CRH2A EMU Driver Manual

Ver. 1.2

This manual is only for use with the Train Simulator game and is not for real-world use.
# Table of Contents

1 Brief Introduction to CRH2A EMU .......................................................... 3  
2 About This Add-On ................................................................................. 4  
3 External Model ....................................................................................... 5  
   3.1 Get to Know Your Train ................................................................. 5  
   3.2 Functions on External Model ......................................................... 6  
4 Get to Know the Cab ............................................................................. 7  
   4.1 The Main Area .............................................................................. 7  
   4.2 Main Upper Area .......................................................................... 7  
   4.3 Right Area .................................................................................... 8  
   4.4 Lower Left of Main Area ............................................................. 8  
   4.5 Left MON Screen ........................................................................ 9  
   4.6 Train Service Number Input Screen .......................................... 9  
   4.7 ATP Screen ................................................................................. 10  
   4.8 Right MON Screen ..................................................................... 11  
5 Driving the CRH2A ............................................................................ 12  
   5.1 Start-Up Procedure ..................................................................... 12  
   5.2 ATP Function in Detail .................................................................. 13  
6 Appendix 1: About the Scenarios .......................................................... 17  
7 Appendix 2: Hotkey List ...................................................................... 19  
8 Appendix 3: How to Use Auto Broadcasting ....................................... 20  
9 Appendix 4: Train Service Number Database .................................... 22  
10 Appendix 5: Screen Chinese to English Translation ........................ 23  
Credits ...................................................................................................... 24
1 Brief Introduction to CRH2A EMU

The China Railways CRH2A EMU high-speed train was originally developed from the Shinkansen E2-1000 Series, although the newer versions of the CRH2 are not related to the E2-1000 Series despite having the same exterior styling. The CRH2A is in widespread use and is one of the most popular high-speed EMUs in China, with over 200 sets currently in service and more planned. CRH2A can be used in single 8-cars consist, or coupled 16-cars consist. For detailed formations please see following tables:

**Unification:** In 2013 as requested by China National Railway Administration, manufactory redesigned the CRH2A’s both exterior and its interior, as well as the entire system in order to meet the operational requirements and new standards of China railway.

### Formation (single unit, non-unified consists)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1c</td>
<td>M2</td>
<td>M1</td>
<td>T1p</td>
<td>T2k</td>
<td>M2p</td>
<td>M1s</td>
<td>T2c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1U</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2U</td>
</tr>
</tbody>
</table>

The green part represents a First-Class coach.

### Formation (single unit, unified consists, 2013 onwards)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1sc</td>
<td>M2</td>
<td>M1</td>
<td>T1p</td>
<td>T2k</td>
<td>M2p</td>
<td>M1</td>
<td>T2c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1U</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2U</td>
</tr>
</tbody>
</table>

The green part represents a First-Class coach.

**1.1 Train data**

- Consist length: 201.4 m (661 ft)
- Width: 3380 mm (11 ft 1 in)
- Height: 3700 mm (12 ft 2 in)
- Maximum operation speed: 250 km/h (155 mph)
- Power output: 4800 kW (6400 hp)
- Electric system: 25 kV 50 Hz AC overhead catenary
- Braking system: Regenerative, electronically controlled pneumatic brakes

CRH2A has had many different exteriors and interior over its production years; This DLC features the first generation of it.
2 About this Add-On

We're proud to present this advanced CRH2A high-speed EMU and we hope that you will experience something you've never experienced before with it.

**Interactive MON screen:** It's a real touch screen! You can click on the screen button to see the next page or to set the train service number.

![Interactive Touch Screen](image1)

**Fully workable ATP system:** Introducing for the first time ever the "target & distance" ATP system in Train Simulator with a continuous braking curve, the CRH2A will let you drive more smoothly from station A to station B. It also comes with the constant speed control, this function will free you from the regulator lever and you will just need to monitor the system.

![Controller Display](image2)

**Train number and auto destination display.** When you use the touch screen to input the train number, the route name and destination will also appear on your ATP and MON screen automatically, as they do on the exterior LED board. This system will also check the train's direction based on the number you entered. For example, D5103 will show Chongqing bei-Chengdu dong, while D5102 will show Chengdu dong-Chongqing bei.

