

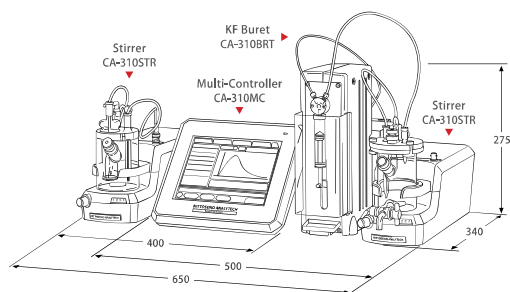
#### ■ Moisture Meter Model CA-310 Coulometric Titration Specifications

|                           |   |
|---------------------------|---|
| Method                    | Coulometric Karl Fischer Titration<br>Up to 4 channels simultaneous measurement (optional)              |
| Titration control         | Constant current pulse timer control  |
| End point detection       | Constant current polarization potential   |
| Electrolysis current      | 430 mA (fast dehydration mode 516 mA)   |
| Titration speed           | Up to 2.2 mg H <sub>2</sub> O/min (36 µg H <sub>2</sub> O/sec)  |
| Back ground               | Automatic correction, constant display,<br>Back ground level at start of measurement is displayed       |
| Measurement range         | 5 µg ~ 999.9999 mg H <sub>2</sub> O<br>(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 150 mL   |
| Display                   | 8.4-inch color LCD touch screen   |
| File memory               | Sample parameters : 99<br>Schedules : 99<br>Results : 9,999   |
| Calculation               | Concentration calculation, statistical calculation,<br>recalculation, reanalysis of titration curve     |
| Printer                   | Option, thermal or dot impact   |
| External input and output | Electric balance : Automatic input of weight<br>USB : 4 ports<br>LAN : 1 port                           |
| Additional functions      | Data Integrity (GLP/GMP support), detection<br>electrode conditioning                                   |
| Bromine mode              | Bromine Index   |
| Operating conditions      | Temperature : 15 ~ 40°C<br>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<br>CA-310STR : Approx. 120 (W) × 340 (D) × 135 (H) mm |
| Weight                    | CA-310MC : Approx. 2.0 kg<br>CA-310STR : Approx. 2.5 kg   |

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

|                           |   |
|---------------------------|---|
| Method                    | Volumetric Karl Fischer Titration<br>Up to 4 channels simultaneous measurement (optional)   |
| Titration control         | Proportional polarization potential comparator  |
| Detection                 | Constant current polarization potential   |
| Measurement range         | 0.1 mg ~ 999.999 mg H <sub>2</sub> O  |
| Stirring method           | Magnetic stirrer  |
| Titration flask           | Open vessel with lid, Capacity 150 mL   |
| Display                   | 8.4-inch color LCD touch screen   |
| File memory               | Sample parameters : 99<br>Factor parameters : 99<br>Schedules : 99<br>Results : 9,999   |
| Calculation               | Concentration calculation, statistical calculation,<br>recalculation, reanalysis of titration curve   |
| Buret                     | Syringe type<br>Volume : 10 mL (option 25 mL)<br>Dosing speed : 1 mL / 1.5 sec<br>Aspiration speed : 1 mL / 1.5 sec<br>Accuracy : ± 0.02 mL (10 mL syringe)   |
| Printer                   | Option, thermal or dot impact   |
| External input and output | Electric balance : Automatic input of weight<br>USB : 4 ports<br>LAN : 1 port   |
| Additional functions      | Data Integrity (GLP/GMP support), detection<br>electrode conditioning   |
| Bromine mode              | Bromine Index and Bromine Number  |
| Operating conditions      | Temperature : 15 ~ 40°C<br>Relative humidity : below 85%; do not condense.  |
| Power supply              | AC 100/115/230/240 V (50/60 Hz) 80 VA   |
| Dimensions                | CA-310MC : Approx. 245 (W) × 160 (D) × 215 (H) mm<br>CA-310STR : Approx. 120 (W) × 340 (D) × 135 (H) mm<br>CA-310BRT : Approx. 110 (W) × 320 (D) × 275 (H) mm |
| Weight                    | CA-310MC : Approx. 2.0 kg<br>CA-310STR : Approx. 2.5 kg<br>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.

## Nittoseiko Analytech Co., Ltd.

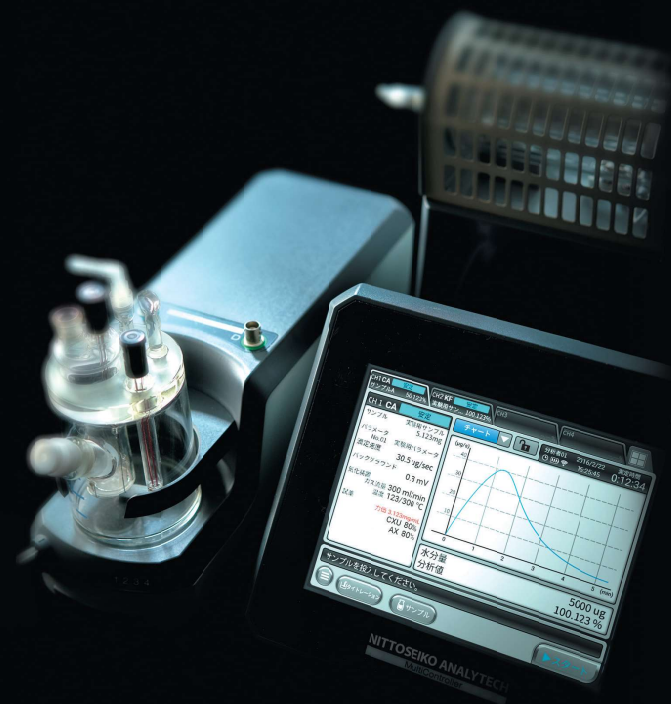
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URL: <https://www.mccat.co.jp/global>

