

User's guide for MT-MOTEUR-ADBLUE

*Training model*

***DIESEL HDI ENGINE (DV6F)***





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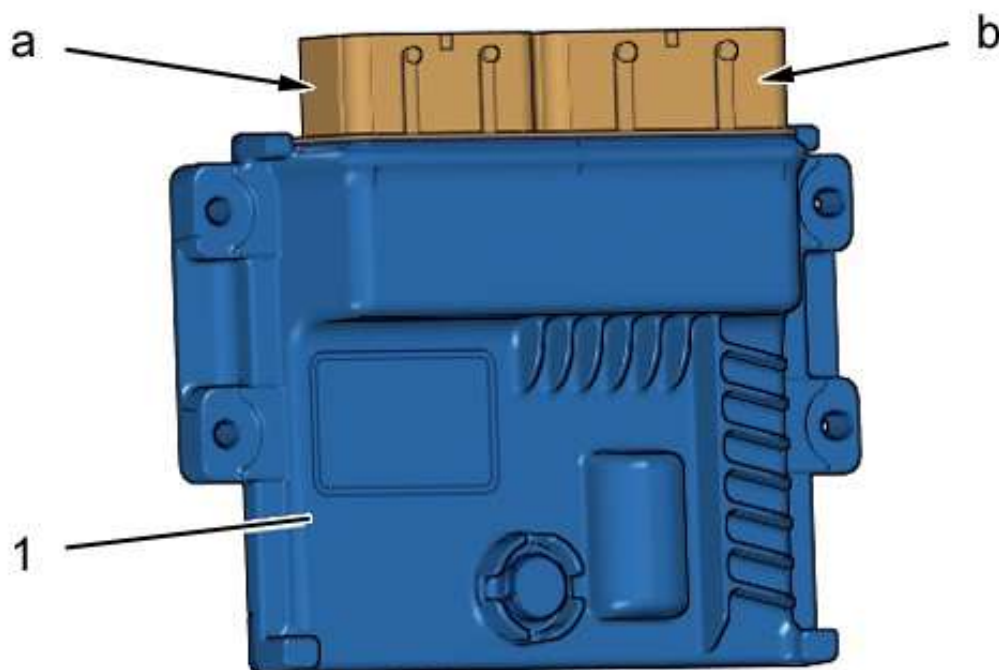
## 1. RESSOURCE

### 1.1. Direct injection HDI system

*Inputs / outputs of an ECU for the Peugeot 508's engine management:*

VF38EBHZMFL024787 DAM: 14073CJ  
1.6 HDI 120, FAP, DV6FC, ADBLUE, BVM6 with Stop & Start.

#### 1. Description



(1) Bosch EDC17 C60 engine's ECU.

"a" Interface for 70 channels Black: Interface CH for passenger compartment

"b" Interface for 120 channels Black: : Interface CM for engine.

## 2. Role

Engine control unit manage an entirety of injection system.

The control unit's software that controls the engine includes:

- Functionalities of injection and depollution control
- Strategies of driving comfort
- Function of immobilizer (\*)
- Emergency strategies
- Engine cooling fan and warning lights commands control (\*)
- Diagnosis with defects memorizing
- Function of vehicle speed control and limitation (\*)
- Function of engine cooling control
- Conditioning air cooling control

(\*) Next version.

The engine ECU provides the electrical control for the following elements:

- Diesel injectors
- Urea injector
- Fuel flow regulation solenoid
- Turbocharger control solenoid
- Preheating and post heating case
- Fuel heater
- Heater of oil vapor recycling circuit
- Fuel additivation pump
- Valve of exhaust gas recycling
- Oil pump solenoid
- Assembly of pump and fuel gauge
- Case of motorized water outlet
- Dosing unit of intake air with position recopy sensor
- DeNOx system: specific catalyst for nitrogen oxides reducing (deNOx)

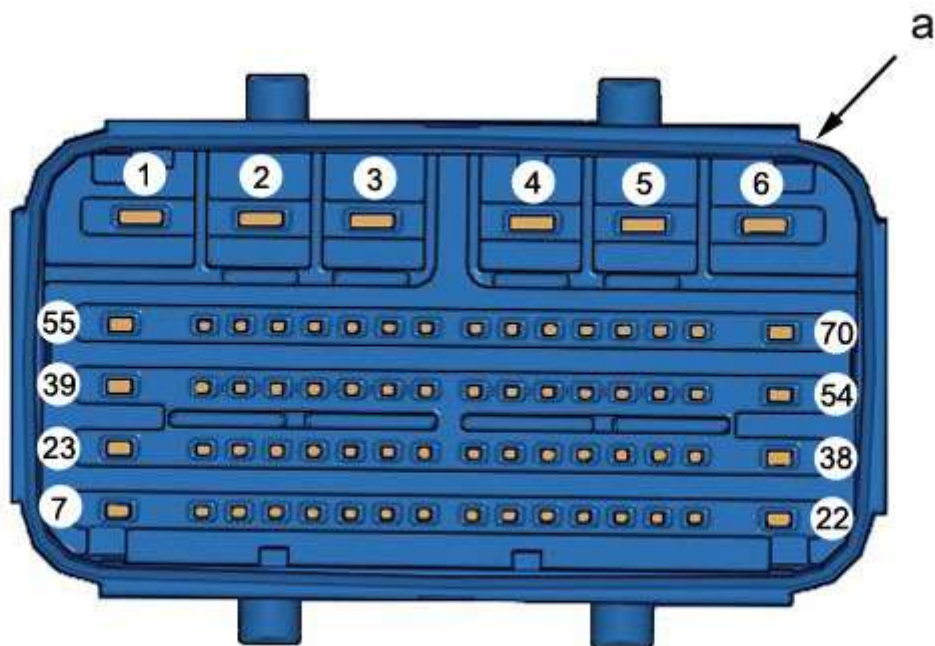
The atmospheric pressure sensor is integrated in the engine ECU and inseparable from it.

