



MONITORINGSYSTEM WATCHDOG PRO

atele
Technik Braucht Kontrolle

MONITORING COOLING CHAINS DURING DRUGS TRANSPORTATION



Problem

Goods that are sensitive to changes in temperature, e.g. foods and drugs, must be stored and transported under strictly regulated conditions. Most drugs must be transported at temperatures ranging from between 2 and 30°C. But something that is already well-established in food transportation has to date been neglected in the movement of drugs – i.e. shipping in air-conditioned vehicles. It is only possible to meet temperature requirements when freight spaces are heated in winter and cooled in summer. A high-quality transport process will not only employ air-conditioned vehicles but will also monitor and document temperatures.

Task

A monitoring system suitable for industrial applications is required to measure the temperature at different points in a vehicle's cooling space. In other words, a system that monitors compliance with temperature requirements and how long the vehicle doors remain open. This data must be recorded, for instance, to integrated memory cards, so that the required documentation duties may be fulfilled. It must be possible to immediately send an alarm to the person responsible for handling logistics when unusual events occur. E.g. what problem has occurred on which vehicle? Critical temperature fluctuations or the situation where the doors have remained open for too long demand quick countermeasures for the protection of the goods in transit.

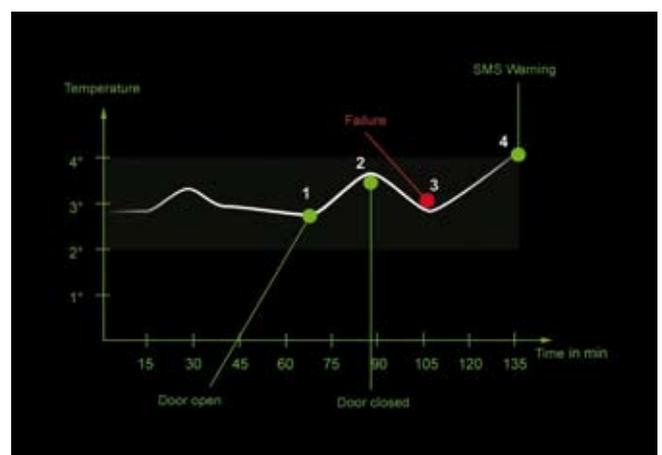
Solution

WatchDog pro is able to monitor the temperatures at four different points in the vehicle's cooling space and records how long the doors to the cooling space remain open to ensure that the cooling chain is not interrupted when drugs are shipped by road. Alarms will be triggered through the GSM modem

contained in the *WatchDog pro* box when the temperatures (e.g. 2 to 30°C) exceed or fall short of requirements or if the doors to the cooling space remain open for too long. The system's flexibility means that it also allows cooled products (2 to 8°C) to be transported. The measured values are logged on to a memory card and cannot be deleted or written over by the monitoring system. Even board power failures will not cause any data to be lost.

The *WatchDog pro* programming environment (WDP SOFT) enables the permissible temperatures and times and vehicle-specific alarm texts to be programmed. A specially developed software is used to read out the memory card (MMC-READER) which will filter, format and convert the data into a universally legible format.

The pre-configured *WatchDog pro* box will reduce the necessary installation work and will thus minimize vehicle downtimes. The extended *WatchDog pro* monitoring system also permits additional parameters to be integrated into the monitoring system.





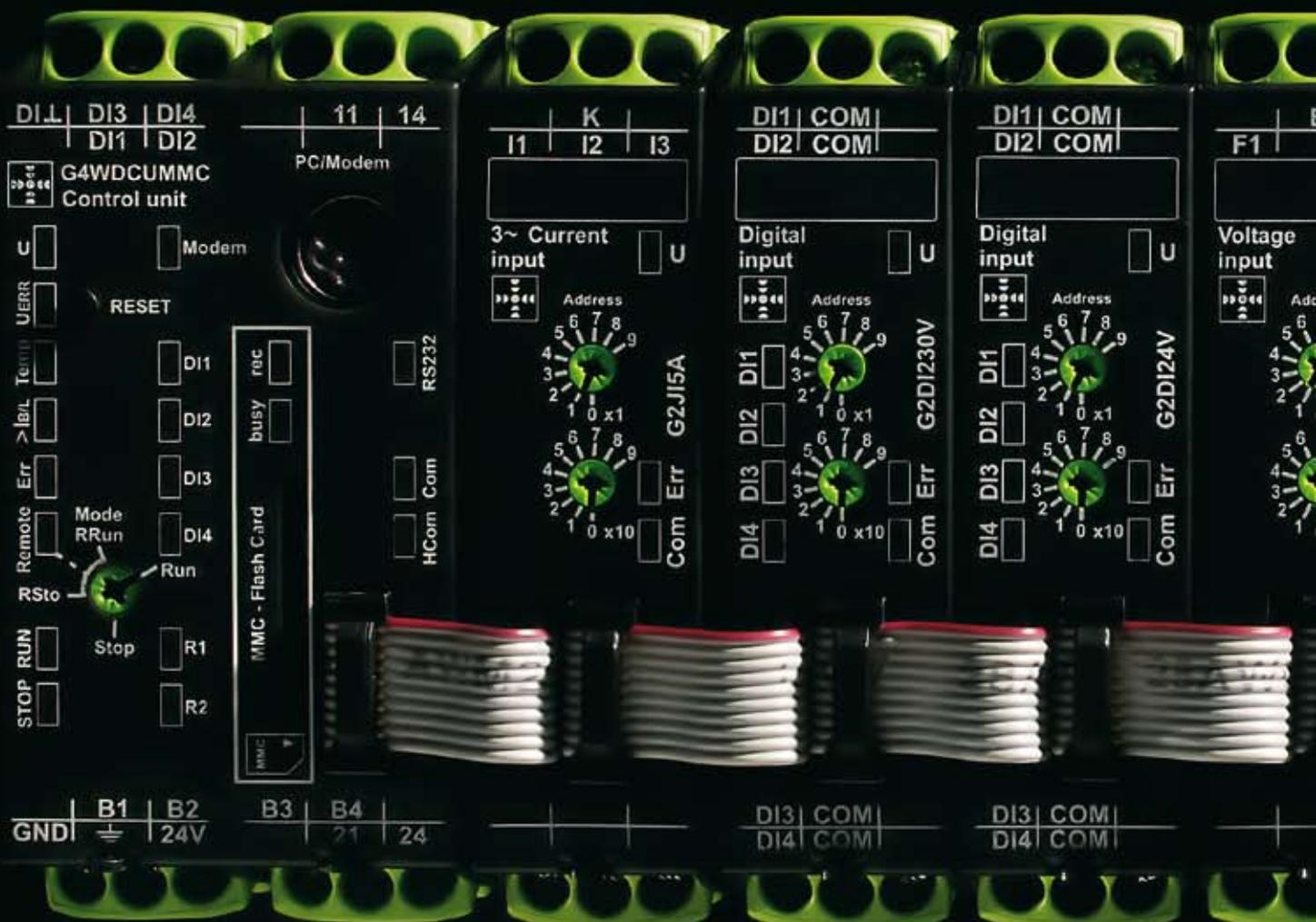
**EVEN MODERN DRUGS
MAY SPOIL AND BECOME
WORTHLESS WHEN
TRAVELLING FROM A TO B.**

