

**measurement
gas analysis
data acquisition
process control
drive solutions**

FUJI
ELECTRIC

Fuji Electric France S.A.

FUJI ELECTRIC

A worldwide reputation

FUJI ELECTRIC FRANCE S.A., subsidiary of the Japanese group FUJI ELECTRIC Co., Ltd, manufactures and markets in Europe the instruments that made the worldwide reputation of the Group. Specialist of the industrial instrumentation, the Company supplies products and services to the main industrial sectors : oil and gas, petrochemical, chemical, energy, iron industry, food industry, paper mills, pharmaceutical industry, nuclear... With a 7 billion Euros turnover and 12000 employees in the world, FUJI ELECTRIC also counts among the biggest specialists of the electric equipment and automated systems such as vending machines and automatic change machines. The recent establishment of the French factory in Clermont-Ferrand, bridgehead for the manufacture of the pressure transmitters for Europe and Middle East, provides also the necessary services to customers. The teams of engineers and technicians collaborate still more effectively with the users of the FUJI ELECTRIC products for an optimal efficiency and reliability of the installations.



A complete range for the industry

Thanks to a sales network covering France and Europe, FUJI ELECTRIC FRANCE SA markets a complete range of :

- Pressure transmitters
(differential, gauge, absolute. Liquid level and remote seals)
- Flowmeters (electromagnetic and ultrasonic)
- Gas analyzers
- Industrial recorders
- Temperature controllers and process controllers
- Temperature sensors and Temperature transmitters
- Inverters for electrical motors

The FUJI ELECTRIC FRANCE factory has been organised for an optimisation of stocks, and an efficient distribution throughout the French and European sales network.

In an ultramodern factory, built in 1995, FUJI ELECTRIC FRANCE uses the most rigorous process to guarantee the respect for criteria of high-level quality, and optimal operation of its products.

When you select FUJI ELECTRIC, you opt for safety and quality, even when process conditions are extremely severe.



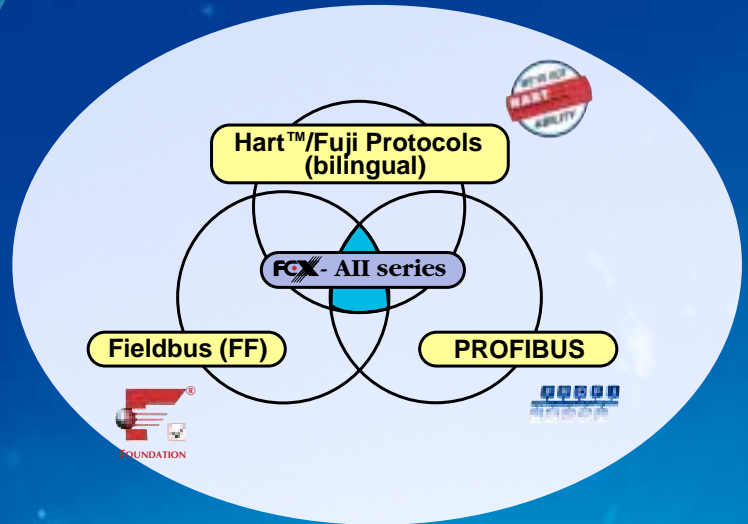
With the continuous concern to improve the service to his customers, Fuji Electric France S.A set up, from his establishment in 1995, a quality assurance system according to ISO 9002 for the production and sales of pressure transmitters. The ISO 9002 certificate was delivered by the AFAQ in November, 1997.



