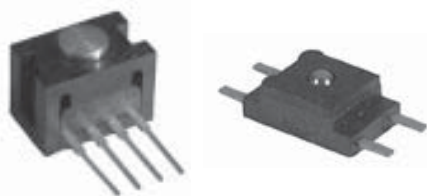


# Infusion Pumps

## PRODUCTS



FSG and FSL Series

## BENEFIT

- Force can be sensed through a hose clamp or disposable monitoring device in the tubing, without any direct contact with the medium being infused

## CONTACT US

For application assistance, current specifications or name of the nearest Authorized Distributor, check the Honeywell web site or call:

1-800-537-6945 USA  
 1-800-737-3360 Canada  
 1-815-235-6847 International

FAX 1-815-235-6545 USA

## INTERNET

[www.honeywell.com/sensing](http://www.honeywell.com/sensing)  
[info.sc@honeywell.com](mailto:info.sc@honeywell.com)

## BACKGROUND

Although infusion pumps have long been delivering fluids and medications to patients, the potential uses of the devices grow as they become more compact. The original infusion pumps were bulky mechanisms, but today, infusion pumps have evolved into easy-to-use models, including portable, ambulatory, and implantable devices. These smaller and more affordable pumps offer improved accuracy and functionality.

An electronically regulated system operates on gravity, battery, or AC power. The maximum flow rate of a traditional gravity-fed device is limited by the height of the drug bag and the needle size. The bag needs to be placed at least 36 in above the patient, and the maximum rate is approximately 400 ml/hr. These devices work well with low viscosity fluids, but not with thick fluids such as blood. Often, a roller clamp on the tubing controls the drug flow. This method is inaccurate because it counts the drops instead of doses and cannot compensate flow rate.

## SOLUTIONS

Honeywell offers FS Series force sensors that are available in two different commercial grade packages. The 500 g unit uses a ball plunger having a 2 mm diameter. The 1,500 g unit uses a button with a 5 mm diameter. The stainless steel plunger provides excellent mechanical stability and is adaptable to a variety of applications. The mechanical travel required to achieve the span output is very small, less than 0,03 mm at 1,500 g. The sensor package design incorporates a patented modular construction. The design uses an innovative elastomeric technology and engineered molded plastics that accommodate load capacities of 4,5 kg over-force. Various electrical interconnects can accept prewired connectors, printed circuit board mounting, and surface mounting.

Sensors can interface with the tubing through either an elastic membrane or the cradle in a bracket. Sensor performance will largely be affected by the design and use of these interfaces. Therefore, correct installation is critical to proper sensor performance. Designers should also consider such factors as the tubing's characteristics (shape, size, elasticity), load (tightness and repeatability), and environment (temperature and media) in developing their applications.

See figures on page 2.

**Additional Force Sensor product information is available on the Web at:**  
<http://content.honeywell.com/sensing/prodinfo/force/>

# Infusion Pumps

Figure 1 Noninvasive sensing interface: membrane

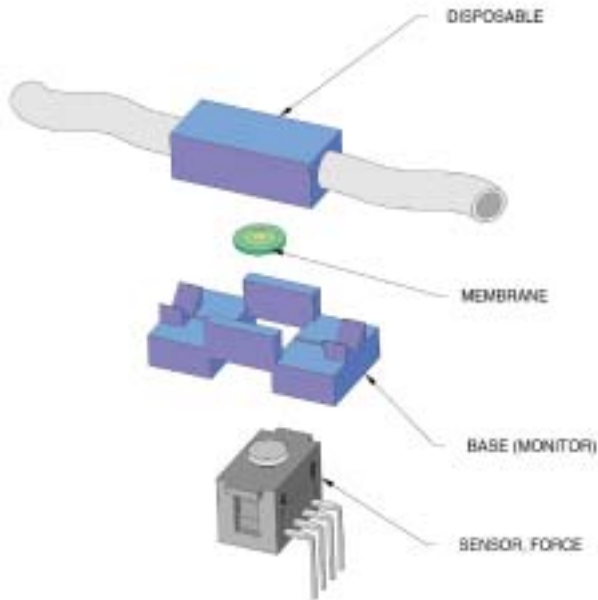
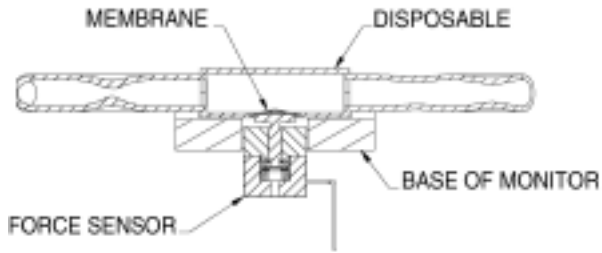


Figure 2 Noninvasive sensing interface: hose clamp

