OPERATING INSTRUCTIONS

MOTOMETER ECT 700 ELECTRONIC COMPRESSION TESTER

Page

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MOTOMETER ECT 700 ELECTRONIC COMPRESSION TESTER

OPERATING INSTRUCTIONS

1. Description

The MOTOMETER MOTOMETER ECT 700 electronic pressure measuring device is designed to precisely measure pressures up to 70 bar and pressure leakage relative to a 4 bar reference pressure in a range of fluids.

To meet modern engine and vehicle aftermarket needs, MOTOMETER ECT 700 uses advanced digital electronics to provide both high precision measurements and the capability to download measured data to a computer for visualisation, evaluation, documentation and archiving.

As successor to the MOTOMETER KPS recording compression tester, MOTOMETER ECT 700 is specifically designed to measure cylinder compression on diesel, petrol (gasoline) and gas engines.

In addition, MOTOMETER ECT 700 offers the additional functions of:

- Cylinder leakage measurement
- Static pressure and relative vacuum in a range from -4 to 70 bar max

Accordingly, the MOTOMETER ECT 700 Sensor is manufactured in a high grade of stainless steel which is resistant to a range of media, including those typically found on engines and engine powered vehicles, equipment, ships and boats e.g.:

- Lubricants
- Coolants
- Hydraulic fluids including:
    - Power steering fluids
    - Automatic transmission fluids

1.1. Technical Data MOTOMETER ECT 700:

Measuring range / accuracy:

- Compression 1.5 bar <-> 70bar (accuracy 0.7bar)
- Static pressure -4 bar <-> 70 bar (accuracy 0.7bar)
- Leakage 0 bar <-> 4 bar relative in % (reproducibility / precision +/- 0.05 bar)

1.2 Scope-of-Supply MOTOMETER ECT 700 Starter Set

MOTOMETER ECT 700 Starter Set consisting of:

- Handheld MOTOMETER ECT 700
- Software ECT 700 for PC
- USB-cable
- Pressure sensor
- Battery E-Block 9V
- Pressure hose
- 3 Extensions 70mm, 140mm and Angle 70°
- 2 Rubber cones 30° and 63°

1.3 Scope-of-Supply *MOTOMETER ECT 700 Profi Set*

MOTOMETER ECT 700 Profi Set consisting of:

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- Software ECT 700 for PC
- USB-cable
- Pressure sensor
- Battery E-Block 9V

2. MOTOMETER ECT 700 Handset

2.1 Keypad

The full range of MOTOMETER ECT 700 functions is accessed using only 6 keys and an eight character, single line display.

Menu up

Menu down

ON/OFF

Start / Save measurement

Back

Enter

2.2 Keypad Functions

ON/OFF

(In some cases switching OFF must be preceded by  to exit a selected function)
MENU UP / MENU DOWN
 
Navigates in menus and selects functions and memory spaces for measurements.
 Confirms the selection of an item in a menu or submenu.
Also used to access the Setup menu.
BACK
 Returns the display to a previous menu or cancels a process.
START
 Starts compression and pressure leakage measurements.
Pressing  after a pressure leakage measurement also saves the measurement to the Handset memory.
For static pressure / vacuum measurement,  also automatically sets the MOTOMETER ECT 700 Handset to zero.

2.3 Explanation of Display Symbols

Legend of symbols		
		Displayed during compression and leakage mesurements The figure denotes the memory space currently selected. The bar below shows the condition of the battery. Denotes memory space 1 and battery fully charged- Denotes memory space 1 and battery almost empty-
		Symbolises a memory place when no measured value is present empty **(only for compression and leakage measurements)**
		During a compression measurements this symbol represents a piston and connecting rod. The ECT 700 Handset is waiting for a pressure rise of at least 1.5bar (triggering threshold) before the measuring process starts.
		During a compression measurement the 8 time arrows represent 100% of the Measuring Time entered during Handset setup. After the measurement, the pressure value is automatically stored on the current memory space Previous measured value will be overwritten.
		During a leakage measurements the flashing "equals" sign means a measurement is proceeding and the measured value is being regularly updated
		Durng a static pressure measurement these flashing symbols mean a measurement is proceeding and the measured value is being regularly updated. "Plus" = measured value is above reference pressure. "Minus" = measured value is below reference pressure. "Dot" = current zero reference
		The abbreviation for overload. Is displayed when the measured value exceeds 70 or is less than -4.5. **(only for compression and leakage measurements)**

3.0 Setting up the MOTOMETER ECT 700

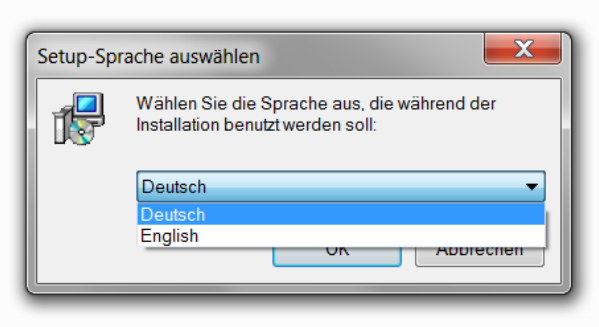
3.0 System requirements

- Microsoft Windows XP or higher
- At least 128 MB RAM
- 16,7 MB available hard disc space
- 1 free USB-connection
- On a monitor with a resolution of at least1152x864

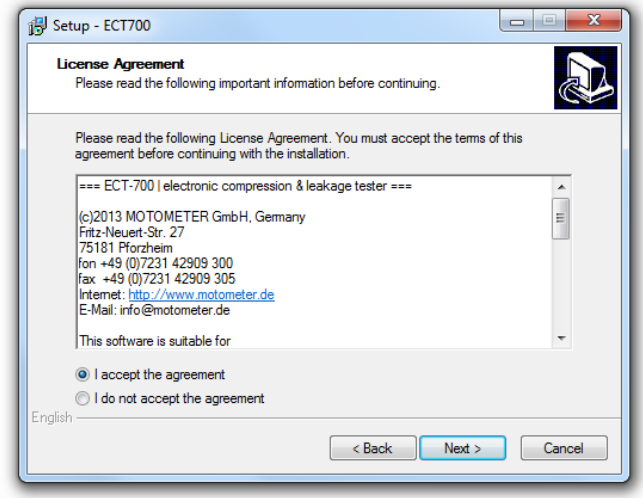
3.1 Software installation

Install the MOTOMETER MOTOMETER ECT 700 software on your computer. Connect the USB flash drive to any of the USB ports. Open your data browser (e.g. Windows Explorer) and go to the USB-driver). Open the EXT-700_Application_Setup.exe and start with double click.

