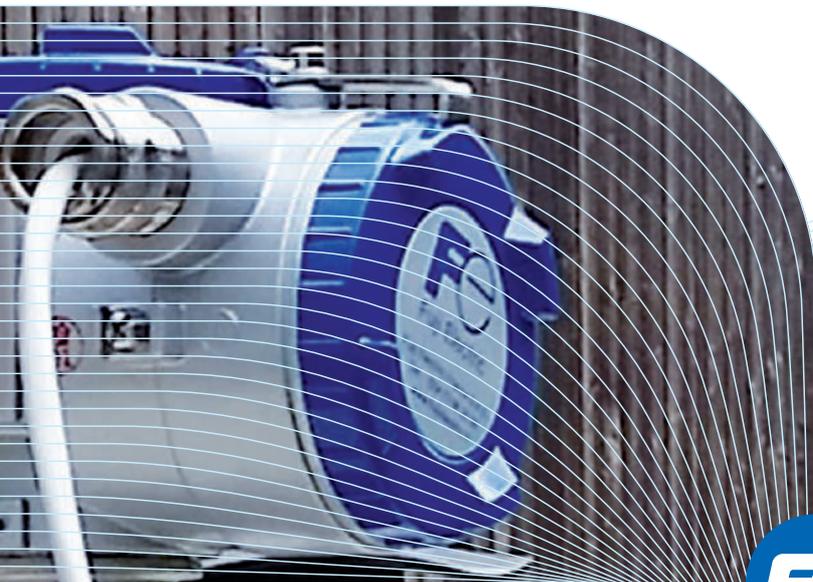
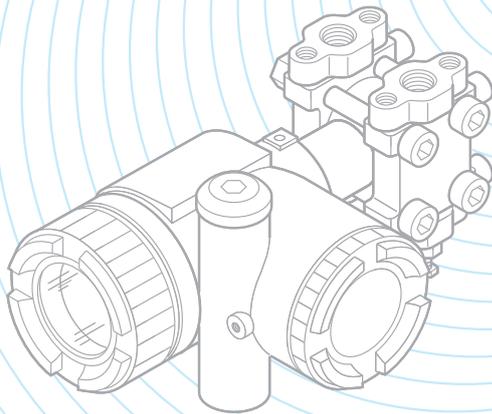


Pressure Transmitters

Pressure, Flow,
Level and Density
measurement

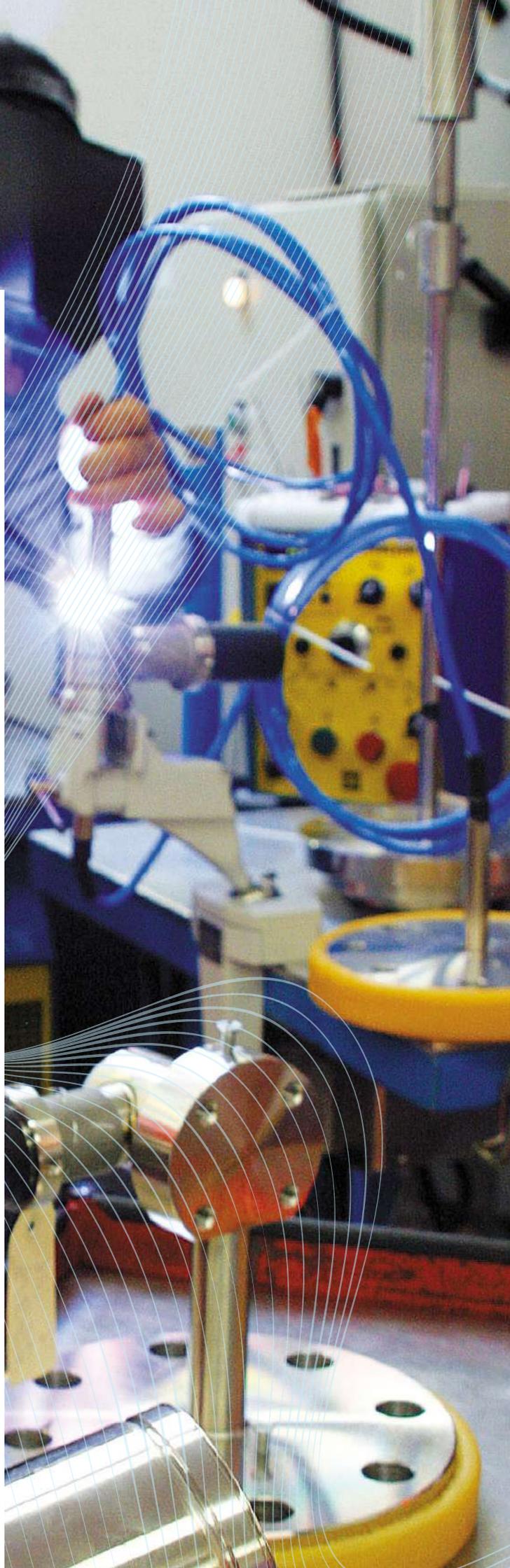


FCX-AII



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Introduction

Fuji Electric Co., Ltd. Group

Founded in Japan in 1923, the Fuji Electric Co., Ltd. Group is recognised as one of the world leaders in electrical power equipment, industrial controllers and instrumentation. With over 8 billion dollars in turnover and 27 000 employees* worldwide, Fuji Electric's engineers and technicians play an active part in all technological innovations in the field of energy optimisation and savings. Thanks to the experience it has acquired in developing electronic components and perfect command of the most recent technologies, Fuji Electric offers products which are perfectly adapted to applications in most industrial sectors including production, electrical energy transport and industrial equipment.

*As for March, 2019



Fuji Electric France S.A.S.

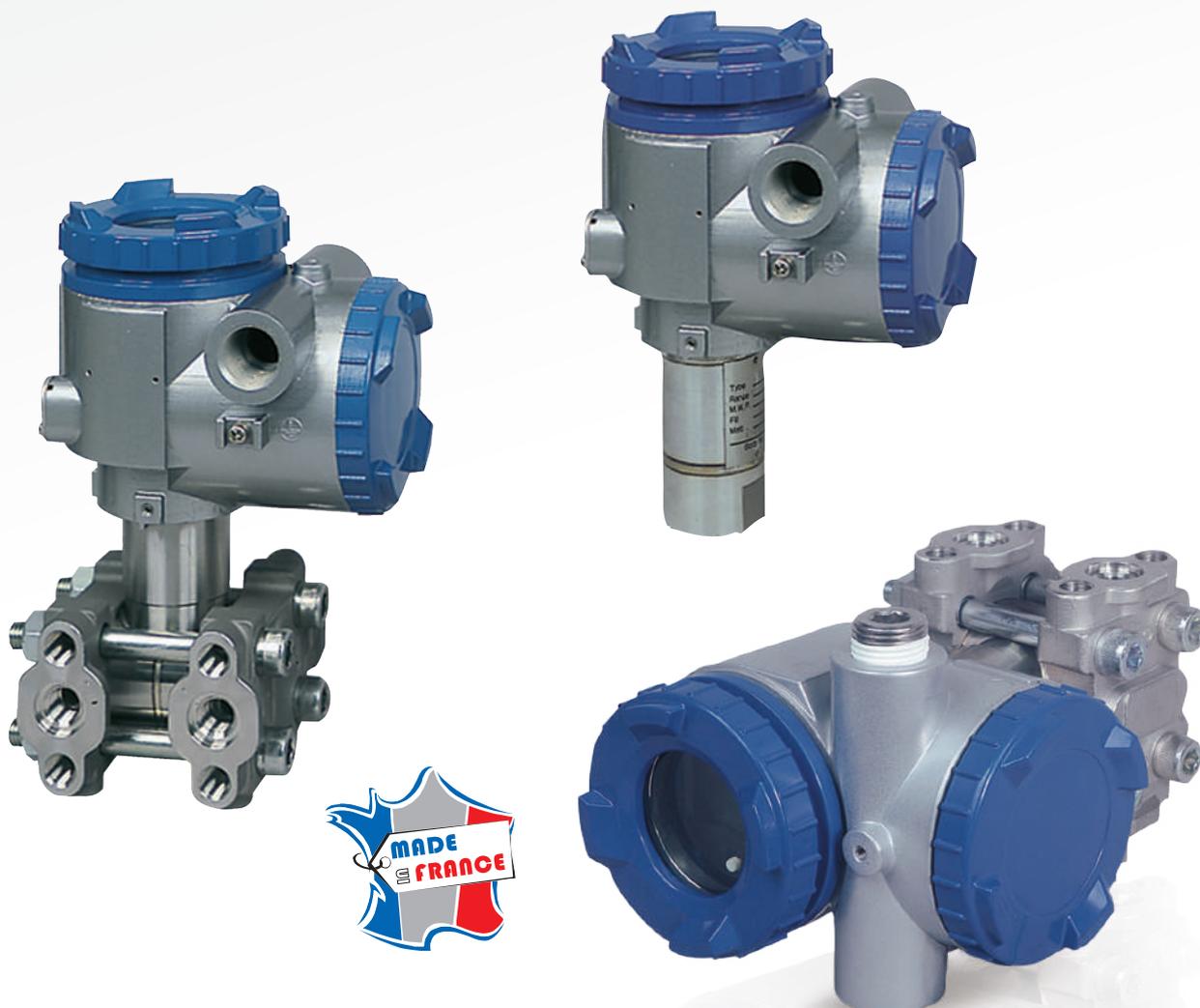
Fuji Electric France is a subsidiary company of the worldwide group, Fuji Electric Co. Ltd. The French company manufactures and sells in Europe the instruments that have built the Japanese group's reputation. As a recognised specialist in pressure transmitter manufacture, our area of expertise also covers all industrial instrumentation: measurement, monitoring, regulation, analysis of combustion gas, metering, energy optimisation and radiation monitoring.

Over the last 20 years, our manufacturing site at Clermont-Ferrand and recent expansion to Cournon d'Auvergne have enabled us to guarantee the fastest manufacturing turnaround times for our pressure transmitters and to provide a European wide service to our clients, for all our products.

