

User Manual for DT-E001

Electronic Control Unit

Information Processing, A/D Conversion, Sensor and Actuator Management



EXKOTEST[®]

DM No. 00304305-v2

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1. INSTRUCTION MANUAL



**The model should only be opened by
certified and authorised persons**

Installing and starting up benchtop learning module DT-E001

Connect the module to the 12 V – 25 A power supply unit provided. Then wire up the components to operate the system as indicated in the user manual.



Environment

Learning module DT-E001 is designed for benchtop use. It must be installed in a dry place away from dust, steam and combustion fumes.

The module requires approximately 400–500 lux of light

The module must be operated in a practical exercise room. Its operating noise level does not exceed 70 decibels.

Module DT-E001 is protected against potential user error.

Calibrating and maintaining module DT-E001

Calibration: factory setting.

Maintenance frequency: none.

Cleaning: use a soft, clean cloth.

Number of units and position of user

Module DT-E001 is a single work station.

The module user will remain seated throughout operation.

Putting out of operation

Switch off the power supply by setting the switch to 0.

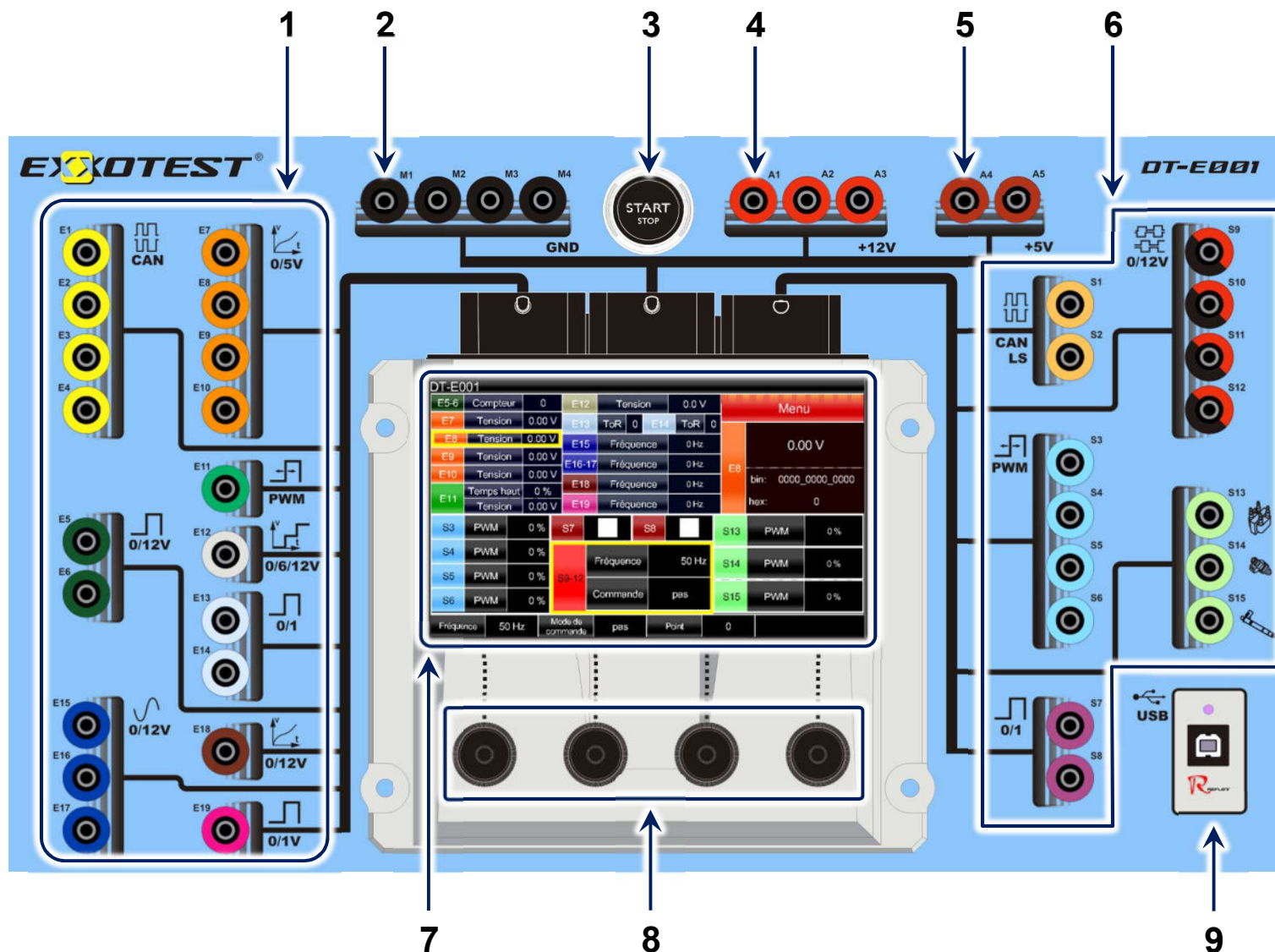
Unplug from the 230 V supply.

Store module DT-E001 in a secure room while out of use.

Transporting module DT-E001

Module DT-E001 must be switched off and disconnected before transport.

2. PRESENTATION OF THE MODULE



Module components

No.	Description
1	Communication bus and/or sensor signal input sockets
2	Ground sockets available for measurement or to power other modules
3	Start/Stop button: enables or disables the outputs (6)
4	12 V supply sockets available for the other modules
5	5 V supply sockets available for the other modules
6	Output sockets to control actuators and transmit LS CAN frames
7	Touch screen
8	Pushbuttons/knobs relating to the functions described at the bottom of the screen
9	USB port for communication with the REFLET program and to update the module

LIST OF MODULE DT-E001 OUTPUTS

Socket No.	Signal	Module
S1	LS CAN: CAN H signal	DT-E002, 'Dashboard'
S2	LS CAN: CAN L signal	
S3	EGR valve control, 0-12 V PWM	DT-C003, 'Engine control by PWM system'
S4	Air Control Valve control, 0-12 V PWM	
S5	Electronic Throttle control, 0-12 V PWM	
S6	Electric fan chopper control, 0-12 V PWM	DT-C006, 'Electric fan unit'
S7	Electric fan low speed control (grounding)	
S8	Electric fan high speed control (grounding)	
S9	Stepper motor control, 0-12 V	DT-C005, 'Stepper motors'
S10	Stepper motor control, 0-12 V	
S11	Stepper motor control, 0-12 V	
S12	Stepper motor control, 0-12 V	
S13	Ignition coil control	DT-C002, 'Injection and ignition systems'
S14	Petrol injector control	
S15	Diesel injector control	