TECHNIK BRAUCHT KONTROLLE.

A MILESTONE IN MONITORING TECHNOLOGY

WatchDog pro is a modular, industry-compliant monitoring system that combines classical monitoring and time-related functions with the communication potential of fieldbuses, SMS and e-mail. The central control unit makes the system intelligent, so that sophisticated monitoring and automation functions can also be implemented. As the problem solver for stationary and mobile applications in the mechanical engineering field as well as for industrial and building systems, *WatchDog pro* combines the flexibility of PLC with a robust monitoring system for industrial applications. Thanks to its withstand voltage, clearances, creepage distances and rated surge voltage it can perform under the harshest industrial conditions. Its modular design will bring end-to-end advantages from planning through power-on to plant expansion.

WatchDog pro is thus above the equipment class to which classical time and monitoring relays belong. The monitoring functions for current, voltage, phase sequence, phase failure, active power



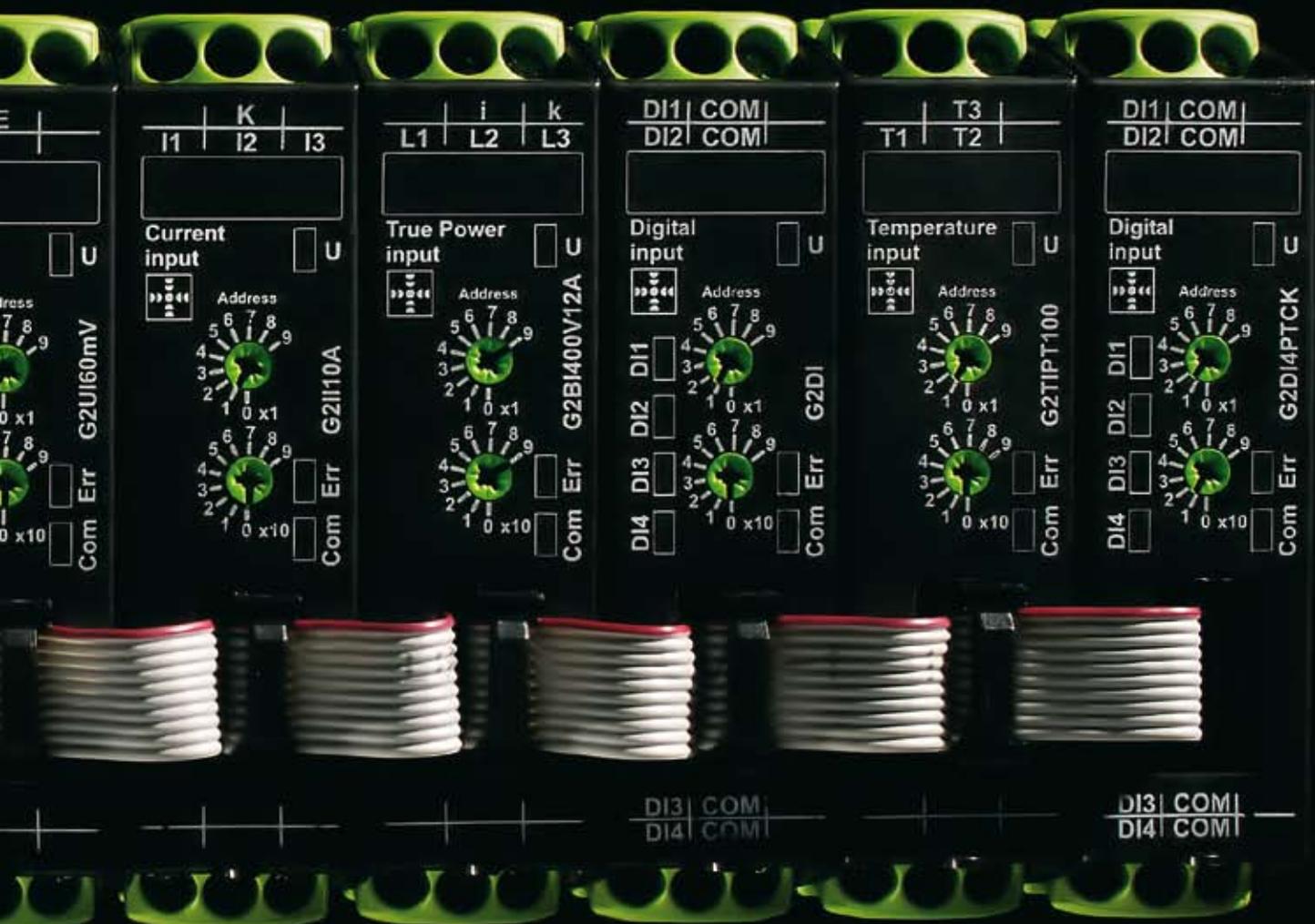
and temperature have been combined into an integrated, modular monitoring scheme with a system application in mind. By combining all necessary monitoring and control functions it meets the requirements placed on an automation system.

