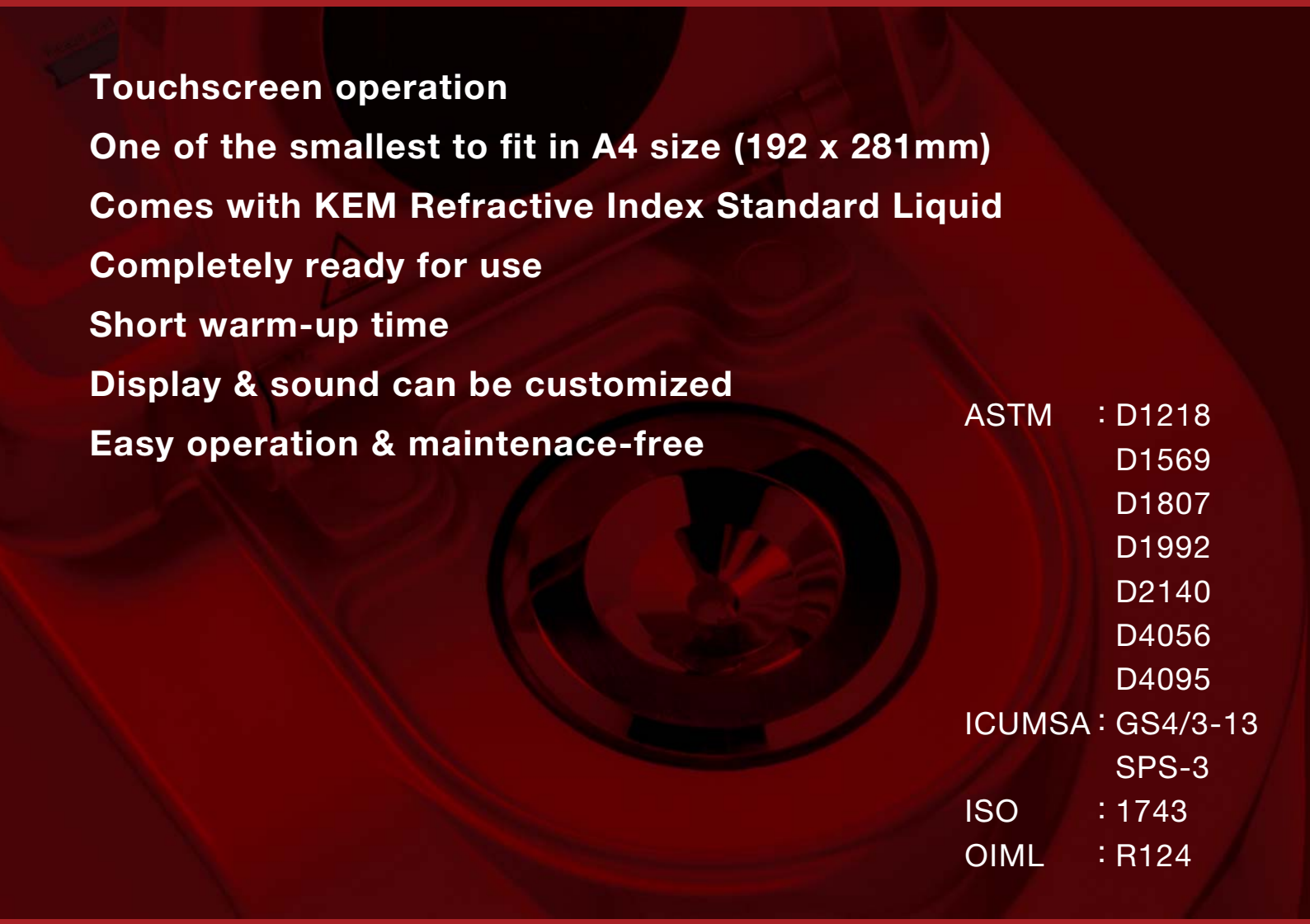
Refractometer

RA-620/-600



- Touchscreen operation
- One of the smallest to fit in A4 size (192 x 281mm)
- Comes with KEM Refractive Index Standard Liquid
- Completely ready for use
- Short warm-up time
- Display & sound can be customized
- Easy operation & maintenace-free

ASTM : D1218
D1569
D1807
D1992
D2140
D4056
D4095
ICUMSA : GS4/3-13
SPS-3
ISO : 1743
OIML : R124

CE

KYOTO ELECTRONICS MANUFACTURING CO.,LTD.

