M O D E R N O N - L I N E A N A L Y T I C S

MURTAC

Mess- und Regeltechnik Analytische Chemie GmbH

O N - L I N E P R O C E S S A N A L Y S E R F A M I L Y O M T 3

OMT3 – the platform to automatize wet chemistry analysis

- panel PC with Windows® operating system
- Murtac web interface
- self test function
- integrated database
- lab accuracy
- single- and multi parameter measurement
- internal digestion, distillation, extraction available

1. Summary

The OMT3 on-line process analyser is drafted as a single-/ multi-parameter analysing system.
Controlled by a panel-PC with Windows® operating system precise dosage elements provide lab accurate analyses with high reproducibility – this works while full integrated in the "PC-world".
Beside digital standard process interfaces like Profibus, Modbus RTU and Ethernet TCP/IP also classic analogous 4-20mAmps current loops for signal transfer are available on demand. An elegant possibility for remote control/-enquiry is the optional web-interface (Murtac web-interface).

2. System components

Control unit

- Panel-PC with 12,1" touch-screen
- service interfaces (3xUSB, 1xRJ45 for LAN)
- 3 LED lamps showing the device status
- 5 push buttons for local operation
- instruments for pH, mV, temperature, conductivity – according to demand

digestion unit

Analytic part

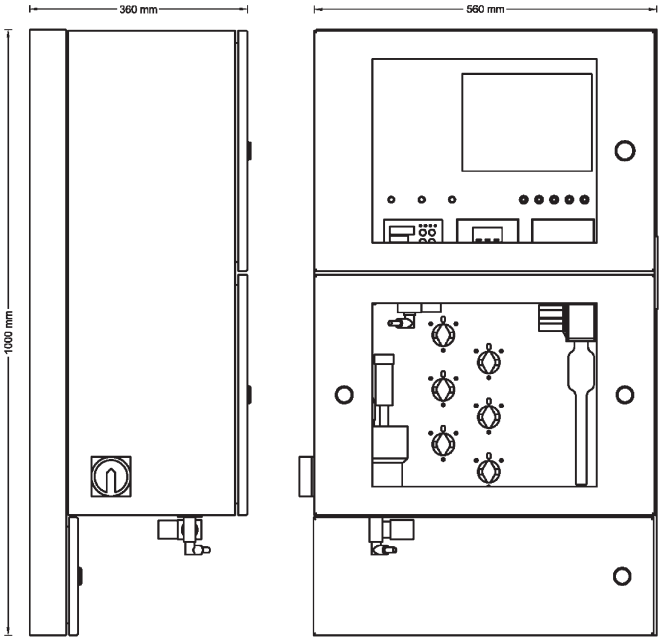
- sample dosage
- measurement vessel
- chemical dosage
- flush system
- optional: single beam photometer, spectro photometer
- optional: digestion-, extraction-, distillation unit

Software

- Windows® operating system
- macro controlled sampling- measurement- and calibration sequences
- scheduler
- logging modules
- solver algorithm
- calendar
- service routine
- control of up to 3 tasks (analysing procedures) possible in parallel
- local display by following screens: flow diagram, titration-/ calibration curve, daily trend curve, weekly trend curve and summarized 4 fields screen
- optional: Murtac web-interface for remote control/-enquiry

Housing

made of powder coated stainless steel



main dimensions OMT3

3. System description

Control unit

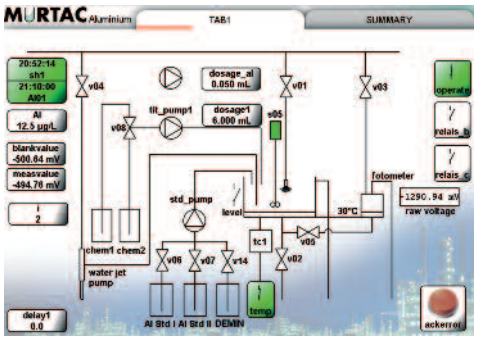
A robust computer with integrated 12,1" colour screen (panel-PC) is used for control of the analyser. It can be operated locally with mouse and keyboard. Optional the operation of the device computer is possible by Murtac web-interface. For the local operation 5 push-buttons (ON, OFF, CAL, CHEM, F1) are realised. The program gives the possibility for free selection of measuring sequences, -times and -cycles. The programming of the measuring sequence (schedule) itself is done in daily or weekly peroids. The basic device status is displayed by 3 LED lamps (green=operation, yellow=calibration, red=error)

