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Test Project

Module B – Installation and Commissioning of Passenger Compartment Door

Rail Vehicle Technology

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WSC2026_TP61_en

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Introduction to Test Project

The passenger compartment door, through which passengers get on and off the train, is one of the core rail vehicle parts that are most frequently used, as well as a piece of essential equipment to ensure operation safety and efficiency. In order to improve the service life of a passenger compartment door, strict requirements for its performance and installation precision are imposed. Thus, the installation and commissioning of passenger compartment door is a crucial routine job for rail vehicle technicians. The job mainly covers passenger compartment door installation, mechanical parameters adjustment, electrical connection, overall appearance inspection, electrical function tests, etc.

The workstation is provided with a passenger compartment door to be adjusted and its electrical control equipment. The technicians need to conduct parts installation and mechanical parameters adjustment, and electrical function tests as per the door installation requirements, so as to ensure that the passenger compartment door meets the installation standards and normal use requirements.

As rail vehicle is a complex system, and vehicle technicians often encounter various issues during maintenance, excellent technicians must possess innovative problem-identifying and problem-solving capabilities. This skill competition requires the Competitor to resolve door maintenance problems through innovative adjustments to the equipment.

Description of project and tasks

The time allocated to the Installation and Commissioning of Passenger Compartment Door Test Project is 360 minutes.

The Competitor should complete all tasks within the time allocated to the Module.

First, make preparations according to requirements.

Second, complete the five (5) tasks listed below:

- B1 Passenger compartment door installation and mechanical parameters adjustment
- B2 Passenger compartment door electrical connection
- B3 Passenger compartment door overall appearance inspection
- B4 Passenger compartment door electric circuit wiring
- B5 Passenger compartment door electrical function test

Note: During operations, strictly adhere to the operation safety rules and carry out the tasks in order of B1& B2, B3, B4 and B5. B1 and B2 can be performed simultaneously.

Lastly, after all tasks listed in this Test Project are completed, the Competitor should clean and organize the site and submit the relevant materials and Record Sheets to the Experts.

Preparations

Before starting the operation tasks, the Competitor needs to analyze all tasks and count and check equipment, tools and materials in the workstation according to the standards set out in the WSC2026_WM61_B Installation and Commissioning of Passenger Compartment Door Work Manual. In the case of any problem, the Competitor need to solve it immediately.

1. Read carefully this Test Project to understand the operation tasks;
2. Count and check all equipment, tools and materials in the workstation and fill the problems uncovered in the Installation and commissioning of passenger compartment door pre-operation inspection Record Sheet (Fill all

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problems at one time). If any equipment, tools or material is found missing or unqualified, submit the Record Sheet to the Experts to apply for replacement or supplementation.

3. Submit the Record Sheet (with name and country of the Competitor filled at the corresponding blanks) to the Experts.

Note: The WSC2026_TP61_B_R03 Passenger Compartment Door Fault Example Description Table clarifies the types of defects, and any defects not described in the Table are considered normal.

B1 Passenger compartment door installation and mechanical parameters adjustment

Task B1 requires the Competitor to install and adjust the passenger compartment door and its parts according to the standards and requirements set out in the WSC2026_WM61_B Installation and Commissioning of Passenger Compartment Door Work Manual. Main work items include:

1. Adjust passenger compartment door basic parameters, to bring its mechanical condition up to qualified service standards;
2. Install and adjust passenger compartment door accessories (including support rollers, isolating lock mechanism, catch hook, emergency egress device and cover plates, etc.);
3. Fill the operation results in the B1 Passenger compartment door installation and mechanical parameters adjustment Record Sheet.

Note: The cover plate with the emergency egress device must be installed. Installation of other cover plates is optional, but corresponding marks will be deducted if they are not installed. If a door header cover plate falls off during installation, installation of all door header cover plates shall not be continued and the operation will be deemed a failure.

B2 Passenger compartment door electrical connection

Task B2 requires the Competitor to complete electrical connection of the passenger compartment door according to the standards and requirements set out in the WSC2026_WM61_B Installation and Commissioning of Passenger Compartment Door Work Manual. Main work items include:

1. Adjust the S1 Limit Switch to the proper position to ensure the normal functioning of the door;
2. Complete electrical connection between the isolating lock mechanism and the door control unit;
3. Complete the installation and electrical connection of the door indicators.

Note: If the door header cover plates are not installed, the door indicators may be tied to a suitable position on the door header for display of door status

4. After completing all items involved in task B1 and task B2, the Competitor needs to report the operation status to the Experts and submit the Record Sheet (B1). Only with the Experts' approval can the Competitor proceed to the next task.

