MITSUBISHI CHEMICAL

Mitsubishi Chemical Group

Automatic Titrator
GT-200

Advanced interface and the new algorithm have enhanced the ease of use in versatile potentiometric titration measurement.

Analysis for Solution

MITSUBISHI CHEMICAL ANALYTECH CO., LTD.

Instruments Division

Advanced, intuitive GUI interface and the new algorithm potentiometric titration measurement.

The GT-series has developed into a new generation stage. GT-200 is now operated like a PC, such as mouse and USB memory for the ease of use. Intuitive graphical display has enabled one click quick start and is also easy set up for versatile measurements. Comprehensive options are ready for a fully automated system with up to 12 burets and 24 sample changer.

DATA on USB

USB memory can be used for multipurpose now.

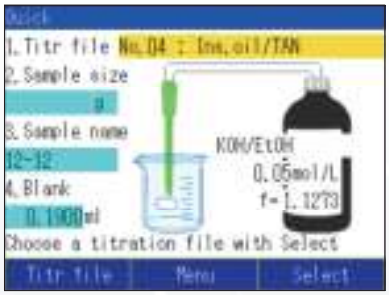
[PRINT SCREEN],

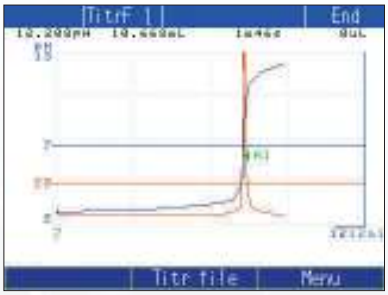
[EXPORT RAW DATA],

[EXPORT METHOD],

[ALL SYSTEM BACKUP].

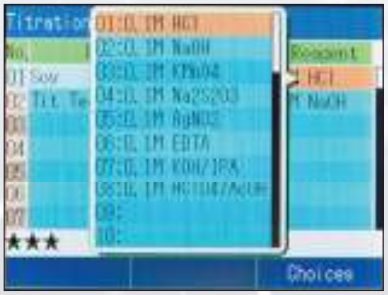
Print Screen on USB

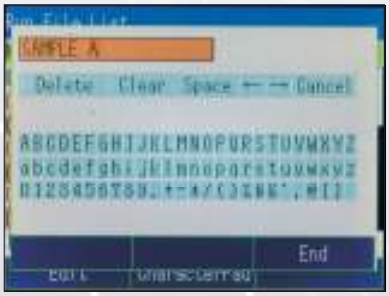




STRESS FREE WITH MOUSE

Mouse control enables improved user accessibility. Popup menu and scroll bar will bring smooth operation like a PC also for inputting alphanumeric names.



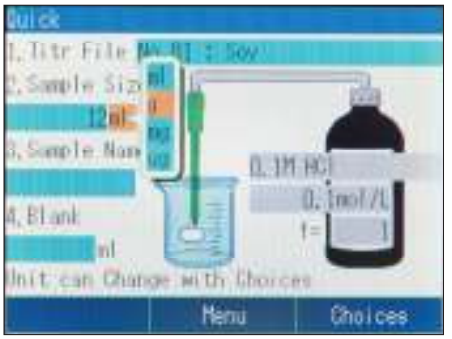


(distributer option, some wireless mice may not be applicable)

ONE PRESS TO GET RESULT

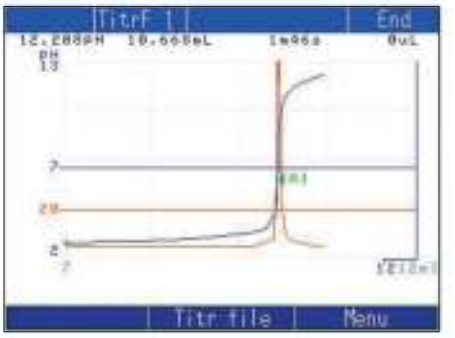
All information are displayed in one view, start titration by just pressing [start] for routine analysis.
5.7 inch COLOR LCD increases visibility for clear and sure recognition of status.

