Hand-held multifunction calibrator CPH8000-ET and CPH8000/IS-ET/IS   **EN**

Documenting Multivariable Multichannel Calibrator CPH8000 - ET and CPH8000/IS - ET/IS

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Prior to starting any work, read the operating instructions!
Keep for later use!

Content

You can find the declarations of conformity online on the website www.wika.com

1   General information

- The models CPH8000 - ET or CPH8000/IS -ET/IS hand-held multifunction calibrator described in the operating instructions has been manufactured using state-of-the-art technology. All components are subject to stringent quality and environmental criteria during production. Our management systems are certified to ISO 9001 and ISO 14001

- These operating instructions contain important information on handling the Multichannel Calibrator model CPH8000 - ET or CPH8000/IS -ET/IS. Working safely requires that all safety instructions and work instructions are observed.

- Observe the relevant local accident prevention regulations and general safety regulations for the range of use of the Multichannel Calibrator model CPH8000 - ET or CPH8000/IS -ET/IS.

- The operating instructions are part of the product and must be kept in the immediate vicinity of the Multichannel Calibrator model CPH8000 - ET or CPH8000/IS -ET/IS and readily accessible to skilled personnel at any time.

- Skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.

- The manufacturer's liability is void in the case of any damage caused by using the product contrary to its intended use, non-compliance with these operating instructions, assignment of insufficiently qualified skilled personnel or unauthorized modifications to the CPH8000 - ET or CPH8000/IS -ET/IS

- The general terms and conditions contained in the sales documentation shall apply.

- Subject to technical modifications.

- Factory calibrations / DKD/DAkkS calibrations are carried out in accordance with international standards.

- Further information:
  - Internet address: www.wika.de / www.wika.com
  - Relevant data sheet: CT 18.03
  - Application consultant: Tel.:   +49 9372 132-0
                             Fax: +49 9372 132-406
                             E-Mail: info@wika.com

2 Safety

2.1 Explanation of symbols

DANGER!
... indicates a directly dangerous situation resulting in serious injury or death, if not avoided.

Information
... points out useful tips, recommendations and information for efficient and trouble-free operation.

WARNING!
... indicates a potentially dangerous situation in a potentially explosive atmosphere, resulting in serious injury or death, if not avoided

WARNING!
Before installation, commissioning and operation, ensure that the appropriate reference pressure sensor has been selected in terms of measuring range, design and specific measuring conditions. Serious injuries and/or damage can occur should these not be observed.

Further important safety instructions can be found in the individual chapters of these operating instruction.

2.2 Intended use

The Multichannel Calibrator model CPH8000 - ET or CPH8000/IS -ET/IS can be used as a calibration instrument and also for any application which requires an accurate pressure measurement.

The Multichannel Calibrator model CPH8000 - ET or CPH8000/IS -ET/IS has been designed and built solely for the intended use described here, and may only be used accordingly.

The technical specifications contained in these operating instructions must be observed.
Improper handling or operation of the Multichannel Calibrator model CPH8000 - ET or CPH8000/IS - ET/IS outside of its technical specifications requires the instrument to be taken out of service immediately and inspected by an authorized WIKA service engineer.

Handle electronic precision measuring instruments with the required care (protect from humidity, impacts, strong magnetic fields, static electricity and extreme temperatures, do not insert any objects into the instrument or its openings). Plugs and sockets must be protected from contamination.

If the Multichannel Calibrator model CPH8000 - ET or CPH8000/IS -ET/IS are transported from a cold into a warm environment, the formation of condensation may result in the instrument malfunctioning. Before putting it back into operation, wait for the instrument temperature and the room temperature to equalize.

The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.

2.3 Personnel qualification

WARNING!
Risk of injury should qualification be insufficient
Improper handling can result in considerable injury and damage to equipment.
  ■ The activities described in these operating instructions may only be carried out by skilled personnel who have the qualifications described below

Skilled personnel
Skilled personnel, authorized by the operator, are understood to be personnel who, based on their technical training,
knowledge of measurement and control technology and on their experience and knowledge of country-specific regulations, current standards and directives, are capable of carrying out the work described and independently recognizing potential hazards.

Special operating conditions require further appropriate knowledge, e.g. of aggressive media.

2.4   Additional safety instructions for instruments with ATEX approval only CPH8000/IS -ET/IS

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WARNING!
Non-observance of these instructions and their contents may result in the loss of explosion protection.

■ Battery operation:
Use only the rechargeable battery which is supplied by WIKA! Only charge the battery outside of the hazardous area!

■ Operation of the serial interface in the hazardous area is prohibited.

Further hazardous area safety instructions!
Observe the operating information and the relevant country-specific regulations concerning use in hazardous areas (e.g. EN IEC 60079-14).

The CPH8000/IS-ET/IS intrinsically safe multichannel calibrator has been designed for use in Ex Hazardous Areas. These are areas where potentially flammable or explosive vapors may occur. These areas are referred to as hazardous (classified) locations in the United States, as Hazardous Locations in Canada, as Potentially Explosive Atmospheres in Europe and as Explosive Gas Atmospheres by most of the rest of the world. The CPH8000/IS-ET/IS intrinsically safe multichannel calibrator is designed as intrinsically safe. This means that connecting the CPH8000/IS-ET/IS intrinsically safe multichannel calibrator to equipment that is used within intrinsically safe circuits will not cause an ignition capable arc as long as the entity parameters are suitably matched.

Information/Approval for hazardous locations:

WARNING!
■ **Ex Hazardous Areas**
An Ex-hazardous area as used in this manual refers to an area made hazardous by the potential presence of flammable or explosive vapors. These areas are also referred to as hazardous locations.

II 2G
Ex ib IIC T4 Gb - Tamb -10° C - 50° C

WARNING!
Only gauges powered by batteries are approved for use in hazardous locations.
Use only the rechargeable battery which is supplied by WIKA! Only charge the battery outside of the hazardous area!

2.5   Special hazards

WARNING!
- When measuring pressure, make sure that the process pressure line is shut off and depressurized before it is connected to or disconnected from the pressure module.

- Disconnect test leads before changing to another measurement or generation function.

- Observe the working conditions in accordance with chapter "3. Specifications".

- Always operate the device within its overload limits.

- To ensure problem-free operation, only operate the Multichannel Calibrator model CPH8000/IS-ET/IS on battery power. Only use the mains connection for charging the Hand-held pressure calibrators batteries.

- Do not apply a voltage greater than the specified voltage to the instrument. See chapter "3. Specifications".

- Make sure that the test probes never contact a voltage source while the test leads are connected to the current terminals.

- Do not use the calibrator if it is damaged. Before using the multichannel calibrator, check that there are no cracks or missing plastic parts on the case. Pay particular attention to the insulation of the connectors.

- Select the proper function and correct measuring range for the measurement.

- Inspect the test leads for damaged insulation or exposed metal. Check the continuity of the test leads. Damaged test leads should be replaced before using the multichannel calibrator.

- When using test probes keep fingers away from the test probe contacts. Keep your fingers behind the test probes' finger guards.

- First connect the common lead, and then the live lead. When disconnecting, remove the live test lead first.

- Do not use the multichannel calibrator if it is not working properly. The instrument protection might be compromised. If in doubt, have the instrument checked.

- Do not operate the calibrator in areas with explosive gases, vapours or dust.

- To avoid false readings, which could lead to possible electric shock or personal injury, charge the rechargeable battery as soon as the battery indicator appears.

- In order to avoid any possible damage to the multichannel calibrator or the test equipment, use the correct leads, the correct function and the correct range for the measuring application.

2.6 Labelling / safety marks

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Explanation of symbols

CPH8000 - ET and CPH8000/IS - ET/IS

Before mounting and commissioning the Multichannel Calibrator model CPH8000 - ET or CPH8000/IS -ET/IS, ensure you read the operating instructions!

CE, European Community
Instruments bearing this mark comply with the relevant European directives.

This marking on the instruments indicates that they must not be disposed of in domestic waste. The disposal is carried out by return to the manufacturer or by the corresponding municipal authorities. See Directive 2002/96/EC

Only CPH8000/IS -ET/IS

ATEX European Explosion Protection Directive
(Atmosphère = AT, explosible = Ex)
Instruments bearing this mark comply with the requirements of the European Directive 94/9/CE (ATEX) on explosion protection.

IECEx for IEC 60079-0, IEC 60079-11

3 Specifications

3.1 Base instrument

Base instrument	
Indication	
Display	Touchscreen + 5 keys
Dimensions	640 x 480 Dots Dot size: 0.06 x 0.06 mm (0.002 x 0.002 in)
Backlight	LED
Electrical input and output	
Number and type	banana-plug inputs for electrical parameters, resistance thermometers and thermocouples
Resistance thermometer (RTD)	Pt100 (385, 3616, 3906, 3926, 3923), Pt200, Pt500, Pt1000 (385, 3916), Ni100, Ni120, Cu10, Cu100
Thermocouples	Types J, K, T, F, R, S, B, U, L, N, E, C
Voltage signal	input: DC ±100 mV, ±2 V, ±80 V output: DC 20 V
Current signal	input: DC ±100 mA output: DC 20 mA
Frequency signal	0 ... 50,000 Hz
Pulses signal	1 ... 999,999
Resistance	0 ... 10,000 Ω
Voltage supply	DC 24 V
HART® communication	
HART® module	based on HART® universal and common practice commands
Resistance	HART® resistance 250 Ω (activatable)
Loop current	max. DC 24 mA
Voltage supply	DC 24 V
Pressure connection	1/8 BSP (female)
Calibration interval	365 days
Overpressure limit	2X proof, 3X burst; static pressure < 50 psig (3,5 bar)
Materials, wetted parts	Ranges ≤ 5 psi (0,350bar) Silicon, 316 SS, glass filled resins, epoxy Ranges > 5 to 1500 psi (0,350 to 100bar) 316 SS Ranges >1500 psi (100bar) 316 SS, Fluorocarbon Rubber
Pressure media	Ranges ≤ 5 psi (0,350bar) – clean, dry, non-corrosive gases Ranges > 5 psi (0,350bar) – media compatible with the listed wetted parts.
Compensated temperature range	-10 to 50°C
Measuring rate	10 values/second, (not adjustable)
Units	bar, mbar, psi, psf, Pa, hPa, kPa, MPa, torr, atm, kg/cm², kg/m², mmHg (0 °C), cmHg (0 °C), mHg (0 °C), inHg (0 °C), mmH$_2$O (4 °C), cmH$_2$O (4 °C), mH$_2$O (4 °C), inH$_2$O (4 °C), ftH$_2$O (4 °C)
Voltage supply	
Battery type	rechargeable battery NiMH
Battery life (fully-charged)	6-8 hours for typical usage
Power supply	AC 100 ... 240 V, 50/60 Hz
Permissible ambient conditions	
Operating temperature	-10 ... +50 °C (14 ... 122 °F)
Storage temperature	-30 ... +80 °C (-22 ... +176 °F)
Relative humidity	Operating humidity: 10 ... 90 % r. h. (non-condensing) Storage humidity: 0 ... 90 % r. h. (non-condensing)

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3.2   Certificates

Certificate	
Calibration	3.1 calibration certificate per DIN EN 10204 option: ACCREDIA calibration certificate
Recommended recalibration interval	1 year (dependent on conditions of use)

Approvals and certificates, see website

3.3   Pressure module

3.3.1   Internal sensors
(Other pressure ranges available on request)
- One year specifications
- Pneumatic connection: depending on the model

Measuring range		Precision (% FS) [1]	Accuracy (% FS) [2] [3]	Resolution	
Relative Pressure					
-25... +25 mbar [4]	(-10…+10 inH$_2$O @4C)	0.015	0.025	0.001 mbar	(0.00001 psi)
-100 ... +100 mbar	(-40…+40 c @4C)	0.015	0.025	0.001 mbar	(0.00001 psi)
-250 ... +250 mbar	(-100…100 inH$_2$O @4C)	0.015	0.025	0.001 mbar	(0.00001 psi)
-400 ... +400 mbar	(-150…150 inH$_2$O @4C)	0.015	0.025	0.001 mbar	(0.00001 psi)
-600 ... +600 mbar	(-8…8 psi)	0.015	0.025	0.001 mbar	(0.00001 psi)
-900 ... +1,500 mbar	(-14,5…20 psi)	0.015	0.025	0.01 mbar	(0.0001 psi)
-1 ... 7 bar	(-14,5…100 psi)	0.015	0.025	0.01 mbar	(0.0001 psi)
-1 ... 10 bar	(-14,5…150 psi)	0.015	0.025	0.1 mbar	(0.001 psi)
-1 ... 21 bar	(-14,5…300 psi)	0.015	0.025	0.1 mbar	(0.001 psi)
-1 ... 40 bar [4]	(-14,5…500 psi) [4]	0.015 [4]	0.025 [4]	0.1 mbar [4]	(0.001 psi) [4]
0 ... 60 bar [4]	(0 ... 900 psi) [4]	0.015 [4]	0.025 [4]	0.1 mbar [4]	(0.001 psi) [4]
0 ... 100 bar [4]	(0…1,500 psi) [4]	0.015 [4]	0.025 [4]	1 mbar [4]	(0.015 psi) [4]

Measuring range		Precision (% FS) [1]	Accuracy (% FS) [2] [3]	Resolution	
Absolute Pressure					
552 ... 1.172 mbar abs.	(8…17 psi abs.)	0.015	0.025	0.01 mbar	(0.0001 psi)
0 ... 1,500 mbar abs.	(0…20 psi abs.)	0.015	0.025	0.01 mbar	(0.0001 psi)
0 ... 2,500 mbar abs.	(0…30 psi abs.)	0.015	0.025	0.01 mbar	(0.0001 psi)
0 ... 7 bar abs.	(0…100 psi abs.)	0.015	0.025	0.01 mbar	(0.0001 psi)
0 ... 11 bar abs.	(0…165 psi abs.)	0.015	0.025	0.1 mbar	(0.001 psi)
0 ... 21 bar abs.	(0…355 psi abs.)	0.015	0.025	0.1 mbar	(0.001 psi)
0 ... 81 bar abs. [4]	(0…1,015 psi abs.) [4]	0.015 [4]	0.025 [4]	1 mbar [4]	(0.015 psi) [4]
0 ... 100 bar abs. [4]	(0…1,515 psi abs.) [4]	0.015 [4]	0.025 [4]	1 mbar [4]	(0.015 psi) [4]

1) In general, "Precision" includes non-linearity, hysteresis and non-repeatability.
2) Premium Accuracy 0,02% fs available for some ranges on request.
3) It is defined by the total measurement uncertainty, which is expressed with the coverage factor (k=2) and includes the following factors: the intrinsic performance of the instrument, the measurement uncertainty of the reference instrument, long-term stability, influence of ambient conditions, drift and temperature effects over the compensated range during a periodic zero point correction
4) For Models CPH8000 ET and CPH8000 ET/IS only.

3.3.2   External pressure sensor CPT8100

External sensors
(Other pressure ranges available on request)
- One year specifications
- Pneumatic connection: 1/2" BSP M other on request with adaptors

Measuring range		Precision (% FS) [1]	Accuracy (% FS) [2] [3]	Resolution	
Relative Pressure					
-25... +25 mbar	(-10...+10 inH$_2$O @4C)	0.015	0.025	0.001 mbar	(0.00001 psi)
-100 ... +100 mbar	(-40...+40 inH$_2$O @4C)	0.015	0.025	0.001 mbar	(0.00001 psi)
-250 ... +250 mbar	(-100...100 inH$_2$O @4C)	0.015	0.025	0.001 mbar	(0.00001 psi)
-400 ... +400 mbar	(-150...150 inH$_2$O @4C)	0.015	0.025	0.001 mbar	(0.00001 psi)
-600 ... +600 mbar	(-8...8 psi)	0.015	0.025	0.001 mbar	(0.00001 psi)
-900 ... +1,500 mbar	(-14,5...20 psi)	0.015	0.025	0.01 mbar	(0.0001 psi)
-1 ... 7 bar	(-14,5...100 psi)	0.015	0.025	0.1 mbar	(0.001 psi)
-1 ... 10 bar	(-14,5...150 psi)	0.015	0.025	0.1 mbar	(0.001 psi)
-1 ... 21 bar	(-14,5...300 psi)	0.015	0.025	0.1 mbar	(0.001 psi)
-1 ... 40 bar	(-14,5...500 psi)	0.015	0.025	1 mbar	(0.015 psi)
0 ... 60 bar	(0...900 psi)	0.015	0.025	1 mbar	(0.015 psi)
0 ... 100 bar	(0...1500 psi)	0.015	0.025	1 mbar	(0.015 psi)
0 ... 250 bar	(0...3000 psi)	0.015	0.025	1 mbar	(0.015 psi)
0 ... 400 bar	(0...5000 psi)	0.015	0.025	1 mbar	(0.015 psi)
0 ... 700 bar	(0...10000 psi)	0.015	0.025	1 mbar	(0.015 psi)
Absolute Pressure					
552 ... 1.172 mbar abs.	(8...17 psi abs.)	0.015	0.025	0.01 mbar	(0.0001 psi)
0 ... 1,500 mbar abs.	(0...20 psi abs.)	0.015	0.025	0.01 mbar	(0.0001 psi)
0 ... 2,500 mbar abs.	(0...30 psi abs.)	0.015	0.025	0.01 mbar	(0.0001 psi)
0 ... 7 bar abs.	(0...100 psi abs.)	0.015	0.025	0.1 mbar	(0.001 psi)
0 ... 11 bar abs.	(0...165 psi abs.)	0.015	0.025	0.1 mbar	(0.001 psi)
0 ... 21 bar abs.	(0...355 psi abs.)	0.015	0.025	0.1 mbar	(0.001 psi)
0 ... 81 bar abs.	(0...1015 psi abs.)	0.015	0.025	1 mbar	(0.015 psi)
0 ... 100 bar abs.	(0...1515 psi abs.)	0.015	0.025	1 mbar	(0.015 psi)

1) In general, "Precision" includes non-linearity, hysteresis and non-repeatability.
2) Premium Accuracy 0,02% fs available for some ranges on request.
3) It is defined by the total measurement uncertainty, which is expressed with the coverage factor (k=2) and includes the following factors: the intrinsic performance of the instrument, the measurement uncertainty of the reference instrument, long-term stability, influence of ambient conditions, drift and temperature effects over the compensated range during a periodic zero point correction

Figure 1 – External pressure sensor CPT8100

3.4 Electrical signals

3.4.1 Electrical input signals

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Electrical input signal

Electrical signal	Measuring range	Full scale	Precision % of rdg ±% FS	Accuracy % of rdg ±% FS	Max. resolution
Voltage DC [1) 2)]	±100 mV [3)]	100 mV	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS	0.0001 mV
	±2 V [3)]	2 V	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS	0.000001 V
	±80 V [4)]	80 V	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS	0.00001 V
Current DC [1) 5)]	±100 mA	100 mA	0.008 % ±0.003 % FS	0.01 % ±0.003 % FS	0.0001 mA
Resistance [1) 6)]	0 ... 400 Ω	400 Ω	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS	0.001 Ω
	0 ... 10,000 Ω	10,000 Ω	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS	0.01 Ω
Frequency [7)]	0.5 ... 10,000 Hz [8)]	50,000 Hz	0.01 Hz	0.01 Hz	0.001 Hz
	10,000 ... 20,000 Hz [8)]	50,000 Hz	0.1 Hz	0.1 Hz	0.001 Hz
	20,000 ... 30,000 Hz [9)]	50,000 Hz	1 Hz	1 Hz	0.001 Hz
	30,000 ... 50,000 Hz [9)]	50,000 Hz	20 Hz	20 Hz	0.001 Hz
Pulses [10)]	1 ... 999,999	999,999	N/A	N/A	1

1) One year specifications with temperature effect: 0.001 % of reading * It – tcl for t : -10 °C ≤ t ≤ 19 °C and 23 °C ≤ t ≤ 50 °C and tc = 20 °C
   14 °F ≤ t ≤ 66.2 °F and 73.4 °F ≤ t ≤ 122 °F and t₀ = 68 °F
2) Maximum input voltage: DC ±100 V
3) Input impedance: > 100 MΩ
4) Input impedance: 0.5 MΩ
5) Maximum input current: ±120 mA; Input impedance: < 20 Ω
6) Measure current: < 200 µA
7) Maximum Input Voltage: ±100 V; Input impedance: > 100 MΩ
   Minimum amplitude of square wave: 1.5 V p-p @ 50 kHz, 0.7 V p-p @ 5 Hz
   Configurable duty cycle from 10 % up to 90 % with minimum amplitude of 5 V p-p
8) For both frequency inputs simultaneously (IN A + IN B)
9) For only one frequency input (IN A or IN B) in the same time
10) Amplitude: 1 ... 80 V, frequency: 0.5 ... 20 Hz

3.4.2 Electrical output signals

Electrical output signal

Electrical signal	Measuring range	Full scale	Precision % of rdg ±% FS	Accuracy % of rdg ±% FS	Max. resolution
Voltage DC [1)]	0 ... 100 mV [2)]	100 mV	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS	0.0001 mV
	0 ... 2 V [3)]	2 V	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS	0.000001 V
	0 ... 20 V [3)]	20 V	0.015 % ±0.003 % FS	0.02 % ±0.003 % FS	0.00001 V
Current DC [4)]	0 ... 20 mA [5)]	20 mA	0.02 % ±0.003 % FS	0.025 % ±0.003 % FS	0.0001 mA
Resistance [4)]	0 ... 400 Ω	400 Ω	0.008 % ±0.003 % FS	0.01 % ±0.003 % FS	0.001 Ω
	0 ... 10,000 Ω	10,000 Ω	0.008 % ±0.002 % FS	0.01 % ±0.002 % FS	0.01 Ω
Frequency	0.5 ... 20,000 Hz	20,000 Hz	0.1 Hz	0.1 Hz	0.001 Hz
Pulses [6)]	1 ... 999,999	999,999	N/A	N/A	1

1) One year specifications with temperature effect: 0.001 % output * It – tcl for t : -10 °C ≤ t ≤ 19 °C and 23 °C ≤ t ≤ 50 °C and tc = 20 °C
   14 °F ≤ t ≤ 66.2 °F and 73.4 °F ≤ t ≤ 122 °F and t₀ = 68 °F
2) Output impedance = 10 Ω - Rlmin > 1 kΩ
3) Output impedance < 30 mΩ - Rlmin > 1 kΩ
4) One year specifications with temperature effect: 0.002 % output * It – tcl for t : -10 °C ≤ t ≤ 19 °C and 23 °C ≤ t ≤ 50 °C and tc = 20 °C
   14 °F ≤ t ≤ 66.2 °F and 73.4 °F ≤ t ≤ 122 °F and t₀ = 68 °F
5) Output impedance > 100 MΩ - Rlmax < 750 Ω
6) Amplitude: 0.1 ... 15 Vrms, frequency: 0.5 ... 200 Hz

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3.4.3 HART module

The CPH8000 – CPH8000/ET can be equipped with an optional HART® module having the following characteristics:

HART® module
■ For communication with HART® instruments
■ Supports a selected set of HART® universal commands
■ Read basic instrument information and trim the mA output on most HART® enabled transmitters
■ No necessity to use DDL specific libraries
■ Integrated 250 Ω resistance
■ Integrated 24 V voltage supply

HART® commands
■ Read ID
■ Read current and percentage of range
■ Read current and four (predefined) dynamic variables
■ Read tag (TAG), descriptor (DD), date
■ Read PV sensor information
■ Read output signal
■ Write tag (TAG), descriptor (DD), date
■ Enable/disable fixed current mode
■ Trim DAC zero
■ Trim DAC gain

3.5   Resistance thermometer measurement

Resistance thermometer measurement

- One year specifications
- Temperature effect see 'Electrical input signal/Resistance'
- Measure current: < 200 µA
- Specification for 4-wire measurements with $I_{meas.}$ < 0.2 mA

Input signals	Measuring range		Precision		Accuracy		Resolution
Pt100 (385) [1]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.07 °C	(0.13 °F)	0.09 °C	(0.16 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.15 °C	(0.27 °F)	0.17 °C	(0.31 °F)	
Pt100 (3916) [2]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.07 °C	(0.13 °F)	0.09 °C	(0.16 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.15 °C	(0.27 °F)	0.17 °C	(0.31 °F)	
Pt100 (3902) [3]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.07 °C	(0.13 °F)	0.09 °C	(0.16 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.15 °C	(0.27 °F)	0.17 °C	(0.31 °F)	
Pt100 (3926) [4]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.07 °C	(0.13 °F)	0.09 °C	(0.16 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.15 °C	(0.27 °F)	0.17 °C	(0.31 °F)	
Pt100 (3923) [5]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.07 °C	(0.13 °F)	0.09 °C	(0.16 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.15 °C	(0.27 °F)	0.17 °C	(0.31 °F)	
Pt200 (385) [1]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.09 °C	(0.16 °F)	0.1 °C	(0.18 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.18 °C	(0.32 °F)	0.21 °C	(0.38 °F)	
Pt500 (385) [1]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.09 °C	(0.16 °F)	0.1 °C	(0.18 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.18 °C	(0.32 °F)	0.21 °C	(0.38 °F)	
Pt1000 (385) [1]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.09 °C	(0.16 °F)	0.1 °C	(0.18 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.18 °C	(0.32 °F)	0.21 °C	(0.38 °F)	
Pt1000 (3916) [2]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.09 °C	(0.16 °F)	0.1 °C	(0.18 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.18 °C	(0.32 °F)	0.21 °C	(0.38 °F)	
Cu10 (42) [6]	-70 ... 0 °C	(-94 ... +32 °F)	0.23 °C	(0.41 °F)	0.28 °C	(0.5 °F)	0.1 °C (0.18 °F)
	0 ... 40 °C	(32 ... 104 °F)	0.24 °C	(0.43 °F)	0.29 °C	(0.52 °F)	
	40 ... 150 °C	(104 ... 302 °F)	0.27 °C	(0.49 °F)	0.3 °C	(0.54 °F)	
Cu100 [7]	-180 ... 0 °C	(-295 ... +32 °F)	0.06 °C	(0.11 °F)	0.07 °C	(0.13 °F)	0.01 °C (0.02 °F)
	0 ... 80 °C	(32 ... 176 °F)	0.07 °C	(0.13 °F)	0.08 °C	(0.14 °F)	
	80 ... 150 °C	(176 ... 302 °F)	0.08 °C	(0.14 °F)	0.09 °C	(0.16 °F)	
Ni100 (617) [8]	-60 ... 0 °C	(-76 ... 32 °F)	0.04 °C	(0.07 °F)	0.05 °C	(0.09 °F)	0.01 °C (0.02 °F)
	0 ... 100 °C	(32 ... 212 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	
	100 ... 180 °C	(212 ... 356 °F)					
Ni120 (672) [9]	0 ... 100 °C	(32 ... 212 °F)	0.04 °C	(0.07 °F)	0.05 °C	(0.09 °F)	0.01 °C (0.02 °F)
	100 ... 150 °C	(212 ... 302 °F)	0.05 °C	(0.09 °F)			

1) IEC 751 (α = 0.00385 °C^{-1})
2) JIS C1604 (α = 0.003916 °C^{-1})
3) U.S. Standard (α = 0.003902 °C^{-1})
4) Old U.S. Standard (α = 0.003926 °C^{-1})
5) SAMA (α = 0.003923 °C^{-1})
6) α = 0.0042 °C^{-1}
7) α = 0.0042 °C^{-1}
8) DIN 43760 (α = 0.00617 °C^{-1})
9) α = 0.00672 °C^{-1}

3.6 Resistance thermometer simulation

Resistance thermometer simulation

- One year specifications
- Temperature effect see "Electrical output signal/Resistance"

Output signals	Measuring range		Precision		Accuracy		Resolution
Pt100 (385) [1]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.07 °C	(0.13 °F)	0.09 °C	(0.16 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.15 °C	(0.27 °F)	0.17 °C	(0.31 °F)	
Pt100 (3916) [2]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.07 °C	(0.13 °F)	0.09 °C	(0.16 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.15 °C	(0.27 °F)	0.17 °C	(0.31 °F)	
Pt100 (3902) [3]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.07 °C	(0.13 °F)	0.09 °C	(0.16 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.15 °C	(0.27 °F)	0.17 °C	(0.31 °F)	
Pt100 (3926) [4]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.07 °C	(0.13 °F)	0.09 °C	(0.16 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.15 °C	(0.27 °F)	0.17 °C	(0.31 °F)	
Pt100 (3923) [5]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.07 °C	(0.13 °F)	0.09 °C	(0.16 °F)	
	300 ... 850 °C	(572 ... 1.562 °F)	0.15 °C	(0.27 °F)	0.17 °C	(0.31 °F)	
Pt200 (385) [1]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.09 °C	(0.16 °F)	0.1 °C	(0.18 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.18 °C	(0.32 °F)	0.21 °C	(0.38 °F)	
Pt500 (385) [1]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.09 °C	(0.16 °F)	0.1 °C	(0.18 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.18 °C	(0.32 °F)	0.21 °C	(0.38 °F)	
Pt1000 (385) [1]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.09 °C	(0.16 °F)	0.1 °C	(0.18 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.18 °C	(0.32 °F)	0.21 °C	(0.38 °F)	
Pt1000 (3916) [2]	-200 ... 0 °C	(-328 ... +32 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	0.01 °C (0.02 °F)
	0 ... 300 °C	(32 ... 572 °F)	0.09 °C	(0.16 °F)	0.1 °C	(0.18 °F)	
	300 ... 850 °C	(572 ... 1,562 °F)	0.18 °C	(0.32 °F)	0.21 °C	(0.38 °F)	
Cu10 (42) [6]	-70 ... 0 °C	(-94 ... +32 °F)	0.23 °C	(0.41 °F)	0.28 °C	(0.5 °F)	0.1 °C (0.18 °F)
	0 ... 40 °C	(32 ... 104 °F)	0.24 °C	(0.43 °F)	0.29 °C	(0.52 °F)	
	40 ... 150 °C	(104 ... 302 °F)	0.27 °C	(0.49 °F)	0.3 °C	(0.54 °F)	
Cu100 [7]	-180 ... 0 °C	(-295 ... +32 °F)	0.06 °C	(0.11 °F)	0.07 °C	(0.13 °F)	0.01 °C (0.02 °F)
	0 ... 80 °C	(32 ... 176 °F)	0.07 °C	(0.13 °F)	0.08 °C	(0.14 °F)	
	80 ... 150 °C	(176 ... 302 °F)	0.08 °C	(0.14 °F)	0.09 °C	(0.16 °F)	
Ni100 (617) [8]	-60 ... 0 °C	(-76 ... 32 °F)	0.04 °C	(0.07 °F)	0.05 °C	(0.09 °F)	0.01 °C (0.02 °F)
	0 ... 100 °C	(32 ... 212 °F)	0.05 °C	(0.09 °F)	0.06 °C	(0.11 °F)	
	100 ... 180 °C	(212 ... 356 °F)					
Ni120 (672) [9]	0 ... 100 °C	(32 ... 212 °F)	0.04 °C	(0.07 °F)	0.05 °C	(0.09 °F)	0.01 °C (0.02 °F)
	100 ... 150 °C	(212 ... 302 °F)	0.05 °C	(0.09 °F)			

