

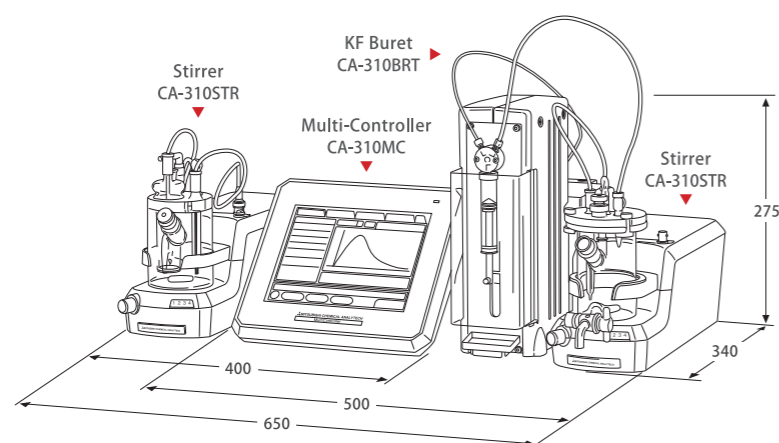
### Moisture Meter Model CA-310 Coulometric Titration Specifications

Method	Coulometric Karl Fischer Titration Up to 4 channels simultaneous measurement (optional)
Titration control	Constant current pulse timer control
End point detection	Constant current polarization potential
Electrolysis current	430mA (fast dehydration mode 516mA)
Titration speed	Up to 2.2mg H <sub>2</sub> O/min (36 μg H <sub>2</sub> O/sec)
Back ground	Automatic correction, constant display, Back ground level at start of measurement is displayed
Measurement range	5 μg - 999.9999mg H <sub>2</sub> O (5 μg measurement : under dry atmosphere)
Detection sensitivity	0.1 μg H <sub>2</sub> O
Accuracy	< 0.3 % RSD at 1 mg or more H <sub>2</sub> O
Stirring method	Magnetic stirrer
Titration cell	Closed, Capacity 150mL
Display	8.4 - inch color LCD touch screen
File memory	Sample parameters : 99 Schedules : 99 Results : 9,999
Calculation	Concentration calculation, statistical calculation, recalculation, reanalysis of titration curve
Printer	Option, thermal or dot impact
External input and output	Electric balance : Automatic input of weight USB : 4 ports LAN : 1 port
Additional functions	Data Integrity (GLP/GMP support), detection electrode conditioning
Bromine mode	Bromine Index
Operating conditions	Temperature : 15 - 40°C Relative humidity : below 85% (without condensation)
Power supply	AC 100/115/230/240 V (50/60 Hz) 80 VA
Dimensions	CA-310MC : Approx. 245 (W) × 160 (D) × 215 (H) mm CA-310STR : Approx. 120 (W) × 340 (D) × 135 (H) mm
Weight	CA-310MC : Approx. 2.0kg CA-310STR : Approx. 2.5kg

### Moisture Meter Model CA-310 Volumetric Titration Specifications

Method	Volumetric Karl Fischer Titration Up to 4 channels simultaneous measurement (optional)
Titration control	Proportional polarization potential comparator
Detection	Constant current polarization potential
Measurement range	0.1mg - 999.999mg H <sub>2</sub> O
Stirring method	Magnetic stirrer
Titration flask	Open vessel with lid, Capacity 150mL
Display	8.4 - inch color LCD touch screen
File memory	Sample parameters : 99 Factor parameters : 99 Schedules : 99 Results : 9,999
Calculation	Concentration calculation, statistical calculation, recalculation, reanalysis of titration curve
Buret	Syringe type Volume : 10mL (option 25mL) Dosing speed : 1mL / 1.5sec Aspiration speed : 1mL / 1.5sec Accuracy : ±0.02mL (10mL syringe)
Printer	Option, thermal or dot impact
External input and output	Electric balance : Automatic input of weight USB : 4 ports LAN : 1 port
Additional functions	Data Integrity (GLP/GMP support), detection electrode conditioning
Bromine mode	Bromine Index and Bromine Number
Operating conditions	Temperature : 15 - 40°C Relative humidity : below 85%; do not condense.
Power supply	AC100/115/230/240 V (50/60 Hz) 80 VA
Dimensions	CA-310MC : Approx. 245 (W) × 160 (D) × 215 (H) mm CA-310STR : Approx. 120 (W) × 340 (D) × 135 (H) mm CA-310BRT : Approx. 110 (W) × 320 (D) × 275 (H) mm
Weight	CA-310MC : Approx. 2.0kg CA-310STR : Approx. 2.5kg CA-310BRT : Approx. 3.5 kg