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MEASUREMENT

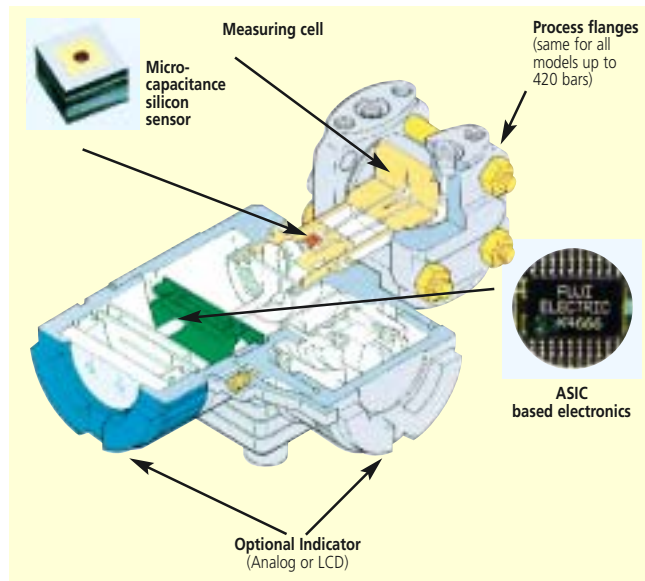


Hand Held Communicators



Pressure transmitters - FCX-All séries

As a leader in the pressure measurement field, FUJI ELECTRIC has achieved an installed base of about 500 000 FCX transmitters throughout the world. As a result of high technology design, a high-quality micro-capacitance silicon sensor has been developed (floating design located in the neck of the cell). The microprocessor based electronics unit provides different outputs : 4-20 mA with Hart™ / Fuji protocols, or Fieldbus Foundation H1, or Profibus PA.



FCX-All series are available for differential, gauge and absolute pressure, liquid level, and offer measuring ranges from 10mmWC to 500bar. For specific application, Fuji Electric can supply a wide selection of remote seals. Thanks to 0,07% accuracy, a 1 to 100 wide rangeability, and the various materials available for wetted parts (Tantalum, Monel, Hastelloy C or PVDF) our transmitters can be used in various applications in industry fields such as : petrochemistry, chemistry, energy,

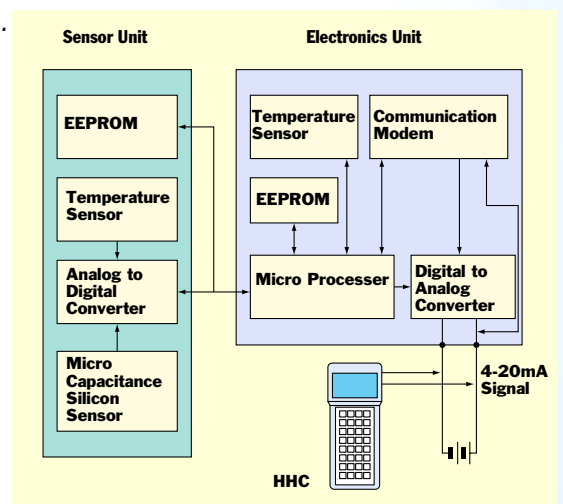
iron industry, food industry and water treatment. Thanks to micro-processors and LSI chips, the FCX-All transmitters offer excellent repeatability. The standard FCX-All provides 4-20 mA + FUJI and HART™ protocols It is also available with selectable Fieldbus Foundation H1 / Profibus PA protocols. The modular design allows interchangeability between the cell unit and electronics units, providing easy and quick maintenance.

Pressure transmitters - FCX-CII séries

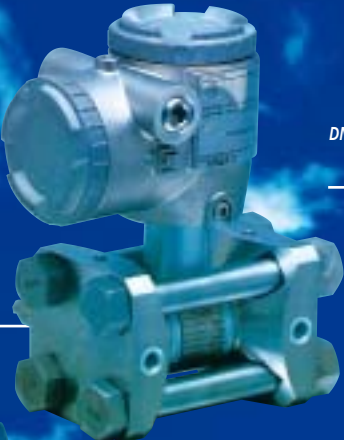
Thanks to its experience, and in order to satisfy the users demand, FUJI ELECTRIC has introduced the FCX-CII as an economical version of the FCX-All series. ASIC for electronics, and manufacturing know how have made it possible a smaller housing of T shape type. Measuring cell is limited to Stainless steel material. Accuracy is 0,1%.

FCX-CII series are available for differential and gauge pressure, and offer measuring ranges from 60mmWC to 100bar. The compact size and weight of the gauge pressure transmitter allow a direct mounting on the pipe. A limited range of remote seals are also available, consult Fuji Electric. The FCX-CII can be equipped with optional Analog or LCD Indicators.

