

Model 3310 – Elemental Mercury Calibration Unit

Rev. 041814



The **Tekran**[®] **Model 3310 Elemental Mercury Calibrator** allows high level mercury monitoring systems to be accurately calibrated using elemental mercury. It integrates seamlessly with the **Tekran**[®] **Series 3300** speciating CEM, however it can also be used as a *stand-alone* mercury calibration system. The calibration source allows both multi-point calibrations and standard additions to be automatically initiated. The unit generates concentrations of mercury by using a NIST traceable temperature controlled saturated mercury vapor source. Precision mass flow controllers are used to dilute the output of this source to the desired value. The unit is capable of continuously generating large flow rates of calibration gas at virtually no ongoing cost - unlike expensive mercury calibration gas cylinders.

The **Model 3310** incorporates technology originally developed for the **Model 2505 Manual Calibration Unit**. Unlike other saturated sources, the **Model 3310** contains a host of advanced features that provide superior accuracy and allow unattended, remote operation.

Product Highlights

- Output concentration range: 0.5 - 1900 ug/m³ *
- Calibration gas delivery rate: 2 - 30 SLPM *
- Mercury source will last for many years
- Allowable ambient temp: +5 to +40 °C
- Hg source control range: +5.00 to +50.00¹ °C
- Independent linearization tables for each MFC

Applications

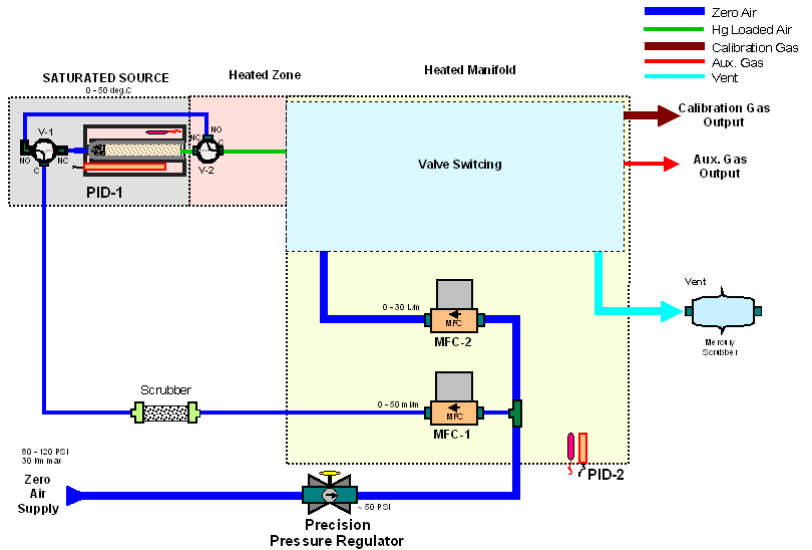
- Coal fired power plants
- Waste incinerators
- Other industrial sources
- Speciation studies
- Bench scale testing
- Mercury removal process monitoring

* Standard Unit. Other working ranges are available. Not all output flow/concentration combinations are available simultaneously. Contact Tekran for details.

¹ Other temperature ranges available.

Principles of Operation

A Peltier heater/cooler maintains a precise temperature for the mercury reservoir. A mass flow controller (MFC-1) provides a precise and accurate carrier flow through the mercury chamber. The emerging air is saturated with elemental mercury vapor. This saturated flow is diluted with MFC-2. Solenoid valves serve to positively isolate the source when mercury is not required and to select between two available outputs. Backpressure regulators provide positive pressure relief in case either output is activated while blocked. The MFC's are heated to minimize thermal drift. Additional heated zones and safety interlocks ensure that the source is activated only when all temperatures are stable.



Product Features

- Two output ports:
 - ◆ Main calibration gas output
 - ◆ Auxiliary output for special applications
- High Output rate: up to 30 SLPM
- Heated/cooled saturated mercury source
- Ultra-precise source control
 - ◆ Repeatability: $\pm 0.02^{\circ}\text{C}$
 - ◆ Accuracy: $\pm 0.05^{\circ}\text{C}$
 - ◆ Range: $+5.00 - +50.00^1\text{ }^{\circ}\text{C}$
- Automatic purging of system lines after high value calibrations are complete or if error is detected during operation
- Precision pressure sensor allows constant output concentration despite back pressure variations
- MFC's are temperature controlled to minimize thermal drift
- MFC's are individually calibrated to minimize errors at low flow settings
 - ◆ Multi-point calibration tables
 - ◆ Linear interpolation between calibration points
- Solenoid valves provide the following functions:
 - ◆ Isolation of Hg source until safe to activate
 - ◆ Selection between main and auxiliary outputs
 - ◆ Venting of source during stabilization period
- Remote control option (**Option 100**)
 - ◆ Allows operation with any CEM or control system
 - ◆ Six contact closure **Status** outputs
 - ◆ Six contact closure **Control** inputs

Remote Control

All **Calibrators** can be used as an integrated part of the **Series 3300 CEM**. When **Option 100** is ordered, the unit can also be used in stand-alone mode (without the CEM). **Option 100** provides a set of six rear panel status outputs and six control inputs and a special version of the PC control s/w. In either case, communications with the module is via industry standard RS-485 Modbus-RTU protocol. (A USB to RS-485 converter is supplied with each system.) For stand alone applications, a Windows™ based program provides direct communication & control of the module and provides the calibration unit with a wealth of capabilities.

- ◆ Readout and logging of all current temperatures, pressures and flows
- ◆ Setting of all temperatures and MFC set points
- ◆ Calculation, display and logging of current **output concentration** (at any desired reference conditions)
- ◆ Initiation of immediate calibration operation
- ◆ Initiation of automatic scheduled or “on demand” multi-step calibration sequences
- ◆ Periodic temperature sensor and MFC recalibrations
- Control via computer GUI, electrical contact closures or dde link from other PC applications (e.g. **Excel**)
 - ◆ Output log files are available in standard CSV format.
 - ◆ Optional: Calibrator PC can act as an **OPC server** for use with SCADA systems
 - ◆ Optional: Calibrator PC can act as **Modbus** or **Modbus/TCP-IP slave**.