Whatever the industrial sector of activity (oil & gas, chemicals, paper, food production, nuclear, energy, water & environment, etc.), Fuji Electric France is here to help you throughout the product life cycle with diagnosis, advice, solutions, assistance with operating and commissioning, to deliver you a tailored response that is best suited to your specific needs.



A transmitter at the edge of technology



Considered as one of the leaders in the pressure measurement field, Fuji Electric has installed numerous FCX transmitters around the world. Boosted by its experience and with the constant desire to meet its users' requirements, Fuji Electric France has continually enhanced the FCX-AII V5 into the best referring applicable transmitters of its generation. Thanks to the wide variety of ranges available and the numerous customisation possibilities, the FCX-AII version 5 pressure transmitter can be adapted to all applications, whatever the industrial sector.

The detecting cell in the FCX-AII V5 series cover measurement ranges between 1 mbar and 500 bar in differential, relative and absolute pressure. They also provide very well suited solutions for level, density and flow rate measurements. For specific applications, our engineers can assist you with a wide choice of remote flange types.

The standard accuracy of 0.065% (up to optional 0.04%), the wide turndown ratio (from 1 to 100) and the diversity of materials available for wetted parts (Tantalum, Monel®, Hastelloy C® or PVDF®) expand the scope of applications: chemicals, petrochemicals, energy, steel-making, pulp & paper, food & beverage or water treatment.

FCX-AII V5

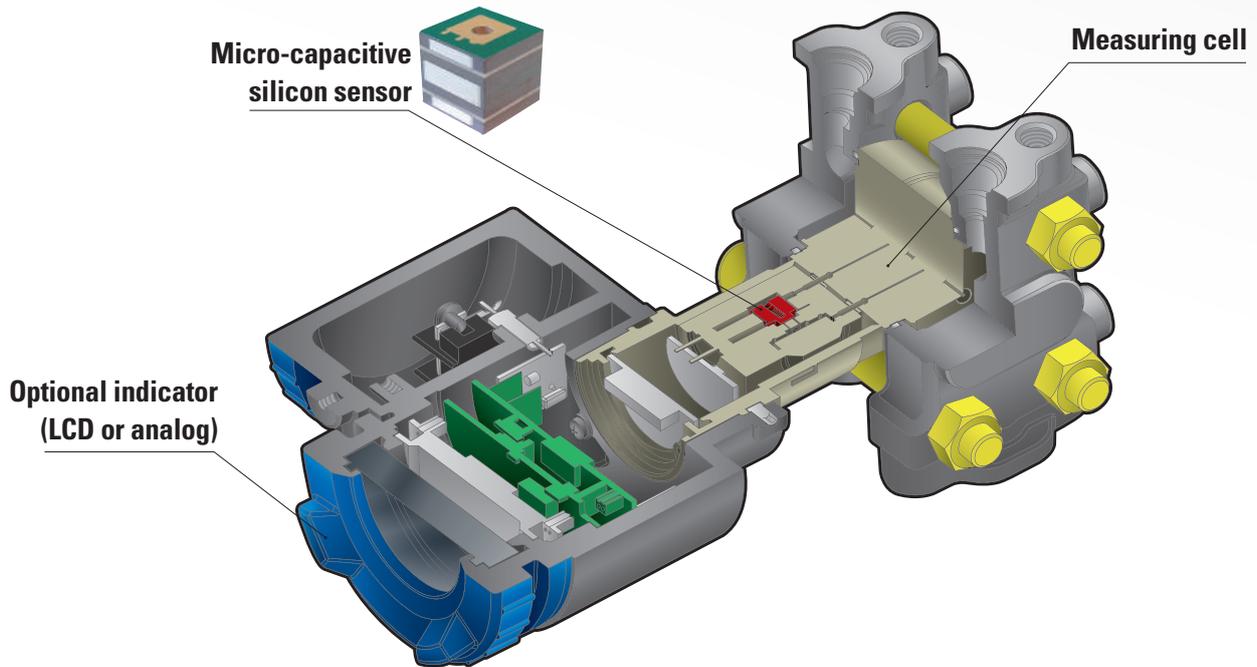
Benefiting from our advanced digital signal processing and the latest LSI ICs technologies, the FCX-AII V5 transmitter offers users excellent accuracy and repeatability.

The FCX-AII V5 is available in a "Smart" version with a 4-20 mA output current loop and HART® communication protocol. It is also available with the Foundation™ Fieldbus H1 communication protocol. The FCX-AII V5 transmitter's modular design enables interchangeability with different elements and so quick and easy maintenance for the appliance.

Micro-capacitive based technology

Accuracy	Standard: $\pm 0.065\%$ of the calibrated span Option $\pm 0.04\%$ of the calibrated span
Long term stability	$\pm 0.1\%$ max. span / 10 years

Differential pressure transmitters for static pressures up to 1380 bar (20 000 psi)



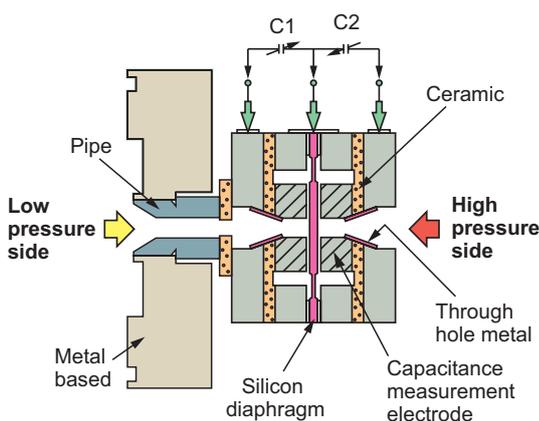
Using their experiences in microelectronic designs, Fuji Electric's engineers have developed a micro-capacitive effect sensor from a silicon chip, as a sensitive element in the measurement cell.

Using a silicon measurement diaphragm enables hysteresis and mechanical fatigue problems to be limited on the sensitive element and so provide the user with very high zero stability and long term reliability.

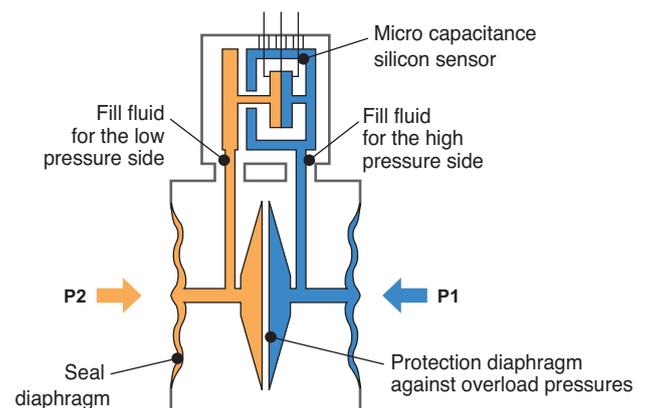
The FCX-All V5 transmitters are manufactured according to the ISO 9001 quality standard.

The sensitive element receives the differential pressure, which causes the two capacity values to vary. The "floating" design of the capacitive sensor drastically improves the static pressure effect and temperature characteristics.

Micro-capacitive element



Measuring cell



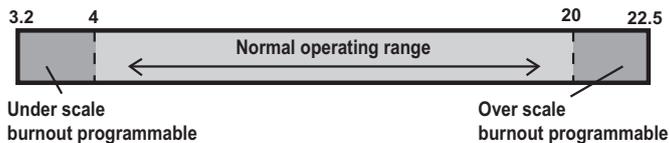
Optional functionalities

Digital indicator

The FCX-All V5 transmitter may be equipped with an analog or digital indicator. The digital indicator is based on LCD technology and shows the information on 2 lines each of 6 digits and also includes 3 push buttons. The indicator enables the measurement in engineering units and the local configuration of the transmitter.

Main settings:

- Zero/Span calibration without reference pressure service
- Linear or square root signal
- Damping
- Digital indicator configuration
- Zero/Span calibration
- Self-diagnosis
- Output circuit calibration
- Burnout value



Digital display of process value



Burnout current

In conformance to the NAMUR NE 43 recommendations, the 4-20 mA output of the transmitter can be driven to a specific value when a failure condition is detected.

The burnout current is programmable and can be either down scaled between 3.2 mA and 4.0 mA or over scaled between 20.0 mA and 22.5mA.

Maintenance functions

The calibration parameters are saved in the transmitter. At any time it is possible to come back to the factory calibration of the transmitter. Min and max temperatures are stored in the transmitter memory. It is always possible to visualize the values in a specific menu on the screen of the hand held communicator. All the adjustment functions of the transmitter can be locked by a password (the external adjusting screw is also locked).

Communication

The FCX-All V5 is a «smart» pressure transmitter that provides a 4-20 mA output with the HART® digital communication protocol. The FCX-All V5 is also available with the Foundation™ Fieldbus H1 communication protocol.

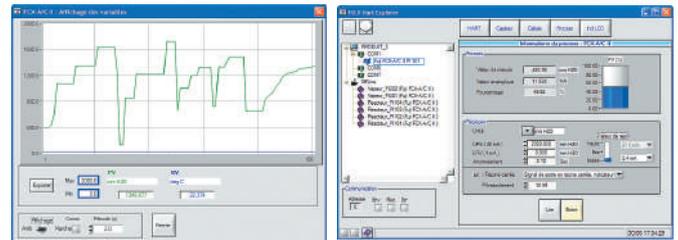
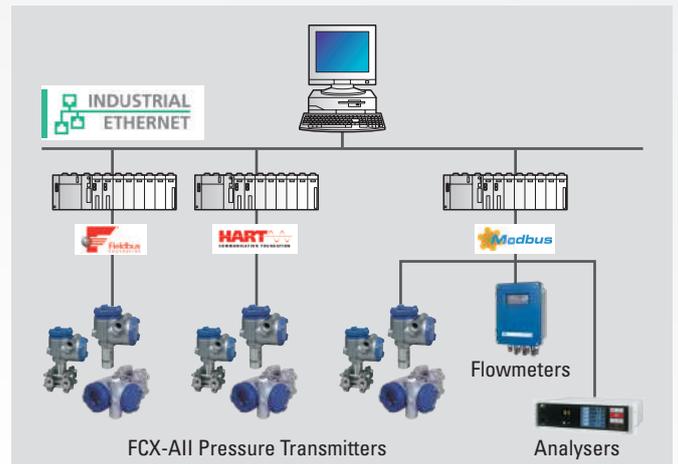
In its smart version, FCX-All V5 pressure transmitters can be configured using any hand held terminal that accepts HART® device description (DD) files.