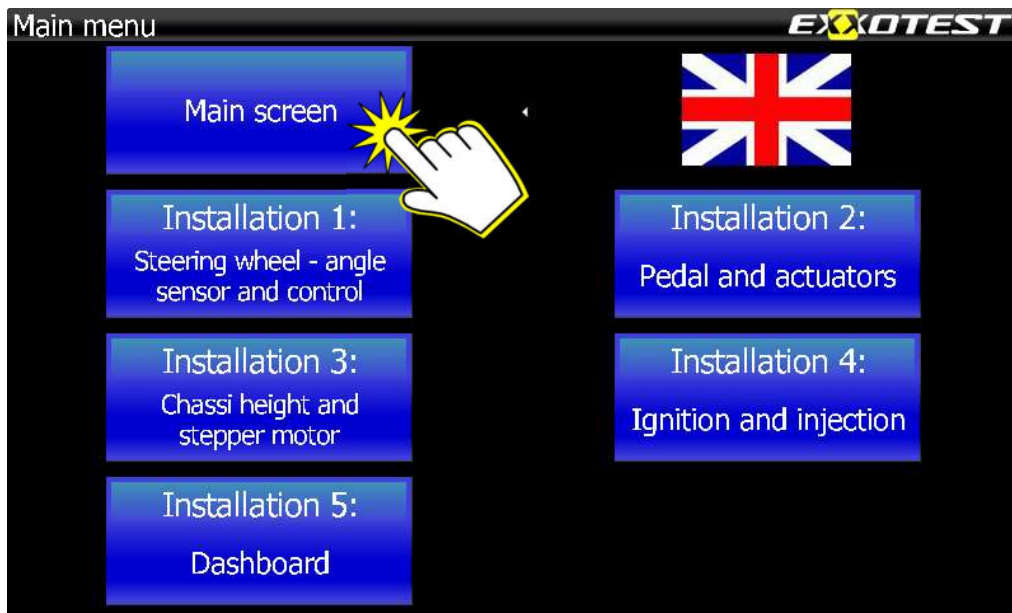
LIST OF MODULE DT-E001 INPUTS

Socket No.	Signal	Module
E1	HS CAN: CAN H signal	DT-M001 , 'Steering angle sensor + lighting/turn-signal control'
E2	HS CAN: CAN L signal	
E3	LS CAN: CAN H signal	
E4	LS CAN: CAN L signal	
E5	Square-wave analog signal (S1): 0-12 V	
E6	Square-wave analog signal (S2): 0-12 V	
E7	Analog signal, 0-5 V variable voltage	DT-M002 , 'Pedal position and ride height sensor'
E8	Analog signal, 0-5 V variable voltage	DT-M004 , 'Air temperature and pressure sensors'
E9	Analog signal, 0-5 V variable voltage	
E10	Analog signal, 0-5 V variable voltage	DT-C003 , 'Engine control by PWM system'
E11	Pulse Width Modulation, 0-12 V	DT-M002 , 'Digital ride height sensors'
E12	'Diag info' signal, 0, 6 or 12 V	DT-C006 , 'Electric fan unit management'
E13	Binary input, 0-12V	DT-M002 , 'Brake pedal sensor'
E14	Binary input, 0-12V	
E15	Square-wave analog signal: 0-12V	DT-M006 , 'Speed and position sensors'
E16	Inductive sine-wave signal, channel 1	
E17	Inductive sine-wave signal, channel 2	
E18	Variable-frequency square-wave signal: 0-12 V	DT-M004 , 'Air flow sensor'
E19	Variable-frequency square-wave signal: 0-1.6 V	DT-M003 , 'ABS wheel sensor'

3. TOUCH SCREEN: SELECTION AND NAVIGATION

3.1. Basic operation

Once module DT-E001 has been powered up from the 12 V–25 A supply provided and a short startup sequence has run, the following screen appears.

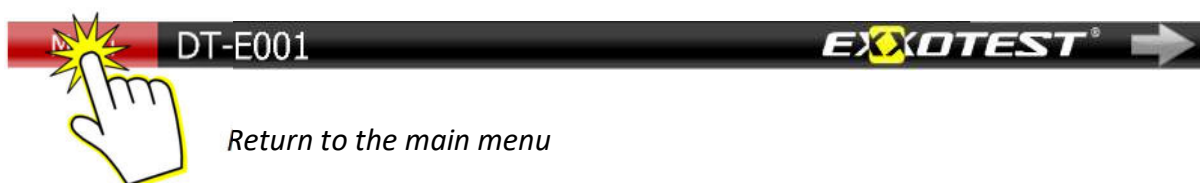


This is the main menu. As **the screen is touch-sensitive**, simply touch the field you wish to select.

- ✓ Select the flag to change language. Press again to continue scrolling through the available languages.
- ✓ Select “Main screen” and “Setup 1”, “Setup 2” “Setup 3”, etc. to choose the operating mode of module **DT-E001** (the modes are described in the following pages).

➤ *The main menu will change as new upgrades are introduced (additional languages, new setups, etc.). Free updates can be easily downloaded from our online server via the USB port.*

To return to the main menu from the various “setups”, press the red block in the top left corner of the screen in every mode.



3.2. Activating the control outputs



➤ **Beware:** The actuators are disabled if the arrow is not green!

4. MAIN SCREEN



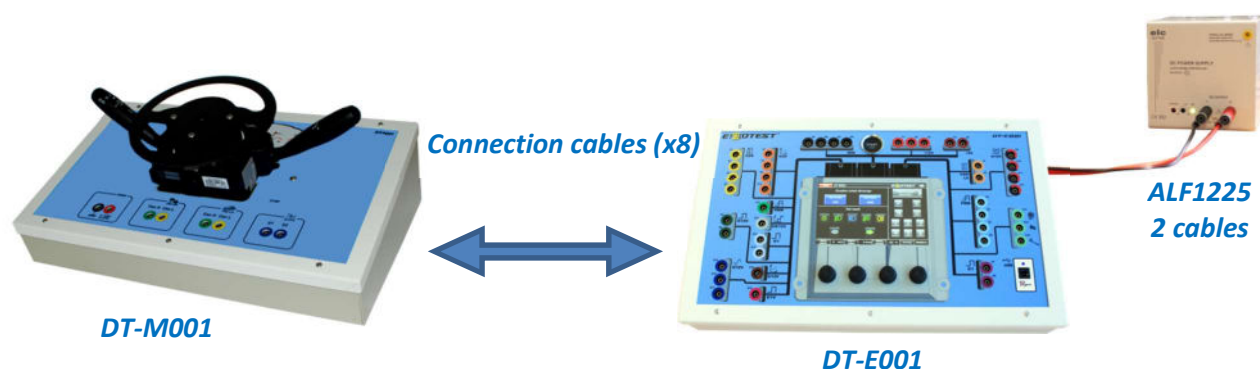
All input and output sockets of module **DT-E001** are accessed via this screen.

4.1. Digital conversions

DT-E001 input sockets	Input signal	Encoding	Resolution
E5, E6	Step counter	12-bit	1 bit corresponds to 1 step
E7, E8, E9, E10	Voltage: 0–5 V	10-bit	$2^{10}=1024$; $5 / 1024 = 0.0049$ V Thus 4.9 mV for 1 bit
E11	0–100%	8-bit	1 bit corresponds to 1%
E12	Voltage from 0 to 15V	10-bit	$2^{10}=1024$; $15 / 1024 = 0.01465$ V Thus 14.65 mV for 1 bit
E16, E17, E18, E19	Frequency: 0–4095 Hz	12-bit	1 bit corresponds to 1 Hz

