DGiC-CB

INSTRUCTION MANUAL

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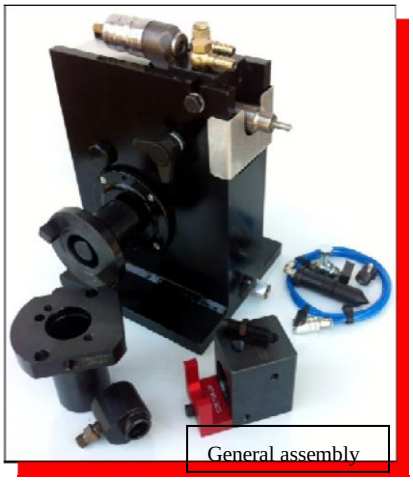
INTRODUCTION

The DGIC-CB simulator is used to test EUI model unit injectors of the most important BRANDS and models available on the market to date.

Our simulator is in continuous improvement and development depending on the market requests and on our customers' needs.

The DGIC-CB has to be used with Cam-Box.

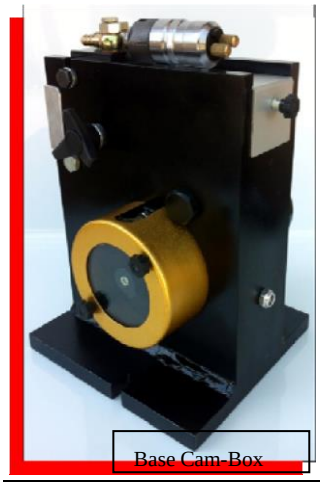
Our base mechanics "Cam-Box" is composed as follows:



General assembly

- ✔ Black box known as Cam-Box
- ✔ A base adapter block for EUI unit injector (usually with the code SRA0124-03) that allows unit injectors mounting such as *Volvo Bosch* and *Iveco (large model)*
- ✔ Large camshaft
- ✔ Rocker
- ✔ Base nuts and bolts kit that includes:

- n. 2 centering guides with the test bench platform
- n. 2 bolts and bolt sleeves to fix the Cam-Box to the platform



Base Cam-Box

- ✔ n. 1 adapter junction for spray collection
- ✔ n. 1 Rilsan tube
- ✔ n. 1 spray damper to route the liquid from the pulveriser to the burette
- ✔ n. 1 perforated bolt (M14x1.5 mm) to mount on the inlet (IN)
- ✔ n. 1 check valve (M14x1.5 mm) to mount on the outlet (OUT)
- ✔ n. 2 barb fittings (IN/OUT), hole Ø 14 mm
- ✔ n. 4 copper washers Ø 14 mm for junction and valve
- ✔ n. 2 protection covers

1. INSTRUMENT SWITCHING ON

After connecting the simulator to the power supply 220V 50-60Hz, shift the ignition switch on "I". The switch is on the instrument rear panel (*see paragraph 15*).

On the display it will be shown the home page (as illustrated in Fig. 1).

Fig. 1

In the home page there will be:

- *The main simulator abbreviation "DGIC"*
- *The software and the database version*
- *The "key" symbol on the upper right that allows access to the simulator "special" settings (e.g.: language, and so forth).*

2. COIL ELECTRICAL CONNECTION

After unit injector mounting in the specific adapter block and after having it appropriately fixed in the Cam-Box (*see the mechanical part of the user manual, paragraph 17)*, connect the wiring to the coil.

IMPORTANT NOTES:

2.1. In case of a 2 pin coil (for example PDE, Volvo Bosch or Delphi), only connect to the coil the wiring numbered with 1.

2.2. In case of a 4 pin coil (for example Volvo Delphi EUI-3), connect the wiring numbered with 1 to the coil n. 1 (that is the two pins closer to the pulveriser). Connect the wiring numbered with 2 to the coil n. 2 (that is the two pins closer to the unit injector spring).

3. PROXIMITY SENSOR

Check the mounting and the phase of the sensor mounted before on the Cam-Box *(see the mechanical part of the user manual, paragraph 17*). The wiring sensor opposite end should be connected to the instrument "proximity sensor" socket *(see paragraph 15)*.

4. UNIT INJECTOR SELECTION

To set the kind of injector to test, you can follow two methods:

4.1. The first one consists of pressing the "DB" key, setting BRAND, TYPE, CODE and proceeding directly to paragraph 4.

4.2. The second one is as follows:

4.2.1 Press "FORWARD" (green arrow).

4.2.2 Select the test to perform. For example "Test Injector" (*see Fig. 2*).

4.2.3 Press "ENTER" (green arrow) once to continue.

4.2.4 Choose the test to perform. For example, "eRLC", the coils electrical test (Fig. 3). Press "ENTER" (green arrow) once and enter the "eRLC" test.

Fig. 2

Fig. 3

4.3. The DGIC detects that a new unit injector has been connected (Fig. 4) and asks if the operator wants to reset *BRAND*, *TYPE*, and *CODE*.

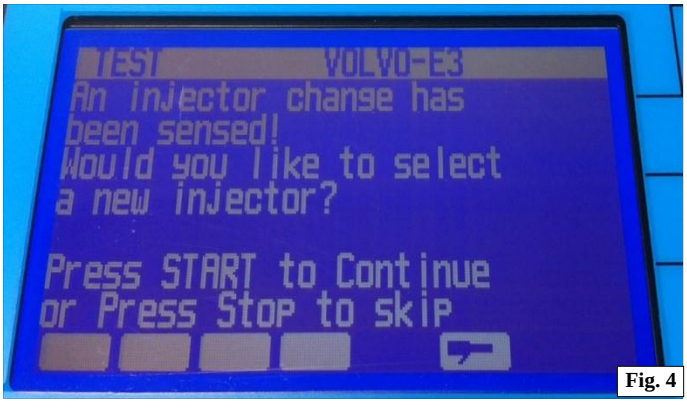


Fig. 4

Fig. 5

Pressing "FORWARD"/"START"*(green arrow*), it is possible to access the same menu (Fig. 5) displayed if the "DB" key *(see paragraph 4.1)* is pressed.

5. CHOOSING UNIT INJECTOR PROFILE TO TEST

In the "Injector Profile" menu (Fig. 5), move the pointer with the Up/Down arrows to choose among the options BRAND, TYPE and CODE, to set the DGIC to work with the unit injector underling the test. Proceed as follows:

5.1. BRAND: (Fig. 6)

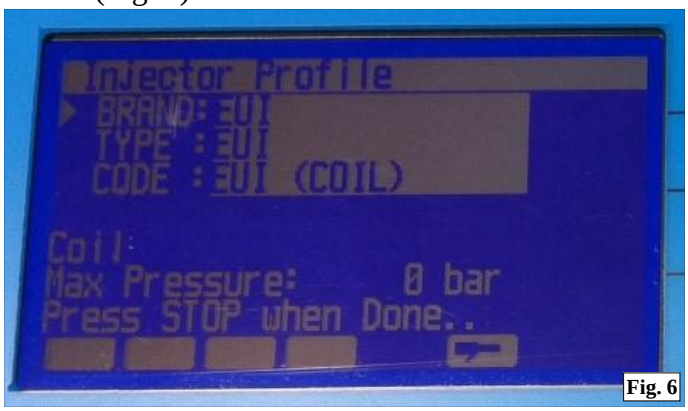


Fig. 6

5.1.1 Use the Up/Down arrows to place the pointer near the BRAND option.

5.1.2 Press “ENTER” (green arrow) to enter the BRAND list (Fig. 6.1).

5.1.3 Select the desired BRAND moving the pointer with the Up/Down arrows.

5.1.4 Press “ENTER” (green arrow) to confirm the setting.

Fig. 6.1

The DGIC displays the “Injector Profile” menu (Fig. 5) on the screen.

