DATALOG 20 / 90 / 140

Modular data acquisition system with 2, 9 or 14 input / output boards

DATALOG series of data acquisition systems (2, 9 or 14 input / output boards) are aiming to measure, condition, process, monitor and record analogue and digital signals from all common types of physical sensors.

- DC and AC voltage, current, resistance, strain gauges
- Temperature: Thermocouples, resistive probes
- Dry contacts
- Communication: Modbus RS485, RS 233

Description

DATALOG series of data acquisition systems are aiming to measure, condition, process, monitor and record analogue and digital signals from all common types of physical sensors. 3 different models are available with 2 (DATALOG 20), 9 (DATALOG 90) or 14 (DATALOG 140) input / output boards.

The system can be supplied in various configurations with a choice of input and ouput boards as well as options such as built-in display and printer. DATALOG systems perform measurement, monitoring and recording of analogue and digital signals coming from sensors of physical or electrical values. These signals can be:

- DC and AC voltage: 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: 0-300 kΩ
- RTD: Temperature sensors (Pt100 / 500 / 1000…)
- Strain gauges
- Dry contacts

DATALOG is equipped with RS 232 or RS 485 interface, ASCII protocol and Modbus RTU (for communication by modem or radio, on request). Combined to VISULOG data management software, it makes an advanced real time supervision system.

4 thresholds can be programmed per channel. Every threshold can be associated to a specific relay output and eventually to a conditional handling.

2,000 channels are avaible per module. The channels can be real (input or output), or fictive, in order to make mathematical, bolean and statistical calculations. The calculation channels can be defined over a channel or between channels. 100 linearization tables of 40 pairs of points each are available (measured value associated to calculated value), allowing sensor corrections to be recorded and applied.

Data can be stored on 6 internal memories of 8,000 samples each (1 per task over the six first tasks). Every DATALOG with keyboard option is equipped with a PCMCIA slot allowing configurations and data to be stored.

Due their high metrological measurement quality and numerous internal functions, DATALOG systems are well adapted to a large number of demanding applications:

- Autonomous acquisition system: no computer required
- High accurate sensor calibration system
- Test bench
- Validation of chambers or autoclaves
- Input / ouput interface for PC
- Acquisition system for automation or standard supervision

Specifications

Specifications and performances @23°C ±1°C

Uncertainty is given in % of reading + fixed value.

Analogue input boards: AN 5885 / AN 5906 / AN 5905 / ATC 017

These boards are for universal inputs. Each channel is configurable depending on the quantity to be measured. The connection is performed over a removable screw connector for 0.5 to 2.5 mm2 wires.

AN 5885:

10 input channels allow the following measurements to be performed: DC and AC Voltage, DC and AC Current, Resistance using 3- or 4- wire configuration, Platinum and Nickel RTDs, Thermocouples, Dry contacts, Strain gauges (Need the AN 3700 board).

AN 5906:

10 input channels. Same functions as for the AN 5885, except Strain gauges measurements. Voltage measurement is limited to 60 V.

ATC 017:

This board is to be used for energy source measurements. Resistors mounted in series on the inputs ensure protection against accidental switching short-circuits. It has 10 input channels for measuring as follows: DC and AC Voltage and DC and AC Current.

AN 5905:

20 input channels intended for measurements of: DC and AC Voltage, DC and AC Current, Thermocouples and Dry contacts.

Switching: It is performed over the AN 5885, AN 5900 and ATC 017 boards by using 3-wire dry contact relay.
Differential resistance £ 40 mΩ
Stray emf: ± 2.5 µV
Life: 108 operations
For the AN 5905, the switching is static and performed by means of optomos and the voltage between channels is limited to 60 VDC or AC.
For the other boards, the voltage between channels is limited to 150 VDC or AC.