1) IEC 751 (α = 0.00385 °C⁻¹)
2) JIS C1604 (α = 0.003916 °C⁻¹)
3) U.S. Standard (α = 0.003902 °C⁻¹)
4) Old U.S. Standard (α = 0.003926 °C⁻¹)
5) SAMA (α = 0.003923 °C⁻¹)
6) α = 0.0042 °C⁻¹
7) α = 0.0042 °C⁻¹
8) DIN 43760 (α = 0.00617 °C⁻¹)
9) α = 0.00672 °C⁻¹

EN

3.7 Thermocouple measurement

Thermocouple measurement

Input signals	Measuring range		Linear error		Resolution		Precision % of rdg ±% FS	Accuracy % of rdg ±% FS
Type J [1]	-190 ... 0 °C	(-310 ... +32 °F)	0.05 °C	(0.09 °F)	0.01 °C	(0.02 °F)	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS
	0 ... 1,200 °C	(32 ... 2,192 °F)	0.04 °C	(0.07 °F)				
Type K [1]	-160 ... 0 °C	(-256 ... +32 °F)	0.06 °C	(0.11 °F)	0.01 °C	(0.02 °F)	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS
	0 ... 1,260 °C	(32 ... 2,300 °F)	0.04 °C	(0.07 °F)				
Type T [1]	-130 ... 0 °C	(-202 ... +32 °F)	0.05 °C	(0.09 °F)	0.01 °C	(0.02 °F)	0.01 % ±0.003 % FS	0.01 % ±0.003 % FS
	0 ... 400 °C	(32 ... 752 °F)	0.04 °C	(0.07 °F)				
Type F [1]	0 ... 400 °C	(32 ... 752 °F)	0.05 °C	(0.09 °F)	0.1 °C	(0.18 °F)	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS
Type R	160 ... 1,760 °C	(320 ... 3,200 °F)	0.04 °C	(0.07 °F)	0.1 °C	(0.18 °F)	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS
Type S	170 ... 1,760 °C	(338 ... 3,200 °F)	0.04 °C	(0.07 °F)	0.1 °C	(0.18 °F)	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS
Type B [1]	920 ... 1,820 °C	(1.688 ... 3,308 °F)	0.1 °C	(0.18 °F)	0.1 °C	(0.18 °F)	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS
Type U [1]	-160 ... 0 °C	(-256 ... +32 °F)	0.04 °C	(0.07 °F)	0.01 °C	(0.02 °F)	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS
	0 ... 400 °C	(32 ... 752 °F)						
Type L [1]	-200 ... 0 °C	(-328 ... +32 °F)	0.03 °C	(0.05 °F)	0.01 °C	(0.02 °F)	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS
	0 ... 760 °C	(32 ... 1,400 °F)	0.04 °C	(0.07 °F)				
Type N	0 ... 1,300 °C	(32 ... 2,372 °F)	0.04 °C	(0.07 °F)	0.01 °C	(0.02 °F)	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS
Type E	-200 ... 0 °C	(-328 ... +32 °F)	0.03 °C	(0.05 °F)	0.01 °C	(0.02 °F)	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS
	0 ... 1,000 °C	(32 ... 1,832 °F)	0.04 °C	(0.07 °F)				
Type C [1]	0 ... 2,000 °C	(32 ... 3,632 °F)	0.05 °C	(0.09 °F)	0.1 °C	(0.18 °F)	0.008 % ±0.002 % FS	0.01 % ±0.003 % FS

[1] Precision and Accuracy of the e.m.f. values
For measurements with internal cold junction compensation: cold junction error = 0.15 °C
Maximum input voltage: DC ±100 V
Input Impedance: > 100 MΩ
Temperature effect: 0.001 % of reading * |t – t_c| for t : -10 °C ≤ t ≤ 19 °C and 23 °C ≤ t ≤ 50 °C and t_c = 20 °C
(14 °F ≤ t ≤ 66.2 °F and 73.4 °F ≤ t ≤ 122 °F and t_c = 68 °F)

One year specifications

3.8 Thermocouple simulation

Thermocouple simulation

Output signals	Measuring range		Linear error		Resolution		Precision % of rdg ±% FS	Accuracy % of rdg ±% FS
Type J [1]	-190 ... 0 °C	(-310 ... +32 °F)	0.05 °C	(0.09 °F)	0.01 °C	(0.02 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS
	0 ... 1,200 °C	(32 ... 2,192 °F)	0.04 °C	(0.07 °F)				
Type K [1]	-160 ... 0 °C	(-256 ... +32 °F)	0.06 °C	(0.11 °F)	0.01 °C	(0.02 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS
	0 ... 1,260 °C	(32 ... 2,300 °F)	0.04 °C	(0.07 °F)				
Type T [1]	-130 ... 0 °C	(-202 ... +32 °F)	0.05 °C	(0.09 °F)	0.01 °C	(0.02 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS
	0 ... 400 °C	(32 ... 752 °F)	0.04 °C	(0.07 °F)				
Type F [1]	0 ... 400 °C	(32 ... 752 °F)	0.05 °C	(0.09 °F)	0.1 °C	(0.18 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS
Type R	160 ... 1,760 °C	(320 ... 3,200 °F)	0.04 °C	(0.07 °F)	0.1 °C	(0.18 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS
Type S	170 ... 1,760 °C	(338 ... 3,200 °F)	0.04 °C	(0.07 °F)	0.1 °C	(0.18 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS
Type B [1]	920 ... 1,820 °C	(1.688 ... 3,308 °F)	0.1 °C	(0.18 °F)	0.1 °C	(0.18 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS
Type U [1]	-160 ... 0 °C	(-256 ... +32 °F)	0.04 °C	(0.07 °F)	0.01 °C	(0.02 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS
	0 ... 400 °C	(32 ... 752 °F)						
Type L [1]	-200 ... 0 °C	(-328 ... +32 °F)	0.03 °C	(0.05 °F)	0.01 °C	(0.02 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS
	0 ... 760 °C	(32 ... 1,400 °F)	0.04 °C	(0.07 °F)				
Type N	0 ... 1,300 °C	(32 ... 2,372 °F)	0.04 °C	(0.07 °F)	0.01 °C	(0.02 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS
Type E	-200 ... 0 °C	(-328 ... +32 °F)	0.03 °C	(0.05 °F)	0.01 °C	(0.02 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS
	0 ... 1,000 °C	(32 ... 1,832 °F)	0.04 °C	(0.07 °F)				
Type C [1]	0 ... 2,000 °C	(32 ... 3,632 °F)	0.05 °C	(0.09 °F)	0.1 °C	(0.18 °F)	0.01 % ±0.003 % FS	0.015 % ±0.003 % FS

[1] Precision and accuracy of the e.m.f. generation
For temperature simulation with internal cold junction compensation: cold junction error = 0.15 °C

3.9 Environmental parameters module

Parameter	Measuring range		Precision		Accuracy		Max. resolution	
Temperature	-10 ... +50 °C	(14 ... 122 °F)	2.7 °C	(4.86 °F)	3.0 °C	(5.4 °F)	0.1 °C	(0.18 °F)
Barometric pressure	650 ... 1,150 mbar	(9.43 ...16.68 psi)	4 % FS		5 % FS		1 mbar	(0.015 psi)
Relative humidity	10 ... 90 % r. h.		12 %		15 %		1 %	

Approvals

Logo	Description	Country

CE $\langle Ex \rangle$	**EU declaration of conformity**
	■ EMC directive
	  EN 61326-1 emission (group 1, class B) and immunity (basic electromagnetic environment)
	■ ATEX directive
	  II 2G Ex ib IIC T4 Gb - T_{amb}: -10 ... +50 °C
		European Union

IEC IECEx	**IECEx** Hazardous areas Ex ib IIC T4 Gb - T_{amb}: -10 ... +50 °C	International
EHC	**EAC** ■ Electromagnetic compatibility ■ Low voltage directive	Eurasian Economic Community
	DNOP-MakNII Hazardous areas	Ukraine
	BelGIM Metrology, measurement technology	Belarus
-	**MTSCHS** Permission for commissioning	Kazakhstan

Certificates

Certificate	
Calibration	Standard: 3.1 calibration certificate per DIN EN 10204 Option: ACCREDIA calibration certificate
Recommended recalibration interval	1 year (dependent on conditions of use)

Approvals and certificates, see website

3.10   CPH8000 – IS Dimension in mm (in)

3.10.1   Case for instrument model CPH8000 - /IS
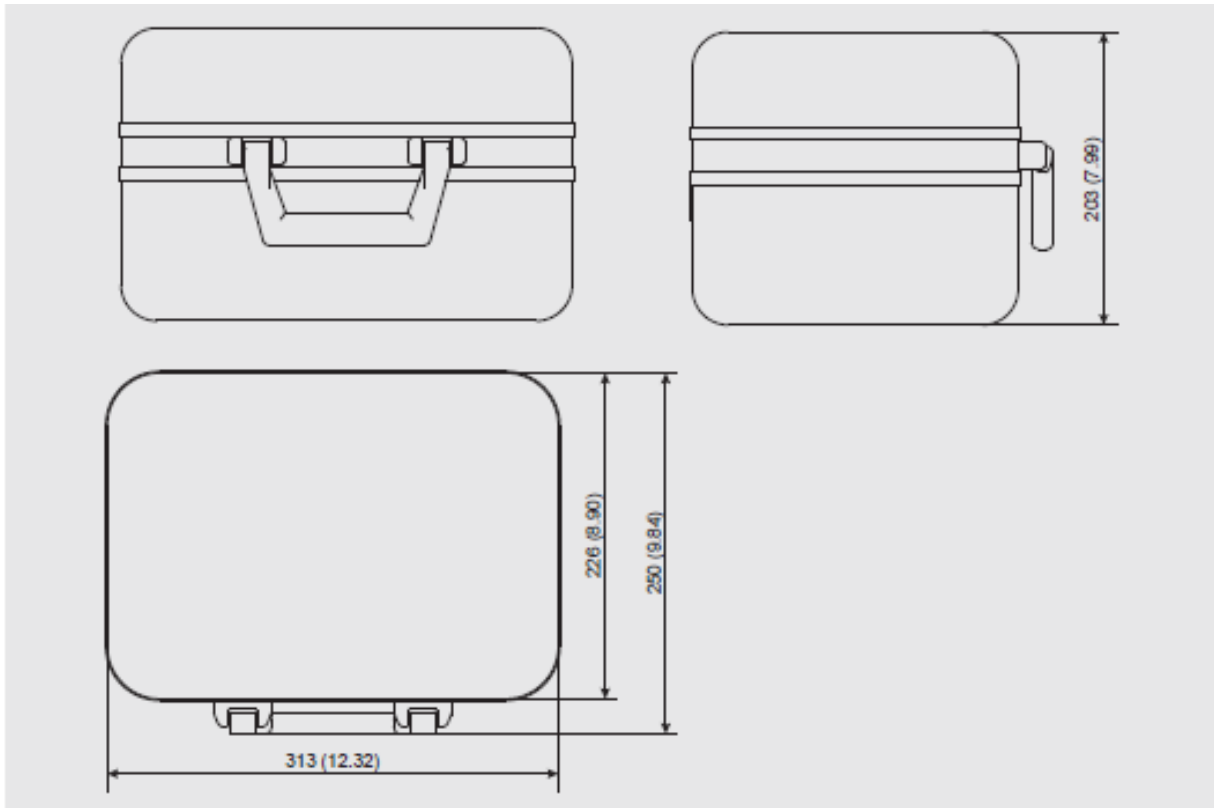
3.10.2   Front panel of model CPH8000 - /IS
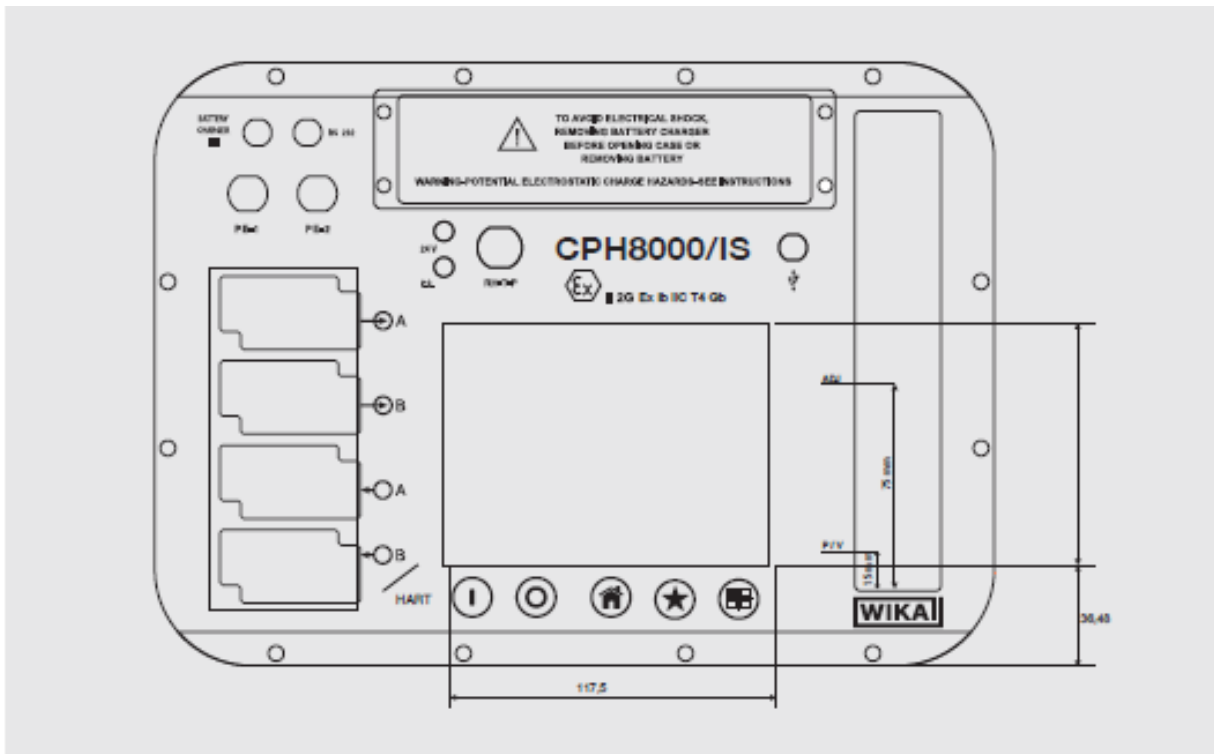
3.10.3   Case for instrument model CPH8000ET - ET/IS
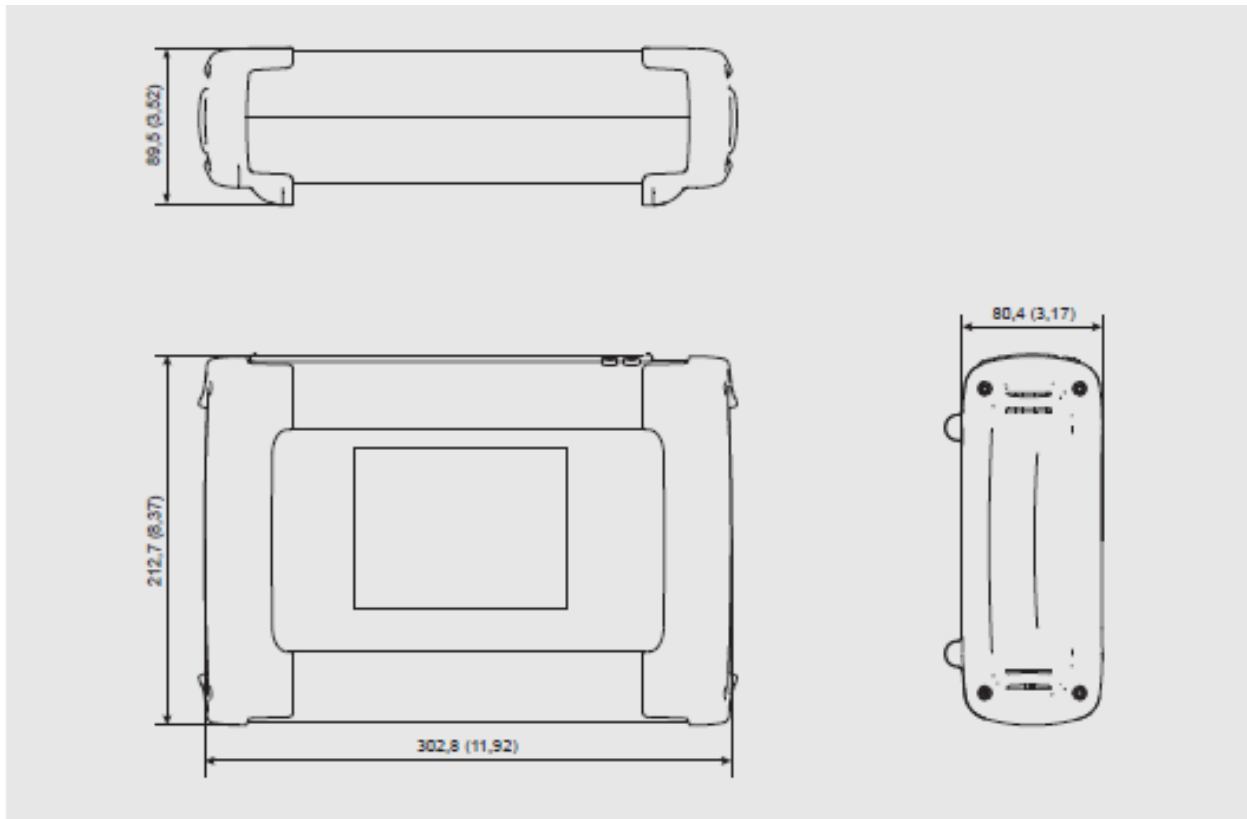
3.10.4   Front panel of model CPH8000 ET - ET/IS
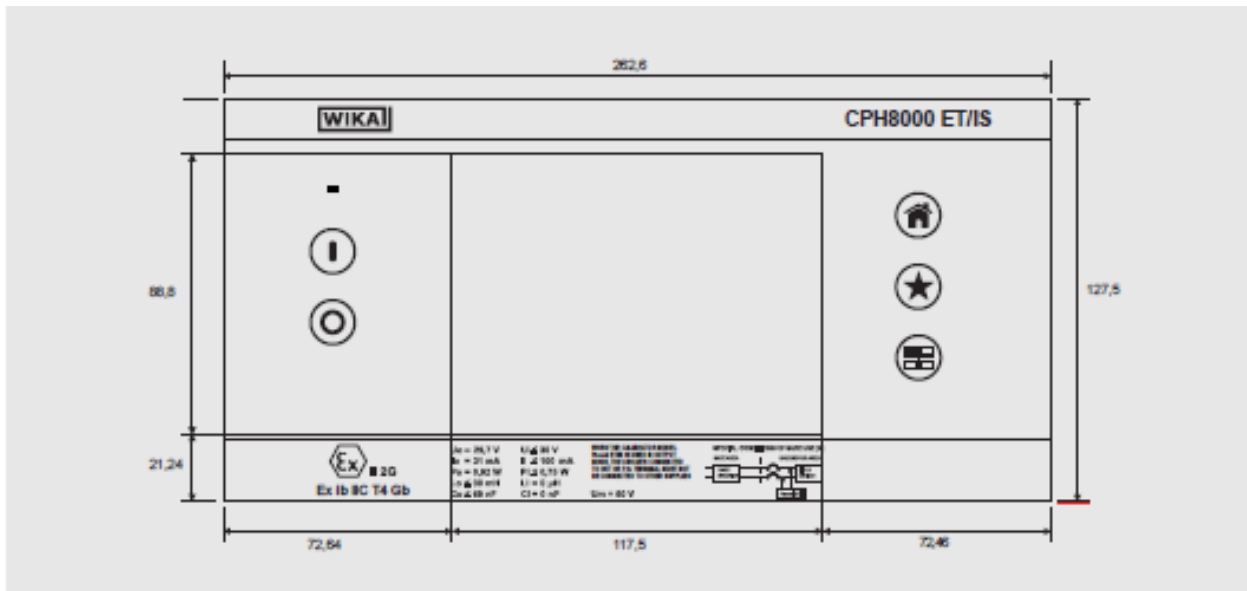
For additional information, consult the WIKA technical sheet CT 18.03 and the order documentation.

4   Design and function

4.1   Description

The CPH8000 - ET and CPH8000/IS -ET/IS are the Professional Advanced Superior Calibrators of latest generation. User friendly interface by a wide display with an industrial touch screen through which it is possible to manage the instrument completely.

The operations are simplified thanks to the touch screen: the display changes in a dynamic way according to the user selections, following test by step the operator during the calibration process, decreasing the learning time and the human errors.

The touch screen can be operated by nude or gloved hands: dirty parts can be easily removed with a cloth or a sponge. The touch screen can be locked during the measurement process to avoid unintentional pressing of keys.

The backlight illumination with LED guarantees a perfect view in case of low environmental visibility. Five keys are present below the touch screen: turn on/off of the instrument, contrast settings and backlight

The CPH8000 - ET and CPH8000/IS -ET/IS consists of two sections:
- ■   Electrical signals measurement/source
- ■   Pressure measurements.

The electrical part of CPH8000 - ET and CPH8000/IS - ET/IS consists from 2 up to 4 electrical modules to be selected between the available ones (2 inputs (IN) – 2 outputs (OUT) – one HART module) for measuring and generating mA, mV, V, Hz, Ohm, Pulse, TC/RTD, depending on the model.

The CPH8000 and CPH8000/IS pressure part consists of:
- ■   Pneumatic distribution block
- ■   Internal manual vacuum/pressure generator with fine adjustment
- ■   Up to three internal pressure sensors with overpressure valves and a barometric reference
- ■   One or two connectors for connecting the external pressure sensors.

The CPH8000ET and CPH8000ET/IS pressure part consists of:
- ■   Up to 2 internal pressure sensors directly faced and a barometric reference
- ■   One or two connectors for connecting the external pressure sensors.
- ■   The presence of internal pressure sensors limits the number of cards for measuring / simulating electrical signals to 2

On the side panel of the instrument there are several connectors for:
- ■   Recharging the battery
- ■   RS232 port
- ■   Connection to the external pressure transducers
- ■   Connection for the environment parameters (temperature, humidity and atmospheric pressure)
- ■   Barometer reference pressure port (optional)

Moreover there are the connections to provide 24 V d.c. power supply to the device under test.

Il CPH8000 - ET and CPH8000/IS - ET/IS are powered with an internal battery pack. The battery allows 6-8 hours of standard operation, depending on the model, before recharging.

Operating CPH8000 - ET and CPH8000/IS -ET/IS user is able to calibrate the whole industrial instrumentation like for example:

- Electronic and pneumatic pressure/vacuum transmitter
- Electronic and pneumatic differential pressure transmitter
- Electronic and pneumatic temperature transmitter (thermocouple and RTD)
- Signal converter V, mV, mA, Hz, Pulse, ohm
- Signal converter I/P and P/I
- Signal isolator mA, mV
- Mathematical Device (adder, subtractor, multiplier, divider)
- Manometer, Pressure switch
- Temperature monitor switch
- Thermocouple and thermoresistance
- Compensation device (up to 4 in-out signals)
- Electronic and pneumatic receiver
- Electronic and pneumatic controller
- Electronic and pneumatic recorder
- Miscellaneous instrument

CPH8000 - ET and CPH8000/IS -ET/IS includes different modules and can be ordered with different hardware conFiguretions..

The hardware conFiguretion depends on the installation of different functional modules:

- Two electrical/temperature IN modules (IN A & IN B)
- Two electrical/temperature OUT modules (OUT A & OUT B)
- Up to 6 pressure measurements in total (depending on the model) obtainable through internal sensors, barometric reference and up to two external pressure sensors all with digital technology
- One environment parameters module (atmospheric pressure, ambient temperature and relative humidity)
- One power supply 24 V d.c.
- One RS-232 communication port
- One USB flash drive connector
- One connection for recharging the battery
- Manual pump for generating pressure and vacuum (CPH8000 and CPH8000/IS only)
- A volumetric precision pressure and vacuum variator (CPH8000 and CPH8000/IS only)
- Series of overpressure protection valves (CPH8000 and CPH8000/IS only)

Battery Life
In order to preserve battery life is recommended to perform complete charge and discharge cycles regularly

Functional module
A functional module is a hardware component that allows the CPH8000 - ET o CPH8000/IS - ET/IS to perform operations like for example measurement and generation of electrical signals and pressure.

4.2   Scope of delivery

- ■ Portable multifunction calibrator model CPH8000 - ET or CPH8000/IS - ET/IS
- ■ Operating instructions
- ■ Smart Power Supply & Battery Charger model 212009 AC 100 … 240V 50/60 Hz or DC 12V (Optional)
- ■ CPH8000 Report software
- ■ RS-232 interface cable to USB adapter
- ■ Electrical kit order no. 241076
- ■ Pneumatic pressure kit order no. 241028 and 241029 (Depending on pressure range)
- ■ 3.1 calibration certificate per DIN EN 10204

Cross-check scope of delivery with delivery note.

4.3   Power supply

Charging
To avoid false measurements, charge the rechargeable batteries as soon as the battery indicator appears. If the batteries run too low the CPH8000 - ET and CPH8000/IS -ET/IS will automatically shut down.

> Use only the original AC/DC converter model 212009 which is supplied by WIKA

4.3.1 Smart Power Supply & Battery Charger model 212009

The Smart Power Supply & Battery Charger Model 212009 is intended to be used with all CPH8000 - ET and CPH8000/IS -ET/IS Series.
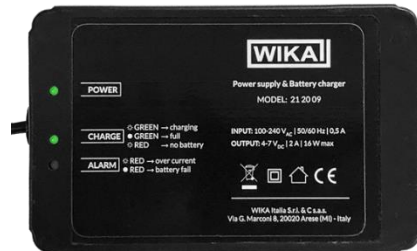
It has been designed and built solely for the intended use described here, and may only be used accordingly. Improper handling or operation of the Smart Power Supply & Battery Charger Model 212009 outside of its technical specifications requires the instrument to be shut down immediately and inspected by an authorized WIKA service engineer.

The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.

The Smart Power Supply & Battery Charger Model 212009 has been specifically designed for both power and recharge the battery of the Pascal Series Multichannel Calibrators, by using just one device. With a digital communications the device monitors the battery charge status during the changing phase.

When the battery of the CPH8000 - ET and CPH8000/IS -ET/IS is full charged, the Smart Power Supply stops the Battery Charging functionality preserving the battery pack lifetime. CPH8000 - ET and CPH8000/IS -ET/IS can remain connected to the power supply anyway, without the risk of damaging the battery pack.

The Smart Power Supply comes with three LED that indicates or alert the operator on the actual operating status of the device.

The Smart Power Supply operates with a AC 100…240V 50/60 Hz or DC 12V (optional) and output a DC 4…7V, 12A with max.16 W

4.3.2 Safety instruction
- The Smart Power Supply shall only be used only at normal indoor room conditions.
- Never use any power cable other than those originally supplied with the Smart Power Supply.
- Unplug the Smart Power Supply from the power source when not in use.
- Do not operate the Smart Power Supply if it has received a blow or has been subject to any damage.
- Do not use the Smart Power Supply for other purposes than the Only one originally forecast.
- Do not open or/and disassemble the Smart Power Supply: such handling may result in a risk of electric shock or fire

EN

4.3.3 Liability Disclaimer
- The manufacturer and supplier cannot accept any responsibility for any improper or incorrect use and any consequences occur.
- Any performance of repairs or alternations by someone other than the original supplier will invalidate the warranty.
- This product is only designed to be used by people who have read and understood this instruction manual.
- The specifications of this product may change without prior notice.
- This product is not a toy. Keep out of the reach of children.
- No part of this manual may be reproduced without written consent of the manufacturer.

4.3.4 LED status Functionalities
The Smart Power Supply & Battery Charger Model 212009 comes with 3 status LED:

- **POWER**: this LED is normally lighted in GREEN when the device is plug to the Main: the device is able to both power the CPH8000 - ET Series Calibrators and recharge the battery at the same time, when low.
  The POWER LED will also light in RED for 1 second each one minute.
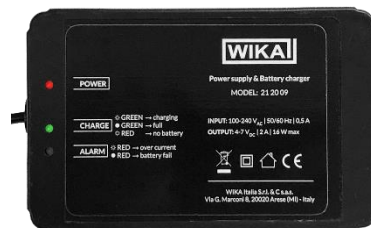
> **WARNING !**
> During this phase the power supply unit is communicating with the CPH8000 - ET Series Calibrators to check the battery status. For such reason do NOT unplug the Smart Power Supply & Battery Charger Model 212009: it must be left connected, otherwise some malfunctions can occur !!

- **CHARGE:**
  The GREEN LED blinks when the Smart Power Supply & Battery Charger Model 212009 is charging the battery of the CPH8000 - ET Series Calibrators.
  The GREEN LED is always lighted when the battery is fully charged
  The RED LED is always lighted when the device detects NO batteries in the Pascal Calibrator

- **ALARM:**
  The RED LED is normally lighted in case of overcurrent supply.
  The RED LED blinks in case of a battery fail, or fault

4.3.5 Operating the device

⚠ **WARNING !**
Check the rate of your Main Supply with the Input rate indicated on the Smart Power Supply & Battery Charger Model 212009 before connecting the device to the Main.

