

DEFENDER

ABS-TC module

User's manual
ver 1.1

www.nanocom.it

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1.1 INTRODUCTION

In this manual only the diagnostic functions related to DEFENDER ABS are described and it's taken for granted that the user knows the NANOCOM basic functions concerning how to explore the menus and how to manage the NANOCOM-generated files. It's thus recommended to carefully read the document "NANOCOM user manual.pdf" where these subjects are dealt with.

1.2 GENERAL INFORMATION

Like the diagnostic functions related to engine TD5's management, NANOCOM allows to perform diagnostic functions related to DEFENDER alarm in STANDALONE mode, that is completely independent from the PC usage by visualizing the interactive functions on the display on the NANOCOM interface, or in REMOTE mode by employing the application NANOCOM.exe for PC.

As for the STANDALONE mode, once NANOCOM is running it is necessary to press key 3 or key 4 (<< >>) until the display shows the writing "DEF. ABS" in order to have access to the alarm diagnostic functions.

At this point, key 1 "ent" allows to have access to the submenu containing the various functions and described in section 2.1.

In REMOTE mode, instead, you have to press button DEF. ABS in the exploration area which allows to expand the buttons that start the diagnostic functions described in chapter .

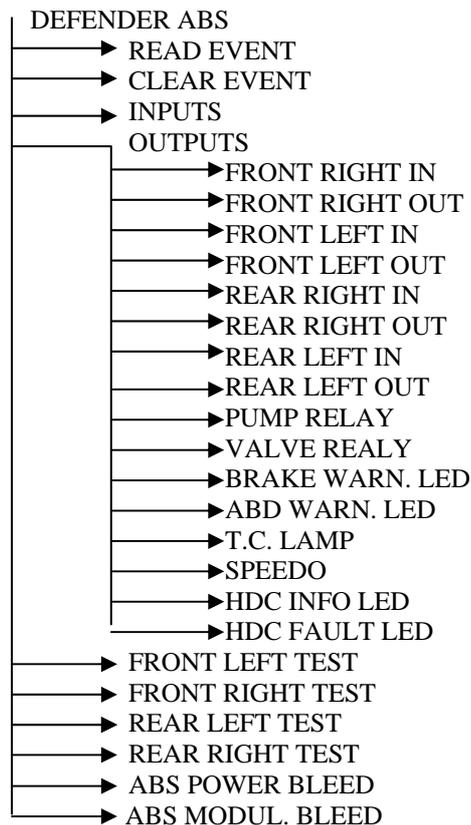
NOTA: To make NANOCOM communicate with ABS ECU, like with the TD5 ECU diagnostic functions, the ignition has to be on.

2 STANDALONE MODE

In this chapter it's described how to use the diagnostic functions in STANDALONE mode, that is without using the PC. The user is thus recommended to read paragraphs 4.1.1-4.1.2-4.1.3 describing this mode and all paragraphs of section 4.3 explaining how to manage th files; section 4.5 dealing with file saving; and the 4.7 concerning error messages.

2.1 MENU DEF. ALLARM

The following tree diagram shows the structure of this submenu:



In this menu the keys perform the following functions:

Key 1: ent	ENTER (gets the function started, or gets into the submenu in case you choose the item "OUTPUT")
Key 2: esc	ESCAPE (gets back to the level of the preceding menu).
Key 3: "←←"	scrolling the menu backward
Key 4: "→→"	scrolling the menu forward

2.2 READ FAULTS FUNCTION

The ABS ECU contains a register which memorizes the faults detected by the system and the number of times these are detected, making a distinction between intermittent errors faults and current faults.

Once key 1 "ent" has been pressed at the menu item READ FAULTS, the writing "Read faults?" appears on the display: pressing key 1 "yes" the function gets started, whereas pressing key 4 "not" you get back to the menu without performing the function.

If the communication is correct, the LED will flash, and if the function is completely performed, the display will show the list of the events.

The faults are listed with the numeric codes. To get to know the meanings of the numeric code see appended table 1.

