



Process Instrumentation

Product Guide



Registered Quality System to ISO 9001:2000

SOR[®] is on your side. We understand the demanding requirements of the process instrumentation industry and the harsh environments that our products must often operate in. We're committed to providing you with products you can depend on day in and day out, year after year. We design, develop and manufacture the highest quality, most reliable electronic and electromechanical level, pressure, temperature and flow instruments available.

For more than 60 years, our watchwords - Doing it right every time – have earned SOR its reputation for excellence by maintaining our commitment to the fundamentals of quality, service and delivery.

We provide dynamic application support and unparalleled customer service through a network of global offices staffed with well-trained and knowledgeable representatives. They are committed to delivering the best products on time, when and where you need them, anywhere in the world.

Our complete product line of instruments can help solve your application challenges. While this Product Guide will help you make your initial instrumentation choices, our representatives and service support staff can truly make the difference.

SOR capabilities extend beyond the manufacture and service of reliable instrumentation. We also stand ready to help your company with problem-solving custom manufacturing, OEM manufacturing and marketing expertise. We're in this together. We're on your side.

SOR is ready to help you from our headquarters in Lenexa, Kansas, or from right in your own back yard – wherever that may be.

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Level
Temperature
Pressure
Flow

Design and specifications are subject to change without notice.
For the latest revisions, visit www.sorinc.com.

Table of Contents

Product Applications.....	2
Level Switches	4
Level Transmitters.....	6
Pressure Switches	7
Pressure Transmitters	9
Differential Pressure Switches.....	10
Flow Switches	12
Temperature Switches	13
 Approval Agencies.....	 14
Hazardous Area Classification.....	14
Environmental Protection.....	14
Classifications	
Outside North America	15
Inside North America	15
 Other Capabilities and Services	
Chemical Seals.....	16
Wireless.....	16
Custom Manufacturing	
Custom Products	16
Nuclear Qualified Products.....	17
Marketing Communications.....	17



WE DELIVER QUALITY ON TIME

Oil & Gas

- Wellhead pressure
- Flow line monitoring
- Separator levels
- Compressor pressure monitoring
- Sump control

Petrochemical

- Catalytic cracker
- Distillation
- Fractionation
- Hydrotreater/Reformer
- Coker
- Flare knockout tank
- Sump control

Power

- Fuel storage and handling
- Steam turbine drip legs
- Hotwell condenser
- Feed water heaters
- Demineralization
- Ash precipitator/scrubber
- Steam drum level
- Sump control

Chemical & Other

- Storage and batch tank level
- High level alarm safety shutdown
- Solvent extraction
- Rupture disc integrity
- Filter integrity
- Water/wastewater treatment
- Pulp processing
- Rotating equipment lube systems
- Sump control

Nuclear Qualified

PRODUCT

Oil & Gas
Petrochemical
Power
Chemical & Other
Nuclear Qualified

Level Switches				
Flanged Chamber	x	x		x
Sealed Chamber			x	x
Top-Mounted Displacer	x	x		x
Top-Mounted Float		x	x	x
Side Mounted	x	x	x	x
Steam Trap		x	x	x
OEM Level	x		x	x
Single-Point Ultrasonic	x	x	x	x
Single-Point Ultrasonic with Self Test	x	x	x	x
Dual-Point Ultrasonic with Self Test	x	x	x	x
Single-Point RF		x	x	x
Single-Point RF with Self Test		x	x	x
Multipoint RF		x	x	x
Level Transmitters				
Ultrasonic	x	x	x	x
Submersible Hydrostatic Pressure	x		x	x
RF	x		x	x
Pressure Switches				
Weatherproof (Pressure/Vacuum/Compound)			x	x
Weatherproof Terminal Block Connections (Pressure/Vacuum/Compound)			x	x
Explosion Proof (Pressure/Vacuum/Compound)	x	x		x
Explosion Proof UL/CSA/ATEX (Pressure/Vacuum/Compound)	x	x		x
Big Hermet Explosion Proof, Hermetically Sealed (Pressure/Vacuum/Compound)	x	x		x

APPLICATIONS



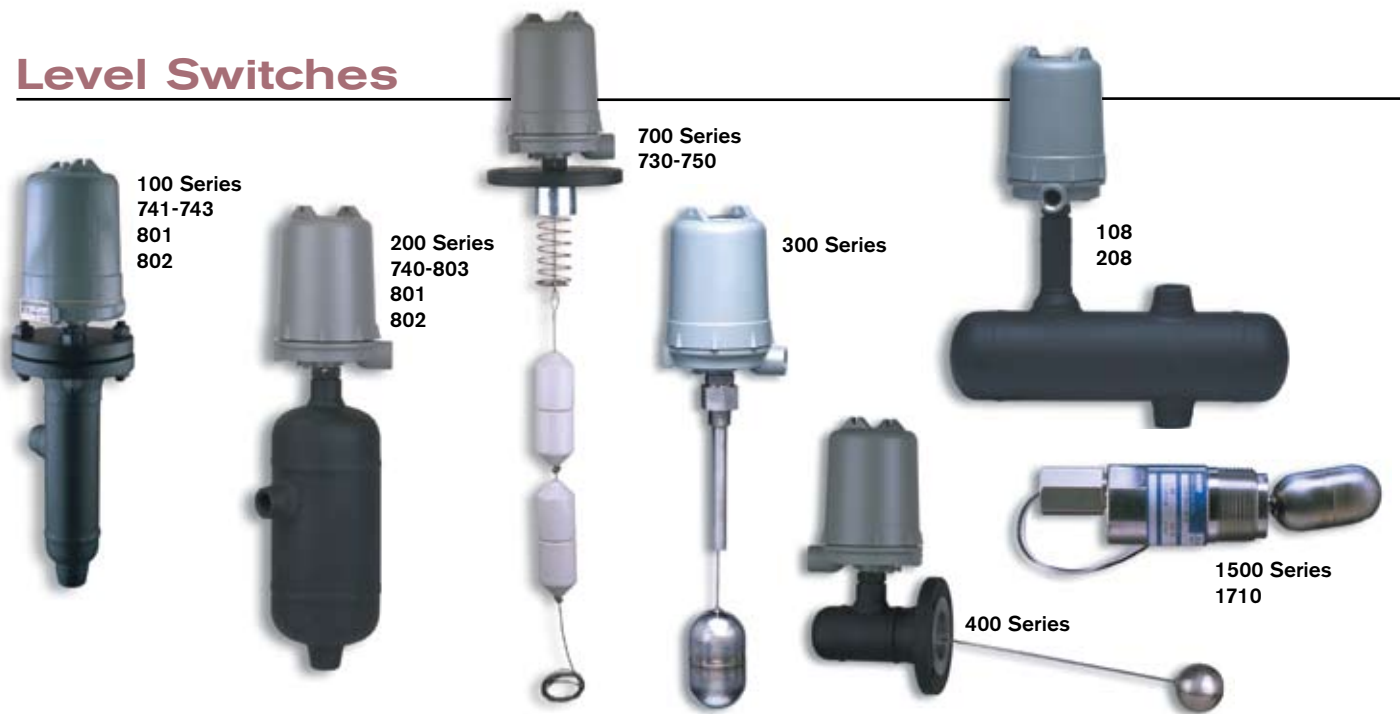
Oil & Gas
Petrochemical
Power
Chemical & Other
Nuclear Qualified

