

Mitsubishi Fuso Light-Duty Bus  
ROSA

Body Building Manual

Export Model 2019

BE741E

BE741G

BE741J

BE740J

BG740G

Issued: December, 2020

Mitsubishi Fuso Truck & Bus Corporation

三菱ふそうトラック・バス株式会社

**Issuance of Mitsubishi Fuso ROSA Body Building Procedures**

Thank you very much for the continuous support you show to Mitsubishi Fuso.

In accordance with Euro VI Vehicle Emissions Controls, the specifications of the 2019 model have been revised.

Hereby, we would like to inform you of, and provide you with additional points and revisions for body building procedures. Upon receipt of this information, please fill in and return the following acknowledgement of receipt by facsimile.

. . . . . Cut Here . . . . .

FAX No.: +81(0)44-330-5827

TO: Marketing Daimler Truck Asia, Bus Product Management  
Mitsubishi Fuso Truck and Bus Corporation

Receipt of Mitsubishi Fuso ROSA Body Builder Manual

1. Company name: \_\_\_\_\_

2. Address: \_\_\_\_\_ Postal code: \_\_\_\_\_

3. Phone No.: \_\_\_\_\_

4. FAX No.: \_\_\_\_\_

5. Name of section/group responsible for storage: \_\_\_\_\_

6. Name of representative responsible for storage: \_\_\_\_\_

7. Title: \_\_\_\_\_

8. Date of receipt and copies received: \_\_\_\_\_ Date: \_\_\_\_\_ / \_\_\_\_\_ copies

9. Message: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Introduction

These body building procedures summarize general technical precautions for building and modifying the 2019 model Mitsubishi Fuso Rosa (hereinafter called the "Rosa"), in accordance with Euro VI Vehicle Emissions Controls.

We would like to ask you to assemble and/or modify the Rosa by sufficiently understanding all relevant laws and regulations, including the Road Transport Vehicle Act safety standards and to be aware of body builder's responsibilities.

Some parts of these procedures require referring to the Body Bilder Manual For Truck "Common Document Please do so where necessary.

If there are any revisions to or additional descriptions of these procedures, Mitsubishi Fuso Truck & Bus Corporation (hereinafter called "MFTBC") will provide information on the correction of or addition to the procedures you have.

Should you have any questions or inquiries about body building, please do not hesitate to contact the nearest MFTBC dealer or the following contact phone number.

### Mitsubishi Fuso Truck and Bus Corporation

890-12 Kashimada, Saiwai-ku, Kawasaki-shi, Kanagawa Prefecture, 212-0058, Japan.

Marketing Daimler Truck Asia, Bus Product Management Phone: +81(0)44-330-7053, Fax: +81(0)44-330-5827



# Table of Contents

<b>5 Matters Concerning Modification</b>	
5.1 General Precautions	5 - 1
5.1.1 Prohibited Matters	5 - 1
5.1.2 Safety Parts	5 - 1
5.2 Chassis Parts Modification	5 - 2
5.2.1 Modification of Chassis Frame	5 - 2
5.2.2 Modification of Chassis Pipes, Hoses and Wires for Control System	5 - 2
5.2.3 Silencing Parts for Vehicle noise regulations	5 - 2
5.2.4 Exhaust System	5 - 3 to 4
5.2.5 Fuel Tank	5 - 4
5.3 Body Modification	5 - 4
5.3.1 General Precautions for Body Modification	5 - 4
<b>6 Matters Concerning Painting</b>	
6.1 Predelivery Painting of Vehicle Body	6 - 1
6.2 Precautions when Repainting	6 - 1
6.2.1 When Repainting Body Outer Panels	6 - 1
6.2.2 Prohibition of Painting	6 - 2
6.2.3 Handling of Laminated Glass	6 - 2
6.2.4 Painting of Disc Wheel	6 - 3
6.2.5 Parts to be Disassembled at the Time of Forced Baking	6 - 4 to 6
6.3 Adhesion of Labels and Stickers	6 - 7
6.3.1 Adhering Procedures	6 - 7 to 12
6.4 Cleaning Solvent	6 - 7
<b>7 Matters Concerning Electricity</b>	
7.1 Electrical Wiring	7 - 1
7.1.1 Body Parts and Existing Wires in the Vehicle	7 - 1
7.1.2 Additional Wires	7 - 1 to 2
7.1.3 Grounding	7 - 2
7.1.4 Fuse	7 - 2 to 3
7.1.5 Wire Size and Acceptable Electric Current	7 - 3 to 4
7.1.6 Recommended Combination of Fuse Capacity and Wire Size	7 - 4
7.2 Precautions for Handling Electronic Devices	7 - 5
7.2.1 Precautions for Electric devices	7 - 5
7.2.2 Precautions for ABS related Parts	7 - 5
7.2.3 Precautions for DUONIC related parts	7 - 5
7.2.4 Precautions for Handling the Advanced Emergency Braking System (AEBS) Related Parts	7 - 6
7.2.5 Precautions for Handling Lane Departure Warning System (LDWS) Related Parts	7 - 7
7.2.6 Precautions for SRS Air Bag	7 - 8
7.2.7 How to Output Speed Signal	7 - 9
7.2.8 Output of Power	7 - 10

Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date

# Table of Contents

**7 Matters Concerning Electricity**

- 7.2.9 Installation of Audio System to Instrument Panel ..... 7 - 11
- 7.3 Lighting Device ..... 7 - 12
  - 7.3.1 Requirements on Lighting Device ..... 7 - 12

Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date





## 2

## Matters Concerning Weight

**2.1 Total Vehicle Weight after Body Building**

- (1) For the total vehicle weight after body building, satisfy the descriptions in the following "Total vehicle weight limit in terms of brake control" and 2.2 Tolerable Weight Limit.

	Standard brake specifications	Limit for body building	Total vehicle weight limit in terms of brake control
	Vehicle category		M3
BE741E	Front: Disc Rear: Disc	Refer to the specifications for each destination.	6170kg
BE741G	Front: Disc Rear: Disc	Refer to the specifications for each destination.	
BE741J BE740J	Front: Disc Rear: Disc	Refer to the specifications for each destination.	6370kg
BG740G	Front: Disc Rear: Disc	Refer to the specifications for each destination.	6200kg

- (2) Total vehicle weight limit and load capacity by category based on notified emission.

The emission gas category is determined based on the vehicle weight. Sufficiently verify the total vehicle weight after body building.

Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date

## 2

## Matters Concerning Weight

**2.2 Tolerable Weight Limit**

**Building a body in a manner in which weight is applied to an axle beyond the weight limit of that axle or to the tyres beyond their weight limits, is not allowed.**

- (1) The following shows the weight limits of each axle. For details, refer to the specifications for each destination.

Vehicle Model	BE741E	BE741G	BE741J BE740J	BG740G
Front Axle	2500kg			
Rear Axle	3800kg			

- (2) List of standard tyres, air pressure and tolerable weights

Vehicle Model	Tyre size	Destination	Standard air pressure kPa/Tolerable weight applied to tyres	
			Front Wheel	Rear Wheel
BE741E	205/85R16-117/115 LLT	Hong Kong Chile	525 /2380kg	350 /3600kg
BE741G	205/85R16-117/115 LLT	Australia	550 /2240kg	350 /3600kg
		Hong Kong Singapore Chile	525 /2570kg	350 /3600kg
	205/80R17.5-120/118 LLT	Taiwan	550 /2640kg	350 /3820kg
BE741J BE740J	205/85R16-117/115 LLT	Australia	600 /2570kg	425 /3980kg
		Hong Kong Singapore Chile	550 /2440kg	375 /3700kg
		New Zealand	600 /2570kg	400 /3840kg
BG740G	205/85R16-117/115 LLT	New Zealand	600 /2570kg	375 /3700kg

- (3) Tyre and air pressure labels

The label attached to the vehicle body indicates the standard tyre and air pressure.

Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date

2

# Matters Concerning Weight

## 2.3 Vehicle Body Tilt

As the increase or decrease in body weight resulting from body building or modification could change a vehicle's attitude, legal conformity, performance or safety may be diminished.

Build or modify the body considering the left/right and front/rear weight differences, so that a vehicle's attitude will be as described below after building and modification.

(1) Vehicle attitude tolerance levels

After building and modification, body tilt must be within the following range.

