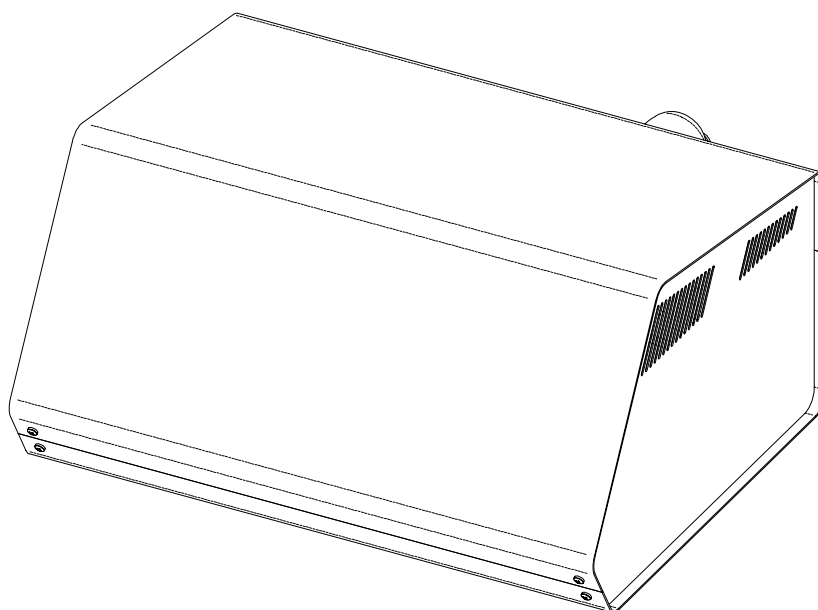


TOTALGAS MODULE 8060

138060SERUK

25/09/2007



SERVICE MANUAL



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INTRODUCTIVE INFORMATION

This document is integrating part of the product it refers to and describes its technical features and uses.



Carefully read these instructions before using the tool and store them for future needs.

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For remarks and information on the product described in this document apply to:

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SYMBOLS

This paragraph describes the symbols used in the DEVICE.



ALTERNATE CURRENT



PROTECTING GROUND

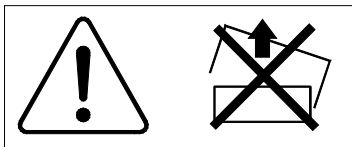


**ATTENTION!
 CONSULT THE INSTRUCTION MANUAL**

**ATTENTION!
 BURN RISK**



**ATTENTION!
 RISK OF ELECTROCUTION**



**ATTENTION!
 NEVER ATTEMPT TO REMOVE THE COVER
 (operation only to be carried out by qualified technicians)**

ISX1279



CE CONFORMITY MARK

It indicates the product compliance with the Essential Safety Requirements provided for the European Directives applicable to the product itself.

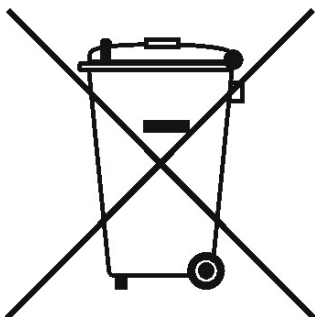
INSTRUCTIONS CONCERNING THE PROPER HANDLING OF DISCARDS OF ELECTRIC AND ELECTRONIC EQUIPMENT

The waste basket symbol put on the equipment suggest that the product, at the end of its useful life, must be treated in a separate way from the domestic rubbish and must be delivered to a separate collection of rubbish centre for electrical and electronic equipments, or to be delivered back to the retailer once you buy a new equivalent product.

An adequate separate collection of rubbish with the intention to lead the equipment to the recycling, the treatment and the wasting environmentally consistent, contributes to avoid possible negative effects on the environment and on health and encourage its components recover.

The user is responsible for the equipment delivery at the end of its life to the appropriate collection structures. For more detailed information related to the available collection systems, please contact the local separate collection of rubbish service or the shop where the product had been purchased.

Anyone who abandons or discards this equipment without delivering it to a separate collection of rubbish centre for electric-electronic rubbish is punishable with the sanction provided for the normative in force concerning the unauthorised wasting of rubbish.



INTRODUCTION

A TOTALGAS properly installed, if kept in good conditions and used according to the use manual, does not require to be frequently serviced.

This manual explains the details of all the routine and extraordinary maintenance procedures as well as the main failures and relevant repair interventions that may be necessary during the use of the tool.



ATTENTION!

All the operations indicated in this manual imply a working knowledge of the instructions in the handbook and must only be carried out by persons trained and authorised by MOTORSCAN S.p.A..

In no circumstance may MOTORSCAN S.p.A. be considered liable for special, collateral, accidental, direct, indirect or consequential damages sustained by third parties in relation to or deriving from purchase or use of these products.

1.1 TOTALGAS DESCRIPTION

TOTALGAS is an exhaust gas analyser for Otto-cycle vehicles. It measures the concentration of CO, CO₂, and HC through an infrared ray microbench and O₂ concentration through an electrochemical sensor.

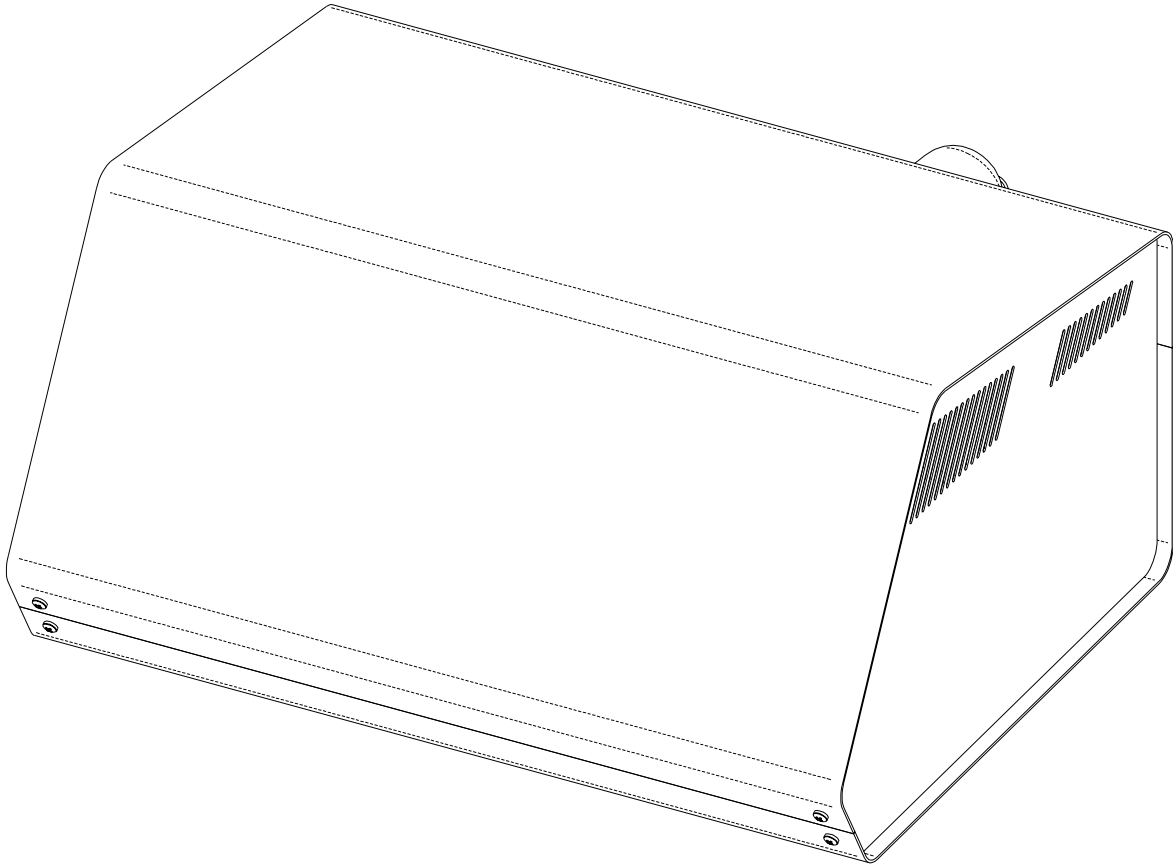
NO reading is instead an option and it is available either by using a special infrared ray bench or by installing an electrochemical sensor in the available seat.

The exhaust gas is sucked through a double head pump from the sampling probe fitted in the exhaust hose and thanks to the condensation separator located on the back of the tool humidity is expelled.

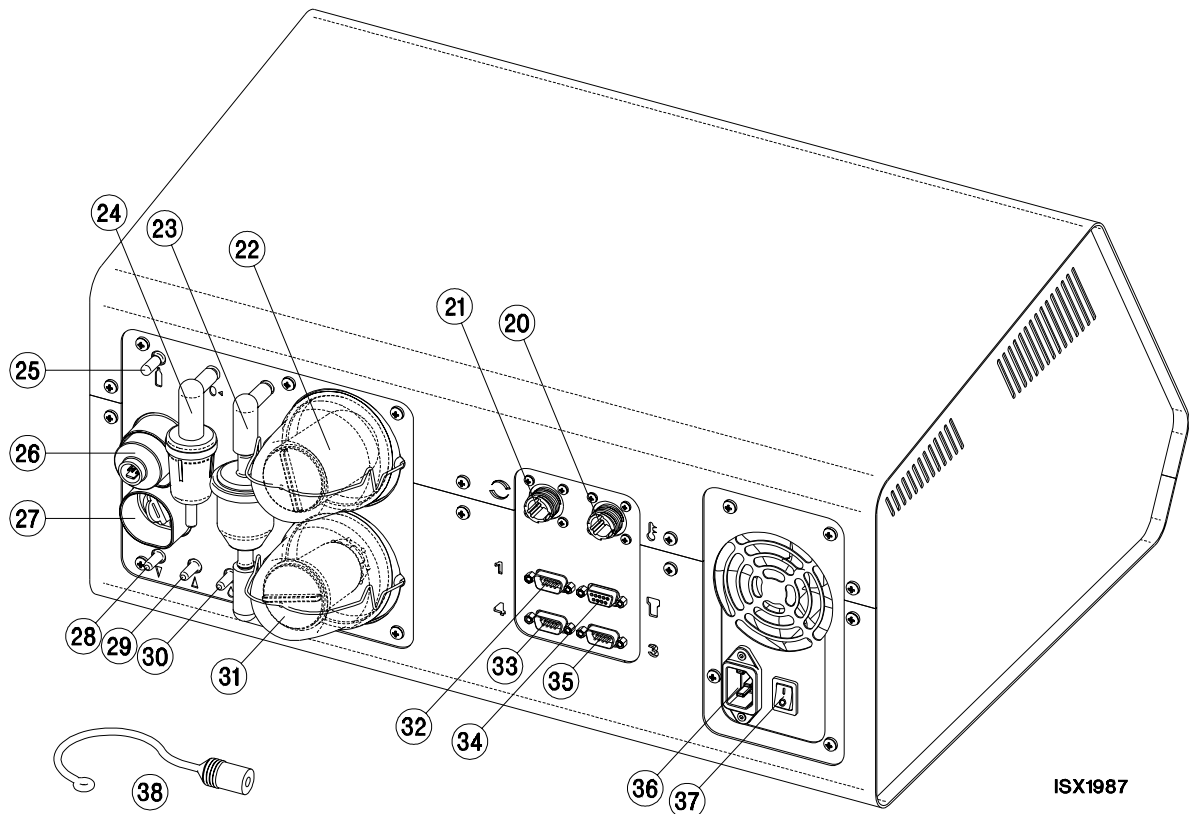
The remaining part, now free from condensation, is injected into the measuring bench to be measured and then into the oxygen electrochemical sensor and then expelled.

Data processing is managed by the basic module (CSA00171 board) and then the processed data are displayed by PC.

