

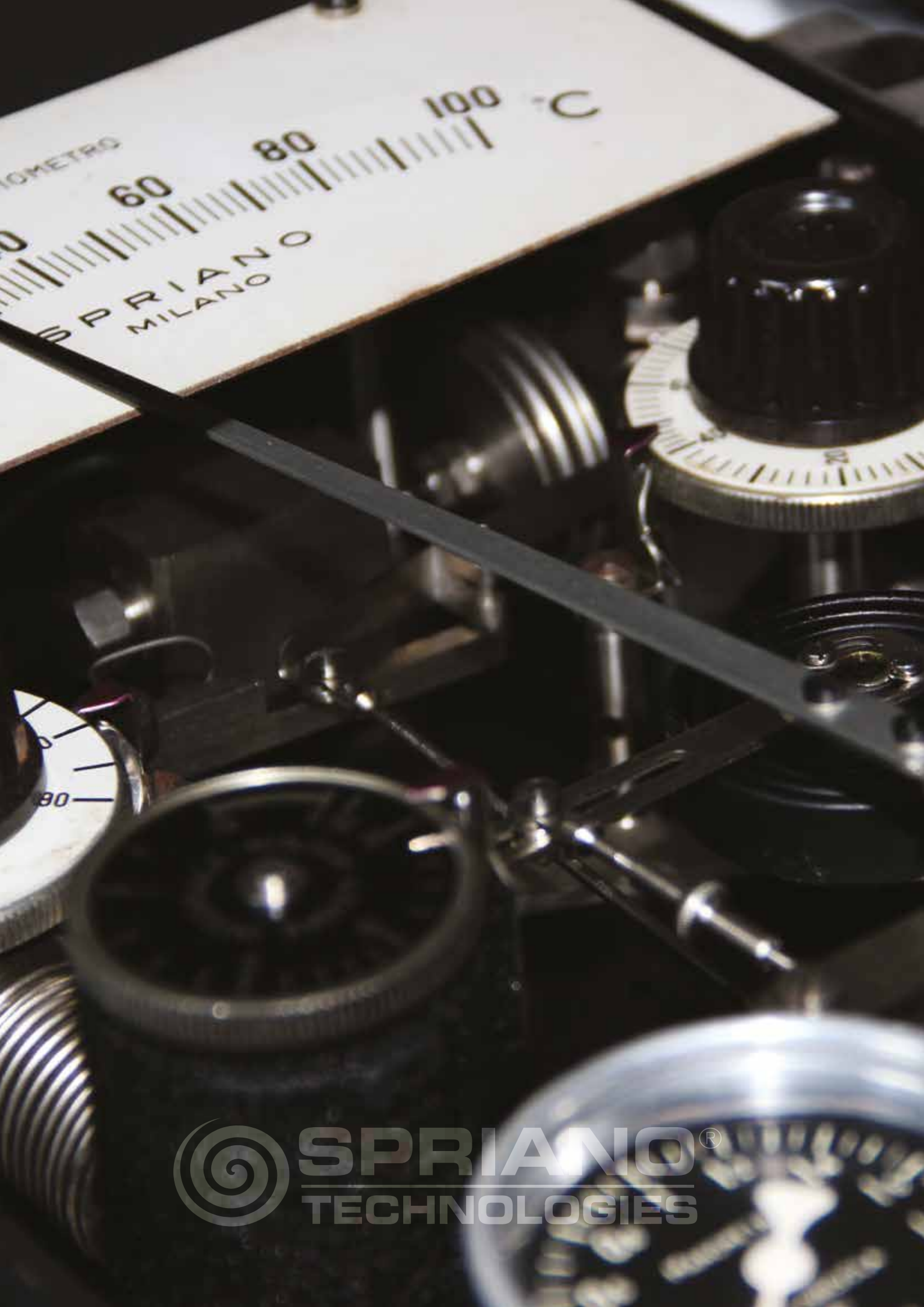


OIL & GAS

PETROCHEMICAL

FERTILIZATION

POWER PLANTS





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SPRIANO
MILANO

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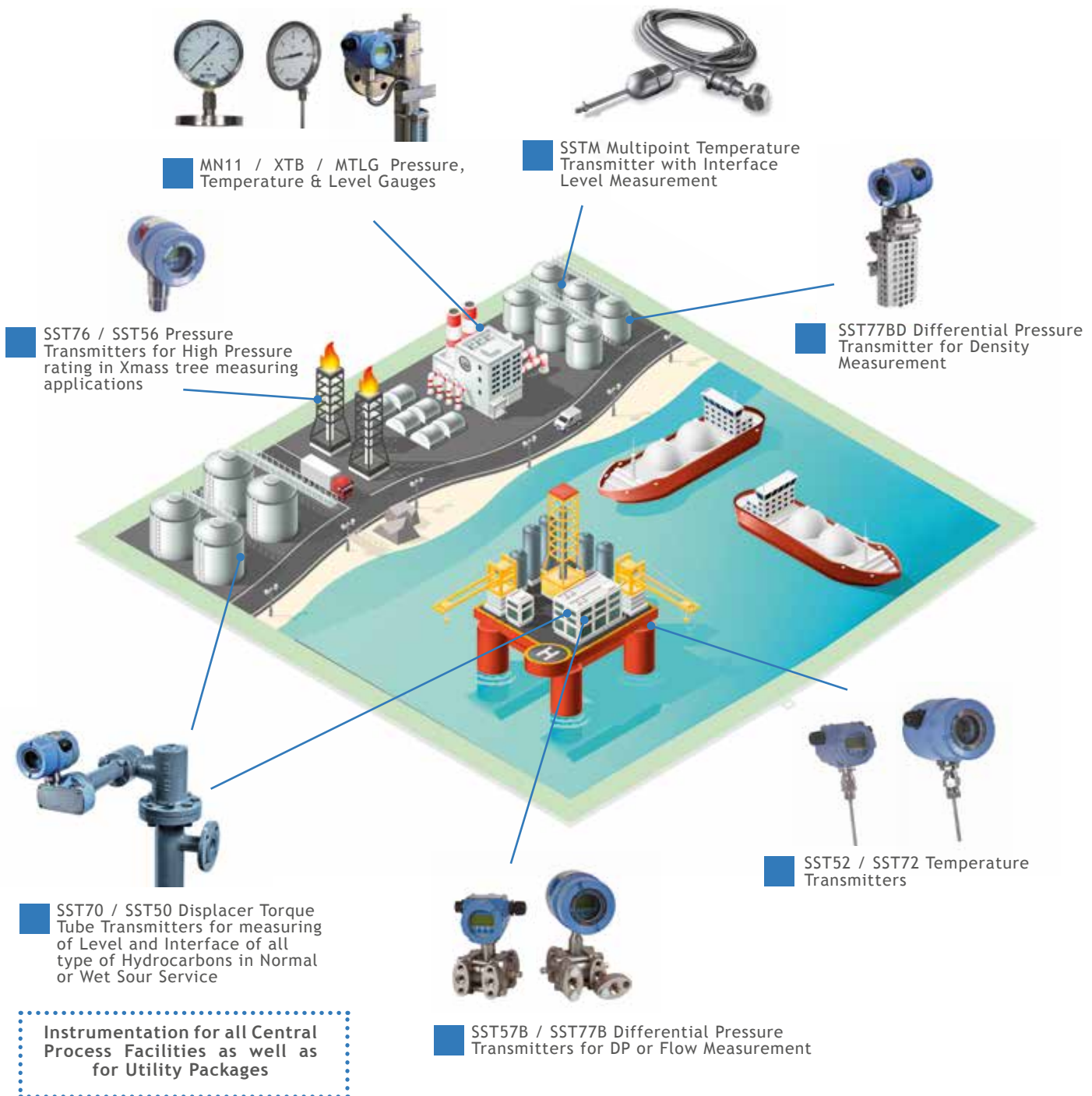
SPRIANO[®]
TECHNOLOGIES

SINCE 1923 WE DESIGN & MANUFACTURE ELECTRONIC & PNEUMATIC INSTRUMENTATION FOR PROCESS AUTOMATION

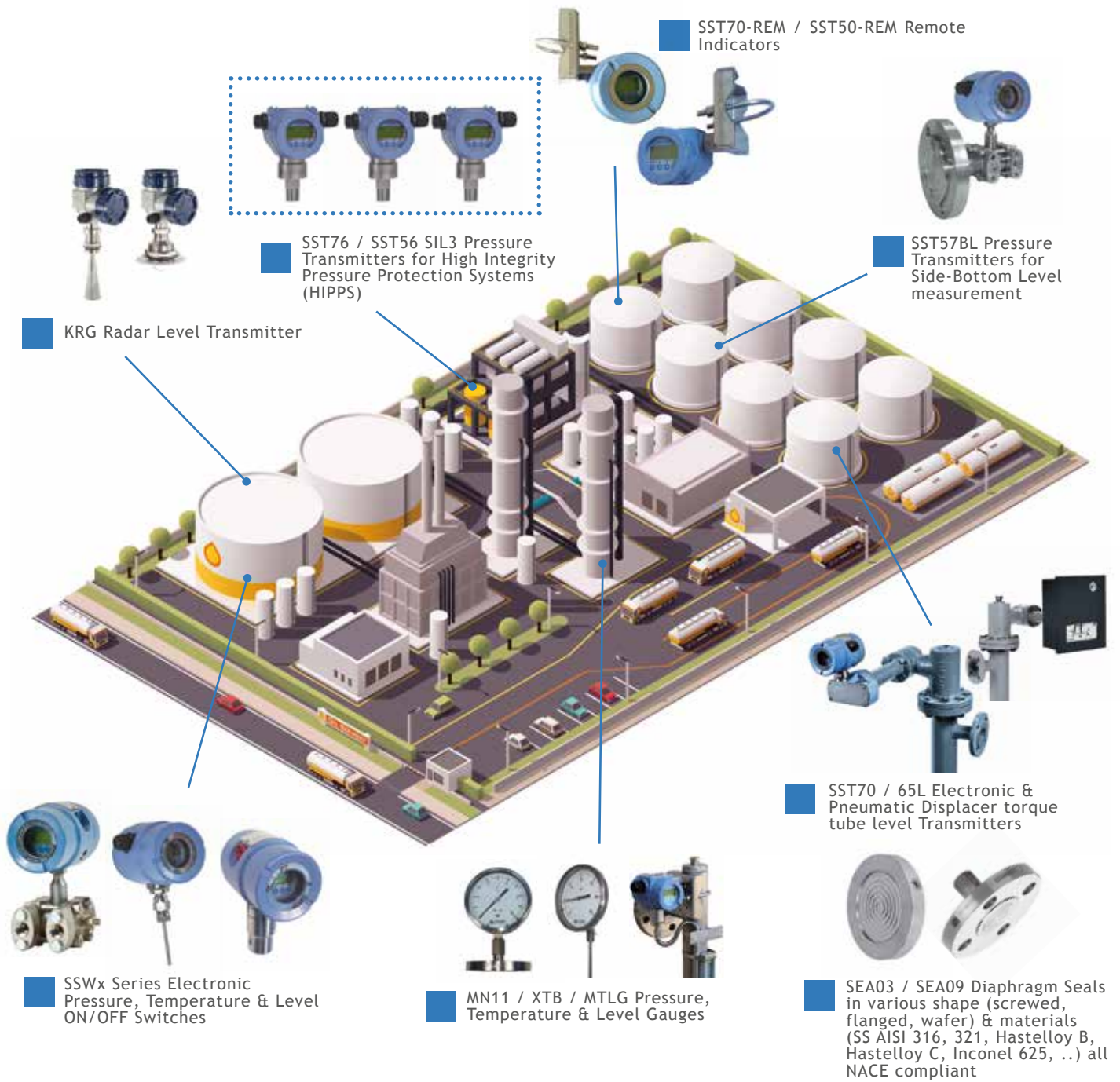
Since its birth during the first years of the 20th Century, Spriano® is leader in the measuring, indication, transmission and regulation of industrial processes. Considered as crucial instruments for the safety of the board during navigation, pressure & temperature gauges together with inclinometers designed by Spriano® were chosen by the engineers of the SSK S-506 Toti, the first submarine after the Second World War to be built in Italy. A masterpiece of innovation and technology that restarted the shipbuilding industry in the country (some items are still present at the permanent section of the National Museum of Science & Technology 'Leonardo da Vinci' in Milan). During the 80's, Spriano® completed its technological transfer from pneumatics

to electronics by developing a complete line of innovative instruments, the 2-wires system and microprocessor-based electronics with both transmission and control function, providing a complete process monitoring system to the end user. The high standards achieved with the instrumentation made possible the participation of Spriano® for different projects in more than 60 countries all over the world. The consolidated activity in Italy is integrated by a growing export activity in many foreign countries, managed by an internationally selected and well-trained Sales Network. Certifications and Type Approvals (ISO 9001, ATEX, PED, SIL, RINA, etc.) guarantee the products to be compliant with the up-to-date technical standards.

