## Application 1: Automatic fruit juice composing system

Logical functions implemented in SIMEX MultiCon CMC makes simple control procedures available. Depending on tanks level our device switches batch valves. After finishing whole sequence our controler switch the pump on. Those levels are seen on CMC screen. There is a possibility to implement some outputs as an alarm signals. There are simple controler and HMI unit collected in one single device. There is no need to create visualization aplication and control procedures separately.
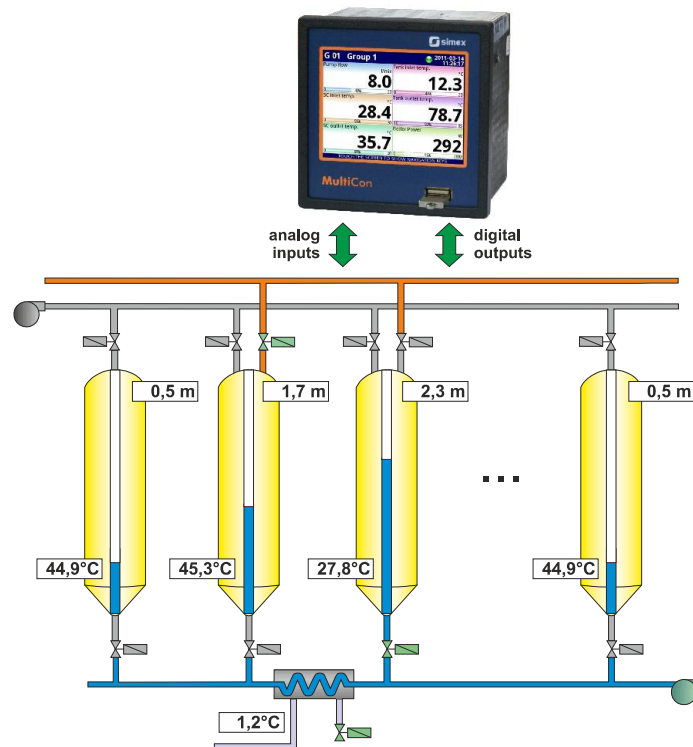
## Application 2: Analog measure points concentrator system

In this kind of industry application CMC-99 collects all analog measurements and sends them through Modbus RTU to main PLC. The distance between CMC-99 and a PLC installation can be up to 1000 m. All measurements are sent using one cable, this is a very cost effective method. Modbus RTU is very popular and reliable communication protocol. There is a possibility to divide Modbus network into several subnets. CMC-99 can work as a Master in one subnet and as a Slave in another.
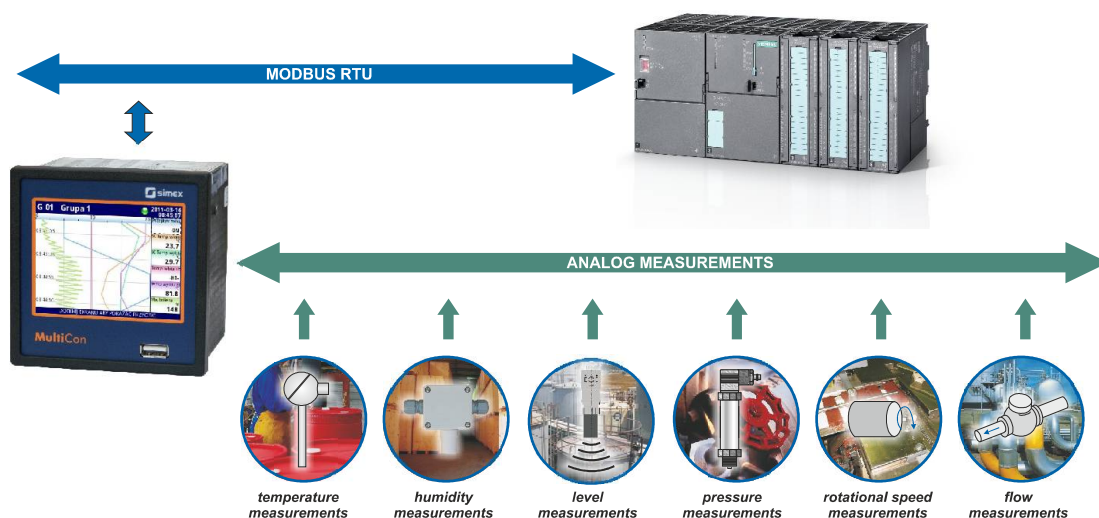
MultiCon

Application 3: Distracted application structures

MultiCon CMC collects all analog measurements using Modbus RTU protocol as a Master mode. All data are sent to another device (e.g. PLC) using one single cable. Today it is the most advisable communiacation method. It is very usefull in distracted application structures.

Modbus RTU protocol can be used in explosive Atex zone as well. There is no need to extend system. All analog measurements are collected together and seen on CMC screen. Our Controler can be extended up to three Modbus RTU subnets. For example introduced above another subnet connects CMC with a PLC. PLC is a Master and the MultiCon is a Slave.
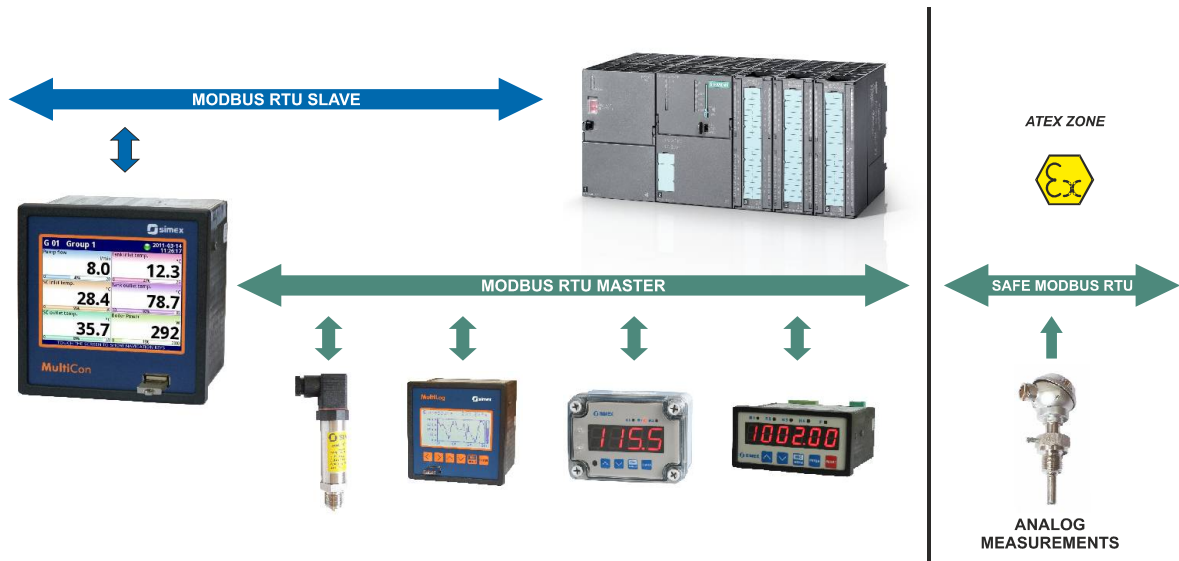

Application 4: Industrial automation trends

Nowadays industrial automation trends are going towards miniaturization and universalization. Outdated and unreliable systems like synoptic control boards can be now replaced with multi-purpose single devices.Today meters/controlers should be able to meet many customers specific needs.

MultiCon CMC is an ideal solution for applications where simultaneous measurement and regulation of numerous channels are required. All control functions are collected in one single device. CMC is equipped with colour TFT touchscreen that makes HMI simple applications possible. It is a very time saving facilitation. Plenty of screen types allow to visualize different measurements very clearly.