Please see **Appendix 4** for detailed database information.
3 External Models

3.1 Get to Know Your Train

Now let’s take a look at the CRH2A’s cars:

Car No.1: Control car with toilet (trailer)

Car No.2: Motor car

Car No.3: Motor car with toilet

Car No.4: Trailer car with pantograph

Car No.5: Dinner car with toilet (trailer)

Car No.6: Trailer car with pantograph

Car No.7: Moto car with toilet (first class)

Car No.8: Trailer control car
3.2 Functions on External Model

This Add-on allows you to set the train number, as detailed below:

① LED direction broad. Enter this information in the cab with the MON screen.
② Coach number: indicate which car this is. Enter this in Scenario editor.
③ Train car number: Enter this in Scenario editor.
④ Consist number: Enter this in Scenario editor.

You need to open the Scenario editor to change the coach number, car number and consist number. You will only need to enter the car number and coach number, consist number will be changed according to what you entered.

You need to enter 4 numbers to change the car and coach numbers. The first three are for car numbers and can only use numbers. The fourth is for the coach number, and can only use capital letters B through P.

The meaning of these letters are as follows:

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>--</td>
<td>Car No.1</td>
<td>Car No.2</td>
<td>Car No.3</td>
<td>Car No.4</td>
<td>Car No.5</td>
</tr>
<tr>
<td>G</td>
<td>H</td>
<td>I</td>
<td>J</td>
<td>K</td>
<td>L</td>
</tr>
<tr>
<td>Car No.6</td>
<td>Car No.7</td>
<td>Car No.8</td>
<td>Car No.9</td>
<td>Car No.10</td>
<td>Car No.11</td>
</tr>
<tr>
<td>M</td>
<td>N</td>
<td>O</td>
<td>P</td>
<td>Q</td>
<td></td>
</tr>
<tr>
<td>Car No.12</td>
<td>Car No.13</td>
<td>Car No.14</td>
<td>Car No.15</td>
<td>Car No.16</td>
<td></td>
</tr>
</tbody>
</table>

6 / 24
4 Get to Know the Cab

This DLC provides a highly detailed and fully functional cab for the CRH2A, now let's look at it:

4.1 The Main Area

![Diagram of Main Area]

1. Pressure gage  
2. Emergency brake button  
3. Master key  
4. Brake handle  
5. Error information display screen  
6. LKJ Screen  
7. Emergency brake reset button  
8. Regulator handle  
9. Doors indicator  
10. Reserve handle  
11. ATP Screen  
12. Constant speed button  
13. Constant speed off button

4.2 Main Upper Area

![Diagram of Main Upper Area]

1. Left desk light  
2. Left sun visor  
3. Right sun visor
4.3 Right Area

1. Right MON Screen   2. Thermos from Forestrail route (Kiha 720, and Rintenjo station) and 22 coaches (YW)   3. Right sun visor   4. Right desk light

4.4 Lower left of main area

4.5 Left MON Screen

1. Hotkey screen  2. Train information screen  3. Train service number input screen

4.6 Train Service Number Input Screen

1. Train service number display position  2. Train class input area  3. Digital input area
You can click on the train service number input button on the top menu to enter the new train service number input screen, then click on the button (4) to activate the keyboard (you will see a flashing cursor). To input the numbers, you need to press D/C/G first and then input the numbers. You can click the menu button to return to the main screen, or the clear button to clear up what you have just entered.

4.7 ATP Screen

1  Distance to next speed limit.
2  Signal mode.
3  Speedometer and speed limit. See ATP section for details.
4  Signal aspects. See ATP section for details.
5  Train service number.
6  Control mode. Display Full/Part/Shunting/On sight/Isolate.
7  Route name and departure/arrival station name display.
8  Shunting mode button.
9  On sight mode button.
10 Isolate mode button.

Please consult the ATP function section for full details.
4.8 Right MON Screen

8. Door state display  9. Consist information (*)

(*): When coupled with another CRH2A train, this will display 2 consists and 16 cars.
5 Driving the CRH2A

5.1 Start-Up Procedure
In most circumstances, you need to start up the train manually, following these steps:
1. Turn the key to get the power on, so that the screen turns on and the control voltage shows 120 V.
2. Raise the pantograph.
3. Press the VCB ON button until "unprepared" and "VCB" lights on the error screen turn off. The traction voltage should now be 25 kV.
4. Press and hold the emergency reset button until the "Emergency" light on the error screen turns off.
5. Move the reverser handle to its front position.
6. Move train brake handle from the remove position to release position to release the brake.
7. Pull the regulator handle towards you, and the train should start moving.

Warning: Please use Expert mode to drive this train.
5.2 ATP function in Details

5.2.1 Introduction
Automatic Train Protection (ATP) is a system preventing the train from speeding or passing a red signal. This system uses a target speed indication and audible warnings to warn the train driver if they are likely to exceed a speed that would cause the train to pass a red (danger) signal or exceed a speed restriction. The system will apply the brakes if the driver fails to respond to these warnings. The system takes into account the speed and position of the train relative until it stops moving in terms of issuing the warnings and applying the brakes.