Refractometer
RA-620/-600

Uniqueness

1 Accuracy of One of the Highest in the World *1

Refractive Index : ±0.00002 nD
(Repeatability : ±0.00001 nD)
(Measurement conducted under standard conditions of KEM.)

Brix : ±0.014%
(Calculated from accuracy of refractive index.)

2 Compact Size Benchtop Refractometer
(Built-in Temperature Control)

Space-saving of A4 Size, Two-thirds of Previous Models in Size (192mm×281mm)
(Comparison with previous models.)

Half of previous models in weight with aluminum die casting housing.
Can be installed anywhere in a limited space of lab.

3 Comes with Refractive Index Standard Liquid (Pure Water)

KEM is the only manufacturer of refractometers that also produces the standard liquids.
Can be used to evaluate reliability.

4 Image of Critical Angle

An image of the Abbe measurement scale can be viewed.

*1 : RA-620

Features

4.7-inch TFT Colour LCD & Touch Screen Operation

Normal Mode

Simple Mode

Easy view of various info.
Straightforward &
user-friendly operation.
Display colours
can be changed.

Sample Cover Equipped with Anti Volatilization Device

Anti Volatilization Device
Furnished on back side of sample cover to prevent sample liquid from volatilizing.

Splash Prevention
Sample cover, when opened, prevents sample from being splashed on LCD.

Secure Measurement
Start button will not be activated when sample cover remains open.

Wide Range of Temperature Control

Temperature control range :
RA-620 : 5 ～ 75°C (41 ～ 167°F)
RA-600 : 5 ～ 75°C (41 ～ 167°F) / 5 ～ 100°C (41 ～ 212°F)(Option)
Suitable for measurement of high-melting-point petroleum or oil and fat.
(Lower limit subject to ambient temperatures.)

Easy to Clean Sample Stage

Easy operation with sample stage at the front.

Calibration Navigator

Convenient and easy-to-follow navigator for calibration.

Indicator

Concentration range can visually be recognized.

Equipped with USB Port

For data save and transfer to PC.
(Saved in a CSV file.)

LAN & Browser Controls

Easy connection to PC with LAN.
Control and data transfer possible through browser in your PC.
No special software required.

Conversion to Concentration

Up to 100 conversion tables can be stored.

Application

Food & Beverages

To check Brix.

- Honey
- Starch syrup
- Liquid sugar
- Isomerized sugar
- Glucose
- Sweeteners
- Beet sugar
- Jam, marmalade
- Fat & oil
- Cooking oil
- Cottonseed oil
- Sesame oil
- Canola oil
- Olive oil
- Palm oil
- Coconut oil
- Condiments & seasonings
- Ketchup
- Vinegar
- Purée
- Soy sauce
- Alcoholic drinks
- Beer
- Wine
- Japanese sake (rice wine)
- Whisky
- Soft drinks
- Carbonated drinks
- Fruit drinks
- Coffee drinks
- English tea
- Milk
- Soy milk
- Lactic acid drinks
- Fruits
- Oranges
- Grapes
- Pears
- Watermelons
- Melons
- Lemons
- Apples
- Grapefruit
- Pineapples
- Peaches
- Limes
- Tomatoes

Standards

ICUMSA : GS4/3-13
SPS-3
ISO : 1743
OIML : R124

Petroleum, Chemicals

To check concentration.

- Light oil
- Kerosene
- Gasoline
- Cyclohexane
- Styrene
- Benzene
- Toluene
- Xylene
- Quenching oils
- Cutting oils (cutting fluids)
- Lubricants
- Water-soluble lubricants
- Insulating oils
- Water-soluble hydraulic oils
- Water-soluble metal working oils
- Rust preventive oils
- Antifreeze
- Ethylene glycol
- Propylene glycol
- Surfactants
- Water-soluble quenching oils
- Electronic components