5.2. TYPE: (Fig. 7)

Fig. 7

Use the Up/Down arrows to place the pointer near the TYPE option.

5.2.1 Press “ENTER” (green arrow) to enter the TYPE list (Fig. 7.1).

5.2.2 Select the desired TYPE moving the pointer with the Up/Down arrows.

5.2.3 Press “ENTER” (green arrow) to confirm the setting.

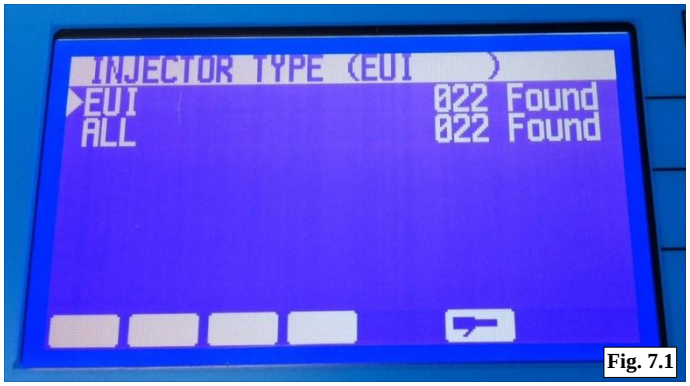


Fig. 7.1

The DGIC displays the “Injector Profile” menu (Fig. 5) on the screen.

5.3. CODE: (Fig. 8)

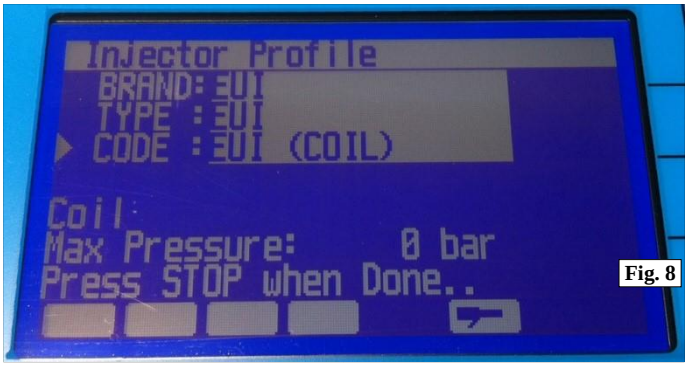


Fig. 8

Use the Up/Down arrows to place the pointer near the CODE option. 5.3.1 Press "ENTER" (green arrow) to enter the CODE list (Fig. 8.1).

5.3.2 Select the desired CODE moving the pointer with the Up/Down arrows.

For example, the code Volvo-E3 for the 4 pins Volvo Delphi.

5.3.3 Press "ENTER" (green arrow) to confirm the setting.

Fig. 8.1

The DGIC displays the first information regarding the set unit injector (Fig. 9).

6. SELECTED CODE INFORMATION

Fig. 9

After confirming unit injector *brand*, *type*, and *code*, the DGIC displays the first information regarding the selected unit injector.

6.1. The displayed information is simple (Fig. 9), but very important as it indicates to the operator what follows:

6.1.1 The unit injector is a COIL, not "PIEZO".

6.1.2 The maximum power pressure from the bench to the inlet junction "IN" must be Max = 5 Bar.

6.1.3 Press "STOP" (red key) when ready to pass to the connections and line test.

7. CONNECTIONS AND LINE TESTS

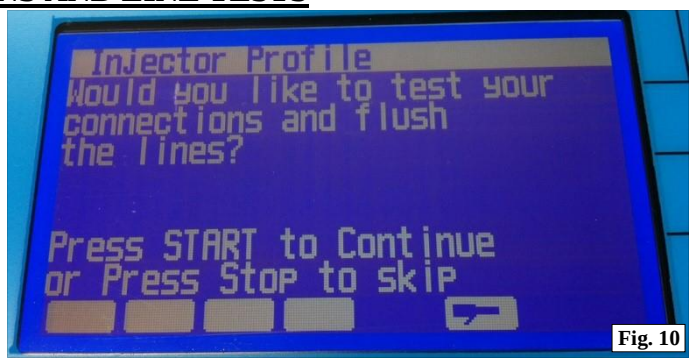


Fig. 10

The DGIC displays a new screen (Fig. 10) in which asks if the operator wants to test the connections and the line. That means checking hydraulic (IN/OUT), electrical (wiring connection) and pulveriser-burette connections.

If the test has to be executed, press "START" (green arrow) and continue from **paragraph 5.1**.
If the test has not to be executed, press "STOP" (red key) and continue from **paragraph 5.2**.
SUGGESTION: *Skip this test pressing "STOP" (red key)!*

7.1. Press "START" (green arrow) to confirm the connections test and start the test (Fig. 10.1). 7.1.1 Make sure that the correct wiring and the correct power and return hoses are connected, that the delivery gathering adapter (RSP, paragraph 13) is mounted, and that the damper is mounted in the burette.

Fig. 10.1

7.1.2 When ready, press "START" (green arrow).

7.1.3 The DGIC displays a new screen (Fig. 10.2) in which asks to:

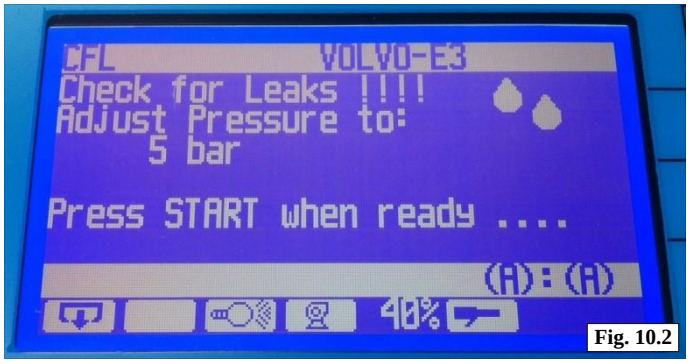


Fig. 10.2

Adjust the power pressure to 5 Bar.
Check possible system leaks.
Press "START", when ready to start the test.

7.1.4 After pressing "START" (*see paragraph 7.1.3*), the DGIC displays a new screen (Fig. 10.3) indicating the "Running..." state, which means that the test is in progress.

