DIDAC BDH

TEACHING MATERIALS

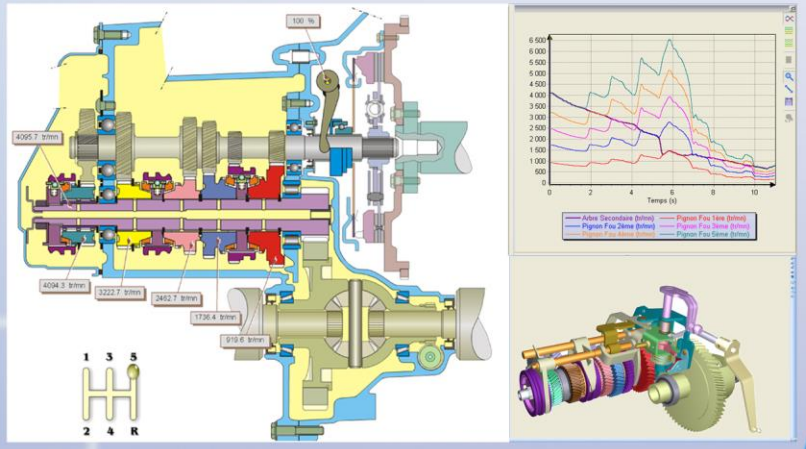
IDEAL LINK BETWEEN REAL SYSTEM AND DIGITAL MODEL

2015 Catalog

Cars

Trucks and Agricultural vehicles

Handling



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SUMMARY

Cars Trucks & Agricultural vehicles Handling

DIDAC BDH SARL - ZAC Croix Chartier - 42 140 SAINT DENIS SUR COISE
Tél. : + 33 (0)6 77 82 98 91 - Site internet : www.didacbdh.com

DIDAC BDH : A COMPLETE RANGE…

AUXILIARY ENERGIES

These modules are designed “to develop the knowledge and methods required for a functional and structural approach to the various systems that use pneumatic and hydraulic energy”.

SENSORS
PRE-ACTUATORS
ACTUATORS

The acquisition, processing, control and dialog functions with the onboard electronic systems are performed using a series of consoles.

ANALYSIS

These products are designed to provide input for the functional and structural analysis.
They can also be used for vehicle technology and practical exercise applications.

SYSTEMS

These assemblies are used to study a vehicle function (engine, brakes, transmission, chassis and suspension, etc.)

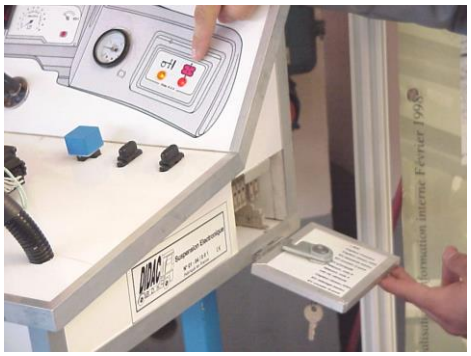
DIDAC BDH : AN EFFICIENT EDUCATIONAL APPROACH…

REAL-LIFE EXERCISES

The trainees immediately identify all the components and locate their position on the vehicle.

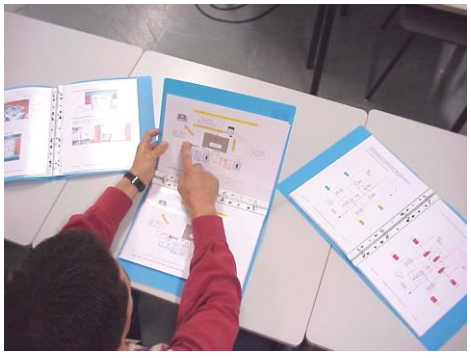
OPERATION

The trainees view all the operating phases, both at a standstill and when in motion, which is not possible with a vehicle that is parked in the workshop.
Conventional measurements or data acquisition.



TROUBLESHOOTING

Instructors can use the built-in fault boxes to easily simulate significant malfunctions that the trainees can use for diagnostic exercises.
Trainees then perform the diagnostic operations using systems identical to those on the vehicle.



TRAINING RESOURCES

A set of documents (resource, user and instructor files) is supplied with each model.
For certain models, these training materials are ideally supplemented by software.

USB DATA ACQUISITION & PROCESSING

12 analog inputs ± 30 V
4 analog inputs ± 400 V
8 digital inputs

16 single-ended / 8 differential channels

16-channel oscilloscope
(With physical values display)

Standalone, powered by USB

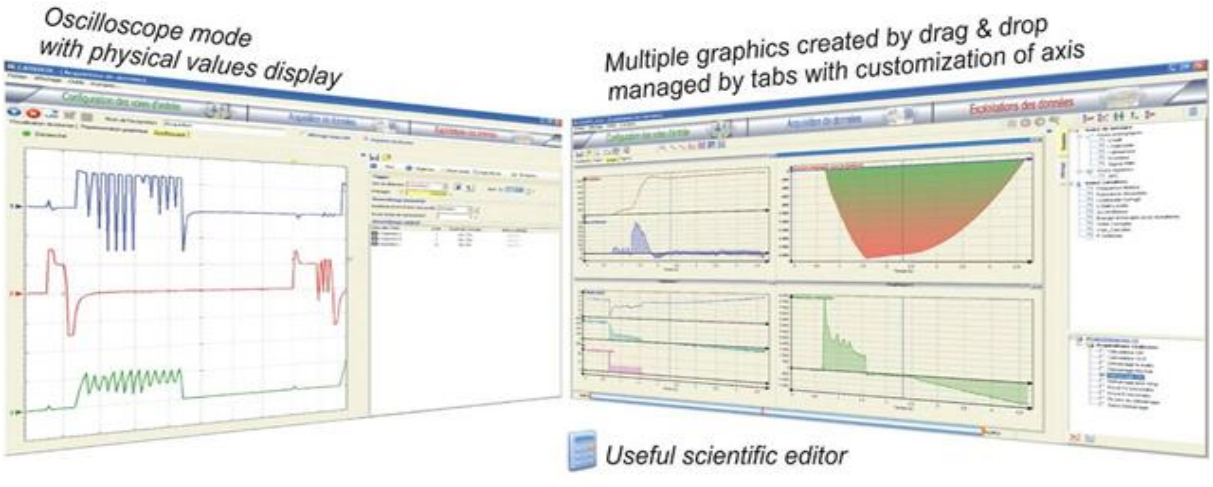
Protected case

250 kHz

Simultaneous analog
(single-ended or differential)
and digital inputs

Adapted to Bac & Bac Pro (French National Education):
. Playful and intuitive setting
. Helpful wiring assistant
. Conversion into physical value (setting by representing the sensor's conversion curve)
. Pictures animated with acquisition data

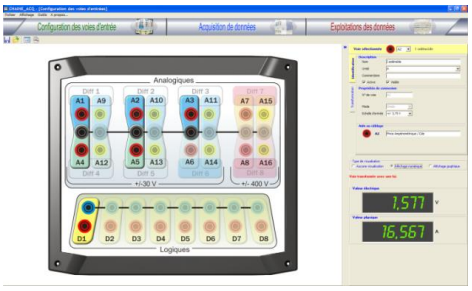
Adapted to BTS (French National Education):
. Particularly adapted to teaching of systems study in BTS AVA (automotive after-sales)
. Easy to use thanks to various modes of acquisition triggering
. Interpretation of data facilitated by the quality of its graphics and the power and flexibility of its scientific editor

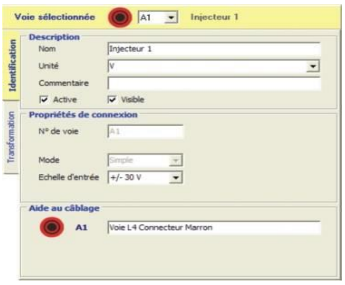


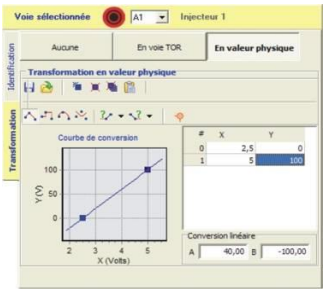
① Configuration des voies d'entrée

Channel identification: Channel conversion:

- into physical value
- into 0 or 1 according to thresholds







- Graphical selection of channels to use by clicking on the image of the case
- Automatic creation of wiring help (printed as table and image).

