

# TRAQC-9

## Calibrators

User Manual



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## 1. General

### 1.1 Warranty

During the design and manufacturing of this instrument the at most attention has been given to quality and durability.

**This manual contains information needed for the safe and effective use of the capabilities of the instrument.**

**Please read the manual carefully before operating the instrument. By doing so possible damage to the instrument or damage caused by the incorrect use of the instrument can be avoided.**

TRADINCO INSTRUMENTS warrants the instrument in accordance with the Standard Terms and Conditions of the Instrument Trade as issued by the Association bearing the name "Federation Het Instrument" (The Instrument Federation, (filed with the Clerk of Utrecht District Court on 13 January 1993 under number 16/93 and with the Chamber of Commerce and Industry in Amersfoort on 18 January 1993. A copy is available on request.

TRADINCO INSTRUMENTS warrants that this product will be free from defects in materials and workmanship for a period of 5 years from the date of shipment. If any such product proves defective during this warranty period, TRADINCO INSTRUMENTS, at its option, will either repair the defective product without charge for parts or labour, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, Customer must notify TRADINCO INSTRUMENTS of the defect before the expiration of the warranty period and make suitable arrangements for the performance of the service.

Customer shall be responsible for packaging and shipping of the defective product to the service centre designated by TRADINCO INSTRUMENTS, with shipping charges prepaid.

If no defect can be found Customer may be charged for costs of the investigation.

This warranty does not apply to any defect, failure or damage caused by:

- a. Improper use of the instrument.
- b. Battery leakage.
- c. Normal wear of the product.
- d. Modification or repair carried out by or on behalf of the owner or by a third party.
- e. Implementation of modifications to the product that are not supplied or implemented by TRADINCO INSTRUMENTS.

TRADINCO INSTRUMENTS and its vendors will not be liable for any indirect, special, incidental or consequential damages irrespective of whether TRADINCO INSTRUMENTS or the vendor has advance notice of the possibility of such damages.

The type number of the product, as listed on the instrument tag plate, should always be mentioned in any correspondence concerning the product.

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## 1.2 TRAQC-9 Description

The Tradinco pressure calibrator TRAQC-9 is a universal pressure calibrator with a measuring range from -1 to 1000 barg, depending on the pressure sensors fitted in the instrument. The calibrator comes in several types such as:

- Absolute
- Vacuum
- Gauge
- Compound

The TRAQC-9 consists of 3 main parts:

- A high quality digital pressure display with curser and two function push buttons.
- One or more pressure sensors plus related pneumatic circuit.
- An electrical measuring circuit (standard mA + V DC)

The built-in central microprocessor has been programmed with the individual pressure and temperature characteristics of each installed sensor and continuously calculates the correct test pressure in a temperature range from 5 to 45 degrees C.

The internal electronics are also checked and compensated continuously.

The built-in measuring cells are protected against overpressure and the calibrator warns the user if a measuring range is exceeded.

This manual includes the following TRAQC-9 types:

- TRAQC-9 P
- TRAQC-9 MAVS
- TRAQC-9 CAC\*
- TRAQC-9 CPC\*
- TRAQC-9 CLPC\*
- TRAQC-9 CHPC\*

\*The TRAQC-9 Controller types will be used in combination with the TRAQC-9 P.

### 1.2.1 CE EMC Directive 2014/30/EU

The electrical part of the TRAQC-9 meets the regulations according to the standards listed below:

- EN-IEC 61000-4-2 : 2009
- EN-IEC 61000-4-3 : 2009
- EN-IEC 61000-4-4 : 2012
- EN-IEC 61000-4-5 : 2009
- EN-IEC 61000-3-2 : 2014
- EN-IEC 61000-3-3 : 2013

The unit is CE marked accordingly

### 1.2.2 CE Electrical Safety Directive 2014/35/EU

The electrical part of the TRAQC-9 meets the regulations according to the standard listed below:

- EN 61010-1 : 2010

The unit is CE marked accordingly

### 1.3 Symbols Used



Warning for conditions or practices that could result in personal injury, loss of life and/or in damage to the product or other property.



Attention signal or remark

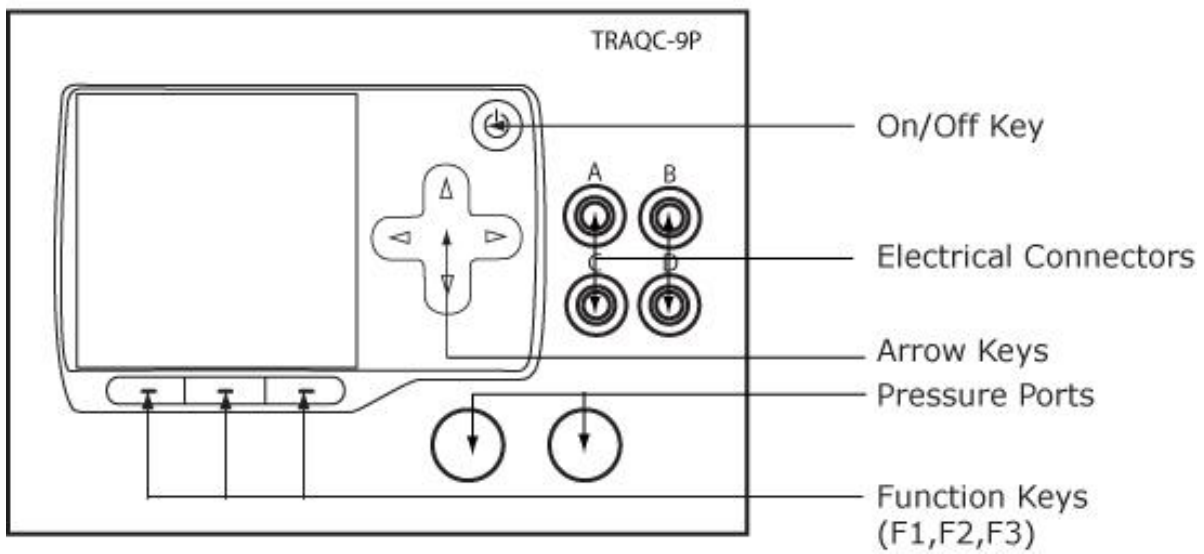
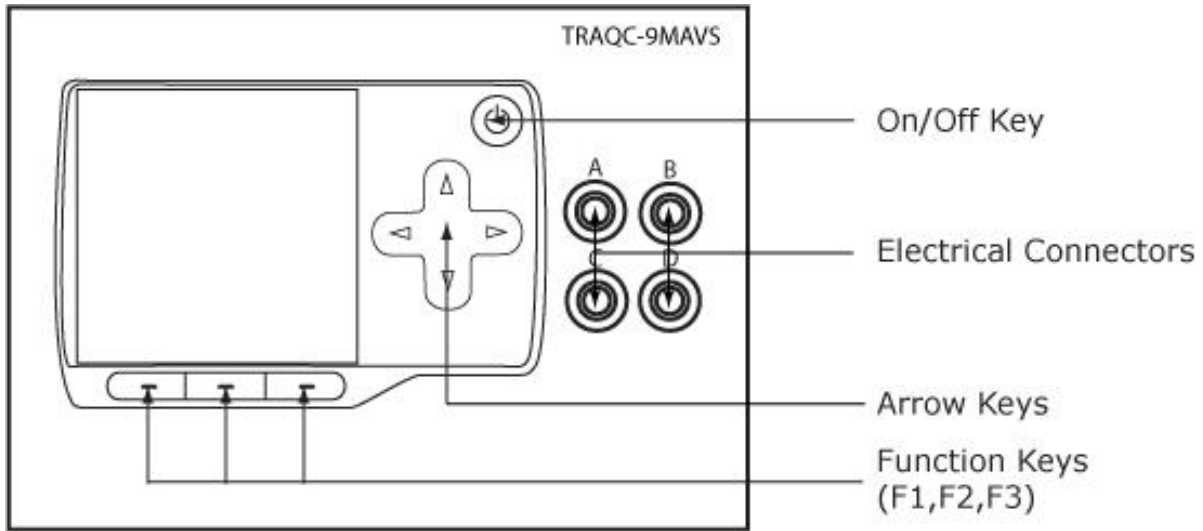
### 1.4 Scope of this manual

This manual contains information for instruments built after January 2011.

This manual is an user manual on how to operate the instrument; it is not a calibration instruction manual.

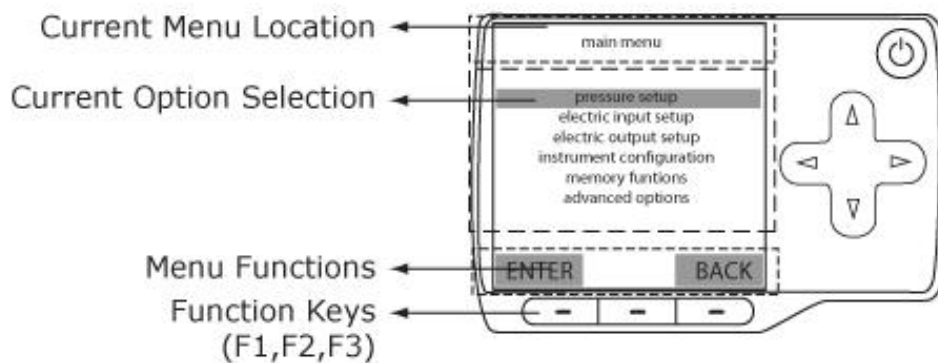
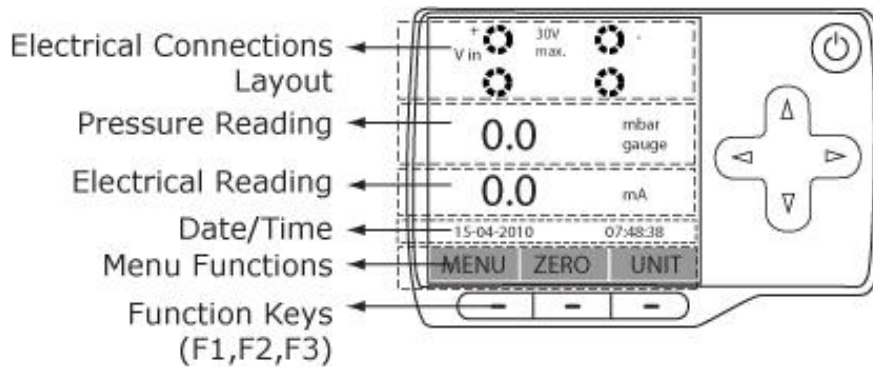
As Tradinco Instruments continuously strives to improve its products, specifications of instruments may be altered without further notice

