



USER MANUAL FOR SMART “P” GAS DETECTORS

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Technical Manual

SMART P



Warning

THIS MANUAL MUST BE CAREFULLY READ BY ALL PERSONS WHO HAVE OR WILL HAVE THE RESPONSIBILITY FOR INSTALLING, USING OR SERVICING THIS PRODUCT.

Like any equipment, this product will perform as designed only if installed, used and serviced in accordance with the manufacturer's instructions. OTHERWISE, IT COULD FAIL TO PERFORM AS DESIGNED AND PERSONS WHO RELY ON THIS PRODUCT FOR THEIR SAFETY COULD SUFFER SEVERE PERSONAL INJURY OR DEATH.

The warranties made by Sensitron s.r.l. with respect to this product are voided if the product is not installed, used and serviced in accordance with the instructions in this user guide. Please protect yourself and others by following them.

We recommend our customers to write or call regarding this equipment prior to use or for any additional information relative to use or repair.



Technical Manual

SMART P

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1) DESCRIPTION

SMART P gas detectors come in the following versions based on the type of gas to be detected:

CO, range 0-300 ppm, 3 pin industrial cell

NO2, range 0-30 ppm, 3 pin industrial cell

Detectors with dual sensor were manufactured to optimise installation costs, coupled with the **CO-NO2** and **CO-PETROL VAPOUR** sensor in a single case.

SMART P use **high performance sensor cells** and test all functions including a **self test for CO cell reliability**.

SMART P detectors are set for 4-wire connections: 2 for power and 2 for data communications via RS485 serial to the **MULTISCAN++PK unit**.

SMART P provide fast and safe installation as well as easy maintenance and field calibration via the **STS/CKD-PK** calibration keypad.

Detectors run on 12-24 Vdc power and sold in IP55 metallic cases.

SMART P-1



Designed to fulfil the new European Standard for gas detection in car parks, the **SMART P-1** gas detectors provide a serial RS485.

The **SMART P-1** employ electrochemical cells for the detection of CO or NO2.

To meet with the standard in full, these detectors are to be connected to **MULTISCAN++PARK** gas control panels.

SMART P-1 detectors for Carbon Monoxide and NO2

CODE	DESCRIPTION		
S2398CO	CO detector for car parks RS485 serial outputs . Range 0-300 ppm.		
S2399ND	NO2 detector for car parks, RS485 serial outputs . Range 0-30 ppm.		

SMART P-2



Designed to fulfil the new European Standard for gas detection in car parks, the **SMART P-2** gas detectors offer the simultaneous detection of CO and NO2 or Petrol vapours integrated in the same detector.

The **SMART P-2** provide a serial RS485.

To meet with the standard in full, these detectors are to be connected to **MULTISCAN++PARK** gas control panels.



SMART P-2 detector for Carbon Monoxide and Nitrogen Dioxide/Petrol

CODE	DESCRIPTION		
S2400CO-ND	CARBON MONOXIDE & NITROGEN DIOXIDE detector for car parks, RS485 serial output . Range 0-300 ppm CO and 0-30 ppm NO2.		
S2400CO-VB	CARBON MONOXIDE & PETROL VAPOURS detector for car parks, RS485 serial output . Range 0-300 ppm CO and 0-100%LEL Petrol Vapours.		

CALIBRATION TOOLS for SMART P

CODE	DESCRIPTION		
STS/CKD-PK	Handheld calibration keypad to be connected to the detector to adjust the Zero, Span and 4-20mA values.		

1.1) Technical specifications

Typical use	To be used with MULTISCAN++PK 256/128/64/32 type units to monitor toxic gas in car parks and garages
Detectable gas	Carbon Monoxide 0-300 ppm. Nitric dioxide 0 - 30 ppm Petrol Vapours 0-100% LEL
Sensor used	Electrochemical cell for CO and NO2. Catalytic for Petrol Vapour.
Power	12-24 Vdc (-20% +15%)
Proportional output	RS485 serial
Absorption at 12-24Vdc	CO max 70mA NO2 max 70mA CO+NO2 max 80mA CO+PETROL VAPOUR max 110 mA
Repeatability	5% FS
Storage temp.	-25 / + 60 °C
Working temperature	-20 / + 60 °C
Relative humidity	20-90 % non condensed RH/40°C
IP protection level	IP55
Weight	600 gr.
Dimensions	L. 100, H. 180, D. 65 mm
Estimated sensor life	4 years for CO and PETROL VAPOUR sensors 3 years for NO2 sensor



2) INSTALLATION

At the mounting and installation phase be sure all safety precautions have been considered.

