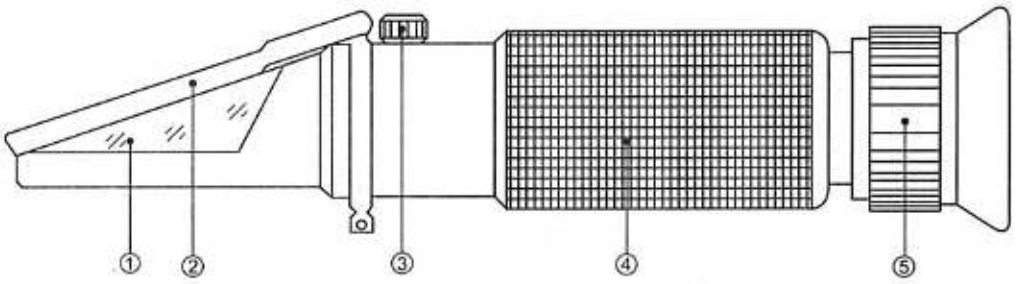
Hand Held Refractometer
Operation Instructions

Series

No.	Model	Measuring Range	Minimum Scale	Size (mm)	Weight (g)
1	REF101/111	0-10% Brix	0.1%	26/30 x 40 x 190	155
2	REF102/112	0-18% Brix	0.1%or0.2%	26/30 x 40 x 170	185
3	REF103/113/103bp	0-32% Brix	0.2%	26/30 x 40 x 170	175/200/110
4	REF104/114/104bp	28-62% Brix	0.2%	26/30 x 40 x 150	160
5	REF105	45-82% Brix	0.5%	26 x 40 x 150	160
6	REF106/116/106bp	58-90% Brix 38-42% Be' 17-27% Water	1% 0.5% 1%	27/30 x 40 x 160	175
7	REF106c/116c	13-25% Honey moisture	0.1%	27/30 x 40 x 160	175
8	REF106b	58-92% Brix 38-43% Be' 12-27% Water	1% 0.5% 1%	26 x 40 x 125	175
9	REF109	58-92% Brix	0.5%	26 x 40 x 125	175
10	REF109b	1.435-1.520Nd	0.001Nd	26 x 40 x 125	175
11	REF1010	0~50% dextrose	1%	26 x 40 x 125	175

Note: 1. Each of the models in Series catalog with footnote "bp" has a prism base made of black engineering plastics.
2. "Weight" listed here refers to the weight of plain type refractometer.

Name of components



1. Prism 2. Cover plate 3. Correcting screw 4. Mirror tube 5. Eyepiece (Adjusting ring of diopter)

Method of operation

1. Aim the front end of the refractometer to the direction of bright light, and adjust the adjusting ring of diopter 5 until the reticle can be seen clearly.
2. Adjustment of null: Open the cover plate 2. Drop one or two drops of distilled water on the prism. Close the cover plate and press it lightly. Then adjust the correcting screw 3 to make the light/dark boundary coincide with the null line.
(Adjustment of refractometer with temperature compensation function should be made under the condition of 20℃ environmental temperature).

* REF104 Model: Make adjustment by using a saturated sodium chloride solution. The refractive index of the saturated sodium chloride solution is: When temperature is at 15°C, adjust to 29.9%; when it is at 20°C, adjust to 29.6%; when it is at 25°C, adjust to 29.2%.

** REF105, REF106 Model Adjustment of reference: Drop one drop of dioptric oil on the bright surface of the reference block. Open the cover plate (2), stick the reference block on the surface of the prism, and press it lightly with your hand, so that it can not slide down, Rotate and adjust the correcting screw (3) to make the light/dark boundary coincide with the reference line (Brix 78.8%).

*** REF 106c Model Adjustment of reference: The method is the same with that of REF106 Model, except that the light/dark boundary should be adjusted to 19.6%.