Mini-Hermet Explosion Proof, Hermetically Sealed (Pressure/Vacuum/Compound)	x	x	x
Dual Hi-Lo Weatherproof		x	x
Dual Hi-Lo Explosion Proof (Pressure/Vacuum/Compound)	x	x	x
Omni - Weatherproof (Pressure)			x
Sub Mini-Hermet Explosion Proof, Hermetically Sealed (Pressure)	x	x	x
Pressure Transmitters			
Electronic Pressure Instrument	x	x	x
Weatherproof Fixed Range		x	x
Immersible Fixed Range		x	x
Mini-Hermet Explosion Proof, Adjustable	x		
Differential Pressure Switches			
Weatherproof (Single Diaphragm)		x	x
Weatherproof Terminal Block (Single Diaphragm)		x	x
Explosion Proof (Single Diaphragm)	x	x	x
Explosion Proof UL/CSA/ATEX (Single Diaphragm)	x	x	x
Big Hermet Explosion Proof, Hermetically Sealed (Single Diaphragm)	x	x	x

Oil & Gas
Petrochemical
Power
Chemical & Other
Nuclear Qualified

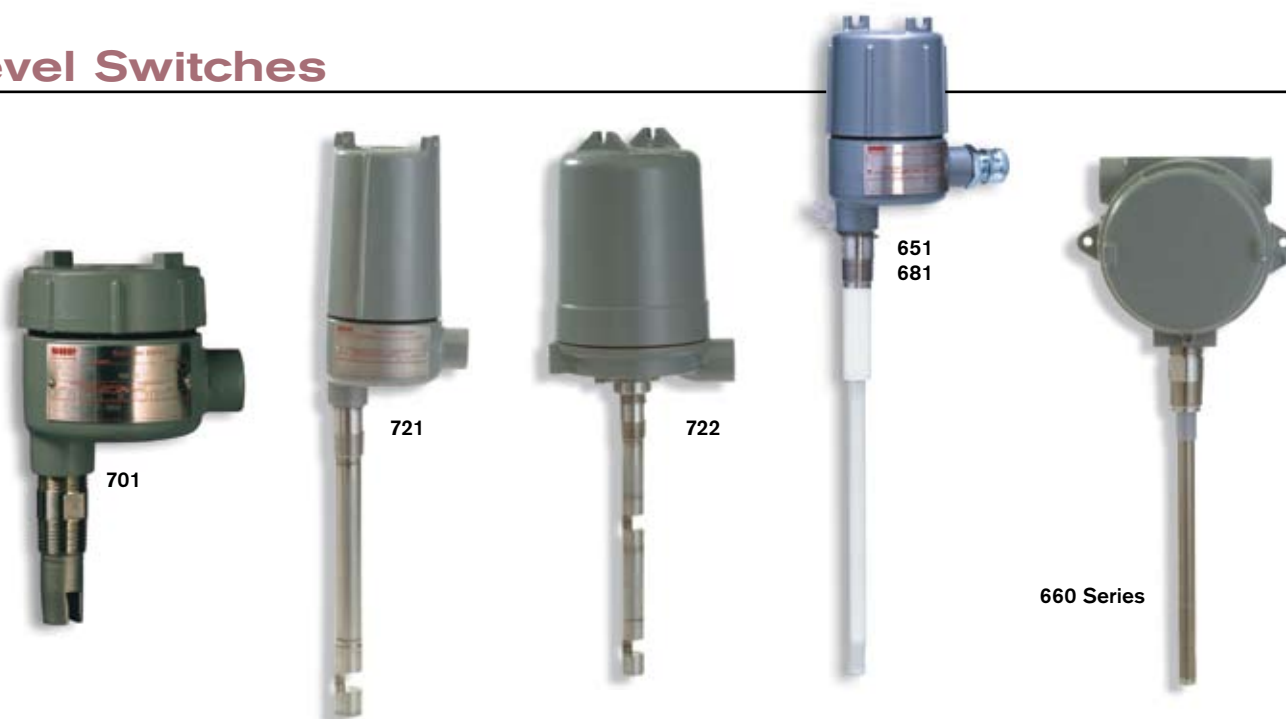
Mini-Hermet Explosion Proof, Hermetically Sealed (Single Diaphragm)	x	x	x
Weatherproof (Dual Opposed Diaphragm)		x	x
Explosion Proof (Dual Opposed Diaphragm)	x	x	x
Weatherproof (High Static Operation)		x	x
Explosion Proof Hermetically Sealed (High Static Operation)	x	x	x
Weatherproof (Low Range)		x	x
Explosion Proof Hermetically Sealed (Low Range)	x	x	x
Flow Switches			
Thermal Differential	x	x	x
Vane Operated	x	x	x
Temperature Transmitters			
Mini-Hermit Explosion Proof, Adjustable	x		
Temperature Switches			
Weatherproof (Direct or Remote Mount)		x	x
Weatherproof Terminal Block Connections (Direct or Remote Mount)		x	x
Explosion Proof (Direct or Remote Mount)	x	x	x
Explosion Proof UL/CSA/ATEX (Direct or Remote Mount)	x	x	x
Big Hermet Explosion Proof, Hermetically Sealed (Direct or Remote Mount)	x	x	x
Mini-Hermet Explosion Proof, Hermetically Sealed (Direct or Remote Mount)	x	x	x