Always consider how important it is the correct positioning of gas detectors to get the optimum response. Be careful never to install gas detectors close to air intakes or fans causing strong air currents.

Be sure the detectors are attached to a firm base to prevent vibration that can damage them, producing unreliable results.

Although the electronics comply with the electromagnetic compatibility rules, it is advised to keep the detectors at a distance from any radio frequency senders (such as radio links or similar).

Please be also sure that detectors are placed in a convenient location for future maintenance and calibration requirements.

We recommend you mount the Smart P detector at nose level (about 150 cm off the ground) since this is the position suited to detect CO and NO₂. The Petrol Vapour detector should, on the other hand, be installed about 30 cm off the ground. *the CO+PETROL VAPOUR detector comes with an extension kit to mount the Petrol Vapour sensor 30 cm off the ground.*

Also remember that correct detector positioning is essential to ensure prompt and accurate detection.

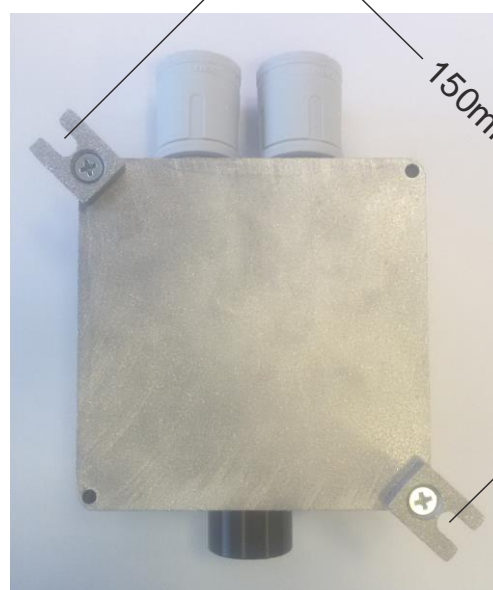
The gas detector is always to be mounted with the sensing element placed downward.

For no reasons at all the enclosure can be drilled.