The engine ECU has two power units those can provide a very high current required to operate the diesel injectors.

### 3. Electrical Specifications

Bosch EDC17 C60 engine ECU (2 interfaces):

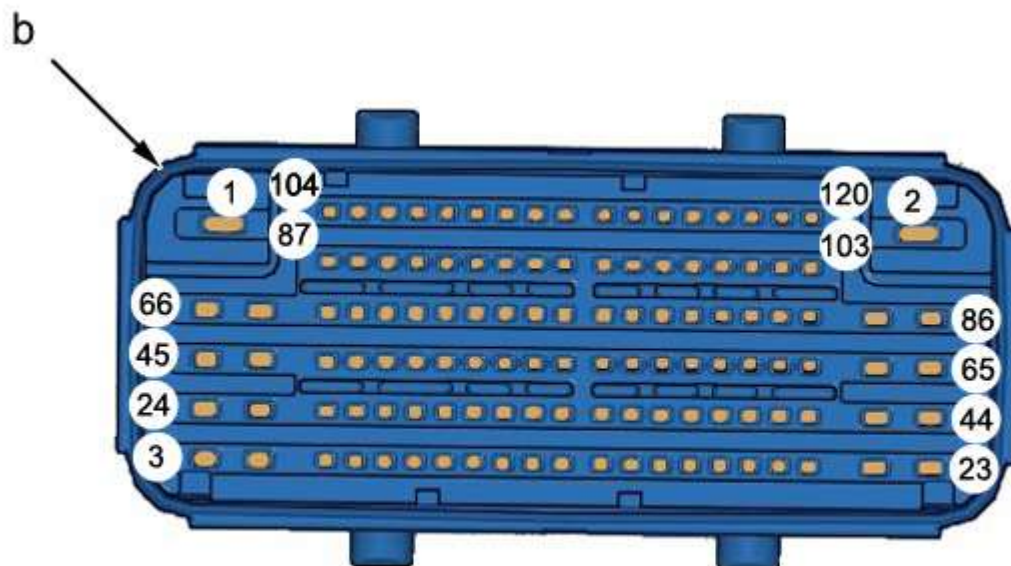
- CH-Interface for 70 channels Black
- CM- Interface for 120 channels Black



"a" • CH-Interface for 70 channels Black	
Channel n°	Allocation of connector channels
1	Power supply for the engine control ECU
2	Power supply for the engine control ECU
3	Power supply for the engine control ECU
4	Mass
5	Mass
6	Not connected channel
7	Power supply for the engine control ECU
8	Mass of the clutch master cylinder position sensor
9	Mass of the neutral position sensor
10	Mass of the refrigerant pressure sensor
11	Mass of the brake vacuum sensor
12	Mass of the accelerator pedal position sensor (position n°1)
13	Mass of the accelerator pedal position sensor (position n°2)
14	Not connected channel
15	LIN - mass (Stop and Start)
16	Not connected channel
17	Mass of the starter control interface box
18	Not connected channel
19 (*)	Signal of the start inhibition (Start Lock) (Automatic or manual gearbox)
20	Not connected channel
21	State of the pump/fuel gauge assembly
22	Not connected channel
23	Power supply for the engine control ECU
24	Signal of the clutch master cylinder position sensor
25	Signal of the neutral position sensor
26	Signal of the refrigerant pressure sensor
27	Signal of the brake vacuum sensor
28	Signal of the accelerator pedal position sensor (position n°1)
29	Signal of the accelerator pedal position sensor (position n°2)
30	Signal from the kick-down contactor of accelerator pedal
31	LIN Stop and Start
	LIN alternator network
32	Signal of the starter control interface box
33	CAN IS Low

34	Stop and Start status of start signal. Stop and Start with starter
35	CAN Low depollution
36	Not connected channel
37	Not connected channel
38	Not connected channel
39	Power supply for the engine control ECU
40	Power supply for the clutch master cylinder position sensor
41	Power supply for the neutral position sensor
42	Power supply for the refrigerant pressure sensor
43	Power supply for the brake vacuum sensor
44	Power supply for the accelerator pedal position sensor
45	Not connected channel
46	Not connected channel
47	Fan-motor assembly state
48	Not connected channel
49	CAN IS High
50	Automatic start/ restart authorization
51	CAN High depollution
52	Signal of the radio controlled alarm clock
53	Not connected channel
54	Fuel pump/ gauge assembly control
55	Power supply for the engine control ECU
56	Signal of repetitive stop
57	Not connected channel
58	DeNOx system relays control
59	Not connected channel
60	Not connected channel
61	Control of the engine ECU's power relays
62	Control of the principal engine ECU's relays
63	Control of the fan-motor assembly 1
64	Control of the fan-motor assembly 2
65	Not connected channel
66	Not connected channel
67	Request of ECU's holding for the network voltage maintenance
68	Automatic start/ restart control
69	Signal from the engine running
70	Control of the fuel additive pump





"b" CM-Interface for 120 channels Black	
Channel n°	Allocation of connector channels
1	Mass of the pre-/post heating case
2	Power supply of the re-heater resistance
	Power supply of the oil vapors recycling circuit re-heater
3	Output of the positive command of the diesel injector N° 3
4	Output of the positive command of the diesel injector N° 2
5	Not connected channel
6	Power supply of the EGR valve position sensor
7	Power supply of the intake air valve position sensor
8	Mass of the engine oil pressure sensor
9	Power supply of the fuel high pressure sensor
10	Not connected channel
11	Power supply of the variable geometry turbocharger position recopy sensor
12	Not connected channel
13	Power supply of the engine rpm sensor
14	Mass of the turbocharger variable geometry position sensor
15	Not connected channel
16	Not connected channel
17	Mass of the EGR valve position sensor
18	Signal from the differential pressure sensor of the particle filter
19	Mass of the differential pressure sensor of the particle filter

