

## **ASSEMBLY INSTRUCTIONS FOR ACD computer**

### **MITSUBISHI Lancer EVO IX**





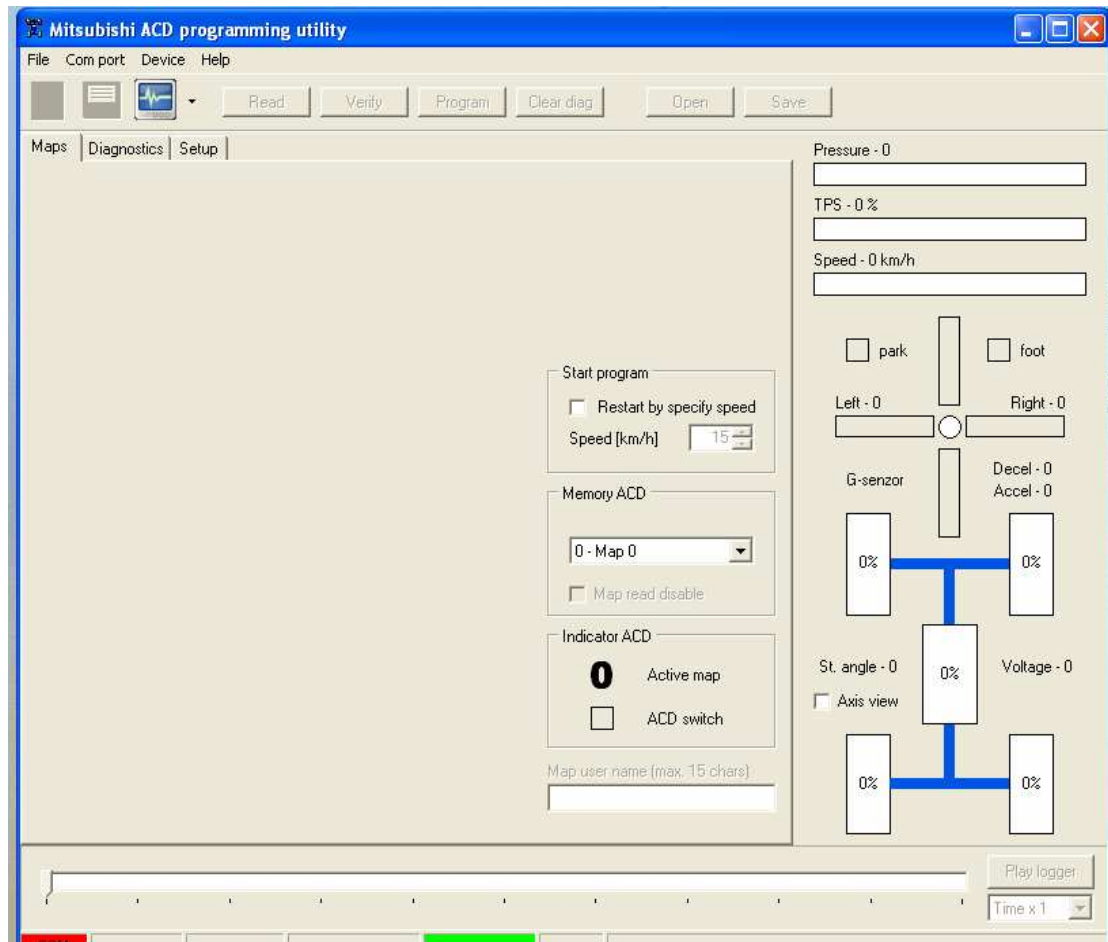
## **DESCRIPTION OF FUNCTIONS OF ACTIVE CENTRE DIFFERENTIAL (ACD) CONTROL COMPUTER FOR MITSUBISHI LANCER EVO 7, 8, 9**

Active control of centre differential (ACD) is very important for controlling vehicles at a high speed. The ACD computer was designed based on data collected from the MS PcWRC. It complies with the FIA regulations and, at the same time, facilitates the work of the whole team during races.

### **MAIN ADVANTAGES**

1. Storing capacity of up to 9 created maps right in the ADC computer. Switching over by the ACD button on the vehicle dashboard. The selected map is indicated right on the ACD computer using the digits from 1 to 9.
2. A possibility to create your own map files with assistance of an expert.
3. Diagnostics – one of the most important assistants for quick identification of defects of the ACD system is the digital indication of error codes which are, in case of a defect, indicated right in the ACD computer. The vehicle crew may operatively inform the service team which may then get ready for the repair of the defect.
4. Active Dataloger which records the behaviour of individual elements of the ACD system in time and monitors the course of the ACD system control. The record time is 72 min. Automatic activate is always before the start – with start program function.

