ICA-7000

Ion chromatograph

Supports comfortable analysis
New model with a variety of functions

NEW

- ◆All-in-one, compact design
- ◆Support both suppressor and non-suppressor systems
- ◆The new optional ion removal device realizes high sensitivity measurement of both anion and cation.

DKK-TOA CORPORATION

ICA-7000
Ion chromatograph

With a new ion analysis and data processing

All-in-one Compact design

Excellent extensibility

Suppressor system and Non-suppressor system

For a wide range of analytical needs

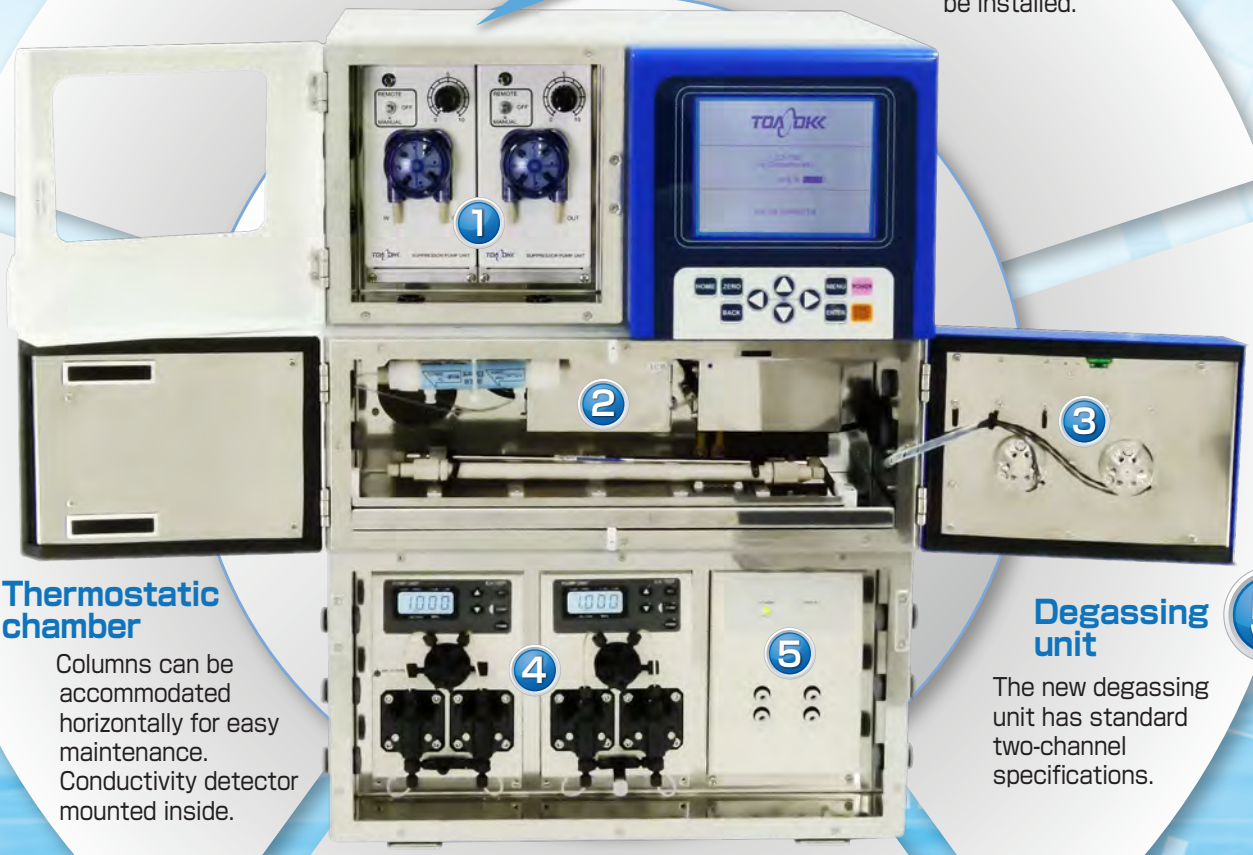
1 Suppressor pump unit

Maximum storage capacity increased from 1 unit (conventional) to 2 units.

It is possible to add ion removal device (electrolytic regeneration method)

3 Injector

Up to 2ch can be installed.



2 Thermostatic chamber

Columns can be accommodated horizontally for easy maintenance.
Conductivity detector mounted inside.

5 Degassing unit

The new degassing unit has standard two-channel specifications.

Pump unit

Use of new pumps to prevent air contamination.
Improved stability of liquid feeding.
Reduce plunger seal exhaustion.

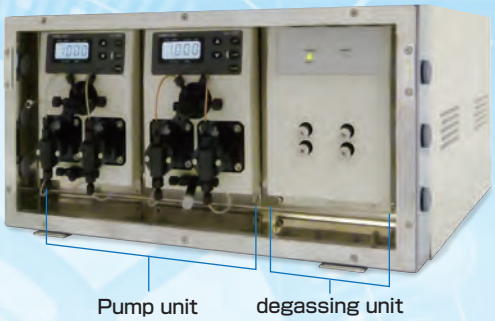
4

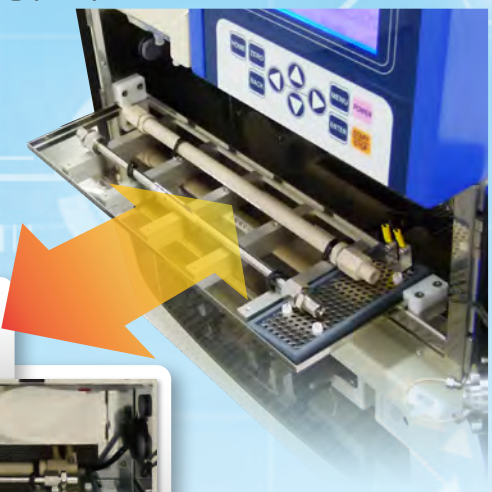
All-in-one, compact design, the same size for the 2ch system

◆The main unit houses and integrates all the units such as the detector, pump, display unit, operation unit, and column thermostat. This has reduced the installation space for the equipment.
◆Low range measurement for high sensitivity analysis has been added

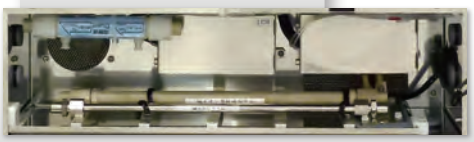
Excellent extensibility due to unitized configuration

◆Up to 2ch of ion chromatograph can be constructed by adding pump units, etc.
◆The use of a new type of pump enables stable liquid feeding.
◆Two remover pumps for suppressor can be accommodated.
◆Horizontal storage of columns to improve maintenance.
◆The new degassing unit has standard two-channel specifications.





