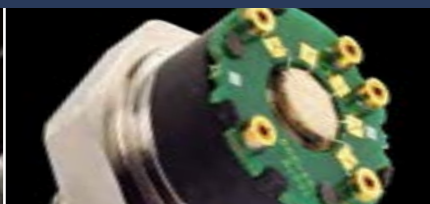


Level | Pressure | Flow | Solenoid Valves

# sensors, controls and fluidic systems



OUR EXPERIENCE

YOUR SOLUTION

  
**Gems**<sup>™</sup>  
Sensors & Controls

  
**KUNDINGER**  
FLUID POWER AUTOMATION CONTROLS

# Our Experience | Your Solution



**Gems Sensors & Controls** is a leading manufacturer of a broad portfolio of liquid level, flow and pressure sensors, miniature solenoid valves, solid-state electronics and fluidic systems. Decades of application engineering experience has given Gems the knowledge required to deliver tailored products that measure up to today's most sophisticated and critical applications. Working around the world with global resources, and to exact customer application and manufacturing requirements, products from Gems Sensors & Controls are used in almost every industry from medical to waste water treatment, semiconductor fabrication to off-highway vehicles and HVACR to food and beverage.

## Your Solution Partner



Supporting our customers with the best product solution while reducing time to market is our One Goal. To achieve it we apply a wealth of tools and global resources that include:

- A dedicated team of application engineers, with over 50 years of experience, who specialize in developing custom solutions to meet unique customer needs
- An extensive portfolio of thousands of proven designs that reduce the time required to successfully deliver your solution when it's needed
- A global direct sales force of experts in fluid level, flow and pressure sensors, controls, solenoid valves and associated fluidic systems
- The resources of Danaher Corporation, a Fortune 500 company; committed to quality, lean manufacturing, and ISO certification— with facilities in North America, Europe and Asia



■ Dedicated tools and processes that eliminate product and process variation at every stage of manufacturing, including:

- Design Failure Mode Effect Analysis (DFMEA)
- Process Failure Mode Effect Analysis (PFMEA)
- Process Capability Studies
- Gauge Repeatability and Reproducibility
- Design Verification and Validation
- Corrective and Preventative Action (CAPA)
- Lean Tools
- 8D Problem Solving Methodology

From standard or custom configured components to engineered integrated sub-assemblies to complete fluidic systems Gems is dedicated to being your one source for all of your fluidic sensing and control needs.

Inside this catalog is the most comprehensive selection of fluid sensors and controls offered by any manufacturer. If you don't see exactly what is needed for your specific application give us a call. Working together our sales and engineering resources will help you to solve your most challenging application problems. Whether it's modifying a standard component, working with your design or creating a completely new sensor, control or system our goal is to produce a quality product that is cost effective, minimizes complexity, and improves the overall value and performance of your equipment.

Our Application Specialists are ready to discuss your system requirements. Contact us today at one of our global offices listed on the back cover. Full product details are available at [www.GemsSensors.com](http://www.GemsSensors.com)

**Call us today — 800-378-1600**



## ■ Switches

### Electro-Optic

#### Section A

Industry's largest selection of electro-optic liquid level sensors is right here at Gems. Compact design for a small footprint anywhere space is at a premium. Solid-state switching and no moving parts ensures dependability over long service life.

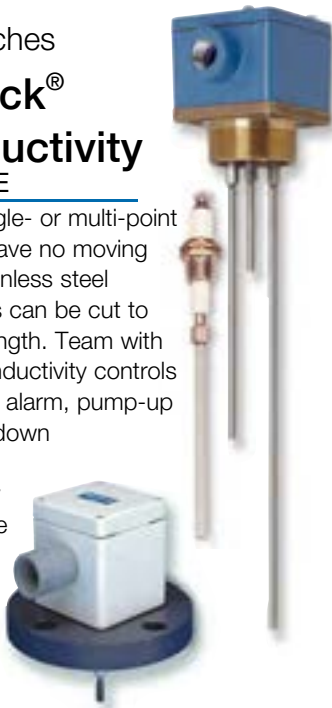


## ■ Switches

### Warrick® Conductivity

#### Section E

These single- or multi-point sensors have no moving parts. Stainless steel electrodes can be cut to desired length. Team with Gems conductivity controls to provide alarm, pump-up or pump-down control in electrically conductive liquids.



