



# FLUID HANDLING TECHNOLOGIES ENGINEERED FOR MEDICAL SCIENCES



OUR EXPERIENCE • YOUR SOLUTION

LEVEL | FLOW | PRESSURE | TEMPERATURE | SOLENOID VALVES | FLUIDIC SYSTEMS



## We've got the experience you need and the innovation you are looking for

Gems Sensors and Controls products have been field-tested around the world and across industries for over 60 years – and in the Medical Industry for over 20 years. We offer an extensive catalog of level, pressure and flow sensors, as well as miniature solenoid valves, available through our worldwide sales and distribution network. Our four, fully-equipped ISO certified manufacturing sites, located in North America (ISO:13485), Asia (ISO:9001) and Europe (ISO:9001), ship more than 4 million sensors annually.

Gems Sensors has earned an international reputation for developing and manufacturing a wide variety of quality, dependable fluidic components and systems. We use real-time customer and industry feedback to drive our manufacturing and quality initiatives. Once installed, our products run continuously in some of the world's harshest environments. There are Gems units in the field today that have been running for decades with no degradation in the original performance.

### Put Gems engineers to work for you

A short list of services and advantages we bring to Medical OEMs includes:

- Collaborative Engineering Support or Turnkey Concept to Production
- Cost-Efficient Development
- Fast Prototyping and Quicker to Market Strategies
- Sophisticated Supply Chain Management
- Lean Manufacturing Protocols
- Certified Quality Processes



# Experience firsthand our passion for engineering fluid handling solutions



## WE GET RESULTS WITH FLUIDS

By leveraging Gems' engineering expertise and broad base of intellectual property, Gems is able to deliver custom, engineered fluidic systems, solutions and integrated sub-assemblies better than any other company in the world. We combine a unique array of intelligent sensors, world-class lean manufacturing tools and ISO registered quality processes to significantly increase efficiency, productivity and quality.

Gems' engineers collectively have more than 400 years of professional experience among active staff. We understand that the art of fluid handling begins with sound science, strict discipline and proven methodology.

### Count on Gems for concept feasibility through commercial manufacturing

Gems understands standard products may not be the best solution for you. We provide outsourced design and development services including custom components, feasibility studies or complete design and development of a complex fluid handling system. Your Gems' program manager will structure each project to meet your company's needs, timing and budget. Whether you don't have the time, resources, or the desire to take on development in-house, Gems is an ideal partner for your next development cycle.

### Flexible, global manufacturing – same high standards on three continents

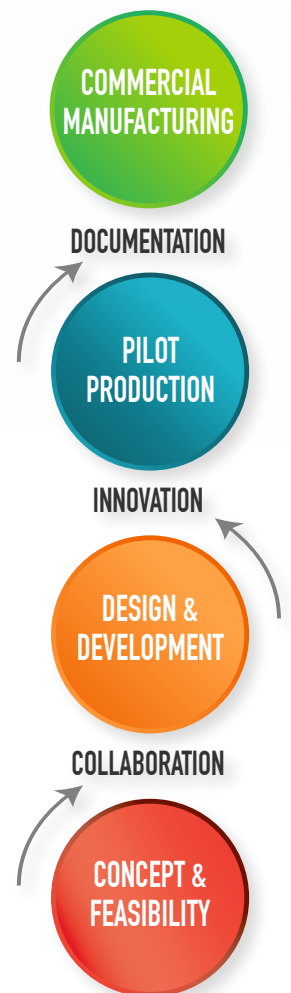
Your design or ours, we will build, test and ship quality sensors to fit your specific project timing and budget. Our facilities are designed to adjust to short-runs or high volume. At each facility, Gems utilizes Lean Manufacturing principles and processes to make significant improvements to safety, quality, delivery and cost.

Areas of focus include:

- Assembly
- Testing
- Labeling/Packaging
- Documentation
- Production Process Validation and Control

*Gems' structured development process delivers predictable, efficient fluidic solutions that save time and money.*

*Talk to Gems Sensors and find out what solutions we can engineer for you.*





# Gems sensors and controls are at the management technology for the me

## IN VITRO DIAGNOSTICS

The industry's smallest continuous level sensors

Gems XM-XT 300 Series Level Transmitters are among the most compact continuous level transmitters in the world – giving you increased design flexibility. Gems' dependable line of level, flow and pressure sensors and valves are a critical component to many sophisticated, high-volume diagnostic machines. Gems Level sensors monitor and measure all fluids:

- Buffers/diluent
- Waste
- DI Water
- Detergents
- Reagents

### **XM-XT 300 Series Continuous Level Transmitter**

A complete line of small, polysulfone liquid level sensors ideal for shallow tanks and reservoirs. Compact and versatile, these plastic level sensors accommodate a broad choice of mountings and float materials.

### **Capacitive Level Sensors**

Gems line of non-contact, non-intrusive or contact probe level sensors adapt to your most complex aqueous applications.

### **Ultra Low Level Sensor**

For detecting levels as low as 16mm from tank bottom. Can be used as a bulk fluid sensor for diluent, mineral oil, DI water or detergents.

## ANALYTICAL INSTRUMENTS

Solutions for mass spectrometry chromatography and laboratory pure water

For the pharmaceutical and biotechnology industries, precise and durable analytical instruments are critical to getting accurate data. Gems' engineered fluidic solutions for analytical devices fit your needs for space, time, materials and value.

### **B-Cryo Series Valve**

Compact and designed to function in extreme temperatures, engineered for service down to  $-320^{\circ}\text{F}$  ( $-196^{\circ}\text{C}$ ).

