

Foreword

This manual is to provide data and directions for the personnel responsible for repairing Hualing series truck chassis, and it also includes the methods for adjustment and repair operation. By referring to this manual, you will be able to correct the fault quickly; there may be some parts that are different from those described in the manual due to improvement of the product; when using this manual, please make sure that the data in this manual are identical with the physical goods, if there is any shortcoming, you are kindly invited to point them out so that we will be able to correct them in the next edition.

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Anhui Hualing Automobile Co., Ltd.

Before reading this manual

- Various data are indicated herein on the basis of the model number of the trucks, the motor vehicle type, engine number, etc. Therefore, you are kindly requested to confirm the model number, etc., of the truck that you have purchased.
- You are kindly requested to understand that the contents of the descriptions and sketches in this manual differ somewhat from the actual truck in some cases that you have purchased because of different specifications, improvements made, etc.
- The meanings of the marks used in this manual are described as follows:



: It stands for special accessories.

- In this manual, the following four items of prompts describe the important precautions and give supplement notes. Each item contains important contents, and therefore, they shall be read and observed carefully.

Danger

It describes the operation that shall be paid attention to when appending such dangerous materials as the battery fluid or the additives to cooling fluid, etc.

Warning

It means that when this precaution is not observed, a serious injury, a fire or even a fatal accident may be resulted from sometimes.

Caution

It means that if this precaution is run counter to, dangerous conditions or damages to equipment and parts, etc., may be caused wherefrom sometimes.

Note

It describes the recommendations, supplementary knowledge, etc., necessary for effectively operating the motor vehicle.

- In this manual, the numerical values are shown in SI unit (Standard International Unit) with the conventional unit (Metric unit) indicated in { } after it. In case the numerical values are not indicated in both units, it means the value in SI unit is the same as that in the Metric unit. SI unit is the abbreviation of Le système International d'Unités.

e.g. 686kpa {7kgf/cm²}

_____ Conventional unit (Metric Unit)

_____ SI unit (Standard International Unit)

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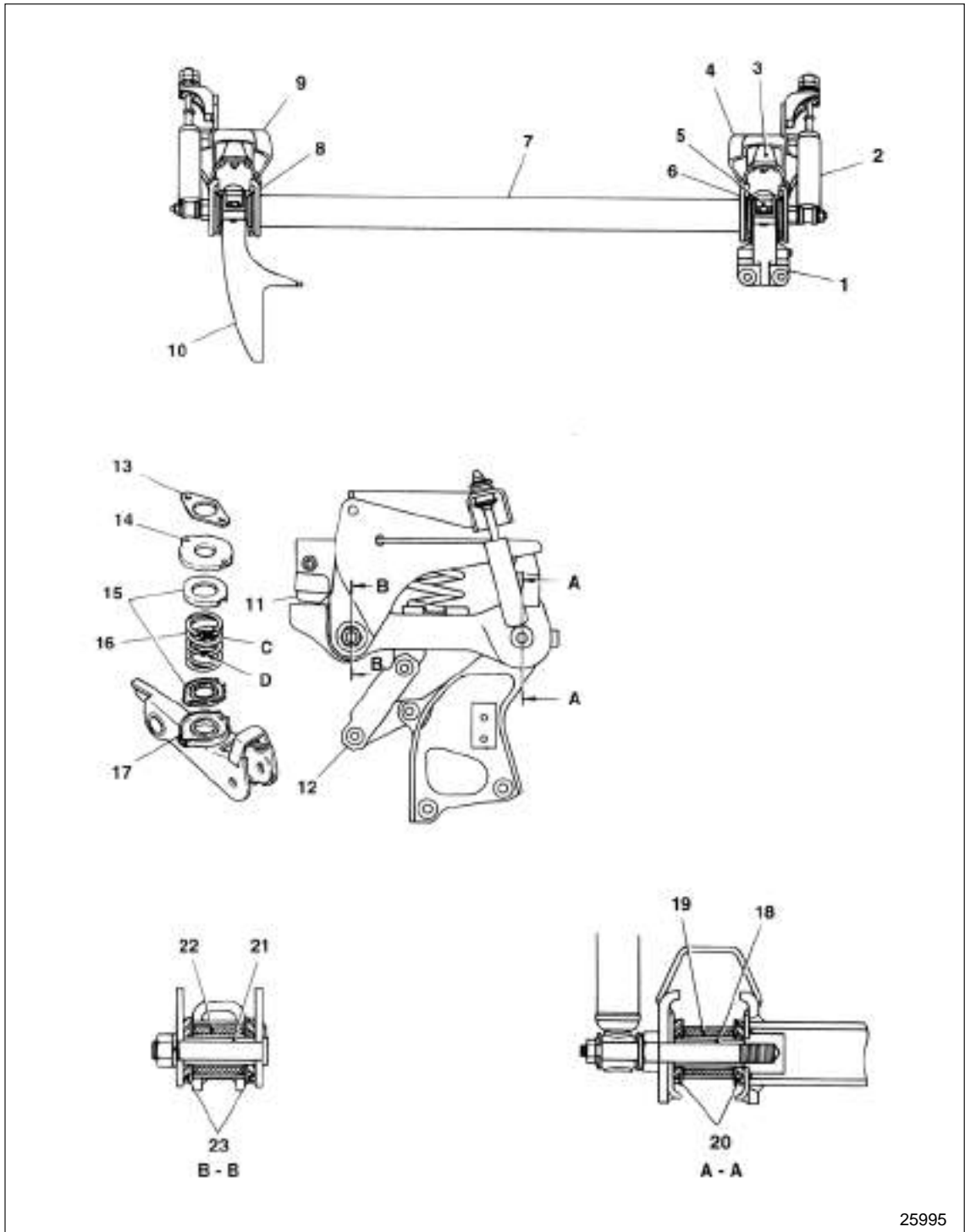
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Structure and Working Principle

► Installation for front end of the cab (installation of the cab)

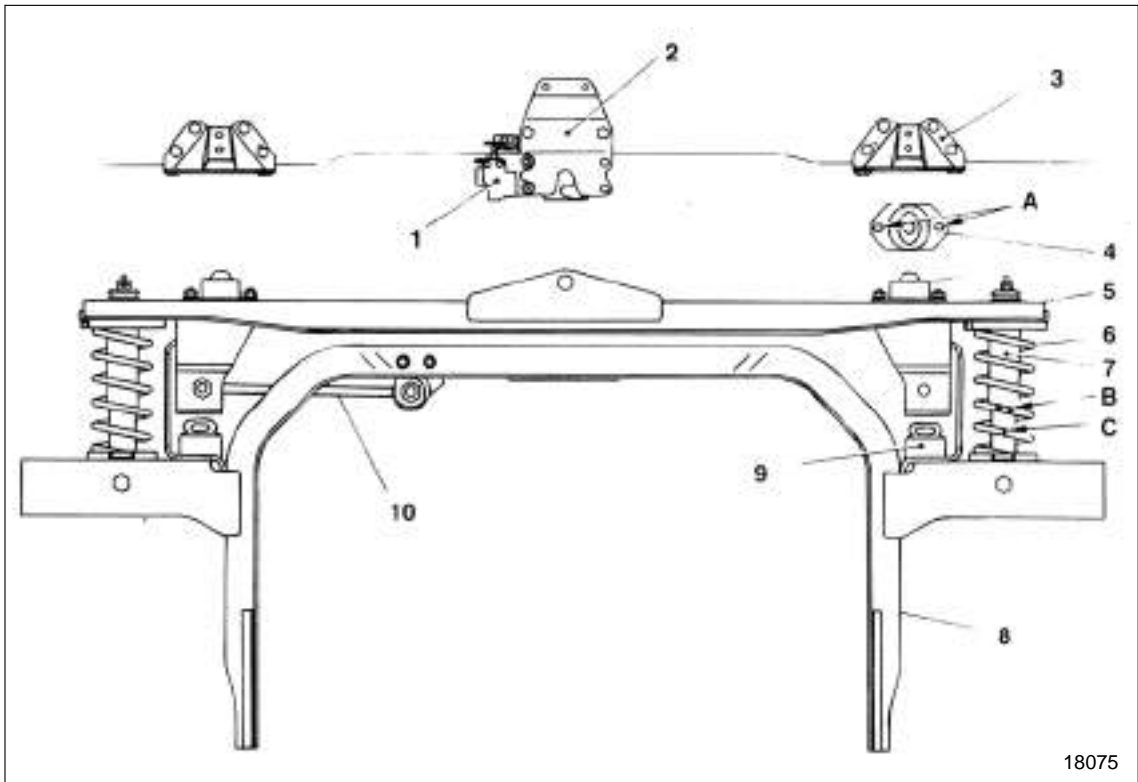


Cab

- | | |
|------------------------------------|----------------------------------|
| 1. lower bracket of cab hinge, RH | 14. spring seat |
| 2. damper | 15. inner spring seat |
| 3. rubber dog A | 16. spiral spring |
| 4. upper bracket of cab hinge, RH | 17. spring seat |
| 5. cab hinge cover | 18. sleeve |
| 6. connecting arm, RH | 19. central bolster of cab hinge |
| 7. stabilizing rod | 20. side bolster of cab hinge |
| 8. connecting arm, LH | 21. sleeve |
| 9. upper bracket of cab hinge, LH | 22. central bolster of cab hinge |
| 10. lower bracket of cab hinge, LH | 23. side bolster of cab hinge |
| 11. rubber dog B | C: paint mark |
| 12. stay bar of the cab | D: paint mark |
| 13. gasket | |

- Gasket 13 is installed on mounting position of spiral spring that is at the side of driver's seat.
- There applied paint mark C and D on spiral spring 16.
- Paint mark C that is marked with two lines is used to indicate relative spring with different specification. (purple: all vehicles excluding dumper; orange: dumper.
- Paint mark D that is marked with one line, is used to adjust orientation of the cab. There equipped with three (white, yellow, red) kinds of spring with different strength. Spring strength is white, yellow and red in turn.
- Because spiral spring has no mounting orientation, the position of paint mark C and D is not always on the position of left figure. When installing spring, its top and bottom may be inverted.

► Installation for rear end of the cab (installation of the cab)



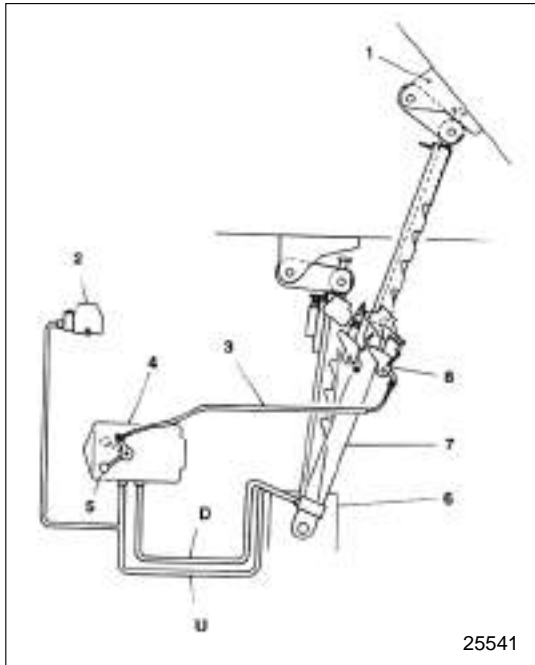
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- 1. tilting locking switch of the cab
- 2. hydraulic latch
- 3. bottom bracket
- 4. bump rubber
- A: adjustment of long circular hole
- B: paint mark
- C: paint mark

- 8. gap bridge of the cab
- 9. rubber dog
- 10. tie rod
- 5. floating transom
- 6. spiral spring
- 7. damper

- Position of bottom bracket 3 and bump rubber 4 can be adjusted by long circular hole that is at the side of bump rubber.
- There applied paint mark B and C on spiral spring 6.
- Paint mark B that is marked with two lines is used to indicate relative spring with different specification. (Azury: all vehicles excluding dumper; pink: dumper.)
- Paint mark C that is marked with one line, is used to adjust orientation of the cab. There equipped with three (white, yellow, red) kinds of spring with different strength. Spring strength is white, yellow and red in turn.

