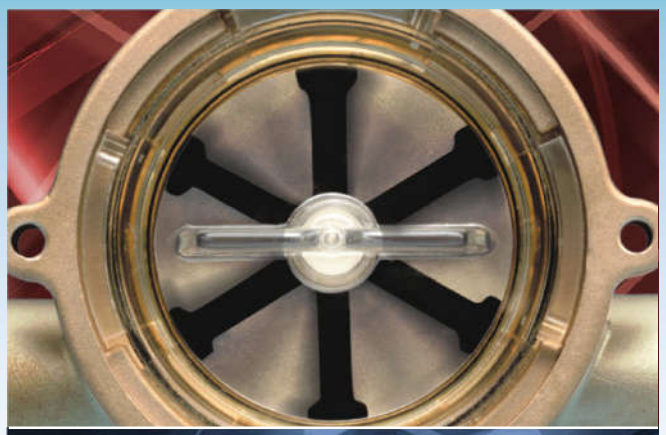
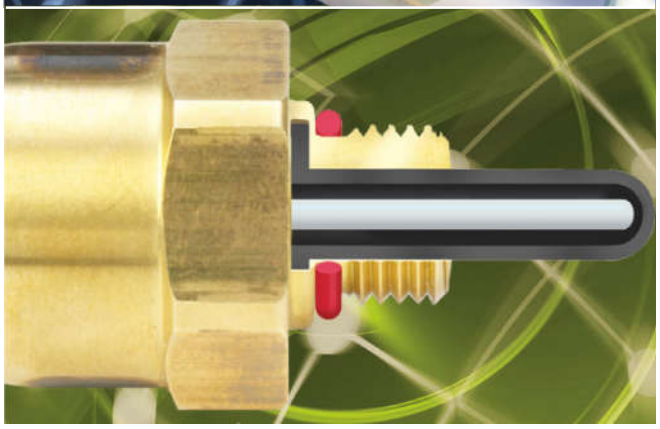



PRODUCT & SOLUTION
OVERVIEW

Gems™
Sensors & Controls

OUR EXPERIENCE • YOUR SOLUTION

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

Your Solution Partner

Gems Sensors & Controls is a leading manufacturer 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 custom solutions 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.

Supporting our customers with the best possible product 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 400 years of combined professional service on staff, 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 distribution network and a global direct sales team of experts in fluid level, flow and pressure sensors, controls, solenoid valves and associated fluidic systems
- A deep commitment 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 Capability Studies
  - Design Verification and Validation
  - Corrective and Preventative Action (CAPA)
  - Lean Tools
  - 8D Problem Solving Methodology

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

Custom Modification & Sub-Assemblies

This brochure provides a broad overview of Gems products and solutions. We offer thousands of variations of the fluid sensors and controls seen within, and many more not included here. We're proud of the wide array of these products, yet we know that no matter how many variations we manufacture, what is a "Standard" product may not be exactly what you need.

Since day one, Gems has helped our customers modify components to deliver solutions that meet their specific performance and installation requirements.

Our Sales, Engineering and Manufacturing groups, along with Application Specialists work daily with customers to customize our current products and to develop new components, sub-assemblies and complete fluid systems. We'll do the same for you.

Gems offers a broad range of customization

- Wetted and Non-Wetted Materials: Alloys and Engineered Plastics
- Electrical Terminations of All Types
- Port Sizes, Fittings and Other Installation Methods
- Sub-assembly Design and Manufacturing

Engineer to engineer problem solving

Gems experience and passion for providing solutions to OEMs produces further benefits to our customers, including:

- Collaborative Engineering
- Reduced Development Costs
- Quicker Time to Market
- Reduced Supplier Base
- Managed Inventory

Integrated Sensor and Control Modules

When you don't see exactly what you need, or your manufacturing process would benefit from a supplied sub-assembly incorporating Gems components, simply let us know. We turn your "wish lists" into reality.

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

Level Sensors

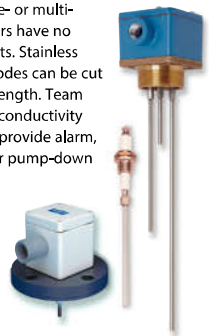
Highly reliable monitoring and detection of a wide range of fluid media through a broad range of contact, non-contact and non-intrusive liquid level sensors and switches.

ELECTRO-OPTIC

These compact electro-optic liquid level sensors feature a small footprint for anywhere space is at a premium. Solid-state switching delivers dependability over a long service life.

CONDUCTIVITY

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.