## 1.1 USER INTERFACE

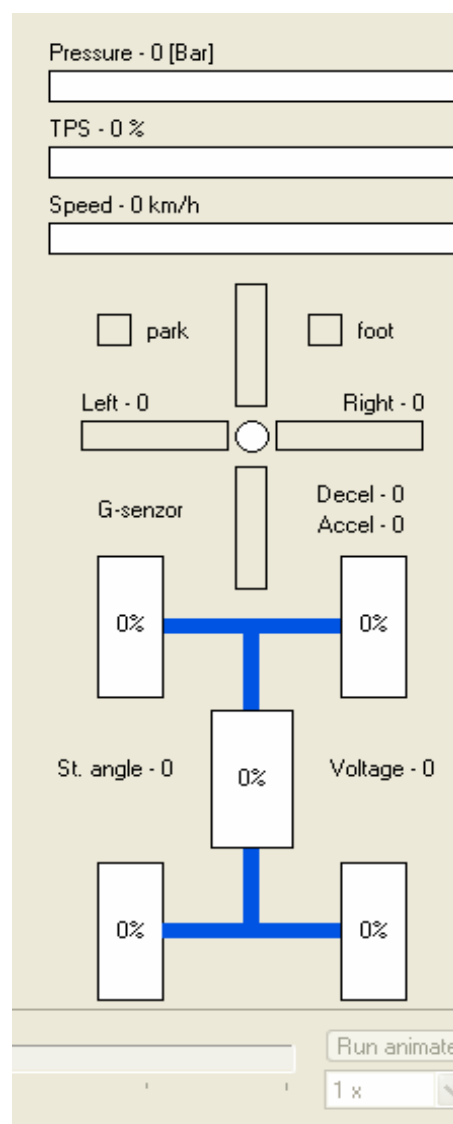


**After the ACD computer is connected to a notebook, the data may be read when driving – graphic representation of the current state of the vehicle** (very helpful for completing the notion of how individual sensors work and how they influence the clamp of the centre differential in percents).



## 1.2 GRAPHICS

1. **PRESSURE** is an informative indication of switched oil pump in the hydraulic circuit.
2. **TPS** – indication of the gas pedal position in the range of 0-100%
3. **SPEED** – indication of the speed of the vehicle (in km/hour)
4. **PARK** – signals the hand brake engagement
5. **FOOT** – signals the use of brake pedal (brake light sensor)
6. **G- sensor** – shows the value of longitudinal and lateral overload
7. **SLIP indication** – shows the slip of individual wheels (0-100%). If you click the **AXIS view** field, the slip of the fore axle as against the rear axle will be graphically represented
8. **ACD indication** – shows the level of clamp of the centre differential in %



## 9. TABLE – START PROGRAM

The Start Program Table can be activated as other tables – by checking the button with „√“. This feature allows clamping the ACD differential immediately before the start of the timed section. Enter the speed limit, into the speed field (km/h), at which the Start Program is to automatically switch off.

The speed limit value may differ for each map. It may be changed by selecting the type of map in the **Memory ACD** table followed by programming.

Activation of the START Program will be signalled to the driver by concurrent lighting of three indicators (TARMAC, GRAVEL, SNOW) on the dashboard.

### **Activation of START program regime (ACD clamp – 100%)**

**- the acceleration pedal to a value exceeding 85%. The vehicle must not be in motion.**

(The Start program will also automatically deactivate by the use of the hand brake or during braking)

The image shows a software configuration window for the 'Start program'. It is divided into three main sections: 'Start program', 'Memory ACD', and 'Indicator ACD'.  
1. 'Start program' section: Contains a checkbox 'Restart by specify speed' which is unchecked. Below it is a 'Speed [km/h]' field with a numeric input of '15' and a small up/down arrow control.  
2. 'Memory ACD' section: Contains a dropdown menu currently showing '0 - Map 0'. Below the dropdown is a checkbox 'Map read disable' which is unchecked.  
3. 'Indicator ACD' section: Contains a large black circle with the number '0' inside, labeled 'Active map'. Below this is a checkbox 'ACD switch' which is unchecked.  
At the bottom of the window is a text input field labeled 'Map user name (max. 15 chars)' which is currently empty.

## 1.3 BASIC SETTING

### **TPS position**

When connecting the ACD computer to the vehicle for the first time, use the following procedure:

1. Switch off the ignition and connect the ACD computer to the series connector.
2. Sit down on the driver's seat and start ignition.
3. Press the ACD SWITCH and hold it for 9 seconds until all three indicators light up (TARMAC, GRAVEL, SNOW). Then, the upper indicator "TARMAC" starts to flash.
4. Release the ACD SWITCH and press the accelerator pedal to the floor.

Then, the lower "SNOW" indicator will start to flash. Release the accelerator pedal to 0%. After about 2 seconds, the indicator will stop flashing and the computer will switch into the operation mode. The system is ready for use.

### **WARNING**

The vehicle must be absolutely motionless during setting (do not move it).

The overall basic setting process takes approx. 15 seconds.

### **STEERING sensor**

Set-up for steering is possible make only if the car running more like 5km/h.

Drive with the car directness and push the ACD button for 6 sec.

After 6 seconds the indicators lamp flash from up to down and back. Steering sensor is fixing in this direct position

## **1.4 EMERGENCY CLAMPING OF THE ACD DIFFERENTIAL TO 100%**

If the half axis breaks, you may lock the system and slowly proceed to the services. Do so by pressing the ACD SWITCH on the dashboard and hold it for 3 seconds until all three indicators light up (tarmac, gravel, snow). You may unclamp the ACD differential by pressing the ACD SWITCH again.