Wall mount the detectors by employing the existing holes



front

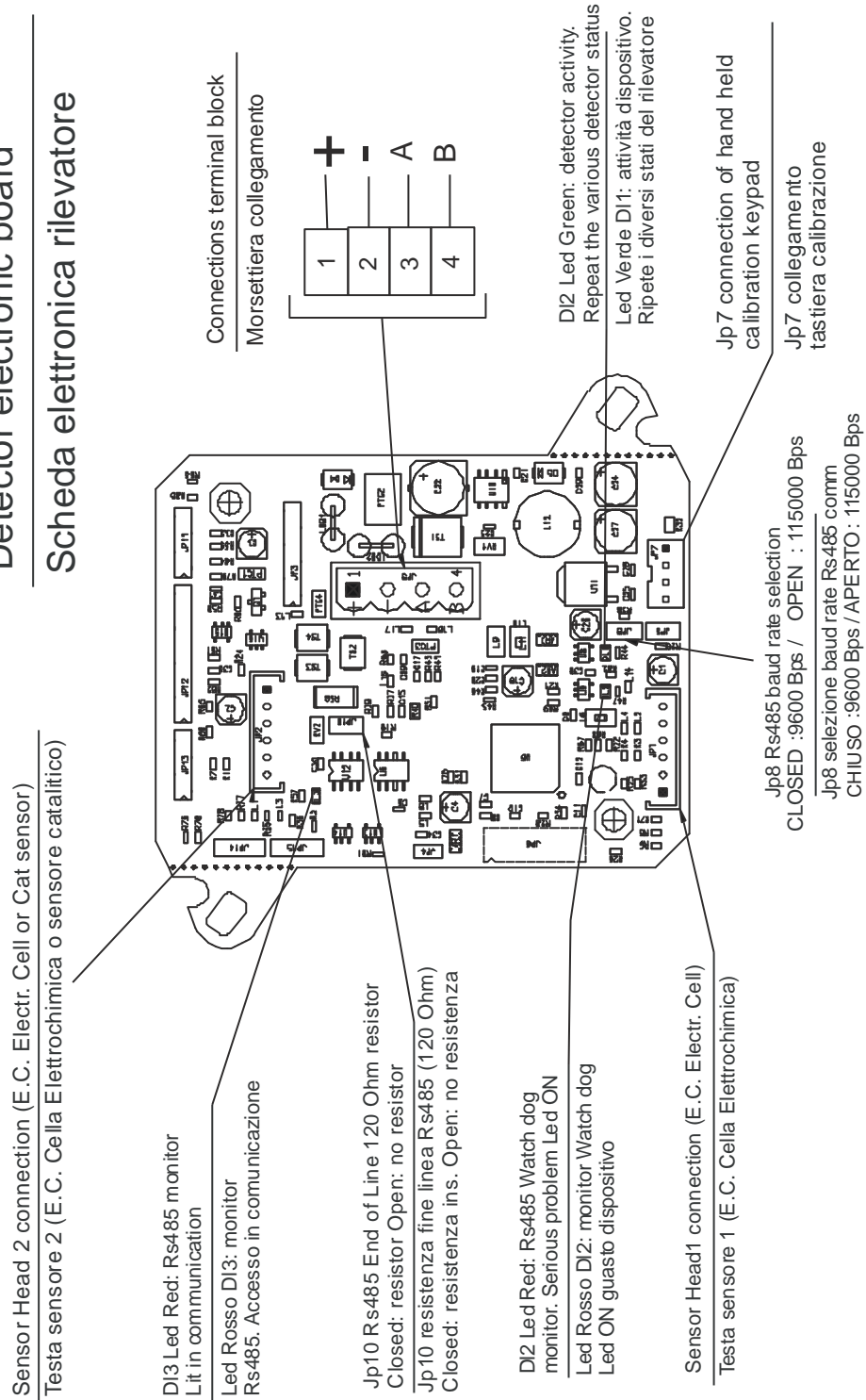


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2.1) Circuit layout

Detector electronic board

Scheda elettronica rilevatore





2.2) Electric wiring

The connection of the detectors to RS485 bus lines should be performed by using a 4-wire cable, 1 pair for the RS485 bus and 1 for the power supply.

Wiring between the detectors and the control panel should be made by using connection cable EIA RS485: 2 core wires with section 0.22 / 0.35 mm² and shield (twisted pair). Nominal capacity between the wires <50pF/m, nominal impedance 120 ohm.

These features can be found in BELDEN cable 9842 or similar (data transmission cable in EIA RS485).

Using this wiring, the total length of the line should not exceed m 1000.