20	Not connected channel
21	Not connected channel
22	Not connected channel
23	Power supply of the air flow sensor
24	Output of the negative command of the diesel injector N° 3
25	Output of the negative command of the diesel injector N° 2
26	Not connected channel
27	Not connected channel
28	Power supply of intake air temperature and pressure sensor
29	Power supply of the engine oil pressure sensor
30	Power supply of the position sensor of the motorized engine's water outlet
31	Power supply of the cam shaft sensor
32	Not connected channel
33	Power supply of the temperature and pressure sensors of low-pressure fuel circuit
34	Not connected channel
35	Not connected channel
36	Not connected channel
37	Not connected channel
38	Power supply of the differential pressure sensor of the particle filter
39	Not connected channel
40	Not connected channel
41	Not connected channel
42	Control of the pressure regulating solenoid valve of the turbocharger variable geometry
43	Not connected channel
44	Power supply of the fuel flow regulator
	Power supply of the pressure regulating solenoid valve of the turbocharger variable geometry
45	Output of the positive command of the diesel injector N° 1
46	Output of the positive command of the diesel injector N° 4
47	Mass of the intake air temperature and pressure sensor
48	Not connected channel
49	Mass of the high-pressure fuel common rail pressure sensor
50	Mass of the temperature and pressure sensors of low-pressure fuel circuit
51	Signal of the engine oil pressure sensor
52	Mass of the intake air outlet position sensor
53	Signal of the intake air outlet position sensor
54	Not connected channel
55	Not connected channel

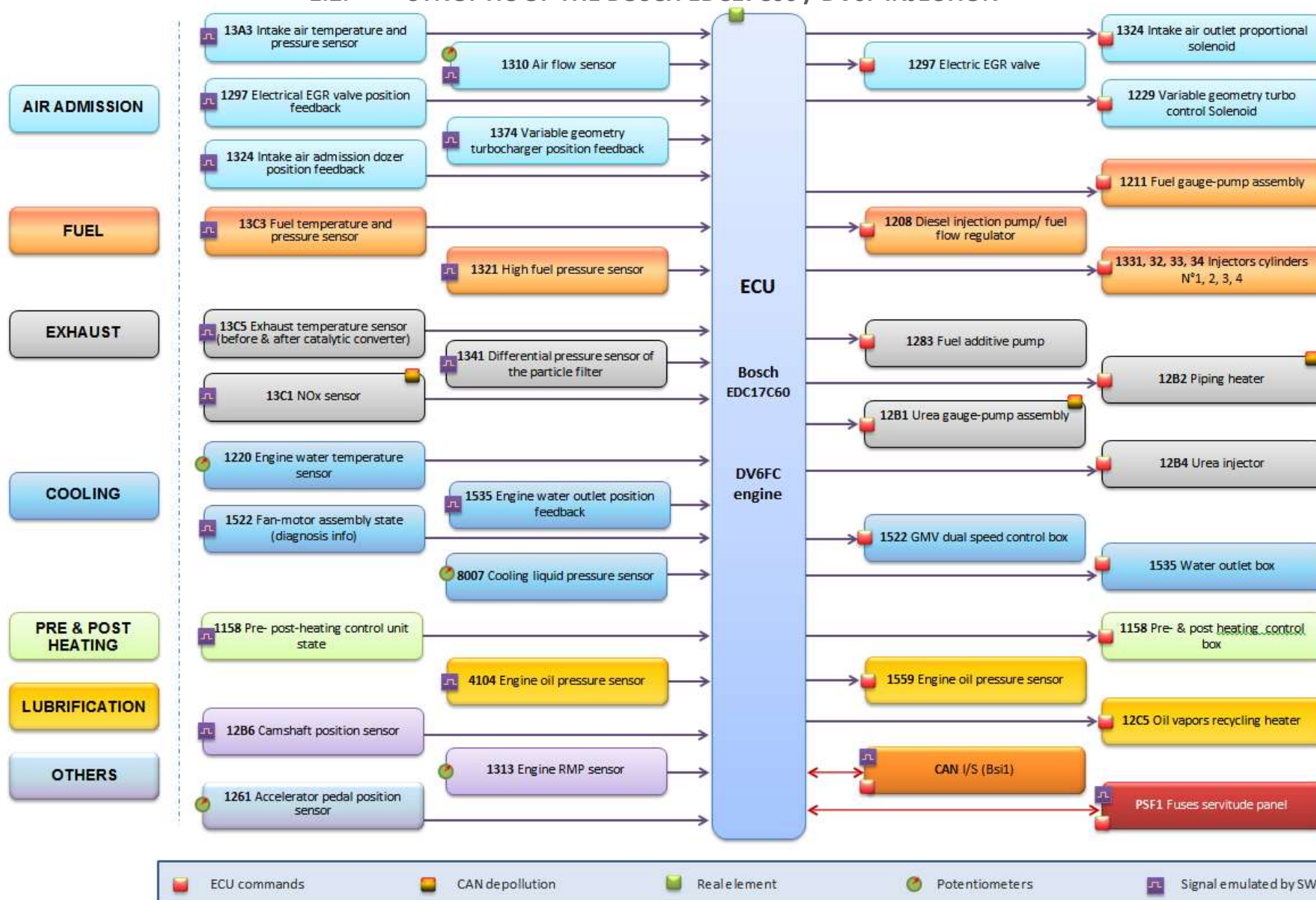
56	Mass of air flow sensor
57	Signal of the variable geometry turbocharger position recopy sensor
58	Signal of the position recopy sensor of the exhaust gases recirculation valve
59	Mass of the water-in-the-fuel detection sensor
60	Signal of the water-in-the-fuel detection sensor
61	Pre- and post-heating box state
62	Fuel heater state
63	Control of the oil vapor recycling circuit heater
64	Control of the oil pump solenoid valve
65	Power supply of the oil pump solenoid valve
	Power supply of the water-in-the-fuel detection sensor
66	Output of the negative command of the diesel injector N° 1
67	Output of the negative command of the diesel injector N° 4
68	Output of the positive command of the actuator of the motorized water outlet
69	Output of the negative command of the actuator of the motorized water outlet
70	Mass of the engine oil level sensor
71	Signal of the engine oil level sensor
72	Signal of the intake air pressure and temperature sensor (air pressure)
73	Not connected channel
74	Signal of the high pressure fuel common rail pressure sensor
75	Not connected channel
76	Signal of the low pressure fuel temperature and pressure sensor (fuel temperature)
77	Signal of the air flow sensor (air temperature)
78	Not connected channel
79	Not connected channel
80	Not connected channel
81	Mass of the engine RMP sensor
82	Signal of the engine RMP sensor
83	Not connected channel
84	Control of the urea injector
85	Control of the fuel flow regulator
86	Power supply of the urea injector
87	Negative control of the EGR solenoid
88	Positive control of the EGR solenoid
89	Not connected channel
90	Not connected channel
91	Not connected channel