### 1.5 Indicator Interface





## 1.6 Navigation



### Arrow Keys

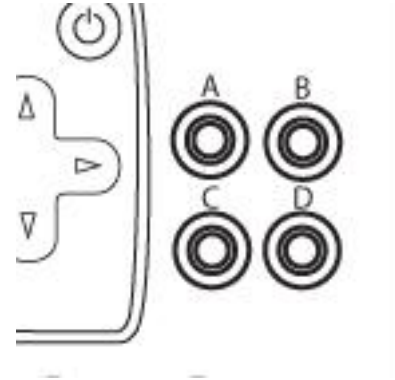


The menu can be accessed when the calibrator is in measuring mode (see figure). Navigating through the menu is possible by pressing the function keys (F1, F2 and F3) and the 'ARROW' keys. Above the function keys in the display, the meaning of the function keys is indicated. By pressing one of the function keys below the display, the menu opens. By pressing the 'BACK' key (F3) results in going one level back. The menu consists of multiple options to choose from. The option in the black bar is the one selected. By pressing the navigation keys up or down, another option in the menu can be selected.

## 1.7 Electrical Connections

The “Electric Connections Layout” in the display references the physical layout of these 4 banana socket. (Example see figure).

The letters A,B,C and D are for identification purposes and will be of reference, in this manual only.



## 2. TRAQC-9 Types

### 2.1 TRAQC-9 Configurations

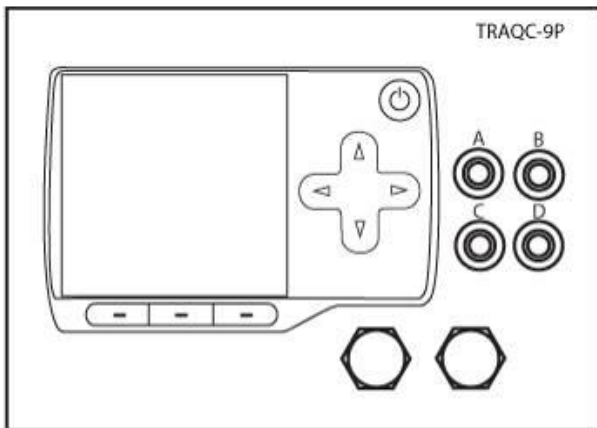
These are:

Model	Pneumatic version	Range
TRAQC-9 P	No regulation	-1 - 1000 barg DC Volt measurement: 0 - 30 V DC Ampere measurement: 0 - 24 mA.
TRAQC-9 MAVS	No regulation	DC Volt measurement: 0 - 30 V DC Ampere measurement: 0 - 24 mA
TRAQC-9 CAC	Reducer and Needle valve	0 - 10 bara
TRAQC-9 CPC	Reducer and Volume regulator	0 - 10 barg
TRRAQ-9 CLPC	Pump with volume control	0 - 1000 mbarg
TRAQC-9 CHPC	Reducer with needle valve.	0 - 350 barg

The various versions and their operating instructions are described on the following pages.

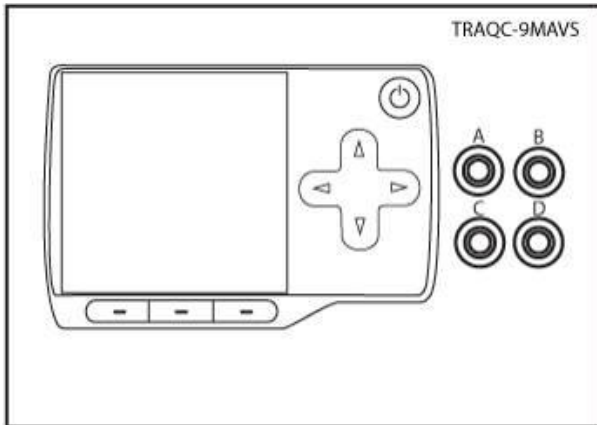
## 2.2 TRAQC-9 P Pressure

The TRAQC-9 P is the pressure indicator.



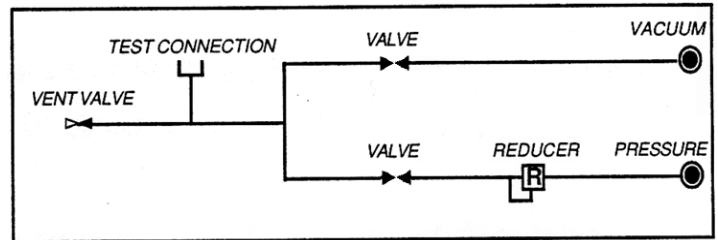
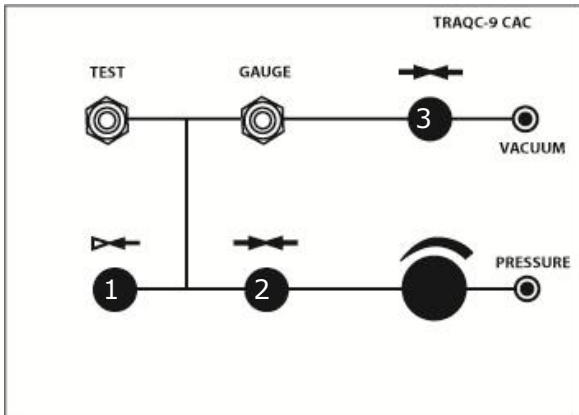
### 2.3 TRAQC-9 MAVS Milliamp ere and Volt Signals

The TRAQC-9 MAVS is the electrical calibrator for the TRAQC-9 series.



## 2.4 TRAQC-9 CAC Absolute pressure Controller

The TRAQC-9 CAC absolute pressure controller, ranging 0 to 10 bar absolute depending on the range of the selected reducer and is suitable for a so-called "dead end" system. The calibrator is equipped with three fine regulating needle valves and a Polyflo test coupling. The TRAQC-9 CAC has to be connected externally to a vacuum-and a pressure supply.



### 2.4.1 TRAQC-9 CAC operating instructions:

Connect the "test" coupling to the unit to be calibrated.

Connect the "gauge" coupling to the TRACQ-9 P.

Close the "bleed valve" (1) and the "pressure shut off valve" (2). Slowly open the "vacuum shut off valve" (3) to the maximum admissible pressure for the "unit under test". Then close the "vacuum shut off valve" again.

While the system is under vacuum pressure, check with the TRAQC-9 P if there is any leakage; this becomes apparent by an extreme change of pressure.

Let air into the system by opening the "bleed valve" (1), then close the "bleed valve" (1).

Eliminate any leaks and repeat the test as described above until all leaks are eliminated.

-To generate sub barometric pressures, close the "pressure shut off valve" (2), slowly open the "vacuum shut off valve" (3) while observing the indicated pressure. Once the "vacuum shut off valve" (3) is open, further regulate the vacuum pressure with the "bleed valve"(1) until the correct pressure is obtained.

-To generate a test pressure above the barometric pressure, close the "vacuum shut off valve"(3), open the "pressure shut off valve"(2) and regulate with the "reducer" until the desired test pressure is obtained.

If the test pressure is to be decreased towards the barometric pressure, the "bleed valve" (1) has to be slowly opened until the correct test pressure is reached.

Repeat the procedure as often as a new test pressure is desired.

When all test pressures have been generated, open the "bleed valve" (1), close the "vacuum shut off valve"(2) and/or "pressure shut off valve"(3) and disconnect the test hoses.



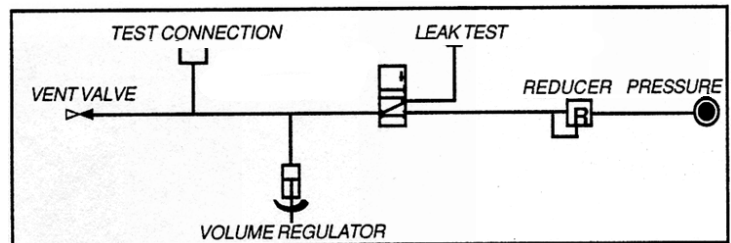
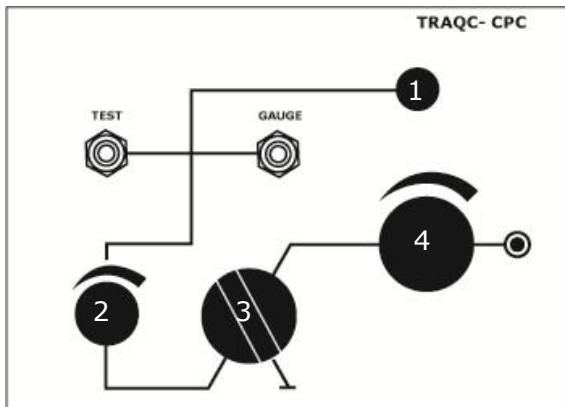
The installed needle valves have a soft seat. It is not necessary to close these with a great deal of force.

## 2.5 TRAQC-9 CPC Pneumatic Controller

The TRAQC-9 CPC is a pressure controller, ranging from 0 to 10 bar depending on the range of the selected reducer and is suitable for a so-called "dead end" system.

The controller is equipped with a fine regulating reducer. The reducer has to be fed from an external pneumatic pressure supply with a maximum pressure of 10 bar.

A leakage-free pneumatic switch is intergraded in the controller in order to be able to perform leakage tests. Also a volume regulator has been installed for fine regulating the test pressure.