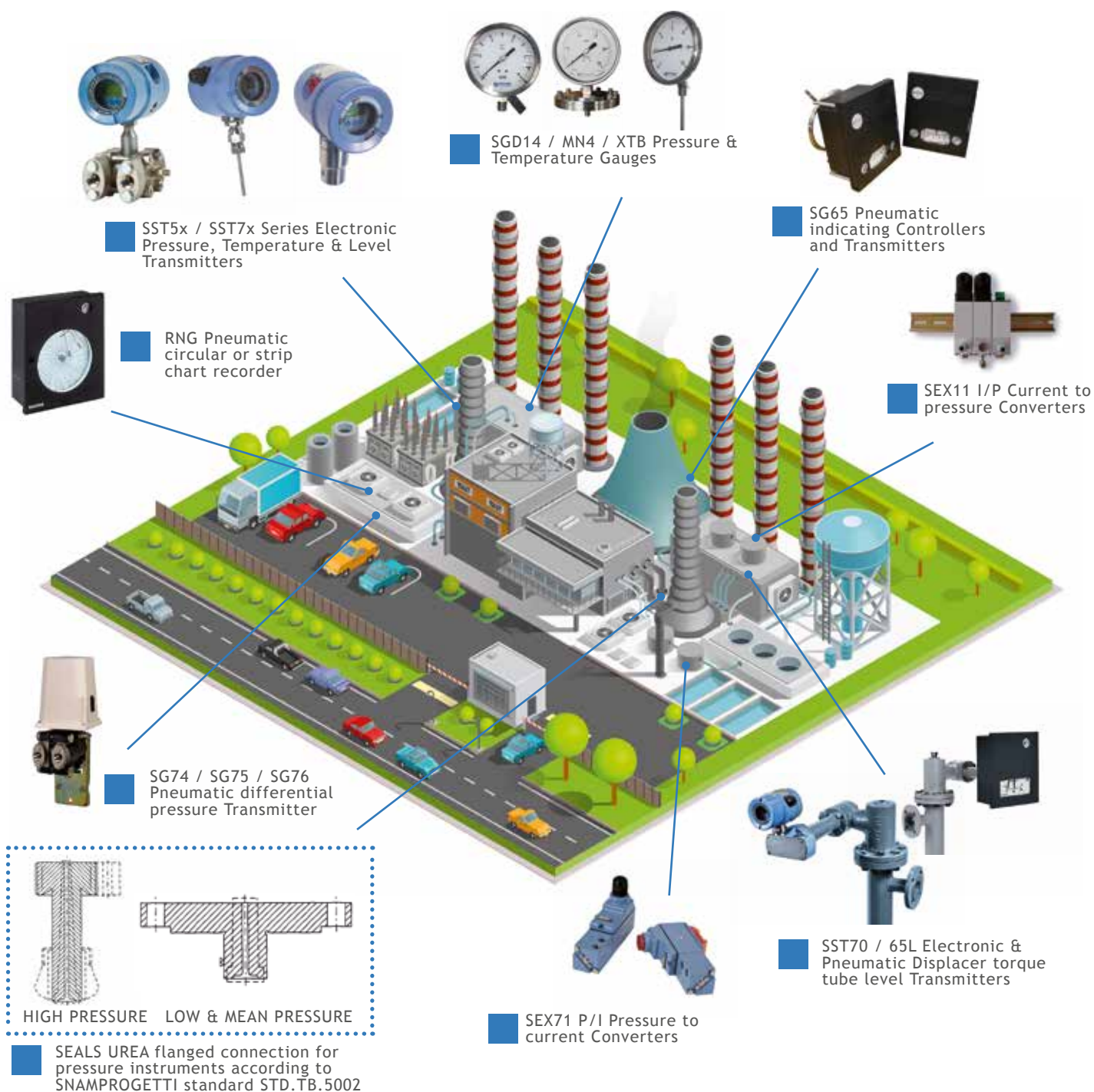
OIL & GAS ONSHORE & OFFSHORE



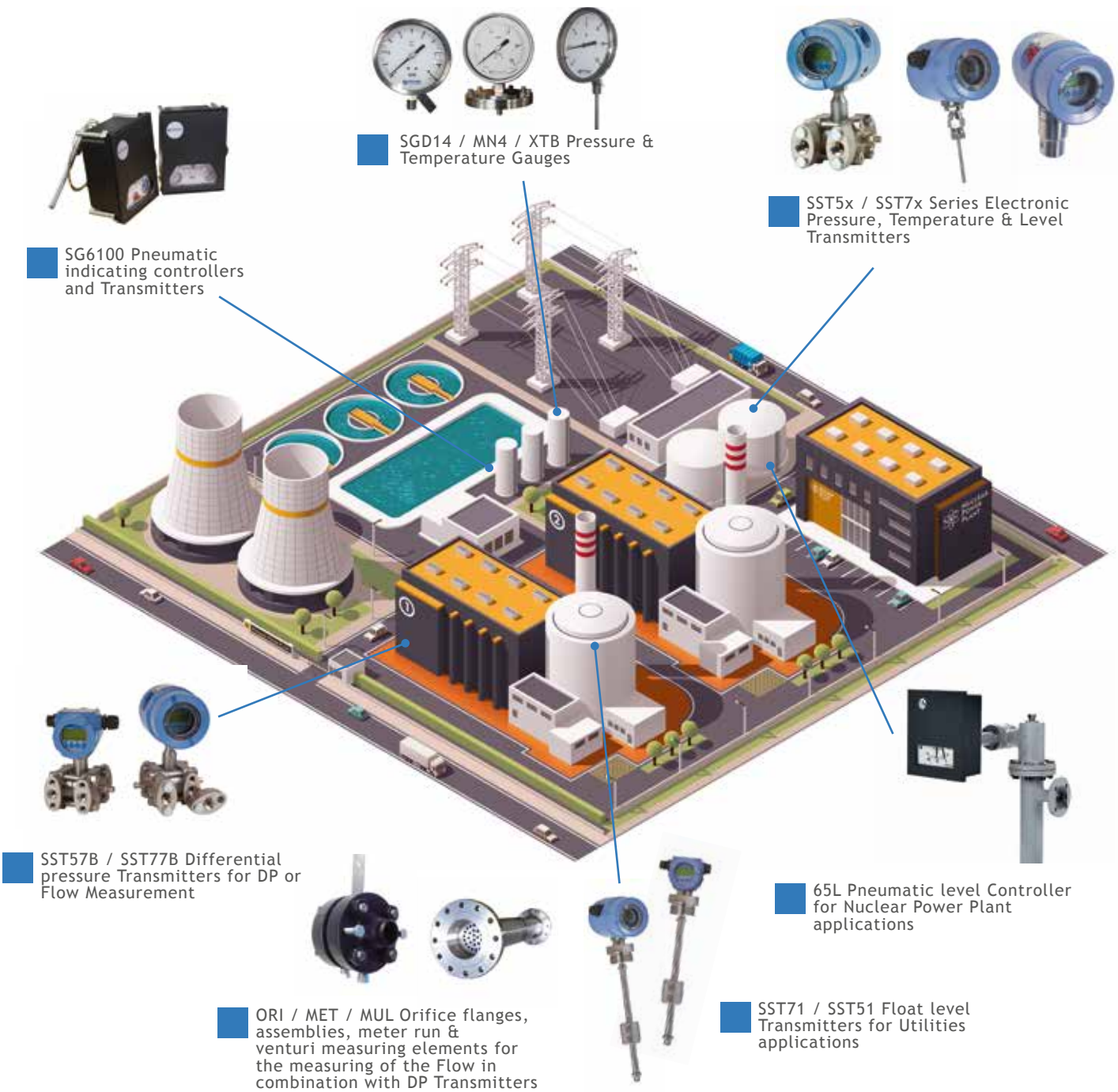
OIL & GAS REFINERY & PETROCHEMICAL PLANTS



AMMONIA, UREA & FERTILIZATION PLANTS



POWER PLANTS



Since 1923 we design & manufacture electronic & pneumatic instrumentation for process automation.

- PRESSURE, TEMPERATURE, LEVEL & FLOW TRANSMITTERS
- PRESSURE, TEMPERATURE & LEVEL SWITCHES
- PRESSURE, TEMPERATURE & LEVEL GAUGES
- FLOW ELEMENTS (ORIFICES ASSEMBLY, MULTISTAGE & MULTIHOLE ORIFICES, VENTURI PIPE & PITOT TUBES)

**ENJOY OUR RANGE
& ROLL WITH US!**

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SPRIANO[®]
TECHNOLOGIES



TRANSMITTERS

SST70 / SST50 Smart Torque Tube Level / Interface / Density Transmitter



The transmitter series SST70 (Ex-d) and SST50 (Ex-ia) measures liquid levels, density and interface levels in closed or open vessels. It converts buoyant force exerted by a displacer immersed in a liquid to a proportional current signal thanks to a mechanical forces transmission device based on a torque tube and a piezoresistive sensor. The Spriano measuring cell contains the sensor and transmits the pressure to the electronics. Thermal drift is compensated using the temperature signal generated by a PTC thermistor integrated in the sensor itself. Based on these readings the microprocessor generates the 4-20mA analog output "two wires system" and displays the pressure measurement on the LCD. Configurations and adjustments can be made remotely using HART® or FOUNDATION FIELDBUS® protocol compatible communicators.



Supply:	12.5 ÷ 30 Vdc
Output signal:	Analog 4 - 20mA , 2 wires / Digital using HART® or FIELDBUS® protocol
Measuring range:	From 0 ÷ 356mm (14") to 0 ÷ 3048mm (120")
Max load:	550 Ohm @ 24 Vdc
Total accuracy:	< ± 0.5% FS including hysteresis, non-linearity and repeatability (IEC 60770)
Response time (63% FS):	< 256 ms (Standard Hart®)
Zero thermal drift:	< ± 0.25%/10 °C
Span thermal drift:	< ± 0.25%/10 °C of Nominal Range
Damping:	0 ÷ 60 s (minimum response time 0.1 s)
Long term stability:	< ± 0.1 % FS/year
Process temperature:	-60 ÷ +150 °C (with finned arm / jacketing : -196 ÷ 400 °C)
Ambient / Storage temperature:	-40 ÷ +85 °C / -40 ÷ +90 °C
LCD display reading:	-10 ÷ +65 °C
Housing:	Die cast aluminum alloy EN AW-6082 finished with epoxy resin / SS AISI 316
Ingress protection degree:	IP66 suitable for tropical climate operation as defined by DIN 50015
Relative Humidity:	0 ÷ 100% R.H.
Process connections:	ANSI / API / DIN / JIS Flanged RF, FF, RTJ, Screwed, Socket Welded
Rating:	Up to PN 400 / ANSI 2500 / API 10000
Torque tube material:	SS AISI 316 + Hastelloy C 276, Full Hastelloy C 276, Inconel 600, Inconel 625
Body / Cage material:	Carbon Steel (WCC, WCB, LCB), Stainless Steel (SS AISI 304, 316, 321), Duplex & Super-duplex alloys, Hastelloy (B, C276), Inconel 625
Body / Cage painting:	Standard or on request for Offshore application according to MR
Allowable tests on materials:	3.1, Hydrotest, NACE, PWHT, HIC, SSC, PMI, NDTs, Stellite, Niploy coating

ACCESSORIES



SST70-REM / SST50-REM

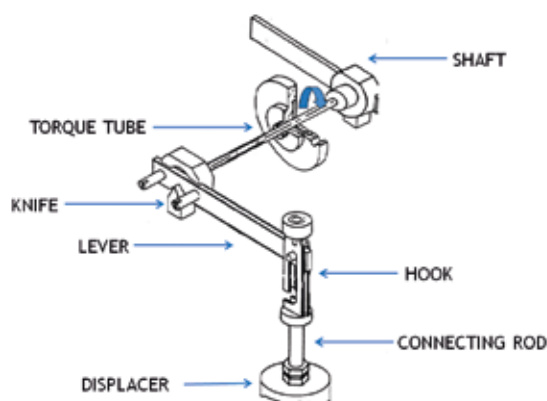


SUNS



PLUGS

TRANSMISSION OF PRINCIPLE



The operation of this element level meter is based on the hydrostatic thrust. A cylindrical body (incorrectly called float) immersed in the liquid under control, gets a boost upwards equal to the weight of the volume of liquid displaced (buoyancy). The variations of this thrust, the float being of cylindrical shape, are directly proportional to changes in the level or the specific weight. Even the apparent weight of the float (equal to its actual weight reduced by the buoyancy) varies with the level and can therefore be taken as a measure of the level itself. The apparent weight of the float can be measured by means of rotation of a tube to twist elastically urged by a lever, so that the elastic reaction of the tube balances the weight of the float. The system level meter is thus constituted, essentially, by a displacer, a lever, a torque tube and a shaft that transmits the rotation of the tube to a system of proximity of the piezoresistive sensor. Is thus obtained to transform the variations in level or of a specific weight in proportional rotation of a lever.

When the liquid level reaches the displacer, the latter in the absence of any buoyancy, rests with all its weight on the lever (torching so the most of the tube) and is disposed in the lowest position (minimum level).



When the level increases an increasing part of the float is immersed in the liquid, the buoyancy increases and decreases the apparent weight of the float, the float rests therefore with a weight less and less on the lever reduces the twist of the tube.



When the liquid level reaches the top of the float, the latter, being the hydrostatic pressure at its maximum value, will impinge with a minimum weight on the lever (that will twist to the minimum the tube) and it will have in the highest position (maximum level).

SPRIANO® Torque Tube Level Transmitters SST70 (Ex-d) and SST50 (Ex-i) Series are based on the measurement of the hydrostatic thrust exerted by the process fluid on a displacer of known size and weight. The transmitter is factory calibrated and reports on the plate all calibration data. Unless otherwise specified in the order is delivered with the following configuration:

- Lower liquid density (or 'Upper Range Value' URV of span): 1,42 kg/l
- Higher liquid density (or 'Lower Range Value' LRV of span): 0 kg/l
- Minimum Span: 0.1 kg/l for Electronic Type, 0.5 kg/l for Pneumatic Type
- Measuring Unit: %, mm, in

	DISPLACER LEVEL TRANSMITTER	SENSOR POSITION	MATERIAL OF SENSOR	INFLUENCE OF VAPOR / HARSH ENVIRONMENT	INFLUENCE OF SLOSHING EFFECT	RATING AND TYPE OF MOUNTING
SPRIANO® TORQUE TUBE TYPE		Completely isolated from process, that is guarantee of maximum accuracy and reliability	Torque tube is fully compatible with all fluids as it can be made in: - SS AISI 316 + Hastelloy C - Full Hastelloy C - Full Inconel 600	None	None	Up to a process rating of ANSI 2500 in all versions: side-side, top-side, bottom-side, top-bottom.
GENERIC SPRING TYPE (LVDT)		Within the process fluid and vapors	Compatibility is limited as the ferromagnetic core and the Non-magnetic push rod must be compatible with both fluid and vapors, and this not always is possible.	The type of vapor influences the coefficient of coupling between the core and transformer, so no standardization of parts is possible	The antagonistic spring that adapts the float to the LVDT is not an axial guide of the core, this is why the measurement liquid is to be dynamically stable.	Process rating is limited to the type of construction: side-side, and side-bottom. Top-side and Top-bottom executions cannot be performed

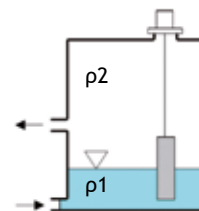
TYPE OF MEASURE

Depending on the configurations set by the customer, it is possible to perform three types of measurement:

LEVEL MEASUREMENT

It is measured by the position of the process level referred to the mounted displacer. To obtain the measurement of the liquid level in the tank, the density of the process liquid ρ_1 must be set in the URV, while the LRV shall be set at the value of the vapors ρ_2 , usually close to zero. The PV will be the measure of the level reached by the liquid on the displacer in % of displacer length or in IU indicating the measurement achieved on the displacer (mm, cm, m, inch, feet).

Note: the displacer does NOT need to be fully submerged by fluid



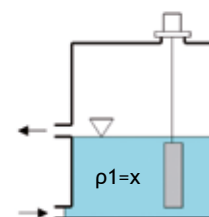
DENSITY MEASUREMENT

It is measured by the density of the liquid contained in the tank.

The LRV value is the minimum density of the process fluid, and the URV is the maximum density of the process fluid to be set.

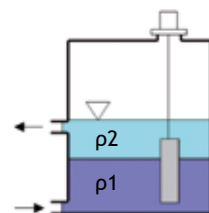
The PV will be a percentage of the density of the process fluid with respect to the span (URV - LRV) or the measurement of the density in kg/l.

Note: the displacer ALWAYS needs to be fully submerged by fluid



INTERFACE MEASUREMENT

It is measured by the position of the interface level between two immiscible liquids referred to the mounted displacer. To measure the position of interface between two immiscible liquids, the density of the LRV (ρ_2 , lighter liquid) and URV (ρ_1 , heavier liquid) must be set. The PV will be the measure of the level reached by the liquid on the displacer in % of displacer length indicating the measurement achieved on the displacer (mm, cm, m, inch, feet).



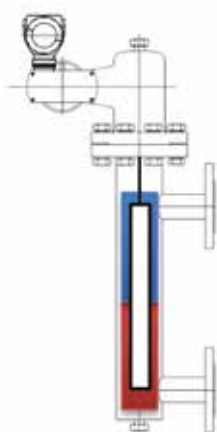
The difference of density must follow the following formula:

$$\Delta\rho = \rho_1 - \rho_2 \approx 0.1 \div 1.42 \text{ Kg/l, where always } \rho_1 > \rho_2.$$

Note: the displacer ALWAYS needs to be fully submerged by fluid

Specific gravity of the Heavier fluid = ρ_1
Specific gravity of the Lighter fluid = ρ_2

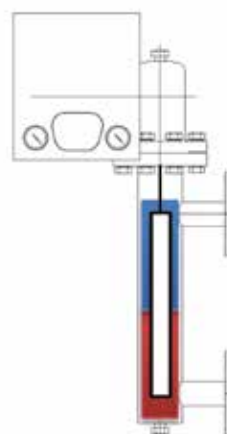
Limitations between Electronic and Pneumatic instruments when they are used as INTERFACE measurements.



Electronic Level Controller
SPRIANO® SST50/SST70 instrument

The difference of density must follow the following formula:

$$\Delta\rho = \rho_1 - \rho_2 \approx 0.1 \div 1.42 \text{ Kg/l}$$



Pneumatic Level Controller
SPRIANO® 65L instrument

The difference of density must follow the following formula:

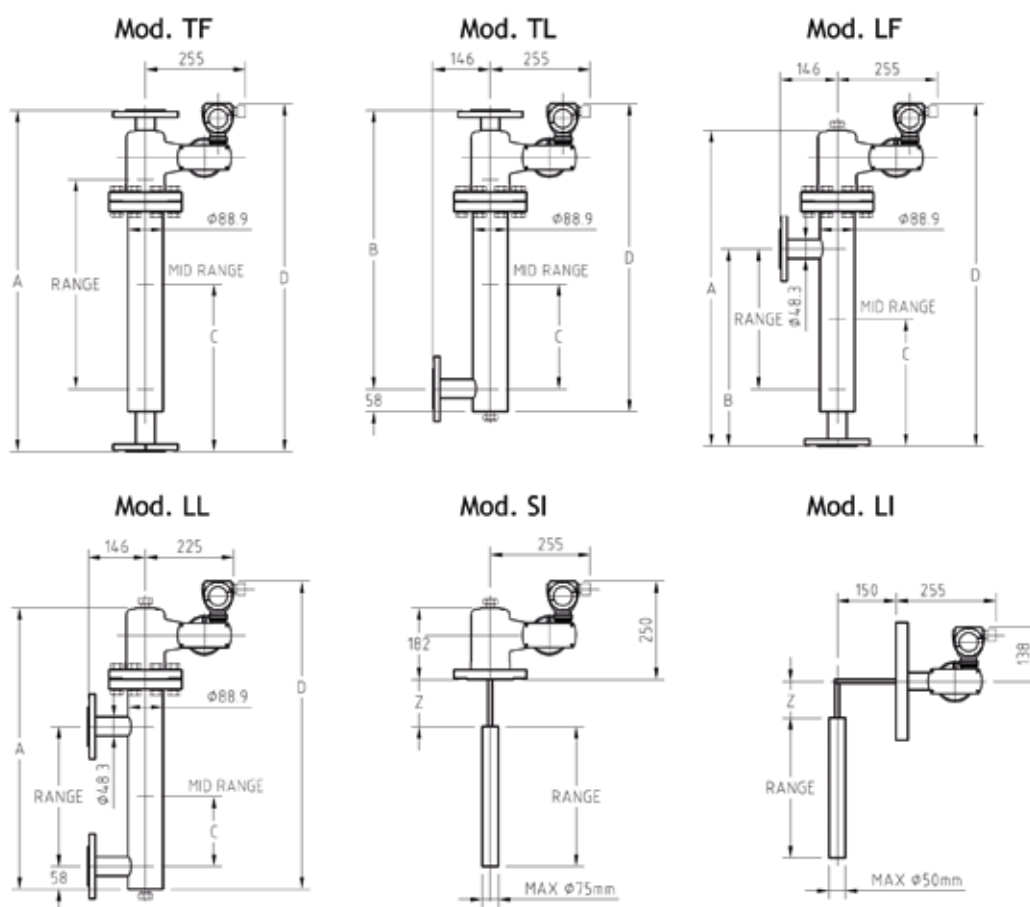
$$\Delta\rho = \rho_1 - \rho_2 \approx 0.5 \div 1.4 \text{ Kg/l}$$

IMPORTANT HINT!

The acceptable difference ($\Delta\rho = \rho_1 - \rho_2$) between these two densities is different depending if we use an electronic instrument (SST50/SST70) or a pneumatic one (65L).

The pneumatic technique has less accuracy and resolution on the mechanical movement, hence it is more limited on the lower $\Delta\rho$ s. If low $\Delta\rho$ s with pneumatic output still are in need to be measured, the electronic solution should be adapted, eventually re-converting again the electronic output in pneumatic output with an I/P Converter.