92	Not connected channel
93	Mass of the exhaust gas temperature sensor (before catalytic converter)
94	Signal of the exhaust gas temperature sensor (before catalytic converter)
95	Signal of the engine water temperature sensor
96	Mass of the engine water temperature sensor
97	Signal of the exhaust gas temperature sensor (after catalytic converter)
98	Mass of the exhaust gas temperature sensor (after catalytic converter)
99	Not connected channel
100	Not connected channel
101	Signal of the camshaft position sensor
102	Not connected channel
103	Control of the pre- and post-heating box
104	Output of the positive command of the intake air dozer
105	Output of the negative command of the intake air dozer
106	Not connected channel
107	Not connected channel
108	Not connected channel
109	Not connected channel
110	Not connected channel
111	Signal of the low pressure fuel temperature and pressure sensor (Fuel pressure)
112	Not connected channel
113	Not connected channel
114	Signal of the intake air pressure and temperature sensor (Air temperature)
115	Not connected channel
116	Mass of the position recopy sensor of the motorized water outlet drawer
117	Signal of the position recopy sensor of the motorized water outlet drawer
118	Signal of the air flow sensor (Air flow)
119	Mass of the camshaft position sensor
120	Not connected channel

## 4. Learning - initialization

The updating of the motor control ECU software could be made through the downloading (engine control unit with an EPROM-flash).

## 1.2. SYNOPTIC OF THE BOSCH EDC17C60 / DV6F INJECTION



Mark	Component
0004	Receiver
1020	Alternator
1031	Battery charge state box
11--	Pre- and post- heating box
1115	Cylinder reference sensor
1208	Diesel injection pump (flow regulator)
1211	Fuel gauge
1220	Engine water temperature sensor
1221	Diesel thermistor
1229	Variable geometry turbocharge regulation solenoid
1253	Solenoid all or nothing (EGR)
1273	Oil vapors recirculation re-heating 1
1276	Fuel re-heater
1283	Fuel additive pump
1297	Electric EGR solenoid
1310	Air flow
1313	Engine RMP sensor
1320	Engine control unit
1321	Diesel haut pressure sensor
1324	Dozer of the proportional solenoid
1331, 1332, 1333, 1334	Cylinder injector N°1, 2, 3, 4
1341	Differential pressure sensor of the particulate filter
1344	Exhaust gas high temperature sensor
1357	Proportional oxygen sensor
1374	Turbocharger position recopy sensor
13A3	Intake air temperature and pressure sensor
1510	Fan motor assembly
40--	Detecting the presence of water in diesel
4110	Engine oil pressure switch
4120	Engine oil level sensor
AE00	Key switch (contact / start)
AE01	Accelerator position sensor
AE02	Engine hood opening control
AE03	Settings display
AE04	Emergency stop
AE05	Power supply relay of the fan motor assembly
AE06	Electric hood lock
AECC	General circuit breaker
AEPC	Control panel
BB00	Battery
BSI1	ECU
C001	Diagnostic socket
PCB	« Printed Circuit Board », EXXOTEST® electronic card
PSF1	Servitude flat engine compartment box Fuses



## 2. APPLICATION NOTES

### 2.1. OPERATION AND MAINTENANCE INSTRUCTIONS

Installation and start-up of the teaching aid MT-MOTEUR-ADBLUE:

Depending on the organization of the institute, this training model is located in the engine and vehicle area. This system is considered as a machine with rotating and hot parts.

Before starting, it is imperative to: unplug the teaching support network cable to avoid distorting measures, check the connection to the fume extraction system and lock the hood.

Put the general circuit breaker in ON-position, then turn the ignition key on the desk on the starting position. The engine starts; you can view the settings on the combined instrument panel and on the color screen.

#### **Environment:**

The engine training model should be used or stored on a flat surface in a dry and protected from dust, water vapor and combustion fumes place with an operated parking brake.

Lighting in the machine area must be sufficiently intense (approximately 400 - 500 Lux).

Engine control systems are protected against errors of future users.

#### **Calibration and maintenance of the engine training model:**

##### For the structure of the engine model:

Calibration: factory settings

Service interval: none

Cleaning: use a clean and soft cloth with the product for windows cleaning

Verification:

- of the lock operation - every month
- of the cylinders operation - every year

##### For the motor:

Oil and filters changes - every 2 years or every 200 hours.