Data acquisition & recording

② Acquisition de données

Acquisition conditions & Oscilloscope mode:

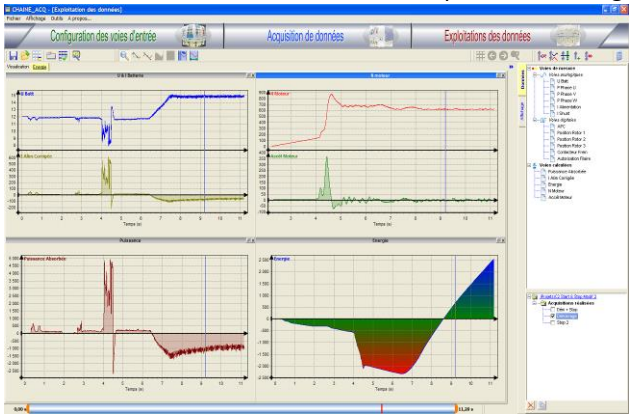
Acquisition mode

Oscilloscope mode

Phenomena analysis & data processing

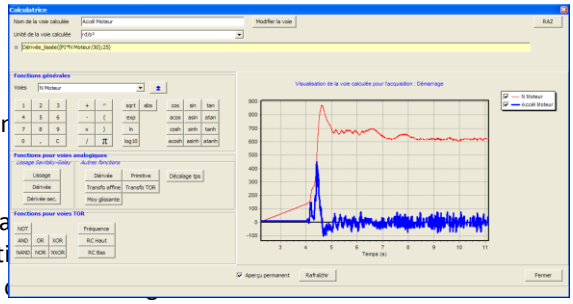
③ Exploitations des données

- Multiple views managed by tabs



Phenomena analysis & Data processing:

- Axis customization in each view
- Measurement tools:
  - Slope
  - Tangent line in one point
  - Definite integral with mean value
  - Rising-edge counter
  - Measure of duty cycle
  - Measure of duration and frequency
- Easy data import by « copy & paste»



- Scientific editor:
  - Basic mathematical fur
  - Moving average
  - Data smoothing
  - First and second deriva
  - Primitive – Antiderivati
  - Transformation into 0
  - Frequency variation computation
  - Duty cycle variation computation (low and high)

PNEUMATIC AND HYDRAULIC MODULES

Réf : MPH

Presentation:

A series of modules (small consoles) are used to meet the requirements of the auxiliary energies reference system.
These modules are designed "to develop the knowledge and methods required for a functional and structural approach to the various systems that use pneumatic and hydraulic energy" **(according to the BEP MVM reference system (French National Education))**.

Methodology:

These modules allow for a global and concrete approach. Each module reproduces **an assembly or subassembly** fitted with **real operational components** that **perform the function being studied** (production, storage, use, etc.).
Trainees can use the system, see it in operation, take measurements, etc.
Each module is derived from a **real system** that we believe is the most relevant in order to study the selected function. In this way, each module can be used to meet at least the requirements of phase 1 of the reference system:
Phase 1: on a vehicle or a **training system**

Proposed method for trainees	**Structure of the module in order to follow the proposed approach**
1 – Identify the function	The module is really operative and, by observation, can be used to identify the function.
2 – Identify the main functions	Each module can be used to easily perform a functional breakdown, in particular by using the separate components.
3 – Identify the functional chain(s)	The links between the components and their layout facilitate the functional understanding of the studied system or subsystem.
4 – Make the automation functions apparent	*See the "Sensors, pre-actuators and actuators" collection.*
5 – Measure and/or view the input and output values used to validate simple functions.	The instrumentation associated with each module can be used to measure the relevant functional parameters.

*The table below shows the modules associated with S2.2 PRODUCTION AND USE OF **HYDRAULIC ENERGY** and S2.3 PRODUCTION AND USE OF **PNEUMATIC ENERGY***

Each module is associated with PC training software that gives details of all the operational phases, with a detailed analysis of each component.

Proposed modules:

MODULE FUNCTION **Media used**	**COMPONENTS USED**	**PHOTOS**
PRODUCING HYDRAULIC ENERGY **"The basic components of all circuits"** fuel circuit lubrication circuit (passenger cars, industrial vehicles, agricultural vehicles, public works vehicles) **Portable console**	Functional assembly, including: - **positive displacement pumps** - **adjustable pressure limiters** - **pressure flow rate measurement devices**	
USING HYDRAULIC ENERGY Hydropneumatic rear suspension (passenger vehicles) **Tipper trucks (industrial vehicles)** Arm of a pallet transporter (Manitou) (agricultural or public works vehicles) **Portable console**	Functional assembly, including: - **a hydraulic generator** - **a simple effect actuator with flow limiter** - **a 2/2 solenoid** - **a manual control to raise/lower the skip** - **a pressure measurement device**	
USING HYDRAULIC ENERGY 2 Tipper truck cab (industrial vehicles) **Skip tipper truck (industrial vehicles, public works)** Fork base lifter (agricultural vehicles) **Portable console**	Functional assembly, including: - **a hydraulic generator** - **a double effect actuator with flow limiters** - **a 4/3 distributor** - **a manual tipper control** - **a pressure measurement device**	
PRODUCING AND STORING PNEUMATIC ENERGY "The basic components of all circuits" **Workshop air circuit (all dominants)** **Portable console**	Functional assembly, including: - **a compressor** - **a tank** - **a safety valve** - **a pressure switch** - **pressure flow rate measurement devices**	

CONDITIONING PNEUMATIC ENERGY "The basic components of all circuits" **Workshop air circuit (all dominants)** **Portable console**	Functional assembly, including: - **a filter** - **a regulator** - **a settler** - **a lubricator**	
USING PNEUMATIC ENERGY (all-or-nothing by solenoid) **Suspension (passenger and industrial vehicles)** Engine EGR (public works and agricultural vehicles) **Portable console**	Functional assembly, including: - **a simple effect actuator** - **2/2 and 3/2 solenoids** - **a manual raise-lower control** - **a pressure measurement device**	
USING PNEUMATIC ENERGY (all-or-nothing by distributor) **Bus door (industrial vehicles)** **Portable console**	Functional assembly, including: - **a double effect actuator** - **one 5/2 distributor and three 3/2 distributors with manual controls** - **adjustable flow rate limiters** - **a pressure measurement device**	
USING PNEUMATIC ENERGY (modulation of pressure according to the effort applied to the control) **HGV brakes (industrial vehicles)** (agricultural and public works vehicles) **Portable console**	Functional assembly, including: - **a simple effect actuator (industrial vehicle type brake chamber)** - **a pressure regulator (industrial vehicle type brake control valve)** - **a quick-fit valve** - **a pressure and control effort measurement device**	

Trainees use training systems made up of real components in their usual operating environment. These simulators are intended for all BEP MVM courses (French National Education). A complete teaching kit is provided. (on CD-ROM).

Characteristics:

Energies :	Dimensions:	weight :
Electric : 12V 25A Pneumatic : 5 (Bar)	L = 500 D = 350 H = 320 (mm)	10 (kg)

Options:

Storage unit
Protective bag

French National Education

TRUCKS AUTOMOTIVE AGRICULTURAL VEHICLES

☒CAP ☒BAC PRO ☐BTS ☐SUP

BASIC ELECTRIC SUITCASE (24V) ou (12V)

Réf : ACC-VEB.24V
Réf : ACC-VEB.12V

The electric's notions became inescapable in the automotive maintenance sector. A good understanding of these physical phenomena is fundamental to identify the functioning of a system and realize a relevant diagnosis. DIDAC BDH realized a suitcase "all inclusive" which allows to analyze electric basic assemblies from components most usually used.

A compact suitcase and a playful and concrete approach

This suitcase allows to develop skills in basic electricity from activities of practical works, to lead activities of diagnosis in understanding on the electric and electronic vehicles systems.

The developed skills are:

- Identify an electric basic component: monostable switch (typify button), switch bistable, swig (voltage, power), resistor, diode, light-emitting diode (LED), simple relay, relay with freewheeling diode, fusible DC motor.
- Cable basic electric components, verify the efficiency
- Measure the voltage, currents and resistor (sometimes, it is necessary to calculate them)
- Analyze: an assembly (plan the potential) and the measured values.

<u>Présentation :</u>

A suitcase (with strengthened edge and locking), containing.

- A 220Vconnector, provided with a protection switch and with a fuse, associated with a connecting cable sector 220V.
- A stabilized and completely protected supply 24V 3A.
- 16 laboratory cables of 0.25m of length (7 red, 5 blacks and 4 blues).

1 tray fixed on the bottom by the suitcase, manufactured and drilled receiving :

- 1 Supply with cartridges (3 red et 3 blacks)
- 2 fuses of 3A with fuse holder and hood
- 1 differential blocking switch RT
- 1 glass lift switch RT
- 1 PTO (power take off) switch
- 2 Classic micro relay
- 1 Mini relay with freewheeling diode
- 1 direct-current motor
- 1 Mini relay

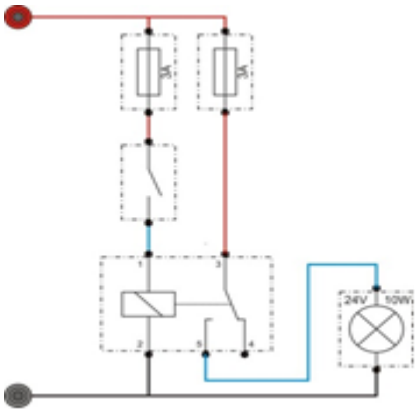
- 2 resistor (500Ω et 1KΩ)
- 4 bulbs (5W et 21W)
- 1 diode (type 1N 4007)
- 1 LED (with it resistor)

NB : The tray is opaque.