5.2.2 ATP in This Add-On
In full control mode, all signaling systems and functions are activated. The systems will get the line speed limit as well as the next speed limit and signal aspect. When approaching the next speed limit (lower than the current speed limit) or when the next signal is red, the system will calculate the distance between the current position and the next speed limit (or next red signal) and apply the appropriate brake force to slow down the train. Unlike the TVM3 or ATC-1 systems’ interval speed curve, the braking curve on our ATP system will be a continuous speed curve from your current speed to the target speed.

Braking performance of the CRH2A EMU
5.2.3 The Information Provided by ATP Screen

1. **Distance to the next speed limit.** This displays up to a distance of 9900 m away from your train. If the distance to the next speed limit is less than 1000 m then the white bar will also change.

2. **Signal mode.** This shows the signal mode, which will be set to either CTCS-0, CTCS-1, CTCS-2 or CTCS-3. The ATP braking curve will only work on settings CTCS 1 through 3.

3. **Speedometer and speed limit bar.** When the bar shows as only white it means that is the current speed limit; When it shows as a white and yellow bar, the yellow part represents the current speed limit while the white part represents the next speed limit; When it shows yellow bar only, it means that the next speed limit is 0, or next signal is red. When the speed limit ahead changes (and is lower than the current one), the system will calculate the braking distance and curve required based on your current speed and the distance to the next speed limit. **When approaching the next speed limit and entering the braking zone, the speed limit bar (yellow parts) will change dynamically to guide you slowing down to the next speed limit.** This is the continuous braking curve which displays on the ATP screen. If you fail to slow down to within the yellow bar part, the auto system will kick in to apply the brake. This system will help you apply the brakes in time and catch up with the timetable.

4. **Digital speedometer and needle.**

5. **Control mode.** Displays the control mode:
   - **Full:** All signal systems and functions are active including the ATP continuous braking curve.
   - **Part:** The signal aspect present and the continuous speed curve control aren’t available, this is used when you are using the CRH2A on another route without the CTCS signal.
**Shunting:** For doing shunting work in a yard. You need to switch to this mode manually while stopped. In shunting mode, you cannot pass a red signal either, and the top speed is 45 km/h.

**On Sight:** In some circumstances, you may be required to pass a red signal. This time you will need use this mode. In order to switch to this mode, you first of all need to stop before the red signal, then switch to it, and then you can pass the signal with a speed of no more than 15 km/h.

**Isolate:** Isolates all systems, you can ignore any signals or speed limits. Using this mode in a normal scenario may cause the scenario to fail.

1. You can only switch to a different mode when the train is stopped. Clicking on a mode button will switch to a different mode, clicking on it again will return to Full/Partial mode.
2. Using the Isolate mode in a normal scenario may cause the scenario to fail.

### 5.2.4 Signal Aspects

1. **Green.** The track is clear and allows you to proceed following the line's speed limitations.
2. **Red.** This signal indicates a stop. If the dispatcher allows you to pass a red, please stop the train and switch to On Sight mode first.
3. **Yellow.** On the Chengdu-suining and Southwest China high-speed networks, you're expected to travel no faster than 160 km/h once you encounter this aspect.
4. **Green-yellow.** This means that the next signal is yellow.
5. **Double yellow.** Indicates the line will lead to a siding.
6. **Red-Yellow.** Not used in Chengdu-suining and Southwest China high-speed network route.
5.2.5 Constant Speed Function
The CRH2A has a constant speed function, this will allow hands-free control of the cab. Once you press the constant speed button the train will hold its current speed automatically. If speed limit changes or if you push or pull the regulator or brake handle, the constant speed function will disengage automatically. To use the constant speed function, you will need to not be speeding and to be in Full control mode.
Appendix 1: About the Scenarios

Scenarios for the Southwest China High Speed Rail Network

Scenario name: C2A01. Get to Know Your Train
Duration: 30 minutes
Start location: Chongqing
Destination: Hechuan
Train service number: D9999

Scenario name: C2A02. Your First Assignment
Duration: 55 minutes
Start location: Chengdu
Destination: Suining
Train service number: D5102

Scenario name: C2A03. Suining to Chongqing
Duration: 60 minutes
Start location: Suining
Destination: Chongqing
Train service number: D5102

Scenario name: C2A04. Evening Rush Hour
Duration: 60 minutes
Start location: Chongqing
Destination: Suining
Train service number: D5121
**Scenarios for Western Sichuan Pass**

