

CALYS 100

Field precision documenting multifunction calibrator

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Suitable for all field and lab measurements, it can simultaneously measure and generate over two isolated channels various signals of temperature, resistance, process, pressure and frequency in one single instrument.

Description

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Providing **extended functionalities** (temperature simulation, scaling, steps, synthesizer, statistical functions...), CALYS 100 makes advanced data exploitation and full data traceability easier, as well as quick access to functions by menus.
The instrument simultaneously measures and simulates:

- Temperature: Up to 0,012% RDG
- Resistance: Up to 0,010% RDG, 4 KΩ range
- Current: Up to 0,012% RDG, 50 mA range + 24 V loop supply
- Voltage: Up to 0,010% RDG, 50 V range
- Frequency: Up to 0,005% RDG, 20 KHz range (10 KHz in simulation)
- Pressure: When used with an external pressure module (ref. ACL433), CALYS 100 can measure and simulate pressure (comparison calibration with a pressure pump).



Using this user-friendly instrument, calibration tasks can be quickly carried out over the whole process chain. Take the 900 g documenting process calibrator to the field with you during the whole week with **10 calibration procedures stored** in the device. Run the procedure after connecting the probes to the instrument (Easy connect system®) and save the results for onsite easy and quick calibration.
Back to the office, you can then upload the data on a computer in order to **issue customized calibration certificates** with dedicated calibration software DATACAL.

IP 54, fully protected by an antichoc rubber holster, CALYS 100 integrates "easyconnect" terminals and a wide backlite display that makes it easy to use in any severe or dark conditions.

Easy connection system®



Connect your probes by simply pushing on the terminal top and insert wires of up to 3 mm or 10 AWG diameter and compensated thermocouple connectors.
Wires are held tight between two brass plates ensuring thermal stability and a very good cold junction compensation for thermocouples. This system also enables 4 mm banana plugs and security connectors to be connected on the terminal top.

CALYS series, 4 models from basic use to advanced performances

Specifications		CALYS 50	CALYS 75	CALYS 100	CALYS 150
Top accuracy		200 ppm		130 ppm	50 ppm
Temperature accuracy	Thermocouples (14) RTDs (12)	0.013% RDG for Tc K 0.012% RDG		0.01% RDG for Tc K 0.01% RDG	0.005% RDG for Tc K 0.006% RDG
DC current + Loop supply 24 V	Range Accuracy	50 mA 0.0175% RDG			100 mA 0.007% RDG
DC voltage	Range Accuracy	50 V IN / 20 V OUT 0.013% RDG	50 V 0.013% RDG	50 V 0.010% RDG	50 V 0.005% RDG
Frequency	Range Accuracy	20 KHz IN / 10 KHz OUT 0.005% RDG			100 KHz 0.01% RDG
Resistance	Range Accuracy	4000 Ω 0.012% RDG		4000 Ω 0.010% RDG	50 KΩ 0.006% RDG
Pressure	Range Accuracy		Relative pressure: 30 bar / Absolute pressure: 1,000 bar 0.05% RDG		
Compliance to standards					21 CFR Part 11

				NADCAP Heat treatment AMS 2750
Additional functions	Advanced data exploitation: Scaling, relative measurement, simulation of ramps and steps, synthetizer, square root, statistical functions Transmitter function			
Additional functions		Switch test Calibration of transmitters		
Additional functions				Comparison calibration HART: Digital calibration and data transfer Calibration of thermistors
Software		DATACAL calibration software for configuration and data management		
Memory		10,000 data stored and recalled on screen as curve or list		

Specifications

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

Uncertainty is given in % of reading (CALYS 100 display) + fixed value.