Item		Unladen	Laden
Fore-Aft (TL)	Tilt angle ( $\theta$ )	-0.25° to -1.25°	-0.05° or less
Right-Left (BL)	Difference in Tail Lamp lateral ground height	±15mm	±30mm

( - : indicates forward tilting)

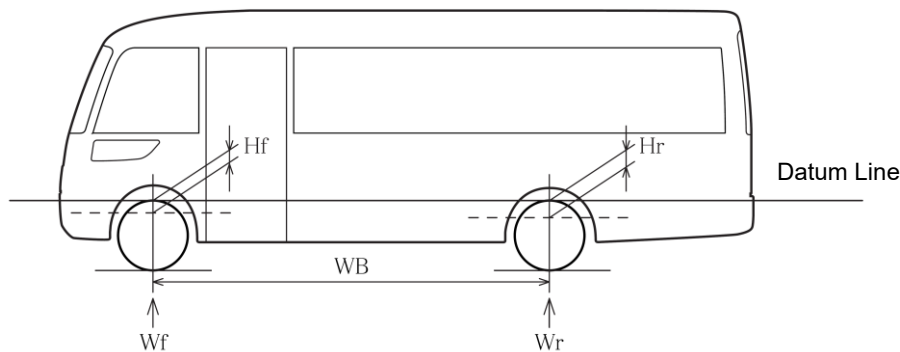
Reference: Base vehicle attitude guidelines (conditions: empty, filled with 100 litres of gasoline and spare tyre tools, 75kg on the driver seat)

	Normal state
BE741E	-0.6°
BE741G BG740G	-0.7°
BE741J BE740J	-0.6°

(2) Front tilt

The amount of change ( $\theta$ ) for the base vehicle can be estimated by the following. Consider this sufficiently when designing.

- How to calculate the volume of change in tilting angle:  $\theta$



Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date











4

Matters Concerning Body Building

Area	Minimum clearance	Precautions
11. Exhaust System	/	<ul style="list-style-type: none"> <li>• Refer to 5.2.4 "Exhaust System" for the gaps between the control cables/hydraulic hoses and the Exhaust system parts of the body building equipment, hydraulic equipment and electrical wires.</li> <li>• Do not install any parts in the outlet direction of the Exhaust Pipe.</li> </ul>
12. Fuel Tank	/	Filling fuel and discharging from the drain bolt must not be disturbed.
13. Frame	/	A chassis number is stamped on the front left side surface of the Side Member. Build body parts in a way that the chassis number can be confirmed from the vehicle side.

Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date





<b>4</b>	<b>Matters Concerning Body Building</b>
----------	---

**4.3 Prevention of Fire Accidents**

**4.3.1 Precautions for the Engine Compartment**

Because the Engine compartment and the areas in the vicinity of the exhaust system become extremely hot, changes in the routing of fuel, brake and vacuum pipes, hoses and harnesses, as well as changing coolant pipes and cables with other types.

**4.3.2 Precautions for Electric Wiring**

For electric wiring, follow the descriptions in "7.1 Electric Wiring."

**4.3.3 Precautions for Exhaust Pipes**

When retreating DPF, soot is burned within the DPF, therefore, the Exhaust Pipe becomes extremely hot and dangerous. Be sure to maintain sufficient clearance around the pipe and take appropriate countermeasures for heat protection. Do not assemble any parts or components around or on the backside of the exhaust vent.

Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date







## 4

## Matters Concerning Body Building

**4.4.4 Precautions for DUONIC Body Building**

The DUONIC of this vehicle is equipped with a computer which controls it. Due to this, incorrect operation could result in a system error or even serious damage to the computer itself.

Pay attention to the following points during body building.

## (a) General precautions for handling

- (1) Do not change the tyre size or the final ratio of vehicles with DUONIC.
- (2) Do not modify equipment, devices, sensors, harnesses or connectors which relate to DUONIC.
- (3) When disconnecting the connector relating to DUONIC, turn the vehicle starter switch OFF first. Moreover, connect the connector before turning the starter switch ON.  
If the connectors of equipment and devices are disconnected while power is supplied to the TCU, the warning lamp could turn ON or functions could deteriorate.
- (4) When painting the Transmission body, mask electric parts, harnesses, connectors, breather and oil cooler pipe joints.  
In addition, mask the label (AFT ONLY, GEAR OIL ONLY) attached to the area near the oil feeding plug to avoid the label from becoming unreadable by paint and thus to prevent the use of incorrect oil.
- (5) After completing body building, check that the vehicle can be driven without problem.

Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date







## 5

## Matters Concerning Modification

## (3) Emission Gas Purifier (DPF and SCR catalyst) and sensors

- (a) Pay special attention to handling of the Emission Gas Purifier (DPF and SCR catalyst) during building. A large impact applied to it, such as falling, could cause damage to it.
- (b) Because there will be negative influence to Emission Gas Purifier (DPF and SCR catalyst) and Engine main unit, do not relocate sensors for the Emission Gas Purifier (DPF and SCR catalyst), emission temperature sensors or pressure sensors. If it is unavoidable to remove them temporarily during building, be sure to return them to their original position.
- In particular, pay attention to avoid assembling the pressure sensor hose backwards or allowing excessive slack or tension. Be sure to set clips to the hose joints and check that there are no gas leaks.
- (c) The Emission Gas Purifier (DPF and SCR catalyst) is disassembled for maintenance. Assemble it appropriately so that there will be no problem when assembling or disassembling.

**5.2.5 Fuel Tank**

- (1) Precautions for relocation and addition of the Fuel Tank  
Do not relocate or add Fuel Tanks.

**5.3 Body Modification****5.3.1 General Precautions for Body Modification**

- (1) From the viewpoints of a vehicle's safety, reliability and commercial value, do not make modifications, including welding or making notches on the standard vehicle.
- (2) Do not relocate the Battery.
- (3) Do not change or relocate lamps.

Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date

## 6

## Matters Concerning Painting

**6.1 Predelivery Painting of Vehicle Body**

The following top coat painting (complete painting) is conducted before delivery to customers.

Manufacturer	Paint Description
DAI NIPPON TORYO	DELICON H-120LB-NA

**6.2 Precautions when Repainting****6.2.1 When Repainting Body Outer Panels**

- (1) Although highly adhesive non-sanding paint is used for painting before delivery, sanding is recommended to completely remove oil and contaminants on the paint surface.
- (2) It is recommended that an air-dry urethane-based paint be used.
- (3) When drying, the temperature of painted surface must be 80°C or lower to protect plastic and rubber parts. If the temperature exceeds 80°C, apply heat shielding.

Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date

























## 7

## Matters Concerning Electricity

- (2) Be sure to install a fuse in the expanded wire circuit, add vinyl-shielded clamps as required and pay special attention to avoid short circuits. Use a fuse with a capacity approximately 1.4 times the loaded current.

Example: For a fuse whose loaded current is 9A:

$$9 \times 1.4 = 12.6$$

Therefore, a 15A standard fuse will be the fuse whose capacity is most appropriate.

Rated current of fuse for load (Japanese Automotive Standards Organization: JASO D610-75)

Load Current A	Less than 7	7 to less than 11	11 to less than 14	14 to less than 21
Fuse Rated Current A	10	15	20	30

Note: If the loaded current is 3.5A or less, it is acceptable to use a 5A fuse.

### 7.1.5 Wire Size and Acceptable Electric Current

- (1) Select an electric wire type from among those in the following table. (JASO D 609: Allowable current of low voltage cables for automobiles)

Type of Electrical Wire	Allowable Ambient Temperature	Remarks
AV wire (Low-voltage cables for automobiles)	60°C or less	This is used for normal wiring
AVX wire (Heat Resistant low-voltage cables for automobiles)	70°C or less	This is used for wiring in the high ambient temperature area around the engine
AEX wire (Heat Resistant low-voltage cables for automobiles)	90°C or less	This is used for wiring in the high ambient temperature area around the engine

Avoid routing wires and cables in spaces where the ambient temperature exceeds 70°C as much as possible.

If it is not avoidable, use AEX wires.

Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date



## 7

## Matters Concerning Electricity

**7.2 Precautions for Handling Electronic Devices**

The following are precautions for body building of vehicles equipped with electronic control systems.

**7.2.1 Precautions for Handling Electronic Devices**

The electronic parts installed in vehicles equipped with an electronic control system, including sensors, control unit and actuators, use multipolar connectors suitable for the low current of electronic circuits. Pay attention to the following handling procedures.