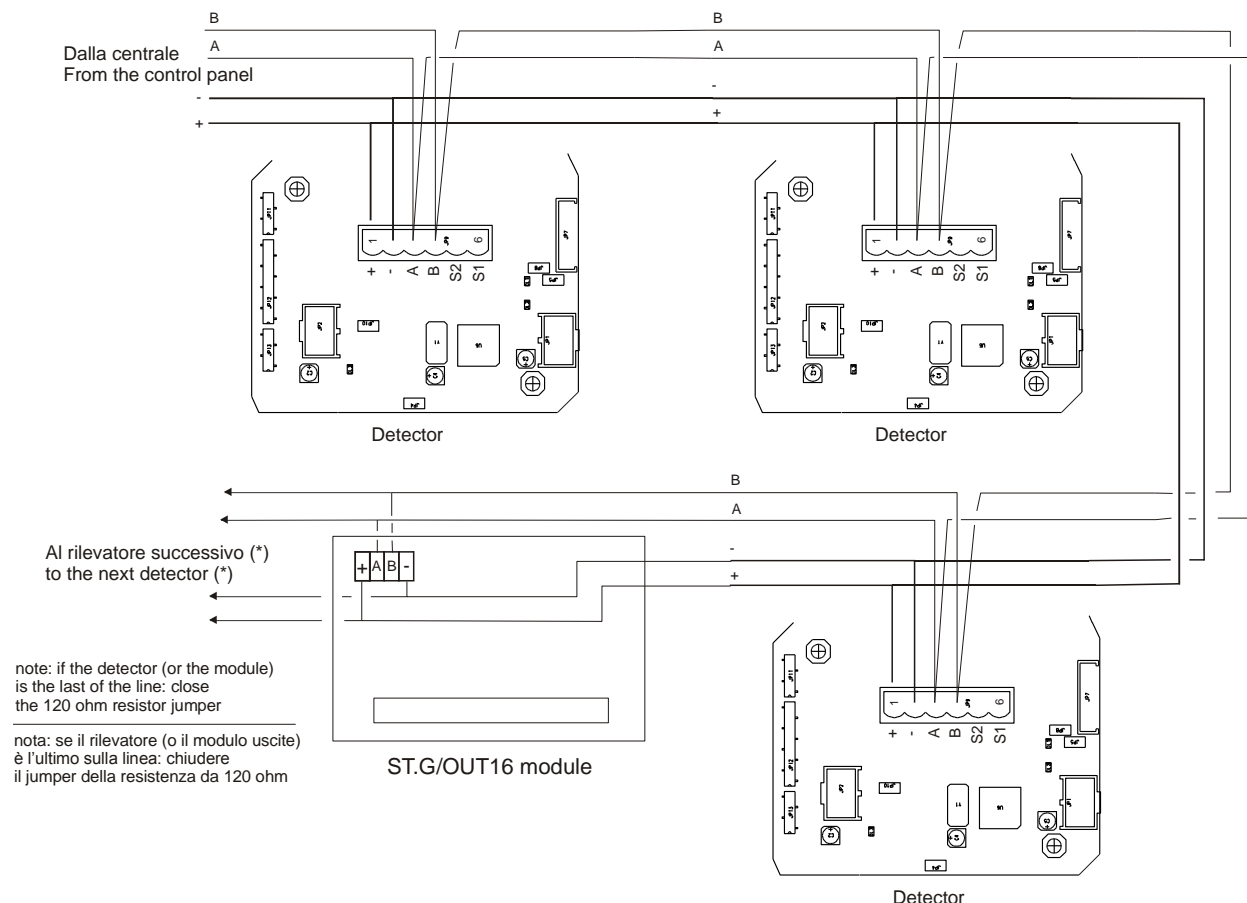
Detectors and output modules are to be wired in daisy chain mode. We recommend avoiding star or tree mode connection as interference immunity would be reduced.

Make sure that a 120 Ohm end line resistor is placed at the beginning and at the end (on the last detector or output module) of the bus line.

For the detectors' power supply connection we recommend to use a 2-wire cable with suitable section according to the distance and number of detectors.

Once the installation has been completed, verify that each detector reaches at least 12 Vdc.

Each Smart P detector connected on the unit line must have a univocal address. Use the specific STS/CKD PK keypad to set the detector address. See the specific paragraph below in the manual.





2.3) Detector power ON

When the detector is powered on, the green LED DL1 on the motherboard starts blinking at slow intermittence.

After nearly two minutes, the red LED flash rate is equivalent to the detector working status (see table below).

Once the warm-up phase is over, the detector can work correctly, although the optimal performances will be achieved after two hours.

2.4) Testing and Use

Detectors are factory calibrated for the specific gas required by the customers. Future adjustment of the preset calibration can be carried out by employing the calibration keypad.

Testing should be carried out by using a gas mixture in the appropriate range, along with our calibration kit.

The green DL1 LED on the electronic board flashes to indicate detector status as illustrated in the table below.