Field Device Tool/Device Type Manager environments

Fuji Electric provides a full DTM package that allows FDT users to accede and configure all parameters of the FCX-All pressure transmitters. The Fuji Electric DTM package is compatible with all FCX smart series pressure transmitters.



HART® / USB modem



FCX-All VG pressure transmitters with safety functions

For a better monitoring and safety of your process

The FCX-All VG transmitter is certified SIL2 (HFT=0) and SIL3 (HFT=1) according to IEC 61508 and IEC 61511 standards. Together with an overall response time of 80 ms, the FCX-All VG version of the FCX-All transmitters provides improved process monitoring and process safety with its powerful processing capabilities. With an SFF of 97%, it offers the best safe failure rate on the market. The definition of periodic test intervals in accordance with expected and integrity ensures the optimization of costs and maintenance operations.



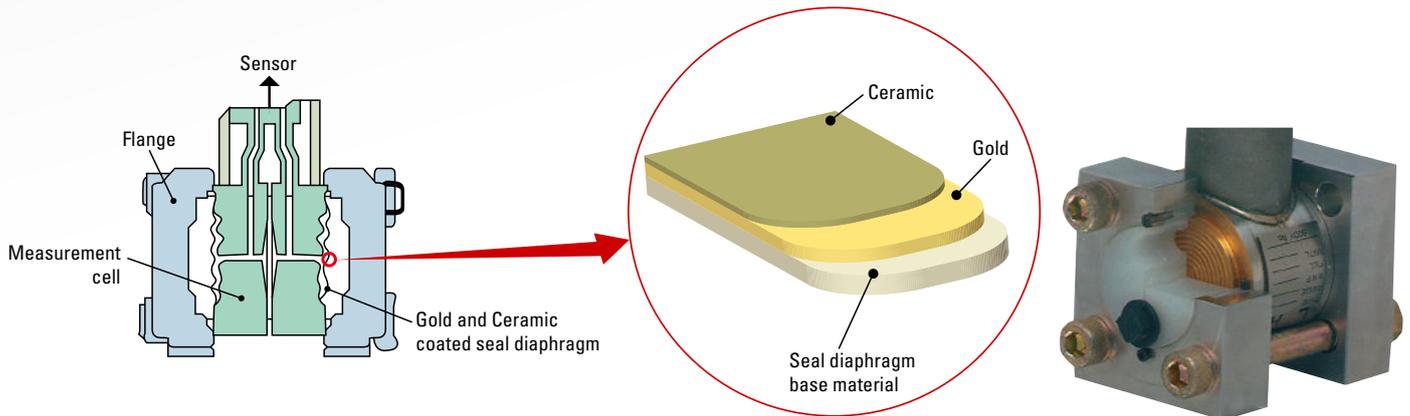
λ_{DU} (dangerous undetected)	37,6 10^{-9} /h
λ_{DU} (dangerous detected)	792 10^{-9} /h
λ_{SU+SD} (safe failures)	451 10^{-9} /h
SFF	97 %
PFH	3,8 10^{-8} /h

Transmitter measurement diaphragm materials

Gold and Ceramic coating : prevention of hydrogen permeation through the measuring diaphragm of the cell

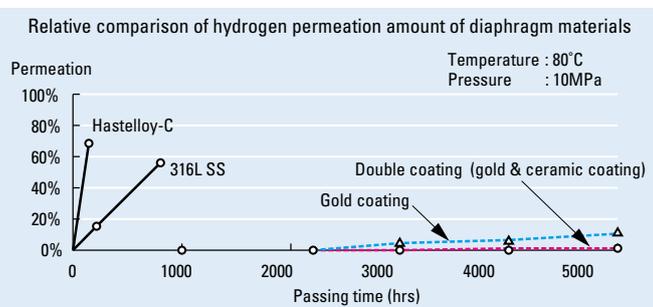
For certain configurations, the process fluids generate hydrogen ions that may permeate through the metal diaphragm. The contamination of the oil associated with this diffusion degrades the transmitter's measurement accuracy and life time. Thanks to our gold and ceramic double-coating diaphragm, the hydrogen's permeation is stopped. In this configuration, the transmitters may be used in sulphur reduction installations, hydrogen production units, oil refineries and putrefaction mud treatment works.

Double coating seal diaphragm for the prevention of hydrogen permeation



Hastelloy C[®], Tantalum, Monel[®]: anti corrosive and chemical attacks

Different materials and coatings are available for the pressure transmitter diaphragms to guarantee the longevity and reliability of your measurements.



Materials	Applications
Gold and Ceramic coating	Sulphur reduction installations, hydrogen production units, oil refineries and putrefaction mud treatment works, ionised gas (hydrogen sulphide)
Tantalum	Hydrochloric acid, sulphuric acid, nitric acid, aqua regia
Titanium	Chloride salt, sulphate compound

Materials	Applications
Hastelloy C [®]	Organic acid, inorganic acid, alkaline type
Monel [®]	Alkaline type, fluorinated acid
Zirconium	Hydrochloric acid, caustic soda, whitening agent

Level and remote seal transmitters

Fuji Electric France manufactures transmitters which are ideally suited to applications which use aggressive, adhesive, crystallising and highly viscous fluids which are dangerous for the environment or toxic, and for high process temperatures.

The diaphragm manufactured in an appropriate material (stainless steel, Hastelloy C®, Tantalum, Monel®, etc.) enables the measured fluid to be separated.

This means that the most difficult measurement requirements can be satisfied by combining the measurement instrument with remote seals. Numerous types of connection may be adapted to existing or future installations (threaded, screw-in, flanged, adaptors, axial, radial, "wafer" type and sanitary connections).

The remote seals also have the advantage of having a large contact surface with the fluid and guarantee precise pressure measurement.

Depending on the application (vacuum, temperature, food, etc.), the system is filled with particular, adapted and specific oils (silicon, fluorinated, food, etc.). It transmits the pressure hydraulically to the measurement instrument. For extreme temperatures (-90 to +400°C), vibrations, capillaries with stainless steel or PVC protecting sheaths enable the measuring cell and its electronics to be distanced and preserved from the heavy process.

- High static pressure
- High overload resistance
- Multiple assemblies
- Temperature variant (ambient and process)

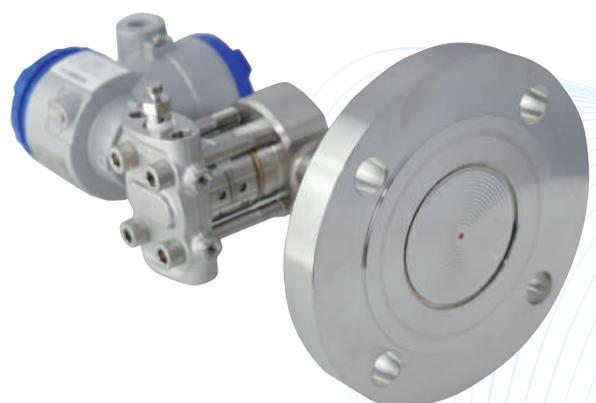


High temperature and high vacuum level applications

Up to 200°C and 0.27kPa abs

Our special treatment for remote seal transmitters enables precise and stable measurement even at high temperatures and high vacuum levels. To guarantee the quality of our products, we apply strict controls throughout the manufacturing process:

- Degassing for parts at high temperature and under high vacuum level.
- Vacuum and high temperature treatment for filling fluid.
- Remote seal filling at high temperature and under high vacuum



“Custom built” technology

Fuji Electric France has a Research & Development department which works closely with customers to find the best solution for their applications.

Flanges, remote seal(s) and specific connections are studied and designed by a team of specialist engineers and technicians (according to customers' specifications) and using powerful Computer Aided Design and Manufacturing tools.

1

Raw materials:

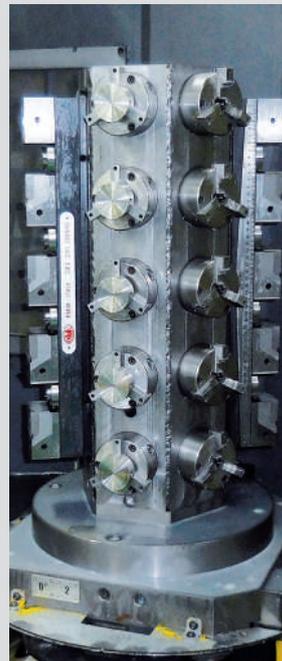
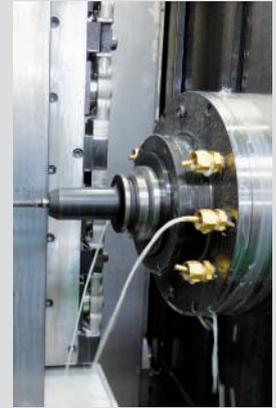
Large stock capacity of stainless steels and noble materials (Hastelloy C®, Tantalum, Duplex®, etc).



2

Part machining and production:

A workshop comprising a range of machining centres and numeric controlled lathes provides high flexibility to the production unit set up in the new Cournon d'Auvergne factory (France).



5

Cells filling:

Filling pressure transmitter measurement cells is a crucial manufacturing stage. Different oils can be used according to the targeted process and the customer's requirements.



Two sites dedicated to transmitters production

Two production sites, Clermont-Ferrand and Cournon-d'Auvergne, and modern equipment to meet your specific needs. Whatever your process, whether you need standard or specific transmitters, our team of specialists is at your disposal to find the concept and solutions which are best suited to your applications.

3

TIG welding stations:

Manually or automatically-operated, Tungsten Inert Gas welding (TIG) technology guarantees robust and reliable assemblies. These specialised welding facilities enable us to assemble the diaphragm seals, the capillaries and directly mount the seals on the transmitters. All welds are checked by a Helium mass spectrometer to guarantee the integrity of the weld.



4

Clean room:

The cell, the core of the pressure transmitter, is manufactured in a 10 000 class clean room which provides the highest level of integrity. This installation, which is combined with the other study, machining, assembly and calibration resources, enables Fuji Electric France to control the whole pressure transmitter manufacturing chain and so provide a precise and reliable product which meets the customer's requirements to the letter.