DC voltage: Measurement

Calibre	**Résolution 7 mesures / s**	**Résolution 20 mesures / s**	**Résolution 100 mesures / s**	**Précision / 1 an à 7 mesures / s**	
				AN 5885	**AN 5905**
60 mV	1 µV	1 µV	30 µV	0,01% L + 7 µV	0,06% L + 7 µV

600 mV	1 µV	10 µV	300 µV	0,01% L + 7 µV	0,06% L + 7 µV
6 V	10 µV	100 µV	3 mV	0,01% L + 40 µV	0,06% L + 40 µV
60 V	100 µV	1 mV	30 mV	0,01% L + 400 µV	0,06% L + 400 µV
600 V	1 mV	10 mV	300 mV	0,01% L + 4 mV	0,06% L + 4 mV

AN 5906 has same ucertainties as AN 5885, but a voltage range up to 60 V.
At 20 meas/s, the uncertainty is slightly reduced with regards to 7 meas/s.
At 50 meas/s, the uncertainty over one year is ranging 4 RU (measurement resolution).
At 100 meas/s, the uncertainty over one year is ranging 12 RU (measurement resolution).
The “process current” ranges need an external 50 Ω - 0.1% shunt.
Rejection level at 50 Hz ±1% over 60 mV range at 7 and 20 meas/s:
- Normal mode > 60 dB
- Common mode > 140 dB

Input impedance: > 100 MΩ over ranges < 6 V; 10 MΩ for upper ranges
Temperature coefficient:
- From 0 to 35°C: (0.0001% + 0.5 RU)/°C
- From 35 to 50°C: (0.001% + 1 RU)/°C

Repeatability between two channels: £ Constant C

AC voltage: Measurement

Range	**Resolution**	**Accuracy / 1 year at 1 meas / s**
60 mV	10 µV	0.5% RDG + 100 µV
600 mV	100 µV	0.5% RDG + 1 mV
6 V	1 mV	0.5% RDG + 10 mV
60 V	10 mV	0.5% RDG + 100 mV
600 V	100 mV	0.5% RDG + 1 V

T-RMS value measurement (AC + DC mode). The accuracies (uncertainties) are given for a sine wave voltage without DC component.
Measurement minimum scanning time: 2 s.
Measurement range: 4 to 110% of range from 40 to 400 Hz
Crest factor influence (CF): 1% for CF = 3
Repeatability between two channels: < C
Temperature coefficient: (0.05% + 0.5 RU)°C
Input impedance: £ 100 MΩ on ranges £ 6 V, 10MΩ for upper ranges
Nota: AN 5905 and AN 5906 boards are limited to 60 V

Resistance : Measurement

Calibre	**Resolution 7 meas / s**	**Resolution 20 meas / s**	**Resolution 100 meas / s**	**Accuracy / 1 year at 7 meas / s**
				AN 5885 and AN

				5906
60 Ω	1 mΩ	1 mΩ	30 mΩ	0.02% RDG + 7 mΩ
600 Ω	1 mΩ	10 mΩ	300 mΩ	0.02% RDG + 7 µΩ
3 kΩ	10 mΩ	100 mΩ	3 Ω	0.02% RDG + 60 mΩ
30 kΩ	100 mΩ	1 Ω		0.02% RDG + 600 mΩ
300 kΩ	2 Ω	10 Ω		0.02% RDG + 4 Ω

The uncertainties at 20 meas/s are the same as for 7 meas/s.
At 50 meas/s, the uncertainty over one year is ranging 4 RU.
At 100 meas/s, the uncertainty over one year is ranging 12 RU.
When measuring with 3-wire configuration, add 100 m Ω to the uncertainties above and, if required, the possible line unbalance.
Measurement current: 1 mA for ranges from 60 Ω to 3 kΩ and 10 µA for 30 kΩ and 300 kΩ ranges.
Permissible line resistance: < 100 Ω per wire
Repeatability between two channels: 3 wires: £ (100 mΩ + 3 UR), 4 wires: £ (10 mΩ + 3 UR)

Resistive probes: Measurement

Unavailable with AN 5905 input board.
Connection: 3 or 4 balanced wires

Sensor	**Range**	**Resolution 7 meas / s**	**Resolution 20 meas / s**	**Resolution 100 meas / s**	**Accuracy / 1 year at 7 meas / s**
					AN 5885 and AN 5906
Pt25	-220°C to +1200°C	0.01°C	0.1°C	1°C	0.02% RDG + 0.07°C
Pt50	-220°C to +1200°C	0.01°C	0.1°C	1°C	0.02% RDG + 0.04°C
Pt100	-220°C to +1200°C	0.01°C	0.1°C	1°C	0.02% RDG + 0.02°C
Pt1000	-220°C to +600°C	0.01°C	0.1°C	1°C	0.02% RDG + 0.02°C
Ni100	-60°C to +180°C	0.01°C	0.1°C	1°C	0.02% RDG + 0.01°C