Level Switches



Product	Model #	Ranges	Certifications and Standards	Features
Flanged Chamber (Refer to Form 912)	100 Series, 741 - 743, 801, 802	vac - 300+ psi vac - 21 bar -65° - 1000°F -54° - 538°C	UL, CSA, ATEX, GOST SAA ANSI/ASME ASTM materials	<ul style="list-style-type: none"> • Serviceable flanged chamber • Stainless steel switching mechanism for harsh atmospheres
Sealed Chamber (Refer to Form 912)	200 Series, 740 - 803, 801, 802	vac - 300+ psi vac - 21 bar -65° - 1000°F -54° - 538°C	UL, CSA, ATEX, GOST SAA ANSI/ASME ASTM materials	<ul style="list-style-type: none"> • Low-cost sealed chamber • Stainless steel switching mechanism for harsh atmospheres
Top Mounted Displacer (Refer to Form 912)	700 Series, 730 - 750	vac - 1000 psi vac - 69 bar -65° - 450°F -54° - 232°C	UL, CSA, ATEX, GOST SAA ASTM materials	<ul style="list-style-type: none"> • Available in 1- or 2-stage switching • Narrow and wide differential • Stainless steel switching mechanism for harsh atmospheres
Top Mounted Float (Refer to Form 912)	300 Series	vac - 750 psi vac - 51 bar -65° - 450°F -54° - 232°C	UL, CSA, ATEX, GOST SAA ASTM materials	<ul style="list-style-type: none"> • Available in 1- or 2-stage switching • Stainless steel switching mechanism for harsh atmospheres
Side Mounted (Refer to Form 912)	400 Series	vac - 1250 psi vac - 95 bar -65° - 450°F -54° - 232°C	UL, CSA, ATEX, GOST SAA ASTM materials	<ul style="list-style-type: none"> • Serviceable flanged chamber • Stainless steel switching mechanism for harsh atmospheres
Steam Trap (Refer to Form 912)	108, 208	vac - 2248 psi vac - 135 bar -65° - 1000°F -54° - 538°C	UL, CSA, ATEX, GOST SAA ANSI/ASME, GOST ASTM materials	<ul style="list-style-type: none"> • Serviceable flanged or sealed chamber • Stainless steel switching mechanism for harsh atmospheres
OEM Level (Refer to Forms 498, 500 and 864)	1500 Series, 1710	vac - 1500 psi vac - 100 bar -40° - 400°F -40° - 204°C	CSA, GOST ATEX ASTM materials	<ul style="list-style-type: none"> • Economical side- and top-mounted versions available

Level Switches



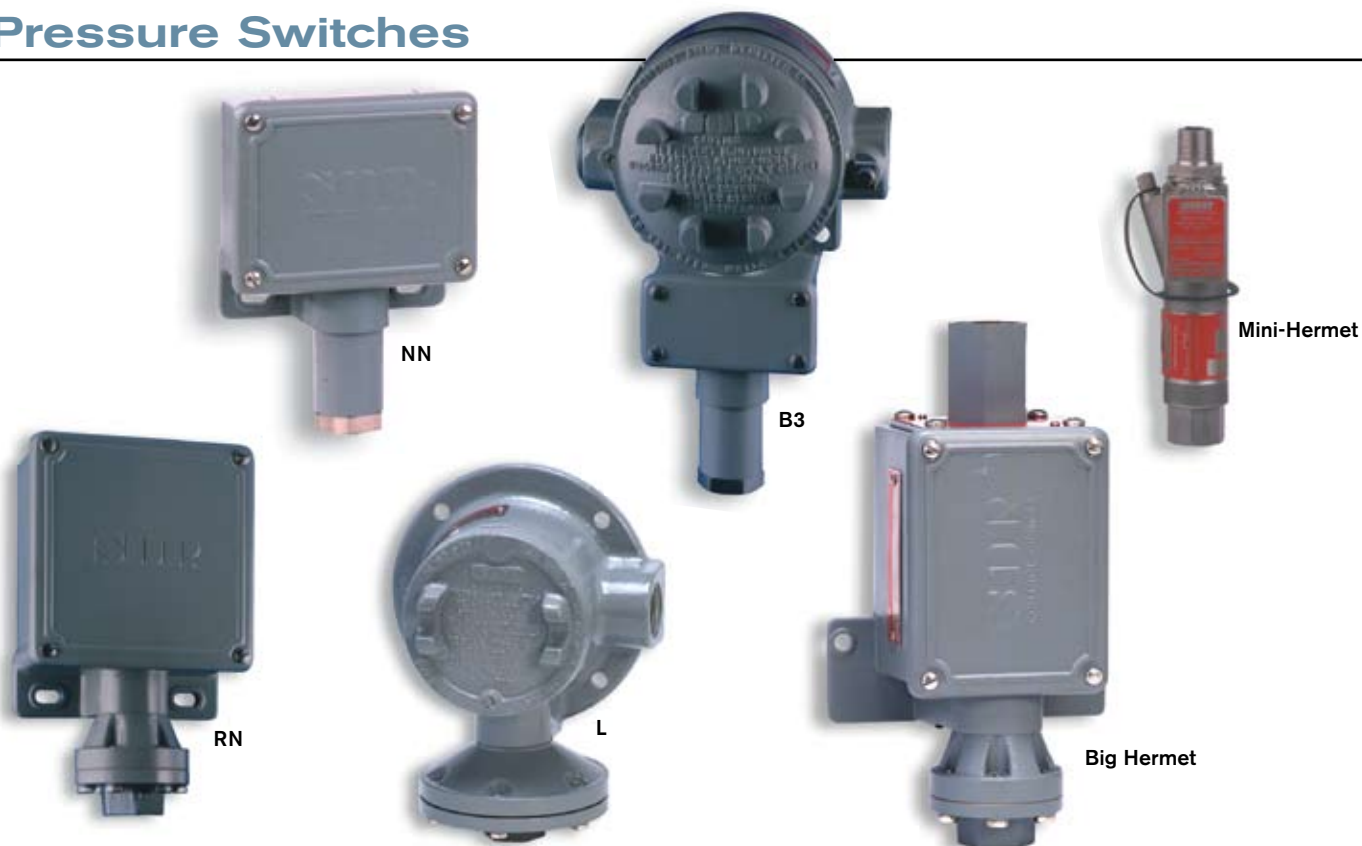
Product	Model #	Ranges	Certifications	Features
Single Point Ultrasonic (Refer to Form 1145)	701	0 - 2000 psi 0 - 135 bar -40° - 250°F -40° - 121°C	FM, CSA, GOST	<ul style="list-style-type: none"> • Low cost • No calibration required • Relay and current shift (8/16mA) output available • 316SS sensor
Single Point Ultrasonic with Self Test (Refer to Form 1145)	721	0 - 2000 psi 0 - 135 bar -40° - 250°F -40° - 121°C	FM, CSA, GOST	<ul style="list-style-type: none"> • No calibration required • Relay and current shift (8/16mA) output available • 316SS sensor
Dual Point Ultrasonic with Self Test (Refer to Form 1145)	722	0 - 2000 psi 0 - 135 bar -40° - 250°F -40° - 121°C	FM, CSA, GOST	<ul style="list-style-type: none"> • No calibration required • Set points can be linked to provide "pump logic" • Relay and current shift (8/16mA) output available • 316SS, Alloy 20, Hastelloy-C Sensors
Single Point RF (Refer to Form 1100)	651	vac - 4000 psi vac - 275 bar -40° - 400°F -40° - 204°C	FM, CSA, GOST	<ul style="list-style-type: none"> • Low cost • Single-point switch for alarm applications • Relay and current shift (8/16mA) output available • A variety of probe configurations meet most application conditions
Single Point RF with Self Test (Refer to Form 1100)	681	vac - 1500 psi vac - 100 bar -40° - 400°F -40° - 204°C	GOST	<ul style="list-style-type: none"> • Adjustable differential feature provides for pump control • Relay and current shift (8/16mA) output available • A variety of probe configurations meet most application conditions
Multipoint RF (Refer to Form 1100)	660 Series	vac - 4000 psi vac - 275 bar -40° - 400°F -40° - 204°C	FM, CSA, GOST	<ul style="list-style-type: none"> • Up to four points level indication for pump control • Adjustable differential feature provides for pump control • A variety of probe configurations meet most application conditions

