UNIVERSAL MONITORING SYSTEMS
MS2+, MS3+, MS4+
New generation !

COMPLETE SOLUTION FOR MONITORING OF TEMPERATURE, HUMIDITY AND OTHER QUANTITIES IN THESE FIELDS:
- Food and beverages industry (HACCP)
- Pharmaceutical industry
- Blood stations, pharmacies
- Horticulture and cultivation of plants
- HVAC (heating, ventilation, air conditioning, cooling
- Building and energy management
- Research and development
- Laboratories (GLP)

Single- to sixteen channel dataloggers are designed for recording of values from transducers of variety of quantities, alarm state indication, and process control. Parameters of inputs are defined by the types of installed input modules. Datalogger with transducers configured accordingly to client order can measure analog signals, frequency, count impulses, evaluate two-state quantities and read data from devices compatible with ADAM Advantech protocol. If input signal modification is required it is possible to modify the input modules for different types. Input signals are connected to removable terminal block located on the logger upper side. Analyzing of the record is enabled after data download to the personal computer by means of the included program.

New firmware and software enable especially to:
- get information from the logger by means of the SMS messages - actual values, alarms, memory occupation and others - as response to SMS request from the user and after alarm creation at the logger. Logger should be connected via GSM modem supporting SMS.
- configure individually each input channel for measurement, alarm evaluation and data logging, including individual logging interval for each input.
- each input channel can be individually programmed for different modes of record (continuous record, time dependent record, record only if specified logic conditions are matched, record triggered by external signal, etc.). It is enabled to record with shorter interval in case, measured values match previously defined conditions e.g. to map in detail trouble state. It is also enabled to memorize actual value and time if defined time event appears.
- set up to four different logic conditions for each channel to activate alarm. Each condition compares measured values from inputs with set limits. It is possible to set hysteresis and delay of condition validity.
- assign to each input channel name of actual recorded process to identify monitored object (e.g. type of monitored product). It is enabled to select this name from logger keyboard during the operation (MS3+ and MS4+).
- indicate alarm state after matching defined combination up to four alarms from any inputs.
- assign each input channel name of currently recorded process to describe monitored object (e.g. product name). This name is possible to assign from the MS3+ or MS4+ logger front panel keys.
- store several configuration profiles (all logger parameters setting) for different measuring tasks and select profiles from logger keyboard (MS3+ and MS4+).

STANDARD FEATURES OF AVAILABLE DATALOGGER MODELS	MS2+	MS3+	MS4+
data logging function	YES	YES	YES
interface RS485, operation of several dataloggers in the network		YES	YES
dual line LCD display and four push-buttons on the datalogger panel		YES	YES
alarm indication audible and visible on the datalogger panel		YES	YES
voltage output for external alarm indication		YES	YES
16 output relays			YES

Datalogger MS2+: no display, no alarm function, only for measurement and record
Datalogger MS3+: all functions as MS2+, in addition dual line alphanumeric LCD display and four push buttons. LCD enables to display actual values from input channels and datalogger configuration. Two limits for each channel are adjustable for alarm function. Out of range values are indicated by appropriate LED and audio signal. The direction of the limits, hysteresis and audio indication are user programmable for each channel. Each MS3+ datalogger has ALARM OUT output e.g. for connection of external audio alarm indication or a voice dialer. PC program enables to set wide variety of alarm modes. From simple (increase/decrease of measured value referring to set limit) to complex (logic combination up to 4 conditions from different input channels, additional time functions etc.).

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Datalogger MS4+: all functions as MS3+ plus installed board with 16 output relays (250V/8A) with switchitching-over contacts for controlling of external devices. Each relay can be switched by appearance of one or more alarms at different input channels accordingly to setting from the PC program. Contacts of the relays can control external devices (switching OFF the device, switching ON the heating or ventilation, switching ON of distant alarm etc.). Output signals from relays and the power are connected to internal terminals via cable glands.

PROGRAM FOR PERSONAL COMPUTER

Setting of all system parameters and the stored data processing is performed by the PC software for Windows. **Included software - freeware** is possible to download free from www.cometsystem.cz. It enables to communicate with logger through a serial RS232 link or through an RS485 network (long distance or more networked loggers), by means of the USB converter, by means of modems (line or GSM) or by means of external Ethernet converter. It also enables to configure the logger, read recorded values and display actual values of the inputs. It is possible to view and print recorded values in numeric format and export to dbf format for consequent analysis in any data processor (e.g. MS Excel). Free program version does not work with graphs.