6

Calibration benches:

All Fuji Electric France pressure transmitters are individually calibrated on computer based automatic benches. The recent design of these calibration systems guarantees high precision as well as the full traceability across the entire production chain.



Our pressure transmitters are manufactured in France in our 2 production sites (Clermont-Ferrand and Cournon-d'Auvergne).

Quality & Environment

To ensure customer satisfaction, Fuji Electric France has set up an integrated management system based on the continuous improvement principle, in accordance with the requirements in the ISO 9001 and ISO 14001 international reference bases (For Clermont-Ferrand and Cournon-d'Auvergne plants).



QUALITY CERTIFICATION

ISO 9001: 2015 Quality Management System
(certificate No. 1997/8402).

CALIBRATION

All our pressure transmitters may be provided with a 5-point calibration record using gauges connected to various international systems (ILAC-MRA, Cofrac, DKD, etc.).

On request and for specific installations, the traceability of the connection of the measurement instruments used may also be mentioned.



ENVIRONMENTAL CERTIFICATION

ISO 14 001: 2015 Environmental Management System
(certificate No. 2014/59264)

METROLOGY

Fuji Electric France has its own metrology laboratory in its Clermont-Ferrand (France) factory.

A three-dimensional viewing machine enables precise and quick verification of the different mechanical parts which make up the transmitter. Different pressure balance are used to calibrate transmitters under static pressure up to 1400 bar. A high accuracy pressure balance is used to calibrate our reference equipment.



Accreditation & Certification

EXPLOSIVE ATMOSPHERES

- ATEX (Europe)
- IECEx (World)
- cCSAus (Canada, United States)

PRODUCT CONFORMITY

- CE (Europe)
- Metrological certificates (Russia)

ENVIRONMENTAL GAS ANALYSERS

- TÜV and MCERTS QAL1 EN14181 (Europe)
- DNV-GL and LLOYD'S REGISTER (Marine Certifications)

PRODUCT SAFETY

- K3-A/1E and K3-AD/1E (EDF Nuclear)
- IEC 61508 SIL2/3 (World)
- PED (Europe)

PRODUCT TRACEABILITY

- ISO 15156-3 conformity
- NACE MR0103/MR0175 (World)

Marine type approval

The FCX-AIII (All V5) and FCX-AII series have received DNV-GL marine Type Approval Certificate. The products tested conform to the certification requirements and are authorised for installation in the locations listed below:

Temperature D	Open deck on a ship with ambient temperatures from -20°C to +70°C
Humidity B	Anywhere on the ship with a humidity rate up to 100%
Vibration B	Equipment such as combustion engine pumps and their associated pumping system
EMC B	Everywhere on the ship, including the deck and the open deck
Enclosure C	Open deck, lower deck, lower plates in the engine room



Services

Fuji Electric is available to assist you in the metrological follow-up and maintenance of your instruments. Together, we devise a plan that is best suited to your industry, and our team remains at your disposal throughout the entire life cycle of the equipment.



ASSISTANCE

Commissioning, maintenance contracts and on-site calibration (certificates)

ADVICE

Diagnostics and solutions for measuring, monitoring, regulating, automating and optimising procedures

REACTIVITY

Repair centre and supply of spare parts at our Clermont-Ferrand factory

TRAINING

Approved training centre for all products

EXPERTISE

Calibration services carried out with measurement tools in line with national standards

On-site calibration

The use of a pressure calibration case enables our technicians to carry out all pressure transmitter verification and maintenance operations on-site. Just as for a workshop service, a 5-point calibration reading carried out using gauges connected to the different internal systems (ILAC-LRA, Cofrac, DKD, etc.) is provided. In combination with on-site temperature and flow rate verification resources, our team can carry out full maintenance and calibration campaigns for your on-site instruments.

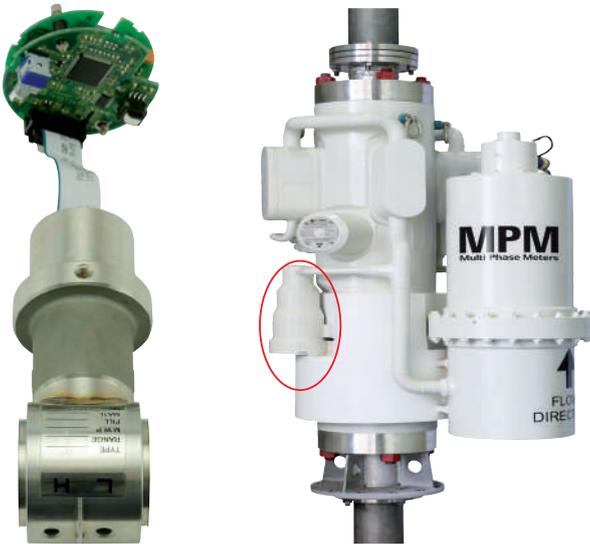


OIL & GAS APPLICATIONS

Since 1996, Fuji Electric France has been developing specific differential pressure transmitters for oil applications and which are ideally suited to Topside and Subsea applications (depths down to 4000 meters).

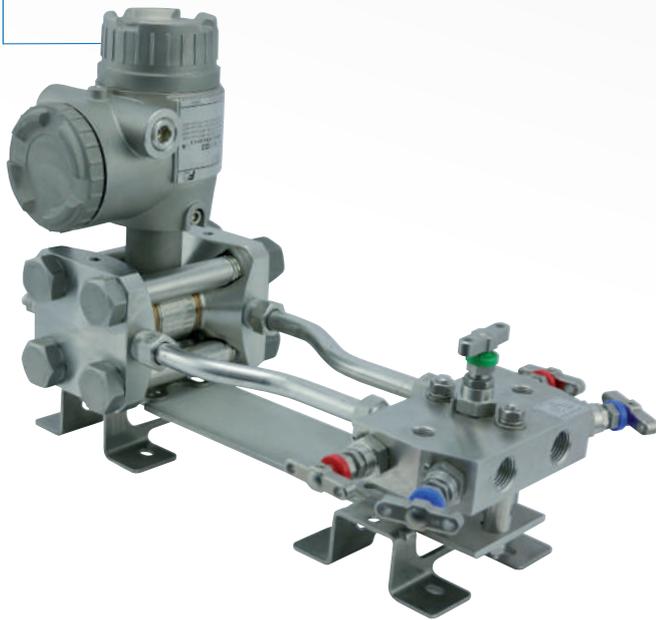
Thanks to technology based on a "floating" design of its sensitive element, our differential pressure transmitters enable flow measurements with the following static pressures :

- 7500 psi (517 bar),
- 10 000 psi (690 bar),
- 15 000 psi (1035 bar),
- 20 000 psi (1380 bar).



Differential pressure transmitter compact mounting

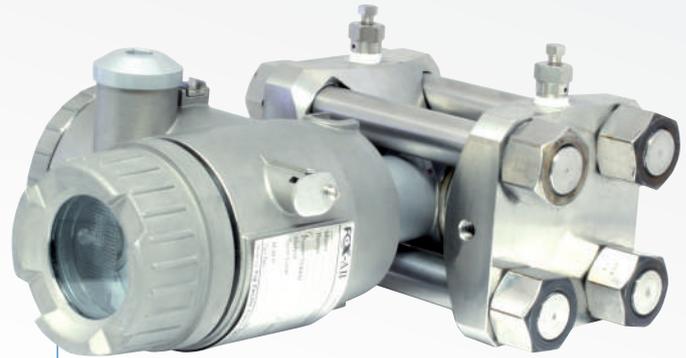
for static pressure up to 10 000 psi (690 bar)
with 5-valves manifold.



Approvals :



PED



Differential pressure transmitter
for high static pressure
up to 15 000 psi (1035 bar).

Application :

Topside flow rate measurements under
extreme environmental conditions.

Numerous designs are possible:

Process connection by remote seals
for high static pressure differential
pressure transmitters
(Hub connectors, API,
SPO standards or
at customer request).



Remote seals & options



API Standard



Flushing ring



Specific remote seals

NUCLEAR APPLICATIONS

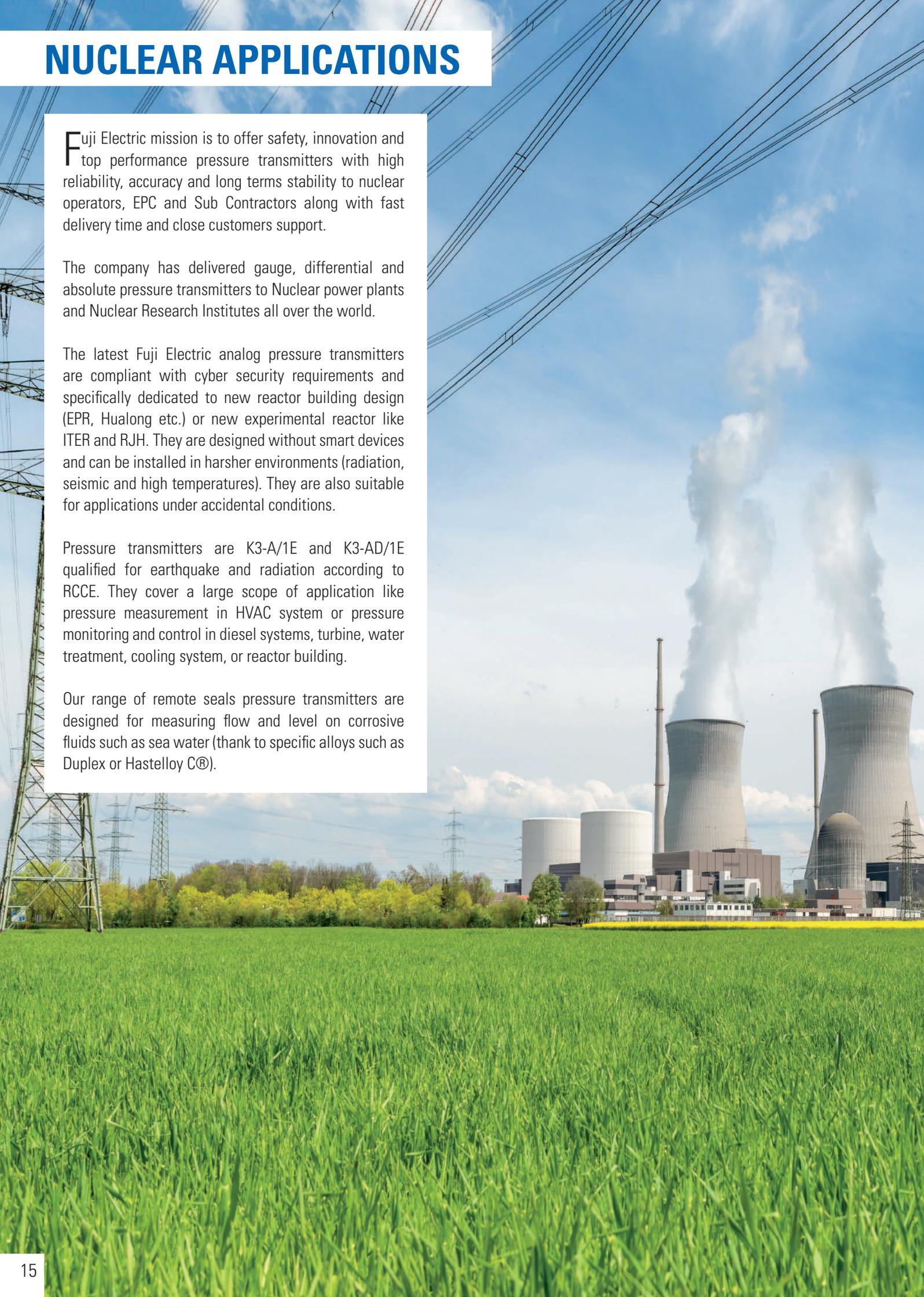
Fuji Electric mission is to offer safety, innovation and top performance pressure transmitters with high reliability, accuracy and long terms stability to nuclear operators, EPC and Sub Contractors along with fast delivery time and close customers support.

