

# CALIBRATION

## CALYS 50

### On-site multifunction calibrator



### Simultaneous Measurement and Generation Protected for on-site use Easy connection system

Designed with a close collaboration with industrials, Calys 50 integrates all the necessary functions for adjustment and maintenance of process.

Its ergonomic design and its embedded software allow Calys 50 to be a high performance calibrator and very easy to use.

IP 54, full protected by an anti-shock sheath, with "easy-connect®" terminals integrated, a very contrasted backlight display, it will be comfortable to use in all conditions

Its elastomer keypad protects it from dirty and grease marks, the keys allow to use Calys 50 with gloves. It has 10 working configurations recorded by user or user group, to always find the good configuration for designed and repetitive jobs.

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## Calys 50: presentation

Calys 50 is a portable calibrator able to measure and to generate simultaneously on 2 isolated channels.

It has a wide backlighted display with high contrast to be used for application in dark room.

Full protected by the **sheath**, a keypad in lexan protects it from dirties and numerical keypad knocked up is usable even using protective gloves.

It is able to measure and generate voltage, current, frequency, resistance signals and also resistive probes and thermocouples.



Calys 50 is delivered in standard with a strap and a stand for desktop use, a quick battery charger, and a set of 6 measuring cable with crocodile clips

## Main characteristics

Display: Backlight display with contrast settings

USB Connection

Recommended ambient conditions: 0 to 50°C, 10 to 80% relative humidity

Maximum ambient conditions: -10 to 55°C, 10 to 80% relative humidity

Ingress protection rating: IP 54

Rechargeable NiMH Batteries

Dimensions: 210X110X50 mm (8.3x4.3x2.0 in.)

Weight: 900g (32 Oz.)

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## "easy connect" system

This unique system is used by pushing on the terminal's top, by inserting:

- Wires with a diameter up to 3 mm,
  - Compensated thermocouple connectors,
  - Pin terminal on front panel,
- and next by releasing.

Wires are tighten between 2 brass plates which provide an great thermal gradient, so that allows a very good cold junction compensation for thermocouples.

Calys 50 allows 4mm connectors and also security connectors to be connected on the front panel.



## Display resolution:

Calys 50 allows the digit number after the dot to be selected: This function is justified by the needs of users who want or not to display the best resolution for calibration or on the contrary limit it for simple verifications.

## Functions:

Calys 50 allows the following physical values to be measured and simulated:

- **Voltage**
- **Current**
- **Resistance**
- **Temperature by resistive probes and thermocouples**
- **Frequency for frequency signals and for dry contacts**

It is able to perform scaling of process signals and so to correct temperature probes.

It is compatible with HART transmitters by inserting a 250ohms resistance which doesn't disturb digital data transfer.

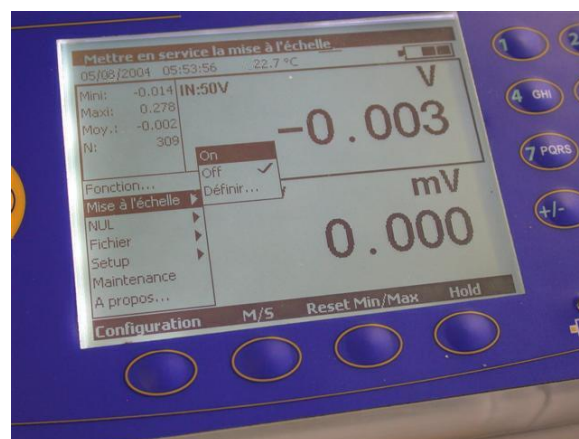
## Display

Calys 50 dual display indicates permanently the measurement value, and also the emitted value, the gauge and the used functions.

On the top date, time and also external temperature are also indicated.

During measuring average, maximum, minimum and the number of measurements are displayed on the left. While for emission this part of screen displays all details of ramps, steps and constant value emission functions.

Drop-down menus are used with the navigator, and an on-line help is available to make easier connections of probes and wires.



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## Functions and performances: @23°C ±5°C

Accuracies are given in % of reading(a CALYS 50 display) + fixed value

### Direct current: Measurement

Calys 50 is able to measure up to 50 mA, with or without power supply of loop (24V power supply).

Range	Resolution	Accuracy / 1yr	Remarks
±50mA	1 µA	0,018%R + 2 µA	Rin < 25 Ω

For measurements of transmitters outputs, special ranges give a dual display using mA and % of full scale.

