

BR CLASS 156 DMU

DRIVING MANUAL

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1) Background

The British Rail Class 156 *Super Sprinter* is a diesel multiple unit (DMU). A hundred and fourteen of these units were built from 1987-89 by Metro-Cammell (now owned by Alstom) at their Washwood Heath Works in Birmingham.

They were built to replace elderly First Generation “Heritage” DMUs and locomotive-hauled passenger trains. Compared to a loco-hauled train, a modern DMU was cheaper to operate, caused less wear to the track and could reduce journey times.

2) Technical Information

The design of the Class 156 was more conservative than Metro Cammell’s earlier Class 151 design, the body shell was made of steel instead of aluminium, and the cab design was deliberately similar to the BREL Class 150 to ease union acceptance.

These units were all built as two-car sets, numbered 156401-514. Each unit was formed of two driving motors, one of which contained a lavatory. Individual carriage numbered as follows:

52401-52514 – Driving Motor Standard (DMS) – contain an area for storing wheelchairs, bicycles etc.
57401-57514 – Driving Motor Standard Lavatory (DMSL)

The vehicles are powered by 6-cylinder Cummins NT855-R5 diesel engines through Voith T211r hydraulic automatic transmission and Gmeinder final drive units. Although speeds of up to 90mph (140km/h) have been observed on level track, the units have a top speed of 75mph (121km/h) in regular service.

The first 100 units were all ordered by the Provincial sector of British Rail, and therefore carried the sector's livery of blue and beige with light blue stripe. Twenty units, numbers 156401-419/422 based at Tyseley depot, were later repainted into Regional Railways Express livery after the rebranding of Provincial.

The last fourteen units, numbers 156501-514 were ordered by Strathclyde PTE, and carried a distinctive orange black livery. This was later replaced by an attractive carmine and cream livery, reminiscent of the 1950s livery carried by Mk.1 coaching stock.

Maximum speed: 75 mph (121 km/h)

Weight DMS: 35.5 t

Weight DMSL: 36.1 t

Engine(s): 213 kW (286 hp) Cummins NT855-R5 Diesel (1 per car)

Transmission: Voith Hydraulic T211r (2 axles driven per car)

Coupling system: BSI

3) Liveries

- Regional Railways



- Express



- **Central Trains**



- **ONE Railway**



- **Northern Rail**



- **ScotRail (year 2000)**



4) Key features

[v1.0.0]

- Automatic Warning System (AWS) self-test routine.
- Fully functional destination blind (operates during game-play).
- Prototypical headlight operations.
- Prototypical wind-screen wiper operations.
- Westinghouse notched brake system with faithful pressure readings.
- Accurate simulation physics based on real Class 156 timings.
- Animated cab accessories such as windows, sunblind's and arm rest.
- Fully functional wheel slip protection (WSP) with realistic speedometer fluctuations.
- High quality audio with stereo cab sound effects.
- Semi-functional "compressor speed up" feature.
- Highly immersive cab environment with realistic night lighting effects.
- Realistic RPM, torque converter and fluid coupling simulation.
- Driver to guard buzzer.
- Drivers Reminder Appliance (DRA).
- Automatic engine shut down (after a time out period of 10 minutes real time).
- NRN radio test call feature.

5) Switches, buttons and functionalities.



1. **Speedometer gauge** – This is used to read the speed of the train. Fluctuations of speed readings may occur during wheel slip or wheel slide events.
2. **A) Main Reservoir (left needle)** – Displays the pressure reading of air within the main reservoir tanks in BAR.

B) Brake Cylinder Pressure (right needle) – Displays the pressure reading of air that is applied in the brake cylinder in BAR.
3. **A) Fault light (left)** – This **light** illuminates when a fault is detected (wheelslip for example) within the driving unit.

B) Fault light (right) – This **light** illuminates when a fault is detected (wheelslip for example) within the whole train.

C) Engine Stop (left) – This **button**, *when pressed*, stops the engine on both units.

D) Engine Start (right) – This **button**, *when pressed*, starts the engine on both units.
4. **Signal button** – This **button**, *when pressed*, will sound the buzzer which is used to notify the conductor in many different circumstances.
5. **A) DRA** – This **button**, *when pressed*, is used to remind the driver to check the signal ahead before departing from a station, as a result it will disable the use of the throttle.

B) Sander – This **button**, *when pressed*, is used to apply sand to the track during wheel spin. Use of this button has the following limitations;

BRAKING

- Emergency – automatic sand.
- Step 3 – manual sand (press button).
- Step 2 – manual sand (press button).
- Step 1 – not available.
- Release – not available.

TRACTION

- If wheel spin is detected by the unit when power is being applied (i.e the desk fault lights flash), then manual sanding is available for a period of 10 seconds only.
- Sand is not available under traction unless wheel spin is detected.

NOTE – FOR ALL OF THE ABOVE (BRAKE AND TRACTION), SAND CANNOT BE APPLIED BELOW A TRAIN SPEED OF 7MPH.

6. **Brake lever** – The brake **lever** has 5 positions. Release – step 1, step 2, step 3 and emergency. Step 1 and step 2 positions are used in normal service.
7. **Horn lever** – The horn **lever** has two positions, high and low. High will activate the “high” tone horn once. Low will activate the “low” tone horn once.