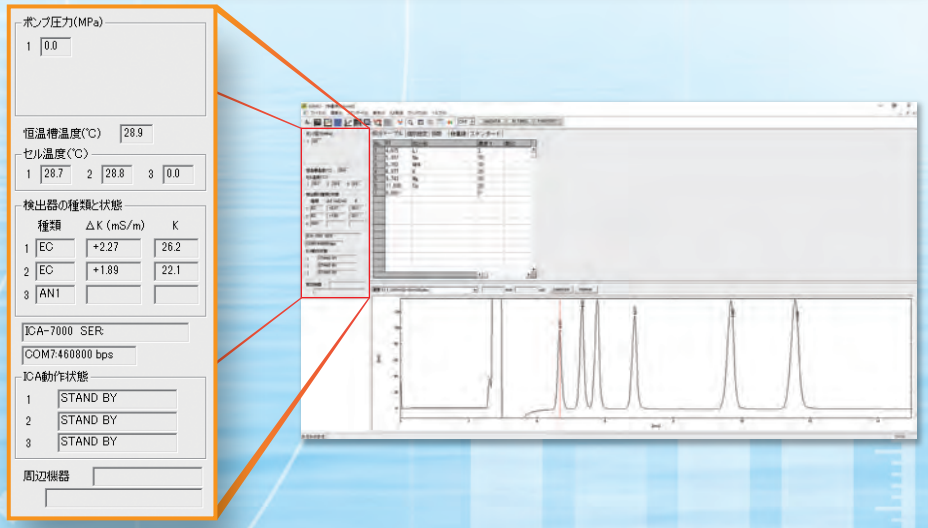
Column part can be pulled out



Thermostatic chamber

Device control and data processing by USB communication

◆Communication between the main unit and the PC is USB-based, and the PC can be operated remotely by using a commercially available RS232-LAN converter adaptor.
◆All operations can be done from the PC by installing the dedicated software.



Supporting the suppressor system allows high sensitivity analysis

Chemical suppressor pump / Chemical suppressor

For a wide range of analytical needs

◆Combined with a post-column reactor, it is also possible to analyze cyan/bromic acid (water test method) and heavy metals.

Post-column reactor

Electrochemical detector

◆When Combined with an electrochemical detector. sugars analysis is possible.

ICA-7000 Meets Different Needs with Three Systems

1. Non-suppressor system (Basic system)

★ Simplest component system
Compatible with both anions and cations.

2. Ion removal device system (electrolytic regeneration method)

★ Analyzing anions and cations with high sensitivity by adding an ion removal device to the basic system.

3. Chemical suppressor system

★ Sensitive Analysis of Anion at Low Cost

Suppressor pump unit

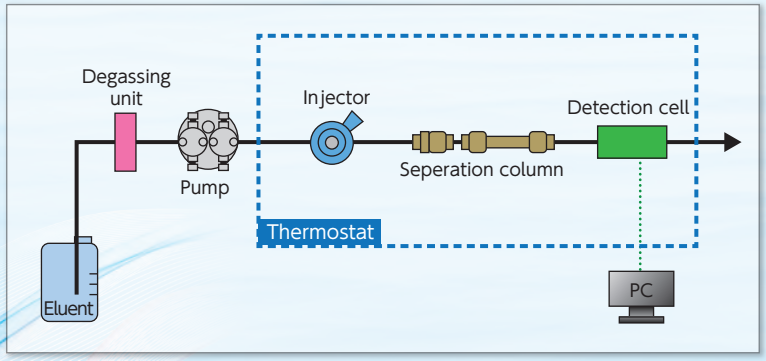
Chemical suppressor

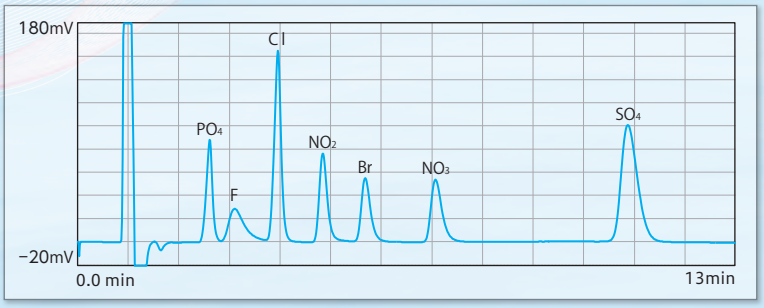
1. Non-suppressor system (Basic system)

★ Simplest component system. Can be used for anions and cations analysis by a non-suppressor.

Configuration

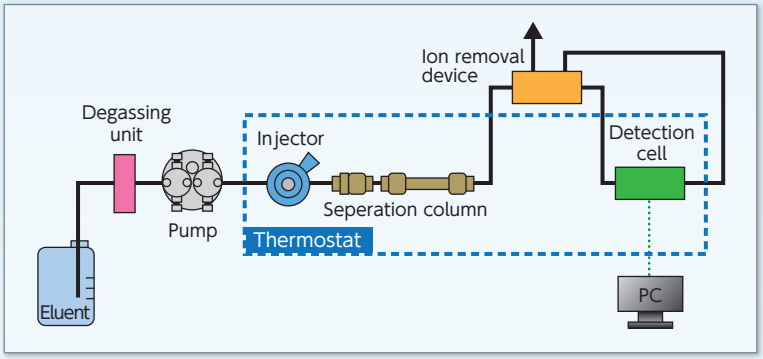
◆Main unit※ ICA-7000
◆Conductivity cell

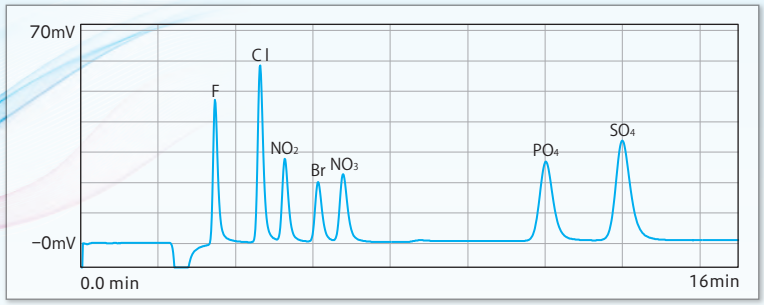




2. Ion removal device system (electrolytic regeneration method)

★Analyzing anions and cations with high sensitivity by adding an ion removal device to the basic system.