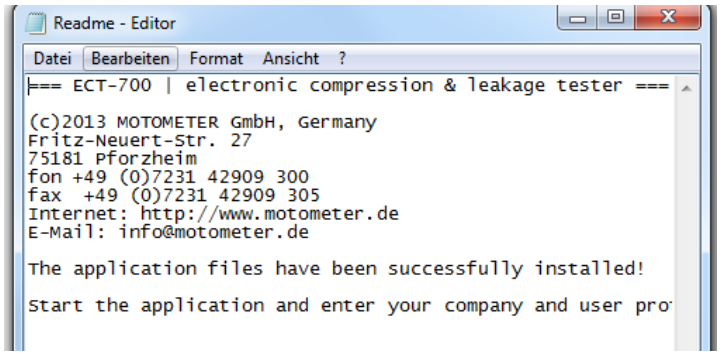
Choose your language (German or English) and confirm with OK



Accept the End User License Agreement (EULA) and click on the Next button

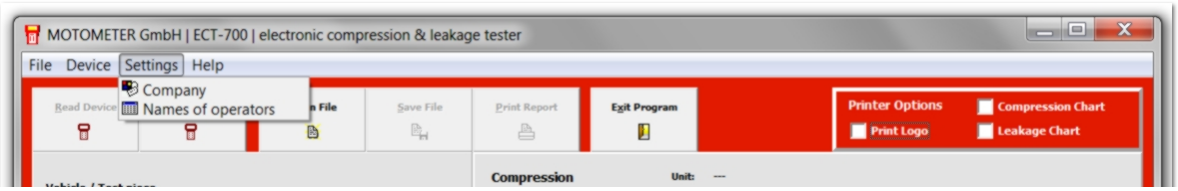


When installation is finished the MOTOMETER ECT 700 software and a Readme file with important information open automatically. Please read the file carefully.



Then open the "Settings" menu in the software toolbar and click on:

- "Company" to enter and save your company details
- "Operators" to enter and save the names of employees who will use the MOTOMETER ECT 700



3.2 Setting up the MOTOMETER ECT 700 Handset and Sensor

3.2.1 Battery

Pressing the spring clip on the battery cover at the back of the handset and sliding the cover downwards.

Insert the battery into the MOTOMETER ECT 700 and replace the cover.

3.2.2 Sensor / MOTOMETER Universal Connector

Screw the MOTOMETER ECT 700 Sensor firmly into the MOTOMETER Universal Connector to form an assembly using the copper washer provided as a seal

Connect the Sensor/MOTOMETER Universal Connector assembly to the MOTOMETER ECT 700

Press  for about 1 second to switch on the MOTOMETER ECT 700

Press  once to adjust the Sensor to Zero

The following display appears briefly

Wait until zero adjustment is complete,

Press  again to call up the MOTOMETER ECT 700 Setup menu.

MOTOMETER ECT 700 displays the first item in the settings menu

(measuring time).

Use  To navigate in the setup menu

Press  to enter the set-up submenus and to confirm choices

3.2.3. Setup of Individual Items

We recommend selecting your preferred Language as the first setup step**.**

The MOTOMETER ECT 700 Handset display can be set to

or


(Measuring Time)

Allows you to set the time during which MOTOMETER ECT 700 records data from 1 to 6 seconds.

Resets all MOTOMETER ECT 700 submenu items to the factory defaults i.e.:

Measuring Time: 2sec

Unit: bar

Contrast level: 4

Idle shutdown time: 10 min.

Language: English

(Information)

The Info submenu contains information about your MOTOMETER ECT 700:

- **Battery**: Displays the actual battery voltage .
- **S/N:** Displays the serial number of the MOTOMETER ECT 700 hand-held unit
- **Firmware:** Displays the firmware version in use
- **HwOption:** Displays the hardware options used in your MOTOMETER ECT 700
- **Sensor:** Displays the type of Sensor attached to your MOTOMETER ECT 700
- **ProdDate:** Displays the date of production of your MOTOMETER ECT 700
- **PCB-Rev:** Displays information about your MOTOMETER ECT 700 printed circuit board

Sets the idle shutdown period before MOTOMETER ECT 700 Handset switches off automatically. Select between 0 (never) and 45 minutes (maximum) in 5 minute steps.

Sets the backlighting of the display on a scale from 1 to 6.

(Delete all)

Deletes all stored readings in the MOTOMETER ECT 700.

Allows individual readings to be deleted cylinder by cylinder.

Sets the unit of pressure to bar, PSI or kPa

3.3 Preparing MOTOMETER ECT 700 for a Measurement

Using the USB cable, connect the MOTOMETER ECT 700 to the computer running the MOTOMETER ECT 700 software.

Important: Do not switch on the MOTOMETER ECT 700 Handset – it will automatically activate in its USB mode.

Save to the MOTOMETER ECT 700 software any previous measurements that you will need in the future.

Important: existing measurements on the MOTOMETER ECT 700 will be overwritten during every new test procedure.

4.0 Using MOTOMETER ECT 700 - Measuring Cylinder Compression

Up to 12 cylinder compression measurements can be recorded in parallel with measurements for leakage on the same cylinders (see 5.0 below).

4.1 Preparation of the MOTOMETER ECT 700 Handset and Sensor

Screw the MOTOMETER ECT 700 Sensor firmly into the MOTOMETER Universal Connector using the copper sealing washer provided as a seal, a shown.

4.2 Engine

Run the engine to its normal operating temperature (around 80°C).

In the case of vehicle engines, put the transmission into "neutral" and apply the parking brake (handbrake).

Engage “P” (Park) on automatic transmissions.

Immobilise the ignition or fuel injection systems so that the engine will crank but not start.

See 10.1 in Useful Information for hints on immobilising the engine.

On petrol (gasoline) engines remove all the spark plugs from all the cylinders in the engine cylinder head.

On diesel engines check in the tables of MOTOMETER engine-specific adaptors whether the Sensor should be inserted into the glow plug or the injector nozzle bore.
Then remove the glow plugs or injectors from all cylinders, according to the MOTOMETER tables.

Screw the correct MOTOMETER engine-specific adaptor into the spark plug, glow plug or injector bore.