CAPACITANCE

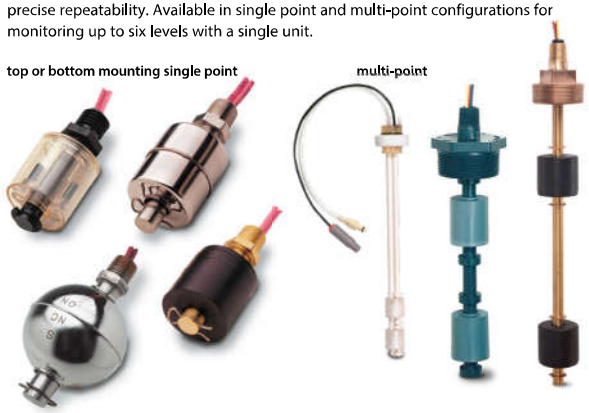
An excellent choice for turbulent or coating liquids, Gems offers multiple solid-state capacitance point level switches, including non-contact versions.

FLOAT

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. Available in single point and multi-point configurations for monitoring up to six levels with a single unit.

top or bottom mounting single point

multi-point



side mounting single point

high purity – PTFE and PVDF resist build-up of foreign material for ultra-pure fluids

SPECIAL PURPOSE

Includes bent stems, slosh shields, temperature sensing, siphon tubes and many others.

Level Sensors

ULTRASONIC

- Zero maintenance
- Ignores condensation on sensor
- Will not sense foam as liquid

XLS-1 level switches are compatible with water-and hydrocarbon-based liquids. Perfect for applications where condensation may affect other sensing technologies.

XLS-1

WATER IN FUEL

This solid-state sensor is an innovative, no-moving-parts solution specifically designed to detect the presence of water in fuel tanks and filters. An ideal solution for off-highway vehicles, locomotive and generator sets.

WIF-1250

MAGNETOSTRICTIVE

These robust transmitters are particularly ideal where extremely accurate level measurement is required; providing accuracy to within ±0.2mm, and a resolution better than 0.1mm. The temperature-compensated signal output is 4 to 20 mA. These units are available in lengths ranging from 8˝ to 157˝ (200 to 6,000 mm). The HART protocol version allows dual float tracking, and the explosion-proof version enables operation in Category 1 (Zone 0) or Category 1/2 environments.

FLOAT

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.

compact, OEM transmitters

standard size transmitters

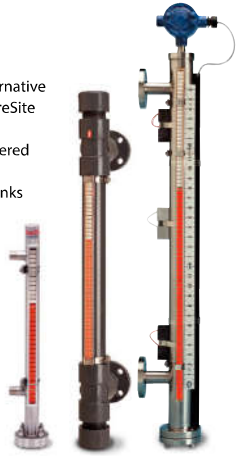
VISUAL INDICATORS

DipTape™ and DrumTape™

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, indicators are non-electric, plus liquids and vapors remain sealed from the atmosphere.
DIPTAPE indicators: designed for tanks;
DRUMTAPE indicators: fit 30 or 55 gallon storage drums. Available in alloy, all PVC and engineered plastic versions.

SureSite®

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.



Pressure Sensors

From catalog parts to custom solutions, Gems rugged and dependable pressure sensors, transducers, and switches are ready to serve your most demanding applications.

PISTON/DIAPHRAGM & SEALED PISTON
SWITCHES

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.

CAPACITIVE
TRANSDUCERS

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.

SOLID-STATE
SWITCHES

3600 Series

Communications Interface for field programming

Offering exceptional accuracy and stability, these solid-state switches employ sophisticated sputtered thin film sensors. They provide excellent repeatability in high shock and vibration environments, and are superior to mechanical switches in high frequency cycling applications. An optional Communications Interface enables Set Point, Reset Point, and Time Delay programming in the field.

SUBMERSIBLE
TRANSDUCERS

3700 Series

9600 Series

9600 Series pressure transducers meet the rigorous conditions for ground water monitoring with Hastelloy® and 318 SS wetted parts. They feature built in specific gravity compensation for true level reading.

The 3700 Series is optimized for low power consumption for battery-powered remote monitoring. They feature hermetic headers and a fully potted cable assembly to ensure long service life when immersed. Suitable for both clean and salt water application.

Pressure Sensors

SPUTTERED THIN FILM

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 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.
- **31IS/32IS Series** — Intrinsically safe variants. ExII 1G; Ex ia IIBt4 Ga; ATEX Certified
- **31CS/32CS Series** — CSA Certified intrinsically safe variants.
- **31EP/EA and 32EP/EA Series** — CSA and ATEX approved explosion-proof variants.