Because spiral spring has no mounting orientation, the position of paint mark B and C is not always on the position of left figure. When installing spring, its top and bottom may be inverted.



► **Tilting system of the cab (installation of the cab)**

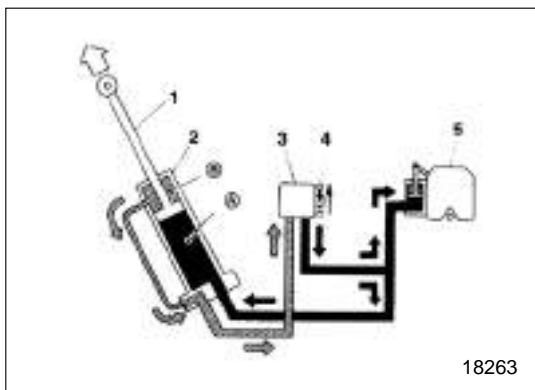
1. upper bracket
2. hydraulic latch
3. control cable
4. tilting oil pump of the cab
5. rod
6. lower bracket
7. tilting hydraulic cylinder and rod assembly of the cab
8. rod

D: lower side hydraulic line

U: raise side hydraulic line

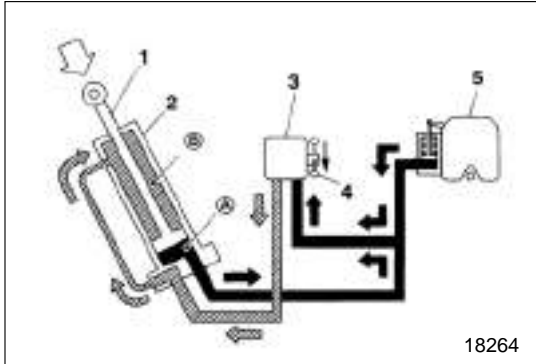
Tilting system of the cab includes an oil pump that produces hydraulic pressure, a retractable hydraulic cylinder that makes cab raise aslant and lower aslant, and an electric system that controls these works.

- Raising and lowering of the cab aslant is operated by rod 5 of tilting oil pump 4 of the cab.
- Rod 5 connects with rod 8 of tilting hydraulic cylinder and rod assembly 7 through control cable 3. When lowering cab, lock condition of tilting hydraulic cylinder and rod assembly can be relieved immediately.
- Hydraulic latch 2 is mounted on rear end of the cab, and links installation of cab and rear end of the cab. When the cab rises aslant, lock condition is relieved by hydraulic pressure.
- For detailed information of each part of tilting system, please refer to the following content.
- tilting hydraulic loop of the cab
- tilting oil pump of the cab
- tilting hydraulic cylinder and rod assembly of the cab
- circuit of tilting system of the cab



• **Tilting hydraulic loop of the cab**

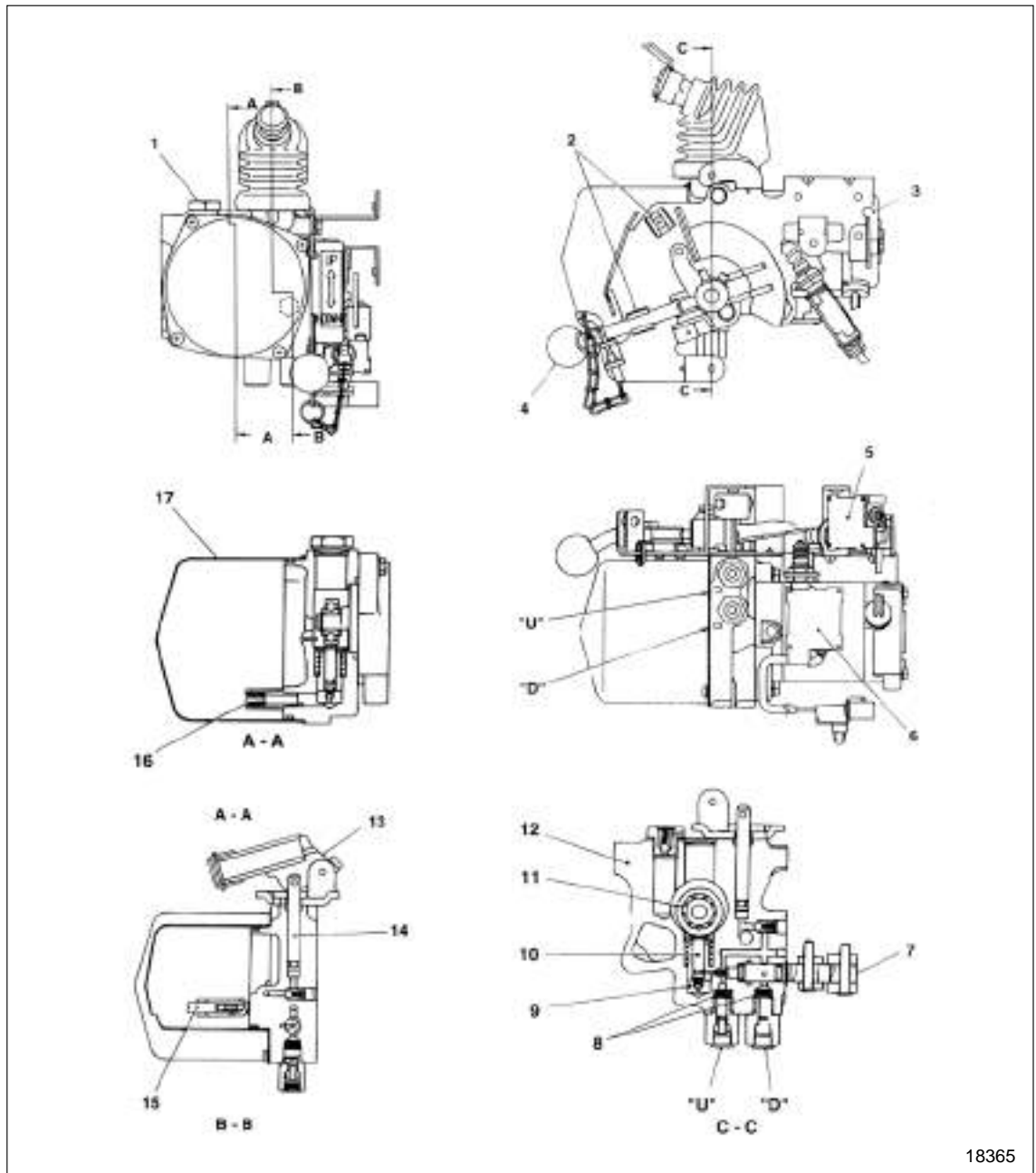
1. piston
2. tilting hydraulic cylinder of the cab
3. oil pump
4. tilting rod
5. hydraulic latch



► **When the cab rising aslant**

- When putting tilting rod 4 on UP position, hydraulic oil (tilting oil in the cab) will apply force to make the cab rise aslant as the following.
- Hydraulic oil supercharged by oil pump 3 flows into oil cavity A of tilting hydraulic cylinder 2 in the cab through passage at UP side [solid black]. At this time, hydraulic oil also flows into hydraulic latch 5, to relieve lock condition of mounting position at rear end of the cab.
- At the same time, hydraulic oil in oil cavity ⑧ of tilting hydraulic cylinder 2 is pressed back and flows into fluid reservoir of oil pump 3 through passage at DOWN side [diagonal lines].
- As a result, hydraulic oil in oil cavity A pushes piston 1 upwards, so to raise the cab aslant.
- When put tilting rod 4 on DOWN position, hydraulic oil will apply force to make the cab lower aslant as the following.
- Hydraulic oil supercharged by oil pump 3 flows into oil cavity ⑩ of tilting hydraulic cylinder 2 of cab through passage at DOWN side [diagonal lines].
- At the same time, hydraulic oil in oil cavity ④ of tilting hydraulic cylinder 2 is pressed back and flows into reservoir of oil pump 3 through passage at UP side [solid black]. Hydraulic oil that has acted on hydraulic latch 5 also flows back to reservoir of oil pump under the effect of spring in the hydraulic latch.
- As a result, hydraulic oil in oil cavity ⑧ pushes piston 1 downwards, so to lower the cab aslant.
- When the cab lowers aslant completely, hydraulic latch 5 will lock the cab.

► When the cab rising aslant



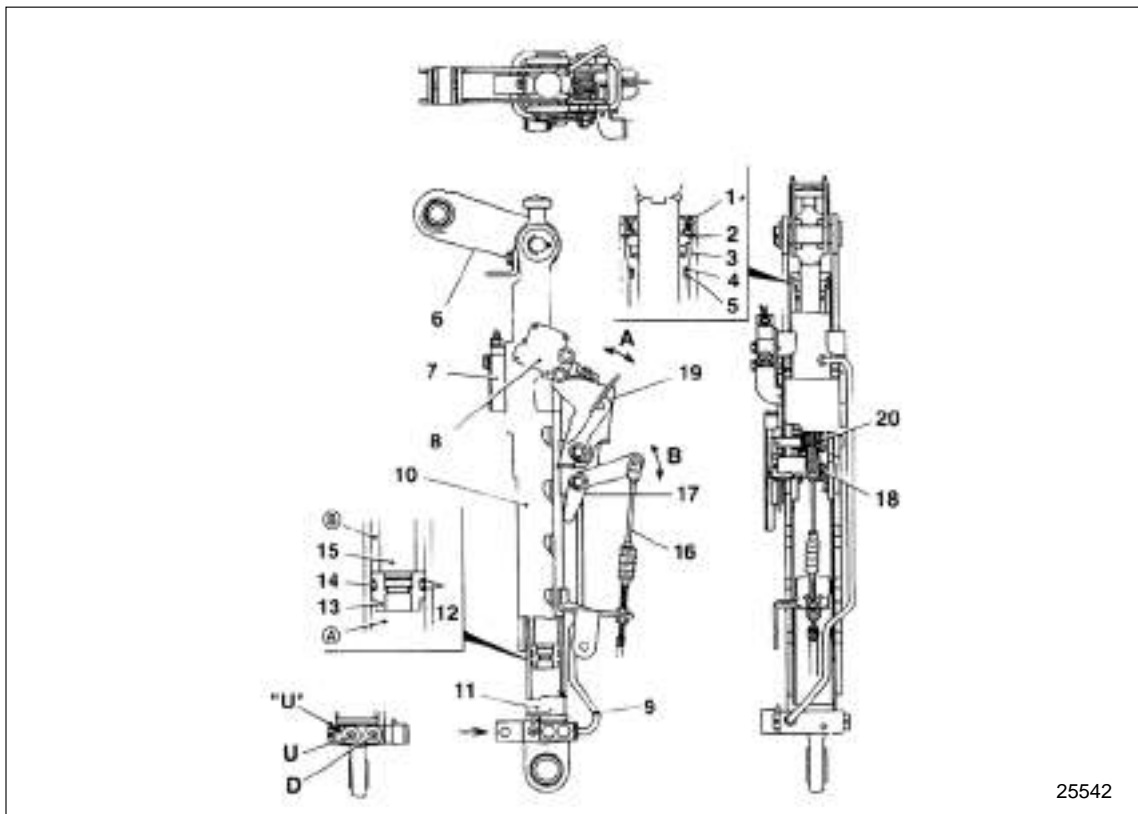
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- | | | |
|-----------------------|------------------------------|--------------------------------------|
| 1. oil feed port | 2. support | 3. DC C0 motor |
| 4. rod | 5. UP/DOWN changeover switch | 6. tilting switch of the cab |
| 7. shuttle valve | 8. filter | 9. subassembly of hydraulic cylinder |
| 10. piston | 11. bearing | 12. pump body |
| 13. hand oil pump rod | 14. piston | 15. safety valve |
| 16. filter | 17. fluid reservoir | D: DOWN (lower) |
- U: UP (raise)

- Oil pump is equipped with UP/DOWN changeover switch 5 and tilting switch 6 of the cab.
- Operation of rod 4 will transform contact of UP/DOWN changeover switch 5 and tilting switch 6 of the cab.
- Operation of rod 4 will also transform inner hydraulic oil passage of pump body 12 that is between hydraulic oil (tilting oil in the cab) loops at UP side and DOWN side.
- When DC motor 3 does not work normally because battery is lack of electric power or there is fault in electric system, use hand oil pump to make cab rise aslant or lower aslant.

