



# MOTOPLAT VC-07 USB

## Instruction Manual

2014 Version

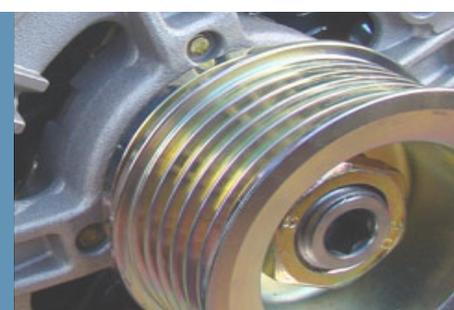


The Motoplat VC-07 USB tester is an addition to your current test equipment, that allows you to check and test the alternators that are fitted on the latest cars, such as: BMW, Mercedes Benz, Volkswagen and Audi.



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## IMPORTANT INFORMATION



### Safety Warning

Electrical devices should be installed and operated in such a way that all applicable safety requirements are met. It is your responsibility as an installer to ensure that you identify the relevant safety standards and comply with them. Failure to do so may result in damage to equipment and personal injury. In particular, you should study the contents of this guide carefully before installing or operating the equipment.

People who start using this product should review carefully this instruction manual, or have had a training from a qualified person.

The use of electrical equipment is entirely at your own risk and Pos Service Holland is under no circumstances responsible for any incidental, consequential or special damages of any kind whatsoever, including but not limited to lost profits arising from or in any way connected with the use of the automated test equipment or this manual.

Since this tester only operates in conjunction with other test equipment, you should also be aware of the installation, operation and safety requirements of the other equipment.

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# Motoplat VC-07 USB Instruction Manual

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## Section 1 – General information

### 1.0 General information about Motoplat VC-07 USB alternator tester:

The Motoplat VC-07 USB tester is an addition to your current test equipment, that allows you to check and test the alternators that are fitted on the latest cars, such as: BMW, Mercedes Benz, Volkswagen and Audi.

These alternators are controlled by:

<b>COM</b> (LIN / Start-Stop)	PSA / Mercedes Benz / Chrysler / Volks Wagen / BMW / Audi / Skoda /Seat / Honda / Toyota / Porsche / Renault / Fiat / Volvo / Ford /Landrover
<b>COM</b> (BSS 1,2,3)	BMW / Rolls Royce / Renault / Mini / Audi / Volks Wagen / Mercedes Benz (old types)
<b>PWM</b>	Ford Group / Mazda / Landrover / GM
<b>PD Drive</b>	Mazda
<b>RLO</b>	Toyota (sense)
<b>C</b>	Hyundai / Kia / Nissan (from 2005)
<b>DFM</b> (Positive / Negative / 24 Volt)	Mercedes Benz / Volkswagen / Audi / PSA / Honda / Toyota

The VC-07 USB alternator tester only takes a few seconds to automatically identify the type of regulator used on the alternator that needs to be tested (Lin\_1, Lin\_2, BSS\_1,2,3). There is even the possibility to identify the type of regulator without the alternator itself (+B, 0v socket).

While the tester is checking the PWM and PD, the monitor will also display information about the DFM signal.

Initial setting of the VC-07 USB voltage is 14.5V, but it can be changed by pressing the buttons '15.5V', '13.5V', '12.5V' or the 'OFF' button. This duplicates the actual situation in the car during charging.

The DFM signal is displayed in percentage (%), which allows you to evaluate the performance during charging at a specific moment.

An additional function of the VC-07 USB alternator tester is a Voltage Meter.

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## Section 2 – Installation

### 2.0 Software installation + USB connection

#### Required:

- \*The software file “VC-07 USB\_install\_05-2014.msi”
- \*A VC-07 2014 model with a built in USB connection  
(USB connections can be ordered for earlier models as an option!)
- \*USB cable
- \*PC or laptop (not included)

#### How to install:

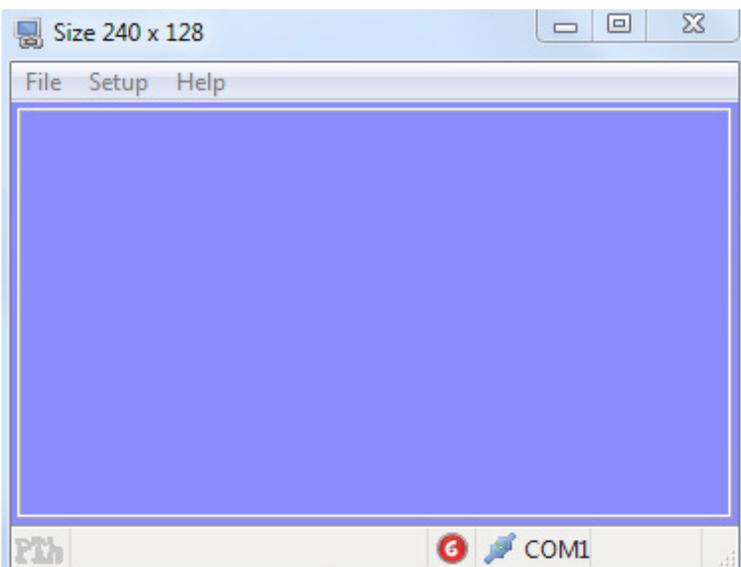
This software will work with any late windows version software or any late PC or laptop and is easy to install.