Analytic part

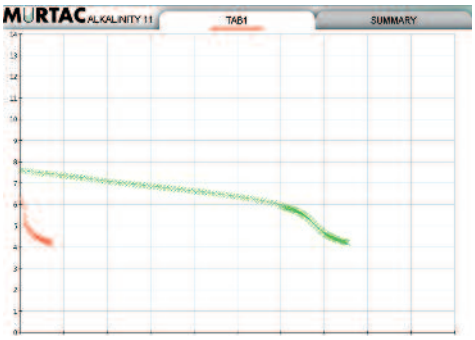
sampling

Murtac supplies different sampling systems according to sample and sampling spots needs:

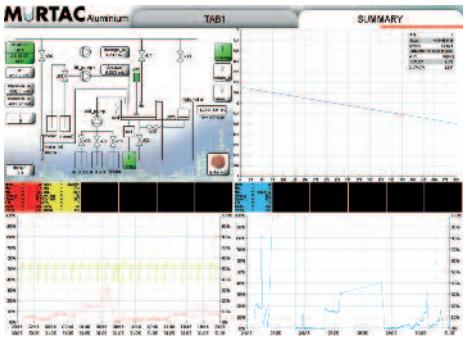
Sampling pretreatment
- in situ filtration
- filtration
- degasing



flow diagram



titration curves



summerized screen

sample dosage
Following possibilities can be used:
- dosage loop
- stich line (modified dosage loop)
- dosage pumps
- over flow vessel
- weighing

measurement vessel
In the measurement vessel the mixing of sample with chemicals takes place. If necessary the compensation of temperature difference is done by the computer measuring the temperature of sample in measurement vessel. If needed the measurement vessel and possible installed photometric cell can be temperature controlled by an independent heating loop.

sample treatment
Following units for enhanced sample treatment are available, depending in lab method to be automized:
- thermal digestion (30°-155°C in glass cuvette)
- distillation
- organic extraction

detection:
Many different detection methods can be used as there are:
- colour change
- potentiometry (pH, redox, ion selective electrodes)
- conductivity
- single beam photometer
- UV/VIS spectro photometer
- NIR spectro photometer

cleaning
Cleaning of sample lines, measurement vessel, sample pretreatment units, detectors in general is done by suitable process-/DEMIN water. If necessary appropriate cleaning fluid (H_2SO_4, NaOH, NH_4, Citric acid,.....) will be used.

housing
The polypropylen powder coated stainless steel housing provides sufficient protection in measurement rooms and clean production environments (IP55). Limited outdoor installation is possible (under shed roof e.g.). Electronics and the wet part of the analyser are separated liquid-tight in the device itself.

ATEX

Ex II 3 G Ex nA nC pz IIC T4 Gc

Optional the analyser can be delivered with pressure proof housing, pressure connection, pressure control and in ATEX conform design. The conformity will be certified in specific test protocol from TÜV Austria.

Software
Based in Windows® operating system the software is programmed strictly object orientated in C and C++. The programming of the measurement sequences is done in easy understandable and simple programmable macro language (teaching in programming is offered by Murtac).