1.2 FRONT VIEW OF THE INSTRUMENT

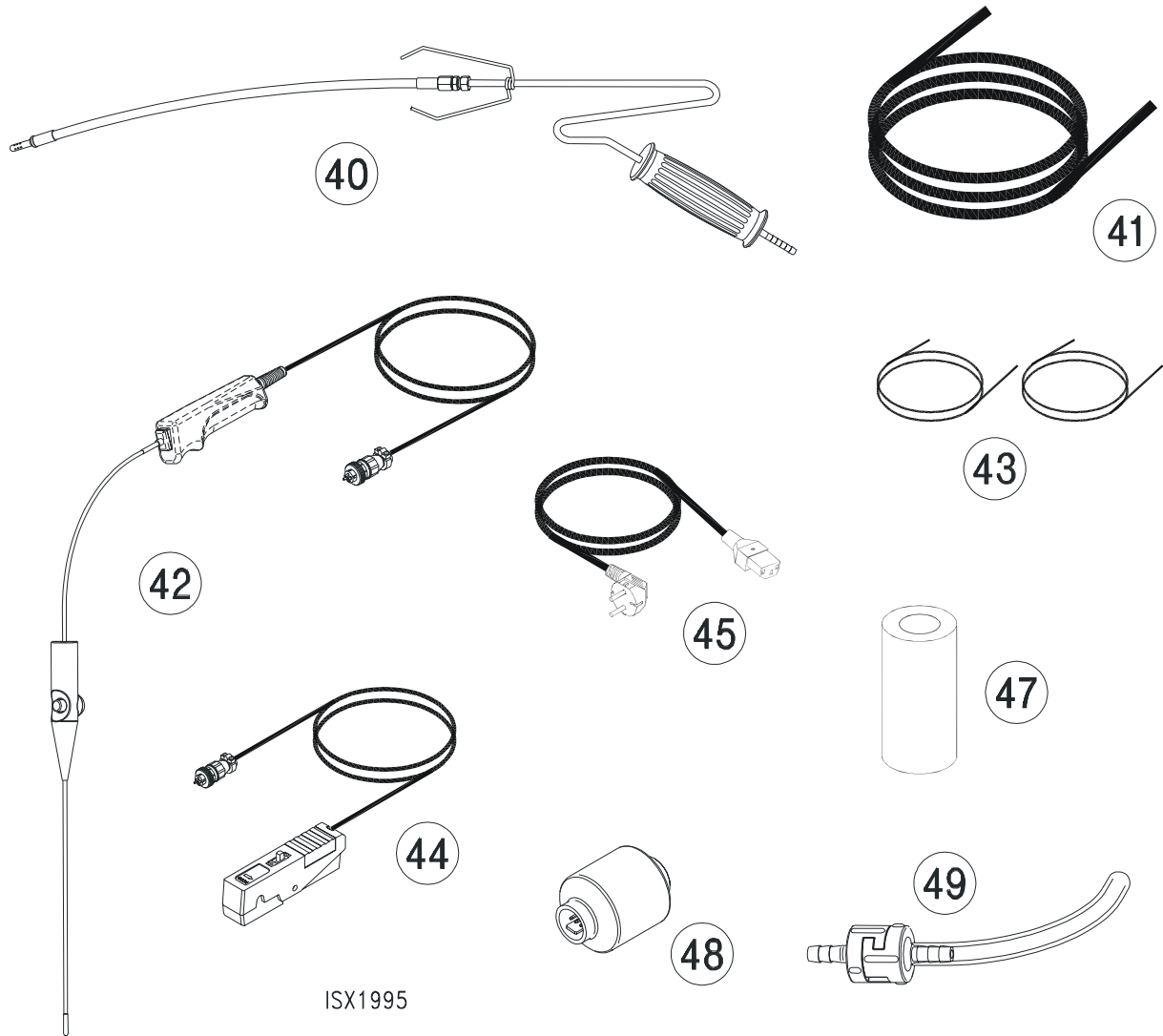


1.3 REAR VIEW OF INSTRUMENT



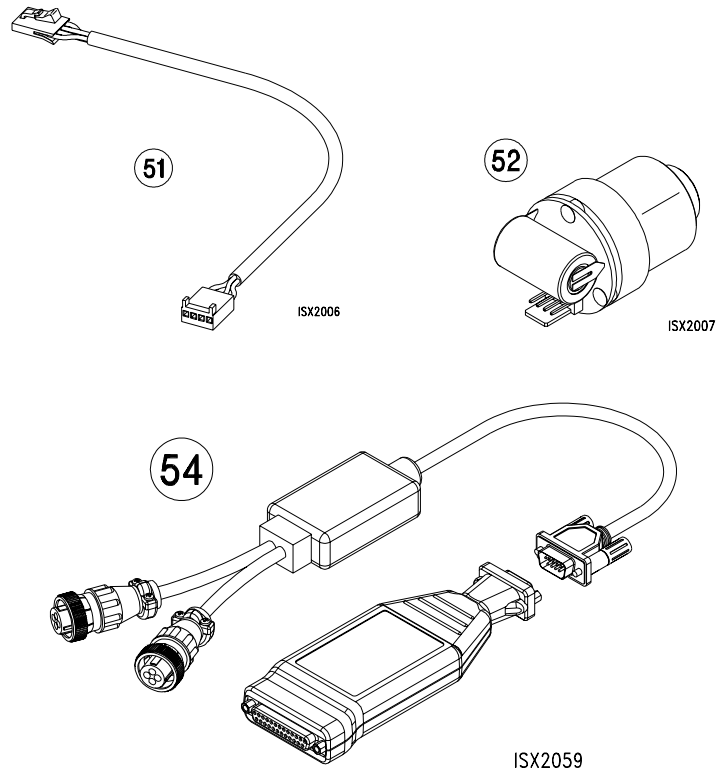
- 20 TEMPERATURE PROBE SOCKET
- 21 RPM INDUCTION CLAMP SOCKET
- 22 CONDENSATION SEPARATOR GLASS (coalescence filter)
- 23 CONDENSATION FILTER
- 24 ENVIRONMENTAL AIR INLET
- 25 CALIBRATING GAS INLET WITH SERVICE CAP
- 26 O2 SENSOR
- 27 NO SENSOR (optional)
- 28 GAS OUTLET
- 29 GAS PROBE INLET
- 30 CONDENSATION DRAIN
- 31 CONDENSATION SEPARATOR GLASS (plastic granules filter)
- 32 COM1 PC SOCKET
- 33 COM4 (not enable)
- 34 COM2 (not enable)
- 35 COM3 (not enable)
- 36 POWER SOCKET
- 37 MAIN POWER SWITCH
- 38 LEAK TEST PLUG

1.4 STANDARD ACCESSORIES



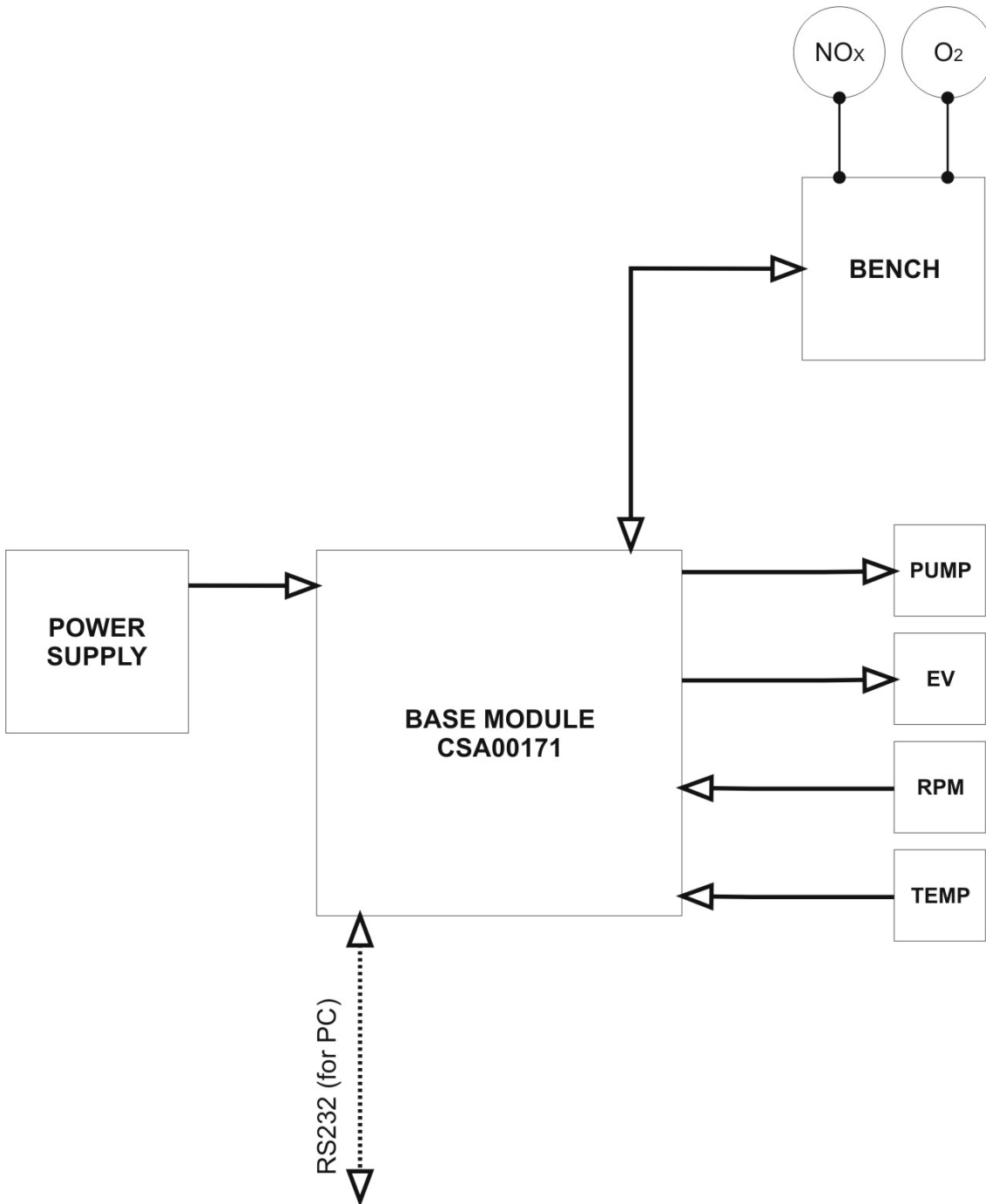
- 40 **GAS PICK-UP PROBE**
- 41 **GAS HOSE**
- 42 **TEMPERATURE PROBE**
- 43 **CONDENSATION AND GAS DRAIN HOSE (2 ITEMS)**
- 44 **INDUCTION RPM CLAMP**
- 45 **POWER CORD**
- 47 **COALESCENCE FILTER**
- 48 **O2 SENSOR**
- 49 **CHECK VALVE**

1.5 OPTIONAL



- 51 + 52 OPTION KIT FOR NO SENSOR MOD. 8055
- 54 OBD RPM COUNTER MOD. 8290

1.6 BLOCK DIAGRAM



- The BASIC MODULE board supplements the power control functions (solenoid valve and pump), the communication connectors for bench interfacing, the serial connection to other unit, and the distribution of supplies and it contains a sensor for the measurement of pressure in the pneumatic circuit.
- The data are displayed through the monitor of the PC which is connected to the RS232 port of the unit.

1.7 PNEUMATIC UNIT

1.7.1 CONSTRUCTION

The pneumatic circuit is the section of the circuit characterised by the passage of the testing gas.

The pneumatic circuit of the analyser is made by a supporting base, a plate and two transparent glasses.

The assembly makes up and supports the material necessary to the separation of steam and to the exhaust gas analysis:

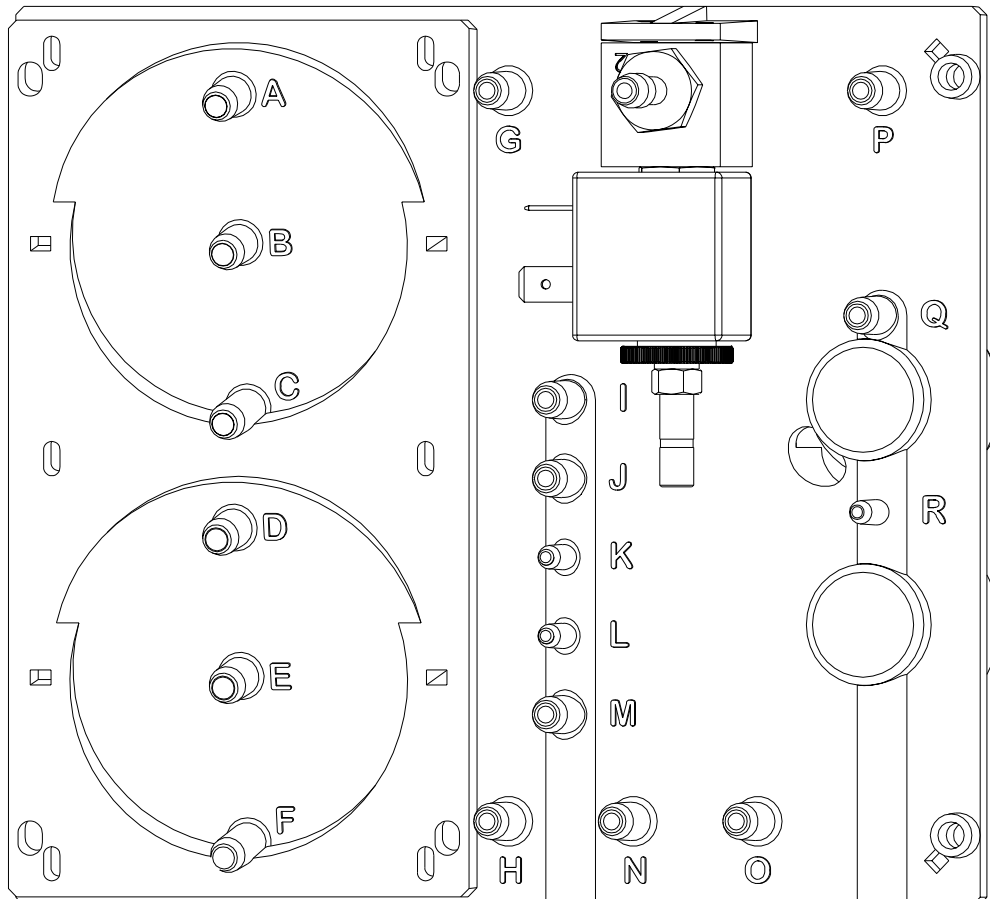
- steam filter;
- activated carbons filter;
- coalescent filter;
- plastic granules filter;
- oxygen sensor;
- solenoid valve;
- Rauclair 5X8 pipe;
- NO sensor (option).

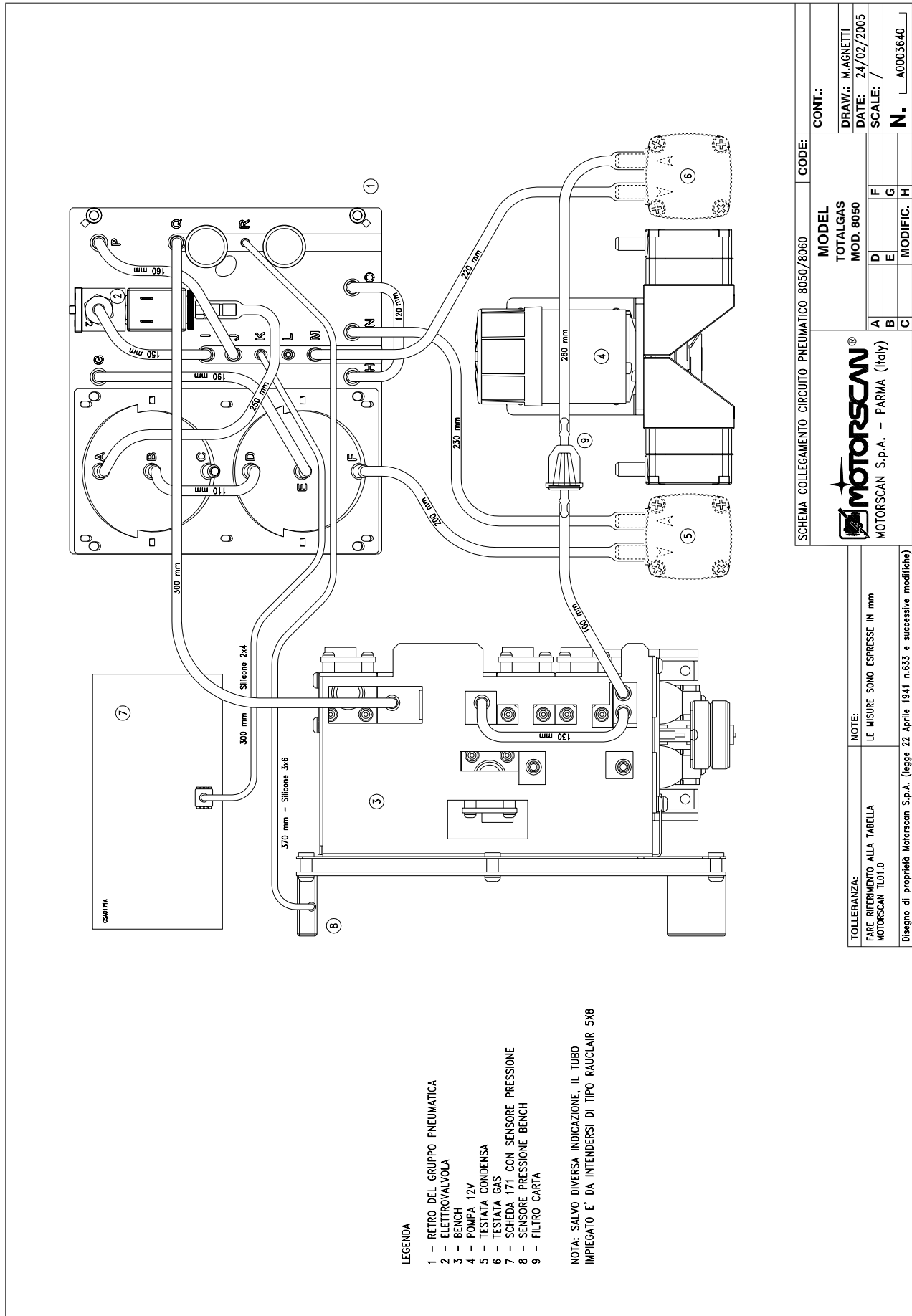
You can find below the layout of the plate inside where spouts have been indicated in capital letters to carry out, by means of the A table, the connection of pipes whose total length is 2310 mm.