### 2.5.1 TRAQC-9 CPC operating instructions:

Decrease the "reducer" (4) by turning it fully counterclockwise so that the test pressure is zero, set the "volume regulator" (2) in the middle position and close the "bleed valve"(1).

Connect the "TEST" coupling to the unit to be calibrated.

Connect "GAUGE" coupling to the TRAQC-9 P.

Open the "selector switch" (3) (knob in line).

Slowly increase the pressure by operating the "reducer"(4) clockwise, until the maximum admissible pressure for the unit under test is reached. Close the "selector switch"(3).

Check with the TRAQC-9 P if there is any leakage, this becomes apparent by an extreme change of the test pressure. Open the selector switch. Remove the pressure from the system by decreasing the "reducer"(4) to minimum and by opening the "bleed valve"(1).

Eliminate any leaks and repeat the test as described above until all leaks are eliminated.

Close the "bleed valve". Slowly increase pressure with the "reducer"(4) until the desired test pressure has been reached; close the "selector switch"(3) and fine tune the test pressure with the "volume regulator"(2).

The first test pressure has now been generated. After the measurement value has now been recorded, the selector switch has to be opened again and the following test pressure can be created.

Repeat the procedure as often as a new test pressure is desired. When all test pressures have been generated, the selector switch must be opened, the "reducer"(4) must decreased set to minimum (fully ccw), open the "bleed valve"(1), the test hoses must be disconnected and turn in "volume regulator"(2) completely.



It is recommended to regulate the decrease of the test pressure by means of the "bleed valve"(1) instead of the reducer; this avoids fouling of the reducer

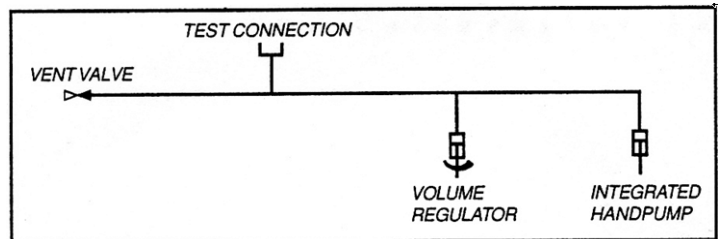
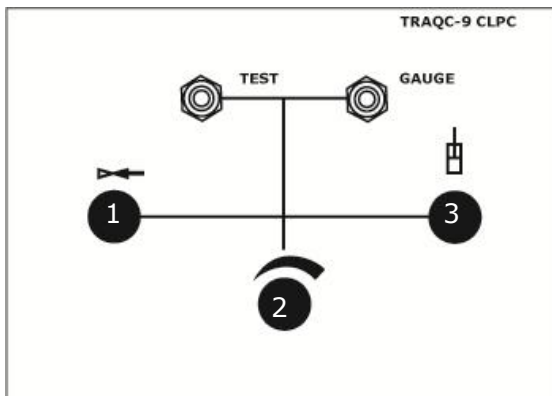


The installed needle valve has a soft seat. It is not necessary to close these with a great deal of force.

## 2.6 TRAQC-9 CLPC Low Pressure Controller

The TRAQC-9 CLPC is a low pressure controller, ranging from 0 to 1000 mbar and is suitable for a so-called "dead end" system.

Integrated in the controller are a small manually operated pump and a volume regulator for generating and regulating the test pressure.



The TRAQC-9 CLPC needs no external pneumatic supply.

### 2.6.1 The TRAQC-9 CLPC operating instructions:

Connect the "TEST" coupling to the unit to be calibrated.

Connect the "GAUGE" coupling to the TRAQC-9 P.

Close the "bleed valve" (1). Use the "manual pump"(3) to create the maximum admissible pressure for the "unit under test".

Check with the TRAQC-9 P if there is any leakage, this becomes apparent by an extreme change of the test pressure. Release air from the system by opening the "bleed valve" (1). Set the "volume regulator" (2) in the middle position.

Eliminate any leaks and repeat the test as described above until all leaks are eliminated.

Close the "bleed valve" (1). Use the "manual pump" (3) to get close to the desired test pressure. Now use the "volume regulator" (3) to fine trim the test pressure to the desired value. Repeat the procedure as often as a new test pressure is desired. When all test pressures have been generated, open the "bleed valve" (1), disconnect the test hoses and turn in the "volume regulator" (2) completely.

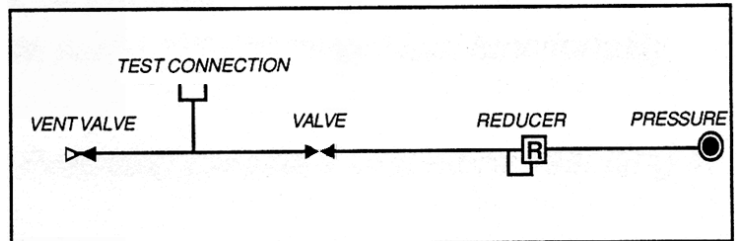
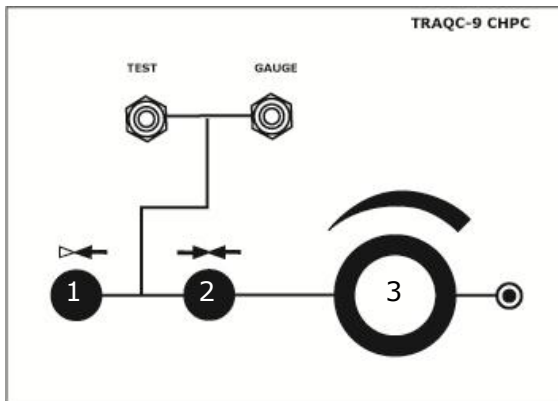


The installed needle valve has a soft seat. It is not necessary to close this with a great deal of force.



## 2.7 TRAQC-9 CHPC High Pressure Controller

The TRAQC-9 CHPC is a high pressure controller, ranging from 0 to 350 bar, depending on the range of the selected reducer and is suitable for a so-called "dead end" system. The calibrator is equipped with a high pressure reducer. The reducer has to be fed from an external high pressure supply with a maximum pressure of 350 bar.



### 2.7.1 TRAQC-9 CHPC Operating instructions:

Decrease the "reducer"(3) to minimum by turning it fully counterclockwise.

Close the "pressure shut off valve"(2) by turning it fully clockwise.

Connect the "test" coupling to the unit to be calibrated.

Connect the "Gauge" coupling to the TRAQC-9 P.

Close the "bleed valve"(1) and open the "pressure shut off valve"(2). Slowly increase the pressure with the "reducer"(3) until the maximum admissible pressure for the unit under test is reached. Close the "pressure shut off valve"(2) and decrease the "reducer"(3) to minimum. Check with the TRAQC-9 P if there is any leakage; this becomes apparent by an extreme change of the test pressure. Then remove the pressure from the system by opening the "bleed valve"(1).

Eliminate any leaks and repeat the test as described above until all leaks are eliminated.

Close the "bleed valve"(1). Open the "pressure shut off valve"(2) and increase the "reducer"(3) to approximately 110% of the desired test pressure. Then close the "pressure shut off valve"(2).

For regulating the test pressure:

-Slowly opening and closing the "pressure shut off valve"(2) will result in a pressure increase.

-Slowly opening and closing the "bleed valve" will result in a pressure decrease.

A measurement can be performed when both the "pressure shut off valve"(2) and the "bleed valve"(1) are closed.

Repeat the procedure as often as a new test pressure is desired. When all test pressures have been generated, decrease the "reducer"(3) to a minimum, close the "pressure shut off valve"(2), open the "bleed valve" (1) and disconnect the test hoses.

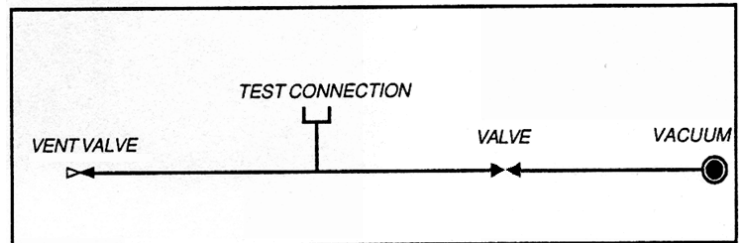
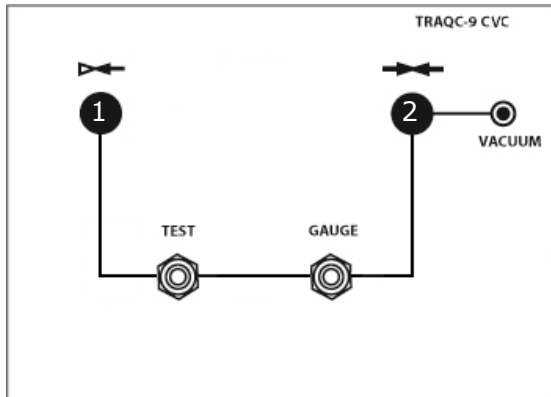


The installed needle valves have a soft seat. It is not necessary to close these with a great deal of force.

## 2.8 TRAQC-9 CVC

The TRAQC-9 CVC vacuum pressure controller, ranging -1 to 0 bar gauge and is suitable for a so-called "dead end" system.

The calibrator is equipped with two fine regulating needle valves and a Polyflo test couplings. The TRAQC-9 CVC has to be connected externally to a vacuum supply.



### 2.8.1 TRAQC-9 CVC operating instructions:

Connect the "test" coupling to the unit to be calibrated.

Connect the "gauge" coupling to the TRAQC-9 P.

Close the "vacuum shut off valve" (2) and then the "bleed valve" (1). Slowly open the "vacuum shut off valve" (2) to the maximum admissible vacuum pressure for the "unit under test". Then close the "vacuum shut off valve" (2) again.

While the system is under vacuum pressure, check with the TRAQC-9 P if there is any leakage; this becomes apparent by an extreme change of pressure.

Let air into the system by opening the "bleed valve" (1).

