



A **CALYS 1000** a CALYS termékcsalád többfunkciós kalibrátora. Tökéletes eszköz a fejlett folyamatkarbantartáshoz és a tesztpadon való használatra minden iparágban.

Alkalmas minden terepi és laboratóriumi méréshez, egyszerre képes mérni, előállítani és regisztrálni két különálló csatornán a hőmérséklet, nyomás, ellenállás, folyamat és frekvencia különböző jeleit.

A kibővített funkcionalitást (hőmérséklet szimuláció, skálázás, lépések, szintetizátor, statisztikai funkciók, felhasználó által programozható konfigurációk, stb...) biztosító CALYS 1000 megkönnyíti a adatok kiértékelését és teljes nyomon követhetőségét, valamint a menük segítségével a funkcióhoz való gyors hozzáférést.

A műszer egyidejűleg méri és szimulálja a következő apramétereket:

- Hőmérséklet: max. 0,014% MÉ
- Ellenállás: max. 0,012% MÉ, 4 kΩ tartomány
- Áram: max. 0,0175% MÉ, 50 mA tartomány + 24 V hurok táp
- Feszültség: max. 0,013% MÉ, 50 V tartomány
- Frekvencia: max. 0,005% MÉ, 20 kHz tartomány (10 kHz szimulációban)
- Nyomás: külső nyomásmodullal (ref. ACL433) (összehasonlító kalibrálás nyomáspumpával)

Kalibrálás és DATA CAL szoftver

Ezzel a felhasználóbarát műszerrel a kalibrálási feladatok gyorsan elvégezhetők a teljes folyamatláncban. Ez a dokumentáló folyamatkalibrátor a készülékben tárolt 10 kalibrációs eljárással egy teljes hétagig terepre vihető. A mérési eljárás lefuttatása a szondák műszerhez történő csatlakoztatása után és az eredmények helyszíni mentése egyszerű és gyors kalibrációt tesz lehetővé. Visszatérve az irodába, az adatok számítógépre töltethetők fel testreszabott kalibrációs tanúsítványok készítéséhez a dedikált DATA CAL kalibrációs szoftverrel.

Innovatív és ergonomikus kialakítás



- Fém ház a fokozott robusz-tusság érdekében
- Érintőképernyő
- USB kommunikáció
- Hordfogantyú
- Táplálás telepről / hálózatról

Grafikus képernyő és kijelző felbontás



A CALYS 1000 lehetővé teszi a tizedespont utáni számjegyek számainak kiválasztását: Ezt a funkciót azoknak a felhasználóknak az igényei indokolják, akik a legjobb felbontást akarják megjeleníteni a kalibráláshoz, vagyéppen ellenkezőleg, korlátozzák az egyszerű ellenőrzésekhez.

A CALYS 1000 kettős kijelző folyamatosan jelzi a mérési értéket, valamint a kimeneti értéket, a mérőműszert és a használt funkciókat.

A dátum felett az idő és a külső hőmérséklet is megjelenik. Mérés közben az átlag, maximum, minimum és a mérések száma jelenik meg a bal oldalon, ezen kívül a képernyő ezen része minden részletet megjelenít a rámpákról, lépésekkel és az állandó érték kimeneti funkciókról.

A szondák és vezetékek egyszerűbb csatlakoztatásához legördülő menük és online súgó is elérhető.

Performances & technical specifications @23 °C ±5 °C

Uncertainty is given in % of reading + fixed value.