## 2.1 MAPS

ACD computer contains 9 standard mapos

1.	TARMAC technical , dry	ASFALT technický, suchý
2.	TARMAC fast, dry	ASFALT rychlý, suchý
3.	TARMAC slippy	ASFALT kluzký
4.	GRAVEL technical , dry	ŠOTOLINA technický, suchý
5.	GRAVEL fast, dry	ŠOTOLINA rychlý, suchý
6.	GRAVEL slippy	ŠOTOLINA kluzký
7.	SNOW technical, nibs	SNÍH technický na hrotech
8.	SNOW fast, nibs	SNÍH rychlý na hrotech
9.	SNOW slippy	SNÍH kluzký

## 2.2 SELECTION OF INDIVIDUAL MAPS FROM THE DRIVER'S SEAT

**Individual maps are stored in the unit in three sections:**

**A) TARMAC      B) GRAVEL      C) SNOW**

- |  |                |
|--|----------------|
| <b>1. A) TARMAC</b> section contains the following maps: | 1,2,3, and OFF |
| <b>2. B) GRAVEL</b> section contains the following maps: | 4,5,6, and OFF |
| <b>3. C) SNOW</b> section contains the following maps:   | 7,8,9, and OFF |

You may check the actually activated map on the display of the ACD computer.

### **1. Selecting A) TARMAC section**

- Switch on the ignition.
- Press and hold the ACD button for 6 seconds until two green indicators light up; the unlighted indicator indicates the selected section.

○ TARMAC

● GRAVEL

● SNOW

- Release the button and the **A) TARMAC** regime will automatically activate after 2 seconds. Then, only one indicator will light up.

If the TARMAC indicator lights up, you have selected Map No. 1 of the total pack of 9 maps stored in the unit. By switching to GRAVEL – you select Map No. 2, SNOW – Map No.3. After pressing the ACD button, all indicators will turn off. In this position, the ACD system is turned off (it is advisable to use it during transfer between the speed tests – it saves the differential fins and hydraulic pump from wearing). By pressing the button again, you select Map No. 1 or Map 2, 3 within the selected A) TARMAC section.



## **2. Selecting B) GRAVEL section**

- Press and hold the ACD button for 6 seconds until two green indicators light up; the unlighted indicator indicates the selected section. After the button is released, the 2 second interval of automatic activation of the section will start. By pressing the ACD button again (before the lapse of 2 seconds), you switch from the **A) TARMAC** to **B) GRAVEL**. In such case, the TARMAC and SNOW indicators will light up. The unlighted indicator indicates the GRAVEL section which includes the Maps 4, 5, 6

- TARMAC
- GRAVEL
- SNOW

After selecting the **B) GRAVEL** section and after automatic activation after 2 seconds, the TARMAC indicator will light up which will indicate that Map No. 4 of the total pack of 9 Maps was selected. By pressing the button again, you switch to GRAVEL – Map No.5, or SNOW – Map No. 6. If all indicators are unlighted, the ACD system is switched off.

By pressing the button again, you select Map No. 4 and other following maps in the B) GRAVEL section.