Resistive probes: Measurement and simulation

Sensor	Input / Output range	Resolution	Accuracy / 1 year in measurement	Accuracy / 1 year in simulation
Pt50 (α = 3851)	-220°C to +850°C	0.01°C	0.010% RDG + 0.06°C	0.012% RDG + 0.18°C
Pt100 (α = 3851)	-220°C to + 850°C	0.01°C	0.010% RDG + 0.05°C	0.012% RDG + 0.12°C
Pt100 (α = 3916)	-200°C to +510°C	0.01°C	0.010% RDG + 0.05°C	0.012% RDG + 0.12°C
Pt100 (α = 3926)	-210°C to +850°C	0.01°C	0.010% RDG + 0.05°C	0.012% RDG + 0.12°C
Pt200 (α = 3851)	-220°C to + 850°C	0.01°C	0.010% RDG + 0.12°C	0.012% RDG + 0.33°C
Pt500 (α = 3851)	-220°C to + 850°C	0.01°C	0.010% RDG + 0.07°C	0.012% RDG + 0.18°C
Pt1000 (α = 3851)	-220°C to +850°C	0.01°C	0.010% RDG + 0.05°C	0.012% RDG + 0.08°C
Ni100 (α = 618)	-60°C to +180°C	0.01°C	0.010% RDG + 0.03°C	0.012% RDG + 0.08°C
Ni120 (α = 672)	-40°C to +205°C	0.01°C	0.010% RDG + 0.03°C	0.012% RDG + 0.08°C
Ni1000 (α = 618)	-60°C to +180°C	0.01°C	0.010% RDG + 0.03°C	0.012% RDG + 0.08°C
Cu10 (α = 427)	-70°C to +150°C	0.01°C	0.010% RDG + 0.18°C	0.012% RDG + 0.1°C
Cu50 (α = 428)	-50°C to +150°C	0.01°C	0.010% RDG + 0.06°C	0.012% RDG + 0.15°C

Resistive probes measurements in 2, 3 or 4 wires: automatic recognition of number of connected wires, with indication on screen
Accuracies are given for 4-wire mounted probes
Take into account particular error of temperature sensor used and implementation conditions
Temperature coefficient: < 10% of accuracy /°C
Measuring current: 0.25 mA (Measurement) or from 0.1 to 1 mA (Emission)
Current settling time: < 5 ms

Thermocouples: Measurement and simulation

Type	Input range	Resolution	Accuracy / 1 year in measurement	Output range	Resolution	Accuracy / 1 year in simulation
K	-250 to -200°C -200 to -120°C -120 to 0°C 0 to +1372°C	0.1°C 0.1°C 0.05°C 0.05°C	0.70°C 0.20°C 0.1°C 0.010% RDG + 0.08°C	-240 to -50°C -50 to 0°C +0 to +1372°C	0.1°C 0.1°C 0.05°C	0.50°C 0.09°C 0.013% L + 0.07°C
T	-250 to -200°C -200 to -120°C -120 to -50°C -500 to +400°C	0.1°C 0.05°C 0.05°C 0.05°C	0.60°C 0.20°C 0.10°C 0.010% RDG + 0.08°C	-240 to -100°C -100 to +0°C +0 to +400°C	0.1°C 0.05°C 0.05°C	0.35°C 0.09°C 0.010% L + 0.08°C
J	-210 to -120°C -120 to 0°C +0 to +1200°C	0.05°C 0.05°C 0.05°C	0.2°C 0.09°C 0.010% RDG + 0.07°C	-210 to -0°C +0 to +1200°C	0.05°C 0.05°C	0.18°C 0.010% L + 0.07°C
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	0.4°C 0.13°C 0.07°C 0.010% RDG + 0.05°C	-240 to -100°C -100 to +40°C +40 to +1000°C	0.1°C 0.1°C 0.05°C	0.2°C 0.09°C 0.010% L + 0.05°C
R	-50 to +150°C +150 to +550°C +550 to 1768°C	0.1°C 0.1°C 0.10°C	0.7°C 0.010% RDG + 0.3°C 0.010% RDG + 0.2°C	-50 to +350°C +350 to +900°C +900 to 1768°C	0.1°C 0.1°C 0.1°C	0.45°C 0.010% L + 0.35°C 0.010% L + 0.2°C
S	-50 to +150°C +150 to +550°C +550 to +1768°C	0.1°C 0.1°C 0.1°C	0.7°C 0.010% RDG + 0.35°C 0.010% RDG + 0.25°C	-50 to +120°C +120 to +450°C +450 to +1768°C	0.1°C 0.1°C 0.1°C	0.7°C 0.010% L + 0.35°C 0.010% L + 0.25°C
B	+400 to +900°C +900 to +1820°C	0.1°C 0.1°C	0.010% RDG + 0.4°C 0.010% RDG + 0.2°C	+400 to +850°C +850 to +1820°C	0.1°C 0.1°C	0.010% L + 0.4°C 0.010% L + 0.2°C
U	-200 to +660°C	0.05°C	0.15°C	-200 to +660°C	0.05°C	0.13°C

