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## **1. Remerciements / Thanks**

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## 2. Cab presentation





### 3. Operating modes

The VB2N cab works with BB17000 and BB25500 engines and most key commands are identical.

4 operating modes are available:

- Simple
- Intermediate
- Expert without VA (Expert mode without activating VA ("**Veille Automatique à contrôle de maintien d'appui**" = *Driver's Safety Device* or "*Dead Man's Switch*" i.e. a safety device to ensure that the train automatically stops if the driver doesn't acknowledge a signal to check the driver's state of awareness.)
- Expert with VA

	Simple mode	Intermediate mode	Expert mode
Automatic engine startup after pantograph rise	Yes	Yes	No
Separate power / brake	No	Yes	Yes
Regulator	Yes	Yes	No
Notches management	No	Yes	Yes
Automatic notches and shunts management		Yes, always	Yes, always
VA	No	No	Option
AWS	No	Automatic	Yes
Doors closing with buzzer	No	Yes	Yes

For a direct access:

Pantographs operating in intermediate or expert mode: paragraph 7

Simple mode operation: paragraph 9

Intermediate mode operation: paragraph 11

Expert mode operation: paragraph 10



## 4. Operating principles

### 4.1. Expert mode

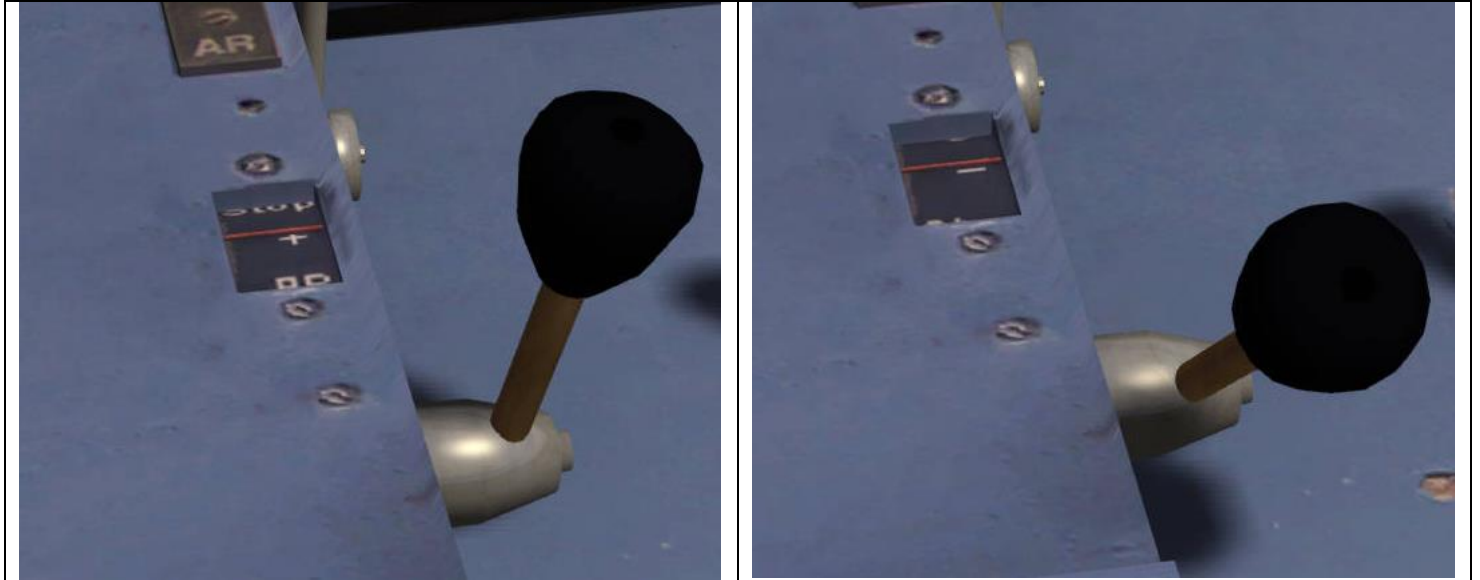
#### 4.1.1. Notches and shunts

To increase traction power, you have to move **notches** and **make shunts** to reach the maximum speed. Notches and shunts modifications change the engines current intensity and voltage.