CHEMICAL VAPOR DEPOSITION

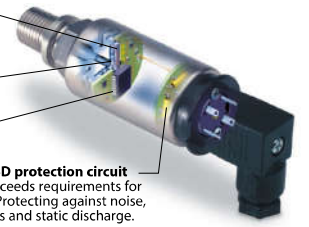
Gems Chemical Vapor Deposition (CVD) pressure transducers provide an effective method of overcoming the often severe limitations of other low-cost pressure measuring products. A state-of-the-art ASIC chip in each transducer provides greater linearity correction than traditional thermal compensation methods.

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.

Thicker Diaphragm
Handles pulsating pressures—all stainless steel wetted parts.

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.

LOW PRESSURE - MEMS

- 5 to 600 psi (0.35 to 40 bar)

3500 Series transducers are compact with all-stainless steel wetted parts at an unbeatable price performance ratio. Available in a wide choice of electrical outputs, and electrical/pressure connections.

3500 Series

Solenoid Valves

Gems reliable solenoid valves offer automatic flow control for liquids and gases. Gems also specializes in engineering custom manifolds that accommodate multiple sensor technologies.

GENERAL PURPOSE

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).

All Gems valves are available with a wide range of options. Our modular designs can be easily configured to your specific application. For products with specifications not shown here please contact Gems.

Gems General Purpose Solenoid Valve Series:

ISOLATION FOR HIGH PURITY OR AGGRESSIVE FLUIDS

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.

CRYOGENIC VALVES TO -320° F (-196° C)

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

MANIFOLDS

Gems Valve Engineers specialize in working with OEMs to design and manufacture integrated valve and manifold assemblies to meet most any fluidic system requirements.

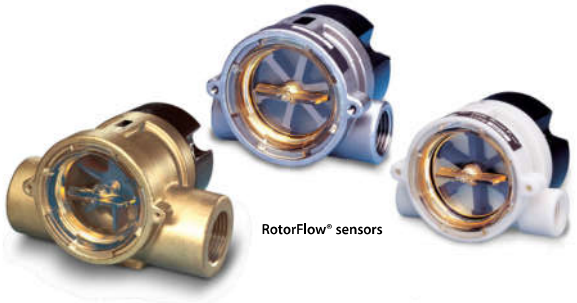
- Simplified fluidic systems
- Decreased number of potential leak paths
- Reduction in the amount of mounting hardware
- Complex and precise flow control

Flow Sensors

Gems offers a complete range of flow sensors and switches that deliver reliable measurements of both conductive and non-conductive fluids and gases.

ELECTRONIC

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

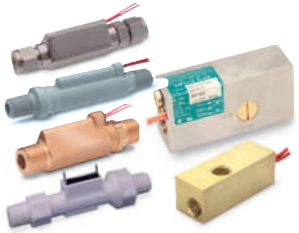
NO MOVING PARTS

FS-600 Series features solid-state thermal dispersion technology to provide reliable flow switch operation even without filtration. They are compatible with both conductive and non-conductive fluids. A straight-through design makes the FS-600 ideally suited for fluids with particulates or slurries, or alternating media viscosity.

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 ±3 % of reading and 0.5 % repeatability. Lightweight, they mount in any position. Incorporate flow sensing into custom assemblies with the tiny TurboFlow® Insert.

PISTON

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 capabilities include viscosity compensation, and high pressure handling to 1,500 PSIG (103 bar). Brass, plastic or stainless steel bodies.



PADDLE

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.

SHUTTLE

For monitoring water and oil—in line sizes 3/4″ 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).

Controls & Temperature Sensors

INTRINSICALLY SAFE RELAYS AND CONTROLS

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., and are easy to install 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. Select from a broad choice of Safe-Pak® and Warrick models.

Warrick® Series 47 4-channel relay alarm panel control

Warrick® Series 17/27 conductivity level control

SAFE-PAK® relays & Zener barriers

STANDARD RELAYS AND CONDUCTIVITY LEVEL CONTROLS

These relays boost your sensor's load handling ability in non-hazardous locations with the reliability and advantages inherent in solid-state controls.

Warrick® Dual Function Series DF

Warrick® Series 16/26M

STANDARD AND CUSTOM WARRICK® PANELS

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 solid-state relays, timers, alternators, transformers, alarms, indicator lights and more.

RA-431 alarm panel

DMS-470/570 Series

TEMPERATURE

- **PDTF Series - Temperature Switches.** Setpoints between 70°F - 285°F (20°C - 140°C)
- **ETS-200 Series - Continuous Sensing** Proportional resistance output—RTD or thermistor. IP67 reliability.
- **TM-950 Series - Open Thermistor Sensors.** Unique fused-glass design provides high-pressure capability – to 450 PSIG (31 bar)

PDTF Series

ETS-200 Series

TM-950 Series

RECEIVERS

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. Some available with relay output switching.

compact panel mounted receivers

Gems™ Sensors & Controls

OUR EXPERIENCE • YOUR SOLUTION

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