- - The sockets implanted around each constituent and cabled on these components
- - 1 "silk-screened" panel implanted inside the lid representing the principal plans of components (symbol and number of ways).
- - 1 compartment (in the lid) for tidy up cables.
- - 1 multimeter.
- 1 part of TPS supplied on USB key.

Educational activities :

- The serial / parallel Resistor (consumer, current using, ohm's law)
- The serial / parallel lights (power, voltage, drain current)
- Simple relay (technical characteristic circuits, command / power current)
- Multiple Cablings of a relay
- Diode (role and control)
- Light-emitting diode (role, power supply)
- Relay with diode of free wheel (role and control)
- Engine with live direct current and with relay (difference of potential)



Teaching aid to CAP to BTS (French National Education):

General characteristics

Dimensions :	Weight :
L = 470 D = 350 H = 150 (mm)	6 (Kg)

French National Education

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TRUCKS AUTOMOTIVE AGRICULTURAL VEHICLES

SENSORS, ACTUATORS AND PRE-ACTUATORS

Réf : CPA

PRESENTATION

Those simulators are constituted of stands (same dimensions) to put on desks.

This allows students to realise specific activities :

- measure data (pressure, temperature, level, position, rotation speed…).
- command of the electromagnetic gates (« all or nothing » (TOR), “cyclic ratio opening” (RCO), and “call – maintenance” with charge condensing).
- command of the engines (DC current and step by step).

This allows teachers to propose a large panel of operations.

- Those simulators are constituted of :
- real electronic components for observation and experimentation.
- manufacturer drawings of electric circuits and photographs to locate them easily, in order to reproduce the environment of the sensors or the actuators.
- female plugs are fixed at connection points to ease the measures of the physical data.
- possibility of digital display panels, pressure reducers, pressure gauges according to simulations.

Those simulators are delivered with a handle for an easier transport. The dimensions and weight

allows to use those models in a classroom, a workshop or a laboratory. They can also be arranged in a cupboard.

The power supply (24 V) is allowed by 2 female plugs fixed on the right side panel. For the pneumatic supply a quick connection is fixed on the left side.

Function study :

The developed knowledge are :

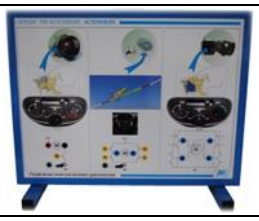
THE SENSORS :

MEASURE THE PRESSURE *:* sensor for the tank pressure (drop alert) sensor for the fowa pressure (raise alert), sensor for the air supply pressure, sensor for the oil pressure (piezo-electric). **Réf : CPA-MPR**	
MEASURE THE LEVELS *:* sensor for the oil level with warm wire, sensor for the water level with electrodes, sensor "reed" for the fuel level. **Réf : CPA-MN**	
MEASURE THE POSITIONS : sensor for the position of the accelerator pedal (angular potentiometer), sensor for the height of the under-body (inductive). **Réf : CPA-MPO**	
MEASURE THE TEMPERATURES : sensors for the external air temperature and for the water temperature (thermistors C.T.N.). **Réf : CPA-MT**	
MEASURE THE ROTATION SPEED: sensor for the wheel rotation speed ABS-EBS (inductive with associated target), sensor for the vehicle speed (hall effect), sensor for the wheel rotation speed ABS (magneto-resistive). **Réf : CPA-MVR**	

STUDY OF PRE-ACTUORS :

COMMAND THE ELECTROMAGNETIC GATES : brake (fowa exhaust) « all or nothing » (TOR), "cyclic ratio opening" (RCO), and "call – maintenance" with charge condensing. **Réf : CPA-CE**	
COMMAND BY RELAY : traditional, double or temporized. **Réf : CPA-CR**	

STUDY OF ACTUORS :

COMMAND THE ELECTRIC ENGINES : DC current and step by step. **Réf : CPA-CME**	

The student is going to acquire the following competences :

- Identify the different components as well as different electric and pneumatic connections (supply pressure, delivered pressure and exhaust pressure)
- Locate different components (according to photos).
- Know main technological functions.
- Measure and/or visualize the inlets and outlets to valid the system working.
- Analyse different adjustments.
- Reproduce data found by the electronic calculators (temperature, engine rotation speed ...)
- Acquire complementary knowledge and methods for a functional and structural analyze for the different electronic systems.
- Assimilate essential knowledge and know-how to carry out a diagnosis or a maintenance action.

Those simulators comply with the requirements from BEP to BTS (French National Education). A complete technical and pedagogic documentation is supplied on USB key.

General characteristics :

Energie :	Dimensions :	Weight :
Electric 24V 12A Pneumatic 6 to 8 (Bar)	L = 600 D = 250 H = 450 (mm)	20 (kg)

Options :

- Slip-cover
- Cupboard
- electric supply (24V - 6A) totally secure
- Data acquisition USB and exploitation Car&Box

Marketing :

The simulators can be sold separately. Free of port

French National Education

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TRUCKS AUTOMOTIVE AGRICULTURAL VEHICLES

FUEL PUMP

Réf : CPA-PC

Presentation :

Real components in functioning: a concrete approach and an adapted pedagogy.

Indeed, this desk is realized from components stemming from circuits of low-pressure fuel.

It have :
- An electric pump with wheel 2V.
- A pressure regulator 3 bar.
- A faucet order the quantity injected and of the output of the pump.
- A viewer of the electric and hydraulic value.
- A device power failure.
- Sensors (inside) to measure tension and current in entry and pressure and flow got out of it.

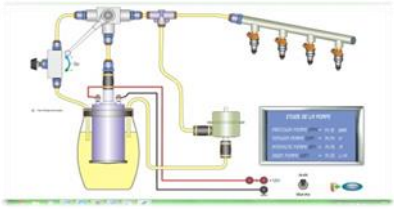
Real components connected to the software of acquisition and animation : an effective association which develops the autonomy.

Besides the information supplied by the billposter, the module links with the PC by USB connection and opens a whole field of educational activity where the pupil measures, observes and analyzes in any autonomy.

The software have 4 parts : « Resources », « Real time animations», « Acquisitions » and finaly «Pumps survey and regulation survey».

Pedagogic activities :

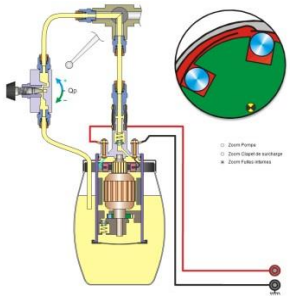
The study of the complete circuit shows how is realized the regulation of pressure. It allows the student to highlight the internal functioning of the pressure regulator.



It also shows the limits of the performances of the regulator associated with the pump. it highlights finally the influence of the power supply of the pump (resistant connecting system).

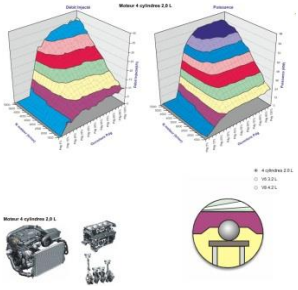
Example of study :

- Role of pressure generator.
- Influence of the injected quantity.
- Check and determination of the characteristics of the regulator. Waterproof circuit (trap, injector).
- Application of the standard and the translation of the real circuit in diagram.
- Methodology of control circuit (setting-up of the manometer, been of the flow pump).



The only pump is also studied and highlights the role of the pump and the notions of FLOW AND PRESSURE:

Reading the characteristics: pressure / flow and current / voltage.



- Drawn the curve of overall efficiency.
- Study of the hydraulic characteristics: capacity, volume efficiency and internal leaks.
- Influence of a defect of power supply.

Those simulators comply with the requirements from BEP to BTS (French National Education). A complete technical and pedagogic documentation is supplied on USB key.

General characteristics :

Energies :	Dimensions :	Weight :
220 V 50 Hz	L = 600 D = 250 H = 450 (mm)	20 (Kg)

Option : Slip cover

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AUTOMOTIVE

INSTRUMENT CLUSTER

Réf : ANA-CI

This teaching equipment propose the study of a receiver instrument cluster of motor vehicle on a multiplexe network CAN.
Two practical activities proposed on fields Information of the common-core syllabus STI2D or of S SI.

Presentation :

- An instrument cluster learned on a command and connect desk
- An USB-CAN adaptor.
- A reception software/data transmission CAN.
- A decoding software of a CAN oscillogram.
- An USB key include: teaching application, resources, and software.