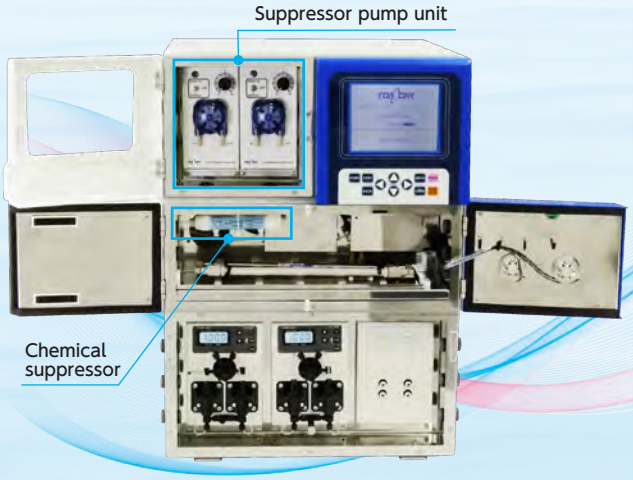


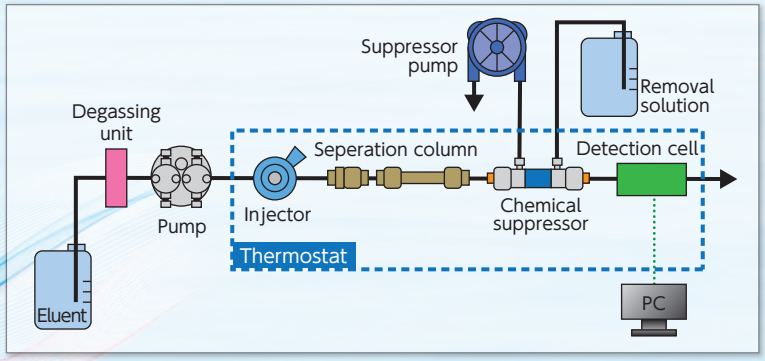
Configuration

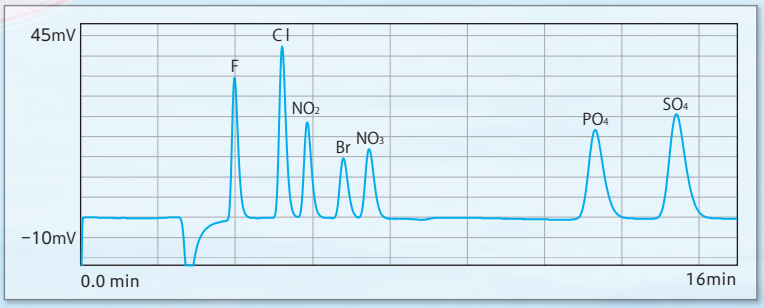
◆Main unit※ ICA-7000
◆Conductivity cell
◆Module for anion measurement ICA-AMS 7600400U or
Module for cation measurement ICA-CMS 7600410U

3. Chemical suppressor system

★By incorporating a chemical suppressor and a pump unit into the basic system, anions can be analyzed with high sensitivity.







Configuration

◆Main unit※ ICA-7000
◆Conductivity cel
◆Suppressor pump unit 7591950U
◆Chemical suppressor 6813690K

※One pump unit, one degassing unit and one injection valve are included.

Analyzing anions and cations with high sensitivity

Ion removal device

Module for anion measurement ICA-AMS: 7600400U
Module for cation measurement ICA-CMS: 7600410U

★ Electrolytic regeneration type ion removal device

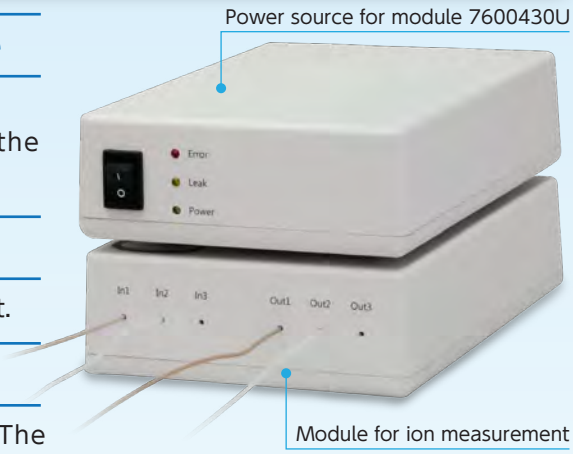
"There is no need to prepare regenerant (removal solution).
The solution required for electrolysis is the effluent from the detector or pure water."

★ Continuous regeneration method

No switching of the suppressor is required for each measurement.

★ No special setting required

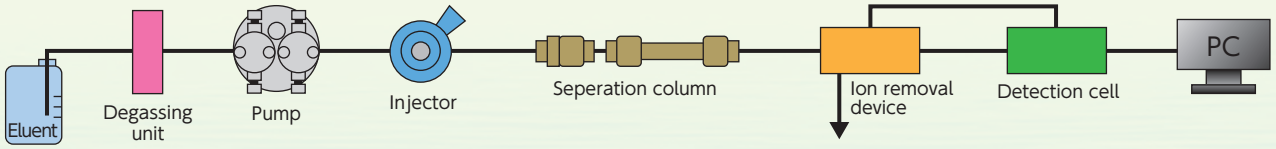
After the power is turned on, all are in automatic control. The operation status can be checked by the lighting status (blue, yellow, and red) of the LED on the power supply front panel for the module.