Key **e** allows moving the traction command towards the windshield and key **r** allows moving the traction command **to towards oneself**.

Form the lower position and pushing the lever, we successively move to positions: 0, -, +, Stop, PR.

To increase by one notch, you must move the traction command to + and to decrease by one notch, you must move the traction command to -.



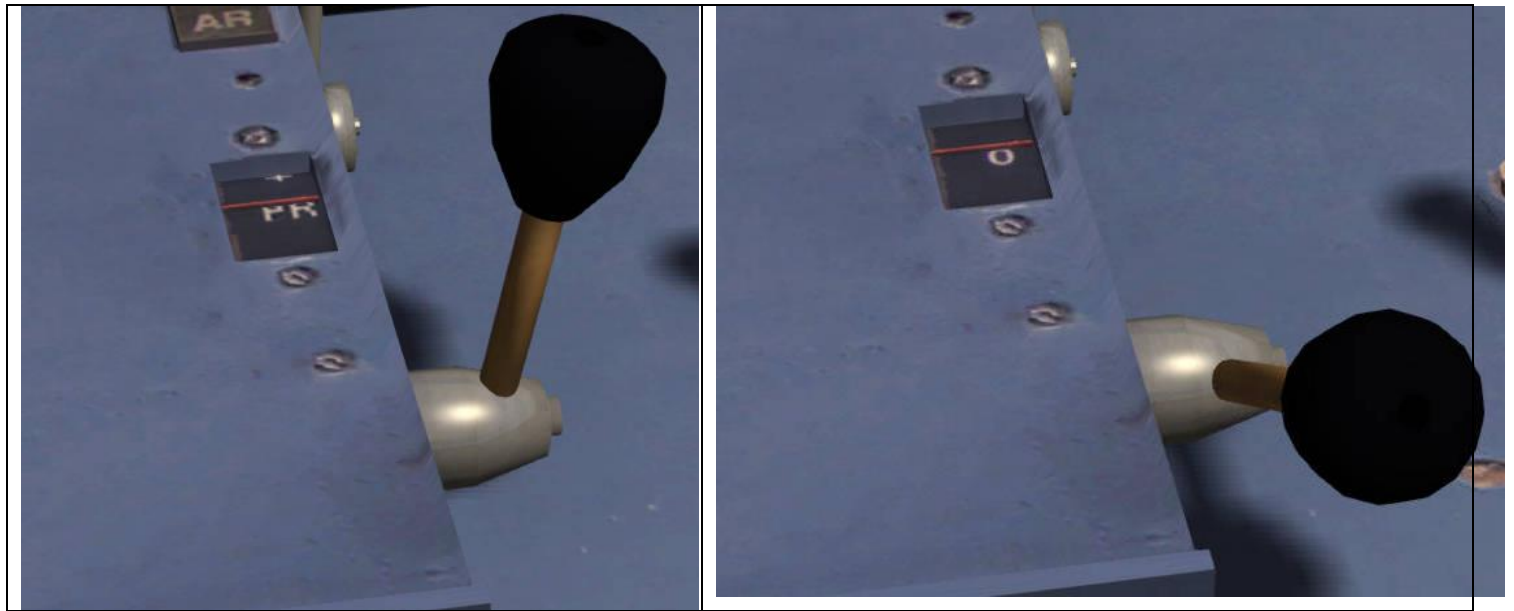
+/-Stop and +/-Stop movements make the notches go up or down one by one.

If the traction command is left on + or on -, once a notch has been increased or decreased, nothing happens.



Therefore, to increase by 2 notches in a row, you must type e (from stop to +), r (to go back to Stop) and then e again (from Stop to +).

**Positions PR and 0 explained below allow automatically increasing or decreasing notches and shunts.**



#### 4.1.2. Automatic notch increase or decrease

Once in PR position, notches are increased automatically.

When moving the traction command on 0, notches are decreased automatically.

**To stop the notch increase or decrease in automatic mode (PR or 0)**, you just need to leave the current position setting the needle on +, - or Stop.

