Applications

Crude oil and petroleum products – Density/SG

ASTM D 1250, D 4052, D 5002, D 5798, D 5931, ISO 12185, 15212-1, DIN 51757
Density/SG (Specific Gravity) of crude oil, fuel oil (heavy oil, light oil, kerosene, gasoline) or lubricant is measured to obtain reference value for product pricing and taxation.
The flat structure of joint between sampling nozzle and measurement cell less prone to the generation of air bubbles while sampling. Pressurized sampling and measurement by the Auto Sampler helps to prevent the generation of air bubbles by vaporization of the sample, reducing their affect on measurement results.

Chemical products – Density/SG/Concentration

JIS K 0061
Density/SG is important for quality control and management in the chemical industries. For organic substances typically found in the petroleum industry, it is used for QC of intermediates and finished products. Inorganic substances found in the heavy chemical industries test to ensure purity control and concentration checks. Less contact with samples by use of the digital density meter helps operators perform measurements more safely. The Semiautomatic cleaning unit also helps to ensure improved safety for operators who measure chemicals such as acids and bases.

Beverages – Brix/Density

Density and Brix are measured for QC or line control of milk, dairy products, soft drinks, carbonated drinks, fruit juice or soy milk.

Alcoholic beverage – Alcohol concentration

OIML R 22 , Official analysis method of the National TAX Agency Japan
For beer, sake, whisky, brandy, wine distilled spirits, etc.: alcohol degree or concentration of extract is used in quality control. The alcohol degree is used in taxation.

Food – Brix/Concentration

Brix concentration is used in QC of food material like honeydew, extracts, saline solution, syrup or isomerized sugar. Brix is also used for QC of soy sauce, cooking sauce or gravy. Cleaning is very important for measuring different samples such as water-soluble and oil-soluble samples. The semiautomatic cleaning unit can set up to 3 types of cleaning liquid, and it is able to clean samples with suitable cleaning liquids by simply changing method.

Fat and oil – Density/SG

Density/SG is used for quality control of plant oil or animal fat.

Flavor, Fragrance, Pharmaceutical products (USP, EP, ChP, JP) – Density

Samples in this category are precious and expensive. Even with a specific amount of sample, successful measurements will be done easily and conveniently.

KYOTO ELECTRONICS
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Distributed by

Density/Specific Gravity Meter

DA-860/850/840

Auto Sampler

AS-8030

KYOTO ELECTRONICS
MANUFACTURING CO.,LTD.

Density/Specific Gravity Meter

DA-860 DA-850 DA-840

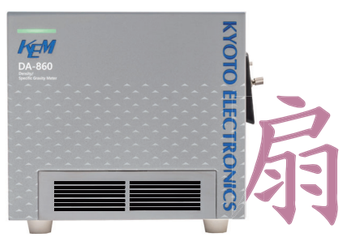
- 01 High reliability
- 02 Enhanced operability and expandability by separated operation unit and measurement unit
- 03 Less measurement time
- 04 5 types of different pump units
- 05 Increase of work efficiency by multiple simultaneous measurements
- 06 Space-saving compact design

Selectable front panel of the measurement unit

Select your favorite one of three panels and make it the perfect one for your lab.

縞

Stripe



扇

Sector（Fan shaped pattern)

京都

“京都” means “KYOTO”

The operation unit is not provided by KEM, please prepare tablet / personal computer locally.

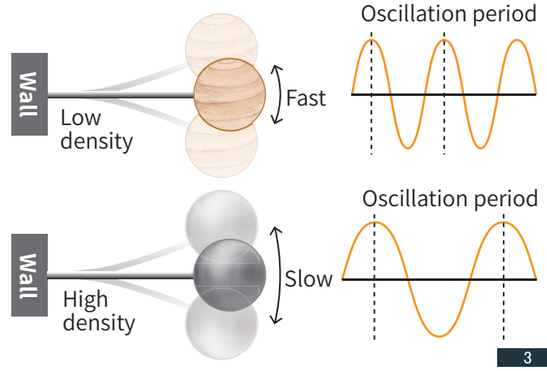
Auto Sampler

AS-8030

- 01 Reduce running costs by highly effective rinsing
- 02 4 types of different flow units
- 03 Space-saving compact design
- 04 Less drying time by high flow pump
- 05 Reduce sample waste by auto sample retrieving
- 06 Easy and proper sampling and measurement while pressurizing