Tighten the adaptor with a torque wrench according to the adaptor thread size:

- Thread M8 10 Nm
- Thread M9 12 Nm
- Thread M10 15 Nm
- Thread M12 22 Nm
- Thread M14 25 Nm

Attach the Sensor/MOTOMETER Universal Connector assembly to the MOTOMETER engine-specific adaptor.

Selection on: http://www.motometer.de/adapterdatenbank/site/SucheFahrzeugdaten.html

Connect the plug on the MOTOMETER ECT 700 cable to the socket on the free end of the Sensor.

Press  for approximately 1 second to switch on the MOTOMETER ECT 700 Handset.

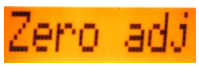
The Handset automatically goes to menu point 

in the main menu.

Press 

to confirm the compression measurement function.

Wait until the MOTOMETER ECT 700 Handset automatically sets itself to zero:



Using  select the number of the cylinder to be tested i.e.

 to 

Important: The display may show a previous measured value for the cylinder but this will be automatically overwritten.

4.3 Executing the Cylinder Compression Measurement

Press  to begin the measurement procedure

Then either:

Take the MOTOMETER ECT 700 into the vehicle and sit in the driver's seat

Or

Connect a remote control starter switch to terminal B + (30) and terminal 50 of the starter motor.

Crank the engine using the ignition key or remote starter switch while depressing the accelerator pedal or manually opening the throttle valve (EGR valve on diesels).

A series of chevron symbols  appears on the display.

Continue cranking until all the chevrons disappear.

The display now shows the measured compression in the selected unit, e.g.  .

Select the next cylinder to be measured using  .

Repeat the above steps for each further cylinder.

Press  for about 1 second to shut down the MOTOMETER ECT 700 Handset

4.4 Diagnosis

Compare the measurement displayed with the engine manufacturer's specified values for cylinder compression.

4.5 Downloading results

Start the MOTOMETER ECT 700 Software on your computer.

Use the USB cable to connect the MOTOMETER ECT 700 Handset to the computer running the MOTOMETER ECT 700 software.

Important: Do not switch on the MOTOMETER ECT 700 Handset! It will automatically activate in its USB mode.

Click the mouse on the 

button to download the compression measurements to the MOTOMETER ECT 700 software.

5.0 Using MOTOMETER ECT 700 – Measuring Combustion Chamber Leakage

A cylinder leakage test using MOTOMETER ECT 700 measures the rate as a percentage (%) at which air is escaping from the engine combustion chamber via the piston rings, the valves, a leaking gasket or other possible source.

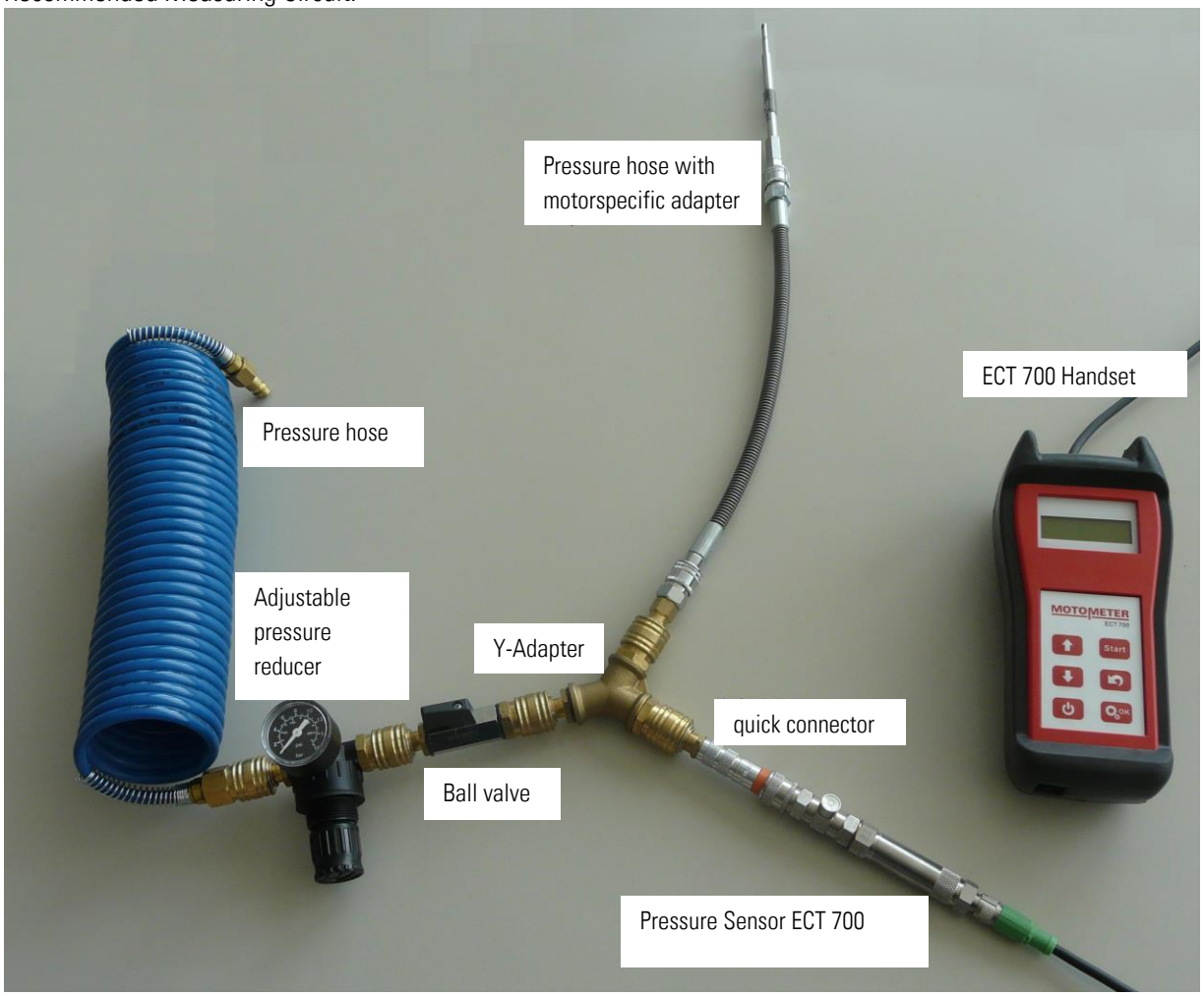
To achieve this, a 4 bar "reference" air pressure is applied to the combustion chamber from a workshop compressed air supply system or separate compressor.