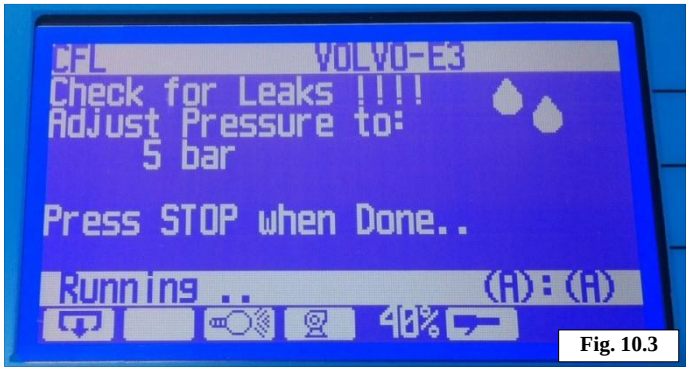


Fig. 10.3

It is therefore necessary to regulate the test bench revolutions (+/- 500 RPM, Revolutions Per Minute) to allow the spray.

During this phase the aim is to check for possible system leaks!

7.1.5 At the end of the test, press "STOP" (red key) once to interrupt the test. The DGIC displays again the preceding screen again (Fig. 10.2).

In case of system leaks, solve the detected problems and repeat the test (*see paragraphs 7.1.4 and 7.1.5*).

7.1.6 Press "STOP" (red key) again to exit the executed test and continue with the other tests described from paragraph 6.

7.2. Press "STOP" (red key) to skip the connection test.

The DGIC displays the new screen (Fig. 10.4) in which it indicates to:

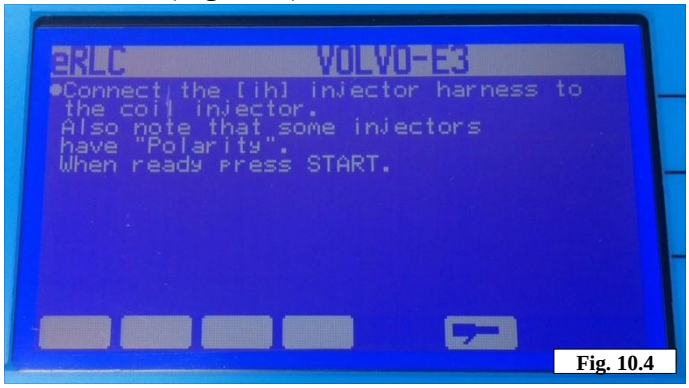


Fig. 10.4

7.2.1 Connect the appropriate wiring to the unit injector connector.

7.2.2 Check to have the right polarity as some EUI systems have polarity.

7.2.3 Press "START" (green arrow), when ready to enter the "eRLC" test screen.

8. "eRLC" ELECTRICAL TEST

The DGIC displays a new screen (Fig. 11) where it is possible to start the real coil electrical test.

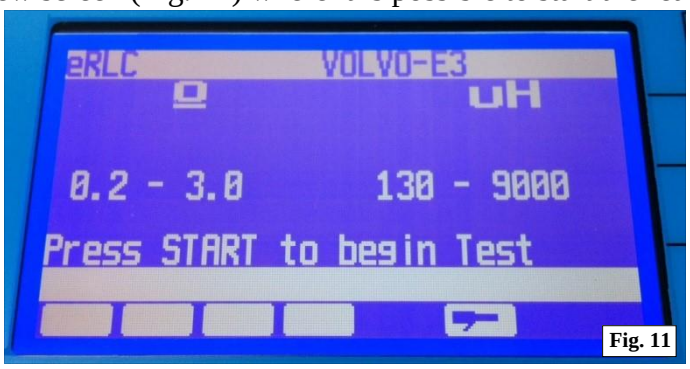


Fig. 11

In Fig. 11 the following information is available:

8.1. 0.2 – 3.0 Ω = the coil resistance Ohm value. The value detected by the DGIC will be shown above the Ohm range.

8.2. 130 – 9000 µH = the coil inductance Microhenry value. The value detected by the DGIC will be shown above the Microhenry range.

Continue as follows (Fig. 12):

8.3. The display shows: Press “START” (green arrow) to begin the electrical test.

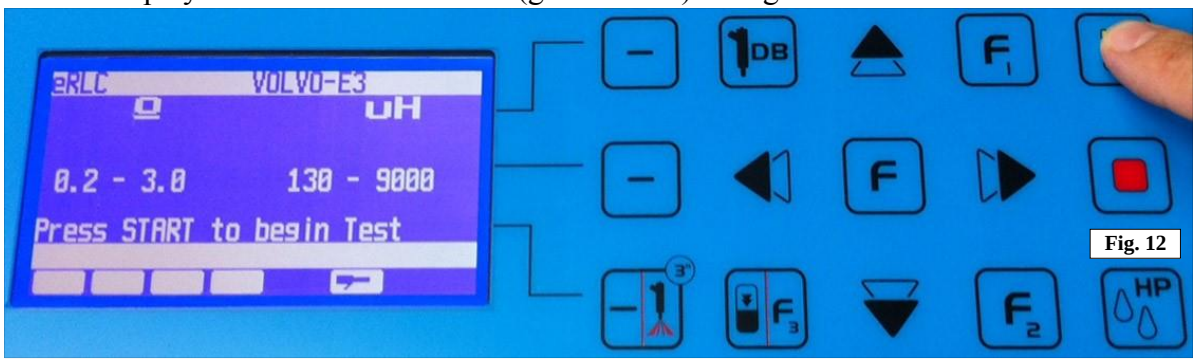


Fig. 12

8.3.1 The DGIC begins the “eRLC” test (Fig. 13) with the real resistance (Ω) and inductance (µH)

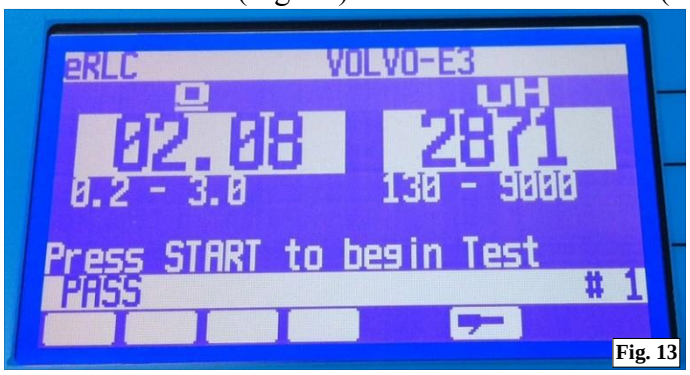


Fig. 13

values in the appropriate boxes on the display (*see paragraphs 8.1 and 8.2*).

8.3.2 Check that the test results are correct, making sure that “Ω” and “µH” values are within tolerance limits. If the coil is “short-circuited” or is “open”, the display shows this state.

ATTENTION: *In case of EUI-E3 (4 PINS), the wiring should be connected in the appropriate way:*

Coil 1 (pulveriser side) to wiring n. 1

Coil 2 (spring side) to wiring n. 2

The eRLC test needs to be executed on both coils, so after executing coil n. 1 test, press the right arrow once to select coil n. 2.

In the lower right corner of the DGIC display (Fig. 13), near the hash symbol (#), appears the wire number from which the DGIC will detect the coil values.

Proceed with the eRLC test as indicated in paragraph 6.