At this point the keys have the following functions:

Key 1: no function
Key 2: esc ESCAPE (gets to the level of the previous menu).
Key 3: "bak" gets to the first code
Key 4: "→→" goes on to the following code

To get to the main menu press "esc" or scroll through all the listed events by using key 4: in both cases, before getting to the main menu the writing "Save this file?" appears on the display. Pressing key 1 "yes" you store a file containing the faults triggered by the ECU; whereas pressing key 4 "not" you get back straight to the menu.

The file generated is stored in NANOCOM's memory with extension .fa3, it will thus be possible to visualize these faults later in text format transferring this file on the PC.

The faults are featured as follows:

AA-B NNN

Where 'AA-B' is the number of the fault, and NNN is the number of times the fault has been detected

2.3 CLEAR FAULT CODE FUNCTION

Once the key 1 "ent" has been pressed at the menu item CLEAR FAULT, the writing "Clear faults?" will appear on the display: pressing key 1 "yes" the function gets started, whereas pressing key 4 "not" you get back to the menu without performing the function.

If the communication is on, the LED will flash, and if the function is correctly performed, the display will show the writing "the fault codes have been cleared".

At the end of the function, you don't need to press any key, NANOCOM gets automatically to the menu.

2.4 INPUTS FUNCTION

Once the key 1 "ent" has been pressed at the menu item INPUTS, the writing "Read inputs?" will appear on the display: pressing key 1 "yes" the alarm input reading function gets started, where as pressing key 4 "not" you get back to the menu without performing the function.

This function scans continuously all the inputs with the frequency of about one second. If the communication is on, the LED will flash continuously for as long as the scan is performed.

At this point the keys perform the following functions:

Key 1: no function
Key 2: stop stop the scanning.
Key 3: "←←" show previous parameter
Key 4: "→→" show following parameter

The different parameters are shown one by one on the first line of the display.

The parameters of which the scanning is performed are the following:

FLSens(Front Left sensor)	Value (volts) of the front left sensor
FRSens(Front Right sensor)	Value (volts) of the front right sensor
RLSens(Rear Left sensor)	Value (volts) of the rear left sensor
RRSens(Rear Right sensor)	Value (volts) of the rear right sensor
FLOV(Front Left outlet valve)	Driving value of the front right outlet valve
FROV(Front Right outlet valve)	Driving value of the front left outlet valve
RLOV(Rear Left outlet valve)	Driving value of the rear left outlet valve
RROV(Rear Right outlet valve)	Driving value of the rear right outlet valve
FLIV(Front Left inlet valve)	Driving value of the front left inlet valve
FRIV(Front Right inlet valve)	Driving value of the front right inlet valve
RLIV(Rear Left inlet valve)	Driving value of the rear left inlet valve
RRIV(Rear Right inlet valve)	Driving value of the rear right inlet valve

FLWS(Front Left Wheel speed)	Speed value detected on the front left wheel
FRWS(Front Right Wheel speed)	Speed value detected on the front right wheel
RLWS(Rear Left Wheel speed)	Speed value detected on the rear left wheel
RRWS(Rear Right Wheel speed)	Speed value detected on the rear right wheel

Eng. speed(Engine speed)	Engine speed
Eng. torque(Engine torque)	Engine torque in percentage
Throt. Pos(throttle position)	Throttle position
Brake light	Driving value of the brake light relay
Pump Relay	Driving value of the pump relay
Ign. Relay(ignition relay)	Driving value of the ignition relay
Valve sup.(Valve supply)	Value of the valve supply
PMV(Pump monitor voltage)	Value of the pump monitor voltage
GND ref.(Ground reference)	Value (volts) ground reference
Shut.sw(Shuttle switch)	Shuttle switch

2.7 OUTPUTS FUNCTIONS

These functions are in a submenu of the menu DEF. ABS, so when the display shows the item OUTPUTS, pressing key 1 “ent” you get to the submenu containing the following items. Each of these items allows to activate the test of the corresponding output.