TABLE A – PIPES LENGTH

N°	CONNECTION	DESCRIPTION	Length	PIPE type
1	O - H	Probe inlet –plastic filter	120	5X8 rauclair
2	G – E	Plastic filter – steam cup central spout	190	5X8 rauclair
3	D – B	Steam cup top spout – gas cup central spout	110	5X8 rauclair
4	A – SOLENOID VALVE (3)	Gas cup top spout – solenoid valve bottom coupler	250	5X8 rauclair
5	SOLENOID VALVE (2) – I	Solenoid valve top coupler – plate T coupler	150	5X8 rauclair
6	P – J	Cal Gas IN – plate T coupler	160	5X8 rauclair
7	Q – OUT BENCH	Sensors in – OUT bench	300	5X8 rauclair
8	N – OUT BENCH	Steam purge – pump out water side	230	5X8 rauclair
9	F – IN WATER	Steam cup bottom spout – pump in water side	200	5X8 rauclair
10	R – SENS. BENCH	sensors – bench pressure sensor fitting	370	3X6 silicone
11	SENS. 171 – K	CSA00171 board pressure sensor – plate union tee	300	2X4 silicone
12	OUT GAS PUMP – IN BENCH	Pump Out gas side – filter –bench in	280 + 100	5X8 rauclair
13	IN GAS PUMP – M	Pump IN gas side – plate T coupler	220	5X8 rauclair

Pneumatic inside

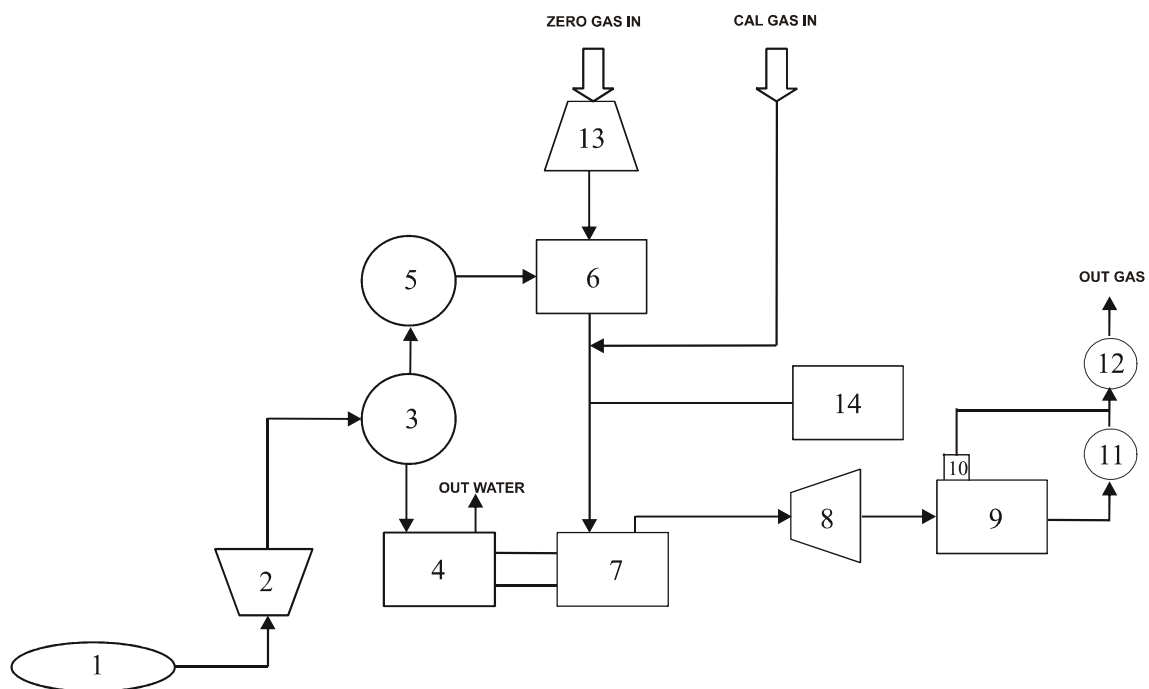




- LEGENDA
- 1 – RETRO DEL GRUPPO PNEUMATICA
 - 2 – ELETTROVALVOLA
 - 3 – BENCH
 - 4 – POMPA 12V
 - 5 – TESTATA CONDENZA
 - 6 – TESTATA GAS
 - 7 – SCHEDE 171 CON SENSORE PRESSIONE
 - 8 – SENSORE PRESSIONE BENCH
 - 9 – FILTRO CARTA
- NOTA: SALVO DIVERSA INDICAZIONE, IL TUBO IMPIEGATO E' DA INTENDERSI DI TIPO RAUCLAIR 5X8

SCHEMA COLLEGAMENTO CIRCUITO PNEUMATICO 8050/8060		CODE:	CONT.:
 MOTORSCAN S.p.A. – PARMA (Italy)		MODEL	
		TOTALGAS MOD. 8050	
TOLLERANZA: FARE RIFERIMENTO ALLA TABELLA MOTORSCAN TL01.0		A	D
NOTE: LE MISURE SONO ESPRESSE IN mm		B	E
Disegno di proprietà MotorScan S.p.A. (legge 22 Aprile 1941 n.633 e successive modifiche)		C	F
		G	H
		N. _____ A0003640	

1.9 PNEUMATIC UNIT BLOCK DIAGRAM



- 1 **GAS PICK-UP PROBE**
- 2 **PLASTIC FILTER**
- 3 **PLASTIC GRANULES FILTER**
- 4 **PUMP WATER SIDE**
- 5 **COALESCENCE FILTER**
- 6 **SOLENOID VALVE**
- 7 **PUMP GAS SIDE**
- 8 **PAPER FILTER**
- 9 **BENCH**
- 10 **BENCH PRESSURE SENSOR**
- 11 **O2 SENSOR**
- 12 **NO SENSOR**
- 13 **ACTIVATED CARBON FILTER**
- 14 **PNEUMATIC CIRCUIT SUCTION PRESSURE SENSOR**

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ROUTINE MAINTENANCE

The routine maintenance shall have to be regularly executed by the mechanical engineers and does not require the tool lid to be opened.

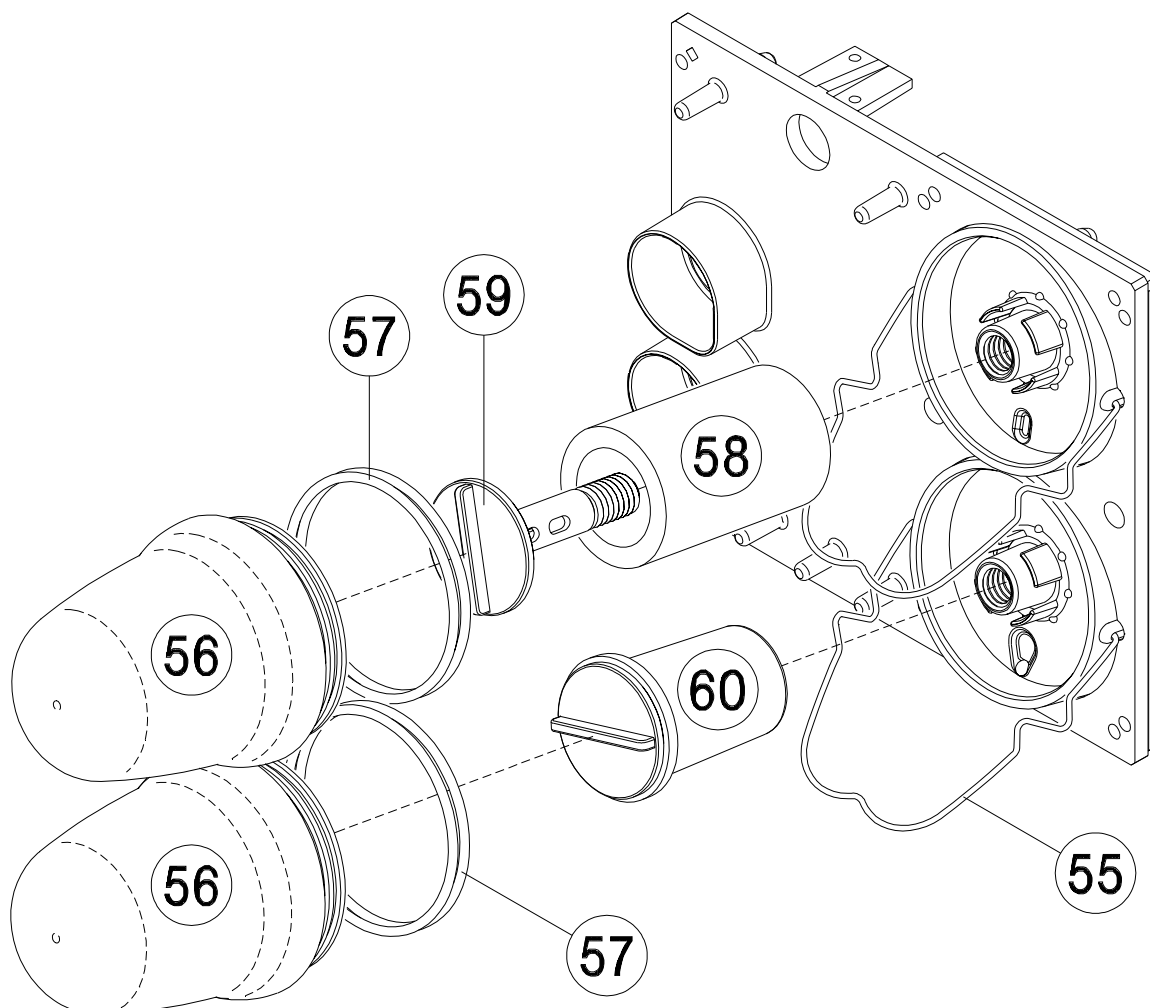
2.1 FILTER REPLACEMENT

Filters (58-60) must be replaced when the instrument shows alarm messages (see chap. "ALARM MESSAGES") or whenever they are found to be particularly blackened.

It is advisable to replace the plastic granules filter (60) at every two replacement of the coalescence filter (58).

To replace filters, proceed as follows:

- Turn off the analyser;
- Remove the little irons blocking the small glasses (55);
- Extract the small glasses (56) through a small rotation;
- Unscrew the ring nut (59) to replace the coalescence filter (58);
- Unscrew the plastic granules filter (60) and replace it;
- Install all parts, taking care to perform all of the operations described above in reverse order and being careful not to damage the O-ring (57).

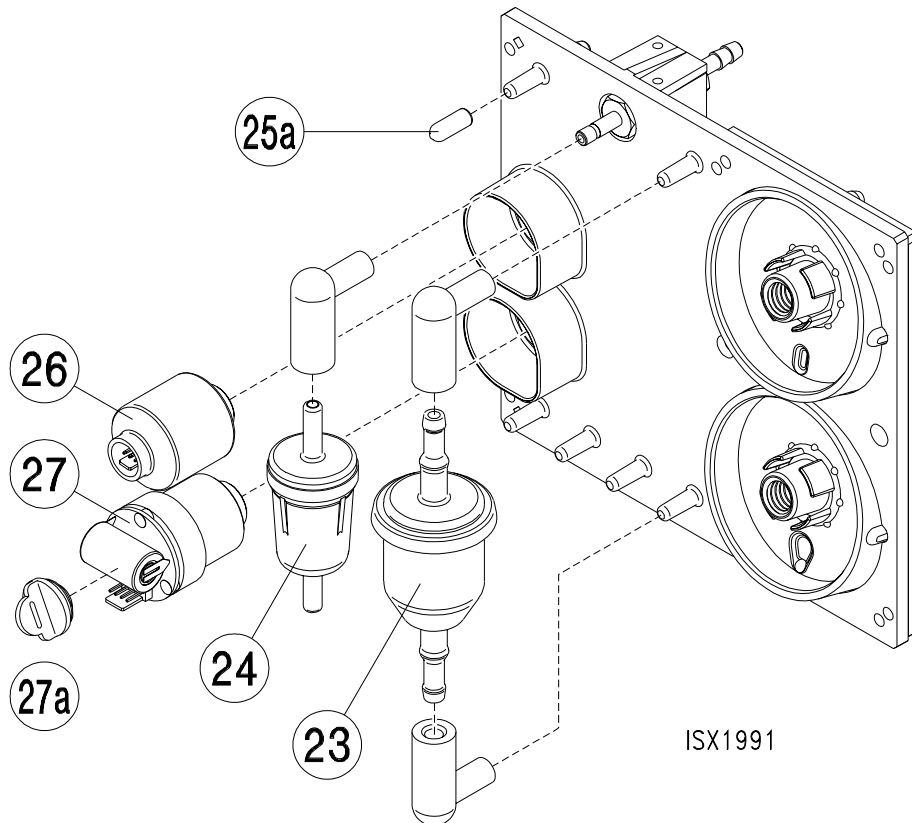


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ATTENTION!

IT IS POSSIBLE TO MAKE THE REINSERTION OF THE SMALL GLASSES EASIER BY TURNING ON THE UNIT AND CLOSING THE ENTRY GAS (29) WHILE THE PUMP IS WORKING: THE SUCTION PRESSURE INSIDE THE SEPARATOR WILL POSITION THEM IN THE CORRECT WAY.

The condensation filter (23) can be cleaned, or must be replaced when cleaning is no longer sufficient. Clean with water.
 Dry with compressed air and remount in the correct direction as indicated on the instrument frame.
 Never ever wash with gasoline, naphtha or paraffin.
 Always check the wholeness of the two rubber elbows.
 If, after the a.m. operations, the filter is still dirty you will have to replace it with a new one.

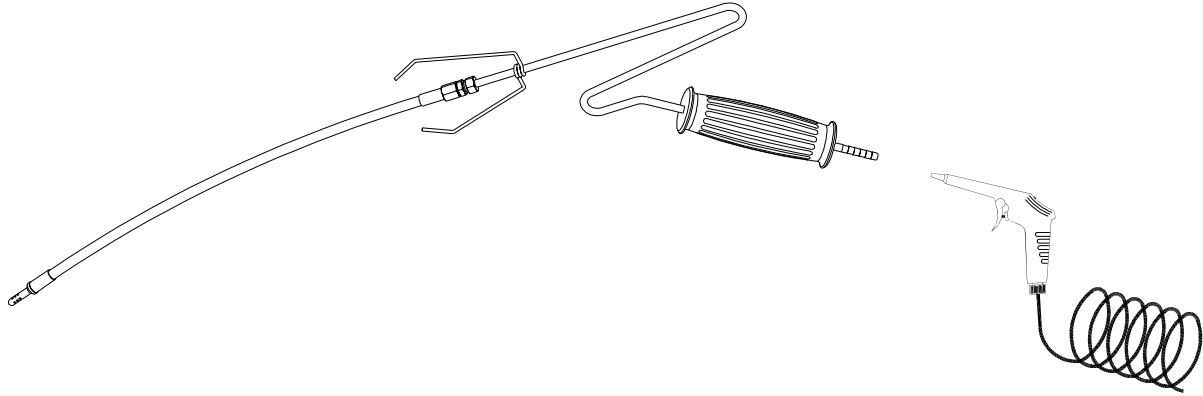


2.2 CLEANING THE SAMPLING PROBE

It is advisable to clean the sampling probe after every two replacements of the coalescent filter (58), in order to remove any carbonious residuals that may have settled inside.

Disconnect the probe from the instrument and blow down the pipe with compressed air.

Never ever wash with gasoline or other solvents.