Level Transmitters



Product	Model #	Ranges	Certifications	Features
echOsonix™ <i>(Refer to Forms 1035 and 1185)</i>	U71, U73	18 in. (0.45m) to 260 ft. (80m)	CSA, GOST	<ul style="list-style-type: none">• Powerful transmitted pulse for greater penetration and flexibility• Automatically adjusted gain continually adapts to process conditions• Echo recognition allows automated false-echo handling• Superior application flexibility – dust, foam, condensation, angle of repose are automatically compensated
Submersible Hydrostatic Pressure <i>(Refer to Form 1144)</i>	510LT 510SF	10 - 463 ftwc (3 - 140m)	ATEX, GOST EEx ia	<ul style="list-style-type: none">• Nose cone with NPT(M) connection or flush sensor design• Unspliced cable lengths up to 3,000 ft.• Ranges from 10 to 463 ftwc• Compact, 316SS housing
RF <i>(Refer to Form 1100)</i>	670 Series	Up to 150 ft. (45m)	FM, CSA, GOST	<ul style="list-style-type: none">• Continuous level measurement transmitter• Measurement range up to 150 ft.• Loop-powered, intrinsically safe 4-20mA output• A variety of probe configurations meet most application conditions

Pressure Switches



Product	Model #	Ranges	Certifications	Features
Weatherproof (Pressure/Vacuum/Compound) <i>(Refer to Form 216)</i>	NN	30 inHg vac - 7000 psi 1 bar vac - 480 bar	CSA, CE, GOST	<ul style="list-style-type: none"> • Low cost • Set point adjustment with calibrated scale
Weatherproof, Terminal Block Connections (Pressure/Vacuum/Compound) <i>(Refer to Form 216)</i>	RN	30 inHg vac - 7000 psi 1 bar vac - 480 bar	CSA, CE, GOST	<ul style="list-style-type: none"> • Set point adjustment with calibrated scale
Explosion Proof (Pressure/Vacuum/Compound) <i>(Refer to Form 216)</i>	L	30 inHg vac - 7000 psi 1 bar vac - 480 bar	UL: Class I, Group C, Div. 1 (as an outlet box) GOST	<ul style="list-style-type: none"> • Low cost • Set point adjustment with calibrated scale
Explosion Proof, UL/CSA/ATEX (Pressure/Vacuum/Compound) <i>(Refer to Form 216)</i>	B3	30 inHg vac - 7000 psi 1 bar vac - 480 bar	UL/CSA: Class I, Group B, Div. 1; ATEX: EEx d IIC T6, GOST	<ul style="list-style-type: none"> • Terminal block connections • Set point adjustment with calibrated scale • Set point adjustment without declassification of hazardous area
Big Hermet - Explosion Proof, Hermetically Sealed (Pressure/Vacuum/Compound) <i>(Refer to Form 455)</i>	Big Hermet	30 inHg vac - 7000 psi 1 bar vac - 480 bar	Unit: UL/CSA: Class I, Group A, Div. 1; SnapSw: UL/CSA, SAA, GOST	<ul style="list-style-type: none"> • Hermetically sealed snap switch(es) • Set point adjustment without declassification of hazardous area
Mini-Hermet - Explosion Proof, Hermetically Sealed (Pressure/Compound) <i>(Refer to Form 456)</i>	Mini-Hermet	30 inHg vac - 7000 psi 1 bar vac - 480 bar	Unit: UL/CSA: Class I, Group A, Div. 1; ATEX: EEx d IIC SnapSw: UL/CSA, ATEX, SAA, GOST	<ul style="list-style-type: none"> • Hermetically sealed snap switch(es) • Set point adjustment without declassification of hazardous area

Pressure Switches



V1



V2



Omni



Sub Mini-Hermet

Product	Model #	Ranges	Certifications	Features
Dual Hi-Lo - Weatherproof (Pressure/Vacuum/Compound) <i>(Refer to Form 217)</i>	V1	30 inHg vac - 4000 psi 1 bar vac - 275 bar	CSA, CE, GOST	<ul style="list-style-type: none"> • Dual set points • Set point adjustment with calibrated scale
Dual Hi-Lo - Explosion Proof Hermetically Sealed (Pressure/Vacuum/Compound) <i>(Refer to Form 217)</i>	V2	30 inHg vac - 4000 psi 1 bar vac - 275 bar	Unit: UL/CSA: Class I, Group A, Div. 1; SnapSw: UL/CSA, ATEX, SAA, GOST	<ul style="list-style-type: none"> • Dual set points • Hermetically sealed snap switches • Set point adjustment with calibrated scale • Set point adjustment without declassification of hazardous area
Omni - Weatherproof (Pressure) <i>(Refer to Form 987)</i>	Omni	7 - 7000 psi 0.5 - 480 bar snap switches	GOST	<ul style="list-style-type: none"> • Environmentally sealed snap switches
Sub Mini-Hermet - Explosion Proof, Hermetically Sealed (Pressure) <i>(Refer to Form 987)</i>	Sub Mini-Hermet	8 - 200 psi 0.5 - 14 bar	SnapSw: UL/CSA, ATEX, SAA, GOST	<ul style="list-style-type: none"> • Hermetically sealed snap switch(es) • Set point adjustment without declassification of hazardous area