B3 Passenger compartment door overall appearance inspection

Task B3 requires the Competitor to complete the inspection of passenger compartment door and its components according to the standards and requirements of the WSC2026_WM61_B Installation and Commissioning of Passenger Compartment Door Work Manual. Main work items include:

1. Conduct comprehensive inspection of the passenger compartment door appearance as a whole as per operation standards.
2. Fill the faults uncovered in the B3 Passenger compartment door overall appearance inspection Record Sheet.

3. After completing all items involved in task B3, the Competitor needs to report the operation status to the Experts and submit the Record Sheet (B3). Only with the Expert's approval can the Competitor proceed to the next task.

Note: The WSC2026_TP61_ B_R03 Passenger Compartment Door Fault Example Description Table clarifies the types of defects, and any defects not described in the Table are considered normal.

B4 Passenger compartment door electric circuit wiring

Task B4 requires the Competitor to complete the passenger compartment door electric circuit installation and wiring as per the electric circuit schematic diagrams and electric circuit wiring table provided at the workstation according to the standards and requirements of the WSC2026_WM61_ B Installation and Commissioning of Passenger Compartment Door Work Manual. Main work items include:

1. Complete the assembly and connection of the missing parts (plug section) of heavy-duty connectors between the relay cabinets in accordance with the Schematic Diagrams and Wiring Table.

Note: The Competitor may give up this item and apply to the Experts that the equipment be restored by the Experts or designated technicians, in which case no marks will be awarded for this item. (The Competitor must leave the workstation and is not allowed to enter it within 10 minutes)

2. As in the electrical test, the door anti-pinch function test cannot be performed by a single person, please assemble and connect the local control box using the components and materials provided at the workstation. Refer to the schematic diagram to connect the local control box to the door control unit terminal strip, so as to allow the local door opening and closing function for the anti-pinch test of the right door (physical door) of Car B1.

ILLUSTRATION	FUNCTION DESCRIPTION
	1. The Door Open and Door Close buttons of the control box will function when the key is at the Local position, and will not function when the key is at the Centralized Control position. 2. When key is at the Local position, pressing the Door Open button can open the door and pressing the Door Close Button can close the door.

Note: The Competitor may give up this item and apply to the Experts that the equipment be restored by the Experts or designated technicians, in which case no marks will be awarded for this item. (The Competitor must leave the workstation and is not allowed to enter it within 10 minutes)

After completing all items involved in task B4, the Competitor needs to report the operation status to the Experts. Only with the Experts' approval can the Competitor proceed to the next task.

B5 Passenger compartment door electrical function test

Task B5 requires the Competitor to complete the passenger compartment door electrical function tests through the ground test bench according to the standards and requirements of the WSC2026_WM61_B Installation and Commissioning of Passenger Compartment Door Work Manual. Main work items include:

1. Conduct electrical function tests according to operation standards;

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2. Record the electrical faults found during the test in the B5 Passenger compartment door electrical function test Record Sheet and submit the Record Sheet to the Experts (or designated persons) for review. The Competitor can fix the faults found only with approval (Note: Review of a fault is allowed to be submitted twice only).

Note: Do not fix faults without approval.

Note: The WSC2026_TP61_ B_R03 Passenger Compartment Door Fault Example Description Table clarifies the types of defects, and any defects not described in the Table are considered normal.

3. After completing all items involved in task B5, the Competitor needs to report the operation status to the Experts and submit the Record Sheet (B5). Only with the Experts' approval can the Competitor proceed to the next task.

Post-operation site cleaning

After all tasks are completed, the Competitor should clean the site and return the tools.

1. Turn off the power supplies;
2. Arrange the equipment neatly and clean the site;
3. Return tools and remaining materials. Check the tools and remaining materials again to ensure that they have all been returned.

Instructions to the Competitor

Instructions

1. The Competitor should not bring any device irrelevant to the Competition to the workstation.
2. Tools, electrical components and materials for the skill competition are all provided at the workstation for the Competitor's free access.
3. During the Competition, for matters irrelevant to the Competition contents, such as use of the washroom, or report of equipment, facilities, tooling, or tool faults, the Competitor can seek help from the Experts.
4. The Competitor may refer to the reference documents for the skill competition provided.