Power on (Quick mode)



Press

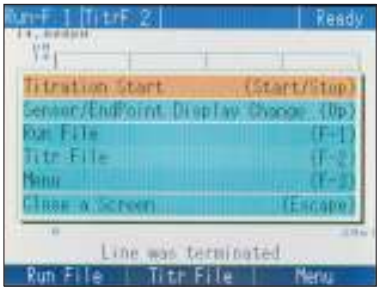
End



OTHER 2 MODES CAN BE SELECTED FOR EDITING METHOD

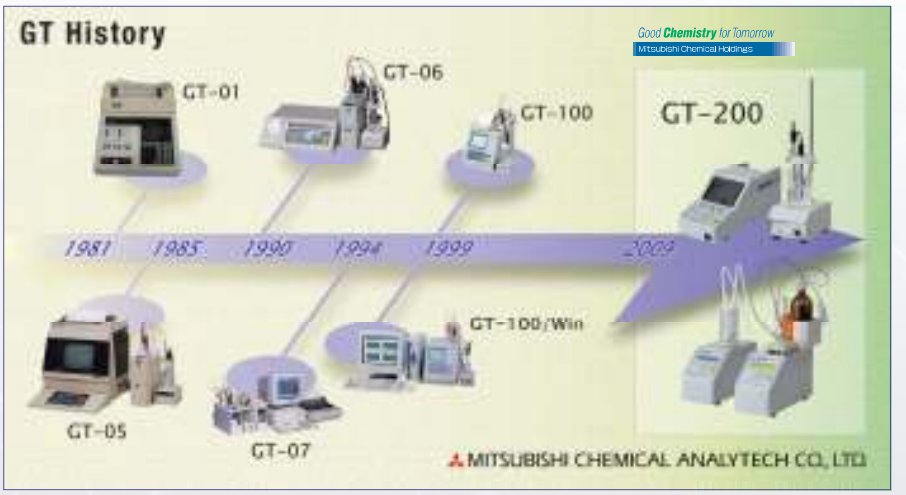
Hybrid Mode

Original Mode



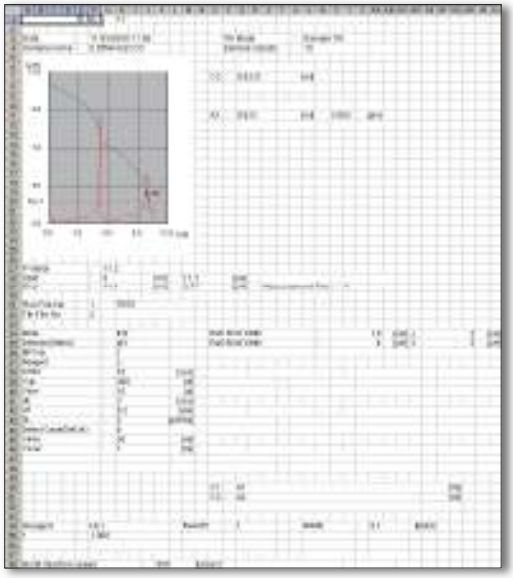
29 YEARS KNOW-HOW, START WITHOUT PARAMETER TUNING (Patent Pending).

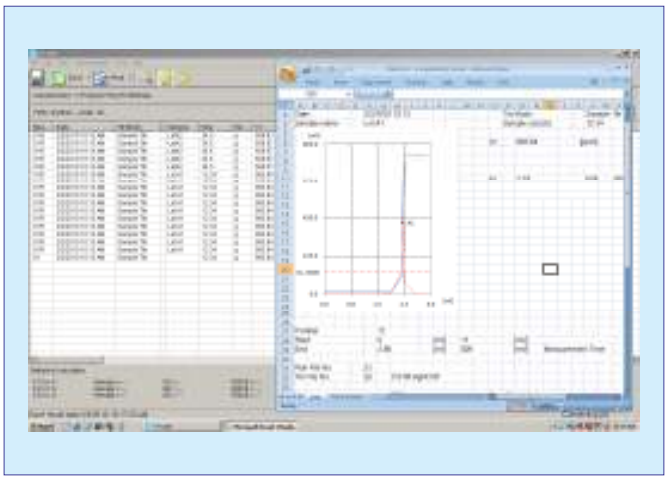
Unique algorithm S.E.D. (Smart End point Detection) enhanced end point recognition, which analyze not only inflection but also total curve. S.E.D. enables to start measurement without complicated setting of parameter .