The uncertainties at 20 meas/s are the same as for 7 meas/s.
At 50 meas/s, the uncertainty over one year is ranging 2 RU.
At 100 meas/s, the uncertainty over one year is ranging 3 RU.
When measuring with 3-wire configuration, add 0.25°C to the uncertainties above and the line unbalance value converted in °C.
Measurement current: 1 mA
Permissible line resistance £ 100 ΩW per wire

Temperature coefficient: (0.002% + 0.0025°C) /°C.

Thermocouples: Measurement

Type	Range	Resolution 7 meas / s	Resolution 20 meas / s	Resolution 100 meas / s	Accuracy / 1 year at 7 meas / s	
					AN 5885 and AN 5906	AN 5905
K	-250 to -200°C -200 to -100°C -100 to +1370°C	0.5°C 0.2°C 0.1°C	0.5°C 0.2°C 0.1°C	1°C 1°C 1°C	0.01% RDG + 1.5°C 0.01% RDG + 0.6°C 0.01% RDG + 0.3°C	0.06% RDG + 1.5°C 0.06% RDG + 0.7°C 0.06% RDG + 0.3°C
T	-250 to -200°C -200 to -100°C -100 to +400°C	0.5°C 0.2°C 0.1°C	0.5°C 0.2°C 0.1°C	1°C 1°C 1°C	0.01% RDG + 1.5°C 0.01% RDG + 0.6°C 0.01% RDG + 0.3°C	0.06% RDG + 2°C 0.06% RDG + 0.6°C 0.06% RDG + 0.3°C
J	-210 to -120°C -120 to +1100°C	0.2°C 0.1°C	0.2°C 0.1°C	1°C 1°C	0.01% RDG + 0.4°C 0.01% RDG + 0.3°C	0.06% RDG + 0.5°C 0.06% RDG + 0.3°C
S	-50 to +550°C +550 to +1768°C	1°C 0.5°C	1°C 0.5°C	1°C 1°C	0.01% RDG + 2°C 0.01% RDG + 0.8°C	0.06% RDG + 2°C 0.06% RDG + 1°C
B	-400 to +900°C +900 to +1820°C	1°C 0.5°C	1°C 0.5°C	1°C 1°C	0.01% RDG + 2°C 0.01% RDG + 1°C	0.06% RDG + 2°C 0.06% RDG + 1°C
N	-250 to -200°C -200 to -100°C -100 to -0°C +0 to +1300°C	1°C 0.5°C 0.2°C 0.1°C	1°C 0.5°C 0.2°C 0.1°C	1°C 1°C 1°C 1°C	0.01% RDG + 2°C 0.01% RDG + 0.8°C 0.01% RDG + 0.4°C 0.01% RDG + 0.3°C	0.06% RDG + 2.5°C 0.06% RDG + 1°C 0.06% RDG + 0.4°C 0.06% RDG + 0.3°C
E	-250 to +1000°C	0.1°C	0.1°C	1°C	0.01% RDG + 1°C	0.06% RDG + 1.5°C
C	-20 to +2320°C	0.2°C	0.2°C	1°C	0.01% RDG + 0.6°C	0.06% RDG + 0.6°C
Mo	+0 to +1375°C	0.1°C	0.1°C	1°C	0.01% RDG + 0.2°C	0.06% RDG + 0.2°C
R	-50 to	1°C	1°C	1°C	0.01% RDG	0.06% RDG

	+550°C +550 to +1768°C	0.5°C	0.5°C	1°C	+ 2°C 0.01% RDG + 0.7°C	+ 2°C 0.06% RDG + 0.8°C
L	-200 to +900°C	0.1°C	0.1°C	0,1°C	0.01% RDG + 0.3°C	0.06% RDG + 0.4°C
U	-200 to -100°C -100 to +600°C	0.2°C 0.1°C	0.2°C 0.1°C	1°C 1°C	0.01% RDG + 0.4°C 0.01% RDG + 0.3°C	0.06% RDG + 0.5°C 0.06% RDG + 0.3°C
Platine	-100 to +1400°C	0.1°C	0.1°C	1°C	0.01% RDG + 0.4°C	0.06% RDG + 0.4°C

Accuracy is given for reference @ 0°C.

