

AUT-701

Automatic Titrator

2ch
**Simultaneous
Titration
Capability**

Superb Electrode Line up

Strong & Float pH Electrode
Micro-Titration pH Electrode

Validation Support

USB Interface

LAN Interface



AUT-701 Unique & Powerful Titration System

Enhanced Specification for Extraordinary
QC and R&D Activities



**Dual
Titration
System**

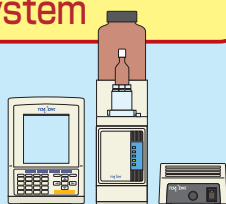
**for
Simultaneous
Applications**

Simultaneous Dual Titration Capability

Adding a second burette and other items to the standard configuration (single titration system) provides capability to perform two different titration methods (such as neutralization and redox) at the same time. Simultaneous measurement of pH and neutralization titration is also possible. By connecting two Model TTT-710 turntables, simultaneous measurement of multiple samples is also possible.

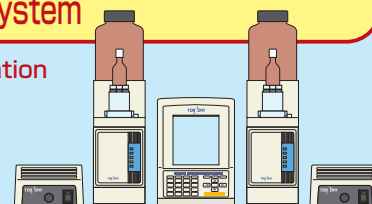
Single Titration System

Standard configuration



Dual Titration System

Two different titration
methods can be
performed
simultaneously

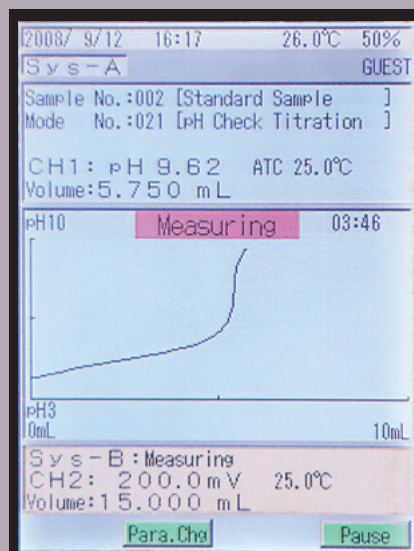


Suggested Configuration for Dual Titration System (pH & ORP)

Standard (single) titration system with additional equipment added (ABT-7 Auto Burette, ST-7 Magnetic Stirrer, ORP Electrode, Electrode Stand & Electrode Holder).



Easy-to-Read Backlit Color LCD

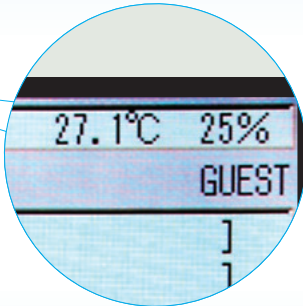


Wide Range of Titration Methods Available (up to 4 electrodes/ 10 burettes)

Standard configuration includes 2pH/mV inputs. Optional titration units such as Photometric, Polarization and Conductivity can be connected to 3ch and 4ch. In addition, up to 10 sets of burette can be connected which allows multi-titration mode and advanced sequential titration to be available.

Advanced Validation Support Feature (logging and display of ambient temp. & RH)

pH calibration history (max 20 sets) function, burette volume checking history function and logging of ambient temp. & RH by using the optional Temp/RH sensor, all designed for a better quality control.



Temp/RH sensor

USB & LAN Interfaces

Data acquisition software, 701, can collect and store data in CSV format for easy data management and transfer to other software applications.

Enriched Data Memory Function

100 data sets can be re-analyzed for single titration system. (200 data sets for dual system)

Fast Titration Mode

Titration time can be shortened.
(Not applicable for some applications)

Superb-Electrode & Titration Kit for Various Titration Needs

Micro-Titration Kit (optional)

Micro-titration kit is ready with combined pH electrode for micro solution and silver combined electrode. It enables less production of waste solution.