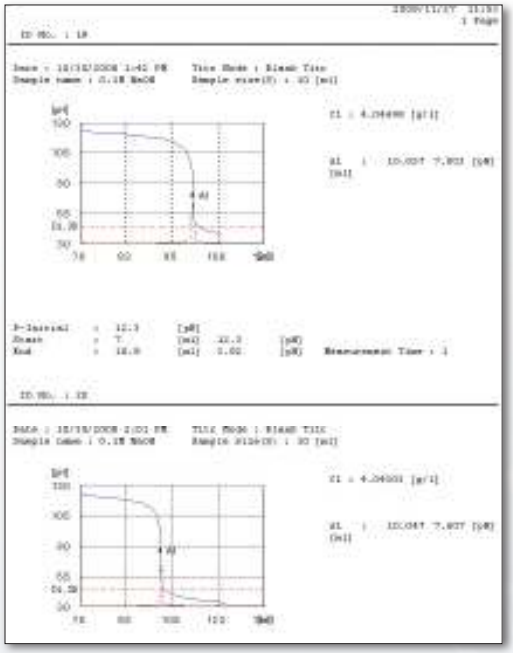


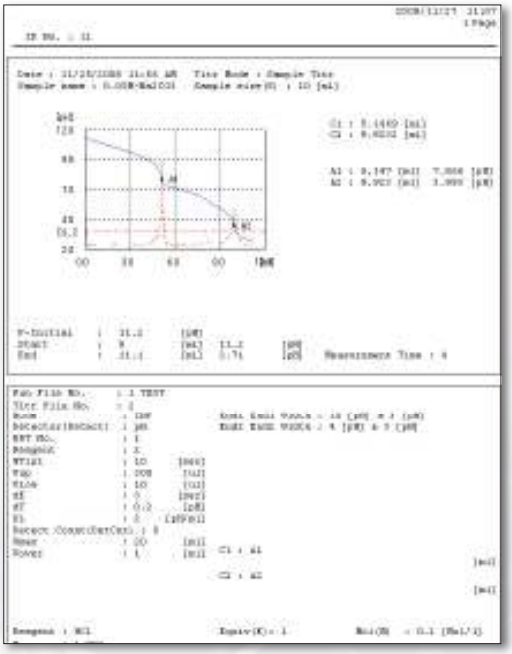
DATA ACQUISITION AND VALIDATION

GT-200 improved not only operation but also data processing. Optional software **Titration Viewer TV-200** acquires results and raw data in csv/txt format automatically. [TV-200] has 6 templates for Excel® and Word® printing with result and chart.









TV-200 (option)

Supplied by CD-ROM with USB cable.
Operating system: Microsoft® Windows® XP/VISTA (Excel® 2003/2007, Word® 2003/2007 is required to use templates)

GLP SUPPORT.

GT-200 has validation function to assure reliability of measurement.

- **VALIDATION** (buret, detection and measurement)
- **HISTORICAL DISPLAY of pH CALIBRATION**
- **LOGIN WITH PASSWORDS**

SYSTEM UPGRADE

Full automation for lower running cost.
Dispensing indicators/solvents and cleaning electrodes can be fully automated by connecting optional burets and sample changers.

GT-200 can operate also series of options, GT-7BRT, GT-7SD, GT-100BRT, GT-100SD, GT-7SC.

GT-200BRT FEATURES

MANUALLY OPERATIVE BURET and DISPENSER

GT-200BRT/SD can be operated from the keypad of the unit with instruction for dispensing, filling/displacing reagent.