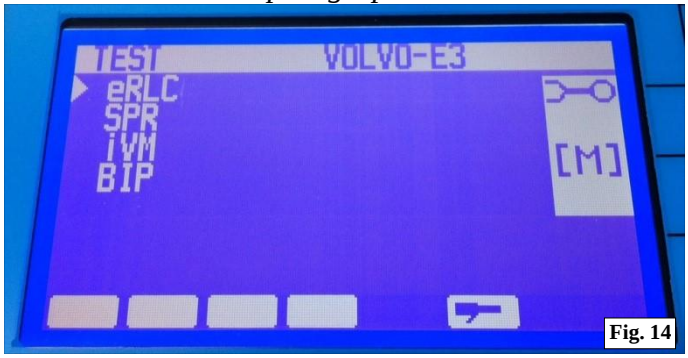


Fig. 14

8.4. Press “STOP” (red key) to return to the test menu screen (Fig. 3 and Fig. 14).

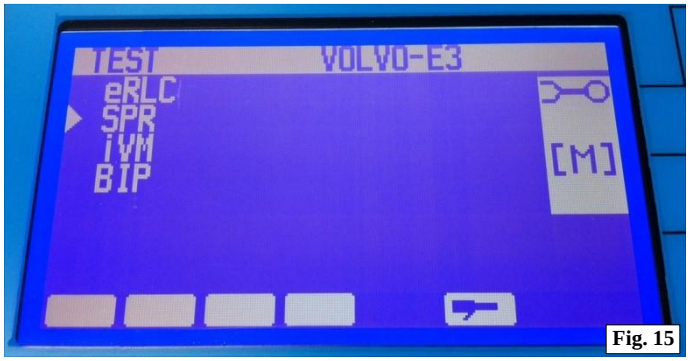


Fig. 15

Using the Up/Down arrows, place the pointer near the SPR option (Fig. 15).

8.5. Press “ENTER” (green arrow) to continue and access the SPR test.

9. “SPR” SPRAY TEST

The DGIC (Fig.) tells the operator to make sure that everything is set correctly for the spray test execution (Fig. 16).

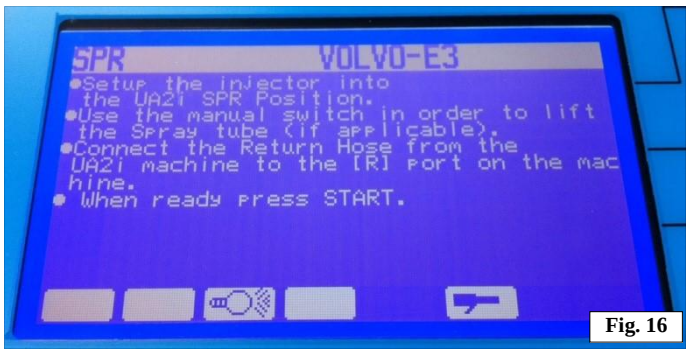


Fig. 16

9.1. The SPR test consists of the execution of 4 spray try outs, called “*SPR.1”*, “*SPR.2”*, “*SPR.3”*, and “*SPR.4”* (Fig. 17) (*see paragraph 9.5*).

The tests should be executed as follows:

9.1.1 Test bench revolutions.

9.1.2 “P[1]” parameter value, that is the coil opening interval expressed in “µs”, or the injection duration.

9.1.3 “T” parameter value.

To set the correct “P[1]” and “T” parameters value, proceed as indicated in paragraph 7.4 and following paragraphs.

9.2. Make sure that the unit injector is correctly mounted on the Cam-Box structure *(see the mechanical part of the user manual, paragraph 17).*

9.3. Make sure to have correctly set the zero and the phase among the proximity sensor, the camshaft and the tappet preloading (*see the mechanical part of the user manual, paragraph 17*).

9.4. Press “START” (green arrow) to access the SPR tests screen.

9.5. The DGIC displays a new screen (Fig. 17) in which it is possible to begin the spray test.

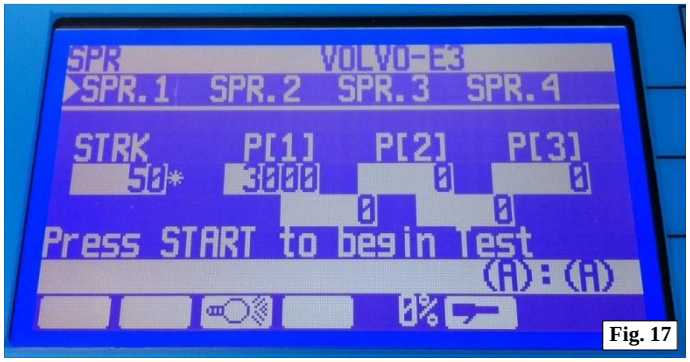


Fig. 17

9.6. In Fig. 17 it is possible to identify the following options:

9.6.1 **STRK**, 50, *. Where:

9.6.1.1 "STRK" is the test bench revolutions number.

9.6.1.2 "50" is the "fictitious" revolutions number shown on the DGIC display, that does not have any benefit, when there is an asterisk "*" near it (*see paragraph 9.6.1.3*). 9.6.1.3 "*" is the revolutions automatic reading mode.

The revolutions reading occurs through the proximity sensor.

9.6.1.4 "P[1]" is the coil opening time in µs (*see paragraph 9.1.2*). 9.7. The test bench revolutions have to be set by the operator acting directly on the test bench. *The test bench revolutions are not managed, but only read by the DGIC!!!*

9.8. "P[1]" parameter can be modified by the operator directly on the DGIC from the screen shown in figures Fig. 17, Fig. 19 and Fig. 20, following these simple steps:

9.8.1 Press the "F" key once (Fig. 18).

9.8.2 The pointer near SPR.1 remains fixed, not flashing, while another

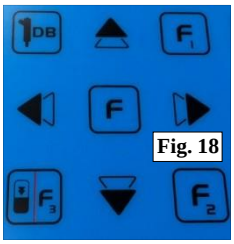


Fig. 18

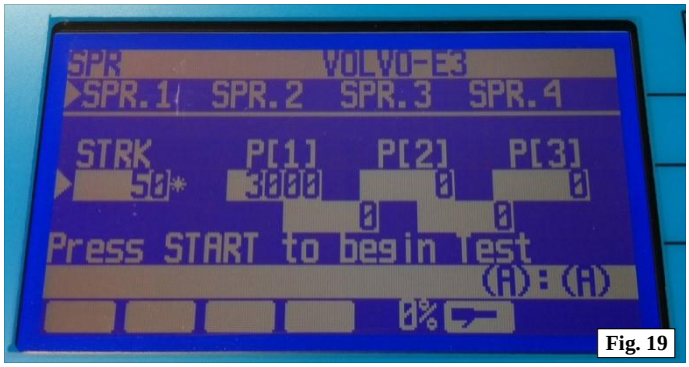


Fig. 19

pointer will be shown near STRK.

When there is a flashing pointer near a box, it means that it is possible to change the box value.

In case of the STRK box (Fig. 19), as the asterisk (*) is shown, it is not possible to change the value.