Standards

ASTM: D1218
D1569
D1807
D1992
D2140
D4056
D4095

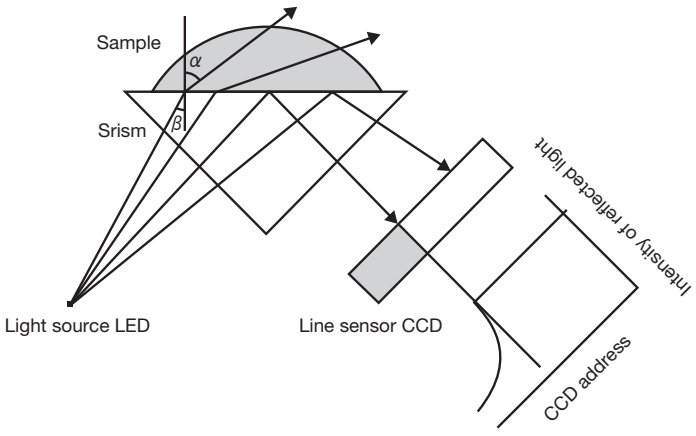
Pharmaceuticals, Flavours & Fragrances, Cosmetics

To check concentration.

- Injection solutions
- Chinese herbal remedy
- Eyedrops
- Toiletries
- Shampoos
- Hair conditioners
- Detergents
- Skin toner
- Hair tonic
- Medical services
- Serum
- Urine
- Ascites
- Body fluids
- Disinfectants
- Ethyl alcohol
- Hydrogen peroxide

Principle of Measurement of Refractive Index

Any visible light changes its direction when it passes through a material with a higher refractive index (RI) to that with a lower refractive index. As the incident ray ⍰ increases, the refractive angle ⍰ will increase in accordance with Snell's Law, and when the refractive angle ⍰ reaches the critical angle (=90°), total refraction will occur at the boundary between the prism and the sample.
In actual measurements by our Refractometers, the light source, the prism (nD=1.768) and the line sensor CCD are placed as shown in the right figure, and the refractive index can be determined from the CCD address of the boundary (critical angle) between the "light" and "dark" area on the line sensor by detecting the intensity of the reflected light with the CCD sensor.



Quick Reference

1 Wipe the sample stage and the prism to clean them.

Remaining samples or some other stuff on the sample stage or the prism may prevent you from conducting an accurate measurement.

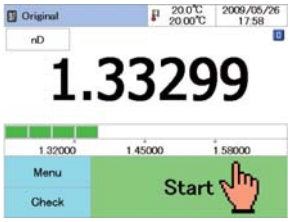
2 Drop a sufficient amount of sample on the prism to cover it entirely.

The minimum amount required is approx. 0.2mL.
A small amount of sample may result in inaccurate measurement with some samples.
Meanwhile, too much sample liquid would make it longer to adjust the temperature and to complete the measurement.

3 Close the sample cover.

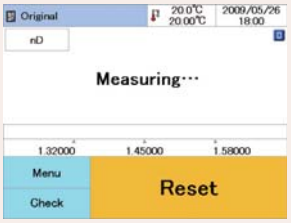
Make sure to close the sample cover.
It is important to do so to block the exterior light and to achieve an accurate measurement.

4 Press “Start”.



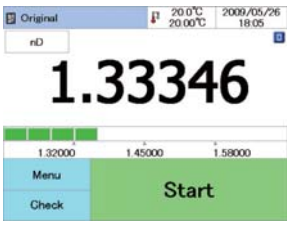
5 Measuring...

“Start” changes to “Reset” once a measurement has started.
Press “Reset” if you wish to stop the measurement.



6 A measurement result appears.

Immediately wipe off the sample after measurement and clean the prism and the sample stage.
Leaving the sample there for a long time may make it difficult to clean the prism and the sample stage.



FAQ

1 Q What are the features of RA-620/-600?

A State-of-the-art design that cannot be seen with past models, and user-friendly operation, even suitable for the first-time users.

2 Q What is the sample amount required?

A A sample of 0.2mL or more is required.

3 Q What should I do after a measurement?

A If the sample is an aqueous solution, wipe it off with water and ethanol using tissues or a soft cloth.
If the sample is an organic solvent such as toluene, wipe it off with ethanol or acetone.

4 Q Are there any consumables?

A Nothing special. We recommend, however, that the dustproof filter be cleaned every one to two months.
If dust persists, replace the filter. (12-03678 Filter Set (5 sheets))

5 Q How can I check the measurement accuracy?

A We recommend that our Refractive Index Standard Liquids be used to check the accuracy.

Options

Sampler

Auto Clean and Sampling Unit DCU-551N

- Effective for precious samples (c.f. Flavors, Fragrances etc)
- Measurement of 1 sample in a 20mL vial.
- Viscosity up to 50,000mPa・s.
- Flow cell unit 12-03018*1, Connecting cable 12-02012 & 64-00625 required.