Up to 12 cylinder leakage measurements can be recorded in parallel with compression measurements for the same cylinders.

5.1 Description of Measuring Circuit

A measuring circuit can be created using standard pneumatic equipment and the standard MOTOMETER ECT 700 scope-of-supply.

Recommended Measuring Circuit:



5.2. Preparing the Engine Cylinder Leakage Measurement

Run the engine to its normal operating temperature (around 80°C).

In the case of vehicle engines:

- On manual transmissions put the transmission into "neutral" and apply the parking brake (handbrake).
- On automatic transmissions engage “P” (Park)

On petrol (gasoline) engines remove the spark plugs from the cylinder to be tested.

On diesel engines check in the tables of MOTOMETER engine specific adaptors to find whether the Sensor should be inserted into the glow plug or the injector nozzle bore.

Remove the glow plugs or injectors from the cylinder to be tested, according to the MOTOMETER tables.

5.2.1. Finding Top Dead Centre and Locking the Crankshaft

To measure leakage the piston in the cylinder to be measured must be at top dead centre (TDC) between the compression and power strokes – i.e. at the top of its stroke with both the inlet and exhaust valves closed.

See 10.2 and 10.3 in Useful Information for hints on finding TDC and locking the crankshaft.

5.3 Preparing the pneumatic circuit

5.3.1 Preparing the Reference Pressure Circuit

Important: Set the 4 bar reference pressure before connecting the Y-Adapter!

Screw the Adapter 622 005 0003 into the MOTOMETER quick connector of the sensor.

Screw the adapter 622 005 0003 (female thread) onto the free (transducer) end of the MOTOMETER ECT 700 Sensor.

Attach the cable from the ECT Handset to the MOTOMETER ECT 700 Sensor.

Select the correct MOTOMETER engine-specific adaptor.

Remove the non-return valve.

Screw the MOTOMETER engine-specific adaptor the into the spark plug, glow plug or injector bore according to the MOTOMETER recommendation

Tighten with a torque wrench according to the adaptor thread size:

- Thread M8 10Nm

- Thread M9 12 Nm
- Thread M10 15 Nm
- Thread M12 22 Nm
- Thread M14 25 Nm

Plug the MOTOMETER Universal Connector onto the MOTOMETER engine-specific adaptor.

5.3.2 Connecting and Pressurising the Y-Adapter

Plug the adapter 622 005 0003 fitted to the MOTOMETER ECT 700 Sensor into one of the couplings on the Y-Adapter. Connect the compressed air supply hose to Y-Adapter.

Important: Do not yet connect the 3-way connector to the cylinder.

5.3.3 Adjusting the Reference Pressure

Pressurise the y-adapter assembly as prepared in 5.3.2 above

Press  for approximately 1 second to switch on the MOTOMETER ECT 700 Handset.

Using  select 

in the main menu and confirm with 

The MOTOMETER ECT 700 automatically adjusts itself to zero pressure and moves to the current reference pressure reading.

Since it is easier to adjust the Reference Pressure upwards from a lower reading, set the pressure in the test circuit to slightly under 4 bar using the adjustable pressure reducer.

MOTOMETER ECT 700 indicates whether the reference pressure is too high, too low or OK

Use the adjustable pressure reducer to set the reference pressure until 

appears on the display. The indication should be stable on the display (no flutter).

Acknowledge Ref OK with 

When the reference pressure is set, MOTOMETER ECT 700 automatically displays the cylinder selection menu.

5.4 Cylinder Leakage Test Procedure

With the piston in the cylinder to be tested locked at TDC and the reference pressure adjusted, now plug the 3-way connector onto the nipple on the MOTOMETER Universal Connector.

Finally plug the pressurised 3-way connector, as prepared in 5.4 and 5.5 above, onto the MOTOMETER Universal Connector / engine-specific adaptor assembly

5.5 Executing the Leakage Measurement

Use  to select the cylinder to be measured.

MOTOMETER ECT 700 indicates a cylinder number from  to 

Press  to obtain a leakage reading in % reading for the selected cylinder.
Close the ball valve.

The reading flashes in the display e.g. 

Press  again to store the reading. 

The MOTOMETER ECT 700 Handset display automatically returns to the cylinder selection menu.

Use  to move to next cylinder to be measured e.g. 

Repeat the procedure above for all cylinders to be measured.

Remember to set the pistons at top dead centre (TDC) between the compression and power strokes and to lock the crankshaft, as described above.

Press  for about 1 second to shut down the MOTOMETER ECT 700 Handset.

5.6 Diagnosis

Use  to read the measurements on the MOTOMETER ECT 700 display

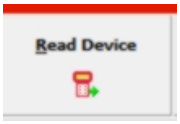
Compare them with the engine manufacturer's specified values for cylinder leakage.

5.7 Downloading Results

Start the MOTOMETER ECT 700 Software on your computer.

Use the USB cable to connect the MOTOMETER ECT 700 Handset to the computer running the MOTOMETER ECT 700 software.

Important: Do not switch on the MOTOMETER ECT 700 Handset! It will automatically activate in its USB mode.

Click the mouse on the 

button to download the leakage measurements to the MOTOMETER ECT 700 software.

6.0 Using MOTOMETER ECT 700 - Measuring Static Pressure / Vacuum

Within its -4.5 to + 70 bar measuring range, MOTOMETER ECT 700 can be used to measure static pressure / vacuum in a range of liquids and gases.

Important: In the case of static pressure / vacuum measurements ALWAYS consult MOTOMETER for application guidelines regarding the use of adaptors to connect the MOTOMETER ECT 700 Sensor into the proposed measuring circuit.

6.1 Preparations for Measuring Static Pressure / Vacuum

To measure static pressure / vacuum, connect the Sensor/MOTOMETER Universal Connector assembly into the pressurised system using the adaptor recommended by MOTOMETER.

Ensure all connections are safe from leakage and recoil.

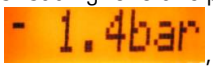
6.2 Static Pressure / Vacuum Test Procedure

Press  for approximately 1 second to switch on the MOTOMETER ECT 700 Handset.

Using  select 

in the main menu and confirm with 

.

The MOTOMETER ECT 700 Handset now automatically display the reading for static pressure / vacuum in the unit selected during setup of the MOTOMETER ECT 700 Handset e.g. 