Double click on the MSI-file and the installation will start and complete automatically

After this is done, a couple of files will appear on the desktop. Please do not remove these!

Double click on the Elterm quick launch icon on the desktop and the program will start.

A small screen will appear as seen below.



Connect the VC-07 USB to 12volts DC and it will automatically turn on or turn it on by pushing the red button on the front panel of the VC-07 USB.

Connect the VC-07 USB tester (USB connection on the back) to the PC or laptop using the USB cable

On the top part of the screen select “Setup” and then “Port” to select the right USB port that is used to connect the VC-07 USB.

The program will automatically start to connect to the COM port selected.

After it finds the right port, the same information will show up on the screen as seen on the VC-07 USB.

If not, please check the USB port settings on the PC or laptop connected.

The USB port settings differs per PC or laptop. Please review online or in the manual of the PC or laptop.

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## Settings:

Select the "Setup" scroll down menu on the top of the screen to change the screen settings, which can be customized by changing transparency background colour, fonts and font colours.

By clicking on "File" in the upper left corner, you will see the next options: log, replay log, history, print, printer settings and exit the program.

It is possible to log or print the test results after or during the test on the (conventional) test bench. The VC-07 USB only logs (saves or prints) the field duty cycle in percentage, the voltage setpoint(s) and the protocols, test methods and other screen details.

It is not possible to get a professional test result because the Amperage, Voltage and RPM of the (conventional) test bench are not used and logged by the VC-07 USB.

After or during the test, just move with your mouse over the info on the screen and the logged history of that test will be visible.

To find the software version you are using, please select "Help"

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## 2.1 Installation of Motoplat VC-07 USB alternator tester:

The Motoplat VC-07 USB is an addition and is only working in combination with other test equipment. To work with the VC-07 USB, it's necessary to connect it to your current test equipment by using the cables +B and GND on the backside of the tester.

Put the red +B cable in the 12V socket of your current tester.  
Put the black GND cable in the Ground of your current tester.



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## 2.2 Connect alternator to Motoplat VC-07 USB tester:

To test an alternator, you should first connect it to your current tester in the usual way. (Please consult the instruction manual of your current tester).

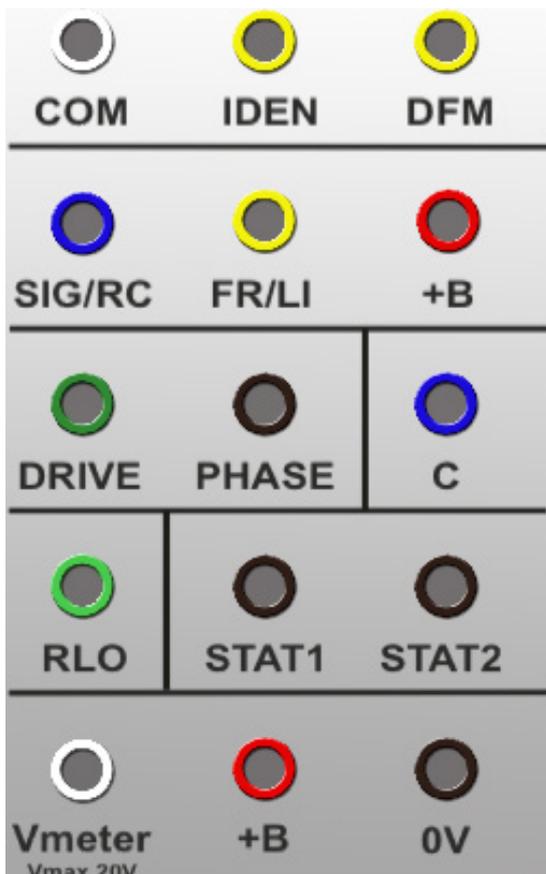
After this is done, you can start to connect the alternator to the VC-07 USB tester. Turn on the tester by pressing the "POWER" button.



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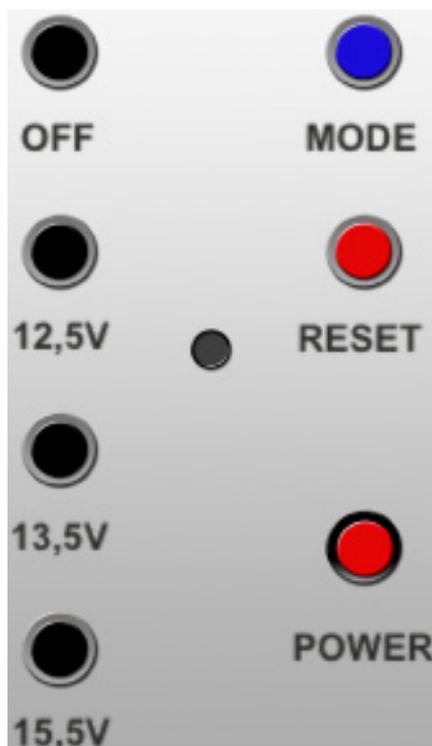
## Section 3 – Instructions