*1 : Contact your distributor in advance in case a sample is highly viscous.

Multiple Sample Changer CHD-502N

- Automatically cleans and dries prism and connecting tubes.
- Measurement of up to 30 samples in 20mL vials.
- Viscosity up to 50,000mPa・s.
- Flow cell unit 12-03018*2, Connecting cable 12-02012 & 64-00625 required.

*2 : Contact your distributor in advance in case a sample is highly viscous.

Printer

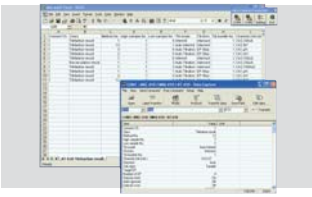
Thermal Printer (DP-600) with Connection Cable 12-02618-0X

Dot Matrix Printer (IDP-100) with Connection Cable 12-02028-0X

Software

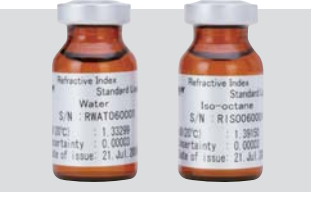
Data Acquisition Software SOFT-CAP

- Data transfer to PC in CSV format
- Connecting cable 12-02012 & 64-00625 required



Standard Liquid

Refractive Index Standard Liquids



JCSS-accredited Refractive Index Standard Liquid

KEM is the only manufacturer of refractometers that aiso produces the standard liquids.

Part number	Part Description	nD at 20°C	mL/bottle	Remarks
12-01610-01	Water/2bottles (JCSS Certif.)	1.33299	10	2 bottles/ set
12-04077-01	Iso-Octane/Water/ea. 1 bottle (JCSS Certif.)*1	1.391**	10	Pure Water & Isooctane 1 bottle each
12-04078-01	Cyclohexane/Water/ea.1 bottle (JCSS Certif.)*1	1.426**	10	Pure Water & Cyclohexane 1 bottle each
12-04080-01	Dichlorotoluene/Water/ea. 1 bottle (JCSS Certif.)	1.546**	10	Pure Water & Dichlorotoluene 1 bottle each
12-04081-01	Dibenzyl Ether/Water/ea. 1 bottle (JCSS Certif.)*1	1.563**	10	Pure Water & Dibenzyl Ether 1 bottle each
12-04082-01	1-Bromonaphtalene/Water/ea. 1 bottle (JCSS Certif.)*2	1.658**	10	Pure Water & 1-Bromonaphtalene 1 bottle each

Shelf life : 3 months from calibration date (Dibenzyl Ether) / 12 months from calibration date (Others).
*1 These items are categorized as hazard items to be exported. They requires special packing & transportation charge.
*2 1-Bromonaphtalene is out of range of measurement for RA-620.

Brix Converted Standard Liquid of Refractive Index

Part number	Part Description	Brix% nD at 20°C	mL/bottle	Remarks
12-04083-30	5% Brix Solution/2bottles	5.** Brix% 1.340**	10	Equivalent to 5% Brix% 2 bottles/ set
12-04083-31	10% Brix Solution/2bottles	10.** Brix% 1.347**	10	Equivalent to 10% Brix% 2 bottles/ set

Shelf life : 1 month from calibration date

Recommend Consumables and Parts

Part number	Part Description	Qty	Remarks
12-04260	Printing Roll RP5860 4rolls Set (for IDP-100)	1 set	For Dot Matrix Printer (IDP-100)
69-00719	Ribbon Cartridge IR-91B Black (for IDP-100)	1 pc	For Dot Matrix Printer (IDP-100)
12-04261	Ribbon Cartridge IR-91B Black (5pcs/set) (for IDP-100)	1 set	For Dot Matrix Printer (IDP-100)
69-00522-11	Thermal Roll Paper STH-215 (10 rolls)	1 set	For Thermal Printer (DP-600)
12-03678	Filter Set (5sheets)	1 set	5 filters/ set

Standard Parts

Part number	Part Description	Qty	Remarks
RA-600 or RA-620	Main Unit	1 unit	
-*1	AC Adapter Type2	1 pc	
69-00444	Touch Pen	1 pc	
-	Water/2bottles	1 set	Refractive Index Standard Liquid (2 bottles/ set)
12-02918	RA-600 Series Operation Manual (CD-ROM)	1 pc	Incl. Operation Manual, Function Description, Operation Manual for RS-232C, Quick Manual, CE Declaration of conformity, etc.
59-00035-01	RA-600 Series Quick Manual	1 copy	
59-00405	Safety Instructions	1 copy	
20-05627	Inspection Certificate/Warranty	1 copy	
50-00761	Contact	1 copy	
59-00133	Unpack the carton	1 copy	

*1 Varies by power supply requirement.