Optional software for Windows is also available. Software has all functions as free software. In addition this software enables most complex graphic processing of recorded data. Automatic data reading from logger to PC in preprogrammed intervals is also possible and other functions.

TECHNICAL PARAMETERS	
Memory type:	internal SRAM, backed-up by Lithium battery
Total memory capacity:	2MB (up to 480 000 values)
Logging mode:	**noncyclic** logging stops after filling the memory **cyclic** after filling memory oldest data is overwritten by new
Logging interval:	adjustable individually for all input channels from 1 second to 24 hours
Real time clock:	year, leap year, month, day, hour, minute, second, backed-up by Lithium battery
Input measured values (1 to 16 inputs):	are defined for each channel by installed input modules (see table) accordingly to user requirements
Resolution of the AD converter (analog channels):	16 bits, conversion duration approximately 100ms/channel
Interface for communication with computer:	**RS232** (RxD,TxD,RTS,CTS,GND) direct connection with computer up to 15 meters, connection with computer by telephone modem, GSM modem, USB adapter, Ethernet converter **RS485** (only for MS3+, MS4+) connection with computer up to 1200 m, possibility of connection of several dataloggers to one communication link
Supported communication speeds:	1200, 9600, 19200, 57600, 115200 Bd
Output for alarm indication (only MS3+, MS4+):	voltage signal 0V/4.8V, maximum current 50mA, output is designed for connection of external audio indication or telephone dialer
Relay alarm outputs (only MS4+):	16 relays (max. 8A/250Vac), switching-over contacts
Power:	from external ac/dc adapter, included in delivery (supplying from source 24V DC possible)
Operating temperature range of datalogger:	0 to 50°C

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Dimensions, weight MS2+, MS3+:	230 x 180 x 90 mm (W x L x D), weight approximately 800g
Dimensions, weight MS4+ (MS2+,MS3+ for thermocouples):	250 x 320 x 110 mm (W x L x D), weight approximately 2000g
Protection:	IP20

TABLE OF INPUTS

TYPE	MEASURED VALUE	ACCURACY	NOTE
AO	dc current 4 to 20 mA	±0.1% FS	With source approximately 21V for two-wire transducers with current loop (e.g temperature and humidity transducers Comet). Only galvanic not isolated.
A1*	dc current 4 to 20 mA	±0.1% FS	for passive sensing of current
BO*	dc current 0 to 20mA	±0.1% FS	
B1*	dc current 0 to 1A	±0.1% FS	
B2*	dc current 0 to 5A	±0.1% FS	
CO	ac current 0 to 20mA	±1% FS	galvanic isolated
C1	ac current 0 to 1A	±1% FS	galvanic isolated
C2	ac current 0 to 5A	±1% FS	galvanic isolated
DO*	dc voltage 0 to 100mV	±0.1% FS	
D1*	dc voltage 0 to 1V	±0.1% FS	
D2*	dc voltage 0 to 10V	±0.1% FS	
D3*	dc voltage 0 to 400V	±0.1% FS	
EO	ac voltage 0 to 100mV	±1% FS	galvanic isolated
E1	ac voltage 0 to 1V	±1% FS	galvanic isolated
E2	ac voltage 0 to 10V	±1% FS	galvanic isolated
E3*	ac voltage 0 to 400V	±1% FS	galvanic isolated
F*	measurement of resistance (specify the range)	±0.1% FS	two-wire connection
J*	input for Nickel RTD temperature sensor Ni1000, 6180 ppm/˚C, range -50 to +250˚C	-50 to +100˚C ±0.2˚C +100 to +250˚C ±0.2% from reading	
K*	input for Platinum RTD temperature sensor Pt100, range -140 to +600˚C	-140 to +100˚C ±0.2˚C +100 to +600˚C ±0.2% from reading	two-wire connection
K1*	input for Platinum RTD temperature sensor Pt1000, range -140 to +600˚C	-140 to +100˚C ±0.2˚C +100 to +600˚C ±0.2% from reading	two-wire connection
N*	thermocouple K (NiCr-Ni) range -70 to +1300˚C	±(0.3% + 1˚C) from reading	linearized, cold junction compensation
T*	thermocouple T (Cu-CuNi) range -200 to +400˚C	±(0.3% + 1˚C) from reading	
O*	thermocouple J (Fe-Co) range -200 to +750˚C	±(0.3% + 1˚C) from reading	
P*	thermocouple S (Pt10%Rh-Pt), range 0 to +1700˚C	±(0.3% + 1˚C) from reading from +200 to +1700˚C	
Q*	thermocouple B (Pt30%Rh-Pt), range +100 to +1800˚C	±(0.3% + 1˚C) from reading from +300 to +1800˚C	linearized
S*	binary input for potential-less contacts	maximum resistance of closed contact: 1000 ohms minimum duration for recording: 200ms	
S1	binary voltage input	voltage for „switched ON" state:3 to 30Vdc, input current in the„switched ON" state: 1 to 9mA-depending on the applied voltage, minimum duration for indication of change: 200ms, galvanic isolated	
CTU	counter input for voltage signal	voltage for „HIGH" state (for counter status change): 3 to 24Vdc maximum pulse frequency 5kHz, backed-up operation, galvanic isolated	
CTK	counter input for potential-less contacts and open collector	maximum pulse frequency 5kHz, programmable filter of pulse ringing, backed-up operation during power mains failure, maximum resistance of closed contact: 10 kohms minimum resistance of open contact: 250 kohms, galvanic unisolated	
FU	input for measurement of frequency of voltage signal	0 to 5kHz, resolution 1Hz, accuracy ±(0.2% from reading + 1Hz) input voltage for state "H": 3 to 24Vdc input current in state "H": approximately 7mA minimum duration of input impuls: 30us, galvanic isolated	