► Resistive probes: Measurement and simulation

| Probe type | Range | Measurement | | Emission | |
|--------------------------------|---------------------|-------------|---------------------|------------|---------------------|
| | | Resolution | Accuracy / 1 year | Resolution | Accuracy / 1 year |
| Pt 50 ($\alpha = 3851$) | -220 °C to +1200 °C | 0.01 °C | 0.012 % R + 0.06 °C | 0.03 °C | 0.014 % R + 0.18 °C |
| Pt 100 ($\alpha = 3851$) | -220 °C to +850 °C | 0.01 °C | 0.012 % R + 0.05 °C | 0.02 °C | 0.014 % R + 0.12 °C |
| Pt 100 ($\alpha = 3916$) | -200 °C to +510 °C | 0.01 °C | 0.012 % R + 0.05 °C | 0.02 °C | 0.014 % R + 0.12 °C |
| Pt 100 ($\alpha = 3926$) | -210 °C to +850 °C | 0.01 °C | 0.012 % R + 0.05 °C | 0.02 °C | 0.014 % R + 0.12 °C |
| Pt 200 ($\alpha = 3851$) | -220 °C to +1200 °C | 0.01 °C | 0.012 % R + 0.12 °C | 0.10 °C | 0.014 % R + 0.33 °C |
| Pt 500 ($\alpha = 3851$) | -220 °C to +1200 °C | 0.01 °C | 0.012 % R + 0.07 °C | 0.03 °C | 0.014 % R + 0.18 °C |
| Pt 1000 ($\alpha = 3851$) | -220 °C to +850 °C | 0.01 °C | 0.012 % R + 0.05 °C | 0.02 °C | 0.014 % R + 0.08 °C |
| Ni 100 ($\alpha = 618$) | -60 °C to +180 °C | 0.01 °C | 0.012 % R + 0.03 °C | 0.01 °C | 0.014 % R + 0.08 °C |
| Ni 120 ($\alpha = 672$) | -40 °C to +205 °C | 0.01 °C | 0.012 % R + 0.03 °C | 0.01 °C | 0.014 % R + 0.08 °C |
| Ni 1000 ($\alpha = 618$) | -60 °C to +180 °C | 0.01 °C | 0.012 % R + 0.03 °C | 0.01 °C | 0.014 % R + 0.08 °C |
| Cu 10 ($\alpha = 427$) | -70 °C to +150 °C | 0.10 °C | 0.012 % R + 0.18 °C | 0.01 °C | 0.014 % R + 0.10 °C |
| Cu 50 ($\alpha = 428$) | -50 °C to +150 °C | 0.01 °C | 0.012 % R + 0.06 °C | 0.03 °C | 0.014 % R + 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)

Settling time: < 1 ms (Simulation on quick transmitters)

► Pressure: Measurement by external digital sensor

| Range | Resolution | 0-1 bar | 0-3 bar | 0-10 bar | 0-30 bar | 0-100 bar | 0-300 bar | 0-1000 bar |
|----------|------------|---------|---------|----------|----------|-----------|-----------|------------|
| Absolute | 0.02 % FS | X | X | X | X | X | X | X |
| Relative | 0.02 % FS | X | X | X | X | | | |

Available in relative, absolute and differential pressure

Connector: 1/4 gas

Accuracy: 0.05 % FS from 10 to 40 °C, 0.1 % FS from -10 to +10 °C & from 40 to 80 °C

ACL433 digital pressure module is connected to CALYS through RS485 serial cable to the digital input connector. All data are digital. Measurements are temperature compensated by a polynomial correction implemented into the firmware at factory.

Performances & technical specifications @23 °C ±5 °C

Uncertainty is given in % of reading + fixed value.