3. Open the cover plate (2). Clean the surface of prism by soft cotton cloth. Drop 1~2 drops of solution to be measured. Close the cover plate. Press it lightly, then read the corresponding scale of light and dark boundary. The reading is the Brix of measured solution.
4. After measurement, clean away the measured solution on the surface of prism and cover plate by moist cotton cloth. After drying, it should be stored perfectly.

Attentions and maintenance

1. Adjusting of the null: Liquid and specimen should be under the same temperature. If the temperature varies greatly, the null point should be adjusted once per 30 minutes.
2. After usage, don' t use water to wash the instrument, so as to prevent water from entering into the instrument.
3. As it is a kind of precision optical instrument, you should handle it gently and take good care of it. Don' t touch and scratch the optical surfaces. It should be kept in the environment of dry, clean and non-corrosive air, so as to prevent the surface of it from turning mouldy and foggy. Please avoid strong shock during transportation.
4. If the consumers use the instrument in accordance with the mentioned method of usage,it can be guaranteed that the instrument can't break down. The optical performance can't change.

Temperature Compensation

The reference of temperature is 20°C. In operation, the temperature compensation should be made according to the table. Brix/ATC is a refractometer provided with an automatic temperature compensation function, so correction of the temperature according to the table is not needed.

Accessories

1. Cleaning cloth 1
2. Suction tube 1
3. Screw driver 1

Temperature Correction Table for Saccharose Solution (Reference temperature is at 20°C)

Tempe-	Quality Fraction %																	
ratur°C	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
	Subtract from measured value																	
10	0.52	0.58	0.59	0.61	0.64	0.67	0.69	0.71	0.72	0.74	0.74	0.74	0.75	0.76	0.77	-	-	-
11	0.48	0.51	0.54	0.55	0.58	0.61	0.63	0.65	0.65	0.67	0.67	0.67	0.68	0.68	0.69	-	-	-
12	0.44	0.47	0.49	0.50	0.52	0.55	0.57	0.58	0.58	0.60	0.60	0.60	0.60	0.61	0.61	-	-	-
13	0.39	0.42	0.43	0.44	0.45	0.49	0.50	0.51	0.51	0.53	0.53	0.53	0.53	0.53	0.53	-	-	-
14	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.46	-	-	-
15	0.29	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.37	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.37	0.37
16	0.24	0.25	0.26	0.27	0.28	0.28	0.29	0.30	0.30	0.31	0.31	0.31	0.31	0.31	0.31	0.30	0.30	0.30
17	0.18	0.19	0.20	0.20	0.21	0.21	0.22	0.22	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.22
18	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
19	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07
	Add to the measured value																	
21	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07
22	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15
23	0.20	0.21	0.21	0.22	0.22	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.23	0.23	0.23	0.23	0.22
24	0.27	0.28	0.29	0.29	0.30	0.30	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.31	0.31	0.31	0.30	0.30
25	0.34	0.35	0.36	0.37	0.38	0.38	0.39	0.39	0.40	0.40	0.40	0.40	0.40	0.39	0.39	0.39	0.38	0.37
26	0.42	0.43	0.44	0.45	0.46	0.46	0.47	0.47	0.48	0.48	0.48	0.48	0.48	0.47	0.47	0.46	0.46	0.45
27	0.50	0.51	0.52	0.53	0.54	0.55	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.55	0.55	0.54	0.53	0.52
28	0.58	0.59	0.60	0.61	0.62	0.63	0.64	0.64	0.64	0.65	0.65	0.64	0.64	0.64	0.63	0.62	0.61	0.60
29	0.66	0.67	0.68	0.69	0.70	0.71	0.72	0.73	0.73	0.73	0.73	0.73	0.72	0.72	0.71	0.70	0.69	0.68
30	0.74	0.75	0.77	0.78	0.79	0.80	0.81	0.81	0.81	0.82	0.81	0.81	0.81	0.80	0.79	0.78	0.77	0.75