9.8.3 Press the right arrow once to move the flashing pointer on the P[1] value box (Fig. 20).

Fig. 20

9.8.4 Use the Up/Down arrows to change the "P[1]" parameter value.

9.8.5 The change of the “P[1]” parameter is immediately “operative”. It is recommended to press the “F” key once to confirm the change. This also allows to exit from the parameter changing screen (Fig. 19 and Fig. 20) to return to SPR.1 test screen (Fig. 17).

9.9. If required in the calibration table, it is also necessary to change the “T” parameter. To view the “T” parameter changing screen (Fig. 21, Fig. 22, and Fig. 23), start from the screen illustrated in Fig. 17 and follow these simple steps:

9.9.1 Keep the “F” key (Fig. 18) pressed for 3-4 seconds.

9.9.2 The DGIC displays a new screen (Fig. 21).

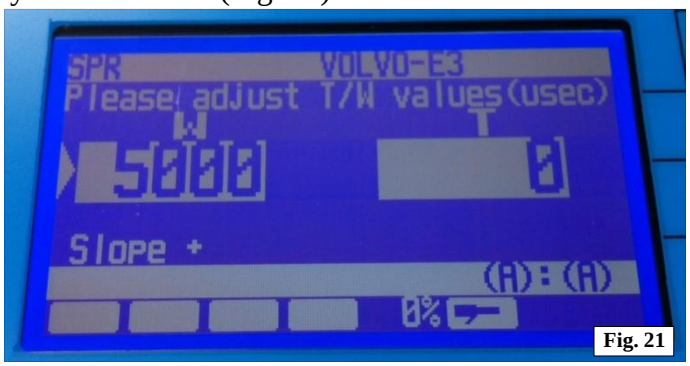


Fig. 21

9.9.3 Press the right arrow once to move the flashing pointer from the “W” parameter box to the “T” parameter box (Fig. 22).

Fig. 22

9.9.4 Use the Up/Down arrows to change the “T” parameter value.

Fig. 23

9.9.5 The change of the “T” parameter is immediately “operative”. It is necessary to press “ENTER” (green arrow) once to confirm the change and exit from the parameter changing screen (Fig. 21, Fig. 22, and Fig. 23), and access the SPR tests execution screen (Fig. 24) with the “Running..” mode on.

9.10. The “Slope” parameter must always be set on positive (+).

If the “Slope” parameter is negative (-), it is necessary to set it on positive (*see paragraph 16*).

9.11. After pressing “ENTER” (green arrow) in paragraph 7.9.5, the DGIC displays a new screen (Fig. 24) starting the first SPR.1 spray test.

Fig. 24

The "Running.." mode indicates that the SPR.1 test is in progress (see the pointer near SPR.1). The operator has to set the revolutions number and the test bench booker.

IMPORTANT:

9.11.1 The revolutions number is indicated in the provided written calibration table till the next software update is available.

9.11.2 The duration of the burette opening, during the spray tests, is not important. SPR tests execution is only useful to check that the spray is in progress, and the spray quality. This test is completely "visual". No volumetric measuring.

In the next update, the operator will be able to take advantage of all the DGIC potentialities 9.12. After completing the SPR.1 test, to continue to the next tests (for example, SPR.2), it is possible to follow two procedures.

9.12.1 Simply press the right arrow once. The pointer will move near SPR.2, with the "Running.." mode always on. The only difficulty of this procedure is that the unit injector will always be in function.

9.12.1.1 Manage the "P[1]" and "T" parameters change as explained in paragraphs 7.8 and 7.9, as the "Running.." mode is *always* on.

9.12.2 Press "STOP" (red key) once. The DGIC exits the Running mode and the unit injector stops working.

9.12.2.1 Press the right arrow once. The pointer will move near SPR.2.

9.12.2.2 Manage the "P[1]" and "T" parameters change as explained for the SPR.1 test (*see paragraphs 9.8 and 9.9*).

9.13. At the end of the last SPR.4 test, press "STOP" (red key) once to stop the test execution.

9.14. Press "STOP" (red key) once again to exit the SPR tests and return to the test menu screen (Fig. 15).

9.15. Use the Up/Down arrows to move the pointer near the "iVM" volumetric test (Fig. 30).

10. “iVM” VOLUMETRIC TEST

Fig. 25

The DGIC (Fig. 25) tells the operator to make sure that everything is set correctly for the volumetric test execution (Fig. 26).

Fig. 26

Once the screen illustrated in Fig. 26 is shown (where the display indicates to the operator to check that everything is correctly set), press FORWARD (green arrow) once to start the injector warming up (Fig. 27).
During the warming up phase, the test bench needs to be in function (for example, 500 RPM) and the low pressure has to be set at least at 3.5 Bar.

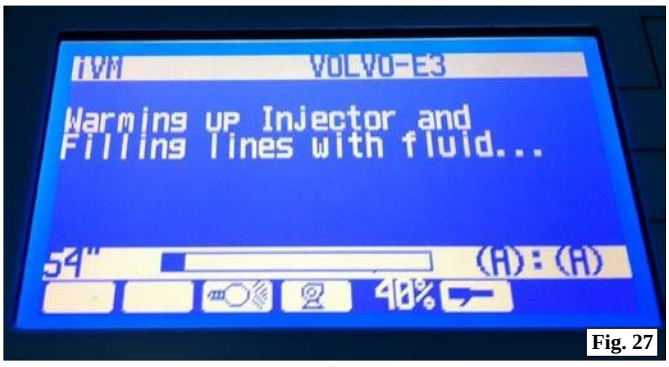


Fig. 27

The “warming up” consists of a 1 minute (60") “free” test execution so that the EUI can warm itself up. At the same time, the operator has time to check that there are no system leaks and that everything is working in the appropriate way.
The warming up can be interrupted simply pressing STOP (red key) once, directly skipping to the iVM tests screen (Fig. 28).
Once the test duration time (60") countdown reaches the end, the DGIC automatically shows on the display the iVM volumetric tests screen (Fig. 28).

10.1. The iVM test consists of the execution of 4 volumetric tests called "*VTP.1"*, "*VTP.2"*, "*VTP.3"*, and "*VTP.4"* (Fig. 28).

Fig. 28

10.1.1 In the iVM tests main screen (Fig. 28) the display shows the following information:

10.1.1.1 VTP.1 = volumetric test n. 1

10.1.1.2 VTP.2 = volumetric test n. 2

10.1.1.3 VTP.3 = volumetric test n. 3

10.1.1.4 VTP.4 = volumetric test n. 4

10.1.1.5 STRK = revolutions number of the test to execute. In case of the VTP.1 test of the example illustrated in Fig. 28, the display shows that the revolutions number that the operator has to set from the test bench should be 679 RPM.
The asterisk symbol (*)near the revolutions box indicates that the DGIC is in revolutions reading automatic mode. From the proximity sensor, the DGIC can read the test bench revolutions.
It is very important to set the revolutions as indicated in the STRK box. If the test bench revolutions number are different from the ones indicated in the SRTK box, it is possible that some sprays are missing, with consequent test irregularities.