Even complicated automation process can be implemented in MultiCon easily. Different types of inputs are joined with virtual channels. Using those channels and built in control methods Simex MultiCon CMC covers almost every industrial automation process.
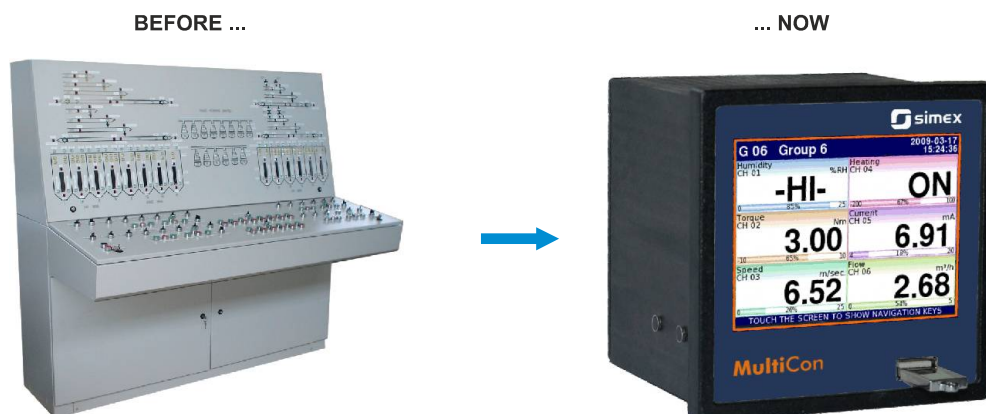
Application 5: Expanded mathematical functions

MultiCon CMC controller allows to operate logical channels with mathematical functions. One can change every channel value using arithmetic operations. This possibility is very usefull when CMC should work for example as a signal circuit analyser for monitoring eg.: power, power factors and electric energy. Having only voltage and current as input channels, all mentioned values can be calculated using mathematical functions only. The result of arithmetic operation is also an input channel and it can be displayed on CMC-99 screen or connected with our controller's output. Using binary logic as arithmetic component MultiCon CMC gives you a great possibility to implement simple PLC industrial application control systems.


Application 6: User's simplification

Simex MultiCon CMC controller has a lot of parametres and functions to set up. They make this device more versatile and they can cover our customers specific needs. Extended options, that CMC device has, can make set working process time-consuming. Luckily two USB Host ports are available. One can plug a PC mouse and keyboard to fasten configuration and programming process. Although each CMC is supplied with a scriber, an operator can also use a PC mouse for easy configuration, especially if one has to configure many CMC units at the same time.

OR

Application 7: PID loop systems

Nowadays industrial automation trends are going towards advanced controlling systems. SIMEX MultiCon CMC has up to 5 seperate PID controllers. Even very enhanced industrial application can be supported with CMC device. It is obvious that PID loop applications are cost and energy effective control systems.
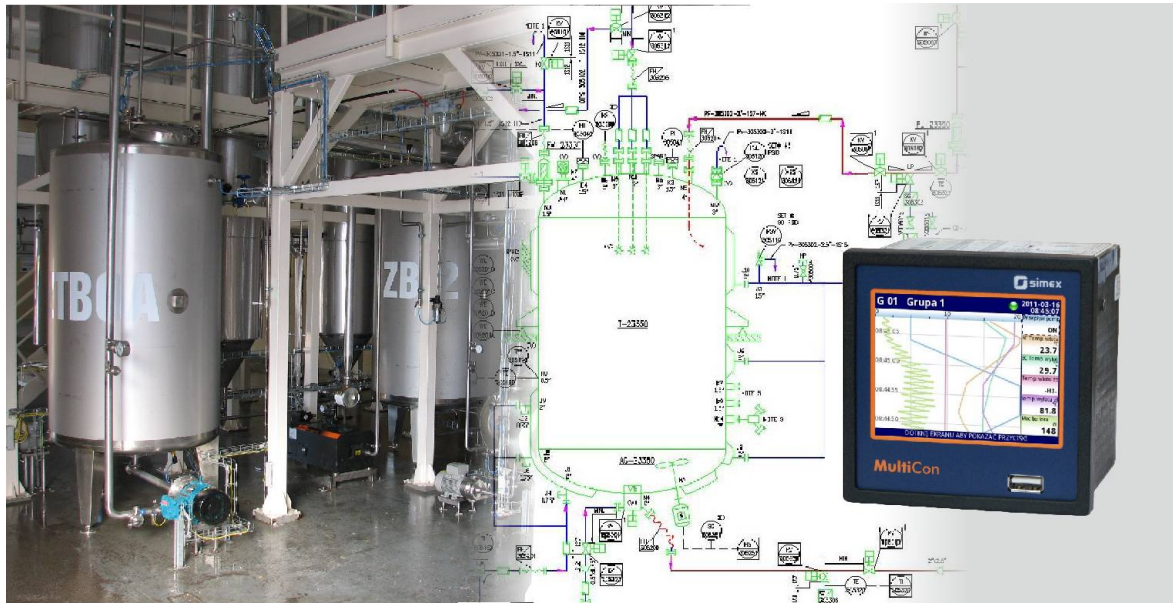

Application 8: MultiCon CMC as a temperature meter

As a great example of CMC universal functionality is our latest successful story. MultiCon CMC-99 collects measurements from 12 temperature points (CMC-141 from 18 temperature points) and sends them to the SimCorder software which loggs them in a file. The customer uses one CMC only to view all the measurements at one place. Great facilitation is that our device has dedicated input slots for temperature sensors either resistance or thermocouple. There is no need to use additional devices like eg. external transmitters.



Pt 100 / THERMOCOUPLES MEASUREMENTS

Application 9: High current relay outputs

A great amount of available controllers have built in relay outputs, but MultiCon CMC has high current relay output slots as an option. The CMC can be equipped with 4 Relays 5A or 6 Relays 5A current load modules. For example CMC having this relay output module in, can control heaters with 1200W load. Furthermore CMC users don't have to install contactors or indirect relays in their applications, which significantly can save space in electric cabinets. When contactors or indirect relays are necessary in any way, MultiCon CMC has 24V DC power supply excitation, in order to drive their coils.
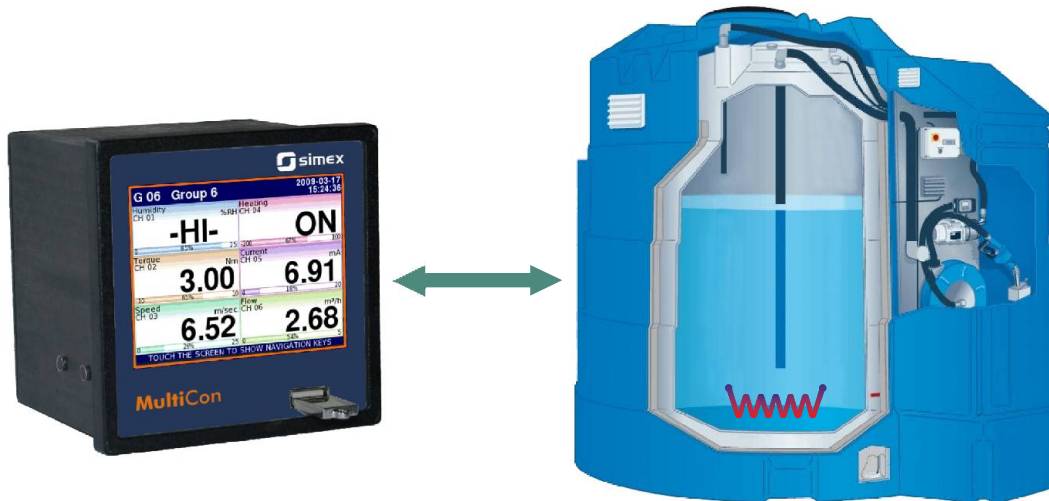