The standard FCX-CII provides 4-20 mA + FUJI and HART™ protocols It is also available with selectable Fieldbus Foundation H1 / Profibus PA protocols. The modular design allows interchangeability between the cell unit and electronics units, providing easy and quick maintenance. The electronics module is the same as the FCX-All's one.



MEASUREMENT



DP or Flow measurement for Off-Shore applications. Static pressure up to 860bars, 316 SS housing.

DP measurement (Chemistry). DN25 / PN16 PVDF flanges. Tantalum or Hastelloy C for other wetted parts.



GP measurement (Food & Pharmaceutical industries). DN50 seal according to DIN 11851.



GP measurement (Food industry). Seal with flush diaphragm, without dead volume.



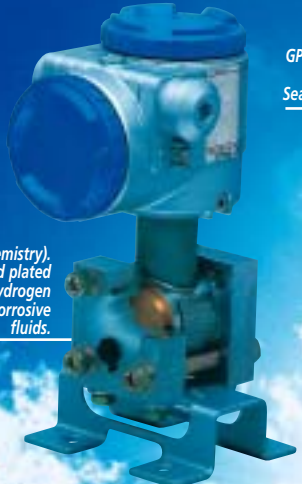
DP measurement. DN80 / PN 40 seals, with capillaries.



GP measurement (Food & Pharmaceutical industries). "In Line" seal with CLAMP connections, without dead volume.



Tank level measurement. Seal DN80 / PN40, with diaphragm extension.



DP measurement (Chemistry). PVDF inserts and gold plated diaphragms. For Hydrogen service or highly corrosive fluids.

GP measurement (Paper industry). Seal with 1" connection.



Open tank level measurement. Seal DN80 / PN40, short design.



Closed tank level measurement. Seals DN80 / PN40, with capillary on HP side and rigid mounting on LP side.



Open tank level measurement. Seal DN50 / PN40.

Specific applications

Have you a specific process? If no standard material can be used for your process, then FUJI ELECTRIC FRANCE has got a solution for you. For us your "specific" is a standard! Chemistry, Paper mills, Oil & Gas : in all these industries, the transmitters are submitted to very severe conditions. The know-how of our local team guarantees the respect of very strict production standards and a constant innovation.

The use of exotic materials for wetted parts, such as Tantalum, Monel, Hastelloy C, PVDF..), seals with capillaries or direct mounting, with flush or extension diaphragms, are a few examples of specific applications that FUJI ELECTRIC is able to manage in its French factory.

Among the numerous supplied specific applications, one can quote : remote seals connection with special flanges (flush or extension type), sanitary connections, screwed or welded adaptors. Pressure transmission between the seals and the transmitter's cell can be achieved by direct rigid connection or by flexible ones (capillaries). Exotic materials, such as Hastelloy C, Monel and Tantalum are used to measure very aggressive fluids .The filling of remote seals with different fluids (silicone oils, fluorinated, sanitary), which are selected according to process, enables vacuum and/or high temperature measurements up to 400°C. It is possible to use the transmitters in a severe environment (such as offshore terminals) thanks to corrosion resistant flanges and bolting designed for high static pressure (up to 1000 bars), together with stainless steel electronics housing.

A custom-made technology

Modern equipments, near your production unit, to meet all of your specific requirements.



Machining workshop :

A set of machining center and numerical lathes brings a flexibility almost without limit to the production tools that Fuji Electric set up in France.



TIG-Welding :

On the various welding stations, the diaphragms of the seals, the capillaries and the sleeve tubes for direct mounting are welded manually or automatically. The tightness of each weld is checked individually with a Helium mass spectrometer.

The TIG technology (tungsten-inert gas welding) guarantees durable reliability.



CAD facilities :

The design of flanges, remote seals and various specific requirements is performed by a team of engineers and technicians, according to customers' specifications, and thanks to powerful computers and software.



Clean room :

The assembling of the measuring cell, which is the "heart" of the transmitter, is made in a clean room, class 10 000. This facility, associated with the design, machining, assembling and calibration equipments, allows FUJI ELECTRIC to control the complete manufacturing line and to offer specific and reliable products, completely adapted to the needs of the customers.

Calibration benches :

All FUJI ELECTRIC transmitters are calibrated on computer based automatic benches. The modern design of these calibration devices grants high accuracy and detection of the slightest defect.