Eliminate any leaks and repeat the test as described above until all leaks are eliminated.

-To generate vacuum pressures, close the "vacuum shut off valve" (2) and then "bleed valve"(1), slowly open the "vacuum shut off valve" (2) while observing the indicated pressure. Once the "vacuum shut off valve" (2) is open, further regulate the vacuum pressure with the "bleed valve"(1) until the correct pressure is obtained.

Repeat the procedure as often as a new test pressure is desired.

When all test pressures have been generated, open the "bleed valve" (1), close the "vacuum shut off valve"(2) and disconnect the test hoses.




The installed needle valves have a soft seat. It is not necessary to close these with a great deal of force.

## 3. Operating Instructions


### 3.1 Power On/Off

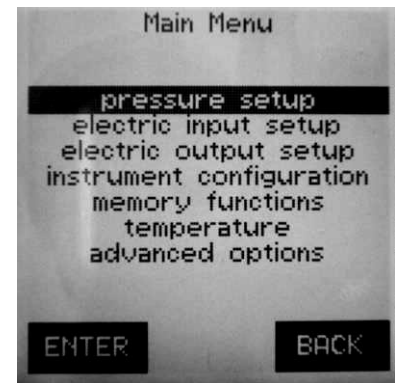
The TRAQC-9 is switched on and off by pressing the on/off key. The TRAQC-9 will go through a short startup self-check routine. During that routine the display shows the current firmware. After completing the startup procedures the device switches into the measuring mode and displays the measured value(s), and the measuring unit(s) from last time. When turning off the device, the display shows 'Shutting Down'.

 If the calibrator needs to be recalibrated at short notice, a message with the date that the instrument should be re-calibrated is displayed for several seconds before the startup procedure continues. If the recalibration date has expired a message is displayed as a warning. By pressing 'ENTER' key (F1) the start-up procedure is continued.

### 3.2 Menu

The main menu is accessed by pressing the 'MENU' key (F1). On top in the display the current location in the menu structure is shown.

 Most of the functions in the menu structure are optional. Therefore it is possible the TRAQC-9 included with this manual has less functions than explained in this user manual.



#### 3.2.1 Main Menu Structure

Main Menu					
pressure setup	electric input setup	electric output setup	instrument configuration	memory functions	advanced options
averaging on/off	mA input	pressure xmtr mode	backlight setup	list by tagNr.	Set rtc time
averaging setup	mA + Xmtr supply	xmtr mode settings	select language	list by serialNr.	Set rtc date
resolution setup	Xmtr power setup	current output	date/time display	view definitions	Set recall date
conversion table	switch test	current output settings	show settings		Erase data memory
Set customer unit	switch test setup	voltage output	factory defaults		Show instrument data
gauge mode	V input	voltage output settings			Adjust instrument inputs
absolute mode	Hart resistor	auto span check mode			Adjust instrument output
set abs interval	mA/V scaling	ramp mode			Show calibration factors
set Baro.ref.int	set mA/V scaling				

### 3.3 Zeroing

To zero an input signal press 'ZERO' key (F2) in the "measuring mode" display. The menu shows the different inputs that can be zeroed, consisting of pressure inputs and the electrical inputs. Select the desired input using the 'ARROW' keys.

- By pressing the 'BACK' key (F3) the zeroing procedure is stopped without making modifications.
- By pressing 'ENTER' key (F1) the zeroing procedure is continued and there is asked to confirm the zeroing procedure after which the calibrator returns to measuring mode.



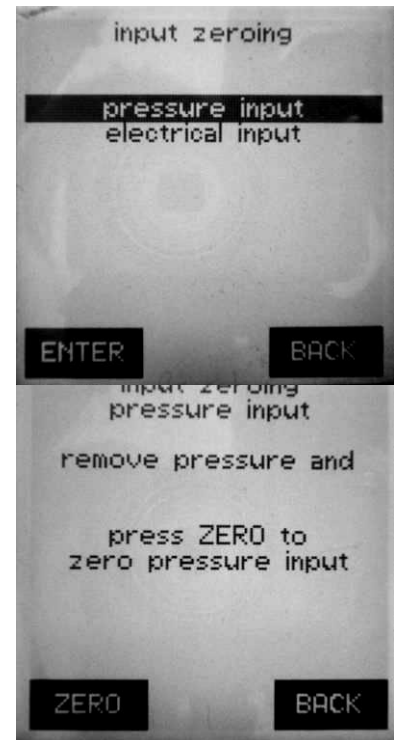
When zeroing the 'Pressure Input', ensure that the pressure ports are open to atmospheric pressure.

The TRAQC-9 P comes standard with a quick connect coupling with integrated shut off valve. This can be opened by:

- Connect/insert the other half of the coupling to the pressure coupling (-port) of the TRAQC-9 P
- Connect one side of a pressure hose to the pressure coupling (-port) of the TRAQC-9 P and leave the other side of the hose unconnected.

With these procedures the pressure in the system of the TRAQC-9 P can get equal with the atmospheric pressure.

To zero another test pressure and/or electrical signal, first generate the required test signal (tare value) and carry out the above-described zeroing procedure. The test value displayed is the difference between the actual test value and the entered tare value.

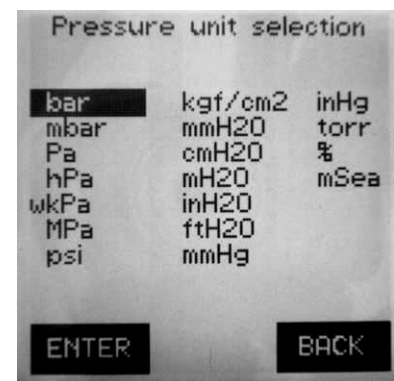


### 3.4 Selecting Pressure Units

When in "measuring mode" screen press the 'UNIT' key (F3) to change the unit. Use the 'ARROW' keys to select the desired unit and press 'ENTER' key (F1) to confirm and go back to "measuring mode".

The following units can be selected:

bar	kgf/cm <sup>2</sup>	inHg
mbar	mmH <sub>2</sub> O	torr
Pa	cmH <sub>2</sub> O	%
hPa	mH <sub>2</sub> O	mSea
kPa	inH <sub>2</sub> O	
MPa	ftH <sub>2</sub> O	
psi	mmHg	



### 3.5 Pressure Range

By pressing the 'UP'-or "DOWN' 'ARROW' key in "measuring mode" it is possible to select a pressure sensor.  
 When the TRAQC-9 is equipped with two pressure sensors use the 'ARROW' keys to select the desired pressure sensor and press 'ENTER' key (F1) to confirm, press the 'BACK' key (F3) to cancel.



#### 3.5.1 Selecting Pressure sensor Auto ranging

The TRAQC-9 P can also be equipped with two pressure ranges and one pressure connection for measuring test pressure. The TRAQC-9 P is configured to automatically switch the measuring range.

When the test pressure exceeds 101% of the low measuring range the TRAQC-9 P will automatically switch from the low pressure range to the high pressure range. If the test pressure is lower than 99% of the low pressure range it will automatically switch back to the low pressure range.

This auto ranging feature will be automatically be enabled when the TRAQC-9 P is switched on.

To overwrite the automatic switching between the two pressure sensors, one of the sensors can be selected as described in par. 3.5

To enable the auto ranging again:

- Power TRAQC-9 P off and start it up again.
- By entering the 'Pressure range' menu, selecting both the pressure ranges by pressing the 'UP' and 'DOWN' key of the 'ARROW' keys and press the 'BACK' key (F3) to go back to the "measuring mode".

### 3.6 Instrument Status

By pressing the 'LEFT'-or "RIGHT' 'ARROW' key in "measuring mode" the instruments status is shown.

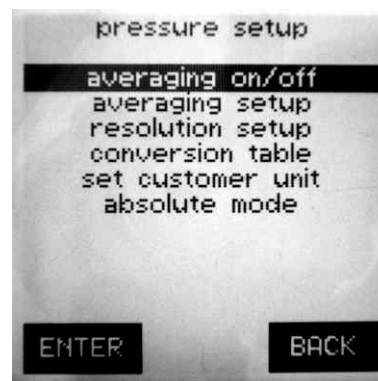


## 4. User Configuration

### 4.1 Pressure Setup

The "Pressure Setup" menu shows the options for pressure inputs.

After pressing the 'MENU' key (F1), press the 'ARROW' keys until the "pressure setup" is selected, then press 'ENTER' key (F1). The available pressure options for the instrument are now displayed (see figure) and it is now possible to select one of options with the 'ARROW' keys. The different options of the pressure setup are described in the following paragraphs.



#### 4.1.1 Averaging on/off

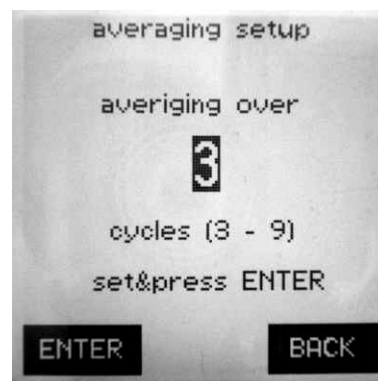
A progressing averaging can be applied. The reading speed is standard three times per second. The objective is to display the fluctuating measuring signals in a reliable manner. If averaging is switched on, this is shown by 'x̄' above the pressure unit reading in the 'measuring mode' menu.

To enable or disable the averaging function select the "averaging on/off" option in the "pressure setup" menu.

The default state is the "averaging off". To change the current state press 'ENTER' key (F1).

#### 4.1.2 Averaging setup

The number of times that averaging must be performed can be set as follows: Select the "averaging setup" in the pressure setup menu with the 'ARROW' keys and press 'ENTER' key (F1) to confirm. Now use the 'ARROW' keys to change the number of cycles to the desired one, press 'ENTER' key (F1) to confirm. The number of cycles default is 6. The cycles can be set from 3 to 9.