Application 10: Fast SSR outputs

A great deal of industrial automation solutions needs fast durable outputs. MultiCon CMC is now ready to meet the requirement due to the SSR output available as another PCB module. Fast SSR output can be driven down to 0.1 sec time period. As an example, typical production lines require fast working controllers. Simex MultiCon CMC, with its colour display and visualisation possibilities covers our customers needs prefectly.
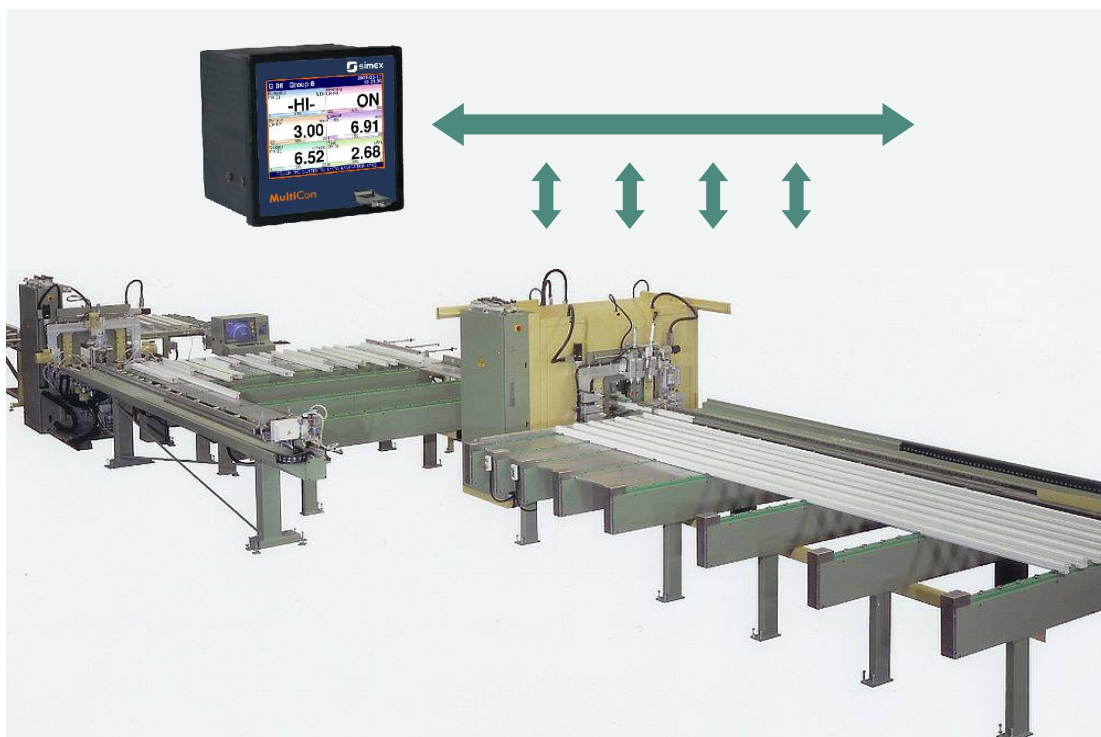
Application 11: CMC scatter application

Thanks to Advanced Communication Module (**ACM**) available as another slot in CMC, there is a great possibility to implement scatter applications using all Simex and other devices equipped with RS-485 port. MultiCon's Modbus RTU Master has many settings that make demanding and complicate applications possible to realize. Intermediate pumping stations scatter in wide distance is a good example of CMC universality. Options like Modbus Time-out are very usefull for eg. GPRS communication.
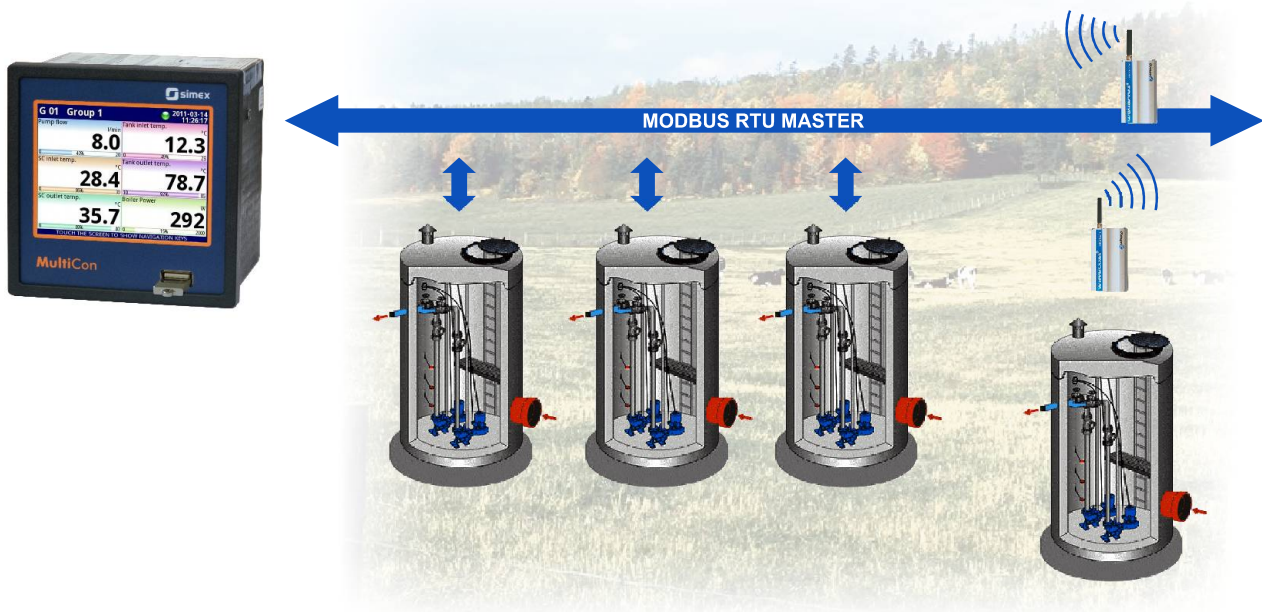
Application 12: Auto configuration for Simex devices in CMC Modbus RTU interface

Multicon CMC Modbus Master communication options may not be obvious for non experienced maintenance engineers. We have made readymade settings for all Simex devices equipped with RS-485. To set it up one just has to choose a device from the list in the CMC menu. There is no need to change any Modbus option. Communication will start and function automatically.
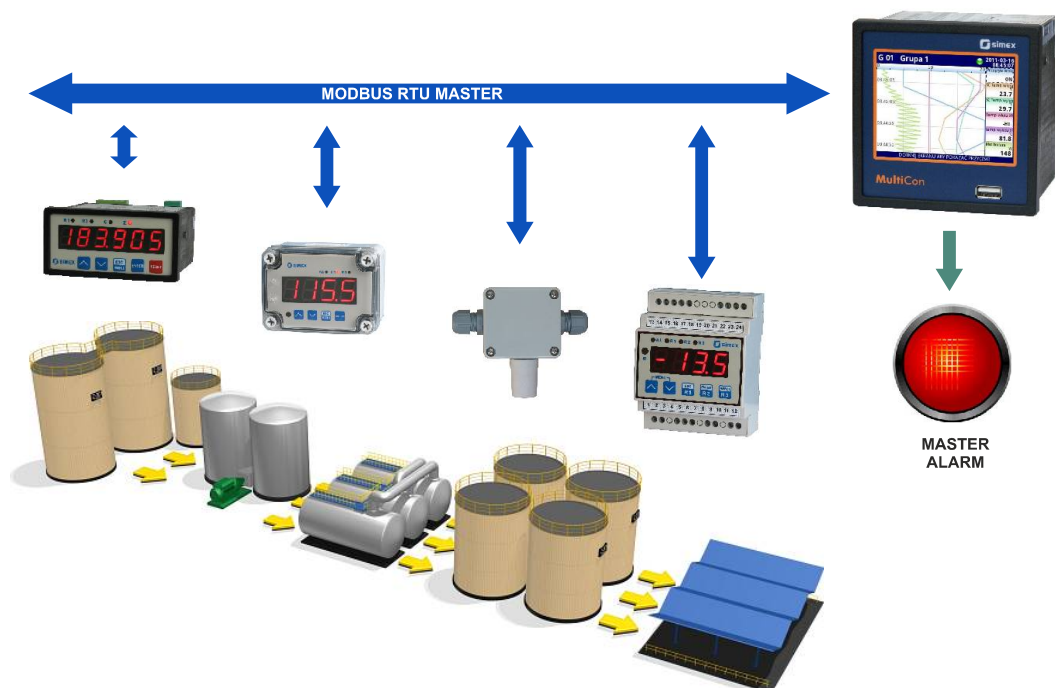
Application 13: CMC date and time controller

Many typical automation applications are time period. It is very unprofitable to make an investment with expensive PLC if control applications are relatively simple. The MultiCon CMC, thanks to implemented timer system, has a great possibility to control those systems alone. Using different input and output slots one can design as complicated automation systems as PLC, but inexpensively.

As an example, gardening industry needs controllers with date and time functions.

Application 14: Precise analog outputs as a new CMC slot

Thanks to available Analog output module, there is a great possibility to control industrial applications using continuous analog signals. There are 4096 divisions available. Using profiles function one can compose even very complicated controling. Chemical and pharmaceutical applications that need complicated composing systems are easy to implement with CMC.