10.1.1.6 P = microseconds, that is the coil opening time.

10.1.1.7 P(2), and P(3) are useful to set a multiple injection, but at the moment it is not required.

10.1.1.8 60" = is the test duration time. It indicates to the operator that the first VTP.1 test cycle will last 60 seconds (60") and that the operator will have to set the test bench booker (the burette opening) for the whole test duration time, that is 60 seconds, checking that the real burette opening and closure will happen in the appropriate moment, in synchronization with the VTP test beginning and end. Pay attention to the timer. The test duration time is shown by the DGIC display in the form of a timer, which runs the countdown, for example from 60" to 0".

10.1.1.9 When START (green arrow) is pressed, before the real test begins (for example, 60 seconds) the DGIC:

Executes a fifteen seconds test in which it remembers to drain the burette (Fig. 29).

Fig. 29

This pause can be skipped pressing STOP (red key) once.

Indicates to the operator to correctly regulate the power pressure (or low pressure) and to

Fig. 30

press START (green arrow) when ready (Fig. 30).

Executes a fifteen seconds test with the VTP real parameters chosen for the execution in the VTP.1 example (Fig. 31),

Fig. 31

and at the end of the test, the DGIC automatically starts the real test (Fig. 32), that is the VTP.1

Fig. 32

execution real countdown.

The burette booker has to be opened at the beginning of this countdown and closed when the time arrives at zero seconds.

Fig. 33

At the end of each VTP test, the DGIC stops so that the operator can check the detected volumes in the burette, comparing them with the ones indicated (Fig. 33) on the display D= delivery/volume.

10.1.2 To repeat the recently executed test, press START (green arrow) or STOP (red key) to return to the screen illustrated in Fig. 28 and start the VTP.1 test execution again.

10.1.3 The DGIC repeats everything is described in the steps above.

10.1.4 To execute the other VTP tests (for example, VTP.2), at the end of the first VTP test, press FORWARD (green arrow) once. The DGIC displays the VTP general information screen again (Fig. 28). Press the right arrow once or more times to move the pointer near the box of the test to execute, for example VTP.2 box.

ATTENTION: *For each VTP test, the operator should always set the correct revolutions number (STRK) from the test bench.*

10.1.5 When ready, press START (green arrow) to start the execution of the sequence described in the VTP.1 test paragraphs.

10.1.6 At the end of each test, check the detected volumetric value.

10.1.7 At the end of the last VTP.4 test, press "STOP" (red key) once to exit the iVM tests and return to the test menu screen (Fig. 25).

ATTENTION: *To date, to execute the iVM test for the EUI-E3 unit injectors, it is necessary to set the DWELL parameter on D = 2000.*
Proceed to the DWELL parameter change, as indicated in paragraph 13 and after that, without switching off the DGIC, enter the iVM tests screen and execute the VTP tests as described in paragraph 10.

10.2. Use the Up/Down arrows to move the pointer near the "BIP" volumetric test.
The BIP test is at the moment operable only if the RSP sensor (optional) is available.
The BIP test execution will be described with the next software update.

11. INSTRUMENT SWITCHING OFF

Return to the home page and shift the switch (ON-OFF) on "0" to switch off the DGIC.

11.1. Disconnect the wiring from the unit injector connection.

NOTE: *From this paragraph on, some illustrations are inserted again for a better understanding!*

12. “T” and “W” PARAMETERS SETTING

12.1. To change the “T” parameter, it is necessary to access the first spray tests screen (Fig. 17).

Fig. 17

To view the “T” parameter changing screen (Fig. 21, Fig. 22, and Fig. 23), start from the screen illustrated in Fig. 17 and follow these simple steps:

12.1.1 Keep the “F” key (Fig. 18) pressed for 3-4 seconds.

12.1.2 The DGIC displays a new screen (Fig. 21).

Fig. 21

12.1.3 Press the right arrow once to move the flashing pointer from the “W” parameter box to the “T” parameter box (Fig. 22).

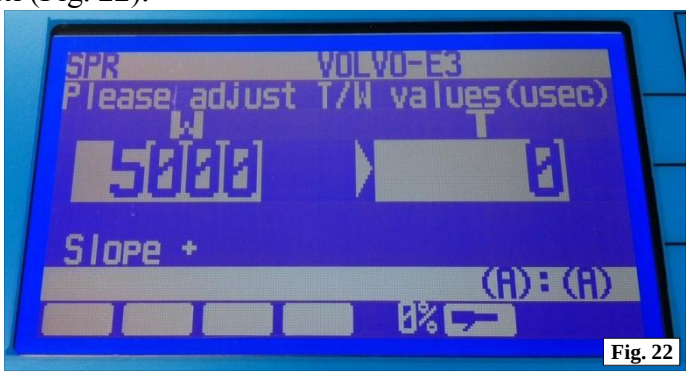


Fig. 22

12.1.4 Use the Up/Down arrows to change the “T” parameter value.

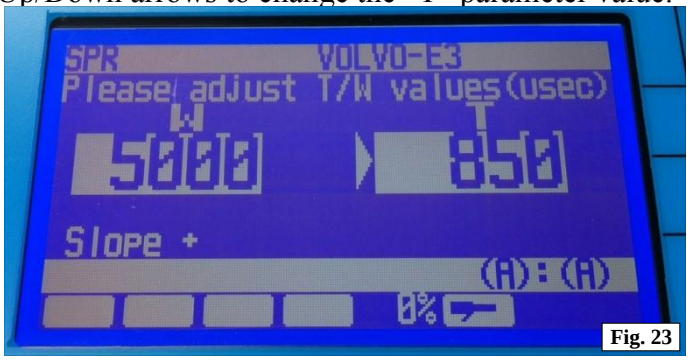


Fig. 23

12.1.5 The change of the “T” parameter is immediately “operative”. It is necessary to press

"ENTER" (green arrow) once to confirm the change and exit from the parameter changing screen (Fig. 21, Fig. 22, and Fig. 23), and access the SPR tests execution screen (Fig. 24) with the "Running.." mode on.

12.2. To change the "W" parameter, proceed as just described for the "T" parameter, but this time place the pointer near the "W" parameter box.

ATTENTION: *"T" AND "W" PARAMETERS CHANGES ARE LOST (RESET) EVERY TIME THE SPR TESTS SCREEN IS CLOSED AND EVERY TIME THE DGIC IS SWITCHED OFF!*

13. "DWELL" PARAMETER SETTING

13.1. To view the DWELL parameter screen, it is necessary to access the first spray test screen (Fig. 17).

Fig. 17

13.1.1 To view the DWELL parameter, press the key in the upper left corner once (*see Front Panel, paragraph 16*), the key with the number 13.

13.1.2 The DGIC shows the DWELL parameter screen (Fig. 34).

Fig. 34

ATTENTION: *THE DWELL PARAMETER CHANGES ARE LOST (RESET) EVERY TIME THE DGIC IS SWITCHED OFF!*

14. "SLOPE" PARAMETER SETTING

14.1. The "SLOPE" parameter is used to plan the specific kind of reading that uses the proximity sensor.
In this case, the proximity works with a positive value, so the parameter should be preset with a positive value. Unfortunately, during the execution of some software updates, it is possible that the Slope parameter will be setup in an incorrect way.
To setup the "SLOPE" parameter, follow these simple steps:

14.1.1 Enter the SPR tests execution screen (Fig. 17).

14.1.2 Keep the "F" key (Fig. 18) pressed for 3-4 seconds.

14.1.3 The DGIC displays the “W” and “T” parameters change screen (as illustrated in Fig. 21, here inserted again for a better understanding).