Pressure Transmitters



Product	Model #	Ranges	Certifications	Features
Electronic Pressure Instrument <i>(Refer to Form 1301)</i>	2SGT	30 inHg vac - 2000 psig -1.0 - 135 bar 10 - 2000 psia 0.7 - 135 bar abs.	UL/cUL: Class I, Group A, Div. 2; ATEX: EEx nL IIC, GOST	<ul style="list-style-type: none"> Dual set points with programmable dead bands 150% URL Gage indication with programmable engineering units 4-20mA, loop-powered output with programmable 5:1 turndown Self diagnostics with manual circuit tests Local programming without declassification or hazardous area
Weatherproof, Fixed Range <i>(Refer to Form 1173)</i>	503FR	5 - 2000 psi .34 - 140 bar	ATEX: EEx ia, GOST	<ul style="list-style-type: none"> Low cost Environmentally sealed electrical connection
Immersible, Fixed Range <i>(Refer to Form 1174)</i>	510IM	5 - 2000 psi .34 - 140 bar	ATEX: EEx ia, GOST	<ul style="list-style-type: none"> Suitable for continuous liquid immersion Compact, 316SS housing
Mini-Hermet - Explosion Proof, Adjustable <i>(Refer to Forms 1175, 1176, 1177 and 1178)</i>	534CR, 534HS, 536CR, 536HS	10 - 15,000 psi .69 - 1000 bar	FM/CSA: Class I, Group A, Div. 1, EXPL/IS, GOST	<ul style="list-style-type: none"> 4-20mA, loop powered or 1-5Vdc, low-power outputs Calibration without declassification of hazardous area Hermetically sealed electrical connection and zero/span adjustments 5:1 turndown (4:1 turndown on 534CR)

