

AT

O2

MULTI-PARAMETRIC

AUTOMATIC

PROCESS

TITRATOR



maselli misura
PROCESS ANALYZERS

Multi-parameter titrator AT-02. Laboratory titration at the process.



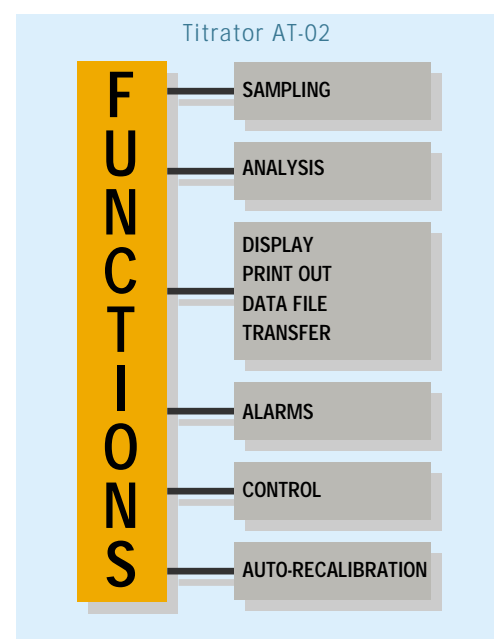
The analysis of process parameters by titration is changing. In newer, automatic processing systems the continuous monitoring of all variables is a must, and the laboratory cannot supply these results on a timely enough basis. The answer lies in automatic on-line titration, shifting titration procedures from the laboratory to process. The Maselli AT-02 process titrator is designed for process analysis of multiple parameters for a broad range of products. It is the ideal solution to today's changing needs.

The AT-02 unit: multi-purpose analysis center

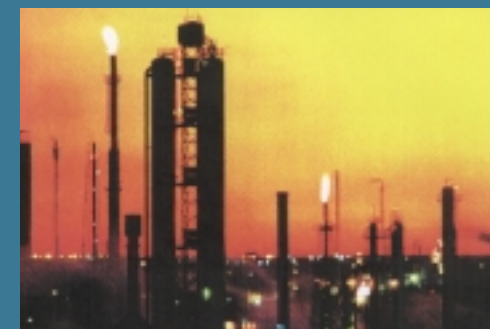
The AT-02 titrator is designed to operate under difficult operational and environmental conditions, without specialized staff. The AT-02 acts as an analysis center by controlling several processes simultaneously, and by performing different types of analysis for each process. The unit is self-contained in a stainless steel waterproof cabinet, with simple, rugged mechanical components. The hardware system makes it possible to sample from up to 6 lines, and to perform several analyses per line. The unit executes routine, automatic recalibration programs. The operating program includes an easy-to-use operational menu, even for unskilled staff. Qualified operators can program the unit from the keyboard for a variety of titration operations.

GENERAL FEATURES

- Stainless steel assembly
- Easy installation
- 6 sampling lines
- Different analysis for each line
- Automatic recalibration
- Analog and serial outputs
- Local data printing
- Adjustable alarm settings
- On-board controller
- Historical data file
- Reliable results
- Simple to use



AT-02 Titrator: multi-parameter titrator for different industries



The AT-02's versatile design provides a broad range of personalized applications in various industrial sectors.

INDUSTRY	PRODUCT	ANALYSIS
Food Industry	Juice	pH, total acidity, n. of formaldehyde, Brix
	Water treatment	pH, conductivity, reduction-oxidation, alkalinity/acidity, total/residual chlorine, hardness, turbidity, selective ions
	Milk	Lactic acid
	Controlling liquids	Total acidity, salt concentration, sugar concentration, dry residue
	Mayonnaise	Total acidity
Chemical and Biochemical Industry	Basic products	Acids, bases, intermediates, finished products
	Synthetic fibers	DMF, formic acid
	Soaps	Alkalinity, sodium chloride
	Culture broths	pH, total acidity, n. of formaldehyde, Brix
Mechanical Industry	Lubricating-refrigerating oils	% Oil, pH, alkalinity, conductivity
Metal Treatment	Metals	Iron II, Iron III, accelerator (hydrogen peroxide), fluorides, zinc, nitrites
Environmental Monitoring	Wastewater treatment	Metals, Neutralization
	Wastewater	pH, turbidity, metals
Energy	Water treatment	pH, conductivity, hardness, chlorides
	Condensate water	pH, conductivity, turbidity, alkalizers



Components of the AT-02 unit.