The company has delivered gauge, differential and absolute pressure transmitters to Nuclear power plants and Nuclear Research Institutes all over the world.

The latest Fuji Electric analog pressure transmitters are compliant with cyber security requirements and specifically dedicated to new reactor building design (EPR, Hualong etc.) or new experimental reactor like ITER and RJH. They are designed without smart devices and can be installed in harsher environments (radiation, seismic and high temperatures). They are also suitable for applications under accidental conditions.

Pressure transmitters are K3-A/1E and K3-AD/1E qualified for earthquake and radiation according to RCCE. They cover a large scope of application like pressure measurement in HVAC system or pressure monitoring and control in diesel systems, turbine, water treatment, cooling system, or reactor building.

Our range of remote seals pressure transmitters are designed for measuring flow and level on corrosive fluids such as sea water (thank to specific alloys such as Duplex or Hastelloy C®).



"K3-A, K3-AD category"

classified or no classified digital or analog pressure transmitters (absolute, relative or differential pressure).

Approvals :



Reference bases:

ISO 9001 v.2015 ISO 14001
HAF604 ATEX QN100/QN200/QN300
RCC-E ed. 2007 and 2012



"K3-AD category" classified or no classified digital or analog remote seal(s) pressure transmitters (relative or differential pressure).

Options



Removable electrical connectors
(Souriau, SAIB & Jaeger)



Local digital indicator



HP and LP inverter

ENERGY METERING APPLICATIONS

The energy metering solutions offered by Fuji Electric France allow to reduce energy consumption, to measure, optimize and invoice the energy produced or consumed via the water, air, gas and steam networks.

A complete range of differential pressure mechanisms (Pitot tube, micro-venturi, wedge, diaphragm, annular chamber, venturi, nozzle, V-Cone®) and associated accessories provide precision measurement of fluids in the most extreme conditions.

The corrected flow measurements offered meet the current construction standards ISO5167, ASME MFC-3M, DIN, BS 1042, API 2530, NF X10-112 and can be used in commercial transactions. Our measuring devices are in conformity with the European Directive 97/23 EC.

In addition to its measuring and metering equipment, our team is here to help you with the supply, commissioning, maintenance and calibration of your heating or cooling energy metering applications.



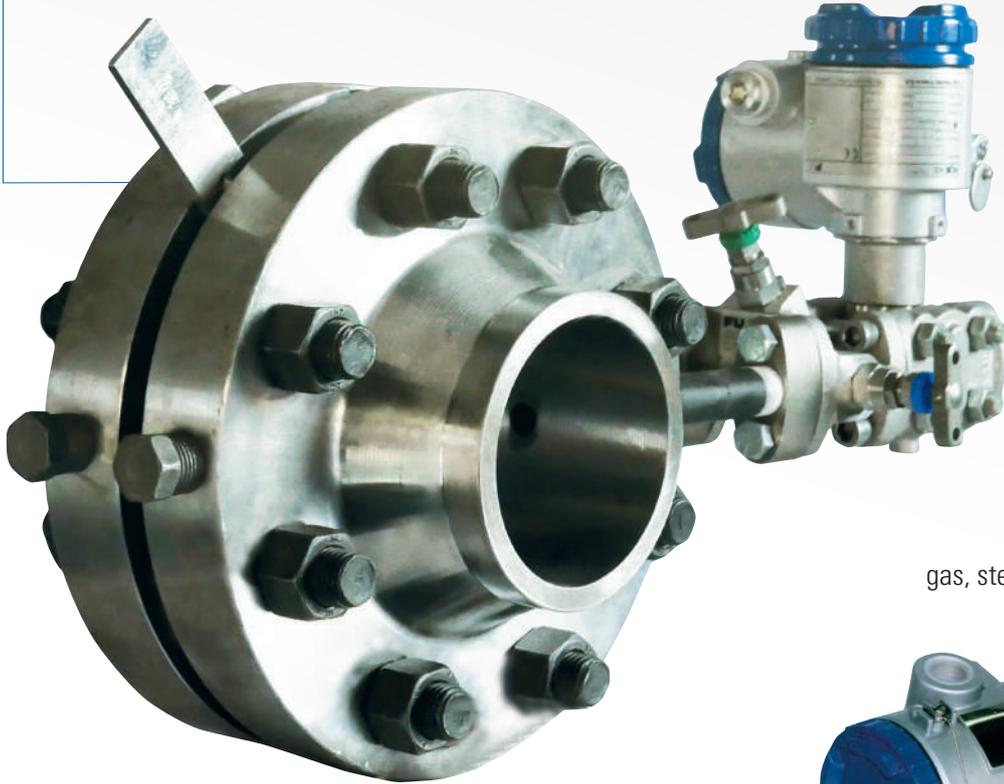
Flow measurement by differential pressure device (orifice plate) for application on gas, liquid and steam.

Approvals :

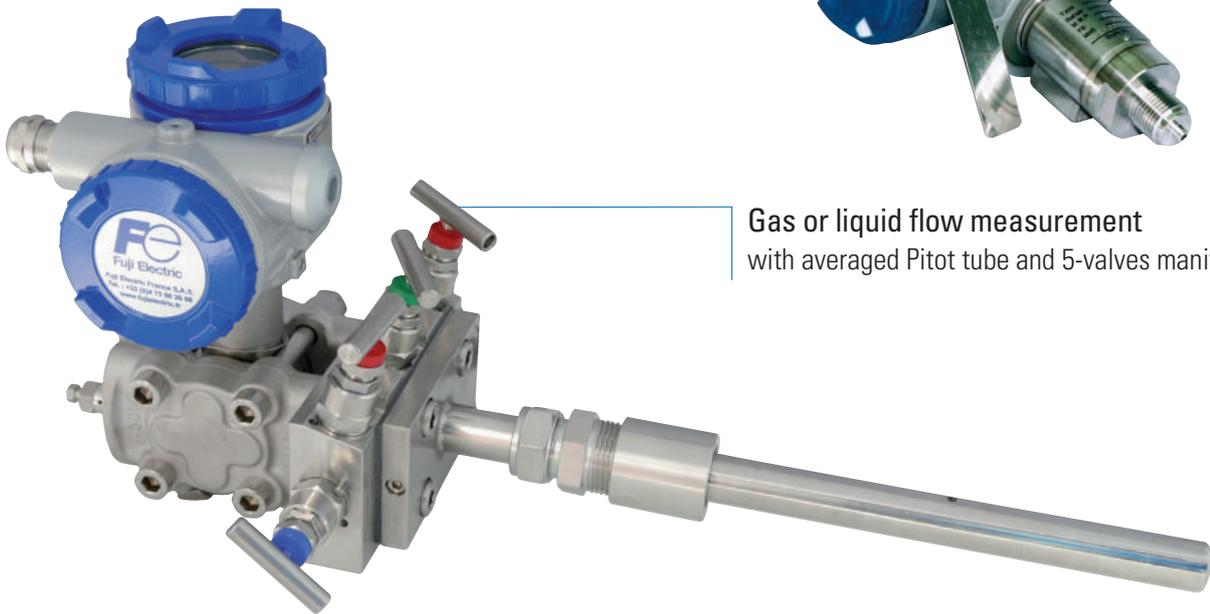


ISO
5167

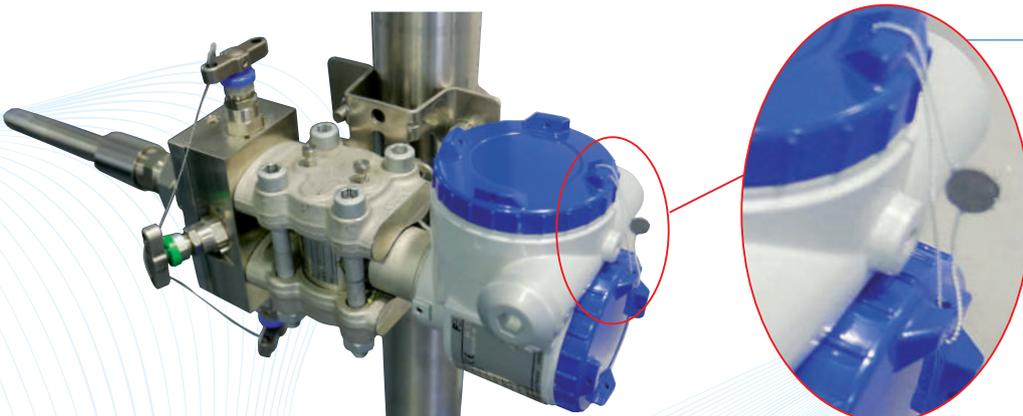
NF
X10-112



Relative or absolute gas, steam or liquid pressure measurement via a manometric connection.