Scenario name: C2A05. First Direct Service on the Chenglan Route  
Duration: 75 minutes  
Start location: Du jiangyan  
Destination: Mao xian

Scenario name: C2A06. Way Back to the Land of Abundance  
Duration: 50 minutes  
Start location: Wen chuan  
Destination: Du jiangyan

**Quick Drive Scenarios:**
This DLC also features Quick Drive scenarios; you can create your own journeys by clicking on the Quick Drive menu.
## Appendix 2 : Hotkey List

### Light controls

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Headlamp shift up</td>
<td>H</td>
</tr>
<tr>
<td>Headlamp shift down</td>
<td>Shift+H</td>
</tr>
<tr>
<td>Main Cab light</td>
<td>L</td>
</tr>
<tr>
<td>Desk light left</td>
<td>Ctrl+N</td>
</tr>
<tr>
<td>Desk light right</td>
<td>Shift+N</td>
</tr>
</tbody>
</table>

### Basic function

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiper</td>
<td>V</td>
</tr>
<tr>
<td>Horn</td>
<td>Space</td>
</tr>
<tr>
<td>Increase regulator</td>
<td>A</td>
</tr>
<tr>
<td>Decrease regulator</td>
<td>D</td>
</tr>
<tr>
<td>Reverser forward</td>
<td>W</td>
</tr>
<tr>
<td>Reverser backward</td>
<td>S</td>
</tr>
<tr>
<td>Increase train brake</td>
<td>Apostrophe</td>
</tr>
<tr>
<td>Decrease train brake</td>
<td>Semi Colon</td>
</tr>
<tr>
<td>Left sun visor</td>
<td>Ctrl+S</td>
</tr>
<tr>
<td>Right sun visor</td>
<td>Shift+S</td>
</tr>
<tr>
<td>Pantograph</td>
<td>P</td>
</tr>
<tr>
<td>Master Key</td>
<td>K</td>
</tr>
<tr>
<td>Doors</td>
<td>T</td>
</tr>
</tbody>
</table>

### Advanced function

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>VCB On</td>
<td>Y</td>
</tr>
<tr>
<td>VCB Off</td>
<td>Z</td>
</tr>
<tr>
<td>ATP Isolate Mode</td>
<td>I</td>
</tr>
<tr>
<td>ATP On-Sight Mode</td>
<td>O</td>
</tr>
<tr>
<td>ATP Shunting Mode</td>
<td>U</td>
</tr>
<tr>
<td>Emergency Brake</td>
<td>Backspace</td>
</tr>
<tr>
<td>EB Reset</td>
<td>E</td>
</tr>
<tr>
<td>Constant On</td>
<td>B</td>
</tr>
<tr>
<td>Constant Off</td>
<td>Ctrl+B</td>
</tr>
</tbody>
</table>
Appendix 3 : How to Use Auto Broadcasting

This add-on provides an automatic broadcasting system for use during play time, if you wish to use it in your own scenario, please take the following steps:

1. Click Track Infrastructures in the scenario editor, then select the siding marker and put it on the track that the player's train will have to pass, then give it a relevant name.

2. In timetable view, create an event such as "Go Via" and give it a name, such as "DepSuining".
3. Write the following script in your scenario script.

```plaintext
if event == "DepSuining" then
    SysCall ( "PlayerEngine:SetControlValue", "BroadCasting", 0, 2 );
    return TRUE;
end
```

Here the *DepSuining* is the name of event. We will need this to trigger the broadcasting. You will also require resetting the broadcasting value to 0 when the player is at the platform:

```plaintext
if event == "Tongnan" then
    SysCall ( "PlayerEngine:SetControlValue", "BroadCasting", 0, 0 );
    return TRUE;
end
```

*Tongnan* is the station event. You can set up a pick-up passenger event here and enter this event name in Trigger Success section.