LED DL1 (green) shows the detector's operative status (mS= milliseconds)	
Warm-Up	Flashing 750 mS ON; 250 mS OFF
Fault low	Lit fixed
Allarm 1	Flashing 250 mS ON; 1750 mS OFF
Allarm 2	Flashing 250 mS ON; 250 mS OFF; 250 mS ON; 1250 mS OFF
Allarm 3	Flashing 250 mS ON; 250 mS OFF; 250 mS ON; 250 mS OFF 250 mS ON; 750 mS OFF
Fault high	Flashing 250 mS ON; 250 mS OFF
Normal status	Flashing 1 sec. ON; 1 sec. OFF

2.5) Handheld calibration keypad ST.S/CKD PK

Smart P gas detectors offer a field adjustment for the Zero, Span (response to gas) and the serial address (for the RS485 bus).

By operating with the handheld calibration keypad, pressing ENTER, ESC, Arrow UP and Arrow DOWN, the Zero, Span and serial Address shall be accomplished.

The keypad can be connected when the detector is powered ON and operating. Before opening the detector enclosure, be sure all safety precautions have been considered.

Insert the female connector of the keypad at the edge of the flat cable into the male connector on the Smart P main board.

Once connected, the keypad will display the gas concentration being measured.

Adjustments are required whenever either Fault or unjustified Alarms due to environmental conditions occur (Zero adjustment) or detectors need modifying their response to gas (Span adjustment).

Span adjustment requires a calibrated gas cylinder, either filled with the same gas the detector has been calibrated for or a reference gas advised by the manufacturer

For the Zero adjustment, gas detectors are to be in fresh air (without any gas or interfering compounds) and powered on since 8 hours at least.

Once the routine is over a test with gas is to be made to verify the right working condition.