MEASUREMENT



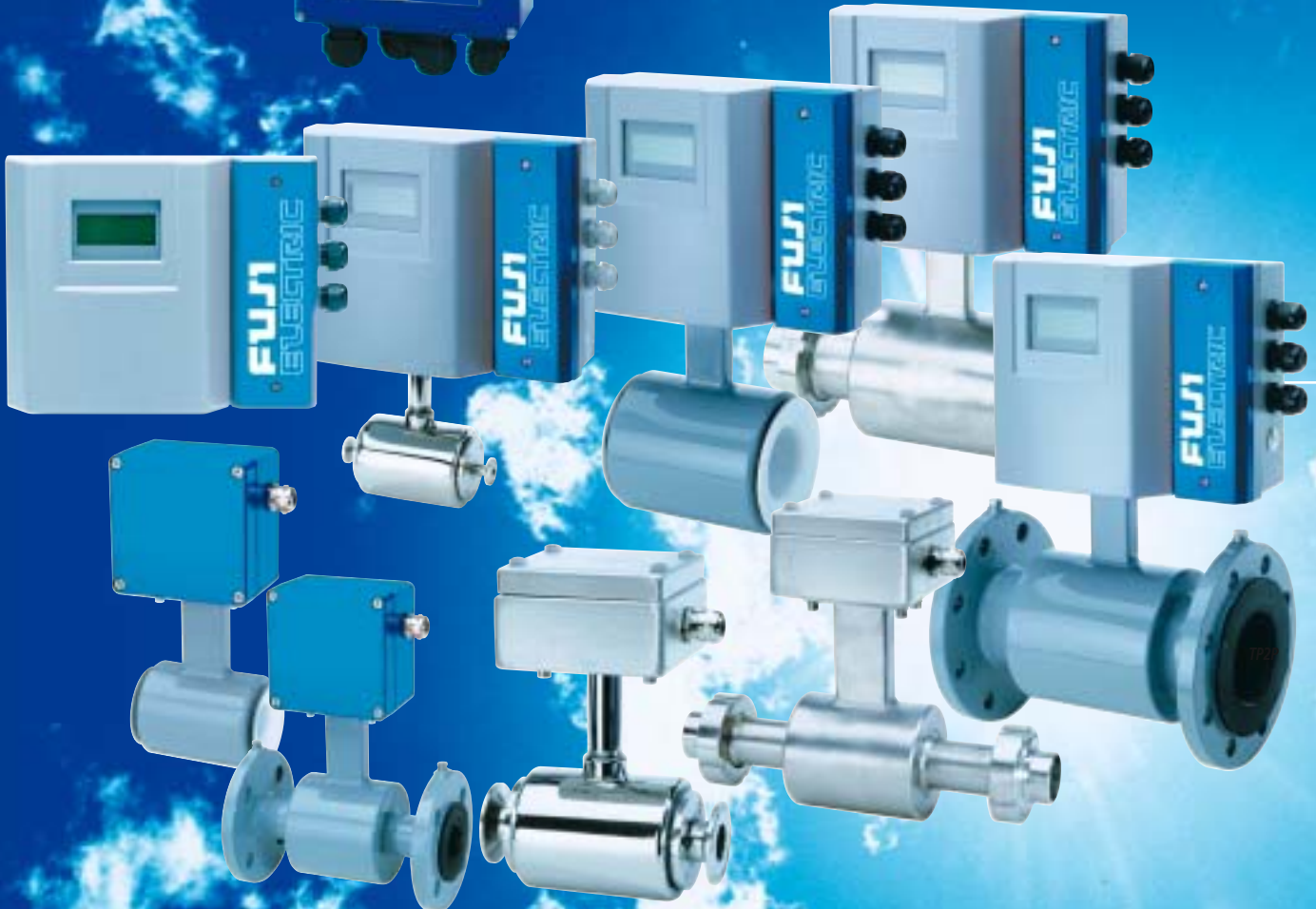
Sensors for
"Portaflow-X"
flowmeter



Sensors for
"Time Delta"
flowmeter



Sensors for
"M-flow"
flowmeter



Ultrasonic flowmeters

FUJI ELECTRIC engineers, thanks to their long experience in ultrasonic measurement, have created the PORTAFLOW-X (portable type) and the TIME DELTA (fixed type). These instruments are based on transit-time measuring method and are particularly suitable for liquid flow measurement (temperature -40° to $+200^{\circ}$ C). The sensors (Clamp-on type) are located outside the pipe, without need to cut or drill it for installation. The 32 bits microprocessor based electronics allows a high accuracy ($\pm 1\%$), a response time of 1 second or less, a very good immunity to air bubbles (ABM system), and to changes of fluid pressure and temperature (continuous calculation of sonic speed).