### **FS-380 Flow Switch**

The one-piece magnetic PPS composite piston is ideal for high-pressure applications. Uses 100 micron filtration which is less susceptible to clogging than other high-pressure in line flow switches.

### **3100/3200 Series Thin Film Pressure Transducers**

Unbeatable price/performance ratio in a small package size, features all-stainless steel wetted parts, a broad selection of electrical and pressure connections, as well as a wide choice of electrical outputs.

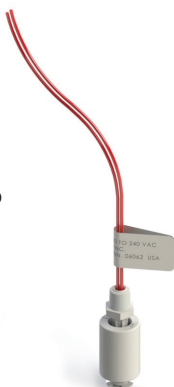


*B-Cryo Series Valve is the right size for today's smaller machines.*

## GEMS IS YOUR PARTNER FOR CUSTOMIZED FLUID MANAGEMENT SOLUTIONS

**Customers have the option of selecting "off the shelf" components.**

Pictured here is Gems' popular LS level sensor that is often used in medical applications to detect low level conditions. Customers often modify this part to fit their specific needs.



**Gems works with customers to develop custom solutions.**

Gems' engineering group is passionate about helping our customers solve fluid management challenges. In this example, Gems created a custom solution utilizing the LS, rigid mounting, tube fittings, siphon tubes, etc.





# at the heart of fluid ne medical sciences



## MEDICAL LASERS

### Helping lasers stay cool

To prevent overheating and machine shut down, Gems' flow switches detect minimum flow of liquids in the laser's cooling loop. And, Gems' valves control coolant in the handheld laser wand. Gems' products measure and control water, gases, cleaning solutions, dialysate, coolant and air. Gems' laser product offerings include:

#### FS-500 Flow Switch

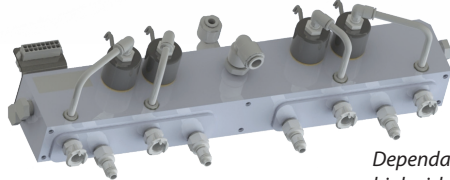
Compact and easy to maintain because the bonnet and shuttle can be removed while leaving the housing and pipework intact.

#### FS-380P Flow Switch

Ensures laser generator receives adequate cooling to prevent over heating and machine shut down.



Gems provides high quality components at competitive pricing. Our engineers continue to innovate for laser treatments for skin resurfacing, tattoo removal, hair removal and vascular treatment.



Dependable fluid controls for high-risk medical devices.

## SURGICAL SYSTEMS

### Accurate at low pressure and low temperature

For cryosurgical equipment, especially systems for low-pressure cryogenic ablation, Gems' valves are used to control delivery and vent low-pressure liquid nitrogen. Also, Gems' pressure transducers continually monitor liquid nitrogen supply tanks. For delicate vitrectomy procedures, Gems' valves can actuate at very high speeds (2,500 actuations per minute) with repeatable performance.

#### Gems A, B and D Valves

Control delivery and vent low pressure liquid nitrogen. This robust 2- and 3-way miniature solenoid utilizes a stainless steel body to resist corrosion for most acids, alkaline solutions and harsh environments.

#### Gems 2200 Series Pressure Transducer

Features proven CVD sensing technology, an ASIC (amplified units), and modular packaging to provide a sensor line that can easily accommodate specials while not sacrificing high performance.



Sophisticated respiratory controls for demanding medical applications.

### Gems' fluidic engineering expertise enables design flexibility for our customers.

With this further developed LS product, Gems is providing our customer with a reliable, streamlined solution (designed and calibrated for the customer's containers). As a result, the customer has improved design flexibility and the convenience of ordering a single item.



### Gems' ongoing collaboration results in a fully custom, scalable assembly solution.

Some of the world's leading medical device manufacturers have relied on Gems to design, manufacture, test and deliver custom, plug-and-play assemblies for their medical devices.



### Put the passion and know-how of Gems to work for your next design!

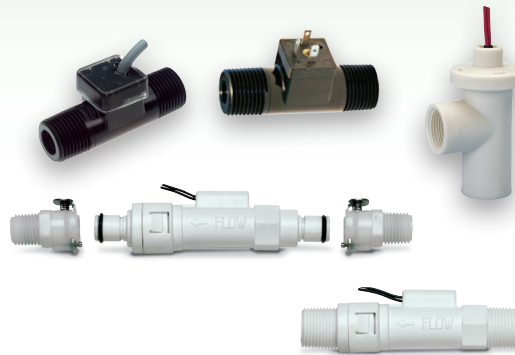
There is virtually no limit to the creativity of the fluid management solutions Gems can provide. From one to many sensors and a variety of materials of construction, Gems is ready to help you make the most of your next medical device design.

# PUT GEMS EXPERIENCE TO WORK FOR YOU



## Level Sensors and Transmitters

- Level sensing experts since 1955
- Widest range of material compatibility in the industry
- Durable and reliable performance



## Flow Switches and Meters

- Large portfolio designed specifically for versatility and performance
- High-quality, corrosion-resistant materials
- Repeatable performance at low flows



## Pressure Switches and Transducers

- Over 1 million units sold annually
- Unbeatable price performance ratio in a small package size
- Suitable for demanding and high-precision applications



## Valves and Manifolds

- Automatic fluid flow control of liquid or gases
- Bubble tight plungers for reliable operation over millions of cycles
- Custom coils allow valves to exactly meet your design requirements
- Engineering capabilities to integrate multiple sensing technologies into modularized systems





*Gems Sensors is a division of Danaher Corporation, a Fortune Global 500 Company.*





OUR EXPERIENCE • YOUR SOLUTION

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