Hand oil pump includes hand oil pump 13 and piston 14.

Inclined mark “U” indicates hydraulic oil feed port at UP side, “D” indicates hydraulic oil feed port at DOWN side. Countermarked at the bottom of pump body 12, they are used to prevent connecting line wrongly.



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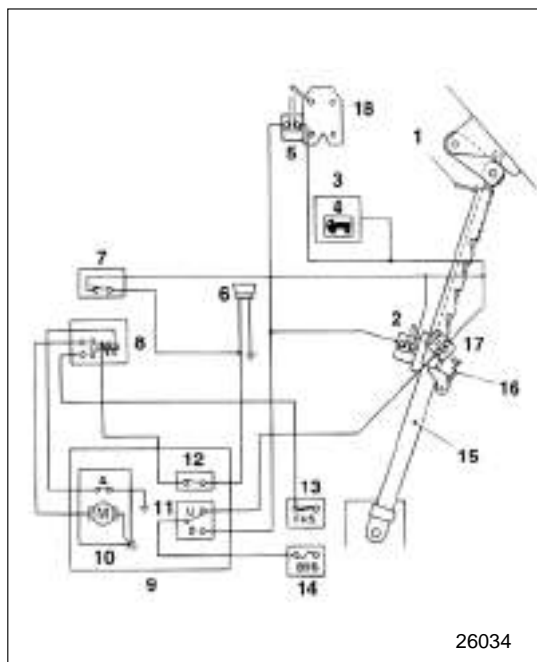
► Tilting hydraulic cylinder and rod assembly of the cab

- | | | |
|--------------------------------------------------|-------------------------------|----------------|
| 1. dust proof seal ring | 2. snap ring | 3. sleeve |
| 4. washer | 5. O washer | 6. rod |
| 7. limit switch for stroke of hydraulic cylinder | 8. tilting complete switch | 9. pipe |
| 10. stopper | 11. hydraulic cylinder barrel | 12. washer |
| 13. piston | 14. O ring | 15. piston rod |
| 16. control cable | 17. rod | 18. spring |
| 19. rod | 20. spring | |

Ⓐ: working oil cavity at UP side Ⓑ: working oil cavity at DOWN side D: DOWN orifice
U: UP orifice

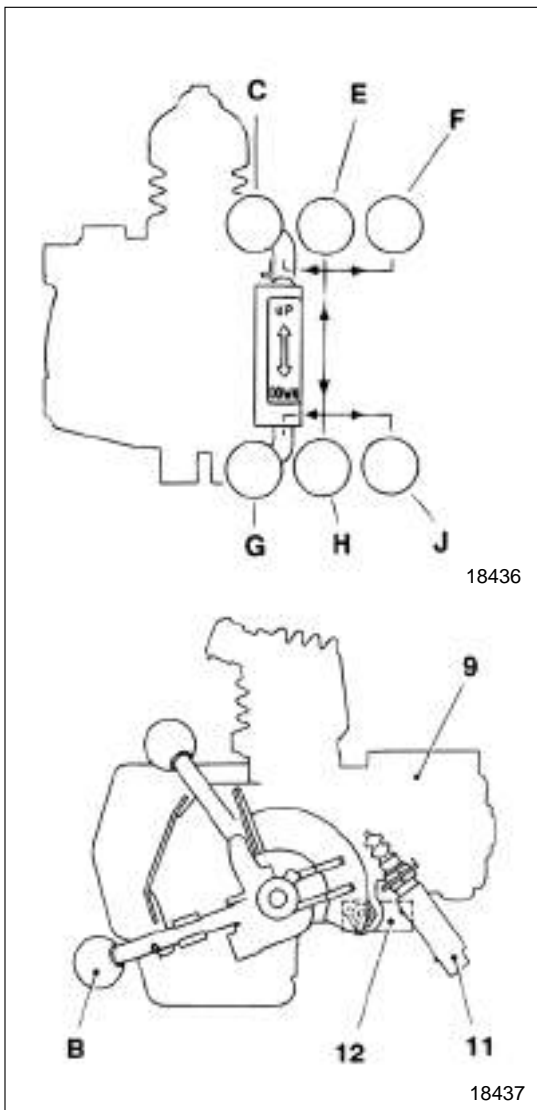
- Hydraulic cylinder barrel is separated into oil cavity (A) and oil cavity (B) by piston 13.
- When the cab rises aslant, hydraulic oil (tilting oil in the cab) flows into oil cavity (A); when the cab lowers aslant, hydraulic oil flows into oil cavity (B), and applies force to piston.
- On both sides of hydraulic cylinder barrel 11, there installed O ring 5, 14 and washer 4, 12. The aim is to prevent oil leakage.
- At the bottom of hydraulic cylinder barrel 11, there are UP orifice (marked “U”) that raises the cab and DOWN orifice (marked “D”) that lowers the cab.
- In the cylinder barrel, there also installed check valve that can prevent the cab falling off when hydraulic system gets wrong.
- Piston 13 is equipped with piston rod 15, which is connected to bottom surface of the cab through rod 6.
- When the cab rises aslant, if hydraulic system gets wrong, the cab may fall off. To prevent from falling off, it is equipped with ratchet stopper 10.
- Stopper acts with piston rod 15, and is locked by rod 19.
- When camion runs or the cab rises aslant, rod 19 is pressed to A direction by spring 20, and keeps pressing at ratchet of stopper 10.
- When finishing aslant rise, rod 19 is moved to bottom end of stopper 10, and pushes tilting complete switch 8 to prevent hydraulic cylinder from acting.
- Rod 17 is pressed to B direction by spring 18 but not block movement of rod 19.
- When the cab lowers aslant, the rod at the side of oil pump draws control cable 16, and rod 17 pushes rod 19, thus to relieve locking condition.
- Rod 6 is used to ensure that during running, the cab will not be raised forcedly by hydraulic cylinder because of vibration.

► Circuit of tilting system of the cab

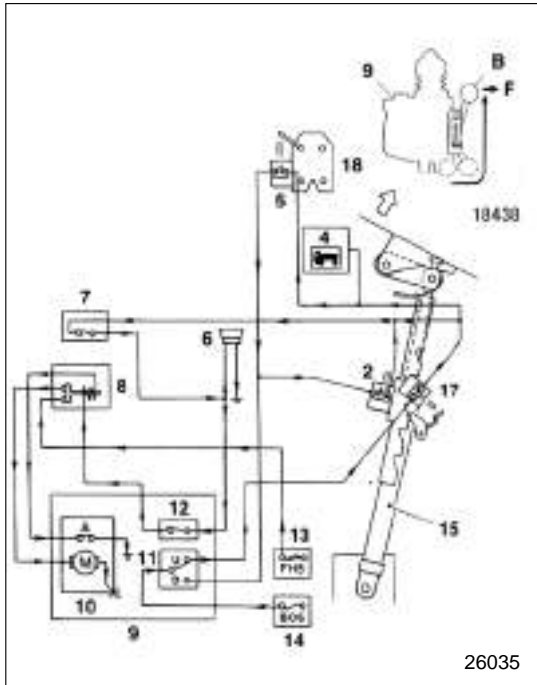


1. stopper
 2. limit switch for stroke of hydraulic cylinder
 3. combined instrument
 4. tilting warning lamp of the cab
 5. tilting locking switch of the cab
 6. buzzer
 7. neutral switch of transmission
 8. tilting relay of the cab
 9. tilting oil pump assembly of the cab
 10. tilting oil pump of the cab
 11. UP/DOWN changeover switch
 12. tilting switch of the cab
 13. strong-current fuse box
 14. fuse box
 15. tilting hydraulic cylinder and rod assembly of the cab
 16. stopper
 17. tilting complete switch
 18. hydraulic latch
- A: thermostatic switch
 D: DOWN
 M: DC motor
 U: UP

- Only when neutral switch of transmission 7 is in ON position or transmission is in neutral position, can switch on circuit of tilting system of the cab. When tilting system works, buzzer 6 will sound continually.
- Tilting hydraulic cylinder and rod assembly 15 of the cab is equipped with limit switch for stroke of hydraulic cylinder 2 and tilting complete switch 17. When finishing aslant rising or lowering, they will do the following operation automatically.
- When tilting hydraulic cylinder and rod assembly 15 of the cab retracts completely (finish rising and lowering operation), pressed down by stopper 1, limit switch for stroke of hydraulic cylinder 2 moves to OFF position.
- When tilting hydraulic cylinder and rod assembly 15 of the cab stretches completely (finish rising and lowering operation), pressed down by stopper 16, tilting completing switch 17 moves to OFF position.
- Tilting locking switch of the cab is installed on hydraulic latch 18 that is on the back of the cab. When lowering the cab to mounting bracket at the rear part of the cab completely, locking switch turns off forcibly.
- Tilting hydraulic pump 10 of the cab is equipped with thermostatic switch A. When fault of hydraulic system makes oil temperature increase, thermostatic switch is cut off and forces DC motor to stop, thus to protect hydraulic system. At this situation, buzzer 6 will sound continually.
- UP/DOWN changeover switch 11 and tilting switch 12 of the cab is transformed by moving rod B of tilting oil pump assembly 9.



Position of rod B	U/DOWN changeover switch 11	Tilting switch 12 of the cab
C	Contact closes at UP side	OFF
E		ON/OFF switching point
F		ON
G	Contact closes at DOWN side	OFF
H		ON/OFF switching point
J		ON



► **When the cab rising aslant**

Move rod B of tilting oil pump assembly 9 of the cab to UP position, and pull it to F. At this time, the cab will begin to rise.