Operation safety rules

(1) Put on proper personal protective equipment according to operation requirements;
(2) Take site safety protection measures and confirm that no safety hazards exist;
(3) Before performing operations with power off, confirm that the power supplies are turned off and hang the No Switching On plate;
(4) Before performing operations with power on, turn on the power supplies after confirming that no safety hazards exists;
(5) Do not operate in a violent or an unsafe manner, including but not limited to forcibly pulling, dragging, smashing, throwing, and other violent behaviors, as well as behaviors that may cause personnel injuries or damage to equipment;
(6) When using a torque spanner, do confirm the correctness of the torque; set the torque to 0 when returning the spanner;
(7) All the tools or materials used during operations should be placed in the tool trolley or on the rubber tool mat only.

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Note: If a Competitor fails to comply with the operation safety rules and is considered to be have operated in a dangerous manner or have caused a safety hazard in the workplace, or equipment damage or personal injuries, marks will be deducted. In serious cases, the Competitor may be disqualified from the Competition.

Record Sheets

The Record Sheets to be filled out during completion of this Test Project are:

1. Installation and commissioning of passenger compartment door pre-operation inspection Record Sheet
2. B1 Passenger compartment door installation and adjustment Record Sheet
3. B3 Passenger compartment door overall appearance inspection Record Sheet
4. B5 Passenger compartment door electrical function test Record Sheet

Note: Record Sheets will be provided separately.

References

1. WSC2026_WM61_B Installation and Commissioning of Passenger Compartment Door Work Manual
2. WSC2026_TP61_A_R03_Pantograph Fault Example Description Table

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Installation and commissioning of passenger compartment door pre-operation inspection Record Sheet

Country/Region:_____Competitor:_____

Instructions:

1. Record abnormal equipment/tools/materials only and mark the corresponding options with "☒". After inspection of all equipment/tools/materials, sign at the bottom of the Record Sheet;
2. If an item needs to be replaced or claimed, submit this Record Sheet to an Expert (or designated person). For replacement of an item, the original one needs to be provided as well. The Expert have the right to reject requests for items that are not abnormal;
3. The Review Result column will be filled in by the Expert (or designated person) who should sign at the bottom of the Record Sheet after requests have been reviewed and handled.

No.	Equipment/Tool/Material Name & Specification	Problem Description	Request	Review Result
1			Replacement☐ Claim for new item☐	Approved☐ Rejected☐
2			Replacement☐ Claim for new item☐	Approved☐ Rejected☐
3			Replacement☐ Claim for new item☐	Approved☐ Rejected☐
4			Replacement☐ Claim for new item☐	Approved☐ Rejected☐
5			Replacement☐ Claim for new item☐	Approved☐ Rejected☐
6			Replacement☐ Claim for new item☐	Approved☐ Rejected☐

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7			Replacement☐ Claim for new item☐	Approved☐ Rejected☐
8			Replacement☐ Claim for new item☐	Approved☐ Rejected☐

Expert (or designated person):

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B1 Passenger compartment door installation and adjustment Record Sheet

Country/Region:_____ Competitor:_____

Instructions:

1. If the operation result is a value by measurement, fill in the exact figure.
2. If the operation result is not a value by measurement, mark the corresponding option within the Operation Result column with "☒".
3. Facing the outside of the door; the left-hand side the left leaf and the right-hand side is the right leaf

No.	Operation Item	Operation Sub-item	Operation Result	
1	Passenger compartment door mechanical parameters adjustment	Adjust door leaves parallelism, and apply torque to threaded pins	Left door leave a: _____mm Right door leave a: _____mm Torque spanner applicable range _____ to _____ N·m Torque value _____ N·m	
2		Adjust door leaf pre-load, and apply torque to the fasteners of the door leaf carrier and door leaf. Measurement positions: Locate the lower measurement position at a distance of 150 mm above the threshold Locate the upper measurement position at a distance of 1800 mm above the threshold	Left: Y1_____mm (Top) Y2_____mm (Bottom) Y3_____mm (Y2 - Y1)	Right: Y1' _____mm (Top) Y2' _____mm (Bottom) Y3' _____mm (Y2' - Y1')
			X1_____mm (Bottom) X2_____mm (Top) X3_____mm (X2-X1) 8	
			1. Fastening bolt in eccentric wheel: Torque spanner applicable range _____ to _____ N·m Tightening torque: _____ N·m **2. Other 8 bolts:** Torque spanner applicable range _____ to _____ N·m Tightening torque: _____ N·m	