#### 4.1.3 Resolution Setup

To change the number of digits (from 3 to 6) select "resolution setup" in the "pressure setup" menu and use the 'ARROW' keys to change the number of digits, confirm by pressing the 'ENTER' key (F1)



#### 4.1.4 Conversion Table

The pressure indicator is capable of displaying pressure according to the SI or the ANSI standards. Change between SI and ANSI using the 'ARROW' keys and confirm by pressing 'ENTER' key (F1).

The ANSI standard has other conversion factors than the SI standard; see the following table for a number of units:

	Unit	SI	ANSI
01	bar	1	1
02	mbar	1000	1000
03	Pa	100000	100000
04	hPa	1000	1000
05	kPa	100	100
06	Mpa	0,1	0,1
07	psi	14,503768	14,503768
08	kgf/cm <sup>2</sup>	1,0197162	1,0197162
09	mmH <sup>2</sup> O	10197,162	10215,491
10	cmH <sup>2</sup> O	1019,7162	1021,5491
11	mH <sup>2</sup> O	10,197162	10,215491
12	inH <sup>2</sup> O	401,46293	402,1598
13	ftH <sup>2</sup> O	33,455222	33,513316
14	mmHg	750,063755	752,78742
15	inHg	29,52997	29,6373
16	torr	750,063755	750,063755

#### 4.1.5 Set customer unit

The density of seawater for the region where the pressure indicator is used can be set here.

When a test pressure is set, the TRAQC-9 P can calculate the pressure into meters under water. The density of the seawater will differ in different parts of the world and the value has to be adjusted for correcting for the pressure under water.

The seawater density is set in kg/m<sup>3</sup> and can be adjusted from 950 up to and 1100 kg/m<sup>3</sup>.

For adjusting the unit, use the left and right arrow keys to select the digit which has to be altered and use the up and down arrow keys for adjusting the selected digit. When the right value has been set, press the enter key (F1).



#### 4.1.6 Gauge mode

Not yet implemented, for future development.

#### 4.1.7 Absolute mode

Not yet implemented, for future development.

#### 4.1.8 Set abs interval

Not yet implemented, for future development.

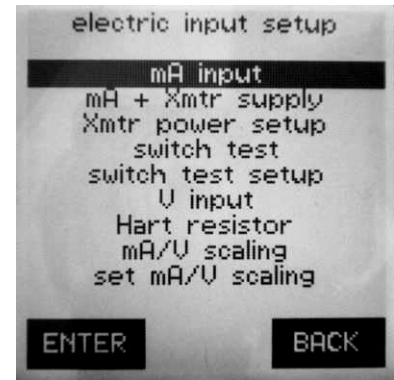
#### 4.1.9 Set Baro.ref.int

Not yet implemented, for future development.

## 4.2 Electrical Input Setup

The electrical connections can be used to measure between 0 - 24 mA, 0 to 11V, and for connection of a switch.

To access the menu options for the electrical input first press the 'MENU' key, then select the "electric setup" option with the 'ARROW' keys and press the 'ENTER' key (F1), the menu will be displayed. The options are explained in the next paragraphs.



### 4.2.1 mA Input

To switch the current input on or off select "current input on/off" with the 'ARROW' keys and press 'ENTER' key (F1) to continue. Select the desired state and press 'ENTER' key (F1) to confirm.

### 4.2.2 mA + Xmtr Supply (optional)

To (de-)activate the mA + Transmitter Supply select the "mA + Xmtr supply" using the 'ARROW' keys and press 'ENTER' key (F1).

The display will show the measured current and the text '20V' in the "measuring mode" to alert the user that the transmitter supply is on.

### 4.2.3 Xmtr Power Setup (optional)

In the "Xmtr power setup" a set time can be selected from 0 to 9 minutes using the 'ARROW' keys. When the correct time is entered press the 'ENTER' key (F1) to continue.



When selecting a zero, the Xmtr supply will be on continuously. When a time between 1 - 9 minutes is selected the Xmtr supply will be switched off after the set time. However, this is only done when the pressure change limit has not exceeded in the meantime. When the pressure change has exceeded the limit, the timer is reset to zero and starts again.



In the next screen a value can be entered from 0.1 to 99.9% FS using the 'ARROW' keys. The entered time and the limit will be saved in the internal memory and will be used immediately to switch the Xmtr supply on or off.



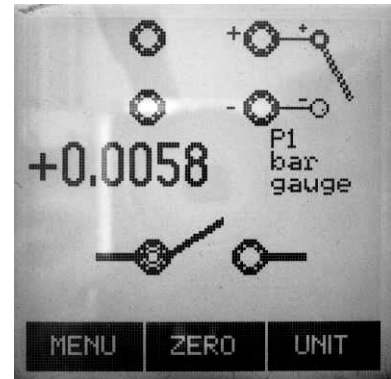
#### 4.2.4 Switch Test

To enable the switch test select the "Switch test" option in the electrical setup menu, press the 'ENTER' key (F1) to confirm.

If the switch input is activated the status of the switch connected between the ground and the switch input is shown on the bottom half of the display, an example of this is shown in the figure.

The calibrator will continue to measure the pressure until the switch changes its state; if this happens the display will show the new state and the pressure reading is locked.

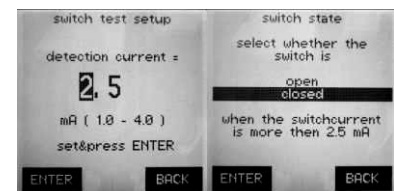
The pressure reading and the switch status display will not change until the user presses the 'UNLOCK' key (F3) as shown in the display.



The TRAQC-9 uses the status of the switch when the switch function is enabled as the reference status, after this the TRAQC-9 responds to changes in the status. This means that both normally open and normally closed switches can be tested.

#### 4.2.5 Switch Test Setup

In this menu it is possible to first set the desired detection current with the 'ARROW' keys and then to select if the switch should be normally open or closed above the set detection current.



#### 4.2.6 V Input

To switch the voltage input on or off select the "voltage input on/off" in the "electrical setup" menu and press 'ENTER' key (F1) to continue. Select the desired state by using the 'ARROW' keys and press 'ENTER' key (F1) to confirm.

If the input was switched off the input will be switched on and the electrical signal including the measuring unit will be displayed on the bottom line of the display, otherwise the input will be switched off and the bottom half of the display will be empty.



#### 4.2.7 Hart Resistor

A dedicated resistor inside the TRAQC-9 can be activated in order to enable Hart communication when required. In the electric input setup, go to "Hart resistor", press 'ENTER' key (F1). The display shows "Hart Resistor ON / OFF"

Select "ON" or "OFF" as required with the 'ARROW' keys, and press 'ENTER' key (F1) to confirm and return to the electric input setup menu.

## 4.2.8 mA/V Scaling

This function allows you to convert the reading of the electrical input to a pressure unit or to percentage.

-  First activate "mA Input" or "V Input" depending on use.
-  Selection of the scaling units and values can be done via the menu option "set mA/V scaling". When the conversion values are not yet entered when the scaling function is switched on, the user will be asked to enter these values when the scaling function is switched 'on'.

To switch between the scaling 'on' or 'off', select the desired state with the 'ARROW' keys and press 'ENTER' key (F1) to confirm.

When scaling is on, in the "measuring mode" screen the unit will show the measured current will be displayed in the desired unit from the "set mA/V scaling" feature (see paragraph 4.2.9) When the scaling function is turned off, the display will again show the measured electrical current or voltage.

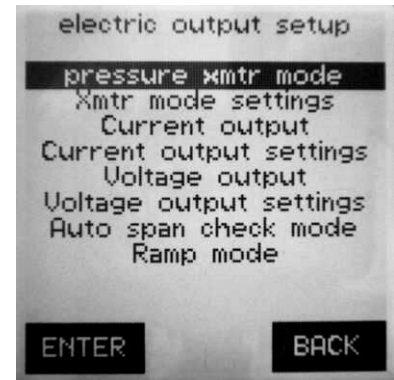
## 4.2.9 Set mA/V Scaling

With this function the user can set the conversion factors for the mA or V scaling. The display of the scaled mA (or V) can be in a pressure unit or a percentage (%) but also in percentage error of the unit under test.



### 4.3 Electrical Output Setup (Optional)

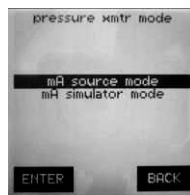
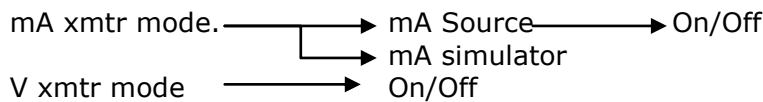
In the main menu select "Electrical Output Setup".  
The following options will be displayed:



Select with 'ARROW' keys as required, press 'ENTER' key (F1):

#### 4.3.1 Pressure xmtr mode (Pressure transmitter mode)

The TRAQC-9 will be used to replace a pressure transmitter output for calibration purposes.  
Select:

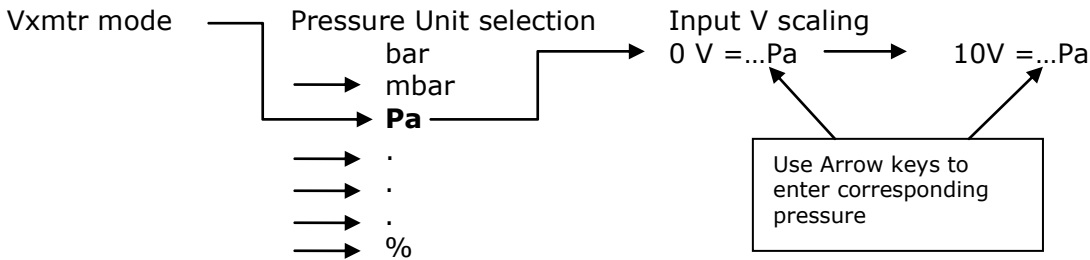
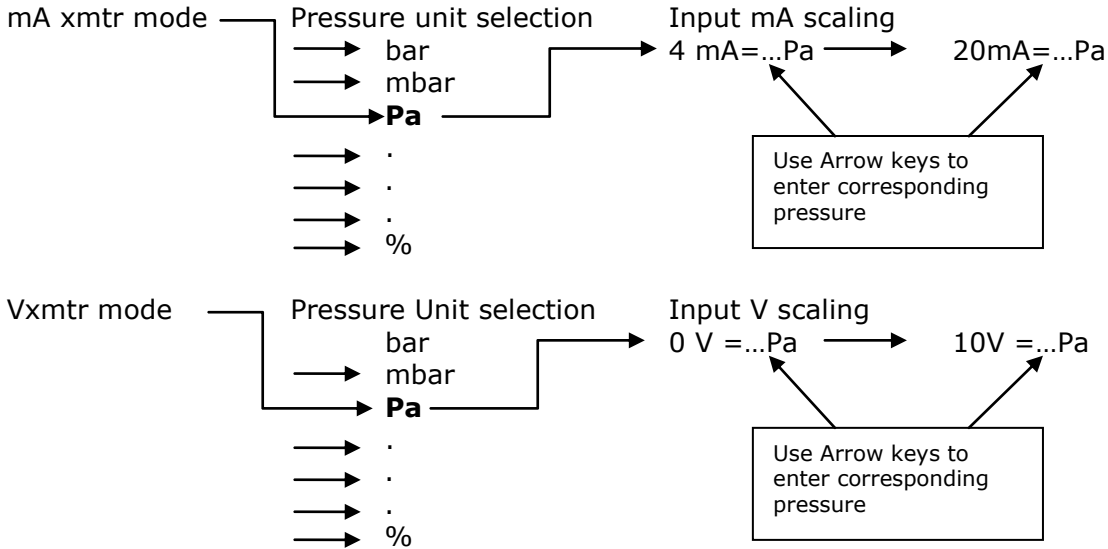


In "mA source" the TRAQC-9 will supply electrical power and control the mA output. (effectively a controlled current source).  
In mA simulator an external electrical power supply is required, and the TRAQC-9 will only control the mA output.

### 4.3.2 Xmtr mode settings (Parameter Mode Settings)

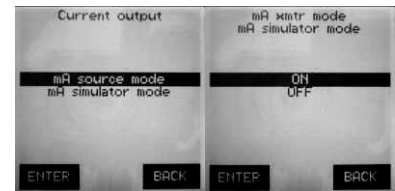
After configuration of "Pressure Xmtr mode" according 3.4.1, with "Xmtr mode settings" the scaling and the units of the output to be simulated can be set:

Select:



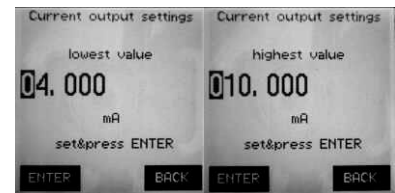
### 4.3.3 Current Output

The current Output option is identical to the "pressure Xmtr" mode, with exception of the output setting (as set in the next step: "Current output Settings"). Output setting will not be in pressure units, but in mA with fixed mA steps to go from minimum to maximum. Current output will switch on / off in this menu.



### 4.3.4 Current Output Settings

As explained in "Xmtr mode settings" there are no units to select: The user is requested to enter Lowest value, highest value and step value direct in mA. Values in excess of the standard range of 0 - 24 mA will be refused: when ENTERED the instrument will refuse and display: "Invalid entry". The display will wait for a valid entry before proceeding to next entry.



#### 4.3.5 Voltage Output

The Voltage Output option is identical to the "pressure Xmtr" mode, with exception of the output setting (as set in the next step: "Voltage output Settings") : Output setting will not be in pressure units, but in Volt., with fixed Volt steps to go from minimum to maximum. Voltage output will switch on / off in this menu.

#### 4.3.6 Voltage Output Settings

As explained in "Xmtr mode settings" there are no units to select: The user is requested to enter Lowest value, highest value and step value direct in V. Values in excess of the standard range of 0-11 V will be refused: when ENTERED the instrument will refuse and display: " Invalid entry". The display will wait for a valid entry before proceeding to next entry



Following functions are only available when "Current output" or "Voltage output" has been switched to "on".

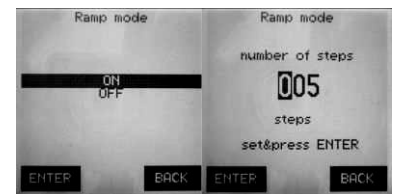
#### 4.3.7 Auto Span Check Mode

Select "On", automatically the "step time entry" panel is displayed: Enter the required step time using the 'ARROW' keys, then press 'ENTER' key (F1).  
Select "off ": the function has been disabled.



#### 4.3.8 Ramp Mode

Select "On", automatically the "Number of steps entry" panel is displayed: Enter the required number of steps using the 'ARROW' keys, and then press 'ENTER' key (F1).  
Automatically the "Step time entry" panel is displayed: Enter the required step time in seconds, using the 'ARROW' keys.  
Press 'ENTER' key (F1) to confirm.



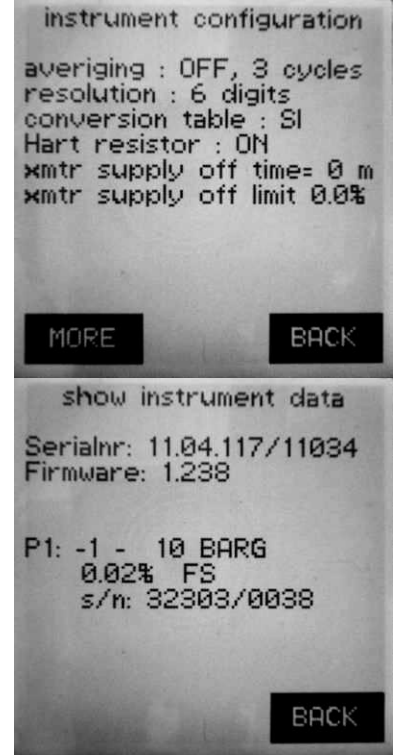

Select "off": the function has been disabled.

#### 4.4 Instrument Configuration

The TRAQC-9 can be configured by selecting the instrument configuration label in the main menu.



		<p>Backlight setup; use the 'ARROW' keys to change the contrast.</p>
		<p>Select language; the language can be set to English, Dutch, French and German by using the 'ARROW' keys.</p>
		<p>Date/time display; turning date/time in display on/off.</p>

 <p>instrument configuration</p> <p>averiging : OFF, 3 cycles resolution : 6 digits conversion table : SI Hart resistor : ON xmtr supply off time= 0 m xmtr supply off limit 0.0%</p> <p>MORE      BACK</p> <hr/> <p>show instrument data</p> <p>Serialnr: 11.04.117/11034 Firmware: 1.238</p> <p>P1: -1 - 10 BARG 0.02% FS s/n: 32303/0038</p> <p>BACK</p>		<p>Show settings; shows the current configuration of the instrument.</p>
 <p>factory defaults</p> <p>user programmed settings will be restored to the factory defaults</p> <p>is this what you want ?</p> <p>press</p> <p>ENTER to continue BACK to abort</p> <p>ENTER      BACK</p>		<p>Factory defaults; sets the device back in the factory defaults.*</p>

\* Restoring the TRAQC-9 will change the settings made by user back into the factory defaults. These defaults are:

- measuring range is 1
  - only the basic unit of the instrument is selectable
  - current/voltage/switch input switched off
  - time display is off
  - date display is off
  - zeroing point offset off and value set to zero
  - averaging is off
  - averaging number is 6
  - resolution is 6 digits
  - SI standard selected
  - absolute mode is off\*
  - absolute interval 1 min\*
  - language reset to the instrument default language
  - calibration procedure = measure up only, 3 points, linear
  - calibration spec = FS
- \* when available

## 4.5 Memory functions

Not available, only for portable instruments.

## 4.6 Temperature

Not yet implemented, for future development.

## 4.7 Advanced Options

To change the advanced options of the TRAQC-9 select the menu "advanced options" in the "main menu" and press 'ENTER' key (F1) to continue. Use the 'ARROW' keys to set the password's numbers and press 'ENTER' key (F1) to continue. The password is '2098'.



### 4.7.1 Set rtc time

The calibrator has a real time clock (rtc); this clock has a separate battery to keep up the time when the calibrator is switched off. To change the time select "set rtc time" in the "advanced options" menu with the 'ARROW' keys and press 'ENTER' key (F1) to continue. Use the 'ARROW' keys to change the time. After completing the time setting press 'ENTER' key (F1) to confirm. Leaving the time setting without changing, press 'BACK' key (F3).



### 4.7.2 Set rtc date

To set the real time clock date select the "set rtc date" in the "advanced options" menu and continue with pressing 'ENTER' key (F1). Use the 'ARROW' keys to change the date to the desired setting and press 'ENTER' key (F1) to confirm.






#### 4.7.3 Set recal Date

To change the recalibration date select the "set recal date" menu in the "advanced options" menu with the 'ARROW' keys and press 'ENTER' key (F1) to continue. The new recalibration date is shown being the current date. Change the date with the 'ARROW' keys and press 'ENTER' key (F1) to confirm.

When the instrument is adjusted, automatically the adjustment date is changed. The calibration date is not stored within the software of the calibrator. The calibration date is shown on the outside of the calibrator by, for instance, a sticker.

 Calibrators are delivered with a recommended recalibration period of 12 months.

#### 4.7.4 Erase data memory

Not available, only for portable instruments.

#### 4.7.5 Show Product Data

To view the product details select "show instrument data" menu in the "advanced options" menu and press 'ENTER' key (F1).

The information shown is the following:

- The serial number
- Firmware version
- Recalibration date
- Pump details
- Accuracy %FS



## 4.8 Calibration of TRAQC-9

The TRAQC-9 is calibrated by Tradinco Instruments B.V. to achieve the stated accuracy. The calibration report is supplied with the instrument. The user cannot change these factory adjustments. However, it is possible to make adjustments within the predetermined accuracy limits and calibrate the TRAQC-9.