, 

.

Repeat the above steps for each pressurised system / test-piece to be measured.

Press  for about 1 second to shut down the MOTOMETER ECT 700 Handset

NB. To avoid pollution and unexpected backlash / recoil in hoses etc. always de-pressurise pneumatic and hydraulic circuits before connecting or disconnecting the MOTOMETER ECT 700 Sensor.

7.0 Processing Measured Data

The ECT Software package is designed to display both cylinder compression and cylinder leakage measurements as bar graphs.

7.1 Downloading Data

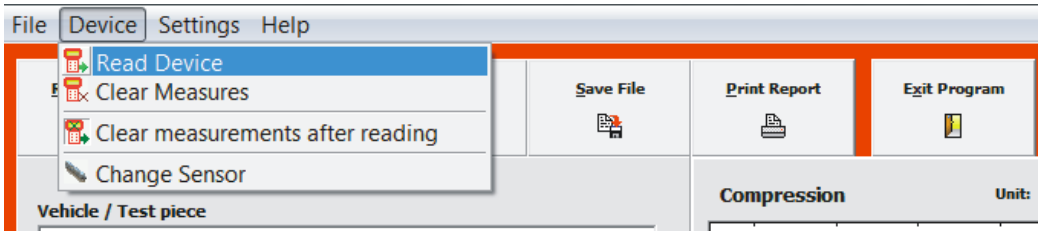
Use the USB cable supplied to connect the MOTOMETER ECT 700 Handset to a computer running the MOTOMETER ECT 700 software.

Important: Do not switch on the MOTOMETER ECT 700 Handset! It will automatically activate in its USB mode.

Click on the window 

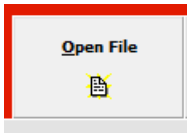
to download and display data from the MOTOMETER ECT 700.

Alternatively, use the pull down menu “Device” in the toolbar to download the data.

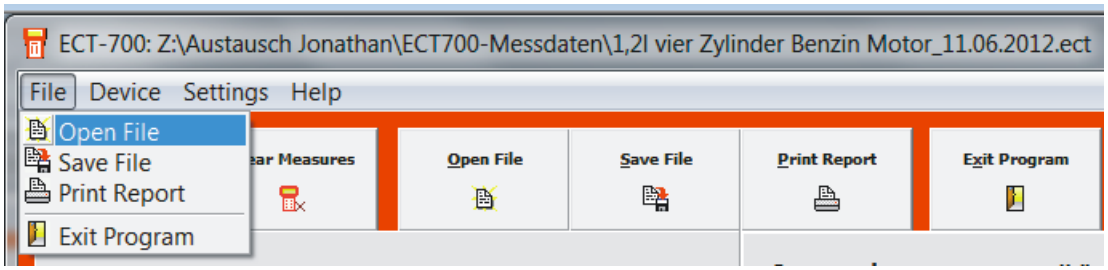


The Device pull-down menu can also be used to clear measurements from the MOTOMETER ECT 700 memory and to set the software to always clear measurements after download (read) of data from the MOTOMETER ECT 700 Handset

To work on earlier measurements click on the OPEN FILE window to access earlier measurements you saved as a file.

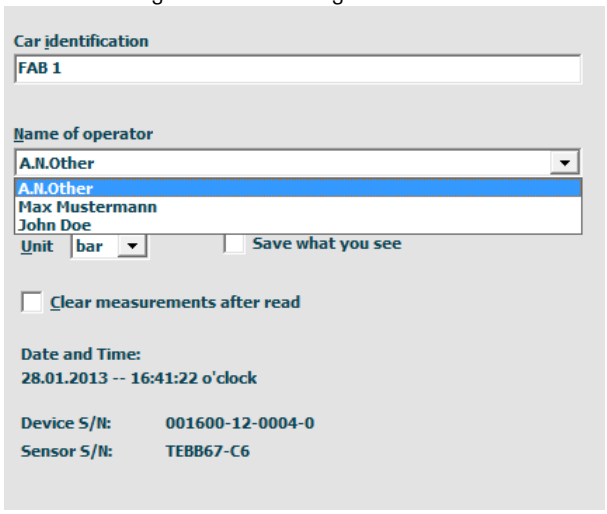


Alternatively use the Toolbar pull down menu “File”



7.2 Preparing a Report

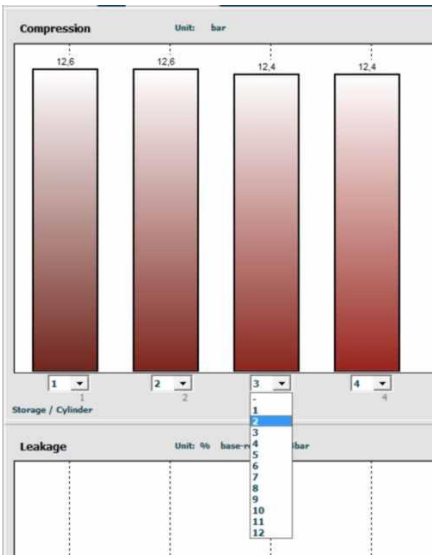
Enter the designation of the engine or vehicle in “vehicle / test-piece identification”



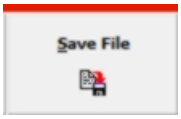
The name of the operator can be chosen from the names you entered when installing and setting up the software.

7.2.1. Comparing Results

The ECT software allows you to move the measured results among the 12 possible bar graph positions to allow simpler comparison of two or more results. Simply select the new position for the result in the pull-down menu



By ticking the box  you can save the results as a file in their new order.

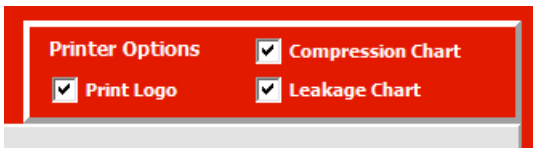
Alternatively, click the button  in the toolbar.

The file will be named according to the Vehicle/Test piece identity previously entered.

Important: The measurement results not displayed due to a change of order are still stored by the software.

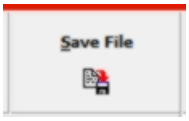
7.2.2 Printing the Report

Select the content of the printout by ticking the boxes in the Printer Options window.