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3		Adjust the door leaves centering	Completed or not: Yes □ No □	
4		Adjust the upper swing out movement	Left door leaf a: _____mm Right door leaf a: _____mm	
5		Adjust the lower swing out movement	Left door leaf a: _____mm Right door leaf a: _____mm	
6		Adjust door leaves height, and apply toque to the drive unit bolts	Top vertical distance a: _____– _____ mm Bottom vertical distance b: _____– _____mm	
			Torque spanner applicable range _____ to _____ N·m Torque value _____ N·m	
7		Adjust the roller swing arms and apply torque to the fasteners	Torque spanner applicable range _____ to _____ N·m Torque value _____ N·m Completed or not: Yes ☐ No ☐	
8		Adjust the seal pressing at the upper area, and apply torque to the upper guide rail fasteners	Left door leaf b: _____mm Right door leaf b: _____mm *The parameter b here refers to the same distance of the b mentioned in the adjustment of the seal pressing at the lower area.	
9		Check the total width of the finger protection rubbers after the door is closed	Top a: _____mm Bottom a: _____mm	
10		Adjust the seal pressing at the lower area	Left door leaf b: _____mm Right door leaf b: _____mm	
11		Ensure the four corners of the door are not obviously beyond the car body surface	Protrusion at the upper left corner of the left door leaf: _____mm Protrusion at the lower left corner of the left door leaf: _____mm	Protrusion at the upper right corner of the right door leaf: _____mm Protrusion at the lower right corner of the right door leaf: _____mm

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12		Install and adjust the support rollers, and apply torque to the fasteners	**1. Hexagon Bolt:** Torque spanner applicable range _____ to _____ N·m Torque value _____ N·m **2. Hexagon Nut:** Torque spanner applicable range _____ to _____ N·m Torque value _____ N·m Completed or not: Yes ☐ No ☐
13		Adjust the door opening width Measuring points are 1800mm above the threshold	Door opening width _____mm
14	Passenger compartment door accessories installation and adjustment	Install and adjust the isolating lock mechanism, and apply torque to the fasteners	Torque spanner applicable range _____ to _____ N·m Torque value _____ N·m Door isolation function is Normal ☐/ Abnormal ☐
15		Install and adjust the catch hook, and apply torque to the fasteners	Torque spanner applicable range _____ to _____ N·m Torque value _____ N·m Completed or not: Yes ☐ No ☐
16		Install and adjust the emergency egress device (torque application not required)	Device unlocking function is effective and can be locked ☐ Device unlocking function is ineffective and cannot be locked ☐
17		Bind and fix the steel wire rope	Completed or not: Yes ☐ No ☐
18		Complete the electrical connection of door indicators and install the cover plates within the door area (torque application **not required**)	Completed or not: Yes ☐ No ☐
Task Completion Description:		1. The door can open and close normally, with no obvious sticking or friction. 2. The right side vertical cover plate is properly installed.	

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Supplemental description (if necessary):

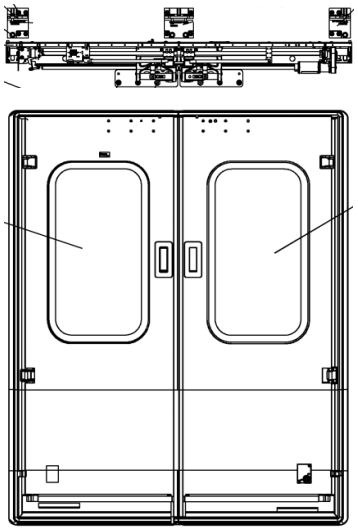
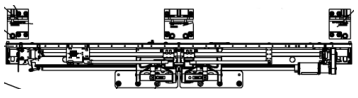
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B3 Passenger compartment door overall appearance inspection

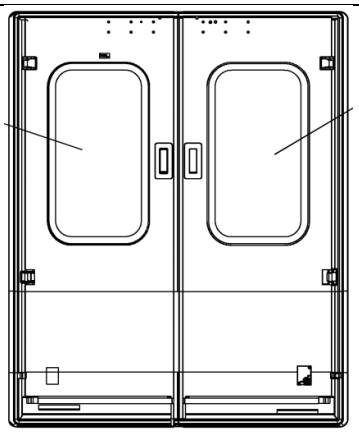
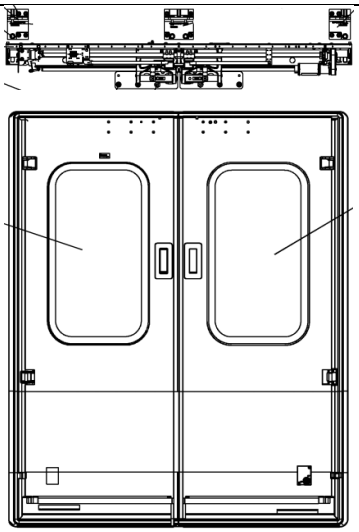
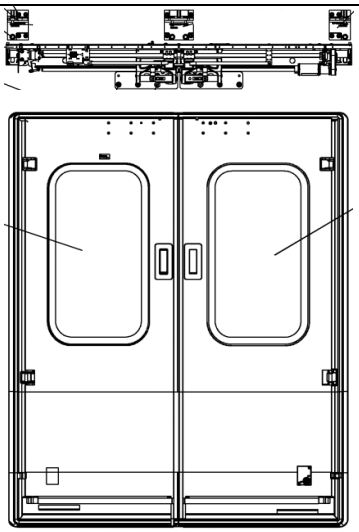
Country/Region:_____ Competitor:_____