Measurement Principle

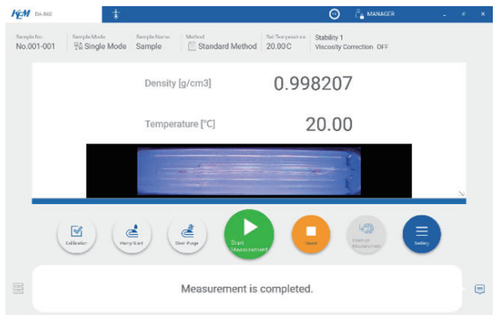
Just imagine the model where a weight is attached too a bar at the end and a bar is fixed on a wall as shown in the right figures. And when you hit the weight by a finger, the weight starts vibrating. Now you will find that the heavier the weight becomes, the slower it vibrates, and vice versa. This is because the weight will vibrate on the oscillation period specific to a substance in proportion to the mass of weight. This means that one can determine the density of a substance by measuring its oscillation period since density becomes proportional to the mass when the volume is constant, i.e. a fixed tube.



Features

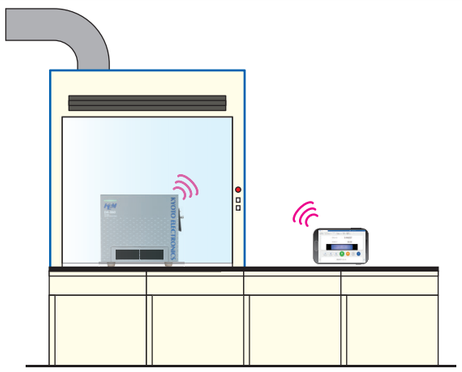
High reliability

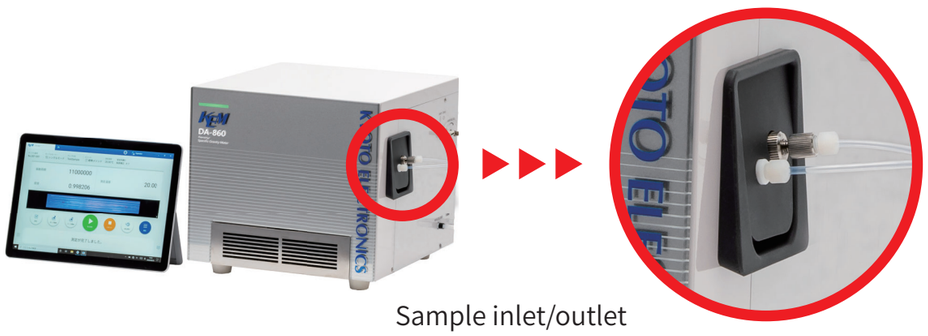
- Kyoto Electronics Manufacturing Co., Ltd. (KEM) is the only manufacturer in Japan of standard liquids that conform to ISO17034, which is traceable to national standards.
- KEM oscillation-type density meters are calibrated with international MRA*1-compliant and ISO17025-compliant JCSS*2 laboratory density standards, which are traceable to international standards in the world.
  *1 Mutual Recognition Arrangement
  *2 Japan Calibration Service System
- High repeatability (DA-860: SD 1×10^{-6} g/cm^3)



Enhanced operability and expandability with a separate configuration for the operation unit and measurement unit

- The measurement unit can be operated remotely from a separate location via a wireless LAN connection.
  For instance, you can place the measurement unit in a fume hood and operate remotely from outside the fume hood.
  *For wireless operation, a Wi-Fi router and LAN cables between the measurement units and the Wi-Fi router are required.
  *The operation unit is not provided by KEM, please prepare tablet / personal computer locally.





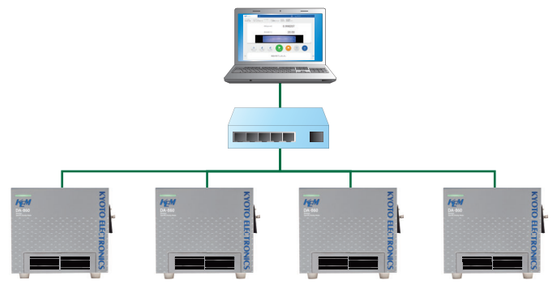
Sample inlet/outlet

Less measurement time

- The measurement time is shortened by the new “Stability mode 4” which is an evolution of the conventional algorithm.
  Possible to measure a sample for approx. 10 sec with four digit accuracy when the temperature is stable.