Calys 50 also allows to linearize following linear or quadratic signal.

In current measurement Hart compatibility can be selected to measure currents coming from Hart protocol transmitters

### DC current: Emission

Range	Resolution	Accuracy / 1yr
24mA	1 µA	0,018%R + 2 µA

Emission with or without loop supply (24V)

#### Preprogrammed steps

	0%	25%	50%	75%	100%
4-20mA linear	4	8	12	16	20
0-20mA quad	0	5	10	15	20
4-20mA linear	4	5	8	13	20
0-20Ma quad	0	1,25	5	11,25	20
4-20mA valves	3,8-4	-4,2	12		19,20,21

### Direct voltage: Measurement

Range	Resolution	Accuracy / 1yr	Remarks
±100mV	1 µV	0,013%R + 3 µV	Rin > 10 MΩ
±1V	10 µV	0,013%R + 20 µV	Rin > 10 MΩ
±10V	100 µV	0,015%R + 200 µV	Rin = 1MΩ
±50V	1 mV	0,015%R + 2 mV	Rin = 1MΩ

Rin: input resistance

### Direct voltage: Emission

Range	Resolution	Accuracy / 1yr	Remarks
100mV	1 µV	0,013% R+ 3 µV	Load 1KΩ
2V	10 µV	0,013% R+ 30 µV	Load 2KΩ
20V	100 µV	0,015% R+ 300 µV	Load 4KΩ

### Frequency and counting: Measurement

Range	Resolution	Accuracy / 1yr
20 kHz	< 0.01 Hz	0.005%R

Threshold triggering: 1V

Unit scale: pulse/min or Hz

Measurement on frequency signal and on dry contacts

Measurement for counting will be done on defined time or on infinite time.

### Frequency and pulses: Emission

Range	Resolution	Accuracy / 1yr
1000 Hz	< 0.01 Hz	0.005% R
10 kHz	10 Hz	0.005% R

Unit scale: pulse/min or Hz

Pulse emissions

Dry contact simulation

Max amplitude: 20V selectable by user

### Resistance: Measurement

Range	Resolution	Accuracy / 1yr	Remarks
400 Ω	1 mΩ	0.012% R+ 10 mΩ	Measurement current = 0.25 mA
4000 Ω	10 mΩ	0.012% R+ 100 mΩ	Measurement current = 0.25 mA

2, 3 or 4 wires resistance measurement :automatic recognition of number of connected wires, with indication on screen

### Resistance: Emission

Range	Resolution	Accuracy / 1yr	Remarks
400 Ω	10 mΩ	0.014% + 30 mΩ	next from 0.1 to 10 mA
4000 Ω	100 mΩ	0.014%R + 300 mΩ	next from 0.01 to 0.1 mA

Resistance emission: establishing time <1ms for compatibility with smart transmitters type

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## Temperature

### Resistive probes: Measurement and emission

Probe type	Range	Resolution Measurement	Accuracy / 1yr Measurement	Resolution Emission	Accuracy / 1yr Emission
Pt 50 ( $\alpha = 3850$ )	- 220°C + 1 200°C	0,01°C	0,012 % L+ 0,06°C	0,03°C	0,014 % L+ 0,18°C
Pt 100 ( $\alpha = 3850$ )	- 220°C + 1 200°C	0,01°C	0,012 % L+ 0,05°C	0,02°C	0,014 % L+ 0,12°C
JPt 100 ( $\alpha = 3916$ )	- 200°C + 510°C	0,01°C	0,012 % L+ 0,05°C	0,02°C	0,014 % L+ 0,12°C
Pt 100 ( $\alpha = 3926$ )	- 210°C + 850°C	0,01°C	0,012 % L+ 0,05°C	0,02°C	0,014 % L+ 0,12°C
Pt 200 ( $\alpha = 3851$ )	- 220°C + 600°C	0,01°C	0,012 % L+ 0,12°C	0,10°C	0,014 % L+ 0,33°C
Pt 500 ( $\alpha = 3850$ )	- 220°C + 1 200°C	0,01°C	0,012 % L+ 0,07°C	0,03°C	0,014 % L+ 0,18°C
Pt 1 000 ( $\alpha = 3851$ )	- 220°C + 1 200°C	0,01°C	0,012 % L+ 0,05°C	0,02°C	0,014 % L+ 0,08°C
Ni 100 ( $\alpha = 618$ )	- 60°C + 180°C	0,01°C	0,012 % L+ 0,03°C	0,01°C	0,014 % L+ 0,08°C
Ni 120 ( $\alpha = 672$ )	- 40°C + 205°C	0,01°C	0,012 % L+ 0,03°C	0,01°C	0,014 % L+ 0,08°C
Ni 1 000 ( $\alpha = 618$ )	- 60°C + 180°C	0,01°C	0,012 % L+ 0,03°C	0,01°C	0,014 % L+ 0,08°C
Cu 10 ( $\alpha = 427$ )	- 70°C + 150°C	0,1°C	0,012 % L+ 0,18°C	0,01°C	0,014 % L+ 0,10°C
Cu 50 ( $\alpha = 428$ )	- 50°C + 150°C	0,01°C	0,012 % L+ 0,06°C	0,03°C	0,014 % L+ 0,15°C