### **3. Selecting C) SNOW section**

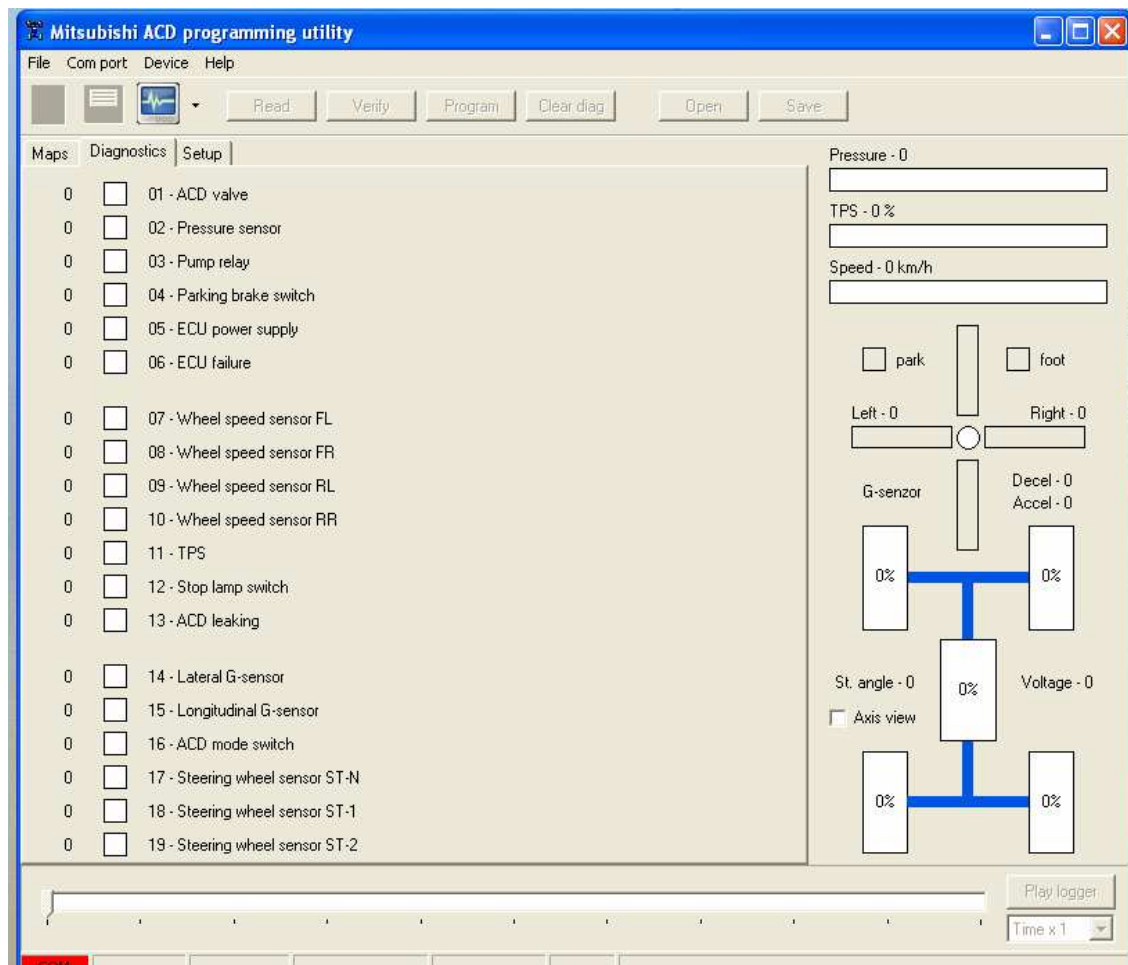
- Press and hold the ACD button for 6 seconds until two green indicators light up; the unlighted indicator indicates the selected section. After you release the button, the 2 second interval of automatic activation of the section will start. By pressing the ACD button again (before the lapse of 2 seconds), you switch from the **B) GRAVEL** section to the **C) SNOW** section. In such case, the TARMAC and GRAVEL indicators will light up. The unlighted indicator indicates the SNOW section which includes the Maps 7, 8, 9

- TARMAC
- GRAVEL
- SNOW

After you select the **C) SNOW** section and after the automatic activation after 2 seconds, the TARMAC indicator will light up, indicating that Map No. 7 of the total pack of 9 Maps was selected. By pressing the button again, you switch to GRAVEL – Map No.8, or SNOW – Map No. 9. If all indicators are unlighted, the ACD system is switched off.

By pressing the button again, you select Map No. 7 and following maps in the C) SNOW section.

## 3.1 DIAGNOSTICS



### **Section 1**

- 01. ACD valve
- 02. Accumulator pressure sensor
- 03. Hydraulic pump relay
- 04. Hand brake sensor
- 05. Control unit supply
- 06. Defective control unit

### **Section 2**

- 07. Front left wheel sensor
- 08. Front right wheel sensor
- 09. Rear left wheel sensor
- 10. Rear right wheel sensor
- 11. Throttle valve position sensor
- 12. Brake light sensor
- 13. Oil leak in pressure section of the hydraulic system

### **Section 3**

- 14. G1 overload sensor
- 15. G2 overload sensor
- 16. ACD button
- 17. Steering wheel sensor 1
- 18. Steering wheel sensor 2
- 19. Steering wheel sensor 3

Error codes are divided into 3 sections. The first section includes the most serious defects which significantly influence the function of the centre differential.

The detected defects need to be repaired immediately.

The second and third sections include less serious defects.

The error code is indicated on the display of the control unit by red colour.