Pedagogic activities :

Discovery of instrument cluster and bus CAN :

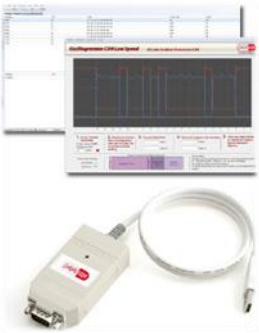
Study to understand what the functions of the instrument cluster and bus are CAN

- Functional and structural analysis of the informations chanel. (file SysML)
- Discovery differents vehicle network.
- To take advantage of bus CAN
- Time 3h

Buisness skill	knowledge
- **CO3.1** Decode system cdcf. - **CO4.1**. Indentify and characterize the functions and system components as weel as its in/out - **CO4.2**. Indentify and characterize Organisation of material and/or software system - **CO4.4**. Indentify and characterize technical solutions relative to materials, to structure, to energy and to information (acquisition, treatment, transmission) system	- **2.1** Functional system approach - **2.3.6** Informative system's behavior - **3.2.4** Transmission the information, network and web
knowledge	**capacity**
Architectural network (topology, mode of communication, type of transmission, method of access to the support, the technical switching).	Identify network's functional and material architectural

Study of CAN of physical layer

- Study model ISO layer.
- Physical layer : signal's measure, the pupil understands how are obtained the logical levels.
- Link layer: oscillogram decoding (software supplied), the pupil understands the frame constitution
- Application layer : Frame reception and new frame creation (Adapter USB and software communication CAN supplied), The student unsderstand The information frame coding..
- Durating 3h.



Buisness skill	knowledge
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knowledge	**capacity**
Architectural network (topology, mode of communication, type of transmission, method of access to the support, technical switching).	Identify network's functional and material architectural
OSI Model	describ organisation des principaux protocoles
Network 's communication Communication supports, Notion of protocol, parameters of configuration. Notion of parallel and serial frame, connections.	Analyze information's size and flow Identifier les architectures fonctionnelle et matérielle Identifier les supports de communication Identifier et analyser le message transmis, notion de protocole, paramètres de configuration

General characteristics:

Energie :	Dimensions :	Weight :
220 V 50Hz	L = 400 D = 300 H = 300 (mm)	6 (Kg)

Software and documentation are supplied on USB key

French National Education

☐CAP ☒BAC PRO ☒BTS ☒SUP

AUTOMOTIVE

MANUAL GEARBOX BVM

Réf : ANA-BVM

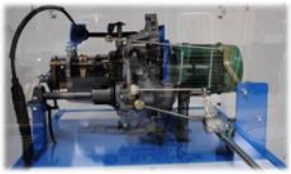
This teaching kit is used to study gearboxes both from the functional (adaptation to the engine and the vehicle, calculation of ratios, study of synchronization) and structural perspectives (drivetrain, design, rotation guides, sealing, etc.).
It is particularly well suited to teaching functional and structural analysis, mechanical and technological aspects and to practical exercises.
It is widely used in BEP and BTS courses (French National Education).

<u>Presentation :</u>

The kit include :

A chassis on casters with

• A cutaway gearbox with a variable speed rotational drive (normal, and extra slow speeds).



• A clutch and the control mechanism, the transmissions

• The gearbox controls

• A control panel (meter accelarator and cluch pedal, gear level)

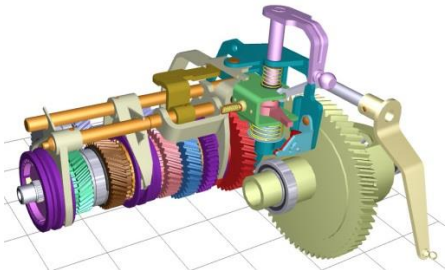
• An equipped measurement system:
  - Speed and position sensor
  - An acquisition card inside the chassis and connected to a PC by a USB cable.

• Software with :
  - A section to discover the gearbox (2D and 3D)
  - A section used to animate the 2D images of the gearbox on the screen in real time.
  - A section used to take measurements during the various operating phases, and during synchronization in particular.
  - A replay function of the measurements that animates the internal parts of the gearbox (synchronization ring, gears, etc.).

Teaching activities :

After completing these activities, trainees will be able to:

- Locate the components on the vehicle.
- Locate and identify the various components of a gearbox.
- Analyze the function of the gearbox (calculation of ratios, ranges, adaptation to the engine and the vehicle).
- Identify the various components of a synchromesh.
- Demonstrate the need for a synchromesh.
- Analyze the various phases of the synchromesh.
- Analyze the malfunctions of a synchromesh.



The structure of the model adopts a very concrete approach to the study of a gearbox. Moreover, the software can be used to analyze the ratios and, in particular, the synchromesh, in very close detail.

This educational set cover all level from CAP to BTS (french educational) a very complete educational file is supplied with the model on USB key.
EXCLUSIVITY: a software (on PC) of piloting of images from the simulator will be delivered with the model detailing all phases of functioning with detailed analysis of every constituent.

Approached subjects

- The measurements are “replayed” in order to analyze the gear shift phase (speed of the gears before shifting, required speed, action of the synchromesh, etc.)
- The digital models provided can be used to perform a concrete and precise study of each of the parts.

So, this set is very relevant in the teaching of the analysis systems.

General characteristics :

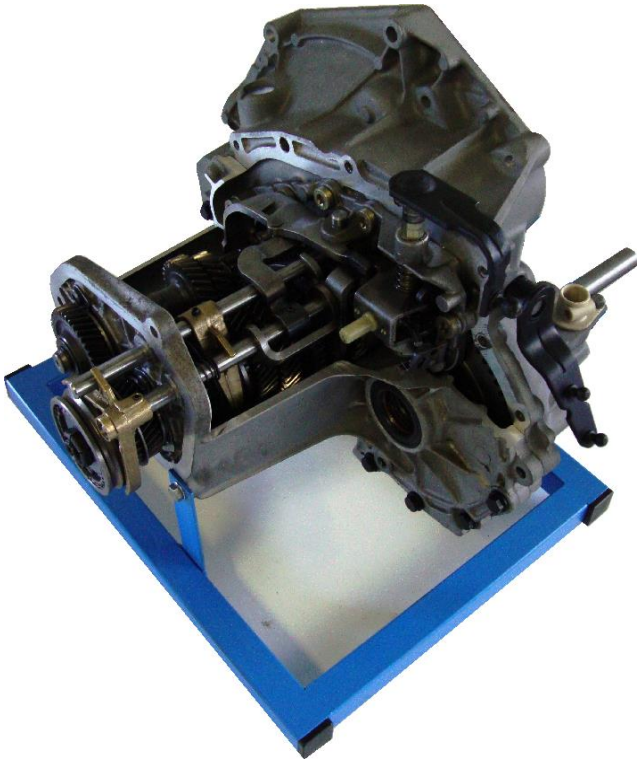
Energie :	Dimensions :	Weight :
Electric 220 V 50 Hz	L = 1300 D = 700 H = 1000 (mm)	100 (Kg)

Option : Slip cover

French National Education

☒CAP ☒BAC PRO ☒BTS ☒SUP

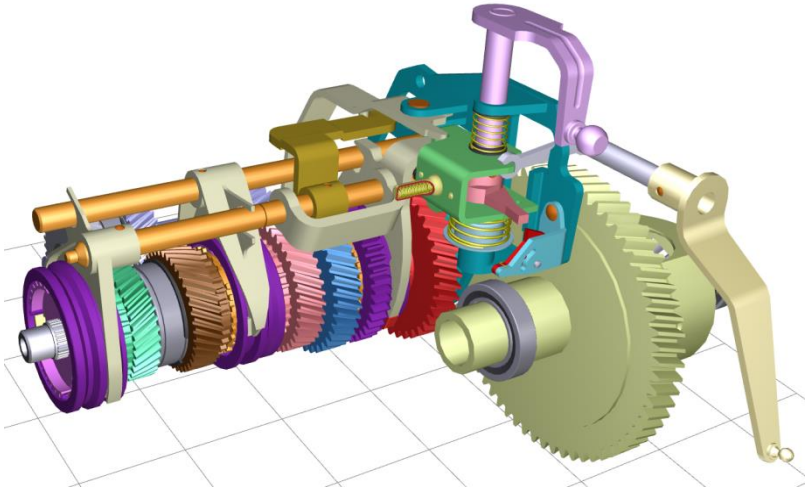
TRUCKS AUTOMOTIVE AGRICULTURAL VEHICLES



GEARBOX IN SECTIONAL VIEW MA5 : 20CC25

Réf : ACC-SUP.BVM

The numeric model 3D is supplied with the real gearbox. It published with SolidWorks or quite other viewer 3D (without license).



Dimensions :

The model is on nonskid feet.

L = 600mm D = 600mm H = 550mm Weight : 25Kg

French National Education

☒CAP ☒BAC PRO ☒BTS ☒SUP

TRUCKS AUTOMOTIVE AGRICULTURAL VEHICLES

MASTERVAC and MASTER-CYLINDER

Réf : ANA-MMC

This pedagogic unit allows a complete study of the braking assistance device (mastervac) and of the master-cylinder.
It is specially appropriated for functional and structural analyze lessons, mechanics, technology and exercises.
It can be used from BEP to BTS (French National Education).