5. STEERING ANGLE SENSOR AND CONTROLS: SETUP 1

5.1. Necessary hardware and wiring

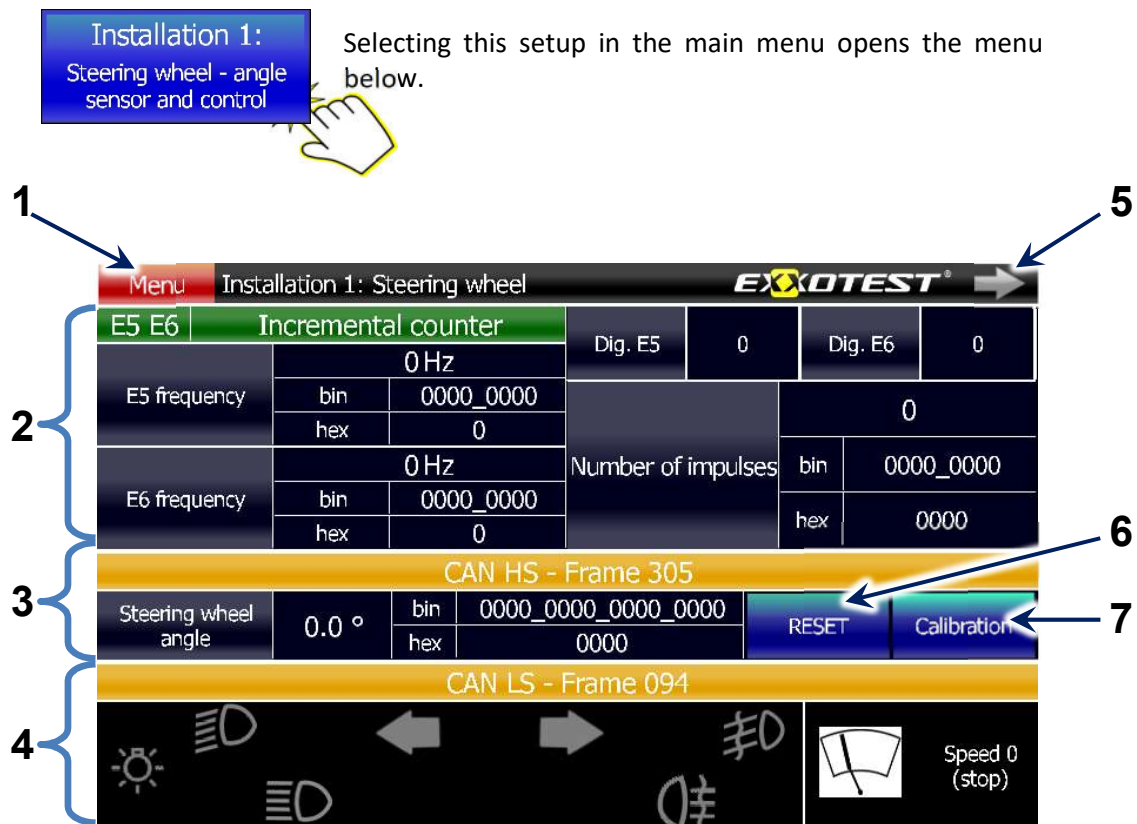


Connections

Allocation	DT-M001 terminal	DT-E001 terminal
High Speed CAN	H	E1
	L	E2
Low Speed CAN	H	E3
	L	E4
Steering angle sensor: analog signals	S1	E5
	S2	E6
Grounds and power supplies*	+12V	A1
	GND	M1

* with ALF1225 connected to the rear of DT-E001

5.2. Description of the screen

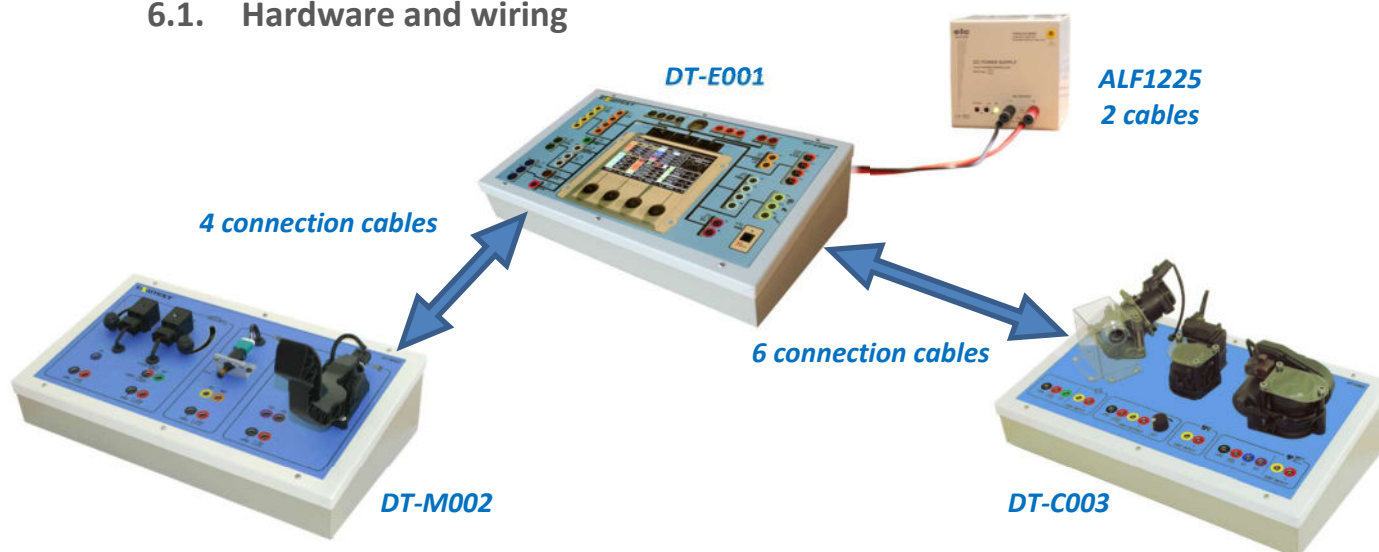


No.	Description
1	Return to the main menu
2	Analog sensor information: frequency + digital conversion
3	Steering angle in degrees, and binary and hexadecimal code (Inter System CAN)
4	Lighting/turn-signal indicator and wiper speed displays (Comfort CAN)
5	Press the Start/Stop button to enable (or disable) controls (indicator)
6	Reset (then calibrate)
7	Steering mid-point calibration (reset first)

➤ Refer to the DT-M001 instructions: details of sensor operation, practical exercises, etc.