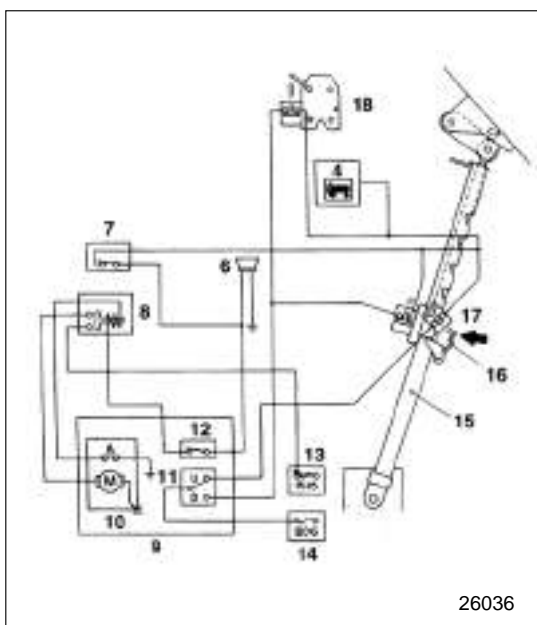
- osition of rod B: UP
- 14→1 (U) →18→4
- 5→2
- 7→
- 6→grounding

Buzz 6 will sound. At the same time, tilting warning lamp of the cab 4 will illuminate.

- osition of rod B: F (switch 12 will switch on at any moment)
- 14→11 (U) →17→7→13→8 (coil) →10 (A) →grounding

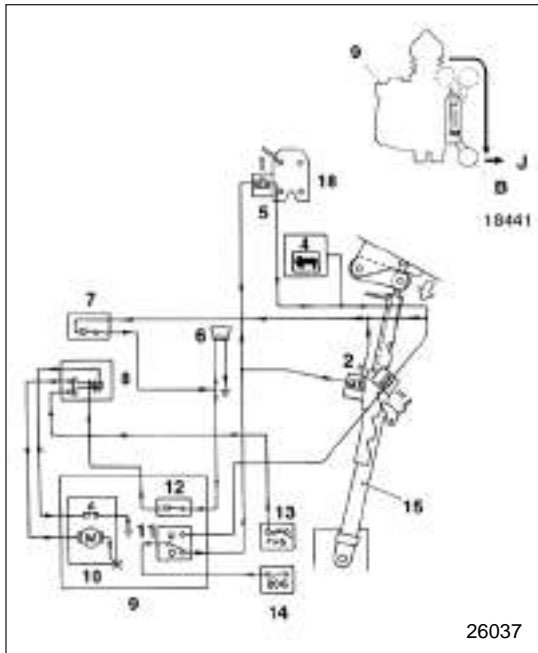
Tilting relay 8 of the cab is energized to make relay contact close.

- 13→8 (coil) →10 (M) →grounding



DC motor M of tilting oil pump 10 will run, and tilting hydraulic cylinder and rod assembly 15 of the cab will stretch, and the cab will begin to rise.

- When tilting hydraulic cylinder and rod assembly 15 of the cab reaches specified tilt angle, stopper 16 will make tilting complete switch 17 move to OFF position. (as shown by the arrow)
- Because tilting complete switch 17 is turned off, then tilting relay 8 of the cab will be cut off, too. DC motor M of tilting oil pump 10 of the cab will stop running. So, the cab stops rising. Buzz 6 stops sounding. At the same time, tilting warning lamp 4 of the cab will extinguish.



► **When the cab lowering aslant**

Move rod B of tilting oil pump assembly 9 of the cab to DOWN position, and pull it to J. At this time, the cab will begin to lower.

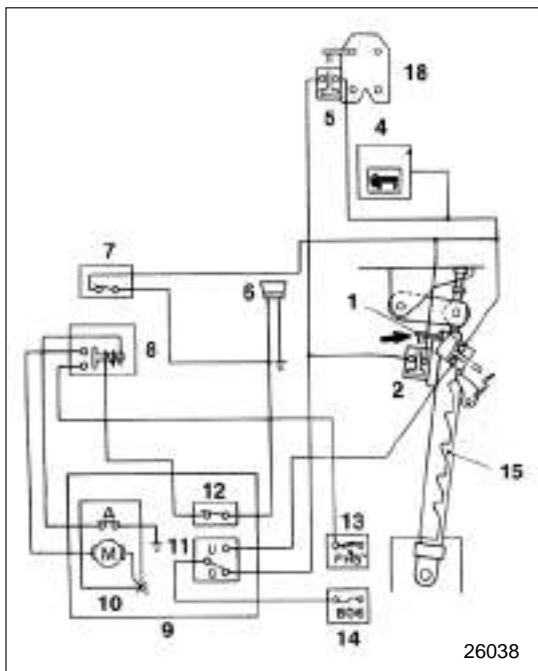
- Position of rod B: DOWN
14→11 (D) →2→7→12→grounding
5
→4

Buzz 6 will sound. At the same time, tilting warning lamp of the cab 4 will illuminate.

- Position of rod B: J (witch 12 will switch on at any moment)
- 14→11 (D) →2→7→12→8 (coil) →10 (A) →grounding

Tilting relay 8 of the cab is energized to make relay contact close.

- 13→8 (contact) →10 (M) →grounding



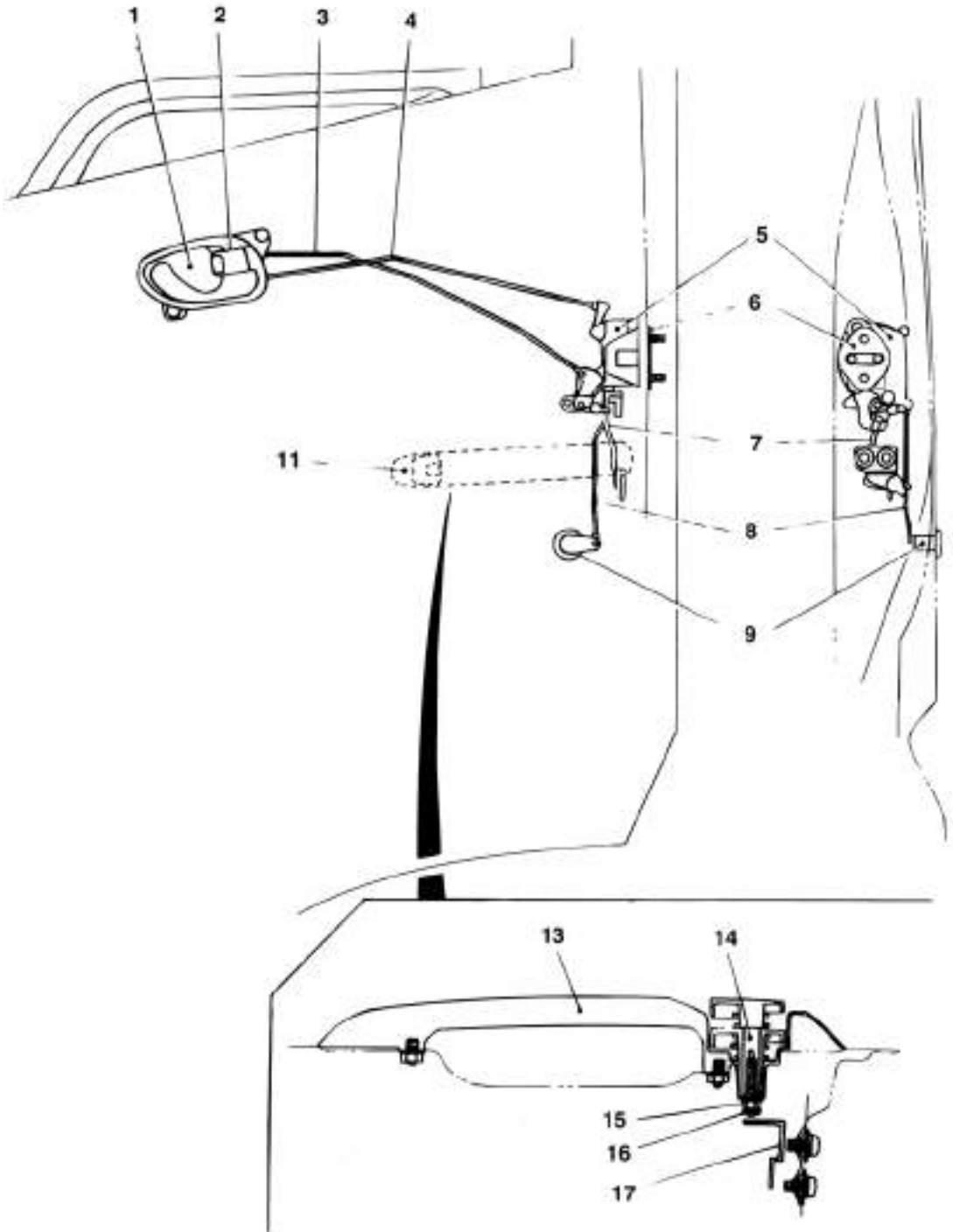
DC motor M of tilting oil pump 10 will run, and tilting hydraulic cylinder and rod assembly 15 of the cab will retract, and the cab will begin to lower.

- Even the cab has lowered to mounting position of itself, DC motor M of the tilting oil pump 10 will continue to run.
- When tilting hydraulic cylinder and rod assembly 15 reaches specified position, stopper 1 will make limit switch for stroke of hydraulic cylinder 2 move to OFF position. (as shown by the arrow)
- When hydraulic latch 18 fastens the cab fully, tilting locking switch 5 of the cab turns off.
- When limit switch 2 for stroke of hydraulic cylinder and hydraulic switch 5 mentioned above is turned off, circuit of switch 2 and switch 5 is cut off.

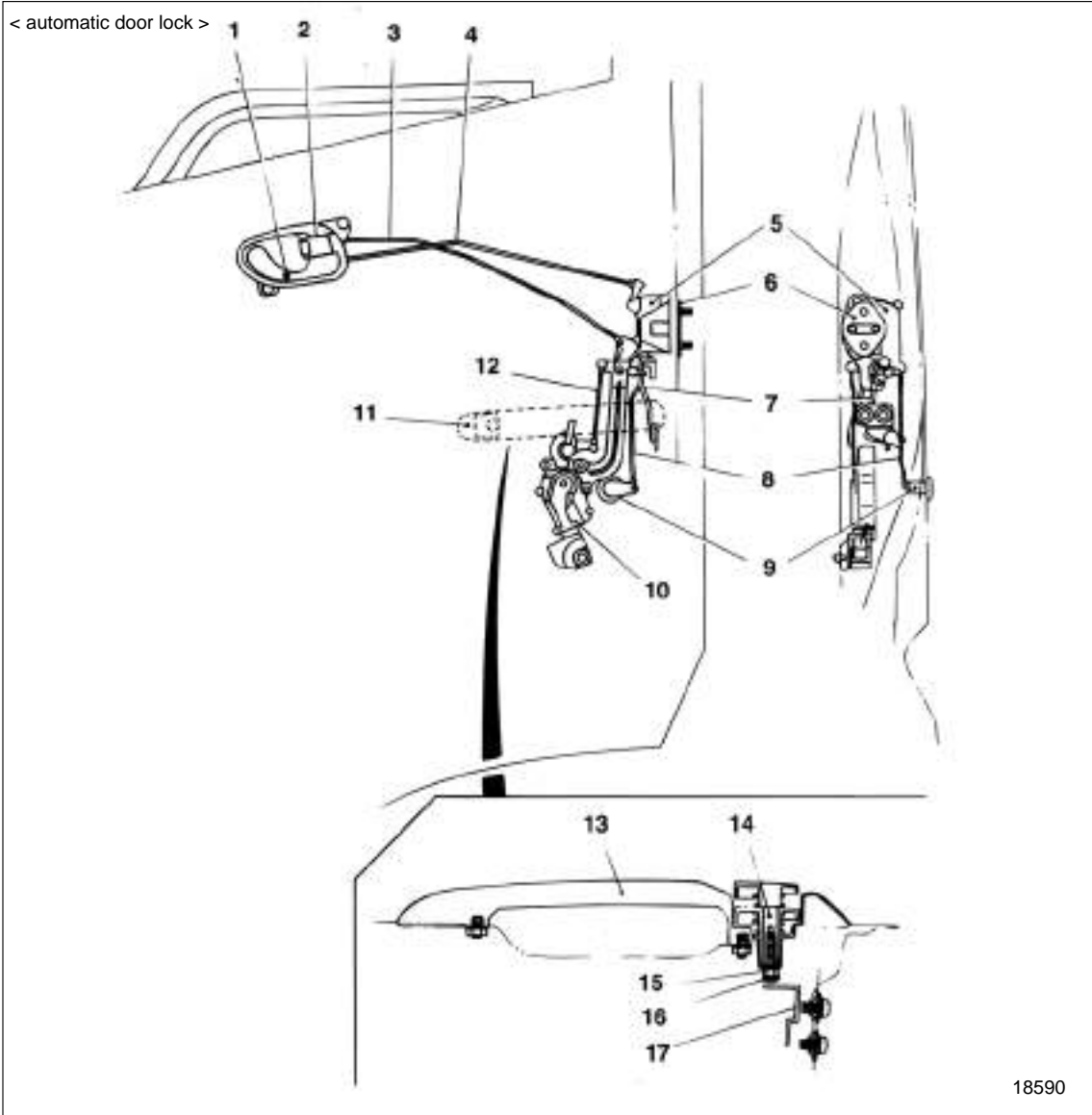
Thus, tilting relay 8 is cut off, motor M of tilting oil pump 10 stops running. The cab stops lowering. At the same time, tilting warning lamp 4 of the cab will extinguish.