#### 4.2. Intermediate mode operation

In intermediate mode, 3 traction command positions are enabled: 0, Stop and PR (see 4.1.2).





When moving to the Stop position, notch increase or decrease is stopped.

Raising the pantograph automatically enables the circuit breaker thus starting the engine.  
After emergency brake, you must start the engine with the circuit breakers command.






Otherwise the behaviour is the same as expert mode without VA.





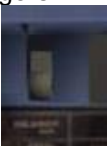
## 5. Keyboard commands list

It is assumed that the qwerty model is used.

Command	SIMPLE mode	Intermediate mode	Expert mode
Expert mode			<p>u key (if not pressed at scenario start before the first pantograph raise, the mode is intermediate).</p> <p>The “Autre cabine utilisée” light is temporarily switched on to acknowledge the request.</p> 
Pantograph	p key or shift p	<p>p key or shift p or mouse selection of lever (see § 7)</p> 	<p>p key or shift p or mouse selection of lever (see § 7)</p> 
Circuit breakers (Disjoncteurs)	Automatic after pantograph is raised or manual, after emergency brake, with key n alone.	Automatic after pantograph is raised or manual, after emergency brake, with key n alone.	<p>n key then m key</p> 
Throttle	a key and d key	a key and d key (can be used in replacement or in parallel with notch increase or decrease)	a key and d key ( <u>should not be used</u> as it is not synchronized with notches increase or decrease and with meters update)
Inverter	s key	w key and s key	w key and s key
Move traction command towards the windshield		e key	e key
Move traction command towards oneself		r key	r key
Train brake (release / increase)	See Throttle	; key and ' key	; key and ' key
		The longer the key is pressed, the faster the brake is released or increased.	The longer the key is pressed, the faster the brake is released or increased.
		Brake increase by 2%: shift ' key	Brake increase by 2%: shift ' key
		Brake release by 2%: shift ; key	Brake release by 2%: shift ; key



Command	SIMPLE mode	Intermediate mode	Expert mode
Train brake : increase, using the mouse 	Select the brake lever	Select the brake lever	Select the brake lever
Train brake (release / increase)	Using the regulator	; key and ' key  The longer the key is pressed, the faster the brake is released or increased.	; key and ' key  The longer the key is pressed, the faster the brake is released or increased.
Emergency brake	backspace key or mouse selection of button 	backspace key or mouse selection of button 	backspace key or mouse selection of button 
Signal warning sound acknowledgement (AWS)		Automatic	q key
Loading / unloading passengers	t key  It's the game that will decide when to apply the request to close the doors.	t key  It's the game that will decide when to apply the request to close the doors.  If the buzzer is enabled, it is turned off when the doors close.	t key  It's the game that will decide when to apply the request to close the doors.  If the buzzer is enabled, it is turned off when the doors close.
Doors closing button   (Switch on the left of the TV screens)		I key to go from the neutral position to the buzzer ("ronfleur") position and then to the doors closing position or position selection with the mouse.  In the buzzer in position, the buzzer sound is enabled until the button position is not changed.  Warning: closing the doors with this button might be considered premature in a scenario where the loading / unloading of passengers is taken into account.  Shift I keys to go one notch back.	I key to go from the neutral position to the buzzer ("ronfleur") position and then to the doors closing position or position selection with the mouse.  In the buzzer in position, the buzzer sound is enabled until the button position is not changed.  Warning: closing the doors with this button might be considered premature in a scenario where the loading / unloading of passengers is taken into account.  Shift I keys to go one notch back.

Command	SIMPLE mode	Intermediate mode	Expert mode
Horn 	enter key (quick push: one tone. Long push: 2 tones) or mouse selection at the base of the lever.	enter key (quick push: one tone. Long push: 2 tones) or mouse selection at the base of the lever.	enter key (quick push: one tone. Long push: 2 tones) or mouse selection at the base of the lever.
Headlights 	h key and shift+h keys or mouse selection	h key and shift+h keys or mouse selection	h key and shift+h keys or mouse selection
Cab light 	l key and shift+l keys or mouse selection	Touche « l » et « maj+l » or mouse selection	l key and shift+l keys or mouse selection
Wipers (only those seen from inside are animated) 	v key or mouse selection	v key or mouse selection	v key or mouse selection
Cab change	Ctrl = To move to the different cabs of the consist.	Ctrl = To move to the different cabs of the consist.	Ctrl = To move to the different cabs of the consist.
Passengers  lighting	o key or mouse selection	o key or mouse selection	o key or mouse selection