Portaflow-X

This ultrasonic portable flowmeter consists of two sensors clamped on the pipe (DN 13 to 6000 mm, according to sensors) and of a digital converter operating on internal battery or on power line. It can measure bi-directional flow speeds from -32 to $+32$ m/s. A large LCD graphic screen, a set of pop-up menus and a reduced number of keys make of this device a simple, powerful and friendly tool very appreciated by every person wishing to do a punctual measure of flow. In addition to the display of flow and totalization, the PORTAFLOW-X also offers functions of data logging (40000 values), of graphic display of the measured value and of the resultant sound wave, and the storage in memory of 1 to 20 configurations. A RS232C interface allows the connection to a PC computer. An optional graphic printer is available.

Time DELTA

This ultrasonic fixed type flowmeter consists of two sensors clamped on the pipe (DN 50 to 6000 mm, according to sensors) and of a digital converter, remote mounted. It can measure bi-directional flow speeds from -32 to $+32$ m/s. A display and an integrated keyboard allow the user to configure and to check all the settings. In addition to the 4-20 mA output, the Time Delta is equipped with a totalization function, an automatic range change, 2 alarms and 2 configurable contact outputs. The converter and the sensors have IP67 protection.

M-Flow

This ultrasonic fixed type flowmeter is designed to be suitable for pharmaceutical, food and beverage or semi-conductor manufacturing where no contact between the sensor and the ultra-pure liquid is absolutely necessary. It consists of two sensors clamped on the pipe (DN 25 to 225 mm, according to sensors) and of digital converter, remote mounted. It can measure bi-directional flow speeds from -10 to $+10$ m/s. The system cycle is 0,2 sec for fast response in case of batch process. A display and an integrated keyboard allow the user to configure and to check all the settings. In addition to the 4-20 mA output, the M-Flow is equipped with a totalization function, an automatic range change, process alarm, flow ant total switch for batch application and 2 configurable contact outputs.

MAGNETOFLOW® electromagnetic flowmeters

In the chemical, pharmaceutical, paper, food, wastewater or drinking water treatment industries, the Magnetoflow® electromagnetic flowmeters can be used wherever one wishes to measure the flow of an electrically conductive liquid. Their main characteristics are, an excellent accuracy ($\pm 0,25\%$), the total absence of pressure loss in the pipe, no moving parts, and a very good reliability.

The Magnetoflow® flowmeters are available for pipe diameters from 6 to 1400 mm. According to the characteristics of the liquid to be measured, the user can choose among several internal liners of the measuring tube (PTFE, Hard rubber, Soft rubber and Halar) and several of electrode materials (AISI 316 Ti, Hastelloy C, Platinum). The microprocessor-based converter can be mounted on top of the flow tube (IP65 or IP68) or remote mounted (IP65). The Magnetoflow® flowmeters can provide current (0/4-20 mA), voltage (0/1-5Vdc or 0/2-10Vdc), frequency output or Hart™ communication.

GAS ANALYSIS

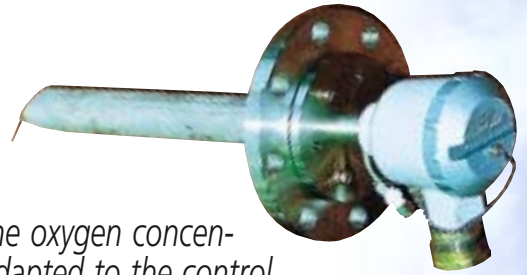


ZRY (IP 65 Version)



In-Situ "zircomat-P" oxygen analyzers

The "Zircomat-P" analyzer is designed to measure continuously the oxygen concentration in flue gases of boilers and industrial ovens. It is perfectly adapted to the control and to the optimisation of the excess of air in combustion and consequently allows a reduction of the consumption of the fuel (fuel oils, gas, coal...). It consists of a ZRM or ZRY (IP 65 version) microprocessor-based converter and a ZFK detector. The converter ZRM is equipped with a LED display for the indication of the measure of oxygen and a LCD display for the configuration of the analyzer.