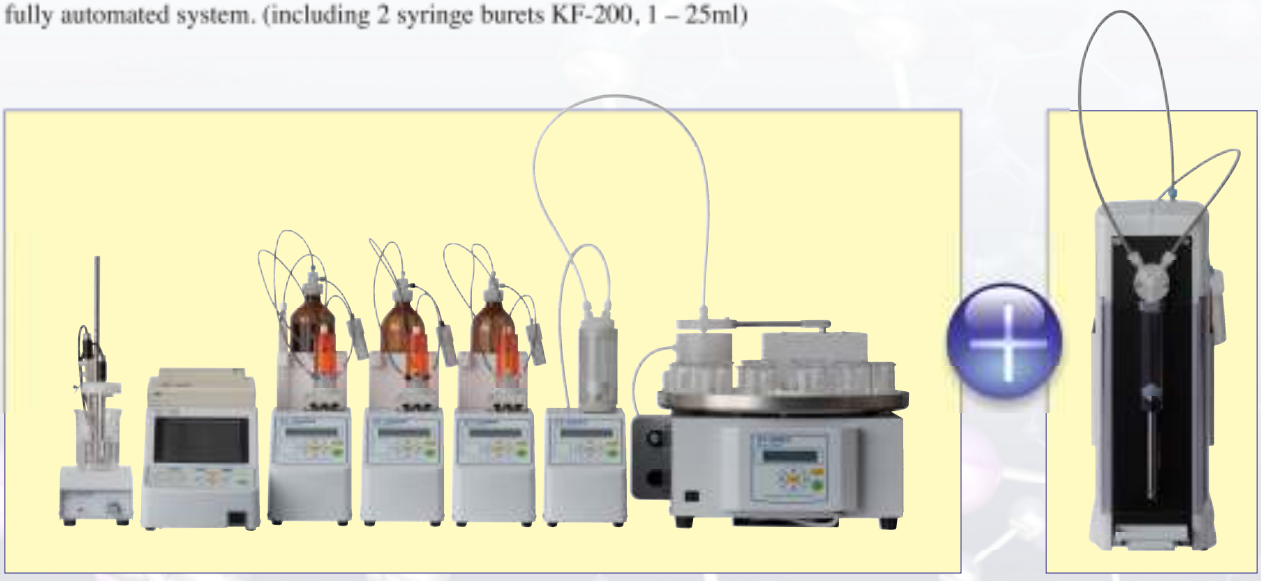
COMPACT DESIGN and FREE LAYOUT IN REMOTE USE

Autoburet and stirrer are stand alone. This allows them to be allocated inside a draft chamber.
(extension cable optional)

Stirrer: can be used up to 1 liter volume.

UPGRADE AVAILABLE UP TO 12 BURET UNITS

Automation is now one of the keys for low cost operation. GT-200 now allows to connect up to 12 buret units for fully automated system. (including 2 syringe burets KF-200, 1 – 25ml)



VERSATILE AND USEFUL FUNCTIONS

COMBINATION TITRATION

2 detector connector enables also to combine different types of titration in one sequencial method.

1 pH adjustment preparation and neutralization.

2 Follow Acidity with Salinity in food.

EMPTY BURET NEAR ENDPOINT? NO PROBLEM AT ALL, GT-200 DOES NOT BREAK DOSING AROUND END POINT.

Unique function F.V.R. (First Variable Refilling) which allows refilling buret prior to empty, so units can be run without suspending titration near end point.

When an end point is around 20ml with using a 20ml buret, reagent refill occurs around the end point. Titration interval becomes longer and smooth titration curves sometimes can not be obtained.
By setting “F.V.R.”, position of refilling can be avoided around end point, e.g. 15ml. Reagent starts at 15ml adequtely prior to end point and smooth titration curve can be obtained properly.

