



dovetail
GAMES

CSX GenSet NRE 3GS-21B



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1 Background

1.1 Loco

The NRE 3GS21B is a low-emissions diesel switcher locomotive built by National Railway Equipment. It is powered by three Cummins QSK19C I6 engines with each one developing 700 horsepower (522 kW) and creating a total power output of 2,100 horsepower (1,570 kW). Having multiple engines instead of a single prime mover, a design referred to as a "GenSet", reduces overall diesel emissions and improves fuel efficiency. More than 150 of the 3GS21B GenSet locomotives have been produced to date, with the majority of these units being manufactured at NREC's Mount Vernon shops in Southern Illinois. In addition, one road slug model has also been produced.

Replacing the single engine prime mover with three GenSets producing equal horsepower, coordinated by 21st century computer and electronic controls, gives the N-ViroMotive several major advantages:

- It can exceed the capacity of the prime movers to move freight and passengers.
- A reduction in NOx and PMs emissions (85-90%).
- A reduction in noise (85%).
- A reduction in fuel consumption (40%-60%).
- A reduction in maintenance costs (35-50%).

Thanks to these main features of the loco, the NRE's N-ViroMotive is fast becoming the engine of choice.

The GenSet N-ViroMotive locomotive was developed and designed by NRE between 2001 and 2005 in response to the California Air Resources Board more stringent environmental regulations. The first engine went into service in 2007. While originally proto-typed for major Class I switching yard services in southern California and southeast Texas, the NViroMotive's achievement of ultra-low emissions and noise as well as the significant fuel consumption savings it produces, has allowed the N-ViroMotive to expand to other markets, including short haul, passenger and mainline freight duty cycles. Today there are more than 300 N-ViroMotives in service throughout the world.

1.2 Design & Specification

Power Type	Diesel-Electric
Locomotive Weight	268,000lbs (121.5t)
Vehicle Length	62ft 6in (19.1m)
Build Date	2006 – Present
Vehicle Power	2,100hp (1.5MW)
Top Speed	65mph (104.61km/h)
Brake Types	Air Brakes
Tractive Effort	80,386lbs (36.5t)

2 Rolling Stock

2.1 CSX GenSet NRE 3GS-21B



3 Driving the CSX GenSet NRE 3GS-21B

3.1 Cab Controls



- | | | | |
|---|--------------|----|------------------------|
| 1 | Horn | 10 | Digital Speedometer |
| 2 | Sander | 11 | Front Head Lights |
| 3 | Reverser | 12 | Bell |
| 4 | Throttle | 13 | Train Brake |
| 5 | Ditch Lights | 14 | Engine Brake |
| 6 | Gauge Lights | 15 | Platform Lights |
| 7 | Cab Lights | 16 | Rear Headlights |
| 8 | Wipers | 17 | Ditch Lights Direction |
| 9 | Engine Run | | |



3.2 Locomotive Keyboard Controls

Key Equivalent	Action
 	Decrease or Increase Throttle.
 	Move Reverser Forward or Backward.
 	Decrease or Increase the Train Brake.
 	Decrease or Increase the Engine Brake.

3.3 General Keyboard Controls

Key Equivalent	Action
	Load/Unload. Press to load/unload passengers or freight.
	Lights. Repeatedly pressing will cycle through headlight states where appropriate.
	Windscreen Wipers. Press once to switch on and again to switch off.
	(Expert) Engine Stop/Start. By default engines will already be running at the start of a scenario. Press this button to stop and then again to restart the engine.
	(Expert) Alerter. The Alerter is a system used on some trains to ensure that the driver has seen a signal. If the alert sounds (a black/yellow striped symbol is shown on the Driver's display), this must be acknowledged by pressing the Alerter button or the emergency brakes will be applied.
	(Expert) Sander. Causes sand to be laid on the rails next to the wheels to assist with adhesion. Press once to apply sand and again to stop.
	Bell. Sound the bell
	Horn. Sound the horn's tone.
	Cab Light. Toggle the Cab light on and off.
	Gauge Lights. Toggle the Gauge lights on and off.
	Platform Lights. Toggle the Platform lights on and off.
	Ditch Lights. Increase or decrease the Ditch light control.
 	

Key Equivalent	Action
Ctrl J	Ditch Light Direction. Switch the direction front to back.
G	Number Lights. Activate or de-activate the Number lights.
? /	Handbrake On/Off. This icon is displayed in the Coupling view.
Ctrl D	ACES Alert. Activate the driver safety Alerter.
Ctrl F	ATC Cab Signalling. Activate the in cab signalling system.
Ctrl Shift C	Couple manually.

3.4 In Cab Signaling

Locomotives on the New York to New Haven route feature in-cab signalling systems. The image below shows the in-cab display. Visually the display may vary for other locomotives but the principle remains the same.



Signal States (from top to bottom)

- N (Normal)
- L (Limited)
- M (Medium)
- R (Restricted)
- S (Stop)

If the signal aspect is “N” (Normal) then the speed indicator will show as the above image depicts and you should adhere to the current speed limit on the line. If the signal aspect is anything lower than normal then a speed signal aspect will be displayed and you should run at either the signal speed as indicated OR the current track speed limit – whichever is lowest. Because the in cab signalling lacks any displayed numerical values, it is understood that a “Restricted” indicator signifies a speed of 15mph, a “Medium” indicator signifies a speed of 30mph, a “Limited” indicator signifies a speed of 50mph.

If you enter a new block and it has a reduced aspect (e.g. going from Normal to Limited) then the following happens and must be done by the engineer:

- An alarm will go off in the cab.
- The cab signalling will update to reflect the new signal speed and confirm what the new aspect is.
- If the train is within the MAS (Maximum Allowed Speed) then the engineer must simply press the ACKNOWLEDGE button (Q key) within 8 seconds.
- If the train is above MAS then the engineer must zero the throttle, move the brakes into 40% application or greater, and then press ACKNOWLEDGE within 8 seconds.
- Note: It is not required to be within the speed limit during the 8 seconds, it is only required that the engineer has confirmed to the ATC system that they acknowledge the reduction in aspect and have taken appropriate action to comply with it.
- If the brakes fall below 40% while still being above MAS then the alarm will sound again and the same procedure must be followed.
- Failure to acknowledge correctly within 8 seconds means the brakes will go to full service application - however, the engineer can apply the same procedure as above and they will be able to regain control of the train without having to stop.
- Once the train is under the new MAS the engineer can simply release the brakes and apply throttle as required.

4 Scenarios

*****For driving tutorials, please visit the Academy from the main TS2015 menu screen*****

4.1 [GenSet] Get Ready, GenSet, Go!

The cooling East River breeze provides a welcome reprieve as you perform your yard duties on this hot summer's day.

Duration: 55 Minutes

Difficulty: Hard

4.2 [GenSet] Point to Point

Your next task has arrived! Two tracks at Hunts Point have been cleared in preparation for your arrival. Once at Hunts Point you are required to drop off two different types of boxcars on different tracks.

Duration: 25 Minutes

Difficulty: Medium

4.3 [GenSet] The Harlem Shuffle

Take the engineer's seat of CSX 1311 which is ready for this morning's switching. Starting at Oak Point Yard, deliver a cut of empty trash cars to Harlem River Yard and on the return journey, bring a full cut of cars back to Oak Point Yard.

Duration: 40 Minutes

Difficulty: Medium

5 Acknowledgements

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