ANALOG OUTPUT

Application 15: MultiCon CMC the scatter controller

Taking into consideration actual industrial trends, we are pleased to introduce the MultiCon CMC as a scatter controller. There is a Simex family of digital I/O, counter and analog input external modules, implemented in a small housing, that are easy to built inside control boxes. A single cable connection with RS-485 as a Modbus RTU makes applications economical and noise robust. The CMC can be used as the net Master that works out outputs using information collected from different inputs. Scatter solutions are very common when industrial applications occupy a lot of space.
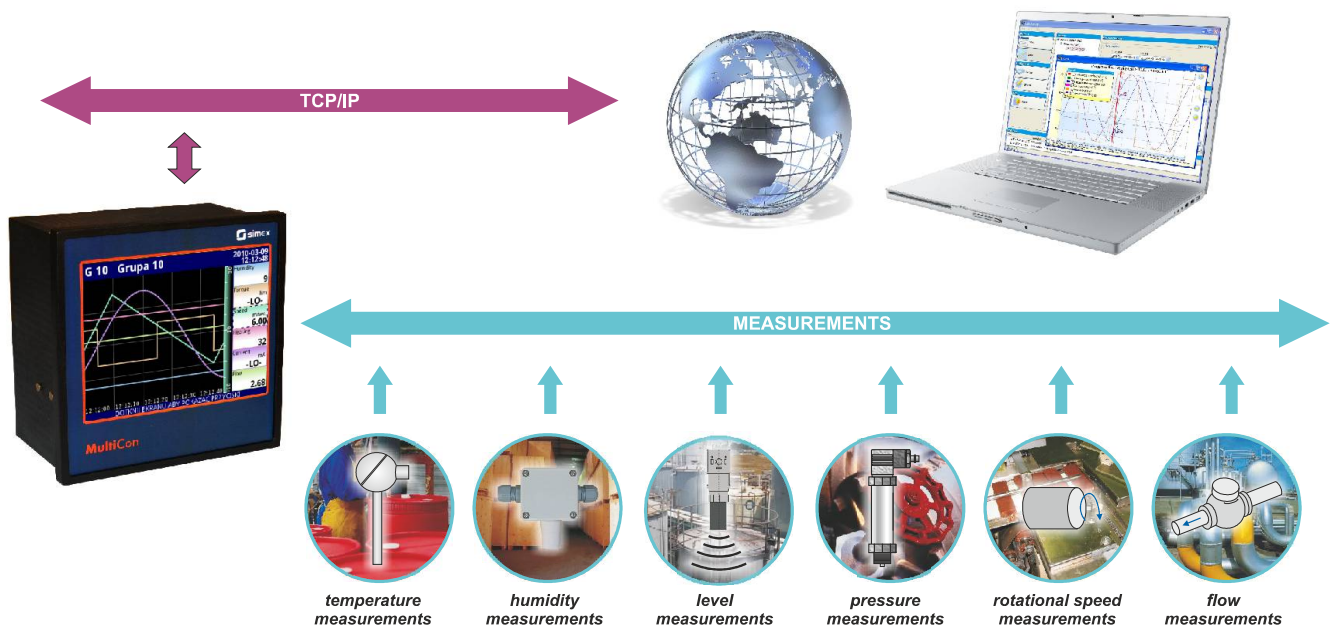

Application 16: TS-35 DIN rail holders

Sometimes there is a necessity to build MultiCon CMC inside a control box. Using a common TS-35 DIN rail and new, optional MultiCon CMC DIN rail holders, the controller is easy to assemble in such applications. This way of installation is very helpfull if access to this device has to be protected against unauthorized personel or high IP protection is required.

Application 17: MultiCon CMC screen using web browser

MultiCon CMC is well known as a universal meter and data logger. The unit is capable to collect different type of measurements coming to the input modules or transmitted via Modbus RTU port. Now, thanks to the Ethernet port build-in optionally, CMC gets a new functionality - display channels can be selected and viewed using typical web browser. The device can have a static or dynamic IP address (DHCP mode) which enables you to introduce CMC to a corporate network.

TCP/IP

MEASUREMENTS

| temperature measurements | humidity measurements | level measurements | pressure measurements | rotational speed measurements | flow measurements |

Application 18: MultiCon CMC data logger

Taking into consideration current industrial trends, there is usually a requirement to control actuators and logg data using a one single device. In this case CMC is the right choice. Using the software licence key a customer can activate data logging functions. Recorded data can be moved to the DAQ Manager PC software with a USB flashdrive. The DAQ Manager allows to analyse recorded measurements using tables or graphs. Data can even be exported as a file for use in other customer programs for further analysis.
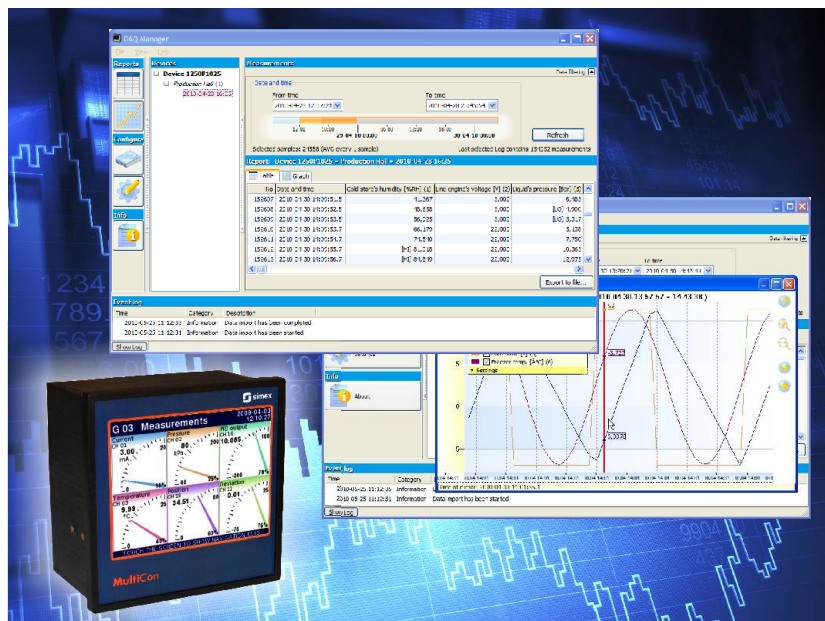
Application 19: Easy "setpoint" access

It is very convenient, for users, to change „Setpoint" values in each regulator easily. In the MultiCon one has just to touch a choosen logic channel on the unit screen and hold for at least one second. There is no need to struggle with all settings in the Menu mode. Setpoint value can be mathematical function or picked profile as well. It is very usefull in a heating characteristic procedure eg.
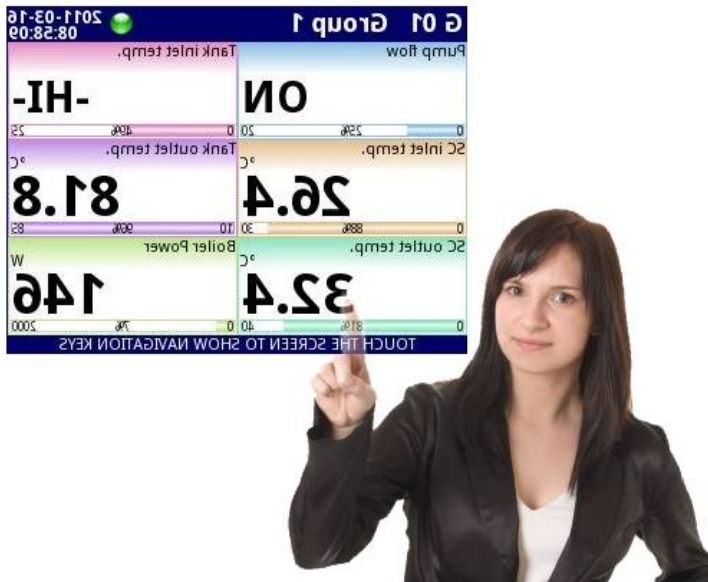
Application 20: Time profiles at industrial applications

There are many industrial objects that are time period determined. Everyday controlling cycle depends on day time. Good examples for those applications are typical pumping stations or chicken farms. The MultiCon CMC has built in, time control functions that are suitable for common time cycle applications. Using other CMC's functions, one can build quite sophisticated controlling procedures.
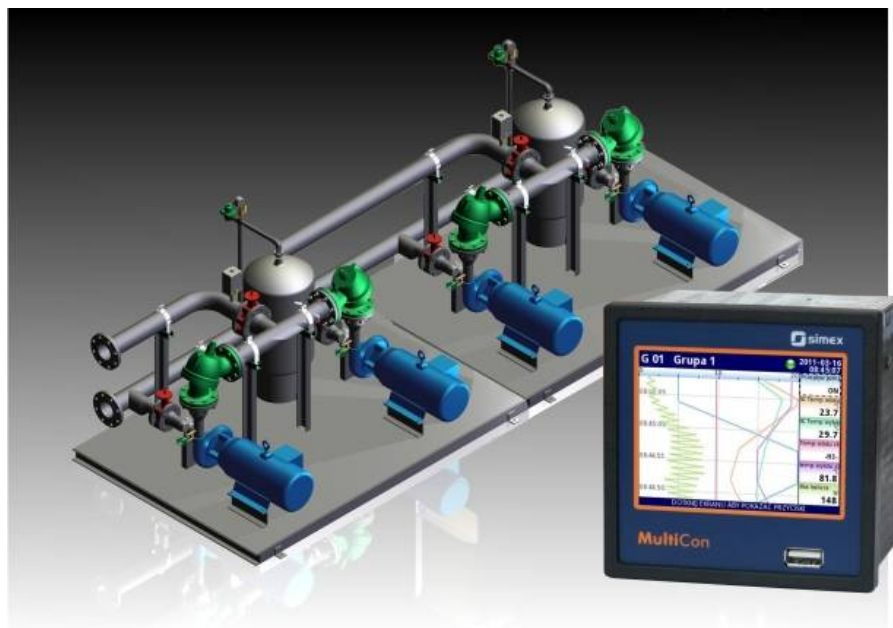
Application 21: New pulse, flow and tacho inputs