Optional in expert mode (see paragraph 6):

COMMAND	Expert mode
Press the VA command	Space key
VA test and activation or end of VA test	k key
Disable VA	Shift + k key

## **6. Operating VA (Expert mode)**

The VA control is enabled above 10 Km/h.

The driver must regularly press the VA command using a foot pedal or by pressing on the right side of the console. This action is simulated by the space key.

An emergency stop is triggered in 2 cases:

- Command released for more than 5 seconds, with warning sound after 2.5 seconds (horn sound).
- Command pressed for more than 60 seconds, with warning sound after 55 seconds (ring!).





So you need to press the command for less than 60 seconds then release it for less than 5 seconds and start a new cycle if you don't want to hear a warning sound. According to the sound heard, you must release the command (ring! heard) or press the command (horn sound heard) before the emergency brake is triggered.

The VA test function allows to check that the VA system works properly and, for the game, to activate it. It works as the train is stopped and triggers an actual emergency stop. Once the VA test function is enabled, let the test go to emergency brake trigger before starting the train. As soon as the emergency stop is triggered, the test automatically stops.

VA can be disabled anytime.

## 7. Operating the pantographs (Expert and intermediate modes)

The pantographs are in 4 possible states:

Pantographs state		Lever position
0	All pantographs are lowered	
N	Normal Raise pantograph above the opposite cab.	
N+S	Normal + Secours Raise all pantographs	
S	Secours ( <i>backup</i> ) Raise pantograph above the driver cab	

To go in direction 0 -> N -> N + S -> S, use the p key or rotate the lever with the mouse.  
To go in the opposite direction, use keys "Shift p" or rotate the lever with the mouse.

Within about 2 seconds the lever or several press of key p / shift p can be done to select the desired position.

Once pantographs are on their way up or down, the lever and the action of the p key are locked. Once the pantographs are in stable position (low or high), action on the pantographs is possible again.

## 8. Cab signaling operation (AWS in intermediate mode and in expert mode)

It's the game AWS system, enabled in intermediate and expert mode.

When an AWS inductor in the middle of the track ("crocodile") is reached, the locomotive enables the warning signal. If the signal is in "waiting" or "closed" status, AWS will sound a beep followed by the flashing of the LSSF lamp ("Lampe de Signalisation Signal Fermé" = Closed signal signaling lamp).

The signal must quickly be acknowledged by pushing button BP(AC)SF ("Bouton-Poussoir Acquittement Signal Fermé" = Closed signal acknowledgment push button) which triggers LSSF to stay on without flashing.



In expert mode, the driver acknowledges pushing key "q". In intermediate mode, the acknowledgment is done automatically.

The LSSF lamp is then switched off when crossing the next open signal.

The lack of acknowledgment within 5 seconds after the beep triggers an emergency stop.