When using the internal reference junction, add an additional uncertainty of ±0.2°C for the AN 5885 et AN 5906 boards, ±0.3°C for AN 5905 board.
Repeatability between two channels:
- over a same board: 1 RU
- between two different boards: 1 RU plus the RJC error
Input resistance: ³ 100M W
Permissible line resistance: K Ω per wire

Strain gauges : AN 3700 + AN 5885

Sensor power: A specific power board common to all “gauge” channels occupies one standard slot in the system.
Available voltage: 2 V or 10 V switched to each bridge measured.
Measurement current: 1 mA or 8 mA switched to each half- or quarter-bridge measured
Voltage and current are selected by switches located on the gauge power board. Three compensation gauges can be connected to three quarter- bridge configurations.
Measured signals applied to the standard inputs of the analogue input boards as follows: one channel per quarter- bridge, two consecutive channels per half- or full bridge. Free channels can still be used for other purposes.
Sensors:
Minimum 120 Ω gauges or transducers
Maximum voltage drop permissible in one gauge: 3.2 V
Permissible unbalanced voltages compatible with the 30 mV and 300 mV ranges of the system voltmeter
Measurement rate: 7 meas/s, 20 meas/s or 50 meas/s
Note: The system can measure in full bridge configuration with externally supplied power, in this case, the gauge power board is not necessary.

Configuration	Range	Power	Measurement range (2)	Resolution 7 meas / s	Accuracy / 1 year at 7 meas / s
Full bridge	30 mV 30 mV 300 mV 300 mV	10 V 2 V 10 V 2 V	±6,000 ±30,000 ±60,000 ±300,000	0.2 µƐ 1 µƐ 0.2 µƐ 1 µƐ	0.08% RDG + 0.6 µƐ 0.08% RDG + 12 µƐ 0.06% RDG + 1 µƐ

					0.06% RDG + 20 µε
Half bridge	30 mV 30 mV 300 mV 300 mV	8 mA 1 mA 8 mA 1 mA	±6,000 ±40,000 ±60,000 ±400,000	0.2 µε 1 µε 0.2 µε 2 µε	0.08% RDG + 3.6 µε 0.08% RDG + 27 µε 0.06% RDG + 4 µε 0.06% RDG + 40 µε
Quarter bridge	30 mV 30 mV 300 mV 300 mV	8 mA 1 mA 8 mA 1 mA	±6,000 ±40,000 ±60,000 ±400,000	0.2 µε 1 µε 0.2 µε 2 µε	0.08% RDG + 4 µε 0.08% RDG + 37 µε 0.06% RDG + 4.4 µε 0.06% RDG + 50 µε

Digital input board: AN 5886

This board counts pulses or measures frequencies of ten periodic signals.
Each channel is coil-insulated from other channels of the data acquisition system.
Input voltage for any channel: Level 1: CH1 > +2.9 V, Level 0: CH0 < +1 V
Maximum applicable voltage: ±50 VDC or AC peak
Input current for level 1: 1.6 mA typical

Input insulation: 100 VDC or AC RMS max. between each channel

Counter inputs: Count positive transitions on the inputs

User selectable bounce filtering time: 500 µs and 1 ms (typical) by a switch located on the digital input board. The filter on channels 1 and 2 can be eliminated to allow high-speed counting.
A jumper on the digital input board allows the use of channel input 10 as a trigger to validate or inhibit other counter inputs on the same board.