(Not applicable for some applications)

Minimum volume : approx. 10 mL

Maximum volume : approx. 20 mL

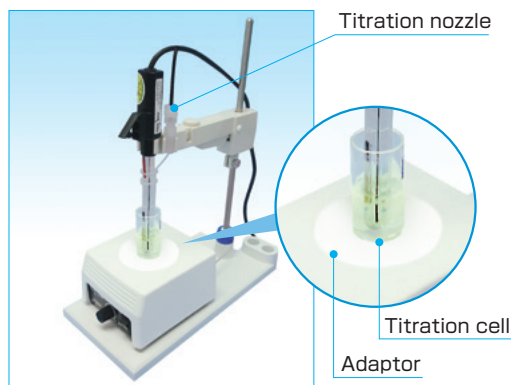
● Configuration

Adaptor, Titration nozzle,

Titration cell (50 pcs.),

O-ring P-5 (2 pcs.), O-ring

P12 (2 pcs.), and Stirring bar (2 pcs.)

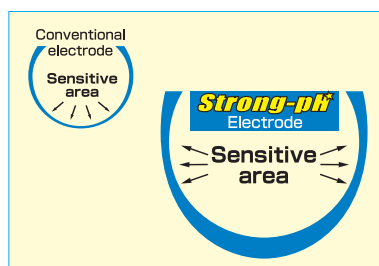


Worry-Free Operation with Durable Glass Electrode

What is the "Strong & Float" pH Electrode?

Strong : Strength of the tip part is reinforced greatly (more than 10 times tougher than our conventional type)

Float : Built-in floating stick helps user to check inner solution concentration at a glance