### 3.0 Plug descriptions:



<b>COM</b>	Communication with the alternator
<b>IDEN</b>	Identification BSS (BSD), LIN and DFM type connections
<b>DFM</b>	<i>Measurement input signal DFM (Pos./Neg./24v.)</i>
<b>SIG/RC</b>	Output to PWM controlled alternator
<b>FR/LI</b>	Alternator measurement DFM input
<b>+B</b>	Power output
<b>DRIVE</b>	Alternator control output (PD type regulator)
<b>PHASE</b>	Phase measurement (presence and level)
<b>C</b>	“C” control output
<b>RLO</b>	“RLO” output alternator control (Toyota)
<b>STAT1</b>	Phase signal simulation (to check regulator without alternator) (Bosch)
<b>STAT2</b>	Phase signal simulation (to check regulator without alternator) (use both STAT1 and STAT2 for Valeo)
<b>Vmeter</b>	Voltage measure input (max 20V) + actual voltage COM regulator
<b>+B</b>	Power output
<b>0V (GND)</b>	Power input

### 3.1 Button descriptions



<b>OFF</b>	Voltage set point button
<b>12,5V</b>	Voltage set point button
<b>13,5V</b>	Voltage set point button
<b>15,5V</b>	Voltage set point button
<b>MODE</b>	Manuel selection button of functions => 0. COM 1. Vmeter 2. PWM (Focus / Mondeo) 3. PWM (Opel / GM) 4. C 5. D DRIVE 6. RLO 7. A. DFM Positive B. + VSP/Off button for DFM Negative C. FR/LI connection for 24V test
<b>RESET</b>	Processor restart (if tester freezes) or identification of LIN/BSS regulators
<b>POWER</b>	Power button

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## Section 4 – Systems

### 4.0 COM LIN\_1



<b>Mode</b>	Tester automatically begins to identify the alternator control system
<b>1. System</b>	COM LIN 1.3 / H Baud = 9600
<b>2. Connection</b>	COM
<b>3. Field duty cycle</b>	Increase as high as possible with your current tester
<b>4. Voltage output</b>	Pass when it's close to the set voltage
<b>5. Voltage set-point</b>	Voltage can be changed by pressing buttons 12,5V / 13,5V / 15,5V / OFF
<b>6. Pass / Error message</b>	Pass = No message / If you can change VSP Error = Mechanical / Electrical / Temperature



*\*Indicates the actual voltage of the COM regulator when connecting Vmeter to the B+ of the alternator.*

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## 4.0 COM LIN\_2



<b>Mode</b>	Tester automatically begins to identify the alternator control system
<b>1. System</b>	COM LIN 2.1 / H Baud = 19200
<b>2. Connection</b>	COM
<b>3. Field duty cycle</b>	Increase as high as possible with your current tester
<b>4. Voltage output</b>	Pass when it's close to the set voltage
<b>5. Voltage set-point</b>	Voltage can be changed by pressing buttons 12,5V / 13,5V / 15,5V / OFF
<b>6. Pass / Error message</b>	Pass = No message / If you can change VSP Error = Mechanical / Electrical / Temperature



*\*Indicates the actual voltage of the COM regulator when connecting Vmeter to the B+ of the alternator.*

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## 4.2 COM BSS



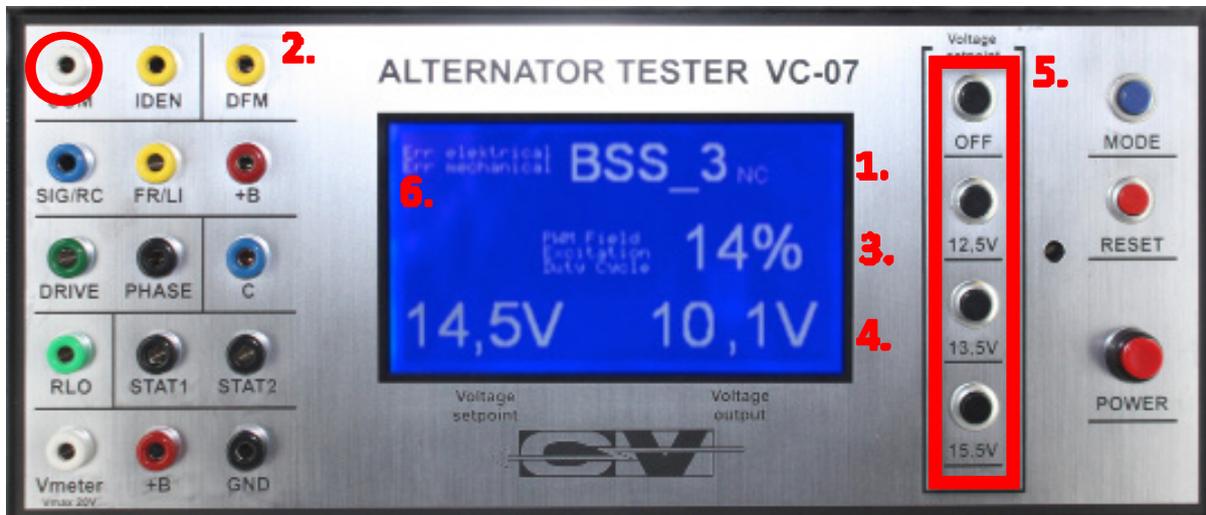
<b>Mode</b>	Tester automatically begins to identify the alternator control system
<b>1. System</b>	COM BSS_1,2 or 3
<b>2. Connection</b>	COM
<b>3. Field duty cycle</b>	Increase as high as possible with your current tester
<b>4. Voltage output</b>	Pass when it's close to the set voltage
<b>5. Voltage set-point</b>	Voltage can be changed by pressing buttons 12,5V / 13,5V / 15,5V / OFF
<b>6. Pass / Error message</b>	Pass = No message / If you can change VSP Error = Mechanical / Electrical / Temperature