An integral component of the central control unit is the datalogger. Supported by *WatchDog pro*, plant and system data can be logged on a memory card and used for high-speed evaluating. Forming another part of an efficient maintenance management system, the interfaces (fieldbuses, web server, SMS) will allow simple remote maintenance as well as integration into a more comprehensive process control system.

WatchDog pro is a quantum leap in the field of monitoring technology, building on the long-established TELE products of the GAMMA industrial series. Typical applications are to be found in the areas of water supply and waste water disposal, power distribution as well as heating, ventilation and

air conditioning. The system's modular design and industry compliance make it perfectly suitable for monitoring small and medium-sized machines and plant as well as for use in the process industry.

WatchDog pro



THE MISSING LINK

The consistently vertical networking from the operating level down to field level, means that WatchDog pro is able to access all relevant key figures and data – even including individual measured values – online from office locations.

A gap between field and control levels often quickly develops in actual modern measuring, monitoring and control applications. With conventional engineering, sensors and sensor relays can only be linked to an overall control-level system, e.g. a PLC or process-control system, with great technical and financial effort. Processing the measured data, i.e. associating the field level with the control level, is always a complex task.

And this is precisely where the strengths of TELE's *WatchDog pro* monitoring system lie. Direct industry-compliant monitoring in the field, the forwarding and processing of measured values at software levels and important PLC control tasks may be handled by *WatchDog pro* in proximity to the process. *WatchDog pro* is able to directly observe and control such electrical data as motor performances, rotary fields, mains voltages and motor temperatures as required, for instance, for monitoring pumps. The modular system does not only very comfortably close this gap between the two lower levels of the automation pyramid but also delivers additional functionalities at both levels.

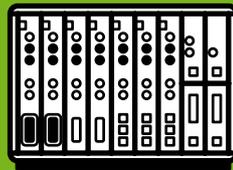
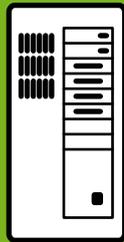
The universal ability to network with the factory level via widely available field buses makes *WatchDog pro* a universal and manufacturer-independent partner for all types of control hardware. An innovative system therefore that in regard to functionality and comfort sets new standards in this price segment and elegantly closes the gap described – thus constituting **the missing link**.





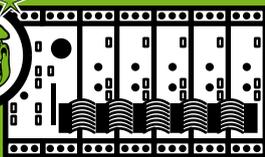
Plant Level

LAN

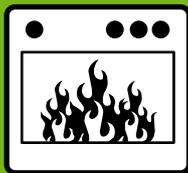


Process Level

Fieldbus



Control Level



Field Level



WatchDog pro is industry compliant in all respects. The design of its terminals, its clearances and creepage distances, its robust structural design, and its withstand voltage allow its direct use in industrial environments.

• **Enhanced plant availability**

WatchDog pro increases plant availability while simultaneously delivering savings in setting up, commissioning, maintaining and expanding systems.

The system is able to recognize errors in advance and report them in a targeted fashion. Thus helping prevent expensive downtimes.

• **Intelligent maintenance management**

WatchDog pro is a flexible modular monitoring system for process, manufacturing and building automation. Such plant and system data as operating hours, start-ups and statuses producing greater wear on components may be captured. Such data may then be used as the basis for economic maintenance management.

• **Targeted data records**

WatchDog pro doesn't produce any unnecessary floods of data. Users decide whether they require the recorded information on a daily or hourly basis or only in the event of malfunctions. Which means that errors and their causes can be quickly recognized and remedied.

• **Reconstruction of malfunctions**

When failures occur, too many error messages make troubleshooting difficult. By recording error chains, *WatchDog pro* makes localizing the fault simple, which means that costs are saved through shorter downtimes.

• **Suitable for frequency converters**

WatchDog pro monitors currents, voltages and power directly at converter-fed machines even in difficult electrical conditions. And delivers precise results in those areas where measuring equipment usually fails due to PWM voltages.

• **Autonomous functioning of plant components**

WatchDog pro handles monitoring and control tasks directly at the process and delivers a selection of processed data to the control level. These tasks are also safely fulfilled in the event of isolated running, i.e. when communications to the control level fail.

WHY WATCHDOG PRO?



- **Greater process transparency**

In order to limit the flood of process and system data in extensive plants without, however, losing important information, *WatchDog pro* handles control and data-processing tasks close to the process. Which relieves the burden on the overall communications and control infrastructure.

- **Modular design**

WatchDog pro's modular design saves space – and thus costs – in switch cabinets. The individual system is compiled to suit the demands of the individual application so that space- and cost-intensive units are no longer required.

- **Minimum training effort**

The programming environment is so simply and comprehensibly structured that time- and cost-intensive training is not required to program *WatchDog pro*.

- **Intuitive programming interface**

WatchDog pro's programming interface allows all procedures to be simulated offline and to be monitored online during operations. Which permits rapid commissioning. Measured values may also be forced using the programming environment in order to overrule the actually measured value for test purposes.