Multiple management by a single operation unit

- Multiple units can be operated simultaneously and data can be managed comprehensively.
- Up to 4 units by a personal computer, up to 2 units by a tablet computer can be operated at the same time.
  *A switching hub and LAN cables are required.



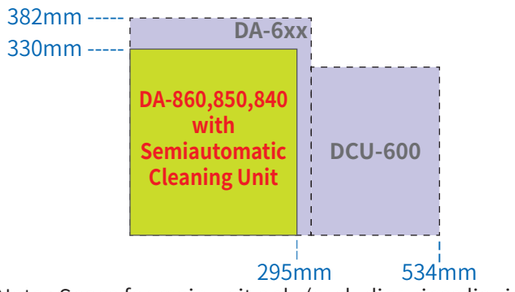
Space-saving compact design

- Approx. 20% less footprint is required compared to the conventional density meter.
- Approx. 45% less footprint for density meter with semiautomatic cleaning unit is required compared to the conventional one.

Conventional density meter
DA-6xx with auto clean unit
DCU-600

DA-860/850.840 with semiautomatic cleaning unit

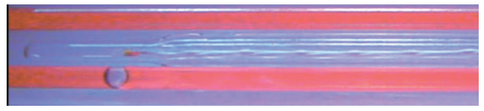
Footprint

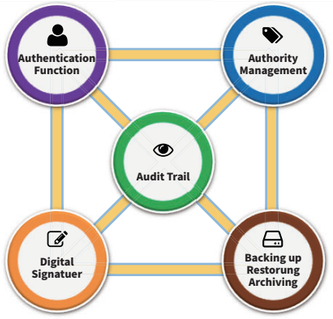


Note : Space for main unit only (excluding rinse liquid bottles, desiccant container, etc.)

Other outstanding features

- 21 CFR part 11 support
- Built-in camera for bubble checking
- Bubble detection
- LIMS connection





Options
PUMP UNITS FOR DA-860/850/840

Semiautomatic Cleaning Unit (2 liquids or 3 liquids)

After manual sampling, measurement, draining, 2-liquid or 3-liquid rinsing and drying are performed automatically.

Air Pump Unit (Standard)

Standard model with high flow rate and high cleanability.
It has excellent chemical-resistance.

Peristaltic Pump Unit

No need for a dedicated drain bottles.
Easy to control sampling speed.

Purge Unit

Model for sample injection and cleaning using a syringe.
And also connected to Auto Sampler (AS-8030)

Pump Unit	Air Pump Unit	Peristaltic Pump Unit	Semiautomatic Cleaning Unit		Purge Unit
			2 Liquids	3 Liquids	
Application	Petroleum/chemical products, etc.	Beverages, alcohol, etc.	All industries	All industries	For connecting autosampler
Sampling	Automatic/manual	Automatic/manual	Automatic/manual	Automatic/manual	By syringe
Measuring	Automatic/manual	Automatic/manual	Automatic/manual	Automatic/manual	Manual
Draining	Automatic/manual	Automatic/manual	Automatic/manual	Automatic/manual	By syringe
Cleaning	Manual	Manual	Automatic/manual	Automatic/manual	By syringe
Drying	Manual	Manual	Automatic/manual	Automatic/manual	Manual

STANDARD LIQUID

Part name	Part number	g/cm3 at 20°C	mL/bottle	Remarks
Pure Water (JCSS-accredited)	12-02708-01	0.998**	10	2 bottles/set
Isooctane (JCSS-accredited) *1	12-03288-01	0.691**	10	Pure Water & Isooctance 1 bottle each
Dichlorotoluene (JCSS-accredited)	12-03289-01	1.249**	10	Pure Water & Dichlorotoluene 1 bottle each
Bromobenzene (JCSS-accredited) *1	12-03290-01	1.494**	10	Pure Water & Bromobenzene 1 bottle each
5% ethanol	12-03536-30	0.991**	20	3 bottles/set
10% ethanol	12-03536-31	0.985**	20	3 bottles/set
15% ethanol	12-03536-32	0.980**	20	3 bottles/set
20% ethanol	12-03536-33	0.975**	20	3 bottles/set

Shelf life: 6 months from calibration date (Bromobenzene, Ethanol) / 12 months from calibration date (Others)
*1 These items are categorized as hazard items to be exported. They require special packing & transportation charge.