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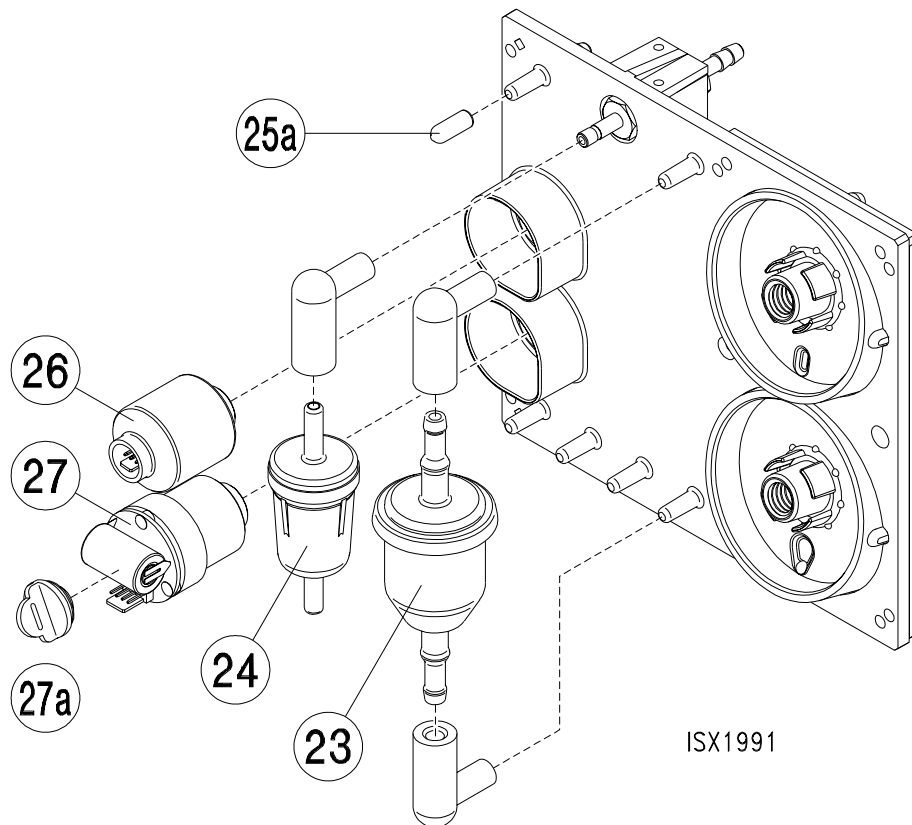
EXTRAORDINARY MAINTENANCE

By extraordinary maintenance we mean all the operations that are not of common use but that are reserved to the skilled technicians and that in some cases require the use of specific software and the opening of the tool.

3.1 CALIBRATING WITH A SAMPLE GAS BOTTLE

For the calibration operations it's necessary to use the service software "**SIM524W**".
For further details consult the chapter concerning the software "**SIM524W**".

3.2 OXYGEN SENSOR REPLACEMENT



Since it is the electrochemical type, the oxygen sensor (26) only lasts a limited time. It must be replaced when the instrument can no longer to calibrate the value. At the sensor exhaustion an alarm message appears on the monitor.

Proceed in the following way to replace the sensor:

- Disconnect the electrical connector and remove the sensor itself by unscrewing it in an anticlockwise direction;
- screw on the new sensor and re-connect it, remembering to insert the electrical connector in the right position and with the correct polarity.

Always tighten and loosen the sensors with the hands. Do not use tools which could damage the sensor itself.

ATTENTION!
 THE ELECTROCHEMICAL SENSORS ARE OPERATIVE ONLY AFTER THEIR CHEMICAL STABILIZATION IN THE WORKING AMBIENT.
 IT IS ADVISABLE, THEREFORE, TO OPEN THE SEALS OF THE NEW O2 SENSOR AT LEAST 15 MINUTES BEFORE USING IT.

3.3 NO SENSOR

3.3.1 INSTALLATION

The analysers of the TOTALGAS series are pre-set for the reading of the Nitrogen Oxide (NO) that can be detected by an electrochemical sensor connected to the bench motherboard or to a special infrared bench.

3.3.1.1 NO ELECTROCHEMICAL SENSOR:

1. remove the sensor from the sealed wrapping at least 15' before installation;
2. open the lid of the analyser;
3. unscrew the closing plug (**27a**);
4. break the plastic diaphragm in the sensor housing;
5. fit the connection cable by leaving outside the connector for the sensor connection;
6. screw the NO sensor by your hands without squeezing the cable;
7. fit the connector on the NO sensor;
8. fit the other end of the cable on the bench connector located beside the O2 connector;
9. power on the analyser;
10. connect to the SIM524W;
11. press F7 – CONFIGURATION;
12. set **NO el. (bench)** between the options present in ANALOG SENSOR CONFIGURATION;
13. upon the password request enter **8020**;
14. go back to the initial page through ESC;
15. press F2 – SPAN;
16. enter the bottle concentration value;
17. press SPAN;
18. upon OPEN CALIBRATION BOTTLE message display inject the gas at 3,5 l/min from CAL GAS IN;
19. upon the display of BENCH CLEAN – CLOSE BOTT. message close the bottle.

The analyser is now ready for use.

It is important to remember that the sensor life is highly depending on use, exhaust gas temperature, and duration of the various tests.

To replace a depleted sensor the steps of the procedure described above shall have to be repeated from point 6 to 19 by always remembering to unwrap the sensor 15' before mounting it.

To have more details about the use of the SIM524W see the relevant paragraph.

3.3.1.2 INFRARED NO SENSOR:

1. disassemble the bottom and the lid of the analyser;
2. disassemble the traditional Sibench (2700SIBENCH) by unscrewing the 3 screws that secure it to the frame;
3. disconnect the supply cable;
4. disconnect the flat signal by delicately removing the hot glue that retains it;
5. disconnect the gas inlet and outlet hoses;
6. delicately disconnect the pressure sensor hose;
7. disassemble the Sibench with the infrared channel for the NO measurement (2700SIBENCHNO);
8. repeat the procedure from point 6 to point 2 in the reverse order;
9. power on the analyser;
10. connect with the SIM524W;
11. press F7 – CONFIGURATION;
12. set **NO IR. (bench)** among the options present in ANALOG SENSOR CONFIGURATION;
13. upon the password request enter **8020**;
14. go back to the initial page through ESC;
15. press F2 – SPAN;
16. enter the bottle concentration value;
17. press SPAN;
18. upon the OPEN CALIBRATION BOTTLE message display inject the gas at 3,5 l/min from CAL GAS IN;
19. upon the BENCH CLEAN – CLOSE BOTT. message display close the bottle.

The analyser is now ready for use.

In this configuration the NO reading has an unlimited duration as well as the other gases measured through the infrared rays (CO, CO2 e HC).

To have more details about the use of the SIM524W see the relevant paragraph.

Attention !

The use of standard gas bottles with concentrations being equal or higher than 1000 ppm vol is suggested.

3.4 ACTIVATED CARBON FILTER REPLACEMENT

Any hydrocarbon residues (that could be present in the air) are eliminated from the air intake by the instrument for the reset operation by means of activated carbon filters.

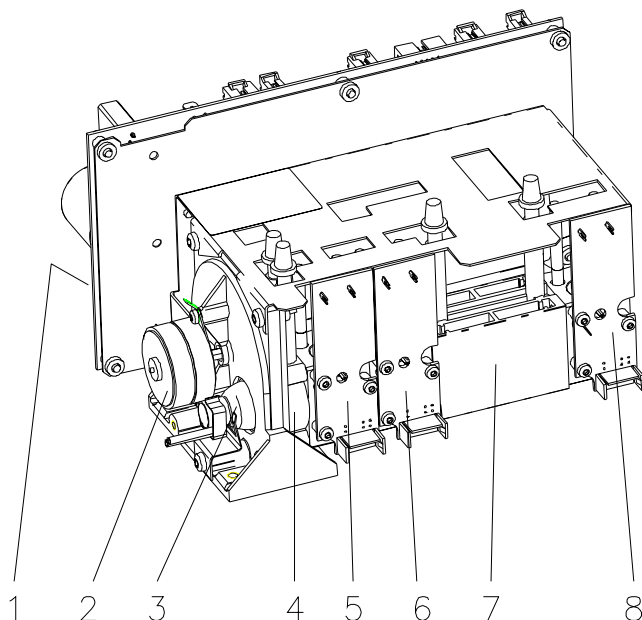
Activated carbon filters (**24**) last about 1 year.
 This period may change depending on the working ambient.

During the installation comply with the direction indicated by the arrow on the filter and keep it turned upwards.

3.5 MEASUREMENT BENCH

SIBENCH works according to the Non-Dispersive infrared absorption principle (NDIR).
 It is made up by an infrared emitter, a short bench, the CO₂ and CO detectors, a long bench and the HC¹ detector.

The exhaust gas enters into the benches and the detectors measure the infrared rays “absorption” by turning them into an electric signal that is in turn converted in a value by the motherboard.



N.	Description
1	Motherboard
2	Chopper
3	Infrared resistance
4	CO/CO ₂ Bench
5	Detector CO ₂
6	Detector CO
7	HC Bench
8	Detector HC

Thanks to the use of the SIM524W it is possible to detect and identify possible defects of the Sibench and hence understand if it is necessary to replace the part.

To carry out the replacement please comply with the following:

1. disassemble the bottom of the tool;
2. unscrew the 3 screws that secure it to the frame;
3. disconnect the signal flat by delicately removing the hot glue sticking it;
4. disconnect the supply cable;
5. disconnect the gas inlet and outlet hoses;
6. delicately disconnect the pressure hose.

Subsequently replace the dismantled bench with the new one and carefully repeat all the operations in reverse order.

All the benches are already calibrated by MOTORSCAN S.p.A. hence a new calibration is not necessary.
 It is important to remind that according to some standards the serial number of the measurement bench is specified in the label that hence will have to be replaced with a new one.

¹ The benches pre-set for the NO infrared reading are equipped with a infrared resistance as well as an additional bench and additional detector.

This table specifies all the possible bench errors, with the relevant error codes, description and possible suggested solutions.

Error N°	Error Description	Possible solution
1	ADC HC out of tolerance	Insert connector correctly, replace bench
2	ADC CO out of tolerance	Insert connector correctly, replace bench
3	ADC CO2 out of tolerance	Insert connector correctly, replace bench
4	ADC NO - DIR out of tolerance	Insert connector correctly, replace bench
5	ADC O2 out of tolerance	Replace O2 sensor, replace bench
6	Analogue input 2 out of tolerance	Replace bench
7	Analogue input 1 out of tolerance	Replace bench
8	Pressure out of tolerance	Replace bench
9	Flow rate sensor out of tolerance	Replace bench
10	CO2 temperature out of tolerance	Replace bench
11	HC temperature out of tolerance	Replace bench
12	NO - NDIR temperature out of tolerance	Replace bench
13	Radiator temperature 3K out of tolerance	Replace bench
14	Radiator temperature NO - NDIR out of tolerance	Replace bench
15	Supply voltage out of tolerance	Connect correct supply voltage, rep. bench
16	Supply voltage for measuring bridge out of tolerance	Replace bench
17	Radiator voltage 3K out of tolerance	Replace bench
18	Radiator voltage NO - NDIR out of tolerance	Replace bench
19	HC adjustment error	Clean measuring chambers, replace bench
20	CO adjustment error	Replace bench
21	CO2 adjustment error	Replace bench
22	NO - DIR adjustment error	Clean measuring chambers, replace bench
23	HC slope adjustment error	Perform three point calibration
24	CO slope adjustment error	Perform three point calibration
25	CO2 slope adjustment error	Perform three point calibration
26	NO - DIR slope adjustment error	Replace bench
29	ADC faulty	Replace bench
30	3K radiator faulty	Replace bench
31	NO - DIR radiator faulty	Replace bench
32	Chopper motor faulty	Replace bench
33	Analogue input 1 faulty	Replace bench
34	Analogue input 2 faulty	Replace bench
35	Air pressure sensor faulty	Replace bench
36	Measuring branch of flow sensor faulty	Replace bench
37	Reference branch of flow sensor faulty	Replace bench

Error N°	Error Description	Possible solution
38	EEPROM error	Replace bench
39	Change in signal for HC too small	Replace bench
40	Change in signal for CO too small	Replace bench
41	Change in signal for CO2 too small	Replace bench
42	Change in signal for NO - DIR too small	Replace bench
43	Change in signal for HC too large	Replace bench
44	Change in signal for CO too large	Replace bench
45	Change in signal for CO2 too large	Replace bench
46	Change in signal for NO - DIR too large	Replace bench
47	Coefficients for temperature compensation for HC are too small	Replace bench
48	Coefficients for temperature compensation for CO are too small	Replace bench
49	Coefficients for temperature compensation for CO2 are too small	Replace bench
50	Coefficients for temperature compensation for NO are too small	Replace bench
51	Coefficients for temperature compensation for HC are too large	Replace bench
52	Coefficients for temperature compensation for CO are too large	Replace bench
53	Coefficients for temperature compensation for CO2 are too large	Replace bench
54	Coefficients for temperature compensation for NO are too large	Replace bench
55	HC sag not calibrated	Perform Mid-value calibration
56	CO sag not calibrated	Perform Mid-value calibration
57	CO2 sag not calibrated	Perform Mid-value calibration
58	NO - DIR sag not calibrated	Perform Mid-value calibration
59	HC full scale value not calibrated	Perform End-value calibration
60	CO full scale value not calibrated	Perform End-value calibration
61	CO2 full scale value not calibrated	Perform End-value calibration
62	NO - DIR full scale value not calibrated	Perform End-value calibration
67	Iteration error with HC	Replace bench
68	Iteration error with CO	Replace bench
69	Iteration error with CO2	Replace bench
70	Iteration error with NO - DIR	Replace bench
71	Convergence error with HC	Replace bench
72	Convergence error with CO	Replace bench
73	Convergence error with CO2	Replace bench
74	Convergence error with NO - DIR	Replace bench
75	Mathematical error	Disconnect supply voltage
76	Temperature compensation erroneous	Replace bench
77	Temperature compensation erroneous start conditions	Replace bench
78	Temperature compensation gradient error	Replace bench
79	Temperature compensation erroneous	Replace bench

Error N°	Error Description	Possible solution
80	NO electrochemical sensor missing	Install NO sensor
81	O2 electrochemical sensor missing	Install O2 sensor
84	Flow sensor missing	Replace bench
87	O2 zero point erroneous	Replace bench
88	Angle of tilt too large	Replace bench

3.6 PUMP MAINTENANCE

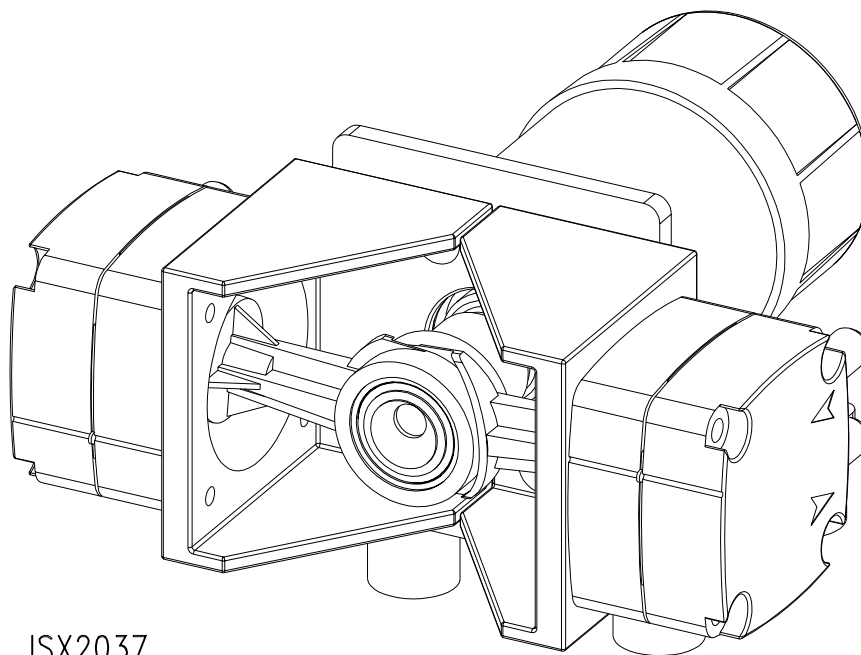
The proper functioning of the suction pump remarkably affects the life of the analyser hence a periodical maintenance is suggested.