A great number of industrial applications are built using a wide range of proximity switches, which are mostly driven with fast digital inputs, like pulse counter inputs. These signals give some pieces of information about position, speed, flow, etc. The Muliticon I/O modules list has now been extended with the following new onces:

CP4 - 4 universal pulse counters
FT4 - 4 tachometer/flow inputs with totalizer counters and 4 analog current inputs extra
FI4 - 4 flow inputs as analog current inputs with totalizer counters and 4 analog current inputs extra.

Application 22: Technical manual available inside MultiCon memory

In order to make the configuration easier, we have decided to keep the MultiCon operating manual inside the CMC memory. One can download manual using a USB memory stick, if there is a need. This functionality helps to keep all required documentation close to device.
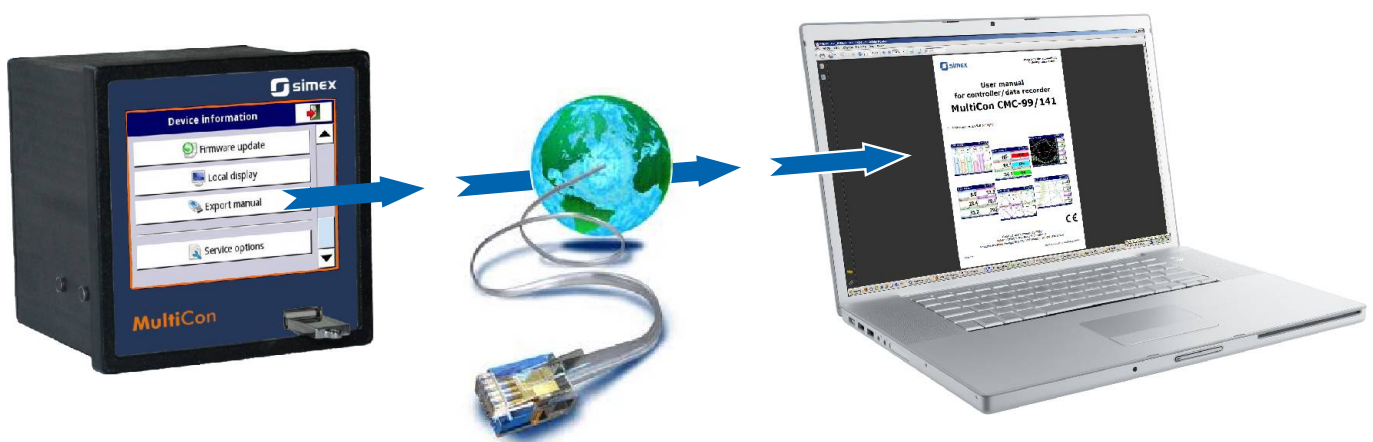
Application 23: Modbus TCP opens up great opportunities

The MultiCon has implemented Modbus TCP server version. Up to 3 clients can communicate with our device at the same time. It can be the CMC's web page, the DAQ Manager PC software or a dedicated SCADA software. Nowadays ethernet/internet is the most popular communication medium. The MultiCon's functionality with Modbus TCP offers now many new possibilities in the industry monitoring and control applications.

Application 24: Cost-effecitve SCADA solution

It is obvious that more sophisticated applications require complex Human Machine Interfaces. Multipurpose SCADA systems are quite expensive solution. Our proposal is to build your own HTML Web pages. All measurements are than available through Java script Modbus TCP library. There are plenty of applications that support html programming and they are free of charge. The HTML language allows to design even quite sophisticated and demanding applications.
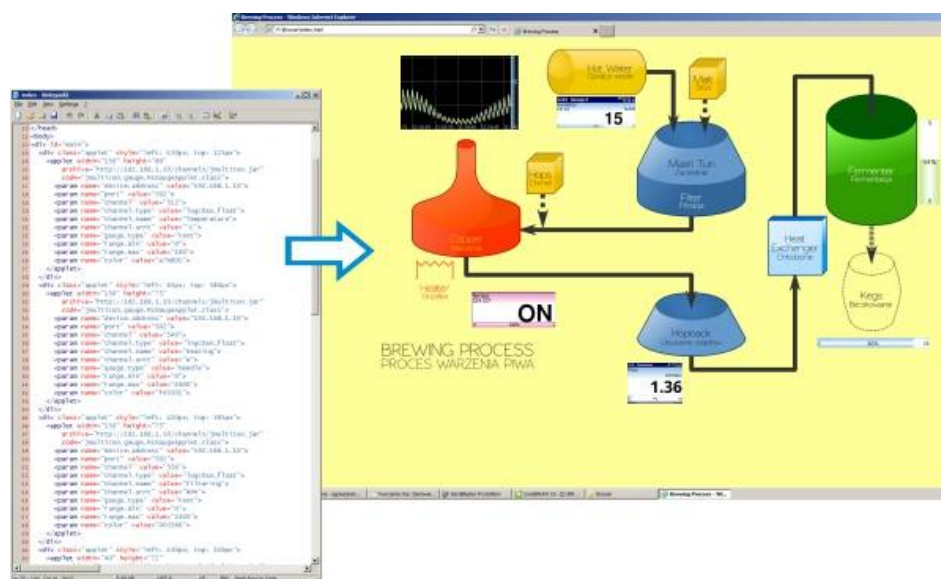
Application 25: Hourmeter modules

The **HM2** and **HM4** are the hourmeters modules developed for the **MultiCon CMC** units. Allow to measure period of time between START and STOP signals, as well as sum of periods. These modules are ideal solution to control working time of a machinery, duration of phenomena or for maintenance purposes. The **HM2** and **HM4** have 2 and 4 independent couters respectively. Each counter is equipped with 2 inputs - START/STOP and programmable, which can be set as asynchronous RESET, HOLD or used as independent digital input.

Application 26: Time format

Time format is an advanced method of data presentation in format of time. User can easily get a desired format, by entering a "formatting string" composed of letters and colons, for example a string: "w:d:hh:mm" lets user to display data as number of weeks, days, hours and minutes, separated by colons. This mechanism allows also for dividing the result on two independent channels. Input data must be expressed in seconds. The maximum displaying precision is 1/1000 of a second.

Application 27: MultiCon as a modern compass rose

MultiCon CMC features 1.5 GB of memory enabling to save up to 125,000,000 samples, and offers the possibility of remote access. Thus, it can be successfully used as a service-free recorder of climate data. The mode of displaying values as phasor diagrams makes it possible to visualise the data collected from a weather station in the form of a classic compass rose.

