FD 5 / 10 / 15

Fast acquisition module with
universal synchronized inputs and
embedded webserver software

FD systems are a series of fast (470 Hz/channel) and flexible data acquisition modules available in 3 models of 5 / 10 / 15 universal synchronized inputs.

- Process: Voltage, current, resistance, frequency
- Temperature: Thermocouples, resistive probes, thermistors
- Analogue inputs, calculation channels
- Analogue outputs, relays, TTL inputs/outputs, 24 VDC output to supply sensors
- Communication: Ethernet TCP/IP, USB, WIFI (external access point in option)

Description

FD systems are a series of fast (470 Hz / channel) and flexible data acquisition modules to be used in the field and on test benches. 3 different models are available with 5, 10 or 15 universal synchronized inputs (1 ADC per channel).

All necessary configuration and management software (WEB server technology) are embedded into the plug-and-play system and allow remote control of the acquisition through any web browser: Setup, start, result display, monitoring and data exportation. FD memory capacity (internal and external via USB drive or SD card), allows several months of data to be recorded.

FD modules perform measurement, monitoring and recording of analogue and digital signals coming from sensors of physical or electrical values. These signals can be:

- Voltage: Standard 0-100 V
- Current: 0-20 and 4-20 mA with external shunts
- Thermocouples: Type K/T/J/N/E/R/S/B… with or without cold junction compensation
- Resistance: 0-3000 Ω and 0-200 kΩ
- RTD: Temperature sensors (Pt100 / 500 / 1000…) in 2, 3 or 4 wires
- Frequency: up to 10 kHz measuring frequency and counting

Fast and still accurate, FD 5 / 10 / 15 modules perform acquisition from every input simultaneously up to 470 samples / s / channel. 3 scanning speeds are avalaible, matching 3 different levels of accuracy. Measurement can be performed with different frequencies, resolutions, trigger conditions and types of inputs, making FDs perfect for measurement and control of fast phenomenon.

Channels being synchronized, the scanning speed does not depend on the number of channels scanned and recorded. The instruments are freed from multiplexer constraints: regardless of the number of channels acquired, the speed will remain optimum. Two additional slave modules can be connected to the main module to extend the number of inputs available and make a network.

Accurate monitoring and flexibility are ensured with:

- Up to four limits per channel
- Unlimited number of calculation channels
- 2 analogue 0-10 V outputs
- 2 output relays
- 5 TTL inputs/outputs
- 1 24 VDC output (to supply up to five 4-20 mA sensors)
- Ethernet TCP/IP, USB, WIFI external access point in option

Specifications

Specifications and performances in temperature @23°C ±5°C

Uncertainty is given in % of reading + fixed value.

Resistive probes: Measurement

Type	Range	Resolution	High accuracy / 1 year (periodic mode)	Standard accuracy / 1 year (periodic mode)	Low accuracy / 1 year (continuous mode)
Pt50 (= 3851)	-220°C to +850°C	0.01°C	0.08% RDG + 0.04°C	0.08% RDG + 0.07°C	0.08% RDG + 0.14°C
Pt100 (= 3851)	-220°C to +850°C	0.01°C	0.08% RDG + 0.035°C	0.08% RDG + 0.06°C	0.08% RDG + 0.12°C
Pt100 (= 3916)	-200°C to +510°C	0.01°C	0.08% RDG + 0.035°C	0.08% RDG + 0.06°C	0.08% RDG + 0.12°C
Pt100 (= 3926)	-210°C to +850°C	0.01°C	0.08% RDG + 0.035°C	0.08% RDG + 0.06°C	0.08% RDG + 0.12°C
Pt200 (= 3851)	-220°C to +850°C	0.01°C	0.08% RDG + 0.04°C	0.08% RDG + 0.07°C	0.08% RDG + 0.14°C
Pt500 (= 3851)	-220°C to +850°C	0.01°C	0.08% RDG + 0.04°C	0.08% RDG + 0.07°C	0.08% RDG + 0.14°C
Pt1000 (= 3851)	-220°C to +850°C	0.01°C	0.08% RDG + 0.035°C	0.08% RDG + 0.06°C	0.08% RDG + 0.12°C
Ni100 (= 618)	-60°C to +180°C	0.01°C	0.08% RDG + 0.04°C	0.08% RDG + 0.07°C	0.08% RDG + 0.14°C
Ni120 (= 672)	-40°C to +205°C	0.01°C	0.08% RDG + 0.04°C	0.08% RDG + 0.07°C	0.08% RDG + 0.14°C
Ni1000 (= 618)	-60°C to +180°C	0.01°C	0.08% RDG + 0.04°C	0.08% RDG + 0.07°C	0.08% RDG + 0.14°C
Cu10 (= 427)	-70°C to +150°C	0.01°C	0.2°C	0.3°C	0.55°C
Cu50 (= 428)	-50°C to +150°C	0.01°C	0.08% RDG + 0.06°C	0.08% RDG + 0.08°C	0.08% RDG + 0.11°C