6. ACCELERATOR PEDAL, ETC/EGR/ACV: SETUP 2

6.1. Hardware and wiring



Connections

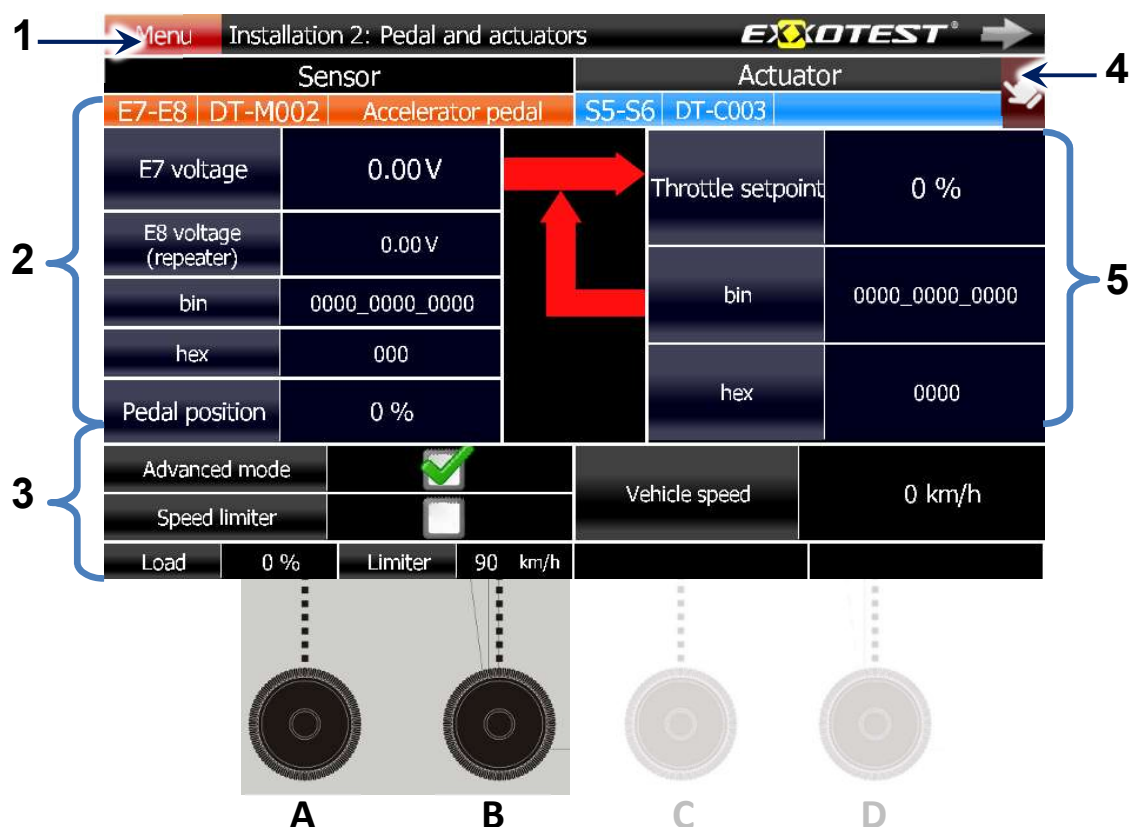
	Allocation	DT-M002 terminal	DT-E001 terminal	DT-C003 terminal
Accelerator pedal	Sensor signal	S5	E7	
		S6	E8	
	Grounds and power supplies*	+5V	A4	
		GND	M1	
Electronic Throttle Control	Position copy signal		E9	S2
			E10	S3
	Engine control		S5	GBF INPUT +
			S6	GBF INPUT -
	Grounds and power supplies*		A5	+5V
			M2	GND
EGR valve	Engine control		A1	GBF INPUT +
			S3	GBF INPUT -
	Position copy signal		E9	S1
	Grounds and power supplies*		A4	+5V
			M3	GND
Air Control Valve	Engine control		A2	GBF INPUT +
			S4	GBF INPUT -

* with ALF1225 connected to the rear of DT-E001

6.2. Description of the “Electronic Throttle Control” screen (default selection)



Selecting this setup in the main menu opens the menu below.

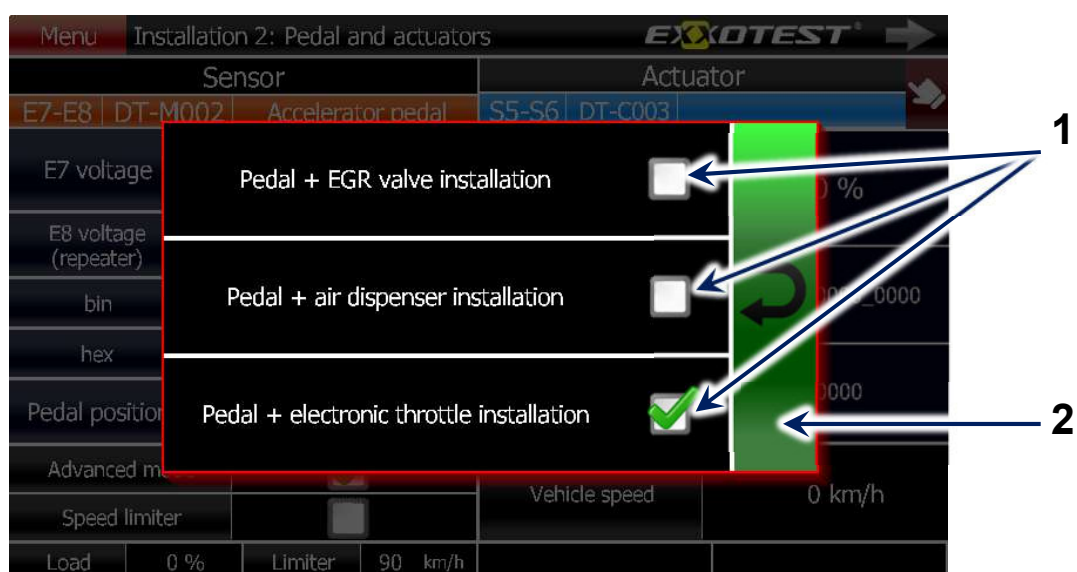


No.	Description
1	Return to the main menu
2	Analog sensor information: voltage, percentage, digital conversion
3	Advanced mode: speed limiter
4	Go to “Setup selection” menu (see next page)
5	Electronic Throttle Control setpoint as percentage + digital conversion
A	Load percentage setting
B	Speed limit setting
C and D	Not used

6.3. Selecting the setup



Selecting this icon on the “Setup 2” screen displays the following menu.



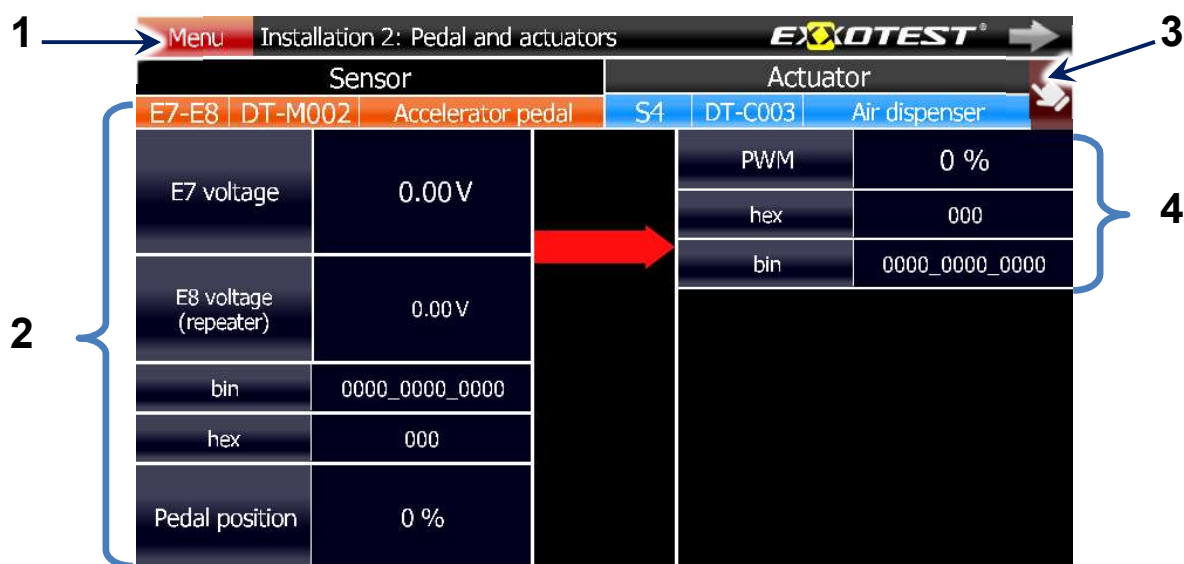
No.	Description
1	Check boxes to select active setup
2	Return to selected setup screen

6.4. Description of the “Air Control Valve” screen

Pedal + air dispenser installation



Choosing this setup in the “Setup selection” menu (see above) displays the following menu.