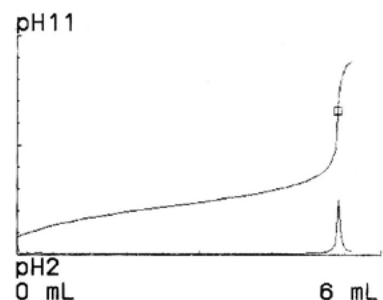
Printout Sample

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System [A]
Sample No.009

Date      2008/ 1/24 11:21
TIT.T.    00:04:19
Op.Name   GUEST
Size      3.0000

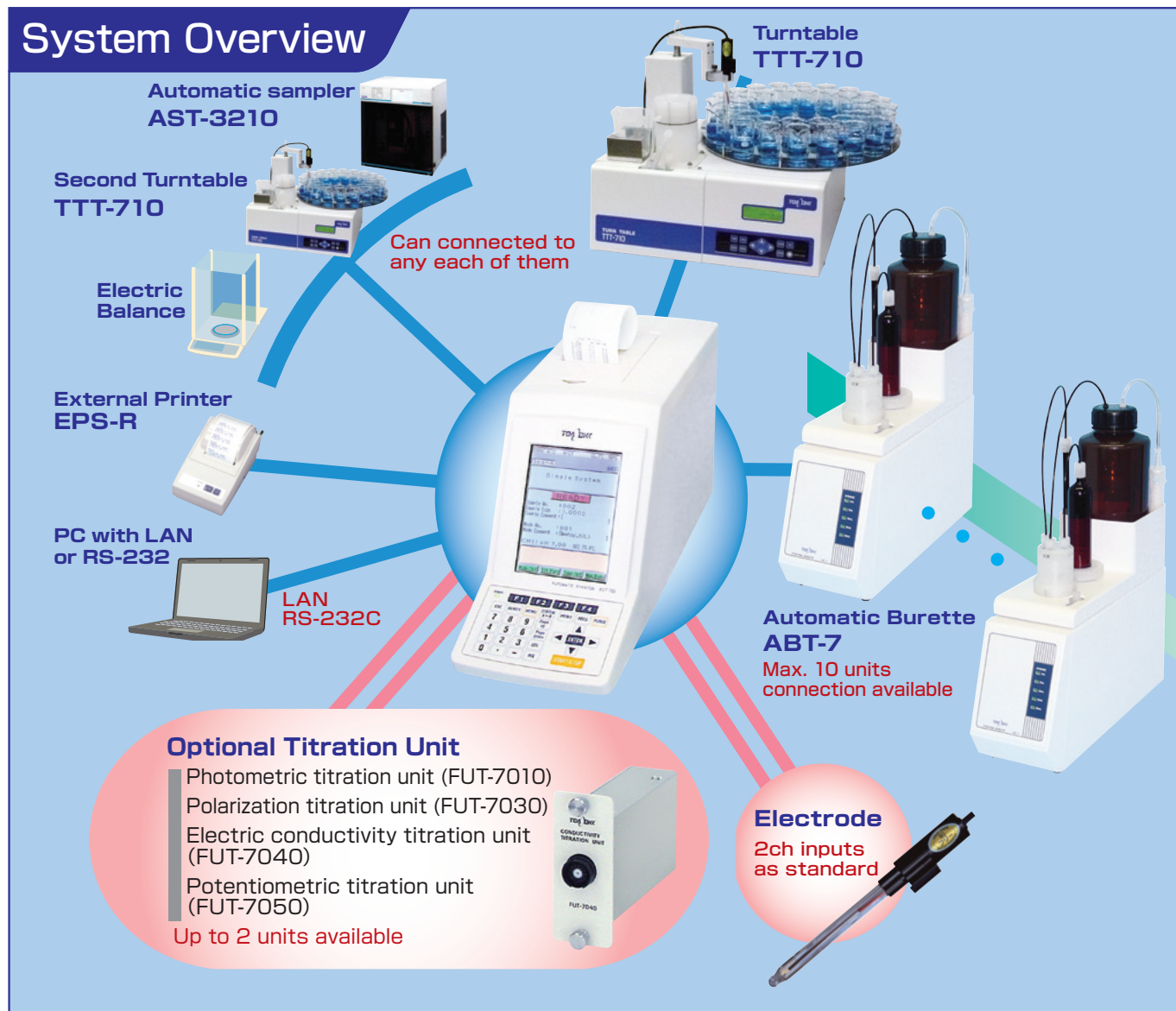
Unit      pH(ATC)
Ini.P     pH 3.48
Ini.T     17.2°C
Fin.P     pH 10.62
Fin.T     17.5°C
Max.D.1   2594.0 dmV/dmL
EP0T1     pH 8.62
VEQ1      5.285 mL
Fin.V     5.500 mL
Conc.1    0.6423 %
    
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Printing items is designatable

Modular Concept Allows Expansion for Your Future Needs

System Overview

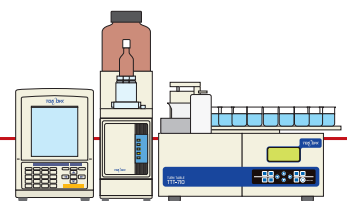


System Examples

● Automatic Multiple Sample Titration System

AUT-701 + TTT-710

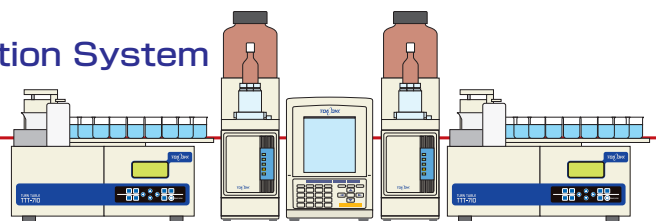
Multiple sample titration can be done automatically by setting pretreated samples on the turntable. The FLEX function allows operators to change titration condition of each sample. (For example, Table #1 to #5: pH measurement, over #6: neutralization titration)



● Dual Automatic Multiple Sample Titration System

AUT-701(Dual System) + TTT-710 × 2

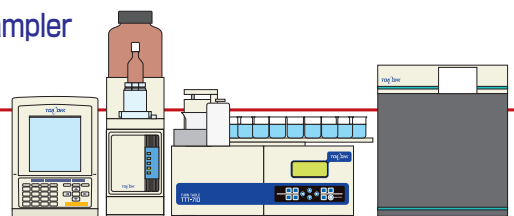
Different two kinds of multiple titration system can be configured at the same time.