Fig. 21

14.1.4 Press three times the right arrow to move the pointer from “W” (Fig. 21) to “T” (Fig. 22) and then again to “SLOPE” (Fig. 35).

Fig. 35

14.1.5 Use the Up/Down arrows to change in positive (+) the “Slope” parameter (Fig. 35).

14.1.6 The change of the *Slope* parameter is immediately “operative”. It is recommended to press “ENTER” (green arrow) once to confirm the change and exit the parameter “T” changing screen.

The DGIC displays the SRP tests screen (Fig. 17). Repeat from paragraph 7.5.

1 = Power On/Off Switch

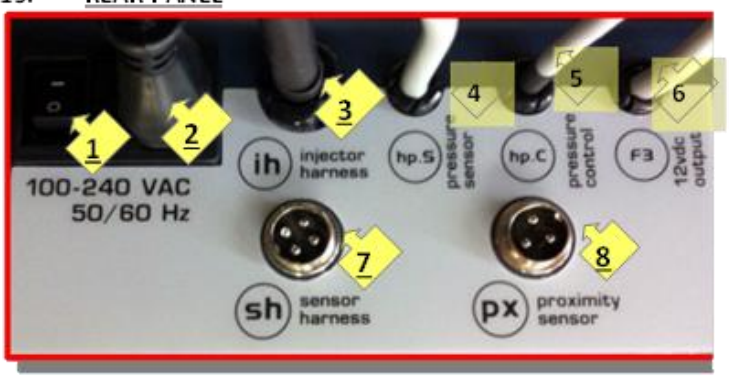
2 = Power Cable Socket 220V

3 = Wiring for Injector(s) *(Common Rail)*

7 = RSP Sensor Socket

8 = Proximity Sensor Socket

15. REAR PANEL



16. **FRONT PANEL**

As already explained, the DGIC is the "main" simulator. According to the customer needs it can be set as:

- DGIC-CB, Cam-Box simulator
- DGIC-4, Common Rail simulator
- DGIC-4-CB, Common Rail and Cam-Box simulator.

The front panel consists of many keys, not all active to manage the Cam-Box.

1 = Enter, Start, Forward 2 = STOP 5 = Right Arrow	7 = Up Arrow 8 = Multifunction Key 9 = Down Arrow	11 = Left Arrow 12 = DB 13 = Setting 14 = Automatic/Manual

MECHANICAL PART OF THE USER MANUAL

Specifically designed and realized Cam-box for different unit injector models testing.
The next paragraphs provide information on how to arrange the bench and the Cam-Box to check the "EUI" unit injectors.

17. CAM-BOX INSTALLATION ON TEST BENCH

NOTE 1: *Make sure to have already mounted the two centering cylindrical guides under the CamBox. These guides help to correctly place the structure (Cam-Box) in line with the test bench ISO coupling.*
Make sure to have the right camshaft mounted. The camshaft choice is strictly connected to the kind of EUI of which it is necessary to execute the test.
Mount the motoring coupling, cone 30 mm (S030-01), on the camshaft.
Prepare the correct adapter block. Each EUI unit injector model has its specific test adapter block.
Place the damper in the burette.


Fig. A

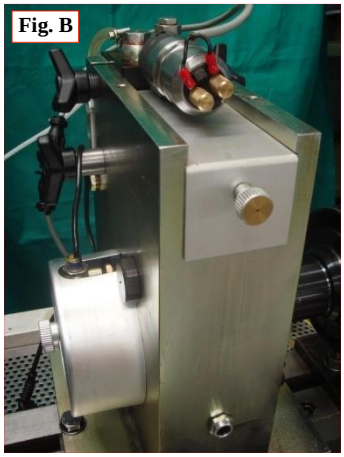


Fig. B

17.1.1 Insert the unit injector in the adapter block and fix it with the appropriate bracket and locking screw.

17.1.2 Mount the adapter ("AZ0034-09" Ø 7 mm or "AZ003409A" Ø 9 mm) on the pulveriser.

17.1.3 Mount the adapter block + EUI in position in the CamBox (Fig. B).
Fix everything in position on the Cam-Box, correctly blocking the fixing screws.

17.1.4 Connect the Rilsan tube from the spray gathering adapter to the damper in the burette.

17.1.5 Connect the power tubes (IN-OUT) from the test bench to the inlet (IN) and outlet (OUT) holes of the adapter block (junctions supplied).

17.1.6 Remember to mount on the adapter lock outlet hole (OUT) a check valve (minimum valve calibration 3/3.5 Bar).

17.2. PHASE AND "UI" AND "PDE" TAPPET SETTING

NOTE 2: *The whole Cam-Box setting procedure has to be done with the bench switched off (not in motion!!!) and unit injector in position.*

17.2.1 Manually turn the test bench fly-wheel, putting the camshaft in “PMI” (Punto Morto Inferiore [BDC, Bottom Dead Centre]) position, as illustrated in Fig. C. 17.2.2 Keeping the rocket with the roller in contact with the camshaft, adjust the tappet screw getting completely rid of the mechanical play.

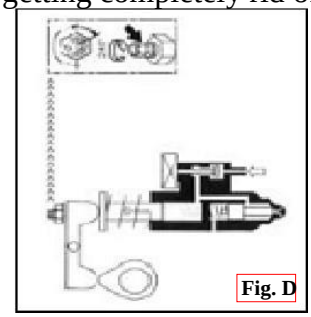


Fig. D

17.2.3 After eliminating the tappet mechanical play, manually turn the fly-wheel, placing the camshaft in “PMS” (Punto Morto Superiore [TDC, Top Dead Centre]), making sure that the pumping element is in the maximum camshaft pumping position (Fig. D). **NOTE 3:** *Keep the camshaft fixed in PMS position.*

17.2.4 Screw completely the tappet screw (Fig. E), being sure to place the pumping element at the maximum end point.

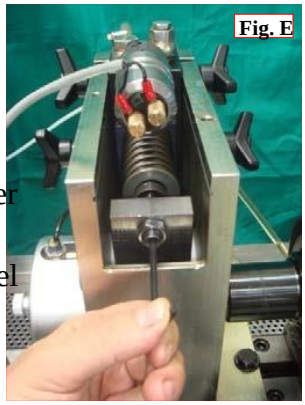


Fig. E

17.2.5 Once the pumping element end point is reached, turn the tappet screw (Fig. E) out to about -240° (in the opposite direction) and fix appropriately the screw locking the lock nut.

17.2.6 Mount the proximity sensor on the appropriate sensor holder support.

17.2.7 Adjust the distance between the sensor and the phonic wheel thread at about 0.8 mm (Fig. G). Use a feeler gauge in support. **NOTE 4:** Connect the proximity wiring to the appropriate proximity socket (*see paragraph 15*).