- **Cost savings through direct measurements**

The direct measuring of electric values, e.g. voltage, phase sequence, power and active power, at field levels means that with *WatchDog pro* expensive converters and measuring transducers are no longer required to create standard signals. And the safe isolation of the measuring modules also means that costs for buffer amplifiers may be avoided.

- **Manufacturer-independent communications**

Modern automation systems demand components with a variety of interfaces. *WatchDog pro* supports the field buses most widely used in communications to the factory level so that it may be integrated on a manufacturer-independent basis into the control level.

The fieldbus module enables WatchDog pro to be linked to the process control level. To cater for as many users as possible, WatchDog pro supports the most widely used fieldbuses: Profibus, Modbus-RTU, DeviceNet, CANopen, Modbus-TCP, Ethernet/IP.



Innovative technology and simple operation

Simple installation

The central unit and the expansion modules are simply clicked on to the DIN rail. The bus connectors are part of the modules. These are connected to the next module or the central unit. The bus doesn't only handle communications with the modules but also supplies them. Assembly and wiring is completed with the connection of the signals to be monitored. The *WatchDog pro* system is both easy and quick to design.

Addressing

Each expansion module must be assigned a unique ID to make clear addressing possible. This is achieved with the address selector switches on the front of the modules. Coordination between the existing devices and the software is concluded with the allocation of the addresses assigned in the programming environment's hardware view. It's even easier with the "refresh hardware" function where *WatchDog pro* automatically searches for existing modules.

Commissioning

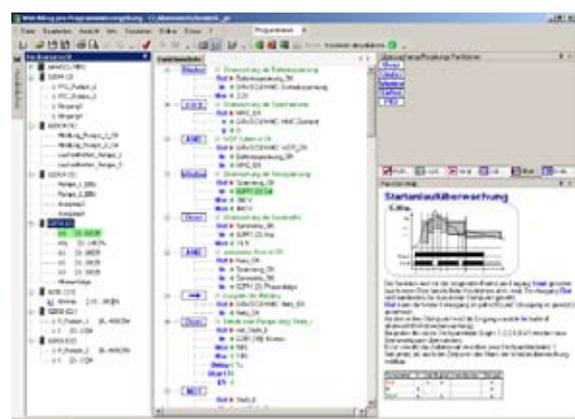
The functionality of the program created may be comfortably tested offline. While the user varies the analogue and digital input signals as required, the program monitors all registers, intermediate results and the resulting outputs. All values may even be monitored with *WatchDog pro* online with the programming interface during commissioning and regular operations. Measured values may also be simulated on the system while it is in operation. This is done to check the response to system statuses that are not usually achievable in practice or are only achievable with great difficulty.

Programming interface

WatchDog pro's Windows-based programming interface is divided into three columns. The left column displays the installed hardware with all the available signals. The libraries explaining the functions and their possibilities are presented on the right side. The function list for solving the monitoring tasks is created in the centre. The programming interface has been kept simple and the scope of functions has been minimized to make complicated and cost-intensive training unnecessary.

Project documentation

WatchDog pro accompanies users in the preparation of function lists and will automatically create project documentation immediately on completion of commissioning. Projects may therefore be documented without additional work or cost.





SUPERVISION SUPERHERO

WATCHDOG
PRO IN

THE EARLY MORNING CRANE DISASTER







**LOAD
UNDER
CONTROL**



Problem

The reliability and fail-safety of cranes falls if the appropriate intelligent monitoring equipment is not employed. The consequent repairs and downtimes make operating cranes uneconomical.

Task

The monitoring of traversing movements, overloads, motor and brake temperatures and wear on the brakes can help optimize the reliability of crane systems. But in order to be able to precisely follow what happens during operations, all operating states must – as they are on black boxes used in airplanes – be recorded precisely on a memory card. Data transfer via a radio module would also naturally be more beneficial because the overall system would allow the causes of defects and downtimes to be located more quickly and simply.

Solution

WatchDog pro delivers clear functional benefits over standard load controls in the monitoring of lifting gear because TELE's system monitors and controls crane motors through the motor current and active power. Compared with conventional overload systems that are clamped to *winder cables, *WatchDog pro* doesn't only save valuable space which remains free for additional lift, it also permits considerable cost savings to be achieved. On the one hand through its relatively low acquisition price and on the other through the significantly greater life span compared with original equipment; this difference increases even further when downtimes occur.

Modules



G4WDCU MMC



G4DI4 PTCK



G2BI1 400V12A

More than the sum of individual sensor relays

From voltage monitoring to mains monitoring

WatchDog pro allows measured values to be logically and arithmetically linked, combined with time functions and queried for any threshold values. Users decide whether the threshold values should be constant, a product of a calculation or the result of a scaled input. Connecting to the field bus permits threshold values to also be defined from the process control system. In this way, for example, *WatchDog pro* is able to distinguish between voltage drops caused by a large machine starting up or by a fault in the mains.

From power monitoring to load monitoring

For sensitive drives (e.g. pumps with axial face seals), the S.WINDOW function is able to check that the power for a machine in the start-up phase is within a time-dependent "band". This allows pump blockages or dry-running to be recognized at an early stage thus enabling the plant to be deactivated – which means optimum protection with *WatchDog pro*.

From the control room into the machine control box

WatchDog pro may be used for all industrial requirements. Its terminal types, clearances and creepage distances, robust design and electric strength allow it to be used in industrial environments. The DC isolation of the function modules means that several plant components may be monitored with just one *WatchDog pro* system. The robust monitoring system may be installed in the machine control cabinet directly next to the application.