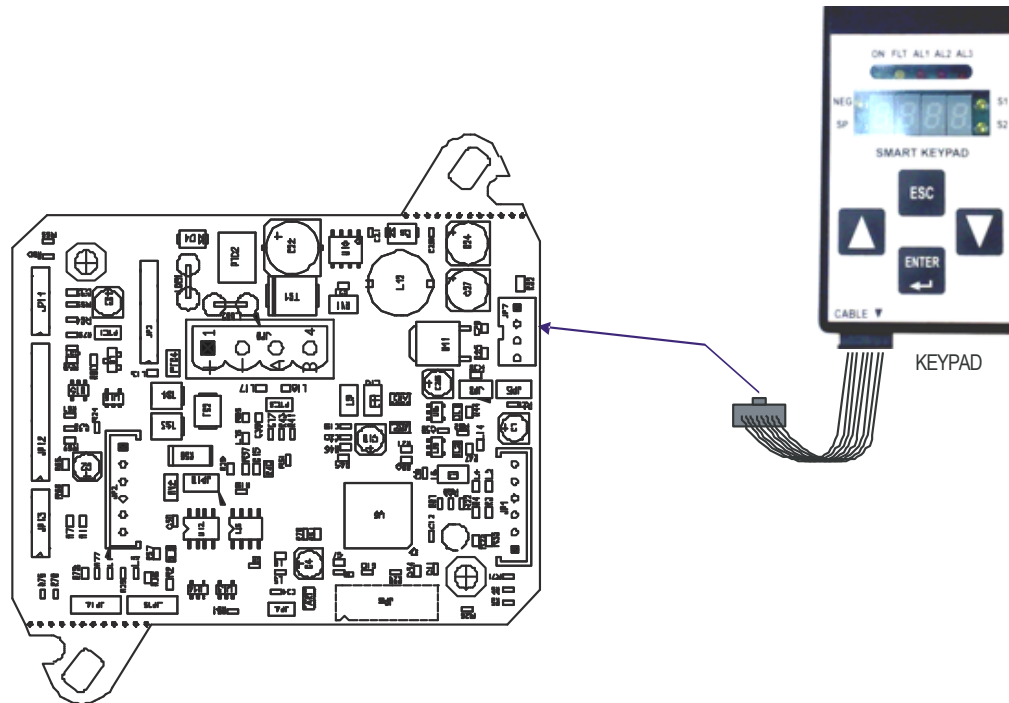


Fig. 2.5 a) Connection of the calibration keypad

Calibration keypad menu

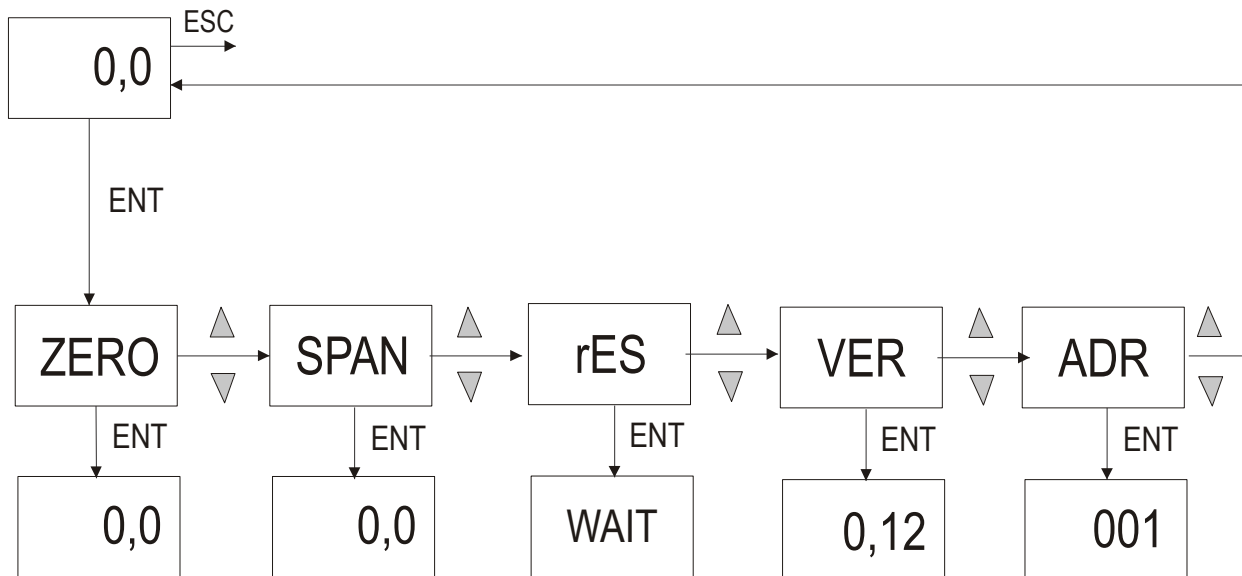


Fig. 2.5 b) Calibration keypad main menu

ZERO

When the detector SMART P is turned On for the first time, or when a new kit sensor is mounted into the instrument, the AUTO ZERO calibration is recommended. This action has to be done under the following two conditions:

Gas detectors are to be in fresh air (without any gas or interfering compounds) and powered on since 8 hours at least. Where there is no such certainty of being in clean air (without gas), calibration Auto zero is necessary to use a special mixture of synthetic air (79% nitrogen and 20.9% oxygen).

Once the routine is over **a test with gas is to be made to verify the right working condition.**

Perform the task of Auto Zero Smart P detector simply by pressing ENT from Auto Zero menu and follow the steps in the block diagram.

SPAN

The **Span** allows the instrument calibration and is to be executed if when tested in gas occurred that the instrument is not properly calibrated. To run the Span is essential the use of a mixture (cylinder) gas sample with the Target Gases (gas that the tool should detect) or with a reference gas to which the sensor is sensitive.

To apply the mixture of gases sample at Smart P, Sensitron makes available a dedicated calibration kit. The calibration KIT, supplied with a carrying case, comprises the necessary instrumentation to verify in situ the response of Sensitron's gas detectors. The calibration cap can be fitted on all of Sensitron sensing heads by employing, when necessary, the endowed adaptors.



Both gaskets and screw threads inside the cap allow an optimum tightness between the sensing head and the cap. The analysis chamber inside the calibration cap has been designed and realized to obtain a test method identical to that adopted in our laboratory for the initial factory calibration.