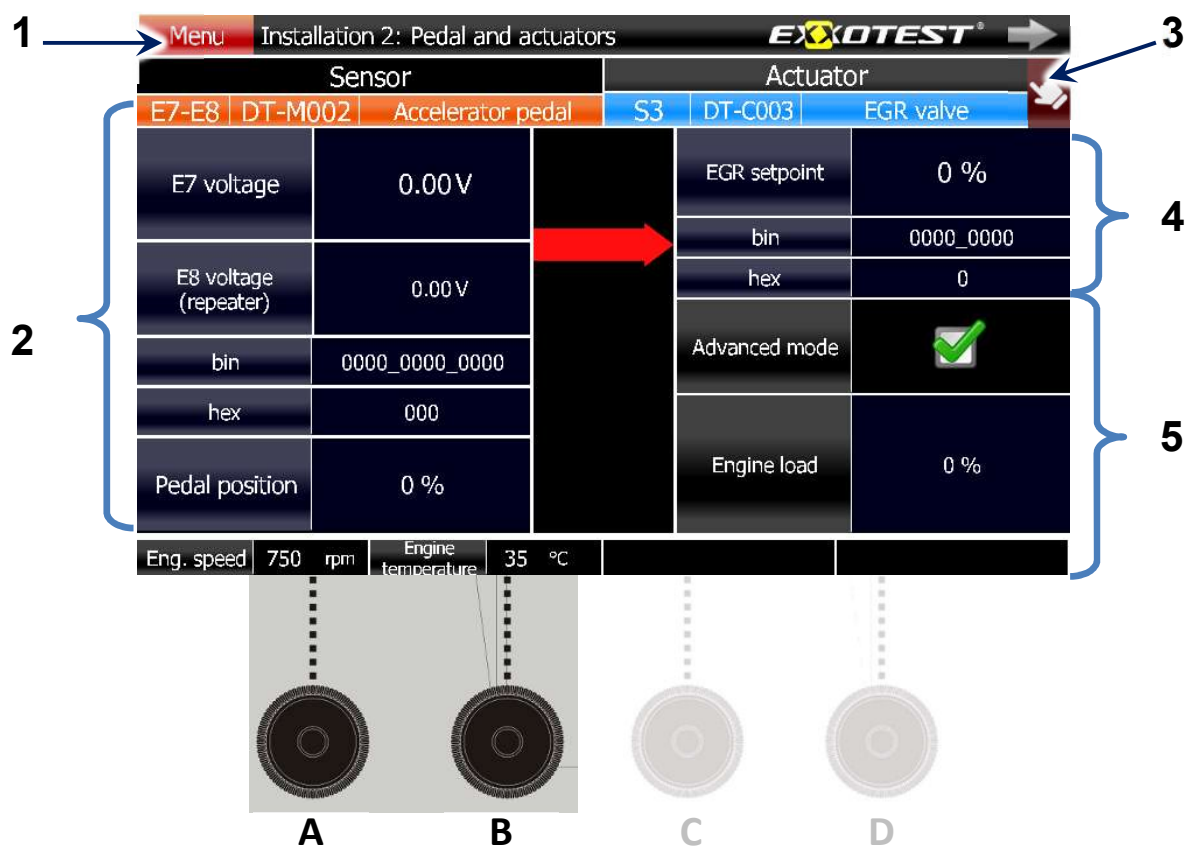
No.	Description
1	Return to the main menu
2	Analog sensor information: voltage, percentage, digital conversion
3	Go to “Setup selection” menu (see dedicated section)
4	Air Control Valve setpoint as percentage + digital conversion

6.5. Description of the “EGR Valve” screen

Pedal + EGR valve installation



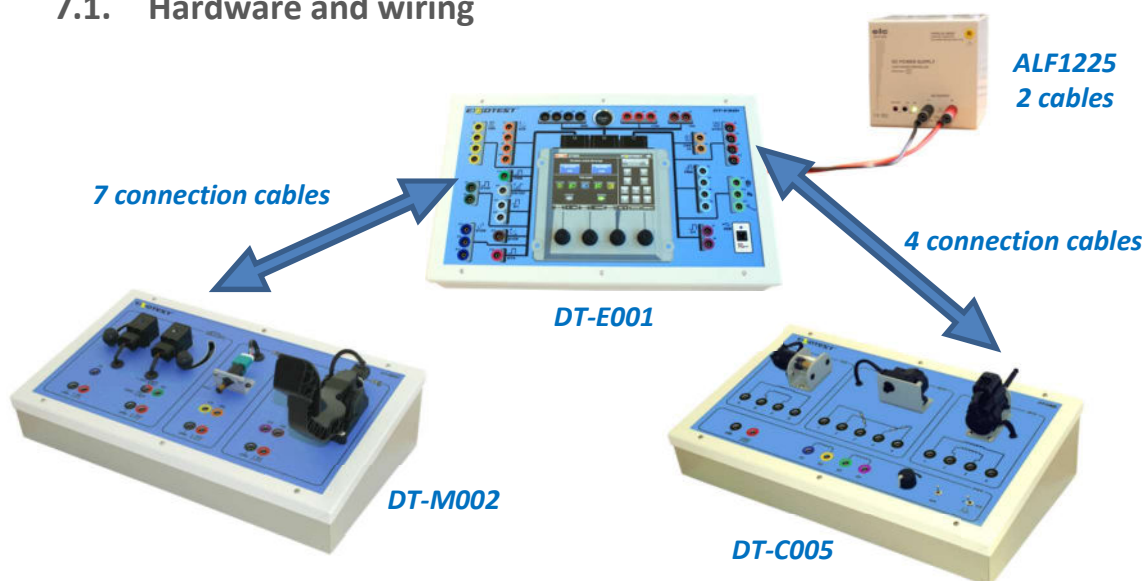
Choosing this setup in the “Setup selection” menu (see dedicated section) displays the following menu.



No.	Description
1	Return to the main menu
2	Analog sensor information: voltage, percentage, digital conversion
3	Go to “Setup selection” menu (see dedicated section)
4	EGR valve setpoint as percentage + digital conversion
5	Advanced mode: engine load (%)
A	Engine speed setting in rpm
B	Engine temperature setting in °C
C and D	Not used

7. RIDE HEIGHT SENSORS AND STEPPER MOTOR: SETUP 3

7.1. Hardware and wiring



Connections

	Allocation	DT-M002 terminal	DT-E001 terminal	DT-C005 terminal
Ride height sensors	Analog sensor signal	S1	E10	
	Digital sensor signal	S2	E11	
	Digital sensor position (Front or Rear)**	GND or +12V	M3 or A2	
	Grounds and power supplies*	+12V	A1	
		+5V	A4	
		GND (x2)	M1, M2	
Headlamp height setting motor	Unipolar stepper motor control		S9	1
			S10	4
			S11	2
			S12	3