CENTRAL COMPONENT

The central unit is the operations center of the AT-02 process titrator, and consists of:

- A) Control panel unit (CPU)
- B) Interfacing and power unit (I/O)
- C) Display and keyboard system
- D) Memory card (optional)
- E) Printing unit
- F) Power supply unit

The 32-bit microprocessor CPU board controls all titrator operations. It drives the automatic on-line product sampling cycle, and performs the measurement following the programmed method of analysis. It also gathers, stores and processes data, displays the results, and controls the automatic recalibration cycles. Finally, it communicates with external hardware via RS232 serial communications. A 32-channel I/O board provides an interface with external devices. The analyzer is equipped with a continuous-tape printer that prints results and tables of control values. All programming, performed using the polycarbonate membrane keyboard, is displayed on a high-intensity alphanumeric display.

PERISTALTIC DISPENSING PUMP

The pump panel can include up to 6 peristaltic pumps, and is programmed according to the analytical requirements of the specific process. The pumps normally transfer the standard calibration solutions and titrating reagents, and deliver the analyzed product to the measurement cell.

SYRINGE DISPENSER

Next to the pump panel is the dosage dispensing group. Each of up to three dispensers consists of a stepping motor and a syringe which accurately controls the proportion of the reagent being dispensed. Depending on the type of syringe used, the minimum reagent volume injected may vary from 0.3 to 3 microliters. The syringes also can be made of polyethersulfone, a material resistant to a broad spectrum of products. A three-way valve located above each syringe enables the reagent to be drawn from the container during the suction phase, for injection into the analysis cell during the dosing phase. In special cases, one of the syringes in the dispenser can also be used to draw a sample of analyzed product from the analysis cell. This system permits fast and accurate sampling of small product quantities.

REAGENT RECOVERY

The compartment for storage and recapture of reagents and standard calibration solutions is located below the dispensing pump compartment. The containers are equipped with level sensors that detect when it is necessary to replenish the solutions.

DATA TRANSFER

The AT-02 industrial titrator can be connected to a computer. After analysis the AT-02 transfers a data string of the analysis results at the computer's request via standard RS232 or RS422 serial communications. The AT-02 also can be connected to a remote serial printer, to print all of the information normally provided by the small printer mounted on the titrator. The titrator's software also includes an historical data memory file that saves up to 300 analysis and operation records, which can be expanded to as many as 1800 records by inserting a PCMCIA "Memory Card."

CONTROLLER

In addition to its measurement functions, the AT-02 titrator can also control the process. The controller is a floating contact regulator. Based on the variable-to-setpoint deviation, the customized calculation algorithms control up to 32 devices.

ELECTRODES

The versatile nature of the AT-02 industrial titrator is underscored by the possibility of installing up to 3 electrodes in the analysis cell. In response to the specific process requirements, operators can use pH and reduction-oxidation (bound and unbound) electrodes, conductivity electrodes, selective ion electrodes (platinum, silver, fluoride, etc.), or others.

The software that controls the AT-02 titrator permits the automatic recalibration of the sensors. The automatic recalibration feature is important because, in addition to insuring continuous proper performance of the unit, it reduces operator or laboratory maintenance for routine calibration operations.