► Door lock system

<hand door lock>



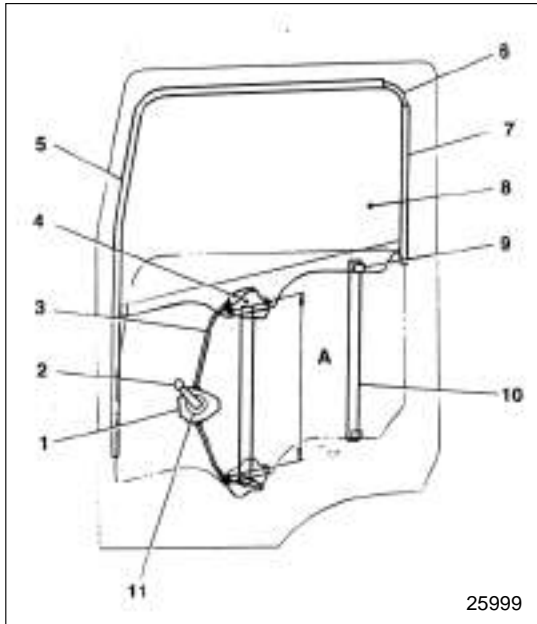
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- | | |
|----------------------------|-------------------------------------------------|
| 1. inner handle | 2. lock button of the door |
| 3. pull rod of door lock | 4. release rod of the door |
| 5. door latch | 6. latch eye |
| 7. release rod of the door | 8. pull rod for lock core of the door |
| 9. lock core of the door | 10. actuator of door lock (automatic door lock) |
| 11. outer handle assembly | 12. pull rod of actuator (automatic door lock) |
| 13. outer handle | 14. button |
| 15. nut | 16. screw |
| | 17. support |

- Outer handle assembly 11 can adjust stroke of button 14, thus to make the door open and close exactly.
- To adjust stroke, loosen nut 15 and rotate the bolt 16 fitted on button 14.
- The end of screw 16 will press support 17, then move release rod of the door to relieve door latch 5.



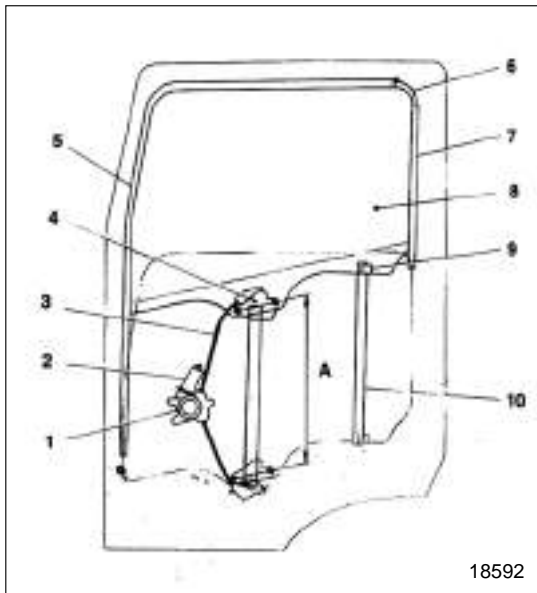
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► Open system for door glass <manual>

1. adjuster
2. adjuster handle
3. bracing cable
4. bracket disk
5. front frame of the door
6. lifting groove
7. rear groove of the door
8. door glass
9. sliding block
10. rear guide pulley
11. drum wheel

A: moving range of bracket plate

- Adjuster 1 makes drum wheel 11 interlock with bracket disk 4 through bracing cable 3.
- When rotating adjuster handle 2, bracket disk 4 is raised or lowered by bracing cable 3, thus to make door glass 8 rise or descend.
- Sliding block 9 connects with rear guide pulley 10, and slides along vertical direction.



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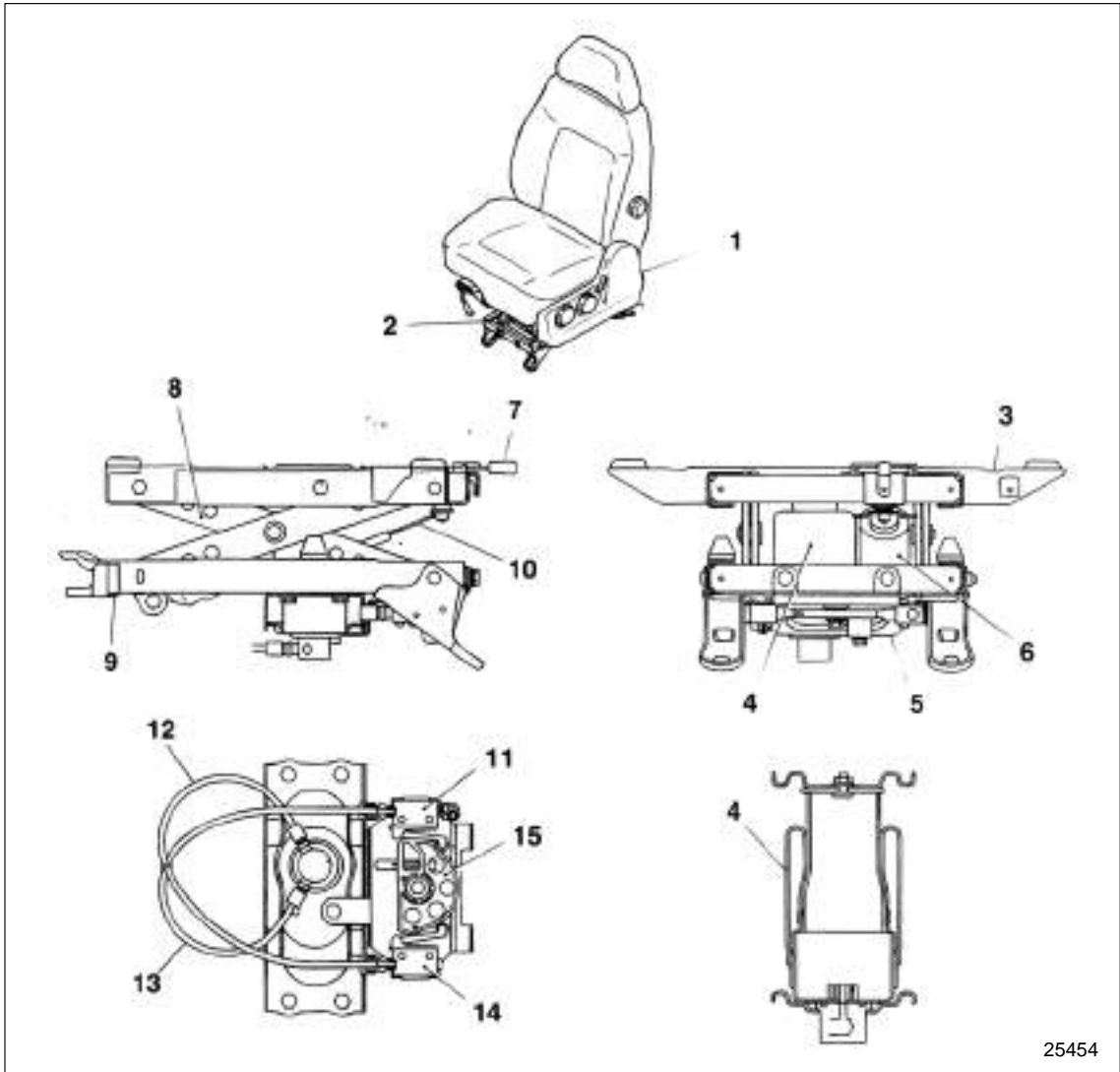
< Electrical operation >

1. adjuster
2. motor of power window
3. bracing cable
4. bracket disk
5. front frame of the door
6. lifting groove
7. rear groove of the door
8. door glass
9. sliding block
10. rear guide pulley

A: Moving range of bracket plate

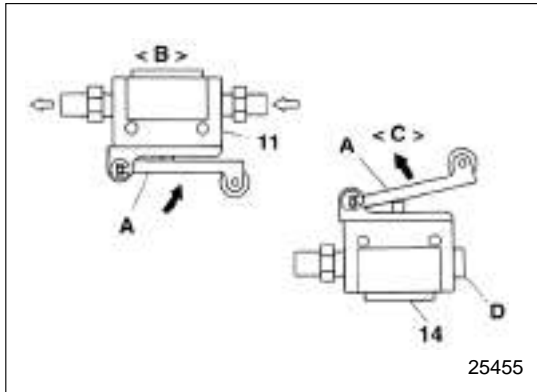
- Adjuster 1 makes motor of power window interlock with bracket disk 4 through bracing cable 3.
- When rotate adjuster handle 2, bracket disk 4 is raised or lowered by bracing cable 3, thus to make door glass 8 rise or descend.
- Sliding block 9 connects with rear guide pulley 10, and slides up and down.