L	-200 to +900°C	0.05°C	0.2°C	-200 to +900°C	0.05°C	0.17°C
C	-20 to +900°C +900 to 2310°C	0.1°C 0.1°C	0.2°C 0.010% RDG + 0.15°C	-20 to +900°C +900 to 2310°C	0.1°C 0.1°C	0.23°C 0.010% L + 0.15°C
N	-240 to -190°C -190 to -110°C -110 to +0°C +0 to +1300°C	0.10°C 0.1°C 0.05°C 0.05°C	0.4°C 0.10°C 0.08°C 0.010% RDG + 0.15°C	-240 to -190°C -190 to -110°C -110 to +0°C +0 to +1300°C	0.10°C 0.1°C 0.05°C 0.05°C	0.25°C 0.13°C 0.08°C 0.010% L + 0.06°C
Platine	-100 to +1400°C	0.05°C	0.25°C	-100 to +1400°C	0.05°C	0.25°C
Mo	+0 to +1375°C	0.05°C	0.010% RDG + 0.06°C	+0 to +1375°C	0.05°C	0.010% L + 0.06°C
NiMo/NiCo	-50 to +1410°C	0.05°C	0.010% RDG + 0.30°C	-50 to +1410°C	0.05°C	0.010% L + 0.3°C

Accuracy is given for reference @ 0°C.
When using the internal reference junction (except couple B) add an additional uncertainty of 0.2 °C at 0 °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) or manually entered.
Temperature coefficient: <10% of accuracy /°C
Display unit: °C and F
Thermocouples: D and G, for specifications, refer to instruction manual

Specifications and performances in pressure @23°C ±5°C>

Pressure: Measurement by external digital sensor



Ranges	0-1 bar	0-3 bar	0-10 bar	0-30 bar	0-100 bar	0-300 bar	0-1000 bar
Absolute	X	X	X	X	X	X	X
Relative	X	X	X	X			

Available in relative, absolute and differential pressure.
Connector: ¼ gas
Resolution: 0.02% FS
Accuracy:
- 0.05% FS from 10 to 40°C
- 0.1% FS from -10 to +10°C and from 40 to 80°C
This digital pressure module ACL433 is connected to CALYS 100 through RS485 serial cable to the digital input connector. All data are digital. Measurements are compensated in temperature by a polynomial correction implemented into the firmware at factory.

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

DC current: Measurement

With or without loop supply

Range	Resolution	Accuracy / 1 year	Nota Rin
0-20 mA	1 µA	0.012% RDG + 2 µA	< 25 Ω
4-20 mA	1 µA	0.012% RDG + 2 µA	< 25 Ω
±50 mA	1 µA	0.012% RDG + 2 µA	< 25 Ω

Temperature coefficient: < 10 ppm/°C beyond reference domain
Loop supply: 24 V ±10%
HART® compatibility: Input impedance Rin = 280 Ω
Display with linear or quadratic scaling

DC current: Emission

With or without loop supply

Range	Resolution	Accuracy / 1 year
24 mA	1 µA	0.012% RDG + 2 µA
4-20 mA	1 µA	0.012% RDG + 2 µA
0-20 mA	1 µA	0.012% RDG + 2 µA

Temperature Coefficient < 10 ppm/°C beyond reference domain
Settling time: < 5 ms
Specifications given for CALYS configurations in:
- Active mode (+24V ON) 1 Meter in passive mode (+24 V OFF)
- Passive mode (+24 V OFF) 1 Meter in active mode (+24 V ON)
Pre-programmed steps

0%	25%	50%	75%	100%
4-20 mA linear	4	8	12	16	20
0-20 mA linear	0	5	10	15	20
4-20 mA quad	4	5	8	13	20
0-20 mA quad	0	1.25	5	11,25	20