The instrument consists of an ion rejection module and a power supply for the module that controls it.

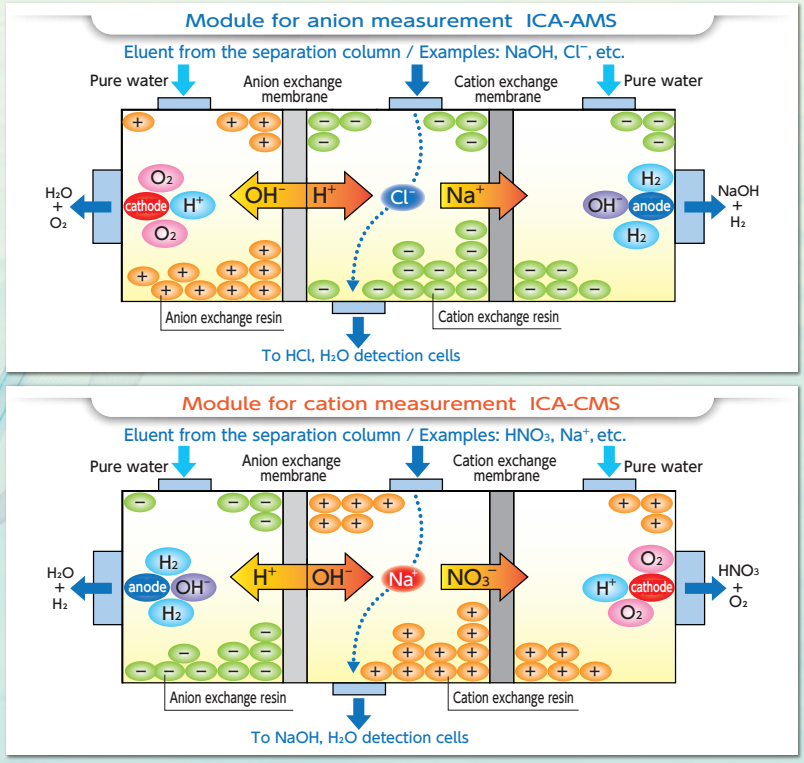
◆Role of the ion removal device

The eluent used in ion chromatography with the suppressor method is an acidic or alkaline electrolyte solution. In addition, this solution itself exhibits high electrical conductivity. As shown in the system flow diagram below, the suppressor is placed between the separation column and the detector (electrical conductivity detection cell). In order to convert the eluent from the separation column to a solution with low electrical conductivity before detection, counterions of the ion species component to be measured are ion-exchanged at the suppressor section. The low electrical conductivity of the solution at the detection stage suppresses baseline noise, and therefore improves the sensitivity of the ionic species component to be measured.



◆Structure and suppression principles

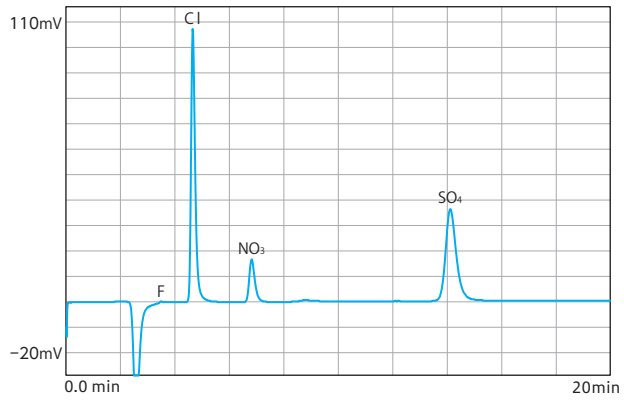
It is divided into three rooms by different ion exchange membranes. In addition, each room is filled with ion exchange resin. It has a structure that prevents the intrusion of hydrogen ions and hydroxide ions generated at the electrode portion and impurity ions contained in the solution supplied to the outer channel in order to perform electrolysis into the inner channel, so that it has an effect of further reducing the electrical conductivity.



Measurement examples

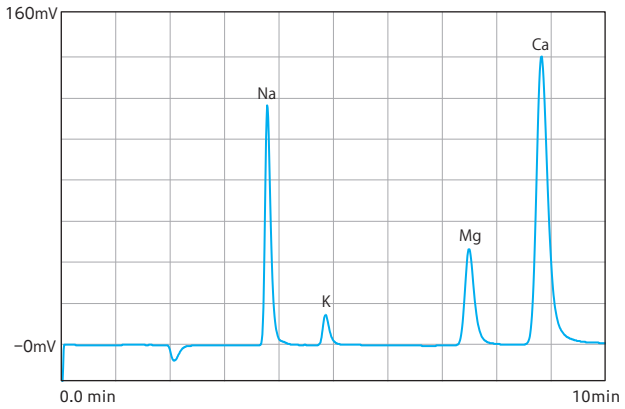
Tap water (anion)

Dilution rate: 10 times dilution



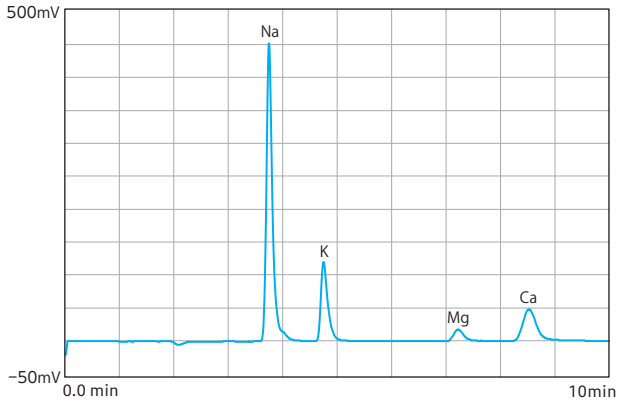
Tap water (cation)