► Pneumatic suspension seat (selecting parts)



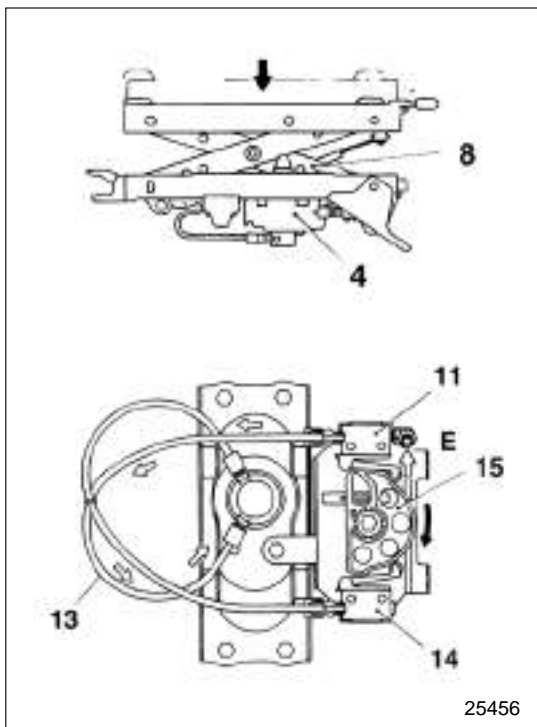
- | | | |
|---------------|----------------------------|----------------|
| 1. seat | 2. air suspension assembly | 3. upper frame |
| 4. air sleeve | 5. stiffening parts | 6. damper |
| 7. rod | 8. link rod | 9. lower frame |
| 10. spring | 11. mechanical valve | 12. air pipe |
| 13. air pipe | 14. mechanical valve | 15. cam |

The function of air suspension assembly 2 is to make the seat keep at constant height even if different-weighted drivers sit on the seat. By cam mechanism 15, mechanical valve 11 and 14, air pressure is supplied to air sleeve 4 automatically, to make the seat keep at some height.



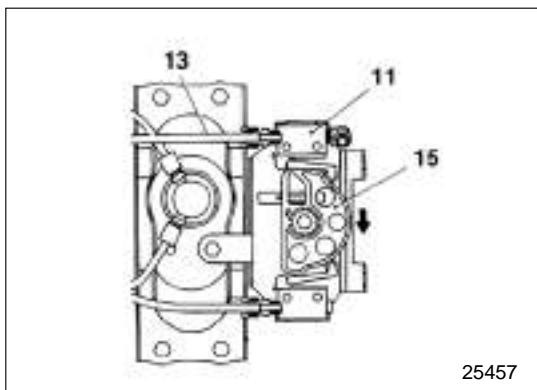
► **Motion of mechanical valve**

- Mechanical 11 and 14 open or close air passage, which depends on the motion of rod A.
- B: Open air passage
- C: Close air passage
- D: Anechoic plug



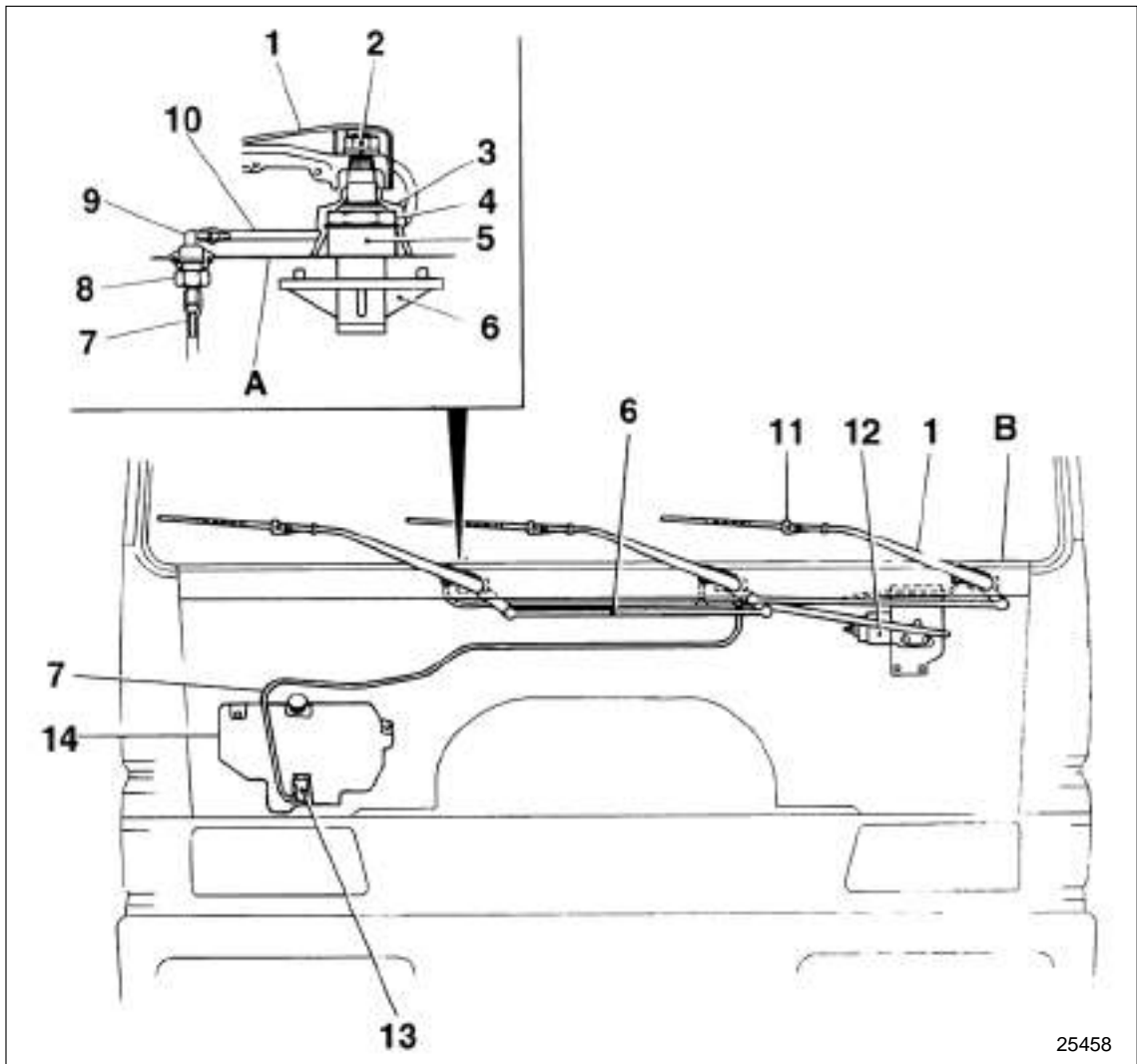
► **Motion of air suspension when the driver sits on the seat**

- When link rod 8 is pressed down by driver's weight, cam 15 will rotate slightly to open air passage of mechanical valve 11. At this time, air passage of mechanical valve 14 is closed.
- Air pressure E comes into air sleeve 4, and lifts link rod 8.



- When link rod 8 lifts and cam 15 returns to original position, air passage of mechanical valve 11 is closed. Seat cushion will return to preset position.

► Wiper and scrubber system



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- | | | |
|--------------------------------|-----------------------------|-------------------------------------|
| 1 wiper arm and brush assembly | 2 nut | 3 shaft cover |
| 4 nut | 5 spacer sleeve | 6 link rod assembly of wiper |
| 7 wiper hose | 8 nut | 9 hose connector |
| 10 hose | 11 scrubber nozzle assembly | 12 wiper motor and bracket assembly |
| 13 scrubber motor | 14 cleaning fluid tank | |
- A: lower plate of sealing cover
B: sealing strip

Troubleshooting

► The whole cab

Possible reason		Failure								
		The cab bounces (topple up and down)	The cab or steering wheel vibrates at high frequency (about 20 Hz) or makes noise	During running, the cab waves highly	Tilting warning lamp of the cab does not illuminate	Tilting warning lamp of the cab does not illuminate	Operation of control rod for hook is too loose.	It is difficult to raise the cab aslant.	Remark	
Related to cab	Fixed installation of the cab	Installation of the cab is loose. There is clearance.	○							
		Rubber gasket is pressed down.		○						
		Main lock hook cannot hitch bracket of lock hook pin tightly.					○			
		Installation of torque rod is not correct.						○		
	Suspended installation of the cab	Installation of front end	Mounting position of hinge cover, hinge bracket and connecting arm for the cab is loose, or there is clearance.	○	○					
			Soft gasket of the hinge is pressed down.	○						
			Balance rod of connecting arm is broken or damaged.			○				
			Damper is pressed down.			○				
			Spiral spring is pressed down.			○				
			Left and right spiral springs do not connect correctly.			○				
		Installation of rear end	Mounting position of hydraulic latch, floating transom, and bridge of the cab is loose, or there is clearance, or hydraulic latch is damaged.		○	○				
			Bump rubber is pressed down.		○					
			Bump rubber and bottom bracket do not install suitably.		○					
			Spiral spring is pressed down.			○				
			Left and right spiral springs do not connect correctly.			○				
			Damper is pressed down.			○				
					○					
					○					
					○					
					○					
				○						
Installation of the cab is not correct.	○	○								
Fuse and strong-current fuse burns out.			○							
Connection of connector is not correct. Wiring is open circuit. Grounding is not correct.			○							

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Possible reason		Failure							Remark
		The cab bounces (tattle up and down)	The cab or steering wheel vibrates at high frequency (about 20 Hz) or makes noise	During running, the cab waves highly	Tilting warning lamp of the cab does not illuminate	Tilting warning lamp of the cab does not illuminate	Operation of control rod for hook is too loose.	It is difficult to raise the cab inclined.	
Related to cab	Adjustment of tilting locking switch of the cab is not correct.				<input type="radio"/>	<input type="radio"/>			
	The switch is damaged.				<input type="radio"/>	<input type="radio"/>			
Related to engine	Mounting position of the engine is damaged, which causes tilt angle increase, thus to cause propeller shaft bent excessively.		<input type="radio"/>						
	Installation of the engine is not correct.		<input type="radio"/>						
	Installation of intake and exhaust system is not correct.		<input type="radio"/>						
Related to transmission	Installation of transmission is not correct.		<input type="radio"/>						
Related to propeller shaft	Propeller shaft bounces too much.		<input type="radio"/>						
	Universal joint wore out excessively.		<input type="radio"/>						
	Connecting spline of slide fork is loose.		<input type="radio"/>						
	Clearance of intermediate bearing is too big.		<input type="radio"/>						
	Rubber cushion of intermediate bearing is damaged, which causes mounting dimension to be changed.		<input type="radio"/>						
	Overloading makes tilt angle of drive axle increase, which causes propeller shaft bent excessively.		<input type="radio"/>						
Related to front axle	There is resonance on bridge seat.	<input type="radio"/>							
Related to rear axle	Reduction gear does not mesh well.		<input type="radio"/>						
	Differential gear does not mesh well.		<input type="radio"/>						
Related to wheel and tyre	Wheel and tyre is out of balance.	<input type="radio"/>							
	Wheel and tyre is out of balance.	<input type="radio"/>							
	Dimension and model of the tyre is different.	<input type="radio"/>							
	Mounting surface of the wheel deformed.	<input type="radio"/>							
Related to front suspension	There is excessive wear between steel spring plates.	<input type="radio"/>							
Related to brake	Brake drum is out of balance.	<input type="radio"/>							
	Brake drum bounces.	<input type="radio"/>							

► **Manual titling of the cab**

Possible reason	Failure				Remark
	The cab cannot rise aslant.	Rear mounting position of the cab cannot be locked.	Tilting warning lamp of the cab does not illuminate.	Tilting warning lamp of the cab does not extinguish.	
Main lock hook does not disconnect.	<input type="radio"/>				
L rod does not disconnect.	<input type="radio"/>				
Torque rod is damaged or losses torque.	<input type="radio"/>				
Link rod assembly does not hitch upper lock hook.		<input type="radio"/>			
Adjustment of tilting locking switch for the cab is not correct.			<input type="radio"/>	<input type="radio"/>	
Tilting locking switch of the cab is damaged.			<input type="radio"/>	<input type="radio"/>	
Tilting warning lamp bulb of the cab is damaged.			<input type="radio"/>		
Fuse or strong-current fuse burns out.			<input type="radio"/>		
Circuit is open or connects wrongly.			<input type="radio"/>		

► **Electric-hydraulic titling system of the cab(selecting parts)**

Possible reason	Failure						Remark
	The cab does not rise aslant.	The buzzer does not sound.	The buzzer sounds, but the motor does not run.	The sound of the motor is big.	The sound of the motor is small.	Oil pump rod does not change to UP position.	
Fuse or strong-current fuse burns out.	<input type="radio"/>	<input type="radio"/>					
Connection of connector is not correct. Wiring is open circuit. Grounding is not correct.	<input type="radio"/>	<input type="radio"/>					
Capacity of the battery is not sufficient.	<input type="radio"/>						
Tilting hydraulic cylinder of the cab	Tilting complete switch	Adjust wrongly.	<input type="radio"/>				
		The switch has fault.	<input type="radio"/>				
Limit switch for stork of hydraulic cylinder	Limit switch for stork of hydraulic cylinder	Adjust wrongly.					
		The switch has fault.					