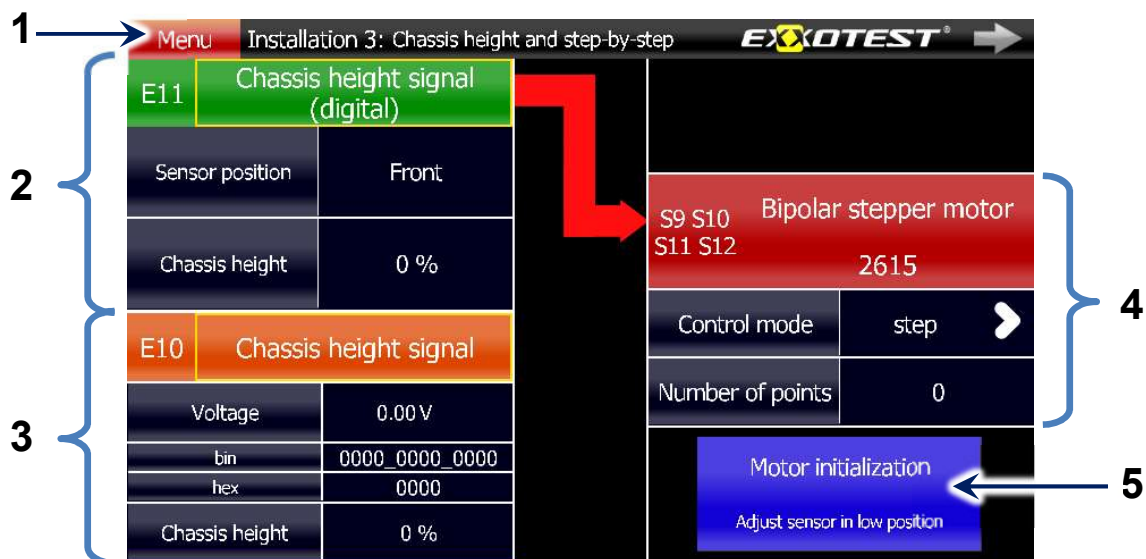
* with ALF1225 connected to the rear of DT-E001

** to change position, change the dedicated terminal connection and then cut the power supply to the sensor and restore (resetting the sensor).

7.2. Description of the “Ride height and stepper motor” screen

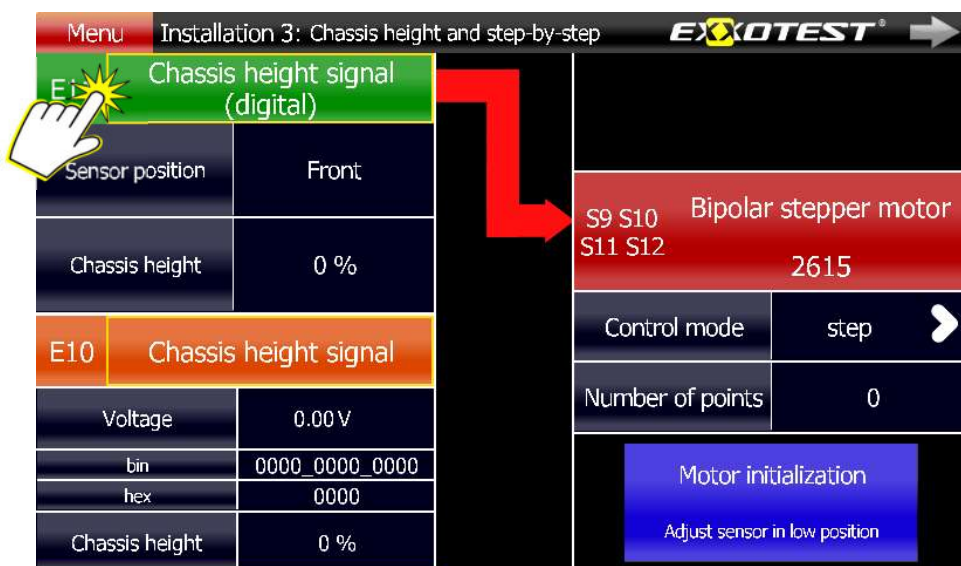


Selecting this setup in the main menu displays the following menu.



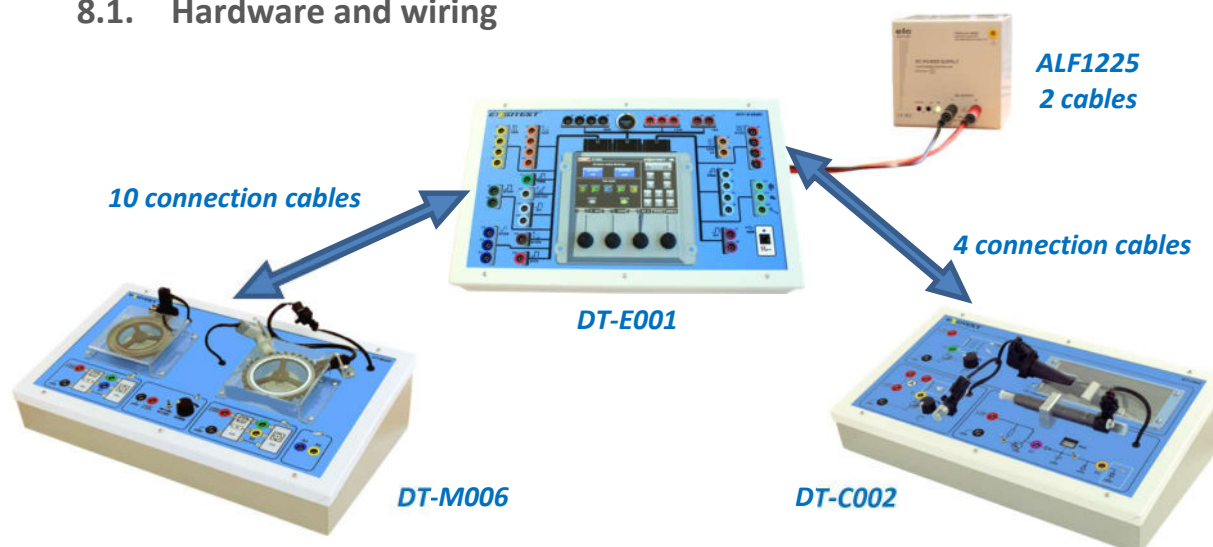
No.	Description
1	Return to the main menu
2	Digital sensor information: ride height position and percentage
3	Analog sensor information: voltage, digital conversion, ride height percentage
4	Bipolar stepper motor control
5	Low-position sensor initialising

Select the sensor you wish to use by pressing the touch screen.



8. IGNITION AND INJECTION: SETUP 4

8.1. Hardware and wiring



Connections

	Allocation	DT-M006 terminal	DT-E001 terminal
Magneto-resistive sensor	Sensor signal	S1	E15 **
	Ground and power supplies*	+12V	A1
		GND	M1
Hall Effect sensor	Sensor signal	S2	E15 **
	Grounds and power supplies*	+12V	A2
		GND	M2
Inductive sensor	Sensor signal	S3	E16
		S4	E17
Target management	Grounds and power supplies*	+12V	A3
		GND	M3