From insular solution to automated system

WatchDog pro functions as an independently operating monitoring system, which may be connected via the most widely used field-buses to the factory level and thus integrated into more comprehensive automated systems. It also permits event-related SMS alarms to be sent via GSM modem. Besides freely selectable texts, measured values may also be transmitted, for instance, "The waste water pump is drawing too much power: 4.5 A."

From motor monitoring to process monitoring

WatchDog pro is able to directly record electric values right up to active power as well as easily evaluate temperature sensors. Many different kinds of physical values may be mapped with sensors to unit signals (0-10V; 4-20 mA) and processed with the monitoring system. *WatchDog pro* doesn't only monitor a plant's drives, it will also check the processes, products and values behind them.



WatchDog pro's linking options and monitoring functions will satisfy any need. Logical operators and the familiar monitoring functions (OVER, UNDER, WINDOW) have been augmented by mathematical links and time functions. That cuts wiring to a minimum, eliminates the need for additional relays, and makes new options possible.



WatchDog pro can log plant and system data on a memory card (MultiMediaCard: MMC™). It can be stored periodically and/or controlled by an event (a fault, for instance). That makes fault localizing easier and safeguards against unjustified third-party claims.

Drivers are offered by WatchDog pro that make it easy to connect GSM modems. That allows SMS messages to be sent in response to specific events. Alongside freely selectable texts, measured variables can also be sent (for example: "The discharge pump is drawing too much current: 4.5A")



Measured values (modules) can be interrogated for any number of threshold values without installing additional modules. This allows different measures to be taken in response to a measured variable's respective value (warning – partial shutdown – emergency shutdown).

APPLICATION AREAS

Many different electric motors, servo motors, pumps and drives are used on conveyor belts employed in manufacturing industrial and consumer goods. Classical motor-protection switches safeguard each motor separately but cannot operate beyond their individual capacities. *WatchDog pro* is not limited to this simple type of motor monitoring; it is able to network individual data. The result is intelligent monitoring over the entire application. Thanks to wide-ranging communication options, it is easily possible to integrate *WatchDog pro* into process control systems.

WatchDog pro's capabilities are also particularly good with the technical systems employed to treat **industrial and municipal waste waters**. The monitoring system may be used for controlling and monitoring unmanned waste-water pump stations. The unique monitoring system even allows pumps to be monitored when they are just starting. Through the inclusion of pressures and throughputs in monitoring, damage to pumps may be reliably recognized before they fail totally.

Redundant measuring and monitoring systems are employed in monitoring sensitive processes at refineries and in the chemicals industry. *WatchDog pro* evaluates the consumption of active power to enable pumps to be reliably monitored and in this way complement mechanical throughput sensors. Even converter-controlled pumps do not pose any problems. Intelligent monitoring means that the constancy of measuring results may be monitored and deviations immediately reported to the process control system. In the event of malfunctions, *WatchDog pro* will automatically shut down the application to create a safe mode.

WatchDog pro delivers clear functional benefits over mechanical load controls in the monitoring of lifting gear. The system is able to monitor and control crane motors through motor currents and active power. The electronic monitoring system scores points with such features as the recording of load curves, total loads for several cranes and the precise parameterization of load limits. From simple upgrading to special solutions, *WatchDog pro* makes classical mechanical solutions appear antiquated.



The right choice for any application

Central Unit

Status LEDs provide information about the *WatchDog pro* system's current operating status (fault, operating mode, status of the inputs and outputs, communication, datalogger). The central control unit's operating mode can be changed using a mode-selection switch. There are four digital inputs for control voltages and two relay outputs directly on the control unit. The datalogger records plant and system data on a MultiMediaCard™ on an event basis.

Voltage 1~

The single-phase voltage measuring modules will measure direct or alternating currents (16.6 to 400 Hz). The measuring ranges depend on the circuits and end at 60 mV and 150 mV for shunt measurements and 10 V (G2UI1 10 V) or at 30 V, 60 V and 300 V (G2UI1 300 V). Thus allowing single-phase networks, battery voltages, intermediate converter circuits and shunts to be monitored.

Voltage 3~

The 3-phase voltage-measuring module measures the phase (phase-to-neutral) voltages in 3-phase systems. The mean of the phase-conductor voltages as well as the phase sequence (direction of rotation) and asymmetry are also determined. So it registers all the data of a low-voltage 3-phase system relevant to voltage.

Current

The single-phase current-measuring module determines dc or ac voltages (16.6 to 400Hz) over measuring ranges from 20mA to 10A. With current transformers, these ranges are capable of virtually unlimited extension. The 3-phase current-measuring module determines all three phase currents (5A). In conjunction with the new S.WINDOW function, new standards have been set in monitoring quality.



Loadmonitoring

The active power measuring module (G2B11) measures power consumption at single-phase or symmetrical three-phase loads. Up to 4800 watts may be measured directly without transformers. The current in the first phase (L1-i) will be recorded in addition to active power.

The power measuring module (G2C11) will also measure idle power, apparent power, the power factor, the voltage in the first phase and the load type (inductive / capacitive).

The active power allows *WatchDog pro* inferences to be made about the operating status of motors from idling to overload.

Temperature

Whereas the triggering of a temperature monitor with thermistors (PTC) depends on their nominal temperature, with the temperature-measuring module and a PT100 sensor the temperature can be imaged in *WatchDog pro* in degrees Celsius. That is necessary in the case of applications having several or settable switching thresholds. It can also be used to provide temperature-dependent current monitoring.

Digital input

The *WatchDog pro* digital input modules have four channels with a common reference potential. Control voltages of 230V AC, 24V AC/DC or potential-free contacts are interrogated, depending on the type of module. Another variant allows thermistors (PTC according to DIN 44081) to be connected for temperature monitoring, with a short circuit in the sensor lead triggering a fault report just as in the case of overtemperature.