		Failure	The cab does not rise aslant.							Remark	
			The buzzer does not sound.	The buzzer sounds, but the motor does not run.	The sound of the motor is big.	The sound of the motor is small.	Oil pump rod does not change to UP position.	During rising aslant, it stops suddenly.	It takes a long time to rise aslant.		Mechanical lock does not work.
		Possible reason									
Tilting oil pump of the cab	U P / D O W N changeover switch	Adjust wrongly.	<input type="radio"/>								
		The switch has fault.	<input type="radio"/>								
	Tilting switch of the cab	Adjust wrongly.		<input type="radio"/>							
		The switch has fault.		<input type="radio"/>							
	The motor is seized.			<input type="radio"/>				<input type="radio"/>			
	Temperature of the oil is too high (thermostatic switch is on close position).							<input type="radio"/>			
	Thermostatic switch has fault (when oil temperature is low, it is turned off).			<input type="radio"/>							
Tilting relay of the cab has fault.			<input type="radio"/>								
Neutral switch of the transmission has fault.			<input type="radio"/>								
Buzzer has fault.			<input type="radio"/>								
Hydraulic system	There is oil leakage, because the pipe is broken or connection is not correct.						<input type="radio"/>		<input type="radio"/>		
	There is oil leakage, because the pipe is broken or connection is not correct.						<input type="radio"/>		<input type="radio"/>		
	Connection of pipe and hose is not correct.				<input type="radio"/>						
	Oil is redundant.						<input type="radio"/>		<input type="radio"/>		
	Oil is not sufficient.						<input type="radio"/>		<input type="radio"/>		
	Air comes into hydraulic system.						<input type="radio"/>		<input type="radio"/>		
Control cable	Adjust wrongly.		<input type="radio"/>				<input type="radio"/>				
	It is broken, or there is resistance.		<input type="radio"/>				<input type="radio"/>				
Hydraulic latch	Rotating position is seized or there is resistance.			<input type="radio"/>			<input type="radio"/>				
	Foreign materials come into latch.			<input type="radio"/>							
Tilting hydraulic cylinder of the cab	Piston rod is bent.			<input type="radio"/>			<input type="radio"/>	<input type="radio"/>			
	Seal ring of the piston is damaged (O ring, washer).				<input type="radio"/>			<input type="radio"/>			
	The pipe of hydraulic cylinder is broken.				<input type="radio"/>			<input type="radio"/>			
Tilting hydraulic cylinder of the cab	Foreign materials blocked mechanical lock.			<input type="radio"/>				<input type="radio"/>			
	Return spring of mechanical lock is damaged.							<input type="radio"/>			
	Mechanical lock rod is seized or there is resistance.			<input type="radio"/>				<input type="radio"/>			

Cab

Possible reason		Failure					The cab does not rise aslant.					During rising aslant, it stops suddenly.	It takes a long time to rise aslant.	Mechanical lock does not work.	After the cab rises aslant, the buzzer continues to sound.	Remark		
		The buzzer does not sound.	The buzzer sounds, but the motor does not run.	The sound of the motor is big.	The sound of the motor is small.	Oil pump rod does not change to UP position.												
Tilting oil pump of the cab	Rotating position of the rod is seized or there is resistance.					○												
	Foreign materials blocked rotating position of the rod.					○												
	The rod is on neutral position.				○	○	○											
	Seal ring of the piston is damaged.			○	○													
	Seal ring of changeover valve is damaged.			○	○					○								
	Safety valve is damaged.			○	○					○								
	Filter is blocked.			○			○	○										
	Pump body is broken.			○	○					○								
The cab hinge is seized or there is resistance.			○						○									
The cab is overloading.			○			○	○											
Transmission is not in neutral position.		○																
Electric system	Fuse or strong-current fuse burns out.																	
	Connection of connector is not correct. Wiring is open circuit. Grounding is not correct.																	
	Capacity of the battery is not sufficient																	
	Tilting hydraulic cylinder of the cab	Tilting complete switch	Adjust wrongly.															
			The switch has fault.															
	Limit switch for stork of hydraulic cylinder	Adjust wrongly.														○		
			The switch has fault.		○											○		
	Tilting oil pump of the cab	U P / D O W N changeover switch	Adjust wrongly.		○													
			The switch has fault.		○													
		Tilting switch of the cab	Adjust wrongly.															
			The switch has fault.															
	Hydraulic system	The motor is seized.																
Temperature of the oil is too high (thermostatic switch is on close position).																		
Thermostatic switch has fault (when oil temperature is low, it is turned off).																		

		Failure	The cab does not rise aslant.							Remark	
			The buzzer does not sound.	The buzzer sounds, but the motor does not run.	The sound of the motor is big.	The sound of the motor is small.	Oil pump rod does not change to UP position.	During rising aslant, it stops suddenly.	It takes a long time to rise aslant.		Mechanical lock does not work.
		Possible reason									
Electric system	Hydraulic system	Tilting relay of the cab has fault.									
		Neutral switch of the transmission has fault.									
		The buzzer has fault.		○							
Hydraulic system		There is oil leakage, because the pipe is broken or connection is not correct.					○				
		There is oil leakage, because the pipe is broken or connection is not correct.					○				
		Connection of pipe and hose is not correct.		○							
		Oil is redundant.									
		Oil is not sufficient.									
		Oil is bad.					○				
Control cable		Air comes into hydraulic system.					○				
		Adjust wrongly.				○		○			
Hydraulic latch		It is broken, or there is resistance.				○		○			
		Rotating position is seized or there is resistance.							○		
Tilting hydraulic cylinder of the cab		Foreign materials come into latch.							○		
		Piston rod is bent.									
		Seal ring of the piston is damaged (O ring, washer).					○				
		The pipe of hydraulic cylinder is broken.					○				
		Foreign materials blocked mechanical lock.		○	○			○			
		Return spring of mechanical lock is damaged.		○				○			
Tilting oil pump of the cab		Mechanical lock rod is seized or there is resistance.				○		○			
		Rotating position of the rod is seized or there is resistance.				○					
		Foreign materials blocked rotating position of the rod.				○					
		The rod is on neutral position.	○	○	○						
		Seal ring of the piston is damaged.									
		Seal ring of changeover valve is damaged.									
		Safety valve is damaged.									
		Filter is blocked.		○							
	Pump body is broken.										

Possible reason	Failure						The cab does not rise aslant.	The cab does not rise aslant.	During rising aslant, it stops suddenly.	It takes a long time to rise aslant.	Mechanical lock does not work.	After the cab rises aslant, the buzzer continues to sound.	Remark
	The buzzer does not sound.	The buzzer sounds, but the motor does not run.	The sound of the motor is big.	The sound of the motor is small.	Oil pump rod does not change to UP position.								
The cab hinge is seized or there is resistance.													
The cab is overloading.													
Transmission is not in neutral position.	○												

► Door lock

Possible reason	Failure						Automatic door			Remark
	Inner handle cannot open the door.	It is difficult to operate inner handle.	Outer handle cannot open the door.	It is difficult to operate outer handle.	The door cannot be opened and closed smartly.	When use the key	When use the button of door lock	When use the switch of automatic door lock		
Adjustment of the door is not correct.	○		○	○						
Each door rod	The rod is deformed.		○		○					
	The rod is out of position.	○		○		○	○	○		
	The rod interferes each other.		○		○					
Lock core of the door is deformed or damaged.					○					
Power window and door lock switch assembly have fault.							○			
Actuator of door lock has fault.					○	○	○			
Door latch is deformed or damaged.	○		○	○						
Fuse or strong-current fuse burns out.					○	○	○			
Connection of connector is not correct. Wiring is open circuit. Grounding is not correct.					○	○	○			
Capacity of the battery is not sufficient					○	○	○			
Electronic Control unit of power window has fault.					○	○	○			
Latch eye is deformed.	○	○		○						
Adjustment of outer handle is not correct.			○							

► **Manual opening system for door glass**

Failure		Possible reason	During operating, the adjuster handle is heavy.	When lifting door glass, the door glass moves unstably.	When lifting door glass, there is abnormal noise in adjuster.	When the vehicle runs, there is abnormal noise in adjuster.	When the vehicle runs, door glass descends automatically.	Remark
Possible reason								
Adjuster	The adjuster has fault.	<input type="radio"/>					<input type="radio"/>	
	The bracing cable slides badly.	<input type="radio"/>		<input type="radio"/>				
	The roller has resistance.	<input type="radio"/>		<input type="radio"/>				
	Installation is not correct.	<input type="radio"/>		<input type="radio"/>				
Lifting groove is damaged.		<input type="radio"/>						
Installation of lifting groove is not correct.			<input type="radio"/>					
Rear guide rail assembly is deformed.		<input type="radio"/>						
Installation of rear guide rail assembly is not correct.			<input type="radio"/>					
Installation of door glass is not correct.			<input type="radio"/>					
Sliding block is damaged.			<input type="radio"/>					

► **Power window (selecting parts)**

Failure		Possible reason	During running, the door glass descends automatically.	During running, there is abnormal noise in adjuster of power window.	Power window does not work.	Power window does not stop working.	When power window works, there is abnormal noise.	Remark
Possible reason								
Switch of power window has fault.					<input type="radio"/>	<input type="radio"/>		
Controller of power window has fault.					<input type="radio"/>	<input type="radio"/>		
Adjuster of power window has fault.		<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Installation of adjuster for power window is not correct.							<input type="radio"/>	
Fuse and strong-current fuse burns out.					<input type="radio"/>			
Connection of connector is not correct. Wiring is open circuit. Grounding is not correct.					<input type="radio"/>			