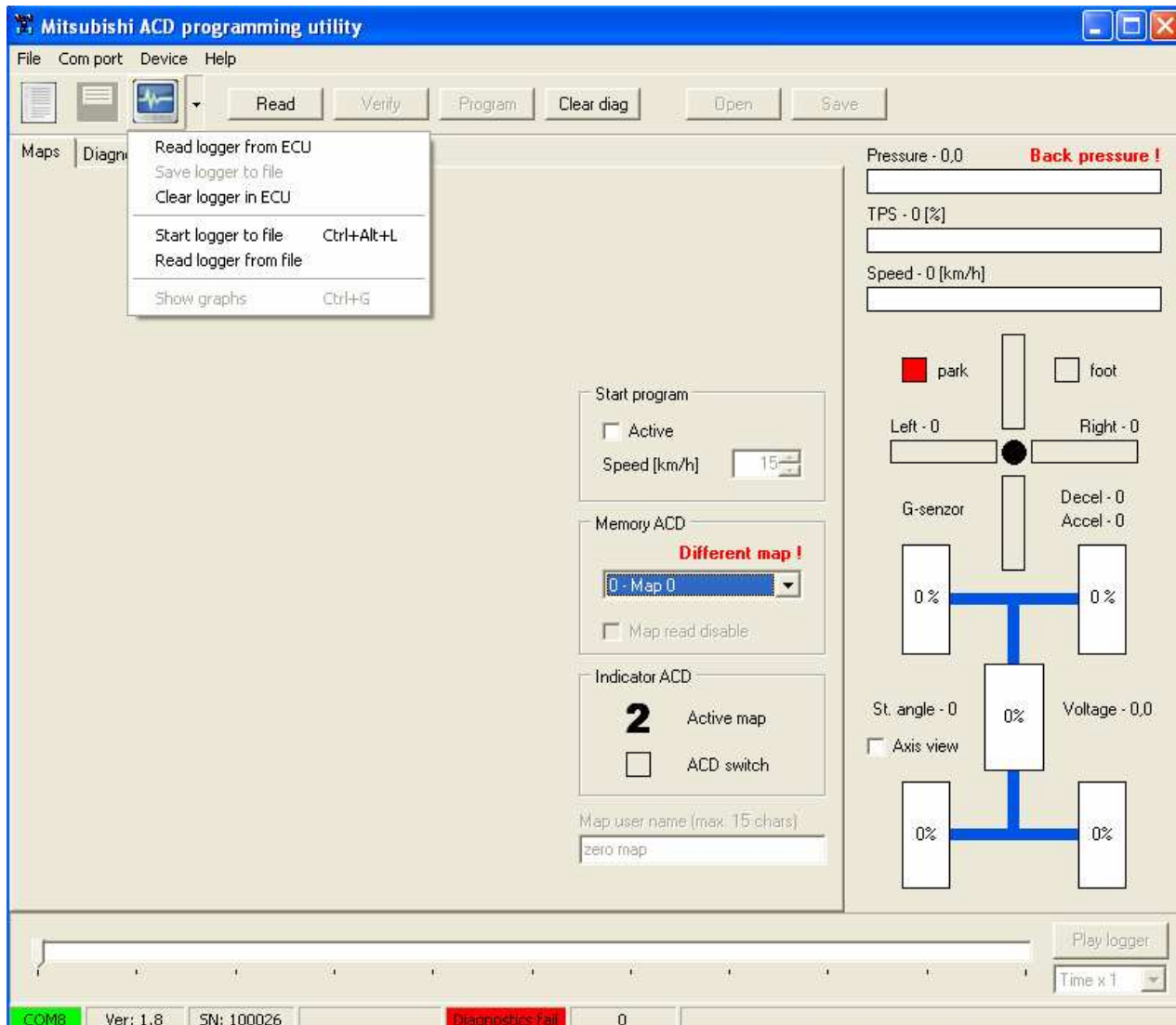
Error codes may be deleted right in the vehicle.

The deletion is carried out as follows:

1. Switch off the ignition.
2. Press the ACD button on the dashboard and turn the ignition key to position I.

Error codes may also be deleted by connecting a notebook to the control unit.

## 4.1 DATALOGGER OPERATION



The datalogger record allows to evaluate the course of individual speed tests in real time or in a slow-down mode. Visualisation may be presented in the graphic form or in a graph with optional parameters/quantities.

The ACD internal memory capacity is 72 min.

The datalogger operation icon is located on the upper tool bar (third from the left)



## 4.2. ACTIVATION OF THE DATALOGGER RECORD

The datalogger record will automatically start with the activation of the **START program** mode. (it is enabled by a quick and short depressing of the gas pedal/throttle above the value of 85%)

The activated START program mode is indicated on the dashboard by indicator lamps TARMAC, GRAVEL, SNOW which switch on simultaneously

(Note: If the vehicle does not move within 10 seconds after the START program has been activated, the program will be disabled automatically)

The datalogger record is carried out for the entire driving time of the vehicle in the speed test.

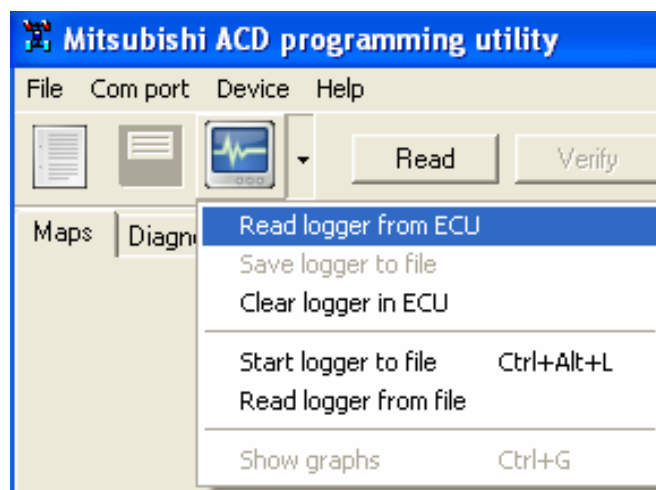
The record is completed whenever the vehicle remains standing for more than 5 seconds (or if it moves at a speed lower than 5km/h for a period of 5 seconds)

**TIP !** - It is possible to check the datalogger record directly on the ACD computer. If the datalogger record is active – green dot lights on the display indicating the map number.