■ Plug the Smart Power Supply & Battery Charger Model 212009 to the CPH8000 - ET and CPH8000/IS -ET/IS

■ Plug the Smart Power Supply & Battery Charger Model 212009 to the Main Supply: the GREEN POWER and CHARGE LEDs will light up:
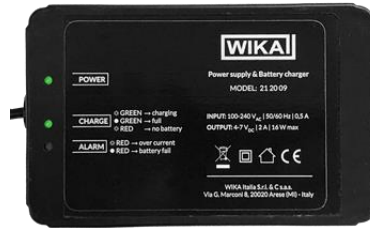
The Smart Power Supply & Battery Charger Model 212009 shows the power supply to the CPH8000 - ET and CPH8000/IS -ET/IS (GREEN Power LED) and the actual battery CHARGE status (GREEN or RED light)

4.3.6 Care and Maintenance
■ Extreme temperatures, vibration and shock should be avoided as these may cause damage to the unit.
■ When cleaning the displays and casings, use a soft damp cloth only. Do not wet the exposed metal part of the charging unit. Do not use solvents or scouring agents as they may mark the casing.
■ Do not spill water to the charging unit.
■ Do not make any repair attempts to the units. Return it to its original point of purchase for repair by a qualified engineer. Opening and tampering with the units may invalidate its guarantee.
■ Do not expose the unit to extreme and sudden temperature changes, this may lead to damage to the electronic parts in the unit.

4.3.7 Technical Specifications
■ Input voltage: AC 100 … 240 V – 50/60 Hz – 0,5 A optional DC 12V
■ Output voltage: DC 4 … 7 V – 2A – 16 W max
■ Dimensions (L x H x W):   123 x 50 x 78 mm
■ Weight :   250 gr.

5   Transport, packaging and storage

5.1   Trasport
Check the Multichannel Calibrator model CPH8000 - ET o CPH8000/IS -ET/IS for any damage that may have been caused by transport. Obvious damage must be reported immediately.

5.2   Packaging
Do not remove packaging until just before mounting.
Keep the packaging as it will provide optimum protection during transport (e.g. sending for calibration)..

5.3   Storage

Permissible conditions at the place of storage:
- Storage temperature:: -30 ... +80 °C
- Relative Humidity: 10 ... 90 % u.r. (non- condensing)

Avoid exposure to the following factors:
- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock (putting it down hard)
- Soot, vapour, dust and corrosive gases
- Potentially explosive environments, flammable atmospheres

Store the instrument in its original packaging in a location that fulfills the conditions listed above. If the original packaging is not available, pack and store the instrument as described below:
- Wrap the instrument in an antistatic plastic film.
- Place the instrument, along with shock-absorbent material, in the packaging.
- If stored for a prolonged period of time (more than 30 days), place a bag, containing a desiccant, inside the packaging.

6 Commissioning, operation

6.1 Commissioning

6.1.1 Instrument overview CPH8000 - /IS

Figure 2 – CPH8000

1	RS-232 port	10	Changing the number of windows
2	Connector for Smart battery charger	11	USB socket
3	PE1-2 Connectors for external P. transducer	12	Manual pump (vacuum/21 bar)
4	IN electrical/temperature modules	13	Fine adjument
5	OUT electrical/temperature modules	14	Barometric reference port
6	Power ON	15	Vent
7	Power OFF	16	Pneumatic port
8	Home	17	Environmental Parameter Connector
9	Programmable Function button	18	Loop power supply – 24 V d.c.

6.1.2   Instrument overview CPH8000ET - ET/IS
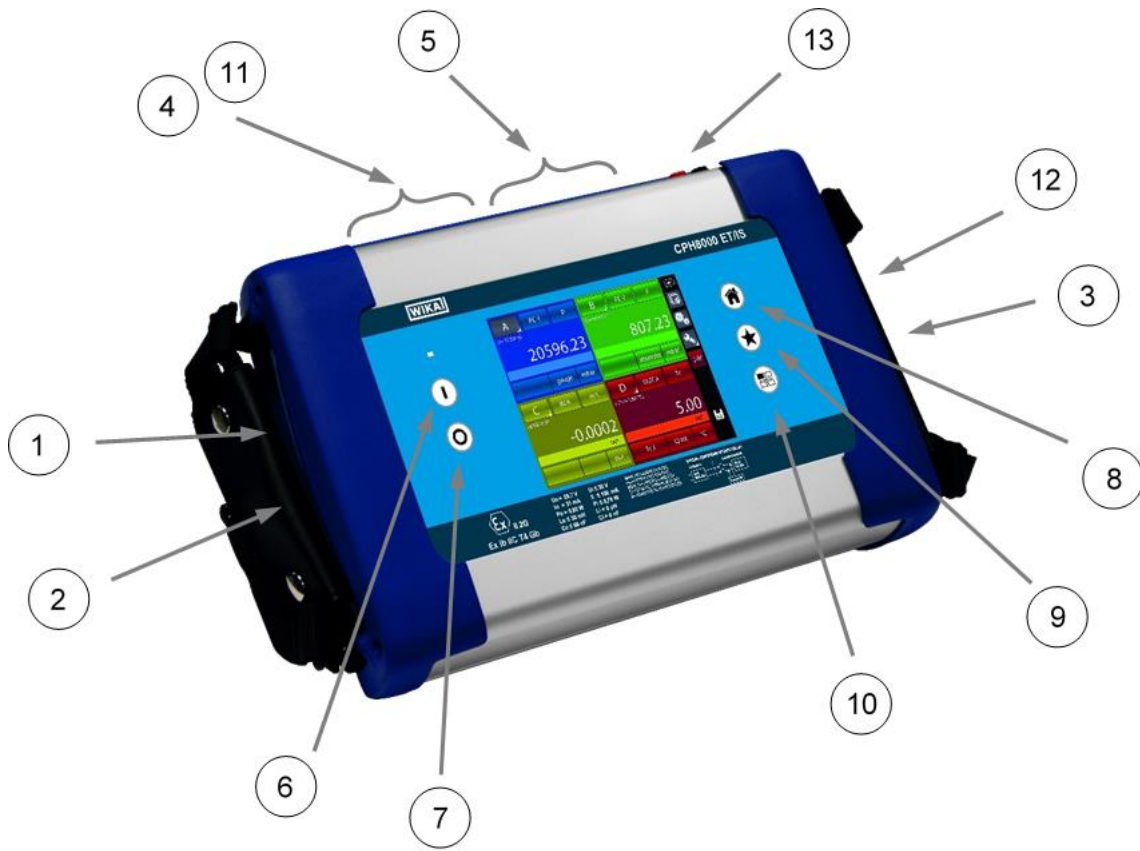
Figure 3 – CPH8000ET

1	RS-232 port	8	Home
2	Connector for Smart battery charger	9	Programmable Function button
3	PE1-2 Connectors for external P. transducer	10	Changing the number of windows
4	IN electrical/temperature modules	11	Internal pressure sensors ports (if present)
5	OUT electrical/temperature modules	12	Environmental Parameter Connector
6	Power ON	13	Loop power supply – 24 V d.c.
7	Power OFF		.

6.1.3   Functional Modules

The functional modules can be classified according to their assignments:

- ■   Electrical and temperature signals measurement
- ■   Up to 6 pressure measurements in total (depending on the model) obtainable through internal sensors, barometric reference and up to two external pressure sensors all with digital technology
- ■   Electrical and temperature signals generation/simulation
- ■   Pressure generation and regulation (depending on the model)
- ■   Environmental parameters measurement

Many different configurations are available according to the specific requirements of the user.

6.1.3.1   Input module for electrical/temperature signals

The input module for electrical/temperature parameters measurement is one of those modules inserted from the instrument's front panel; two slides drive the module into its position. It is possible to have up to two input modules in the same instrument: IN A and IN B. This terminology is used also by the software to carry out the connection between physical input IN and software channel. For example: if you connect a thermoresistance Pt100 to module IN A, the temperature measured by this thermoresistance can be displayed in any of the four available windows. The following figures shows the pins connection in electrical/temperature IN module based on models.

CPH8000 - /IS   CPH8000ET – ET/IS
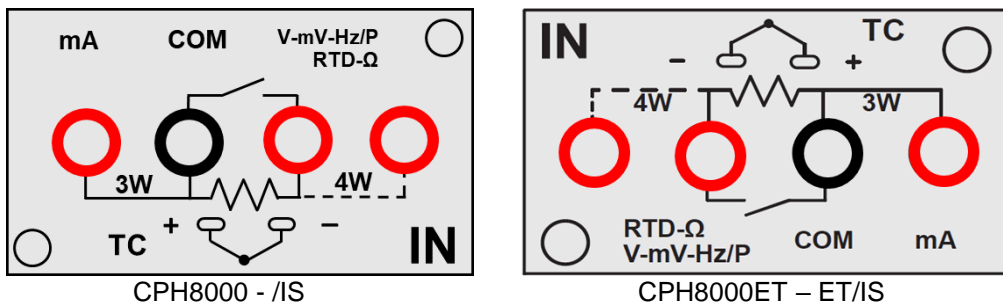
Figure 4 – Input panel module

6.1.3.2   Output module for electrical/temperature signals

The output module for electrical/temperature parameters generation or simulation is one of those inserted from the instrument's front panel; two slides drive the module into its position. It is possible to have up to two output modules in the same instrument: OUT A and OUT B. This terminology is used also by the software to carry out the connection between physical output OUT and software channel. For example: if you connect a signal-receiver to module output OUT A, the current 4…20 mA generated can be displayed in any of the four available windows.

The following figures shows the output module for electrical/temperature parameters based on models.

CPH8000 - /IS   CPH8000ET – ET/IS
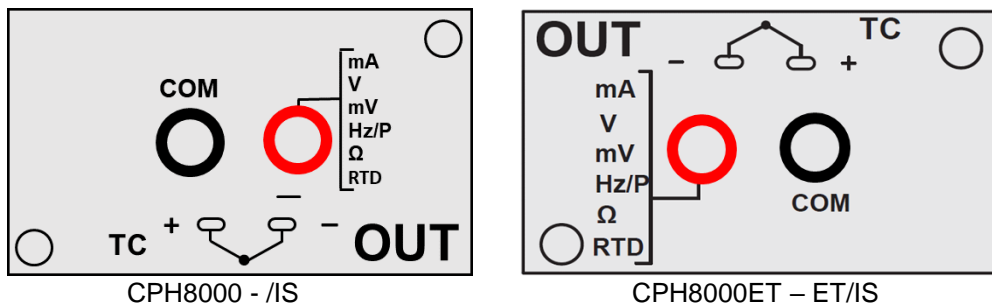
Figure 5 – Output panel module

6.1.3.3   Pressure module

The instrument can carry out up to 6 pressure measurements, three of which with internal pressure sensors (max two CPH8000ET - ET / IS), a barometric sensor and up to two external pressure sensors all with digital technology. The selection of the transducers with their characteristics are listed in the table, see chapter 3.3 "Pressure measurement"

6.1.3.4 HART module

The Hart module allows communication with Hart instruments (normally transmitters) being able to acquire digital measurements, instrument data and modify some settings. On the front panel it takes the place of either the OUT A module or the OUT B module.

The module is galvanically isolated from the internal electronics of the CPH8000 (like the IN and OUT modules). It is equipped with its internal microprocessor in order to guarantee flexibility and expandability for the future. It can provide direct 24V power supply for the transmitter power loop.

It can also provide the 250Ω load resistance, excludable or electronically insertable, necessary for Hart communication, avoiding the use of an external resistance.

The following figure shows the HART® module
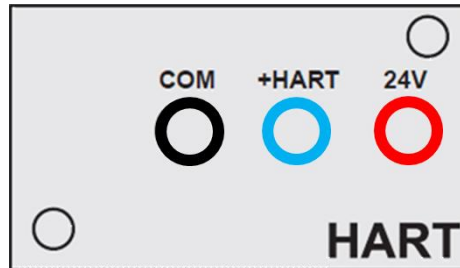
Figure 6 - HART® module

Depending by several factors and combination that the user can found in a plant, there are many wiring possibility depending by:

- ■ Using module internal or external Power Supply.
- ■ Using internal or external load resistance.
- ■ Simultaneous analog connection of AO TRX to one Input module for mA reading

Please consider, if the user enable the internal load resistance, this will be connected between the +HART and COM terminals.

Here same examples:
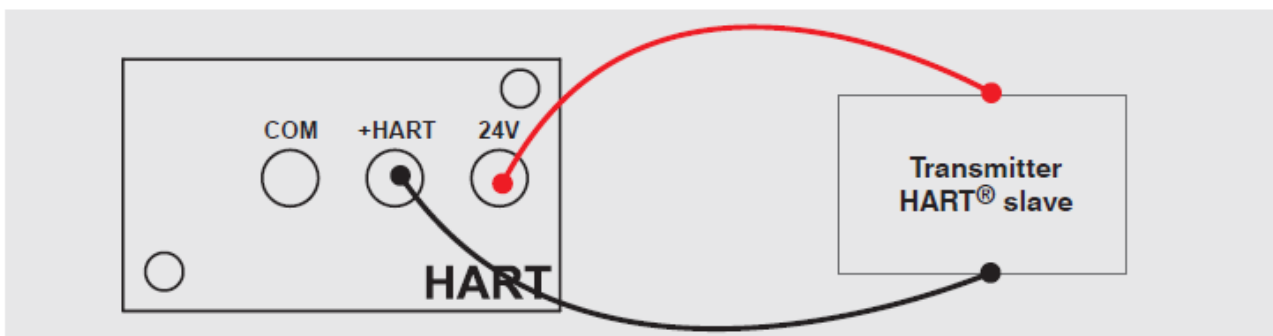
Figure 7 - Case 1: 24V from module, 250Ω from module
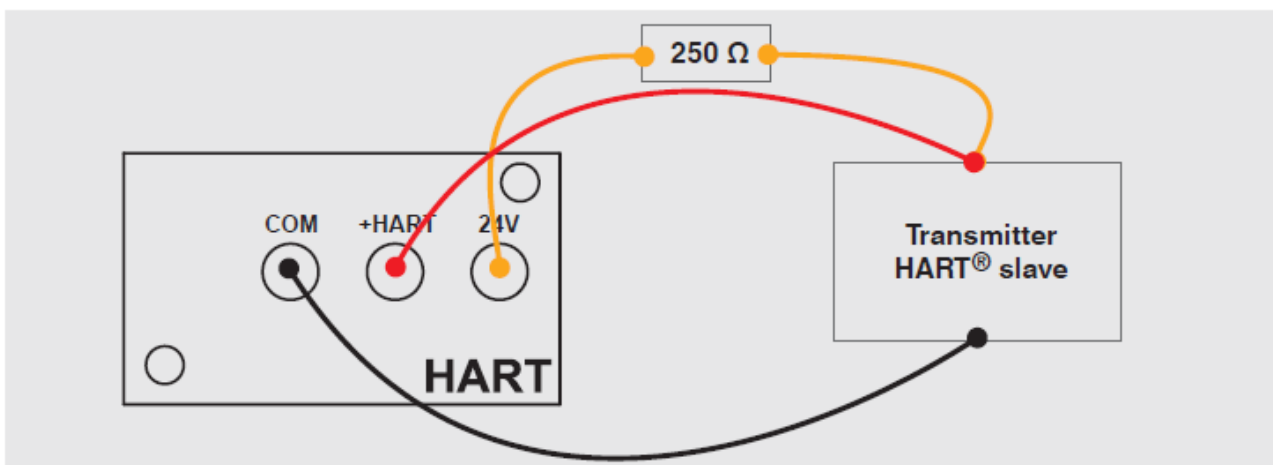
Figure 8 - Case 2: 24V from module, 250Ω external

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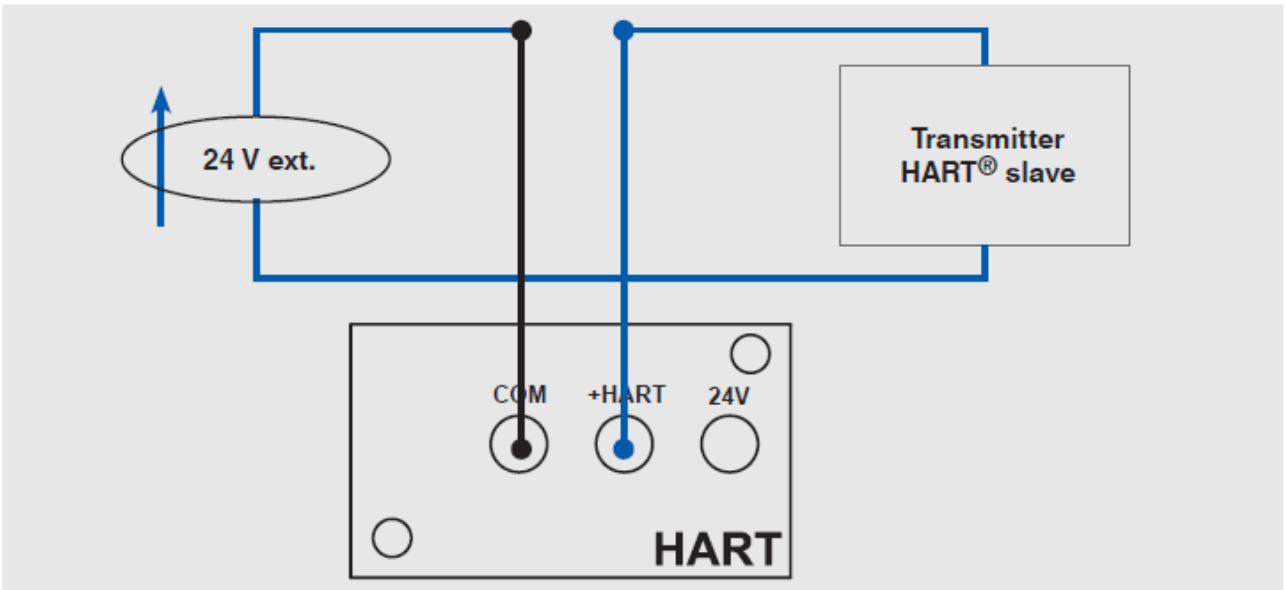
Figure 9 - Case 3: 24V external, 250Ω from module
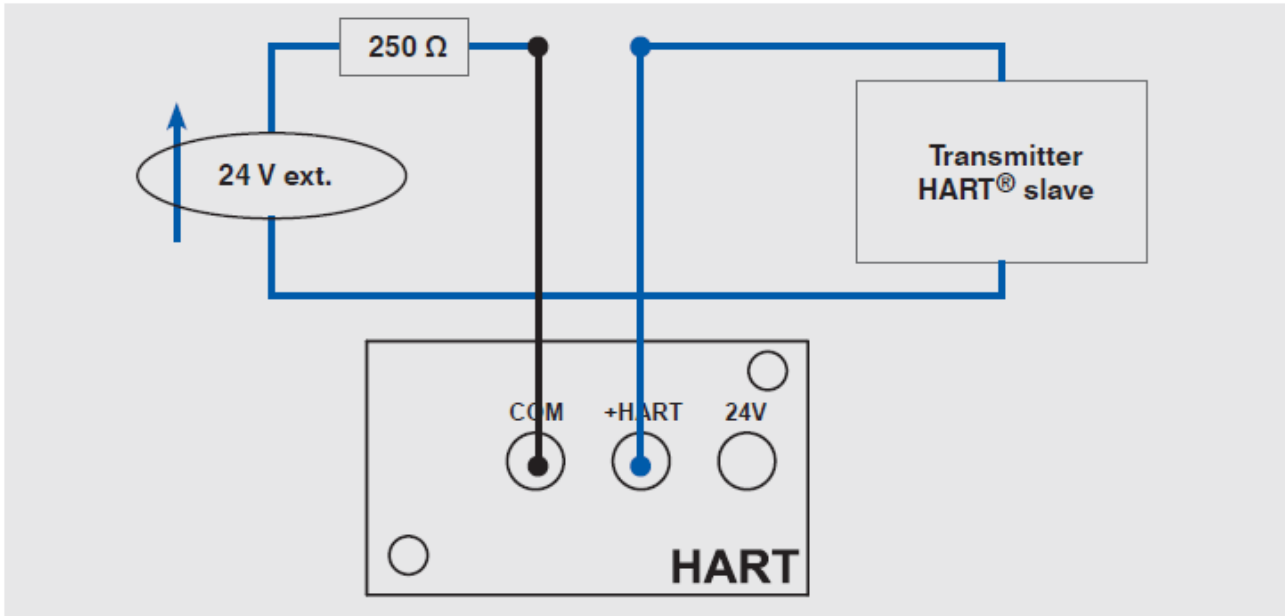
Figure 10 - Case 4: 24V external, 250Ω external
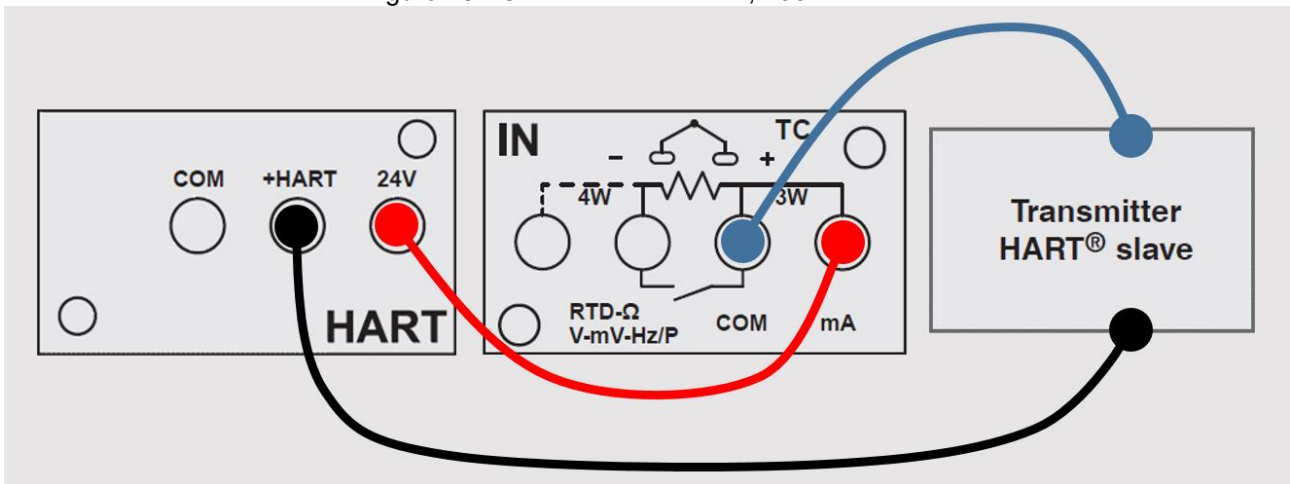
Figure 11 - Case 5: 24V from module, 250Ω from module, mA reading by IN module

6.1.3.5   Environmental parameters module (optional)

This module allows to measure: temperature, relative humidity and atmospheric pressure. These parameters represent the most important factors that affect the calibration results. This module is connected to CPH8000 - ET o CPH8000/IS -ET/IS with the available multiple pin connector: This module is plug & play and the relevant information about the environmental parameters are displayed on the status bar at the top of the screen.

This information is automatically reported when generating calibration reports.

The environmental parameters module with interval and the relative resolutions are in the table, see chapter 3.9 "Environmental parameters module".

6.2   Pressure

6.2.1   Pneumatic circuit CPH8000 - /IS (not avaiilable for CPH8000ET- ET/IS)

The CPH8000 (not available for CPH8000ET) can be equipped with three internal pressure transducers, a barometric sensor and two external pressure transducers: the internal ones operate only with clean gases, while the external ones can operate indifferently with gases or liquids compatible with the membrane of AISI 316 stainless steel with which they are equipped.

The CPH8000 is equipped with a pneumatic circuit that allows easy connection of the instrument to be calibrated and allows a wide range of calibration. The integrated manual pump and the volumetric precision variator allow the generation of the required pressure / vacuum.

The pressure generated internally, according to the model of the calibrator, is distributed to one, two, three or all the sensors in parallel, which, depending on the measuring range, are protected by overpressure valves when the pressure generated is higher than respective full scale values. The pressure-vacuum selector allows the generation of the vacuum.

For example, if you want to measure a 3-15 PSI pneumatic signal or a high pressure, higher than 21 bar (only available for CPH8000ET-ET/IS), using the internal sensor directly connected to the process, you must pay attention to the full scale value of the transducer to which you connect in how unprotected it is against overpressure.
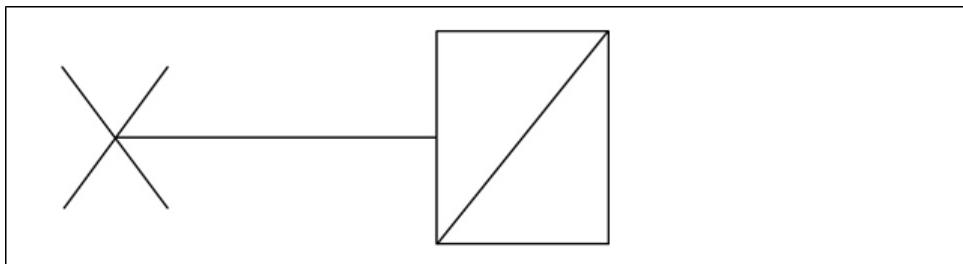
Figure 12 – Direct pressure transducer

Only CPH8000 and CPH8000 / IS have three different pneumatic circuits, according to the configuration:

■   Version with up to two transducers in parallel to the pump, one of which is protected by an overpressure valve, while the other does not require any protection since the full scale value corresponds to the maximum pressure generation of the pump pressure. See following diagram:

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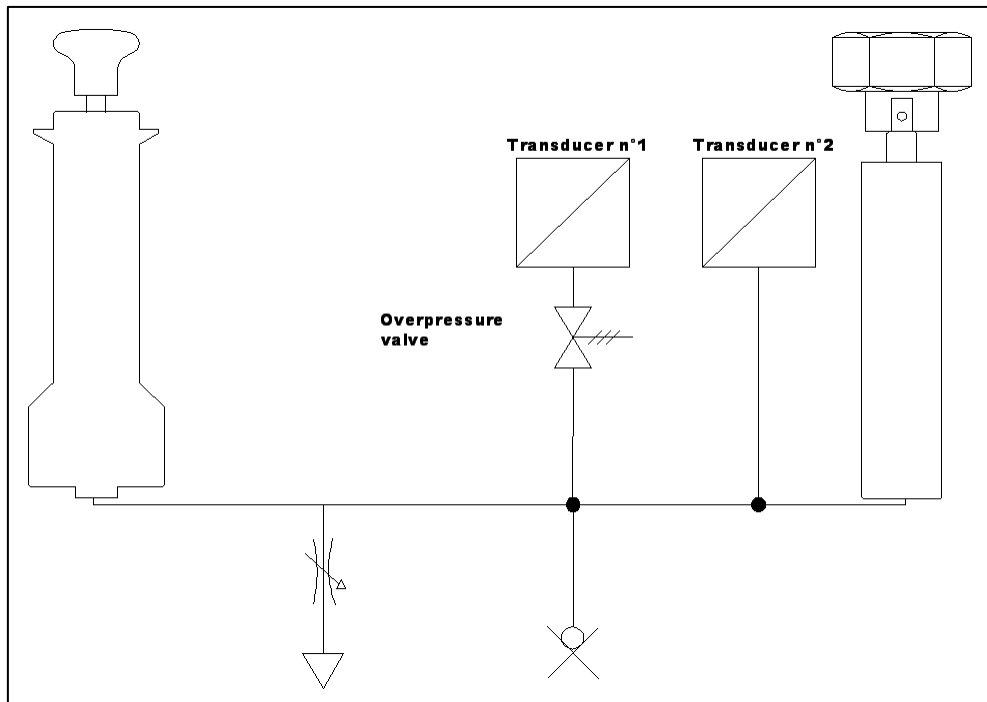
Figure 13 – Circuit with two transducers in parallel

■ Version with three transducers, two of which connected in parallel with the pump and protected by an overpressure valve as they have a full scale lower than the maximum pressure value generated by the pump itself while the third has the same value
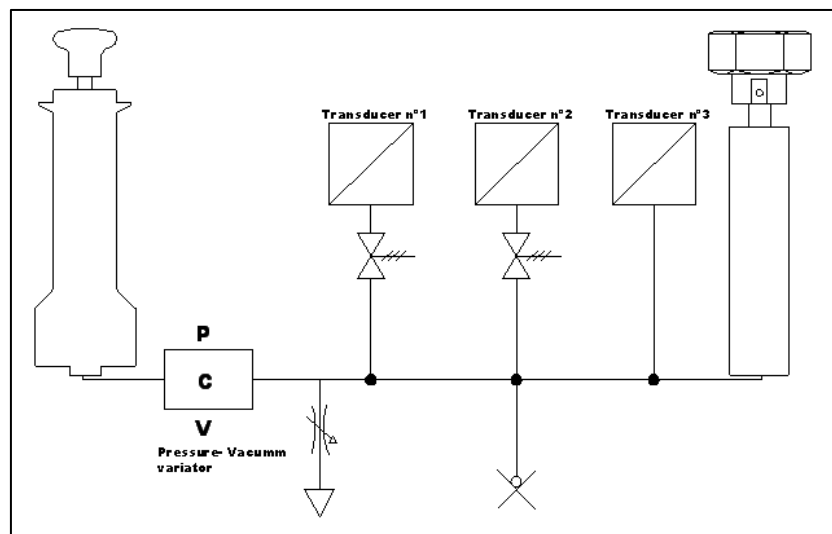
Figure 14 – Circuit with three transducers in parallel

6.3   Electrical section

The CPH8000 - ET or CPH8000 / IS -ET / IS is a multifunction calibrator.
There can be four electrical / temperature modules, two of which are for input signals (IN A - IN B) and two for the output signals (OUT A - OUT B).

6.3.1 Misure segnali elettrici

The instrument is able to measure voltage, current, resistance and frequency. To optimize the resolution and get better measurement results, there are three ranges for voltage measurement, two for resistance measurements, one range for current and three ranges for frequency.
Ranges of measurement and resolutions are specified in table, see chapter 3.4.1 " Electrical signals".

6.3.2 Thermocouple measurements

The electrical module measures signals from the thermocouple and shows it in different engineering units (°C, °F, K). Thermocouple types, measuring range, linearity error and related resolutions are given in the table, see chapter 3.7 "Thermocouple measurement").