● Automatic Multiple Sample Titration System with Automatic Sampler

AUT-701 + TTT-710 + AST-3210

Series of multiple sample operations (measurement - dilution - reagent dispense - titration - cleaning) can be performed automatically after setting samples on the turntable.



Peripheral Equipment



Automated Continuous Multiple Sample Measurement Capability

Turntable TTT-710

● Easy maintenance

Electrode cleaning tank and electrode storage tank are placed on the front of the unit. This enables easy maintenance of tubes, electrodes, etc.

● Wide-range of electrode cleaning modes available

Pure water shower cleaning comes as a standard feature. Chemical cleaning, bubbling cleaning, and air blow modes are also available as optional features.

● Analyzer mount for extra space-saving (optional)

Specifications

Display	LCD	
Number of samples/ Beakers used	12 samples	200mL beaker, 300mL tall beaker (Our recommendation: Glass beakers manufactured by AGC TECHNO GLASS CO., LTD. or HARIO CO., LTD.)
	18 samples	100mL tall beaker (Our recommendation: Glass beakers manufactured by AGC TECHNO GLASS CO., LTD. or HARIO CO., LTD.)
	36 samples	30mL beaker, 50mL tall beaker (Our recommendation: Glass beakers manufactured by AGC TECHNO GLASS CO., LTD.)
	60 samples	20mL dedicated beaker (H-20 beaker manufactured by NICHIDEN RIKA-GLASS CO., LTD.)
	100 samples	20mL dedicated beaker (H-20 beaker manufactured by NICHIDEN RIKA-GLASS CO., LTD.)
Stirring method	Standard: Magnetic stirring Option: Propeller stirring	
Cleaning mode*	(1) Pure water shower → Air blow (2) Pure water bubbling → Pure water shower → Air blow (3) Chemical shower → Pure water shower → Air blow (4) Chemical bubbling → Pure water shower → Air blow (5) Chemical bubbling → Pure water bubbling → Pure water shower → Air blow (6) Chemical bubbling → Chemical shower → Air blow (7) Chemical shower → Air blow (8) Chemical bubbling → Pure water bubbling → Chemical shower → Air blow Note: - Air blow cleaning is available when the optional air pump box is installed. - Chemical cleaning is available when the optional external control box and chemical pump are installed. - Bubbling cleaning is available when the optional air pump box and waste water valve are installed.	
Cleaning time	0-9999 seconds	
Detection of final sample	Possible by using completion detection pin or defining the final sample number by key operation	
Cleaning tank material	Polypropylene	
Performance-guaranteed temperature	5-40°C	
Power requirements	100-240VAC, 50/60Hz	

Power consumption	Standard	When 100VAC is applied: Approx. 60VA at the maximum When 240VAC is applied: Approx. 90VA at the maximum
	When optional product is connected	When 100VAC is applied: Approx. 100VA at the maximum When 240VAC is applied: Approx. 130VA at the maximum
Dimensions	Main unit (not including table)	Approx. W440 x H409 x D391mm
	When table is attached	Approx. W566 x H409 x D507mm
	Maximum dimensions when in operation	Approx. W566 x H534 x D507mm
Weight of main unit	Approx. 16kg (Not including table and electrodes)	

Standard Accessories

Table (Specify either for 12, 18, 36 or 60 samples)
Electrode cartridge (Specify a suitable type depending on the number of samples/purpose)
Cleaning water tank (10L, with liquid level sensor)
Waste water tank (10L, with liquid level sensor)
Cleaning water tube (3m)
Waste water hose (1.5m)
Completion detection pin
Power cord
2P-3P conversion adapter
Disposable beaker
Operation manual