Channel number	**1-2**	**1 à 10**	
Filter on	None	500 µs	1 ms
Max counting frequency	100 kHz	180 Hz	50 Hz
Minimum pulse duration	5 µs	2 ms	2 ms
Minimum time between two pulse	5 µs	2 ms	2 ms

Frequency inputs:

Range	**Resolution**	**Minimum frequency, integration time**	**Maximum frequency**

		1 s	**0.2 s**	
100 Hz	0.001 Hz	1 Hz	5 Hz	99.999 Hz
1000 Hz	0.01 Hz	1 Hz	5 Hz	999.99 Hz
10 kHz	0.1 Hz	0.01 kHz	0.05 kHz	9.9999 kHz
100 kHz	1 Hz	0.1 kHz	0.5 kHz	99.999 kHz

Uncertainty: 0.02% + 2 RU.
Temperature coefficient: 0.0004% /°C
NB: No filter is provided on frequency inputs. A cyclic ratio of approx. 50% (square signal) is advisable to obtain stable measurements but the pulse duration should always be above 5 µs.

Analogue output board: AN 5888

The board is made up of 5 digital/analogue converters (12 bits) each providing two output quantities, a voltage -10 to +10 V and a current 0-20 mA or 4- 20 mA.
As voltage and current quantities come from the same converter, they cannot be used simultaneously.
Voltage and current channels of the same board are coil-insulated and also are insulated from other system input/outputs.

Range	**Resolution**	**Uncertainty**
10 V	1 mV	5 mV
0-20 mA	0.01 mA	0.02 mA
4-20 mA	0.01 mA	0.02 mA

Voltage output:
Minimum permissible load resistance: 5 kΩ
Current output:
- Internal power:
Maximum permissible load resistance: 500 Ω
Open circuit voltage: 12 V
- External power:
Supply voltage: 15V ≤ supply V ≤ 50 V
Max. permissible load resistance: Rmax = (V supply - 2) / 0.02
Max. permissible common mode voltage between analogue channels and other system I/O channels: 150 VDC or VAC peak

Average processing time: 20 ms
Signal risetime to resistance load: 20 µs / V
Maximum load capacity: 10 µF
Temperature coefficient: 0.01% /°C

Dry relay output board: AN 5887

Capacity: 10 bistable relays per board
Wired to removable screw terminal connector
Contact resistance load: 48 V or 1 A or 30 Ω
Number of operations: 5.105 in the following conditions.
Each contact is either common, on or off.
The relays are controlled according to system program, for example:

- on a specific alarm limit action
- remote controlled from one of the communication interfaces
- on a conditional processing

Further features

Scanning rate	Three integration times are programmable channel per channel. This criterion acts on the conversion and settling time, the lowest speed gives the maximum resolution and accuracy. (1) Analogue-to-digital converter, 12 bits with successive approximations. This speed is not available for strain gauges.
Channels	Each module can address 2,000 channels. These can be real channels (input or output) or virtual channels performing computations.
Calculation channels	The embedded software is able to perform data calculations and store calculation results over a channel or between channels. Calculation channels can be used to condition outputs (relays, analogue outputs).
Alarms	Every channel can be configured with 4 alarms levels for monitoring purposes. A specific relay output or, if required, a conditional processing may be associated to each threshold.
Linearization	100 linearization table with 40 pairs of counts each may be accessed by the user (measured value associated with computed value), thus allowing sensors to be corrected.

Conditional processing	IF, THEN, DO are accessible and authorise changes to constants, thresholds, tasks, i.e. scanning conditions.

General specifications

Size	DATALOG 20: 160 x 149 x 410 mm DATALOG 90: 160 x 291 x 410 mm DATALOG 140 : 160 x 393 x 410 mm
Weight	3 to 9 kg according to the model and options
Power supply	100 / 230 V ±10%, 50 / 60 Hz
Battery (option)	Type: battery pack with built-in charger Battery life: 3 h
Communication ports	RS 232 and RS 485 Modbus RTU and ASCII
Storage capacity	Internal of 6 storage memories of 8 000 measurements (1 per task over the first six tasks) External on PCMCIA card

Environmental specifications

Reference range	23°C ±1°C (RH: 45 to 75 % condensing)
Operating reference range	0 to +50°C (RH: 20 to 80 % condensing)
Storage temperature limits	-30°C to +50°C (Battery charged)
Maximum height	0 to 2200 m
Sealing	IP 40 according to EN 60529