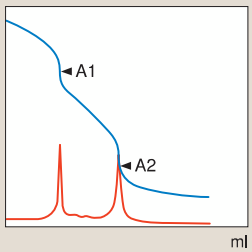
BURET CASSETTE AND HOLDER FOR QUICK CHANGE

	Buret cassette
Standard 20ml	Option: 1ml, 5ml, 10ml, 20ml with temp sensor, 20ml with internal coating.
Repeatability	+/- 0.01ml
Precision	1.000ml +/- 0.01ml 10.000ml +/- 0.02ml 20.000ml +/- 0.03ml
Dimension	69(W) x 121(D) x 131(H)mm

Cassette Holder	For each 0.5 liter, 1.0 liter bottle

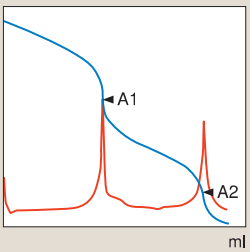
Various Modes of End Point Recognition

TEST titration



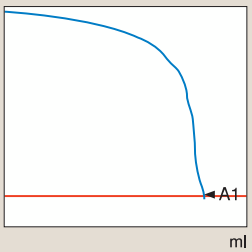
Use if the parameters are unknown. Parameters will be calculated automatically.

Inflection point (INF)



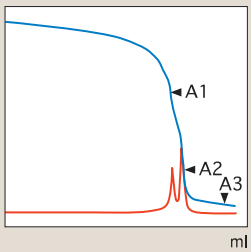
Inflection points are detected within preset potential ranges and recognized as end point. This is the most standard titration mode.

Setting potential (SET-P)



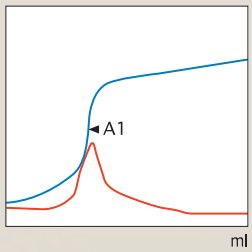
Reaching a preset potential is regarded as end point and calculate total amount.

Inflection point/setting potential (INF/SP)



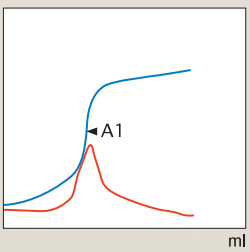
End point will first be searched via infection point. If not found, the preset potential will be regarded as end point.

Petroleum neutralization number - official method (OIL-A)



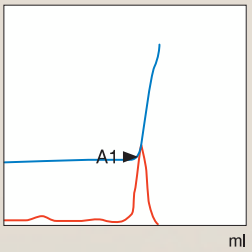
TAN/TBN for petroleum. ISO 6619/3771, ASTM D664/D2896. Titration continues until potential change is small.

Petroleum neutralization number - common method (OIL-J)



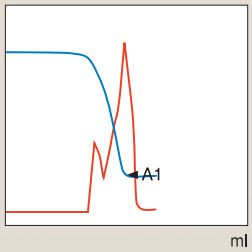
JIS K2501: Simplified method, enable to preset.

F intersection detection (CROSS-F)



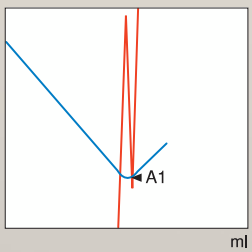
Recognize front intersection of potential change start (indicator color change start) as end point by indicator photometric titration method.

B intersection detection (CROSS-B)



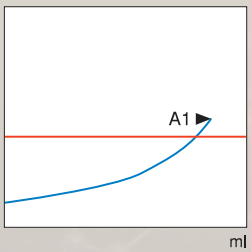
Recognize back intersection of potential change end (indicator color change end) as end point by indicator photometric titration method.

V intersection detection (CROSS-V)



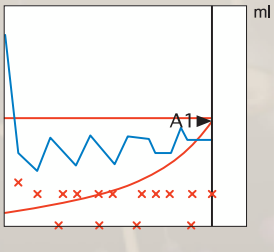
Method for obtaining tangent intersections of V-shaped titration curves by conductivity titration and amperometric titration.

Return time (R-TIME)



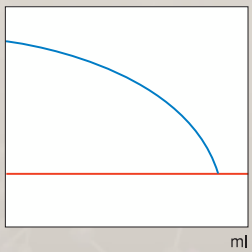
End point is defined when a preset time passes after reaching a preset potential.