### Appearance (mm)



**Note:** Follow instructions in manuals to correctly install, connect and operate the instruments. Contents of catalogues are subject to change without prior notice when improvements are made in performance. The actual color of the goods may appear different from color printed. All screen images are simulated. \*Company and product names contained herein are the trademarks or registered trademarks of the company concerned.

**Safety Precautions** ● Read through the user's manual first before installing, piping, wiring and operating this monitor, then always follow to the manual to correctly operate the monitor.

**MITSUBISHI CHEMICAL ANALYTECH CO.,LTD.**

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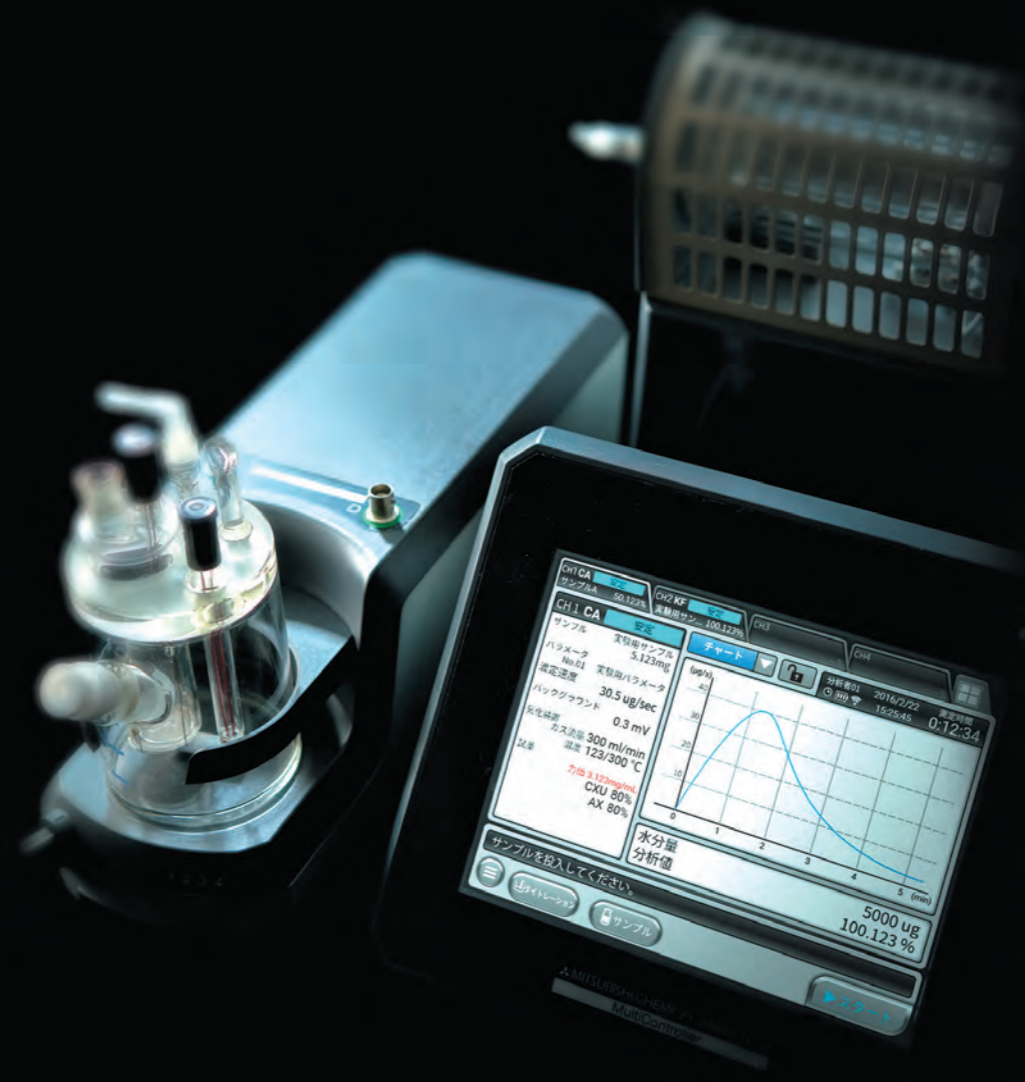
Tel: +81(0)46-278-0056