Safety specifications

Class	In accordance with EN 61010-1 Category III, pollution 2
Rated voltage	60 V
Chocks and vibrations	EN 61010-1
EMC conformity	Immunity: • EN 61000-4-2 • EN 61000-4-3 • EN 61000-4-5 • EN 61000-4-6 • EN 61000-4-11 EN 61000-4-4 Conducted and radiated emissions: • EN 55022, class B

	• EN 61000-3-2 • EN 61000-3-3

Models and accessories

Instrument:

D2AO Data acquisition system with 2 input / output board slots, without keyboard nor display

D2CO Data acquisition system with 2 input / output board slots, with keyboard and display*

D9AO Data acquisition system with 9 input / output board slots, without keyboard nor display

D9AB Data acquisition system with 9 input / output board slots, without keyboard nor display

With rechargeable battery

D9CO Data acquisition system with 9 input / output board slots, with keyboard and display*

D9CB Data acquisition system with 9 input / output board slots, with keyboard and display*

With rechargeable battery

D9CI Data acquisition system with 9 input / output board slots, with keyboard and display*

With internal printer

D14AO Data acquisition system with 14 input / output board slots, without keyboard nor display

D14AB Data acquisition system with 14 input / output board slots, without keyboard nor display

With rechargeable battery

D14CO Data acquisition system with 14 input / output board slots, with keyboard and display*

D14CB Data acquisition system with 14 input / output board slots, with keyboard and display*

With rechargeable battery

D14CI Data acquisition system with 14 input / output board slots, with keyboard and display*

With internal printer

Delivered in standard with:

- User manual
- Power supply cable
- RS 232 cable
- Carrying handle
- Configuration and management software LOGIDAT
  * Interface for PCMCIA memory card in standard with all DATALOG with keyboard

Boards:

AN5885	10-channel - board universal inputs
AN5886	10-channel board - digital inputs
AN5887	10-channel board - dry relay output
AN5888	5-channel board - analogue output
AN3700	Strain gauge power supply board
AN5905	20-channel - 2 wires board analog inputs
AN5906	10-channel board - opto inputs
ATC017	10-channel - protected input board

Accessories:

ER48276-000	Disconnectable terminal block for 10 channel board
ER44007-024	Shunt for process current measuring
ATC012	Drive for PCMCIA memory card
ATC014	PCMCIA memory card PCMCIA 32 Mo
ATC026	Rack mounting kit for DATALOG 20
ATC027	Rack mounting kit for DATALOG 90
ATC028	Rack mounting kit for DATALOG 140
ATC030	Set of 10 paper rolls for DATALOG
ATC031	Voltmeter for DATALOG
ATC032	Supply for DATALOG
ATC052	Converter RS 485 / RS 232
ATC053	Converter RS 485 / USB
ATC054	Converter RS 485 / Ethernet
ATC061	Converter RS 232 / USB
ATC023	Protection back panel for DATALOG 20

ATC024 Protection back panel for DATALOG 90

ATC025 Protection back panel for DATALOG 140

Software:

VISULOG Monitoring & data processing software full version – 1 licence

VISULOG-ETAL Monitoring & data processing software full version – 1 licence

+ Calibration module

VISULOG-PHARMA Monitoring & data processing software full version – 1 licence

+ Module for advanced management of access rights, 21 CFR Part 11 compliant

VISULOG-ETAL-PHARMA Monitoring & data processing software full version – 1 licence

+ Calibration module

+ Module for advanced management of access rights, 21 CFR Part 11 compliant

LTC001 Driver for Labview (Available on download on www.aoip.com)

DAOPC OPC server for DATALOG

LTC003 DLL library

Software licences**:**

LIC VISU Additional license for VISULOG

LIC VISU ETAL Additional license for VISULOG with ETAL optional module

LIC VISU PHARMA Additional license for VISULOG with PHARMA optional module

LIC VISU ETAL PHARMA Additional license for VISULOG with ETAL and PHARMA optional module

LIC VISULOG WEB License for VISULOG WEB

Certification:

QMA11EN COFRAC certificate of calibration

With all relevant data points where the device has been tested

Packing information:

DATALOG 20 size 160 x 149 x 410 mm

DATALOG 90 size 160 x 291 x 410 mm

DATALOG 140 size	160 x 393 x 410 mm
Weight	3 to 9 kg according to the model and options