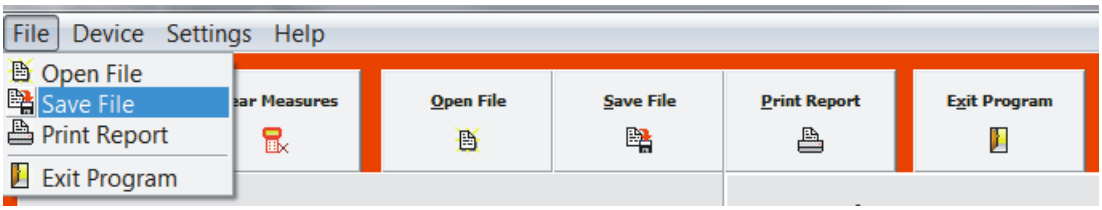


Then click the window “Print Report”

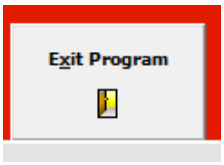
7.3 Saving Test Results

To save test results as a file click the  button

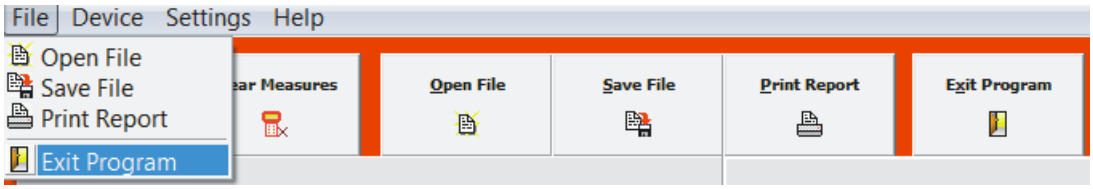
Alternatively, use the function “Save Results under the Toolbar menu “File”.



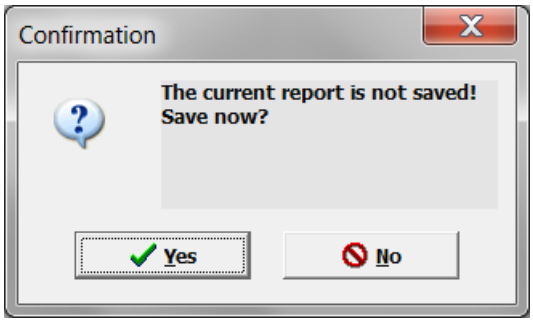
7.4. Exiting the ECT Software

Click on the button 

Alternatively, use the function “Exit Program” under the Toolbar menu “File”.



The software prompts you to save unsaved reports.



8. Adjusting the MOTOMETER ECT 700 Handset for Use with a new Sensor

If your MOTOMETER ECT 700 Sensor has to be replaced for any reason you will need to set the MOTOMETER ECT 700 Handset to the characteristics of the new Sensor.

8.1 Adjustment Procedure

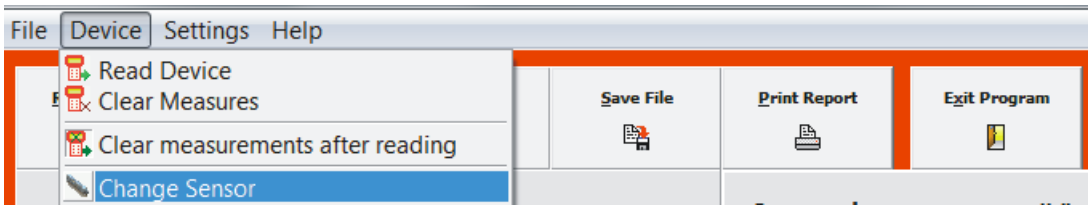
Start the MOTOMETER ECT 700 software on your PC.

Connect the MOTOMETER ECT 700 Handset to your computer using the USB cable.

Important: Do not switch on the MOTOMETER ECT 700 Handset – it will automatically activate in its USB mode.

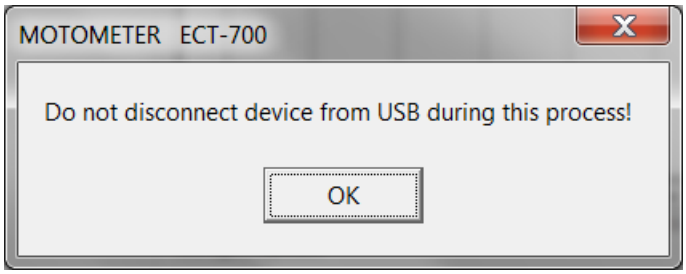
NB: Do not disconnect the MOTOMETER ECT 700 Handset during the Sensor adjustment process.

Select "Device" in main menu in the toolbar



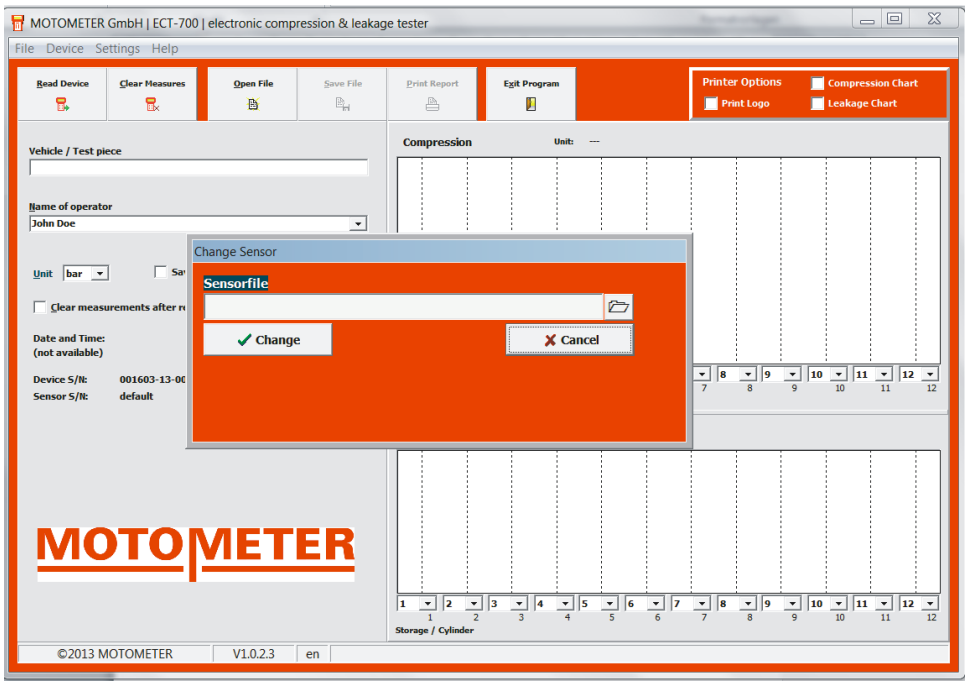
Click on "Change Sensor".