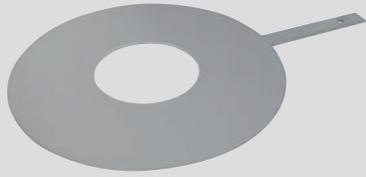


Gas or liquid flow measurement with averaged Pitot tube and 5-valves manifold.



For metering applications special covers are proposed as an option for sealing purpose.

Differential pressure devices for flow measurement



Single or multi orifice plate



Monoblock orifice and annular chambers



Nozzles



Wedge

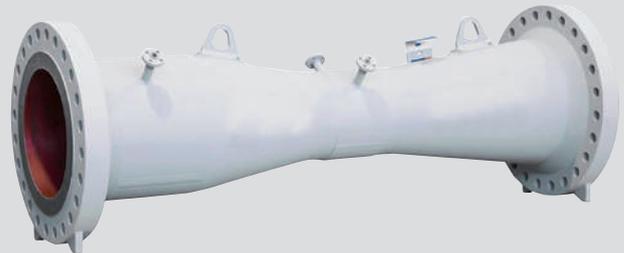


V-cone®

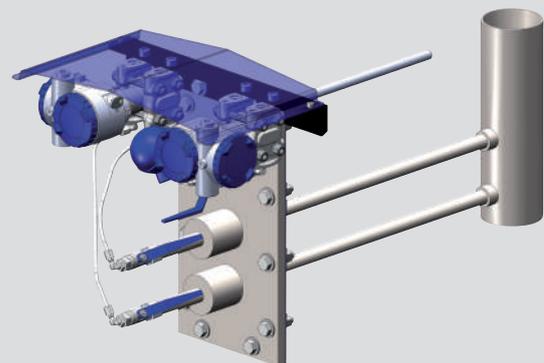
Depending on the complexity and diversity of applications in differential pressure flow measurement, Fuji Electric offers a wide range of primary elements (orifice plate or diaphragm, venturi tube and nozzle) to find the most suitable solution to your process.



Integrated orifice plate



Venturi



Micro venturi



Averaging and single point Pitot tube

Accessories for pressure transmitters



Manifolds



Condensation collectors



Expansion siphons



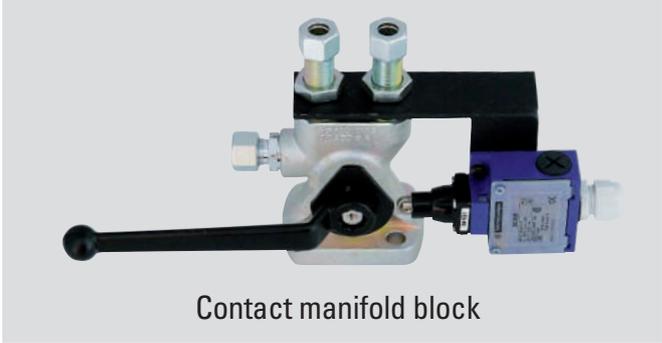
Insulation valves



Standard or ADF glands

Accessories for reliable and easy pressure transmitter mounting in the process:

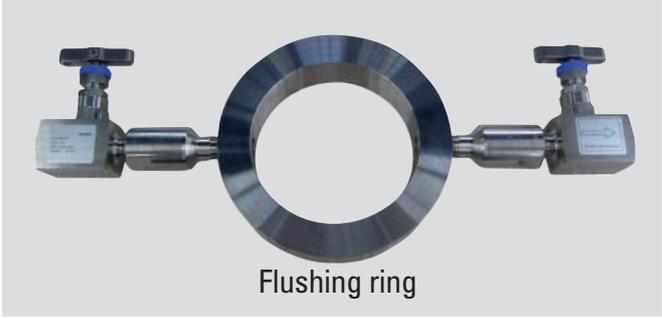
- Insulation valves, expansion siphons, pressure gauges, manifolds that can be used for steam applications and at high temperatures.
- Condensation collectors, connectors, plugs and glands.



Contact manifold block



BIM block



Flushing ring



Protection enclosures

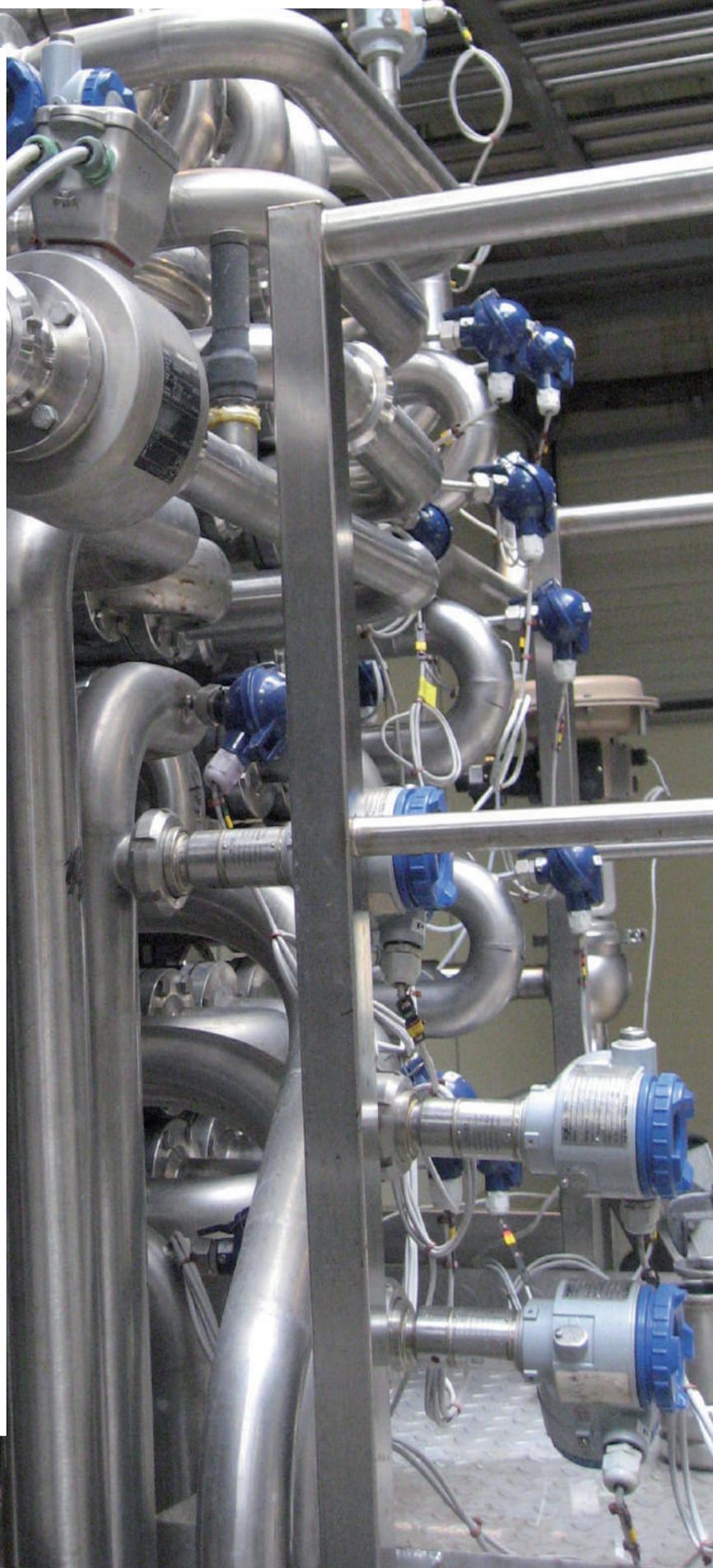
FOOD & BEVERAGE, PHARMACEUTICAL AND COSMETIC APPLICATIONS

Thanks to the numerous references and approvals available for food & beverage, pharmaceutical and cosmetic applications, Fuji Electric France manufactures hygienic relative, absolute and differential pressure transmitters that guarantee safety and reliability for your measurements.

A wide range of process connections is available for hygienic and sanitary applications according to DIN 11851, DIN 11864, DIN 32676, VARIVENT®, NEUMO®, etc. Types of materials and surface roughness comply with the main international hygienic and sanitary standards (EHEDG, 3A, FDA, ASMEBPE).

The filling oils used (Neobee® vegetable oil, mineral oils) comply with FDA requirements. The flush design of the remote seals provides excellent temperature and overpressure resistance, ensuring easy "Cleaning-in-Place" (CIP) and "Sterilization-in-place" (SIP) processes.

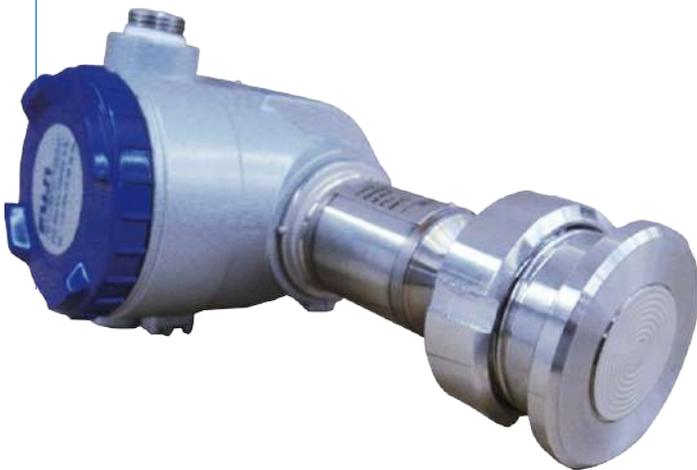
In addition to process pressure and hydrostatic level measurements, Fuji Electric France pressure transmitters can be used to measure inert gas layer, filter dirt build-up, filling pressures and clean room overpressures.



Transmitter/remote seal assembly
DN50 according to DIN 11851



Specific "no dead volume" remote seal,
assembled with coupling nut DN25
according to DIN 11851.