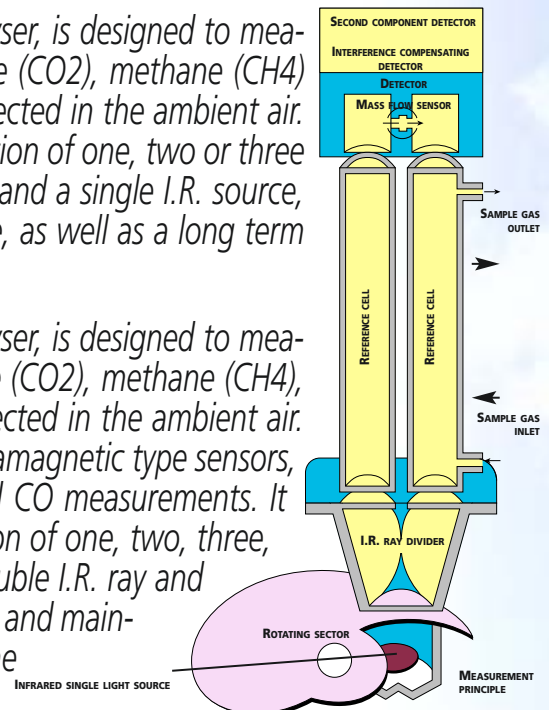


The ZFK detector consists of an element in zirconium, which, thanks to a physico-chemical reaction, allows the measure of the concentration of oxygen. It is directly placed in the flue conduit in contact with the smokes.

Infrared gas analyzer

The ZRJ, non-dispersion infrared-ray absorption method gas analyser, is designed to measure the concentrations of carbon monoxide (CO), carbon dioxide (CO₂), methane (CH₄) and oxygen (O₂) in gases generated by industrial processes or rejected in the ambient air. It allows, according to the selected version, the measure by extraction of one, two or three components. Its measurement system, based on a simple I.R. ray and a single I.R. source, brings to the user the benefit of the easiest use and maintenance, as well as a long term high accuracy and stability of the measured value.

The ZKJ, non-dispersion infrared-ray absorption method gas analyser, is designed to measure the concentrations of carbon monoxide (CO), carbon dioxide (CO₂), methane (CH₄), sulphur dioxide (SO₂), and nitrogen monoxide (NO_x) in gases rejected in the ambient air. An additional oxygen (O₂) measurement, made by zirconia or paramagnetic type sensors, can be added for indication and correction of the NO_x, SO₂ and CO measurements. It allows, according to the selected version, the measure by extraction of one, two, three, four or five components. Its measurement system, based on a double I.R. ray and a single I.R. source, brings to the user the benefit of the easiest use and maintenance, as well as a long term high accuracy and stability of the measured value.



Flue gas analysis A2F system

The A2F system allows continuous measurement and control of carbon monoxide (CO), carbon dioxide (CO₂), sulphur dioxide (SO₂), and nitrogen monoxide (NO_x) contained in smokes generated by the combustion of natural gas, fuel oil, coal, or garbage. It consists of one or two infrared gas analyzers, one zirconia oxygen analyzer, and one gas sampling system. It has specially been developed by Fuji Electric France to meet the new pollution control standards requiring the control of the smokes generated by the 2 to 20 MW boilers. Designed to fit easily into all installations and benefiting from the experience of Fuji Electric, manufacturer of industrial analysis devices, the A2F system is for the user an economic "turnkey" solution, accurate, reliable and flexible.

Fuji Electric France's technical team can also offer various specific adaptations or other associated supply such as calibration certificates, start-up, training, maintenance contracts...