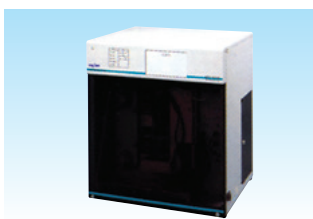
Options

Product	Code No.
Turntable connection cable (2m) Cable for connection to AUT-701, TA-70, TS-70 or TP-70	7075670K
Air pump box (for air blow)	7400560U
Air pump box (for air blow and bubbling)	7401640U
Waste water valve for TTT-710 (pinch cock)	7401650U
Waste water valve for TTT-710 (solenoid valve)	7401660U
Propeller stirring unit (for table for 12 or 18 samples)	7401670U
Propeller stirring unit (for table for 36 samples)	7401680U
Propeller stirring unit (for table for 60 or 100 samples)	7401690U

*For further information regarding chemical cleaning, please contact us.

Full Automatic Operation ~ Measurement to Cleaning

Automatic Sampler AST-3210



Principle	Three-way stopvalve switching measuring tube
Sample volume	About 0.2 - 20 mL (fixed loop volume [measuring tube])
Repeatability	0.5% or less for 10 mL sample as CV value
Measurement vessel	Material : hard glass, Number of electrode : Max. 4 Max. volume : approx. 150 mL, Number of titration nozzle : Max. 4 Min. required volume : about 100 mL
Alarm indication	Pure water empty, Waste water full, System abnormal
Tanks for waste water & pure water	20 L plastic tank
Power source	AC line 50/60Hz
Power consumption	Approx. 100VA
External dimensions & Weight	Approx. W565 mm x H635 mm x D480 mm, approx. 45 kg

*The attachment cable for the titrator, trunk cable for electrode and others are sold separately based on the model designation

Data Acquisition Software for PC

Data Acquisition Software 701 7075650K

Capable of importing data to PC in the CSV format using USB memory, LAN or RS-232.

For System Expansion (Dual Titration)

Automatic Burette ABT-7



Magnetic Stirrer ST-7



For Plain Paper Printing

External Printer EPS-R

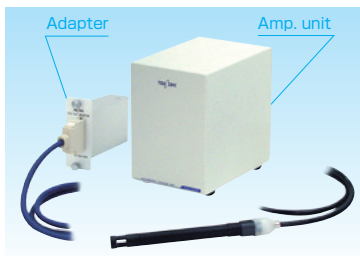


Optional Units

Photometric Titration Unit Two wave length auto switching available

FUT-7010 (Immersion electrode OPE-21A attached)

Used to detect the color variation of indicator and used for quantitative analysis of metallization like plating solution.



*The adaptor is built into the titrator and the amp. unit is standalone.

Amp. unit dimension : Approx. W102 X H153 X D119 mm
Standard interference filter : 530 nm, 630 nm

Polarization Titration Unit

FUT-7030 (Twin platinum electrode HDP-303 attached)

Used for iodide value or diazo titration.

*This unit is built into the titrator.

Measuring method : constant-current voltage method,
constant-voltage current method
Detecting electrode : twin platinum electrode (HDP-303)
Applied voltage : 0 +/- 1,000 mV (settable at optimum voltage)
Applied current : 0 +/- 1,000 μ A (settable at optimum voltage)



Potentiometric Titration Unit

FUT-7050 (Electrode is option)

*This unit is built into the titrator.

mV : 0 +/- 2,000.0 mV
Temperature : 0-100.0°C



Electric Conductivity Titration Unit

FUT-7040 (Conductivity cell CT-57101B attached)

Can be used for electric conductivity measurement.

*This unit is built into the titrator.