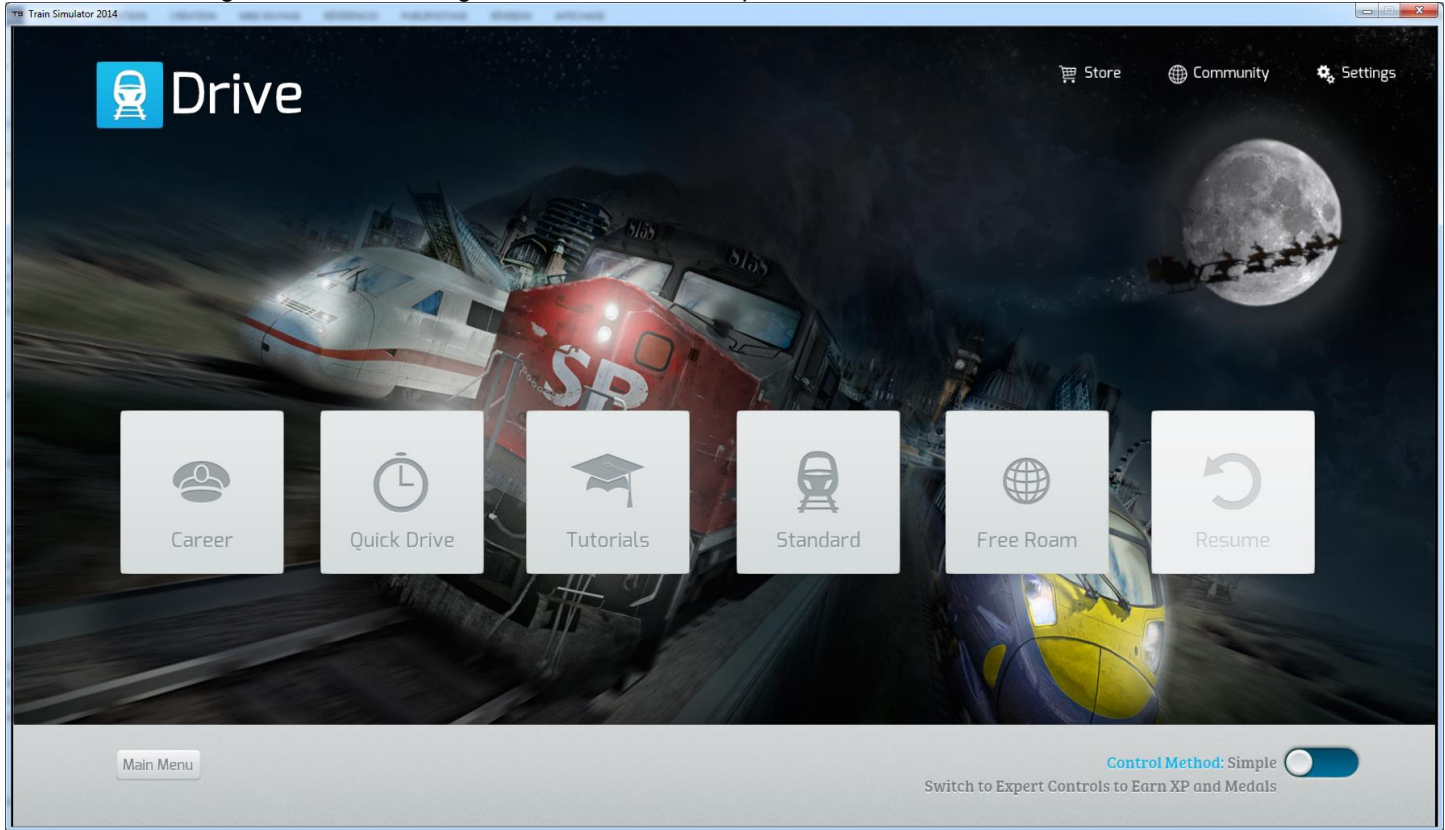
If an emergency stop occurs, you must push key "q" to be able to release the brakes before starting up again.



## 9. Simple mode operation


### 9.1. Configuration

This mode is configured when selecting "Control Method": Simple in the Drive:



### 9.2. Engine startup

One mandatory action, raising on of the pantographs: "p" key to raise / lower the pantograph above the opposite cab or "shift p" to raise / lower the pantograph above the occupied cab (At a given time, only one pantograph is raised or

lowered). A click on  from the driver interface displayed with F4 doesn't raise the pantograph. Once one pantograph is raised, the circuit breaker is enabled and the engine starts.

### 9.3. Driving

Key a increases the engine power and simultaneously releases the brakes.

Key d lowers the engine power and simultaneously increases the brakes.

Key s allows to change the direction of movement.

Key n to restart the engine after an emergency stop.

You can also use the mouse on the matching commands from the driver interface displayed with F4 :


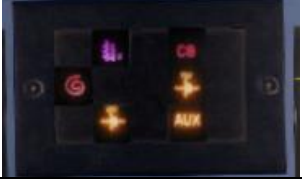



### 9.4. Engine stop procedures

Stop using normal brakes or emergency stop (backspace key).