Dilution rate: 10 times dilution



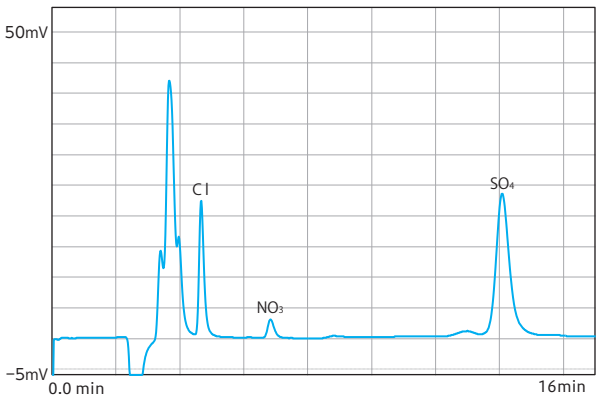
Juice

Dilution rate: 1,000 times dilution

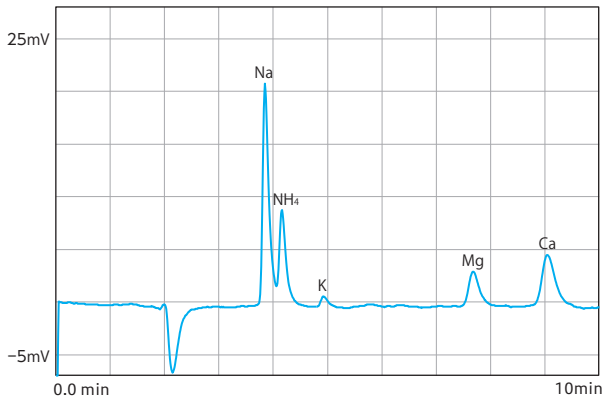


Food ingredients

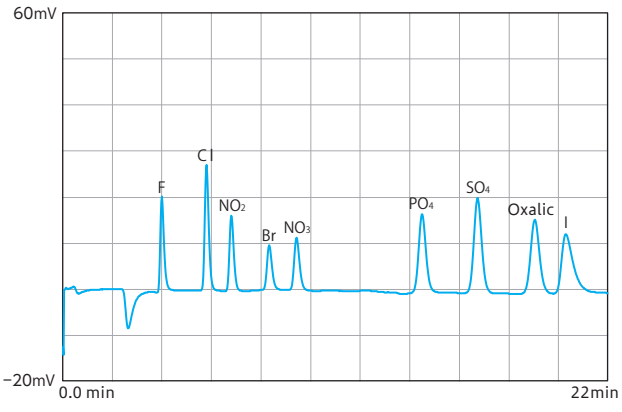
Dilution rate: 100 times dilution



Rainwater



Anion standard solution (9 components)



Further low concentration quantitation achieved

Chemical suppressor unit

Suppressor Pump Unit: 7591950U | Chemical suppressor: 6813690K

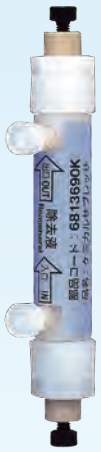
★ Low-cost, high-sensitivity analysis

The combination of the suppressor pump unit for liquid removal and the chemical suppressor (6813690K) enables high-sensitivity anion analysis. The chemical suppressor is a suppressor for anion analysis that uses a high-exchange capacity cation-exchange membrane (fiber-type).

★ Space-saving/easy-to-maintain design

The pumping unit can be installed in the body of the ICA-7000 and does not require any extra space. The chemical suppressor can also be installed in the thermostatic chamber of the main unit.

Suppressor pump unit



Chemical suppressor

Compatible with ion chromatography and post-column method

Post-column reactor

ICA-200PR

★ Non-metal pumps with excellent chemical resistance are used.

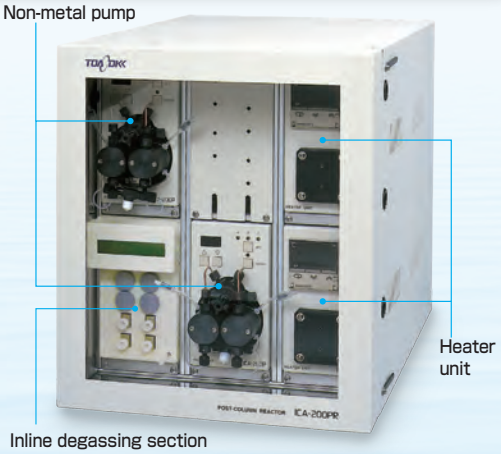
★ Equipped with 2 pumps for reaction reagents and 2 heaters.

★ Temperature can be controlled between 40° C and 100° C.

★ Equipped with plunger self-cleaning function of the pump unit.

Application Example

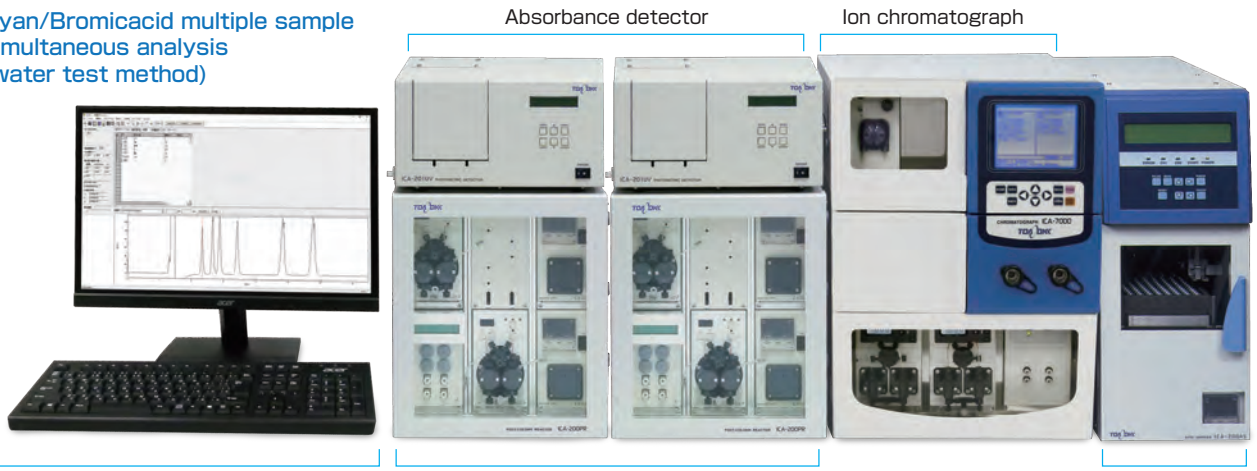
- ◆Cyan/Bromic acid analysis (Water test method)
- ◆Heavy metal analysis



◆Example of system application

Cyanide / Bromicacid multiple sample simultaneous analysis system (example)

Cyan/Bromicacid multiple sample simultaneous analysis (water test method)



Support for continuous measurement of multiple samples

Auto-sampler

ICA-200AS

Autosampler
(Standard type)

Autosampler with cooling function available
(Factory option)

★Up to 2ch simultaneous measurement

By adding a syringe unit and a valve unit, simultaneous measurement of 2ch or independent measurement can be performed.