(The waste oil and filters should be replaced by a competent body)

Air and diesel filters exchange - every 4 years or every 400 hours.

Cooling liquid replacement - every 5 years.

(The waste liquid should be replaced by a competent body)

Monitoring of levels should be done every month.

Visual check of all hoses (water, fuel) - every month.

**WARNING: The unit, displayed on the combined instrument panel, shows tenths of an hour.**

### For liquid change:

Prerequisites of interventions: the engine must be cold, the engine brake should be blocked, the power plug must be unhooked, the ignition key should be on stop-position and the circuit breaker on OFF.

- Engine oil: access to the drain plug through the hatch of the liquid containment tray. The bench provides an easier passage on the distribution side. The filling should be done by the engine oil drain plug located at the top of the engine (oil capacity: 3.25 liters; oil quality: 5w30).
- The cooling liquid: the change should be carried-out by removing the hose at the bottom of the cooling radiator. Recovering of the liquid via the hatch on the liquid containment tray. After filling, purge the circuit (capacity:  $\approx$  6 liters). The expansion tank is located under the yellow hatch (see photo opposite). The opening of it should be done with closed engine hood, after loosen the security screw to unlock the door, finally made it to pivot. It is important to put the hatch on its original position and lock it.



### Fuel:

The tank filling should be made only by the teacher. Before filling, turn the ignition key to the stop position, remove the 230V-connection and put the circuit breaker on OFF. Check for power by turning the ignition key on the start position. If nothing happens, it does mean that there is no more current. Use only diesel fuel.

### Number of the working places:

The engine teaching model is considered as a single workstation. The user of the training bench will remain standing throughout its learning session.

### Consignment operating process:

- Turn the ignition key to the stop position.
- Remove the 230V-plugg unless the teacher wants to recharge the battery.
- Turn the circuit breaker on OFF-position
- Check for the power by turning the ignition key on start position; if nothing happens, there is no more current.
- Remove the ignition key and store it in a lockable place.
- Check that engine hood is in the closed position.
- Allow the teacher to handle the engine training model.
- Put on the training model an information card titled 'Consigned Material'.

### Residual risk:

Only the teacher will carry-out refueling, respecting the rules defined by the institute. During the lessons the student should stay in front of the engine training model. Access to the inside of this pedagogical support is reserved to qualified and authorized personnel only.

### Engine training model transport:

The engine should be transported only if it is turned-off and consigned (see above).



## 2.2. Electrical part : 230V / 12V

Photo of the 230V power supply part of the engine training model:



If you need to change the battery, it should be replaced by an equivalent battery (size, power, space requirements, maintenance ...). The removal of the old battery should be done by the battery recycling facilities.

### TECHNICAL CHARACTERISTIQUES OF CHARGER

230V / 12V charger built-into the battery compartment of the engine training model:



- The charger is fully automatic; it passes from one phase to another according to the progress of the recharge state.
- The respective durations of those states depend on several parameters (charger rated power, battery's discharge state, battery's age, ambient temperature ...).
- It is strongly recommended to leave the charger plugged permanently.

- Case in extruded anodized aluminum; aluminum plates, epoxy paint
- Sector input tension: 230V - 15% / + 10%
- Frequency from 50 to 60 Hz
- Output tension: U bat +/- 2%
- 1 or 2 independent outputs (depend on model)
- Output current: I bat +/- 10%
- Charging curve: 2, selectable by an extern switch (open lead, leak-proof batteries / AGM / gel)
- Functioning temperature: from -20°C to + 50°C
- Ventilated naturally (without fan)
- Maximal power available from -20°C to +25°C, progressive auto-limitation (without break)

**Electronic protections against:**

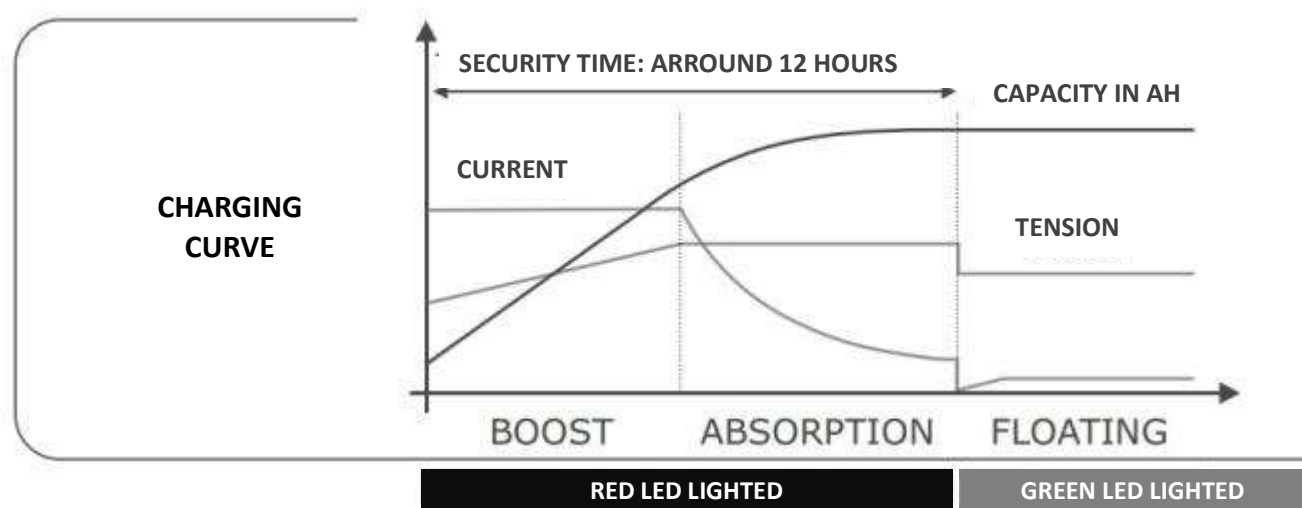
- The fugitives output's short circuits
- The discharge from the battery to the charger
- The sector overvoltage