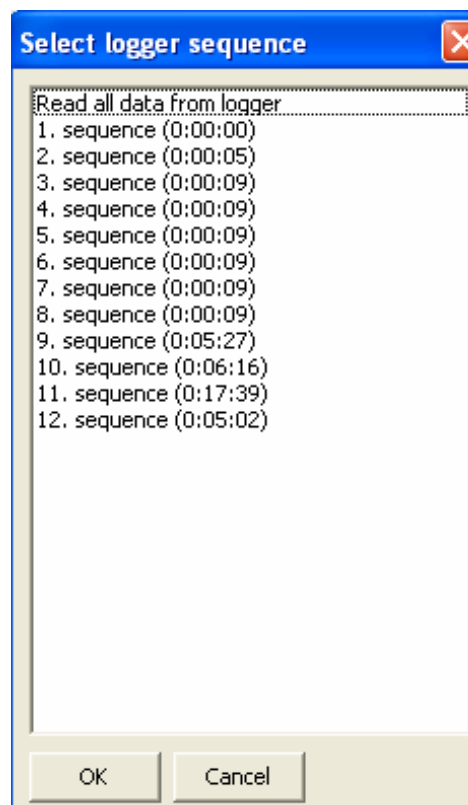
## 4.3. READING AND SAVING THE DATALOGGER RECORD

Interconnect your laptop with the ACD computer (directly on the vehicle)

By clicking the datalogger icon the following menu appears.



**Read logger from ECU** – click to view all the sequences which contain the ACD internal memory. Select the relevant sequence and click the OK button to automatically download the same.



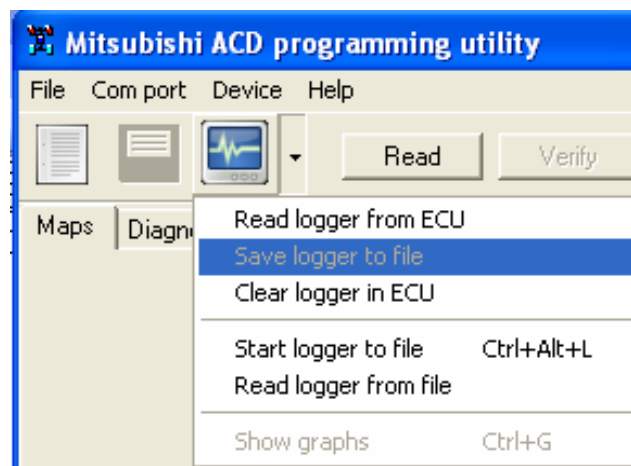
**TIP !** – we recommend to download the saved sequences individually for the sake of transparency of the individual speed tests. Sequences are arranged in descending order from the oldest to the latest.

After downloading the selected sequence, save the very file to the folder you have chosen on your laptop.

Click the datalogger icon – and select **SAVE LOGGER TO FILE**.

Select the target folder to save the relevant sequence. Name the sequence at your own discretion and save it.

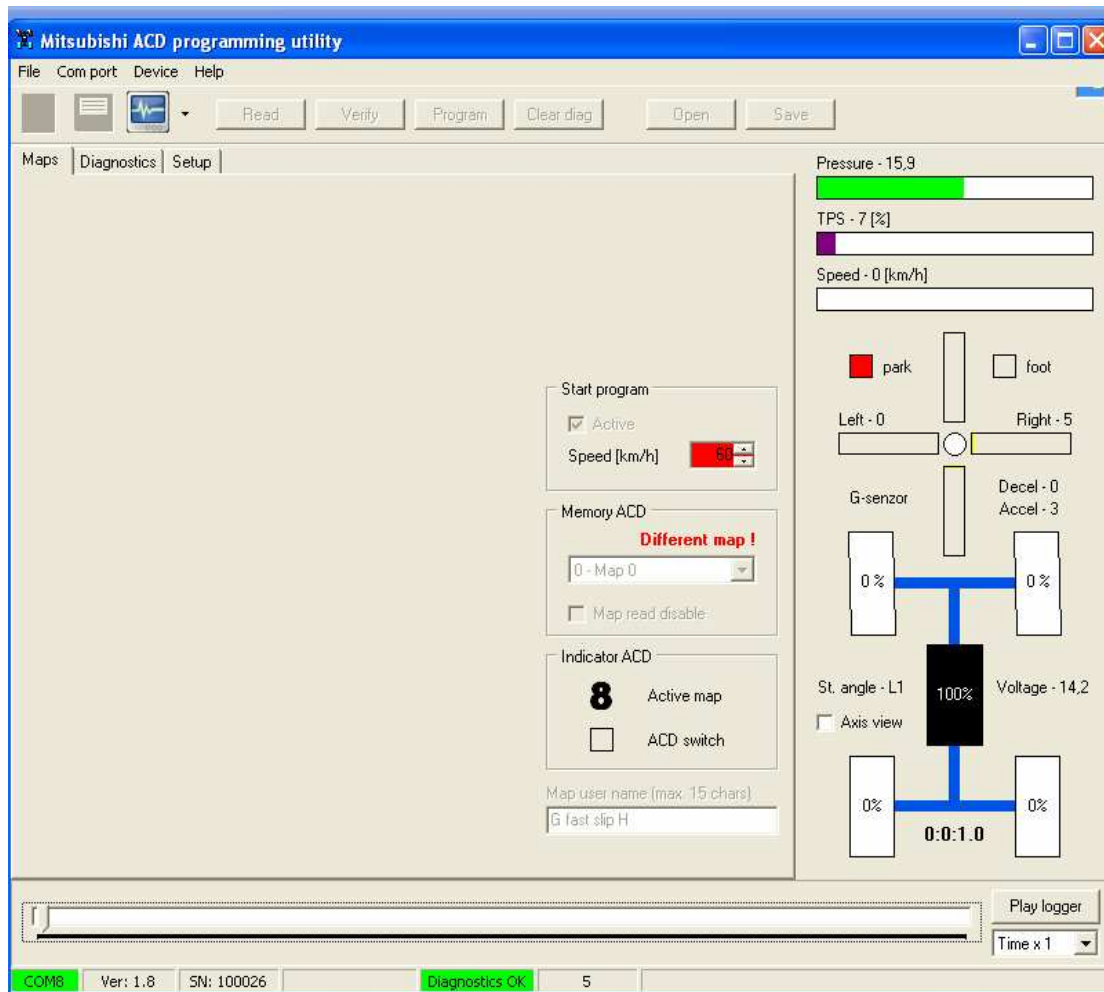
Other sequences stored in the ACD computer memory will be saved in the same fashion.