DIMENSIONAL DRAWINGS



REFERENCE TABLE

	RANGE [mm] / [in]	356 14	610 24	813 32	1219 48	1524 60	1829 72	2134 84	2438 96	3048 120
TF	A	651	905	1108	48	1524	2124	2429	2733	3343
	C	298	552	527	60	1829	1035	1187	1339	1644
	D	701	955	1158	72	2134	2174	2479	2763	3393
	WEIGHT [Kg]	33	35	37	84	2438	47	50	53	59
TL	A	601	855	1058	96	3048	2074	2379	2683	3293
	B	543	797	1000	120	1711	2016	2321	2625	3235
	C	178	305	407	610	762	915	1067	1219	1524
	D	651	905	1108	1514	1819	2124	2429	2733	3343
	WEIGHT [Kg]	33	35	37	41	44	47	50	53	59
LF	A	766	1020	1223	1629	1934	2239	2544	2848	3458
	B	465	719	922	1328	1633	1938	2243	2547	3157
	C	287	679	515	718	871	1023	1176	1328	1633
	D	866	1120	1323	1729	2034	2339	2644	2948	3558
	WEIGHT [Kg]	35	37	39	43	46	49	52	55	61
LL	A	716	970	1173	1579	1884	2189	2494	2798	3408
	C	178	305	407	610	762	915	1067	1219	1524
	D	816	1070	1273	1679	1984	2289	2594	2898	3508
	WEIGHT [Kg]	35	37	39	43	46	49	52	55	61
MAX DISPLACER DIAMETER		63.5	54	43	35	31.8	28.6	26.9	25	22
SI	WEIGHT [Kg]	25								
LI	WEIGHT [Kg]	22								

SST76 / SST56 Smart pressure transmitter



SST76 / SST56 series SMART pressure transmitters can be remotely configured by a universal hand held terminal (HHT) or by a PC with a dedicated interface. Moreover, it is possible to locally configure the instruments (zero and span) by means of 4 push buttons and to display the data on the wide LCD display. These transmitters, complete with diaphragm in AISI 316, measure relative pressure with spans from 0,02 to 401bar. The pressure measuring element is a piezoresistive sensor. It is possible to choose a variety of sensors to satisfy all process conditions. The Spriano® measuring cell contains the sensor and transmits pressure to the electronics. Based on these readings the microprocessor generates the 4-20mA analog output “two wires system” and displays the pressure measurement on the LCD. Configurations and adjustments can be made remotely using HART® or FOUNDATION FIELDBUS® protocol compatible communicators.



Supply:	12.5 ÷ 30 Vdc
Output signal:	Analog 4 - 20mA , 2 wires / Digital using HART® or FIELDBUS® protocol
Measuring range:	From 0 ÷ 0,35 bar to 0 ÷ 1000 bar
Max load:	550 Ohm @ 24 Vdc
Total accuracy:	<0.07% FS (0 ÷ 80°C), <0.2% FS (0 ÷ -40°C) including hysteresis, non-linearity and repeatability (IEC 60770)
Response time (63% FS):	< 256 ms (Standard Hart®)
Zero thermal drift:	< ± 0,1%/10°C
Span thermal drift:	< ± 0,1%/10°C of Nominal Range
Damping:	0 ÷ 60 s (minimum response time 0.1 s)
Long term stability:	< ± 0.1 % FS/year
Process temperature:	-40 ÷ +85°C (with finned arm: up to 130°C; with syphon: up to 235°C; with capillary: up to 283°C)
Ambient / Storage temperature:	-40 ÷ +85°C / -40 ÷ +90°C
LCD display reading:	-10 ÷ +65°C
Housing:	Die cast aluminum alloy EN AW-6082 finished with epoxy resin / SS AISI 316
Ingress protection degree:	IP66 suitable for tropical climate operation as defined by DIN 50015
Relative Humidity:	0 ÷ 100% R.H.
Process connections:	ANSI / API / DIN / JIS Flanged RF, FF, RTJ, Screwed
Nameplate:	Stainless Steel, fixed on housing
Self test:	In case of malfunction the output is forced to fail-safe state 3.85 mA / 21 mA

MEASURING RANGE & SPAN LIMITS

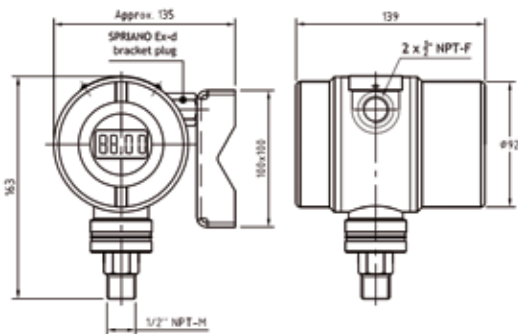
Transmitter Type	Nominal Range [bar]	Span Limits MIN/MAX [bar]	Range Limits MIN/MAX [bar]	Overpressure MAX [bar]
SST56 / SST76	0/0,35	0,023/0,7	-0,35/0,35	10
SST56 / SST76	0/1	0,067/2	-1/1	20
SST56 / SST76	0/2,5	0,117/3,5	-1/2,5	40
SST56 / SST76	0/5	0,2/6	-1/5	50
SST56 / SST76	0/10	0,367/11	-1/10	60
SST56 / SST76	0/30	1,033/31	-1/30	150
SST56 / SST76	0/100	3,37/101	-1/100	200
SST56 / SST76	0/200	6,7/201	-1/200	600
SST56 / SST76	0/400	13,4/401	-1/400	800
SST56	0/1000	33/1001	-1/1000	1500

LCD INTERFACE WITH CONFIGURATION MENU

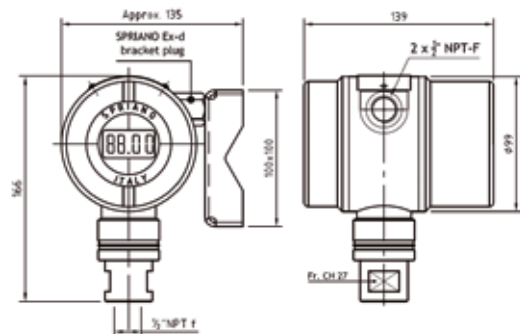
- Menu security with password
- Direct communication between HART® commands and display functions
- Immediate visualization for temperature of instrument and sensor (optional)
- Bar graph with full scale indication



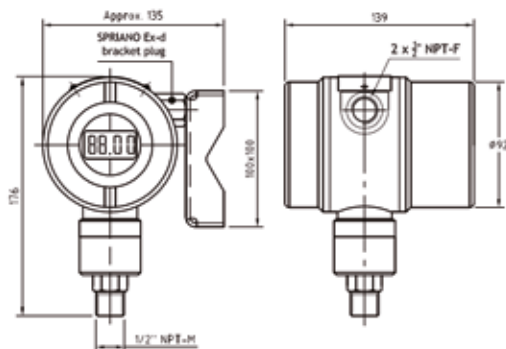
DIMENSIONAL DRAWINGS



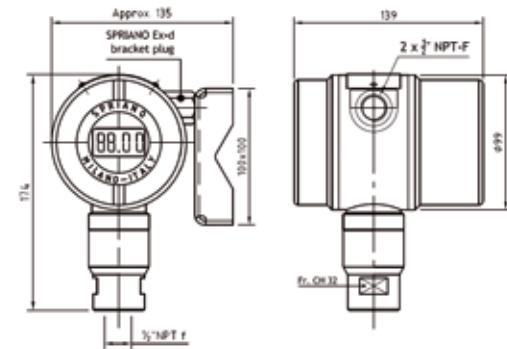
SST76 1/2" NPT-M screwed for Ps up to 30 bar



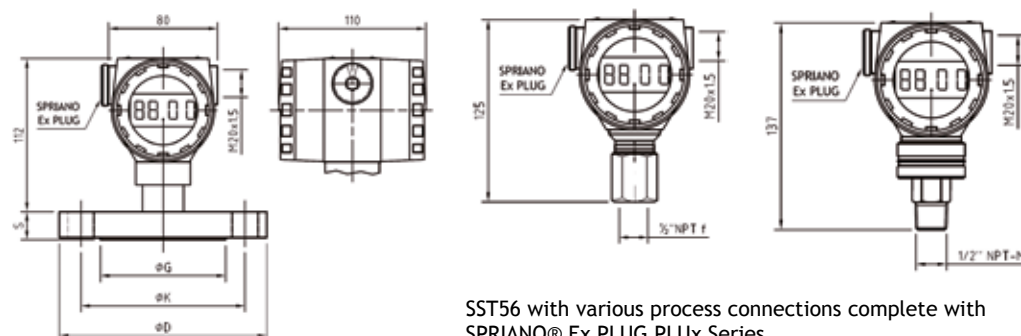
SST76 1/2" NPT-F screwed for Ps up to 30 bar



SST76 1/2" NPT-M screwed for Ps up to 400 bar



SST76 1/2" NPT-F screwed for Ps up to 400 bar



SST56 with various process connections complete with SPRIANO® Ex PLUG PLUX Series

SST77B / SST57B Smart differential pressure transmitter



SST77B / SST57B series SMART differential pressure transmitters are microprocessor-based instruments that combine the analog signal advantages (4-20mA) together with the flexibility of digital communication using HART® or FOUNDATION FIELDBUS® protocol.

The SST77B transmitters measure differential pressure with spans from 1,2 to 20.000 mbar with a static pressure up to 200 bar (400 bar as option). The pressure measuring element is a piezoresistive sensor and it is possible to choose a variety of sensors to satisfy all process conditions.

The Spriano® measuring cell contains the sensor and transmits pressure to the electronics. Thermal drift is compensated using the temperature signal generated by a PTC thermistor integrated in the sensor itself. Based on these readings the microprocessor generates the 4-20 mA analog output two wires system and displays the pressure measurement on the LCD.



Supply:	12.5 ÷ 30 Vdc
Output signal:	Analog 4 - 20mA , 2 wires / Digital using HART® or FIELDBUS® protocol
Measuring range:	From 0 ÷ 18 mbar to 0 ÷ 10 bar
Max load:	550 Ohm @ 24 Vdc
Total accuracy:	< ± 0.1% FS including hysteresis, non-linearity and repeatability (IEC 60770)
Max static pressure (18-50 mbar):	50 bar on either side
Max static pressure (350-10000 mbar):	100 bar on either side
Response time (63% FS):	< 256 ms (Standard Hart®)
Zero thermal drift:	< ± 0,1%/10° C
Span thermal drift:	< ± 0,1%/10° C of Nominal Range
Damping:	0 ÷ 60 s (minimum response time 0.1 s)
Long term stability:	< ± 0.1 % FS/year
Process temperature:	-40 ÷ +85 °C (with capillary: up to 283 °C)
Ambient / Storage temperature:	-40 ÷ +85 °C / -40 ÷ +90 °C
LCD display reading:	-10 ÷ +65 °C
Housing:	Die cast aluminum alloy EN AW-6082 finished with epoxy resin / SS AISI 316
Ingress protection degree:	IP66 suitable for tropical climate operation as defined by DIN 50015
Relative Humidity:	0 ÷ 100% R.H.
Process connections:	2 x 1/4" NPT-F (Standard) or 2 x 1/2" NPT-F
Nameplate:	Stainless Steel, fixed on housing
Self test:	In case of malfunction the output is forced to fail-safe state 3.85 mA / 21 mA

MEASURING RANGE & SPAN LIMITS

Transmitter Type	Nominal Range [mbar]	Span Limits MIN/MAX [mbar]	Range Limits MIN/MAX [mbar]
SST57B / SST77B	0/18	1,2/36	-18/+18
SST57B / SST77B	0/50	3,3/100	-50/+50
SST57B / SST77B	0/350	23/700	-350/+350
SST57B / SST77B	0/1000	67/2000	-1000/+1000
SST57B / SST77B	0/2500	167/5000	-2500/+2500
SST57B / SST77B	0/5000	333/10000	-5000/+5000
SST57B / SST77B	0/10000	667/20000	-10000/+10000

TYPE OF MEASURE

Depending on the configurations set by the customer, it is possible to perform three types of measurement:

DIFFERENTIAL PRESSURE MEASUREMENT

The simplest function of SSTx7B transmitters is to measure differential pressure up to 10000 mbar introduced by a Venturi, an Orifice plate or simply by a water column into a tank.

SSTx7B series can withstand up to 200 bar static line pressure (optional up to 400 bar).

LEVEL MEASUREMENT IN PRESSURIZED TANKS

It is possible to measure the liquid column into pressurized tanks by using flanged diaphragm seals with capillaries.

The “+” side must be connected at the bottom of tank and the “-” side at the TOP part of it.

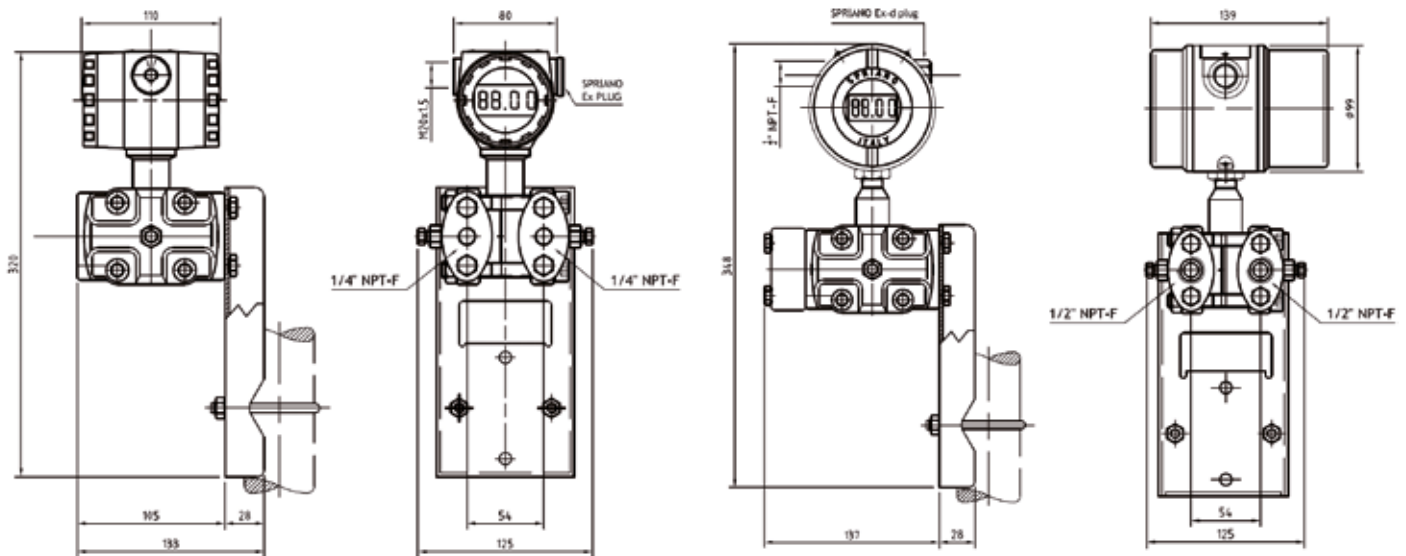
By using Stevino's Law $P = \rho gh$ it is possible for SSTx7B transmitters to get the level of the tank whatever is the pressure inside of it.

FLOW MEASUREMENT WITH AUXILIARY MEASURING ELEMENTS

By measuring differential pressure loss introduced by a Venturi or an Orifice plate, SSTx7B series can calculate the Volumetric flow in m^3/h .

The only datas required by the transmitter in order to perform the calculation are the maximum ΔP and the maximum volumetric flowrate associated to it.

DIMENSIONAL DRAWINGS



SST57B 1/4" NPT-F screwed process connections complete with 2" mounting bracket and SPRIANO® Ex-d PLUG.

SST77B 1/2" NPT-F screwed process connections complete with 2" mounting bracket and SPRIANO® Ex-d PLUG.

SST77BL / SST57BL Smart DP level transmitter



SST77BL / SST57BL series SMART DP level transmitters are microprocessor-based instruments that combine the analog signal advantages (4-20mA) together with the flexibility of digital communication using HART® or FOUNDATION FIELDBUS® protocol.

The SST77BL transmitters measure a liquid level head with spans from 1.2 to 10.000 mbar also with a static pressure. The pressure measuring element is a piezoresistive sensor. It is possible to choose a variety of sensors to satisfy all process conditions.

The Spriano® measuring cell contains the sensor and transmits pressure to the electronics. Thermal drift is compensated using the temperature signal generated by a PTC thermistor integrated in the sensor itself. Based on these readings the microprocessor generates the 4-20 mA analog output two wires system and displays the pressure measurement on the LCD.