8. **A) Wiper switch** – The wiper **switch** controls the speed of the wind-screen wiper on the driver's side only. It has 3 positions, off, slow and fast. Another switch is available on the second-man's side to operate the wind-screen wiper thus.

B) AWS reset – This **button**, *when pressed*, cancels the AWS warning horn.

9. **A) Throttle lever** – The throttle **lever** regulates the fuel feed to the engine thus increasing or decreasing the power applied to the driving wheels.

B) Reverser switch – The reverser **switch** controls the direction of travel (forwards or backwards). When a scenario loads the reverser will be in the "off" position, this denotes that the control desk is turned off. Upon moving the reverser from "off" to "neutral" will activate the AWS-self test routine which must be cancelled by pressing [Q] or the "AWS reset" button explained above.

10. **Radio call** – This **button**, *when pressed*, triggers a test call to the local signal box.

11. **Cab call** – This **button**, *when pressed*, triggers a cab to cab buzzer for direct communications with the conductor. In RailWorks you will not get a response.

12. **Switch panel** – This panel contains many buttons which are explained below.



Top left to bottom right.

- **Fault Light Dimmer** – Not functional.
- **Instrument Lights** – This **switch** activates the instrument lights for night scenarios only.
- **Windscreen Demist** – Not functional.
- **Destination Light** – This **switch** activates the illumination for the destination display.
- **Tail Light** – This **switch** activates the tail lights
- **Headlight** – This **3 way switch** activates the appropriate headlights for day or night operations.
- **Marker light** – This **switch** activates the marker lights.
- **Compressor Speed Up** – This **switch** activates the “compressor speed up” sequence. Only operational when the “reverser” is in the “neutral” position.
- **Hold Gear** – Not functional.

6) Headlight System

For the first time in RailWorks we have recreated the prototypical headlight operations by allowing the user to control the head, tail and marker lights individually as a **real train driver** would. It is your responsibility to ensure they are setup correctly each time you travel depending on the scenario situation.

There are two types of “headlight clusters”; below we are demonstrating **type 1** which uses standard light bulbs.



Tail lights – These lights are displayed by default when the scenario is loaded for the first time on both ends of the train. The tail lights should be left in the ON position in the trailing cab.



Marker lights – Marker lights are used when operating within a depot environment. They are also used in conjunction with the headlights during normal operations explained below.



Headlight (right) – The “right” headlight is used in conjunction with the marker lights during normal DAY operations.



Headlight (left) – The “left” headlight is used in conjunction with the marker lights during normal NIGHT operations.

There are two types of “headlight clusters”; below we are demonstrating **type 2** which uses LED light bulbs.



Tail lights – These lights are displayed by default when the scenario is loaded for the first time on both ends of the train. The tail lights should be left in the ON position in the trailing cab.



Marker lights – Marker lights are used when operating within a depot environment. They are also used in conjunction with the headlights during normal operations explained below.



Headlight (right) – The “right” headlight is used in conjunction with the marker lights during normal DAY operations.



Headlight (left) – The “left” headlight is used in conjunction with the marker lights during normal NIGHT operations.

Headlights are automatically controlled during AI operations.

7) Destination display

We are proud to present our unique destination display operations. You are now able to change your destination display during game play (instead of within the scenario editor).

To change your destinations simply click the train you wish to drive and then focus the camera on the front of the train. After you can press F8 to scroll through the list of destinations, or F7 to scroll back through the list of destinations.

8) Scenarios

[1] Northern in the South

First Great Western is currently suffering from a lack of Class 165 DMUs due to refurbishment. Northern Rail has hired out two of their Class 156 DMUs for use on the Oxford to Reading section of the line.

Your task is to work the two units on an Oxford to Reading stopping service, calling all stops en route. It's wet and windy, so you must perform each stop at your best to finish at Reading on time.

Medium/40mins

[2] Norwich Knowledge

Due to a new service starting later in the year, ONE Railway have begun operating a drivers route learning trip between Norwich Crown Point and Slough using a Class 156 DMU. Today you shall start on the Willesden Branch and head onto the GWML to Slough.

Medium/25mins

[3] Where should they go?

The Class 156 DMU is being trialled on the Great Western Mainline leading up to the privatisation of the railway. You are joining the peak day express service from Slough into Paddington. You are then required to complete some shunt moves into the yard.

Easy/40mins

[4] Sprinting the ECML

It's 1990 and the Class 156 DMU has been in service for a number of years. Regional Railways has a service running between Darlington and York, stopping at all stations and this particular timetable is still being tested to see how efficiently the Class 156 can run.

Medium/40mins

[5] Midnight-moon

Take your train from Oxford to Paddington under the midnight moon light. You are the last eastbound train of the night.

Easy/80mins

[6] Shunt move

A Class 156 DMU has just arrived into Hedborough station and this unit has been scheduled for maintenance work. Your task is to complete the shunt move into the depot.

Easy/10mins

[7] Fault Testing

A brand-new Class 156 DMU "Super Sprinter" is on a test run at the German TestTrak. You are required today to assist with its development by driving the unit under different conditions.

