



Water flow monitoring for automated systems: Edstrom FloSense™

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There are many advantages to utilizing automated watering systems to deliver drinking water to laboratory animals. Chief among these is the ability to sustain consistent water quality for the animals to consume in the effort to reduce or eliminate any non-experimental variables from affecting valuable research. Various types of monitoring can be employed to ensure the physical makeup of laboratory animal drinking water is free of unwanted constituents. Additionally, the flow of water can be monitored to allow for worry-free mechanical operation. The Edstrom FloSense™ monitors water flow at an individual mouse rack, providing advanced notice of an abnormal flow condition (Fig. 1).

The need for water flow monitoring in the vivarium

The rare presence of unwanted water flow from an automated watering system can be detrimental to animal welfare and research. Atypical mouse behavior such as packing bedding or nesting materials in a drinking valve or pushing an enrichment device against the valve stem can lead to an undesirable discharge of water. In response to this, Edstrom offers FloSense.

FloSense monitors water flow at an individual rack and alarms if there is a constant flow of 0.5 ml per minute detected beyond a user assigned timeframe. This timeframe is based on the population of mice in the specific rack. The sensitivity of FloSense is so acute that it is equipped with a settable alarm delay to accommodate the normal drinking activity of the cage residents in the mouse rack. Should a flow alarm be triggered, FloSense will identify the rack and notification will be sent to the designated personnel to take action.

Intelligent alarming

FloSense will actively adjust to the nature of the water flow properties it is monitoring based on the degree of need. There can be differences in the level of severity of the conditions that trigger a FloSense alarm. In the event of a pronounced constant flow condition, FloSense has been engineered to provide *intelligent alarming*. The principle behind intelligent alarming is that the faster the flow of water, the faster FloSense will respond with an alarm notification. Depending on the speed of flow, FloSense can be triggered to alarm in as little as 10 minutes. This advanced notice of water flow will allow vivarium staff the ability to intercept the issue before it can escalate and become a more serious problem.

How FloSense monitors the automated watering system

FloSense was designed to be highly flexible in its ability to adapt to new or existing mouse racks. FloSense has a combination

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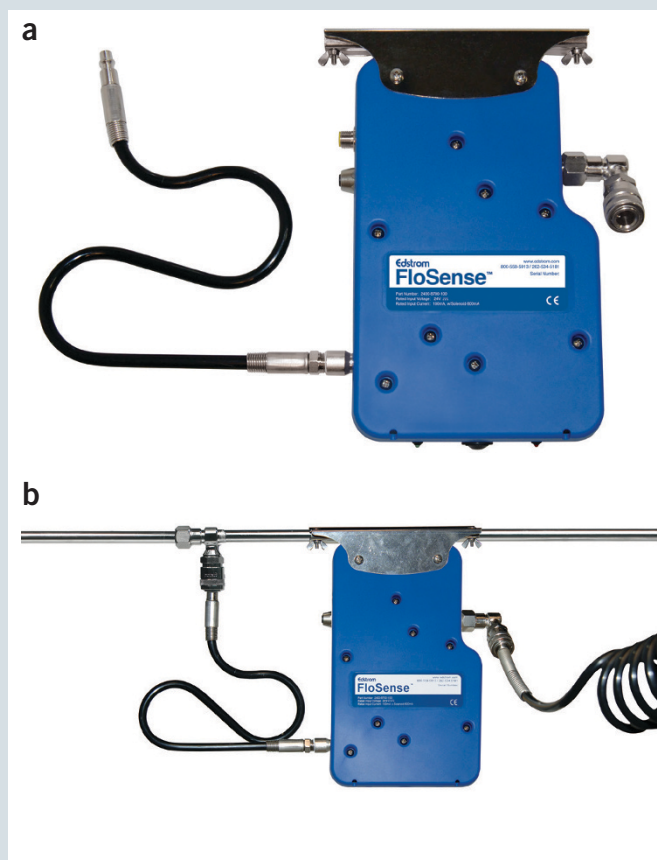


FIGURE 1 | Picture of the Edstrom FloSense system standalone (a) and hooked up (b).

communication and power cable that is routed back to the Edstrom environmental monitoring system (PulseCMC® or Watchdog®) and to the FloSense power supply. Communication with the environmental monitoring system can be accomplished in two different ways depending on the needs of a specific vivarium.

The first method involves connecting each FloSense unit so that it will communicate individually with PulseCMC or Watchdog. If an alarm occurs in this configuration, the user knows specifically which room and rack is being affected by the flow condition. The second wiring method is to ‘daisy-chain’ each FloSense unit together in a single room. Doing so will cause FloSense to communicate back to the monitoring system so that the alarm focuses around a particular room, and not specifically to a rack

within the room. If an alarm occurs in this configuration, the staff member would go to the room in alarm and confirm the location of the occurrence by observing the red LED visual indicator on the FloSense unit that is attached to the particular rack in need of their attention.

At the time of an alarm for either chosen configuration, the red LED illuminates on the FloSense unit as described above and an alarm is sent to the Edstrom Watchdog or Pulse system, to be delivered to staff through call out or email. The monitoring system can also log pertinent data related to the event such as the time when it began, when the alarm was acknowledged, and when the flow condition was ultimately resolved. This data can be later called up in reports and aid in vital recordkeeping.

Adding an optional solenoid

An optional solenoid can be added as an additional safety measure. In the event there is an alarm, the normally open solenoid will close off the water supplied to the individual rack the FloSense is connected to. Simply pressing the reset button on the FloSense will open the solenoid and start the water flowing again.

The addition of a solenoid as a compliment to the FloSense monitoring unit can be particularly useful in the event that there is an alarm during off-hours or at nighttime. Mice are active at night, and if their activity creates a situation that leads to an unwanted flow condition animal care staff may not be readily available to attend to the problem. Having the solenoid shut-off valve gives staff an additional safety feature and the confidence that at the time when they would otherwise be vulnerable to an event, the solenoid will shut off the water flowing to the rack.

Universally compatible—making the connection easy

FloSense is universally compatible with all makes and models of cage racks. The monitoring unit employs quick disconnect coupling to connect with the automated watering system of the cage rack. This allows the FloSense to be retrofitted with an existing Edstrom

flushing automated watering system, or be introduced at the time of new construction.

Edstrom FloSense is mounted on to the room distribution piping near the rack it is intended to monitor. There are no modifications needed to be made to the existing room distribution piping. The recoil hose that provide incoming water to the rack is disconnected from the incoming water interconnect and connected to the water inlet hose of the FloSense unit via a quick disconnect. The recoil hose from the cage rack is then connected to the water outlet side of the FloSense.

FloSense—offering additional peace of mind for automated watering

The benefits of using automated watering systems in the vivarium have been known for years. Now the Edstrom FloSense magnifies that value by presenting contingency preparedness. Whether there is a need for safeguarding an irreplaceable strain, or simply the desire to have an additional layer of protection for the research, FloSense fosters added confidence. Having measures in place that present advanced notice of water flow concerns lets vivarium and husbandry professionals be assured that animal welfare and research are well protected.

Company profile/contact

Edstrom Industries, LLC is the recognized leader in providing automated animal watering systems, water purification and environmental monitoring and control solutions to the world's top animal laboratories. Since 1969, leading universities, government labs, pharmaceuticals and biotech firms have relied on the Edstrom range of products, services and expertise to ensure the efficiency of their facility and the elimination of variables in their studies. For more information on FloSense or other Edstrom products, call us at 800-558-5913 or visit us on the web at www.edstrom.com.

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