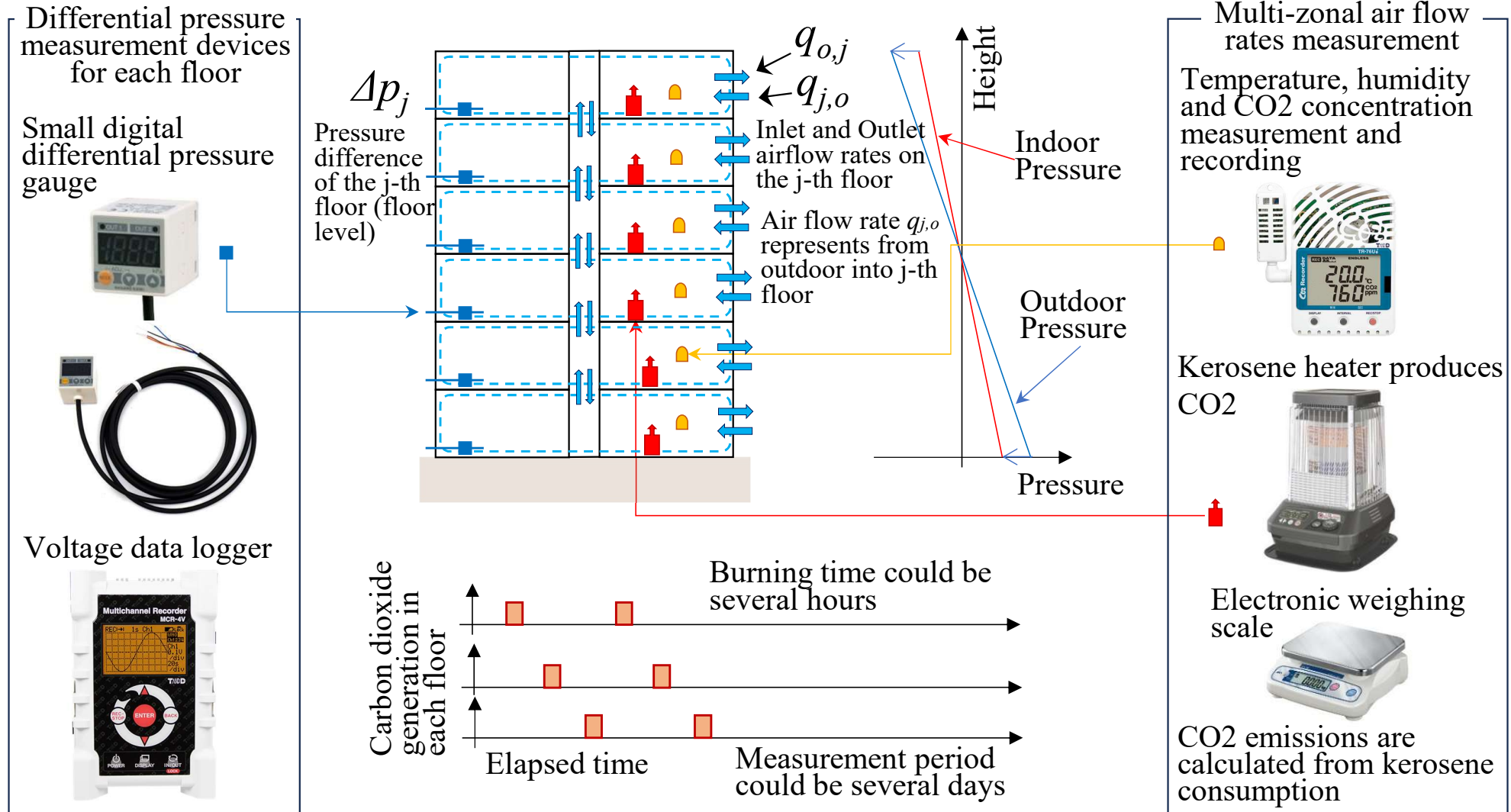


# Method for measuring airtightness with stack effect in multi-story buildings

In large buildings, it is difficult to measure the airtightness using a blower. However, there is always a natural temperature difference between the inside and outside of a building. Therefore, we devised a method that utilizes the pressure difference and ventilation caused by the chimney effect.



This measurement method uses carbon dioxide from kerosene heaters to measure ventilation in multiple zones over several days. The outdoor air inflow rate  $q_{j,o}$  and outflow rate  $q_{o,j}$  passing through the gaps in the outer skin of the  $j$ -th floor are then calculated using a moving batch least squares method over several hours. The moving average of the measured indoor and outdoor pressure difference  $\Delta p_j$  is also calculated. The least squares method is applied to these dozens of sets of  $q$  and  $\Delta p$  taken every several hours to determine the equivalent gap area and power exponent for each floor.