Specifications

Model		DA-860 (6-digit)	DA-850 (5-digit)	DA-840 (4-digit)
Measurement Method		Resonant frequency oscillation		
Measurement Range		0 to 3 g/cm³		
Temperature Range*1		0 to 100 °C (32 to 212 °F)		
Accuracy*2	Density	±2×10⁻⁵ g/cm³ (around 1.0 g/cm³) ±4×10⁻⁵ g/cm³ (around 1.5 g/cm³)	±5×10⁻⁵ g/cm³ (around 1.0 g/cm³) ±1×10⁻⁴ g/cm³ (around 1.5 g/cm³)	±1×10⁻⁴ g/cm³
		(Calibration with air and water required.)		
	Temp	±0.02°C/±0.04°F (10 to 30°C/50 to 86°F) ±0.05°C/±0.09°F (0 to 90°C/32 to 194°F)	±0.03°C/±0.05°F (10 to 30°C/50 to 86°F) ±0.05°C/±0.09°F (0 to 90°C/32 to 194°F)	±0.05°C/±0.09°F (0 to 90°C/32 to 194°F)
Repeatability*3	Density	SD 1×10⁻⁶ g/cm³	SD 1×10⁻⁵ g/cm³	SD 5×10⁻⁵ g/cm³
Minimum Sample Required		1) Approx. 1mL (Syringe) 2) Approx. 2mL (Pump)		
Minimum Measurement Time		1) Approx. 10 seconds (Manual)*4		
Display		1) Tablet / PC connection (LCD resolution: 1,280 x 768 or higher) 2) Shows density, SG, oscillation frequency, temp, concentration, other messages. 3) English/ Japanese/ Mandarin Chinese/ Korean/ Russian		
Viscosity Correction		Yes		
Sampling		1) Manual by syringe 2) Auto by pump		
Method		Saves up to 1000 different methods in built-in memory including measurement parameters, density auto correction, concentration conversion, etc.		
Stability		Five modes of stability according to measurement accuracy and time.		
Density Auto Correction		1) Saves conversion table or formula at your desired temperatures according to your samples. 2) Temperature conversion table preprogrammed according to ASTM standard for petroleum, petroleum products and lubricating oils.		
Auto Conversion		1) Between concentration and density. 2) Between temperature and density.		
Statistics		1) Auto or manual calculation of mean value, SD and coefficient. 2) Recalculation, data deletion.		
Interfaces		1) LAN: × 1; Tablet / Personal computer (PC) 2) USB 2.0: × 1; USB flash drive, Thermal Printer (DP-600)*5 3) RS-232C: × 2; Dot Matrix Printer (IDP-100)*5, Autosampler (AS-8030)		
Options		1) Printer: DP-600, IDP-100 2) Auto Sampler: AS-8030		
Data I/O		1) USB flash drive as data storage medium. 2) Application Notes provided in USB flash drive.		
Wetted Materials		PTFE, borosilicate glass, SUS304		
Ambient Conditions		1) Temperature: 5 to 35 °C (41 to 95 °F) 2) Humidity: 85%RH or below (No condensation allowed.)		
Pressure Resistance of Measurement Cell		Up to 10 bar		
Power Supply		DC 24V 5A (Main Unit)		
		AC 100 to 240 V ± 10%; 50/60 Hz (Comes with AC adapter.)		
Power Consumption		40 W (max. 120 W, min. 20 W)		
Dimensions		295 (W) × 330 (D) × 255 (H) mm (11.6 (W) × 13.0 (D) × 10.0 (H) inches)		
Weight		19 kg (42 lbs)		

*1: The above accuracies are guaranteed in the temperature range of 0 to 90°C (32 to 194°F) with all series.
*2,*3,*4 According to KEM standard measurement conditions.
*5: Please contact us for compatible printers.