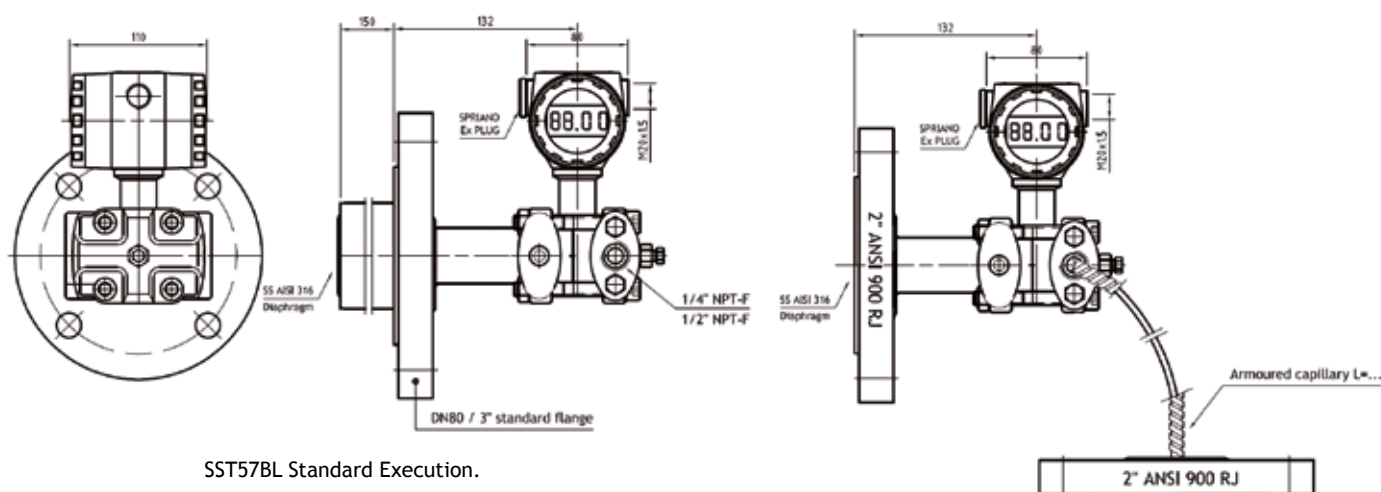


Supply:	12.5 ÷ 30 Vdc
Output signal:	Analog 4 - 20mA , 2 wires / Digital using HART® or FIELDBUS® protocol
Measuring range:	From 0 ÷ 18 mbar to 0 ÷ 10 bar
Max load:	550 Ohm @ 24 Vdc
Total accuracy:	< ± 0.1% FS including hysteresis, non-linearity and repeatability (IEC 60770)
Max static pressure (18-50 mbar):	50 bar on either side
Max static pressure (350-10000 mbar):	100 bar on either side
Response time (63% FS):	< 256 ms (Standard Hart®)
Zero thermal drift:	< ± 0,1%/10° C
Span thermal drift:	< ± 0,1%/10° C of Nominal Range
Damping:	0 ÷ 60 s (minimum response time 0.1 s)
Long term stability:	< ± 0.1 % FS/year
Process temperature:	-40 ÷ +85 °C (with capillary: up to 283 °C)
Ambient / Storage temperature:	-40 ÷ +85 °C / -40 ÷ +90 °C
LCD display reading:	-10 ÷ +65 °C
Housing:	Die cast aluminum alloy EN AW-6082 finished with epoxy resin / SS AISI 316
Ingress protection degree:	IP66 suitable for tropical climate operation as defined by DIN 50015
Relative Humidity:	0 ÷ 100% R.H.
Process connections:	ANSI / API / DIN / JIS Flanged RF, FF, RTJ starting from 2"
Nameplate:	Stainless Steel, fixed on housing
Self test:	In case of malfunction the output is forced to fail-safe state 3.85 mA / 21 mA

MEASURING RANGE & SPAN LIMITS

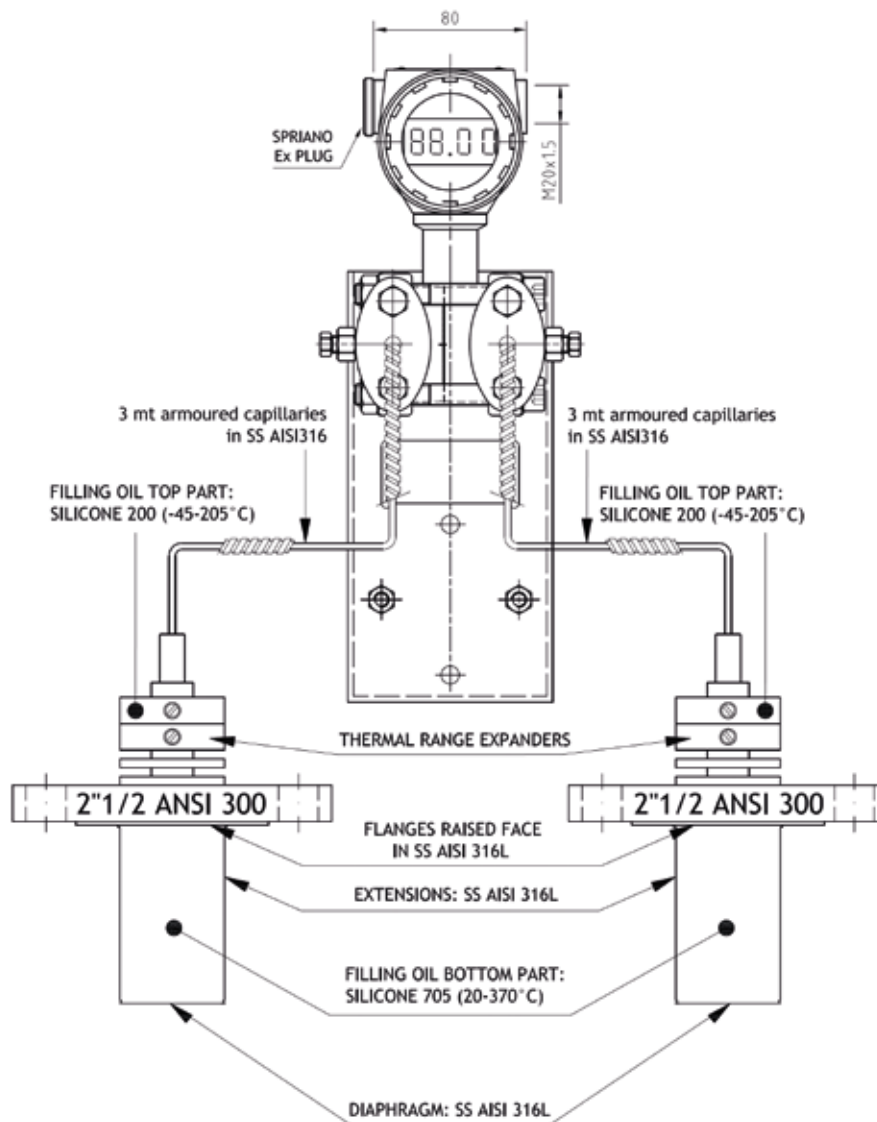
Transmitter Type	Nominal Range [mbar]	Span Limits MIN/MAX [mbar]	Range Limits MIN/MAX [mbar]
SST57B / SST77B	0/18	1,2/36	-18/+18
SST57B / SST77B	0/50	3,3/100	-50/+50
SST57B / SST77B	0/350	23/700	-350/+350
SST57B / SST77B	0/1000	67/2000	-1000/+1000
SST57B / SST77B	0/2500	167/5000	-2500/+2500
SST57B / SST77B	0/5000	333/10000	-5000/+5000

DIMENSIONAL DRAWINGS



SST57BL Standard Execution.

SST57BL with RTJ flanges and armored capillary on “-” side



SST57B with thermal expanders to be used for Ts up to 370°C.

SST72 / SST52 Smart temperature transmitter



SST72 / SST52 series SMART temperature transmitters are microprocessor-based instruments that combine the analog signal advantages (4-20mA) together with the flexibility of digital communication using HART® or FOUNDATION FIELDBUS® protocol.

These transmitters are able to accept 3 wires Pt 100 ohm resistance thermometers and total accuracy is depending on class of the sensors utilized such as DIN A, DIN B, 1/3 DIN, 1/5 DIN, 1/10 DIN etc.

Based on these readings the microprocessor generates the 4-20 mA analog output “two wires system” and displays the temperature measurement on the LCD.



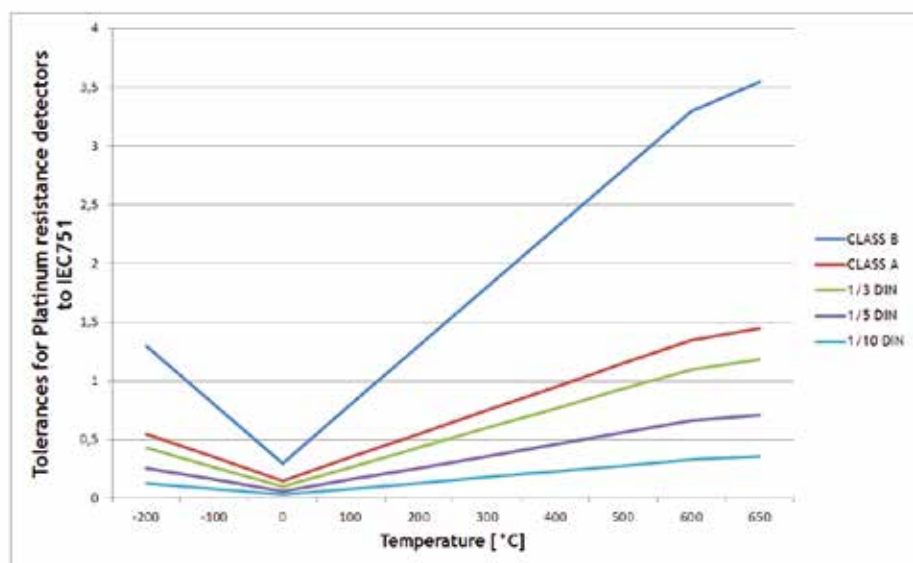
Supply:	12.5 ÷ 30 Vdc
Output signal:	Analog 4 - 20mA , 2 wires / Digital using HART® or FIELDBUS® protocol
Measuring range:	Nipple-Union-Nipple: Tmax = 150 °C, Remote: Tmax = 350 °C or 500 °C (*)
Max load:	550 Ohm @ 24 Vdc
Total accuracy:	εDGT + εPT100 including hysteresis, non-linearity and repeatability (IEC 60770)
Digital accuracy (εDGT):	< ± 0.1% FS / 100 °C
Thermoelement accuracy (εPT100):	see below table “Tolerance classes for PT100 thermocouples (IEC751)
Response time (63% FS):	< 256 ms (Standard Hart®)
Zero thermal drift:	< ± 0,1%/10 °C
Span thermal drift:	< ± 0,1%/10 °C of Nominal Range
Damping:	0 ÷ 60 s (minimum response time 0.1 s)
Long term stability:	< ± 0.1 % FS/year
Process temperature:	-40 ÷ +85 °C (remote: up to 350 °C; remote and thermowell: up to 500 °C)
Ambient / Storage temperature:	-40 ÷ +85 °C / -40 ÷ +90 °C
LCD display reading:	-10 ÷ +65 °C
Housing:	Die cast aluminum alloy EN AW-6082 finished with epoxy resin / SS AISI 316
Ingress protection degree:	IP66 suitable for tropical climate operation as defined by DIN 50015
Relative Humidity:	0 ÷ 100% R.H.
Process connections:	ANSI / API / DIN / JIS Flanged RF, FF, RTJ, Screwed (through thermowell)
Nameplate:	Stainless Steel, fixed on housing
Self test:	In case of malfunction the output is forced to fail-safe state 3.85 mA / 21 mA

(*)Tmax = 350 °C is about the installation without thermowell, Tmax = 500 °C is complete with thermowell.

TOLERANCE CLASSES FOR PT100 THERMOCOUPLES (IEC751)

TEMPERATURE [°C]	CLASS B [± °C]	CLASS A [± °C]	1/3 DIN [± °C]	1/5 DIN [± °C]	1/10 DIN [± °C]
-200	1.3	0.55	0.44	0.26	0.13
-100	0.8	0.35	0.27	0.16	0.08
0	0.3	0.15	0.1	0.06	0.03
100	0.8	0.35	0.27	0.16	0.08
200	1.3	0.55	0.44	0.26	0.13
300	1.8	0.75	0.6	0.36	0.18
400	2.3	0.95	0.77	0.46	0.23
500	2.8	1.15	0.94	0.56	0.28
600	3.3	1.35	1.1	0.66	0.33
650	3.6	1.45	1.2	0.72	0.36

TOTAL ACCURACY

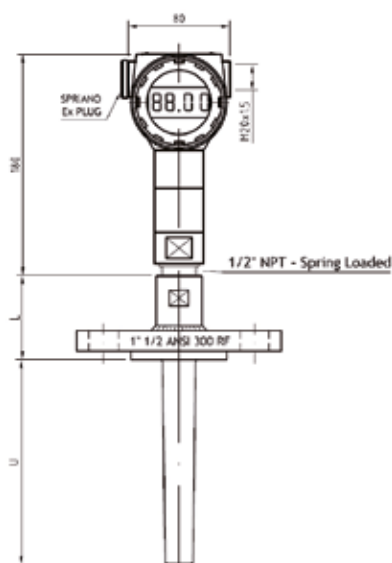


Total instrument accuracy ϵ_{TOT} is given by the formula

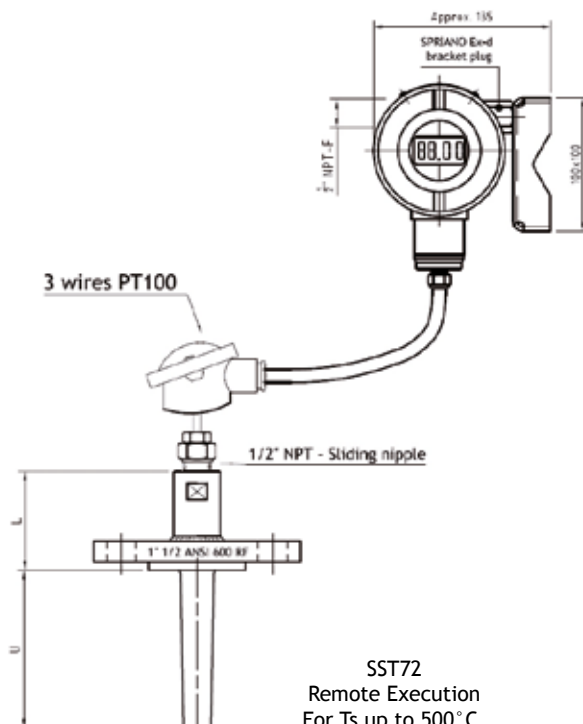
$$\epsilon_{TOT} = \epsilon_{PT100} + \epsilon_{DGT} [\pm ^\circ \text{C}]$$

where ϵ_{PT100} is the thermoelement accuracy (see tab. 1) and ϵ_{DGT} is the digital accuracy (see performances)

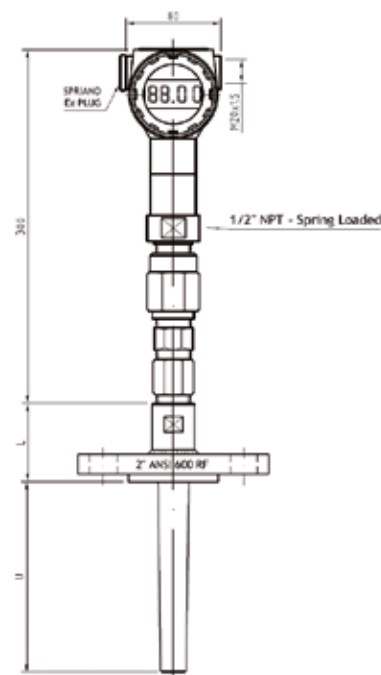
DIMENSIONAL DRAWINGS



SST52
Standard Execution.



SST72
Remote Execution
For Ts up to 500°C.



SST52
Nipple Union Nipple
For Ts up to 150°C.

SST71 / SST51 Smart float level transmitter



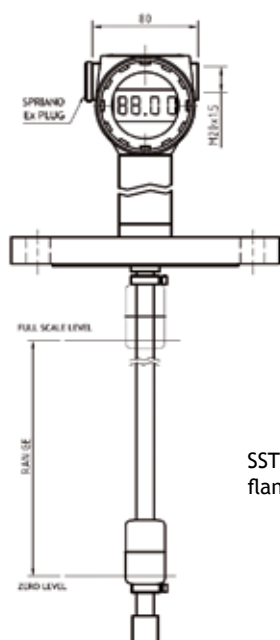
SST71 / SST51 series SMART float level transmitters are microprocessor-based instruments that combine the analog signal advantages (4-20mA) together with the flexibility of digital communication using HART® or FOUNDATION FIELDBUS® protocol.

Inside the float is placed a magnet which drives, without contact, reed contacts located inside a pipe that can itself be the guide of the float. Moving along its guide pipe, the float changes the reed contact status. Based on these readings the microprocessor generates the 4-20 mA analog output “two wires system” and displays the temperature measurement on the LCD.

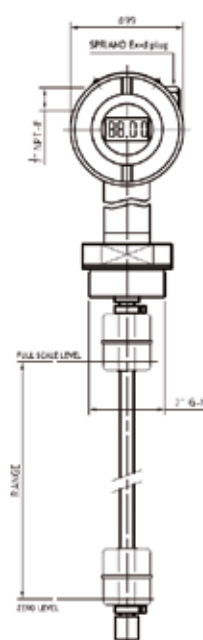


Supply:	12.5 ÷ 30 Vdc
Output signal:	Analog 4 - 20mA , 2 wires / Digital using HART® or FIELDBUS® protocol
Measuring range:	From 0 ÷ 500 mm to 0 ÷ 6 m
Max load:	550 Ohm @ 24 Vdc
Total accuracy:	< ± 5 mm including hysteresis, non-linearity and repeatability (IEC 60770)
Response time (63% FS):	< 256 ms (Standard Hart®)
Zero thermal drift:	< ± 0,1%/10° C
Span thermal drift:	< ± 0,1%/10° C of Nominal Range
Damping:	0 ÷ 60 s (minimum response time 0.1 s)
Long term stability:	< ± 0.1 % FS/year
Process temperature:	-40 ÷ +85° C (with HT reed switches: up to 130° C)
Ambient / Storage temperature:	-40 ÷ +85° C / -40 ÷ +90° C
LCD display reading:	-10 ÷ +65° C
Housing:	Die cast aluminum alloy EN AW-6082 finished with epoxy resin / SS AISI 316
Ingress protection degree:	IP66 suitable for tropical climate operation as defined by DIN 50015
Relative Humidity:	0 ÷ 100% R.H.
Process connections:	ANSI / API / DIN / JIS Flanged RF, FF, RTJ or Screwed starting from 1”1/2
Nameplate:	Stainless Steel, fixed on housing
Float material:	SS AISI 316, Neoprene, Spansil

DIMENSIONAL DRAWINGS



SST51 with standard flanged connection.



SST71 with 2" G-M screwed connection.

SST70-REM / SST50-REM 4-20mA Loop powered field digital indicators



The 4-20mA loop powered field digital indicators are microprocessor based instruments. The SST50-REM / SST70-REM series includes 4-20mA loop powered field digital indicators for ATEX or non ATEX applications. They can be remotely configured by a universal hand held terminal (HHT) or by PC with a dedicated interface. Moreover, it is possible to configure locally the instruments (zero and span) by means of push buttons and to display the data on the wide LCD display. Every measured variable can be represented (level, ullage, volume, pressure, flow, temperature, density, etc. and user-defined units inserted by display).

