

AUT-701 Examples of Applications

Food Processing			
Titration Type	Electrode Type	Model	Titration Contents
Acid/base titration	*pH combined	GST-5741C	Acidity of fruit drink by end point titration
			Acidity analysis of yogurt
	Trace volume	GST-5723S	Acidity of fruit drink
			Lactic acid (C ₃ H ₆ O ₃) of noodle treatment fluid
ORP titration	Platinum comb. or Platinum Reference	PTS-5011C HP-105 HS-305DS	Total acidity/amino acid of rice wine
			Vitamin C in juice
Precipitation titration	Silver comb. or Silver Reference	ELX-006 HA-101 HS-305DS	POV of edible oil
			Seasonings (soy source, source, vinegar etc.)
Chelate titration	Photometric tit. unit (630nm)	FUT-7010	Calcium concentration in corn flakes
			Calcium ion Reference
Non-aqueous titration	Glass Reference (Temp. sensor)	HGS-2005	Acid value in edible oil
		HS-305DS (TH-1005)	Amino acid analysis by perchloric acid titration
Conductivity titration	Conductivity unit	FUT-7040	Sulfate ion (SO ₄ ²⁻)
Acid/base titration	pH comb. (double junction)	ELP-062	Continuous acidity salt analysis of vinegar, mayonnaise
Precipitation titration	Silver comb.	ELX-006	

*: Standard electrode : Optional combination electrodes with Electrode adapter 0JD0001 & Electrode holder S-HLD-S

Chemistry			
Titration Type	Electrode Type	Model	Titration Contents
Acid/base titration	*pH combined	GST-5741C	Phosphoric acid
			Phosphoric ester
			Fractional quantitative analysis of hydro-barium (Ba(OH) ₂) & carbonate barium (BaCO ₃)
			Formalin concentration analysis by sodium sulfite method
			Hydrozine (N ₂ H ₄)
ORP titration	Platinum combined or Platinum Reference	PTS-5011C HP-105 HS-305DS	Iodide (I ₂)
			Peroxide hydrogen (H ₂ O ₂)
			Sodium sulfite (NaSO ₃)
			Purity analysis of sodium disulfite (Na ₂ S ₂ O ₅)
			Purity analysis of persulfuric acid ((NH ₄) ₂ S ₂ O ₈)
			Potassium ferricyanide
			NaSH in hydrosulfuric absorbent caustic soda
			Sulfuric ion (S ₂ ⁻)
Precipitation titration	Chloride ion Reference	CL-125B HS-305DS	Hydrazine (N ₂ H ₄)
			Salt analysis in raw concrete
	Silver Reference	HA-101 HS-305DS	Chloride ion concentration in cement
			Low concentration chloride ion (Cl ⁻)
	Silver combined or Silver Reference	ELX-006 HA-101 HS-305DS	Sulfuric ion (S ₂ ⁻)
Chelate titration	Photometric tit. unit (530nm)	FUT-7010	Cobalt ion in cobalt chloride (CoCl ₂)
			Copper ion Reference
Non-aqueous titration	Glass Reference (Temp. sensor)	HGS-2005 HS-305DS (TH-1005B)	Fractional quantitative analysis of fluoride (HF) and nitrate acid (HNO ₃)
			Epoxy equivalent analysis
			Saponification value analysis
Conductivity titration	Conductivity unit	FUT-7040	Fractional quantitative analysis of sodium hydroxide (NaOH) & triethyleamin ((C ₂ H ₅) ₃ N)

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Metal Plating			
Titration Type	Electrode Type	Model	Titration Contents
Acid/base titration	*pH combined	GST-5741C	Bora acid (H3BO3) in nickel plating liquid
			Sodium hydroxide in permanganate salt liquid
			Fractional quantitative analysis of sodium hydroxide (NaOH) & sodium carbonic acid (Na2CO3) in cadmium cyanide plating liquid
ORP titration	Platinum comb. or Platinum Reference	PTS-5011C	Chromic acid (CrO3) in plating liquid
		HP-105	Tin (Sn2+) in pewter plating liquid
		HS-305DS	Analysis of sodium phosphorite acid
Precipitation titration	Silver comb. or Silver Reference	ELX-006	Potassium sodium tartrate in copper cyanide plating liquid
		HA-101	Nickel chloride (NiCl2) in nickel plating liquid
		HS-305DS	Sodium cyanide (NaCN) in copper cyanide plating liquid
Chelate titration	Photometric tit. unit (530nm)	FUT-7010	Nickel (Ni) in nickel plating liquid
			Lead (Pb) in pewtar plating liquid
	Photometric tit. unit (630nm)	FUT-7010	Copper (Cu) in copper cyanide plating liquid
			Zinc oxide (ZnO) in zinc plating liquid
Calcium ion Reference	CA-135B	HS-305DS	Cadmium in cadmium cyanide plating liquid
	HS-305DS		Nickel (Ni) in nickel plating liquid (reverse titration by copper ion electrode)
Acid/base titration Chelate titration Precipitation titration	pH comb. (double junction) Photometric tit. unit (530nm) Silver comb.	ELP-062 FUT-7010 ELX-006	Continuous analysis of boric acid (H3BO3), total nickel (Ni), nickel chloride (NiCl2), nickel sulfate (NiSO4) in nickel plating liquid

*: Standard electrode : Optional combination electrodes with Electrode adapter 0JD0001 & Electrode holder S-HLD-S