Differential Pressure Switches



101NN
121NN



101L
121L



Big Hermet



101RN
121RN



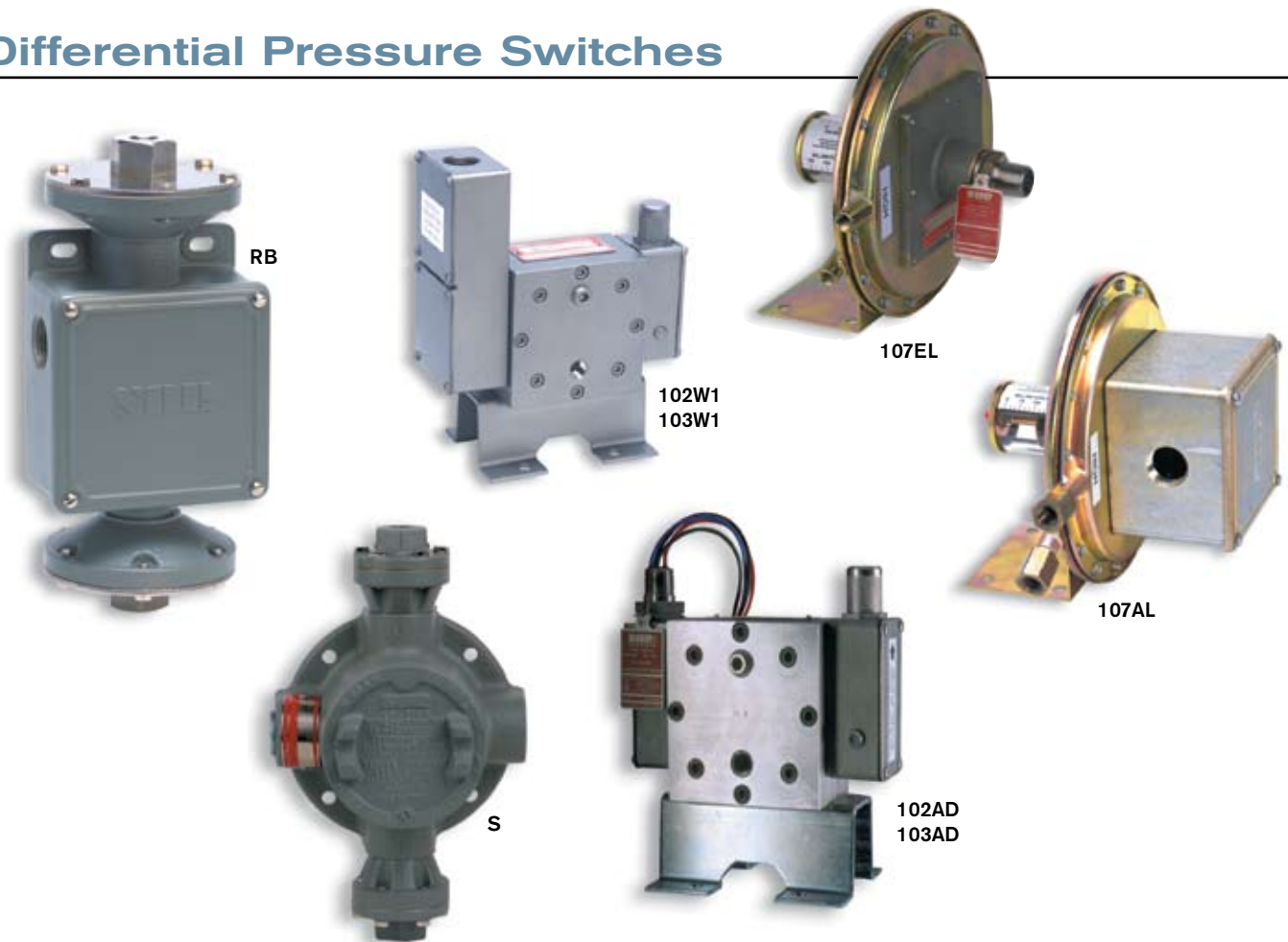
101B3
121B3



Mini-Hermet

Product	Model #	Ranges	Certifications	Features
Weatherproof (Single diaphragm) <i>(Refer to Form 468)</i>	101NN, 121NN	3 - 500 psid .2 - 35 bar	CSA, CE, GOST	<ul style="list-style-type: none"> • Low cost • Set point adjustment with calibrated scale
Weatherproof, Terminal Block (Single diaphragm) <i>(Refer to Form 468)</i>	101RN, 121RN	3 - 500 psid .2 - 35 bar	CSA, CE, GOST	<ul style="list-style-type: none"> • Set point adjustment with calibrated scale
Explosion Proof (Single diaphragm) <i>(Refer to Form 468)</i>	101L, 121L	3 - 500 psid .2 - 35 bar	UL: Class I, GOST Group C, Div. 1 (as an outlet box)	<ul style="list-style-type: none"> • Low cost • Set point adjustment with calibrated scale
Explosion Proof, UL/CSA/ATEX (Single diaphragm) <i>(Refer to Form 468)</i>	101B3, 121B3	3 - 500 psid .2 - 35 bar	UL/CSA: Class I, Group B, Div. 1; ATEX: EEx d IIC T6, GOST	<ul style="list-style-type: none"> • Terminal block connections • Set point adjustment with calibrated scale • Set point adjustment without declassification of hazardous area
Big Hermet - Explosion Proof, Hermetically Sealed (Single diaphragm) <i>(Refer to Form 468)</i>	Big Hermet	3 - 500 psid .2 - 35 bar	Unit: UL/CSA: Class I, Group A, Div. 1; SnapSw: UL/CSA, SAA, GOST	<ul style="list-style-type: none"> • Hermetically sealed snap switch(es) • Set point adjustment without declassification of hazardous area
Mini-Hermet - Explosion Proof, Hermetically Sealed (Single diaphragm) <i>(Refer to Form 468)</i>	Mini-Hermet	3 - 500 psid .2 - 35 bar	Unit: UL/CSA: Class I, Group A, Div. 1; ATEX: EEx d IIC; SnapSw: UL/CSA, ATEX, SAA, GOST	<ul style="list-style-type: none"> • Hermetically sealed snap switch(es) • Set point adjustment without declassification of hazardous area

Differential Pressure Switches



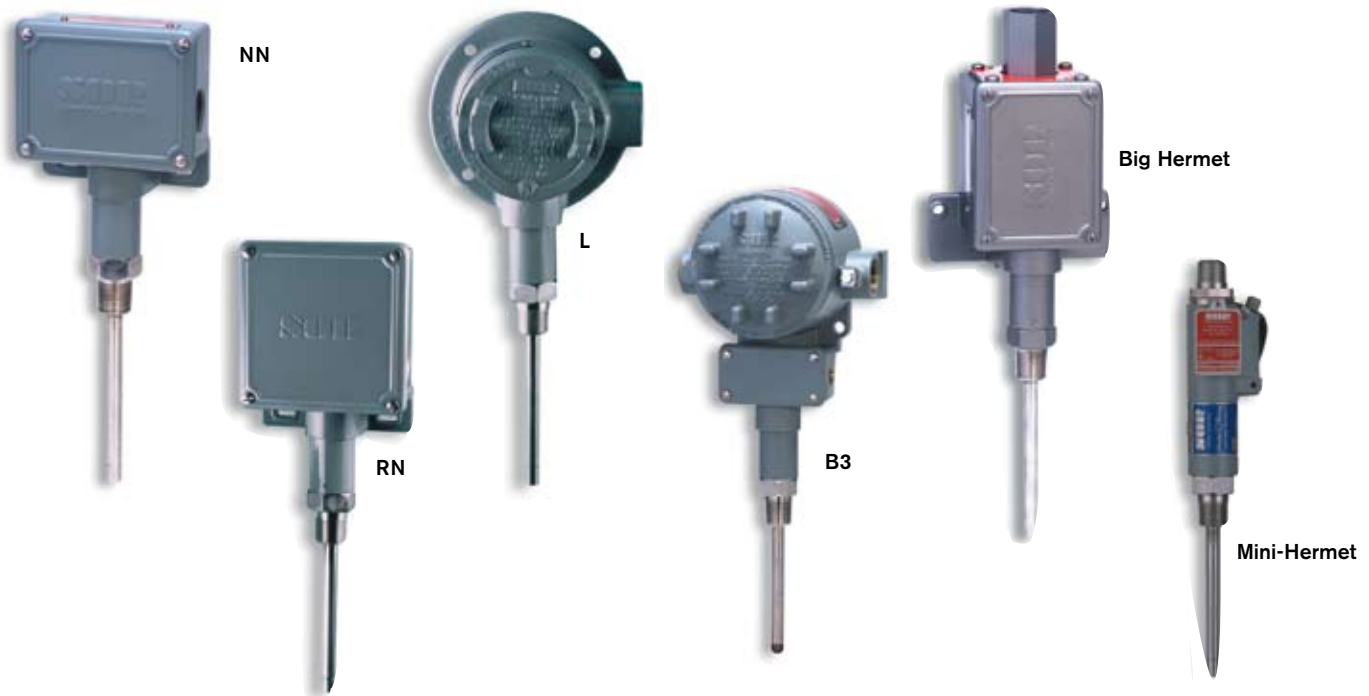
Product	Model #	Ranges	Certifications	Features
Weatherproof (Dual, opposed diaphragm) <i>(Refer to Form 386)</i>	RB	0.5 - 1000 psid 35 mbar - 70 bar	CSA, CE, GOST	<ul style="list-style-type: none"> Terminal block connections Set point adjustment with calibrated scale
Explosion Proof (Dual, opposed diaphragm) <i>(Refer to Form 386)</i>	S	0.5 - 500 psid 35 mbar - 70 bar	UL: Class I, Group C, Div. 1 (as an outlet box), GOST	<ul style="list-style-type: none"> Set-point adjustment with calibrated scale
Weatherproof (High-static operation) <i>(Refer to Form 388)</i>	102W1 103W1	7 inwc - 2500 psid 18 mbar - 175 bar	CSA, GOST	<ul style="list-style-type: none"> Negligible temperature and/or static influence
Explosion Proof, Hermetically Sealed (High-static operation) <i>(Refer to Form 388)</i>	102AD, 103AD	7 inwc - 2500 psid 18 mbar - 175 bar	Unit: ATEX: EEx d IIC; SnapSw: UL/CSA, ATEX, SAA, GOST	<ul style="list-style-type: none"> Negligible temperature and/or static influence Hermetically sealed snap switch(es) Set point adjustment without declassification of hazardous area
Weatherproof (Low range) <i>(Refer to Form 459)</i>	107AL	0.25 - 40 inwd 6.4 - 1000 mmwc	FM, CSA, GOST	<ul style="list-style-type: none"> Set point adjustment with calibrated scale
Explosion Proof, Hermetically Sealed (Low range) <i>(Refer to Form 459)</i>	107EL	0.3 - 40 inwd 7.5 - 1000 mmwc	SnapSw: UL/CSA, ATEX, SAA, GOST	<ul style="list-style-type: none"> Hermetically sealed snap switch(es) Set point adjustment without declassification of hazardous area