URL: <https://www.mccat.co.jp/global>

CAT No.21030818121E

# CA-310

## High Spec & Performance Karl Fischer Moisture Meter



**MITSUBISHI CHEMICAL ANALYTECH CO.,LTD.**



# World's Leading High Performance Moisture Meter



- ▶ Standalone system supporting Data Integrity requirements
- ▶ Convertible stirrer for coulometric and volumetric
- ▶ Barcode reading from reagent bottle
- ▶ Wireless connection
- ▶ Lower measurement limit of 5µg H<sub>2</sub>O
- ▶ Automatic SOP editorial support
- ▶ Up to 4-channels measurement simultaneously
- ▶ Bromine Index, Bromine Number
- ▶ LIMS support
- ▶ 8.4 inch color LCD touch screen

OFFICIAL TESTING METHOD: Petroleum, Chemical, Pharma /Medical, Ore, Agriculture and Foods.

ISO: 760, 3699, 3839, 4317, 5381, 5536, 6296, 6488, 7105, 7335, 8534, 10101(gas), 10336, 10337, 10362, 11021, 12779, 12937, 14897, 15512, 20764, 20938.  
 IEC: 60814 (insulating)  
 ASTM: D890, D1159, D1364, D1492, D1533, D2710, D3401, D4017, D4377, D4928, D5460, D5530, D6304, D6869, D7375, E1064, E203  
 JIS: K0113, K0068  
 JAPANESE PHARMAPOEIA.

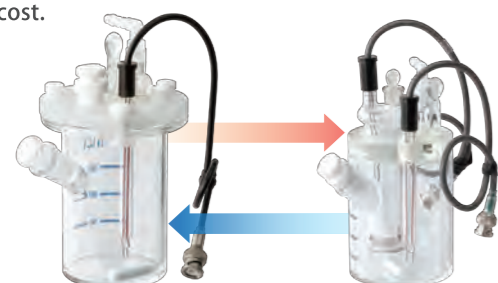
\*list of method are extracted.



## Features

### Convertible function

Compatible stirrer allows both volumetric and coulometric method just by converting volumetric flask and coulometric cell. This feature enables wide range of applications at low initial cost.



### 4 simultaneous messages on one display

Connected channels can be viewed using tabs that display measurement status. All channels can be viewed on one display.



### Lowest limit of quantitation 5µg H<sub>2</sub>O

In dry atmosphere (e.g., in glove boxes) and microanalysis modes, the coulometric method achieves 5µg H<sub>2</sub>O.

### Bromine Index/ Bromine Number

Measurement of bromine index and bromine number, parameters widely used in the petroleum industry, can be measured on the CA-310 system by simply selecting the applicable measurement modes.

### LIMS connection

Measurement data can be exported automatically to the folder in network for LIMS (TAB.txt format).

### Ramp heating (JP Patent: 3284783)

Easily determine of the optimal heating temperature for unknown samples.