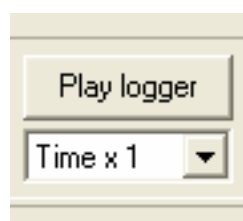
When all sequences have been saved you may remove them from the ACD computer  
- **CLEAR LOGGER IN ECU** (recommended for more transparency)

## 4.4. REPLAYING AND ANALYSING THE DATALOGGER

Choose the sequence you want to play –**READ LOGGER FROM FILE**. After being selected, the relevant sequence is automatically downloaded to the program.

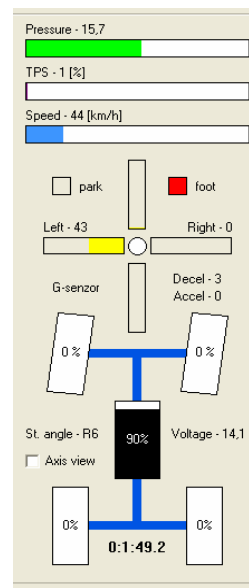
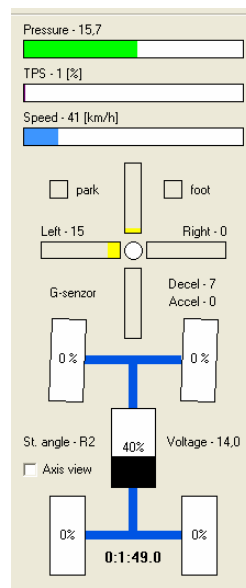
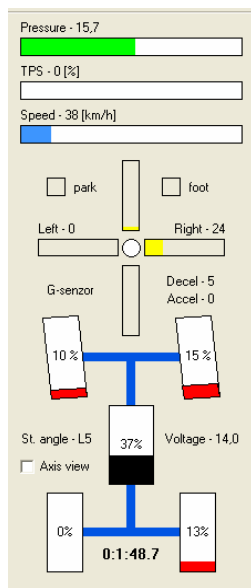
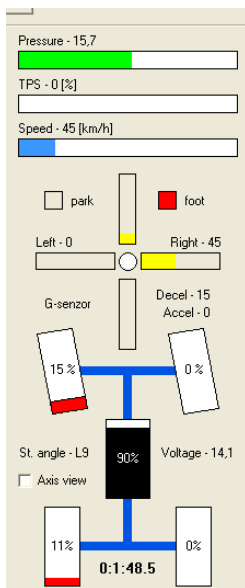
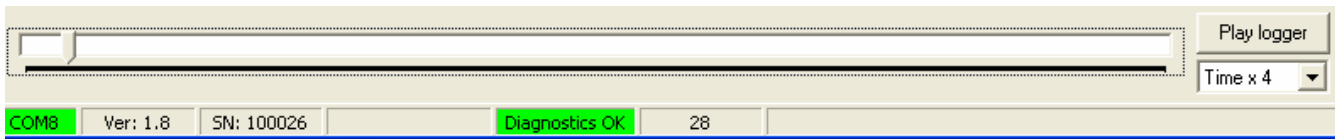


Press the **PLAY LOGGER** button to play the sequence. Subsequently, the record replay starts. (the replay speed can be changed – **TIME** function)