Instructions:

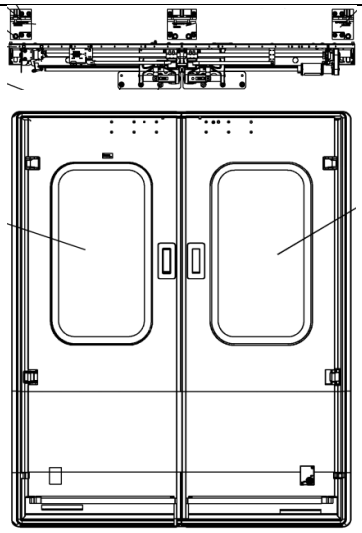
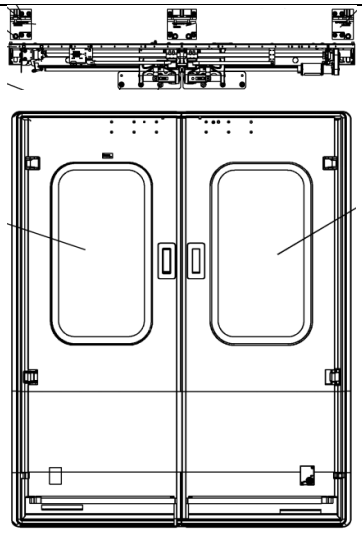
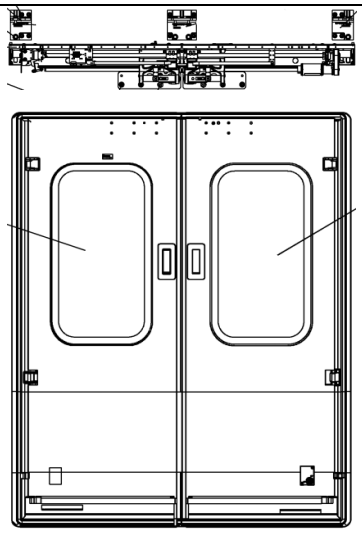
1. For the record of a single faulty part, fill in one row of the table, where the Competitor should circle the faulty position in the Fault Position Illustration column. If a part has multiple faults, additional annotations can be added as needed. (Note: The fault point should be at the center of the circle, and the diameter of the circle shall not exceed 10 mm.)
2. In the Fault Description column, describe fault type only, such as loose fastener, stains, and foreign objects;
3. Maintenance for the faults is not required.

No.	Faulty Part	Fault Position Illustration	Fault Description
1			
2			

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3			
4			

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5			
6			
7			

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Supplemental description (if necessary):

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B5 Passenger compartment door electrical function test Record Sheet

Country/Region:_____ Competitor:_____

Instructions:

1. Record faults as per the requirements of the Record Sheet.
2. Before fixing a fault, submit the Record Sheet to an Expert (or designated person), and the fault can be fixed only with approval. If the fault found is not correct, the Expert (or designated person) has the right to reject the request, and the Competitor can fill in the backup line and apply again;
3. If a fault is rejected twice, no marks will be given for the fault, and the fault will be fixed by the Experts or designated technicians instead (the Competitor must leave the workstation and is not allowed to enter it within 2 minutes);
4. The Review Result column is filled by an Expert (or designated person) and confirmed with his/her signature.

No.	Fault Phenomenon	Fault Position and Description	Review Result	Reviewed by
Example	*When pressing the Open LH Doors button in Car A1, the door cannot open*	*Wire XXX of Car XX is not connected to contact XXX* *Wire XX of Car XXX is incorrectly connected to contact YYY, wire YYY is incorrectly connected to contact XXX*	/	/
Fault 1			Approved☐ Rejected☐	
Fault 1 (backup)			Approved☐ Rejected☐	

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Fault 2			Approved☐ Rejected☐	
Fault 2 (backup)			Approved☐ Rejected☐	
Fault 3			Approved☐ Rejected☐	
Fault 3 (backup)			Approved☐ Rejected☐	

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