It is possible to perform the measurement in two different ways: with internal reference (cold junction), with external reference cold junction or by entering the reference value through the keyboard. When internal reference cold junction is selected, the ambient temperature is measured through the thermocouple pins using a special resistance thermometer. This temperature value is used for compensation. The standard connector Mignon for thermocouple is shown in Fig. 4 "Input panel module". The resistance thermometer for compensation of the reference cold junction is integrated in the same connector.

6.3.3 Resistance thermometer measurements

The electrical module measures signals from resistance thermometer and shows it in different engineering units (°C, °F, K). Resistance thermometer types, measuring range and related resolutions are given in the table, see chapter 3.6 "Resistance thermometer simulation").

It is possible to connect the resistance thermometer according to the type of measurement: 2-wire, 3-wire and 4-wire. The 2-wire measurement is performed without any compensation of the connection cables resistances; in this case the connection is among the two central (COM - Ω) pins. In the case of 3-wire connection the pin identified with the writing 3W must also be used. While for the 4-wire measurement, the most accurate of the above, is performed by using all four pins

6.3.4 Generation of electrical parameters

The output module (OUT) allows to generate voltage, current, resistance and frequency. For the voltage there are three different ranges with different resolutions. Resistance has two ranges while current and frequency have only one range. Ranges and resolutions are given in the table, see chapter 3.4.2 "Electrical output signal")

6.3.5 Thermocouple simulation

Through the output module it is possible to simulate thermocouples. This function can be used to test and calibrate: thermocouple transmitters, analogue or digital indicators. A resistance thermometer Pt100, inserted in isothermal contact with the connectors, measures the ambient temperature for the cold junction compensation. It is possible to disable the automatic cold junction compensation and set out the reference temperature by the keyboard. The instrument can simulate thermocouple types indicated in the table, see chapter 3.8 "Thermocouple simulation")

6.3.6   Resistance thermometer simulation

Through the output module (OUT) it is possible to simulate resistance thermometer. This function can be used to check and calibrate: temperature transmitters – analogue or digital indicators.
The instrument can simulate resistance thermometer types indicated in the table, see chapter 3.6 "Resistance thermometer simulation").

Fast programming of the value to be simulated
In generation or simulation on any particular channel the simulated value can be rapidly changed by pressing immediately to the right of the simulated value. By pressing the displayed value a virtual numerical keyboard appears.
For more information see paragraph 6.6.5 "Change gen/sim value"

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6.4 User interface

The CPH8000 - ET o CPH8000/IS -ET/IS has a wide display with touchscreen through which it is possible to set up the instrument.
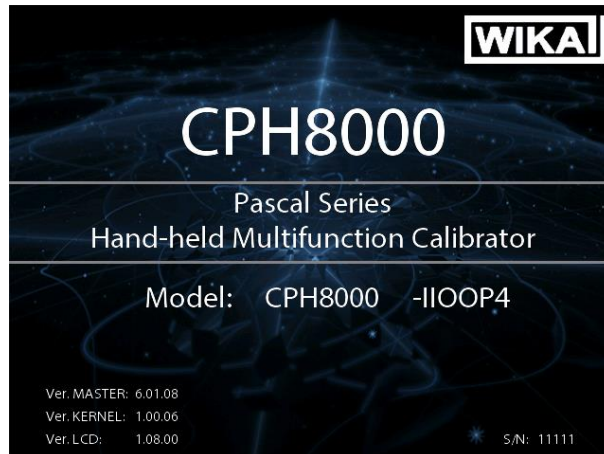
Figure 15 – Splash screen

The 1-, 2-, 3- or 4-window display mode shows a right column containing the following information:

- ■ Environmental parameter sensor measurements:
    - Ambient temperature
    - Barometric pressure
    - Relative humidity
- ■ Battery charge status – power supply
- ■ Data logger status
- ■ Date
- ■ Time
- ■ Buttons for channel/instrument/global functions

 Some buttons include a white semi-triangle symbol on the bottom right side: it indicates that the button has different function. It allows to activate 2 different actions, depending on the short or long pressing of the button itself..

The display shows up to four windows (channels) that can be switched from one to four by using the button

 .

Each window can also be assigned to a different channel, related to its functional module, and according to the user requirement.
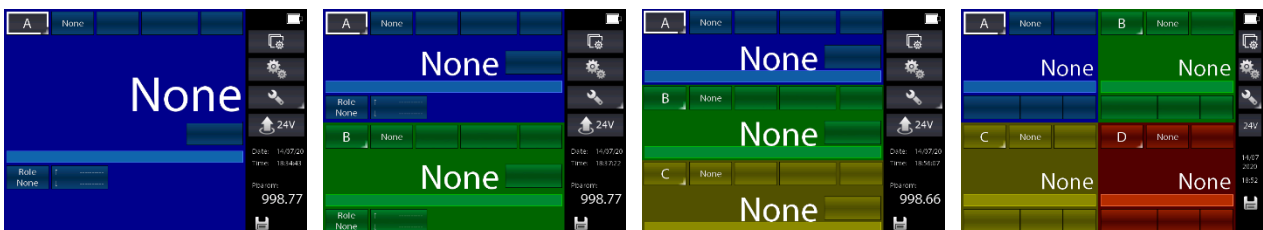
Figure 16 – Display configurations from 1 to 4 windows

The following figure shows the typical display of the calibrator.
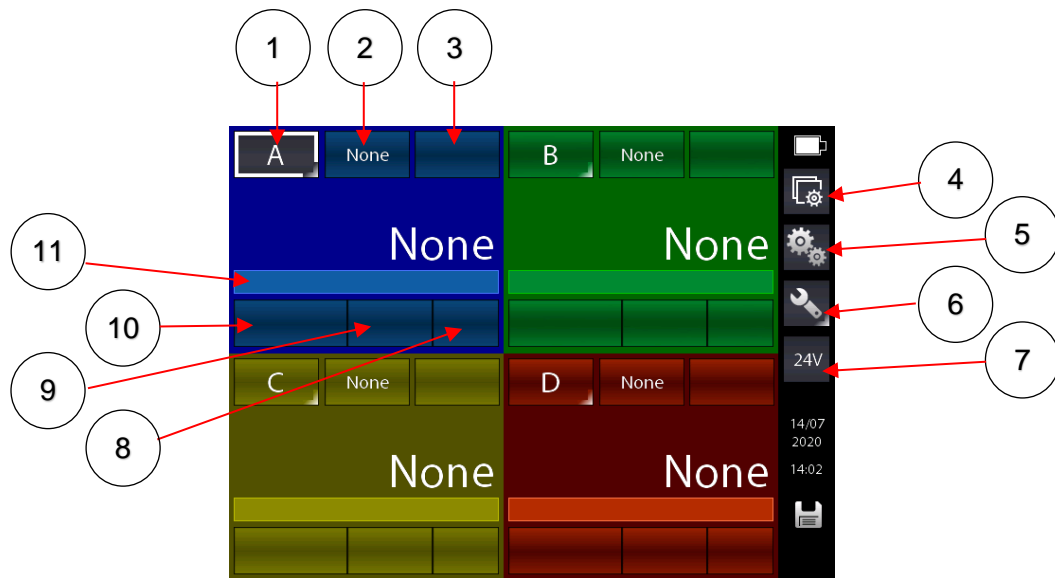
Figure 17 – Typical display of CPH8000 - ET o CPH8000/IS -ET/IS with 4 windows

(1) Selection / Assignment of the channel letter to the active window

(2) Selecting the source for module IN / OUT / P / button

(3) Selecting the field of the selected module (where applicable)

(4) Channel settings

(5) Instrument functions

(6) General settings

(7) Enable/Disable P.S. DC 24 V

(8) Selecting the unit of the selected field (where changeable)

(9) Selecting the field options of the selected module (where applicable), i.e. Tc or Rtd type

(10) Selecting the sub-field of the selected module (where applicable)

(11) Line for display status messages when active (i.e. filter, ramp, offset, etc…).

Compared to the display mode for one single channel, the 1- or 2-window display mode shows additional information as follows:

Figure 18 - Typical display with 2 windows of CPH8000 - ET o CPH8000/IS -ET/IS

1. Selection / Assignment of the channel letter to the active window

2. Selecting the source for module IN / OUT / P / button

3. Selecting the field of the selected module (where applicable)

4. Selecting the field options of the selected module (where applicable), i.e. Tc or Rtd type

5. External cold junction

6. Selecting the unit of the selected field (where changeable)

7. MAX and MIN values indication. Press the button to reset data

8. Selection of the channel role (none, REF, DUT)

9. Line for display status messages when active (i.e. filter, ramp, offset, etc…).

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6.4.1   Channel configuration

The assignment of a function to a software channel is a simple and intuitive procedure.
The channel assignments are very similar and independent for each channel.
The calibrator manage 4 channels identified by the letters from A to D. Each display window can shows the information of the desired channel by selecting the corresponding letter.

The following procedure shows how to configure the Channel C on the first window and how to set up the CPH8000 – CPH8000ET for temperature measurement through a Pt100 resistance thermometer connected to the input terminals of the IN A module (using 4 wires measurement).
The selection of one of the four available channels is made by pressing the channel letter on the displays, as shown in the figure below..

Channel selection
To verify if the channel has been correctly selected it is possible to check if the button indicating the channel letter located in the top left corner of the corresponding channel window, is indicated with a white border on grey background or not. See figure below..
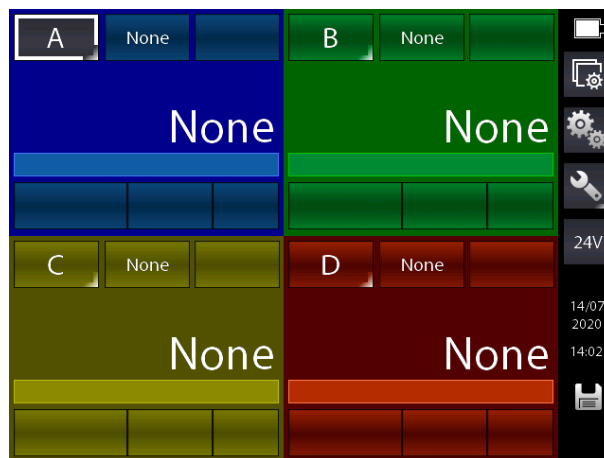
Figure 19 – Channel A selected

First, change the assignment of the channel letter on the first box to switch from channel A to channel C. This is done by pressing and holding for a few seconds the button indicated by the letter Q in order to activate its secondary function (as explained over it).
The short pressure, on the other hand, on the channel letter indication buttons, activates the pressed channel (gray background of the button).
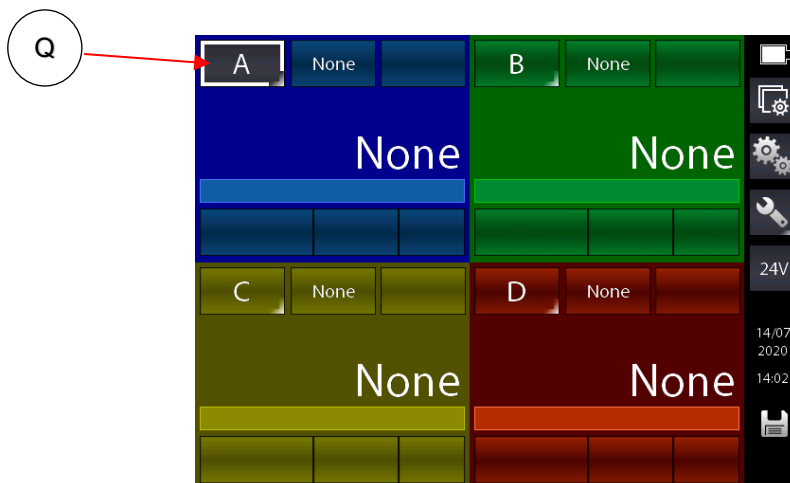
Figure 20 – Changing the channel letter

By pressing and holding the Q key the following screen appears:
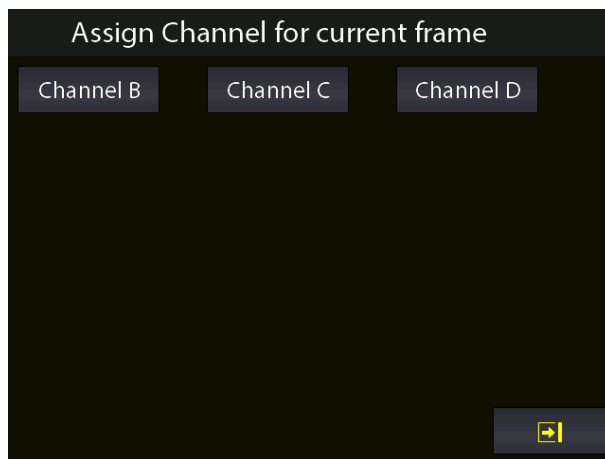
Figure 21 - Selecting the channel letter

Press the [Channel C] button to assign the channel C.
The screen changes as follows:
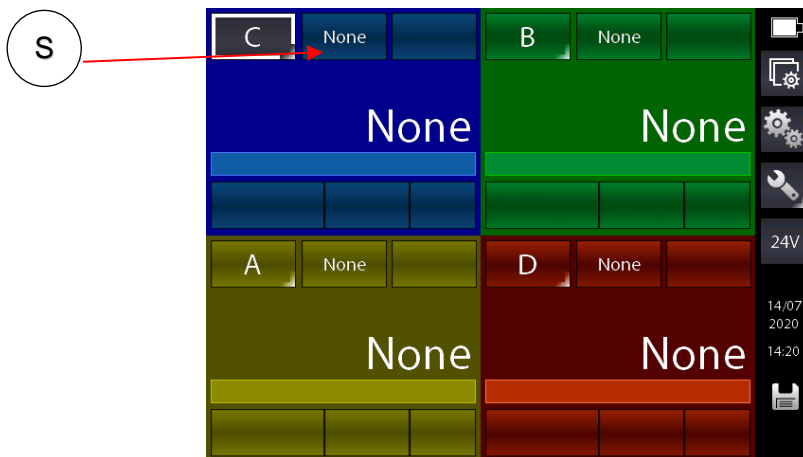
Figure 22 - First window assigned to channel "C"

Now the desired module for the Rtd measurement must be selected on the first window with channel C.
Press the S key which currently indicates "None" to mean no module selected. Appears: (the list varies according to the configuration of the installed modules)
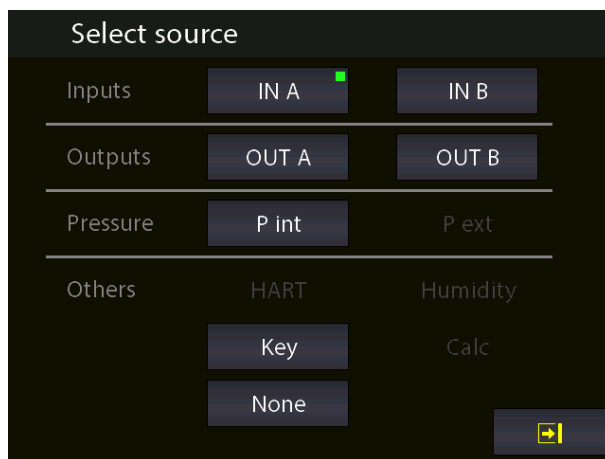
Figure 23 - Source selection

To continue with the example, select the desired module, in the case in question, since it is necessary to measure from an input, select the source "IN A".
The home screen changes to:
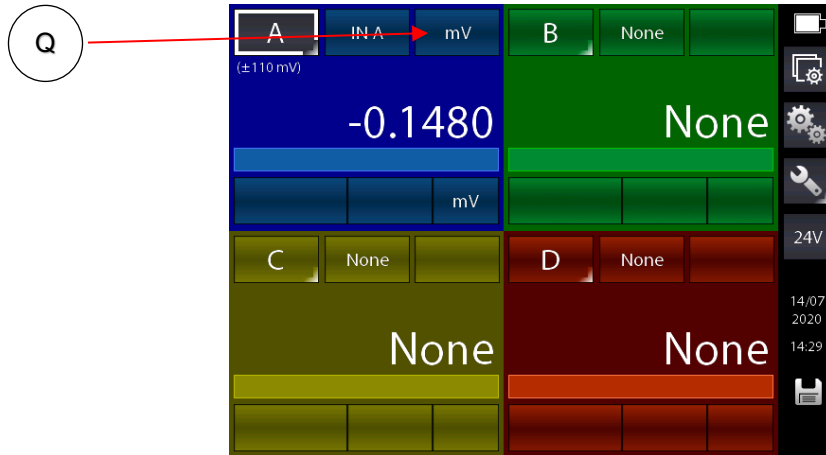
Figure 24 - IN A selected

The instrument is set up on the IN A module by preselecting the last field used for this module (in this case the last field was mV measurement). Having to change the field to choose Rtd measurement, press the key indicated with Q and it appears:
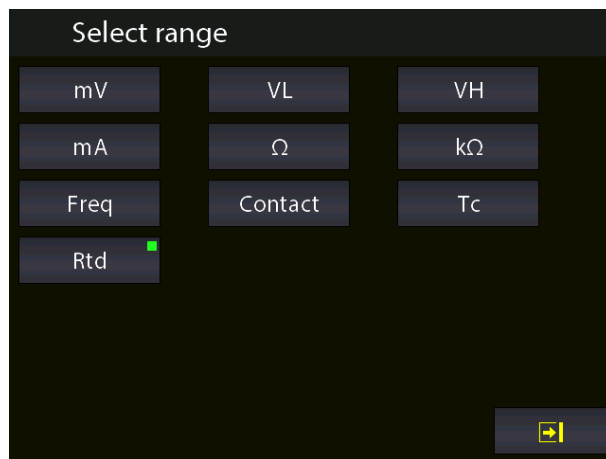
Figure 25 - Selecting the unit for module IN A

Select Rtd (the choice is confirmed by a small green square in the right side of the selected field box) appears:
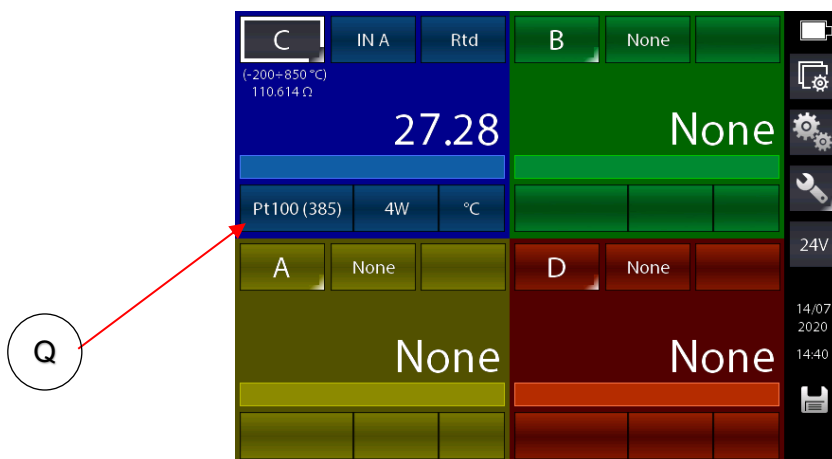
Figure 26 - Module IN A with Rtd unit selected

The instrument is set up in Rtd with the last type of Rtd used previously, in this case an Rtd Pt100-385. If you want to measure a User type Rtd, press the button Q which allows the selection of the type Rtd, the following appears:
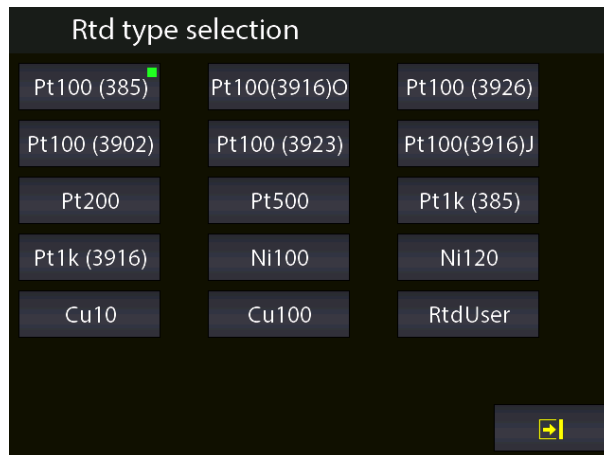
Figure 27 - Selecting the Rtd type

Press type indicated with "RtdUser", appears:
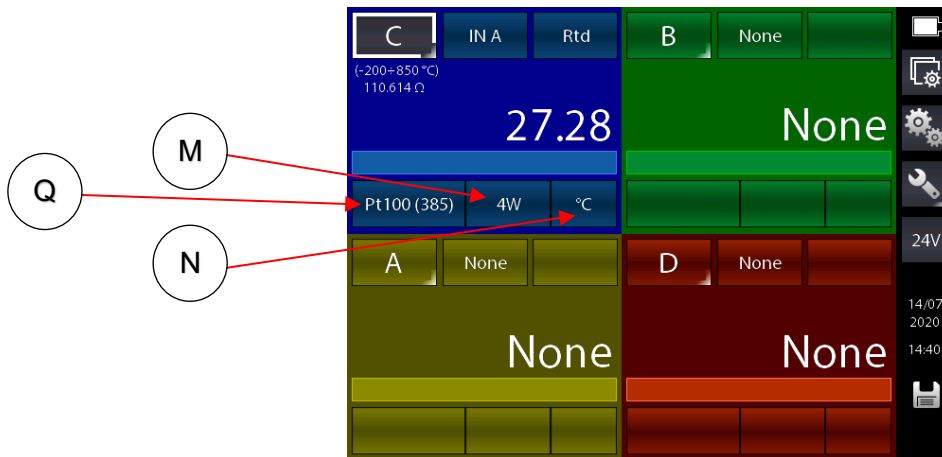
Figure 28 - IN A module with RtdUser selected

The instrument is designed to measure RtdUser on IN A with 4Fili and in degrees centigrade. If desired, you can use the M and N keys to change respectively the number of wires to be used for connection to the Rtd and the desired engineering unit.
Specifically, the Q key now displays a small semi-triangle at the bottom right indicating that you can access a different function by pressing it a little longer.
Pressing for a long time, in fact, accesses the setting page of the desired parameters for the custom or User resistance thermometer.
It is possible to set up to 10 RtdUsers assignable to channels IN A and / or IN B.

Figure 29 – Selection RtdUser

Press the gray field for two seconds to access the parameter setting

Figure 30 - Setting parameters for RtdUser

Figure 31 – Confirmation application of parameters for RtdUser

Measurements of RTD - 4-wire
If possible it is recommended to perform RTD measurements with 4-wire to eliminate parasite resistances of the connection cables. All specifications for resistance thermometer aim for 4-wire measurement.

RTD USER must be selected when the operator needs to measure a non-standard RTD in agreement with the following formula:

Se T≥ 0 °C $R(t)= Ro * (1 + A * t + B * T^2)$

Se T< 0 °C $R(t)= Ro * (1 + A * t + B * T^2 + C (t - 100) * t^3)$

Where:

A	=	$X * 10^{-3} °C^{-1}$
B	=	$X * 10^{-7} °C^{-2}$
C	=	$X * 10^{-12} °C^{-3}$
Ro	=	Resistance @ t = 0,01 °C
X	=	Value

Further specific parameters can be also configured for the already configured channel by pressing the button:

Based on the selected channel, the following screen appears:
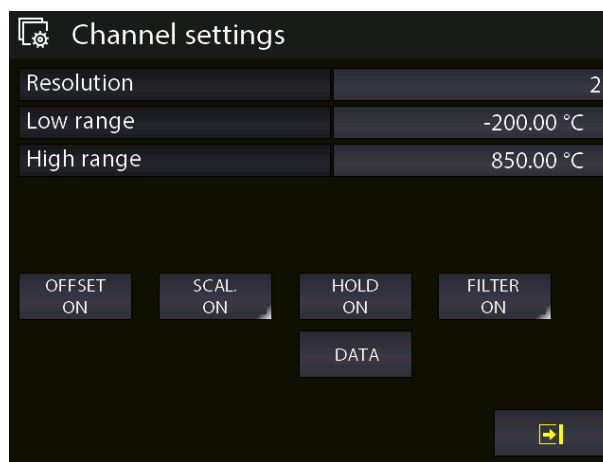
Figure 32 - Channel setting

Here, the resolution can be set by selecting the number of decimal digits and also the initial and final values of the calibration, the relationship between the configured channels as **REF** (REFerence) and **DUT** (Device Under Test).

This data will be used in the report function.

6.4.2   Other assignments

6.4.2.1   Pressure measurement

The following procedure illustrates the configuration of the CPH8000 - ET or CPH8000 / IS - ET / IS for measuring pressure. A channel is chosen by pressing the button with the indication of the channel letter (becomes gray background) and then press the button to assign the desired functional module (Q)
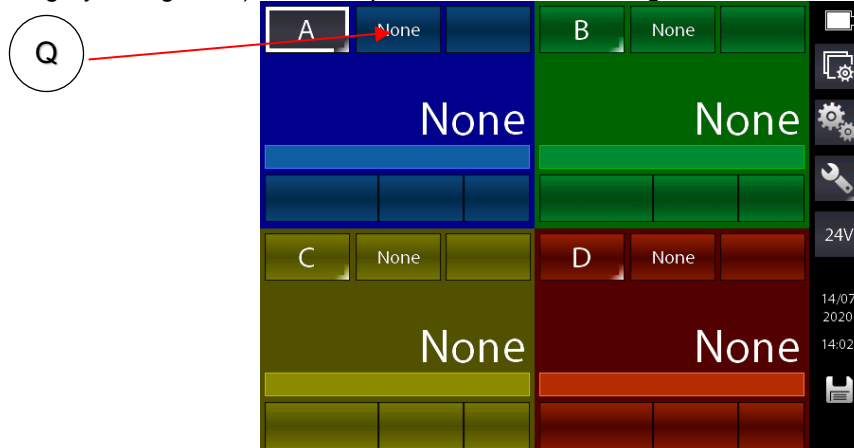
Figure 33 – Channel assign selection

The following screen appears:
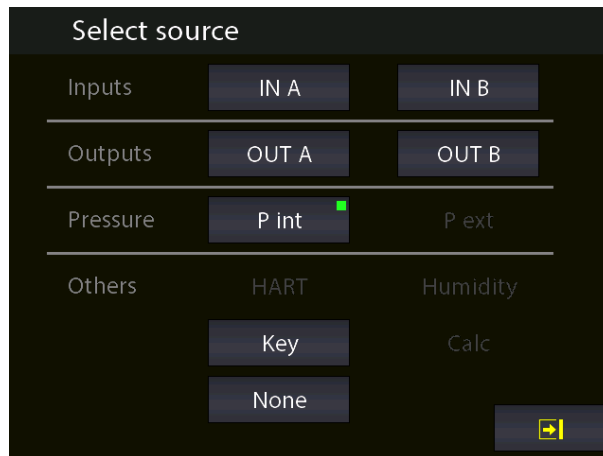
Figure 34 - Selecting the source [P]
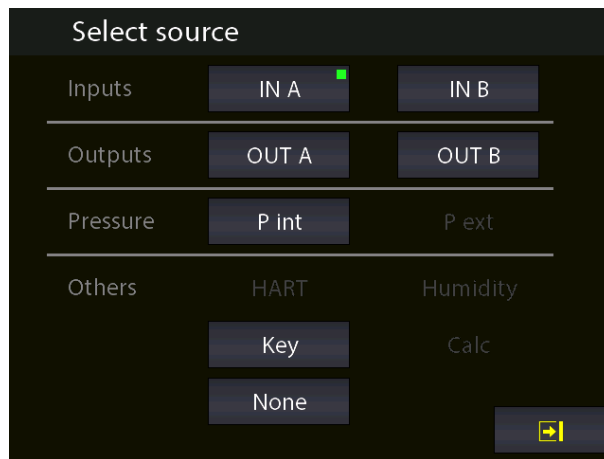
The program automatically shows the following display on the display and the operator must select the parameter or entity to associate with the selected channel, (for example, channel A). In this case press P, press and you have:
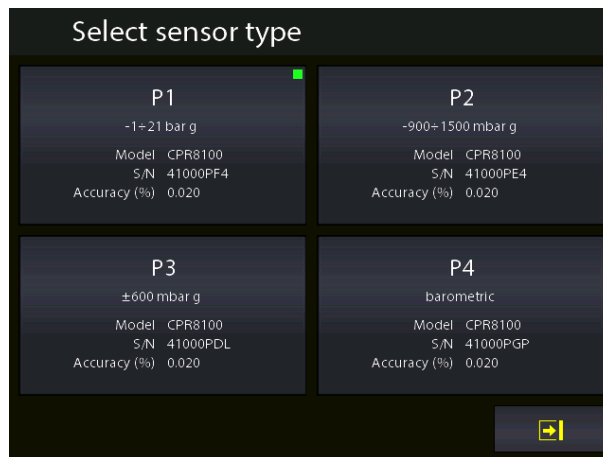
Figure 35 – Pressure sensor selection

The CPH8000 or CPH8000 / IS can carry out up to 6 pressure measurements, 3 of which with internal sensors, a barometric reference and up to two external pressure sensors all with digital technology.
Now you have to assign one to the chosen channel.

  The list varies according to the sensors installed and mounted or connected.

The internal sensors are identified by P1 to P4 (this number may vary accordingly to the number of available sensors) with their measuring range and mode (g = gauge pressure or a = absolute pressure), model, serial number and accuracy. External sensors, if connected, are identified by PE-1 (first external sensor) or PE-2 (second external sensor).

See the figure above as example.

When the sensor has been selected, the following screen appears:

EN

Figure 36 – Pressure sensor parameters selection

The pressure engineering unit can be changed by pressing the button indicated with "R" in the picture above. The pressure engineering units available are:

Unità di misura					
bar	mbar	$ftH_2O@4°C$	$inH_2O@4°C$	$inHg@0°C$	psf
psi	atm	torr	$mH_2O@4°C$	$cmH_2O@4°C$	$mmH_2O@4°C$
$mHg@0°C$	$cmHg@0°C$	$mmHg@0°C$	$kg/m^2@g\_std$	$kg/cm^2@g\_std$	MPa
kPa	hPa	Pa			
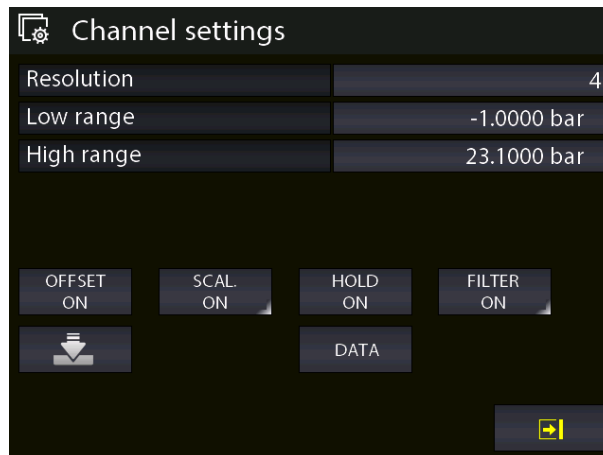
Figure 37 – Sensor range setup

By pressing the DATA key, you will have access to the summary page of the sensor characteristics and the date of the last calibration, with the possibility of entering the desired calibration period (password Level 1 protected).

