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Principles of Operation	491Flex Base Module	FlexStream Base Module
Dilution of constant component vapor emission from permeation or diffusion tubes	✓	✓
Delivery of precise, adjustable, low concentration dynamically blended gas mixtures. Trace concentrations - ppmv, ppbv, pptv	✓	✓
Oven temperature and dilution flow rate adjustment and standby, zero, span selection	Manual controls	Touchscreen
External PC monitoring and control via industry-standard Modbus® RTU communications protocol and Ethernet or serial RS-232 connectivity	✗	✓
Permeation Tube Oven		
Construction - high thermal mass oven with electronic PID control	Vertical orientation	Vertical orientation
Oven temperature range (heat only)	30-150 °C	30-150 °C
NIST-traceable oven temperature	✓	✓
Oven setpoint resolution and control	±0.1 °C	±0.01 °C
Temperature digital indication and adjust via front panel	✓	✓

Over-temperature detection with audible alarm and oven power removal		
Temperature digital indication and adjust via computer interface		
Diluent Gas (customer-supplied)		
Carrier flow rate across oven	manually-set	fixed
Uses inert, non-reactive, non-hazardous dry gas (Nitrogen, zero air, Argon, etc.)		
Mass flow subsystem is factory-calibrated in Nitrogen; contact factory for calibration in other type gas		
Accepts a gas correction factor (GCF) for most gases to auto-adjust the dilution mass flow rate when a diluent gas other than Nitrogen is used		
Using the supplied FlexLink™ PC-based software (FlexStream only), the mass flow controller subsystem can be easily calibrated with up to 10 points in other diluent gases (Customer supplies the flow standard)		
Primary Dilution Flow Rate		
Dilution flow rate type	Mass flow meter	Mass flow meter and controller
Standard dilution flow rate range	0.25 to 5 lpm	0.25 to 5 lpm
Optional flow rate ranges available	10, 1, 0.5 lpm	10, 1, 0.5 lpm
Flow rate accuracy	±1% FS	Lesser of ±1.5% Reading and ±1% FS
Flow rate calibration method	Analog zero/span adjust	Piece-wise linear fit of up to 10 calibration points
Flow rate indication via front panel		

Flow rate control via front panel	Flow rate set by manual valve from front panel	Flow rate set from touch screen target flow or target concentration
Flow rate digital indication and control via computer interface		
Flow rate can be auto-set based on target concentration		
Accepts Vapor Emissions from the Following Devices*		
Liquid-filled disposable tubes up to 15 cm in length (maximum of 8 tubes)		
Liquid-filled high rate (LFH) permeation tubes (maximum of 1 tube)		
Factory pre-filled gas-fed permeation tubes (maximum of 1 tube)		
Diffusion tubes (maximum of 4 tubes)		
*Note: A single oven can hold only one of the above tube types at a time		
Standard Component Flow Path		
Component contacts only glass, Teflon® and stainless steel		
Glass permeation tube holder		
Suitable for reactive component gases		
Optional Component Flow Path		
Heated output lines		
Stainless steel		
Electro-polished stainless steel		
Sulfinert-coated stainless steel		

Teflon only		
Teflon permeation tube holder		
Standard Modes of Operation		
Standby		
Zero		
Span-by-flow	Manual valve set and digital indication	Touchscreen flow setpoint and digital indication
Span-by-concentration (user-specified target concentration)		
Auto-calculates flow setpoint based on target concentration, tube emission rate and oven temperature	Manual Calculation	
Automatically updates touchscreen with up to eight generated concentration values		
Output Concentration Range		
Below 1 ppb to over 1000 ppm depending on tube emission rate and dilution flow rate; low ppb and ppt with secondary dilution		
User selects units of ppm, ppb or ppt		
Interfaces		
Local human interface - color touch screen with virtual keypad		
Remote computer interfaces (standard Ethernet & RS-232)		
Communications Protocol		Modbus RTU
PC-based Software		

KIN-TEK FlexLink™ software CD shipped with instrument		
FlexStream Labview® Modbus driver on FlexLink™ CD		
LabView®-based starter software with source available		
Expandability		
Additional permeation ovens		
Customer-refillable gas-fed permeation oven option		
Secondary dilution flow rate option; other ranges available	0.5 to 5 lpm	0.5 to 5 lpm
Overall output gas stream dilution ratio with both primary and secondary dilution	Up to 10,000:1	Up to 10,000:1
Direct gas blending module option		
Humidified gas module option		Contact factory
Gas stream output Interface module option; If secondary dilution module is installed, subtract 10 psig (69 kPa)	ambient to 40 psig (276 kPa)	ambient to 30 psig (207 kPa)
Instrument Housing (specified when ordering)		
Carrying case (standard)		
Expansion chassis (option); desktop or rack-mount; 2 cases maximum	3 modules per case	3 modules per case
Maximum number of modules in a single system	6	6
Power Requirements (specified when ordering)		
115 VAC, 50/60 Hz		
230 VAC, 50/60 Hz		

Dimensions and Weight		
Dimensions (Base module in carrying case)	Similar	Similar
Weight (Base module in carrying case)	Similar	Similar
Certifications		
European CE Mark (230 VAC, 50 Hz)		
NRTL (site-specific)	not tested	
CSA (site-specific)	not tested	
UL (site-specific)		not tested
Speciality Applications (Please contact the Factory)		
Special diluent (carrier) gases other than inert gases		
Trace moisture		
Chemical compatibility issues		
Heat tracing requirements		
Other	