Thermocouples: Measurement

Type	Range	Resolution	High accuracy / 1 year	Standard accuracy / 1 year	Low accuracy / 1 year (continuous

			(periodic mode)	(periodic mode)	mode)
K	-250 to -200°C -200 to -120°C -120 to 0°C +0 to +1372°C	0.2°C 0.1°C 0.05°C 0.05°C	1.1% RDG + 1.9°C 0.12% RDG 0.04% RDG + 0.1°C 0.015% RDG + 0.1°C	(1.1% RDG + 1.9°C) * 1.79 (0.12% RDG) * 2.2 (0.04% RDG + 0.1°C) * 2 0.021% RDG + 0.2°C	(1.1% RDG + 1.9°C) * 3.85 (0.12% RDG) * 4.5 (0.04% RDG + 0.1°C) * 4 0.025% RDG + 0.4°C
T	-250 to -200°C -200 to -100°C -100 to -0°C +0 to +400°C	0.2°C 0.05°C 0.05°C 0.05°C	0.75% RDG + 1.25°C 0.13% RDG 0.55% RDG + 0.09°C 0.09°C	(0.75% RDG + 1.25°C) * 2 (0.13% RDG) * 2 (0.55% RDG + 0.09°C) * 2 0.18°C	(0.75% RDG + 1.25°C) * 4 (0.13% RDG) * 4 (0.55% RDG + 0,.9°C) * 4 0.39°C
J	-210 to -120°C -120 to -0°C +0 to +1200°C	0.05°C 0.05°C 0.05°C	0.8% RDG + 0.05°C 0.3% RDG + 0.08°C 0.1% RDG + 0.08°C	(0.8% RDG + 0.05°C) * 2 (0.3% RDG + 0.08°C) * 1.9 (0.1% RDG + 0.08°C) * 1.9	(0.8% RDG + 0.05°C) * 4 (0.3% RDG + 0.08°C) * 3.8 (0.1% RDG + 0.08°C) * 3.8
E	-250 to -200°C -200 to -100°C -100 to -0°C +0 to +1000°C	0.1°C 0.05°C 0.05°C 0.05°C	0.6% RDG + 1°C 0.76% RDG + 0.03°C 0.27% RDG + 0.07°C 0.15% RDG + 0.07°C	(0.6% RDG + 1°C) * 1.8 (0.76% RDG + 0.03°C) * 1.9 (0.27% RDG + 0.07°C) * 1.9 0.15% RDG + 0.13°C	(0.6% RDG + 1°C) * 3.6 (0.76% RDG + 0.03°C) * 3.7 (0.27% RDG + 0.07°C) * 3.7 0.15% RDG + 0.26°C
R	-50 to +150°C +150 to +550°C +550 to +1768°C	0.5°C 0.2°C 0.1°C	1°C 0.4°C 0.5°C	2°C 0.9°C 0.9°C	4°C 1.9°C 1.5°C
S	-50 to +150°C +150 to +550°C +550 to +1450°C +1450 to +1768°C	0.5°C 0.2°C 0.1°C 0.1°C	1°C 0.4°C 0.45°C 0.6°C	2°C 0.8°C 0.8°C 1°C	4°C 1.6°C 1.6°C 1.8°C
B	+400 to +900°C +900 to +1820°C	0.2°C 0.1°C	0.9°C 0.65°C	1.8°C 1°C	3.8°C 1.95°C
U	-200 to -100°C -100 to +50°C +50 to +600°C	0.05°C 0.05°C 0.05°C	0.25°C 0.15°C 0.15°C	0.45°C 0.25°C 0.2°C	0.85°C 0.55°C 0.4°C