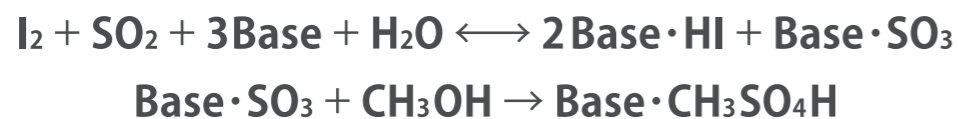
- VA-300
- VA-230
- VA-210
- VA-236S





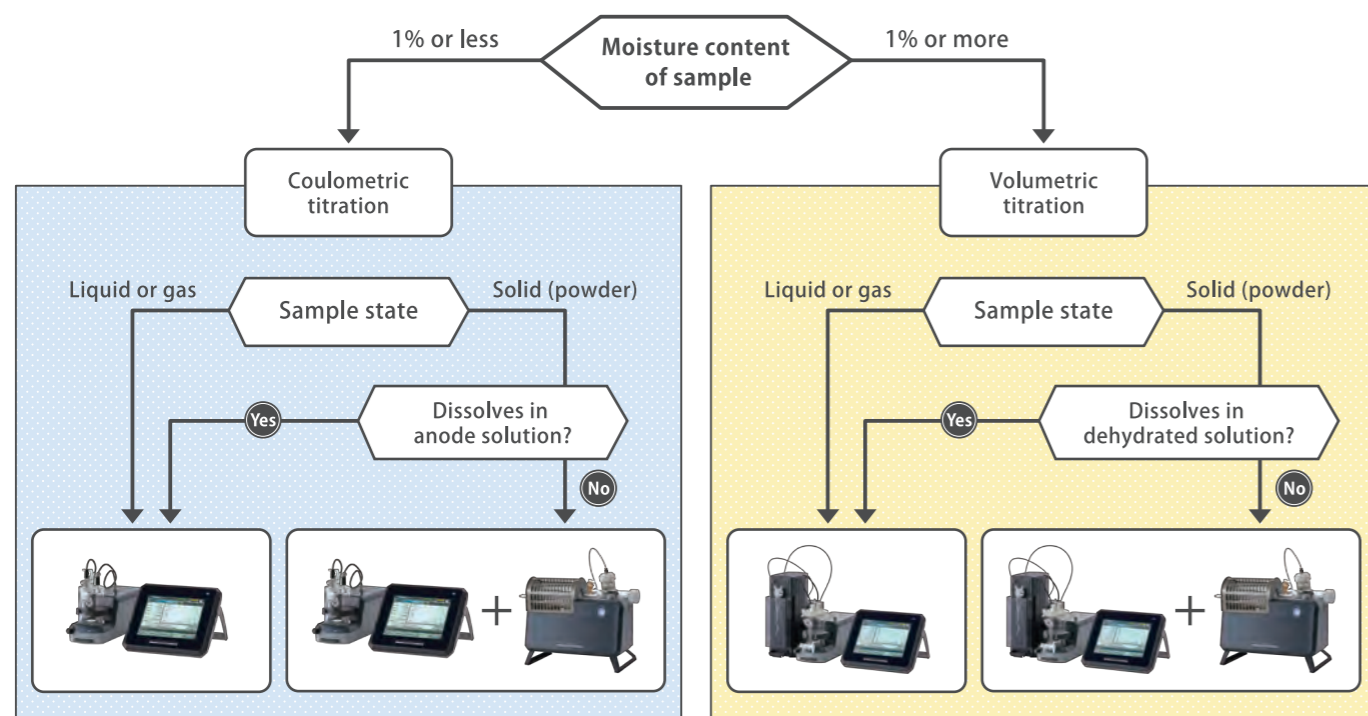
## Principle

The Karl Fischer method is a water determination method that utilizes the fact that water (H<sub>2</sub>O) in a sample always reacts with iodine (I<sub>2</sub>) in the reagents in a 1:1 ratio according to the following equation discovered by the German chemist Dr. Karl Fischer (1901-1958).