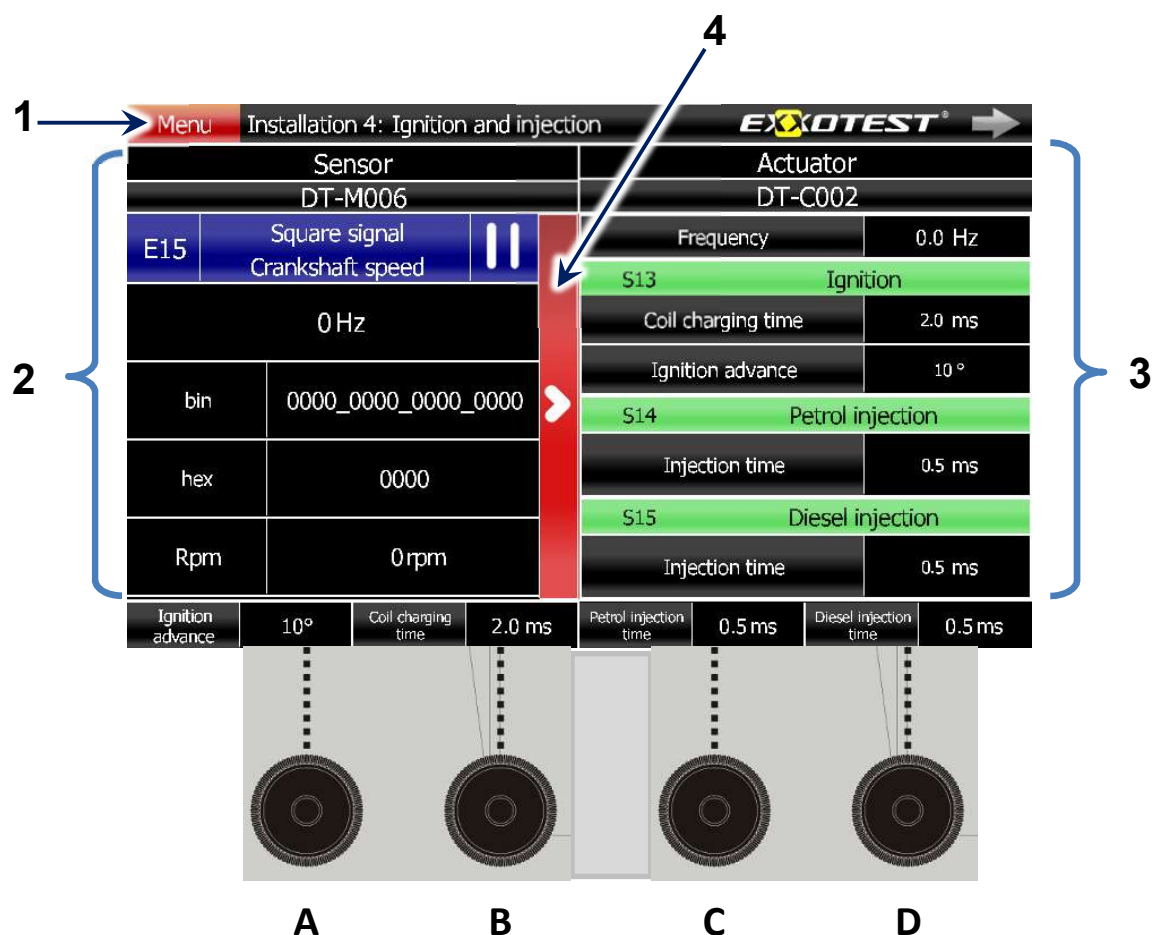
* with ALF1225 connected to the rear of DT-E001

** only connect one sensor at a time to E15

8.2. Description of the “Ignition and injection” alarms

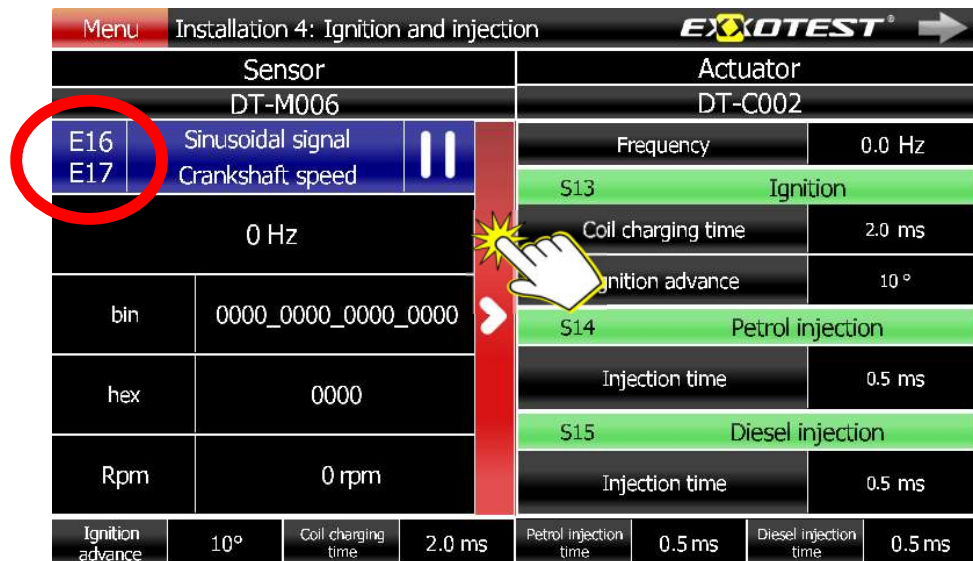


Selecting this setup in the main menu displays the following menu.

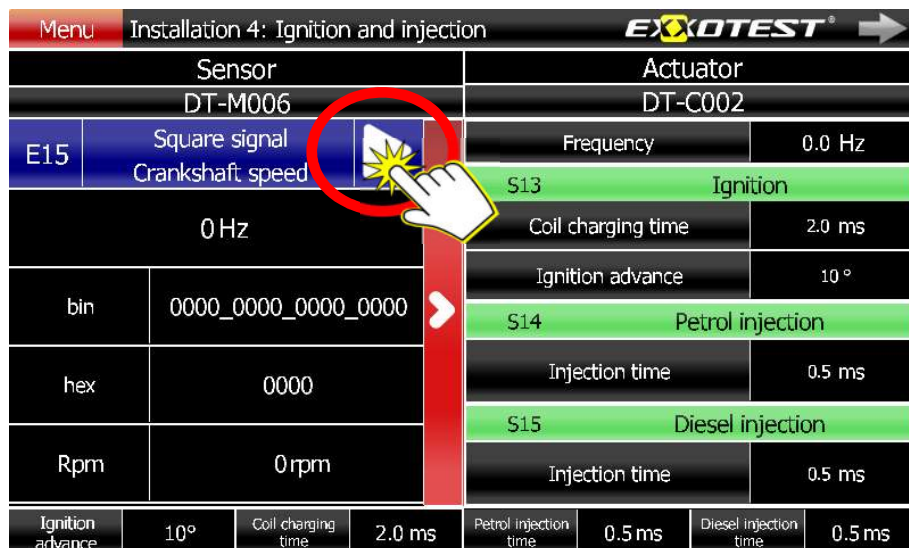


No.	Description
1	Return to the main menu
2	Sensor information (magnetoresistive or Hall effect): Frequency, digital conversion, speed
3	Actuator information (ignition coil, petrol injector or diesel injector): Frequency, time, degrees
4	Press the red area to switch to the third sensor (see next page)
A	Spark advance setting (in degrees)
B	Coil charge time setting (in milliseconds)
C	Petrol injector injection time setting (in milliseconds)
D	Diesel injector injection time setting (in milliseconds)

- ✓ Select the central part of the screen (red area) to switch from input E15 (magnetoresistive or Hall effect sensor) to inductive sensor inputs E16 and E17.