The most effective method to test its efficiency certainly is the leak test.

The part being more subject to wear and tear is the gasket; in any case it is usually sufficient to clean it with water to guarantee its original performance.

To carry out this operation please comply with the following procedure:

1. loosen without fully unscrewing the 4 screws that secure the pump to the bottom of the frame;
2. make the pump slide towards the back of the analyser;
3. extract it by pulling it to the top;
4. unscrew the four screws that secure the head with the fittings;
5. dismount the Viton gasket;
6. clean it with water or replace it with a new one in case of cracks or apparent deformations;
7. mount it back by making sure that the tab corresponds to the reference notches on the plastic heads;
8. position the pump back in its seat;
9. make it slide towards the front of the tool;
10. after having verified that the membrane hits the centre and that the connection rod is at the inferior deadlock, screw up the 4 fixing screws.



If instead the whole pump needed to be replaced, one reached step 3 just disconnect the supply cable and disconnect the hoses from the heads and then repeat the operations executed until now in the reverse order by taking care not to invert the hoses.

It is important to remember that, by looking at the tool from the front sight, the right head of the pump (that is the one towards the outside of the Totalgas) is the gas side whereas the left head (that is the one towards the bench) is the steam side and hence the one which is most frequently serviced.

At the end of any maintenance and/or repair intervention it is advisable to carry out a leak test and check if the gas and water outflows of the tool are correct (about 5 and 8 litres per minute respectively).

3.7 AUXILIARY DATA

For the calibration operations it's necessary to use the service software "SIM524W".

The analogue channels are useful to identify possible leaks of the pneumatic circuit or the supplier electronic circuit.

When the pump is OFF in the PRESSURE window must show 0, while with the pump ON a 55 to 65 value.

When the GAS PROBE INLET (29) is closed the pressure value starts increasing: should the value decrease when the pump is stopped it means a leak is present in the circuit.

By closing the hoses one by one by means of pliers starting from the CSA00171 board pressure sensor it is possible to cut off some sections of the circuit in order to identify the defect cause.

For further details consult the chapter concerning the software "SIM524W".

3.8 POWER UNIT

The TOTALGAS analyser is equipped with a 300 W commercial ATX power unit.

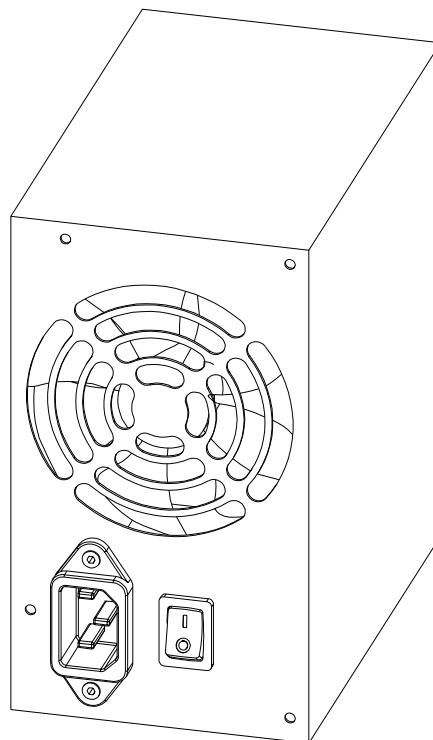
In case of voltage rushes a protection system is automatically enabled which powers off the tool; if this is the case, comply with the following:

1. turn off the switch;
2. disconnect the network cable;
3. wait for some seconds to allow the inner condensers to discharge;
4. reconnect the network cable;
5. turn the switch ON.

In case the tool cannot be powered on even after some trials it is necessary to replace the ATX power unit with an **equivalent** unit in the following way:

1. turn the switch OFF;
2. disconnect the network cable;
3. open the lid of the analyser;
4. unscrew the 4 screws that secure it to the frame;
5. delicately disconnect the connector from the J15 connector on the CSA00171 board by simultaneously pressing on the retaining hook;
6. disconnect the supply cable of the J2 display board;
7. unscrew the grounding cable from the power unit;
8. install the new power unit by repeating all of the previous steps in the reverse order.

For the above mentioned reasons it is advisable to wait always for some instants between the powering off and the next powering on of the unit.



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3.9 SOLENOID VALVE REPLACEMENT/CLEANING

TOTALGAS is provided with only one 12 volt solenoid valve that is excited during the zero setting test in order to let clean air into the measurement bench.

The presence of the activated carbon filter prevents the inlet of the hydrocarbons that may be present in the environment by thus ensuring a correct zero setting of the bench.

In time some particles of carbon may come out of the filter and settle in the solenoid valve by altering its perfect seal and this could compromise the leak test of the analyser.

To clean the solenoid valve it is necessary to comply with the following procedure:

1. unscrew the two screws that retain the solenoid valve body to the pneumatic unit;
2. pull the hose out of the lower fitting;
3. unscrew the lower fitting;
4. unscrew the knurled ring nut;
5. remove the exciting coil;
6. unscrew the metal sleeve;
7. remove the cursor inside it;
8. accurately clean all the parts;
9. reassemble all the parts by repeating the steps from 7 to 1.

Attention. The n. 2 digit engraved on the solenoid valve body shall have to be turned towards the analyser inside

If instead the whole solenoid valve is to be replaced, comply with the following:

1. unscrew the two screws that retain the solenoid valve body to the pneumatic unit;
2. pull the hoses out of the fittings;
3. replace the solenoid valve by taking care to keep the n. 2 digit engraved on the solenoid valve body turned towards the analyser inside;
4. fit the hoses into the fittings by taking care not to switch them;
5. screw the two screws that secure the solenoid valve body to the pneumatic unit.

3.10 REPLACEMENT OF THE CSA00171 BASIC MODULE BOARD

The CSA00171 display board is made with the SMD technology so, in case of failure, the replacement of the whole part is suggested.

To replace the board comply with the following procedure:

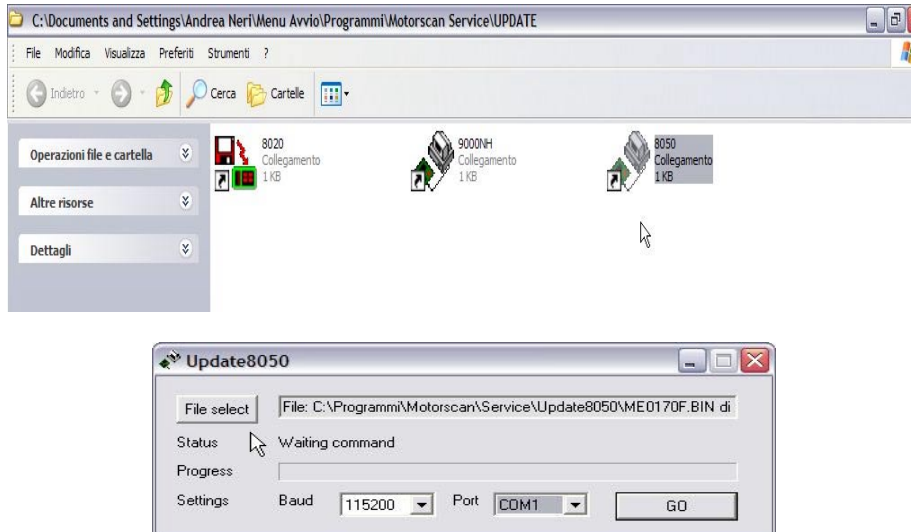
1. power off the analyser;
2. disconnect the network cable;
3. open the lid of the analyser;
4. delicately unscrew the 8 turrets that secure the board to the frame;
5. disconnect the power supply cable (J15) by simultaneously pressing the retaining hook;
6. disconnect the rpm cable (J10) and the temperature cable (J8);
7. disconnect the bench (J16), pump (J13), and solenoid valve (J14) supply cables;
8. disconnect the bench (J5) and display (J1) signal flats;
9. disconnect the cable from the ground junction;
10. disconnect the silicon hose from the pressure sensor;
11. replace the board by taking care to move from the old one to the new one the plastic spacers located on the 4 angles;
12. install the basic module board by repeating the previous steps in the reverse order.

At the end of the whole process a software update is suggested (see the relevant chapter).

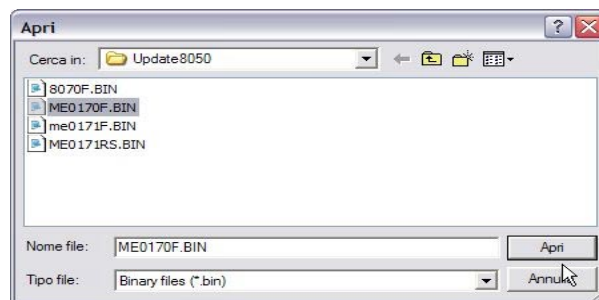
3.11 SOFTWARE UPDATE

To carry out a software update of the analyser comply with the following procedure:

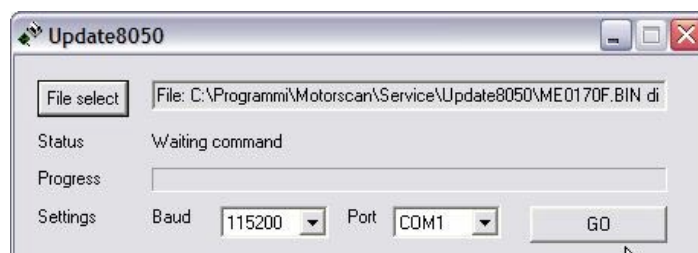
1. power off the tool;
2. connect the PC to the COM 1 of the analyser though the relevant serial cable;
3. launch the Update 8050 programme;



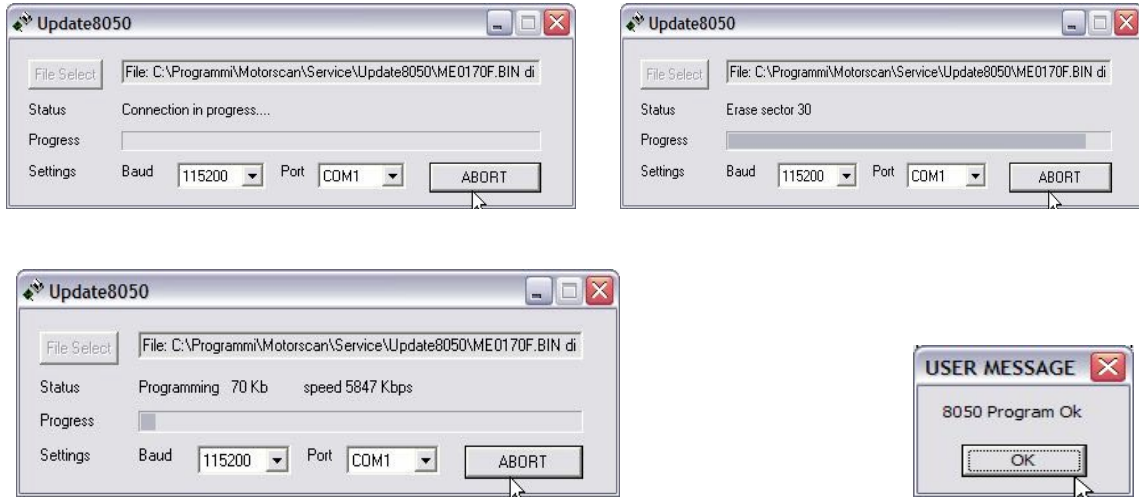
4. select the wished file;
 - At the moment the following files are available:
 - 8070F.bin = 8070 complete update;
 - ME0170F.bin = 8050 complete update;
 - ME0171F.bin = 8060/8071 complete update or basic module board only;
 - ME0171RS.bin = 8060/8071 complete update in RS mode without final result indication (only for Italy);



5. click on the **“Open”** key to confirm the choice;
6. close the files selection window.
7. press the **“GO”** key;



8. power on the analyser.
9. From now on the programming continues automatically until the successful update confirmation message is displayed.



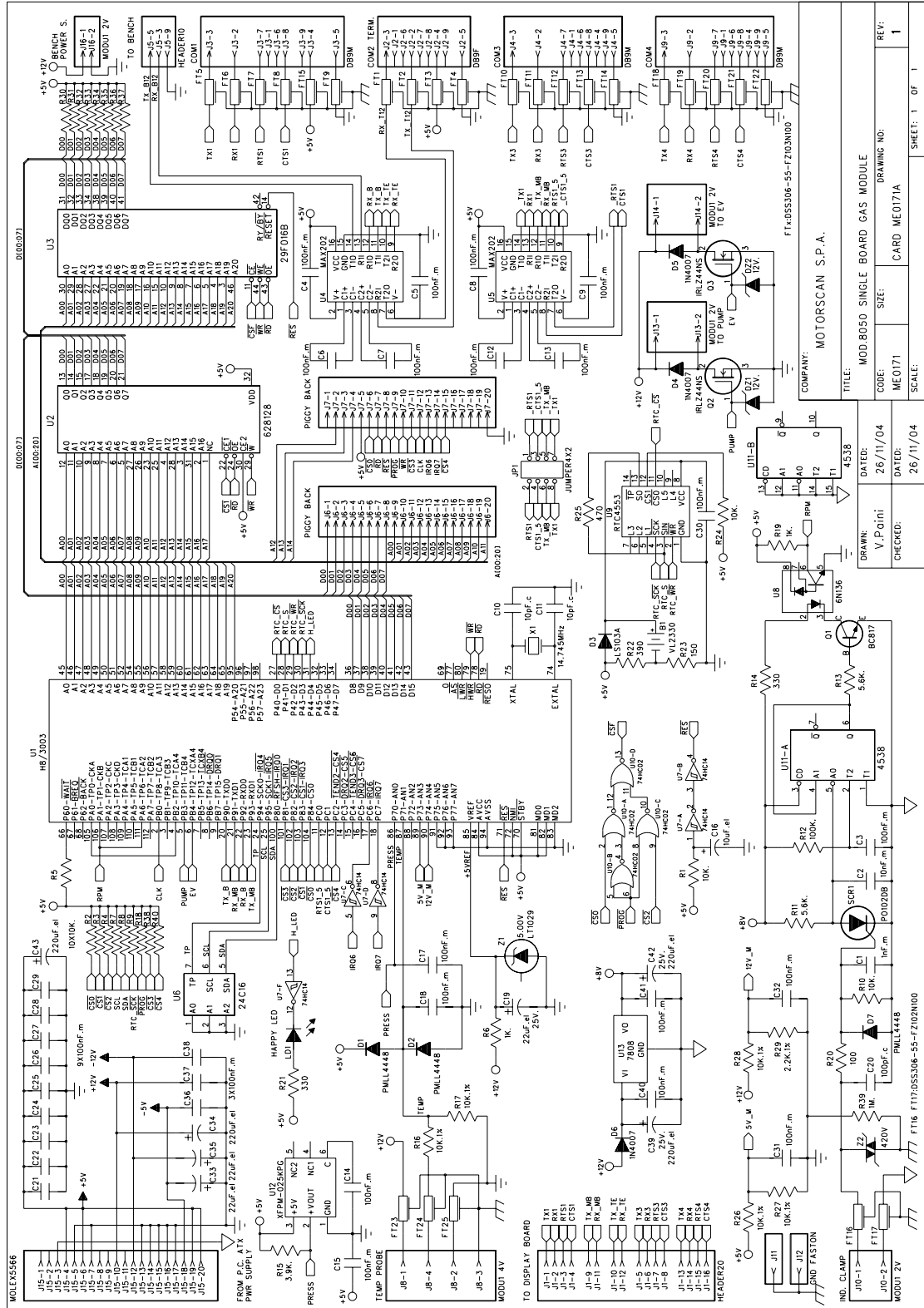
10. Disconnect the PC.