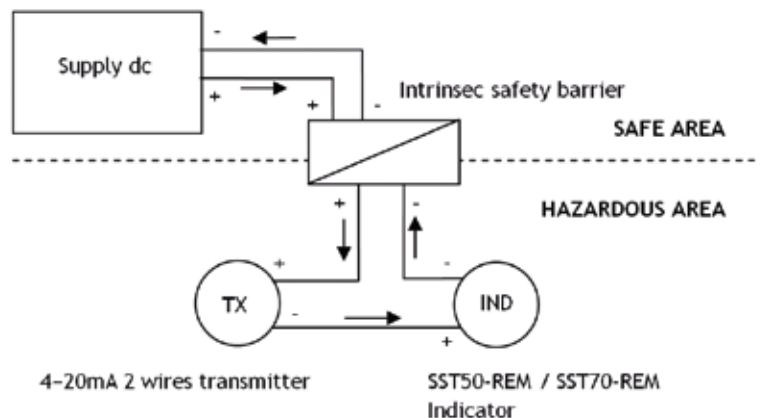


Supply:	From 2 wires 4 - 20mA loop, series connection
Input signal:	Analog 4 - 20mA, 2 wires
Measuring range:	4 - 20mA
Voltage drop:	5.5V@4mA (max 6.9V@20mA)
Output resolution:	< ± 0,01% nominal range (at 20°C)
Display resolution:	0.1 digit
Ambient / Storage temperature:	-40 ÷ +85°C / -40 ÷ +90°C
LCD display reading:	-10 ÷ +65°C
Housing:	Die cast aluminum alloy EN AW-6082 finished with epoxy resin / SS AISI 316
Ingress protection degree:	IP66 suitable for tropical climate operation as defined by DIN 50015
Electrical connections:	2 cable entries 1/2" NPT-F or M20x1.5
Relative Humidity:	0 ÷ 100% R.H.
Nameplate:	Stainless Steel, fixed on housing
Self test:	In case of malfunction the output is forced to fail-safe state 3.85 mA / 21 mA

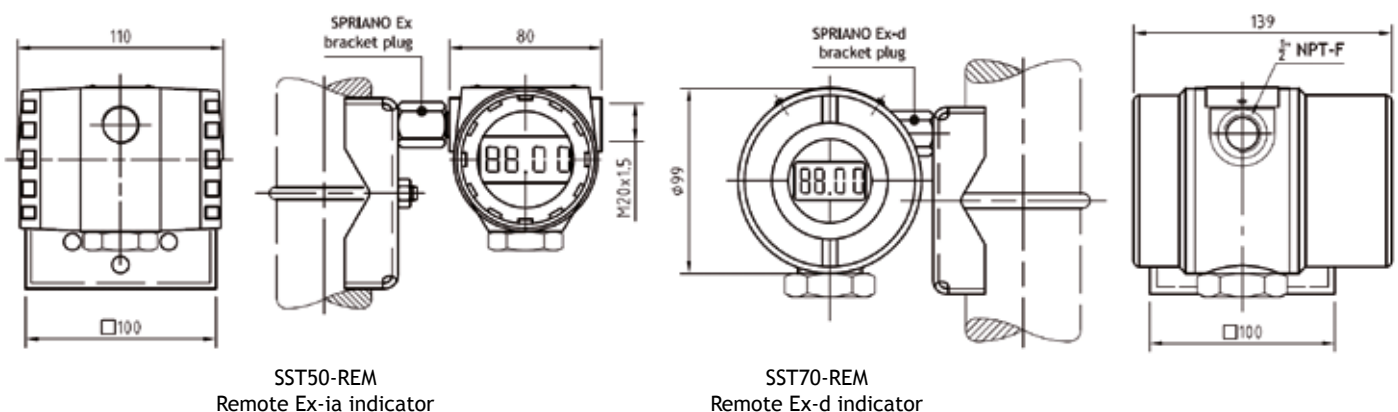
CONNECTION LAYOUT

Electrical connections indications

The indicator can be connected to any kind of 4-20mA 2 wires transmitter to display the measured value (level, ullage, volume, pressure, flow, temperature, density, ...). Measuring unit can be chosen among 18 different pressure units, 6 level units or 3 temperature units, and % of the measuring span, selectable via software.



DIMENSIONAL DRAWINGS







GAUGES

MTLG Smart visual reed level transmitter and gauge



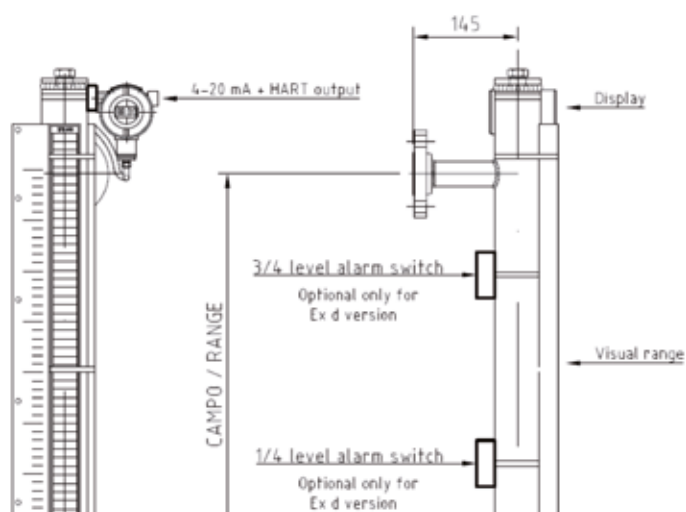
MTLG series SMART visual reed transmitters are microprocessor based instruments that combine the 4-20mA + HART® or FOUNDATION FIELDBUS® protocol with signal advantages (4-20mA) together with the convenience of local visualization of measurement by means of graduated scale.

MTLG series SMART visual reed transmitters have, inside the float, a magnet which drives, without contact, reed contacts and the sensing elements of the graduated scale. These reed variations are then acquired by the electronic board and converted into an analog 4-20mA+HART® communication protocol.

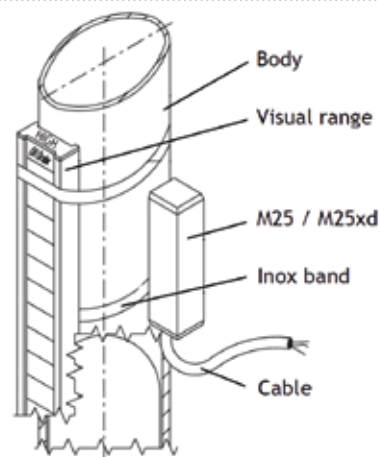


Supply:	12.5 ÷ 30 Vdc
Output signal:	Visual / Analog 4 - 20mA , 2 wires / Digital using HART® or FIELDBUS® protocol
Measuring range:	From 0 ÷ 500 mm to 0 ÷ 6 m
Max load:	550 Ohm @ 24 Vdc
Total accuracy:	< ± 5 mm
Response time (63% FS):	< 256 ms (Standard Hart®)
Zero thermal drift:	< ± 0,1%/10°C
Span thermal drift:	< ± 0,1%/10°C of Nominal Range
Damping:	0 ÷ 60 s (minimum response time 0.1 s)
Long term stability:	< ± 0.1 % FS/year
Process temperature:	-40 ÷ +85 °C (with HT reed switches: up to 130 °C)
Ambient / Storage temperature:	-40 ÷ +85 °C / -40 ÷ +90 °C
LCD display reading:	-10 ÷ +65 °C
Housing:	Die cast aluminum alloy EN AW-6082 finished with epoxy resin / SS AISI 316
Ingress protection degree:	IP66 suitable for tropical climate operation as defined by DIN 50015
Relative Humidity:	0 ÷ 100% R.H.
Process connections:	ANSI / API / DIN / JIS Flanged RF, FF, RTJ or Screwed starting from 1"1/2
Nameplate:	Stainless Steel, fixed on housing
Body / Cage material:	Stainless Steel (SS AISI 304, 316, 321), Duplex & Superduplex alloys, Hastelloy (B, C276), Inconel 625
Float material:	SS AISI 316, Neoprene, Spansil

DIMENSIONAL DRAWINGS



MTLG smart visual and electronic reed level transmitter complete with level alarm switches



M25 Magnetic alarms give a signal of min and/or max level, on the level indicator of MLG / MTLG series. They are connected to the indicator trough small clamp on bands in stainless steel and they can be regulated in any position needed on the instrument body; maintaining the sensor cable on the bottom. Before connecting the alarm, be sure of its well working, by changing manually the level of the liquid in the body.

MLG Smart Differential Pressure Transmitter



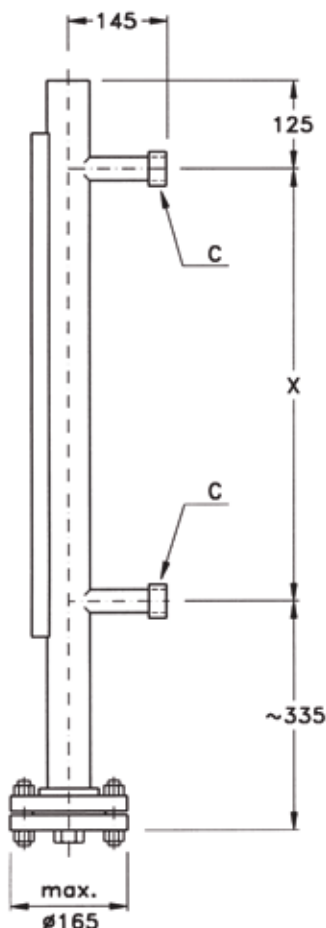
A permanent magnet incorporated in the float actuates the sensing elements mounted in the special waterproof case, causing them to rotate 180°. These elements, which are treated with special paints of contrasting color on the two faces, show the red color faces when the level increases (float going up) and the white faces when the level decreases (float going down), thus showing very clearly the position of the float and hence the liquids level.

MLG series SMART visual reed transmitters have, inside the float, a magnet which drives, without contact, reed contacts and the sensing elements of the graduated scale. These reed variations are then acquired by the electronic board and converted into an analog 4-20mA+HART® communication protocol.

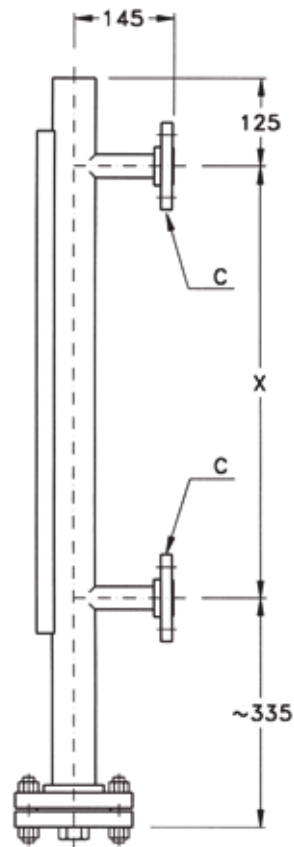


Output signal:	Visual
Measuring range:	From 0 ÷ 500 mm to 0 ÷ 6 m
Total accuracy:	< ± 5 mm
Process temperature:	-60 ÷ +150°C (with finned arm / jacketing: -196 ÷ 400°C)
Ambient / Storage temperature:	-40 ÷ +85°C / -40 ÷ +90°C
Process connections:	ANSI / API / DIN / JIS Flanged RF, FF, RTJ or Screwed starting from 1"1/2
Nameplate:	Stainless Steel, fixed on housing
Body / Cage material:	Stainless Steel (SS AISI 304, 316, 321), Duplex & Superduplex alloys, Hastelloy (B, C276), Inconel 625
Float material:	SS AISI 316, Neoprene, Spansil

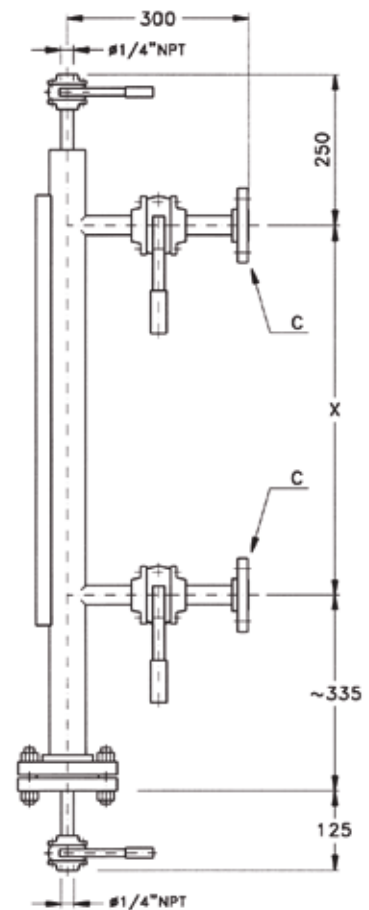
DIMENSIONAL DRAWINGS



MLG magnetic level gauge with screwed connections



MLG magnetic level gauge with flanged connections



MLG magnetic level gauge with flanged connections and interception valves

MN11 Bourdon pressure gauge



MN11 pressure gauges, are accurate instruments suitable to satisfy the hardness working conditions and the most severe requirements of the various industrial sectors for which have been designed.



Measuring system:	Bourdon spring
Case diameter:	63, 100 or 150 mm
Mounting options:	Local / Wall: bottom connection or Panel: low back connection
Measuring range:	From 0 ÷ 0.6 to 0 ÷ 1000 bar or equivalent units of pressure or vacuum ranges
Process Connections:	Thread size for lower or back mounting: 1/2" G or NPT (optional seals)
Accuracy class:	Class 1 (1% FS) for DN100 e DN150 Class 1.6 (1.6% FS) for DN63
Process temperature:	-30 ÷ +250°C dry execution / +10 ÷ +80°C glycerine filled / -30 ÷ +120°C oil filled
Ambient temperature:	-30 ÷ +60°C dry execution / +10 ÷ +60°C glycerine filled / -30 ÷ +60°C oil filled
Pointer:	Aluminum with micrometer adjustment
Ingress protection degree:	IP65
Electric contacts:	ATEX version, inductive contact
Options:	Other process connections, Case and ring AISI 316 SS, Diaphragm seals, Oxygen service, Dial tag marking, Maximum reading pointer, Movement with dampening, Accuracy class 0,5

SGD14 Solid front pressure gauge



Solid front pressure gauges SGD14 series are manufactured as per EN 837-1 and ASME B40.1.

During the design of this type of pressure gauges, "safety" factor is taken into great consideration. Safety is guaranteed by a protection baffle wall positioned between the pressure element assembly and the dial, and by a blow-out device made of a back plate which allows an eventual pressure vent from the casing.



Measuring system:	Tube Spring
Case diameter:	100 or 150 mm (125 mm for model in phenolic resin)
Measuring range:	From 0 ÷ 0.6 to 0 ÷ 1000 bar or equivalent units of pressure or vacuum ranges
Overpressure:	Up to 1000 bar: 130% FS / Up to 60 bar: 160% FS / Up to 60 bar: 250% FS
Process Connections:	Thread size for lower or back mounting: 1/2" G or NPT (optional seals)
Accuracy class:	Class 1 (1% FS) Class 0.5 (0.5%FS)
Process temperature:	-30 ÷ +250°C dry execution / +10 ÷ +80°C glycerine filled / -30 ÷ +120°C oil filled
Ambient temperature:	-30 ÷ +60°C dry execution / +10 ÷ +60°C glycerine filled / -30 ÷ +60°C oil filled
Pointer:	Aluminum with micrometer adjustment
Ingress protection degree:	IP65
Electric contacts:	ATEX version, inductive contact
Options:	Other process connections, Case and ring AISI 316 SS, Diaphragm seals, Oxygen service, Dial tag marking, Maximum reading pointer, Movement with dampening

MN4 Diaphragm pressure gauge



MN4 series pressure gauges are tools combined with a separation diaphragm which, undergoing the pressure of the process fluid, activates the movement.

This type of instrument can detect the pressure of highly viscous or crystallizable or solidifiable fluids.



Measuring system:	Separation diaphragm
Case diameter:	100 or 150 mm
Measuring range:	From 0 ÷ 16 to 0 ÷ 400 bar or equivalent units of pressure or vacuum ranges
Overpressure:	115% FS occasionally allowed (Special on request)
Process Connections:	Thread size for lower or back mounting: 1/2" G or NPT (optional seals)
Accuracy class:	Class 1.6 (1.6% FS)
Process temperature:	-20 ÷ +100°C std / -20 ÷ +150°C special gaskets / -20 ÷ +100°C PTFE coating
Ambient temperature:	-20 ÷ +60°C
Pointer:	Aluminum with micrometer adjustment
Ingress protection degree:	IP65
Electric contacts:	ATEX version, inductive contact
Options:	Diaphragm stop, Case and ring AISI 316 SS, Spacer, Solid front case, Liquid filling, Maximum reading pointer, Electrical contacts

H Test and precision pressure gauges



H Series pressure gauge is specifically ment for periodically checking the accuracy of other service gauges or pressure operated instruments and for precision measures of pressure. Besides the construction accuracy, the easy reading is the basic characteristic of instruments Series H assured by mirror ring, subdivisions of graduation, dial colour and pointer design.