## ■ Switches

### Float

#### Section A & B

Available in a vast range of sizes, mountings and materials, Gems offers the broadest selection of float-type level switches anywhere. Using a proven reed switch design, float type switches deliver long, trouble-free service with precise repeatability. They are available in both single point and multi-point configurations. Multi-point switches monitor up to six levels with a single unit; lengths from a few inches (centimeters) to 10 feet (3 m).



multi-point

top or bottom  
mounting  
single point

side  
mounting

special purpose  
includes bent stems,  
slosh shields,  
temperature sensing,  
siphon tubes and  
many others

## ■ Switches

### High Purity

#### Section A

Gems high purity sensors are designed for ultra-pure fluid applications. PTFE and PVDF resist build-up of foreign material and sticky media. These high-purity level sensors come in single, multi-point, float and electro-optic types.



## ■ Switches/Transmitters

### Ultrasonic

#### Section A & C

Gems ultrasonic switches and transmitters are ideal for applications requiring solid-state level measurement such as those with ultrapure, dirty, coating, scaling or corrosive-type liquids. Available in contact and non-contact single point, or multi-point versions. Up to four actuation levels or continuous measurement to 26 feet (8 m). Also available for small tanks less than 4 ft. (1.2 m). Made of polypropylene, PVDF, PFA.



## ■ Indicators

### DIPTAPE™ and DRUMTAPE™

#### Section D

Pop the cap, pull the tab—and up comes the tape to tell you exactly how much liquid remains in the tank or drum. Ideal for hazardous areas, DIPTAPE and DRUMTAPE indicators are non-electric, plus liquids and vapors remain sealed from the atmosphere. DIPTAPE indicators are designed for tanks; DRUMTAPE indicators fit 30 or 55 gallon storage drums. DIPTAPE and DRUMTAPE are available in alloy, all PVC and engineered plastic versions.



## ■ Switches

### Non-Intrusive

#### Section A

The ExOsense™ sensor is a break-through in liquid sensor technology. The unique, patented piezo-resonant transducer and microprocessor based electronic control module allow the sensor to accurately detect liquid levels non-intrusively from the outside of plastic bottles. ExOsense virtually eliminates all concerns over sensor compatibility, calibration and liquid media contamination.



## ■ Switches

### Capacitive

#### Section A

Gems Capacitance sensors are frequency-tuned for liquid detection. Most are non-contact models that sense from outside a fluid vessel's wall, and offer adjustability to operate accurately with both aqueous and non-aqueous liquids.

CAP-100

CAP-150

CAP-300

CAP-200



## ■ Transmitters

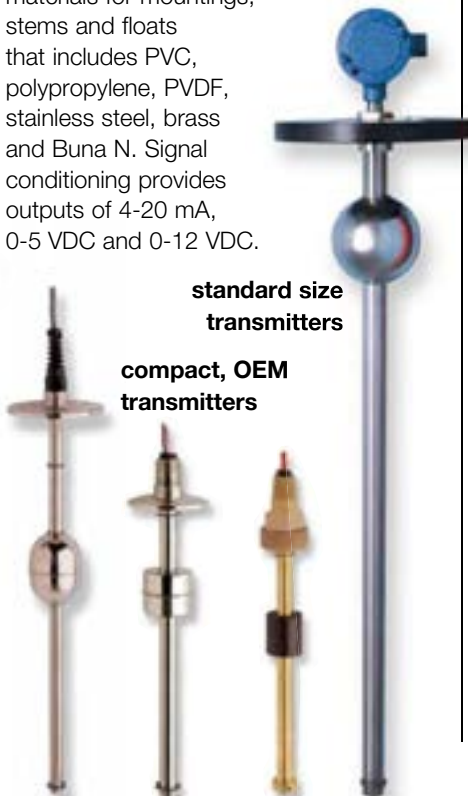
### Float

#### Section C

Standard lengths offer measurement from a few inches (centimeters) to 18 feet (5.5 m). Choose from a variety of materials for mountings, stems and floats that includes PVC, polypropylene, PVDF, stainless steel, brass and Buna N. Signal conditioning provides outputs of 4-20 mA, 0-5 VDC and 0-12 VDC.