Digital output

The central control unit already possesses two relay outputs. Relay modules with up to four potential-free contacts may be added when more relay outputs are required (change-over contacts). *WatchDog pro* modules each possessing 4 NPN or PNP outputs are available for control voltages. Thus allowing systems possessing many intervention points to be controlled.

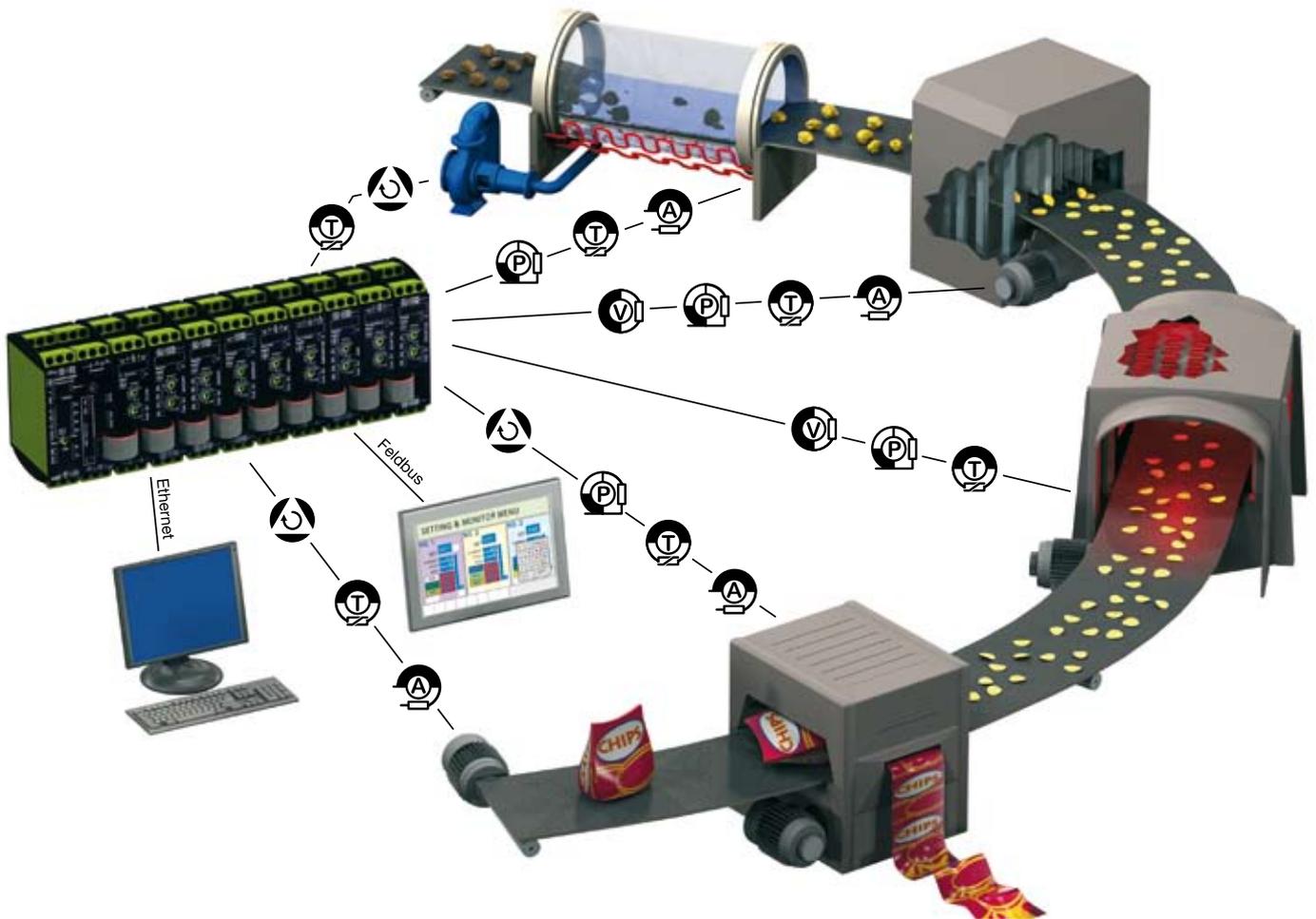
Analogue input / output

With its analogue input and output module, *WatchDog pro* offers a flexible extension that permits non-electrical values to be included in monitoring. Physical values may be read in with the help of sensors through two voltage inputs (0 to 10 V) and two current inputs (4 to 20 mA). *WatchDog pro* is able to output both voltage and current signals through the analogue output and thus assume control and governing tasks.