		RA-620	RA-600
Measurement Method		Detection of Critical Angle of Optical Refraction	
Light Source		LED Na-D Line (589.3nm)	
Measurement Items		Refractive Index, Brix, Other Concentrations	
Measurement Range	Refractive Index (nD)	1.32000 ~ 1.58000	1.3200 ~ 1.7000
	Brix	0.00 ~ 100.00%	
Accuracy*1	Refractive Index (nD)	±0.00002	±0.0001*2
	Brix	±0.014%*3 (0 ~ 85.0%)	±0.1%
Repeatability*4	Refractive Index (nD)	±0.00001	±0.0001
	Brix	±0.007% (<5%) ±0.01% (≧5%)	±0.1%
Resolution	Refractive Index (nD)	0.00001	0.0001
	Brix	0.001% (<5%) 0.01% (≧5%)	0.1%
Temperature Control*5*6		5 ~ 75°C (41 ~ 167°F)	5 ~ 75°C (41 ~ 167°F) 5 ~ 100°C (41 ~ 212°F) (Option)*7
Temperature Indication Resolution		0.01°C (0.02°F)	0.1°C (0.2°F)
Minimum Amount of Sample		0.2mL	
Display		4.7-inch colour TFT LCD	
Operation		Touchscreen (Comes with Stylus.)	
Security		Password Protection	
Data Storage	Number of Methods	100 methods	
	Measurement Results	300 data	
	Calibration Record	20 data	
	Check Record	20 data	
	External Storage	USB Flash Drive	
Temp. Compensation	Brix	5.00 ~ 75.00°C (41.00 ~ 167.00°F) (Automatic compensation by preprogrammed conversion table.)	
Concentration	By Conversion Table	100 data	
Interfaces	LAN	x 1; Personal computer (PC)	
	USB1.1	x 2; USB flash drive, keyboard, barcode reader, Epson inkjet printer*8, Thermal Printer (DP-600)	
	RS-232C	x 2; Dot Matrix Printer (IDP-100), Auto Clean and Sampling Unit (DCU-551N), Multiple Sample Changer (CHD-502N)	
Ambient Conditions	Temperature	5 ~ 35°C (41 ~ 95°F)*7	
	Humidity	85%RH or below (No condensation allowed.)	
Power Supply		AC 100 ~ 240V, 50/60Hz (Comes with AC adapter.)	
Power Consumption		20W (max. 50W, min. 10W)	
Dimensions		192 (W) x 281 (D) x 166 (H) mm (7.6 (W) x 11.1 (D) x 6.5 (H) inches)	
Weight		5kg (11.0 lbs)	
Export Packing in Double Carton Box		G/W 9.1kg (20.0 lbs); 560 (W) x 460 (D) x 330 (H)mm (22.0 (W) x 18.1 (D) x 13.0 (H) inches)(May vary in some cases.)	
Materials in Contact with Samples	Prism	Artificial Sapphire	
	Sample Stage	SUS316	
Option	Printer	Thermal Printer, Dot Matrix Printer	
	Sampling Unit, Changer	DCU-551N, CHD-502N	
	Software	SOFT-CAP (Data acquisition software)	
Expandability	Barcode Reader	Reads sample name, measurement conditions, value of standard liquid	
	Battery	Yes*9	

*1 : By KEM's standard measurement conditions. *2: Accuracy is not guaranteed when the set temperature is above 75°C.
*3 : Calculated from measurement accuracy of refractive index: nD 0.00002 = Brix 0.014%. *4 : By KEM's standard measument conditions. Subject to sample properties.
*5 : Peltier Thermostat. *6 : Lower limit 12°C below ambient. *7 : When the set temperature is 75°C, reduce ambient temperature to 25°C or below.
*8 : Enquire for applicable models. *9 : Contact your distributor for details.

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Your Distributor

1505-23-SK