► Thermocouples: Measurement and simulation

| Type | Measurement | | | Simulation | | |
|---------------|------------------|---------|---------------------|------------------|---------|---------------------|
| | Range | Res | Accuracy / 1 year | Range | Res | Accuracy / 1 year |
| K | -250 to -200 °C | 0.2 °C | 0.80 °C | -240 to -50 °C | 0.2 °C | 0.60 °C |
| | -200 to -120 °C | 0.1 °C | 0.25 °C | -50 to -0 °C | 0.1 °C | 0.10 °C |
| | -120 to -0 °C | 0.05 °C | 0.1 °C | +0 to +1372 °C | 0.05 °C | 0.013 % R + 0.08 °C |
| | +0 to +1372 °C | 0.05 °C | 0.013 % R + 0.08 °C | | | |
| T | -250 to -200 °C | 0.2 °C | 0.70 °C | -240 to -100 °C | 0.2 °C | 0.40 °C |
| | -200 to -120 °C | 0.05 °C | 0.25 °C | -100 to -0 °C | 0.05 °C | 0.10 °C |
| | -120 to -50 °C | 0.05 °C | 0.10 °C | +0 to +400 °C | 0.05 °C | 0.013 % R + 0.08 °C |
| | -50 to +400 °C | 0.05 °C | 0.013 % R + 0.08 °C | | | |
| J | -210 to -120 °C | 0.05 °C | 0.25 °C | -210 to -0 °C | 0.05 °C | 0.20 °C |
| | -120 to -0 °C | 0.05 °C | 0.09 °C | +0 to +1200 °C | 0.05 °C | 0.013 % R + 0.07 °C |
| | +0 to +1200 °C | 0.05 °C | 0.013 % R + 0.07 °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 +1000 °C | 0.05 °C | 0.013 % R + 0.05 °C |
| | +0 to +1000 °C | 0.05 °C | 0.013 % R + 0.05 °C | | | |
| R | -50 to +150 °C | 0.5 °C | 0.8 °C | -50 to +350 °C | 0.5 °C | 0.5 °C |
| | +150 to +550 °C | 0.2 °C | 0.013 % R + 0.35 °C | +350 to +900 °C | 0.2 °C | 0.013 % R + 0.35 °C |
| | +550 to +1768 °C | 0.1 °C | 0.013 % R + 0.2 °C | +900 to +1768 °C | 0.1 °C | 0.013 % R + 0.2 °C |
| S | -50 to +150 °C | 0.5 °C | 0.80 °C | -50 to +120 °C | 0.5 °C | 0.8 °C |
| | +150 to +550 °C | 0.2 °C | 0.013 % R + 0.35 °C | +120 to +450 °C | 0.2 °C | 0.013 % R + 0.35 °C |
| | +550 to +1768 °C | 0.1 °C | 0.013 % R + 0.25 °C | +450 to +1768 °C | 0.1 °C | 0.013 % R + 0.25 °C |
| B | +400 to +900 °C | 0.2 °C | 0.013 % R + 0.4 °C | +400 to +850 °C | 0.2 °C | 0.013 % R + 0.4 °C |
| | +900 to +1820 °C | 0.1 °C | 0.013 % R + 0.2 °C | +850 to +1820 °C | 0.1 °C | 0.013 % R + 0.2 °C |
| U | -200 to +60 °C | 0.05 °C | 0.15 °C | -200 to +600 °C | 0.05 °C | 0.15 °C |
| L | -200 to +00 °C | 0.05 °C | 0.2 °C | -200 to +900 °C | 0.05 °C | 0.20 °C |
| C | -20 to +900 °C | 0.1 °C | 0.25 °C | -20 to +900 °C | 0.1 °C | 0.25 °C |
| | +900 to +2310 °C | 0.1 °C | 0.013 % R + 0.15 °C | +900 to +2310 °C | 0.1 °C | 0.013 % R + 0.15 °C |
| N | -240 to -190 °C | 0.2 °C | 0.5 °C | -240 to -190 °C | 0.2 °C | 0.3 °C |
| | -190 to -110 °C | 0.1 °C | 0.15 °C | -190 to -110 °C | 0.1 °C | 0.15 °C |
| | -110 to -0 °C | 0.05 °C | 0.08 °C | -110 to -0 °C | 0.05 °C | 0.08 °C |
| | +0 to +1300 °C | 0.05 °C | 0.013 % R + 0.06 °C | +0 to +1300 °C | 0.05 °C | 0.013 % R + 0.06 °C |
| Pt | -100 to +1400 °C | 0.05 °C | 0.3 °C | -100 to +1400 °C | 0.05 °C | 0.3 °C |
| Mo | +0 to +1375 °C | 0.05 °C | 0.013 % R + 0.06 °C | +0 to +1375 °C | 0.05 °C | 0.013 % R + 0.06 °C |
| NiMo/ NiCo | -50 to +1410 °C | 0.05 °C | 0.013 % R + 0.30 °C | -50 to +1410 °C | 0.05 °C | 0.013 % R + 0.30 °C |

Accuracy is given for reference @ 0 °C.