★ Continuous automatic measurement of up to 90 samples is possible

Up to 90 samples can be measured continuously and automatically by simply placing the sample container in the sample rack (when the instrument control software is used).

★ Voluntary setting of sample measurement order, injection volume, repeat measurement

Samples lined in the sample rack can be measured in the order or randomly. Sample injection volume, repeat measurement, measurement channel can be set according to the sample.

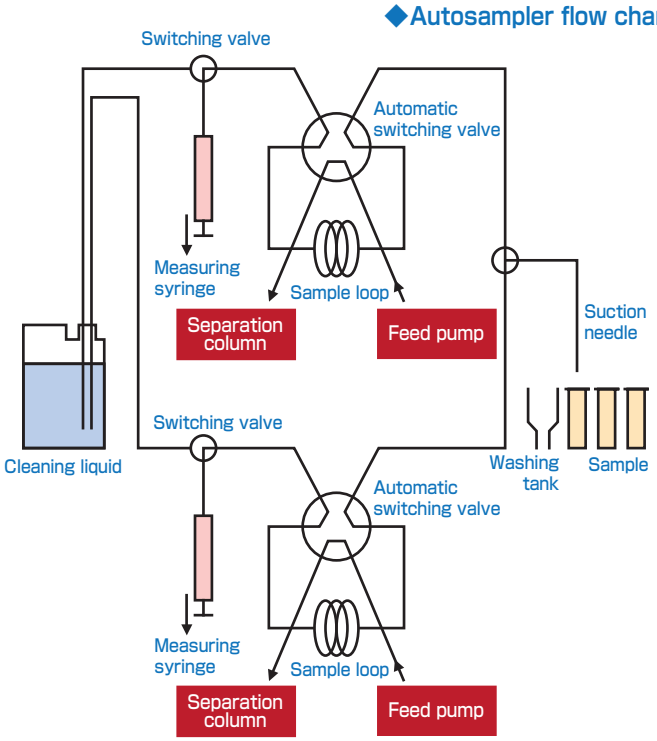
★ 2 types of sample injection methods can be selected.

As for sample injection, LOOP mode (Loop volume constant injection) or INJECTION mode (Optional setting of injection volume) can be selected.

★ Automatic dilution of samples (Max. 40 samples)

Sample can be diluted with voluntary factor, and the diluted sample can be injected. Dilution factor can be set according to the sample.

◆Autosampler flow chart



Specification

◆Ion Chromatograph Main Unit ICA-7000

Indicator		Backlit monochromatic LCD
Setup operation		Key operation or setting operation using PC-only software
Wetted materials		Non-metal
Power		AC100V 50/60Hz
Power consumption		Up to Approx. 300VA
Dimension		Approx. 400 (width) × 550 (height) × 471 (depth) mm
Weight		1 flow path: approx. 28 kg, 2 flow paths: approx. 31kg
Constant temp. section	Temp. control system	Air circulation system
	Temp. control range	Room temp. +10~60℃
	Temp. stability	±0.1℃
	Internal dimensions of the thermostatic chamber	Approx. 365 (width) × 100 (height) × 113 (depth) mm
	Storable column	Three units of ϕ4.6 x 250mm can be accommodated at the same time.
	Liquid leakage sensor	Built-in
	Other	Two conductivity cells, two injectors, two suppressors, and a reaction coil can be accommodated at the same time.
Sample injection port	Method	Manual Sample Injector using PEEK syringe needles
	Wetted materials	PEEK and ceramics
	Pressure resistance	25MPa
	Sample weighing system	Loop cut method
	Number of installations	Up to two equations
Degassing section	Method	In-line fluororesin gas permeation separation type
	Number of installations	2-channel (standard built-in)
Pumping section	Type name	ICA-700P (dedicated pumps)
	Liquid feed system	Linear drive double plunger reciprocating system
	Wetted materials	PEEK, sapphire, ruby, PTFE, PCTFE, PFAs, ETFE, and Kalrez
	Max. delivery pressure	20MPa
	Flow setting range	0.001~9.999mL (setting range in dedicated software: 0.01~9.99mL/min)
	One head discharge amount	80μL
	Gradient	Isocratic: 1 type, gradient: 2 types
	Number of installations	Up to 3 units (number of standard installations: 1 unit)
Sensor	Method	Electrical conductivity circuit 2ch, analog input circuit 2ch
	Number of installations	Up to 3ch
Data processing Controlling software	OS	Windows10, Windows8.1, Windows7, 32bit or 64 bits
	Form of communication	USB
	Main Control/Monitor Contents	Turn ON/OFF the power supply and start/stop the timers for one week. Flow rate, pressure, pressure limit, temp. (constant temp. chamber, cell section), electrical conductivity detector setting, measurement signal, etc.
	Data capture	Independent 3ch

◆Recommended PC (Note: Please purchase a PC/printer separately) to use the software for control/data analysis.

