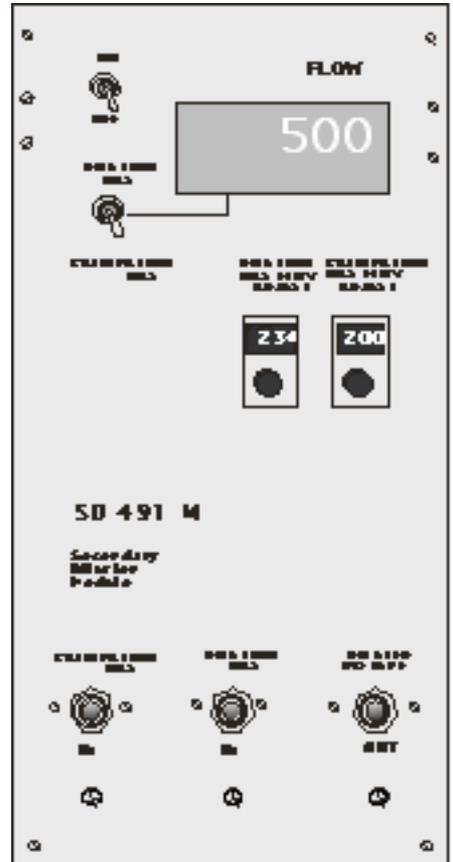


491 M-SD Secondary Dilution Module

DESCRIPTION

The **491M-SD Module** extends the range of concentration attained from permeation tubes. It is a special, high purity dilution system designed to split off a carefully measured flow of calibration gases from a permeation tube system and combine it with a larger flow of clean

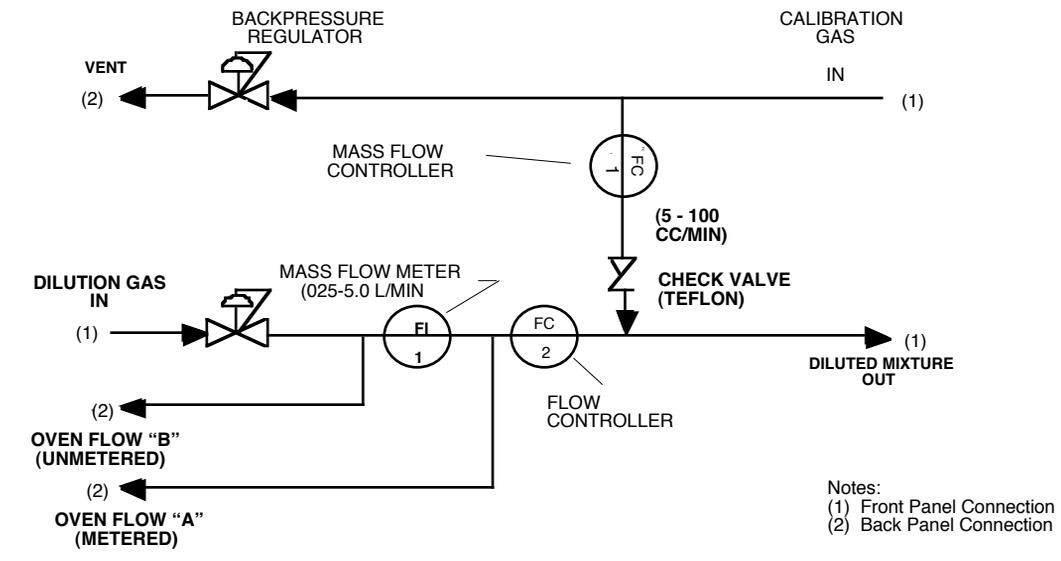


dilution gas to form lower concentration mixtures. Dilution ratios from 3.5:1 to 1000:1 are possible with the standard unit. Thus, a 100 part-per-billion (ppb) mixture from a permeation tube can be diluted to 100 part-per-trillion (pptr).

Another function of the system is to broaden the concentration range of a single permeation tube. Since the concentration of component from the permeation unit upstream can be varied over a 20:1 ratio, the combination of permeation unit plus **491M-SD** can give a concentration range of up to 20,000:1. Thus, a single LFH tube could be used for concentrations from 1000 ppm down to 50 ppb without changing its operating temperature.

PRIMARY DESIGN

Span mixture from a **491M** permeation unit is fed into the calibration gas **491M-SD**. A 100 ml/min mass flow controller splits off a portion of this flow for redilution. See Flow Diagram. Dilution gas is mixed with this small flow of calibration gas to form the final diluted span mixture. Variations in calibration gas flow amounts (mass flow controller) and dilution gas flow amounts (mass flow meter) determine final dilution ratios possible.



FLOW DIAGRAM
491M-SD SECONDARY DILUTION MODULE