Flow Switches



Product	Model #	Features
Thermal Differential <i>(Refer to Form 1021)</i>	T21	<ul style="list-style-type: none">• Wide operating process temperature range of -100°F to 392°F• Removable, plug-in electronics board• Self-heating sensor design
Vane Operated <i>(Refer to Form 672)</i>	900 Series	<ul style="list-style-type: none">• Stainless steel switching mechanism for harsh atmospheres• All ASTM materials construction• Flow monitoring for a wide range of pipe sizes and specific gravities

Temperature Switches



Product	Model #	Ranges	Certifications	Features
Weatherproof (Direct or remote mount) <i>(Refer to Form 220)</i>	NN	-50° - 1000°F -45° - 540°C	CSA, CE, GOST	<ul style="list-style-type: none"> • Low cost • Set point adjustment with calibrated scale
Weatherproof, Terminal Block Connections (Direct or remote mount) <i>(Refer to Form 220)</i>	RN	-50° - 1000°F -45° - 540°C	CSA, CE, GOST	<ul style="list-style-type: none"> • Terminal block connections • Set point adjustment with calibrated scale
Explosion Proof (Direct or remote mount) <i>(Refer to Form 220)</i>	L	-50° - 1000°F -45° - 540°C	UL: Class I, Group C, Div. 1 (as an outlet box), GOST	<ul style="list-style-type: none"> • Low cost • Set point adjustment with calibrated scale
Explosion Proof, UL/CSA/ATEX (Direct or remote mount) <i>(Refer to Form 220)</i>	B3	-50° - 1000°F -45° - 540°C	UL/CSA: Class I, Group B, Div. 1; ATEX: EEx d IIC, GOST	<ul style="list-style-type: none"> • Terminal block connections • Set point adjustment with calibrated scale • Set point adjustment without declassification of hazardous area
Big Hermet - Explosion Proof, Hermetically Sealed (Direct or remote mount) <i>(Refer to Form 220)</i>	Big Hermet	-50° - 1000°F -45° - 540°C	Unit: UL/CSA: Class I, Group A, Div. 1; SnapSw: UL/CSA, SAA, GOST	<ul style="list-style-type: none"> • Hermetically sealed snap switch(es) • Set point adjustment with calibrated scale • Set point adjustment without declassification of hazardous area
Mini-Hermet - Explosion Proof, Hermetically Sealed (Direct or remote mount) <i>(Refer to Form 220)</i>	Mini-Hermet	-50° - 1000°F -45° - 540°C	Unit: UL/CSA: Class I, Group A, Div. 1; ATEX: EEx d IIC; SnapSw: UL/CSA, ATEX, SAA, GOST	<ul style="list-style-type: none"> • Hermetically sealed snap switch(es) • Set point adjustment without declassification of hazardous area

Approval Agencies

SOR products satisfy the requirements of approval agencies worldwide. Often, a common design is capable of multiple approvals. In other cases, modified construction techniques are necessary to meet specific agency requirements.



3A



ATEX (BASEEFA, DEMKO, KEMA, SIRA)

SAA

Australia Standards Association



Canadian Standards Association



CE Marked: EMC Directive 89/3367/EEC



APPROVED

Factory Mutual



GOST

Heavy Industrial (Self-Certified)

JIS/RIIS Japanese Industrial Standards



KOSHA



SASO



Underwriters Laboratories

Hazardous Area Classification

Hazardous Areas are locations where the potential for fire or explosion exists because of gases, dust or easily ignitable fibers or flyings in the atmosphere.

In North America, hazardous areas are separated by classes, divisions, and groups to define the level of safety required for equipment installed in these locations. Classes define the general form of the flammable materials in the atmosphere. Divisions define the probability of the presence of flammable materials. Groups classify the exact flammable nature of the material.

In Europe and countries outside of North America, classification of hazardous areas is accomplished differently. Zones are used to define the probability of presence of the flammable materials. **Protection Types** denote the level of safety for the device. Groups classify the exact flammable nature of the material. These groups are separated differently than North American Groups. **Temperature Identifications** convey the maximum surface temperature of the apparatus based on 104°F (40°C) ambient. These temperature codes are selected carefully so as not to exceed the ignition temperature of the specific gas or vapor to be encountered in the application.

Environmental Protection

Similar to hazardous location classifications, environmental protection ratings are slightly different within and outside of North America. National Electrical Manufacturers Association (NEMA) and Ingress Protection (IP) Codes provide similar information regarding protection against specified environmental conditions.

NEMA 4 Indoor or outdoor use. Protection against wind-blown dust and rain, splashing water, hose-directed water and damage from external ice formation.

NEMA 4X NEMA 4, plus protection against corrosion.

IP 65 Dust-tight and protected against water jets.

IP 68 Dust-tight and suitable for indefinite immersion.

Some classifications are not shown here. For further detailed information, see specific standards published by approval organizations.

Classifications Outside North America

Zone 0	Area in which an explosive gas-air mixture is continuously present or present for long periods.
Zone 1	Area in which an explosive gas-air mixture is likely to occur in normal operation.
Zone 2	Area in which an explosive gas-air mixture is not likely to occur, and if it occurs it will only exist for a short time.

(Zones 0 and 1 are similar to North American Div. 1 classification. Zone 2 is similar to North American Div. 2 classification.)

Protection Types		Specific to Zone
d	Flameproof (Explosion-proof) Enclosure	1, 2
e	Increased Safety	1, 2
ia	Intrinsic Safety	0, 1, 2
ib	Intrinsic Safety	1, 2
o	Oil Immersion	2
p	Pressurized (Purged) Apparatus	1, 2
q	Powder Filling (Sand Filling)	2
m	Encapsulation	1, 2
n	Normally Non-sparking and/or Non-incendive Circuits	2
Group I	For application in below-ground installations (mines) where methane (firedamp) and coal dust may be present.	
Group IIA	For application in above-ground installations where hazards due to propane may exist. (This group most closely matches the North American Group D.)	
Group IIB	For application in above-ground installations where hazards due to ethylene may exist. (This group most closely matches the North American Group C.)	
Group IIC	For application in above-ground installations where hazards due to hydrogen or acetylene may exist. (This group most closely matches the North American Groups A and B.)	