*\*Indicates the actual voltage of the COM regulator when connecting Vmeter to the B+ of the alternator.*

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## 4.3 COM BSS\_3



<b>Mode</b>	Tester automatically begins to identify the alternator control system
<b>1. System</b>	COM BSS_3 (example)
<b>2. Connection</b>	COM
<b>3. Field duty cycle</b>	Increase as high as possible with your current tester
<b>4. Voltage output</b>	Pass when it's close to the set voltage
<b>5. Voltage set-point</b>	Voltage can be changed by pressing buttons 12,5V / 13,5V / 15,5V / OFF
<b>6. Pass / Error message</b>	Pass = No message / If you can change VSP Error = Mechanical / Electrical / Temperature



\*Indicates the actual voltage of the COM regulator when connecting Vmeter to the B+ of the alternator.

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## 4.4 Voltage meter



<b>Mode</b>	Press 1 time on the Mode button
<b>1. System</b>	Vmeter
<b>2. Connection</b>	Vmeter / GND (GND is not required)
<b>3. Field duty cycle</b>	Non applicable
<b>4. Voltage output</b>	Only voltage output is displayed (Max. 20 Volts!!!)
<b>5. Voltage set-point</b>	Non applicable
<b>6. Pass / Error message</b>	Non applicable

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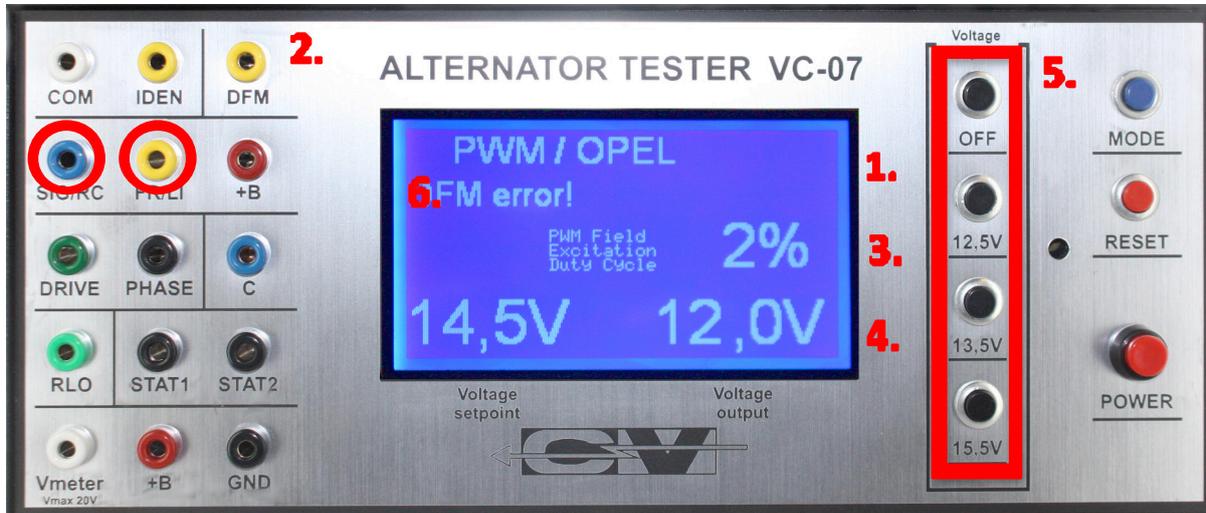
## 4.5 PWM (Focus / Mondeo)



<b>Mode</b>	Press 2 times on the Mode button
<b>1. System</b>	PWM (Focus / Mondeo)
<b>2. Connection</b>	SIG/RC / FR/LI / +B
<b>3. Field duty cycle</b>	Increase as high as possible with your current tester
<b>4. Voltage output</b>	Pass when it's close to the set voltage
<b>5. Voltage set-point</b>	Voltage can be changed by pressing buttons 12,5V / 13,5V / 15,5V / OFF
<b>6. Pass / Error message</b>	Pass = DFM OK / If you can change VSP Fail = No control of regulator

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## 4.6 PWM (Opel / GM)



<b>Mode</b>	Press 3 times on the Mode button
<b>1. System</b>	PWM (Opel / GM)
<b>2. Connection</b>	SIG/RC / FR/LI (special wiring included)
<b>3. Field duty cycle</b>	Increase as high as possible with your current tester
<b>4. Voltage output</b>	Pass when it's close to the set voltage
<b>5. Voltage set-point</b>	Voltage can be changed by pressing buttons 12,5V / 13,5V / 15,5V / OFF
<b>6. Pass / Error message</b>	Pass = DFM OK / If you can change VSP Fail = No control of regulator