Presentation :
This model is constituted of :

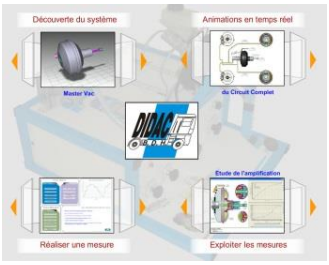
A desk has :

- A mastervac and its vacuum pump.
- A tandem master-cylinder tandem and the brake pedal.
- Two internal brake receivers.
- A drawing to locate real components on the vehicle.
- Brake fixing devices.
- Failures simulation devices (assistance and hydraulic circuit).

A measure system (discreet and perfectly integrated) with :

- Sensors (effort, pressure, race).
- An acquisition card (into the stand and in connection with a computer through a USB cable).

A software with :

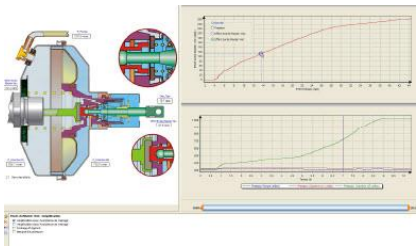


- A part allowing to discover the system (in 2D and in **3D**)
- A part allowing to **animate** on screen 2D drawings of the **mechanism in real time**.
- A part allowing to carry out measures in different working stages.
- A part allowing to « reproduce » those measures animating, for each one, the studied part (master-cylinder, assistance, regulation).

Pedagogic activities :

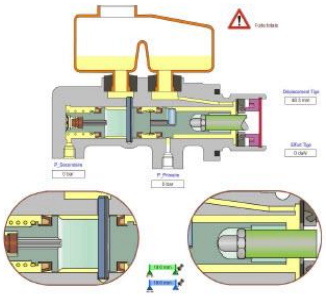
The student is going to acquire the following competences :

- Locate the components in the vehicle
- Locate and identify the different components of a mastervac and a master-cylinder.



FOR THE MASTERVAC :

- D'analyser le fonctionnement d'un mastervac du point de vue qualitatif (amplification, point de saturation, régulation) mais aussi quantitatif (lois d'assistance, efforts et pressions en jeu).
- D'analyser les dysfonctionnements du mastervac (manque d'assistance, défaut interne, clapet HS).



For the MASTER-CYLINDER

- Analyze the internal working stages of the master-cylinder (rise in pressuring according to the brake fixing tests).
- Quantify the races, pressure and efforts concerned.
- Analyze the failures due to a hydraulic leakage (partial or total).
-

Approached subjects

Real components associated to measures and animations of great quality (images quality and technologic rigor) allow a complete exploitation of the model. The students will « see inside » thanks to animations and have a very concrete and rigorous of the working. Thinks to measures, the students will be able to apply analysis and mechanics tools developed and to have a relevant connection with the diagnosis operations.

General characteristics:

Energie :	Dimensions :	Masse :
220 V 50 Hz	L = 650 P = 700 H = 650 (mm)	50 (Kg)

Software and documentation supplied on USB key

French National Education

☐CAP ☒BAC PRO ☒BTS ☒SUP

AUTOMOTIVE

EMERGENCY BRAKING AID

AFU

Réf : ANA-AFU

This pedagogic unit allows a complete study of the AFU system associated with ESP and with the distance regulator.
It is specially appropriated for functional and structural analyze lessons, mechanics, technology and exercises.
It can be used from BAC to BTS (French National Education).

Presentation :

This model is constituted of :

A desk with :

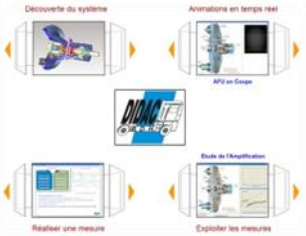
- A mastervac equipped with the AFU function and a vacuum pump (RENAULT, AUDI models…).
- A tandem master-cylinder with the brake pedal.
- Two internal braking receivers.
- A drawing to locate real components on the vehicle.
- Stop lights.
- An electronic card accurately reproducing the piloting of AFU by the ABS/ESP calculator.

.

A measure system (discreet and perfectly intagrated) with :

- Sensors (effort, pressure, race).
- An acquisition card (into the stand in connection with a computer through a USB cable).

A software with :



-

part allows to discover the system (in 2D and in **3D**)

- A part allows to **animate on screen** 2D drawings of the **mechanism in real time**.
- A part allows to carry out measures in different working stages.
- A part allows to « reproduce » those measures animating, for each one, the studied part (assistance, AFU, Booster).

Pedagogic activities :

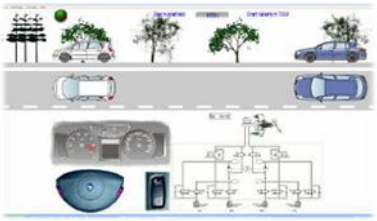
The student is going to acquire the following competences :

- Locate the components on the vehicle.
- Locate and identify the different components of a mastervac and a master-cylinder.
- Analyze the lack of performance of an assistance device without AFU.
- Analyze the working of the AFU system in the different command modes :
    - Normal mode low speed
    - Normal mode middle speed and high speed
    - Emergency braking mode
    - ABS/ESP active regulation mode
    - distance regulator mode
    - analyze the diagnosis stage (reproduction of the CLIP test mode)

The real components associated to measures and animations of great quality (images quality and technologic rigor) allow a complete exploitation of the model.

The students can « see inside» thanks to animations and have a very concrete and rigorous approach of the working.

Study of distance regulator mode
The user programs the regulator on the dashboard (same as on a real vehicle).
He moves the vehicle (follower equipped with AFU).
He observes the system behavior on the animated diagram.



General characteristics :

Energie :	Dimensions :	Weight :
220 V 50 Hz	L = 600 D = 700 H = 600 (mm)	30 (Kg)

Software and documentation supplied on USB key

French National Education

☐CAP ☒BAC PRO ☒BTS ☒SUP

AUTOMOTIVE

HGV BRAKE CONTROL VALVE

Réf : ANA-RF

This teaching kit covers a complete overview of an EBS-type HGV brake control valve (pneumatic brake).
It is particularly well suited to teaching functional and structural analysis, mechanical and technological aspects and to practical exercises.
It is widely used in BAC and BTS courses (French National Education).

Presentation :

This model is constituted of:

A desk with :

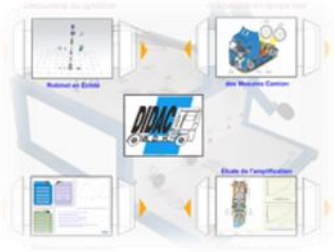
- An HGV type valve with an EBS type brake pedal.
- Two internal brake receivers.
- Screen prints that illustrate the situation on a diagram of real components.
- Brake lights.
- Devices used to adjust the play of the brakes.
- Devices to produce faults (in the pressure source and the brake receivers).

A discreet and totally integrated measurement system comprising:

- Sensors (effort, pressures, travel).
- An acquisition PCB inside the console and connected to a PC by a USB cable.

Teaching software, with:

- A section to discover the system (2D and 3D)
- A section used to animate the 2D images of the mechanism on the screen in real time.
- A section used to take measurements during the various operating phases.
- A replay function of the measurements that animates each of the studied parts (front and rear stages).



Pedagogic activities :

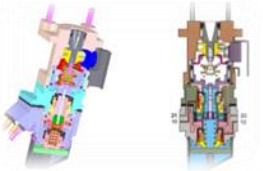
After completing these activities, trainees will be able to:

- Locate the components on the vehicle.
- Locate and identify the various components of a pneumatic brake valve.
- Analyze the workings of the valve and demonstrate the relation between the travel, effort and pressure.
- Analyze the pressure regulation of each valve.
- Analyze the malfunctions (lack of pressure, leaks on one of the stages).

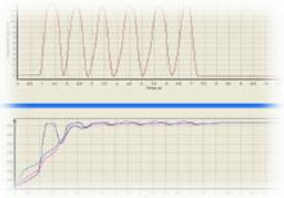
The real components associated with the measurements and high-quality animations (quality of the images and technological quality) allow the console to be used to good effect.

Approached subjects

Analysis of a brake valve using 3D images and real-time 2D animations while actuating the brake pedal



Acquisition and use of the graphs to fine tune the study of the valve by, for example, studying the pressure regulation (increase, stabilization and decrease of the pressure).
Graph of the input/output law of the valve in normal and fault modes



General characteristics :

Energies :	Dimensions :	Weight :
Electrique : 220 V 50 Hz Pneumatique : 7 (Bar)	L = 600 D = 700 H = 600 (mm)	30 (Kg)

Software and documentation supplied on USB key

French National Education

☐CAP ☒BAC PRO ☒BTS ☒SUP

TRUCKS AGRICULTURAL VEHICLES

TIMING BELT

Réf : ANA-CD

The timing belt links the crankshaft to the camshaft through the coolant pump and the injection pump. The path of the belt is determined by the position of the gears and rollers.