SCHEMES, LAYOUT & COMPONENT LISTS

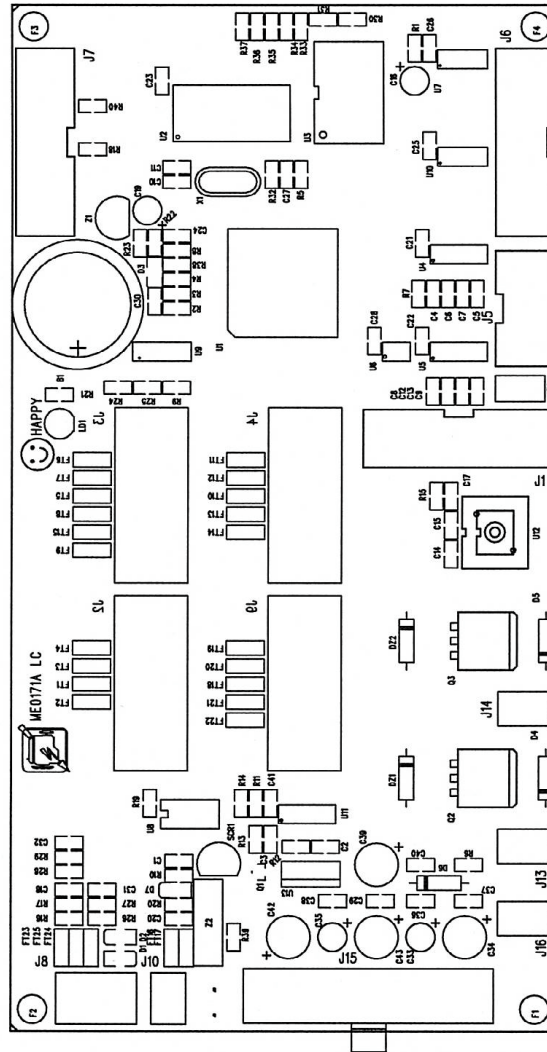
This section includes the wiring diagrams, the layout and the list of components of the boards installed inside the analyser.

4.1 BASE MODULE BOARD CSA00171

4.1.1 SCHEMATIC DIAGRAM



4.1.2 LAYOUT



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4.1.3 LIST OF COMPONENTS

Me0171.LIS

Bill of Materials for Me0171.sch REV.1 26/11/2004				
FILENAME ME0171.LIS				
Item	Qty	Reference	Part Name	Description
1	1	U6	24C16 S08	256 X 8 BIT I2C BUS EEPROM
2	1	U3	29F016B TSOP48	4096K X 8 FLASH MEMORY
3	1	U11	4538 S016	Dual Monostable
4	1	U2	628128-VB SO32WB	128K X 8 BIT CMOS RAM
5	1	U8	6N136	DIP8 OPTOCPLER
6	1	U10	74HC02 SO14	
7	1	U7	74HC14 SO14	HEX SCHMITT-TRIGGER INV
8	1	U13	7808 TO220	GENERIC + VOLTAGE REGULATOR
9	1	B1	BATTERY,VL2330	RECHARGEABLE LITHIUM 3V BATTERY
10	1	Q1	BC817	NPN Small signal Transistor
11	1	C16	CPOLA,10uF.e1 25v	RADIAL CAP, 0.1" PIN SPACE, 0.2" DIAMETER
12	3	C19 C33	CPOLA,22uF.e1 25v	RADIAL CAP, 0.1" PIN SPACE, 0.2" DIAMETER
13	4	C34 C39	CPOLB,220uF.e1 25v	RADIAL CAP, 0.15" PIN SPACE, 0.3" DIAMETER
14	1	X1	CRYSTAL,14.745MHZ	CRYSTAL BASSO PROFILO
15	30	C3-9	C_SMD1206,100nF.m	SURFACE MOUNT CAPACITOR
			C12-15	
			C17-18	
			C21-32	
			C36-38	
			C40-41	
16				
17	1	C20	C_SMD1206,100pF.c	SURFACE MOUNT CAPACITOR
18	1	C2	C_SMD1206,10nF.m	SURFACE MOUNT CAPACITOR
19	2	C10-11	C_SMD1206,10pF.c	SURFACE MOUNT CAPACITOR
20	1	C1	C_SMD1206,1nF.m	SURFACE MOUNT CAPACITOR
21	1	J2	DCON9F	9 PIN D-TYPE CONNECTOR V-FEMALE C.S.
22	3	J3-4 J9	DCON9M	9 PIN D-TYPE CONNECTOR V-MALE C.S.
23	1	R39	R_SMD1206,1M.	
24	3	D4-5 D6	DIODO,1N4007	Axial ss Diode w Alternate.
25	2	D21-2	DIODO-ZENER 12V 1W	
26	1	D3	DIO_SMD,LS103A	Axial ss Diode SOD80C
27	3	D1-2 D7	DIO_SMD,PMLL4448	Axial ss Diode SOD80C
28	1	U1	H8/3003	16 BIT MICROCONTR. HD6413003F16T
29	1	J5	HEADER10	10 PIN 2-ROW HEADER .100 SPACING (X & Y)
30	3	J1 J6-7	HEADER20	20 PIN 2-ROW HEADER .100 SPACING (X & Y)
31	2	Q2-3	IRLZ44NS,IRLZ44NS	GDS Nch MOSFET D2PAK
32	1	LD1	LED	LIGHT EMITTING DIODE 3mm GREEN
33	1	Z1	LT1029,5.00V	5VOLT PRECISION REFERENCE
34	2	U4-5	MAX202 SO16	+5V POWERED RS-232 DRIVER/RECEIVER
35	4	J10	MODU1/2V	2 PIN AMP MODU1 CONNECTOR V-C.S.
			J13-14	
			J16	
36	1	J8	MODU1/4V	4 PIN AMP MODU1 CONNECTOR V-C.S.
37	1	J15	MOLEX5566	20 PIN 2 ROW CONNECTOR V-C.S (PWR ATX-PC).
38	1	Z2	MOV 420V	AC PEAK VOLTAGE CLAMP
39	1	SCR1	PO102DB	SCR Small signal
40	1	R25	R_SMD1206,470	
41	1	U9	RTC4553	REAL TIME CLOCK MODULE (SOLITO EPSON)
42	1	R20	R_SMD1206,100	
43	1	R12	R_SMD1206,100K.	
44	21	R1-5	R_SMD1206,10K.	

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Me0171.LIS

		R7-10 R18		
		R30-38		
		R40 R24		
45	5	R16-17	R_SMD1206,10K.1%	
		R26-28		
46	1	R23	R_SMD1206,150	
47	2	R6 R19	R_SMD1206,1K.	
48	1	R29	R_SMD1206,2.2K.1%	
49	1	R15	R_SMD1206,3.9K.	
50	2	R14 R21	R_SMD1206,330	
51	1	R22	R_SMD1206,390	
52	2	R11 R13	R_SMD1206,5.6K.	
53	1	J11-12	FASTON C.S.V.	
54	1	U12	XFPM-025KPG, XFPM-025PG	VACUUM/PRESSURE SENSOR (non montare)
55	25	FT1-15	1n.	Noise suppression filter MURATA
		FT18-22	DSS306-55-FZ102N100	
		FT23-25		
		FT16-17		
56	1	JP1	JUMPER4x2	Strip 4x2 passo 2mm + 4 jumper

Note:

I 4 connettori DB9 vanno montati lato saldature con controparte per torrette a passo non metrico a saldare su c.s.

JUMPER POSITION ON CSA00171 BOARD	
INSTRUMENT	JP1
8050	NO
8060	YES
8070	YES
8071	YES

LIST OF ERRORS

ERROR N°	ERROR	SOLUTION
01	Zero error	Replace Sibench Replace oxygen sensor
02	Calibration error	Replace Sibench
03	Span O2 error	Replace the oxygen sensor
04	Supply voltage error	
05	Leak test error, leaks are too large	Clean or replace pump gasket Replace rubber elbows Replace plastic filter Clean or replace pump head Restore pneumatic unit hoses Clean or replace solenoid valve Replace steam trap bowl Clean or replace bowl O-ring Replace pressure sensor on board CSA00171
06	Leak test error, circuit vacuum too high	Operator's error, repeat the test by closing when opportune Remove any possible obstructions on the gas or water outlet Check the correct assembly of the zero solenoid valve
07	Residue HC error	Replace filters Clean or replace gas sampling probe
08	Communication errors	Restore inner flats Software update Replace board CSA00171 Replace Sibench
09	Gas flow error	Replace filters Clean or replace gas sampling probe Replace rubber elbows on Zero gas in Restore the solenoid valve block position (no. 2 towards the inside)
10	Bench error	Restore Sibench power supply cable Restore Sibench communication flat Replace Sibench
20	Pump always off	Restore connections Remove leak test plug Restore engine brushes contacts Replace pump Replace board CSA00171
21	Pump always on	Replace board CSA00171
22	Out gas flow low	Clean and reposition pump gaskets Remove possible obstructions on Out gas
30	Tool off	Reset analyser (power it off and on again) Replace on-off switch power unit
32	Tool Reset	Replace on-off switch power unit
40	Presence of Sibench error codes	Calibrate Sibench with two bottles Clean Sibench Restore pneumatic unit Restore out gas flow Restore zero solenoid valve Replace Sibench

ERROR N°	ERROR	SOLUTION
41	Values of unstable gases	Restore infrared resistance contacts Calibrate Sibench with two bottles Replace Sibench
42	Water in the Sibench	Clean Sibench Replace Sibench
43	Sibench detector bulb broken	Replace Sibench
44	HC values unstable	Replace filters Clean Sibench Replace Sibench
45	Gas values to full scale	Clean Sibench Replace Sibench
46	Electrochemical NO value not correct	Execute the calibration with bottle Replace NO sensor
47	Infrared NO value not correct	Replace Sibench
48	Oxygen value not to zero with standard gas bottle	Restore pneumatic unit Restore Cal Gas In closing plug Restore NO closing plug Replace oxygen sensor
50	Rpm measurement not correct	Restore connections Replace board CSA00171 Restore ground cable of board CSA00171
51	Temperature measurement not correct	Restore connections Calibrate probe temperature Replace temperature probe Replace board CSA00171
52	Date and time not correct	Set date and time either through hand-held PC or through Sim524W Replace board CSA00171 Replace buffer battery on CSA00171 board Clock integrated reset (quick short on buffer battery)
53	Voltage values from analogue channels not correct	Replace on-off switch power unit Replace board CSA00171
60	Software update failed	Replace board CSA00171
61	Serial communication troubles	Replace board CSA00171
62	Connection troubles with Multex	Software update Replace board CSA00171
71	Zero solenoid valve malfunction	Restore connections Clean solenoid valve inside Replace solenoid valve Replace board CSA00171

SIM524W LITE

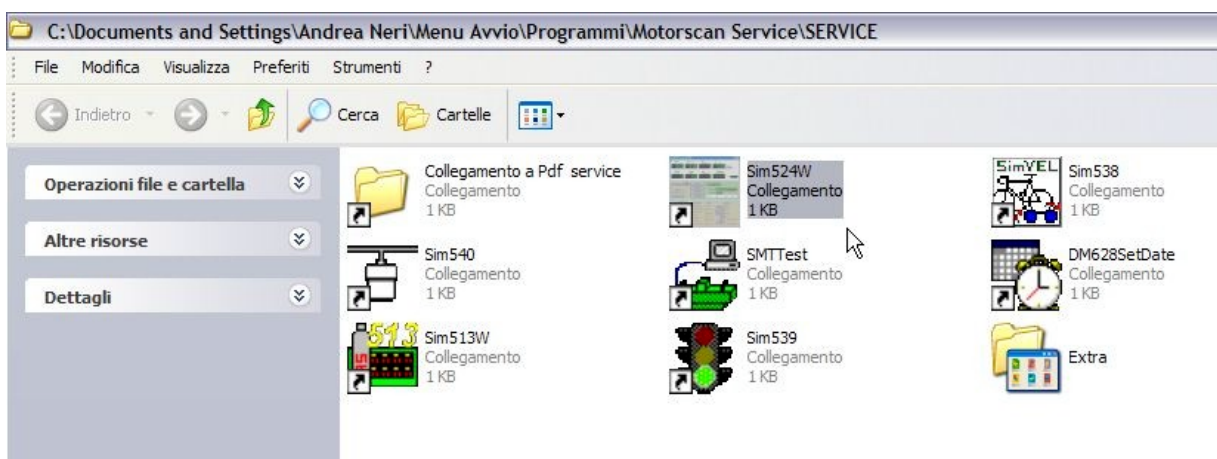
The following description illustrates the various functions of SIM524 v. 1.8 of the 20-09-2005 (or better). It is necessary for the periodic controls of the analysers.

Connect the ANALYSER to the serial port configured during the starting phase of the program (see next point) and using the following type of cable:

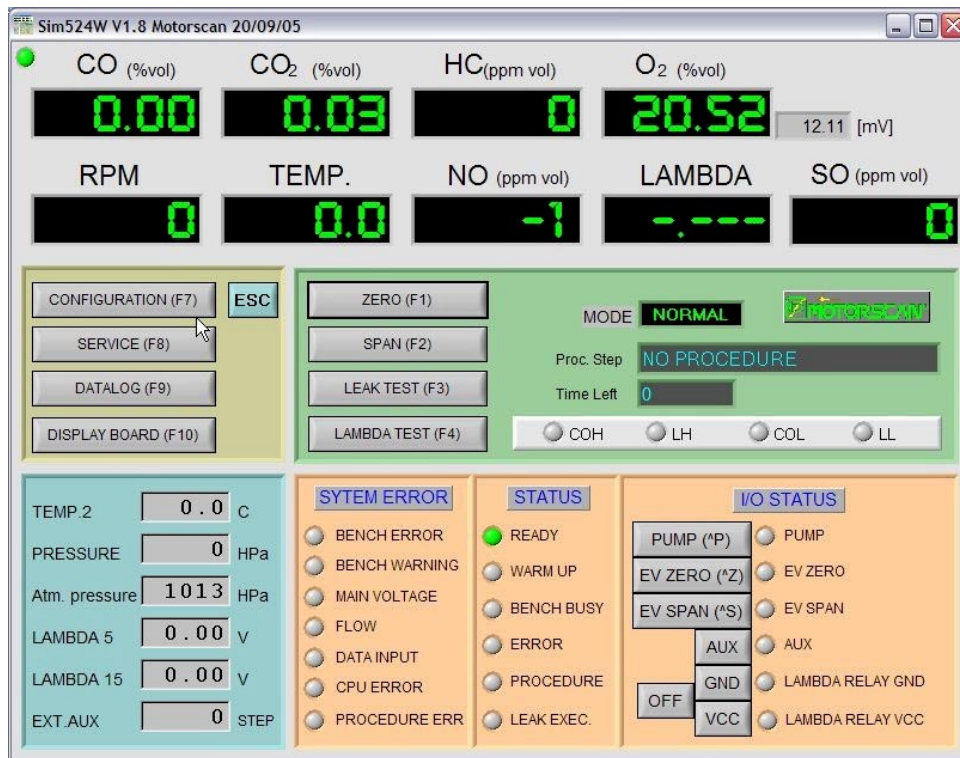
FEMALE DB9	Rx	2 -----	3	Rx	FEMALE DB9
	Tx	3 -----	2	Tx	
	GND	5 -----	5	GND	

6.1 USE OF THE PROGRAM

After installing the CD SERVICE, double-click on the icon “MOTORSCAN SERVICE” and on “SIM524W” then select the serial port of the PC you wish to use.