Inline relative
pressure
measurement
for sterile installations
with pure fluids in flow.



Remote seals & process connections



Food & beverage connections
according to DIN 11851 and SMS



VARIVENT®
connections



DRD connections



Tri-Clamp
connections

CHEMICAL APPLICATIONS

Pressure transmitters are used wherever the customer requires precise and long-lasting measurements. The R&D team expertise and the reliability of our equipment have enabled us to increase the performance and quality of our products in order to meet the many technical challenges of the chemical industry.

Applications in the chemical industry (distillation columns, reactors, separators, etc.) are characterized by very wide temperature and pressure ranges. The pressure transmitters and their process seals are temperature-compensated to ensure accurate and reliable measurements under all ambient and process conditions.

For the storage and supply of raw materials to processes (tanks and buffer tanks, storage of solvents, toxic liquids, ammonia, chlorine, etc.), Fuji Electric has a wide range of level transmitters with separator(s) capable of withstanding the harshest chemical aggressions. The materials used (stainless steel, Hastelloy C®, Tantalum, Monel®, etc.) ensure a long service life of your devices.

Safety is our priority. Our pressure transmitters are certified for use in hazardous areas and comply with the SIL safety regulations. Standard or custom-made transmitters can be delivered in a very short time.

Fuji Electric France is here to help you with the instruments choice, commissioning and maintenance that is best suited to your specific needs.



Approvals :



Flow measurement

with integrated orifice plate in Hastelloy C® and bases in PVDF for chemical resistance to Chlorine.



Differential pressure transmitter

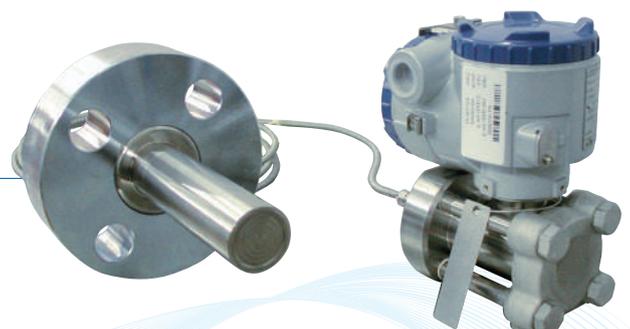
for level or density measurement, mounted with 2 remote seals, the wetted parts are PFA® coated to remedy adhesion of the fluid on the diaphragms.



Level transmitter on closed tank, equipped with remote seals with gold coating for protection against corrosion.



Relative pressure measurement for urea application in the chemical industry with specific material definition.



PAPER MILL APPLICATIONS

Whatever your process (pressure, level or flow), Fuji Electric France pressure transmitters are widely used in paper, cardboard or pulp and paper manufacturing plants and are a guarantee of productivity and plant availability.

The outstanding measuring functions combined with their compact design and ruggedness make our pressure transmitter the ideal product for pulp and paper applications.

Their process connections with extension position the membrane directly in contact with the process without dead volume, eliminating clogging problems associated with viscous fluids that have crystallising, polymerising or precipitating properties.

Special remote seals enable them to withstand strong pressure shocks and abrasion for level measurement in pulpers during the dissolution of waste paper and cellulose. Relative pressure transmitters are used during the fiber separation phases.

During the pulp implementation phases, the transmitters measure the level in the accumulation and drainage towers and in the constant part that serves as a link between the pulp preparation and the paper machine.

For applications on paper and board machines, remote flange models are used to measure the pressure and level of the headbox of the paper machine, as well as the vacuum on the press and sieve section.

Fuji Electric France transmitters operate on the dryer section to measure pressure and steam flow on the cylinders.



Relative or level pressure measurement on tank at atmospheric pressure with flush diaphragm.



Remote seal with ceramic coating to protect the diaphragm against abrasion, often used in paper-making, oil industry, waste water treatment, powder transport, etc.



Level transmitter with extension remote seal and specific length according to customer request.



Level transmitter on open tank equipped with a G2" remote seal and flush diaphragm (also available in 1" and 1.5" version).



Remote seals & process connections



M44 x 1.25 screw-in remote seal



1" – Flush remote seal



G1", G1"1/2 and G2" remote seal



Remote seal with ceramic coating

WATER & ENVIRONMENT APPLICATIONS

For water treatment and environmental applications, Fuji Electric France offers a range of transmitters for pressure, flow and level measurement suitable for aggressive and corrosive fluids.

To limit abrasion during sewage or sludge treatment with loaded water (suspended solids, scum), mountings with flush diaphragm screw-in remote seals are available.

For desalination plants, Fuji Electric France supplies pressure transmitters with diaphragms and parts in contact with the fluid made of Hastelloy C®, Monel® or ceramic coating as well as stainless steel housings to avoid salt aggression.

For organic sludge wet oxidation processes, gold and rhodium coated duplex separators and diaphragms prevent any risk of hydrogen permeation and corrosion.

Thanks to their unique design, our pressure transmitters are extremely resistant to impact, vibration generated by positive displacement pumps and overpressure (water hammer).

This range is in conformity with the major drinking water approvals required for measuring devices. With Fuji Electric France, you can be sure of reliable and accurate measurement whatever the conditions of use.

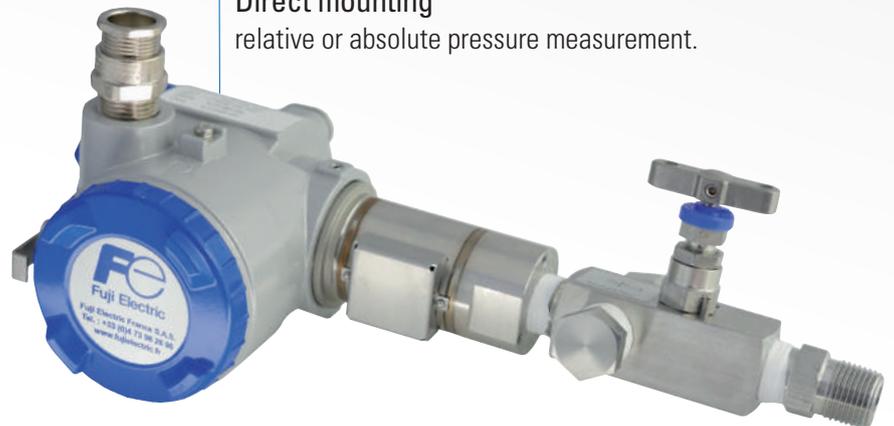


Standard differential pressure measurement for level, flow rate or filter dirt build-up measurement.

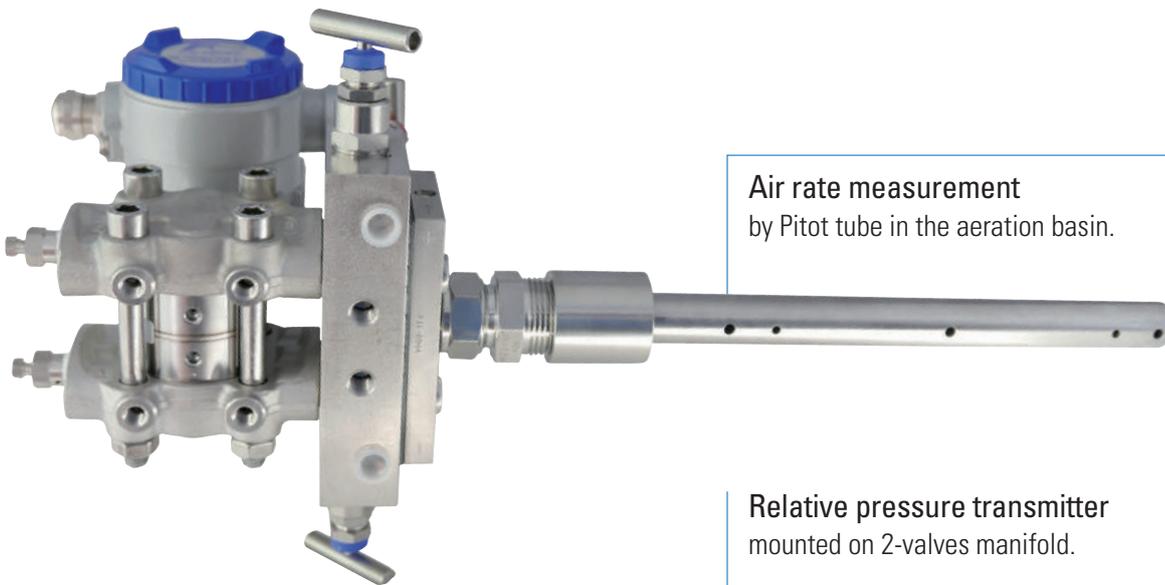
Approvals :



Direct mounting relative or absolute pressure measurement.



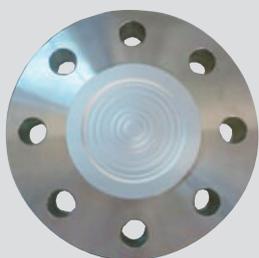
Air rate measurement by Pitot tube in the aeration basin.



Relative pressure transmitter mounted on 2-valves manifold.



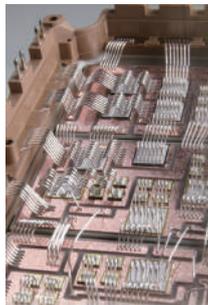
Remote seals & process connections

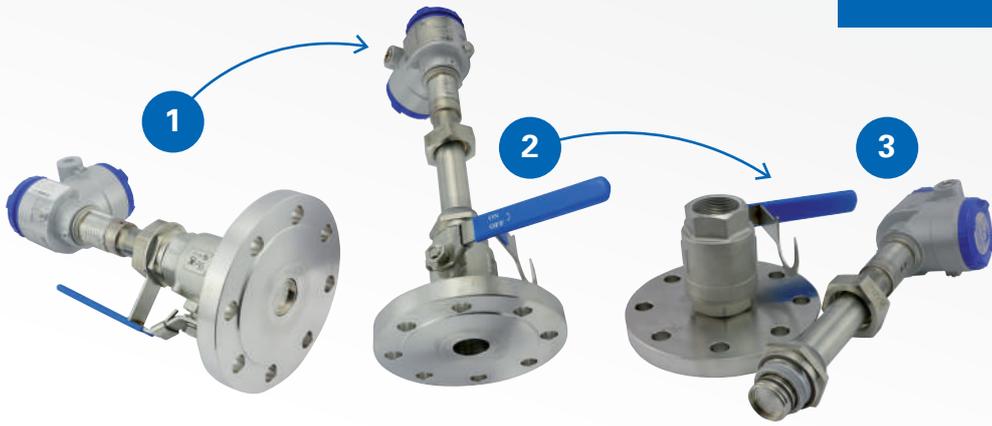


Remote seal with gold/rhodium coating

VARIOUS PROCESS APPLICATIONS

Fuji Electric France studies the specific needs of its customers in order to propose a solution adapted to their applications and conditions of service. For this reason we are constantly expanding the versions of our transmitters and specific remote seals.