EN

Figure 38 – Sensor DATA summary page

Further specific parameters can be also configured for the already configured channel by pressing the button

.

Based on the selected channel the the next screen shows the Span parameter (measuring range) and his resolution. For default the sensor has its maximum range equal to the measuring range (Span). If the Span can be redefined, or to be reduced, the same can be changed by using a numeric keyboard.

 The redefinition of the Span is used during a calibration for comparison where a relationship between a REF and a DUT channel has to be done.

The resolution can also be changed based on the desired number of decimal digits (related to the selected engineering unit):.

Figure 39 – Sensor range setup

6.4.2.2   Thermocouple signal measurement

The following procedure shows the setup for temperature signal measurement, for example, through a thermocouple connected to the IN (input) module.

The particular channel is selected by pressing the channel letter (the background of the button changes in gray). Then, press the button indicated with "Q" to assign the desired functional module:
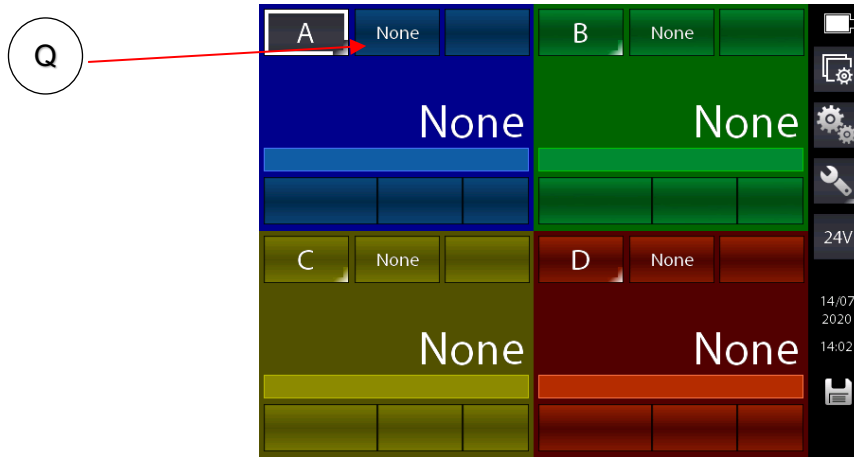
Figure 40 –Tc Channel assign selection

The following screen appears:
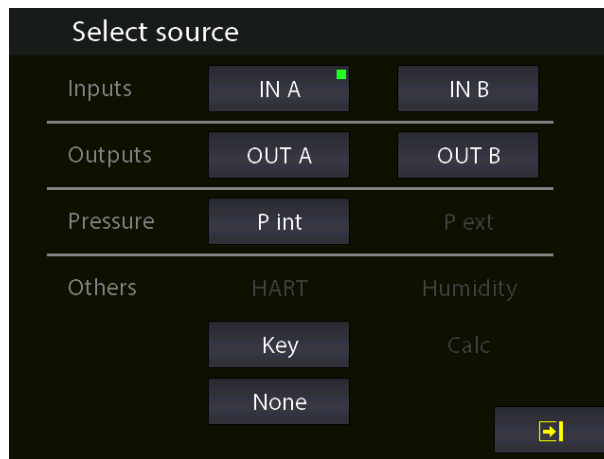
Figure 41 - Selecting source "IN A"

Automatically the program shows the following screen and it remains in this position until the operator points out what type of parameter he desires to associate to a selected channel, for example to the Channel A. In this case press the button "IN A" to measuring from the input.

The main screen changes as follows:
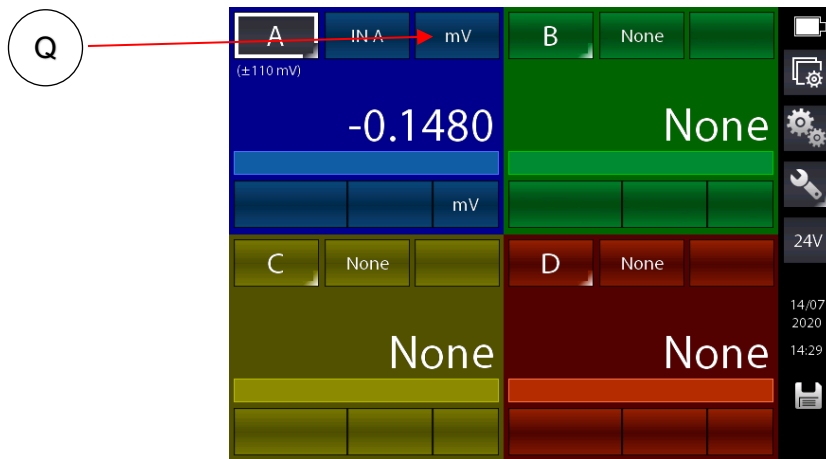
Figure 42 - "IN A" Selected

The instrument is set up on the IN A module, preselecting the last field used for this module (in this case the last field was mV measurement). Having to change the field to choose Tc measurement, press the key indicated with Q and the following appears:
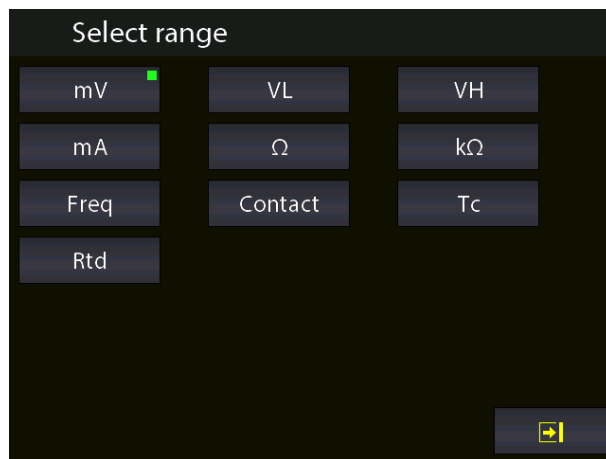
Figure 43 - Selecting "Tc" for the module "IN A"

Press the button "Tc" and press the button ⊞ to select the 1-channel display, and the main screen changes as follows:

Figure 44 - Module "IN A" with "Tc" selected

The calibrator is now set for measuring "Tc", and it select the last thermocouple type used (in this case the last thermocouple type used was Tc, Type J with internal cold junction (active) and temperature shown in °C.

Selecting "internal cold junction", a Pt100 is directly connected to the TC input pins, measures the environmental temperature; whereas by selecting "external cold junction", the temperature value must be inserted by using the keyboard.

Press "R" first in order to change the Cj type into external Cj type (E), then keep pressed the button "R" (a semi triangle symbol on the bottom right corner of the button "R" appears):
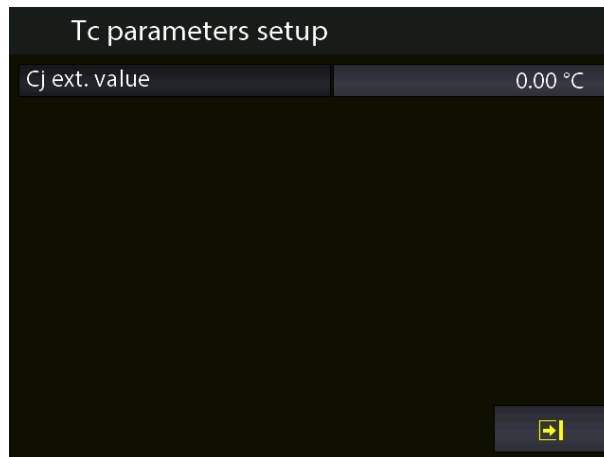
Figure 45 – Tc parameters selection: External Cj type (manual)

6.4.2.3 Electrical parameter measurement

The following procedure shows the settings for the electrical parameters measurement through the input module.

The particular channel is selected by pressing the channel letter (the background of the button changes in gray)

Then, press the button indicated with "Q" to assign the desired functional module:
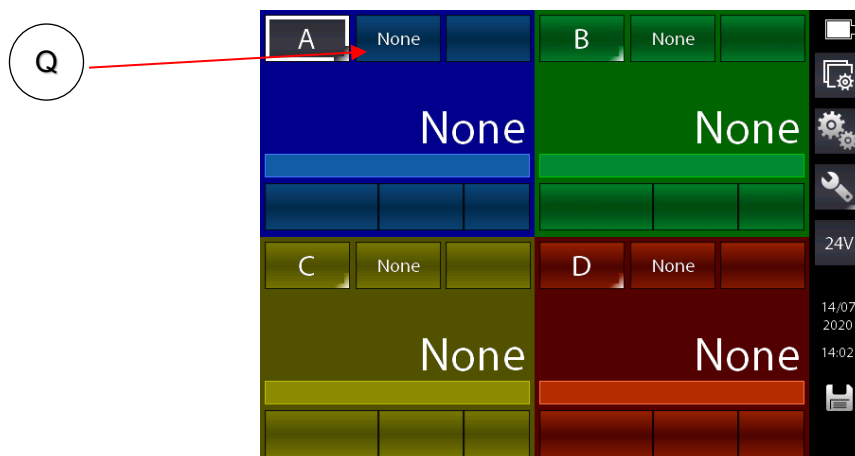
Figure 46 – Channel assign selection IN A - mA

The following screen appears:

Figure 47 - Selecting the source "IN A"

Automatically the program shows the following screen and it remains in this position until the operator points out what type of parameter he desires to associate to a selected channel, for example to the Channel A. In this case press "IN A" for measuring from the input.

The main screen changes as follows:
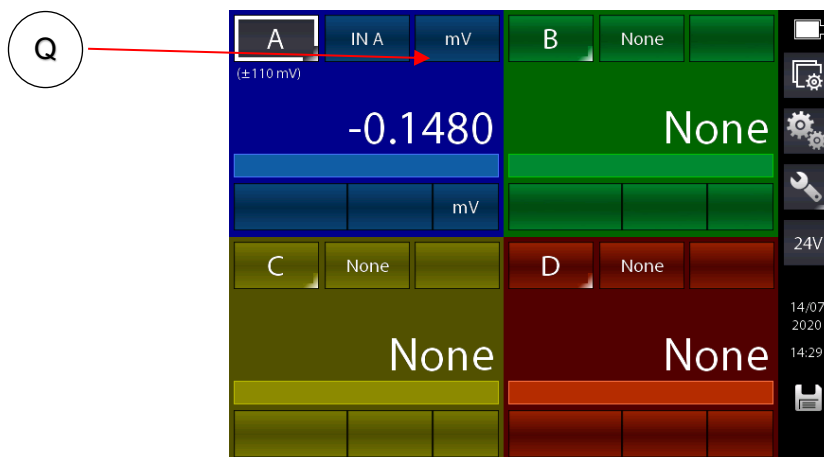
Figure 48 - IN A as first selection

The instrument is set up on the IN A module, preselecting the last field used for this module (in this case the last field was mV measurement). Having to change the range to choose mA measurement, press the key indicated with Q and it appears:
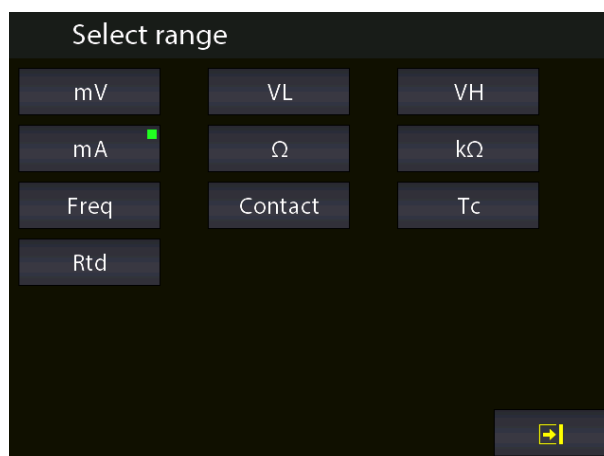
Figure 49 - Selecting "mA" unit for module "IN A"

EN

By selecting the unit mA the following screen appears:

Figure 50 - "mA" selected for module "IN A"

6.4.2.4   Temperature Simulation

The procedure for the temperature simulation assignment is similar to the measurement one as described previously, except for the step where the operator needs to select operative module by pressing the button indicated with "Q":
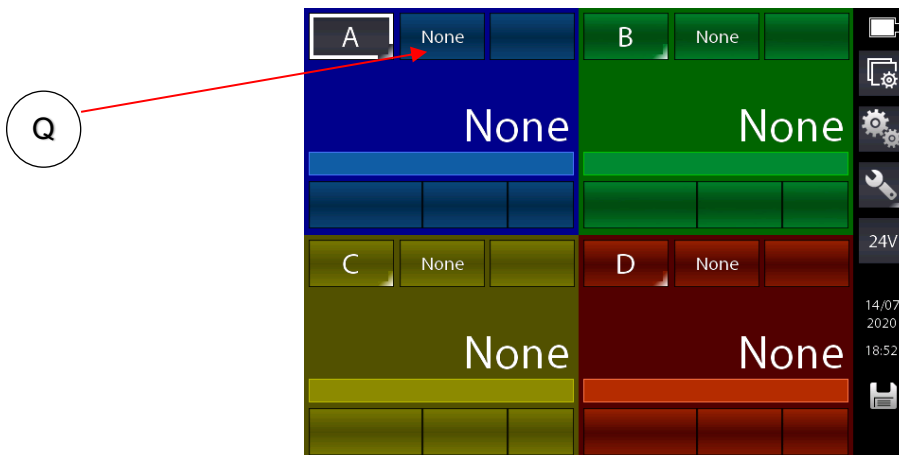
Figure 51 – Selecting channel assignment OUT A - mA

The next step is the selection of one of the output modules OUT A or OUT B (if present):
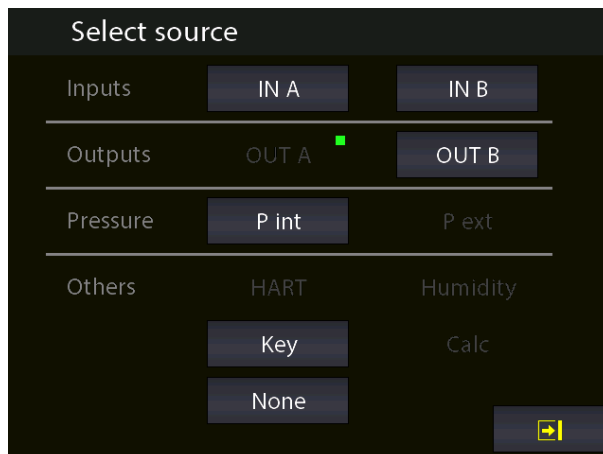
Figure 52 – Selecting generation module (OUT A or OUT B)

6.4.2.5   Electrical parameter generation

The procedure for the assignment of the generation of an electric parameter (for example mA) is similar to the electrical signal measurement one as described previously, expect for the step where the operator needs to select operative module by pressing the button indicated with "Q".

In this case the option OUT A or OUT B should be selected.

From the main screen, now the loop type must be selected via key R between: passive (CPH8000 supply the current loop) or active (current loop supplied externally).
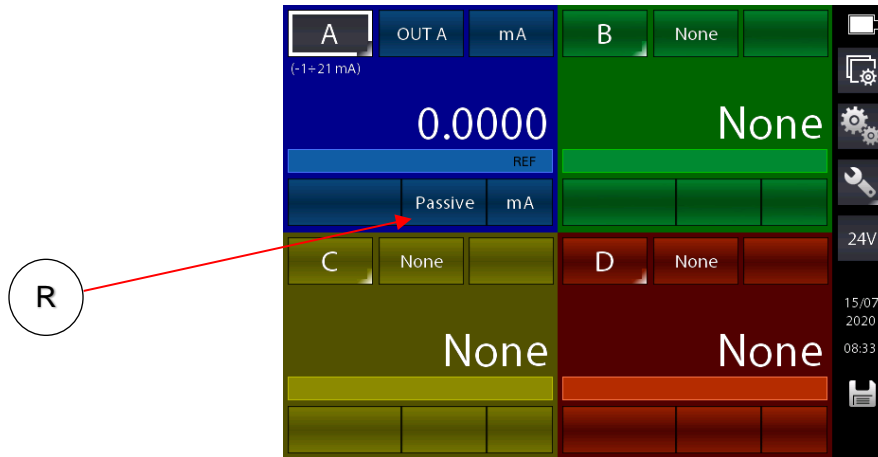
Figure 53 – Setting the mA-loop generation

6.4.2.6   Channel D – mathematic functions

The menu for assignment to channel D provides an additional setting called CALC which allows to obtain a calculated value displayed in this channel obtained from the values of channels A and B. Channel A and channel B must be set with values that are congruent with each other: same engineering unit and same number of decimals.

To access, select Channel D on the display and then the source selection button:
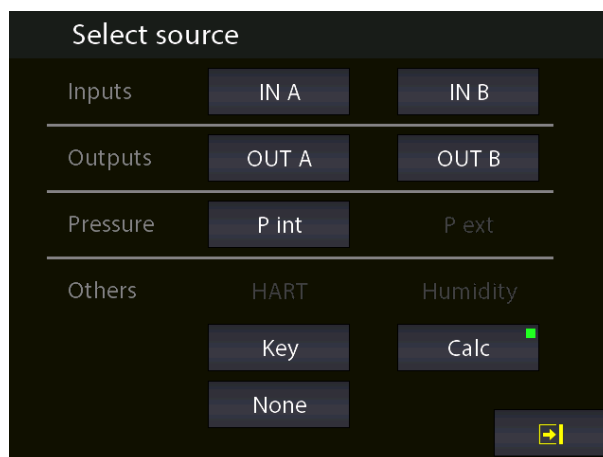
Figure 54 – Selecting Channel D Calc setting

Pressing CALC the followings screen is displayed:
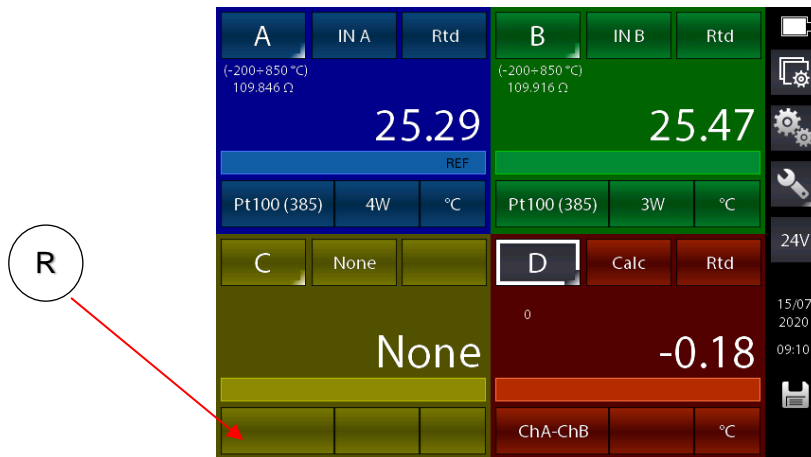
Figure 55 - Selecting assignment of channel Calc

The calibrator is now set for the module CALC and it preset the last used calculation type for this module (in this case the last used calculation type was ChA+ChB).

Press the button indicated with "R" in the picture above to select another calculation type:
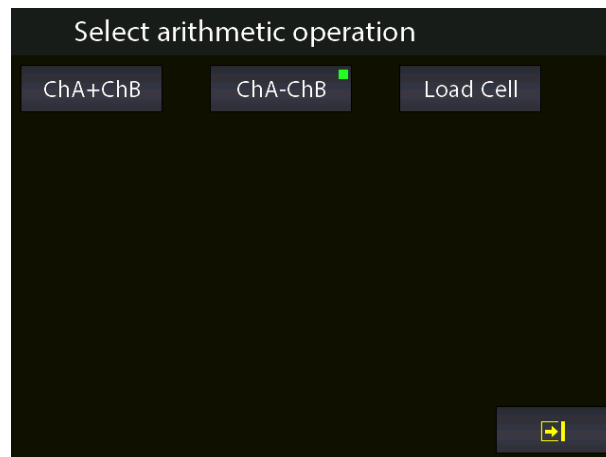
Figure 56 – Types of calculation

Here you can find:

ChA + ChB   Channel D displays the sum of the values of Channel A with Channel B
ChA - ChB   Channel D displays the difference in the value of Channel A with Channel B
Load Cell   Channel D calculates the typical mV/V ratio of load cells
For the ChA + ChB and ChA-ChB functions, channel D can calculate the result only if the following conditions are met:

As already mentioned, channel A and channel B must be set with values that are congruent with each other: same engineering unit and same number of decimals and neither must be in error; otherwise the display of channel D will show that it is not possible to carry out the calculation and the display will be:

Figure 57 - Calculation non possible in Channel D

For the Load Cells, the channel D can calculate the result coming from a load cell connected as per the below scheme
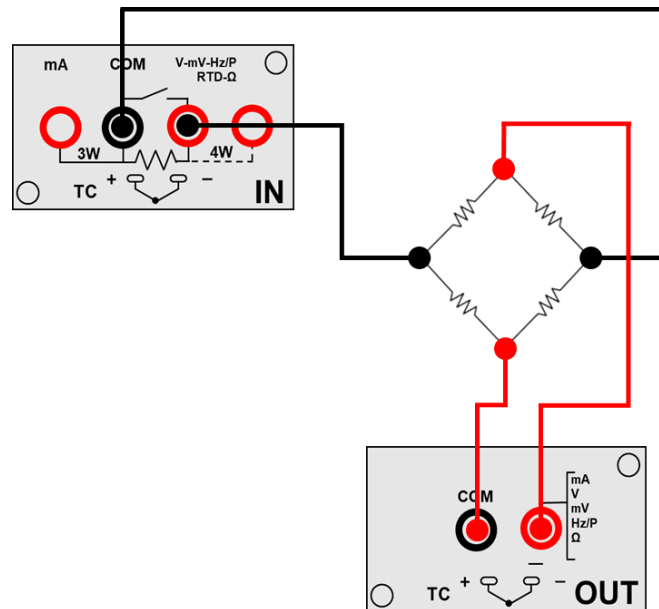
Figure 58 – Load cell connection

The calculation is only possible if the following conditions are met:

Channel A must be set in mV measure (bridge signal) and channel B must be set in generation 0 ÷ 20 V (bridge power supply), moreover channel A must not be in error.

If these conditions are met, you will have:
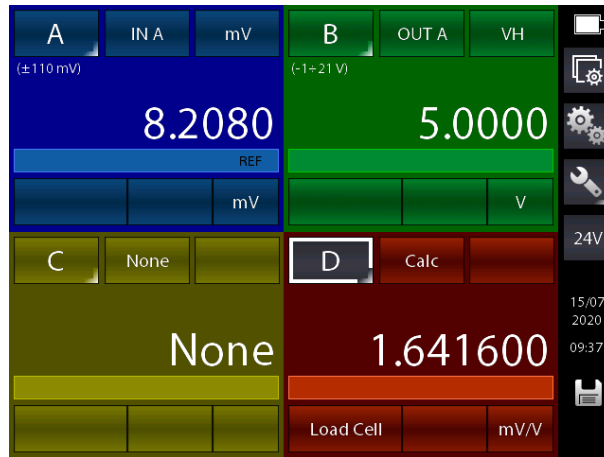
Figure 59 –Load Cell calculation

The CPH8000 - CPH8000/IS allows you to manage sensitivity for load cells ranging from 0 mV/V up to 9.99999 mV/V.

It is also possible to enable the PROPOR function on channel D. from the CHANNEL SETTINGS menu (button) in order to display a more suitable engineering unit on the channel such as Kg or pressures; for example:
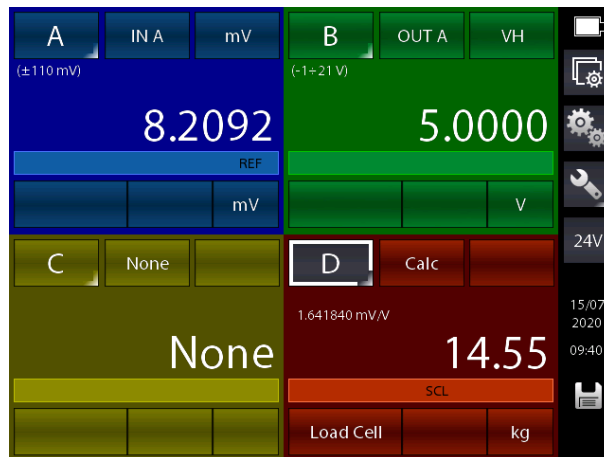
Figure 60 – Load Cell calculation with Scaling function active

6.4.2.7 HART channel assignment

The following procedure shows the setting for the CPH8000 - CPH8000 / IS of the HART measurement thanks to the HART module. A channel is chosen by pressing the button with the indication of the channel letter (becomes grey background) and then press the button to assign the desired functional module (button Q):
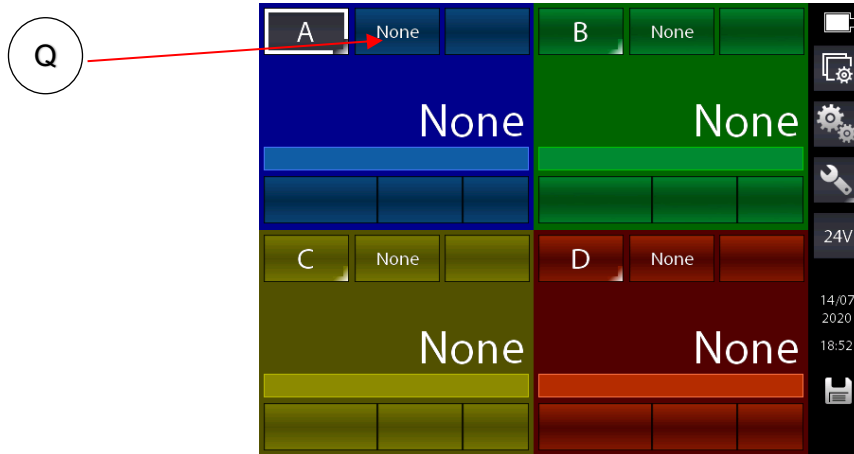
Figure 61 – HART Channel assign selection

The following screen appears:
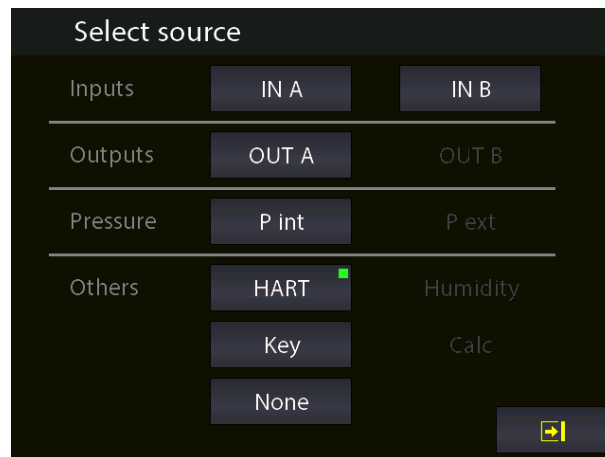
Figure 62 - Selecting the source "HART

Select HART for HART measurement. It appears:
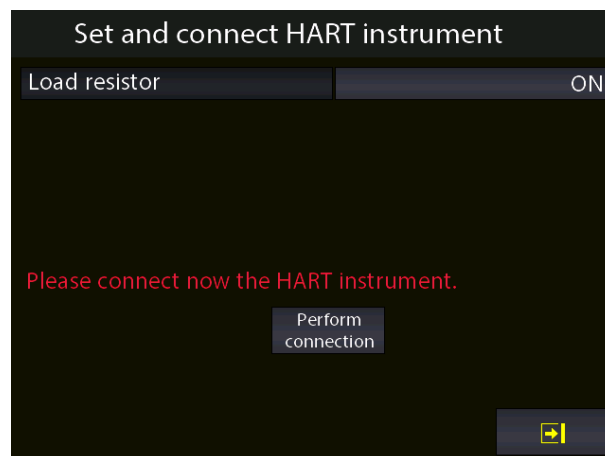
Figure 63 - Connecting a HART device

From this page the user can choose whether or not to enable the internal 250Ω resistance (ON or OFF) indispensable for HART communication (it can be connected externally or the CPH8000 - CPH8000 / IS can supply it).

Before pressing "Connect", make sure you have made the correct connection with the HART instrument.

Press "Connect" and, after a few seconds, if no error is displayed, the main screen appears:
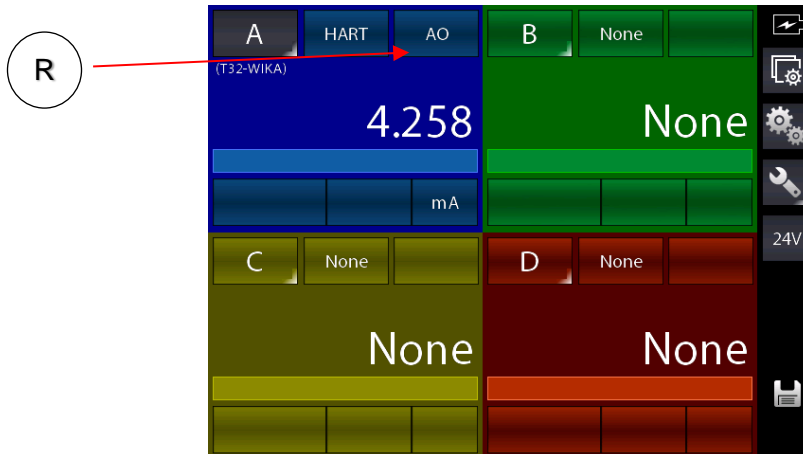
Figure 64 - HART channel A assigned

The main screen shows the HART AO (Analogic Output) value.
Press the button indicated with "R" to display the PV (primary variable) parameter.