Once started, the program forces the Display Board to enter the *transparent mode*² and shows this panel:



Correct dialogue between SIM524W and the analyser is indicated by the green flashing LED in the bottom left-hand part of the PC.

If the LED is red, check all connections and repeat the procedure from the beginning.

6.2 MEASURED VALUES

The boxes CO, CO2, HC, O2, RPM, TEMP, NO, LAMBDA and SO show the corresponding parameters read by the analyser. The auxiliary analogue input values are shown, too (see Base Module electrical schemes for further details): these are the same values which can be read directly from the analyser in the *AUX DATA* menu:

- *TEMP 2*: function not enable.
- *PRESSURE* (in hPa): actually, it is the sucking under pressure, measured by the differential pressure.
- *ATM PRESSURE*: atmospheric pressure read by the bench pressure sensor
- *LAMBDA 5* and *LAMBDA 15* displays the lambda signal values as read by the Lambda Tester. *LAMBDA 15* should be 1/3 of *LAMBDA 5*, which gives the voltage present on the red clamp of the lambda cable (see the lambda tester related documentation for further details).
- *EXT AUX* are internal signals, usually not important for servicing.
- *MV*: is the voltage of the oxygen sensor expressed in mV.

² Transparent Mode means that the Display Board lets the Host PC dialogue with the Base Module board, actually acting as a simple bridge for all commands but few, which are interpreted locally by the Display Board. Entering the transparent mode causes the Display Board to display Host Ctrl (it stands for HOST CONTROL) on the CO and CO2 display.

6.3 ANALYSER'S STATUS AND SYSTEM ERRORS

The status of the analyser is summarised in the *SYSTEM ERROR* e *STATUS* groups (located at the centre bottom).

When red, the *SYSTEM ERROR* LED's indicate one or more of the following conditions:

- *BENCH ERROR*: a fatal error occurred inside the bench.
- *BENCH WARNING*: an error occurred inside the bench which does not necessarily invalidate the correct operation of the bench.
- *MAINS VOLTAGE*: Net voltage alarm (see the Service Manual for further details).
- *FLOW*: flow value not correct.
- *DATA INPUT*: an error occurred in the internal communication.
- *CPU ERROR*: Base Module internal fault.
- *PROCEDURE ERROR*: a procedure (e.g. ZERO, LEAK, SPAN, etc.) was not fully or correctly completed.

As far as the *STATUS* LED's, when lit green they have the following meanings:

- *READY*: the analyser is ready to accept further commands.
- *WARM UP*: the analyser is warming up.
- *BENCH BUSY*: the analyser is busy executing some command or procedure, and cannot accept further commands.
- *ERROR*: a generic error was reported, not otherwise identified.
- *PROCEDURE*: the analyser is executing a procedure.
- *LEAK EXEC.*: the gas analyser has executed the leak test successfully.

WARNING: not all combinations of the STATUS LED's are possible: e.g., an analyser cannot be Ready and Busy at the same time.

6.4 ACTUATORS STATUS AND CONTROL

In the *I/O STATUS* section the status of the following actuators are shown:

- **PUMP (^P)** Sampling pump;
- **EV ZERO (^Z)** Zero air electrovalve;
- **EV SPAN (^S)** Calibration gas electrovalve for the models in which it is present;
- **AUX** Auxiliary outlet enabling (not active);
- **GND** Ground relay of the lambda tester;
- **VCC** Vcc relay of the lambda tester.

Each actuator's status is shown by the corresponding green LED (LED lit: actuator is ON). It is also possible to toggle the actuator's status by pressing the pushbuttons on the left (by means of the mouse or by pressing ^P (CTRL+P), ^Z (CTRL+Z), ^S (CTRL+S)).

6.5 PROCEDURE EXECUTION

Immediately above the status and actuators window there is the *PROC. STEP* window, which displays for the execution of the following procedures:

- **ZERO:** the analyser is executing a zero setting;
- **SPAN:** the analyser is executing a calibration;
- **LEAK TEST:** the analyser is executing a leak test; the negative pressure value can be read in the PRESSURE box;
- **LAMBDA TEST:** (Function which can be executed only with the LAMBDA TESTER) it displays out the lambda test. See the LAMBDA TESTER documentation for further details.

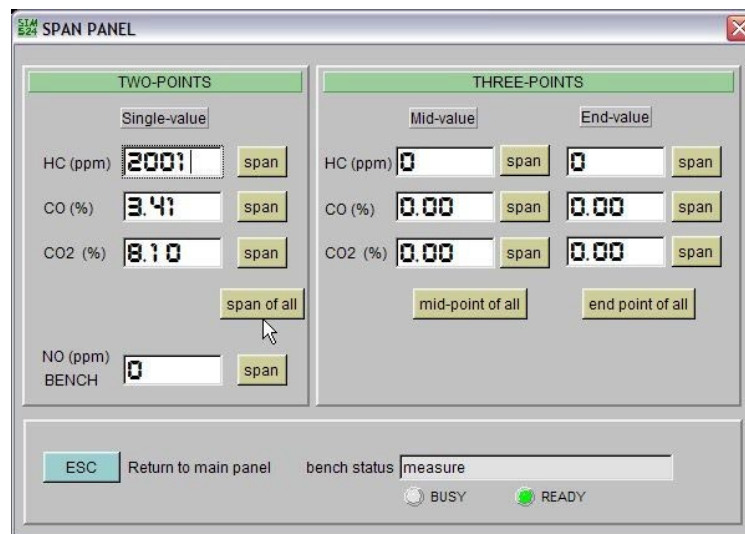
During a procedure execution the *PROC. STEP* box shows which phase of the procedure is actually being executed, and the *TIME LEFT* box the time missing (in seconds) to that phase's completion.

6.5.1 ZERO – F1

By pressing the *ZERO* key (*F1*) the analyser executes a zero setting.

6.5.2 SPAN – F2

This panel is activated by pressing *F2* from the Main Panel.



The panel allows for two-point (one bottle plus zero) or three-point (two bottles plus zero) Span of each IR channel of the bench (HC, CO, CO2), either individually or collectively (recommended).

Usually the one bottle calibration is used. The two bottles calibration is necessary only after an error calibration which has generated at least one of the following bench error codes: 22-23-24.

From this page it is possible to execute also the NO calibration (see chap. "NO SENSOR CALIBRATION").

Note that SIM524W is the only means of calibrating an analyser when a regulation is selected that does not allow a calibration utility to be available to the user.

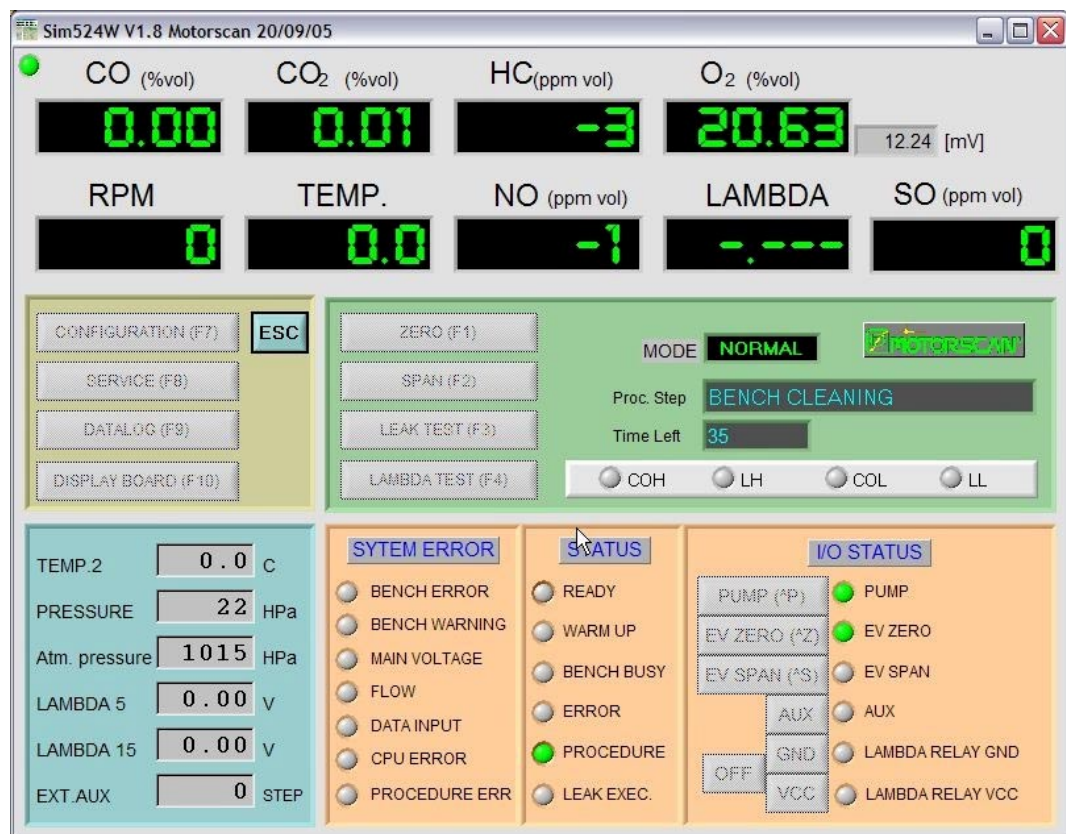
SIM524W overrides the active regulation's settings and performs the calibration by directly issuing the proper commands to the Base Module.

6.5.2.1 TWO POINTS

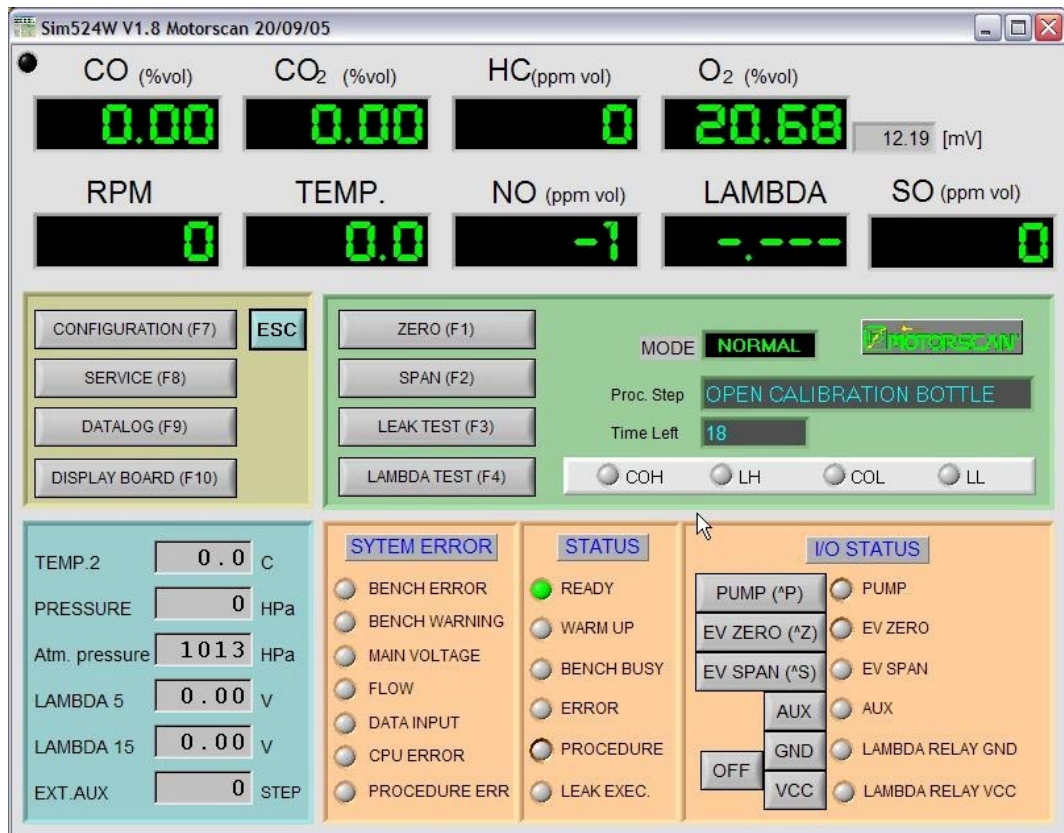
Making a two-point calibration is straightforward: first you need to connect the calibration bottle to the *CAL GAS IN* input at the rear of the analyser; then you have to enter the calibration gas concentrations (HC must be in ppm propane, as usual), confirm them by pressing *<ENTER>* and finally press the **Span of all** pushbutton. This starts the automatic Span procedure. Before actually executing, the Span procedure requires a password.

IMPORTANT: care should be taken in order to avoid accidental calibration with wrong calibration values. However, the analyser's software is designed in such a way that calibration is aborted whenever the expected reading are too far from the actual ones, as it can happen when the calibration bottle is connected but left close.

Once started, the calibration procedure returns to the main panel, and shows its status in the *PROC. STEP* and *TIME LEFT* windows; in the following figure an example is given:



In this case *Bench cleaning* appears; this will be followed by a zero setting and then the operator will be told to open the calibration bottle (see the following picture):



When the stabilisation period is over, the calibration starts. At the end of the calibration the operator is told to close the bottle.

In case you are using a TOTALGAS analyser it is essential to respect the bottle opening and closing times because, since the analyser is not provided with a SPAN solenoid valve, the gas is in direct communication with the bench.

In case of a procedure error the corresponding *PROCEDURE ERR.* LED in the *SYSTEM ERROR* group will be lit (see chapter "ANALYSER'S STATUS AND SYSTEM ERRORS").

6.5.2.2 THREE POINTS

The two bottle calibration is like the procedure previously described, repeated twice: the first one for the bottle for the lower concentrations (Mid-value), and the second one for the bottle for the higher concentrations (End-value).

6.5.3 NO SENSOR CALIBRATION (F2 SPAN)

Contrary to other gases, NO and SO must be calibrated separately through a dedicated bottle. The procedure changes whether the sensor to be calibrated is an infrared sensor inside the bench, an electrolytic sensor connected to it or an electrolytic sensor connected to the CPU. The scheme below summarises which procedure (and hence which paragraph of the handbook) is to be complied with according to the kind of sensor and on which category of tools it is possible to configure it.