Functionally, the TRAQC-9 basic factory calibration will remain active: only the output will be corrected according the "User Adjustments".

These user adjustments can be found under "Advanced Options" in the "Main Menu". The user adjustments are stored in the internal memory.



Beware when making incorrect changes the TRAQC-9 may be damaged and/or not function anymore. If so, contact Tradinco Instruments B.V..



The calibrator will invalidate the calibration report supplied with the calibrator. Therefore you should only adjust the calibrator if you use a pressure or electrical device higher accuracy standards than the accuracy standards of the TRAQC-9.

After entering "Advanced Options" in the "Main Menu" the he "PIN CODE entry" display will appear. Enter the required PIN Code using the arrow keys, and then press 'ENTER' key (F1). The following menu will be displayed:

Commands Set rtc date, set rtc time and set recall date are simple straight forward operations, where dates and times are set using the arrow keys. These functions will not be further explained in this manual.

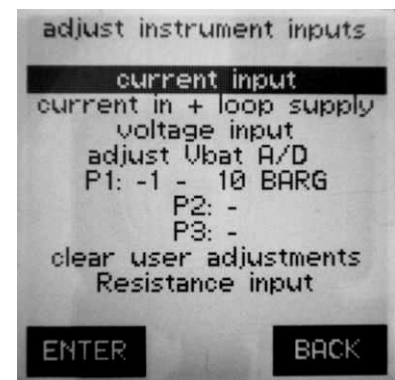
### 4.8.1 Adjust instrument inputs.

As this is a critical operation, affecting the displayed data. When entered, the display will show following option menu:



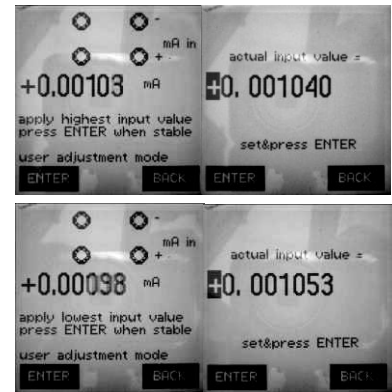
Please be aware of the "Clear User Adjustments" function, described in par. 4.7.7.4. This function will delete **any** user modifications, as made in the "Adjust instrument inputs" and "Adjust instrument outputs": The instrument will revert to its basic calibration.

All adjustments as described in the following chapters are "two point" adjustments: one at minimum value, and one at maximum value. Based on these two points, TRAQC-9 will extrapolate all intermediate data.



#### 4.8.1.1 Current input

The circles at the top of the display represent the TRAQC-9 electrical connectors, physically located at the right hand side of the display. As indicated, the two on the right hand side of the instrument shall be used to feed the mA signal to the TRAQC-9: the at most right connector for the PLUS and the other one for the MINUS. As described in the display, first apply the lowest input value in mA, and press 'ENTER' key (F1) when the signal has stabilized. The instrument will store this value in memory. Now the TRAQC-9 will show the next display, requesting the operator to enter the "actual input value". Using the 'ARROW' keys, 'UP and 'DOWN' for altering the digits and 'LEFT' and 'RIGHT' for selecting the digits of the value which has to be altered. Enter the number of milliamps that were applied in the previous step and press 'ENTER' key (F1) to confirm.



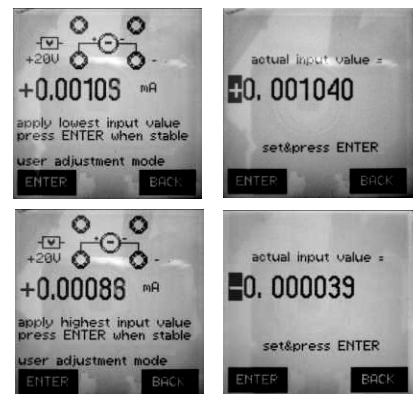
The procedure will continue with the "highest input value" to be applied to the instrument, followed by again entering the number of milliamps, as applied for the highest value. After entering all milliamp. input data, the TRAQC-9 will confirm at the last 'ENTER' key (F1) with a long beep, and automatically revert to the "adjust instrument inputs" menu.



The TRAQC-9 Milliampère measuring range is limited to the maximum voltage/current. The maximum voltage/current that may be applied is 30 Volts and/or 24 mA: do not apply current in excess of these values, as it will result in damage the TRAQC-9 measuring system!

#### 4.8.1.2 Current in + Loop supply (Optional)

Select the 'Current in + loop supply' option in the 'adjust instrument' menu and press 'ENTER' key (F1). For adjusting the "current input + loop supply" follow the same procedure as the "current input" procedure. Carefully follow the instructions on the input screen, and connect the circuit precisely as depicted in the upper display section for each step of the process.



#### 4.8.1.3 Voltage input

Select the "Voltage input" option in the "adjust instrument inputs" menu and press 'ENTER' key (F1). For adjusting voltage input follow the same procedure as the current input. Carefully follow the instructions on the input screen, and connect the circuit precisely as depicted in the upper display section for each step of the process.



#### 4.8.1.4 Adjust Vbat A/D

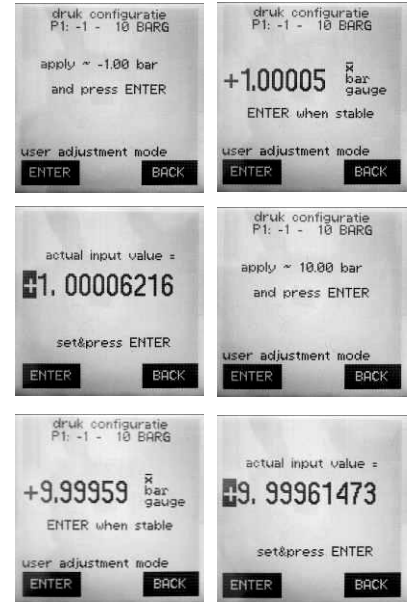
Not available, only for portable instruments.

#### 4.8.1.5 P1: XX-YY BARG (Pressure Sensor Adjustment)

The pressure sensors are adjusted at the beginning and at the end of the measuring range, except for absolute sensors. The absolute sensors are adjusted at 20% (provided this is less than 500 mbar absolute) and at the full scale value.

To adjust the pressure sensor select the 'P1: XX-YY BARG' option in the 'advanced options' menu. After pressing 'ENTER' key (F1), follow the instructions in the TRAQC-9 display carefully:

- Apply ~ (approximately) XX bar (low value), and press 'ENTER' key (F1).
- Now the display of the TRAQC-9 will show the pressure reading.
- Press 'ENTER' key (F1) when stabilized: the TRAQC-9 will store the output of the internal pressure cell.
- Input using the 'ARROW' keys the actual input value (pressure), and press 'ENTER' key (F1)



Now the entire procedure will be repeated for the high pressure value.



It is not important that the pressure applied exactly matches the requested pressure, as indicated by the TRAQC-9. As long as the applied pressure lies around the requested value, the calibration is ok. The only thing critical for the calibration is that exactly the value of the applied pressure is entered, when the TRAQC-9 requests "Input Actual value"

When the two pressures applied are too close in range of one another, the TRAQC-9 will not accept the data and requests if another attempt should be done.

#### 4.8.1.6 Clear user adjustments

To clear the user adjustments select "clear user adjustments" in the "adjust instrument" menu. With clearing the user adjustments, all user made adjustments are removed and the TRAQC-9 will restore to the Tradinco Instruments B.V. default.




#### 4.8.1.7 Resistance input

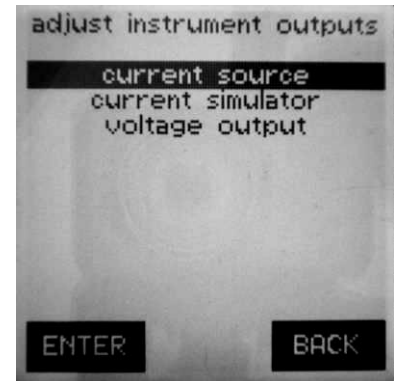
Not yet implemented, for future development.

#### 4.8.2 Adjust instruments outputs (Optional)

As this is a critical operation, affecting the displayed data. When entered, the display will show following option menu:

Select the desired menu with the up and down key of the 'ARROW' keys and press the 'ENTER' key (F1) to enter the desired menu.

 Please be aware of the "Clear User Adjustments" function, described in par. 4.8.1.6. This function will delete **any** user modifications, as made in the "Adjust instrument inputs" and "Adjust instrument outputs": The instrument will revert to its basic calibration.

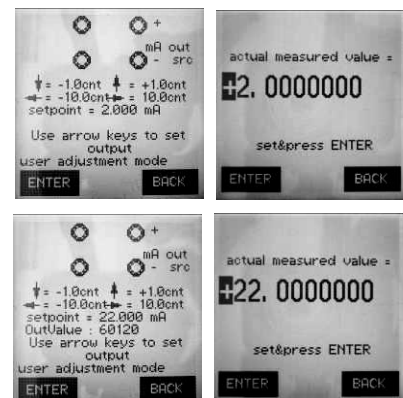


All adjustments as described in the following chapters are "two point" adjustments: one at minimum value, and one at maximum value. Based on these two points, TRAQC-9 will extrapolate all intermediate data.

##### 4.8.2.1 Current source

In order to calibrate the mA signal in source mode, connect the 'PLUS' and 'MINUS' 4mm banana sockets of the TRAQC-9 to a multi meter with higher specifications than the TRAQC-9.

- Correct the output signal by using the 'ARROW' keys. When the desired setting is reached press 'ENTER' key (F1).
- In the following screen, fill in the readout of the multi meter by using the 'ARROW' keys and press the 'ENTER' key (F1) to confirm.
- Repeat the same procedure for the maximum value.