FK	input for measurement of frequency of contact switching	0 to 5kHz, resolution 1Hz, accuracy ±(0.2% from reading + 1Hz) maximum resistance of closed contact: 10 kohms minimum resistance of open contact: 250 kohms, minimum duration of input pulse: 30us, galvanic unisolated
RS	input for serial signal RS485 for devices supporting Advantech protocol	e.g. measurement from transmitters with RS485 digital output connected to the serial RS485 network - ADAM Advantech protocol , galvanic isolated

Notes: Inputs marked (*) are not **galvanic isolated** and have common ground. These inputs are available also as galvanic isolated.

Galvanic isolated analog inputs are marked with letter G following the name of input type (e.g. input for passive measurement of current 4-20mA - type A1 - with galvanic isolation is marked **A1G**). Galvanic isolation is not designed as safety protection. Datalogger for thermocouple measurement has always larger case. Input RS always maps all channels from its position to position 16. Therefore input RS should always be installed to the position with the highest input channel number.

INCLUDED ACCESSORY: Calibration certificate from the manufacturer, ac/dc adapter, wall holders, communication cable for RS232 of 2 meters length, free program for Windows (also ready to download from www.cometsystem.cz). Program enables to control all logger functions and view and print the record in numerical format.

OPTIONAL ACCESSORY:

■ **M2006 - built-in converter** for communication with the PC via USB port - only for new MS3+, MS4+

■ **MP001 - RS485/RS232 converter f**or serial port COMx of the PC, ac/dc adapter included

■ **M2002 - external audio indication unit**

■ **MP002 - telephone voice dialer** for alarm reporting, ac/dc adapter included

■ **SWR006 - optional software** for Windows comfort graphic environment, including on-line graph

■ **M2007 - built-in Ethernet interface** for communication via Ethernet - only for new MS3+, MS4+

■ **MP010** - built-in independent interface for sending and reception of SMS

■ **MP009** - GSM modem Fastrack M1306B, without accessories

■ **MP009/1** - GSM antenna 3dB for modem Fastrack, right-angled

■ **MP009/2** - Data cable for setting of GSM modem Fastrack

■ **MP009/3** - Ac/dc source 230V/12V for powering of GSM modem Fastrack

■ **Watertight unit -** in larger case with cable glands with protection rate IP55 - only for MS2+, MS3+. Not available for loggers with thermocouple inputs and MS4+. Case dimensions 250 x 320 x 110 mm.

Temperature and humidity transducers Comet are directly compatible with the MS2+, MS3+, MS4+ systems. It is very easy to built a complete calibrated temperature and/or relative humidity monitoring system with Comet components.

Warranty: 2 years