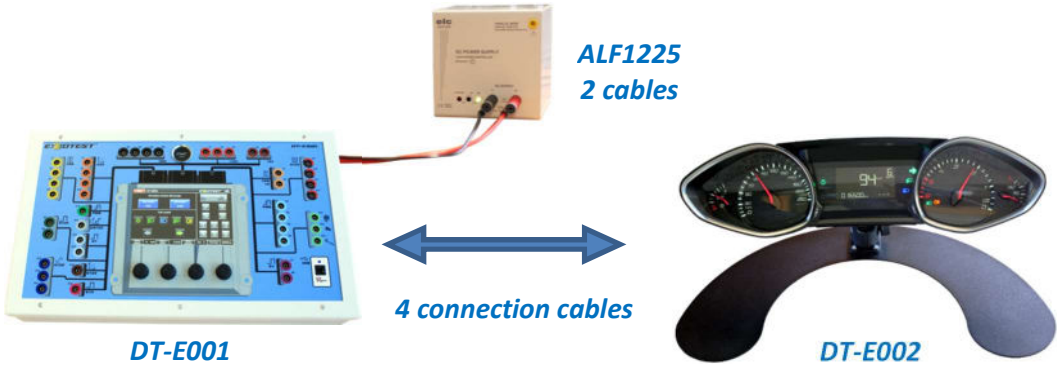
- ✓ You can freeze the sensor information by pressing pause, then restart the measurement by pressing the arrow again.



- Refer to the DT-M006 instructions: details of sensor operation, practical exercises, etc.

9. INSTRUMENT CLUSTER: SETUP 5

9.1. Hardware and wiring



Connections

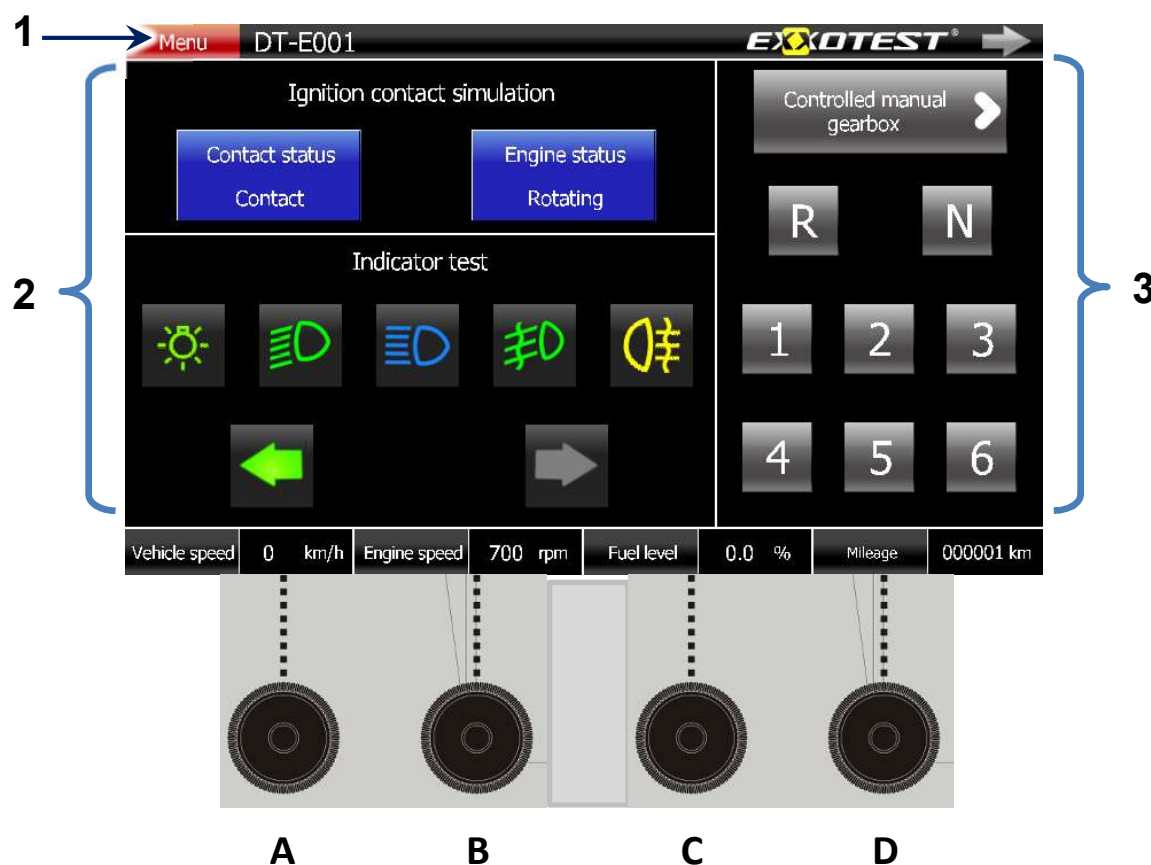
	Allocation	DT-E001 terminal	DT-E002 terminal
Instrument cluster	LS CAN H signal	S1	Green socket
	LS CAN L signal	S2	Yellow socket
	Ground and power supplies*	M1 GND	Black socket
		A1 +12V	Red socket

* with ALF1225 connected to the rear of DT-E001

9.2. Description of the “Instrument cluster” screen



Selecting this setup in the main menu displays the following menu.



No.	Description
1	Return to the main menu
2	Simulation of ignition, engine starting and lighting/turn-signal indicator lamps
3	Gearbox information and gear engaged
A	Vehicle speed variation (in km/h)
B	Engine speed variation (in rpm)
C	Fuel level variation (in %)
D	Distance travelled variation (in km)

CE DECLARATION OF CONFORMITY



Manufacturer Name: **ANNECY ELECTRONIQUE SAS**
 Street: **1, rue Callisto - Parc Altaïs**
 Town: **74650 CHAVANOD**
 Country: **France**

Represented by the signatory below, declares that the following product:

Product reference	Product name	Make
DT-E001	Benchtop learning module: Information Processing – Analog/Digital Conversion	EXXOTEST

complies with all requirements of European directives relating to the design of Electrical & Electronic Equipment (EEE) and the management of Waste Electrical & Electronic Equipment (WEEE) in the EU:

- Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE)
- Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS)
- Electromagnetic Compatibility Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004.

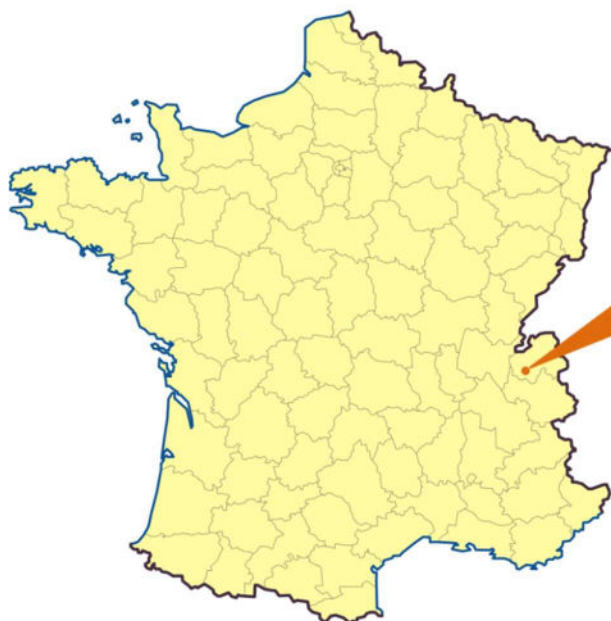
The product has been manufactured in accordance with the requirements of European directive:

- Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.

Signed in Chavanod on 20 July 2015

Stéphane Sorlin, Chairman

A handwritten signature in blue ink, consisting of a stylized 'S' followed by a horizontal line.



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Original Instructions

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