A warning will appear..



Acknowledge the warning with the OK button

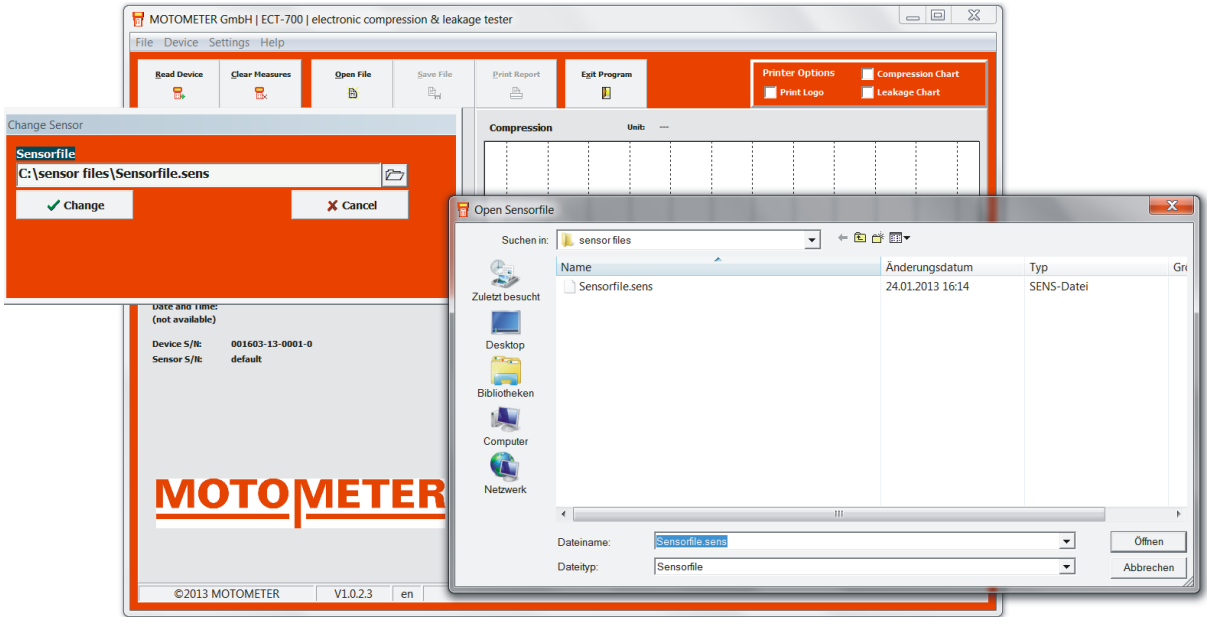
The software automatically goes to the Sensor Change window.



If necessary, expand the Sensor change window by placing the mouse on the field at bottom right of the window. Click the left hand mouse button and enlarge the window by dragging it diagonally.

Browse the computer hard disc to locate the data file for the new Sensor, as received from MOTOMETER.

Load the file to the Sensor Change window by clicking the OPEN FILE button  .

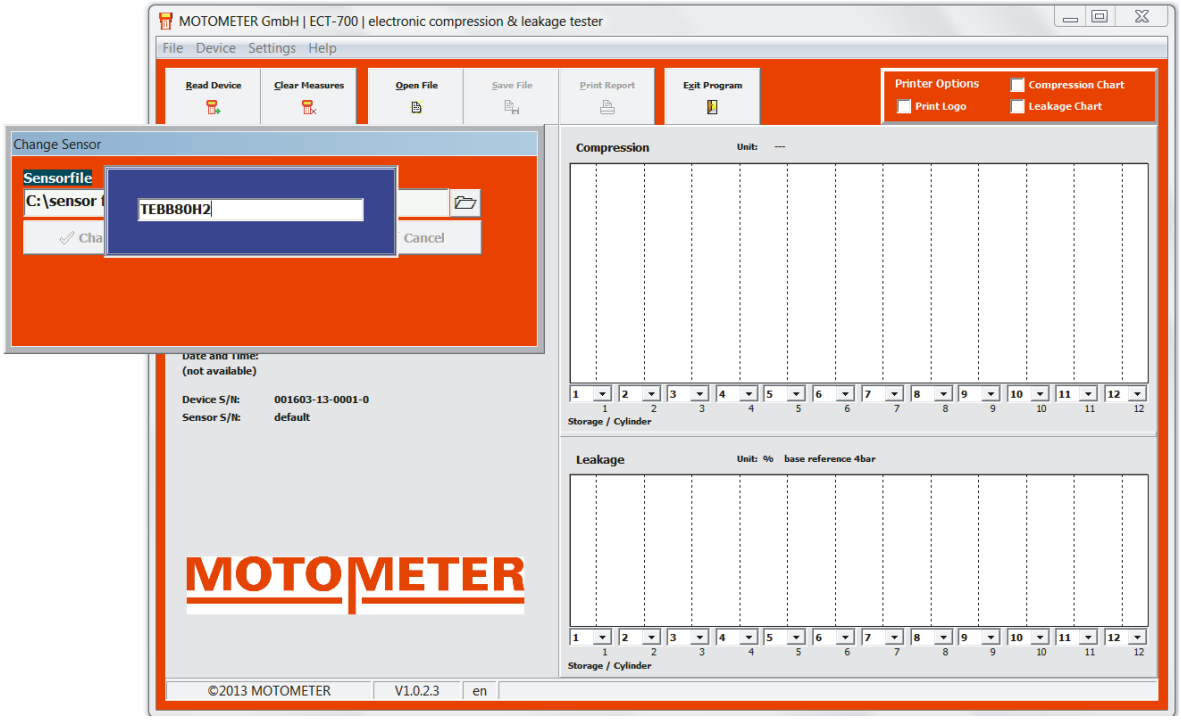


Click “Change” at the Sensor Change window

The software prompts you to enter the serial number of the new Sensor.

Important: The Sensor serial number is etched onto the lower hexagon of the Sensor

Enter the serial number.