FRONT RIGHT IN	Activates or deactivates the front right inlet valve
FRONT RIGHT OUT	Activates or deactivates the front right outlet valve
FRONT LEFT IN	Activates or deactivates the front left inlet valve
FRONT LEFT OUT	Activates or deactivates the front left outlet valve
REAR RIGHT IN	Activates or deactivates the rear right inlet valve
REAR RIGHT OUT	Activates or deactivates the rear right outlet valve
REAR LEFT IN	Activates or deactivates the rear left inlet valve
REAR LEFT OUT	Activates or deactivates the rear left outlet valve
PUMP RELAY	Activates the ABS pump relay
VALVE REALY	Activates the ABS valve relay
BRAKE WARN. LED	Activates the brake warning led
ABS WARN. LED	Activates the ABS warning led
T.C. LAMP	Activates the TD lamp
SPEEDO	Activates the output of the tachometer with a reference of 100 mph
HDC INFO LED	Activates the lamp indicating that the HDC system is on
HDC FAULT LED	Activates the HDC mil lamp

You’ll perform the function by pressing key 1 “ent”.

Now the keys will acquire the following functions:

Key 1: esc	leaves the function
Key 2:	no function
Key 3: “on”	activates the test
Key 4: “off”	stops the test

Once within the function, you’ll activate the test by pressing key 3 “on”. You keep on performing it until you press key 4 “off” or you leave the function through key 1 “esc”.

2.8 FRONT LEFT TEST FUNCTION

This function allows to perform a test of the front left wheel brake.

Once the key “ent” has been pressed at the menu item FRONT LEFT TEST, the writing “FrontLeft test?” will appear on the display. Pressing key 1 “yes” you’ll start the function, whereas pressing key 4 “not” you’ll get back to the menu without performing the function.

If the communication is on, the LED will flash and the wheel brake will be activated for about 10 seconds; if the function is ended properly, the display will show the writing “Test done”.

At the end of the function you don’t need to press any key, NANOCOM will automatically get back to the menu.

2.9 FRONT RIGHT TEST FUNCTION

This function allows to perform a test of the front right wheel brake.

Once the key “ent” has been pressed at the menu item FRONT RIGHT TEST, the writing “FrontRight test?” will appear on the display. Pressing key 1 “yes” you’ll start the function, whereas pressing key 4 “not” you’ll get back to the menu without performing the function.

If the communication is on, the LED will flash and the wheel brake will be activated for about 10 seconds; if the function is ended properly, the display will show the writing “Test done”.

At the end of the function you don’t need to press any key, NANOCOM will automatically get back to the menu.

2.10 REAR LEFT TEST FUNCTION

This function allows to perform a test of the rear left wheel brake.

Once the key “ent” has been pressed at the menu item REAR LEFT TEST, the writing “RearLeft test?” will appear on the display. Pressing key 1 “yes” you’ll start the function, whereas pressing key 4 “not” you’ll get back to the menu without performing the function.

If the communication is on, the LED will flash and the wheel brake will be activated for about 10 seconds; if the function is ended properly, the display will show the writing “Test done”.

At the end of the function you don’t need to press any key, NANOCOM will automatically get back to the menu.

2.11 REAR RIGHT TEST FUNCTION

This function allows to perform a test of the rear right wheel brake.

Once the key “ent” has been pressed at the menu item REAR RIGHT TEST, the writing “RearRight test?” will appear on the display. Pressing key 1 “yes” you’ll start the function, whereas pressing key 4 “not” you’ll get back to the menu without performing the function.

If the communication is on, the LED will flash and the wheel brake will be activated for about 10 seconds; if the function is ended properly, the display will show the writing “Test done”.

At the end of the function you don’t need to press any key, NANOCOM will automatically get back to the menu.

2.12 POWER BLEED FUNCTION

This function allows to perform the ABS primary circuit bleeding.

Once the key “ent” has been pressed at the menu item POWER BLEED, the writing “PowerBleed?” will appear on the display. Pressing key 1 “yes” you’ll start the function, whereas pressing key 4 “not” you’ll get back to the menu without performing the function.

If the communication is on, the LED will flash and the pump will be activated for about 4 seconds allowing the bleeding of the primary circuit; if the function is ended properly, the display will show the writing “Test done”.

At the end of the function you don’t need to press any key, NANOCOM will automatically get back to the menu.

2.13 MODULATOR BLEED FUNCTION

This function allows to perform the ABS secondary circuit bleeding.

Once the key “ent” has been pressed at the menu item MODULATOR BLEED, the writing “ModulatorBleed?” will appear on the display. Pressing key 1 “yes” you’ll start the function, whereas pressing key 4 “not” you’ll get back to the menu without performing the function.