Measuring system:	Elastic element
Case diameter:	200 or 250 mm
Mounting options:	Local / Wall: bottom connection or Panel: low back connection
Measuring range:	From 0 ÷ 1 bar to 0 ÷ 250 bar
Overpressure:	Up to 100 bar: 125% FS / Up to 250 bar: 115% FS
Process Connections:	Threaded 1/2" G / Flanged 40 mm diam (shipped with locking vice)
Accuracy class:	Series 7H: 0.3% FS / Series 8H: 0.25% FS / Series 9H: 0.2% FS
Process temperature:	0 ÷ +60°C
Ambient temperature:	0 ÷ +60°C
Ingress protection degree:	IP54
Options:	Oxygen service, Dial tag marking

SGD11 Differential pressure gauge

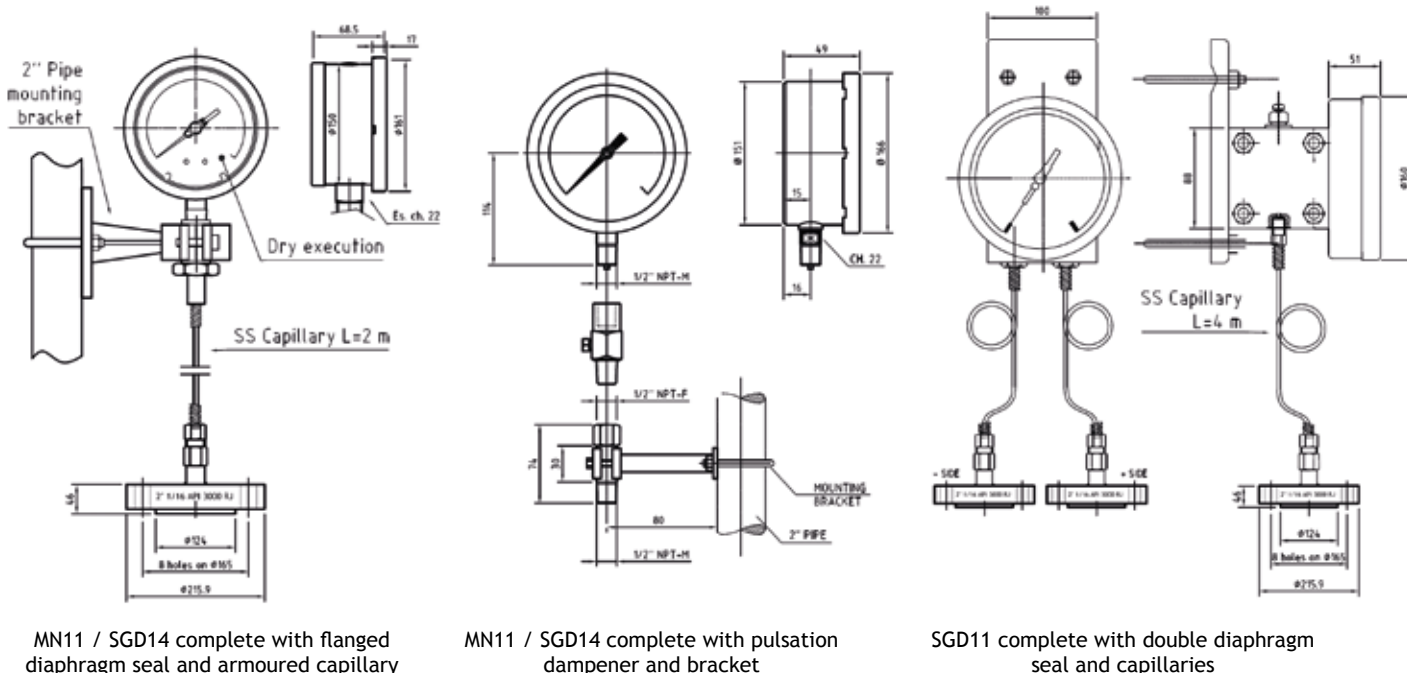


SGD11 reports a differential pressure measurement with a high differential pressure overload and/or high working pressures (static pressures), also in aggressive ambient for gaseous, liquid, viscous and aggressive media. Ranges are between either 25 and 100 mbar (150x150 dimensions) or 100 mbar and 25 bar (100x100 dimensions) with high static pressures up to 400 bar.



Measuring system:	Diaphragm differential cell
Case diameter:	100 or 150 mm
Mounting options:	Direct / Surface with clamp / Back panel flush / 2" pipe mounting
Measuring range:	From 0 ÷ 25 bar to 0 ÷ 100 bar
Overpressure:	Up to 100 bar for 100x100 model (On request 250 and 400 bar) Up to 25 bar for 150x150 model (On request 100 bar)
Diaphragm materials:	SS 316L / Monel / Hastelloy C
Movement:	Stainless steel
Torsion shaft:	Stainless steel
Pressure element:	SS AISI 316Ti or SS AISI 316L independent diaphragm depending on working range
Process Connections:	2 x 1/4" NPT-F std / 2 x 1/2" NPT-F / 2 x 1/2" NPT-M revolving
Accuracy class:	Class 1.6 (1.6% FS)
Process temperature:	-20 ÷ +120°C std (with capillary: up to 283°C)
Ambient temperature:	-20 ÷ +60°C
Pointer:	Aluminum with micrometer adjustment
Dial:	white Aluminum with black figures
Ingress protection degree:	IP65
Electric contacts:	ATEX version, inductive contact
Options:	Case and ring AISI 316 SS, Diaphragm seals, Oxygen service, Dial tag marking, Maximum reading pointer, Solid front case, Accuracy class 1

DIMENSIONAL DRAWINGS



XTB Bimetallic thermometer



To these industrial type bimetal thermometers, with a cylindrical spiral sensing element, are peculiar characteristics, solidity, simplicity and the shape follow UNI and other international standards. Petrochemical plants, dyeing and food industries are the more common application. There are two basics models: back stem and adjustable stem.



Measuring system:	Bimetal spiral
Case diameter:	100, 125 or 150 mm
Type of mounting:	Direct bottom / Direct back / Every angle
Measuring range:	-70 °C ÷ +500 °C
Over-temperature:	115% FS occasionally allowed
Process Connections:	1/2", 3/4" NPT-M / BSP-M or special
Accuracy class:	Class 1 (1% FS)
Process temperature:	-70 °C ÷ +500 °C
Ambient temperature:	-20 ÷ +60 °C
Pointer:	Aluminum with micrometer adjustment
Ingress protection degree:	IP65
Options:	Case and ring AISI 316 SS, Liquid filling, Maximum reading pointer, Electrical contacts

XTG Inert gas thermometer



Gas filled thermometers cover a wide temperature range (from -80 °C up to 600 °C). Their construction can grant full protection of personnel and process from accidental contamination, as the filling gas is non-toxic, suitable in the food, pharmaceutical, chemical and petrochemical industries.



Measuring system:	Cr-Mo steel spiral tube
Case diameter:	100 or 150 mm
Type of mounting:	Direct bottom / Direct back / Every angle
Mounting options:	Local / Wall: bottom connection or Panel: low back connection
Measuring range:	-200 °C ÷ +700 °C
Over-temperature:	115% FS occasionally allowed
Process Connections:	1/2", 3/4" NPT-M / BSP-M or special
Accuracy class:	Class 1 (1% FS)
Process temperature:	-200 °C ÷ +700 °C
Ambient temperature:	-20 ÷ +60 °C
Pointer:	Aluminum with micrometer adjustment
Ingress protection degree:	IP65
Options:	Case and ring AISI 316 SS, Liquid filling, Maximum reading pointer, Electrical contacts, PVC coating (Capillary and bulb)



 **SPRIANO[®]**
TECHNOLOGIES



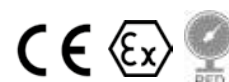
PNEUMATICS

65L Pneumatic Torque Tube Level / Interface / Density Transmitter



65L series level controllers measures liquid levels, density and interface levels in closed or open vessels. It converts buoyant force exerted by a displacer immersed in a liquid to a proportional current signal thanks to a mechanical forces transmission device based on a torque tube and a annexes linkage.

Pneumatic controllers are indicated for locations with no power supply availability or systems with redundancy requirements.



Supply:	1,4 ± 0,1 bar
Output signal:	20 ± 100 kPa / 3 ± 15 PSI / 0.2 ± 1 bar
Measuring range:	From 0 ÷ 356mm (14") to 0 ÷ 3048mm (120")
Total accuracy:	Linearity and Hysteresis < ± 1% FS, Repeatability: < ± 0,2% FS
Density of fluid:	Adjustable between 500 and 1400 Kg/m ³
Control actions:	P / P+I / SD / P+IR
Action:	Direct / Reverse, reversible by rotating the BP dial
Process temperature:	-60 ÷ +150°C (with finned arm / jacketing : -196 ÷ 400°C)
Ambient / Storage temperature:	-20 ÷ +60°C / -40 ÷ +80°C
Housing:	Die cast aluminum UNI 5076
Ingress protection degree:	IP54 (IP65 during operation)
Process connections:	ANSI / API / DIN / JIS Flanged RF, FF, RTJ, Screwed, Socket Welded
Rating:	Up to PN 400 / ANSI 2500 / API 10000
Torque tube material:	SS AISI 316 + Hastelloy C 276, Full Hastelloy C 276, Inconel 600, Inconel 625
Body / Cage material:	Carbon Steel (WCC, WCB, LCB), Stainless Steel (SS AISI 304, 316, 321), Duplex & Super-duplex alloys, Hastelloy (B, C 276), Inconel 625
Body / Cage painting:	Standard or on request for Offshore application according to MR
Allowable tests on materials:	3.1, Hydrotest, NACE, PWHT, HIC, SSC, PMI, NDTs, Stelling, Niploy coating
Options:	With pneumatic set remote control, External Auto-Manual panel

ACCESSORIES



FR10 / FR20

Air filter regulators specially designed for supply, with clean air and controlled pressure, all the pneumatic devices



SS200 - AUTO MANUAL PANEL

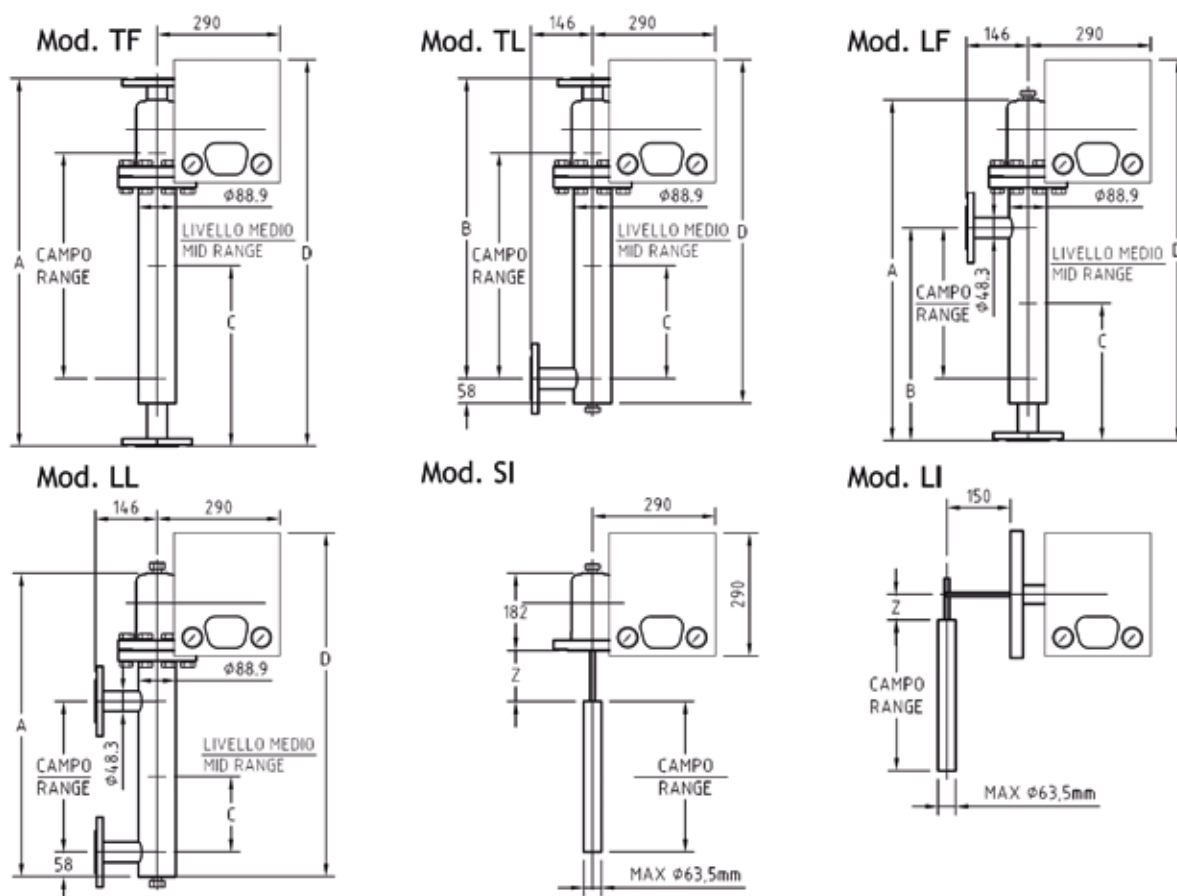
Manual loading station used for the remote positioning of air control valves and other pneumatic control equipment



SEX71

Pneumatic - Electronic converter based on force balanced system

DIMENSIONAL DRAWINGS



REFERENCE TABLE

	RANGE [mm] / [in]	356 14	610 24	813 32	1219 48	1524 60	1829 72	2134 84	2438 96	3048 120
TF	A	651	905	1108	1514	1819	2124	2429	2733	3343
	C	298	552	527	730	882	1035	1187	1339	1644
	D	701	955	1158	1564	1869	2174	2479	2763	3393
	WEIGHT [Kg]	34	36	38	42	45	48	51	54	60
TL	A	601	855	1058	1464	1769	2074	2379	2683	3293
	B	543	797	1000	1406	1711	2016	2321	2625	3235
	C	178	305	407	610	762	915	1067	1219	1524
	D	651	905	1108	1514	1819	2124	2429	2733	3343
	WEIGHT [Kg]	34	36	38	42	45	48	51	54	60
LF	A	766	1020	1223	1629	1934	2239	2544	2848	3458
	B	465	719	922	1328	1633	1938	2243	2547	3157
	C	287	679	515	718	871	1023	1176	1328	1633
	D	866	1120	1323	1729	2034	2339	2644	2948	3558
	WEIGHT [Kg]	36	38	40	44	47	50	53	56	62
LL	A	716	970	1173	1579	1884	2189	2494	2798	3408
	C	178	305	407	610	762	915	1067	1219	1524
	D	816	1070	1273	1679	1984	2289	2594	2898	3508
	WEIGHT [Kg]	36	38	40	44	47	50	53	56	62
MAX DISPLACER DIAMETER		63.5	54	43	35	31.8	28.6	26.9	25	22
SI	WEIGHT [Kg]	26								
LI	WEIGHT [Kg]	23								

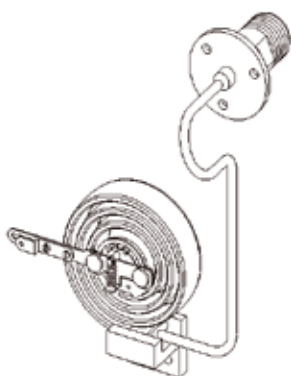
SG65 Pneumatic indicating controllers and transmitters



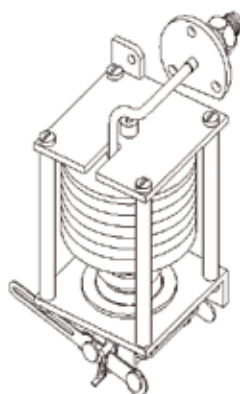
For the control of temperature, pressure and level, in industrial or process plants. The indicating controller is used for control of liquid, gaseous or vaporous media. The instrument senses the temperature, pressure or level of the measured medium directly, displays the operating value, compares the measured variable with the set point and puts out a pneumatic standard signal of 0,2 to 1bar or 3 to 15psi. This output pressure actuates final control element, the pneumatic valve. Four control forms are available: ON-OFF, Proportional, Proportional + Integral, Proportional + Integral + Derivative. The units could be also used for remote control of process operations as pneumatic transmitter (output 0,2÷1bar or 3÷15psi) or receiver controller (input 0,2÷1bar, 3÷15psi).



Supply:	1.4 ± 0.1bar
Output signal:	20 ± 100 kPa / 3 ± 15 PSI / 0.2 ± 1 bar
Measuring range:	Pressure: from -1 ÷ 0 bar to 0 ÷ 1000 bar Temperature: from 0 ÷ 25°C to 0 ÷ 500°C
Total accuracy:	< ± 1% FS
Mounting:	Wall or panel
Control actions:	Total action (on/off) / Proportional: P / Proportional + Integral: P+I / Proportional + Integral + Derivative: P+I+D
Proportional action:	Proportional band ≈ 200%
Integral action:	> 0.05 ÷ 15 rep/min
Derivative action:	0 ÷ >5 rep/min
Action:	Direct / Reverse, reversible by rotating the BP dial
Steady state air consumption:	@air supply 1.4 bar: 0.05 Nm ³ /h
Maximum air delivery:	@air supply 1.4 bar 3.5 Nm ³ /h
Ambient / Storage temperature:	-30 ÷ +80°C / -40 ÷ +80°C
Housing:	Die cast aluminum UNI 5076
Ingress protection degree:	IP54 (IP65 during operation)
Process connections:	Pressure: 1/4" NPT-M-F Temperature: 3/4" G bulb with 2m capillary
Dimensions:	290H 250L 135W [mm]
Options:	Auto-Manual switch panel, Mounting bracket for 2" pipe, Air filter regulator mod. FR10 / FR20, Alarm contacts (electric, inductive or pneumatic), External set point knob, Tropicalized box, Output signal 6 to 30 psi / 0,4 to 2 bar, Remote set point, Temperature compensated system



Bourdon type movement



Low pressure bellows



Temperature-sensing nitrogen-filled, 2 m capillary length, conn. 3/4" GAS, bulb for liquids, material: S.S. ASTM A240 Type 316L.

SG6100 Pneumatic indicating controllers and transmitters



The instrument senses the temperature, pressure or level of the measured medium directly, displays the operating value, compares the measured variable with the set point and puts out a pneumatic standard signal of 0,2 to 1bar or 3 to 15psi. This output pressure actuates final control element, the pneumatic valve. Four control forms are available: ON-OFF, Proportional, Proportional + Integral, Proportional + Integral + Derivative. The units could be also used for remote control of process operations as pneumatic transmitter (output 0,2÷1bar or 3÷15psi) or receiver controller (input 0,2÷1bar, 3÷15psi).