The software includes:
macros
Determined by the programming of the analysing macros depending on degree of completion the macros will be finalized by Murtac, Murtac certified service technicians or from the Murtac trained customer themselves
scheduler
Measurement sequences will start according to list in scheduler and can be repeated periodically (time controlled, daily, weekly,...)
calendar
Due to the calendar function production free times (= measuring free times!) can also be defined by the customer and this without great effort.
solver algorithms
Different evaluation procedures are obtainable in form of solver objects depending in demand
Available evaluation procedures:
- single-/multiple- endpoint titration
- single-/multiple- inflection point titration
- direct-potentiometry
- single-/multiple- standard addition
- photometry
- spectro photometry

calculation
Calculation is done using additional calibration factors and stored key curves.
self diagnosis
Delay times, slopes, offsets and other device parameters gives the possiblility to monitor the analysing procedures for deviations and faulty functions by setable limits. Depending on programming the device stops or continues to get a valid measurement again.
Deviations from defined limit windows may release summerized error messages and will be documented in the LOG-file.

4. Description of the measurement procedure

The trigger of the measurement sequence (analysing procedure) can be done by different events:
- external trigger signal
- scheduler
- local start by mouse and keyboard
- start by optional Murtac web-interface

The analysing procedure starts with sampling.
The standard sampling procedure consists of defined pumping- and valve opening/-closing times.
Important operations like sampling sequences, emptiing of measurement vessel, tightness of valves e.g. are monitored by level-/pressure switches and other analogeous/digital input parameters – controlled by delay times and limit checks. In case of faulty status and/or exceeding limits specific clear text error messages will be generated accordingly.

Sampling is possible out of vessels, basins, open channels, pressure pipes, bypass pipes et cetera. According to the needs the sampling system is designed by material selection, sample consistency (pressure, temperature, chemical composition, solids,...) and analysing demands.
Correct design of the sampling system is an essential prerequisite for successful use of an automized on-line measurement device.

After sample dosage sample conditioning procedures if needed (digestion, distillation, extraction, setting of pH, precipitation,....) are set in place, followed by the analysis procedure.

extraction funnel

Different detectors can be used:
- pH-electrodes
- redox electrodes
- ion sensitive electrodes (S, Cl, Cu, Ag, Ca, NO_3, K, Na,...)
- gas sensitive electrodes (NH_3)
- conductivity cells
- single beam photometric cells
- spectro photometric systems

5) Technical datas:

measuring interval	3-15 minutes without sample conditioning 30-120 minutes with sample conditioning
calibriation	manuel on demand, automized daily, specific according to parameter and selected determination method
signal outputs	analogous 4-20mAmps digital RS232, RS485, Profibus, Modbus RTU, Ethernet TCP/IP
internet	optional Murtac web-interface for remote control/-enquiry
control computer	panel PC fanless, 2GB RAM, 8GB solid state disk
result storage device	solid state disk 3 years minimum
local display	12,1" TFT LCD colour monitor with LED background light
inputs	optional 2 digital inputs 24V AC/DC for device control 3xUSB for mouse, keyboard and stick on key 1xRJ45 for LAN connection
outputs	1 scaleable 4-20mAmps analogous signal output optional up to 6 current loop analogous outputs realiseable 3 digital contact outputs, galvanicaly separated • summerized error • relay B (free configurable) • relay C (free configurable)
power supply	110/115/230V AC, 50/60Hz, input fuse 6,3Amps fast, instrument power supply, best by UPS
power consumption	90VA without measurement vessel temperature control or digestion- distillation unit 250VA with measurement vessel temperature control or digestion- distillation unit
housing	polypropylen powder coated stainless steel
dimensions analyser	1000x560x360mm (HxWxD)
weight analyser	70-100kg
protection class	IP55
kind of installation	wall mounted, hanging
ATEX	optional, with following TÜV Austria certified marking Ex II 3 G Ex nA nC pz IIC T4 Gc
ambient temperature	5-35°C
media supply	
water	
analyser	suitable demineralized process water via prefilter and pre pressure controller 1.5barg
water jet pump	process water via prefilter and pre pressure controller 3barg
waste water	gravity outlet with siphon, interconnection point approx 50cm above floor level, 50mm Polokal below the left corner analyser
chemicals	according to analysung procedures and specific receipes
vessel volume chemicals	depending in needed volume per analyses and stability of the chemical, placed inside or below the analyser

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