Stat (STAT)



Method for using this unit as potentiostats. Titration continues while keeping the potential constant until preset time has passed.

Potential adjustment (ADJUST)



Titrate until preset potential. Pretreatment for combination titration.

Electrodes for Various Samples

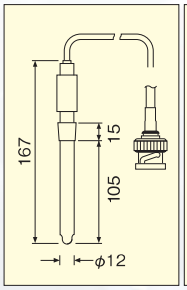
Application and Selection Guide

Titration Method		Electrodes			Option	Application
		Detection	Reference	Combined (det & ref)		
Potentiometry	Acid-Base	Glass, GTPH1B	GTRE10B GTRS10B	GTPC1B, GTPC1C	—	Acidity (Food), Isocyanate (Urethane), HF, HNO_3, CH_3COOH (Mix Acid), Purity (Acid)
	Acid-Base (petro)	Glass, GTPH1B	GTRS10B	—	—	TAN/TBN (Petroleum)
	Redox	Pt, GTPT1B	GTRE10B	GTPR1B, GTPR1C	—	VitamineC (Juice), Iodine value (Food oil), Fe (Plating), Peroxide value (Palm oil), H_2SO_4 (Waste acid), Bromine number, Bromine index
	Precipiation	Ag, GTAG1B Cl, GTCl1B	GTRE10B	GTAC1B, GTAC1C	—	Halogen (Water), Salt (Food), Cl (Oil, Plating), NaCN (Plating), Na_2S (Black liquor), F, I (Mixed acid)
	Cheletemetric	Ion selective F, GTFI1B Cu, GTDI1B Ag, GTAI1B Ca, GTEI1B Pb, GTPI1B	GTRE10B	—	—	Metal (Ni, Cu, Pb, Zn, etc. Plating), Hardness (Water), CaO, MgO (Cement) Boric acid (Plating)
	Surfactant	GTSS11B	—	—	PS board	Surfactant
	Polarization (Constant current)	Double Pt, GTWH10B	—	—	PS board	Br/I, Br/N (Oil), Iodine value (Oil, fat) *Amperometry or potentiometry depends on the testing method.
Amperometry	Polarization (Constant voltage)	Double Pt, GTWH10B	—	—	PS board	
Conductivity	Acid-Base	Double Pt, GTWH10B	—	—	PS board	Basicity of chemicals (Resin solution etc.)
	Precipitation	Double Pt, GTWH10B	—	—	PS board	Methacrylic acid (Dye, potentiometry also applicable)
Photometry	Acid-Base	—	—	—	GTLDII	TAN/TBN (Oil), Acidity (Food), Isocyanate (Uretane), HF, HNO_3, CH_3COOH (Mixed acid), Purity (Acid)
	Cheletemetric	—	—	—	GTLDII	Metal (Ni, Cu, Pb, Zn, etc. Plating), Hardness (Water), CaO, MgO (Cement), Boric acid (Plating)