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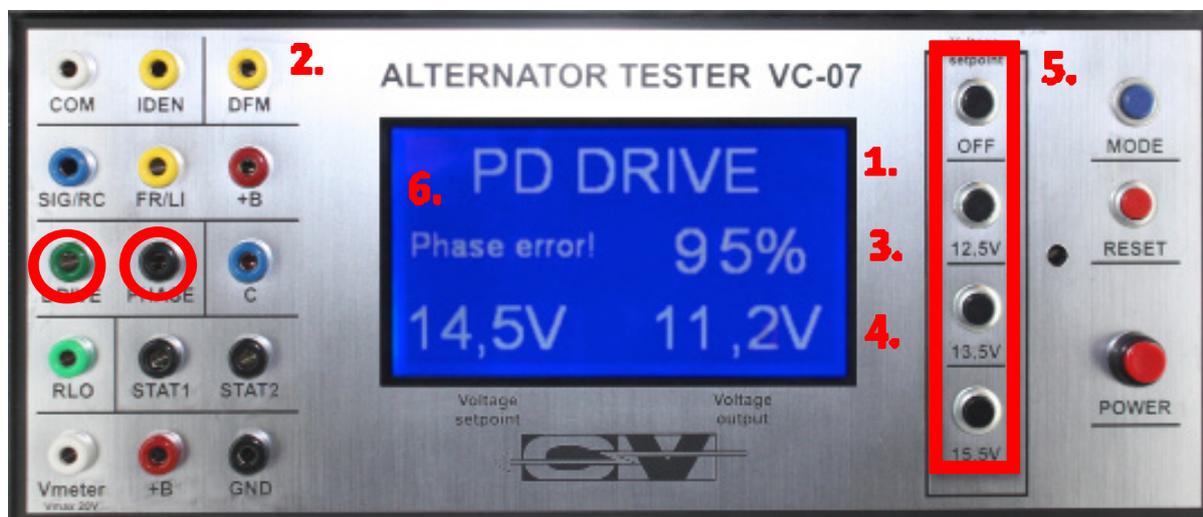
## 4.7 C



<b>Mode</b>	Press 4 times on the Mode button
<b>1. System</b>	C (Kia, Hyundai)
<b>2. Connection</b>	C
<b>3. Field duty cycle</b>	Non applicable
<b>4. Voltage output</b>	Pass when it's close to the set voltage
<b>5. Voltage set-point</b>	Voltage can be changed by pressing buttons 12,5V / 13,5V / 15,5V / OFF
<b>6. Pass / Error message</b>	Pass = If you can change VSP / Fail = No control of regulator

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## 4.8 PD Drive



<b>Mode</b>	Press 5 times on the Mode button
<b>1. System</b>	PD DRIVE (Mazda)
<b>2. Connection</b>	Drive / Phase (W-terminal)
<b>3. Field duty cycle</b>	Increase as high as possible with your current tester
<b>4. Voltage output</b>	Pass when it's close to the set voltage
<b>5. Voltage set-point</b>	Voltage can be changed by pressing buttons 12,5V / 13,5V / 15,5V / OFF
<b>6. Pass / Error message</b>	Pass = If you can change VSP / Error = Phase Error / VSP doesn't change

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## 4.9 RLO



<b>Mode</b>	Press 6 times on the Mode button
<b>1. System</b>	RLO (Toyota sense terminal)
<b>2. Connection</b>	RLO
<b>3. Field duty cycle</b>	Non applicable
<b>4. Voltage output</b>	Pass when it's close to the set voltage
<b>5. Voltage set-point</b>	Voltage can be changed by pressing buttons 12,5V / 13,5V / 15,5V / OFF
<b>6. Pass / Error message</b>	Pass = If you can change VSP / Fail = No control of regulator / VSP doesn't change

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## 4.10.A DFM (Positive)



<b>Mode</b>	Press 7 times on the Mode button
<b>1. System</b>	DFM Positive (from 0% to 99%)
<b>2. Connection</b>	DFM
<b>3. Field duty cycle</b>	Increase as high as possible with your current tester
<b>4. Voltage output</b>	Standard
<b>5. Voltage set-point</b>	Non applicable
<b>6. Pass / Error message</b>	Pass = Duty cycle will change depending on load. Fail = Duty cycle will not change depending on load.

## 4.10.B DFM (Negative)



<b>Mode</b>	Press 7 times on the Mode button + VSP / OFF button for Negative
<b>1. System</b>	DFM Negative (from 99% to 0%)
<b>2. Connection</b>	Try DFM(+), FR/LI(-) and IDEN(-) to find out which is the right connection. The connection is OK when a percentage shows and by applying load, the percentages increase or decrease depending on DFM type.
<b>3. Field duty cycle</b>	Increase as high as possible with your current tester
<b>4. Voltage output</b>	Standard
<b>5. Voltage set-point</b>	Non applicable
<b>6. Pass / Error message</b>	Pass = Duty cycle will change depending on load. Fail = Duty cycle will not change depending on load.

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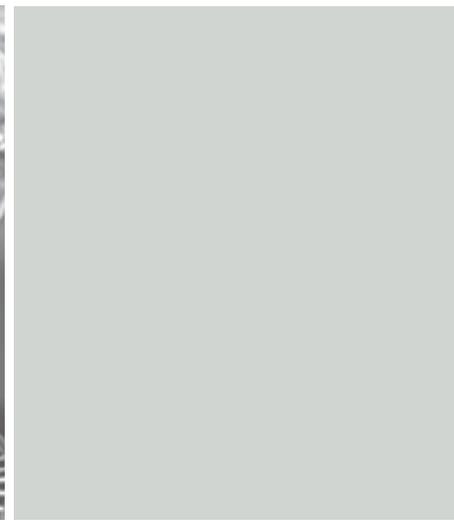
## 4.10.C DFM (24 Volt Test)



<b>Mode</b>	Press 7 times on the Mode button
<b>1. System</b>	DFM 24 Volt Test
<b>2. Connection</b>	FR/LI
<b>3. Field duty cycle</b>	Increase as high as possible with your current tester
<b>4. Voltage output</b>	Standard
<b>5. Voltage set-point</b>	Non applicable
<b>6. Pass / Error message</b>	Pass = Duty cycle will change depending on load. Fail = Duty cycle will not change depending on load.