Application 28: Flow measurement modules

As a universal controller and recorder, **MultiCon CMC** can cooperate with impulse flow meters as well as flow meters equipped with a current output. Apart from the instantaneous value, the total flow of liquid, gas or powder is calculated on a separate channel thanks to the totalizer function. The high load relay output modules as well as precise analogue outputs with the resolution of 4096 segments make MultiCon CMC an ideal solution for the demanding processes of flow capacity regulation.
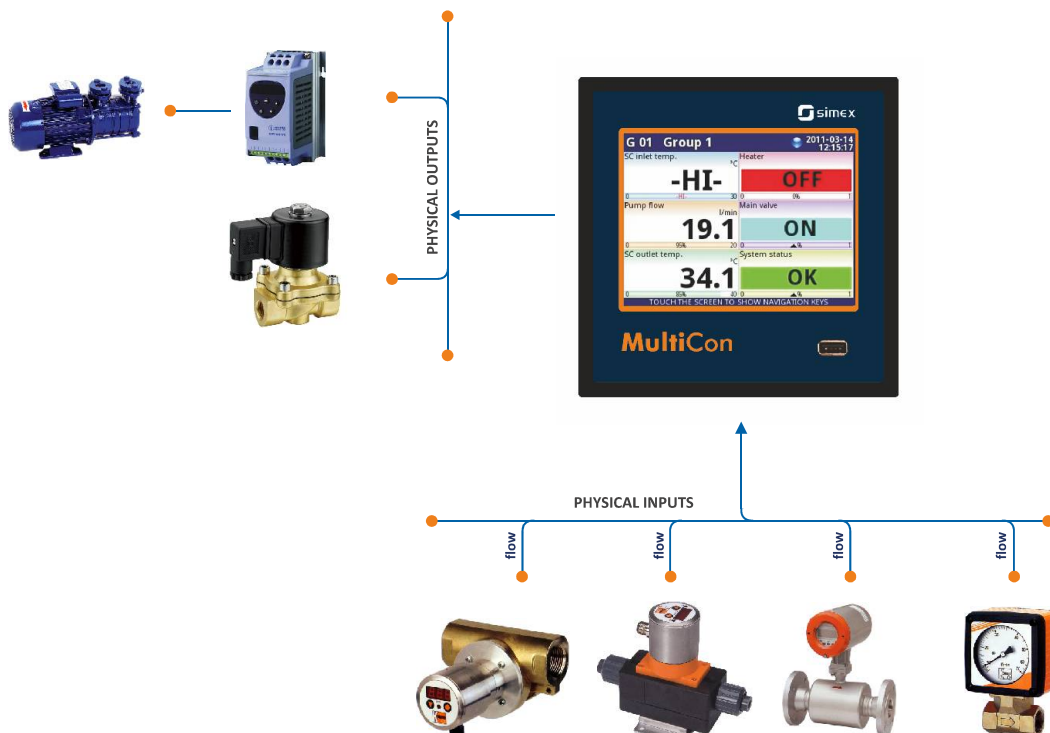
Application 29: MultiLevel Access

With an effort to meet the requirements of the most difficult industrial automation applications, we have equipped the multichannel MultiCon CMC controllers with a new feature. The "**MultiLevel Access**" mode makes the MultiCon CMC even more universal. You can define up to 16 independent users including the administrator who is the only user with a permission to freely configure the device without any limitations. The administrator's role also consists in defining permissions for other users. Only one user can be logged on at a given moment. The user is logged off after the lapse of time from the moment of the last interaction of the user with the device as specified by the administrator or upon express request of the user after clicking the padlock icon on the information bar. The authorisation process is additionally facilitated by the possibility of using USB keys. The hardware key allows the user to log on without the necessity of entering a password while removal of the key is equal to logging off. The key is assigned individually to each user. Such a facilitation will be available only for those users whose devices have Access Dongle licence activated. Otherwise the login and logoff process must be carried out manually. The permission file may be saved using external memory and thus it is portable, which highly decreases the configuration time of subsequent units. The hardware key options are available with a MultiCon CMC device having Access Dongle licence activated only.


Application 30: Extended operating temperature range of the MultiCon CMC

As an universal controller, the **MultiCon CMC** may operate in various conditions, such as in a closed control cabinet, at a production hall surrounded by heavy-duty equipment and even in the control units of seagoing vessels. In response to the requirements of the most demanding customers, MultiCon CMC has met another challenge, i.e. low temperatures. We are proud to inform you that the version with an extended operating temperature range between -20°C and +50°C is now available.

Application 31: MultiCon CMC as a supportive element for small and medium-sized pumping stations

Owing to the broad and varied range of the available input/output modules, the **MultiCon CMC** is an ideal control unit for small and medium-sized pumping stations. On the basis of the signals supplied from the flow meters and the hydrostatic probes, the implemented mathematical functions make it possible to realize complex algorithms of the physical output control. The possibility of securing pumps against dry runs is an additional advantage.

PHYSICAL OUTPUTS

PHYSICAL INPUTS
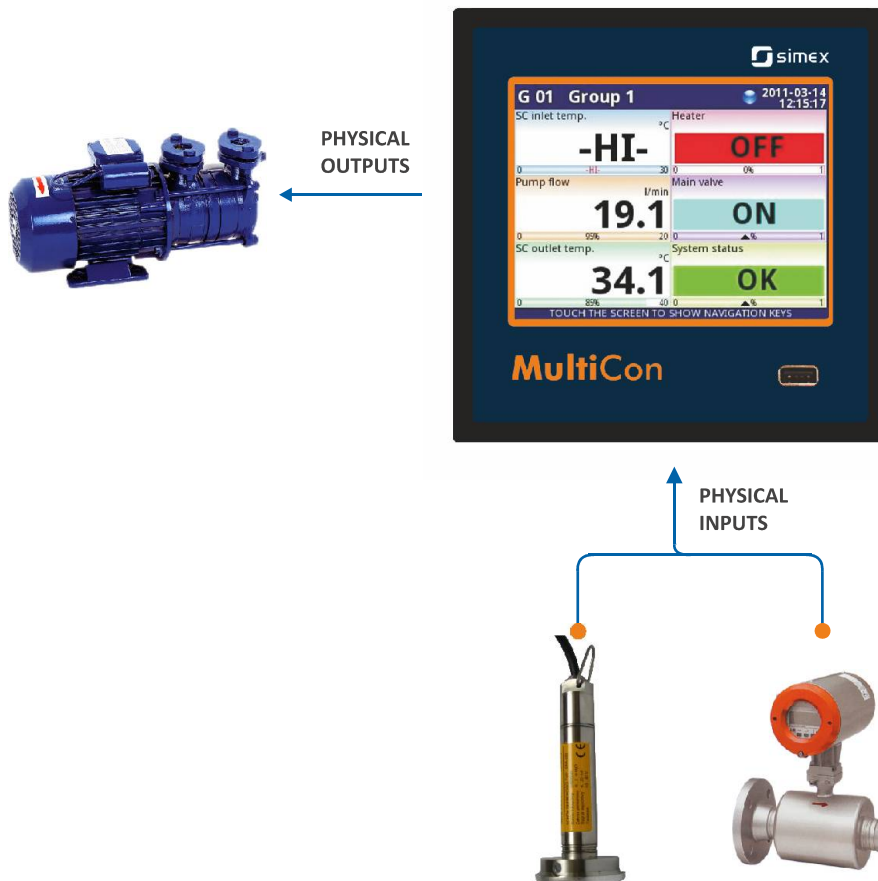
Application 32: MultiCon in a portable case

MultiCon enclosed in a PELI case is dedicated to especially difficult applications in industrial automation where there is no possibility of safe installation of a recorder/controller. The cases are made of highly impact resistant polypropylene copolymer, ABS and stainless steel and meet the most demanding safety standards. The increase of safety does not mean that MultiCon is less functional. It is possible to supply as many as 20 multipin connectors for sensors and external interfaces.

Application 33: MultiCon as a remote controller

Apart from remote data insight via a web browser or the DAQ Manager software, **MultiCon CMC** also enables direct process controlling from almost anywhere in the world. Using the Modbus TCP/IP protocol implemented in MultiCon CMC as well as the remote display functionality, the user can easily transfer the display of the device onto their computer screen. Connecting **MultiCon CMC** to a router with properly routed ports enables full control of the application from home, office or even a hotel room.

Application 34: Heating

The availability of multiple I/O modules enables to adapt the **MultiCon** to a variety of applications. It is a perfect solution for any heating processes. MultiCon can cooperate with thermocouples as well as RTDs. The relay outputs, a quick-connect SSR output and analogue outputs enable to realise simple algorithms of threshold control as well as complex PID control algorithms. The highly user friendly and intuitive interface allows to create appropriate heating profiles.


Application 35: Remote support

Using an Ethernet connection and the "Remote Display" feature, nearly any user of the **MultiCon** has the possibility of receiving remote support regardless of their location. All it takes is a connection of the MultiCon to a router with properly routed ports. Our engineers will be happy to assist in configuring the device. Furthermore, every user has the ability to save any configuration which they may send to us for diagnostic and possible correction purposes.