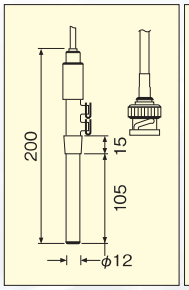
Dimensions of Electrodes

Temperature range: 0 – 60˚C. Cable:1500mm accompanied

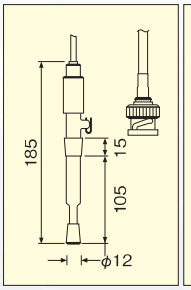
GTPH1B



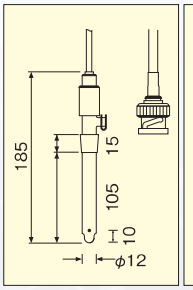
GTRE10B aqueous



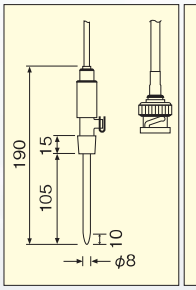
GTRS10B non aqueous sleeve type



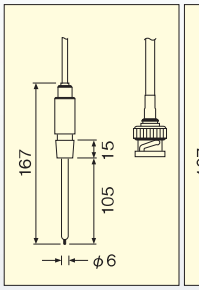
GTPC1B GTPR1B GTAC1B



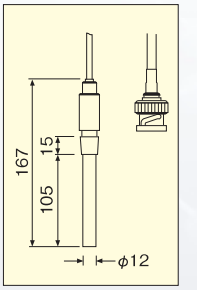
GTPC1C GTPR1C GTAC1C



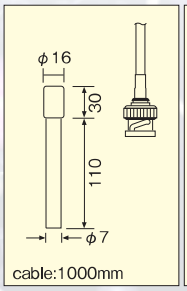
GTAG1B GTPT1B



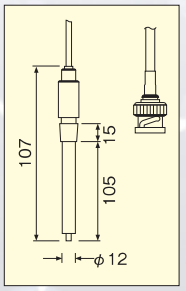
Ion Selective



GTSS11B

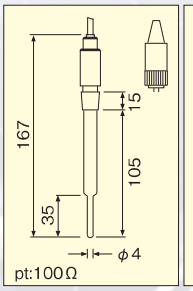


GTWH10B

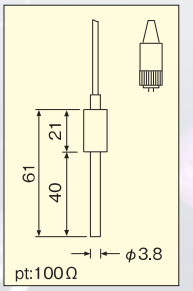


Temp. Sensor

GTTS10D beaker



GTETSB buret



*tip of electrode may differ by part number

Options for versatile application, comprehensive function

Auto Sample Changer GT-200SC

3 types of autosampler are available. GT-200SC can be operated from cable connected console.

TYPE 1 12 pos, 100ml beaker

TYPE 2 12 pos, 100/200ml beaker

TYPE 3 24 pos, 100/200ml beaker

Max number of beaker	12 or 24
Size of beaker	100, 200ml
Max. number of sample configurable	72 samples (24 x 3 times)
Cleaning electrodes	water pump by standard (non-aqueous pump, optional)
Stirring	titration position dispensing position (option)
Operating Console	detachable with 400mm cable
Sensing	proximity switch
Power	AC100-240V 50/60Hz. 100VA (100/120V), 140VA (230/240V)
Dimension and mass	Type1: 414(W) x 489(D) x 310(H)mm, 19Kg Type2: 440(W) x 520(D) x 310(H)mm, 19Kg Type3: 475(W) x 590(D) x 310(H)mm, 20Kg

Printer

Either thermal or impact type are available as option

Thermal Printer

Printing	thermal dot
Paper	width 112mm thermal paper
Speed	1 line per sec
Column	80
Power	AC100-240V 13VA
Dimension	160(W) x170(D) x 67(H)mm
Mass	0.7 kg

*special papers (long life or clean room) are also available.

Impact Printer

Printing	dot matrix
Paper	58mm width paper
Speed	2.5 line per sec
Column	24
Power	AC100-240V 13VA
Dimension	106(W) x 180(D) x 88(H)mm
Mass	0.47 kg

Solvent Dispenser GT-200SD

Dispense	automatic piston buret
Volume	50+/-2ml
Speed	100 to 5000µl/sec
Wetted part	Pyrex glass, PP, PE.
Flow	change by check valve
Tube	PE, 4/6 (mm, ID/OD)
Power	supply from main unit
Dimension	130(W) x 316(D) x 347(H)mm
Mass	4.5kg

Syringe Buret KF-200

Dispense	syringe,
Volume	1, 2.5, 5, 10, 25ml +/-0.02 (10ml)
Flow	change by rotary valve
Tube	PTFE, 2/3 (mm, ID/OD)
Power	from main unit
Dimension	108(W) x 320(D) x 275(H)mm
Mass	3.5kg

Photometric Detector GT-LDII

Detection	probe immersion of optical fiber
Light source	tungsten
Filter	530nm, 620 nm (other wavelength available)
Power	AC100/120/220/240V 10VA
Dimension	90(W) x 266(D) x 150(H)mm
Mass	2kg