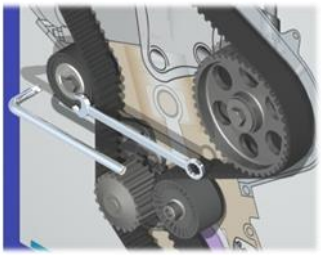
The damage caused to an engine's transmission system by the deterioration of the timing belt can bring the vehicle to a standstill and can even partly destroy the engine, resulting in costly repairs.

It is highly advisable to replace both the timing belts and the belt tighteners and idlers at the same time as a preventive measure according to the manufacturer's recommendations, and to carefully adjust the tightness of the notched belt.

New methods have been developed to improve the precision of the tightness settings that consist essentially in blocking the shafts while the allowing the pulleys to rotate.

Presentation :

The model of the timing belt consists of a console comprising the pulleys, the belt tighteners and idler and the belt, which are all positioned like in a real engine.



The following elements are supplied :

- conventional tools used to adjust the tightness,
- a tool used to measure the tightness when installing,
- a kit of spare rollers for teaching purposes,
- 3D digital models of the transmission parts.

Pedagogic activities :

This tool can be used to teach the functional, structural and mechanical analyses that are part of the new AVA BTS course (French National Education). Student work on a mechanical subassembly on a bench using real tools in a real-life situation.

After completing these activities, student will be able to:

- Identify a power transmission solution:
  - Real components are used

- Identify the parameters that impact operation, life time and maintainability:
  - Study the tightness settings by actually removing and installing the timing belt using modern methods.
  - Comparative study of the method used and the old method that involved blocking the pulleys.

- Anticipate changes, draw up a repair method and produce the materials required in order to understand:
  - While removing/installing the timing belt with a new kit of spare rollers, the technician is unable to tighten the belt tightener.
  - Identification of a solution (replacement of the nuts and bolts, discussion of the set of measurements).
    - Production of the technical documentation (repair method) describing the solution.

This model also caters for the BEP and BAC levels (French National Education). A teaching kit on USB key is supplied with the model.

Approached subjects

CI4: transmission, conversion and use of mechanical energy.

CI6: producing technical documents.

Dimensions :

The model is mounted on anti-skid feet.

Dimensions :	Weight :
L = 450 D = 360 H = 550 (mm)	30 (Kg)

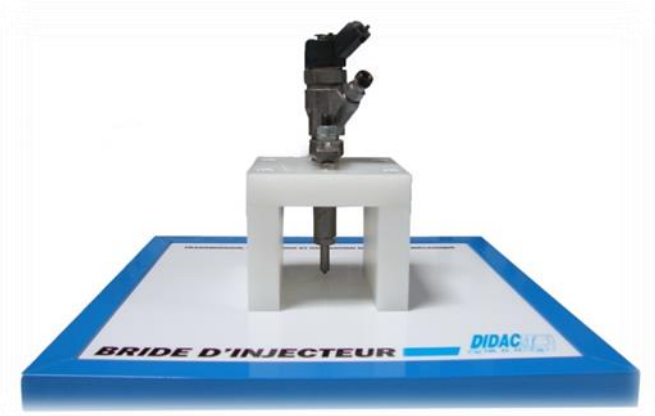
French National Education

☐CAP ☒BAC PRO ☒BTS ☐SUP

AUTOMOTIVE

INJECTOR CLAMP

Réf : ANA-BI

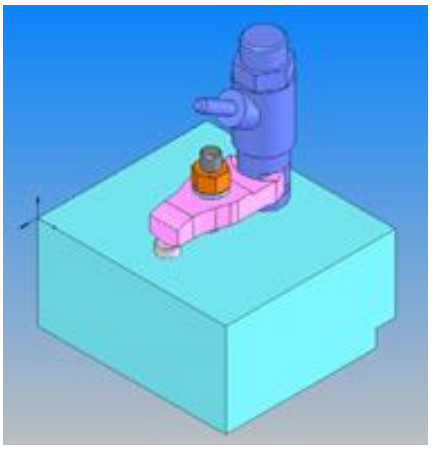


The high-pressure injection systems used on diesel engines have seen the introduction of electrically controlled injectors. Due to the central position of the control coil, the high-pressure coupling is located on the side. This means that the injectors can no longer be screwed into the cylinder head and that each injector is secured by a clamp.
The design of this clamp, which takes account of isostatic factors, is an original means of studying the modeling of mechanical actions and isostatism.

Presentation :

The model of the injector clamp consists of a support representing the cylinder head, on which the various parts are positioned like in a real engine.

A 3D digital model is provided



Pedagogic activities :

This tool can be used to teach the functional, structural and mechanical analyses that are part of the new AVA BTS course (French National Education). Trainees work on an educational mechanical construction made up of real parts in a real-life situation.

After completing these activities, student will be able to:

- Identify a solution to build a complete coupling and its functional conditions:
  - Real components are used

- Model the mechanical actions as part of a static study:
  - Study of the actions that can be transmitted by a coupling.
  - Study the isostatism.
  - Study the association of simple/compound couplings

- Calculate a tightening torque:
  - Static study of loads.
  - Identify a tightening torque using a torque wrench.

This model also caters for the BAC level (French National Education). A teaching kit on USB key is supplied with the model.

Approached subjects

CI4 : transmission, conversion and use of mechanical energy.

General characteristics :

Dimensions :	Weight :
L = 100 D = 100 H = 170 (mm)	2 (Kg)

French National Education

☐CAP ☒BAC PRO ☒BTS ☐SUP

TRUCKS AUTOMOTIVE AGRICULTURAL VEHICLES

CLUTCH

Réf : ANA-EMB

The system of clutch is a device of temporary coupling up allowing to make the change of the reports(connections) of gearbox. Because of his(its) transmission by adhesion, he(it) offers a stake in progressive load(responsibility) of the coupling up, what avoids jolts.

We saw 3 functioning position :

- The put into gear position: the clutch transmits entierly the supplied power, the car runs because the engine connected to the gearbox

- Declutch position: The transmission is interrupted; free wheels or car stop, the engine can continue to turn without drive the wheels. This situation is identical to be in neutral.

- transitional phase sliding : Particularly to pass of the position disconnected towards the put into gear position. The driving steering wheel and the primary shaft drive do not turn in the same speed; there is then sliding between disks, thus waste of energy, in the warm form. This phase allows to synchronize the engine and the gearbox that is to bring them to the same rotation speed. The clutch wear takes place during this phase.

Presentation :

The model of clutch is presented in a frame including the clutch and its mechanism associated with a primary shaft drive blocked in rotation to be able to measure the couple which is passed on transmitted it, the pedal and its cable with system of catching up play and a desk with two display to read in real time the transmitted couple and the effort pressure (instrumented by integrated sensors).
All these elements are positioned such as in the reality.

The simulator is supplied with 3D digital models (under SolidWorks) with the clutch and with the plan of catching up play.

Pedagogic activities :

This tool can be used to teach the functional, structural and mechanical analyses (AFSM) that are part of the new AVA BTS course and BAC PRO (French National Education). Student work on a mechanical subassembly on a bench using real tools in a real-life situation.

After completing these activities, student will be able to :

- Identify a solution of clutch (specificities, characteristics, of disk and the mechanism composition):
  - Component are real (An ''exploded view'' disk is supplied as a supplement to the model insuring a detail structural study.

- Analyze and justify the employment of all the essential parts of the mechanism of clutch by the calculation or the real measures (packing, diaphragm, disk of progressiveness, competences of amortization, and disks of friction).

- Identify the influential parameters on the functioning, understand the influence of the disk clutch wear on the transmitted and highlight the interest of a diaphragm to insure the effort to pressure.

- Highlight the necessity of the catching up of the play, understand the principle of functioning of the automatic system and understand a method of intervention

This model also caters for the BAC level (French National Education). A teaching kit on USB key is supplied with the model.

Approached subjects

CI4 : transmission, conversion and use of mechanical energy.

General characteristics :

The model is mounted on anti-skid feet.

Energie :	Dimensions :	Weight :
220 V 50 Hz	L = 850 D = 750 H = 700 (mm)	90 (Kg)

French National Education

☐CAP ☒BAC PRO ☒BTS ☐SUP

TRUCKS AUTOMOTIVE AGRICULTURAL VEHICLES

ONTROL MODULE OF THE PA6 SEMIAUTOMATIC GEARBOX

Réf : ANA-BVR.PA6

Since the advent of multiplexing, and communications between the gearbox and engine control systems, semiautomatic gearboxes have been developed for LCVs. The benefits in terms of consumption and a comfortable drive are obvious. Many manufacturers have installed these systems in their vehicles, which are widely used by professionals.
This simulator is based on the latest transmission system developed by RENAULT.
A semiautomatic gearbox is a manual gearbox fitted with a system that automates gear shifts.
This add-on is made up of two electro-hydraulic actuators that shift the gears, one master-slave actuator that operates the clutch and a hydraulic generator that supplies the energy required by the actuators.

This teaching tool faithfully reproduces the workings of a Master fitted with a PA0 gearbox with six forward speeds using a sophisticated simulation that is totally transparent for the user. The connections between the ECUs are reproduced to recreate the usual environment of a gearbox ECU.