standard size transmitters

compact, OEM transmitters

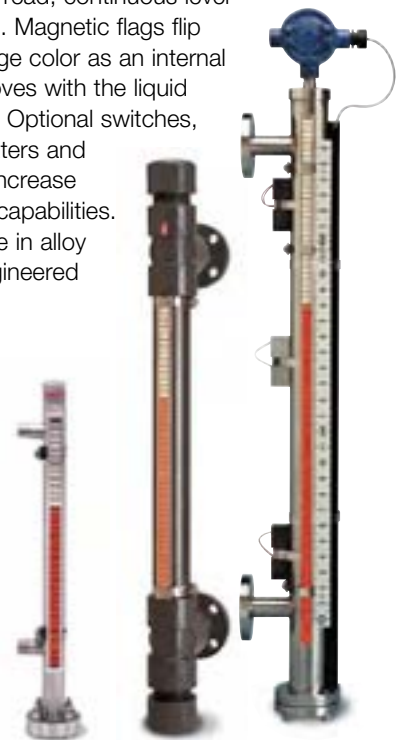


## ■ Visual Level Indicators

### SureSite®

#### Section D

A more durable and safer alternative to breakable sight glasses. SureSite visual level indicators feature stainless steel, alloy or engineered plastic housings that mount externally to top or sides of tanks to provide easy-to-read, continuous level gauging. Magnetic flags flip to change color as an internal float moves with the liquid surface. Optional switches, transmitters and scales increase control capabilities. Available in alloy and engineered plastic.

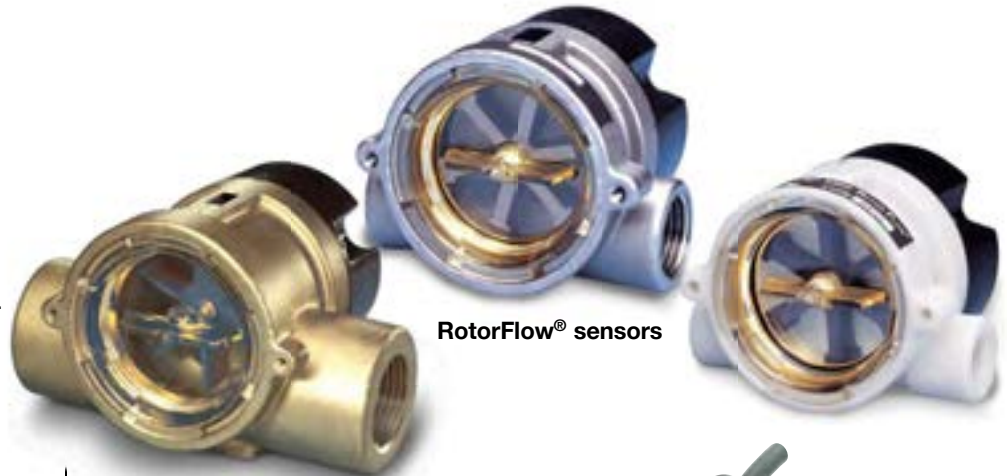


## ■ Sensors/Indicators

### Paddle Wheel

#### Section F

**RotorFlow®:** These highly visible, paddle wheel designs offer accurate visual indication, flow rate sensing and switching. The visual indication is combined with a choice of either pulsed DC output 0-10V DC analog or adjustable 1 Amp switched output. Available with brass, stainless steel or hydrolytically-stable polypropylene housings. Line sizes: 1/4" to 1" (.64 to 2.5 cm). Adjustable settings: 0.1 to 60 GPM (.38 to 227 l/m).



RotorFlow® sensors

## ■ Switches

### Piston

#### Section G

Proven piston switch technology delivers high repeatability and precise calibration for liquids or gases. Fixed setpoints range from a low 50 cc/min to 1.5 GPM (5.7 l/m); adjustable version features setting of 0.5 to 20 GPM (2 to 76 l/m). Special capability versions offer viscosity compensation, and high pressure handling to 1,500 PSIG (103 bar). Brass, plastic or stainless steel bodies.



**TurboFlow®:** Ultra-compact TurboFlow® low flow rate sensors provide continual measurement ranging from 0.1 to 8 GPM (0.5 to 30 lpm). Their Hall-effect sensor delivers accuracy to  $\pm 3\%$  of reading and 0.5 % repeatability. Lightweight, they mount in any position.



TurboFlow® sensors

## ■ Switches

### Paddle

#### Section G

Flow/No-Flow detection for pipes with 1-1/4" (3 cm) diameter and up. Paddles are cut to length for desired actuation setting (from 1-1/4" to 5-1/2" (3 to 14 cm)). Unique, patented cam design assures low pressure drop and does not require bellows, seals or mechanical linkages.



## ■ Switches

### Shuttle

#### Section G

For monitoring water and oil—in line sizes 1/2" to 3" (2.5 to 7.6 cm). Accurate with 1% repeatability and low-pressure drop. Plastic, bronze, stainless steel and marine grade housings. Fixed settings from 0.5 to 100 GPM (1.9 to 378.5 l/m); adjustable settings from 0.75 to 15 GPM (2.8 to 56.8 l/m).



# PRESSURE SENSORS

## ■ Transducers

### Sputtered Thin Film Section H

Sputtered thin film technology provides years of worry-free measurements under demanding real-world conditions. Sputtered metallic strain gauge sensors have terrific thermal properties and superior stability specifications. Ideal for harsh applications demanding long-term service where precise laboratory-type measurements are required.