Power Box

Power	AC100/120/220/240V 80VA
Dimension	110(W) x172(D) x 84(H)mm
Mass	1.5kg

*For four or more burets/BD

PS Board

Option board for
polarization titration (constant current and voltage),
conductivity titration in one board

Closed Cell Set

Available for 100, 200ml with gas purge plug

SPECIFICATIONS

Standard Configuration

GT-200

Type of Measurement	potentiometric titration (Acid-base, Redox, Chelate, Precipitation) Option: polarization (amperometry)/conductivity, photometry
Sensor	2 x detector, 1 x reference, 1 x temperature.
Operating Range	pH :0 -14 (resolution 0.001pH) mV: -2000 - +2000 (resolution 0.1 mV) Conductivity : 0 -20 µA Temperature : 0 - 99℃ (0.1℃, depend on electrode)
Titration Modes	TEST, INF, SET-P, INF/SP, DIL-A, DIL-J CROSS-F, CROSS-B, CROSS-V, R-TIME STAT, ADJUST, pKa
Combination Titration	Two titration files can be set.
USB Export	display, raw data, method, system
Number of Burets and Dispensers	max. 12 (include syringe type)
Pre-set	3 points for one titration file.
GLP	Validation (buret, detection, dispense, measurement). Login with passwords. Historical display of pH calibration
Number of Files	56 titration, 99 result, 40 reagent, 20 formula.
Display	5.7 inch color LCD result, parameter and chart, Multi-language.
Ports	3 x USB, 5 x COM (balance, GT/KF Burettes, printer, RS232C)
Power	100-240VAC, 100VA
Dimension	175(W) x 408(D) x 176(H)mm
Mass	4 kg

*Electrodes can be selected separately for each application indicated in the brochure.

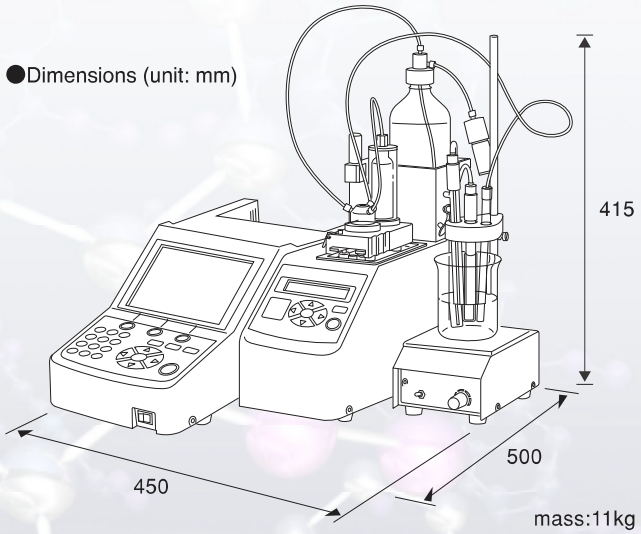
Buret GT-200BRT

Buret volume	20 ml
Accuracy	repeatability +/- 0.01ml (20ml) resolution 0.002ml
Flow	auto valve made of fluoro-plastic
Wetted part	fluoro-plastic, glass, PP
Reagent bottle	500 -1000 ml
Cable	0.5m (option 2m)
Power	supply from main unit or power box
Dimension	127(W) x 378(D) x 260(H)mm
Mass	5.5 kg

Stirrer GT-200STR

Beaker volume	up to 1000 ml
Sample vessel	max 300mm height
Cable	1 m
Power	supply from main unit
Dimension	110(W) x 165(D) x 415(H)mm
Mass	1.2 kg

●Dimensions (unit: mm)



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Pricing on any accessories shown can be found by keying the part number into the search box on our website.

The specifications listed in this brochure are subject to change by the manufacturer and therefore cannot be guaranteed to be correct.
If there are aspects of the specification that must be guaranteed, please provide these to our sales team so that details can be confirmed.

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Please contact us if this literature doesn't answer all your questions.