Here the user has the possibility to change some HART parameters:

■ Select the channel with active HART communication (in this case the channel A)

■ Push the button Channel Settings to open the following screen:
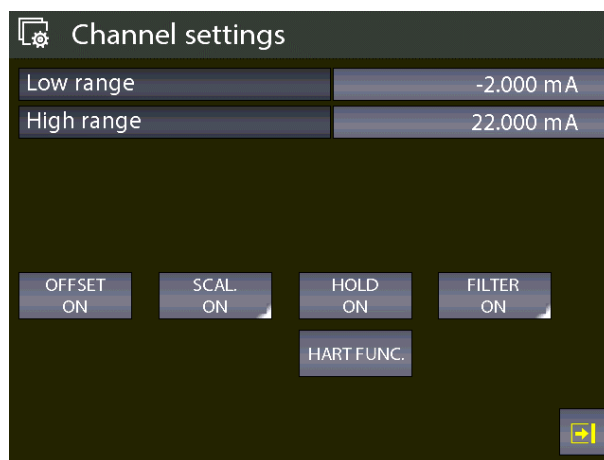
Figure 65 - Setting the HART channel

Push the button "HART FUNC" and the following screen appears:
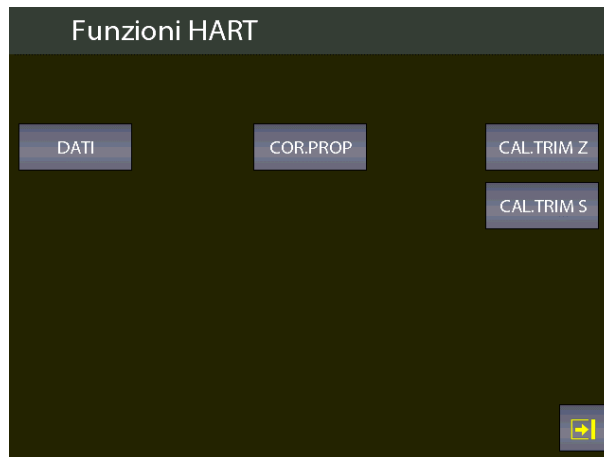
Figure 66 - HART function screen

Push the button "DATA" to display the HART data:

Figure 67 - HART data display

Here the user has the possibility to change some parameter by pushing on the value on the right side of the screen (the ones shown with ':' the arrows at the bottom of the screen display further parameters.
The changeable parameters can be: TAG, DESCRIPTOR, PV decimals units, PV LRV and PV URV.
Press, for example, the button for the TAG value: the following screen appears::

Figure 68 –HART data setting

if desired, delete all the characters with backspace and insert the desired. After press ENTER [↵] to store the parameter inside the HART transmitter; the CPH8000 - CPH8000/IS will return to the previous display.

IMPORTANT NOTE: HART requires that all the characters must be in upper case in order to be properly stored.

6.4.2.8   HART trimmer calibration
When the HART transmitter needs to be recalibrated or adjusted the HART screen shows two types of possibilities:

- ADJ.SCL
- CAL.TRIM (Z,S)

With CAL.TRIM user can correct the analog mA generation, of the HART transmitter, referred to the digital AO value displayed if the output DAC goes out of tolerance.

Zero and Span needs to be corrected.
If the user wants to recalibrate the Trim. an INPUT mA measurement channel has to configured as REF channel. In addition, the loop wiring needs to flow to the IN mA terminals. If no REF mA Input channel is configured first an error will be shown.

From the following screen:
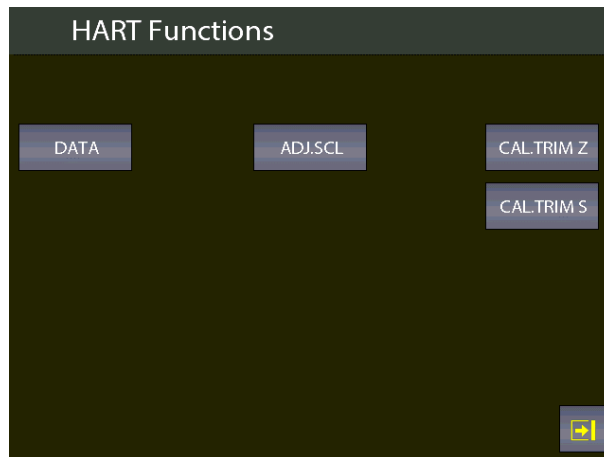
Figure 69 – HART functions

Select, for example, the "CAL.TRIM S" button:

Figure 70 – CAL TRIM S

The HART instrument is put in fixed mode generation (4 or 20 mA) and the REF channel is measuring the true analog mA generation. To re-align to the correct 20 mA (or 4 mA) generation press "CALIBR." button. If needed follow the same procedure for "Zero Trim".

6.4.2.9 HART scale adjust

ADJ.SCL permits to align the range of PV to the Lower and Upper mA generation values.
The PV Lower value (PV LRV) is the value at which the transmitter will generate the 4 mA nominal value, and the PV Upper value (PV URV) is the value at which the transmitter will generate the 20 mA nominal value.
Here is described the "automated" procedure that permits to align in "real-time" these values. The user can also change them manually in the "HART data" page as seen before.
If the user wants to adjust the scale a channel of the same input type of the transmitter has to be configured as REF channel. If no REF channel is configured first an error will be shown.

Press ADJ.SCL menu and the following is shown (assuming that we are using a Pt100 transmitter, e REF simulation Pt100 channel is configured as Channel B):

Figure 71 – COR.PROP

Set the REF Channel to the desired value that permits to output by the transmitter the 4mA value (example 20°C). When the value is stable press ADJ. LRV button.

Now set the REF Channel to the desired value that permits to output the transmitter the 20mA value (example 150°C). When the value is stable press ADJ. URV button.

Now the transmitter will generate 4 and 20 mA between 20 °C and 150 °C.

6.5 Setting channel, function, instrument

All settings can be performed by using the first three buttons on the right side of the main screen from the top to the bottom:

EN
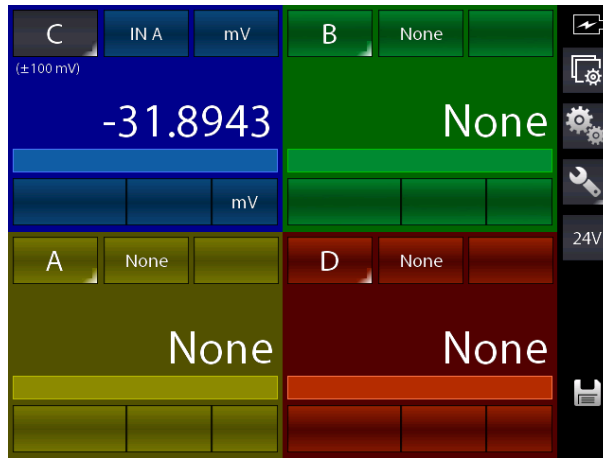
Figure 72 – Channel settings

 Channel setting

 Function setting

 Instrument setting (press and key pressed for some seconds this key to enter the status page)

 Switching button: it enable/disable the 24 V DC current supply for external transmitters

6.5.1 Channel setting

A dedicated screen is accessible pressing the key that allows to configure the instrument channel: this screen contains dynamic elements, so they can differ depending on the module of the channel. If, for example, the channel is configured for thermoresistance measurements, by pressing the button "Chanel setting" the screen could be show the following parameters:
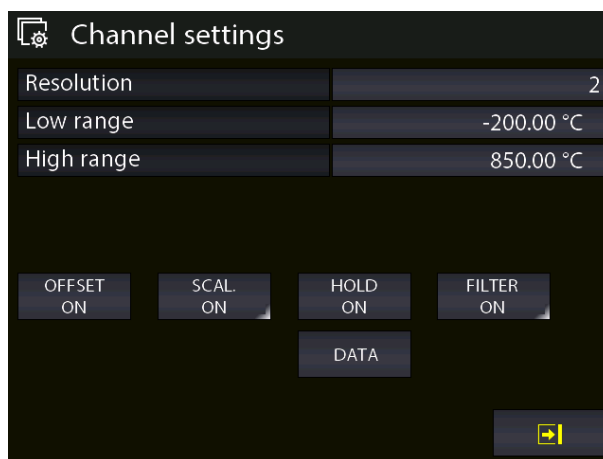
Figure 73 – Channel IN RTD setting

For a selection with a mA IN card, the display is as follows
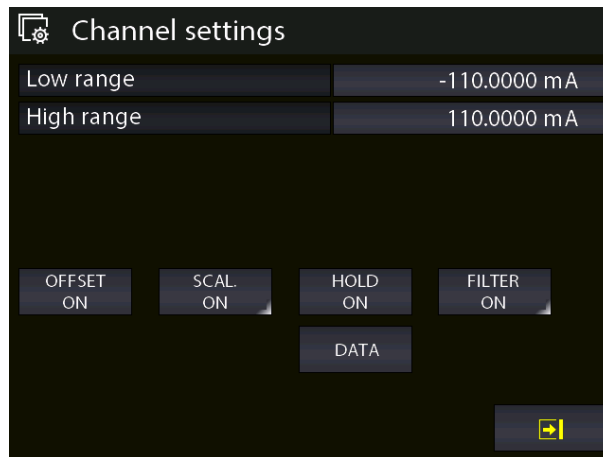
Figure 74 – Channel IN mA setting
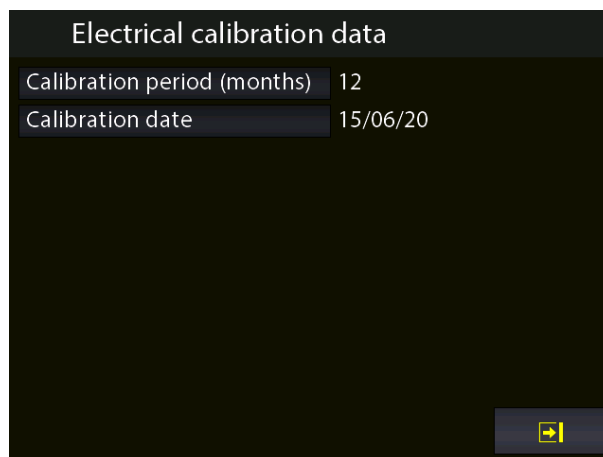
Figure 75 – DATA IN channel display

For IN (measures) and P (P and PE pressures) modules the pages include the following functions::

RESOLUTION   set the number of decimal digits to display (if available)
LOW/HIGH RANGE   It allows you to set the low and high ranges reference values useful for the
                        relationship when the RIF and DST channel roles are used
OFFSET. ON   to set the zero for the measurement (tare)
SCALING ON/OFF   to enable/disable the scale function and display it with a different engineering unit.
                        The parameters of the proportional value can be shown by keeping pressed this
                        button.
HOLD. ON   to hold the last display (HOLD function)
FILTER ON/OFF   to enable/disable the user noise filter on the signal. The parameters of the filter
                        value can be shown by keeping pressed this button.
DATA   channel/sensor information and recertification period setting and last certification
                        date (password Level 1 protected)
ZEROING   It allows the zeroing of the pressure measurement (non-destructive zero)

By entering the settings for an output channel, the same screen shows other functions for that channel:
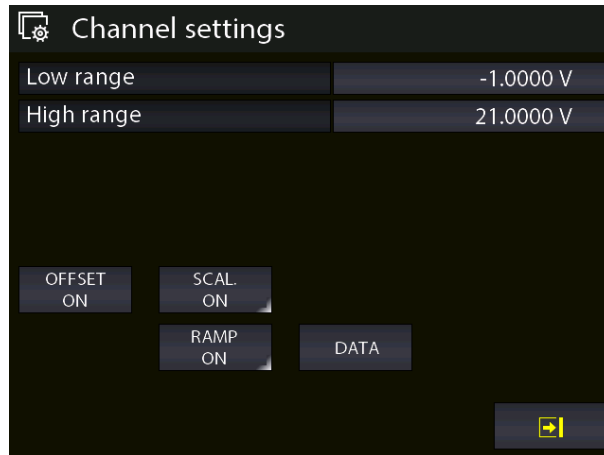
Figure 76 - Setting OUT channel parameters

LOW/HIGH RANGE	It allows you to set the low and high ranges reference values useful for the relationship when the RIF and DST channel roles are used
OFFSET. ON	to set the zero for the measurement (tare)
SCALING ON/OFF	to enable/disable the scale function and display it with a different engineering unit. The parameters of the proportional value can be shown by keeping pressed this button.
RAMP	the user can program a ramp by automatically shifting the generation value in configurable steps.
DATA	channel/sensor information and recertification period setting and last certification date (password Level 1 protected)

For details of these functions, see chapter 6.6 Function detail channel settings

6.5.2   Functions setting

Pressing the key [icon] you can access the configuration of the instrument functions thanks to a dedicated screen.

The screen is as follows:
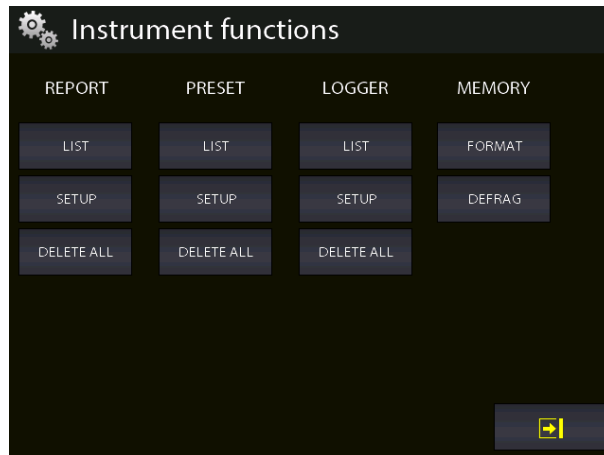
Figure 77 – Instrument functions

Here the user can set different functions grouped by:

- **REPORT**
- **PRESET**
- **LOGGER**
- **MEMORY**

REPORT section
This section is intended for the reports management.

For detailed information see chapter 6.7

PRESET section
This section is intended for the presets management.

For detailed information see chapter 6.7

LOGGER section
This section is intended for the datalogger management.

For detailed information see chapter 6.8.

MEMORY section
The data regarding **Report**, **Logger** and **Preset** are stored in the internal memory of the instrument. It is a virtual memory, the same as the files saved on a computer. The MEMORY section provides 2 different selections:

EN

FORMAT   it deletes the memory completely and it is reset to the company default. This option will delete ALL the above mentioned data, but a confirmation message will appear before executing the command.

DEFRAG   This function can be useful if a lot of data are saved and deleted frequently. In this case some not used black spaces could be created in the memory and a message for insufficient space for storing new data could be displayed. The Defrag function can be used to recover that not used space; the saved data WILL NOT be deleted but a certain time should be necessary to complete the process.

6.5.3   Instrument setting

Pressing the key [wrench icon] you'll have access to the menu which enables to see and change the settings of the instrument:
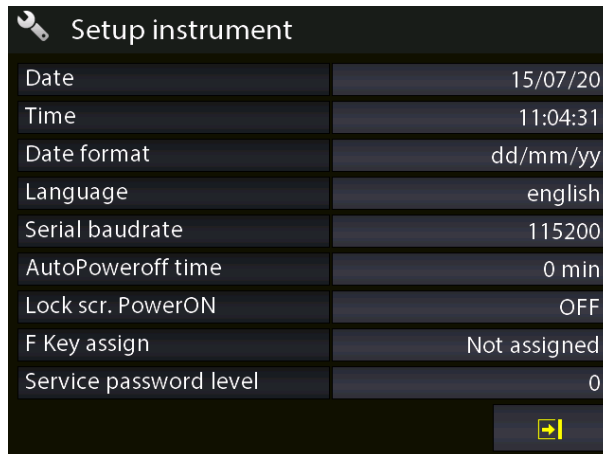
Figure 78 – Instrument setting screen

From this page it is possible to set various parameters of the instrument, such as being able to assign the desired function to the F key [star icon] on the instrument's front keyboard

6.5.3.1   Setting the "F" key of the keyboard

The last function displayed in the picture above can be set. Push the button at the right side close to the field "F key assign". Each option is active only from the main screen, if the calibration is not currently performing a report or an HART adjustment. The following screen appears:

Figure 79 - Setting the "F" key

The available selections are:
- **Hold All ON/OFF**
  When assigned, the F key enable/disable the HOLD function on all active measuring channels.
- **Hold CHN A-B-C-D**
  When assigned, the F key enable/disable the HOLD function on the selected channel A or B or C or D
- **Recall Report list**
  When assigned, the F key load the list of the saved reports
- **Recall Preset list**
  When assigned, the F key load the list of the saved presets

6.5.3.2 Setting the Password field
The password field provides three levels that allow access to the instrument calibration and setting of the period in months of recertification, in detail:

- Level 1 Calibration of internal and external sensor pressure measurements
- Level 2 Calibration of measurements / generation of electrical signals
- Level 3 Authorized personnel only
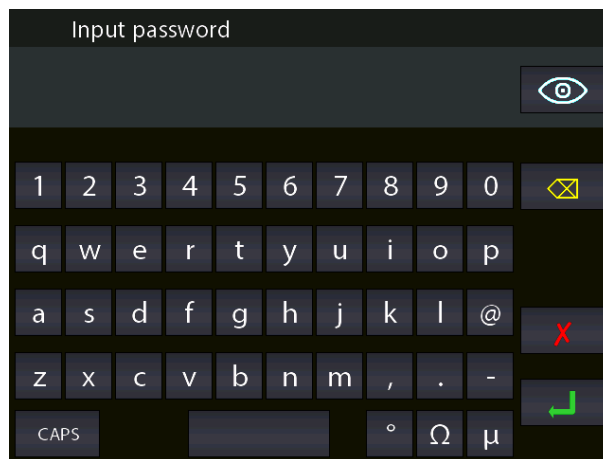
Figure 80 –Password input

In case of need, Level 1 and Level 2 passwords can be requested from the company to WIKA Customer Service.
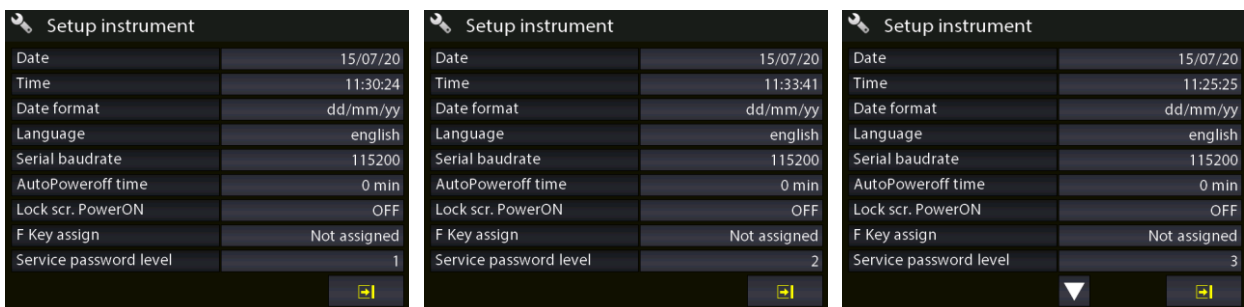
Figure 81 – Password levels

6.5.3.3   Instrument status page

The status page for the calibration can be displayed by pressing the button [wrench icon] on the main screen: the following information are displayed:
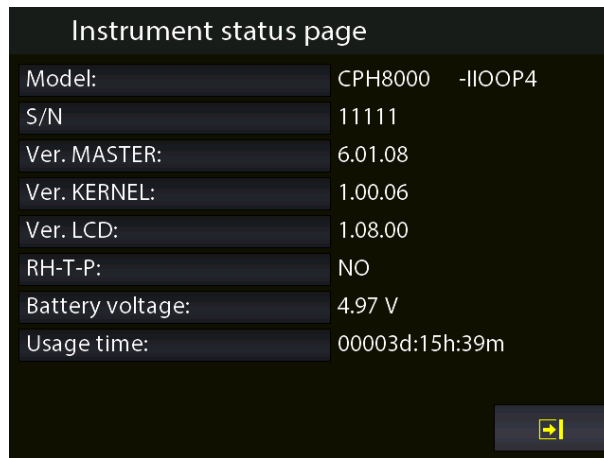
Figure 82 – Instrument status page display

6.6   Channel settings
For setting the channel the following dedicated screen appears:
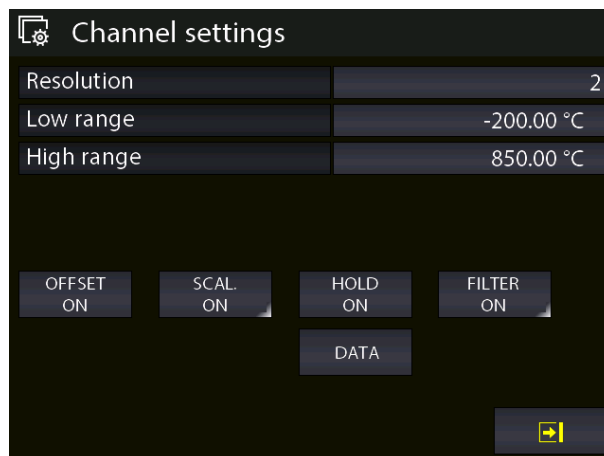
Figure 83 – Channel setting screen

6.6.1   OFFSET ON – OFFSET OFF
The OFFSET On/Off button is used to zeroing or restoring the measure/display of the actual active channel. Press the button Offset on to zeroing the measure (the button shows the indication "Offset off"): if the button is clicked again the Offset Off function is activated (the button shows the indication "Offset on").

The text "OFS" on the blue bar of the main screen indicates that the function is activated.
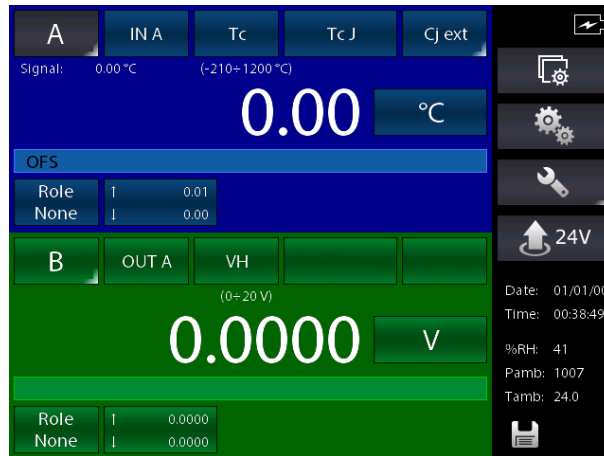
Figure 84 – Offset function activated

6.6.2   SCALING
The engineering unit can be changed by the user by using the Scaling function.
By pressing the Scaling button the following information are available:

■ Low scaling: min. value of the signal and reading scale (i.e. 0 Kg @ 0 bar)
■ High scaling: max. value of the signal and reading scale (i.e. 10 Kg @ 5 bar)
■ Eng. Unit Scl: customized engineering unit of the measuring signal
■ Decimals num.:   number of decimal digits requested
■ Transfer functi.: linear, square root, square

Figure 85 – Proportional parameter setting

After having set the parameters, go back to the previous screen by shorty pressing the button Scaling ON. The main screen now displays the active function by showing the text "SCL" on the blue bar. The measuring value with the new unit is displayed with big numbers, and the actual measuring value is displayed with small numbers, close the indication "Signal".

The following screen shows two channels and the first one displays the active Scaling function active (ON)

Figure 86 – Channel with active Scaling function

6.6.3 HOLD ON – HOLD OFF

The HOLD ON-HOLD OFF button is used to freeze what displayed for the selected channel.
Press HOLD ON to hold the values: HOLD OFF will appear. Press it to unlock the channel. HOLD ON will appear again
HOLD on the display means that the values are hold. See below:
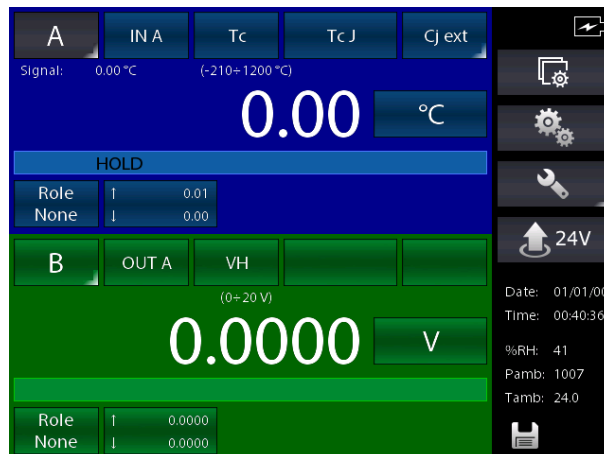
Figure 87 – Channel with HOLD enabled

6.6.4 FILTER

The FILTER key is used to filter in order to reduce any noise on the measurement signal.
Holding down the FILTER key displays: "Filter parameter setting". It is now possible to set the weight of the filter as a percentage.
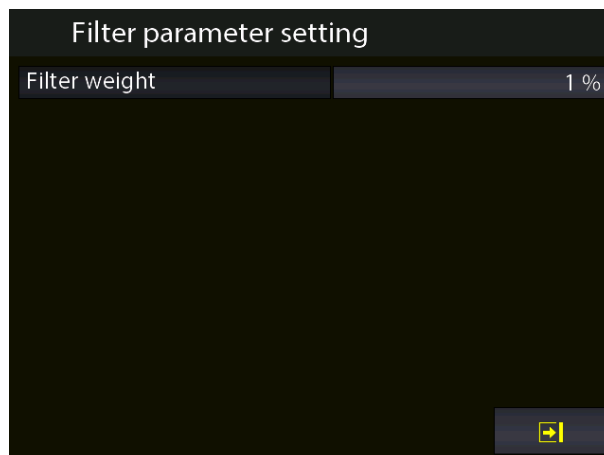
Figure 88 – FILTER setting

After establishing the weight of the filter, return to the previous screen and activate the function by briefly pressing the same button. The word FILTER, shown on the display of the selected channel, indicates that the measurement filter function is activated.

Figure 89 – Channel with FILTER enabled

6.6.5 RAMP

The function RAMP can be activated on OUT channel (generation) and allows the user can program a ramp by automatically shifting the generation value in configurable steps.
If both the 2 generation board are installed, and they are been assigned to two different channels, a different ramp for each output can be programmed.

The programmable ramp follows the following profile:
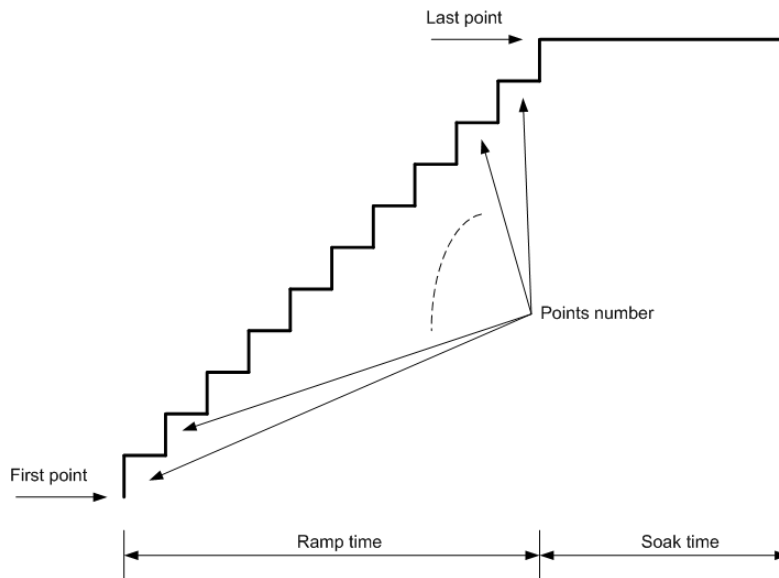
Figure 90 – Ramp profile

EN

Keep pressed the button "RAMP ON" to set the ramp parameters:

Figure 91 – Setting ramp parameters

In the previous screen, for example, a ramp that starts from the value of 0 V has been set, in 11 steps it reaches the value of 10 V within 1 minute, waits 5 sec. and is performed 2 times (number of cycles).
Go back to the previous screen and press the button "RAMP ON" shortly to run the ramp function: the calibrator will show the main screen and on the output channel the indication "ramp" will appears (ramp active on channel B)

Figure 92 – Ramp function active

6.6.6 Modification of the generation/simulation value
The generated/simulated value of an Output card or KEY can be modified from the main screen directly, by pressing the value:
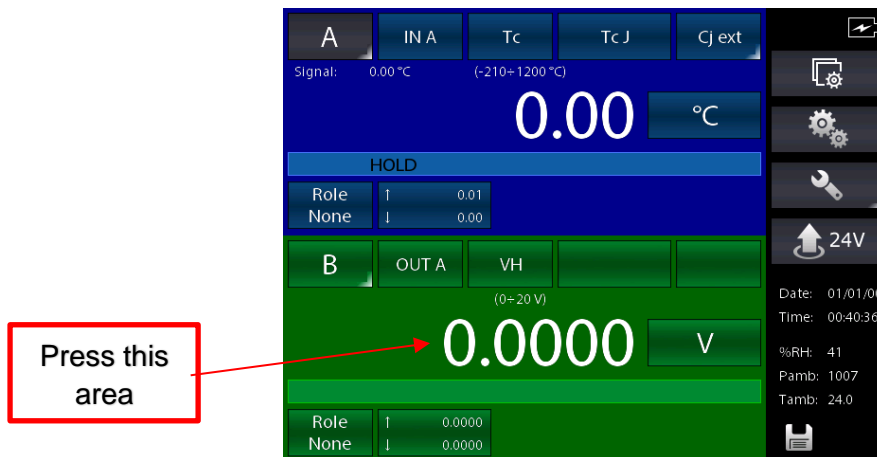
Figure 93 – Generation / simulation value modifying

By pressing the value indicated on the picture above you can select the value of the signals within the limits specified during the assignment (clearly indicated under "min" e "Max" on the left side) with the help of a keyboard:
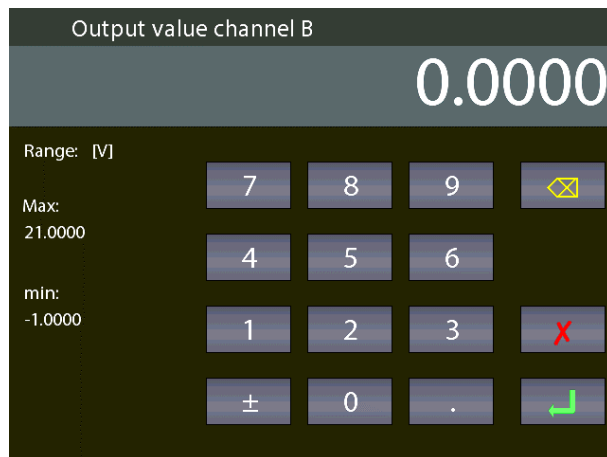
Figure 94 – Modification of generation/simulation value

6.7 REPORT

To configure a report, press the "Role [Role None]" key and set a channel as REF (Reference) and another channel as DUT (Device Under Test), that is, a reference signal and a measurement signal, direct or from the keyboard, the start values and full scale for each channel in use.