Calibration		Sensor type			
		NO			SO
		Infrared (Bench)	Electrochemical (CPU)	Electrochemical (Bench)	Electrochemical (CPU)
SPAN – F2	Eurogas Totalgas		Eurogas Totalgas		
SERVICE – F8		Eurogas		Eurogas	

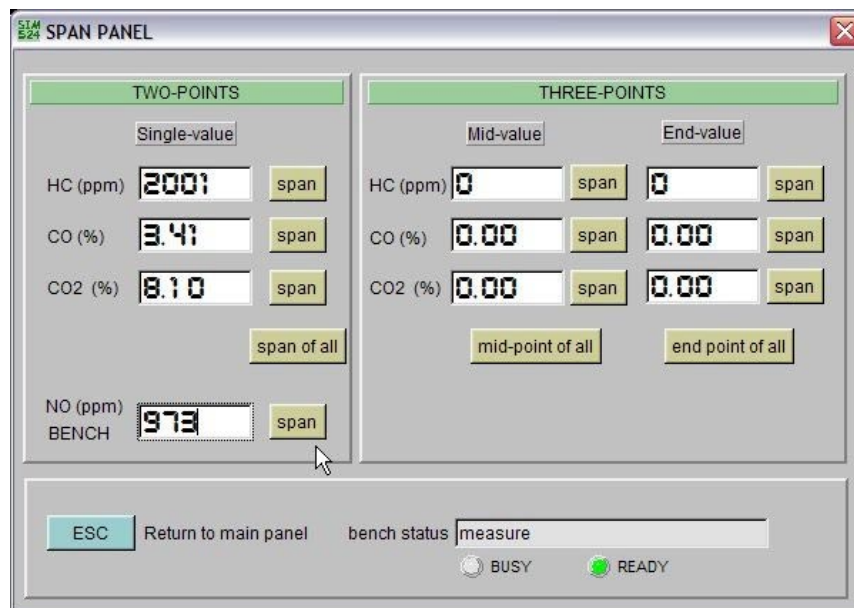
ATTENTION!

IN ORDER TO MODIFY SENSOR CONFIGURATION, PLEASE CONTACT MOTORSCAN S.p.A.

So by summarising the following can be stated:

- The "**F2 SPAN**" function is used in all the cases in which the IR bench is used and/or the sensors are connected to the bench;
- The "**F8 SERVICE**" function is used in the EUROGAS models only where the sensors are connected to the CSA00098.

By pressing the **F2 SPAN** key from the main menu it is possible to enter the screen page shown below from which it is possible to execute the calibration of the NO channel in the following way.



After connecting the bottle to the inlet **CAL GAS IN**, select concentrations by confirming them with **<ENTER>** and press the button **Span**. After starting, the calibration procedure goes back to the main panel, by showing the progress in the window *Proc. step*; similarly to what has been described for other gases.

6.5.4 LEAK TEST – F3

By pressing *F3* the leak test starts whose steps are described in window *PROC. STEP*.
At the end of the test the *LEAK EXEC*. Led colour shows the test result.

6.5.5 LAMBDA TEST – F4

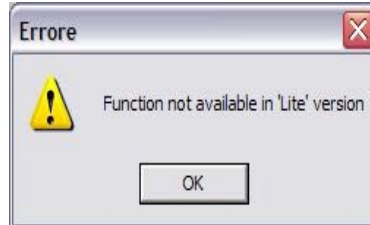
Note that the two relays to be controlled are physically located in the lambda tester; therefore, their status and commands are meaningful only if a Lambda Tester is connected to the analyser.

To deactivate the two relays you have to select the key OFF.

Each actuator's status is shown by the corresponding green LED (LED lit: actuator is ON). It is also possible to toggle the actuator's status by pressing the pushbuttons on the left (by means of the mouse or by pressing *^P (CTRL+P)*, *^Z (CTRL+Z)*, *^S (CTRL+S)*).

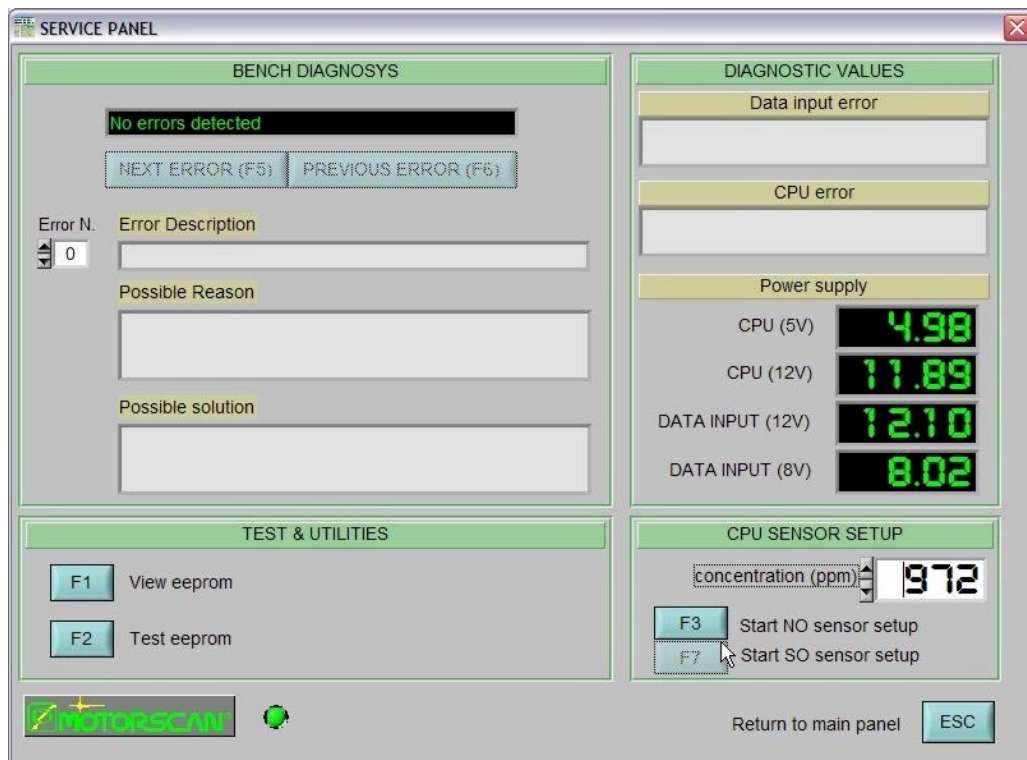
6.6 CONFIGURATION – F7

Function reserved to Motorscan S.p.A..



6.7 SERVICE – F8

By pressing *F8 SERVICE* from the main menu the page below is entered:



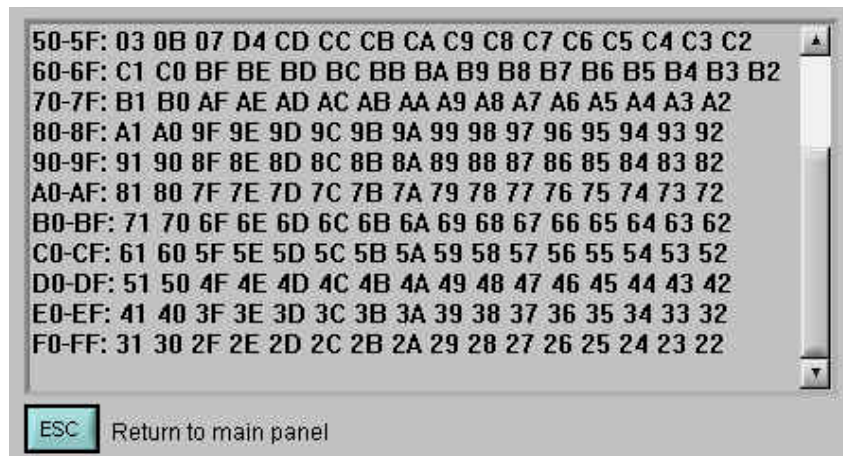
6.7.1 BENCH DIAGNOSYS

This panel allows to diagnose any mistakes of the bench.

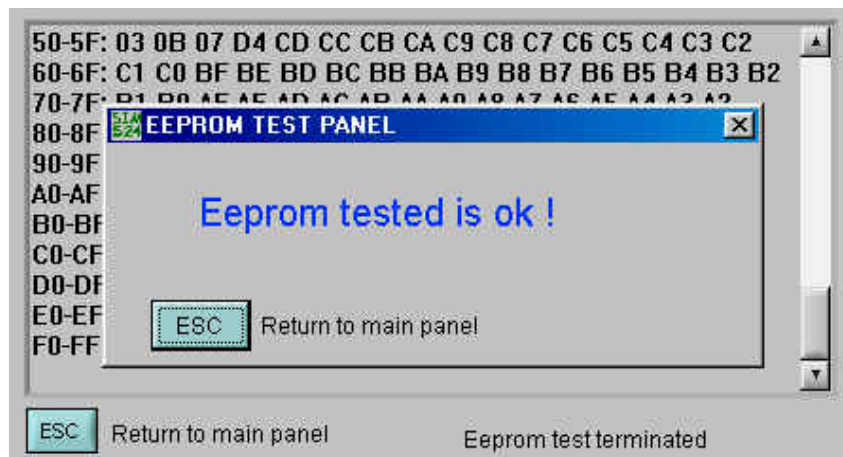
6.7.2 TEST & UTILITIES

The upper-left section, EEPROM, allows for full hexadecimal dumping and testing of the Base Module EEPROM:

- **VIEW EEPROM:** this function dumps all the 256 EEPROM bytes to the screen in hexadecimal format; the bytes are organised into 16 16-bytes row, and the address range for each row is shown on the left of the dump window. An example of a VIEW EEPROM result is given in the figure that follows.



- **TEST EEPROM:** this function automatically tests the EEPROM by first reading the EEPROM contents, then writing it with a pattern and finally restoring it to the original values. The function returns the result of the test.



6.7.3 DIAGNOSTIC VALUES

Only the voltages at the bottom right section (*Power supply*) of the window need be taken into account for servicing. Their meaning is straightforward.

6.7.4 CPU SENSOR SETUP

The *CPU SENSOR SETUP* window can be used to execute a calibration of the NO sensor or the SO sensor by using a reference.

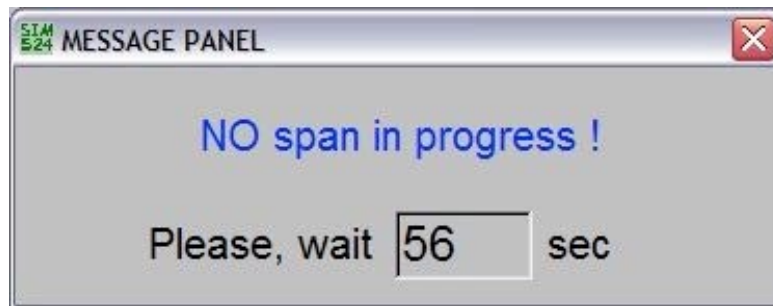
You can access to this function only if the sensors are connected to the board CSA00098 of the Eurogas gas analysers (see chapter “NO SENSOR CALIBRATION”).

After connecting the bottle to the *CAL GAS IN* inlet, select the desired gas concentrations in the *concentration (ppm)* field and confirm by <ENTER> and then press the button **Start NO sensor setup** if a NO sensor is being calibrated or **Start SO sensor setup** if a SO sensor is being calibrated.

A password entry is required before the calibration can start: as usual, the password to be entered is **8020**, confirmed by <ENTER>.

Once the password is acknowledged, open the bottle and introduce the sample gas in the inlet *CAL GAS IN* at 3,5 l/min.

This phase lasts approx. 30 seconds in order to permit the stabilisation of the value. This situation is shown in the following panels:



When the stabilisation time has elapsed, the NO sensor's gain is automatically calculated, stored in the EEPROM (it can be recalled later in the Configuration panel) and shown as in the previous figure.

It is good practice to write it down on the sensor's label, for further reference.

6.8 DATALOG – F9

By this function it is possible to memorise and save in txt format the main parameters of analysers such as values of gas, rpm, temperature at an interval of about two samplings per seconds.

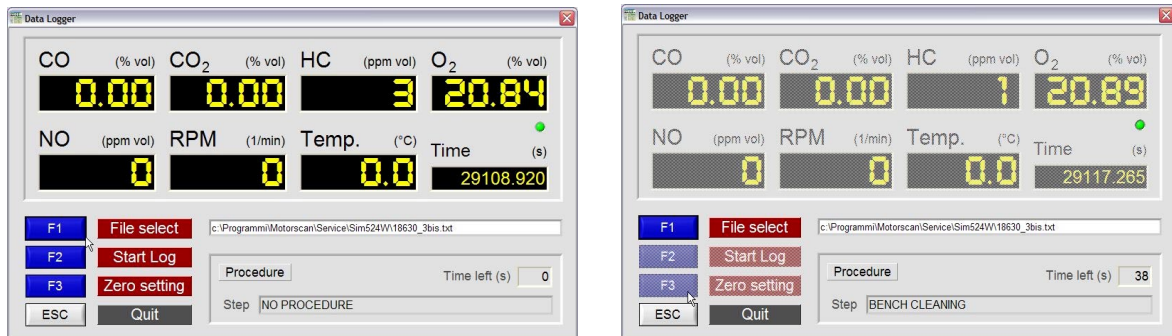
In case of Eurogas the 16 or later version of the software basic module is necessary.

After launching the function *F9 DATALOG* a page is entered to display the values to be then captured and the functioning progressive time.

By *F1* it is possible to select and if necessary to re-name the txt file in which data are saved.

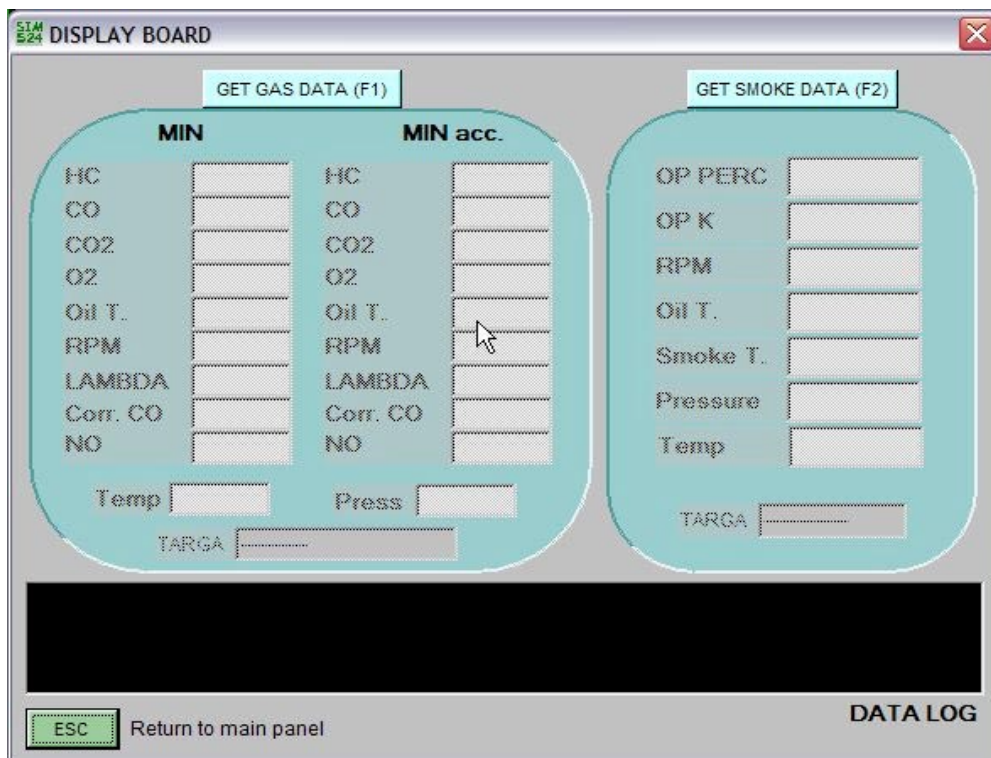
By *F2* the values memorisation starts and stops.

By *F3* to reset the tool, suggested before any scanning.



6.9 DISPLAY BOARD – F10

The *F10* key enables to display data sent by the protocol 1 of the analyser (the panel has been introduced to allow tests by the staff of the MOTORSCAN S.p.A. Technical Department).





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