Application 36: Dosing

MultiCon supports various modules of measuring inputs as well as relay and analogue outputs. Owing to the above, the device has nearly unlimited possibilities. Any types of dosing functions can be a great example of this. **MultiCon** equipped with flow meter inputs as well as relay outputs mentioned above can become a smart dispenser. It measures the existing flow values with unusual ease as well as calculates the balance of the medium and distributes it.
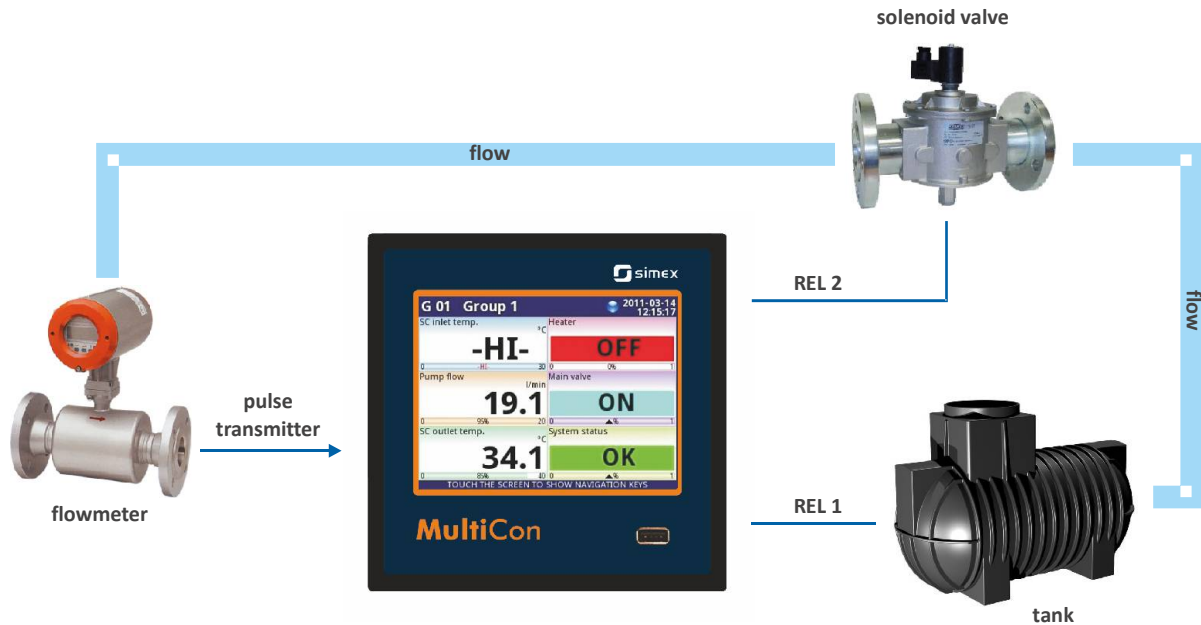
Application 37: MultiCon as an energy meter

MultiCon efficiency has been proven in various industry applications. In some branches, measurement of energy consumption is highly important. There is no need to invest in additional meters - that is where our multichannel controller/recorder comes in handy. Thanks to the transmitters available in our offer, you can easily change the voltage and current into standard automation signals. **MultiCon** can use a number of the built-in mathematical functions to easily calculate the balance and the existing energy consumption.
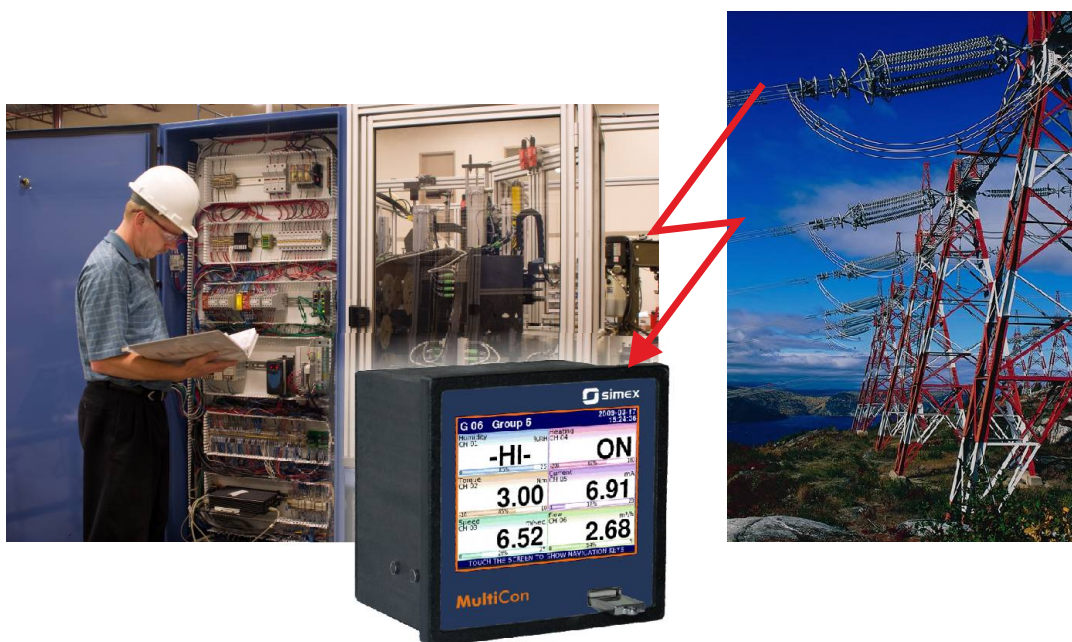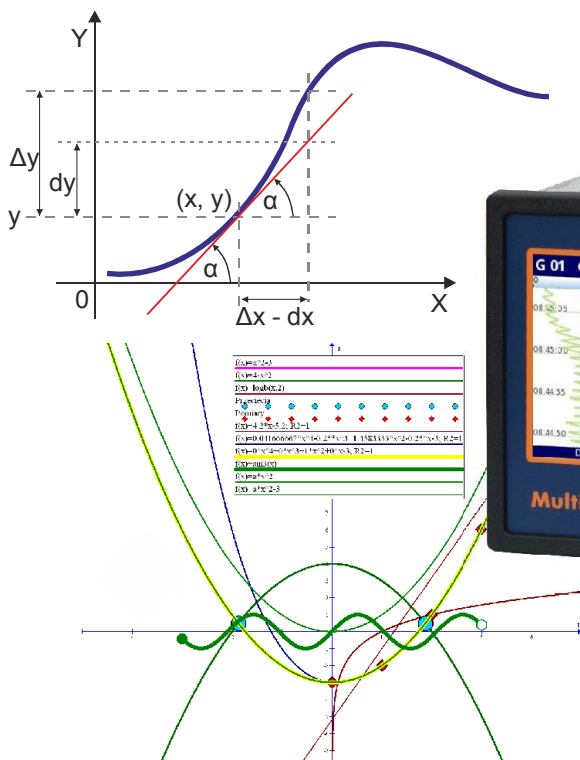
Application 38: MultiCon - Trend diagrams

MultiCon supports both the dynamic processes as well as the slowly varying processes. Especially in case of the latter, the trend diagram function becomes very useful. The user is granted with the possibility of presenting the process/processes on the screen lasting for a period of up to 1 week.

Application 39: MultiCon - Improved mathematical functions

Implementing new mathematical functions such as: derivative, integral, count pulses, flip flop and average, extends the wide scope of possibilities of the **MultiCon** and also significantly decreases the number of the logical channels involved, which makes it possible to optimise complicated applications. Computing the power and acceleration, as well as balancing and averaging of measurement data is much more convenient.

$$\iiint U_H = \frac{IB}{hnq} \neq R_H \cdot \frac{IB}{h^{\varepsilon cos}} h^{sin}_{7}$$