ANALYSIS CELL

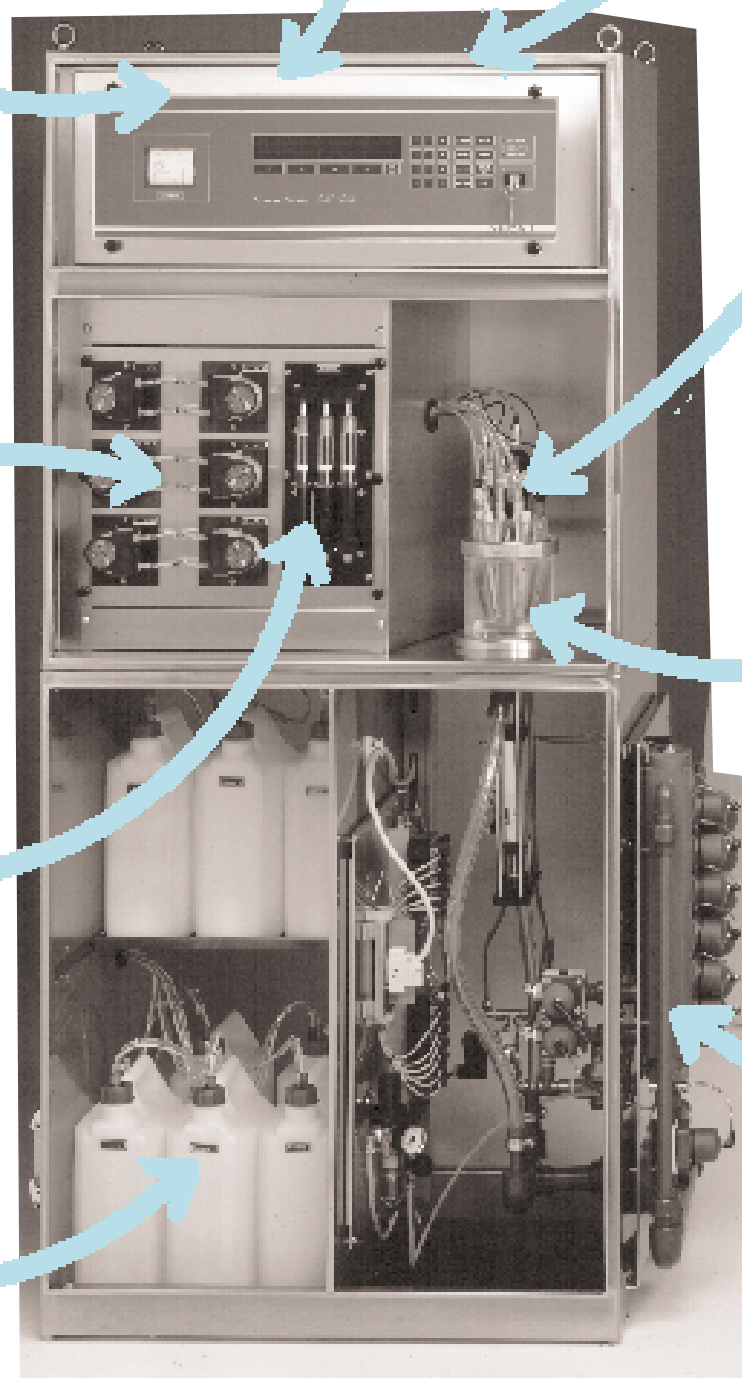
The analysis cell consists of a basin made from plexiglass for standard products, or polyethersulfone for particularly corrosive products. The cell cover is designed to hold:

- a) measurement electrodes (3 max)
- b) temperature sensor
- c) mechanical stirrer
- d) reagent injection capillary tubes (3 max)
- e) standard solution or excess reagent injection tubes (6 max)
- f) drain

The volume of the sample to be analyzed is obtained by precisely positioning an overflow pipe inside the cell. The movement of the overflow pipe is actuated pneumatically by 2 pistons controlled by the CPU. This allows a known volume of the product to remain inside the cell. When the titration is complete, the basin is fully drained prior to the rinse cycle.

