

# High Resolution *Schmidt & Haensch* Automatic Refractometer



## Features of the DUR Refractometers

- ❑ Automatic refractometer for full Abbe range.
- ❑ Work with samples up to 80 degrees C.
- ❑ High accuracy +/- .00001 (+/- 0.00002 at high temperature).
- ❑ Accessories for flow through operation.
- ❑ Digital readout of index, temperature, concentration sample ID, time and date.
- ❑ Only a small amount of sample needed. (0.3 mL)
- ❑ Internal menu for customized operations.
- ❑ User programmable for custom scales.
- ❑ Manual or automatic measurement interval.
- ❑ Option for up to 30 pre-loaded scales.
- ❑ Run 2 refractometer heads from one controller.
- ❑ Membrane keyboard for cleanliness.
- ❑ RS232 included.

## Automatic Digital Refractometer

The DUR series refractometers from Schmidt and Haensch are sophisticated digital refractometers with high accuracy and a wide range of measurable refractive index. There are three different refractometer in the series. The DUR - SW is the standard unit covering the range 1.32000 - 1.53000. The DUR - W2 covers the full Abbe range of refractive index and the DUR - HT is designed to operate at higher sample temperatures up to 80 degs.C. All



three instruments share the same powerful microprocessor based electronics. Each unit can store up to 30

different scales and you can program special scales to suit your own requirements. Optional standard scales include Brix, Ochsle, Zeiss, Beaume, Serum, Protein, alcohols in water and many others. The bright back lit LCD display has 8 lines of 30 characters each. The index, temperature, sample ID, time and date, can be displayed simultaneously. The software also provides for configuration of the printout, formatting of the display and data export.

## High Temperature DUR-HT



The DUR-HT is a full Abbe range refractometer designed to work with samples such as waxes requiring higher temperature - up to 80 degrees C. The sample holder temperature is maintained at the desired temperature by using a recirculating temperature controlled fluid bath. The detector and electronics are cooled by a separate water cooling circuit.

## Vertical or Horizontal Configuration

Each refractometer head can be used with the prism face in a horizontal or vertical configuration. In the horizontal configuration the sample is dropped into the small sample 'dish'. In the vertical configuration (shown below) a hinged door forms a seal to the sample dish so that sample can be poured or otherwise made to flow through the sample compartment.



## Refractive Index & Temperature

The refractive index of a substance changes with temperature. Standard references for refractive index are given at a certain temperature - typically 20 degs C. Refractometers are frequently used to measure concentrations or density of solutes by inferring the concentration from the refractive index. Even though the refractive index changes with temperature the concentration of a given solution will remain the same. Temperature compensation scales are used to correct the concentration for the change in refractive index due to temperature.

## Concentration & Special Scales

There are many 'standard' scales such as the Brix scale where the relationship between refractive index, concentration and temperature are well known for the substances being measured. (Sugars for the Brix scale). For other substances this kind of data may be proprietary or may not exist at all. For some materials such as waxes the refractive index is used as a qualitative standard and temperature corrected index scales are used to standardize the refractive index readings. The DUR refractometer is a microprocessor controlled instrument which can easily be programmed with scales that correct for temperature or concentration or both. The scales are entered via the keyboard and menu structure of the unit. Standard scales such as the Brix, Ochsle, Ethanol or Methanol in water scales are usually pre-loaded into the refractometer, on request, at the factory. But you can program up to 30 standard or proprietary scales using the key-panel to enter the set up menu of the refractometer.

## Sophisticated but easy to use

The DUR refractometers are very sophisticated instruments, suitable for advanced research or quality control applications, yet they are very easy to use. A measurement is initiated with a single key stroke. The index data is returned within a couple of seconds. Alternatively the DUR can be set up to automatically take a reading at programmed intervals. The data can be stored, printed or passed to a PC via the RS232 interface.

## Engineering Quality

The DURs are manufactured in Berlin by Schmidt and Haensch a company with a long history of innovation and engineering quality in the design and production of polarimeters, refractometers and other optical instruments.

## Specifications

Model	DUR - SW	DUR - W2	DUR - HT
Index Range	1.32000 - 1.53000	1.32000 - 1.70000	1.32000 - 1.70000
Brix Range	0 - 95 %		
Display resolution	0.00001		
Accuracy	0.00001	0.00002	0.00002
Working Temperature	up to 40 degs C		up to 80 degs C
Display	8 line 30 character/line LCD		
Prism	Sapphire		
Light source	High pressure lamp with 589 nm filter		
Detector	linear high resolution CCD array		
Output	RS232 data output		
Power	115 / 220 Volts AC		

## Principle of Operation

The DUR is a critical angle refractometer. The DUR's light source produces a beam of monochromatic light which is directed onto the sample. The light returning from the sample, made up of partially reflected light and light that has been totally internally reflected from the sample, falls onto a high precision linear ccd array detector. This detector locates the dividing line between the partially reflected and the much brighter internally reflected light. The position of this dividing line defines the critical angle of total reflection which is directly related to the refractive index of the sample by Snell's law. The refractometer is precisely calibrated to measure this critical angle.

The high spatial resolution of the linear array together with the fact that there are no moving parts in the measurement process means that the DUR refractometers are highly accurate instruments.

## Ordering Information

Model	Description	Part No	Price
DUR - SW	1.32000 - 1.53000 index	T05750	
DUR - W2	1.32000 - 1.70000 index	T06960	
DUR - HT	1.32000 - 1.70000 index	T06970	
DUR-DR	Vertical sample door for flow through. Standard type ( no temperature bath connections )	T05804	
DUR-DRS	Vertical sample door for flow through - with temperature stabilization connections	T05905	

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