Measuring method : AC two electrode method
Measuring range : 0-200.0S/m (depends on cell)
Manual ranging when titration set by titrator.
Temperature : 0-100.0°C



Electrodes

Application	Description	Code	Remarks
Neutralization titration	pH combined electrode (general purpose) Strong-pH	GST-5741C	One of standard accessories of AUT-701
	pH combined electrode (precision measurement) Strong-pH	ELP-035	
	pH combined electrode (double junction)	ELP-062	Junction is replaceable. Effective against KCl inner solution outflow problem
Redox titration	ORP combined electrode (general purpose)	PS-5111C	
	ORP combined electrode (double junction)	ELM-016	Junction is replaceable. Effective against KCl inner solution outflow problem
Salinity titration	Silver combined electrode (general purpose)	ELX-006	Junction is replaceable
	Glass electrode (general purpose)	HGS-2005	Optional electrode adapter (OJD00001) and electrode holder (S-HLD-S) will be required.
Non-aqueous titration	Reference electrode (double junction)	HS-305DS	
	Immersion electrode	OPE-21A	Attached with photometric titration unit
Photometric titration	Immersion electrode	OPE-21A	Attached with photometric titration unit
Polarization titration	Twin platinum electrode	HPD-303	Attached with polarization titration unit
Electric conductivity titration	Electric conductivity cell	CT-57101B	Attached with electric conductivity titration unit

Parts & Solutions

Parts for titrator

Description	Code	Remarks
Magnetic stirrer	ST-7	
Electrode stand with stopper	6948810K	
Electrode holder	OIB00001	Standard accessories of AUT-701 For dual system separate order would be required
Electrode attachment (G)	OIB00004	
Electrode attachment (J)	OIB00005	
Electrode attachment (N)	OIB00008	
Electrode adapter	OJD00001	
Electrode holder	S-HLD-S	
Electrode relaying lead wire (1m)	0GB00001	
Electrode relaying lead wire (3m)	0GB00002	
Micro-titration kit	7075600K	Content : Adaptor, Titration nozzle, Titration cell (50 pcs.), O-ring P-5 (2 pcs.), O-ring P12 (2 pcs.), Stirring bar (2 pcs.)
Turntable connection cable (2m)	7075670K	For TTT-510 connection
AST connection cable (2m)	7075710K	For AST-3210 connection
RS-232 cable (2m)	0GC00002	For PC connection (D-sub9p for PC connection)
Reference electrode inner solution RE-1, 100mL	143F230	For reference electrode (HS-305DS and others)
Reference electrode outer solution RE-2, 100mL	143F238	For electrode for salinity titration
Printer chart paper (5 rolls/pack)	PAP-HCS	For internal printer, one of standard accessories of AUT-701

Parts for burette

Description	Code	Remarks
Unit plate (for 1mL to 20mL syringe)	7075610K	
Unit plate (for 50mL syringe)	7075620K	
20mL brown syringe	AUT-045P	
50mL brown syringe	P000010	
10mL brown syringe	AUT-046P	
5mL brown syringe	AUT-047P	
1mL brown syringe	AUT-048P	
Degassing nozzle (for 1mL to 20mL syringe)	P000070	
Degassing nozzle (for 50mL syringe)	P000071	
Titration nozzle (for micro titration)	AST-P008	
Reagent bottle with tube joint	7075630K	1,000mL translucent brown plastic bottle
Carbon dioxide adsorbent with tube	7075640K	One of standard accessories of ABT-7
Teflon tube, black, 2m (for 5mL to 20mL syringe)	AUT-022P	For 5mL to 50mL syringe
Teflon tube, black, 2m (for 1mL syringe)	AUT-024P	Only for 1mL syringe

Specifications for Standard Configuration

Single Titration System Automatic Titrator AUT-701 + Automatic Burette ABT-7+ Magnetic Stirrer ST-7