Presentation :

• The gearbox and engine ECU

• The diagnostic connector.

• The shift rails and selector forks

• The dashboard with the controls and indicators associated with the semiautomatic gearbox.

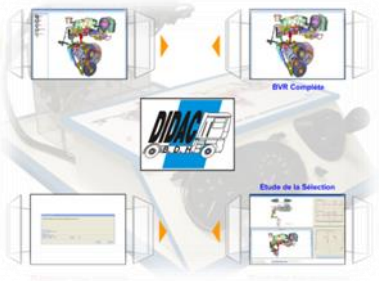
• The clutch

• The print of the gearbox with the pawls and synchromesh.

Pedagogic activities :

After completing these activities, student will be able to:

- Locate the gearbox on the vehicle.
- Locate and identify the various components of the system.
- Identify the components of the gearbox and clutch control system (actuators, sensors, selection and engagement systems).
- Analyze the gear shifts (control cycles of the actuators, synchronization phase)
- Analyze the gear shift modes (the gear shift laws in the different modes, various safety mechanisms)
- Analyze the electric signals exchanged between the different components (analog signals of the actuators and sensors and multiplexed signals).
- Perform fault-finding and diagnostic operations using conventional tools and the manufacturer's tools.



The quantity of real original components and the advanced simulation allow trainees to make work on concrete cases under conditions close to real life in complete safety.
This model caters for the BAC PRO and BTS levels (French National Education). A comprehensive teaching kit on CD-ROM is supplied with the model.
EXCLUSIVE: Each model is associated with PC software used to control the images from the simulator that gives details of all the operational phases, with a detailed analysis of each component. Consequently, this tool is ideally suited to the teaching of systems analyses.

Approached subjects

- Notions of onboard electronic systems.
- Sensors, pre-actuators and actuators.
- Study of double effect actuators and the specifics of midpoint actuators.
- Gear controls, locking, mechanical and electronic synchromesh.
- Study and calculation of gear ratios (reasons for conventional and epicycloidal trains).
- Notions of ECU and sensor settings.
- Diagnostics with smart (RT DIAG) and conventional tools (V.I.).
- Measurement acquisition with conventional acquisition systems.

General characteristics :

Energie :	Dimensions :	Wieght :
220 V 50 Hz	L = 1400 D = 700 H = 1000 (mm)	80 (Kg)

French National Education

☐CAP ☒BAC PRO ☒BTS ☒SUP

TRUCKS AUTOMOTIVE AGRICULTURAL VEHICLES

ELECTRONIC BRAKING SYSTEM

Réf : SYS-EBS

The electronic braking system EBS is a new system already in use at many truck manufacturers (RENAULT TRUCK, SCANIA, MERCEDES, VOLVO).This system includes the ABS and ASR features? AND OPTIMISE THE BRALING EFFICIENCY
This is a little technologic revolution !

Presentation :

The electronic braking system simulator is displayed on a desk with :

• All conventional pneumatic components.

• The electronic components pertaining to the EBS

• A set of wheels driven in rotation at variable speed

• A setting board of the working parameters.

• An acquisition board with the different values (wheel speed, electrovalve voltage, brake valve voltage)

• A system of variable loading on the rear axle

• An outlet allowing the connexion to DIAGNOSTICA

Pedagogic activities :

After completing these activities, student will be able to:

- Identify all the system components
  - The components are guenine.
  - The components are fixed on the board with their electric and pneumatic connexions.

- Analyse the system running :
  - Study the different working stages (EBS mode and safety mode).
  - Pressure reading in different locations on the circuit thanks to specific connexion.
  - Thanks to the spinning wheels, the student visualizes the ABS and ASR regulation stages.
- Carry out diagnosis operations :
  - The control unit box is real and is connectable to the RENAULT diagnosis tool DIAGNOSTICA (new name for DIALOG) in order to control completely and rationally the system.
  - The system being as on the vehicle, it is possible to place in a prominent position the mechanic and pneumatic failures effects (leaks and squeezing, …).

The students are facing a didactic system made of real components in their normal working environment. The wheels are spun and braked by the system which gives to the simulator an obvious pedagogic interest.
This model complies with the requirements from BEP to BTS levels (French national education).
Pedagogic and technical documentation is supplied with the simulator on USB key.

Approached subjects

- Air-brake system and pertaining regulations study
- Air-brake components working study and analysis
- Sensor, pre-actuators, actuators
- EBS-ABS-ASR characteristics study with dynamic visualisation
- Diagnosis with intelligent and conventional control systems (failures boxes)
- Measures acquisition (electric or pneumatic values from each component feature)

General characteristics :

Energies :	Dimensions :	Weight :
Electrique 220 V 50 Hz Pneumatique 8(Bar)	L = 1650 D = 700 H = 1900 (mm)	250 (Kg)

Options :

- Slip cover
- Data acquisition USB and exploitation Car&Box
- Pneumatic suitcase

French National Education

☐CAP ☒BAC PRO ☒BTS ☒SUP

TRUCKS AGRICULTURAL VEHICLES

PNEUMATIC BRAKING SYSTEM

Réf : SYS-FPTR

Presentation :

The pneumatic braking system is constituted of 2 under bodies (truck and trailer) with the different components of the braking system (RENAULT PREMIUM Type).

It includes :

- The air dryer
- The protection valve
- The air tank (3 on the truck, 1 on the trailer)
- The pressure reduction valve for trailer
- The duplex service brake control valve
- The quick release valve
- The load sensing valve (1 on truck, 1 on trailer)
- The double relay governor valve
- The trailer control valve
- The single diaphragm chamber (front truck and trailer)
- The double spring diaphragm chamber (rear truck)
- The automatic coupling on trailer and connexion truck-trailer
- The air pressure reading in different locations on the circuit thanks to specific connexion
- The connections and pipes with quick and safe connexions

All those components are fixed on the board on which the truck and trailer top view is drawn to locate them easily.

Pedagogic activities :




After completing these activities, student will be able to:

- Identify the different components as well as different inlets and outlets (supply, control, inlet and outlet pressure).
- Know each component location and purpose (located on a vehicle view).
- Build the piping according to the manufacturer drawings.
- Carry out pressure measures to allow :
  - Validation of the component working in its pneumatic environment.
  - Control the compliance with manufacturer data.

This model complies with the requirements from CAP to BAC PRO levels (French national Education).

A technical and pedagogic documentation is supplied on USB key.

Approached subjects

- Pneumatic energy storage
- Pneumatic circuits safety and protection
- Pneumatic circuits modulation (brake valve, load sensing valve and trailer control valve)
- A pneumatic circuit checking with pressure gauges

General characteristics :

The 2 parts of the simulator are independent (truck and trailer) and delivered on castors

Energie (bar):	Dimensions (mm) :	Weight (Kg) :
Pneumatic 7	Truck : L = 1400 D = 700 H = 1700	160
	Trailer : L = 700 D = 700 H = 1700	95

Component of pipe connection : 30 of 0.5 m and 5 of 0.75 m
(2 more pipe, and 2 with presure grip)

Option :

- Slip cover
- Pneumatic suitcase

French National Education

☒CAP ☒BAC PRO ☒BTS ☒SUP

TRUCK AGRICULTURAL VEHICLES

ELECTRONIC SUSPENSION

Réf : SYS-SUSP

Presentation :

The electronic suspension simulator is constituted of a truck under body (miniature) equipped of the rear suspension system with raising axle (6X2). This frame is laying on the lower part.

The truck under body is constituted of :

- The 4 suspension units (cushion suspension and bracket) of the raising axle
- The electro-valves set with electric and pneumatic connexions
- The axe level sensors
- The cushion suspension pressure sensor
- The dash board with controls and suspension state display
- The suspension remote control
- The diagnosis outlet

The lower part includes :

- An air tank
- A load simulation system
- A suspension parameters acquisition board
- A setting board (load, vehicle speed)
- Electrical supply
- Castors to ease the simulator manoeuvres

All those items give a real 6X2 truck reduced scale model with raising axle. The system works with guenine components as on the real truck.

The suspension system components and the ones used for the simulation are dissociated in order not to confuse students.

All working phases can be simulated and studied very easily and safely.

Pedagogic activities :

After completing these activities, student will be able to:

- Identify the different components as well as different inlets and outlets (supply, control, inlet and outlet pressure, electric supply, inductive sensors, piezzo-electric sensor).
- Know each component location and purpose.
- Analyse the system working :
  - By simulation of different loads on the axle and observation the system reactions in regards to :
    - Under body height changes
    - The suspension air pressure
    - The electro valves controls
    - The signal sent by the air pressure sensors
    - The control of the remote control

  To carry out failure search operations

This model also caters for CAP to BTS level (French National Education). A teaching kit on USB key is supplied with the model.