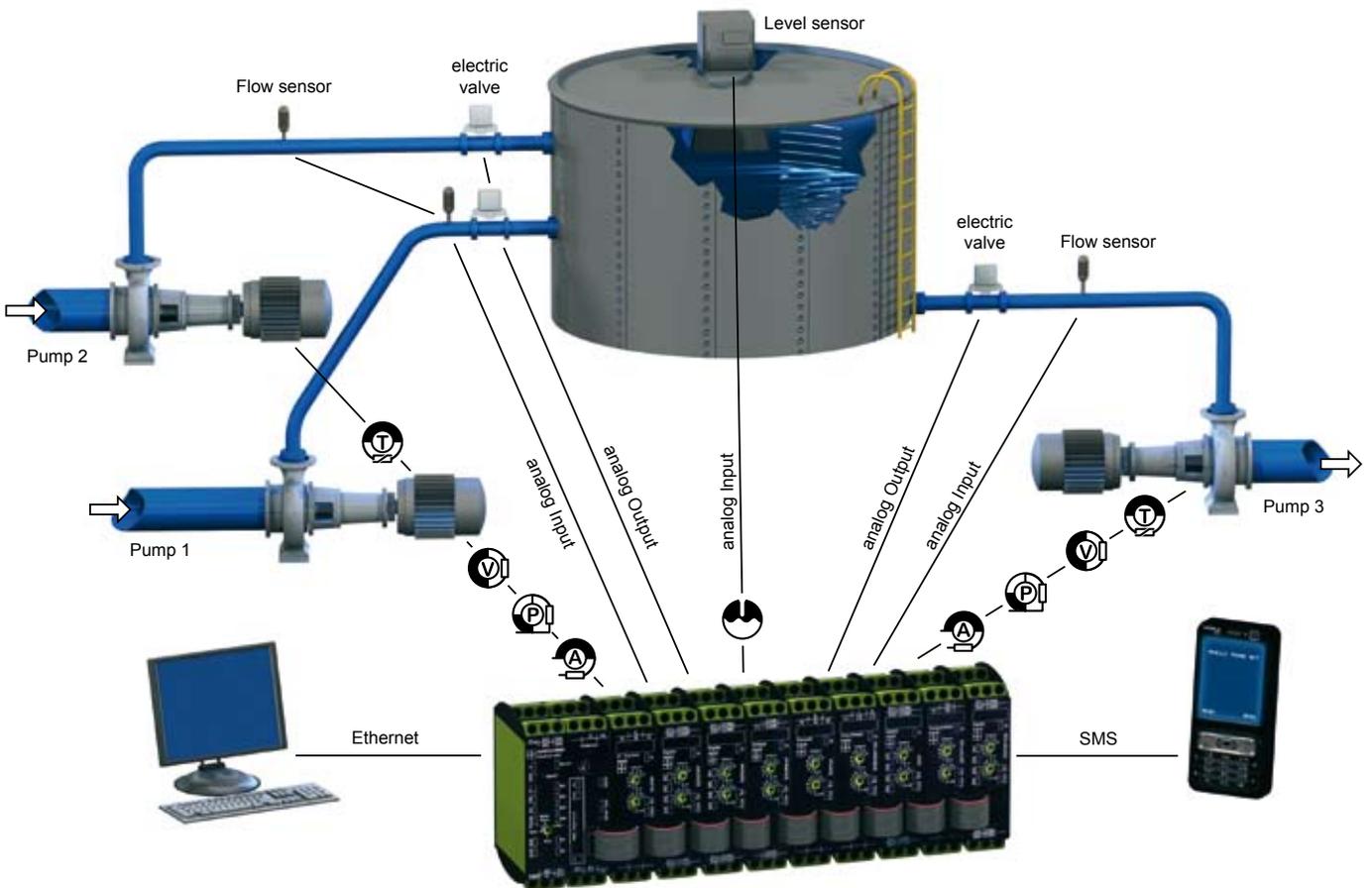


EXAMPLES

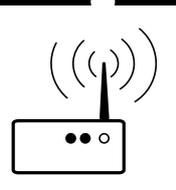
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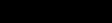
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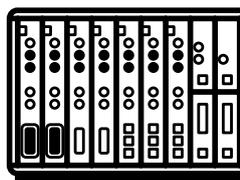


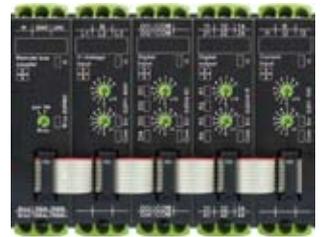
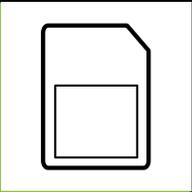
COMMUNICATION



WatchDog pro's parameters are set using a clearly arranged software interface. Plant documentation can be produced at the press of a button from the annotated function list. Communication takes place via a serial interface or over the net using a web server (LAN or WAN).

-  Fieldbus (Modbus RTU)
-  RS232
-  Remote Bus
-  WDP Com
-  Ethernet
-  SMS
-  MMC Card





MODULE & ACCESSORIES

TELE is extending its customer service for implementing complex solutions with the “VIP – Valued Industrial Partner” programme. In addition to developing, producing and distributing TELE brand products, TELE will also advise and assist you in procuring verified quality from selected partners.