Fig. F

17.2.8 Connect the wiring to the coil (*see paragraph 2*).

17.2.9 Switch on the DGIC, shifting the button “0-I” on “I”.

17.2.10 Manually place the camshaft in “IR” (Inizio Rampa [delivery beginning]) position, which is the exact point in which the camshaft starts to press on the unit injector tappet spring plate (*see example in Fig. H).*

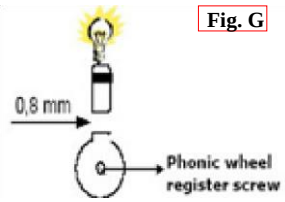


Fig. G

NOTE 5: To more easily recognize the point, it is recommended the use of an indicator mounted on a magnetic support. The indicator feeler pin has to be in contact with the unit injector spring plate.

17.2.11 Holding the initial connection position, manually turn the phonic wheel (in the test rotation direction), being careful to position it with the threads beginning exactly under the proximity sensor in the exact point in which the yellow proximity sensor light switches on (Fig. I).

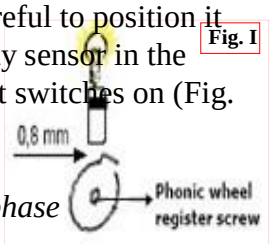


Fig. I

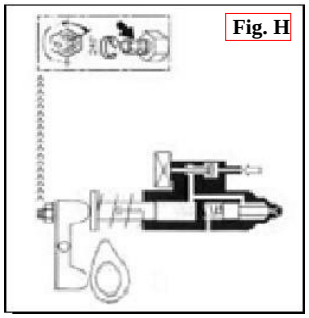


Fig. H

NOTE 6: *The correct position of the phonic wheel is threads beginning-proximity sensor light ON!!! The phase setting among proximity sensor, camshaft and tappet determines the zero point (pumping beginning). In case it is necessary to plan an injection delay or advance, this will be managed by the DGIC.*

17.2.12 Run the tests restarting the execution from the “injector profile” choice (*see paragraph 4*).


Fig. L

17.3. PHASE AND "UP" TAPPET SETTING

NOTE 7: *The whole Cam-Box setting procedure has to be done with the bench switched off (not in motion!!!), the unit injector in position, and the appropriate camshaft mounted.*
"UP" pumps, for example Mercedes, Daf, and so on, usually use the large camshaft.
Mount the motoring coupling, cone 30 mm (AG0030-01), on the camshaft.
Arrange the right adapter sleeve. Each "UP" pump model has its specific sleeve to use for the test execution.
Remove the rocker and its pivot. Close the rocker pivot housing holes with the appropriate caps supplied.
For the test execution, use the original injector or an ISO test injector.
Arrange the proximity sensor as indicated in paragraphs "12.1.6", "12.1.7" and in the "Note 4".

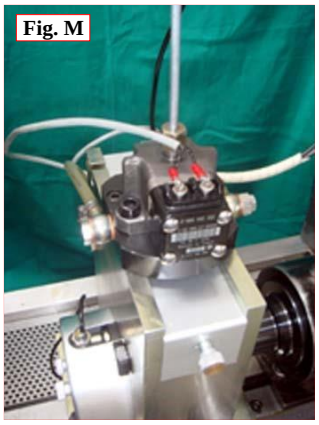


Fig. M

17.3.1 Insert the unit injector in its adapter sleeve (Fig. L) and fix the pump with the screws to the adapter sleeve.

17.3.2 Mount the adapter sleeve + UP in position in the CamBox (Fig. M). Fix everything in position on the Cam-Box, correctly blocking the fixing screws.

17.3.3 Connect the unit injector delivery (junction M14x1.5 mm) with a tube (Fig. M) to the ISO test injector or to its original injector (*see Note 7*).

17.3.4 Connect the power hoses (IN-OUT) from the test bench to the inlet (IN) and outlet (OUT) holes of the adapter sleeve (junctions supplied).

17.3.5 Remember to mount on the adapter sleeve outlet hole (OUT) a check valve (minimum valve calibration 3/3.5 Bar).

17.3.6 Manually turn the test bench fly-wheel, putting the camshaft in "PMI" (Punto Morto Inferiore, [BDC, Bottom Dead Centre]) position, as illustrated in Fig. N.

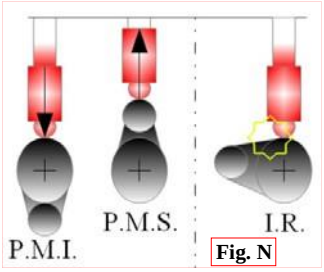


Fig. N

NOTE 8: *For this kind of "UP" unit injector, it is not necessary to remove the tappet play, as the unit injector roller (tappet) always insists, automatically for mechanical coupling, on the camshaft (see Fig. N).*

17.3.7 Connect the wiring to the coil (*see paragraph 2*).

Fig. F

17.3.8 Switch the DGIC on shifting the button on "I".

17.3.9 Manually place the camshaft in "IR" (Inizio Rampa, [delivery beginning]) position, that is the exact point in which the camshaft starts to press on the unit injector tappet roller (*see example in Fig. N*).

17.3.10 Arrange the phase setting among proximity sensor, camshaft/tappet and phonic wheel, as described in paragraph "12.1.11" and in the "Note 6". In case it is necessary to plan an injection delay or advance, this will be managed by the DGIC.

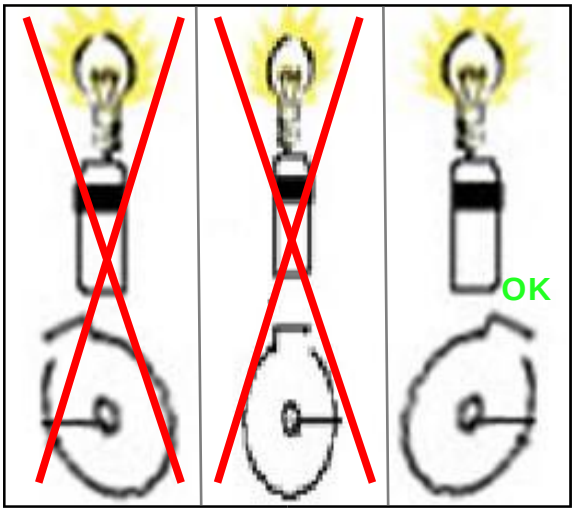
17.3.11 Run the tests restarting the execution from the "injector profile" choice (*see paragraph 4*).

18. RSP SENSOR

RSP sensor is optional.

It can be used in the BIP detection test.
For a correct test execution, you need to mount the RSP sensor on its appropriate adapter support and adequately fix it to the unit injector pump, making sure to position it as much as possible near the magnet valve (coil) working point.
RSP sensor's aim is to detect the "pulse" generated by the coil controlled opening-closure valve. The coil is controlled by the DGIC, that runs the BIP test. As a consequence, the execution of the test called RSP has a logic application only if you have the RSP sensor available.
The data collected by the sensor are processed by the DGIC which shows on the display the BIP value and the missing valve reactions for each coil activation.
Simply put: the DGIC sends "X" electrical commands to the coil that has to open the valve "X" times. If this make a move of the kind "x-", it means that there have been some missing openings, so there is a problem.

Paragraph 2 Appendix



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