Pressure or level transmitter
with cooling element
for use at max. process
temperatures
of 230°C.

Applications:
Dairies, bitumen.

Pressure or level transmitter
with dismounting under load
(ball valve to isolate the
transmitter from the process).

Applications:
Sugar production, paper
production and other
continuous processes.

Disk-type remote seal pressure transmitter
for highly abrasive processes.

Applications:
Concrete, drilling, mines and quarries.



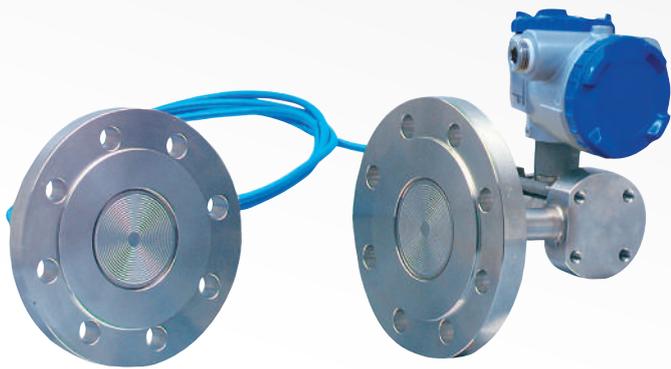
**Relative
pressure transmitter**
with G1.5" connection.

Application:
Aerospace.



Technical Specifications

Transmitters type					
	<i>Differential pressure kPa (mbar)</i>	<i>Relative pressure kPa (bar)</i>	<i>Absolute pressure kPa (bar)</i>	<i>Direct mounting relative pressure kPa (bar)</i>	<i>Direct mounting absolute pressure kPa (bar)</i>
Maximum span	1 (10) 6 (60) 32 (320) 130 (1300) 500 (5000) 3000 (30000) 20000 (200000)	130 (1,3) 500 (5) 3000 (30) 10000 (100) 50000 (500)	16 (0,16) 130 (1,3) 500 (5) 3000 (30) 10000 (100)	130 (1,3) 500 (5) 3000 (30) 10000 (100)	130 (1,3) 500 (5) 3000 (30) 10000 (100)
Model	<i>FKC</i>	<i>FKG</i>	<i>FKA</i>	<i>FKP</i>	<i>FKH</i>
Datasheet reference	EDSF6-134	EDSF5-92	EDSF5-91	EDSF5-98	EDSF5-97
Standard rangeability	100 : 1 depending of the span			16 : 1 depending of the span	
Accuracy of adjusted span	Up to ±0.04% / Standard ±0.065% (Others : please refer to the datasheets)			±0.1%	±0.2%
Temperature limits	-40 to +120°C (process) -40 to +85°C (ambient)			-40 to +100°C (process) -40 to +85°C (ambient)	
Wetted parts material	SS 316L Hastelloy C® Monel® Tantalum (Please refer to the datasheets for more details)			SS 316L	
Output signal & power supply	4-20 mA dc + Hart® protocol / 10.5 to 45 Vdc (power supply)				
Communication	Hart® protocol / Foundation Fieldbus™ H1				
Environmental protection	IP 66/67 and NEMA 4X				
Safety and integrity	IEC 61508 SIL2/SIL3				
Hazardous area certifications	Flame proof and intrinsic safety (ATEX, IECEx, cCSAus) (Please refer to the datasheets for more details)				
Available functions	1/ Burnout according NAMUR NE43 recommendation 2/ Linearization function (14 points) to linearize the output signal				
Options	1/ Local analog or digital indicator, 2/ Arrestor (lightning protection), 3/ Stainless steel (SS 316) electronics housing, 4/ NACE requirements, 5/ High process temperature, vacuum service (for remote seal transmitters),		6/ Chlorine, and oxygen services 7/ Diaphragm with gold or gold/ceramic coating for hydrogen applications, 8/ Stainless steel bolts and nuts, 9/ PTFE process cover gasket, 10/ Tag plate, 11/ Side vents		



<i>Remote seal(s)</i> <i>kPa (mbar)</i>	<i>Level</i> <i>kPa (mbar)</i>	<i>Direct mounting</i> <i>remote seal</i> <i>kPa (bar)</i>
Depending of transmitter version	6 (60) 32 (320) 130 (1300) 500 (5000) 3000 (30000)	130 (1,3) 500 (5) 3000 (30) 10000 (100)
<i>FKB/D/M</i>	<i>FKE</i>	<i>FKH/P</i>
EDSF6-05	EDSF7-68	EDSF6-06
100 : 1 depending of the span		16 : 1 depending of the span
±0.065% (differential and relative pressure), 0,2% (absolute pressure)	±0.165% (0,1% optional)	±0.1% or ±0.2%
-90 to +400°C (process) -40 to +85°C (ambient)	-40 to +150°C (process) -40 to +85°C (ambient)	-40 to +150°C (process) -40 to +85°C (ambient)
SS 316L Hastelloy C® Monel® Tantalum (Please refer to the datasheets for more details)		

Technical Specifications

				
Transmitters type	TR 22 - Gauge pressure TA 22 - Absolute pressure	TR 2 - Gauge pressure TA 2 - Absolute pressure	TR 1 - Gauge pressure TA 1 - Absolute pressure	GR - Gauge pressure GA - Absolute pressure
Sensing element	Flush ceramic cell	Thick enamelled strain gauge on ceramic		
Measurement range	Gauge range : -1 to 50 bar (24 ranges available) Absolute range : 0 to 50 bar abs. (15 ranges available)	Gauge range : -1 to 600 bar (31 ranges available) Absolute range : 0 to 25 bar abs. (13 ranges available)		Gauge range : -1 to 600 bar (31 ranges available) Absolute range : 0 to 25 bar abs. (11 ranges available)
Maximum span Overpressure	1.5 to 75 bar 3 to 75 bar	1.5 to 750 bar 3 to 600 bar		1.5 to 750 bar 3 to 75 bar
Output signal	4 to 20 mA , 2 wires			
Power supply	12 to 28 Vdc (Protection against reverse polarity)			10 to 30 Vdc (Protection against reverse polarity)
Substituted values	Environ 3,7 mA or 25 to 27 mA (In case of strain gauge breaking)			
Zero/span adjustment	± 3% (as option rangeability of 50 to 100% of FS)			
Load	$R (\Omega) = (U_{alim} - 12 V) / 0.02 A$			$R (\Omega) = (U_{alim} - 10 V) / 0.02 A$
Max global error	≤ 0.2% FS (at 25°C) ≤ 0.5% FS (at 25°C) (see data-sheets) Linearity + Hysteresis + Repeatability	≤ 0.2% FS (at 25°C) ≤ 0.5% FS (at 25°C) (see datasheets) Linearity + Hysteresis + Repeatability		≤ 0.5% FS (at 25°C) ≤ 1% FS (at 25°C) (See datasheet) Linearity + Hysteresis + Repeatability
Temperature drift	± 0,03% / °C FS (Between 0 and 50°C)			± 0.03% / °C FS typical ± 0.06% / °C FS max
Ambient temperature	-20 to +100°C (135°C max for short period)	-20 to +70°C		-30 to +80°C
Process temperature	-20 to +70°C			
Storage temperature	-40 to +80°C	-40 to +80°C		
Protection	IP66 (cable glands output)		IP 65 (connector output) IP 66 and IP 68 (cable output)	IP 65 (connector output) IP 66 and IP 68 (cable output)
Connection	Process connection : SS 316L : 1"GM, 1"1/2 or 2"CLAMP, 1"1/2 or 2"SMS Electrical connection : On internal terminals and metallic cable glands ISO12 (Ø4-8 mm)	Process connection : SS 316L : 1/2"GM, 1/4"GM or 1/2"NPTM Electrical connection : On internal terminals and metallic cable glands ISO12 (Ø4-8 mm)	Process connection : SS 316L : 1/2"GM, 1/4"GM , 1/2"NPTM, Electrical connection : ISO4400 / DIN43650 Connectors Cable output 2 m length M12 connection (4 pins)	
Housing	Stainless steel 316L			Stainless steel
Wetted parts	SS 316L + ceramic + FKM seal (Others : see datasheets)		SS 316L + ceramic + FKM seal (Others : see datasheets)	
Certifications / Conformities	<ul style="list-style-type: none"> - ATEX version (option) : Intrinsic safety Ex ia IIC T6 Ga (-30 < T°amb. < 55°C) Ex ia IIC T5 Ga (-30 < T°amb. < 70°C) Ex ia IIIC T80°C Da (-30 < T°amb. < 55°C) Ex ia IIIC T95°C Da (-30 < T°amb. < 70°C) - Group - Category : II - 1 GD and IM1 (GR / GA) 			

Our range of Fuji Electric products

PRESSURE

- Differential pressure (with remote seals)
- Relative or absolute pressure (with remote seal)



FLOW

- Ultrasonic
- Electromagnetic
- Vortex



ENERGY METERING

- Liquid
- Steam
- Gas
- Thermal
- Electricity



GAS ANALYSIS

- Zirconia oxygen analysers
- Non dispersive infrared multigas analysers
- In-situ laser analysers
- Continuous pollutant analysis system (CEMs)



CONTROLLERS

- Temperature control
- Process control



RECORDERS

- Video



TEMPERATURE

- Thermocouples
- Displays
- Thermo-resistances
- Signal converters



SERVICES AND SOLUTIONS

- Design
- Development
- Production





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