**Fuse protections:**

- Intern: Input overload
- Extern: polarity inversion (automatically resettable fuse)

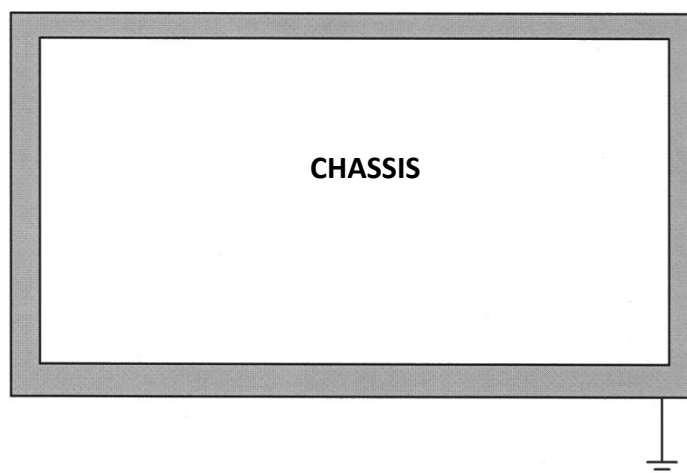
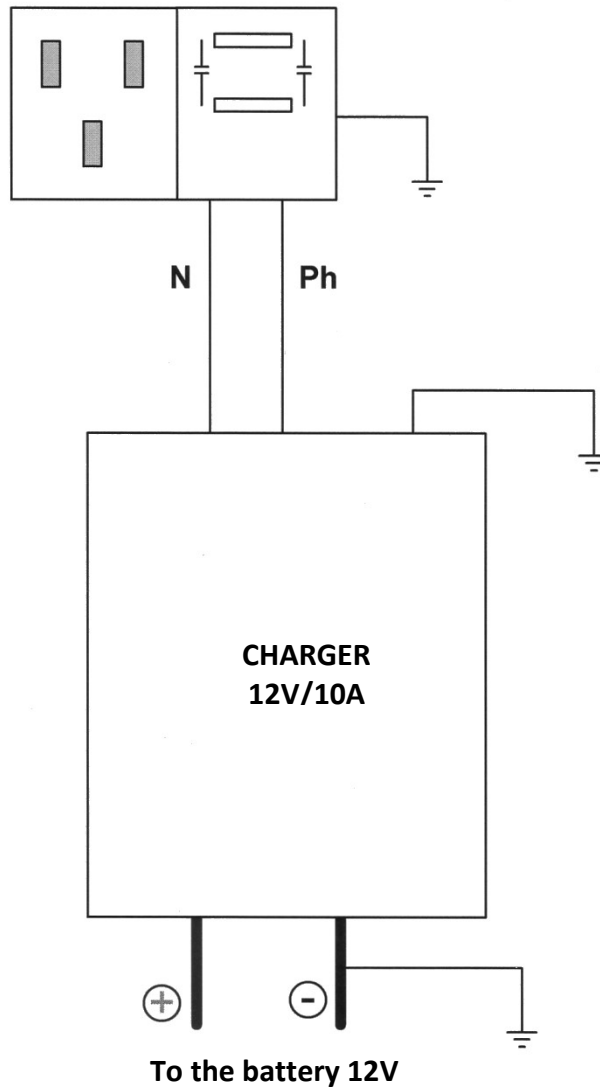
**Others:**

- Storage temperature: from -25°C to + 70°C
- Relative humidity: 90%
- Protection index: IP 54
- Dimensions: 150 x 110 x 55 mm
- Weight: 0,85 kg

