

tics of sensors 504 and 506 have changed, requiring different scaling factors to be used in their interpretation. As will be understood, sensors 504-508 need not be direct-reading devices, but instead may require that their outputs be scaled, processed and even linearized (or otherwise transformed) to obtain desired information from them. They may have to be adjusted (to operate in a linear range, etc.). Transformation and scaling may require that microprocessor 216 interpret the received sensor data according to conventional equations utilizing additional constants stored in data structure 240. The values of these additional constants may have to be changed (if the sensors are adjusted or their output levels shift) in order to ensure accuracy.

To alter the scaling factor of, for instance, the output of static pressure sensor 504, the "upper function" key "P0" keys are depressed to display the output of the static pressure sensor in volts on display 304 of interrogation unit 300. Adjustments may then be made to the sensor 504 itself, to the DC offset voltage applied to adder 230, etc. and a new voltage reading taken, until the output voltage is at a desired level (to ensure linearity of the sensor, especially if it is electromechanical, to prevent analog components of computation units 200 from being overdriven, etc.). The "CAL" key of keyboard 306 is then depressed to store this voltage reading in RAM 208 as a reference for later comparisons. Calibration of the output of differential pressure sensor 506 may be accomplished in a similar fashion.

Although one exemplary embodiment has been described in detail above, those skilled in the art will appreciate that many variations and modifications may be made without departing from the novel and advantageous features of the invention. Moreover, the present invention is by no means limited to the particular components described above, but rather, could be implemented in a variety of other different ways. Accordingly, all such variations and modifications are intended to be included within the scope of the appended claims.

What is claimed is:

1. An apparatus for measuring gas flow comprising: measuring means connected to a gas conduit at a fixed position thereof for producing periodic signals indicative of flow parameters of gas flowing through said conduit including means disposed within said conduit for restricting the cross sectional diameter thereof, having transducer means positioned on opposite sides of said restriction for producing periodic signals proportional to differential pressure across said restricting means; computing means, connected to receive said periodic signals provided by said measuring means, for producing from said periodic signals indicia of the amount of gas flowing through said conduit over a first time interval greater than the periods of said periods signals and for producing indicia of the amount of gas flowing through said conduit over a plurality of different time intervals; means for storing indicia of the amount of flow associated with each of said plurality of different time periods including means storing the values of numerical constants and measured gas flow characteristics used to produce said indicia of gas flow for each of said time periods to verify the accuracy of said produced indicia of gas flow; and portable interrogating means, selectively connected to said storing means, and including means for initializing and calibrating said computing means to

thereby assure accuracy of measurement and being selectively operable for extracting said stored indicia of the amount of flow associated with a selected one of said plurality of time intervals, and having means for selectively determining the length of each of said plurality of time intervals, said interrogating means including means for making a permanent digital record of said extracted indicia of the amount of flow.

2. An apparatus as in claim 1 wherein: said storing means also stores indicia of real said computing means periodically updates said indicia of real time; and said interrogating means includes means for extracting the indicia of real time.
3. An apparatus as in claim 1 wherein: said interrogating means includes means for selectively determining the length of said first time interval.
4. An apparatus as in claim 1 wherein: said record-making means comprises means for imprinting said extracted indicia onto a medium.
5. An apparatus as in claim 1 wherein: said interrogating means includes means for calibrating said computing means; and said computing means includes means for producing an extrapolation of said stored indicia of amount of flow while said calibrating means calibrates said computing means, for storing by said storing means.
6. An apparatus as in claim 5 wherein: said computing means stores the value of at least one constant used for producing indicia of the amount of flow; and said interrogating means includes means for changing the value of said constant during calibration of said computing means by said calibrating means.
7. An apparatus as in claim 1 wherein: said computing means stores the value of at least one constant used for producing indicia of the amount of flow; and said record-making means further includes automatically making a permanent digital record of said value of the constant with the making of said permanent digital record of said extracted indicia of the amount of flow.
8. An apparatus as in claim 1 wherein: said interrogating means includes means for setting the indicia of the amount of flow to an initial value after a permanent digital record of the amount of flow has been made.
9. An apparatus as in claim 1 wherein: said interrogating means includes means for selectively setting the indicia of the amount of flow for each time interval to an initial value after a permanent digital record of the amount of flow has been made.
10. A method of providing a permanent digital record of the amount of gas flowing through a conduit over a first period of time comprising: sensing flow parameters of gas flowing through said conduit at a fixed location, including the rate of flow by disposed in said conduit a means for restricting the cross sectional diameter thereof, and positioning transducer means on opposite sides of said means for restricting for sensing differential gas pressure across said means for restricting;