L	-200 to -40°C -40°C to +900°C	0.05°C	0.2°C 0.17°C	0.3°C 0.22°C	0.55°C 0.35°C
C	-20 to +300°C +300 to +900°C +900 to 2310°C	0.1°C 0.1°C 0.1°C	0.25°C 0.25% RDG + 0.15°C 0.4% RDG	0.55°C 0.25% RDG + 0.4°C 0.6% RDG	1.15°C 0.25% RDG + 0.95°C 1% RDG
N	-240 to -190°C -190 to -110°C -110 to -0°C +0 to +1300°C	0.2°C 0.1°C 0.05°C 0.05°C	0.8% RDG + 1°C 0.7% RDG + 1°C 0.17°C 0.15% RDG + 0.15°C	2% RDG + 3°C (0.7% RDG + 1°C) * 2.1 0.2°C 0.1% RDG + 0.3°C	4% RDG + 6°C (0.7% RDG + 1°C) * 4.2 0.4°C 0.08% RDG + 0.6°C
Platine	-100 to +850°C +850 to +1400°C	0.05°C 0.05°C	0.2°C 0.02% RDG + 0.1°C	0.3°C 0.028% RDG + 0.2°C	0.5°C 0.03% RDG + 0.4°C
Mo	+0 to +1375°C	0.05°C	0.02% RDG + 0.1°C	0.02% RDG + 0.2°C	0.02% RDG + 0.4°C
NiMo/NiCo	-50 to +400°C +400 to +1410°C	0.05°C	0.35°C 0.25°C	0.45°C 0.3°C	0.55°C 0.45°C
D	+0 to +310°C +310°C to +1000°C +1000 to +2315°C	0.1°C 0.05°C 0.05°C	0.3°C 0.3°C 0.04% RDG	0.5°C 0.3°C 0.06% RDG	1.6°C 0.9°C 0.1% RDG
G	+0 to +50°C +50 to +100°C +100°C to +200°C +200 to +300°C +300 to 1400°C +1400 to +2315°C	0.5°C 0.2°C 0.05°C 0.05°C 0.05°C 0.05°C	2.3°C 0.95°C 0.6°C 0.35°C 0.3°C 0.3% RDG	5.4°C 2.1°C 1.35°C 0.8°C 0.65°C 0.45% RDG	11.5°C 4.5°C 2.9°C 1.7°C 1.3°C 0.75% RDG

Accuracy is given for reference @ 0°C.

When using the internal reference junction (except couple B), add an additional uncertainty at 0°C of ±0.5 °C in high or standard accuracy and ±0.8°C in low accuracy.
Temperature coefficient: < 5% of accuracy /°C
It is possible (thermocouple B excepted) to choose by programming the cold junction localization:
- External at 0°C
- Internal (temperature compensation of instrument’s terminals)
- Manually entered
- External (measurement at an input channel)

Specifications and performances in process @23°C ±5°C

DC voltage: Measurement

Range	**Measuring range**	**High accuracy / 1 year (periodic mode)**	**Standard accuracy / 1 year (periodic mode)**	**Low accuracy / 1 year (continuous mode)**
100 mV	-100 mV to +100 mV	0.015% RDG + 3 µV	0.015% RDG + 7 µV	0.015% RDG + 15 µV
1 V	-1 V to +1 V	0.015% RDG + 30 µV	0.015% RDG + 70 µV	0.015% RDG + 150 µV
10 V	-10 V to +10 V	0.015% RDG + 300 µV	0.015% RDG + 700 µV	0.015% RDG + 1,5 mV
50 V	-50 V to +50 V	0.015% RDG + 1 mV	0.015% RDG + 3 mV	0.015% RDG + 7 mV
100 V	-100 V to +100 V	0.015% RDG + 3 mV	0.015% RDG + 7 mV	0.015% RDG + 15 mV

Input impedance:
10 MΩ for ranges up to 1 V
1 MΩ for ranges up to 100 V
Temperature coefficient:
< 7 ppm/°C beyond reference domain for 100 mV and 1 V ranges
< 15 ppm/°C beyond reference domain for 10 V, 50 V and 100 V ranges)

DC current: Measurement

With or without loop supply

Range	**Measuring range**	**High accuracy / 1 year (periodic mode)**	**Standard accuracy / 1 year (periodic mode)**	**Low accuracy / 1 year (continuous mode)**
0-20 mA	0 mA to 20 mA	0.025% RDG + 6 µA	0.025% RDG + 13 µA	0.025% RDG + 30 µA
4-20 mA	4 mA to 20 mA	0.025% RDG + 6 µA	0.025% RDG + 13 µA	0.025% RDG + 30 µA

With external shunt
Temperature coefficient: < 25 ppm/°C beyond reference domain

Resistance: Measurement

Range	**Measuring range**	**High accuracy / 1 year (periodic mode)**	**Standard accuracy / 1 year (periodic mode)**	**Low accuracy / 1 year (continuous mode)**

400 Ω	0 to 400 Ω	0.008% RDG + 10 mΩ	0.008% RDG + 20 mΩ	0.008% RDG + 40 mΩ
3600 Ω	0 to 3600 Ω	0.008% RDG + 100 mΩ	0.008% RDG + 200 mΩ	0.008% RDG + 400 mΩ
200 kΩ	0 to 200 kΩ	0.1% RDG + 5 Ω	0.3% RDG + 8 Ω	0.5% RDG + 10 Ω

Uncertainties given for 4-wire measurement
Automatic detection of connection scheme: 2 wires, 3 wires, or 4 wires.
In 2-wire connection, measurement includes line resistances.
In 3-wire connection, add the line resistance imbalance
200 kΩ range: short or shielded wires
Temperature coefficient: < 20 ppm/°C beyond reference domain