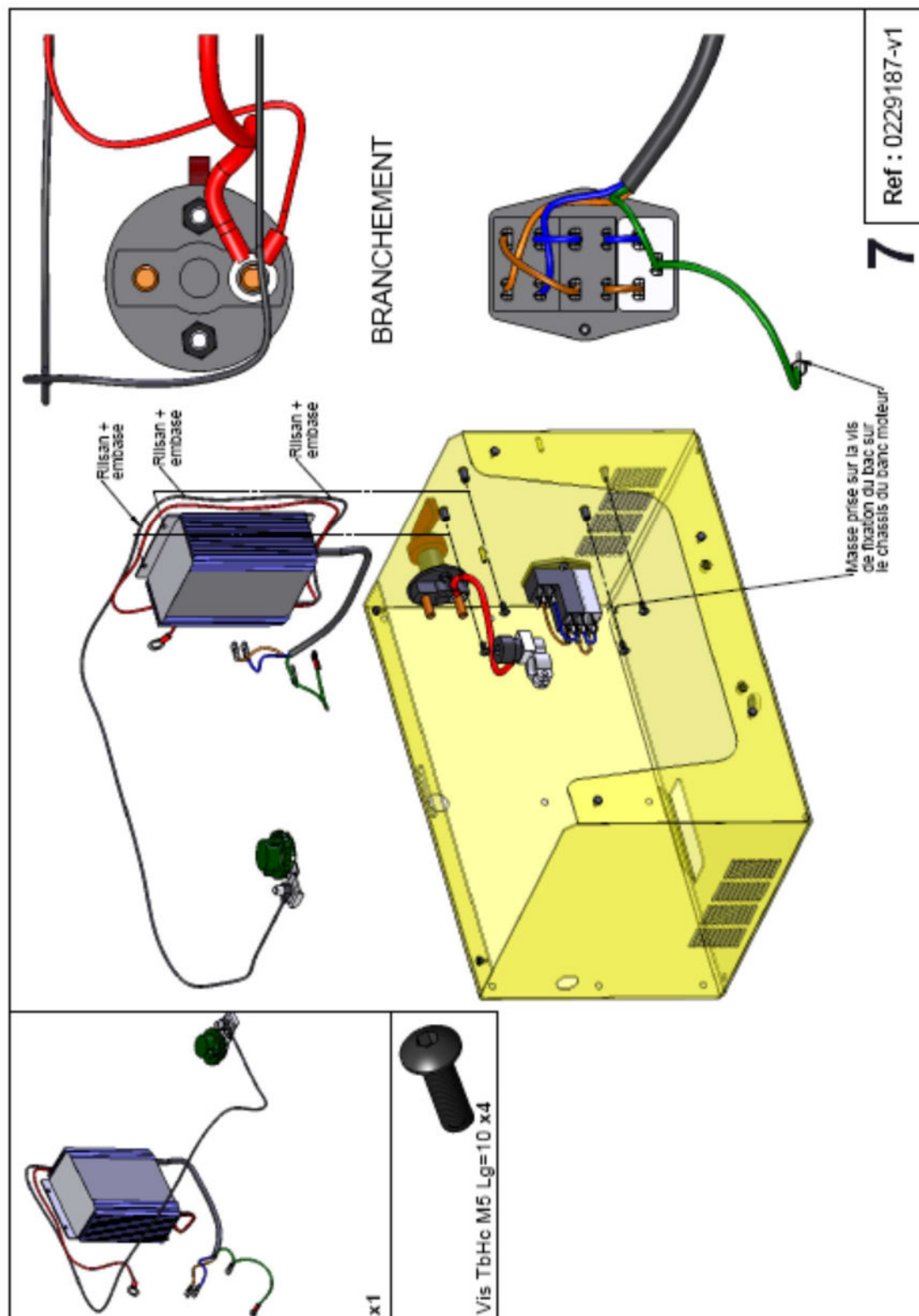


Electrical schemas of the 230V part

Baseplate + filter/ inter  
FN 388-2/21 2A



### Wiring diagram of the 230V-part



### 2.3. EMERGENCY STOP

The "punch" - switch breaks the engine actuators' circuit (i.e. engine stopped), moto fan assembly, starter authorization, the injection power supply switch and the engine cut demand at BSI (see the diagram here below).



## 2.4. ENGINE TRAINING MODEL



DV6F diesel engine provided by PSA: cylinder capacity of 1600 cm<sup>3</sup>, turbo, direct-injection « Common rail ».

### Fuel supply:

The fuel supply is provided by the pump and gauge system immersed from the vehicle:

- level indicator on the dashboard;
- filling plug with anti-siphon system;
- filling operation is described in the user guide.



### The electrical system:



All beams comply with the requirements of automotive manufacturers.

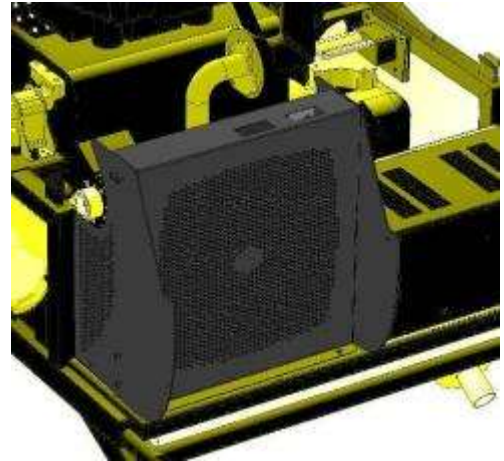
The power supply is placed in a closed box at the front of training model and includes:

- vehicle battery;
- battery switch;
- automatic battery charger;
- 230V-plug for the charger's power supply.



**Cooling:**

The cooling system is identical to a vehicle's and placed on the front of the support. It comprises the radiator, the fan motors assembly, the various hoses and an expansion tank

**Parking brake:**

There is only one on the right rear wheel; it must be operated during storage or use of the engine training model.

**Security:**

The engine training model on chassis is a component of the vehicle taken out of its environment and considered as a machine.

In respect of the Machine Directive 98/37/CE, EXXOTEST protects rotating and hot (above 55°C) parts.

The transparent hood covers the entire engine. It is hinged and supported by jacks.

The closed position allows a maximum safety during operation with engine and maintains full visibility.

The open position provides wide access to the engine and facilitates the various interventions.

The clamping is ensured by an electric lock driven by the control panel.

The electric power supply system is protected by a removable cover.

A fluid retention container is provided in case of leakage or improper handling.

A punch stop provides emergency engine's shutdown in case of an incident.

### The keyhole :



Door security lock, electric opening system, manual closing.

### Disengagement procedure:

Put the ignition key on the position « engine hood open » and press during two seconds on the button with the red indicator, the light will turns off. Stay in front of the hood, press it and support the opening.



Important: The opening of the electric lock is achieved by authorization of the control panel, if the engine is off in hot soak period (> 90°C) a temporization allows the opening only after lowering the engine water's temperature below 90°C.



### The chassis:

The chassis designed by EXXOTEST in high strength tubular steel coated with epoxy paint are robust and lightweight. It rests on Ø160 mm casters (2 fixed and 2 swivel braked) for easy movement.



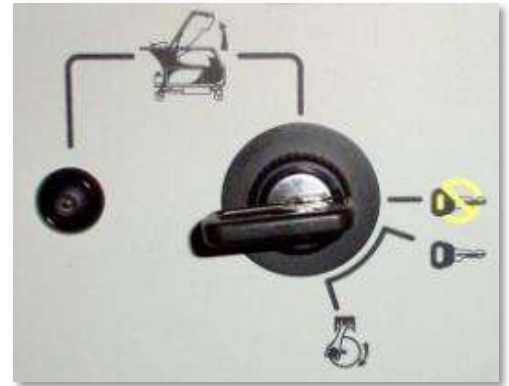
*Design under Solidwork®*



### Command panel:

#### Key switch:

With the positions: 0, contact, start and position of hood opening demand.