- (1) Do not disconnect or connect unnecessary connectors. Otherwise, terminals could become deformed and damaged, causing a contact failure.
- (2) Be sure to hold the housing to disconnect the connectors. Do not pull a wire or remove the connectors forcibly. Otherwise, the terminals could become deformed.
- (3) Pay attention to avoid water, oil or dust adhering to the terminal after disconnecting the connector. Otherwise, a contact failure or unstable power connection could occur.
- (4) Be sure to connect the connector after handling. When wires are disconnected for maintenance, be sure to fix the wires in their original locations upon completion.
- (5) Before disconnecting the connectors, turn the vehicle starter switch OFF. Moreover, connect the connector before turning the starter switch ON. If the connectors are disconnected while power is supplied to the control unit, the warning lamp could turn ON or functions could deteriorate.
- (6) When performing electric welding, follow the precautions described in the Body Builder Manual for Truck "Common Version."
- (7) When cleaning the cabin, pay attention to avoid water splashing on the control unit, relays and connectors.
- (8) Requirements for electronic devices to be assembled  
Do not use electronic devices, including relays, solenoid valves and motors, unless they are equipped with surge protectors, such as diodes and varistors.  
This does not apply to the devices if it is confirmed that they do not produce voltage beyond the requirements for the transient voltage test specified by JASO D001, Environmental testing general rule of automotive electric equipment.
- (9) After assembly operations, check that there are no abnormal conditions in the electric system of the electronic control system. For inspection, refer to the maintenance manual issued by MFTBC.

**7.2.2 Precautions for Handling ABS Related Parts**

It is strictly prohibited to conduct the following modification because it will adversely affect the performance of the ABS.

- (1) Changing the Brake Pipe between the Hydraulic Unit and the Wheel Brake
- (2) Cutting and splicing electric wires
- (3) Modification of the control main unit

**7.2.3 Precautions for handling DUONIC (Dual Clutch Automatic Transmission) related parts**

When building, follow the precautions described below.

- (1) When painting the main Transmission Unit, mask electric parts, wires, harnesses, connectors, the breather and transmission control cable joints.
- (2) It is prohibited to route wires and harnesses along the transmission oil cooler pipes as they become extremely hot.
- (3) After completing body building, engage the selector level in each range and check that the vehicle can be driven without problem.

Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date













## 7

## Matters Concerning Electricity

**7.3 Lighting Device****7.3.1 Requirements for Lighting Device**

Regulations for lighting devices will be enforced for vehicles registered in January 2006 and after. These regulations apply to modified vehicles, therefore it is necessary to mount lighting devices which comply with relevant safety standards.

Moreover, when building vehicle bodies, be sure to check for the most recent standards which are relevant to this matter, including safety standards, to conduct statutory body building.

## (1) Contents of regulation

- Harmonization of technical standards for lighting devices with European laws and regulations.
- Respective technical standards apply to each lighting device (colour of light, light distribution, illuminance), in addition to the standards which apply at the time of installation to the vehicle.
- For more details, refer to the Safety Regulations for Road Vehicles and its appendix, "Technical Standard."

## (2) Precautions for building activity

- Standard vehicles satisfy the regulations. Therefore, do not attach/detach, modify or change electrical circuits unless it is necessary.
- The light axis direction of dipped beam headlamps and front fog lamps are adjusted as follows before delivery from the factory.

If there is a change in vehicle attitude resulting from building heavy parts while the vehicle is unloaded or the lighting devices are disassembled during body building, adjustment is required to balance the vehicle. (The adjustment procedures are described in the maintenance manual)

Lighting device	Orientation of optical axis
Dipped front beam	Facing down: $0.7^{\circ} \pm 0.1^{\circ}$
Front fog lamp	Facing down: $1.147^{\circ} \pm 0.2^{\circ}$

## (3) When changing and adding the lighting devices

- Refer to the regulations for lighting devices.
- When building vehicle bodies, be sure to check with the most recent standards which are relevant to this matter, including safety standards, to conduct statutory body building.

Code	Revision No.	Descriptions	Date	Code	Revision No.	Descriptions	Date

All rights reserved

---

# Building Procedures of Light Duty Bus Rosa

Issued: December, 2020

Mitsubishi Fuso Truck and Bus Corporation

890-12 Kashimada, Saiwai-ku, Kawasaki-shi,  
Kanagawa Prefecture, 212-0058, Japan.

---