### Broadcasting code and meanings

<table>
<thead>
<tr>
<th>Departure (bound for)</th>
<th>Next station</th>
<th>Arrival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>Meaning</td>
<td>Code</td>
</tr>
<tr>
<td>001</td>
<td>For Chengdudong</td>
<td>101</td>
</tr>
<tr>
<td>002</td>
<td>For Chongqingbei</td>
<td>102</td>
</tr>
<tr>
<td>003</td>
<td>For Emeishan</td>
<td>103</td>
</tr>
<tr>
<td>004</td>
<td>For Mianyang</td>
<td>104</td>
</tr>
<tr>
<td>005</td>
<td>For Nanchong</td>
<td>105</td>
</tr>
<tr>
<td>006</td>
<td>For Shanghai</td>
<td>106</td>
</tr>
<tr>
<td>007</td>
<td>For Wuchang</td>
<td>107</td>
</tr>
<tr>
<td>008</td>
<td>009</td>
<td>108</td>
</tr>
<tr>
<td>010</td>
<td>110</td>
<td>111</td>
</tr>
<tr>
<td>011</td>
<td>111</td>
<td>112</td>
</tr>
<tr>
<td>012</td>
<td>112</td>
<td>113</td>
</tr>
<tr>
<td>013</td>
<td>113</td>
<td>114</td>
</tr>
<tr>
<td>014</td>
<td>114</td>
<td>115</td>
</tr>
<tr>
<td>015</td>
<td>115</td>
<td>116</td>
</tr>
<tr>
<td>016</td>
<td>116</td>
<td>117</td>
</tr>
<tr>
<td>017</td>
<td>117</td>
<td>118</td>
</tr>
<tr>
<td>018</td>
<td>118</td>
<td>119</td>
</tr>
<tr>
<td>019</td>
<td>119</td>
<td>120</td>
</tr>
<tr>
<td>020</td>
<td>120</td>
<td>220</td>
</tr>
</tbody>
</table>
## Appendix 4: Train Service Number Database

<table>
<thead>
<tr>
<th>Train number range</th>
<th>Service section</th>
</tr>
</thead>
<tbody>
<tr>
<td>C5003-C5020</td>
<td>Wuchang to Xianning nan</td>
</tr>
<tr>
<td>D401-D450</td>
<td>Shanghai to Nanjing</td>
</tr>
<tr>
<td>D5401-D5510</td>
<td>Shanghai to Hangzhou</td>
</tr>
<tr>
<td>D651-D680</td>
<td>Shanghai to Hangzhou</td>
</tr>
<tr>
<td>D5101-D5132</td>
<td>Chongqing bei to Chengdu dong</td>
</tr>
<tr>
<td>D5133-D5142</td>
<td>Chongqing bei to Emeishan</td>
</tr>
<tr>
<td>D5143-D5152</td>
<td>Chongqing bei to Mianyang</td>
</tr>
<tr>
<td>D5161-D5194</td>
<td>Chengdu dong to Nanchong</td>
</tr>
<tr>
<td>D8231-D8238</td>
<td>Nanning dong to Hezhou</td>
</tr>
<tr>
<td>D8241-D8244</td>
<td>Nanning dong to Hezhou</td>
</tr>
<tr>
<td>D211/D212</td>
<td>Guiyang bei to Guangzhou nan</td>
</tr>
<tr>
<td>D2801-D2820</td>
<td>Guiyang bei to Guangzhou nan</td>
</tr>
<tr>
<td>D2831-D2844</td>
<td>Guilin bei to Guangzhou nan</td>
</tr>
</tbody>
</table>
### Appendix 5: Screen Chinese to English Translation

<table>
<thead>
<tr>
<th>Chinese text</th>
<th>Meaning</th>
<th>Chinese text</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>列车信息</td>
<td>Train information button</td>
<td>下一站</td>
<td>Next station</td>
</tr>
<tr>
<td>应急手册</td>
<td>Hot key information button</td>
<td>车次</td>
<td>Train service number</td>
</tr>
<tr>
<td>列车号码设定</td>
<td>Train service number input button</td>
<td>车厢门</td>
<td>Train doors</td>
</tr>
<tr>
<td>菜单</td>
<td>Menu button</td>
<td>准备未完</td>
<td>Unprepared</td>
</tr>
<tr>
<td>输入</td>
<td>Enter</td>
<td>紧急制动</td>
<td>Emergency brake</td>
</tr>
<tr>
<td>清除</td>
<td>Clear</td>
<td>恒速运行</td>
<td>Constant speed</td>
</tr>
<tr>
<td>确认</td>
<td>Confirm</td>
<td>目视</td>
<td>On Sight</td>
</tr>
<tr>
<td>完全</td>
<td>Full</td>
<td>隔离</td>
<td>Isolate</td>
</tr>
<tr>
<td>调车</td>
<td>Shunting</td>
<td>部分</td>
<td>Part</td>
</tr>
<tr>
<td>开启</td>
<td>Open</td>
<td>关闭</td>
<td>Closed</td>
</tr>
</tbody>
</table>
Credits

Developer: Union Workshop
Supervisor: CNAurora
3D Model: T9Express
Textures: CNAurora, T9Express
Program: CNAurora
Scenario: T9Express
Voice: 节操酱 (Jie Cao Jiang)
Audio Effect: T9Express, CNAurora

Special thanks: Justtrains.net
- Beta testing team of Dovetail Games
- 3rd party team of Dovetail Games