Supply:	1.4 ± 0.1bar
Output signal:	20 ± 100 kPa / 3 ± 15 PSI / 0.2 ± 1 bar
Measuring range:	Pressure: from -1 ÷ 0 bar to 0 ÷ 1000 bar Temperature: from 0 ÷ 25°C to 0 ÷ 500°C
Total accuracy:	< ± 1% FS
Mounting:	Wall or panel
Control actions:	Total action (on/off) / Proportional: P / Proportional + Integral: P+I / Proportional + Integral + Derivative: P+I+D
Proportional action:	Proportional band ≈ 200%
Integral action:	> 0.05 ÷ 15 rep/min
Derivative action:	0 ÷ >5 rep/min
Ingress protection degree:	IP54 (IP65 during operation)
Dimensions:	225H 200L 105W [mm]
Options:	Auto-Manual switch panel, Mounting bracket for 2" pipe, External set point knob, Tropicalized box, Output signal 6 to 30 psi / 0,4 to 2 bar, Remote set point, Temperature compensated system

RNG Circular or strip chart recorder



The circular chart recorders Series RNG are suitable to record physical variables which temperature and pressure of liquids, gaseous or vaporous media in the industrial process plants. These series are mechanic continual trace recorders. The system of writing is made by cartridge with fiber pen. Series allows the simultaneous registration up to three variables of daily or weekly processes (24 hours std).

The strip chart recorder Series RNG2 is suitable to record physical variables which temperature and pressure of liquids, gaseous or vaporous media in the industrial process plants. The system of writing is made by cartridge with fiber pen. Series allows the simultaneous registration up to two variables process (chart speed 20mm/hours std).



Measuring system:	1 pen or 2 pens recording
Chart dimensions:	Circular: 200 or 254 mm / Strip: 120 mm
Variables:	Pressure, Temperature
Chart speed:	Circular: 4-12-48-168 hours/rev / Strip: 40-60-120-180...mm/h
Measuring range:	Pressure: from -1 ÷ 0 bar to 0 ÷ 1000 bar Temperature: from 0 ÷ 25°C to 0 ÷ 500°C
Total accuracy:	< ± 1% FS
Mounting:	Wall or panel
Dimensions:	330H 245L 125W [mm]
Power supply:	220V / 110V / 24V- 50Hz or 1.5V Battery or Spring tightening
Housing:	Die cast aluminum UNI 5076
Ingress protection degree:	IP54 (IP65 during operation)

SG74 / SG75 / SG76 Pneumatic differential pressure transmitter



The SG74 / SG75 / SG76 works on the force balance principle and consists of two main units: The measuring unit which detects the differential pressure variation and consists of two forged bodies and bellows / capsule. The transmission unit converts the differential force applied to the measuring element into a proportional output pneumatic signal. The output pressure, generated by a flapper nozzle relay, feeds the feedback bellows with a rising pressure until the balance between bellows force and measuring element is reached. The whole transmission unit is contained within a water-resistant housing.



Supply:	1.35 ± 0.1 bar
Output signal:	20 ± 100 kPa / 3 ± 15 PSI / 0.2 ± 1 bar
Measuring range:	SG74: From 1,7 ÷ 17 bar to 14 ÷ 100 bar SG75: From 6 ÷ 12 mbar to 12 ÷ 75 mbar SG76: From 25 ÷ 75 mbar kPa to 50 ÷ 520 mbar
Measuring element:	SG74: bellow SG75 / SG76: capsule
Total accuracy:	< ± 0.5% FS
Body material:	Galvanized Carbon Steel A216WCC, AISI 316L (A351 CF3M)
Process connections:	2 x 1/4" NPT-F (Standard) or 2 x 1/2" NPT-F
Ambient / Storage temperature:	-40 ÷ +120°C
Housing:	Thermoplastic resin
Ingress protection degree:	IP55
Options:	Zero suppression / elevation device

SG77 Pneumatic relative transmitter



The SG77 works on the force balance principle and consists of two main units: The measuring unit which detects the differential pressure variation and consists of two forged bodies and a bellows. The transmission unit converts the differential force applied to the measuring element into a proportional output pneumatic signal. The output pressure, generated by a flapper nozzle relay, feeds the feedback bellows with a rising pressure until the balance between bellows force and measuring element is reached. The whole transmission unit is contained within a water-resistant housing.



Supply:	1.4 ± 0.1 bar
Output signal:	20 ± 100 kPa / 3 ± 15 PSI / 0.2 ± 1 bar
Measuring range:	From 1.7 ÷ 17 bar to 14 ÷ 140 bar
Measuring element:	Bellow
Total accuracy:	< ± 0.5% FS
Body material:	Galvanized Carbon Steel A216WCC, AISI 316L (A351 CF3M)
Process connections:	1/4" NPT-F (Standard) or 1/2" NPT-F
Ambient / Storage temperature:	-40 ÷ +120°C
Housing:	Thermoplastic resin
Ingress protection degree:	IP55
Options:	Zero suppression / elevation device

SEX71 Pressure to current converters



SEX71 I/P converters are based on a force balanced system with electronic feedback: measuring the output signal, by means of a piezoelectric sensor, and computing it with dedicated SMT electronics, a reliable and high performing instrument is obtained.



Supply:	From 120 ÷ 240 kPa (1,2 ÷ 2,4bar)
Consumption:	0,1 Nm ³ /h with 140 kPa air supply
Output signal:	20 ± 100 kPa / 3 ± 15 PSI / 0.2 ± 1 bar
Input signal:	4-20mA, 2 wires
Total accuracy:	< ± 0,25% FS
Zero thermal drift:	< ± 0.5%/10° C
Span thermal drift:	< ± 0.5%/10° C of Nominal Range
Mounting:	Wall, DIN rail or 2" pipe
Action:	Direct
Ambient / Storage temperature:	-30 ÷ +80° C
Relative Humidity:	0 ÷ 90% R.H.
Housing:	Die cast aluminum alloy EN AW-6082 finished with epoxy resin
Ingress protection degree:	IP65

SEX11 Current to pressure converters



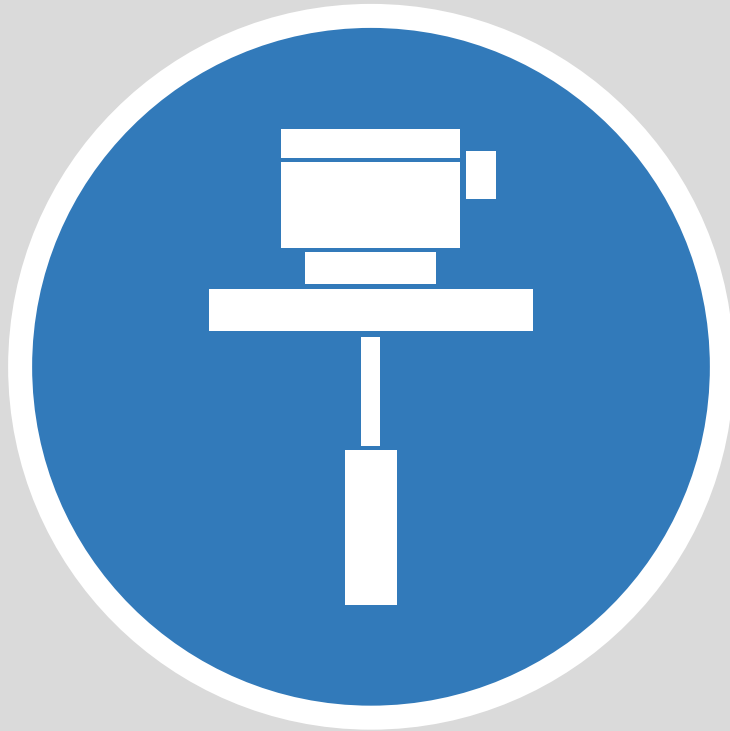
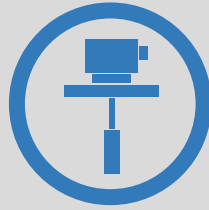
P to I converters SEX11 Series are designed to interface pneumatic 3÷15 psi / 0.2÷1 bar signals to controls systems, data loggers and other data acquisition systems.



Supply:	12.5 ÷ 30 Vdc
Output signal:	Analog 4 - 20mA , 2 wires / 0 - 5 / 0 -10 Vdc 3 wires (16Vdc min supply)
Input signal:	20 - 100 kPa / 0.2 - 1 bar / 3 - 15 PSI
Max load:	650 Ohm @ 24 Vdc
Overpressure:	3 times FS
Total accuracy:	< ± 0.25% FS including hysteresis, non-linearity and repeatability (IEC 60770)
Response time (63% FS):	Piezo: 10 ms / Ceramic: 5 ms
Zero thermal drift:	< ± 0.025 % FS / °C (-10 ÷ 60° C)
Span thermal drift:	Piezo: < ± 0.02 % FS/°C / Ceramic: < ± 0.01 % FS/°C
Long term stability:	Piezo: < ± 0.15 % FS/year / Ceramic: < ± 0.12 % FS/year
Ambient / Process / Storage temperature:	-40 ÷ +85° C / -10 ÷ +80° C / -40 ÷ +90° C
Relative Humidity:	< 98% RH not condensing



 **SPRIANO**[®]
TECHNOLOGIES



SWITCHES

SSW70 / SSW76 / SSW77B / SSW77BL / SSW72 Smart level, pressure & temperature switches



SSW series SMART level, pressure & temperature switches are microprocessor-based instruments with an ON/OFF output signal. It is possible to locally configure the instruments (zero and span) by means of 2 push buttons and to display the data on the display. Thermal drift is compensated using the temperature signal generated by a PTC thermistor integrated in the sensor itself. Based on these readings the microprocessor shows the measurement on the display and command an ON/OFF signal output contact, depending on a set threshold.



Supply:	24 ÷ 30 Vdc
Output signal:	Relay SPDT output: 8A @ 250V
Measuring range:	Same ranges of equivalent transmitter SST7 series
Total accuracy:	<0.07% FS (0 ÷ 80 °C), <0.2% FS (0 ÷ -40 °C) including hysteresis, non-linearity and repeatability (IEC 60770)
Display resolution:	0.1
Programmable delay:	0 ÷ 9999s
Zero thermal drift:	< ± 0,1%/10 °C
Span thermal drift:	< ± 0,1%/10 °C of Nominal Range
Damping:	0 ÷ 60 s (minimum response time 0.1 s)
Long term stability:	< ± 0.1 % FS / year
Process temperature:	Same ranges of equivalent transmitter SST7 series
Ambient / Storage temperature:	-40 ÷ +85 °C / -40 ÷ +90 °C
LCD display reading:	-10 ÷ +65 °C
Housing:	Die cast aluminum alloy EN AW-6082 finished with epoxy resin / SS AISI 316
Ingress protection degree:	IP66 suitable for tropical climate operation as defined by DIN 50015
Relative Humidity:	0 ÷ 100% R.H.
Nameplate:	Stainless Steel, fixed on housing
Terminal board:	6 terminals 18÷22 AWG (Diameter 0.644 ÷ 1.024 / Area 0.326 ÷ 0.823): - 2 terminals for power supply 24 ÷ 30 Vdc - 1 terminals for ground and cable shield connection - 3 terminals for relay signal wiring
Mounting position:	Any position

LCD INTERFACE WITH CONFIGURATION MENU

- Menu security with password
- Selectable measuring unit (% , mm, cm, bar, kg/cm², ...)
- 2 Push buttons for setting and calibration



THRESHOLD SETTING

CODE	LABEL	DESCRIPTION	SIGNAL	FUNCTION
00	Set	Max. Alarm	Direct	Relay ON at Set; OFF at [Set - dif (*)]
01	Set	Max. Alarm	Reverse	Relay OFF at Set; ON at [Set - dif]
02	Set	Min. Alarm	Direct	Relay ON at Set; OFF at [Set + dif]
03	Set	Min. Alarm	Reverse	Relay OFF at Set; ON at [Set + dif]
04	Set	Range	Direct	Relay ON in [Set ± dif] range
05	Set	Range	Reverse	Relay OFF in [Set ± dif] range
06	Set	Hysteresis	Direct	Relay ON at [Set ± dif]; OFF at [Set - dif]
07	Set	Hysteresis	Reverse	Relay OFF at [Set ± dif]; OFF at [Set - dif]
08	Set1(**) / Set2	Level	Direct	Relay ON if < Set1; OFF at Set1. ON at Set2 in reversing mode.
09	Set1 / Set2	Pressure / Level	Reverse	Relay ON at Set1 and still to Set2 in reversing mode; OFF at Set2.
10	Set1 / Set2	MIN / MAX	Direct	Relay ON if >Set1 and <Set2.
11	Set1 / Set2	MIN / MAX	Reverse	Relay OFF if >Set1 and <Set2.
*	Hysteresis can be regulated using the display			
**	Set1 > Set2			

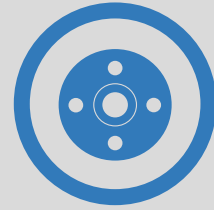


SPRIANO

INLET
P1-101
A181 316L
P 16.939
DN 25
P1-101
A181 316L
P 16.939
DN 25



SPRIANO[®]
TECHNOLOGIES



MEASURING ELEMENTS

ORI Orifice flange assembly



Orifice flanges are intended for use instead of standard pipe flanges when an orifice plate or flow nozzle must be installed. Pairs of pressure tapings are machined into the orifice flange, making separate orifice carriers or tappings in the pipe wall unnecessary. The range of orifice flanges covers all standard sizes and ranges, and all common flange materials. Flanges are available in slip on (SO - Slip On) or welding neck (WN - Welding Neck) form, and are typically supplied with two 1/2" NPT tappings in each flange. Jacking screws to ensure ease of removal of the primary flow element are provided. The primary element can be an Orifice plate or a flow nozzle. Orifice flanges may also be supplied complete with bolting and gasket kits.

Materials:

ASTM A105 - Carbon steel / ASTM A350 LF2 - Low temperature carbon steel
ASTM A182 F316 - Stainless steel / ASTM A182 F304 - Stainless steel
ASTM A182 F11 - Low alloy steel / ASTM A182 F22 - Low alloy steel

Pressure tappings:

As standard, two 1/2" NPT tappings are provided in each flange, one with a plug. Other thread sizes are available on request. Socket weld connections may be specified, and butt weld pipe nipples are also available. Tappings are generally 'flange' type, but 'corner' tappings are available as optional

Gaskets:

Typical specifications include:
- 1,6 mm thick flat non-asbestos fibre
- 4,5 mm thick spiral wound type, carbon steel outer, stainless steel inner, 316L windings with graphite filler

Studbolts and nuts:

Standard materials include:
ASTM A193 B7 and ASTM A194 Gr 2H / ASTM A320 L7 and ASTM A194 Gr 4 o 7
ASTM A320 B8 and ASTM A194 Gr 8 / ASTM A320 B8M and ASTM A194 Gr 8M

MET Flow orifice type meter run



Meter run are used in small diameter pipelines, because of the roughness of the internal surface of pipe, that affects very much the coefficient of flow of the primary element. They are used for pipeline size from 1/2" (ND 15) until 1" 1/2 (ND 40). They are composed of:

- Couple of flanges with annular chamber and pressure taps
- Orifice plate according to ASME / ISO Standard
- Calibrated pipes (20 D Upstream / 10 D Downstream)
- Machined pipes, 20 D upstream and 10 D downstream are minimum length for a good measurement. They are obtained by accurate machining, for assure good uniformity and finish of the measuring section.
- Process connections: Flanged end connection type or butt weld end connections type
- Pressure Taps: 1/2" NPT-F ANSI B1.20.1 Other threads on request

MUL Multistage restriction orifice



Multi-stage restriction orifices are used when on a pipeline it is requested to reduce the inlet pressure of more than its half. These devices, composed of a series of more than one restriction orifice, reduce progressively the pressure inside the pipeline, avoiding erosion of materials and disliked noises, typical when the same pressure loss is obtained by a unique restriction orifice.

Standard materials: calibrated restriction orifices in AISI 316, spool pipe and flanges in the same material of the pipeline.

Necessary data for design and calculation of multistage restriction orifices:

- 1) Required permanent pressure loss
- 2) Process fluid and conditions
- 3) Inlet pressure
- 4) Required flow
- 5) Flowing temperature
- 6) External and internal pipe diameter
- 7) Fluid specific weight at reference conditions
- 8) Fluid specific weight at flowing conditions
- 9) Fluid viscosity

PIT Averaging pitot tube flowmeters



The Averaging Pitot is a primary instrument of measure, designed to produce a differential pressure, proportional to the flow. Based on the theorem of Bernoulli, the four upstream holes take the velocity of the flow in four different points of the pipe (taking an 'average' value), the downstream hole measures the static pressure. The differential pressure that follows is proportional to the flow. The Averaging Pitot measures liquids gas and steam flow in pipes or rectangular ducts accurately. Available for lines from DN 2" until above of the DN 60".

Models and precision:

The flow coefficient of the Averaging Pitot remains stable for a long time. The Averaging Pitot is more precise than an orifice plate in the long term. To each variation of the flow coefficient "K" a reduced accuracy can be expected. In the same interval of time (long enough), we find a flow coefficient K almost constant, the same coefficient K taken in a diaphragm orifice meter can change of about 10%, that gives a result of 10% of error in the reading of the flow. The accuracy of the diaphragm orifice meter, in the long term, it is also subjected to damages due to solids in suspension and/or formations of dirt or fat

Round shape:

Accuracy : $\pm 1,5\%$ of the actual value of the flow
Repeatability: $\pm 0.1\%$ of the actual value of the flow

Diamond shape:

Accuracy : $\pm 1\%$ of the actual value of the flow
Repeatability: $\pm 0.1\%$ of the actual value of the flow

VEN Venturi tube



Venturi Tubes are used for flow measurement of low pressure fluids and in very large pipes. Their application is particularly indicated in the measurement of clean or lightly dirty fluids, where it is required a flow measure with minimum energy loss.