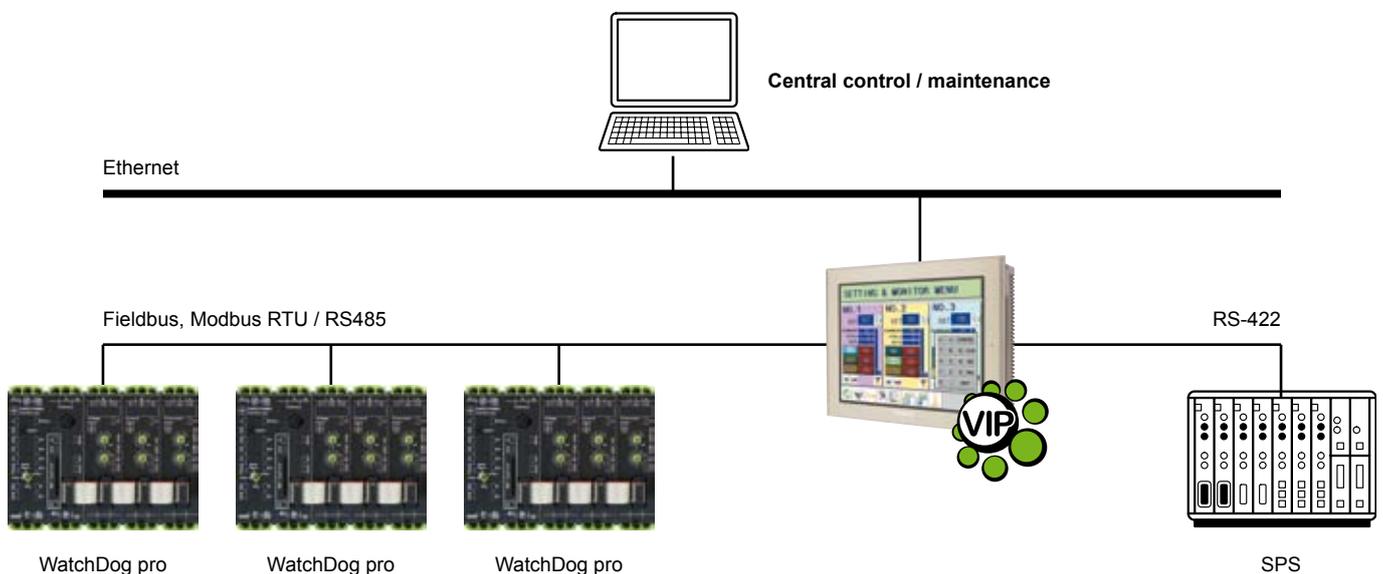
Touchpanels

WatchDog pro executes simple monitoring tasks in the blink of an eye. Commands from the user are entered via buttons, switches and digital inputs. If all values are within the permitted range, *WatchDog pro* switches or controls signal lamps, machinery and equipment via digital or analogue outputs.

This type of operation and display frequently no longer suffices in applications that are more demanding. Full human-machine interfaces (HMI) are then required. In conjunction with its VIP partner, ProFace, TELE has, with the AST3201A

touch panel (AGP family), created a system that leaves no wishes unfulfilled where display, dimension and functions are concerned.

The HMI is able to communicate simultaneously with several *WatchDog pro* systems and other control types while also acting as a gateway. This means that data may also be easily exchanged between the individual *WatchDog pro* systems and controls. The Ethernet link allows data to be dispatched to the general control computer for logging.





- G4WDCU MMC** Central Unit with MultiMediaCard slot and GSM modem driver
- G2FBC** Fieldbus modules for communication between the Central Unit and the process level via Modbus-RTU, Profibus-DP, DeviceNet, CANopen, Modbus-TCP, EtherNet/IP
- G2WDGW2** Fieldbus-Gateway modules for direct communication between WatchDog pro modules and the process level via Modbus-RTU, Profibus-DP, DeviceNet, CANopen, Modbus-TCP, EtherNet/Central Unit
- G2RBC** Remote bus coupler for decentral system extension
- G2UI1 10V** 1-phase voltage measurement module DC/AC (16,6 to 400Hz) • Measured ranges: 0 to 60mV; 150mV; 10V
- G2UI1 300V** 1-phase voltage measurement module DC/AC (16,6 bis 400Hz) • Measured ranges: 0 to 30V; 60V; 300V
- G2PI1 400V** 3~ voltage measurement module AC for 3- and 4-wire circuit (48 to 63Hz) • Measuring of phase voltage, asymmetry and phase sequence
- G2II1 5A** 1-phase current measurement module DC/AC (16,6 to 400Hz) • Measured ranges: 0 to 20mA; 1A; 5A
- G2II1 10A** 1-phase current measurement module DC/AC (16,6 to 400Hz) • Measured ranges: 0 to 100mA; 1A; 10A
- G2JI1 5A** 3-phase current measurement module AC (48 to 63Hz) with common return • Measure ranges 0 to 5A
- G2BI1 400V12A** True power monitoring module AC (10 to 400Hz) for 230/400V loads up to 12A
- G2CI1 400V12A** Power factor and power measurement module AC (10 to 400Hz) for 230/400V loads up to 12A
- G2DI4 PTCK** Thermistor monitoring module for 4 digital PTC inputs
- G2TI1 PT100** Temperature measurement module for one PT100 sensor
- G2DI4 24V** Digital input module for signal voltage DC/AC (48 to 63Hz) • Switch points DC: 9,3V/5,3V; AC: 12,4V/9,2V
- G2DI4 230V** Digital input module for signal voltage DC/AC (48 to 63Hz) • Switch points AC: 153V/53V
- G2DI4 SC** Digital input module for potential free inputs and NPN sensors • Switch points 4,1V at 1,1mA
- G2AM4 M** Analog input and output module for standard signals 0 - 10V / 4 - 20mA
- G2DO4 R** Digital output module with 4 separated relay contacts
- G2DO4 SP24VDC** Digital outputs modules with 4 potential free digital relay outputs
- G2DO4 SN24VDC** Digital outputs modules with 4 semiconductor outputs
- MMC** Formated MultiMediaCard™ for the datalogger function with 1 to 2GB memory
- WDP SOFT** Parameterisation software on CD, running on Windows 98/ME/2000/XP
- MMC-READER** MMC read out package including Datalogger software and MultiMediaCard Reader
- WDP COM** Communication equipment: USB serial converter and interface cable RS232
- WDP GSM** GSM package: GSM modem, data cable, antenna, power supply unit and DIN-rail adapter



Technology needs monitoring: A great deal of research and development has been undertaken at TELE and it benefits further from its production base in Austria and a strong team that brings its products to the market. The company grew with time relays and automation components and the focus on monitoring technology still characterizes the company today. As a pioneer and trendsetter, it is able to deliver intelligent solutions for monitoring plants, factories, buildings and machines and keeping them running.

TELE produces up-to-the-minute monitoring and control equipment that satisfies international standards for worldwide deployment at the highest levels of quality – from a passion and out of professionalism.

Established in 1963 as a family owned company, the headquarters and production base in Vienna has generated branches in Germany and Great Britain and a dense network of more than 50 dealers all over the world. Long-standing customers from all areas of industry and fresh ideas for difficult tasks have made us what we are today – a reliable and flexible partner. Here, the striking green design is the external expression of internal values – quality and innovation constitute the basis for our many years of success and our orientation towards the future.

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