## 10. Expert mode operation

### 10.1. Engine startup

	Command	Remark
Expert mode setting	u key	The “Autre cabine utilisée” light is temporarily switched on to acknowledge the request. Once the u key is pressed, expert mode is set until the exit from the scenario.
Pantograph	p key	See paragraph 7
Enable circuit breaker (“Disjoncteur”)	n key	Wait for the pantograph to be fully raised.  For safety reasons, the startup is implemented with 2 switches : this one stays upwards ...
Engage circuit breaker (“Enclenchement disjoncteur”)	m key	... and this one is reset to its original position. The enable circuit breaker can be switched on before the pantograph is in high position but the circuit breaker won't be engaged before the pantograph reaches its high position. 
VA test	k key	Not mandatory. It's possible to drive in a simpler mode without VA.  When activated see paragraph 6 for required actions. The command must be regularly pressed when the engine starts moving (space key).
Enable circuit breaker (“Disjoncteur”)	n key	To do again after emergency stop triggered by the VA test.
Engage circuit breaker (“Enclenchement disjoncteur”)	m key	
Inverter to forward	w key	Note that there is only one position forward and one backward (no intermediate positions). It's the notches and shunts changes which modify the power.
Release brake	; key	Hold the key down until pressure on CF meter is 0.  The longer the key is pressed, the faster the brake is released.

You can also use the mouse for the available commands from the driver interface displayed with F4, except the red



lever

## 10.2. Driving

The following table doesn't remind the actions to be done after VA activation.

	Command	Remark
Increasing or decreasing notches and shunts controls the engines.		
Upper notch	e key to go from Stop to +	To go back to Stop, and each time the traction command needs to be moved towards oneself, press key r. You must press keys e and r for each notch increase.
Fast automatic notch increase (PR = progression rapide)	e key to go from + to PR	
End of fast automatic notch increase (PR = progression rapide)	Exit from PR mode with r key to go at least from PR to +.	
Lower notch	r key to go from Stop to -	To go back on Stop, and each time the traction command needs to be moved towards the windshield, press key e. You must press keys r and e for each notch decrease.
Automatic notch decrease	r key until position 0 reached.	
End of automatic notch decrease	Exit from position 0 with key r to reach at least - .	
Train brake		
Brake increase	' key	The increase depends on how long the key is pressed. The longer the key is pressed, the faster the brake is increased..
Brake release	; key	The decrease depends on how long the key is pressed. The longer the key is pressed, the faster the brake is released.
Inverter		
Forward	w key	
Backward	s key	

## 10.3. Engine stop

	Command	Remark
Full brake	' key	Until meter CF shows around 3.5.
Inverter to neutral	s key	
Switch off circuits	n key	
Lower pantograph	Shift p keys or mouse selection of pantograph.	

## 11. Intermediate mode operation

### 11.1. Engine startup

	Command	Remark
Pantograph	p key	See paragraph 7. The engine is automatically started.
Inverter to forward	w key	Note that there is only one position forward and one backward (no intermediate positions). It's the notches and shunts changes which modify the power.
Release brake	; key	Hold the key down until pressure on CF meter is 0. The longer the key is pressed, the faster the brake is released.

You can also use the mouse for the available commands from the driver interface displayed with F4, except the red



lever

### 11.2. Driving

	Command	Remark
Increasing or decreasing notches and shunts controls the engines. The regulator can also be used.		
Increase power with regulator	a key	Possible but normally you should use the notch increase.
Decrease power with regulator	d key	Possible but normally you should use the notch increase.
Automatic notches increase	e key to go from Stop to PR	
End of fast automatic notches increase	Exit from PR mode with r key to go from PR to Stop.	
Automatic notches decrease	r key to go from Stop to 0	
End of automatic notches decrease	e key to go to Stop position.	
Train brake		
Brake increase	' key	The increase depends on how long the key is pressed. The longer the key is pressed, the faster the brake is increased..
Brake release	; key	The decrease depends on how long the key is pressed. The longer the key is pressed, the faster the brake is released.
Inverter		
Forward	w key	
Backward	s key	

### 11.3. Engine stop

See expert mode.