There are two common types of Venturi tube: the Venturi Nozzle, and the Classical (Herschel) Venturi. Both feature have nozzle venture a convergent inlet section and a divergent outlet section. The classical Venturi convergent section is a simple truncated cone, whereas for the Venturi nozzle, the inlet contour matches that of the ISA 1932 flow nozzle.

- Calculation, Design and Manufacture to ISO 5167
- Fabricated from Plate or Machined from Bar/Forgings
- Flanged or Weld-In Construction
- Range of Material Grades
- Pipe Size from 2" to 70"
- Calibration Service on Request

Advantages:

The major advantage of the Venturi over orifice plates and flow nozzles is in the area of pressure recovery. Typically, unrecovered pressure is in the region of 10 - 30% of measured DP as opposed to 40 - 90% for an orifice plate (depending on Beta ratio). Although the cost of a Venturi can be comparatively high, where pumping costs are important the initial outlay can be warranted. Another advantage of the Classical Venturi over the other differential pressure producers is that the requirements for upstream and downstream straight pipe lengths are somewhat less onerous

Materials:

Standard materials include ASTM A182 F316 & F304 Stainless Steels, ASTM A182 F11 & F22 low alloyed Steels and ASTM A105 Carbon Steel Standard materials for fabricated from plates devices are ASTM A240 316/316L Stainless Steel and ASTM A516 gr.60/70 Carbon Steel

End connections:

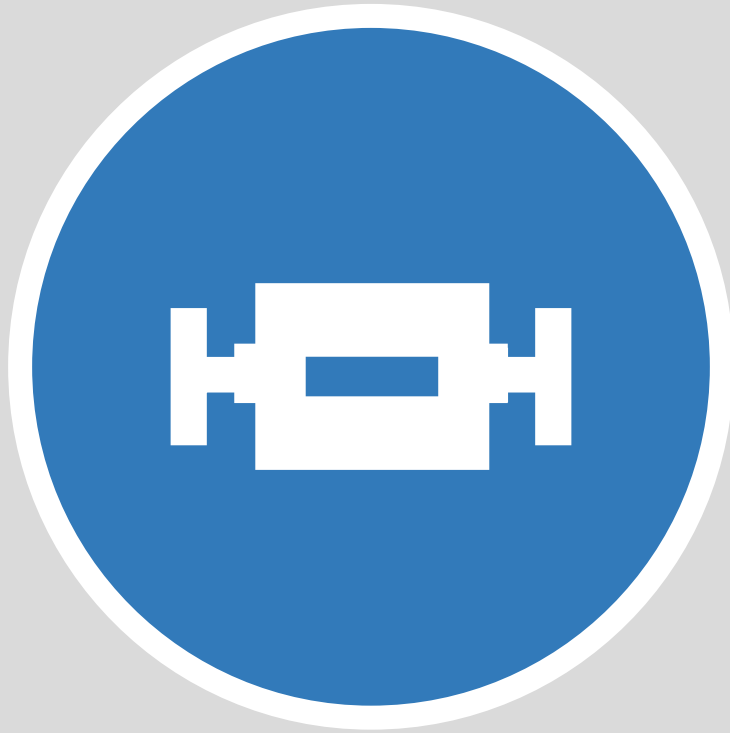
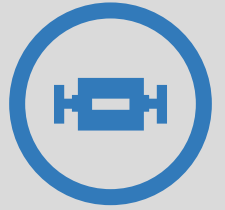
Venturis are available with ends prepared for welding to the pipeline, or fitted with flanges

Pressure tapings:

Venturis can be supplied with a wide variety of pressure tapings, including threaded connections, socket weld connections and welding nipples. The pressure taps can be welded directly on the Venturi body or on Piezometric Rings made from calendered tube and connected to the Venturi



SPRIANO[®]
TECHNOLOGIES



ACCESSORIES

Cod. MAN1/MAN2

Two ways and one valve MAN1 series and two ways and two valves MAN2 series manifolds. To be coupled with pressure gauges, transmitters and switches

Cod. MAN3/MAN5

Three ways and three valves MAN3 series and three ways and five valves MAN5 series manifolds. To be coupled with differential pressure gauges, transmitters and switches

Cod. BBM

Flanged connection manifold

Cod. SYP

Syphons SYP series. Available in Carbon Steel and Stainless Steel. Operating pressure up to 64 bar at 400 °C

Cod. PDA

Pulsation dampener PDA series. Up to 1000 bar working pressure

Cod. OVP

Overpressure protector OVP series. Up to 600 bar overpressure

Cod. SEA01

SEA01 diaphragm seal
To be coupled with transmitters, gauges
and switches

Cod. SEA03

SEA03 diaphragm seal
To be coupled with transmitters, gauges
and switches

Cod. SEA09

SEA09 wafer diaphragm seal
To be coupled with transmitters, gauges
and switches

Cod. PLUGS

Spriano® plugs PLU series allows to lock
unused screwed holes on intrinsically
safe and explosion proof enclosures in
order to protect internal components
against weather conditions

Cod. SUNS

Instrument protection sunshade SUNS
series in hot pressed GRP
Up to 100°C working temperature

Cod. SHS

The Spriano® HART® Server SHS Series is an
application software that allows the user
to access the process and diagnostic data
available on HART® field transmitters

INGRESS PROTECTION IP CODE

Protection against solid bodies		Protection against water	
1 st digit	Description	2 nd digit	Description
0	No protection	0	No protection
1	Protected against solid bodies with diameter > 50 mm.	1	Protected against vertical falls of water drops
2	Protected against solid bodies with diameter > 12 mm.	2	Protected against water falls up to 15° of the vertical
3	Protected against solid bodies with diameter > 2,5 mm.	3	Protected against rain water up to 60° of the vertical
4	Protected against solid bodies with diameter > 1 mm.	4	Protected against water projection in all directions
5	Protected against dust (Without damaging sediments)	5	Protected against water launching in all directions
6	Totally protected against dust	6	Protected against water launching similar to sea waves hits in all directions
-	-	7	Protected against immersion for a limited period and under specified pressure conditions
-	-	8	Protected against long effects immersion under specified pressure conditions

HAZARDOUS AREAS CLASSIFICATION

Hazardous areas are classified into zones on the basis of the frequency and duration of explosive atmosphere. In the following table are given the classification criteria (typical persistence time). The protection concept to be adopted is defined by such classification

The areas outside those classified as hazardous are referred to as “safe areas”.

Area Classification		Classification Criteria
Gases	Dusts	
Zone 0	Zone 20	Area where an explosive atmosphere is present continuously or for a long period.
Zone 1	Zone 21	Area where an explosive atmosphere is likely to occur in normal operation.
Zone 2	Zone 22	An area where an explosive atmosphere is not likely to occur in normal operation and, if it does occur, is likely to do so only infrequently and will exist for a short period only.

GAS GROUP			
Group	Subdivision	Typical Gas	Minimum ignition energy (MIE)
I	-	Methane	280 µJ
II	IIA	Propane	180 µJ
	IIB	Ethylene	60 µJ
	IIC	Hydrogen / Acetylene	20 µJ

SELECTION OF THE EQUIPMENT ACCORDING TO THE INSTALLATION ZONE (GAS).					
Protection Concept	Hazardous areas due to the presence of gases			ATEX 2014/34/UE	
	Zone 0	Zone 1	Zone 2	Group	Category
Ex-ia	Suitable	Redundant	Redundant	II	1G
Ex-ib	Forbidden	Suitable	Redundant	II	2G
Ex-d	Forbidden	Suitable	Redundant	II	2G
Ex-e	Forbidden	Suitable	Redundant	II	2G
Ex-p	Forbidden	Suitable	Redundant	II	2G
Ex-m	Forbidden	Suitable	Redundant	II	2G
Ex-o	Forbidden	Suitable	Redundant	II	2G
Ex-q	Forbidden	Suitable	Redundant	II	2G
Ex-n	Forbidden	Forbidden	Suitable	II	3G

CHEMICAL COMPATIBILITY CHART

Material compatibility reported in the following table is recognized as:

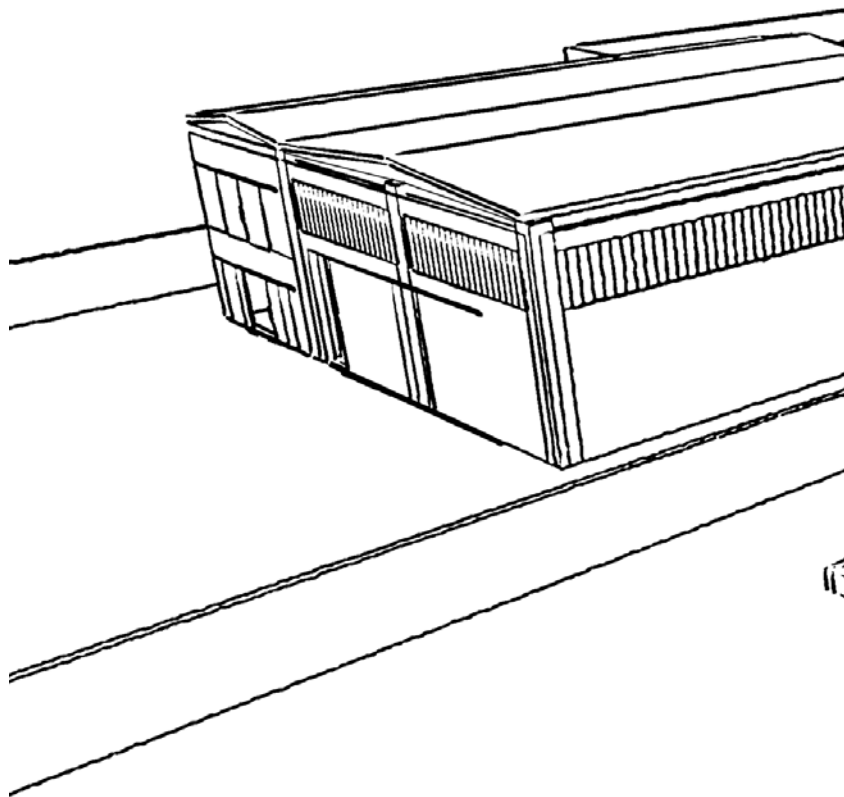
E = Excellent, G = Good, F = Fair, P = Poor, Q = Questionable, NR = Not Recommended, **S** = SPRIANO's advised choice.

PROCESS MEDIUM	HASTELLOY C	AISI 316 SS	MONEL	TANTALUM
Acetic Acid	G	G S	F	G
Acetic Anhydrid	E	G S	G	G
Acetone	G	G S	G	G
Ammonia (wet)	G	G S	Q	P
Ammonium Nitrate	G	G S	Q	G
Boric Acid	E	G	E S	G
Butil Alcohol	E	G S	G	G
Calcium Chloride	G S	G	G	G
Chlorine (dry)	E S	G	Q	E
Chlorine (wet)	E S	G	Q	E
Chromic Acid	F to G S	NR	Q	E
Copper Sulphate	G	G S	Q	G
Citric Acid	F	G S	G	G
Detergents	E	G S	G	E
Ethyl Alcohol	E	E S	E	G
Ethyl Cloride	E	G S	G	E
Ethyl Ether	E	E S	G	G
Fatty Acids	E	G S	G	G
Ferric Chloride	E S	Q	P	E
Formic Acid	E S	Q	Q	G
Furan	G	E S	G	G
Glycerine	E	G S	G	G
Glycols	E	G S	G	G
Hydrochloric Acid	G to E S	NR	Q	G to E
Hydrofluoric Acid	F to G	G	G to E (with GP) S	P
Hydrogen Peroxide	E	E S	F	E
Hydrogen Sulphide	G to E S	G	F	E
Magnesium Carbonate	G to E	G S	G	G
Magnesium Sulphate	G to E	G S	E	G
Maleic Anbhydride	E	G S	G	E
Mercuric Chloride	E S	F	Q	E
Methyl Ether	E	E S	G	G
Nitric Acid	F to E (with GP) S	Q	-	G
Nitrous Acid	E	G S	Q	G
Organic Solvents	E	G S	G	G
Petroleum Products	E	G	E S	G
Phthalic Anhydride	E S	Q	G	G
Phosphoric Acid	F to G (with GP) S	Q	F	G
Potassium Chloride	E	E S	E	G
Potassium Carbonate	G	G S	G	G
PotassiumDichromate	G	G S	G	G
Potassium Hydroxide	G	Q	E S	G
Rosins	E	G	E S	G
Sodium Bisulphate	F	G	G S	G
Sodium Cyanide	G	E S	F	E
Sodium Hydroxide	E	Q	E S	G
Sodium Nitrate	G	G S	Q	G
Sodium Peroxide	E	G S	Q	P
Sulphor Dioxide (wet)	E S	G	P	G
Sulphoric Acid	F	G	P	E S
Trichloroethylene	P to E	E S	G	G
Urea	G	G S	G	G
Water, Salt	E	G	G S	G
Zinc Sulphate	G	G S	G	G



Founded in 1923, SPRIANO® began his activity manufacturing pressure and temperature gauges. In 1936 SPRIANO® has been the first company in Italy to manufacture a modulating pneumatic controller, contributing a consistent technical improvement to Industrial Automation and Control in the Rubber, Oil & Gas and Food industries. In 1970 SPRIANO® engineered and started manufacturing a complete line of Control Valves branded MEC-RELA®, providing effective and efficient solutions for Industrial applications. During the 80's, SPRIANO® completed its technological transfer from pneumatics to electronics by developing a complete line of innovative instruments, the 2-wires system and microprocessor based transmitters. Today SPRIANO® engineers and manufactures pneumatic and electronic instruments for Automation

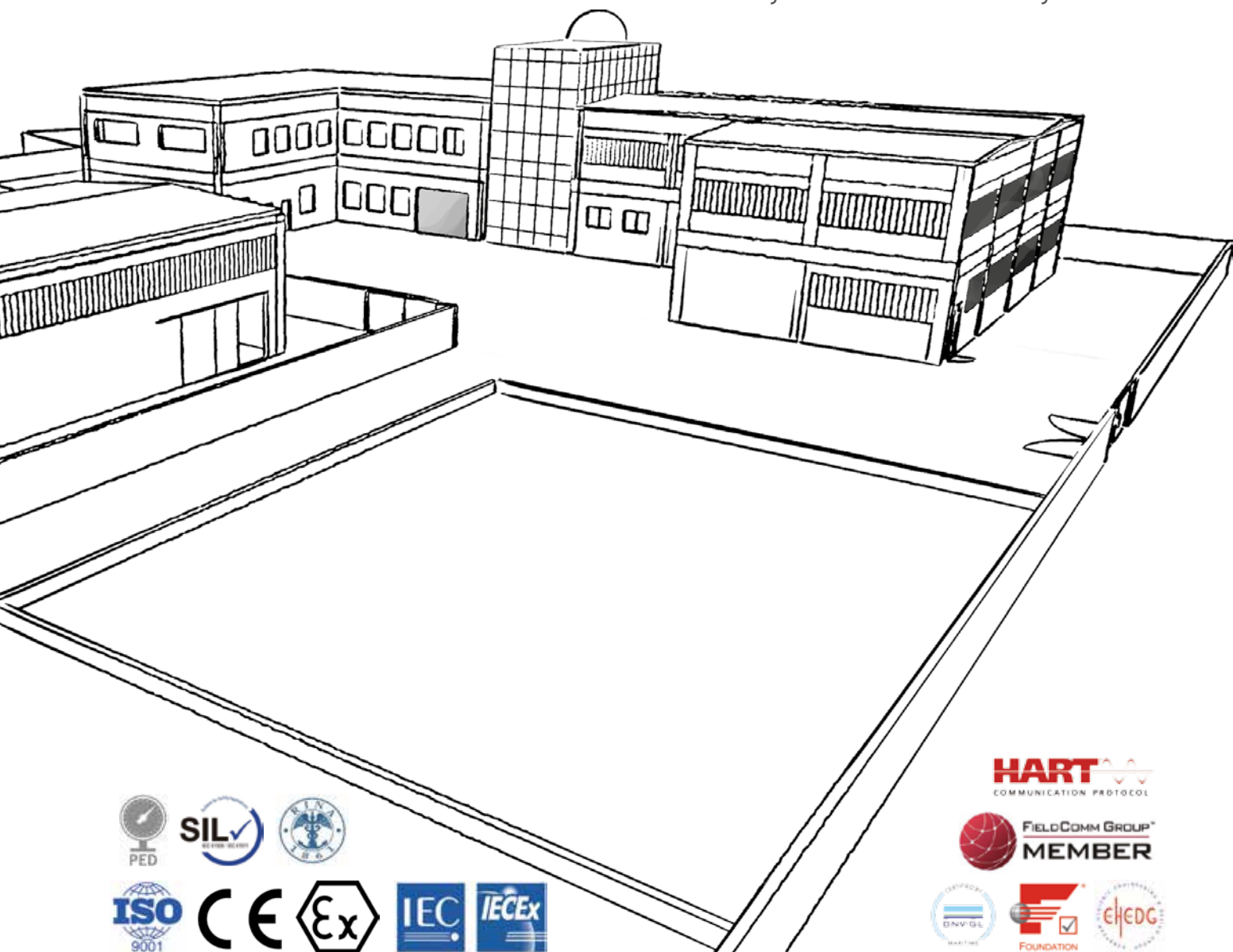
and Control, which can be system integrated into turn-key systems for various industrial sectors: Chemical, Oil & Gas, Pharmaceutical, Food, Power and Marine. ISO 9001, ATEX, PED & SIL certifications guarantee the products to be compliant with the up-to-date technical standards.





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