### Warning!

Testing 24 Volts DFM is possible, but the tester should always be connected to a 12 volts power source.  
(Note: Don't connect the tester in any case to 24 volts!!!)



## Tech Info

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## Section 5 – Tech Info

### 5.0 DFM Explanation

DF(M) stands for Digital Field Monitor.

Every alternator brand has a different abbreviation for the DF(M) connection, for example: FR(Field Return), DF(Digital Field) , DFM(See above), M(Monitor), LI(Load Indicator).

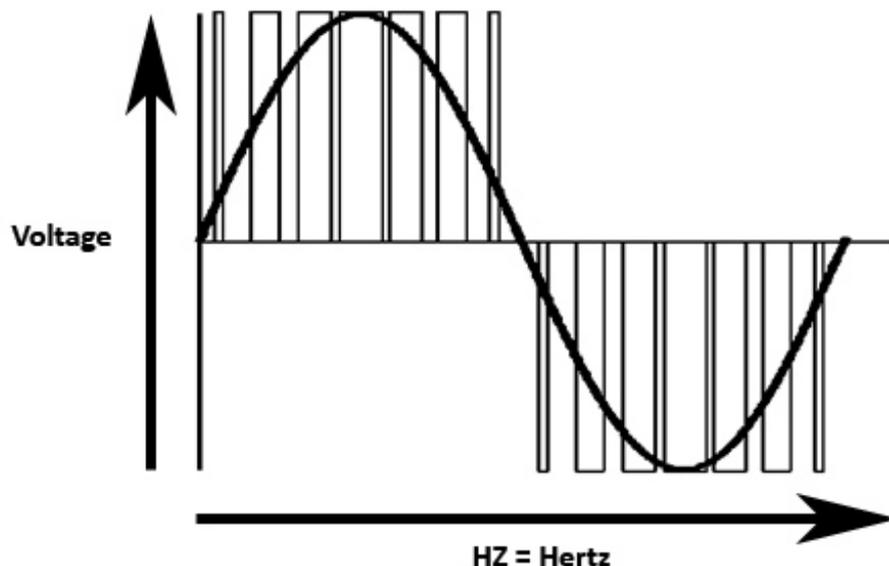
They all function in the same way.

Function:

About the DFM connection there is a positive and negative measurement and both work with a block pulse. When the alternator load increases the block pulse depending on the car application becomes wider or smaller. This is measured in % also called PWM(Pulse Width Modulation).

The car ECU then knows what the load is at a specific moment during charging.

If the load is too high the car ECU can shut down some car accessories and or increase the idle speed.



# Tech Info

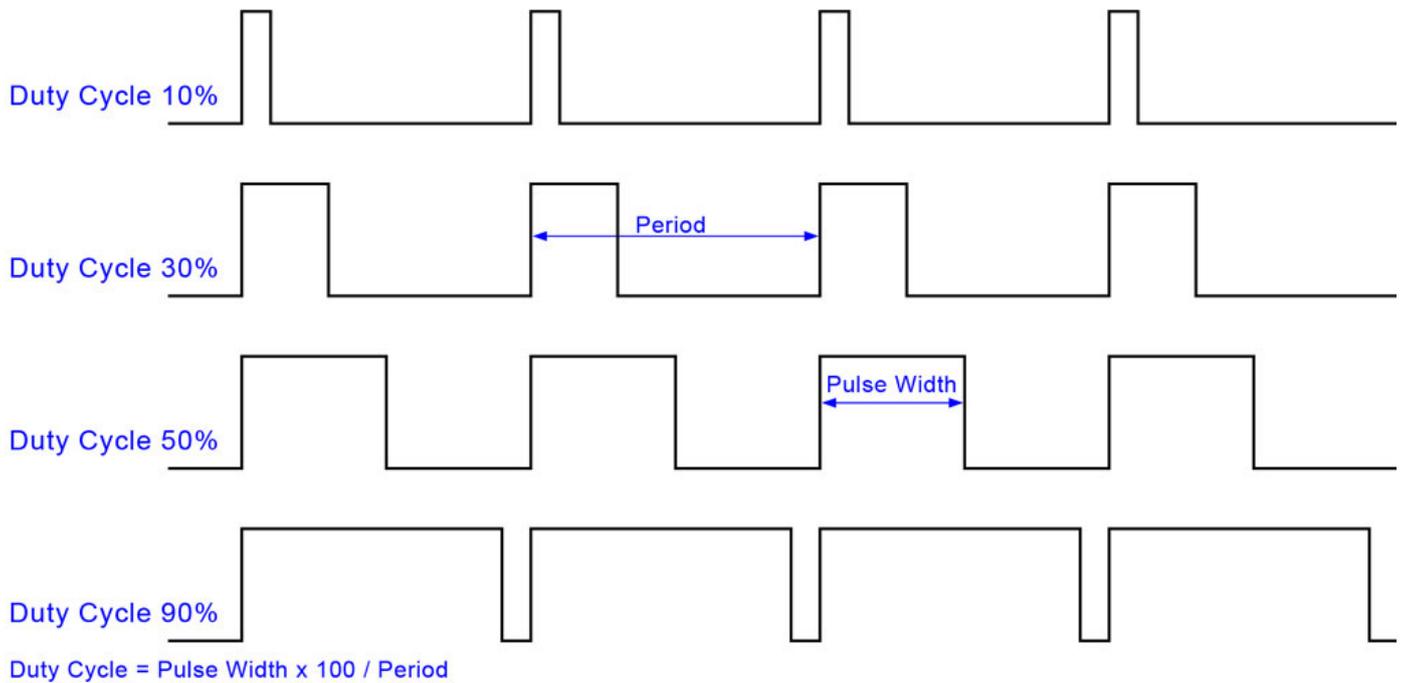
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DFM (M,FR,DF,LI,F) is a block signal (information) that is sent from the alternator to the car ECU. It shows the load level of the rotor of the alternator, also known as electromagnetic force. This has a direct influence on the produced energy of the alternator.