- **4000 Series** — The King of Stability: just 0.06% drift per year (non-cumulative). A broad range of models include submersible, high temperature, and weather proof versions.



3100/3200 Series

- **3100 Series** — Delivers an output signal for both temperature and pressure, providing full scale accuracy of 0.25% and long term drift to just 0.1% over the full scale per year. Unbeatable price to performance ratio in a compact package.
- **3200 Series** — Features thicker diaphragm and pressure snubber to withstand pressure spikes and cavitation.

## ■ Transducers

### Chemical Vapor Deposition Section H

Gems Chemical Vapor Deposition (CVD) pressure transducers and transmitters are based on a solid, proven technology. Our CVD instruments provide an effective method of overcoming the often severe limitations of other low-cost pressure measuring products. A state-of-the-art ASIC chip in each transducer provides greater linearity correction than traditional thermal compensation methods.



2600 Series



2200 Series

#### Thicker Diaphragm

Handles pulsating pressures—all stainless steel wetted parts.

#### CVD Sensor

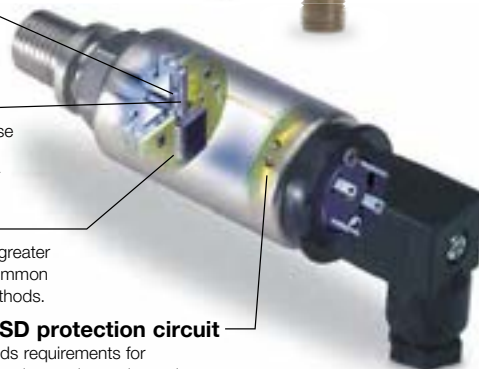
Stability and high sensitivity allow use of our thicker diaphragm. 17-4 PH SS sensor beam is laser welded for distortion-free construction.

#### ASIC Chip

Programmability provides greater linearity correction than common thermal compensation methods.

#### RFI/EMI & ESD protection circuit

Meets and exceeds requirements for CE marking. Protecting against noise, voltage spikes and static discharge.



- **1200/1600 Series** — 4X full-scale proof pressure. Typical 0.5% full-scale accuracy.
- **2200/2600 Series** — 2X full-scale proof pressure. Typical 0.25% full-scale accuracy.
- **6000 Series** — 5 to 1 turndown. Typical 0.15% full-scale accuracy.

## ■ Switches

### Piston/Diaphragm

#### Section I



Gems offers a choice of pressure switches, from compact cylindrical models for OEM use, to larger enclosed units for rugged process applications. A piston/diaphragm design, incorporating the high proof pressure of piston technology allows these switches to operate with the sensitivity and accuracy of a diaphragm design. Repeatability ranges from 0.2 to 2% of the highest set point. Enclosures include aluminum, stainless steel, baked-on enamel coating, reinforced plastic and zinc-plated steel. All are NEMA4 or NEMA4X certified.

## ■ Transducers

### Capacitive

#### Section H



Capacitive transducers are simple, durable and fundamentally stable. Variable capacitor technology, a rugged physical configuration, stainless steel wetted parts and a careful marriage of the mechanical assembly to the electronic circuitry combine to create highly repeatable transducers with low hysteresis and only .5% long-term-drift full scale per year, for low pressure applications. This large family of sensors includes models for positive pressures to 10,000 psi (700 bar), absolute vacuums, differential pressures, barometric pressure, low pressures (0-15 psi/ 0-1 bar), and clean-in-place 3A sanitary applications.

## ■ Switches

### Solid-State

#### Section I



Utilizing our proven pressure sensor and ASIC design, Gems solid state pressure switches offer greater accuracy and repeatability in high shock and vibration environments. They also provide an advantage over electromechanical switches when actuations exceed 50 cycles/minute and a broad frequency response is needed. Available with a large selection of pressure port and electrical connection options.

## ■ Transducers

### Submersible

#### Section H

9500 Series pressure transducers are designed specifically to meet the rigorous conditions for ground water monitoring while providing ultimate performance. They feature a true level reading through built in specific gravity compensation over a 23° F to 113° F (-5° C to 45° C) temperature range.

2400  
Series

9500  
Series



The 2400 Series features silicon-based Micro-Electro-Mechanical Systems (MEMS). Its complete 'system-on-chip' enables an ultra-slim design for bore hole applications.

Both series are impervious to the effects of water, even in the highest humidity and long-term submersion.