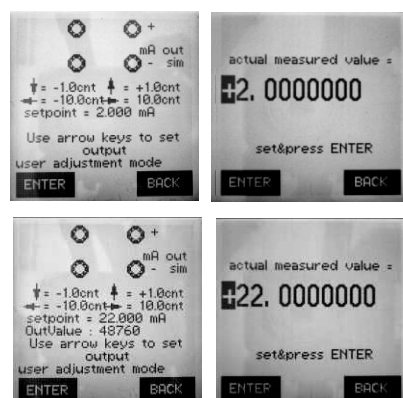
##### 4.8.2.2 Current simulator

In order to calibrate the mA signal in simulator mode:  
Connecting:

- Connect the 4mm banana socket 'PLUS' of the TRAQC-9 to the positive of a DC power supply.
- Connect the 4mm banana socket 'MINUS' of the TRAQC-9 to the positive of a multi meter with a higher specification than the TRAQC-9.
- Connect the negative of the DC power source to the negative of the multi meter.

Correcting:

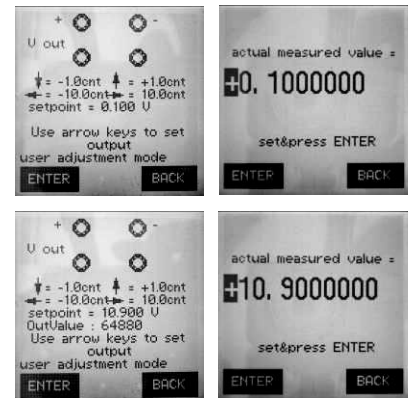
- Correct the output signal by using the 'ARROW' keys. When the desired setting is reached press 'ENTER' key (F1).
- In the following screen, fill in the readout of the multi meter by using the 'ARROW' keys and press the 'ENTER' key (F1) to confirm.
- Repeat the same procedure for the maximum value.



#### 4.8.2.3 Voltage output

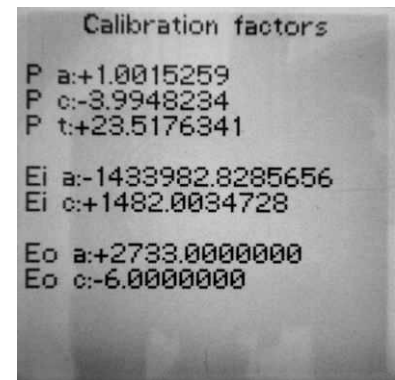
In order to calibrate the Voltage signal, connect the 'PLUS' and 'MINUS' 4mm banana sockets of the TRAQC-9 to a multi meter with higher specifications than the TRAQC-9.

- Correct the output signal by using the 'ARROW' keys. When the desired setting is reached press 'ENTER' key (F1).
- In the following screen, fill in the readout of the multi meter by using the 'ARROW' keys and press the 'ENTER' key (F1) to confirm.
- Repeat the same procedure for the maximum value.



#### 4.8.3 Show calibration factors

In this menu values are stated which are used by Tradinco Instruments for calibrating the TRAQC-9.



## 5. Data transfer

To transfer data to and from the TRAQC-9 makes use of AutoCal<sup>®</sup> calibration management software, available at Tradinco Instruments B.V..

Instructions on how to transfer data is explained in the manual of the AutoCal software.

## 6. Computer Interface (Optional)

### 6.1 General Description

With AutoCal software installed on the computer it is possible to electronically communicate and retrieve a measurement value. It is also possible to control the TRAQC-9 P or MAVS with the AutoCal software. For this communication the TRAQC-9 makes use of a RS232 or Ethernet interface.

### 6.2 Connections

If the TRAQC-9 is equipped with a 9-pin RS232 (female) or Ethernet connection. The connector is mounted on the back side of the pressure indicator.

### 6.3 RS232 Settings

The pin assignment of the TRAQC-9 (9 pin) is as follows:

- 2: Txd transmit data (from calibrator to host);
- 3: Rx receive data (from host calibrator);
- 5: gnd ground signal.

The configuration of the RS232 is as follows:

Data bits = 8  
Parity = none  
Stop bits = 1

The baud rate is fixed at 9600 baud.

### 6.4 Ethernet Settings

Set IP address: For communication by Ethernet connection.

## 7. Maintenance instructions

Check the Traqc-9 for possible damages on:

- Housing
- Test connections and hoses
- Regulating valves

### 7.1.1 Housing

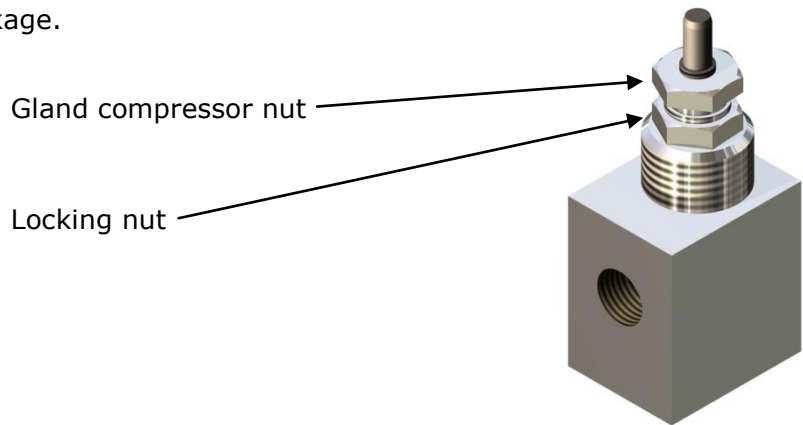
Check the aluminum front and clean it with a non-aggressive and non-corrosive liquid.

### 7.1.2 Test connections

Check the test connections and hoses for any damages. If any damages are found they have to be replaced.

### 7.1.3 Regulating valves

Check the regulating valves for leakage.



If a leakage is detected when the valve is closed, the following procedure has to be followed:

- Remove the black cap from the knob.
- Remove the knob with a Philips-head screwdriver.
- Open the valve.
- Unscrew the 11 mm locking nut.
- Adjust the 11mm gland compressor nut. Adjustment must be made in order that a light friction is detected when turning the control knob.
- When ready tighten the lock nut again.

A spare part kit with new needle and seats is available at Tradinco Instruments



## 8. Product Specifications

### 8.1 General

Display	: 2-colour LCD, 70 x 70 mm, 128 x 128 pixels, with backlight
Resolution	: 4, 5 of 6 digits
Dimensions	: The TRAQC-9 is mounted in a Euro-cassette casing with a height of 3 HE and a width of 36 TE (128.5mm x 182.8mm).
Operating temp.	: 5 - 45 ° C
Certification	: CE
Interface	: RS232 Interface
Menu language	: NL, UK, FR, DE
Connections	: Pressure:
	: -1 to 10 bar : Polyflow
	: 10 to 400 bar : Minimess 1215
	: 400 to 630 bar : Minimess 1620
	: 630 to 1000 bar : ¼" BSP female (others on request)
	: Electric : Banana socket 4mm
Loop supply for external powered transmitters 250 Ohm resistance for HART® transmitters	

### 8.2 Measurement

Accuracy	: ± 0.02% F.S. (± 0,04% F.S. for ranges ≤ 400 mbar and ≥ 400 bar).
Sensor Range	: 0- 100, 160, 250, 400, 600, 1000 mbarg, 0 to -1 barg, 1100 mbara, 10 bara, 0 or -1 to 1, 1.6, 2.5, 4, 6, 10, 16, 20, 40, 60, 100, 160, 250, 400, 600, 1000 barg (others on request).
DC Volt measurement	: 0 – 30 V, 0.02% FS + 0.01%R
DC Ampere measurement	: 0 – 24 mA, 0.02% FS + 0.01%R, Switch test.
Electric (optional)	: Loop supply for externally powered transmitters 4mm 250 Ohm resistance for HART® transmitter.

### 8.3 Generation and control

#### 8.3.1 Traqc-9 P

DC generation, Option : 0 – 11 V, 0.02% R+ 0.01 FS, 0 – 24 mA, 0.025% R+ 0.01 FS.

#### 8.3.2 Traqc-9 CLPC Low Pressure Controller

Pressure ranges within 0 to 1 barg, control resolution 0.01 mbarg  
 (No external pressure supply is required.)

#### 8.3.3 Traqc-9 CHPC High Pressure Controller

Pressure ranges within 0 to 350 barg.  
 (The unit requires an external air supply not exceeding 350 bar.)

#### 8.3.4 Traqc-9 CPC Pressure Controller

Pressure ranges within 0 to 10 barg  
 (An external air supply up to 15 bar is required. )

### 8.3.5 **Traqc-9 CVC Vacuum Controller**

Pressure ranges within 0 to -1 barg  
(An external vacuum pump is required.)

### 8.3.6 **Traqc-9 CAC Absolute Pressure Controller**

Pressure ranges within 0 to 10 bara.  
(Vacuum and pressure supply is required.)

## 8.4 Options & Accessories

### 8.4.1 Standard Supply includes

#### 8.4.1.1 TRAQC-9 P /MAVS

- TRAQC-9 P Indicator
- Calibration Report
- Quick start
- User manual (CD)

#### 8.4.1.2 TRAQC-9 Controller

- TRAQC-9 Controller
- Test-hose and test connection.
- User manual (CD)

### 8.4.2 Optional Supply

- Second Pressure sensor.
- RvA accredited calibration certificate for pressure and electrical signals, traceable to international standards
- AutoCal® calibration management software
- Low pressure connection set. (-1 to 10 bar)
- High pressure connection set. (-1 to 400 bar)
- High pressure connection set. (-1 to 630 bar)
- High pressure connection set. (0 to 1600 bar)
- Set electrical test leads
- RS232 connection
- RS232 cable
- USB to RS232 adaptor
- Ethernet connection
- mA with 24 VDC for externally powered transmitters
- Loop calibration function ( 0 to 24mA sourcing)
- 24 VDC, 1A power supply, which can be switched on and off with the TRAQC-9 P/MAVS.
- UltraClean according to Certificate TIA-UC-1
- Barometric reference sensor, 850 to 1150 mbara (accuracy  $\pm 0.02\%$  FS)

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