When using the internal reference junction (except for couple B) add an additional uncertainty of 0.2 °C at 0 °C.

It is possible (except for thermocouple B) 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

Performances & technical specifications @23°C ±5°C

Uncertainty is given in % of reading + fixed value.

► DC current: Measurement

| Range | Resolution | Accuracy / 1 year | Notes |
|---------|------------|--------------------|---|
| 0-20 mA | 1 µA | 0.0175% RDG + 2 µA | Rin: < 25 Ω With or without loop supply (24 V) |
| 4-20 mA | 1 µA | 0.0175% RDG + 2 µA | |
| ±50 mA | 1 µA | 0.0175% RDG + 2 µA | |

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

CALYS 1000 also allows linear or quadratic signals to be linearized.

Temperature coefficient: < 10 ppm/°C beyond reference domain

Loop supply: 24 V ±10%

HART® compatibility: Input impedance Rin = 280 Ω

► DC current: Emission

| Range | Resolution | Accuracy / 1 year | Note |
|---------|------------|--------------------|------------------------------------|
| 24 mA | 1 µA | 0.0175% RDG + 2 µA | With or without loop supply (24 V) |
| 4-20 mA | 1 µA | 0.0175% RDG + 2 µA | |
| 0-20 mA | 1 µA | 0.0175% RDG + 2 µA | |

Temperature coefficient < 10 ppm/°C beyond reference domain

Settling time: < 5 ms

Preprogrammed 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 |

► Direct voltage: Measurement

| Range | Resolution | Accuracy / 1 year | Notes |
|----------|------------|---------------------|----------------------------------|
| ±100 mV | 1 µV | 0.013% RDG + 3 µV | Rin: > 10 MΩ |
| ±1 V (1) | 10 µV | 0.013% RDG + 20 µV | Rin: > 10 MΩ (1): -0.8 V to +1 V |
| ±10 V | 100 µV | 0.015% RDG + 200 µV | Rin: > 1 MΩ |
| ±50 V | 1 mV | 0.015% RDG + 2 mV | Rin: > 1 MΩ |

Rin: input resistance

Temperature coefficient: < 7 ppm/°C beyond reference domain

► Direct voltage: Emission

| Range | Resolution | Accuracy / 1 yr | Min Load | Notes |
|--------|------------|---------------------|----------|-----------------|
| 100 mV | 1 µV | 0.013% RDG + 3 µV | 1 kΩ | Iout max: 5 mA |
| 2 V | 10 µV | 0.013% RDG + 20 µV | 2 kΩ | Iout max: 5 mA |
| 20 V | 100 µV | 0.015% RDG + 200 µV | 4 kΩ | Iout max: 25 mA |
| 50 V | 1 mV | 0.015% RDG + 2 mV | 4 kΩ | |

Iout: output current from transmitter

Temperature coefficient: < 7 ppm/°C beyond reference domain

Settling time: < 5 ms

Performances & technical specifications @23 °C ±5 °C

Uncertainty is given in % of reading + fixed value.

► Resistance: Measurement

| Range | Resolution | Accuracy / 1 year | Notes |
|--------|------------|--------------------|-----------------------|
| 400 Ω | 1 mΩ | 0,012% RDG + 10 mΩ | Meas current: 0.25 mA |
| 4000 Ω | 10 mΩ | 0,012% RDG+ 100 mΩ | Meas current: 0.25 mA |

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

Accuracies are given for 4-wire mounted probes

Temperature coefficient: < 7 ppm/°C beyond reference domain

Open circuit terminal voltage: < 10 V

Continuity test: Open circuit for R > 1000 Ω and closed circuit for R < 1000 Ω

► Resistance: Emission

| Range | Resolution | Accuracy / 1 year | Notes |
|--------|------------|--|-------------------------------------|
| 40 Ω | 1 mΩ | 0.014% RDG + 3 mΩ 0.014% RDG + 10 mΩ | Iext: 10 mA Iext: 1 mA |
| 400 Ω | 10 mΩ | 0.014% RDG + 20 mΩ 0.014% RDG + 30 mΩ | Iext: 1 / 10 mA Iext: 0.1 / 1 mA |
| 4000 Ω | 100 mΩ | 0.014% RDG + 300 mΩ | Iext: 0.1 / 1 mA |