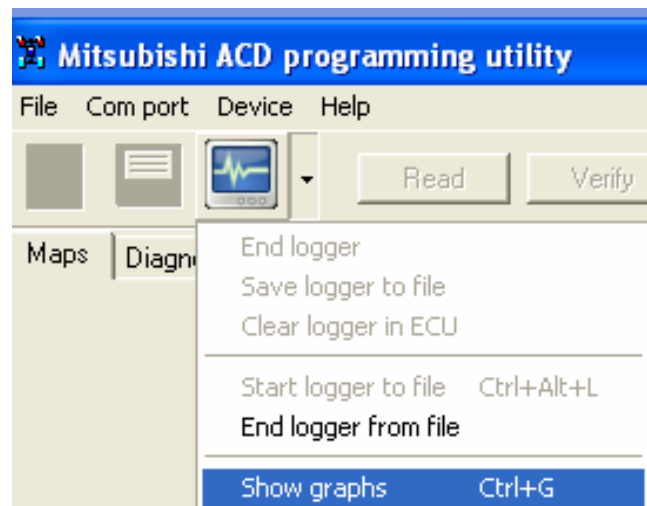


**TIP !** – the replay may also be made manually (step by step)  
Move the slider in the lower bar. (using the mouse or arrow keys on your laptop)

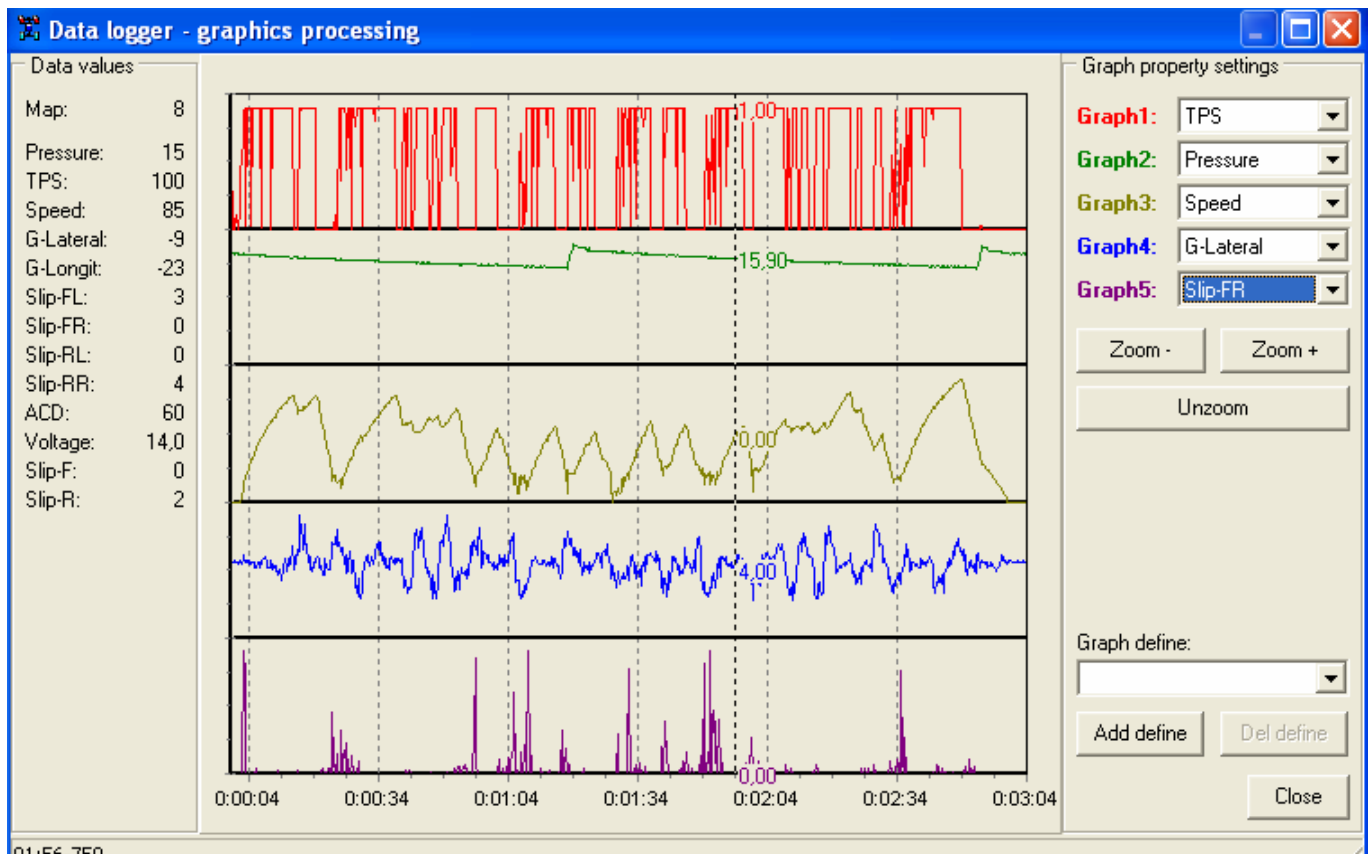


## 4.5 DATALOGGER GRAPH

To view the graph use the SHOW GRAPHS function.



Up to 5 data values can be displayed in the graph – select the required value in upper right corner.



## 4.6 STOPPING THE DATALOGGER REPLAY

To stop the replay, use the END LOGGER FROM FILE function. To replay the next saved sequence follow the steps mentioned above.