Electronics			
Titration Type	Electrode Type	Model	Titration Contents
Acid/base titration	*pH combined	GST-5741C	Acid in etching liquid
			Fraction quantitative analysis of total acid, iron in stainless treatment liquid
			Sulfuric acid (H2SO4) & copper (Cu) in etching liquid for printing circuit board
			Free chloride acid in mask surface treatment liquid
			Acid conc. and aluminum in chemical reagent
			Hydrogen fluoride (HF) or ammonium fluoride (NH4F) in etching liquid
ORP titration	Platinum comb. or Platinum Reference	PTS-5011C HP-105 HS-305DS	Oxalic acid ((COOH)2) in etching liquid
			Copper ion (Cu2+)
			Chromium ion (Cr6+)
			Cobalt ion (Co2+)
			Titanium ion (Ti3+, Ti4+) in etching liquid
			Iron ion (Fe2+) in acid cleaning liquid
			Sodium thiosulfate in desulfurization liquid
			Hydrogen peroxide in chemical polishing liquid
Precipitation titration	Silver comb. or Silver Reference	ELX-006 HA-101 HS-305DS	Oxalic acid ((COOH)2) in etching liquid
			Chloride ion (Cl-) in flux
			Thiohamstoff ((NH2)2CS) incontinuous surface treatment liquid
Chelate titration	Photometric tit. unit (530nm)	FUT-7010	Thiocyanate ion (SCN-) in desulfarization liquid
			Silver ion (Ag+)
	Photometric tit. unit (630nm)	FUT-7010	Nickel (Ni) in nickel plating liquid
			High purity strontium chloride
Copper ion Reference	CU-125	HS-305DS	Purity analysis of zinc oxide (ZnO)
	HS-305DS		Lead ion (Pb2+)
Nonaqueous	Glass	HGS-2005	Copper (Cu) in chemical polishing liquid
			Acid number of flux

Non-aqueous titration	Reference (Temp. sensor)	HS-305DS (TH-1005)	Fraction quantitative analysis of hydrochloric acid (HCl) and hydrofluoric acid (HF)
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Environmental			
Titration Type	Electrode Type	Model	Titration Contents
Acid/base titration	*pH combined	GST-5741C	Alkalinity analysis of city and swage water Acidity analysis of city and swage water
ORP titration	Platinum comb. or Platinum Reference	PTS-5011C	Residual chloride (Cl ₂) of city water
		HP-105	Consumed volume of potassium permanganate acid
		HS-305DS	DO in sea water
Precipitation titration	Photometric tit. unit (630nm)	FUT-7010	Low concentration sulfuric ion (SO ₄ ²⁻)
	Silver comb. or Silver Reference	ELX-006 HA-101 HS-305DS	Chloride ion of city water
Chelate titration	Photometric tit. unit (630nm)	FUT-7010	Total hardness of city water
			Fractional quantitative analysis of calcium (Ca) and magnesium (Mg) of city water

*: Standard electrode : Optional combination electrodes with Electrode adapter 0JD0001 & Electrode holder S-HLD-S

Petrochemicals			
Titration Type	Electrode Type	Model	Titration Contents
Acid/base titration	*pH combined	GST-5741C	Concentration management of NaOH, amine, potassium carbonate in desulfurization waste water
Precipitation titration	Silver comb. or Silver Reference	ELX-006	Hydrogen sulfide in desulfurization waste water
		HA-101 HS-305DS	Chloride ion in desulfurization waste water
Non-aqueous titration	Glass Reference (Temp. sensor)	HGS-2005 HS-305DS (TH-1005)	Acid number of engine oil
			Base number of engine oil
			Acid number of insulation oil
			Acetic acid vinyl
			Carboxylic number of fat and oil
	Polarization unit	FUT-7030	Bromide number in petroleum product

*: Standard electrode : Optional combination electrodes with Electrode adapter 0JD0001 & Electrode holder S-HLD-S

Pharmaceuticals			
Titration Type	Electrode Type	Model	Titration Contents
Acid/base titration	*pH combined	GST-5741C	Sodium bicarbonate (NaHCO ₃) in liquid medicine for stomach
ORP titration	Platinum Reference	HP-105 HS-305DS	Purity analysis of sodium sulfide (Na ₂ S)
Precipitation titration	Platinum Reference	HP-105 HS-305DS	Benzetonium chloride (C ₂₇ H ₄₂ ClNO ₂) by tetraphenel sodiumboric
			Silver comb. or Silver Reference
Chelate titration	Photometric tit. unit (530nm)	FUT-7010	Aluminum oxide (Al ₂ O ₃) in liquid medicine for stomach
	Photometric tit. unit (630nm)	FUT-7010	Magnesium oxide (MgO) in liquid medicine for stomach Calcium carbonate (CaCO ₃) in liquid medicine for stomach
Non-aqueous titration	Glass Reference (Temp. sensor)	HGS-2005 HS-305DS (TH-1005)	Ester number of cosmetic spice
			Acid number of cosmetic spice
			Gluconic acid chlohexazine (C ₂₂ H ₃₀ Cl ₂ N ₁₀)
	Polarization unit	FUT-7030	Aminobenzonic acid ethyle (NH ₂ C ₆ H ₄ COOC ₂ H ₅)
Conductivity titration	Conductivity unit	FUT-7040	Sulfate ion (SO ₄ ²⁻)

*: Standard electrode : Optional combination electrodes with Electrode adapter 0JD0001 & Electrode holder S-HLD-S