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<b>Principles of Operation</b>	<b>FlexStream Base Module</b>
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	✓
Front panel touchscreen for oven temperature and dilution flow rate adjustment and standby, zero and span selection	✓
External PC monitoring and control via industry-standard Modbus® RTU communications protocol and Ethernet or serial RS-232 connectivity	✓
<b>Permeation Tube Oven</b>	
Construction – high thermal mass oven with electronic PID control	Vertical orientation
Oven temperature range (heat only)	30-150 °C
NIST-traceable oven temperature	✓
Oven setpoint resolution and control	±0.01 °C
Temperature digital indication and adjust via front panel	✓
Temperature digital indication and adjust via computer interface	✓
Over-temperature detection with audible alarm and oven power removal	✓
<b>Diluent Gas (customer-supplied)</b>	
Uses inert, non-reactive, non-hazardous dry gas (Nitrogen, zero air, Argon, etc.)	✓

Mass flow controller subsystem is factory-calibrated in Nitrogen; contact factory for calibration in other type gas	
FlexSteam 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, the mass flow controller subsystem can be easily calibrated with up to 10 points in other diluent gases (Customer supplies the flow standard)	
<b>Primary Dilution Mass Flow Controller</b>	
Standard mass flow controller range	0.25 to 5 lpm
Optional mass flow controller ranges available (0.5-10, 0.1-1, 0.1-0.5 lpm)	
Mass flow rate accuracy (with multi-point calibration)	Lesser of $\pm 1.5\%$ Reading and $\pm 1\%$ FS
Mass flow rate digital indication and control via front panel	
Mass flow rate digital indication and control via computer interface	
Mass flow controller calibration method: piece-wise linear fit	up to 10 calibration points
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	
<b>Standard Component Flow Path</b>	
Component contacts only glass, Teflon® and stainless steel	
Glass permeation tube holder	
Suitable for reactive component gases	
<b>Optional Component Flow Path (specified at time of order)</b>	
Heated output lines	
Stainless steel	
Electro-polished stainless steel	

Sulfinert-coated stainless steel	
Teflon only	
Teflon permeation tube holder	
<b>Standard Modes of Operation</b>	
Standby (oven venting at approx 75 cc/min flow rate)	
Zero (with user-specified flow rate)	
Span-by-flow (with user-specified flow rate or concentration)	
Span-by-concentration (with user-specified target concentration)	
Purge	
Auto-calculates flow setpoint based on target concentration, tube emission rate and oven temperature	
Automatically updates touchscreen with up to 8 generated concentration values	
<b>Output Concentration Range</b>	
Below 1 ppb to over 1000 ppm depending on tube emission rate and dilution flow rate; low ppb and ppt concentrations with secondary dilution	
User selects units of ppm, ppb or ppt	
<b>Interfaces</b>	
Local interface – color touch screen display with virtual keypad	
Remote interfaces – Ethernet (standard) and serial RS-232 (standard)	
RS-232 conversion to RS-485 via customer-supplied converter (optional)	
Communications Protocol	Modbus RTU
<b>PC-based Software</b>	
KIN-TEK FlexLink™ software CD shipped with FlexStream Base module	
FlexStream Labview® Modbus driver on FlexLink™ CD	
LabView®-based starter software with source provided upon request	
<b>Expandability</b>	
Additional permeation ovens (via up to 5 FlexPM modules)	

Customer-refillable gas-fed permeation oven option (via FlexGF modules)	
Secondary dilution flow rate option (via FlexSD module); other ranges available	0.5 to 5 lpm
Overall output gas stream dilution ratio with both primary and secondary dilution	Up to 10,000 to 1
Humidified gas module option (contact factory for more information)	
Gas stream output Interface module option (via FlexIM module); If FlexSD secondary dilution module is installed, subtract 10 psig (69 kPa)	ambient to 30 psig (207 kPa)
<b>Instrument Housing (specified when ordering)</b>	
Carrying case (standard)	
Expansion chassis (option); desktop or rack-mount; 2 cases maximum	3 modules per case
Maximum number of modules in a single FlexStream system	6
<b>Power Requirements (specified when ordering)</b>	
115 VAC, 50/60 Hz, 2 A	
230 VAC, 50/60 Hz, 1 A	
<b>Dimensions and Weight</b>	
Dimensions (Base module as packaged in carrying case); approximate; add 3.5 in (8.3 cm) to Depth for front panel inlet filter clearance	7.5 W x 13.5 H x 20 D inch 18.4 W x 34.3 H x 50.8 D cm
Weight (Base module as packaged in carrying case); approximate	27 lb (12.2 kg)
<b>Certifications</b>	
European CE Mark (230 VAC, 50 Hz): FlexBase, FlexPM, FlexSD	
NRTL (site-specific)	
CSA (site-specific)	
<b>Speciality Applications (Please contact the Factory)</b>	
Special diluent (carrier) gases other than inert gases	
Trace moisture	
Chemical compatibility issues	
Heat tracing requirements	

Other	
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