$$\neq \sum_{n=\infty}^{k} \frac{A}{(\frac{b}{\approx}+q)W} \nu\Omega\pi$$

$$d = \frac{n\lambda}{\sin \varphi_n}$$

$$h_s = 0{,}434 \frac{h_{max}-h_{min}}{lgh_{max}-lgh_{min}}$$

Application 40: Production processes supporting

The broad range of I/O modules, expanded regulation features and 1.5 GB memory for simultaneous recording of 60 measuring channels make the **MultiCon** an ideal solution in supporting production processes. Apart from measuring the non-electrical parameters which are key for production, such as temperature, pressure, flow, the MultiCon also calculates details/cycles, records the machine operation time and assigns control signals on the basis of the data collected.
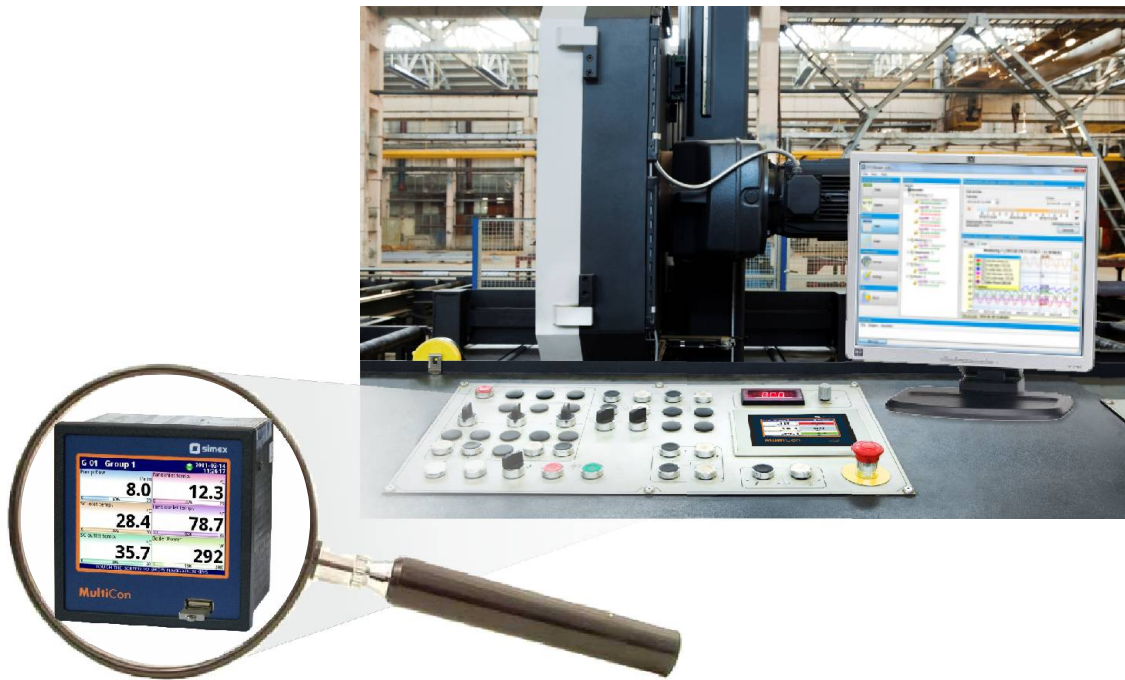

Application 41: Communication between devices

Installing an **ACM** communication module in the **MultiCon** provides a number of possibilities. The three isolated RS-485 interfaces enable easy communication between the devices which also facilitates management of large applications. The fully correlated units may share such activities as: local displaying of the measured values and controlling the physical outputs at the other end of the network. MultiCon which simultaneously carries the Master and Slave functions is an ideal base for creating expansive Modbus networks.

Application 42: Optoisolated counter input modules

Among the numerous I/O modules, the optoisolated meter input modules are specifically worth mentioning. **MultiCon** equipped with a **CP2/CP4** module is compatible with proximity sensors as well as incremental encoders. The device equipped with a meter input module and relay inputs is perfect for such applications as: counting the current quantities of produced components, calculating the production cycles, measuring length or balancing production with control of the drive mechanism of the production line.
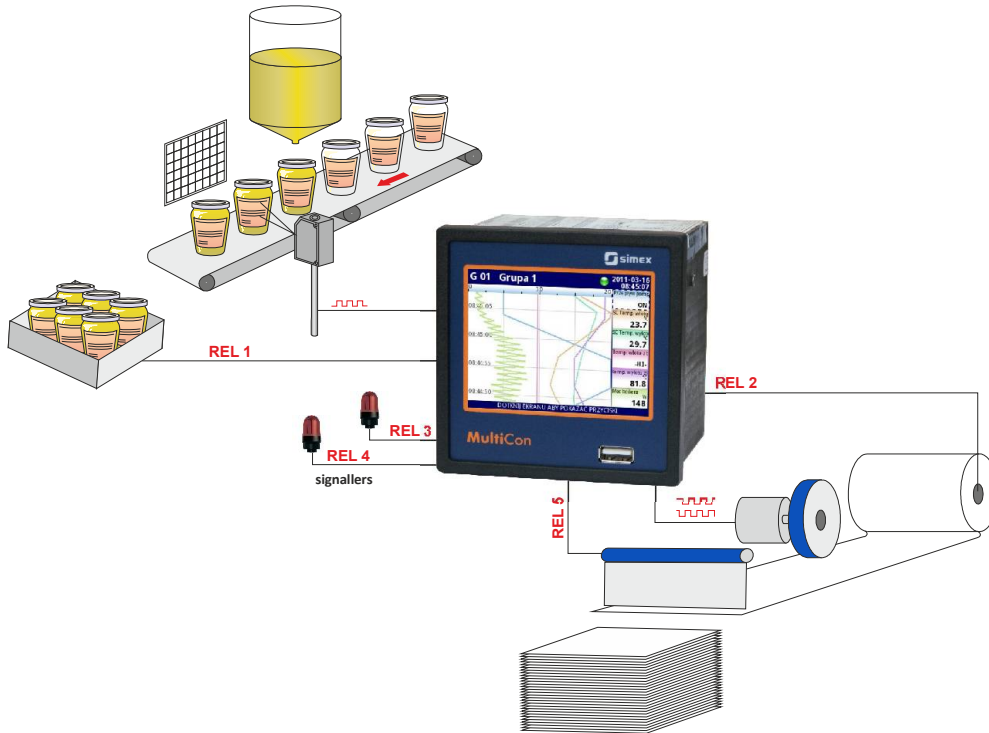

Application 43: MultiCon as a multichannel converter

MultiCon as a multifunctional device offers features of a multichannel meter, regulator and recorder. Owing to the implemented RTU Modbus as well as the possibility of equipping this device with three RS-485 interfaces, CMC is ideal as a converter. The device converts Modbus digital signal into analogue signal and vice versa without any problems. A huge competitive advantage of the MultiCon used as a converter is the possibility of displaying all transmitted signals on a large colour display.

Application 44: Automatic change-of-view

MultiCon provides 90 logical channels - displaying such a large number of variables is a huge challenge. This is where the automatic change-of-view feature is helpful. The user may precisely determine the list of views, change timeout, source of change activation and display time. The following display modes are also available: numeric values, line charts and phasor diagrams, vertical and horizontal bargraphs as well as an analogue meter mode.
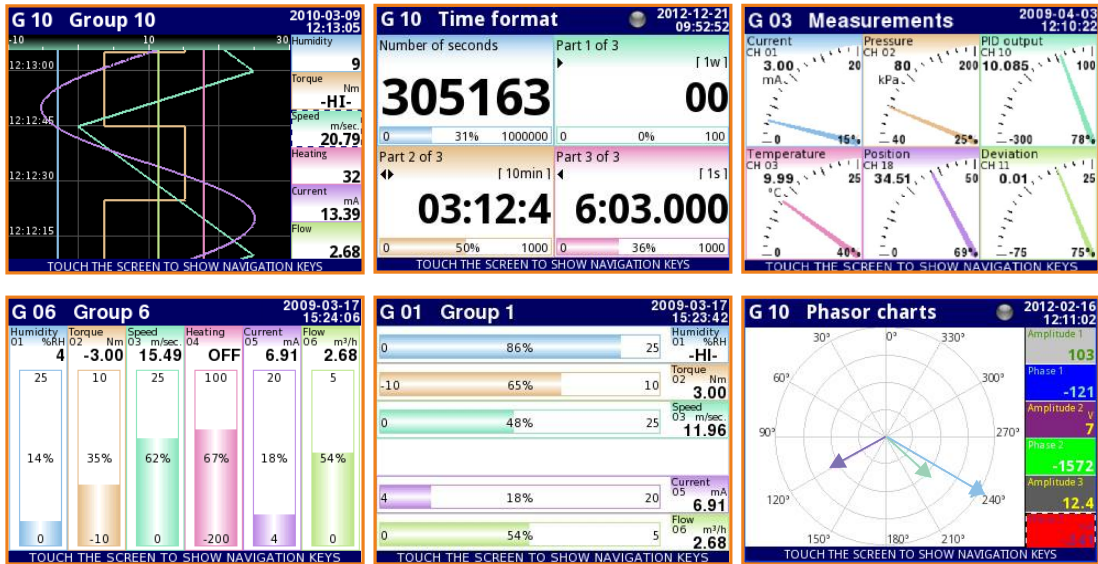
Application 45: New mathematical functions in the MultiCon

Apart from the basic arithmetic and trigonometric functions (sum, product, sine or involution) and logical functions, we have introduced advanced functions such as: derivative and integral. An example of applying an integral is displaying the total value of flow using a standard module of current inputs. This is a solution for all users whose units were not equipped with dedicated **FT/FI** flow measuring modules and balancing of flow is necessary.

$$\iiint U_H = \frac{IB}{hnq} \neq R_H \cdot \frac{IB}{h^{\varepsilon \cos}} h^{\sin}_{7}$$

$$\neq \sum_{n=\infty}^{k} \frac{A}{(\frac{b}{\approx}+q)W} \nu\Omega\pi$$