If the communication is on, the LED will flash and the pump will be activated for about 4 seconds allowing the bleeding of the secondary circuit; if the function is ended properly, the display will show the writing “Test done”.

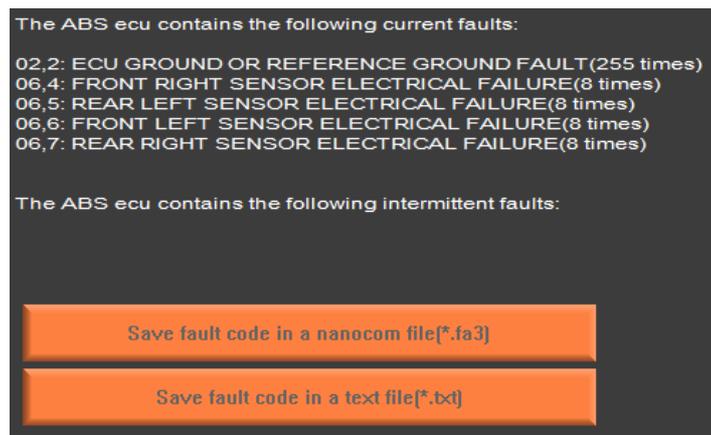
At the end of the function you don’t need to press any key, NANOCOM will automatically get back to the menu.

3 REMOTE MODE

In this chapter it is described how to employ the diagnostic functions in REMOTE mode, that is using the PC; it is recommended to read paragraphs 5.1.1-5.1.2-5.1.3 describing this mode, and all the paragraphs of section 4.3 about files and memory management, and 4.6 concerning error messages.

3.1 READ FAULTS FUNCTION

Clicking the button “Read faults” you start the read faults function. If the function is ended properly after a few seconds the list of the stored events will appear in the input-output data area. The picture shows some examples:



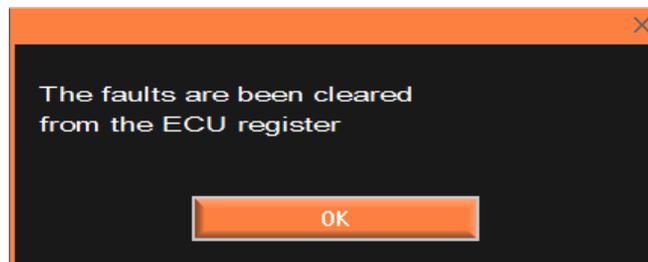
In the input-output data area, at the end at the events list, also two buttons will appear which allow to create a file in the PC memory, containing the read files.

The button “Save fault code in a NANOCOM file (*.fa3) ” saves a file with extention .fa3 (the same generated by NANOCOM in standalone mode). This kind of file is only visible from the application NANOCOM.exe.

The button “Save faults in a text file (*.txt)” saves a text file containing the fault list. Once stored, this text file can be opened with any text editor and thus printed.

3.2 CLEAR FAULTS FUNCTION

Clicking the button “Clear faults” you start the clear faults function. If the function is ended properly after a few seconds the following window will appear, indicating that the function has been successfully performed:



3.3 OPEN FAULT FILE FUNCTION

This function offers the possibility to open a file *.fa3, thus allowing to visualise the faults contained in a file previously saved.

Using NANOCOM in standalone mode you can read the faults register and store the contents in a file, which will be found in NANOCOM memory even after it has been switched off. In a later moment, it will thus be possible to transfer this file to the PC through the “file manager” utility to create a copy of it and open it through this function which will visualise the code contained in the file, or open it directly without importing it to the PC.

This allows to do diagnostics without necessarily having a laptop, or to store the ECU state in a given moment, even if you are distant from your house, workshop, etc.

Clicking the button “Open fault file” a dialogue window will appear offering you to choose whether to open a file contained in NANOCOM or on the PC.

If you choose to open a file contained in NANOCOM, a window will show the files in it. To open the file you want, select one of the files and click the button “OK”.

If you want to open a file contained in the PC, a file browser will appear offering you to choose among the files in the PC.

