The RangeIR™ Liquid Analyzer

The RangeIR™ is a powerful tool for the analysis of liquids, pastes, and gels under controlled temperatures up to 175°C. The unique design allows the safe use of the sample temperature itself in this control, an invaluable feature for rigorous studies. Reactants and reaction products can be monitored as a function of temperature. In addition, the RangeIR™ can be used for sensitive measurements on dissolved or suspended species, by using the elevated temperature to volatilize an interfering liquid.

APPLICATIONS

- Routine quantitative and qualitative measurements on temperature-controlled liquids, pastes, and gels.
- Real-time *in situ* monitoring of reactants and reaction products in liquids as a function of temperature.
- Analysis of dissolved or suspended species in interfering liquids.

FEATURES

- Reproducible measurements.
- Convenient trough for containing liquid samples.
- Fixed 45° single reflection horizontal ATR configuration.
- SuperCharged™ ZnSe ATR Crystal or Gemanium ATR Crystal.
- Exchangeable ATR crystal.
- Simple to align and use.
- Safe, low-voltage heaters permit operation up to 175°C (Note: Germanium becomes optically opaque at temperatures exceeding 100°C.)
- K-type thermocouple directly measures the sample temperature and flips out of the way for easy cleaning of the ATR crystal.
- Secondary K-type thermocouple monitors the crystal temperature, permitting the cascade temperature regulation required as a fail-safe for high temperature operation.
- PermaPurge™ for rapid purging of the FTIR system.
- Requires the Low Voltage Temperature Controller for precise and safe regulation of the sample temperature, with options for direct, cascade, and computer control.
- Available in a specialized configuration for *trans* fat analysis (see FatIR™ data sheet).

Replacement ATR Crystals	
Material	Catalog No.
ZnSe	FAS-ATR-M
Ge	FAS-ATR-J

INCLUDES

- SuperCharged™ ZnSe mounted ATR crystal or Ge ATR mounted crystal.
- Two imbedded cartridge heaters.
- Two K-type thermocouples.
- Mating and PermaPurge™ hardware for the specified FT-IR spectrometer.

ORDERING INFORMATION

		CATALOG NO.
RangeIR™ with ZnSe ATR Crystal		RAN-M-XXX
RangeIR™ with Ge ATR Crystal		RAN-J-XXX
	110V	*220/*240V
FatIR™ System (includes the RangeIR with ZnSe ATR and Temperature Controller)	FAT-1-XXX	FAT-2-XXX
Temperature Controller (220/240V model: CE marked). Includes USB adapter.	ATK-024-3	ATK-024-4

REPLACEMENT PARTS

Top Plate Assembly, ZnSe	RAN-TOP-M
Top Plate Assembly, Ge	RAN-TOP-J
Viton Gasket	RAN-GSK
K-Type Thermocouple	008-144
Heater Assembly (two heaters plus connector)	RAN-HTR
Cartridge Heater, 24V	HTRS-18

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The RangeIR™ Liquid Analyzer is optimized for fast, easy, and accurate infrared measurements of liquids, pastes, and gels at controlled temperatures up to 175°C. The RangeIR™ may also be used to study reactants and reaction products in liquids at elevated temperatures. Further, this equipment is extremely convenient for studying dissolved or suspended species by using elevated temperatures to volatilize an otherwise interfering solvent.

The RangeIR™ is a trough-style single-reflection ATR FTIR accessory. It requires the use of Harrick's Low-Voltage Temperature Controller and is based on our time-proven FastIR™. With the SuperCharged™ ZnSe crystal, this design has the highest optical throughput (>85%) of any ATR accessory. Its simple optical configuration, consisting of only two fixed flat mirrors and a triangular prism ATR crystal, provides optimum performance without the need for sensitive optical alignment adjustments. The design is inherently stable, an essential feature for operation of a system used at the extreme temperatures simulating processing conditions.

The RangeIR™ utilizes a trough configuration to simplify sample introduction and crystal cleaning. This configuration is required to contain substances which have low viscosities at elevated temperatures.

The two 24V cartridge heaters, in thermal contact with the crystal mounting plate, are operated by our low-voltage temperature controller. Two thermocouples are provided, one in the sample and one in contact with the ATR crystal, to enable cascade operation of the temperature controller. Cascade control is necessary at higher temperatures because the lag between the heater and sample temperatures can cause the controller to otherwise overshoot the set point, potentially resulting in damage.

When studying heat-induced changes in liquids, it is important to precisely and accurately know the sample temperature. The RangeIR™ measures and controls the sample temperature directly, instead of recording the crystal or heater temperature, as is commonly done by other ATR accessories. This is important because the sample is exposed to a different thermal environment and hence is at a slightly lower temperature. With the RangeIR™, the sample thermocouple is placed directly into the sample, providing the true value (and control) desired.

The RangeIR™ incorporates easily adjustable and highly stable kinematic mounting, for optimum alignment in the particular spectrometer being used. In addition, the RangeIR™ is equipped with Harrick's patented PermaPurge™. This allows samples to be exchanged without interrupting the purge of the FTIR spectrometer, which, in turn, greatly enhances sample throughput.