## Valves

### General Purpose

#### Section J

Providing 2- and 3-way functions and available in miniature and sub-miniature sizes, Gems general purpose solenoid valves deliver Flow Coefficients ( $C_v$ ) of .018 to .880. Select from NPT port, manifold or barbed connection types. Body materials include brass, stainless steel, acetal, aluminum, and polypropylene. Versions within this group will control operating pressure differentials up to 1000 psi (70 bar).

**Gems General Purpose Solenoid Valve Series:**



## Valves

### Cryogenic Valves to -320°F (-196°C)

#### Section J

These miniature 2-way valves can be configured for liquid nitrogen, liquid carbon dioxide and other extreme temperature media. Teflon® coated plungers, 316 stainless steel guide tubes and plunger springs, encapsulated coils, and Teflon® or Rulon™ seat seals produce a truly robust cryogenic valve for applications requiring high cycle life in extreme environments.

**Gems Cryogenic Solenoid Valve Series: B-Cryo and D-Cryo.**



## Valves

### Isolation for High Purity or Aggressive Fluids

#### Section J

Available in miniature and sub-miniature sizes, these units feature a diaphragm design to isolate the media from the internal components. Diaphragm materials include Viton®, EPR, nitrile (NSF/FDA), perfluoroelastomer and EPDM. Numerous port configurations, voltage options, and coil constructions enable Gems Isolation valves to easily integrate into any complex or demanding system.

**Gems Isolation Solenoid Valve Series:**



## Proximity Switches

### PRX Series

#### Section K

Monitor proper closure of doors and access panels as part of an automated process with these compact sensors. Gems offers a broad selection of versatile, low cost, general purpose proximity sensors designed for dry applications such as security systems and door/panel interlocks. Our PRX Series proximity switches are available in a wide range of size and mounting configurations. PRX series switches, hermetically sealed for long lasting performance, have no standby power requirements and no moving parts. They are easy to install for a variety of applications.



■ Solid-State

## Intrinsically Safe Relays and Controls

### Section L & E

Render any non-voltage-producing sensor, switch or conductivity electrode intrinsically safe with these relays and barriers from Gems. They amplify sensor load-handling capabilities in a wide range of AC and DC control switching applications. They are designed for easy installation in standard circuit boxes in non-hazardous areas. The amount of energy they send to sensors and switches within hazardous areas is insufficient to cause ignition of a specific hazardous atmospheric mixture in its most ignitable concentration.

In addition to safety, they offer great economy by reducing your need for costly explosion-proof sensors, switches, controls and housings. Solid-state reliability assures consistent performance, and with a completely encapsulated construction they are impervious to dust, moisture or foreign material. Select from a broad choice of Safe-Pak<sup>®</sup> and Warrick models.



**Warrick<sup>®</sup>  
Series 17/27  
conductivity  
level control**



**Warrick<sup>®</sup> Series  
47 4-channel  
relay alarm  
panel control**



**SAFE-PAK<sup>®</sup> relays  
& Zener barriers**

■ Electrical

## Standard and Custom Warrick<sup>®</sup> Panels

### Section E

Gems manufactures both custom and standard control panels, bearing the safety mark of UL or CSA, for use in hazardous (UL 913) and non-hazardous (UL 508A) locations. We offer a complete selection of controls including electromechanical and solid-state relays, timers, alternators, motor starters,

transformers, alarms, indicator lights and more.



**single- and  
multi-function  
control panels**



**RA-431  
alarm panel**



**DMS-470/570 Series**

■ Solid-State

## Standard Relays and Conductivity Level Controls

### Section E

These relays boost your sensor's load handling ability in non-hazardous locations with the reliability and advantages inherent in solid-state controls. Available with plug-in bases, open board or threaded terminals.

**Warrick<sup>®</sup>  
Series 16M/26M**



■ Transmitters

## Receivers

### Section D

Your sensors know what's going on, but you're still in the dark without one of Gems receivers. Each receiver features all the calibration adjustments needed to complete a continuous level indication system.



**compact level  
cubes and panel  
mounted receivers**



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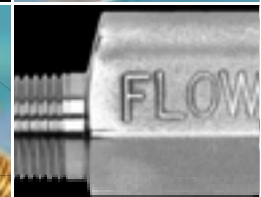
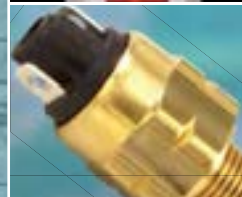
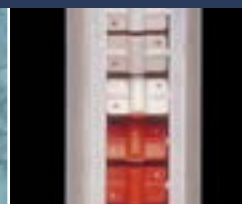
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OUR EXPERIENCE

YOUR SOLUTION

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**Gems**<sup>TM</sup>  
Sensors & Controls