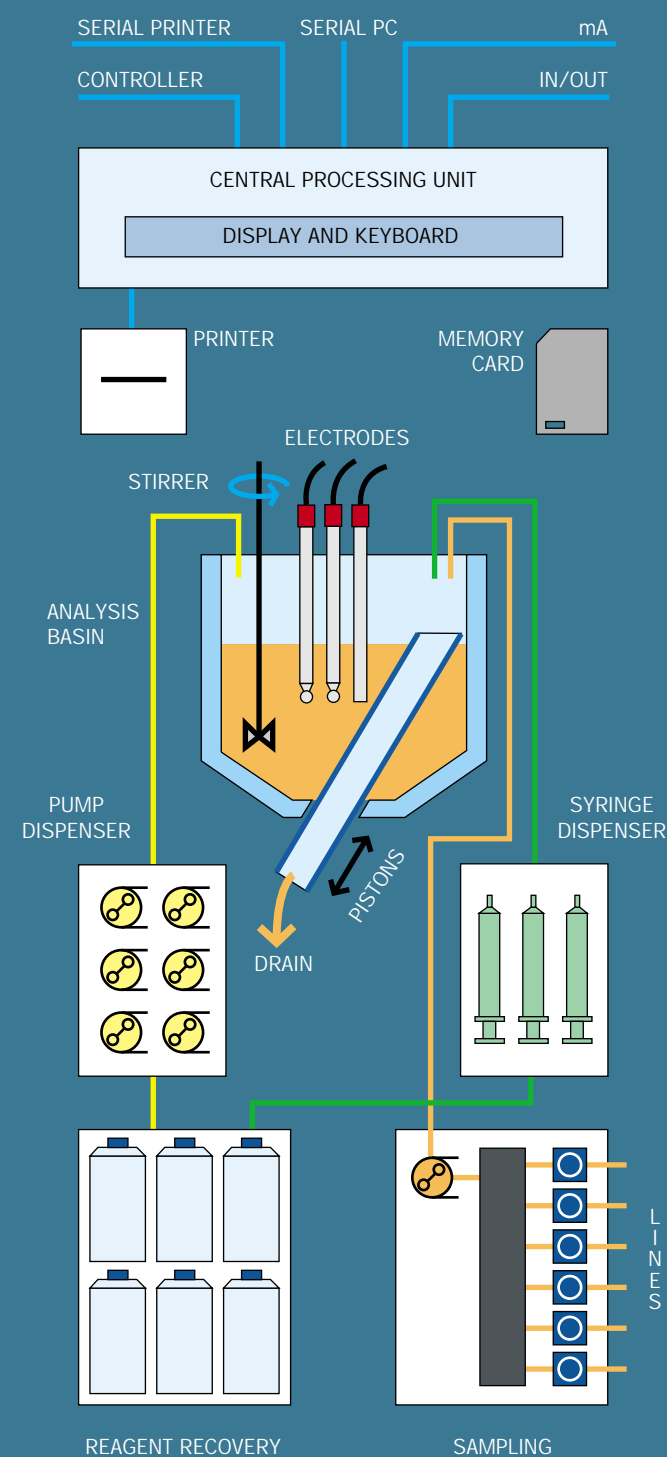
SAMPLING

The sampling device is the most important interface element between the process and the analyzer, since it transfers product from the process lines to the titrator. The sampling system includes a 600 cc collection pipe alongside the AT-02, from which the sample to be analyzed is drawn. After the container is filled, it is isolated from the sample lines and the process. The unit can be programmed to allow up to 6 sample point connections. Each line that channels the product to the container is protected by an integrated filter. The container is equipped with an overflow pipe, a drain valve and a rinsing device.

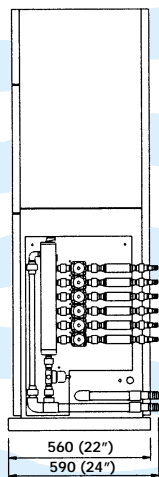
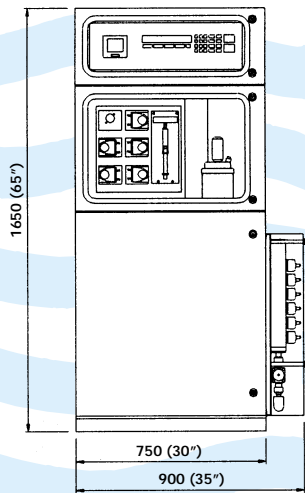


Flow diagram

The sample is drawn automatically from the lines and introduced into the analysis cell, then titrated with reagents using a syringe dispenser. A peristaltic dispenser pump unit controls the automatic recalibration cycle, and the dispensing of excess reagents. A central unit controls all of the titration phases, and regulates the interface with external elements (programming, data transfer, and printing).



Technical data



Sampling

Number of lines	Up to 6
Syringe dispenser	Max 3
Peristaltic pump dispenser	Max 6
Sampling	From single line or with automatic/timed scanning
Product temperature	5÷70 °C
Product pressure	1÷6 Bar
Fixed sample volume	30÷80 ml, adjustable
Sample known volume	750 cc max
Suspended solids	Allowed
Product dilution	Adjustable

Analysis

Sensors	pH, ORP, ion-selective electrodes, conductivity
Temperature compensation	PT100 sensor
Ambient temperature	0÷50 °C
Average reagent consumption	50% of the syringe dispenser
Average measure cycle	3-6 minutes
Concentration measure unit	mg/l, ppm, g/l, %, etc.
Accuracy	2% of the range
Repeatability	1% of the range
Titration method	Acid base, Reduction Oxidation, precipitation, complexometric
Final point selection	Selectable, or automatic (reflexive point search)
Calibration	Automatic
Electrode cleaning	With H ₂ O or with detergent after every analysis

Technical Characteristics

Display	High intensity alphanumeric display, 40x2 characters
Commands	Polyester membrane keyboard
Programming	Menu programming
Outputs	- 4÷20 mA card (6-12-32 channel) - RS232/422 card for computer or printer - Configurable alarms: line or analysis - 6 input contacts for external start - 32 output contacts for control unit
Electric supply	110/220 VAC 50/60Hz 500VA
H ₂ O supply	3÷6 Bar
Pneumatic supply	7 Bar
Product Inlet fitting	DN20 hose adaptor
Discharge fitting	DN32 hose adaptor

Structure

Construction	Stainless Steel
Protection standards	IP65
Dimensions	900 x 590 x 1650 mm (35 x 24 x 65")
Weight	170 Kg

Maintenance

Service	- Each month: replace reagents or calibration solutions and test electrode condition - Each 6 months: replace peristaltic pump tubes
---------	---



maselli misure
PROCESS ANALYZERS

MASELLI MISURE s.p.a.

- FOREIGN SALES OFFICE
- ADMINISTRATION
- FACTORY

43100 Parma - Italy
Via Baganza 4/3
Tel. ++39.0521.257411
Fax ++39.0521.250484
E-mail: info@masellimisure.com
www.masellimisure.com