Recommended PC (sold separately)	OS	Windows10, Windows8.1, Windows7, 32bit or 64 bits
	Processor	Intel Core i3 or more
	Memory	2 GB or more of RAM
	Hard disk	More free space than HDD 16GB
	USB	One or more USB2.0 interface free ports
	Screen resolution	1366 x 768 pixels or more

◆Conductivity cell

Built-in model	ICA-7000 main unit		
Measurement method	Operational amplification method using a three-pole electrode		
Measurement range	0~500mS/m		
Response	FAST (Approx. 1.5 seconds), MIDD (Approx. 3 seconds), and SLOW (Approx. 5.5 seconds)		
Cell control temp	30℃, 35℃, 40℃, 45℃, 50℃		
Output	Analogues: 0~1V		
	Range	×100	500mS/m
		×10	50.0mS/m
		×1	5.00mS/m
		×0.1	0.500mS/m
Output polarity switching	Yes		
Wetted materials	PEEK, titanium, and PCTFE		
Cell withstand voltage	1MPa		
Dimension	Approx. 51 (width) x 114 (height) x 59 (depth) mm (excluding protrusions)		
Weight	Approx. 0.5kg		

NOTE) ●Windows is a registered trademark of the U.S. Microsoft Corporation in the U.S. and other countries.
●Intel Core is a registered trademark of the U.S. Intel Corporation.

◆Pump unit ICA-700P

Built-in model	ICA-7000 main unit
Liquid feed system	Linear drive double plunger reciprocating system
Wetted materials	PEEK, sapphire, ruby, PTFE, PCTFE, PFAs, ETFE, and Kalrez
Maximum delivery pressure	20MPa
Flow setting range	0.001~9.999mL (Setting range for dedicated software: 0.01-9.99mL/min)
One head discharge amount	80μL
Gradient	Isocratic: 1 type, gradient: 2 types
Communication	RS485 (inter-pump communication)
Dimension	Approx. 105 (width) x 144 (height) x 199 (depth)mm (excluding protrusions)
Weight	Approx. 5.2kg

◆Degassing unit

Built-in model	ICA-7000 main unit
Degassing system	In-line type, fluororesin gas permeation separation type
Debt volume	2-channel (standard built-in)
Dimension	Approx. 105 (width) x 144 (height) x 199 (depth)mm (excluding protrusions)
Weight	2 flow paths: Approx. 1.8kg

◆Ion removal devices

Module for anion measurement　ICA-AMS:7600400U
Module for cation measurement　ICA-CMS:7600410U
Power source for module:7600430U

Eluent flow rate	0.5~2.0 mL/min
Operable upper limit temperature limit	Max 60℃ (usually at room temperature)
Pressure resistance	10MPa or lower
Organic solvent resistance	Methanol 10% or less
Ion removal capability	ICA-AMS type(Cation removal) 約30mmol/L Na / 1.0mL/min
	ICA-CMS type(Anion removal) 約30mmol/L Cl / 1.0mL/min
Regenerant	Pure water (not required when using recycle mode)
Power source	Output(24V,1A)　Input(100-240V)
Dimensions	Module for measurement:125(W)×45(H)×182(D)mm Power source for module:125(W)×45(H)×187(D)mm
Weight	Module for measurement 0.48kg, Power source for module 0.52kg

◆Suppressor pump unit 7591950U

Built-in model	ICA-7000 main unit
Liquid feed system	Peristaltic tube pump
Flow area	0~1.0mL/min
Dimension	Approx. 80 (width) x 140 (height) x 190 (depth) mm (excluding protrusions)
Weight	Approx. 0.9kg

◆Chemical suppressor 6813690K

Suppressor volume	150μL
Maximum flow rate of the eluent	2.0mL/min
Operating pressure	1MPa or less
pH range used	pH1~pH13
Dimension	ϕ21.5mm× length 130mm (Max. dimension of protrusion 30mm)

◆Absorbance detector ICA-201UV

How to connect the ICA-7000	Imported to the data processing software through the analog input terminal
Method	Dual beam, single cell
Wetted materials	PEEK, PTFE and silica-glass
Lighting source	Deuterium and halogen lamps
The maximum range of wavelength	190~900nm
Spectral width	10nm
Precision of wave length	±2nm
Response	FAST (Approx. 0.1 sec), MIDD (Approx. 1.0 sec), and SLOW (Approx. 2.0 sec)
Zero point adjustment	Manual and external contacts can be used.
Analog output	0~1V (integrator)　0~10mV (recorder)
Power	AC100V 50/60Hz
Power consumption	Up to 160VA
Dimension	Approx. 290 (width) × 160 (height) × 440 (depth) mm
Weight	Approx. 14kg

◆Post-column reactor ICA-200PR

Pumping section	Method	Double plunger: 2 type
	Wetted materials	PEEK, ruby, and sapphire
	Pressure resistance	35MPa
	Maximum delivery pressure	25MPa (Upper limit of 20MPa is set by dedicated software.)
	Flow setting range	0.01~3.0mL/min
Degassing section		Fluororesin gas permeable type (composed of vacuum pump and degassing unit 2 type)
Reaction tank section		Block type heater: 2 type　Setting temp.: room temp. +5~100℃
Power		AC100V 50/60Hz
Power consumption		Up to Approx. 300VA
Dimension		Approx. 300 (width) × 360 (height) × 460 (depth) mm
Weight		Approx. 20kg

◆Electrochemical detector ICA-5212

Common specification

How to connect the ICA-7000	Imported to the data processing software through the analog input terminal
Method	Tripolar potentiostat
Range of voltage setting	0~±1.99V (10mV step)
Zero point adjustment	Auto zero (external controls available)
Zero adjustment range	Entire measuring range
Polarity switching	Yes
Cell capacity	0.4μL×2
Flow cell withstand voltage	1MPa
Flow cell wetting material	FEP, PCTFE, SUS316
Sensor	Working electrode (glassy carbon, platinum*, gold*, silver*) Referenced electrode (calomel) and counter electrode (SUS316)* are optional.
Operating temp. limit	10~40℃
Response	FAST (Approx. 2 seconds), MIDD (Approx. 4 seconds), and SLOW (Approx. 9 seconds)
Analog output	0~1V FS (integrator) 0~10mV FS (range) (recorder)
Power	AC100V 50/60Hz
Power consumption	Approx. 13VA
Dimension	Approx. 290 (width) × 61 (height) × 462 (depth) mm
Weight	Approx. 10kg