Automatic Titrator AUT-701

Display	Color graphic LCD with back light	
Displayed Item	Simultaneous indication of titration curve, titration volume, pH(mV), temperature and titration time Changing over display of System A/System B display when dual system Ambient temperature and relative humidity when optional Temp. & RH sensor used	
Operational key/operating method	Flat key Dialog method by function keys and ten keys	
Titration/measuring method	Inflection point detection titration Set point titration Full volume titration (inflection point detection/set point) Intersection detection titration Stat titration Preliminary titration pKa measurement pH/mV measurement pH adjustment Electric conductivity measurement	
Number of titration steps	Up to 5 steps (up to 2 steps for intersection titration)	
Titration mode	Standard mode : 20/system User mode : 40/system Link mode (for sequential titration) : 20/system	
Titration control system	Single titration system (system A) Dual titration system (system A/system B) Simultaneous titration/measurement available	
Measuring item/range	pH : 0.00-14.00 mV : 0.0+/-2,000.0mV Temperature : 0.0-100.0°C Constant voltage current method : 0-2,000µA 0-20.00µA 0-200.0µA 0-1000µA (by range selection) Constant current voltage method : 0.0+/-2000.0mV Electric conductivity : by cell Displayed ranges are below : 0-200.0µS/m(0-2,000µS/m) 0-2,000mS/m(0-20,000µS/m) 0-20,000mS/m(0-200.0µS/m) 0-200.0mS/m(0-2,000mS/m) 0-2,000S/m(0-20,000mS/m) 0-20,000S/m(0-200.0mS/m) 0-200.0S/m(0-2,000S/m) (Fixed range for titration, auto ranging for EC measurement*) Transmittance (photometric titration) : 0.0-100.0% Ambient temp. : 0.0-50.0°C RH : 5-90%	
Number of electrode inputs	Max. 4 channels 2 pcs. of pH/mV input installed as standard 3rd & 4th channels are for optional titration units	
Number of connectable auto. burettes	Max. 10 units	
pH calibration	Automatic 3-point calibration (manual calibration only for user's standard solutions)	
pH standard solution	JIS standard solutions/US standard solutions/User's specified standard solutions	
User's pH stand. sol. setting	Given standard solution table input : 3 points	
Temperature compensation range for pH measurement	0.0-100.0°C	
Electric conductivity temperature compensation	Temperature compensation range	ATC (auto. temp. compensation) : 0.0-100.0°C MTC (manual temp. compensation) : 0.0-100.0°C TC off available
	Stand. temp. setting Temp. coefficient	0.0-100.0°C 0.0-10.0%/°C
Validation support function	Ambient condition display, record (ambient temp., relative humidity) pH calibration history : Max. 20 calibrations Self check up history : Max. 6 (by checking input) Periodical check up history : Max. 10 (by standard solution) Burette volume checking history : Max. 6 (data in burette) Electrode management alarm (date management) Reagent replacement alarm (date management) Syringe replacement alarm (date or numbers of strokes management) Reagent empty alarm (alarm point setting available)	
Data memory (re-analysis available)	100 data sets in case of single titration system 200 data sets in case of dual titration system	
Printer	Internal line thermal printer	
Communication	RS-232 × 5ch. #1: Automatic burette (Max. 10 units connectable) #2: PC #3: Turntable (TTT-510) #4: One from among Auto sampler AST-3210, electric balance and Turntable TTT-510 #5: External printer EPS-R LAN × 1 USB(host) × 1	
Ambient temp. & RH	5-35°C, 85% or less (without condensation)	
Power source	AC100V-240V 50/60Hz	
Power consumption	Max. 35VA	
Dimensions & weight	Approx. W150 × H200 × D385 mm, Approx. 3.6 kg	

* When measuring EC in the titration mode, there is only the fixed range available.