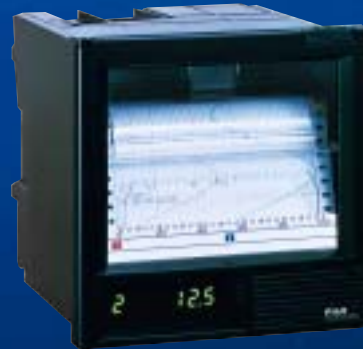
DATA ACQUISITION



6 or 12 channels
180 mm width diagram (PHA)



3 or 6 channels
100 mm width
diagram
(PHC)



1, 2 or 6 channels
100 mm width diagram
(PHE)



Microjet recorders **FCR**

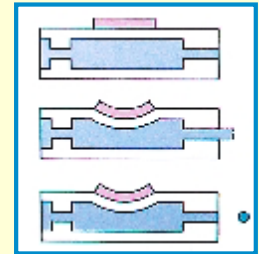
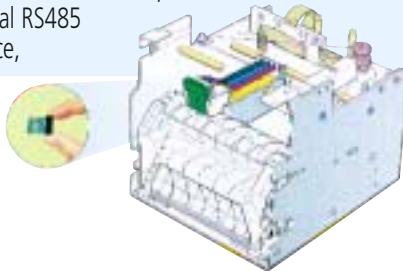
The use of the ink jet printing technology makes of the industrial Microjet recorder an unique and revolutionary device at present on the market. The silicon chip, already used in the manufacture of FCX transmitters, has been used by Fuji Electric in the design of this new printing system. The industrial recorders PHE, PHC (100 mm) and PHA (180 mm) allow continuous recording of 1, 2, 3, 6 or 12 channels in 6 colours with an unprecedented quality and speed.

Thanks to the small number of moving parts, this new technology reduces in a important way the number and the cost of the various maintenance operations which were necessary for the traditional pen printing.

MAIN FEATURES

- Inkjet printing technology,
- 1, 2 or 6 channels, 100 mm width chart paper (PHE),
- 3 or 6 channels, 100 mm width chart paper (PHC),
- 6 or 12 channels, 180 mm width chart paper (PHA),
- Continuous or intermittent trace, 6 colours,
- Universal inputs (Thermocouple, resistance bulb, voltage, current),
- Alphanumeric printing (alarms, reports, messages...)
- Friendly operator interface,
- Simple and quick maintenance,
- Additional sophisticated functions (area recording, zoom, calculation functions...),
- Optional 3 logical inputs, for external command,
- Optional 6 (PHC) or 12 (PHA) relay outputs for remote alarm indication,
- Optional RS485 interface,

The ink jet head is based on a silicon chip. In printing mode, it is not in contact with the paper, this avoids any friction and allows a stable and accurate recording.



The heart of the ink jet printing system is a thin silicon chip (17.6 X 16 mm) designed thanks to the long experience that Fuji Electric acquired in the development and the manufacturing of semiconductors.

When a voltage is applied to the piezo element of the chip, the shape of the elements changes, and ink particles are ejected from the tip of the nozzle. Ink particles draw on the chart paper a series of small dots of about 0.3 mm. The fast combination of this multitude of small dots forms continuous lines and associated alphanumeric characters.

Paperless screen recorder "Data-Trend"

The main feature of the Data-Trend is a 5" STN colour screen. The data are displayed vertically, as with familiar chart recorders. Contrary to conventional recorders, Data-Trend works without paper chart. Measured data are stored in memory and can be directly available on the device or on a PC computer.

MAIN FEATURES

- 3 or 6 universal inputs (Thermocouple, resistance bulb, voltage, current),
- 4 logical inputs, which can be displayed graphically,
- 5" STN colour screen (320 x 240 pixels),
- Continuous, event or timed recording,
- Instantaneous, minimum, maximum, average or peak values,
- Storage of 650 000 data on 3,5" 1,44Mo floppy disk and 350 000 data in memory,
- 2 alarms by channel (alarm copy on 3 relay outputs),
- 18 messages of 20 characters, configurable,
- Configurable totalization and mathematical functions,
- PC software for configuration and evaluation of the recorded data,
- RS485 - MODBUS(tm) interface

Temperature

Thanks to a complete range of temperature sensors (resistance bulbs and thermocouples), analog or digital signal converters, digital indicators, galvanic insulators and 24 Vdc power supplies, Fuji Electric can offer you a solution, whatever your need may be for temperature measurement, or signal conversion, insulation, indication, of an electric signal.