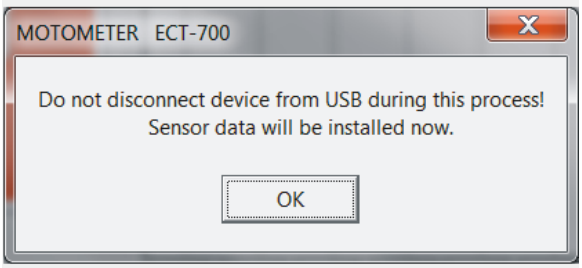


Press the ENTER / RETURN key on your keyboard to save the Sensor serial number.

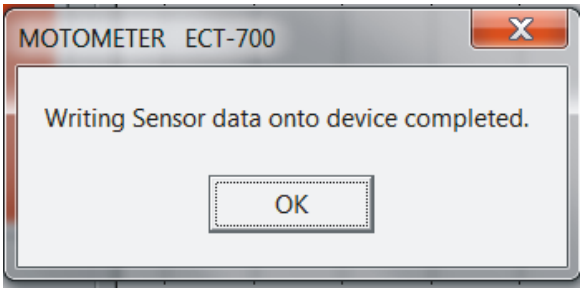
A warning appears.

Acknowledge the warning with the OK button.

A second warning appears



Press OK to automatically load the data of the new Sensor



Press the OK button to acknowledge successful loading of Sensor data

The software returns to the original screen

Disconnect the MOTOMETER ECT 700 from the computer USB port and remove the USB cable.

Your MOTOMETER ECT 700 Handset is now ready for further use with its new Sensor.

9. Caring for your MOTOMETER ECT 700

9.1 Routine Care

- Always fit the plastic thread protection caps to the Sensor socket thread
- Regularly unscrew the Sensor from the MOTOMETER Universal Connector to clean the Sensor head and Connector using a pipe cleaner or compressed air
- Remove the battery from the MOTOMETER ECT 700 before longer periods of storage or if you do not intend to use the MOTOMETER ECT 700 for a longer period.
- Avoid extremes of temperature when using and storing the MOTOMETER ECT 700 and its components
- Avoid dropping the handset and sensor / avoid mechanical damage from other impacts
- Avoid exposing the MOTOMETER ECT 700 to moisture
- Never immerse it in water or other liquids

9.2 Replacing the 9V Block Battery

Important: Always remove discharged batteries immediately!

To avoid damage to the MOTOMETER ECT 700 Handset check the condition of the battery regularly. This is shown by the bar under the cylinder number during a Compression or Leakage test:

The bar is full when the battery is full

And empty when the battery is empty:

The MOTOMETER ECT 700 Handset will not switch on when the battery voltage is too low!

Changing the Battery

Press the spring catch on the battery cover at the back of the MOTOMETER ECT 700 Handset.

Pull the cover downwards to remove it.

Remove the discharged battery.

Insert a new 9V Block Battery

Ensure the correct polarity of the + and – contacts!

Important: The MOTOMETER ECT 700 is polarity protected

MOTOMETER recommends the Varta Zn-MnO_2 Alkaline High Energy battery type 4922.

Other comparable batteries can also be used, including lithium batteries.

Zinc-carbon batteries are not recommended!

10. Equipment

Art. No.	**Description**
623 700 1002	**Set pressure test external pressure**
Additions equipment:	
622 004 1001	Pressure hose approx. 350 mm
622 004 1003	Extensions approx. 70 mm
622 004 1002	Extensions approx. 105 mm
622 004 1005	Extensions approx. 140 mm with rubber cone, for spark plug apertures M 10 x 1 + M 12 x 1.25
622 004 1004	Angle 70°
622 004 1007	Rubber cone with socket 63° ø 17 mm
622 004 1013	Rubber cone with socket 63° ø 21 mm
622 004 1006	Rubber cone with socket 30° ø 21 mm
622 010 4257	Threaded adapters for spark plugs M14 x 1,25: conical seating with short coupling, approx. 134 mm
622 010 4258	Threaded adapters for spark plugs M12 x 1,25: flat seating, approx. 134 mm
622 010 4259	Threaded adapters for spark plugs M10 x 1: flat seating, approx. 134 mm
622 010 4271	Threaded adapters for spark plugs M14 x 1,25: conical seating with standard and long coupling, approx. 161 mm
622 010 4272	Threaded adapters for spark plugs M14 x 1,25: flat seating, approx. 134 mm
622 010 4277	Threaded adapters for spark plugs M18 x 1,5: conical seating with short coupling, approx. 134 mm
622 004 1009	Adapters straight (with screw thread and check-valve)
622 004 1008	Adapter angled (with screw thread and check-valve)

622 010 5606	KPS quick-connect coupling
All motor-specific adapters of MOTOMETER you can find here: http://www.motometer.de/adapterdatenbank/site/SucheFahrzeugdaten.html	

10. Useful information

10.1 Hints on Immobilising an Engine

Possible ways to immobilise ignition or fuel injection systems so that the engine will crank but not fire are:

- On petrol (gasoline) engines by removing the Hall pickup on the crankshaft or camshaft or by disconnecting the low tension leads to the ignition coil
- On diesel engines by disconnecting the accelerator linkage, or with electronic pumps or injectors (EUI, common rail), unplugging the cables from the injectors

10.2 Hints on Finding Top Dead Centre

To measure leakage the piston in the cylinder to be measured must be at top dead centre (TDC) between the compression and power strokes – i.e. at the top of its stroke with both the inlet and exhaust valves closed.

- For number 1 cylinder, this can usually be set by aligning marks on the engine flywheel and flywheel housing.
- According to the engine firing order, by turning the crankshaft one complete revolution (360°) it may be possible to use the marks for a further cylinder (e.g. cylinder 4 on a 4 cylinder inline engine)
- By removing the camshaft / valve cover it possible to see on which cylinder both inlet and exhaust valves are closed, indicating TDC between the compression and power strokes for that cylinder
- For other cylinders a probe can be inserted through the sparkplug, glow plug or injector bore to determine the piston's highest position.

When TDC has been found the crankshaft should be locked to prevent the piston moving down the cylinder under the force of the 4 bar reference pressure.

- In the case of a vehicle with a manual transmission engage 1st gear and apply the parking brake (handbrake)
- In the case of an automatic transmission select "P" (Park).
- On other engines it may be possible to block crankshaft rotation by wedging a steel bar between the teeth of the starter gear and against the flywheel housing through the timing window in the flywheel housing

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