FEATURES
AS-8030

Countermeasure against bubbles by pressurized measurement (Flow unit 1 or Flow unit 2 only)

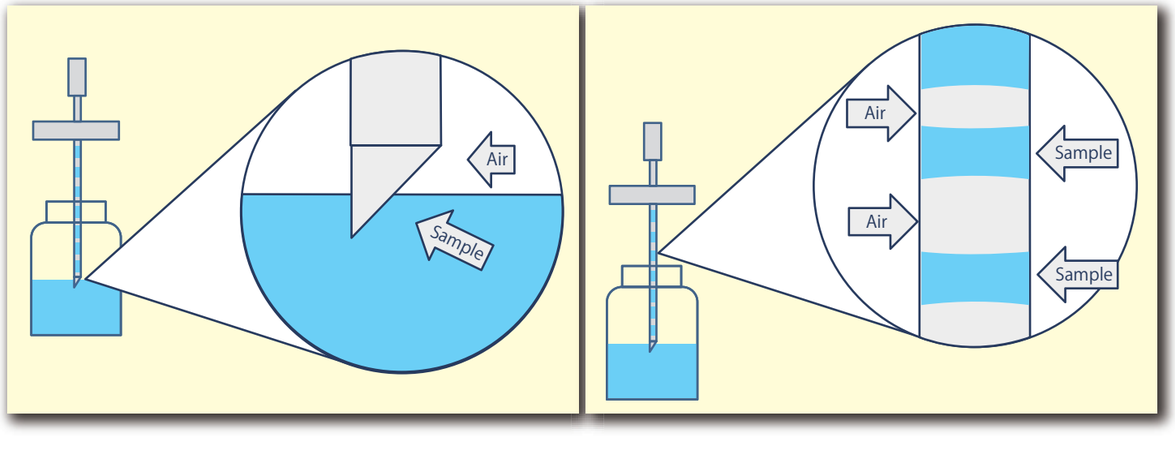
- The pressurized sampling function can prevent the generation of air bubbles in highly volatile samples such as gasoline during sampling and measurement.

Auto sample retrieving after measurements
(Flow Unit 1 or Flow Unit 2 only)

- Valuable samples, such as perfumes, can be returned to the sample vials after measurements.

Highly effective rinsing

- Rinsing effect can be enhanced by injecting air into the rinse liquid during the rinsing operation. The amount of rinse liquid used can be reduced drastically. (Flow Unit 1, Flow Unit 2 or Flow Unit 3 only)
- Equips dedicated sequence for cleaning / substitution by next sample. Sample and air sucked alternately improves cleaning effect, required sample volume is only 20mL. Able to substitute sample without rinse liquid.
  ※Patent Pending (Flow Unit 4 only)



Less drying time by high flow pump
(Flow Unit 2 or Flow Unit 3 only)

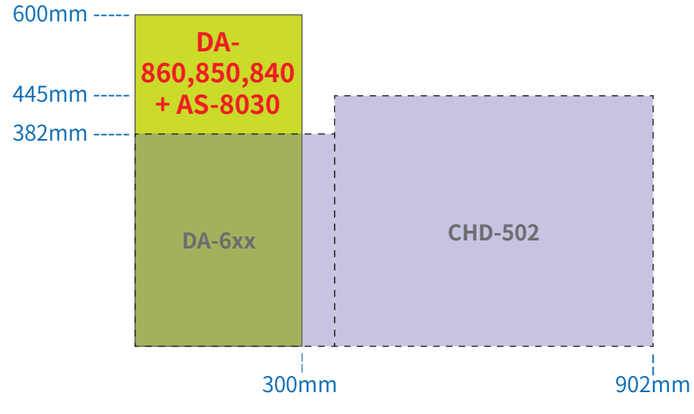
- Approx. 5 times larger flow rate compared with the regular drying pump.
- Can dry the measurement flow path quickly.
- The drying time can be significantly shortened by the high flow pump compared with the conventional model.

Model	Ethanol	Acetone
AS-8030	**30sec**	**15sec**
CHD-502 (Conventional Model)	270sec	90sec

Space-saving compact design

- Approx. 50% less footprint for density meter with external auto sampler is required compared to the conventional ones.
- Width (front) is only 1/3 of the conventional model!

Footprint



Note: Space for main unit only (excluding rinse liquid bottles, desiccant container, etc.)