Standard Accessories

Description	Code
Magnetic stirrer	ST-7
pH electrode (Strong pH combined electrode)*	GST-5741C
pH4.01 standard solution, 500mL*	143F191
pH6.86 standard solution, 500mL*	143F192
Reference electrode internal solution, 50mL*	-
Electrode stand with stopper	6948810K
Electrode holder	01B00001
Electrode attachment (G)	01B00004
Electrode attachment (J)	01B00005
Electrode attachment (N)	01B00008
Printer chart paper (2 rolls)	-
Instruction manual	-

*Not attached when no electrode & no standard solution assigned

Automatic Burette ABT-7

Indication	Syringe size indication : LED
Syringe size setting	Digital rotary switch
Syringe	Fine inner grinding position type 20mL brown glass syringe 1mL, 5mL, 10mL and 50mL syringes are option
Wetted material	Teflon, Daiflon, hard glass
Using tube	ID2mm × OD3mm black Teflon tube (ID1mm × OD3mm black Teflon tube when 1mL syringe)
Absorption time	Approx. 20 seconds for full stroke
Discharge rate	50mL syringe : 2-150mL/min 20mL syringe : 0.6-60.0mL/min 10mL syringe : 0.3-30.0mL/min 5mL syringe : 0.2-15.0mL/min 1mL syringe : 0.03-3.00mL/min
Minimum dropping volume	50mL syringe : 0.0025mL 20mL syringe : 0.001mL 10mL syringe : 0.0005mL 5mL syringe : 0.00025mL 1mL syringe : 0.00005mL
Accuracy of burette	In case of 20mL syringe Whole volume error : +/-0.1% Repeatability : +/-0.01mL
Validation support	Burette volume checking history : Max. 6
Outlet for peripheral equipment	One for burette and one for magnetic stirrer
Ambient temp. & RH	5-35°C, 85% or less (without condensation)
Power source	AC100V-240V 50/60Hz
Power consumption	Approx. 30VA
Dimensions & weight	Approx. W110 × H396 × D346 mm, Approx. 5.4 kg

Standard Accessories

Description	Code
Unit plate (for 1mL to 20mL syringe)	7075610K
Reagent bottle with 1,000mL translucent brown plastic bottle	7075630K
Carbon dioxide adsorbent with tube	7075640K
20mL brown syringe	AUT-045P
Syringe attachment	AUT-066P
Degassing nozzle (for 1mL to 20mL syringe)	P000070
Nozzle cleaning attachment	AUT-067P
Nozzle purge tube	P000108
Teflon tube, black, 2m	AUT-022P
Burette connection cable, 0.9m	118B641
Instruction manual	-

Magnetic Stirrer

Usable beaker	Up to 200mL beaker
External connection terminal	Power for overhead rod type stirrer
Power source	AC100V-240V 50/60Hz
Power consumption	Approx. 5VA
Dimensions & weight	Approx. W110 × H73 × D135 mm, Approx. 0.8 kg

Standard Accessories

Description	Code
Stirring bar	107D039

Analysis Solutions for a Wide Range of Applications

Chemistry



Composition analysis, saponification value,
acid value, epoxy equivalence,
diazotization titration

Food Processing



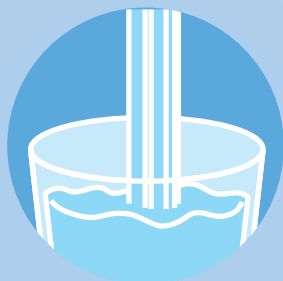
Acidity, salinity, vitamin C,
peroxide value

Pharmaceuticals



Potentiometric titration,
gastric acidity analysis

Environmental



Acidity, alkalinity,
hardness, residual chlorine

Metal Plating



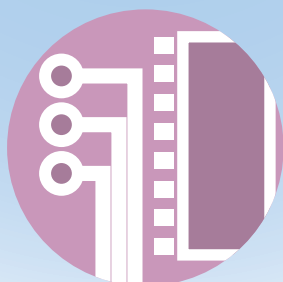
Acid/alkali in nickel plating liquid,
metal composition analysis

Petrochemicals



Neutralization number and bromine
number of
petrochemical product,
hydrogen sulfide
in desulfurization waste water

Electronics



Free acid in etching liquid for
printed circuit card,
free acid in surface treatment liquid

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CAUTION

Do not operate products before
consulting instruction manual.