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

Current settling time: < 1 ms

Iext: Current received by the calibrator

► Frequency and counting: Measurement

| Range | Resolution | Accuracy / 1yr |
|--------|------------|----------------|
| 20 kHz | < 0.01 Hz | 0.005% RDG |

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

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

► Frequency and pulses: Emission

| Range | Resolution | Accuracy / 1 year |
|---------|------------|-------------------|
| 1000 Hz | 0.01 Hz | 0.005% RDG |
| 10 kHz | 10 Hz | 0.005%RDG |

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

Scale unit: Pulse / min and Hz

Pulse emission and dry contact simulation

Max amplitude: 20 V selectable by user

Further functionalities

| | |
|---|---|
| File Menu | Users can save up to 10 full configurations of the instruments and recall them. Configurations include all programming done on instrument. |
| 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 | The features allows the following : <ul style="list-style-type: none"> ▪ Programming 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). |
| Simulation menu | Simulation value is set by entering value on keypad or by changing the specific digit with the cursor. |
| Square root | In current measurement and simulation, this function allows taking into account a quadratic signal coming from transmitter of type ΔP . |
| Statistical functions | Continuous display of average, minimum and maximum value of the signal under monitoring, as well as number of measurements. |
| Transmitters tests | Transmitters can be verified using user procedures. 20 procedures can be stored as well as test results. Deviation curves are displayed. Edition of comprehensive test reports. |
| Switch test | In temperature or pressure mode, CALYS 1000 can control electronic thermostat and pressostat trigger levels. |
| 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. 2 modes are available: <ul style="list-style-type: none"> ▪ Program mode: Starting value, number of steps and the length time have to be set ▪ Manual mode: User has about a hundred 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: 0-20 mA: linear or quadratic 4-20 mA: linear or quadratic |
| Steps simulation | With 100 values manually set, CALYS 1000 enables users to draw a generation curve. |
| Transmitter function | CALYS 1000 is able to be used as a transmitter. Measurement input is copied on the output with scaling. |
| Memory capacity | Up to 10 full configurations (Input / output type, range...) 10,000 data into one or several measurement campaigns, i.e. more than one week work with configurations, measurements, calibration procedures and reports |

General specifications

| | |
|---------------------|--|
| Size | 340 x 245 x 130 mm (L x W x h) |
| Weight | 4 kg |
| Display | 240 x 320 pixel liquid crystal graphical display with backlite & contrast control Display of result as table of values or trend curve |
| Power supply | 230 V ±10 %, 50/60 Hz |
| Battery | Type: Lithium-Ion Charging time: 3 hours Lifetime: 8 hours |
| Communication ports | USB |

Environmental specifications

| | |
|----------------------------|---|
| Reference range | 23°C ±5°C (RH: 45 to 75 % w/o condensing) |
| Operating reference range | -10 to 50°C (RH: 20 to 80 % w/o condensing) |
| Limit operating range | -15°C to +55°C (RH: 10 to 80 % w/o condensing) (70 % at 55°C) |
| Storage temperature limits | -30°C to +60°C |
| Maximum height | 0 to 2000 m |
| IP protection | IP54 according to EN 60529 |

Safety specifications

| | | |
|-----------------------|--|--|
| Protections | Electronic protection up to 250 V for 'voltage' wires Fuse protection for 'current' wires Protection against 'current' circuit breaking during inductive resistance measurements | |
| Class | In accordance with EN 61010-1 Category II, 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 |

Model and accessories

Instrument

CALYS 1000 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, range to be specified at the order: Absolute or relative pressure: Range from -1 -> 1; 3; 10; 30 bar Absolute pressure: Range from -1 -> 100; 300; 1000 bar |
| 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, supplied with USB cable

Certification

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

Delivery

Size 340 x 245 x 130 mm

Weight 4 kg

Standard delivery 6 weeks

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