Temperature Codes

T1	842°F	450°C
T2	572°F	300°C
T3	392°F	200°C
T4	275°F	135°C
T5	212°F	100°C
T6	185°F	85°C

Classifications Inside North America

Class I	Flammable gases or vapors are present in the air in quantities sufficient to produce explosive or ignitable mixture.
Class II	Combustible or conductive dusts are present.
Class III	Ignitable fibers or flyings are present but not likely to be in suspension in sufficient quantities to produce ignitable mixtures. (Group classifications are not applied to this class.)
Division 1	The substance referred to by class is present during normal conditions.
Division 2	The substance referred to by class is present only in abnormal conditions, such as a container failure or system breakdown.
Group A	Acetylene
Group B	Hydrogen (or gases of equivalent hazard)
Group C	Ethylene (or gases of equivalent hazard)
Group D	Gasoline (or gases of equivalent hazard)
Group E	Metal Dust
Group F	Coal Dust
Group G	Grain Dust

This brochure is intended to provide suggestions for the general application of certain types of instruments. Since each application has unique characteristics, it is recommended that you consult SOR to discuss the specific details of your application to ensure the correct instrument is selected.



Chemical Seals

SOR Chemical Seals are custom-manufactured by ReoTemp Instruments, a leading supplier of diaphragm seals with many years of experience in specialty seals.

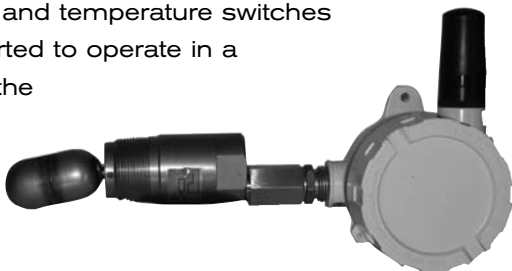
SOR is ready to work with customers on any high-performance chemical seal application such as high vacuum, high temperature, high sterility, custom design, high static pressure/low differential span or high vacuum/high temperature.



Product	Range	Certifications	Features
Threaded Seals Regular or large (more sensitive) diaphragm. With or without flushing port.	30" inHG vac - 2500		<ul style="list-style-type: none">• Isolates sensor• All 316 S.S.• Welded construction• Custom assemblies & materials available
Flanges Seals Regular or large (more sensitive) diaphragm. For pipe sizes: 1, 1 1/2", 2, 3, or 4". With or without flushing port.	30" inHG vac - 2500		<ul style="list-style-type: none">• Isolates sensor• All 316 S.S.• Welded construction• Custom assemblies & materials available
Sanitary Seals Tri-Clamp design for: 3/4", 1", 1 1/2", 2, 2 1/2" or 3" pipe	30" inHG vac - 600psi	3A	<ul style="list-style-type: none">• Sanitary isolation of sensor• Quick connecting tri-clamp• Meets 3A sanitary standards

Wireless

SOR pressure, level and temperature switches can easily be converted to operate in a wireless mode with the customer's choice of transmitter.



Custom Manufacturing

From the latest computer-driven machining tools to robotic welders, SOR is loaded with manufacturing experience. Our mixed-mode capabilities enable us to operate in a job shop environment with an OEM mentality. We specialize in short-run/quick-turn projects, but can also handle high-volume work.



Nuclear Qualified Products

SOR custom engineers nuclear-qualified pressure, temperature and vacuum switches. Our engineering expertise is specifically targeted to meet the unique demands of the nuclear power generation industry and provide solutions.

Compliant

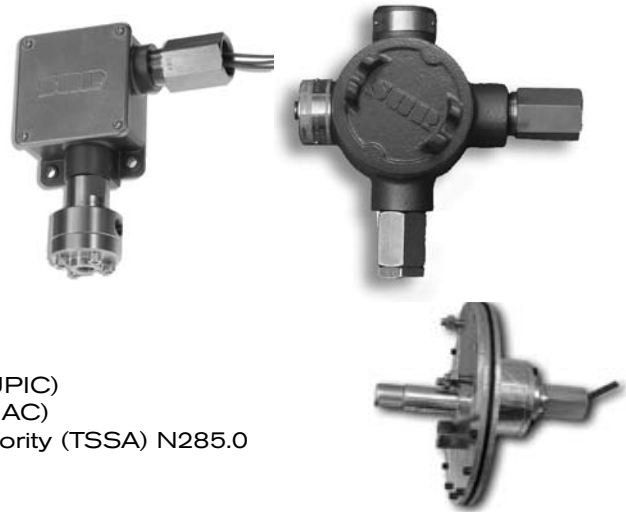
10CFR50, Appendix B
ANSI N45.2
NQA-1 (including reporting)
ASME Section III, subsection NC and ND

Qualified

by a combination of testing and analysis
IEEE-323-1974 & 1983
IEEE-344-1975 & 1987

Audited

Nuclear Procurement Issues Committee (NUPIC)
Nuclear Industry Assessment Committee (NIAC)
Canadian Technical Standards & Safety Authority (TSSA) N285.0
Registered Quality System to ISO 9001:2000



Marketing Communications

SOR is uniquely positioned to help its customers with their business-to-business marketing communications efforts. Our Marketing department has researched, planned, written, video-taped, printed, coordinated and produced promotions, Web sites, corporate and training videos, point-of-purchase displays and more for industrial and consumer companies worldwide.

Our integrated approach uses the latest multimedia technologies to move your message from concept to culmination. While other companies must depend on outside services to complete projects, at SOR and its sister company Digital Lagoon, everything you need is under one roof. We understand the world of industrial marketing and can provide the right medium that generates sales leads and gets results.

- **Creative Services** – Concept, copy and design
- **Web Site Interface Design** – Flash, 2-D and 3-D animation
- **Web Development** – e-commerce, e-training, Web solutions, streaming media and Web site registration
- **Large Format Printing** – State-of-the-art flatbed press, 3-D and motion lenticular printing, high quality, cost-efficient and fast turnaround
- **Web Hosting** – Leading edge data center, power and tier 1 bandwidth redundancy, firewall, Web trends reports and real-time monitoring
- **Video Production** – Studio and location videography, editing, scripting, narration, compression and production
- **CD-ROM and Kiosk Development**, Sales and marketing demos, CD-ROM catalogs and computer-based training
- **DVD Authoring** – Video sales and training presentations



Level

Temperature

Pressure

Flow



Process Instrumentation

We Deliver Quality On Time

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