The voltage is regulated by turning on the rotor current with a frequency of eg.150HZ, which changes the electromagnetic force.

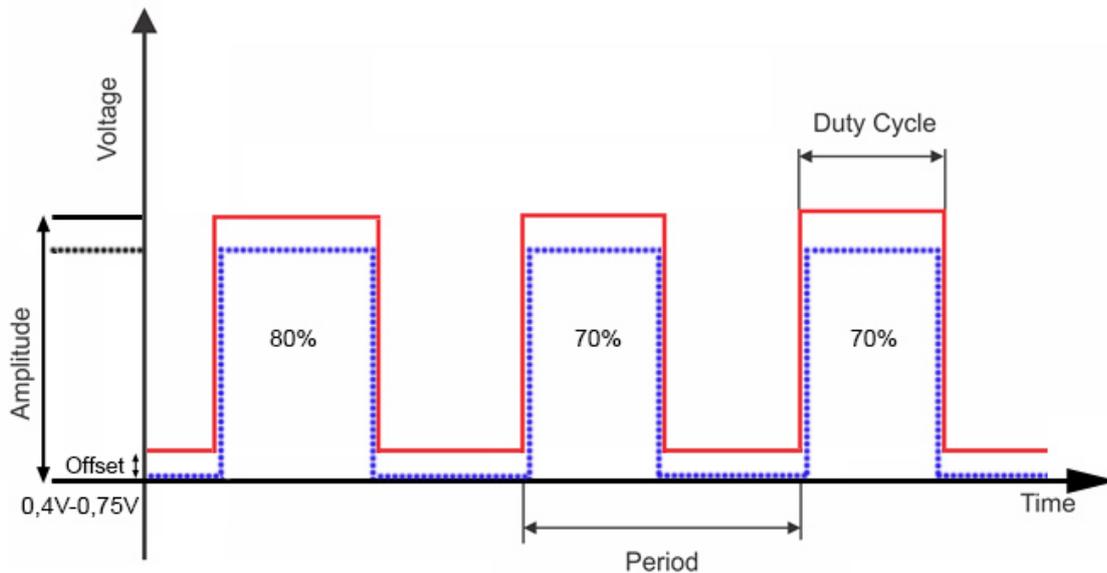
The longer the duration time of the current, the wider the duty cycle will be.

Below you see a diagram as an example to show you what the signal looks like when connected to an oscilloscope:



When looking at the structure of the transistor, an off-set of the DFM signal could show up and will vary in voltage somewhere between 0,1V-1,2V.

The actual diagram on the oscilloscope will look like the drawing below:



If the off-set were to exceed 0,75V, the ECU probably won't recognize the signal and because of that could calculate the wrong load of the alternator at that specific time.

The tester will show three results of the signal:

1. The frequency eg.150HZ
2. The width depending on the alternator load at that specific moment from 0-99 %.
3. Offset - from 0,1 to 1,2Volts

The best testing method is to compare the DFM signal to another alternator with the same OE number.

To check this, place an alternator with a DFM connection on the test bench and connect the DFM connection to the VC-07 USB and change the RPM's to 1500, 2500 and 3500 RPM.

During the test, put three different increasing loads on the alternator and write them down.

Now replace the OE alternator with a rebuild or aftermarket version and repeat the test above.

Compare the values and if the results are the same, the alternator will function well on the car.

If the results are different (especially the width in percentages), the best thing to do is to replace the regulator.

If the width changes like the OE version, the alternator is tested ok and if it doesn't the alternator is faulty.

This test is 100% reliable!

## 5.1 BSS Explanation (bit synchronous single wire)

There are 3 different BSS signals. The difference between them is the ability to show different alternator errors.

\*BSS-1 – only shows a Mechanical or an Electrical error

\*BSS-2 – only shows a Mechanical or an Electrical error

\*BSS-3 – can show both Mechanical and Electrical errors

It is not possible to interchange BSS-1 and BSS-2 regulators with each other because the car ECU can ask about a certain error and if it doesn't get the right answer, it will show an alternator error (charging lamp on) on the dashboard.

BSS-3 can be used for BSS-1 and BSS-2 because it is universal (BSS-3 can provide information about both errors).