Approached subjects

- On board electronic systems smatterings
- Sensors, pre-actuators, actuators
- Systems analysis, study of pneumatic circuits
- Bondage and regulation
- Pressure, effort and flexibility smattering
- Smattering of settings, calibration of the controller and the sensors
- Diagnosis with intelligent and conventional control systems (failure boxes)
- Measures acquisition with traditional acquisition systems

General characteristics :

Energies :	Dimensions :	Weight :
Electric : 220 V 50 Hz Pneumatic : 5 Bar	L= 1400 D= 700 H= 1200 (mm)	160 (Kg)

Options :

- Slip cover
- Data acquisition USB and exploitation Car&Box
- Pneumatic suitcase

French National Education

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TRUCK ARICULTURAL VEHICLES

HYDRAULIC RETARDER

Réf : SYS-RH

The hydraulic retarder is a braking system located on the propeler shaft (gear boxes output). The vehicle kinetic energy is converted in hydraulic then calorific energy into a temperature exchanger. Many technical and economic advantages done of this type of retarder are a device very used by Trucks manufacturers.

Presentation :

This model is constitued of wheeled base on a desk.

The desk have :

- The calculator and its connection
- The sensors (control, temperature) with their connectic
- A Renault connection to connect the computer « DIAGNOSTICA »
- Four potentiometers with a switch simulating
  - The water temperature
  - The engine speed
  - The slope percentage of the vehicle running
  - The speed vehicle
- Indicators allow to see
  - The engine water temperature
  - The speed vehicle
  - The slowing down power percentage developed by the device
- On lateral side a window with disworking simulation (locked)
- A simulation device allowing to get a dynamic behaviour of the vehicle, coherent with different parameters

Pedagogic activities :

After completing these activities, student will be able to:

- **Know and locate all components on the system**

The simulator can view component and identify in situated on front view panel.
The system is located by the power train and by the complete vehicle (dashboard and gearbox).

- **Analyse the working system :**

The simulator can reproduce the true situation of ill down on the vehicle more or less important, and actuate the retarder in order to watch the deceleration and the system behaviour.
The integrated acquisition board allow to realize parameters acquisitions with computer tools when the training level requires it

- **Realize diagnosis process :**

The teacher can realize failures with the special box located on the side of the simulator. These failures can be resolved by the students

- With the computer tool Renault "DIAGNOSTICA"
- Or by means of the blink code
- Or by traditional tool "electric multimeter"

The student is in front of a didactic system with a working as nearest as the reality. This simulator is intended to several level from BAC PRO to BTS level (French national education) A documentation on USB key is supplied with the simulator.

Approached subjects

- Dynamic of the vehicle in slowing down phasis
- Smattering on take on board of electronic systems
- Sensors, preactuators, actuators
- Control in cyclic variable rapport
- Hydraulic circuits study (schematization, mechanic of fluid)
- Diagnosis with intelligent and conventional system (DIAGNOSTICA)
- Acquisition of measures (with traditional device or box failure)

General characteristics :

Energie :	Dimensions :	Weight :
220 V 50 Hz	L= 1100 D= 700 H= 1600 (mm)	65 (Kg)

Options :

- Slip cover
- Data acquisition USB and exploitation Car&Box

French National Education

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TRUCK

ELECTRIC FUNCTIONS V.I.

Réf : SYS-FE

Presentation :

This model is displayed on a stand :

- On one face is drawn the top view of an industrial vehicle which allows to study the electric functions of the « under body ».
- On the other is drawn the view of a driver's cab which allows to study the electric functions of the « driver's cab».

Students can work in two independent groups at the same time.

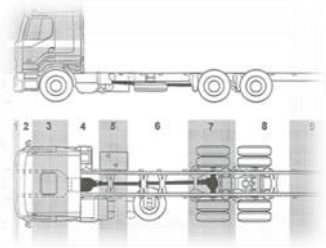
Some additional elements with real electric components can be fixed on each face. On each element is drawn the electric circuit and female plugs are implanted

An arrangement part with locks is integrated in the model (for each face), and allows an easier and more secure storage of all the components and wires delivered with the model.

The simulator is delivered on castors and can be used in a workshop, a laboratory or a classroom

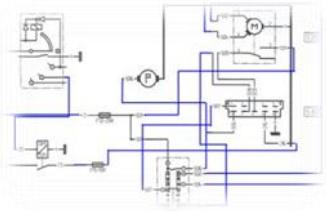
An electric supply (24 volts) is delivered with the model

Pedagogic activities :



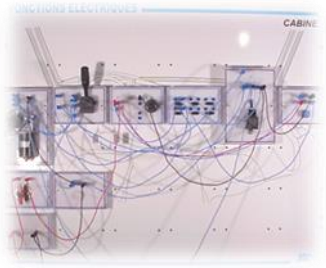
ELECTRIC FUNCTIONS OF THE « UNDER BODY » :

- Main lighting : side-lights, dipped headlights, main-beam headlamps
- Additional lighting : fog lights and long range lights
- Stop lights and reversing lights
- Flashing lights and warning lights.



ELECTRIC FUNCTIONS OF THE « DRIVER'S CAB »:

- Command of the starting circuit and engine stoppage
- Anti-starting and centralized closing
- Essuie-pane and lava-pane
- Window-raiser.



The student is going to acquire the following competences :

- Identify an electric component and its connections.
- Locate its position in the vehicle from the manufacturer drawings.
- Connect the components according to the manufacturer drawings.
- Analyse the system working.
- Carry out electric measures and valid the component working.
- Carry out failure search operations.

This model allows to make two groups of students work, on each face in a autonomous and effective way.

The student is in front of a didactic system with a working as nearest as the reality This simulator is intended to several level from CAP to BTS level (French national education) A documentation on USB key is supplied with the simulator.

General characteristics

Energie :	Dimensions :	Weight :
220 V 50 Hz	L= 1400 D= 700 H= 1700 (mm)	250 (Kg)

Options :

Slip cover
Data acquisition USB and exploitation Car&Box

French National Education

☒CAP ☒BAC PRO ☒BTS ☐SUP

TRUCK AGRICUMTURAL VEHICLES

DXI ENGINE BENCH

Réf : SYS-MSB.DXI5

The proposed engine bench is a new technology which allows the manufacturer to comply with the EURO 4 and EURO 5 norms. It is equipped with an injection system (*common rail type*) and with an urea injection system with a catalyst. This modern unit allows to study, in addition to the injection system, a very large range of motorization aspects (load circuit, starting circuit, oversupply, cooling, lubrication, fixing…)
The model respects perfectly the vehicle's structure.

<u>Presentation :</u>

This bench is constitued :

<u>The engine :</u>

- DXI 5 type 4 cylinders 4.7 L cubic capacity 220 HP (158 KW).
- Oversupply by turbo compressor with a spill valve.
- Driving brake on exhaust.
- Cooling circuit with radiator and surge tank.
- Starter controlled by the engine management calculator.
- Engine management calculator EMS2.
- Fuel tank and urea tank.
- Urea management calculator ADS.
- Catalyst with urea injector, temperature probe and Nox sensor.

<u>A board with calculators necessary for the good working of the CAN network :</u>

- Screen IC05.
- Accelerator pedal.
- Vehicle management calculator VECU.
- Car radio satellite.
- Relay fuse case EJB.
- Diagnosis plug

Safety components :

- A vat for the liquids retention.
- A battery cut system, an emergency stop system, and a starting contactor.
- Protections for the revolving parts, warm parts and batteries (revolving parts directive).

A lot of measures (captors) allowing further pedagogic operations, integrated in :

- Starting circuit
- Cooling circuit
- Fuel circuit

Pedagogic activities :

After completing these activities, student will be able to:

- - Identify the different components of a thermic engine.

- Describe and analyze the engine behaviour (distribution)
- Realize adjustment and fixing operations.
- Identify, describe and analyze the air circuit (oversupply)
- Identify, describe and analyze the exhaust circuit (oversupply and brake)
- Identify, describe and analyze the injection system behaviour and the pollution reduction system.
- Identify, describe and analyze the working of the load circuit, starting circuit, cooling circuit, lubrication.
- Identify and analyze the engine electronic architecture and the exchanges between different calculators.
- Use the diagnosis tools : screen and diagnosis tools (Diag NG3)
- Read and apply the electric diagrams.
- Carry out measures on different sensors and actuators and analyze their principle of operation and their piloting mode.
- Diagnose the different engine systems and specially the injection system.

Approached subjects

A complete documentation is delivered with the engine bench giving the trainers the tools to implement quickly the different provided exercises. Its pedagogic exploitation is very broad. This engine bench complies with the requirements from CAP to BTS (French National Education). The proposed model allows incomparable accessibility and visibility.

General characteristics

Dimensions :	Weight :
L = 1500 D = 1100 H = 1500 (mm)	900 (Kg)

Software and documentation supplied on USB key

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TRUCK AGRICULTURAL VEHICLES

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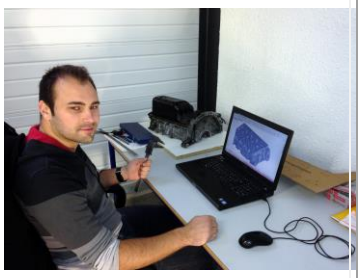

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