## Selecting the Proper Instrument

### Instrument Selection



\*Some substances may not be applicable to the process flow shown above. \*Detail application information is available at <http://mccf.com/english/technical/example.html>

### Comparison of Coulometric Titration and Volumetric Titration

	Coulometric Titration	Volumetric Titration
Principle	Iodine generated by applying a current reacts with moisture, and the amount of iodine consumed by this reaction is calculated from the quantity of electricity.	Calculated from the volume of KF reagent used in the titration
Reagents	Anode solution, cathode solution	KF reagent, dehydrated solvent
Characteristics	low moisture content, measurements can be repeated using the same anode solution	high moisture content, requires titer standardization, wide application range by selecting the appropriate dehydrated solvent
Moisture (absolute quantity)	5 μg to 100 mg H <sub>2</sub> O (approx. several 5 ppm to 1%)	0.1 to 999 mg H <sub>2</sub> O (approx. several 100 ppm to 10%)
Sample	Liquids, gases or solids (including powders) Examples: Organic compounds, inorganic compounds, foods, pharmaceuticals, minerals, naturally-occurring substances (a moisture vaporization method is used for samples containing interfering reaction products)	
Reagent (General type)	AQUAMICRON AX and CXU or AQUAMICRON AXI (single reagent)	AQUAMICRON SSZ and GEX

## Options

### Barcode reading from reagent bottle

Automatically reads reagent information (AQUAMICRON).

- Reagent name
- Lot number
- Expiry date



\*barcode specification : code 39  
AQUAMICRON URL <http://mccf.com/>

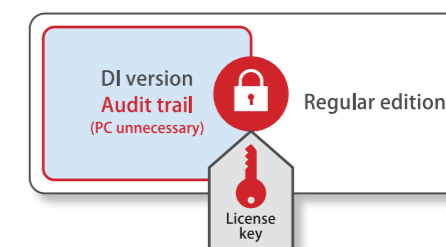
### USB Mouse / Keyboard

A commercially available USB mouse or keyboard allows CA-310 to be operated without touching the screen.

## Systems Designed for GLP and GMP Requirements

### Standalone system supporting Data Integrity requirements (option)

Quality control in the pharmaceutical industry requires strict control based on Good Manufacturing Practices (GMP) standards with a strong need for analytical equipment that can verify the integrity of data. The CA-310, with integrated data integrity feature, comes with strong and smart support for data protection and management without a dedicated PC. Audit trail function is provided as an option in the data integrity version of the CA-310 Software.



### User management (standard)

Administrator can assign each detail operating function to registered operator. There are no restrictions about number of people for registration in unit. From registered list maximum 99 people can be validated for operation. Password expiration dates, maximum number of errors allowed, etc. can also be specified.

### Data back up and restore (standard)

Data (result and parameters) can be backed up to a USB memory, and you can restore data back to the instrument. Data in USB memory after back-up is safely protected from been processed.

### Automatic SOP editorial support (standard)

Operation process (text and screenshot) can be recorded and output to USB for SOP (Standard Operating Procedure).

## Water vaporizer option

### VA-300 (Boat)

For solids and powder such as plastics, rubber, foods, pharmaceuticals, inorganic salts, etc.



Temperature	50 – 300°C
Heater	EC Glass, 150W
Sample size	Up to 10g
Measuring range	Above 5 ppm, with coulometry
Carrier gas	Nitrogen, 0.1 – 0.5L/min
Power supply, maximum consumption	AC 100/120 V (50/60 Hz), 160 VA AC 220/240 V (50/60 Hz), 740 VA
Dimensions / Weight	323(W) × 170(D) × 260(H) mm, Approx. 4.0 kg

### VA-230 (Vial)

For plastics, rubber, foods, pharmaceuticals, inorganic salts, etc.