The faults are visualised in the same way as in the Read faults function, and here too it’s possible to save a text-format file.

3.4 READ INPUTS FUNCTION

Clicking the button “Read inputs” you start function that reads the ABS inputs state.

If the function is performed properly NANOCOM will show the input state in the interactive input-output area.

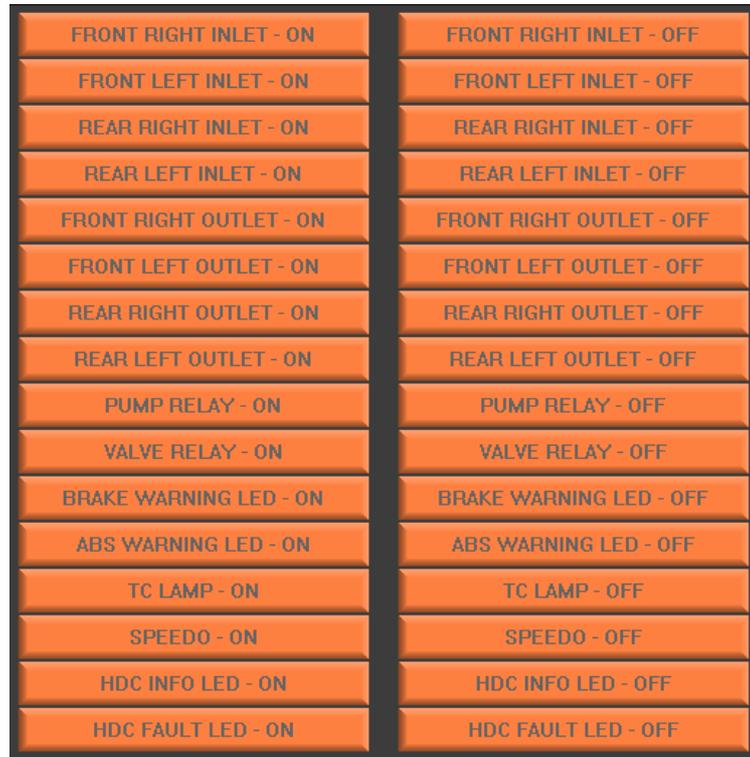
Front-Right sensor(V) 0.02	Front-Left sensor(V) 0.00	Rear-Right sensor(V) 0.00	Rear-Left sensor(V) 0.00
Front-Right wheel speed 1.74	Front-Left wheel speed 1.74	Rear-Right wheel speed 1.74	Rear-Left wheel speed 1.74
Front-Right inlet valve(V) 3.32	Front-Left inlet valve(V) 3.32	Rear-Right inlet valve(V) 3.32	Rear-Left inlet valve(V) 3.32
Front-Right outlet valve(V) 3.32	Front-Left outlet valve(V) 3.25	Rear-Right outlet valve(V) 3.25	Rear-Left outlet valve(V) 3.32
Engine speed(rpm) 702	Engine torque(%) 0	Throttle position(%) 0.00	Ground reference(V) 4.91
Brake light relay(V) 3.32	Pump relay(V) 3.32	Pump monitor(V) 2.73	
Ignition supply(V) 12.26	Valve supply(V) 12.26	Shuttle switch ONE CLOSED	

The meaning of these inputs is described in section 2.3 dealing with the INPUTS function in standalone mode.

The reading of the inputs state is performed uninterruptedly. To stop the function you have to click the button “Stop”.

3.5 OUTPUTS FUNCTIONS

Clicking the button “Test Outputs”, the buttons that allow to start the ECU outputs tests are shown in the input-output area.



Each of these buttons activates or deactivates the corresponding output.
The single outputs tests are described in section 2.4 dealing with these functions in standalone mode.

3.6 FRONT RIGHT TEST FUNCTION

This function allows to perform a front right wheel brake test.
Once the button “Front Right test” has been clicked, the function is activated; if the communication is properly performed, the wheel brake will be activated for about 10 seconds.
A dialog window will indicate that the system will be busy until the NANOCOM interface completes the test.

3.7 FRONT LEFT TEST FUNCTION

This function allows to perform a front left wheel brake test.
Once the button “Front Left test” has been clicked, the function is activated; if the communication is properly performed, the wheel brake will be activated for about 10 seconds.
A dialog window will indicate that the system will be busy until the NANOCOM interface completes the test.