Normal mode specification

Measurement range	0~±1,024nA
Measuring range	0.1~102.4nA (×1) I1 range 1~1,024nA (×10) I1 range
Outputs mode	I1 (ch1 only), I2 (ch2 only), I1+I2, I1-I2

Pulse mode specification

Measurement range	0~±102.4μA
Measuring range	0.01~10.24μA (x1, ch2 only) I1 range 0.1~102.4μA (×10) I1 range
Outputs mode	I1 = ch1 (normal mode), I2=ch2 (pulsed mode)
Time setting range	Pulsing mode　T1=50~990mS T3=0~990mS　Tad=50mS

◆Auto-sampler ICA-200AS

	Standard	With cooling function
Indicator	LCD display with backlight	
Number of samples (When using software for device control)	Usually 90 samples (up to 40 samples when using dilution mode)	
Sample container	2-mL container	
Injection volume of sample	1~150μL (1μL step) 150μL or more with a maximum of 250μL for sample loop fixation	
Sample injection type	Syringe discharge system (INJECT MODE)　Loop cut method (LOOP MODE)	
Dose repeatability	C.V. value not exceeding 0.5% (20μL injection at room temp. of 25℃)	
Samples dilution	Automatic dilution by injection of pure water	
Dilution ratio	10~200 times (10 times step)	
Dilution accuracy	Within ±5% (100-fold dilution at room temp. of 25℃)	
Wetted materials	PEEK, fluorinated resins, SUSs (needles)	
Output connector	RS-232C, contact signal	
Operating temp. limit	5~35℃	
Cooling system	———	Block Cooling of Aluminum Rack by Electronic Cooler
temp. controllable range	———	Room temp. minus 5℃~room temp. minus 25℃ However, the lower limit is 0℃
temp. control accuracy	———	±2℃ (room temp. minus 20℃)
Power	AC100V 50/60Hz	AC100V　50/60Hz
Power consumption	Up to Approx. 80VA	Up to Approx. 150VA
Dimension (Single-channel type and double-channel type with no change in dimensions)	Approx. 213 (width) × 378 (height) × 570 (depth) mm	Approx. 215 (width) × 500 (height) × 570 (depth) mm
Weight	Approx. 13.5kg (one-channel type)　Approx. 15kg (2-channel type)	Approx. 18kg (one-channel type)　Approx. 20kg (2-channel type)

◆Major Column Specifications

Item	Type name	Applications and Major Measurement Ions	Size (inner diameter × length) mm	Material	pH range
For anion analysis	PCI-201S	Non-suppressor analysis and inorganic anions	4.6 × 100	SUS	pH2~pH8
	PCI-211	Non-suppressor analysis and inorganic anions	4.6 × 100	SUS	pH2~pH8
	PCI-205	Suppressor analysis, inorganic anion	4.6 × 250	PEEK	pH3~pH12
	PCI-206	Suppressor analysis, inorganic anion (Features of separation of halide ion)	4.0 × 150	PEEK	pH2~pH12
	PCI-230	Suppressor analysis (Features of separation of acetic acid/formic acid and inorganic anion) It can also be used as a column for non-suppressor analysis.	4.6 × 150	PEEK	pH3~pH12
	PCI-240	Suppressor analysis, inorganic anion (Features of separation of halogen acids from standard seven anions)	4.0 × 250	PEEK	pH3~pH12
	AN1	Suppressor analysis, inorganic anion (Features for separation of sulfate and sulfite ions)	4.6 × 250	PEEK	pH1~pH14
	AN300B	Suppressor analysis, inorganic anion (Features of separation of phosphorous acid, phosphoric acid, sulfurous acid, and sulfate ions)	4.6 × 250	PEEK	pH1~pH13
Guard column for anions	PCI-201SG	PCI-201S guard-column	4.6 × 10	SUS	pH2~pH8
	PCI-211G	PCI-201S guard-column	4.6 × 10	SUS	pH2~pH8
	PCI-205G	PCI-205/206/230/240, AN1 guard-column	4.6 × 10	PEEK	pH2~pH12
	AN300BG	AN300B guard-column	4.6 × 50	PEEK	pH1~pH13
For cation analysis	PCI-302S	Alkali metal ion analysis Alkaline Earth Metal Ion Analysis with Modified Eluent	4.6 × 150	SUS	pH2~pH7
	PCI-302H	Analysis of alkali metal ions and ammonium ions Analysis of Alkaline Earth Metal Ions by Modifying the Eluent	4.6 × 150	PEEK	pH2~pH12
	PCI-322	Simultaneous analysis of alkali metal ion and alkaline earth metal ion Improved peak shape of Mg and Ca ions (Features of sodium and ammonium separation)	4.6 × 250	SUS	pH2~pH12
Guard column for cations	PCI-302SG	PCI-302S/303 guard-column	4.6 × 10	SUS	pH2~pH7
	PCI-302HG	PCI-302H guard-column	4.6 × 10	PEEK	pH2~pH12
	PCI-322SG	PCI-322 guard-column	4.6 × 10	SUS	pH2~pH7
Column for organic acid analysis	PCI-305S	Analysis of Organic Acids and Weak Acids	8.0 × 300	SUS	pH1~pH7
Guard column for organic acid analysis	PCI-305SG	PCI-305S guard-column	4.6 × 50	SUS	pH1~pH7
sugar analysis column	PCI-510	For sugar analysis Sodium hydroxide can be used in the eluent.	4.6 × 250	PEEK	pH1~pH14
Guard column for sugar analysis	PCI-510G	PCI-510 guard-column (1 holder and 5 disks) ※ If you purchase the product for the first time, select this one.	4.6 × 1.0	PEEK	pH1~pH14
	PCI-510GD	PCI-510G replacement disks (Five disks only)	4.6 × 1.0	PEEK	pH1~pH14

Note 1) Application and main measurement target ions described are typical items.
Note 2) The column to be used may be changed depending on the measurement items and measurement details.
Note 3) Please inquire about selecting an appropriate column.
Note 4) Column improvement is made without prior notice.

Column Examples

TOA DKK

DKK-TOA CORPORATION

⚠ CAUTION Please read the operation manual carefully before using products.

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Specifications and prices are subject to change without notice.

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