Temperature	70 – 300°C
Heater	Aluminum block heater, 60W × 2
Sample size	Up to 10g, 2.5mL (10mL vials)
Measuring range	Above 30ppm, with coulometry
Carrier gas	Nitrogen, 0.1 – 0.5L/min
Power supply, maximum consumption	AC 100/120 V (50/60 Hz), 140 VA AC 220/240 V (50/60 Hz), 280 VA
Dimensions / Weight	300(W) × 135(D) × 220(H) mm, Approx. 3.5 kg

### VA-210 (High viscosity)

For lubricants, tar, etc.  
ASTM D6304



Temperature	70 – 199°C
Heater	EC Glass, 200W
Sample size	Up to 50g
Measuring range	Above 5 ppm, with coulometry
Carrier gas	Nitrogen, 0.1 – 0.5 L/min
Power supply, maximum consumption	AC 100/120 V (50/60 Hz), 160 VA AC 220/240 V (50/60 Hz), 740 VA
Dimensions / Weight	300(W) × 135(D) × 220(H) mm, Approx. 3.0 kg

### VA-122 (Dual heater)

Adherent water can also be measured.  
For Iron ores, clays, welding rods, metal oxides, inorganic salts, etc.



Temperature	70 – 300°C, 250 – 1000 °C
Heater	Two sets of two piece housing kanthal electric heater, 1,000W
Sample size	Up to 10g
Measuring range	Above 10ppm
Carrier gas	Nitrogen, 0.1 – 0.5L/min
Power supply, maximum consumption	AC 100/120/220/240 V (50/60 Hz), 1,900 VA with current leakage (15mA) and overcurrent (20mA)
Dimensions / Weight	690(W) × 260(D) × 410(H) mm, Approx. 20.0 kg

\*No CE marking

### VA-236S (Automatic sample changer)

For plastics, rubber, food, pharmaceuticals, inorganic salts, lubricant oil, other powders and solid samples.



Temperature	70 – 300°C
Gas flow	0 – 500mL/min
Carrier gas	Nitrogen (Moisture content : less than 0.01% )
Carrier gas control	Mass flow controller
Number of samples	Sample : 33, Purge : 3
Sample size	Up to 10g, 2.5mL for solids, 5mL for oils (10mL vials)
Power supply, maximum consumption	AC 100/120 V (50/60 Hz), 200 VA AC 220/240 V (50/60 Hz), 250 VA
Dimensions / Weight	370(W) × 560(D) × 400(H) mm, Approx. 18.0kg incl. carousel

### VG-200 (LPG Vaporizer)

Automatically inject a predetermined amount.



Applications	Propane, Butane, and Other liquefied gas samples
Sample injection rate	100 – 600mL/min
Sample size	1 – 99L
Pressure resistance	1MPa
Heater temperature	40 – 90 °C
Power supply, maximum consumption	AC 100/120 V (50/60 Hz), 44 VA AC 220/240 V (50/60 Hz), 48 VA
Dimensions / Weight	150(W) × 350(D) × 270(H) mm, Approx. 6.0 kg

### VA-121 (High temperature type)

For iron ore, clay, metal oxides, inorganic salts, etc.



Temperature	250 – 1000°C
Heater	Two piece housing kanthal electric heater, 800 W
Sample size	Up to 10g
Measuring range	Above 10ppm, with CA-310
Carrier gas	Nitrogen, 0.1 – 0.5L/min
Power supply, maximum consumption	AC 100/120/220/240 V (50/60 Hz), 1,500 VA with current leakage (15mA) and overcurrent (20mA)
Dimensions / Weight	420(W) × 260(D) × 420(H) mm, Approx. 15.5 kg

\*No CE marking

## Other options

### Optical start switch / Foot switch

Start measurement using optical start switches and foot switches when use in a glovebox/draft chamber.



### Wireless adapter



### Reagent exchange unit



Dimensions / Weight 85(W) × 85(D) × 55(H) mm,  
Approx. 0.5kg

### Power unit for VA



Required when using VA-200 and VA-230.

Dimensions / Weight 310(W) × 125(D) × 100(H) mm,  
Approx. 1.5 kg

### Battery for CA-310 stirrer : Glove box



Battery charger

Voltages	Battery charger (input) : AC 100 -240 V 65 VA
Operating time	Approx. 4 hours (continuous measurement : Approx. 2 hours)
Charging time	Approx. 6 hours
Dimensions / Weight	Battery unit 150(W) × 250(D) × 50(H) mm, Approx. 1.3 kg Battery charger 130(W) × 230(D) × 50(H) mm, Approx. 2.3 kg