Conventional density meter
DA-6xx with auto sampler CHD-502N

DA-860/850/840 with auto sampler AS-8030

Options
Flow units for AS-8030

Different flow units can be selected based on the customer application.

Flow Unit 1

Standard unit, for various industries.
Compatible with both aqueous and oil-soluble samples by one sampler.
The pressure pump suppresses the generation of air bubbles even for high-viscosity samples.

Flow Unit 2

Supports 3 types of rinse liquids.
Compatible with both aqueous and oil-soluble samples by one sampler.
The pressure pump suppresses the generation of air bubbles even for high-viscosity samples.
Equipped with a pressure pump for sampling and a high flow drying pump.
Thanks to the high flow pump, drying time is about 80 % faster than conventional models.

Flow Unit 3

Equipped with a suction pump for sampling and a high flow drying pump.
Thanks to the high flow pump, drying time is about 80 % faster than conventional models.

Flow Unit 4

Dedicated unit for rinsing by sample. The required sample volume is only 20mL.
Able to substitute sample without rinse liquid.


Flow Unit 1 and 3


Flow Unit 2


Flow Unit 4

Name	Conditions		
	Sampling	Drying Pump	Rinse Liquid
Flow Unit 1	Pressure Up to approx. 50,000 mPa･s	Normal	2 liquids
Flow Unit 2	Pressure Up to approx. 50,000 mPa･s	High Flow	3 liquids
Flow Unit 3	Suction Up to approx. 1,000 mPa･s	High Flow	2 liquids
Flow Unit 4	Suction Up to approx. 1,000 mPa･s	Normal	0 liquids

Specifications

Model	AS-8030 Auto Sampler
Number of sample positions	30
Type	Standard (N type)
Set temperature	Ambient temperature
Standard sample vials	20 mL
Required sample volume	10 mL : After rinsing and drying 20 mL：For measurement after rinsing / substitution by sample
Sample carrying method	Transfer sample vials on turning rack
Sampling method	Pressure (FU1,FU2 *1) ／ Suction (FU3,FU4 *1)
Drain method	(1) Pressure sample discharge (FU1,FU2 *1) (2) Sample drain by tube pump (FU3,FU4 *1) (3) Retrieve sample back to vial (FU1,FU2 *1)
Sequence	(1) Sample measurement only (FU1,FU2,FU3,FU4 *1) (2) Sample measurement after calibration with air and water (FU1,FU2,FU3 *1) (3) Sample measurement after calibration with two (2) standard substances (FU1,FU2,FU3 *1)
Control	(1) Auto start with [Start] button on the tablet/ PC (FU1,FU2,FU3,FU4 *1) (2) Rinse & Purge operations with [Rinse & Purge] button on the tablet/ PC (FU1,FU2,FU3 *1) (3) Auto calibration with [Calibration] button on the tablet/ PC (FU1,FU2,FU3 *1) (4) Auto check or calibration with [Check] button on the tablet/ PC (5) Emergency measurement (FU1,FU2,FU3,FU4 *1) (6) Table rotation by [Step] button on the left side of the Auto Sampler
Auto power-off	Auto power shutoff for Auto Sampler (AS-8030) / only auto stop temperature control for the Density/Specific Gravity Meter (DA-860/DA-850/DA-840)
External control	Communication with measuring unit via simple serial interface：RS-232C×1ch
Display	Connected to the dedicated tablet/ PC
Compatible models	Density/Specific Gravity Meter：DA-860/DA-850/DA-840 For other units, please contact us.
Ambient conditions	Temperature: 5 to 35 °C (41 to 95 °F) (use acetone for rinse 2 under 15 °C (59 °F)) Humidity：85%RH (subject to no condensation)
Power supply	AC100 to 240V ; 50 / 60Hz (Comes with AC adapter)
Power consumption	Up to 45 W
Dimensions	300 (W) × 600 (D) × 500 (H) mm (11.8 (W) × 23.6 (D) × 19.7 (H) inches
Weight	27 kg (60 lbs)
CE marking As of 2021/03/23	EMC：EN61326-1 Conforms to LVD：EN61010-1 Conforms to RoHS：2011/65/EU,(EU)2015/863

*1 : FU: Flow Unit