These settings must be made before creating the Report or the Preset.
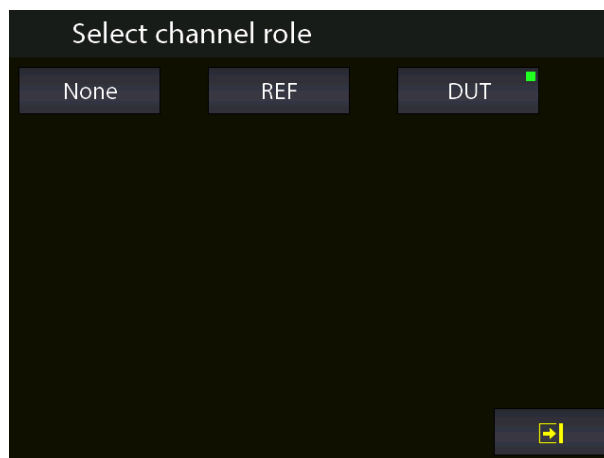
Figure 95 – Role settings for Report and Preset configuration

REFERENCE: remember to set the field equivalent to that of the DUT. When the channel is assigned as a reference, the REF symbol is displayed.

DUT: define the maximum error and the declaration by holding down the "DUT role" key for more than two seconds and the following screen will appear.
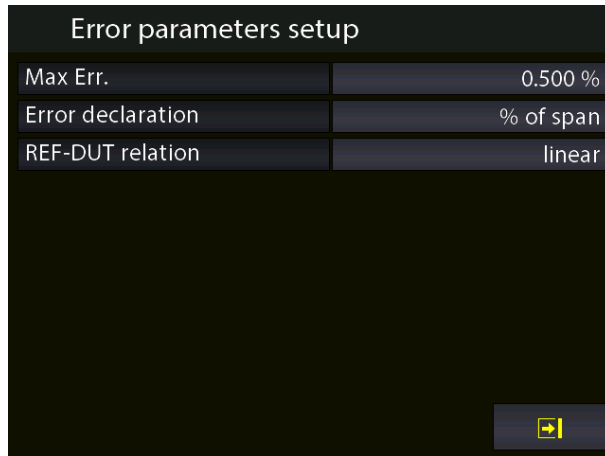
Figure 96 – Modification of the DUT error parameters

Figure 97 – Preliminary settings for Report and Preset configuration
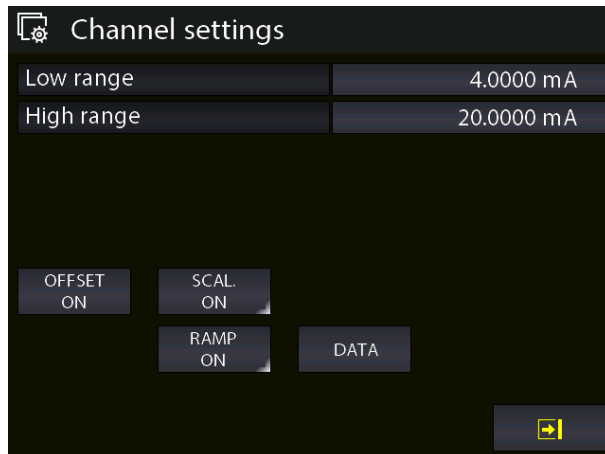
Figure 98 – Changing the low and high range value of the OUT channel
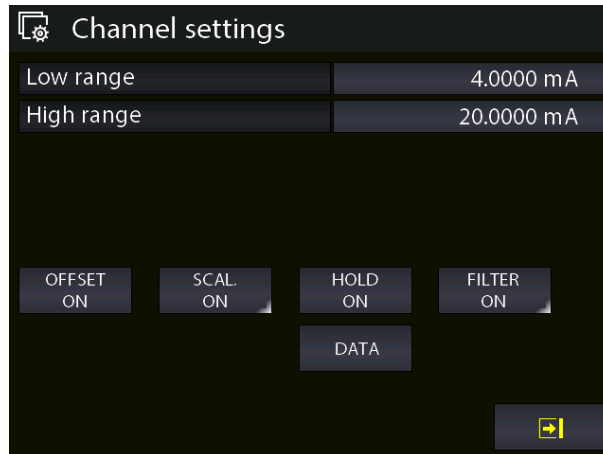
Figure 99 – Changing the low and high range value of the IN channel

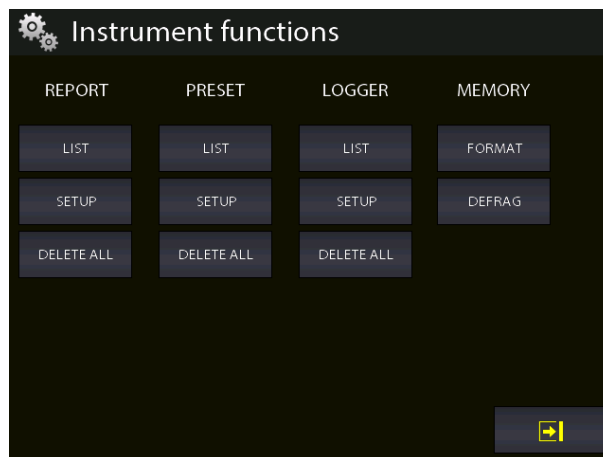From the Function Setting screen (chapter 6.5.2) you access:

Figure 100 – Function settings

On the **REPORT** column the available options are
LIST   View Reports
SETUP   Reports setup
DELETE ALL   Deletes all the Reports

On the **PRESET** column the available options are
LIST   View preset list
SETUP   Preset set up
DELETE ALL   Delete all the presets

By memorizing the setting made as PRESET, the same will remain available for the creation of new reports.
By recalling a PRESET setting, the calibrator will prepare the channels as per the recalled setting and you can proceed with setting up a report by adding the necessary information.
Press SET to create a new report.

If you try to proceed with the creation of a report without having carried out the preliminary operations of setting the RIF and DUT channels, the CPH8000 will return an error message
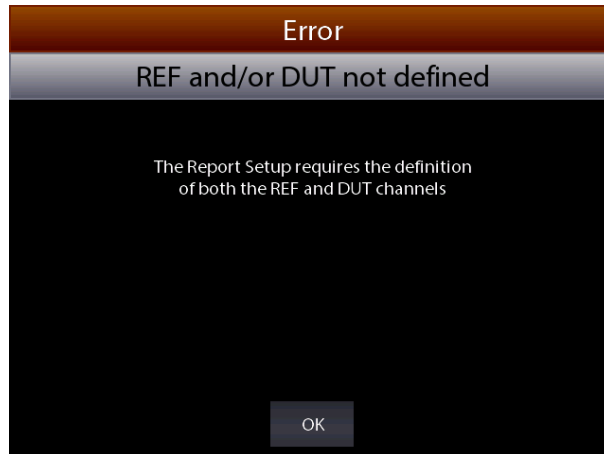
Figure 101 – Error message REF and DUT not defined

Press SETUP to create a new Report. Info required are:

- ■ Report name
- ■ DUT model (Device Under Test)
- ■ DUT Serial Number (Device Under Test)
- ■ Operator
- ■ Job Number
- ■ Found Left
- ■ Up Down
- ■ N. Points

A standard Report configuration for the calibration of a pressure transmitter 0-10 bar range is available here below:

Figure 102 – Report setup, page 1

Figure 103 - Report setup, page 2

Once completed Press STORE per memorize the data.

The following screen will appear:

Figure 104 – Store Report request

Press YES to store the report set up and then press again yes to run the report.

Figure 105 – Report run request

Selecting YES The main screen will be displayed as per below::
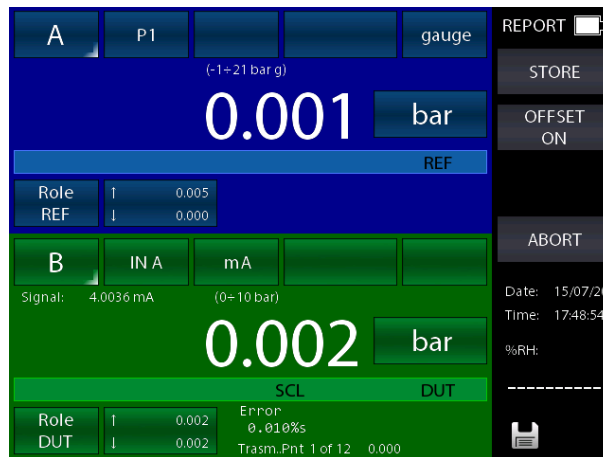
Figure 106 –Report display execution

At the bottom you will see the name of the report (TrasmPress10bar), the calibration point (1 of 12) and its reference value (0.00000). Press STORE to store the first calibration point: the switch to the second point is done automatically (pnt 2 will be shown), and so on for all the predefined calibration points. Pay attention to the bargraph in the DUT display: check if point is inside or outside the limit specified during the DUT assignment..
Once the calibration cycle is defined, the generation of an electrical signal is done automatically.
For the pressure, instead, the operator has to reach the required pressure values using the manual pump and the fine adjustment.
During the configuration process the operator can name the report: the same can be recalled when the same procedure is required.
In any moment the operator can stop the calibration pressing ABORT.

To correct the zero on the reference channel REF, press OFFSET ON before storing the first calibration point: this function is displayed as OFS on the channel display, under the measurement value.
Press again OFFSET OFF to come back to the original configuration: OFS will disappear.

Once the last calibration point is done, press STORE (or ABORT): the Report will end automatically and the display will go back to its original configuration.

On the screen for the Functions Setting (see paragraph 6.5.2.) press LIST to view the stored reports:

Figure 107 – Display Report list

The above picture shows the list of the existing report: name and status are displayed.
Under the status, the writing AS FOUND is displayed when the calibration data refers to a calibration process done on an instrument without any adjustment: when a date is available this means that calibration process is complete (AS FOUND AS LEFT). If the report has never been run, VOID will be displayed next to the name.
Press the arrows to move the cursor up and down to select the report, press the button with light grey background to visualize the information available in the report.

EN

To cancel the reports press and keep pressed the button with light grey background: a confirmation is required by the operator before proceeding. Selecting the area with light grey background next to the report name, the SETUP of the report will be displayed.

If an AS FOUND Report is selected the RUN button will be displayed for the execution of the AS LEFT test, otherwise only the measurement points and the results of the Report will be visible.
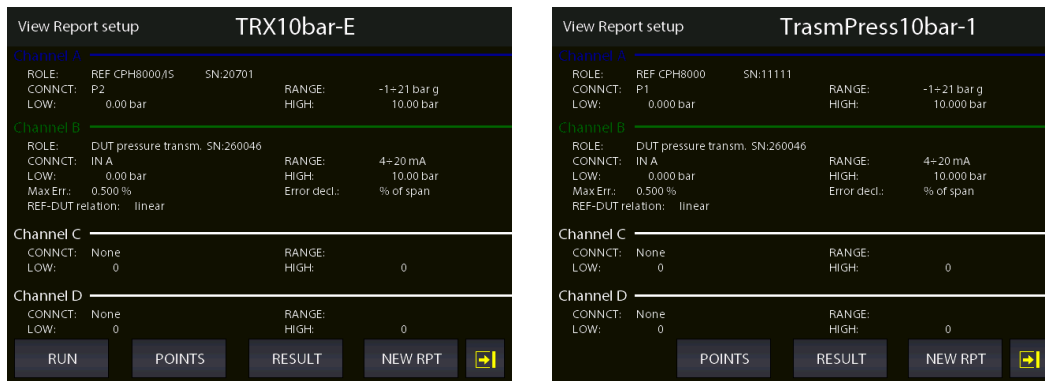

Figure 108 – Display Report setup

Pressing POINTS, the list of the calibration points will be shown:

Figure 109 – Display Report test points

Pressing RESULT, the calibration results are shown, in case of an AS FOUND report, only this selection will be available or both AS FOUND and AS LEFT report result, in the case of a Report of this last type:

Figure 110 – Display Report results UP points

EN

Figure 111 – Display Report results DOWNP points

The buttons on the bottom of the screens allow to access further points (if present): "As found", "As left", "Up", "Down", will appear to enable to see the calibration results related to the different calibration stages. "As found", (calibration points before any adjustment on the DUT) "As left" (calibration points after the adjustment on the DUT has been carried out),"Up" (calibration points going up), "Down" (calibration points going down).

On the screen for the Functions Setting (see paragraph 6.5.2.) press DELETE ALL to delete all the reports in the memory.

Note: a confirmation message will appear before deleting all data

6.7.1 Report of Tc/Rtd with dry well calibrator or dry block management

The CPH8000 – CPH8000/IS allows to create reports for Thermocouples/Thermoresistances by using a dry well calibrator and by automatically manage the temperature points. With the serial interface the Pascal calibrator is able to connect to some dry well calibrators and automatically set the temperature value e and detect the reached stability in order to automatically store the temperature points and then run the test autonomously.

The CPH8000 – CPH8000/IS can manage the following temperature calibrators:
- All models of the Scandura BL-x Series
- All models of the WIKA CTD/CTB9100-x Series
- WIKA model CTD-9100-1100
- Wika CTD4000

The models of the WIKA CTD-9100-x Series require an adapter kit for the conversion from RS-232 to RS-485. The order code for the kit is: 241113.

NOTE: for some dry well calibrators a switching on safety condition could prevent the automatic setting of a set point. In this case the operator must disable this feature. Please read the user manual supplied with the dry well calibrator for further details.

For managing of this report the CPH8000 – CPH8000/IS calibrator also must be equipped with almost 2 IN modules, where one channel must be connected to a reference thermometer (REF) and the second one to the device under test (DUT), both used into the same well dry calibrator.

An RTD or a thermocouple can be used for both the reference thermometer (REF) and the device under test (DUT):

Example:

Figure 112 – Automatic temperature Report setup

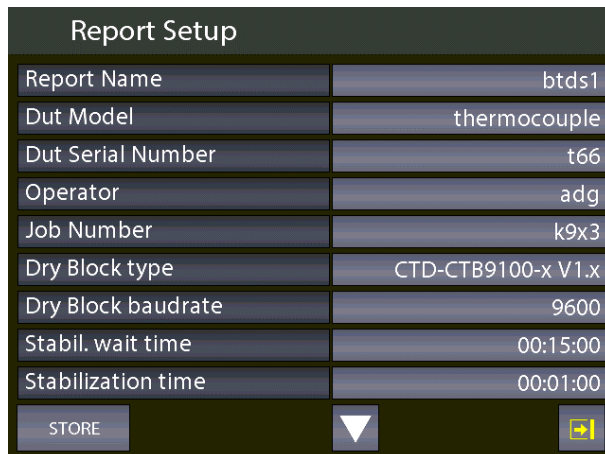Press **REPORT** e set it by using the command **SETUP.RPT**:
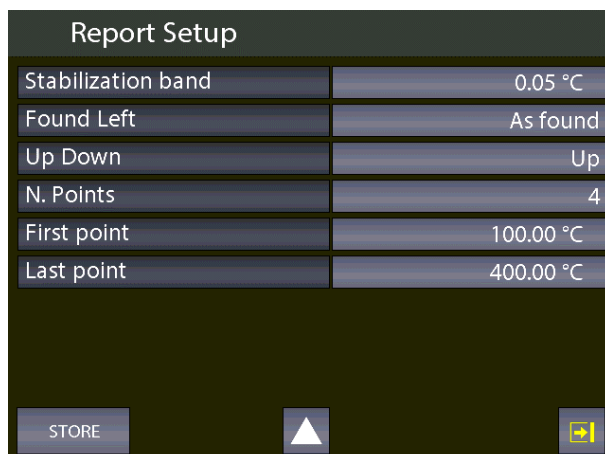

Figure 113 –Report setup, page 1

and

Figure 114 – Report setup, page 2

The following parameters have to be configured at first in order to create reports for Thermocouples / Thermoresistances:

"DUT model": set the type of thermometer by selecting "thermocouple" or "RTD. Do not leave the field as "not defined" otherwise the CPH8000 Report software will be not able to run the proper report type.

"Dry well type": select the dry well calibrator connected to the CPH8000 – CPH8000/IS calibrator

"Dry well Baud rate": set the Baud rate value that must be the same used by the dry well calibrator. Note: some dry well calibrators require the interface converter kit.

"Stab. Wait. Time": set the stability waiting time in the hh:mm:ss format. The CPH8000 calibrator, after setting the temperature point for the report for the serial interface, will wait this dead time before starting to detect the temperature stability value.

"Stab. Time": the algorithm for detecting the stability value will consider the temperature stable by using the two set parameters. When the instrument will detects a stable temperature, the report will store the values of the thermometers and then will proceed to the next set point.

The "Stab. Band" this parameter indicates the temperature range where the temperature value must not fall within for the set time. This allows to detect a stable temperature value.

The values described above depend on the type of the dry well calibrator and its setting specifications.
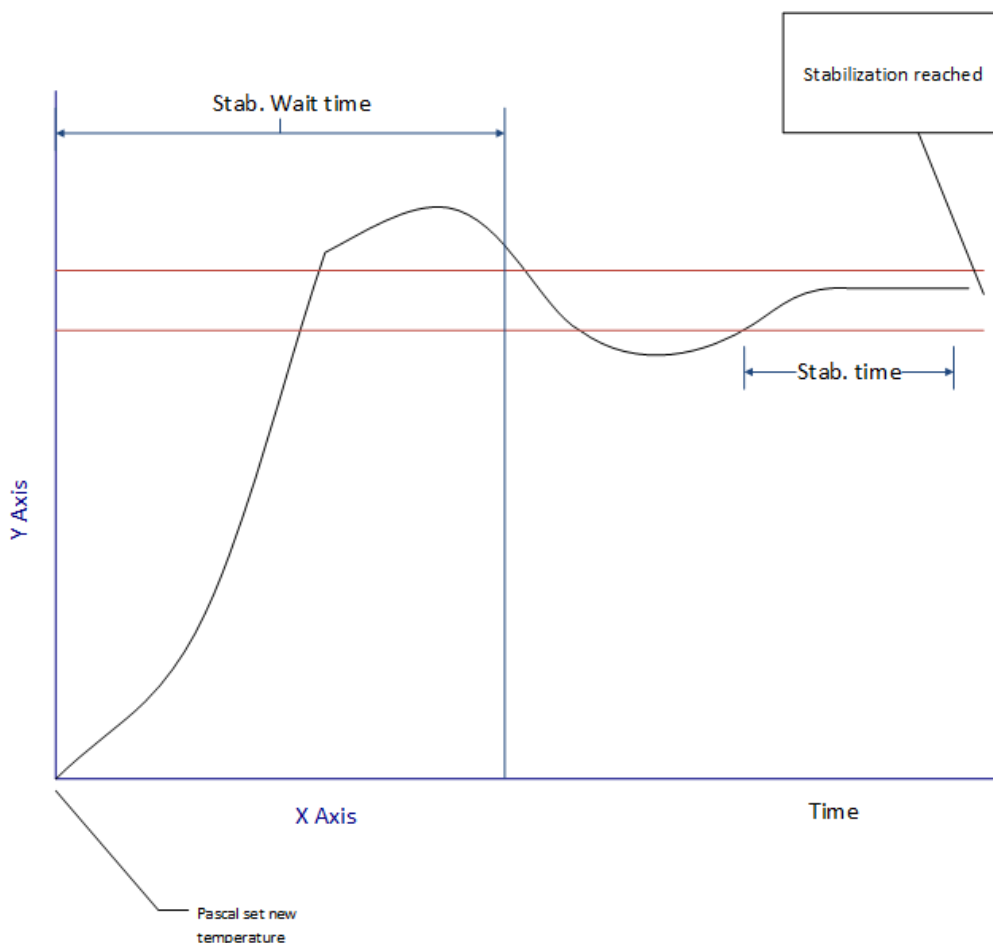
Consider the following chart:

Figure 115 –Report execution

Run the report and the instrument display:

Figure 116 – Report execution

The display shows the status "Stab. Wait. Time" with the remaining time indication.

When the stabilization time is reached the instrument will enter the searching for stabilization:

Figure 117 – Report execution

The display show the parameter "Stabilization Time": the value will came back to the starting value as soon as the temperature goes outside the set range. The counting will start again and, starting from the new time counting, the instrument will check that the temperature value will not change over the set range.

The stability is reached when the timing reach the zero. Then, the instrument will store the REF and DUT values and will start with the next point by repeating the previous steps for all the points set for the Report. When finished the Report can be exported to a PC by means of the software CPH8000 Report (please check chapter 6.8 CPH8000 Report Software).

6.8   CPH8000 Report Software

It is possible to download the Reports in the memory of the CPH8000 –CPH8000 / IS to a PC through the CPH8000 Report Software

Figure 118 – CPH8000 Report

On the home page, select Options to access the software settings
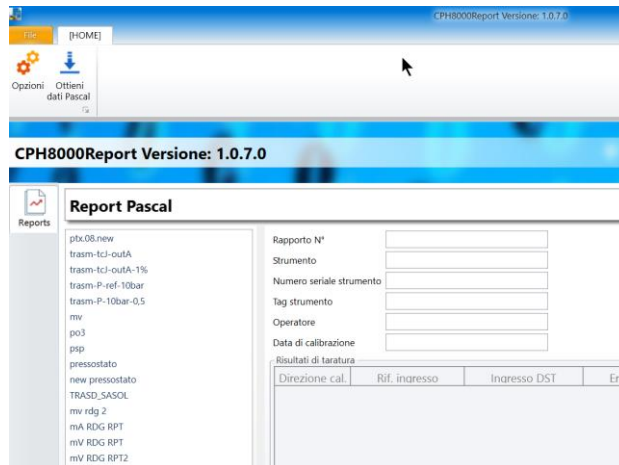
Figure 119 – CPH8000 Report Settings

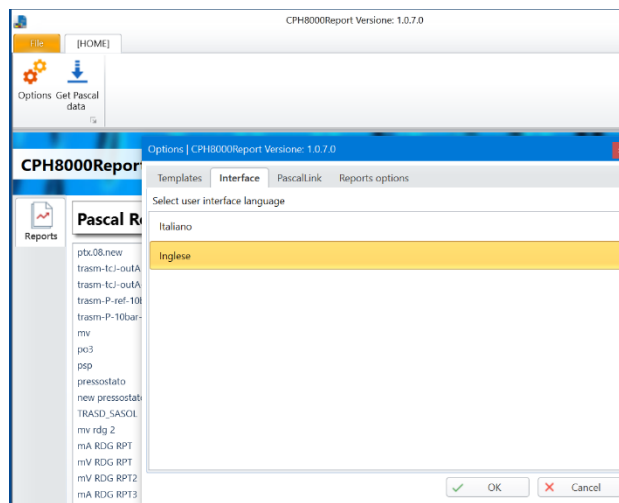Select the "Interface" tab to select the language

Figure 120 – CPH8000 Report Language selection

In the PascaLink tab select the COM port to which the calibrator is connected, set the serial speed to 115200 both in the software and in the CPH8000 and you can check the connection
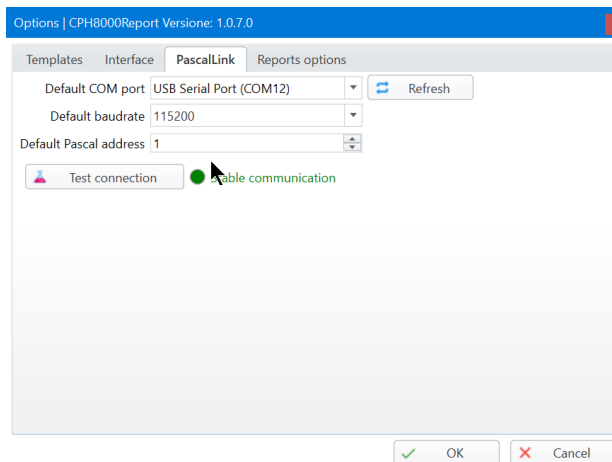
Figure 121 – CPH8000 Report communcation settings and test

Close the settings window and select "Get data" to download the list of Reports present in the calibrator memory.
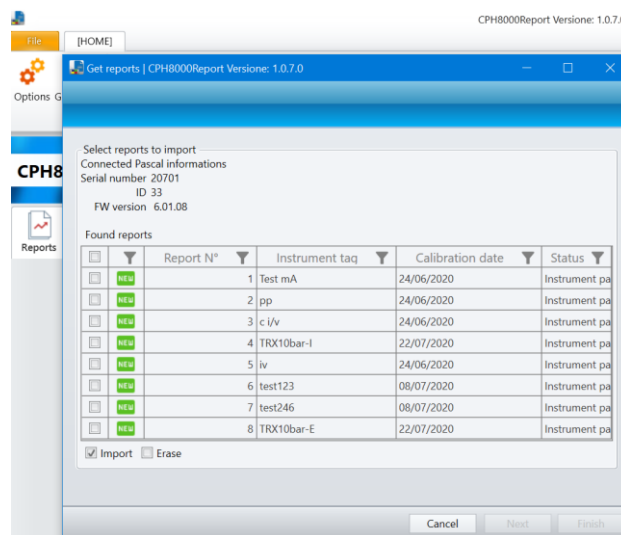
Figure 122 – CPH8000 Report Report List

Once the Report has been selected and downloaded, it can be viewed and saved in PDF, CSV (Excel) and DOC (Word) formats.
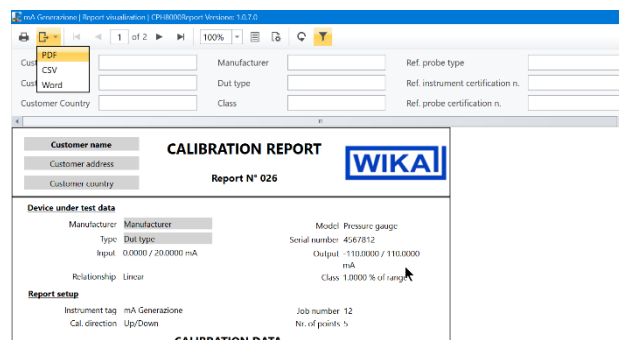
Figure 123 – CPH8000 Report PDF, CSV, DOC

As for the previous Report example for the automatic temperature calibration
(see chapter 6.7.1 Report of Tc/Rtd with dry well calibrator or dry block management), once completed the
report can be imported on a PC when completed in order to be printed. The software will use the proper
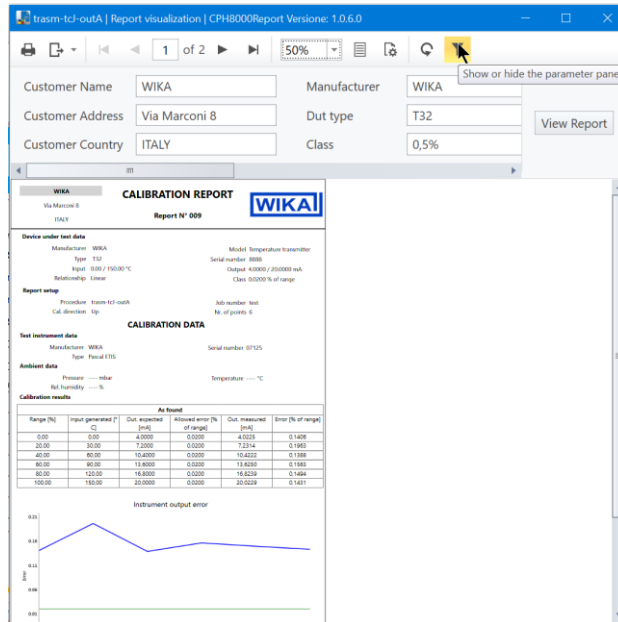template based on the set "thermocouple" or "RTD" parameter:

Figure 124 – Report example

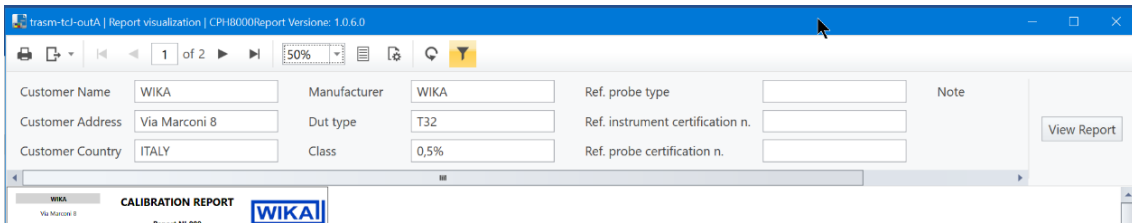This template differs from the standard one in some freely settable fields as indicated below:

Figure 125 – Free fields

This template will also shows the errors in the set engineering unit and not in percentage.

6.9   Data Logger
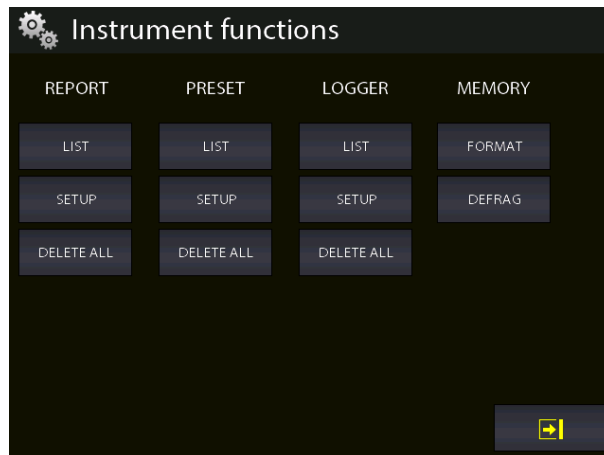From the Function Setting screen (chapter 6.5.2) you access:

Figure 126 – Logger screen

On the LOGGER column, the following options are available

LIST   set up of the Logger
SETUP   View Logs data
DELETE ALL   delete all the Logs

With this function you can configure the data logger for all 4 channels simultaneously.