3.8 REAR RIGHT TEST FUNCTION

This function allows to perform a rear right wheel brake test.
Once the button “Rear Right test” has been clicked, the function is activated; if the communication is properly performed, the wheel brake will be activated for about 10 seconds.
A dialog window will indicate that the system will be busy until the NANOCOM interface completes the test.

3.9 REAR LEFT TEST FUNCTION

This function allows to perform a rear left wheel brake test.

Once the button “Rear left test” has been clicked, the function is activated; if the communication is properly performed, the wheel brake will be activated for about 10 seconds.

A dialog window will indicate that the system will be busy until the NANOCOM interface completes the test.

3.10 POWER BLEED FUNCTION

This function allows to perform ABS primary circuit bleeding.

Once the button “Power bleed” has been clicked, the function is activated; if the communication is properly performed, the pump will be activated for about 4 seconds allowing the circuit bleeding.

A dialog window will indicate that the system will be busy until the NANOCOM interface completes the operation.

3.11 MODULATOR BLEED FUNCTION

This function allows to perform ABS secondary circuit bleeding.

Once the button “Modulator bleed” has been clicked, the function is activated; if the communication is properly performed, the pump will be activated for about 4 seconds allowing the circuit bleeding.

A dialog window will indicate that the system will be busy until the NANOCOM interface completes the operation.

APPENDIX

TABLE 1: COMPLETE FAULT CODE LIST

01,2: pump failure 1 (monitor line)
01,3: pump failure 2 (pump not running when actuated)
01,4: pump failure 3 (pump sticking)
01,5: pump failure 4 (pump running when not actuated)
01,6: shuttle valve switch failure
01,7: ecu internal valve relay fault
02,0: no battery supply voltage
02,1: pwm signal failure from engine ecu
02,2: ecu ground or reference ground fault
02,4: front right sensor offset voltage out of range
02,5: rear left sensor offset voltage out of range
02,6: front left sensor offset voltage out of range
02,7: rear right sensor offset voltage out of range
03,0: front right inlet valve open circuit
03,1: front right outlet valve open circuit
03,2: front left inlet valve open circuit
03,3: front left outlet valve open circuit
03,4: rear right inlet valve open circuit
03,5: rear right outlet valve open circuit
03,6: rear left inlet valve open circuit
03,7: rear left outlet valve open circuit
04,0: pump relay open circuit
04,4: front right sensor output too low
04,5: rear left sensor output too low
04,6: front left sensor output too low
04,7: rear right sensor output too low
05,0: front right inlet valve short to ground
05,1: front right outlet valve short to ground
05,2: front left inlet valve short to ground
05,3: front left outlet valve short to ground
05,4: rear right inlet valve short to ground
05,5: rear right outlet valve short to ground
05,6: rear left inlet valve short to ground
05,7: rear left outlet valve short to ground
06,0: pump relay short to ground
06,4: front right sensor electrical failure
06,5: rear left sensor electrical failure
06,6: front left sensor electrical failure
06,7: rear right sensor electrical failure
07,0: front right inlet valve short to internal supply
07,1: front right outlet valve short to internal supply
07,2: front left inlet valve short to internal supply
07,3: front left outlet valve short to internal supply
07,4: rear right inlet valve short to internal supply
07,5: rear right outlet valve short to internal supply
07,6: rear left inlet valve short to internal supply
07,7: rear left outlet valve short to internal supply
08,0: pump relay short to internal supply
08,4: front right sensor output intermittent
08,5: rear left sensor output intermittent
08,6: front left sensor output intermittent
08,7: rear right sensor output intermittent
09,0: front right inlet valve drive short to supply
09,1: front right outlet valve drive short to supply
09,2: front left inlet valve drive short to supply
09,3: front left outlet valve drive short to supply

09,4: rear right inlet valve drive short to supply
09,5: rear right outlet valve drive short to supply
09,6: rear left inlet valve drive short to supply
09,7: rear left outlet valve drive short to supply
10,0: pump relay drive short to supply
11,0: sticking throttle detected
11,4: shuttle valve switch electrical failure