Resistive probes measurements in 2,3 or 4 wires: automatic recognition of number of connected wires, with indication on screen

- Temperature coefficient: < 10 % of accuracy /°C.
- The accuracy in table above is given for a sensor connection in 4 wires
- Take into account peculiar error of temperature sensor used and implementation conditions
- Measurement current: 0.01mA to 1mA
- Establishing time: <1ms for simulation (simulation on quick transmitters)

### Thermocouples: Measurement and Emission

Type	Range	Measurement		Emission		
		Resolution	Accuracy / 1 yr	OUT range	Resolution	Accuracy / 1 yr
K	- 250 to - 200°C	0,2°C	0,25°C	- 240 to - 50°C	0,2°C	0,60°C
	- 200 to - 120°C	0,1°C	0,10°C	- 50 to + 120°C	0,1°C	0,10°C
	- 120 to 0°C	0,05°C	0,06°C	+120 to + 1 372°C	0,05°C	0,013 % R + 0,08°C
	+ 0 to + 1 372°C	0,05°C	0,013 % L + 0,08°C			
T	- 250 to - 200°C	0,2°C	0,70°C	- 240 to - 100°C	0,20°C	0,40°C
	- 200 to - 120°C	0,05°C	0,25°C	- 100 to - 40°C	0,05°C	0,10°C
	- 120 to - 50°C	0,05°C	0,10°C	- 40 to + 400°C	0,05°C	0,013 % R + 0,08°C
	+ 0 to + 400°C	0,05°C	0,013 % L + 0,08°C			
J	- 210 to - 120°C	0,05°C	0,08°C	- 210 to + 50°C	0,05°C	0,20°C
	- 120 to 0°C	0,05°C	0,013 % L + 0,07°C	+ 50 to + 500°C	0,05°C	0,013 % R + 0,07°C
	+ 0 to + 1 200°C	0,05°C		+ 500 to + 1 200°C	0,05°C	
E	- 250 to - 200°C	0,1°C	0,45°C	- 240 to - 100°C	0,1°C	0,25°C
	- 200 to - 100°C	0,05°C	0,15°C	- 100 to + 40°C	0,1°C	0,10°C
	- 100 to 0°C	0,05°C	0,07°C	+ 40 to + 1 000°C	0,05°C	0,013 % R + 0,05°C
	+ 0 to + 1 000°C	0,05°C	0,013 % L + 0,05°C			
R	- 50 to + 120°C	0,5°C	0,8°C	- 50 to + 350°C	0,50°C	0,5°C
	+ 120 to + 450°C	0,2°C	0,013 % L + 0,35°C	+ 350 to + 900°C	0,20°C	0,013 % R + 0,35°C
	+ 450 to + 1768°C	0,1°C	0,013 % L + 0,2°C	+ 900 to + 1 768°C	0,10°C	0,013 % R + 0,2°C
S	- 50 to + 120°C	0,5°C	0,8°C	- 50 to + 350°C	0,50°C	0,8°C
	+ 120 to + 450°C	0,2°C	0,013 % L + 0,35°C	+ 350 to + 900°C	0,20°C	0,013 % R + 0,35°C
	+ 450 to + 1768°C	0,1°C	0,013 % L + 0,25°C	+ 900 to + 1 768°C	0,10°C	0,013 % R + 0,25°C
B	+ 400 to + 900°C	0,2°C	0,013 % L + 0,4°C	+ 400 to + 850°C	0,20°C	0,013 % R + 0,4°C
	+ 900 to + 1820°C	0,1°C	0,013 % L + 0,2°C	+ 850 to + 1 820°C	0,10°C	0,013 % R + 0,2°C
U	- 200 to 660°C	0,05°C	0,15°C	- 200 to - 70°C	0,05°C	0,15°C
				- 70 to + 600°C	0,05°C	
L	- 200 to + 900°C	0,05°C	0,2°C	- 200 to - 70°C	0,05°C	0,20°C
				- 70 to + 900°C	0,05°C	
C	- 20 to + 900°C	0,1°C	0,25°C	- 20 to + 900°C	0,10°C	0,25°C
	+ 900 to + 2310°C	0,1°C	0,013 % L + 0,15°C	+ 900 to + 2 310°C	0,10°C	0,013 % R + 0,15°C
N	- 240 to - 190°C	0,2°C	0,5°C	- 240 to + 10°C	0,20°C	0,3°C
	- 190 to - 110°C	0,1°C	0,15°C	+ 10 to + 250°C	0,10°C	0,15°C
	- 110 to - 0°C	0,05°C	0,08°C	+ 250 to + 1 300°C	0,05°C	0,08°C
	+ 0 to + 1 300°C	0,05°C	0,013 % L + 0,06°C			0,013 % R + 0,06°C
PI	- 100 to + 1400°C	0,05°C	0,3°C	- 100 to + 1 400°C	0,05°C	0,3°C
Mo	0 to + 1 375°C	0,05°C	0,013 % L + 0,06°C	+ 0 to + 1 375°C	0,05°C	0,013 % R + 0,06°C
NiMo / NiCo	- 50 to + 1410°C	0,05	0,013 % L + 0,30°C	- 50 to + 1 410°C	0,05°C	0,013 % R + 0,30°C