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CAT No.21030820041E

# CA-310

## High Spec & Performance Karl Fischer Moisture Meter



**Nittoseiko 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  $5\mu\text{g H}_2\text{O}$
- ▶ 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 PHARMACOPOEIA.

\*list of method are extracted.

## Features

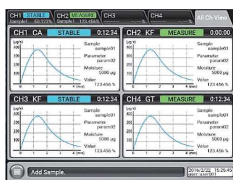
### Convertible function

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 $5\mu\text{g H}_2\text{O}$

In dry atmosphere (e.g., in glove boxes) and microanalysis modes, the coulometric method achieves  $5\mu\text{g H}_2\text{O}$ .

### 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.

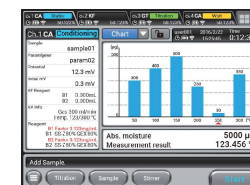
### LIMS connection

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

### Ramp heating (JP Patent: 3284783)

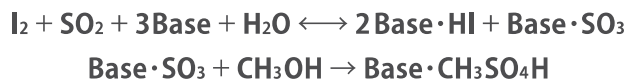
Easily determine of the optimal heating temperature for unknown samples.

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



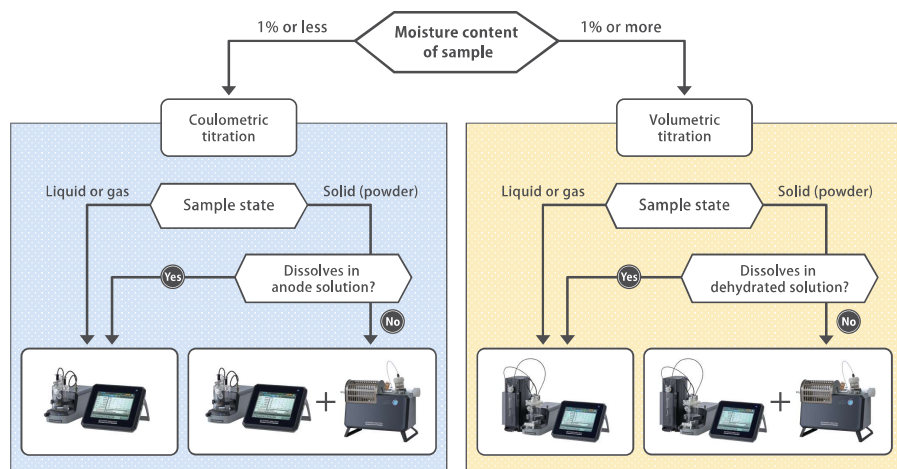
## ➤ Principle

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://mcckf.com/english/technical/example.html>

### ➤ Comparison of Coulometric Titration and Volumetric Titration

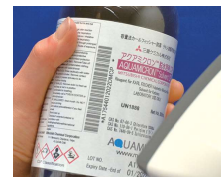
|                              | Coulometric Titration  | Volumetric Titration  |
|------------------------------|--|---|
| Principle                    | Iodine generated by applying a current reacts with moisture, and the amount of iodine consumed by this reaction is calculated from the quantity of 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) | 5µg to 100mg H <sub>2</sub> O (approx. several 5ppm to 1%)   | 0.1 to 999mg H <sub>2</sub> O (approx. several 100 ppm to 10%)  |
| Sample                       | Liquids, gases or solids (including powders)<br>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://mcckf.com/>

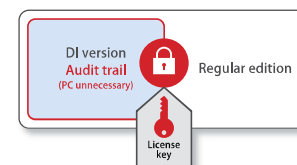
### ➤ USB Mouse / Keyboard

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 being 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 5ppm, with coulometry                 |
| Carrier gas                       | Nitrogen, 0.1 – 0.5 L/min                   |
| Power supply, maximum consumption | AC 100/120 V (50/60 Hz), 160 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 – 0.5 L/min                   |
| Power supply, maximum consumption | AC 100/120 V (50/60 Hz), 140 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 5ppm, with coulometry                 |
| Carrier gas                       | Nitrogen, 0.1 – 0.5 L/min                   |
| Power supply, maximum consumption | AC 100/120 V (50/60 Hz), 160 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 – 0.5 L/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<br>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                         |
| Sample injection rate             | 100 – 600mL/min  |
| Sample size                       | 1 – 99L  |
| Pressure resistance               | 1 MPa  |
| Heater temperature                | 40 – 90 °C   |
| Power supply, maximum consumption | AC 100/120 V (50/60 Hz), 44 VA<br>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 – 0.5 L/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<br>150(W) × 250(D) × 50(H) mm, Approx. 1.3kg<br>Battery charger<br>130(W) × 230(D) × 50(H) mm, Approx. 2.3kg |