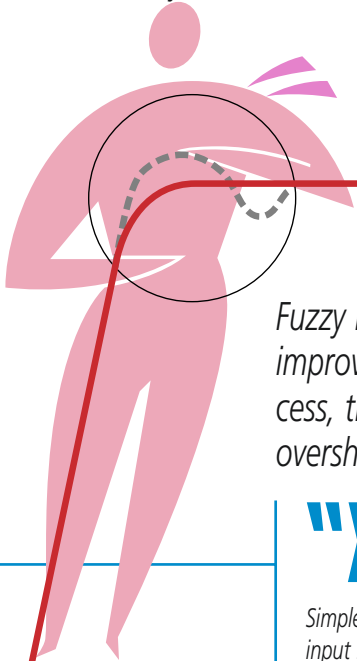
PROCESS CONTROL AND DRIVE



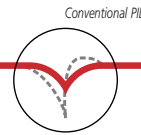
NEMA 4,
IP66 Version
(PXR 3/4)



Thanks to the experience acquired in the field of process control and thanks to a perfect expertness of the most recent technologies, the engineers of Fuji Electric have designed one of the most complete controllers series available on the market. The equipment of a special machine, the control and drive of an industrial oven, and the control of a 3-element boiler are a few examples of all the applications that can be realized with a Fuji Electric controller.



FUZZY LOGIC



Fuzzy logic algorithm, used by the Micro-Controller "X" and the controller "PYX", improves in a important way the response of the controller during start-up and in-process, thanks to a better prevention of set point overshoot and to suppression of transient overshoots due to external disturbances.

"X" Micro-Controllers

Simple to use and cost saving, the Micro-Controller "X" is available in 5 sizes : 24x48 , 48x48 , 72x72, 48x96 and 96x96 mm. The input signal may be of Thermocouple, resistance bulb, voltage or current type. The command signal may be of relay, transistor or 4-20 mA type. 3 control modes are available : On/Off, PID auto-tuning with fuzzy logic, and heating/cooling (2 control outputs).

"PYX" Controllers

The "PYX" Controller is available in 3 sizes : 48x48, 48x96 and 96x96 mm, with universal input signal (Thermocouple, resistance bulb, voltage or current). The command signal may be of relay, transistor or 4-20 mA type. 3 control modes are available : On/Off, PID auto-tuning with fuzzy logic, and heating/cooling (2 control outputs). Auto / Manual command of control loop is available on the front panel. The " PYX " can optionally have one logic input (set-point selection), one external set-point input, one re-transmission output for measured value / set-point / output, one 8-segment set-point generator and a RS485 MODBUS™ interface.

Process controllers "CC-M"

The features of the new process controller "CC-M", real process micro-computer, allow this device to be used in all industry sectors as a simple PID or as the "heart" of a much more complex application.

His graphic colour screen, associated to a library of various displays offers to the user a real window on his process. The "CC-M" has an important number of Inputs/Outputs : analog (7 inputs, 9 outputs) and digital (10 inputs, 11 outputs).

It is available with 1 to 8 PID control loops and configuration is made with function blocks.

Parameters setting of the device can be made on front panel or via a configuration PC software compatible with IEC 1131-3 standard. A RS485 MODBUS™ interface allows to integrate the "CC-M" as a basic element of a process control system or supervision system

Inverters

Recognized as world specialist in the field of power electronic components, Fuji Electric integrated into its inverters for driving motors at variable speed the best of its technology. This results in compact, powerful, simple and very cost saving devices.

To meet all the applications needs, 3 ranges are available (FVR-C11S, FVR-E11S and FRN-G11S) corresponding to powers from 0,1 to 280 kW. Inverters FVR-E11S and FRN-G11S integrate the torque-vector control to obtain, whatever the motor's demand may be, the optimal current and voltage output and to grant an efficient torque.

The excellent performances of the power transistors (Fuji Electric IGBT) used in our inverters allow an operation of the motor as silent as if this one was directly connected to the power line.

These devices are in conformance with the low voltage directives 73 / 23 / EEC and EMC 89 / 336 / EEC.

Your local FUJI ELECTRIC agent

FUJI
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