Accuracy is warranted for reference junction (RJ) at 0°C

With use of internal RJ (except couple B) add a additional uncertainty of 0.3°C

CJC localisation can be selected by keypad programming, except for couple B:

- External at 0°C, internal (temperature compensation of instrument's terminals) or by temperature programming
- Temperature coefficient: <10% of accuracy /°C. Display unit: °C and F.



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## Additional functions

### File Menu:

User can save up to 10 full configurations of the instruments and recall them whenever. Configurations can be saved and recalled in function of user and of use. Configurations include all programming done on instrument, as the range.

### Contrast adjustment:

Screen's contrast can be adjusted whenever to fit with measurement environment

### Screen Backlighting:

Time of backlighting can be programmed to save battery

### Autonomy:

Calys 50 autonomy is 8 hours in the worst condition of use

### Scaling:

In measurement and simulation, scaling allows process signals to be displayed in % of FS or in all other unit

This function also allows sensors to be corrected after a calibration

### Relative measurement:

- Programming of a reference value different from the one of the instrument (NUL function)
- Subtracting of constant value by measuring or programming it from a measured value (TARE function)

### Square root:

In current measurement and simulation, this function allows to take into account a quadratic signal coming from transmitter of type  $\Delta P$

### Statistical functions:

Average, minimum, maximum and also number of measurements done are always displayed. Reset key allows values to be updated.

### Simulation Menu:

Simulation value is set by entering value on keypad or by changing the according digit with the cursor

### Ramps generation:

Starting, ending and length time values of simple or cyclic ramps can be set to do simulation. Number of ramps can also be adjusted in case of cyclic ramps for any signals.

### Steps simulation:

2 modes are proposed.

- Program mode: Starting value, number of steps and the length time have to be set
- Manual mode: User has about a hundred of preset values

In current simulation, user will have some additional preset values in function of range and according to 0%, 25%, 50%, 75% and 100% from selected gauge. Choice is done between gauges:

- 0-20mA: linear or quadratic
- 4-20mA: linear or quadratic

### Synthesizer:

With 100 values manually set, Calys 50 allows curve generation to be remade.

### Transmitter function:

CALYS 50 is able to be used as a transmitter. Measurement input is copied on the output with scaling.

Calys 50 is supplied in standard with 6 testing leads, a quick battery charging system, an instruction manual

## Instructions to order:

**On-site calibrator**

**Protective carrying Case:**

**CALYS 50**

**ACL6050**



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The above mentioned characteristics are subject to change without prior notice

SOFIMAE laboratory on our premises of Ris-Orangis  
\*Ranges available on [www.cofrac.fr](http://www.cofrac.fr)