Accelerator lever.

Analog Gauges combined with the vehicle's instrument: tachometer, water temperature and fuel level indicators, witnesses and timestamp.

16 channels diagnostic socket for connection to the diagnostic tool.

High resolution screen for display of engine information from the CAN network and optional sensors...



## 2.5. THE DIAGNOSIS TOOLS USE

This motorization is installed on the vehicles produced by PSA group, so we could communicate with the injection ECU using diagnosis tools adapted for Citroën or Peugeot.

# DECLARATION OF CONFORMITY

By means of this declaration of conformity, as defined by the European Directive on Electromagnetic Conformity 2004/108/EC, the company:

**S.A.S. ANNECY ELECTRONIQUE**  
**Parc Altaïs – 1, rue Callisto**  
**F74650 CHAVANOD**



Declares that the following product:

Brand	Model	Description
EXXOTEST	MT-MOTEUR-ADBLUE	<b>EDUCATIONAL EQUIPMENT :</b> HDI DV6F diesel engine training model

**I - Has been manufactured in accordance with the requirements of the following European Directives:**

- LV Directive 2006/95/EC - 12 December 2006
- Machinery Directive 98/37/EC - 22 June 1998
- EMC Directive 2004/108/EC - 15 December 2004

**and satisfies the requirements of the following standard:**

- NF EN 61326-1 dated 07/1997 +A1 of 10/1998 +A2 of 09/2001

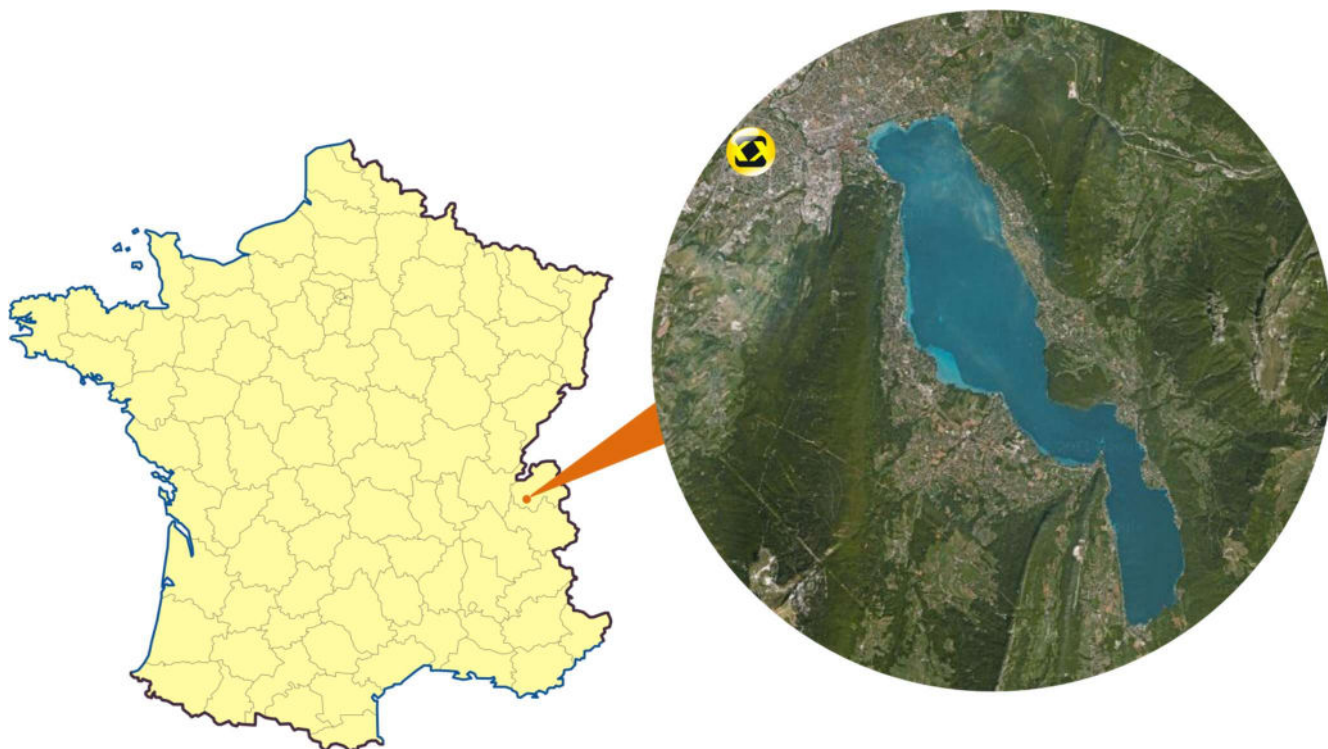
Electrical equipment for measurement, control and laboratory use - EMC requirements in accordance with the following specification:

NF EN55022 : 2003 : B-class  
CEI 801-2 : 1991 : Severity 3  
CEI 801-3 : 1984 : 3 V/m.  
CEI 801-4 : 1988 : Severity 2

**II - Has been manufactured in accordance with the requirements of the European Directives relating to EEE design and WEEE management for the EU.**

- Directive 2002/96/EC dated 27 January 2003 on Waste Electronic and Electrical Equipment (WEEE)
- Directive 2002/95/EC dated 27 January 2003 on the limitations for the use of certain hazardous substances in the construction of Electronic and Electrical Equipment (EEE).

Drawn up in Chavanod on 21 Mars 2016



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Original manual

Document n° 00306030-v1

**ANNECY ELECTRONIQUE, designer and manufacturer of the Exxotest and Navylec equipment.**

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