Frequency, pulse: Measurement

Type	Range	Accuracy / 1an
10 kHz	1 Hz to 10 kHz	0.005% RDG

Temperature coefficient: < 5 ppm/°C beyond reference domain
Trigger level: 1 V
Shots/min and Hz scale
Measurement on frequency output and dry contacts

Specifications and performances in process @23°C ±5°C

Analogue output

Range	Measuring range	High accuracy / 1 year (periodic mode)	Standard accuracy / 1 year (periodic mode)	Low accuracy / 1 year (continuous mode)
0-10 V	0 V to +10 V	0.02% RDG + 3 mV	0.02% RDG + 3 mV	0.02% RDG + 3 mV

Temperature coefficient: < 5 ppm/°C beyond reference domain

Further features

Scanning rate	FD modules offer 3 scanning frequencies, in direct connection with accuracy levels. The input channels are synchronized, making the scanning rate totally independent of the number of channels under acquisition.

Accuracy level	Scanning rate	Scanning period	Number of samples / s / channel
High	4 Hz	240 ms	4 samples

				/ s / ch
	Standard	123 Hz	8.13 ms	123 samples / s / ch
	Low	470 Hz	2.13 ms	470 samples / s / ch
Calculation channels	The embedded software is able to perform data calculations and store calculation results. Calculations can come from input channel values or conditional calculations (Data processing, statistics, conditioning, Boolean calculations). Calculation channels can be used to condition outputs (relays, analogue outputs).			
Alarms	Every channel can be configured with 4 alarms levels for monitoring purposes. Alarms events are stored in a dedicated file (alarm file). Only allowed users can access to the file.			
Linearization	Every channel can be scaled for sensor correction or application of a special scale for 4-20 mA or 0-10 V sensors.			

General specifications

Size	211.5 x 194.7 x 57 mm
Weight	800 g
Power supply	12 V / 800 mA power adapter
Communication ports	TCP/IP, USB, WIFI (optional access point)
Storage capacity	Internal of 100,000 values External on USB drive External on SD card

Environmental specifications

Reference range	23°C ±5°C (RH: 45 to 75 % condensing)
Operating reference range	-10 to 50°C (RH: 20 to 80 % condensing)
Storage temperature limits	-30°C to +60°C
Maximum height	0 to 2000 m

Models and accessories

Instrument:

FD5-5 5-channel stand-alone acquisition system

Delivered in standard with:

- User manual
- Power adapter
- Crossed Ethernet cable and USB cable
- 5 x 4-contact female terminal blocks
- 1 x 6-contact female terminal block
- 1 x 6-contact MiniDIN connector
- Installation CD with drivers and utilities

FD5-10 10-channel stand-alone acquisition system

Delivered in standard with:

- User manual
- Power adapter
- Crossed Ethernet cable and USB cable
- 10 x 4-contact female terminal blocks
- 1 x 6-contact female terminal block
- 1 x 6-contact MiniDIN connector
- Installation CD with drivers and utilities

FD5-15 15-channel stand-alone acquisition system

Delivered in standard with:

- User manual
- Power adapter
- Crossed Ethernet cable and USB cable
- 15 x 4-contact female terminal blocks
- 1 x 6-contact female terminal block
- 1 x 6-contact MiniDIN connector
- Installation CD with drivers and utilities

Slave modules:

FD5-5S 5-channel secondary module

FD5-10S 10-channel secondary module

FD5-15S 15-channel secondary module

Accessories:

ATFD20	Carrying case
FD-WIFI	WIFI access point
ETIIPLE	VPN Ethernet router
ETIIPLG123G	3G / GPRS router, Ethernet / RS 485-232 secure by VPN
ETIANT200	H90 quad-band magnetic antenna, cable length: 1500 mm

Software:

VISULOGTM	Monitoring & data processing software light version – 1 licence
VISULOGTM-ETAL	Monitoring & data processing software light version – 1 licence + Calibration module
VISULOGTM-PHARMA	Monitoring & data processing software light version – 1 licence + Module for advanced management of access rights, 21 CFR Part 11 compliant
VISULOGTM-ETAL-PHARMA	Monitoring & data processing software light version – 1 licence + Calibration module + Module for advanced management of access rights, 21 CFR Part 11 compliant

Software licences:

LIC VISU TM	Additional license for VISULOGTM
LIC VISU TM ETAL	Additional license for VISULOGTM with ETAL optional module
LIC VISU TM PHARMA	Additional license for VISULOGTM with PHARMA optional module
LIC VISU TM ETAL PHARMA	Additional license for VISULOGTM with ETAL and PHARMA optional module

Certification:

QMA11EN	COFRAC certificate of calibration
	With all relevant data points where the device has been tested

Packing information:

Size	211.5 x 194.7 x 57 mm

Weight	800 g