The valve complete with flow meter is to be mounted on the gas can to allow a gas outlet at a controlled velocity to obtain accurate data to verify the sensing element status.

rES Reset

Reset of Fault status

VER Version

Detector firmware version

ADR Address

Address of detector for communicating to RS485 bus. Ex. 004

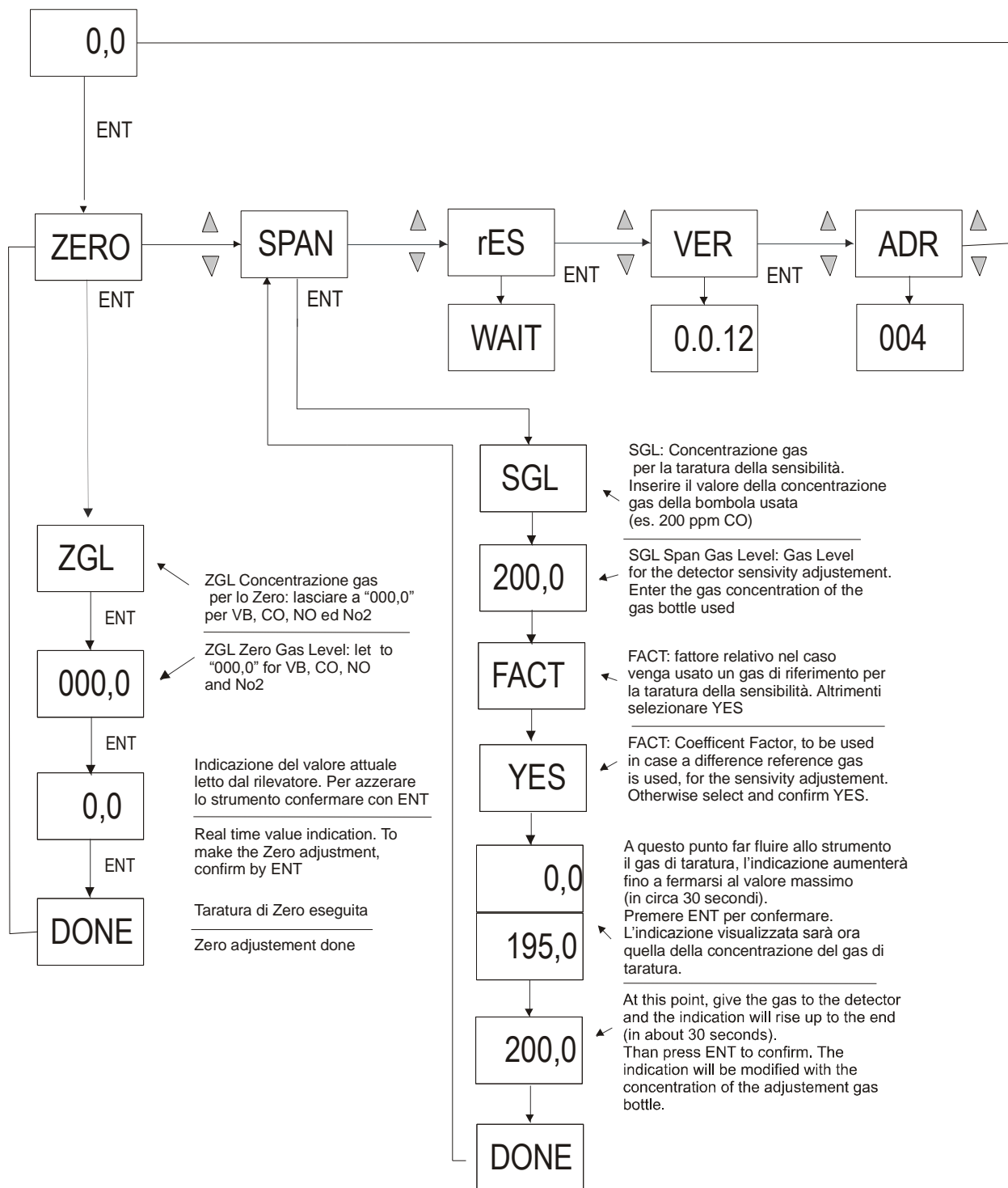


Fig. 2.5 c) Handheld keypad operation flow chart



The information in this document are not binding for the manufacturer and the manufacturer reserves the right to make any changes deemed helpful in improving the product.



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