Selecting SETUP, "Data Logger Setup" will be displayed as per the below:

Log Name   Name of the Log (mandatory)
Sampling time   sampling time between 2 measurements (hours, min., sec.)
Sampling length   total time of the logging
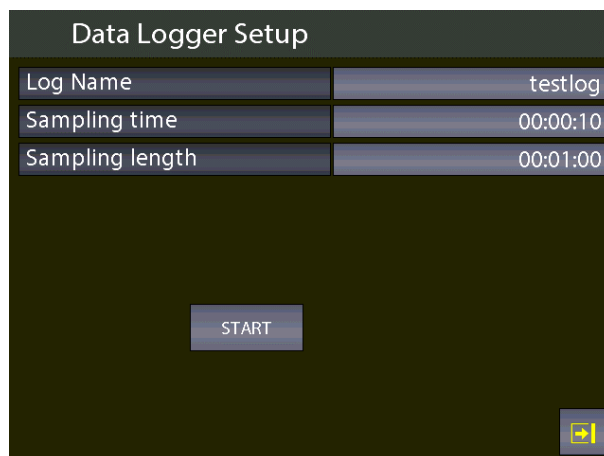
Pressing START, the logging process will start:

Figure 127 – Impostazione dati del Logger

The flashing of the disc icon 💾, on the bottom right side of the screen, shows that the LOGGER is active.
The data will be stored on all 4 Channels (if assigned) simultaneously

Figure 128 – Logger running

Flashing Symbol

By pressing DELETE ALL on the LOGGER column on the screen of the Functions Setting, all the logs will be deleted: a confirmation will be asked to the user before proceeding.

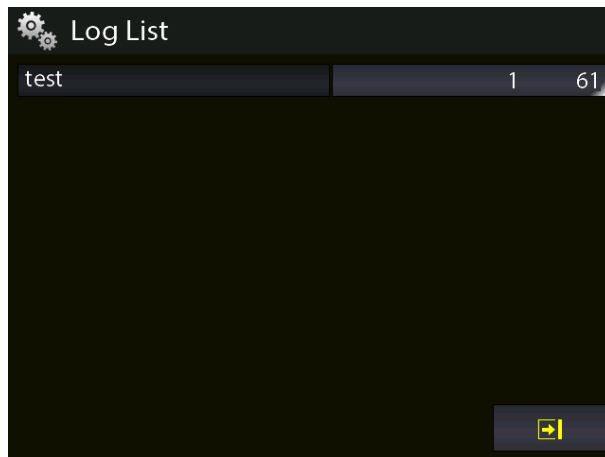Press the button LIST to show all the stored logs

Figure 129 – Display Log list

Press the button with grey background next to the log name to see the data of each log.

It is possible to DELETE the selected LOG selected and keeping selected the button with gray background with the LOG name: a confirmation will be requested before proceeding.
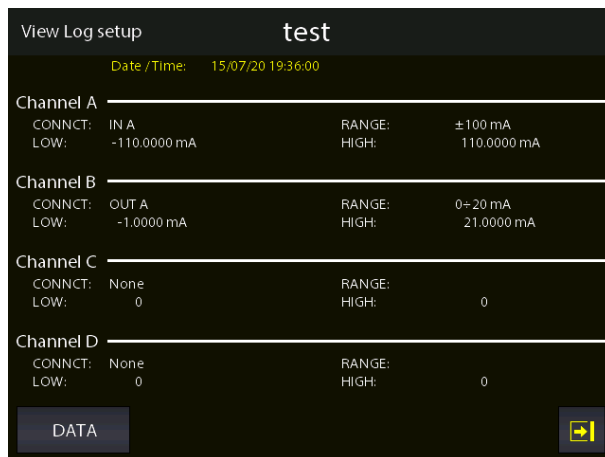

Figure 130 – Display Log settings

Pressing DATA displays the stored values accessible for each active channel for which the LOG has stored values. The values min., Max. Appear on the right of the window. and average of the recorded values.
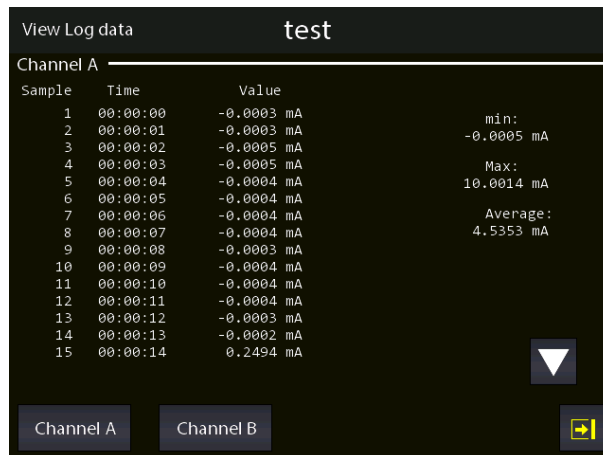
Figure 131 – Display Log data

6.10 Communication

Two softwares are available:

■ CPH8000 Report (see chapter 6.8 CPH8000 Report Software, included in the standard supply), all reports can be sent to the personal computer

■ PASLOG (optional), it is possible to send all the LOGS to the personal computer

Following configuration is required for the download of the data: press the button .
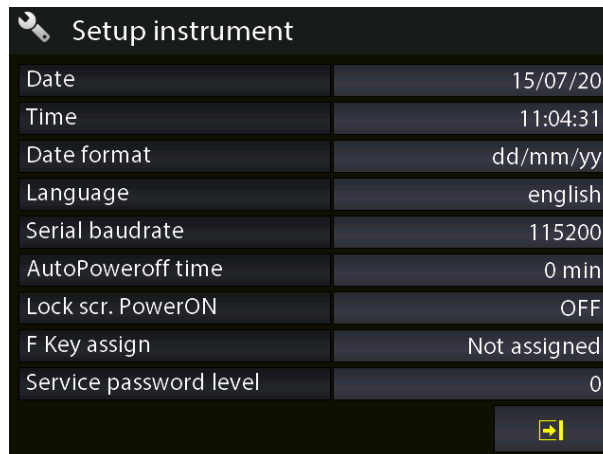

Figure 132 – Display instrument setup

6.11 Calibration examples

6.11.1 Example 1 – Calibration of 2-wire pressure transmitters

CPH8000 - ET o CPH8000/IS -ET/IS genera 24 V c.c. generates 24 V d.c. power supply to the transmitter. The 4-20 mA output signal from the transmitter is sent to be measured to an electrical input signals card IN A or IN B. The pressure reference value to the transmitter is generated by the hand pump and by the fine volumetric regulator, both present in the calibrator, and measured as REF by the calibrator itself.
The figure below shows how to connect the transmitter to the calibrator.
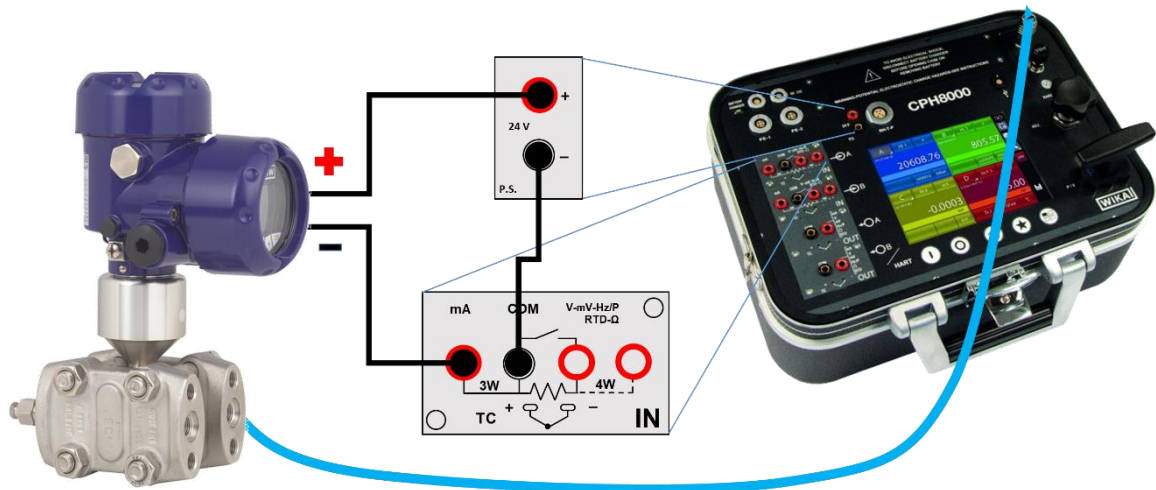

Figure 133 – Pressure transmitter calibration example

A typical configuration of Pascal100 for the calibration of a pressure transmitter is illustrated in the following figure:
- Set a channel for pressure values reading, assigned as REF
- Set a channel for mA reading at the inputs IN A or IN B (if present), assigned as DUT

- Enable the 24 V power supply by pressing the button ![24V] from the side bar
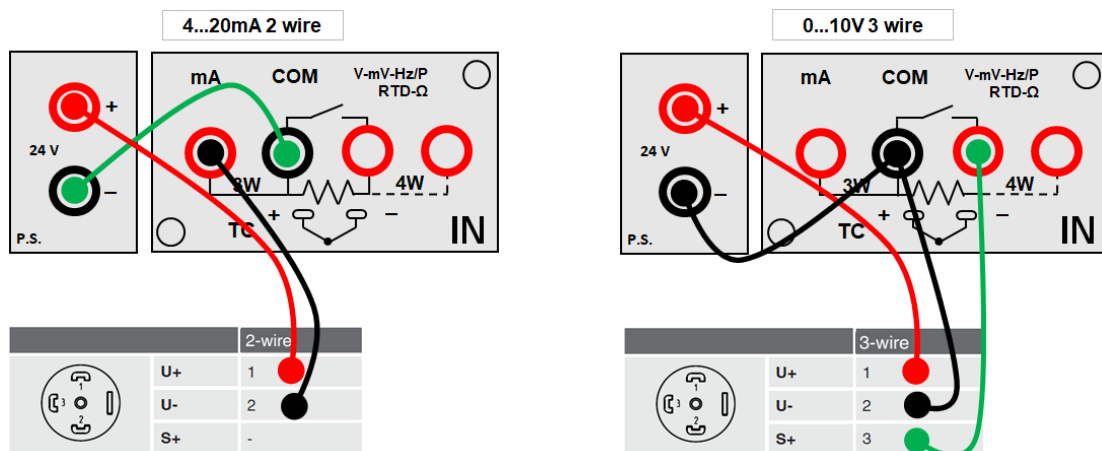- Make the connections as indicated on the picture above

Figure 134 – Examples of 4… 20mA 2 wires and 0… 10V 3 wires pressure transmitters connections

6.11.2   Example 2 – Calibration of PTZ gas volume converters

Il CPH8000 - ET o CPH8000/IS -ET/IS can be used to calibrate a gas volume converter, where the absolute pressure, the temperature value and the Z factor are used to convert the gas volume measurement. Gas volume, calculated at standard conditions.
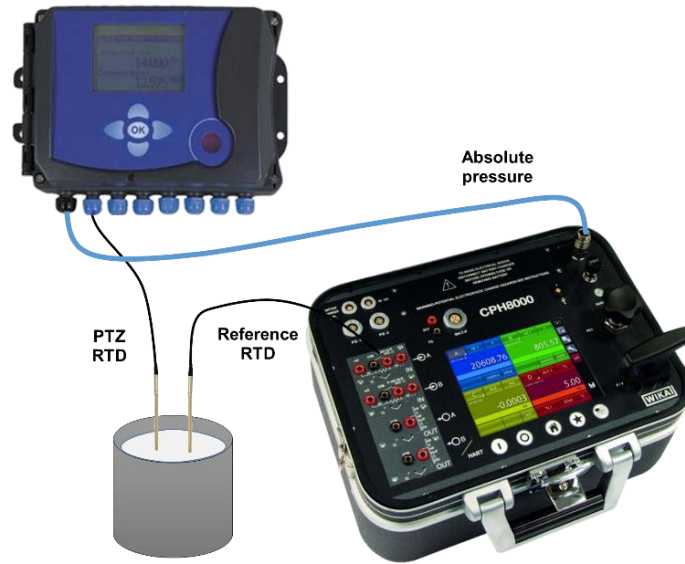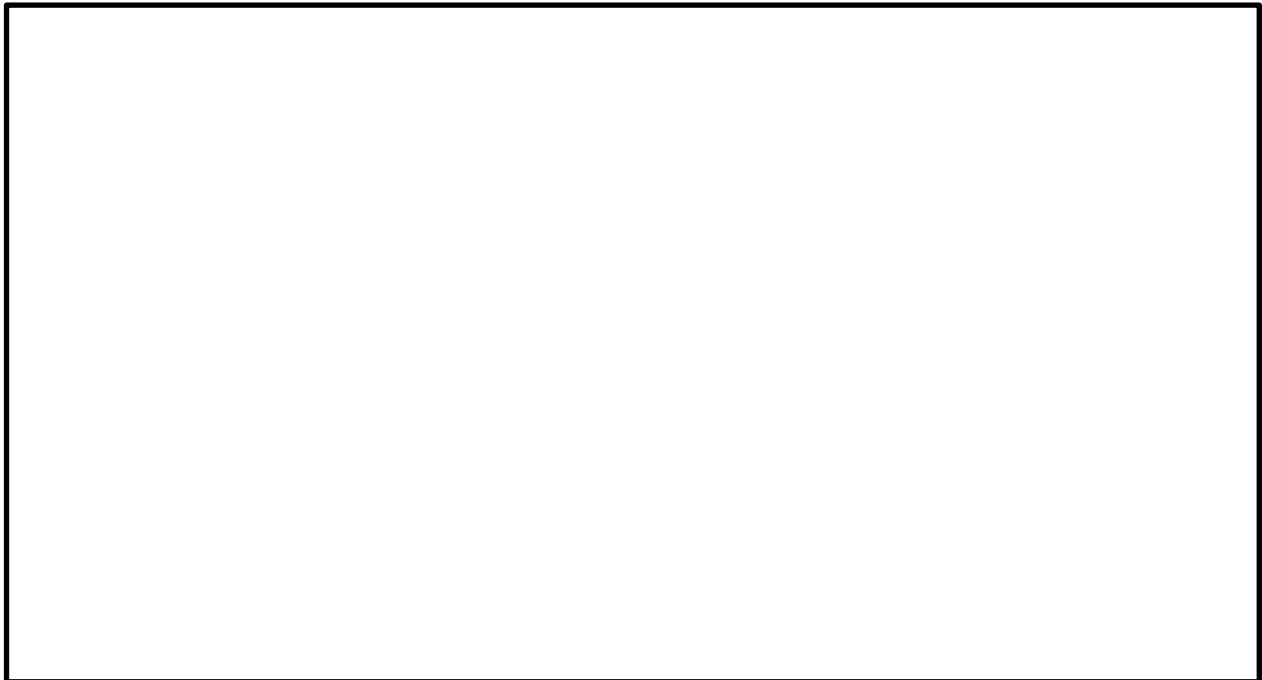
The following figure shows the use of the calibrator:

Figure 135 – PTZ Gas volume converter calibration example

Notes:

6.11.3 Example 3 – Calibration of 4-wire RTD's

A 4-wire RTD can be calibrated by using the method of comparison, connecting it to the input (IN A) as a DUT (Device Under Test) and comparing it with a reference RTD connected to the other input (IN B) as REF (Reference).

In this way the two measures can be compared, the calculated error is reported on the calibration report.

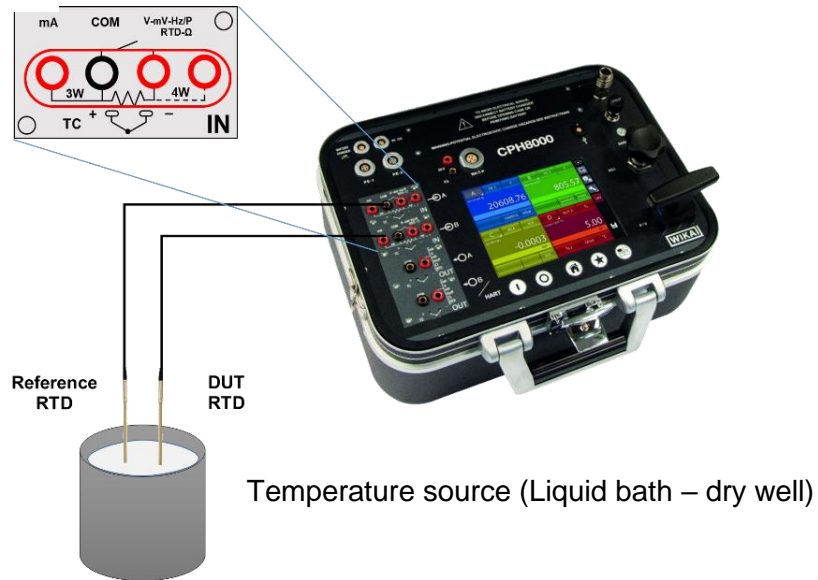The figure below shows the connection of the calibrator:

Comparison method

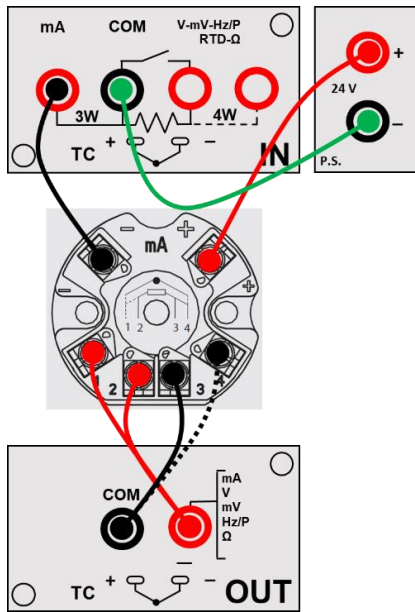Figure 136 – 4-wire thermoresistance calibration example

Notes:

6.11.4 Example 4 - Calibration of a two-wire temperature transmitter with 3 or 4-wire resistance thermometer input
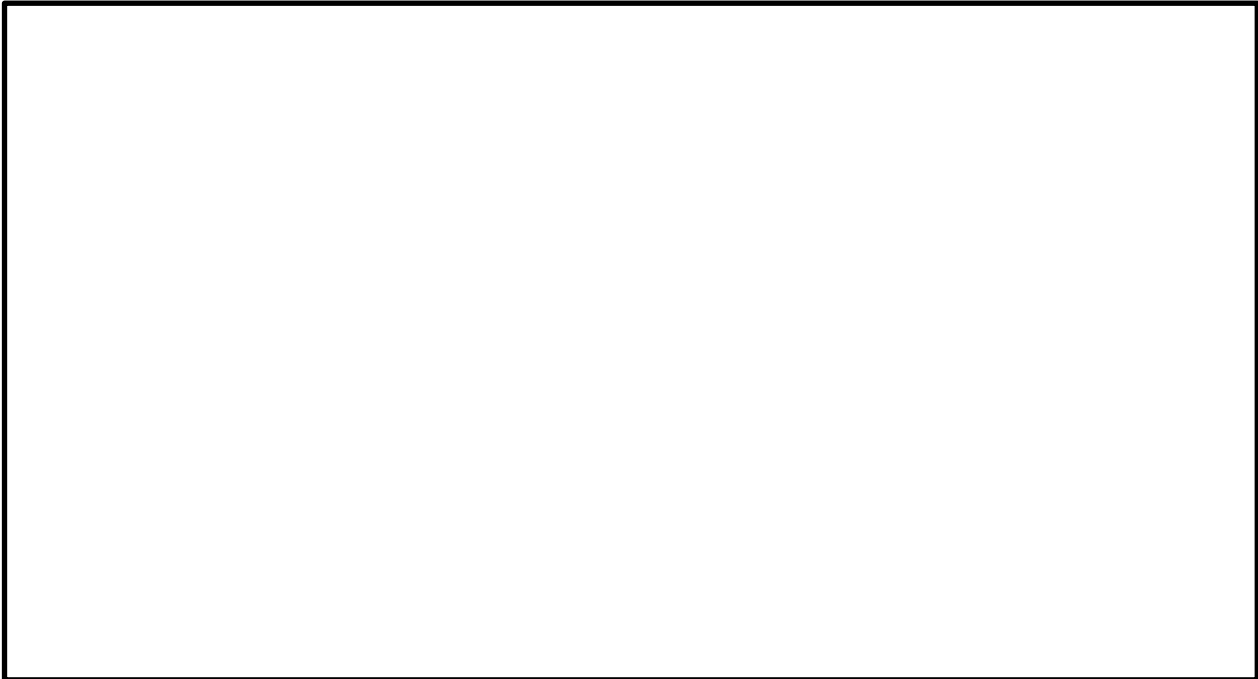

■ Thermoresistance simulated by the calibrator

■ 4-20 mA output measured by the calibrator

■ The calibrator also provides 24Vdc power

Figure 137 – Example of calibration of a PT100 3-4 wires temperature transmitter

Notes:

6.11.5   Example 5 – Calibration of Thermocouples

The calibration of thermocouples is similar to that of RTDs, i.e. by comparison, except for the choice of the type of reference thermocouple to be used accordingly to the types of thermocouples to be calibrated. You must also select the cold junction compensation if the internal, external or assigning a compensation value.

EN

The figure below shows the connection of the calibrator:
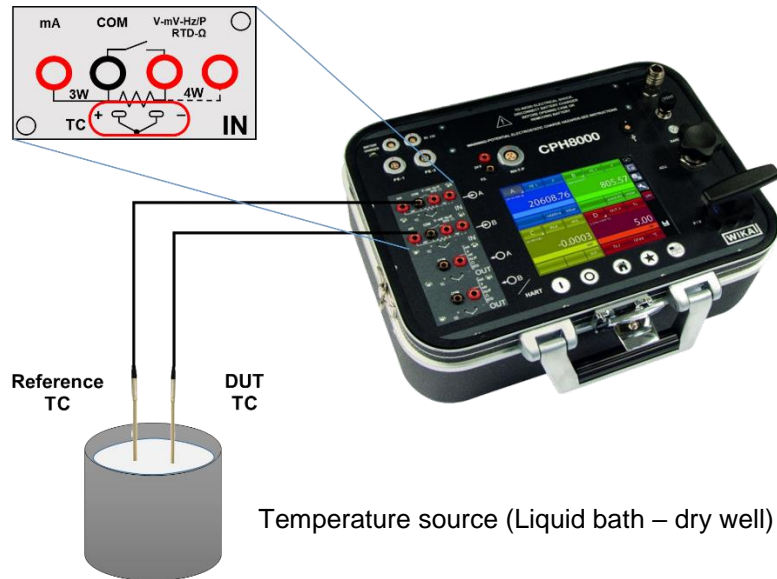
Comparison method

Figure 138 – Thermocouple calibration example

Notes:

6.11.6 Example 6 - Calibration of a two-wire temperature transmitter with thermocouple input

- Termocouple simulated by the calibrator

- 4-20 mA output measured by the calibrator
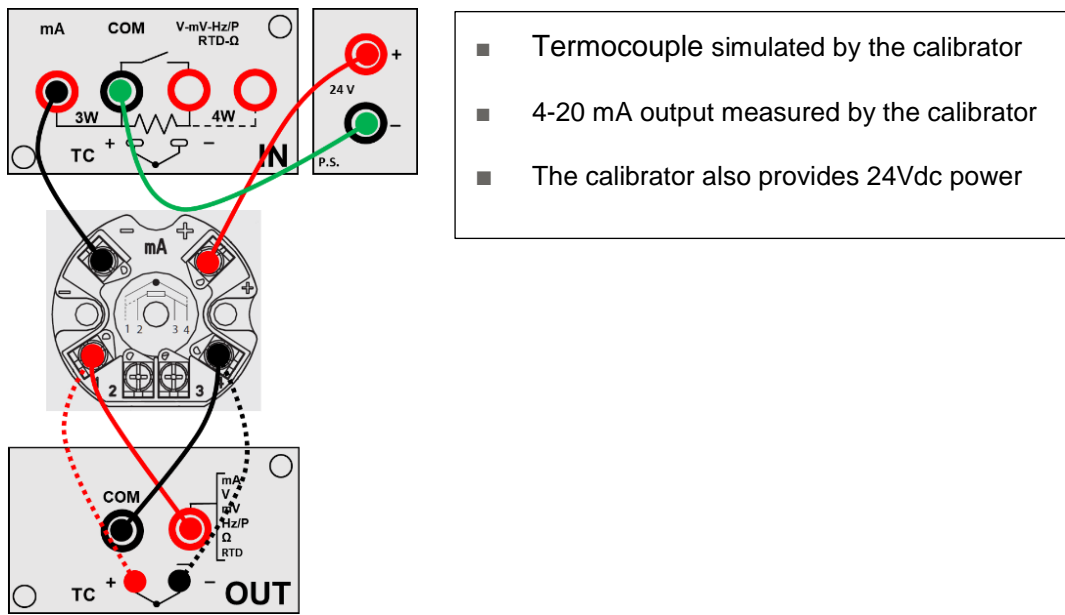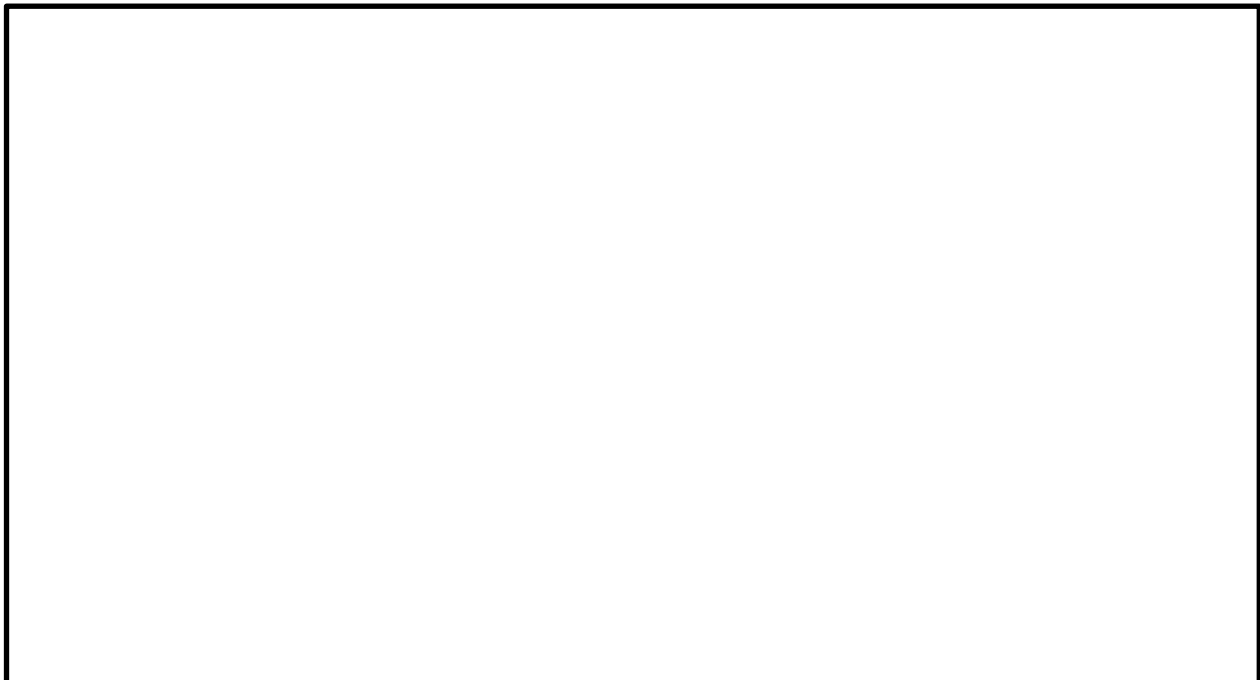
- The calibrator also provides 24Vdc power

Figure 139 – Example of calibration of a Termocouple temperature transmitter

Notes:

7 Maintenance, cleaning and servicing

7.1 Maintenance

The Multichannel Calibrator modelCPH8000 - ET o CPH8000/IS -ET/IS is maintenance-free.
Repairs must only be carried out by the manufacturer..

7.2 Cleaning

CAUTION!
- Before cleaning, correctly disconnect the Multichannel Calibrator model CPH8000 - /IS first release the trapped pressure inside the pneumatic circuit (open Vent valve) or disconnect the external pressure supply (CPH8000ET – ET/IS only), and switch it off.
- Clean the Multichannel Calibrator model Pascal ET, ET-P, ET/IS, ET-P/IS with a moist cloth.
- Electrical connections must not come into contact with moisture

For information on returning the instrument see chapter "8.2 Return"

7.3 Recalibration

ACCREDIA / DKD Certificate - Certificates:
We recommend that the instrument is regularly recalibrated by the manufacturer, with time
intervals of approx. 12 months. Every factory recalibration includes, additionally, an extensive free- of-charge check of all system parameters with respect to their compliance with the specification.
The basic settings will be corrected if necessary.

8   Dismountig, return and disposal

WARNING!
Residual media in dismounted reference pressure sensors can result in a risk to persons, the environment and equipment.
Take sufficient precautionary measures.

8.1   Dismounting
Scollegare installazioni di prova e di taratura solamente dopo che il sistema è stato depressurizzato!

8.2   Return

WARNING!
Strictly observe when shipping the instrument:
All instruments delivered to WIKA must be free from any kind of hazardous substances (acids, bases, solutions, etc.).

When returning the instrument, use the original packaging or a suitable transport package..

To avoid damage:
1. Wrap the instrument in an antistatic plastic film.
2. Place the instrument, along with the shock-absorbent material, in the packaging. Place shockabsorbent material evenly on all sides of the shipping box.
3. If possible, place a bag, containing a desiccant, inside the packaging.
4. Label the shipment as transport of a highly sensitive measuring instrument.

Enclose the completed return form with the Multichannel Calibrator model CPH8000 - ET o CPH8000/IS - ET/IS,

Il modulo resi è disponibile sul nostro sito internet:
www.wika.it / Servizi / Productreturn

8.3   Disposal
Incorrect disposal can put the environment at risk.

Dispose of instrument components and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.

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