4-20 mA valves	3.8-4-4.2	12	19, 20, 21

DC voltage: Measurement

Range	Resolution	Accuracy / 1 year	Nota Rin
+100 mV	1 µV	0.010% RDG + 3 µV	> 10 MΩ
+1 V (1)	10 µV	0.010% RDG + 20 µV	> 10 MΩ
+10 V	100 µV	0.010% RDG + 200 µV	= 1 MΩ
+50 V	1 mV	0.010% RDG + 2 mV	= 1 MΩ

(1) Range specified: -0.8 V to +1 V
Temperature coefficient: < 7 ppm/°C beyond reference domain

DC voltage: Emission

Range	Resolution	Accuracy / 1 year	Minimum load
+100 m V	1 µV	0.010% RDG + 3 µV	1 kΩ
+2 V	10 µV	0.010% RDG + 20 µV	2 kΩ
+20 V	100 µV	0.012% RDG + 200 µV (1)	4 kΩ
+50 V	1 mV	0.012% RDG + 2 mV	4 kΩ

(1) Noise: 3 ppm (for 0.1 Hz to 10 Hz) and 5 ppm (for 10 Hz to 100 Hz)
Temperature coefficient: < 7 ppm/°C beyond reference domain
Settling time: < 5 ms

Frequency and counting: Measurement

Range	Resolution	Accuracy / 1 year
20 kHz	0.01 Hz	0.005% RDG

Scale unit: Pulse / min and Hz
Trigger level: 1 V
Measurement on frequency signals or dry contacts
Counting will be performed on defined time or infinite time.
Temperature coefficient: < 5 ppm/°C beyond reference domain

Frequency and counting: Emission

Range	Resolution	Accuracy / 1 year
1000 Hz	0.01 Hz	0.005% RDG
100 kHz	0.1 Hz	0.005% RDG

Scale unit: Pulse / min and Hz
Emission of pulses and dry contacts
Signal maximum amplitude: 20 V (user selectable)
Temperature coefficient: < 5 ppm/°C beyond reference domain

Resistance: Measurement

Range	Resolution	Accuracy / 1 year
400 Ω	1 mΩ	0.010% RDG + 10 mΩ
4000 Ω	10 mΩ	0.010% RDG + 100 mΩ

Resistance measurement in 2, 3 or 4 wires: automatic recognition of number of connected wires, with indication on screen
Accuracies are given for 4-wire mounted probes
Open circuit terminal voltage: < 10 V
Continuity test: Open circuit for R > 1000 Ω and closed circuit for R < 1000 Ω
Temperature coefficient: < 7 ppm/°C beyond reference domain
Measurement current: 0.25 mA

Resistance: Emission

Range	Resolution	Accuracy / 1 year	Nota Iext
40 Ω	1 mΩ	0.012% RDG + 3 mΩ 0.012% RDG + 10 mΩ	Iext: 10 mA Iext: 1 mA
400 Ω	10 mΩ	0.012% RDG + 20 mΩ 0.012% RDG + 30 mΩ	Iext: 1 / 10 mA Iext: 0.1 / 1 mA
4000 Ω	100 mΩ	0.012% RDG + 300 mΩ	Iext: 0.1 / 1 mA

Temperature coefficient: < 7 ppm/°C beyond reference domain
Current settling time: < 1 ms
Iext : Current received by the calibrator

Further features

Scaling in measurement and simulation modes	Scaling allows process signals to be displayed in % of FS or in all other units. This function also allows sensors to be corrected after a calibration.
Relative measurement	

Models and accessories

Instrument:

CALYS100 On-site documenting multifunction calibrator
Delivered in standard with:

- User manual
- Battery charger
- Set of 6 testing leads
- Carrying strap
- Factory test report

Accessories:

ACL433 External digital pressure sensor for CALYS 75 / 100 / 150 (Absolute or relative pressure)
Different ranges available from 0 to 1,000 bar
Range from -1 -> 1; 3; 10; 30 (Absolute or relative pressure)
Range from -1 -> 100; 300; 1,000 (Absolute pressure only))
Standard accuracy: 0.05% FS
AN6050 Transport case for CALYS series
ACL9311 Set of 6 measuring cables with removable crocodile clips
ER 49504-000 USB cable

Software:

DATACAL Calibration software for CALYS 75 / 100 / 150
Supplied with USB cable

Certification:

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

Packing information:

Size 210 x 110 x 50 mm
Weight 900 g