BOSCH voltage regulators are all BSS-3, so you never have to interchange it with another regulator.

Caution should be taken with VALEO regulators, because they came in 3 different options: BSS-1, BSS-2 and BSS-3.

From our experience we know that it is impossible to purchase new VALEO BSS-3 Regulators for now.

### For Example:

On the BMW E60 series cars from 2003 and up there is a Valeo TG17C010 alternator mounted that has a BSS-2 system onboard. Some years later they used the same alternator, but its number is replaced by the TG17C048 which has a BSS-3 regulator.

If you order a Valeo voltage regulator for that particular alternator you will receive a BSS-2 regulator.

If you purchase a new TG17C048 alternator, it will be equipped with a BSS-3 regulator.

We have checked the signal coming from the ECU on a BMW E60 that had the TG17C048 (BSS-3) OEM alternator, but it was BSS-2.

Probably the BMW factories are getting ready to upgrade the protocol into BSS-3, but for now they just equip the cars with BSS-3 alternators.

Most probably the BSS protocol will no longer be developed, as they will be using the new LIN-INFINEON in the future.

Same situation is with BMW TG17C034 and VW TG17C020: OEM comes with BSS-3, aftermarket BSS-2 and it should work without any problems.

In such situations we will advise to order the one of the Valeo voltage regulators and check if it is really a BSS-1, BSS-2 or BSS-3 regulator. This way you will know for sure and you could mount that specific BSS regulator on that alternator.

This way you don't need to have many different regulators for every different BSS alternator.

## 5.2 LIN Explanation (local interconnect network)

Recently we have developed new LIN protocols and reorganized them for use on the VC-07 USB tester and other future to come Motoplat testers.

The LIN signal will be now displayed from LIN-1 to LIN-14 together with its ID code.

If new LIN protocols appear on the market, we will add more numbers if needed.

We did this to make development in remanufacturing easier and cheaper and more clear for customers.

Again, you don't need to have a regulator for every alternator, just arrange the regulators in groups or ID codes.

So if you know that LIN-2 is used on Mercedes and VW, you just choose the cheaper one and it is compatible and will save money and storage space.

LIN-1	FORD, Volvo Code: 33, 25, 41, 49, 88
LIN-2	Mercedes, VW Code: 28, 33, 25, 41
LIN-3	Honda Code 29 {HONDA 3 speed communication}
LIN-4	Honda Code 29 {HONDA 3 speed communication}
LIN-5	Honda No Code(ID) {HONDA 3 speed communication}
LIN-6	BMW Infineon(No Code)
LIN-7	Toyota (No Code)
LIN-8	Dodge Nitro, Fiat Freemont Code 28
LIN-9	Citroen, Peugeot start/stop. No Code only RPM will show up
LIN-10	New VW Valeo CG series Code 89
LIN-11	Fiat Denso (ms1012101670) Code 76
LIN-12	Fiat, Alfa TG12S111 Code 17
LIN-13	Ford, New Jaguar, Landrover Code 132
LIN-14	Ford( A002tx2581zc) Code 45

LIN-1 and LIN-2 Protocols are used from 2002 up to 2011.

Regulators LIN-1 and LIN-2 with different codes **cannot** be interchanged:

LIN-1 has to be replaced by LIN-1, the same with LIN-2. All the others above LIN-2 have different systems and baud rates, so they cannot be interchanged.

The code that shows up on the screen is the identification code of the regulator which is sent to the ECU to be identified. So to say, they are speaking the same language.

This is where the protocol(ID) will appear, for example: BMW LIN-Infineon or new Valeo CG series alternators.

If you check an alternator and on the screen a LIN-4 (Honda) protocol shows up, but isn't a Honda alternator, it means it is controlled by the same protocol.

It is not possible to interchange BOSCH and VALEO alternators with the same LIN protocol, because they use different addresses(ID), so it will not work on the car!

Please note that we have taken the responsibility upon ourselves to reorganize the LIN-protocols. 12 of the LIN-protocols as mentioned above, do not officially exist by the OE car manufacturers around the world, except for LIN-1 and LIN-2!

*The above car manufacturers are mentioned as an example only!*

## 5.3 Explanation VW Type Connectors

We investigated the possibility to find out the connections of an alternator, by checking the position of the sliders inside the so called "VW connectors" and it is possible

As you will see in the COM connector below, the slider on the bottom is straight across the space in between the other two sliders on top.

In this case, it is 100% sure that it is a COM connector!  
It doesn't matter if it has a 1 or a 2 pin connector.



Figure 1

### COM Connector

**VW, Audi, Mercedes, Porsche, Chrysler, Fiat, Seat, Skoda and more.**

When looking at figure 2 and 3 below, you will see that the sliders are in a different position than the COM connector above.

Figure 2 shows the two sliders on the bottom. The one on the right is opposite of the one on top.  
Looking at figure 3, the sliders are exactly the opposite of the figure 2 connector.

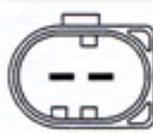


Figure 2

### VW/Audi/Fiat/MB(water-cooled) L/DFM Connector

Can also be

**Ford/Land Rover/Jaguar/Volvo LIN Connector(1 or 2 pins)**



Figure 3

**Only Mercedes/BMW Water-cooled L/DFM Connector**

## Section 6 – Support

### 6.0 Contact Information:

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