Medium/20mins

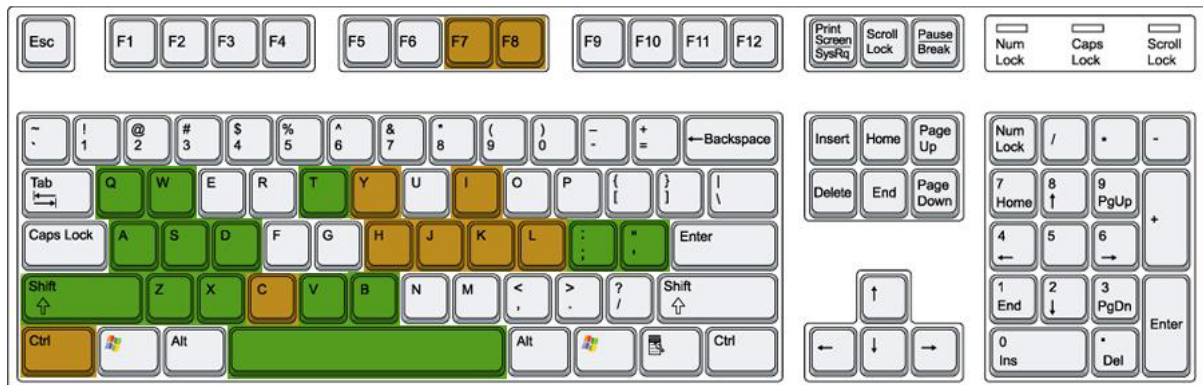
[8] Class 156 Driving Tutorial

Take the challenge and learn how to drive the Class 156 DMU.

Very Hard/20mins

275 minutes of gameplay total.

9) Keyboard Shortcuts



**Green indicates standard RailWorks controls.*

**Orange indicates custom Class 156 controls.*

Standard RailWorks Driving Controls.

- [Q] – AWS Reset.
- [W] – Reverser selection up.
- [A] – Increase throttle.
- [S] – Reverser selection down.
- [D] – Decrease throttle.
- [Z] – Start engine ([CTRL+Z] to Shutdown engine).
- [X] – Sander activation (limitations apply, as mentioned above).
- [V] – Wiper speed toggle ([SHIFT+V] to decrease toggle).
- [B] – Secondary horn.
- [T] – Open doors.
- [;] – Decrease brake step.
- ['] – Increase brake step.

Custom Class 156 Controls.

- [Y] – DRA enable/disable.
- [I] – Instrument light.
- [L] – Destination display light.
- [SHIFT+L] – Clipboard/Cab Light.
- [H] – Headlight toggle ([SHIFT+H] to decrease toggle).
- [J] – Tail light toggle.
- [K] – Marker light toggle.

[C] – Driver to guard buzzer.

[F7] – Scroll destination display down.

[F8] – Scroll destination display up.

10) Compatibility

Simple mode.

Due to the advance technology incorporated into the Class 156 Pack we were unable to provide support for the “simple mode” in RailWorks. Please use “Expert mode”.

RailWorks 2 HUD.

The Class 156 Pack does contain *some* compatibility issues when using the RailWorks 2 HUD. However it is still possible to drive the train in a simple fashion.

Coupling with other Diesel Multiple Units.

The Class 156 DMU can only be coupled with the (“[Thomson Interactive](#)”) Class 170 DMU. Other DMU’s may not respond correctly to throttle, brake and sound activities. Due to RailWorks limitations the Class 156 and Class 170 compatibility only functions in one direction (at this time). The Class 156 must be the leading unit with a driver icon; it is not possible to “switch cabs”.



Image shown displays Thomson Interactive’s Class 170 DMU available from Steam.

RailDriver

No compatibility issues reported.

11) Notes

Repaint Pack

A free repaint pack will be available on our website (<http://www.oovee.co.uk>) sometime between 15/04/2011 and 28/04/2011. It will consist of blank repainting textures.

Destination Pack

A free destination pack will be available on our website (<http://www.oovee.co.uk>) sometime between 15/04/2011 and 28/04/2011. It will consist of blank repainting textures for custom destinations for the destination display.

Class 156 (ScotRail Bonus Pack)

A ScotRail bonus pack will be available in April/May. This will consist of the following;

- 2 modern ScotRail liveries (official licensing pending).
- 5 scenarios for Edinburgh to Glasgow route (developed by [Thomson Interactive](http://www.thomsoninteractive.co.uk)).
- ScotRail cab view modifications and sanding equipment removal.
- Passenger announcements.
- LED destination display.
- Custom lighting and weather effects.

For more information on this pack, as and when it's announced please visit <http://www.oovee.co.uk>.

12) Credits

Internal development team:

- Ally McMurdo
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- RailSimulator.com Ltd
- Richard Holmes

Special thanks to:

- Alstom
- Alan Thomson – Thomson Interactive
- Alan Murphy – National Express East Anglia - Driver Manager
- Martin Steele – National Express East Anglia - Driver Manager
- National Express East Anglia

Thank you for purchasing this add-on.

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