► **Wiper and scrubber**

Possible reason	Failure										Remark
	wiper					Scrubber					
	Inner wiper does not work.	The wiper does not stop working.	The wiper cannot work intermittently.	Wiper brush stops on inadequate position.	Wiping effect of the wiper is bad.	When the wiper works, there is abnormal noise.	Scrubber does not work.	Scrubber cannot inject enough cleaning fluid.	Scrubber cannot inject cleaning fluid.	Wiper cannot work with scrubber.	
Wiper motor has fault.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>					
Scrubber motor has fault.							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Switch for wiper and scrubber has fault.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>			<input type="checkbox"/>	
MULAC (controller) has fault.			<input type="checkbox"/>							<input type="checkbox"/>	
Wiper relay has fault.	<input type="checkbox"/>						<input type="checkbox"/>				
Fuse and strong-current fuse burns out.	<input type="checkbox"/>						<input type="checkbox"/>				
Connection of connector is not correct. Wiring is open circuit. Grounding is not correct.	<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
Position of motor crank for wiper is not correct.				<input type="checkbox"/>							
Wiper link rod and wiper arm connects wrongly.						<input type="checkbox"/>					
Wiper brush is damaged.					<input type="checkbox"/>	<input type="checkbox"/>					
Wiper crank is damaged.					<input type="checkbox"/>						
Scrubber hose distorted.								<input type="checkbox"/>			
Connection of scrubber hose is not correct.									<input type="checkbox"/>		
Scrubber nozzle is blocked.								<input type="checkbox"/>	<input type="checkbox"/>		
Cleaning fluid of scrubber is not sufficient.									<input type="checkbox"/>		

On-vehicle Inspection and Adjustment

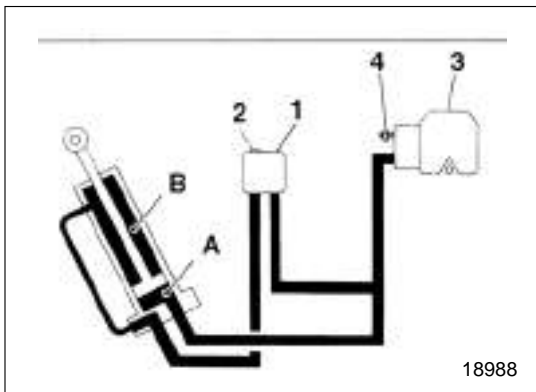
- **Replacing tilting hydraulic oil of the cab and deflating (installation of the cab)**

 **lubricant**

Position	Application position	Specified lubricant	Quantity
-	Tilting oil pump of the cab	MITSUBISHI tilting hydraulic oil of the cab (MIL-H-5606E)	As needed

Warning 

- You must use new tilting hydraulic oil.
- When adding hydraulic oil, prevent dust and water from coming into. Otherwise, tiling function of the cab will be inactive.



Step summary for replacing tilting hydraulic oil of the cab and deflating

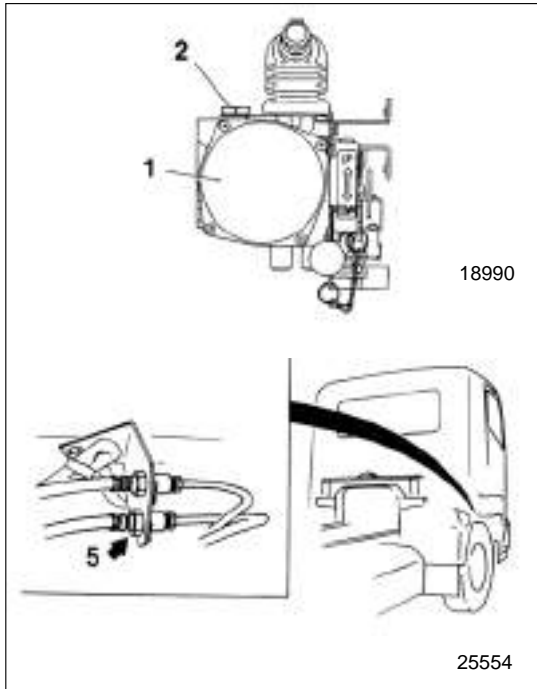
- Disconnect mid part of pipe at UP side, drain old hydraulic oil from tilting oil pump 1 of the cab.
- After injected new hydraulic oil, drain remaining hydraulic oil in pipe at UP side, at the same time, discharge air in the pipe.
- Discharge hydraulic oil that remained in pipeline between drain cock 4 of hydraulic latch 3 and hydraulic latch, at the same time, discharge air in the pipe.

Connect pipeline at UP side again.

- Disconnect mid part of pipe at DOWN side, inject new hydraulic oil into oil cavity A of hydraulic cylinder, and drain old hydraulic oil from oil cavity B of hydraulic cylinder.
- Drain remaining hydraulic oil pipe at DOWN side, at the same time, discharge air in the pipe. Connect DOWN side pipeline again.

(1) Replace hydraulic oil in the oil pump

- Disassemble oil filler cap 2 of tilting oil pump 1 of the cab.
- Disconnect hydraulic oil hose 5 at UP side.
- Put rod of tilting oil pump 1 to UP position, start the motor, to make hydraulic oil flow out from connection of the pipe.



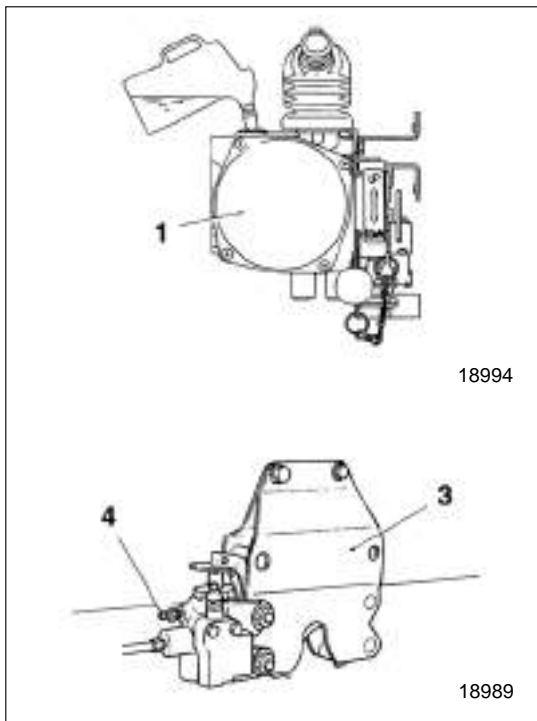
- When no hydraulic oil flows out from connection of the pipe, stop the motor, pump the oil pump two or three times with your hands.

Caution ⚠

If continue to run the motor under the condition that there is no hydraulic oil, the motor may be seized.

(2) Replace hydraulic oil in hydraulic cylinder and pipeline, and deflate

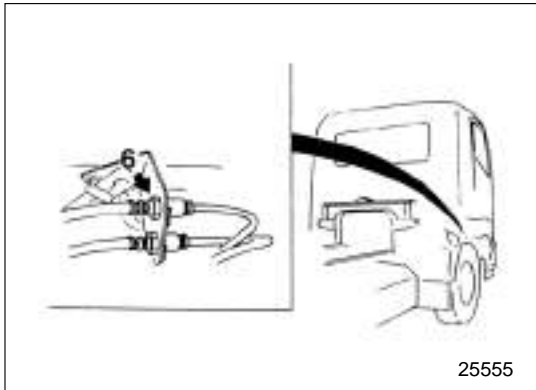
- Add hydraulic oil to the position that is 10 mm lower than filler port of tilting oil pump 1 of the cab.
- Start the motor of tilting oil pump 1 of the cab, discharge 50 cm³ (50 ml) hydraulic oil that remained in pipeline. Then, connect connecting position of hydraulic oil hose 5 at UP side again.



Caution ⚠

At this situation, pipelines at UP side will discharge synchronously. When connect hydraulic oil hose 5 again, be careful not to make hydraulic oil in the pipe flow out. If hydraulic oil flows out, start the motor again to input hydraulic oil into the pipe.

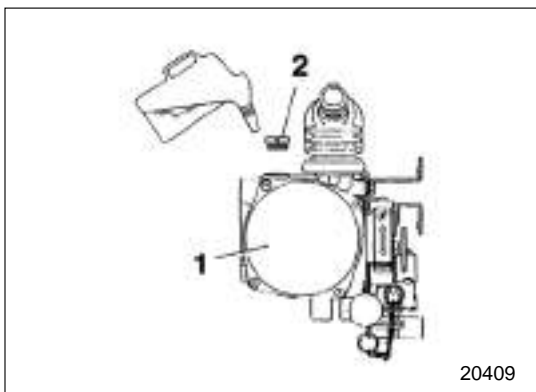
- After relieved drain cock 4 of hydraulic latch 3, start the motor of tilting oil pump 1 of the cab, to discharge 50 cm³ (50 ml) hydraulic oil that remained in pipeline.
- Check if there is air in hydraulic oil discharged from drain cock 4. If there is no air, tighten drain cock again.



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Caution ⚠

Starting oil pump, the motor will make the cab rise aslant slowly. So, when doing this operation, start and stop the motor properly. If raise the cab higher than needed position, it is difficult to do the following operation.

- Disconnect hydraulic oil hose 6 at DOWN side.
- Start the motor of tilting oil pump 1. Hydraulic oil remained in oil cavity B of hydraulic cylinder will flow out from hose 6 at DOWN side. When the cab rises aslant fully, the motor will stop automatically, hydraulic oil will stop flowing.
- Put rod of tilting oil pump 1 to DOWN position. Start the motor, discharge 50 cm³ (50 ml) hydraulic oil that remained in pipeline. Then connect connecting position of hose 6 at DOWN side.

Caution ⚠

At this situation, pipelines at UP side will discharge synchronously. When connect hydraulic oil hose 6 again, be careful not to make hydraulic oil in the pipe flow out. If hydraulic oil flows out, start the motor again to input hydraulic oil into the pipe.

Caution ⚠

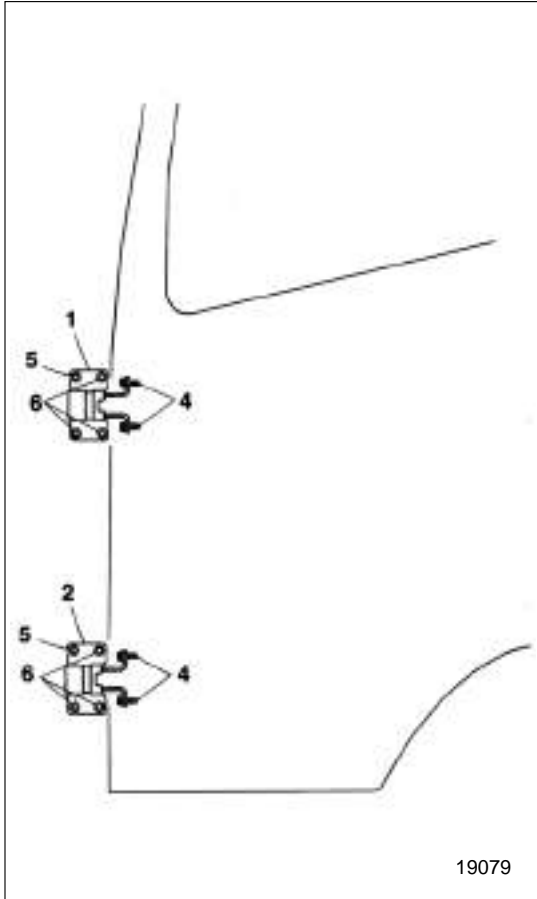
- Lower the cab aslant.
- Add hydraulic oil to the position that is 10 mm lower than filler port of tilting oil pump 1, then tighten oil filler cap 2 temporarily.
- Tilt the cab two or three times, then disconnect oil filler cap 2, check if oil level is 10 mm lower than filler port. If hydraulic oil is not sufficient, replenish it.
- Tighten oil filler cap 2 again.

Caution ⚠

- When tilt the cab, do not add hydraulic oil.
- When the cab descends aslant, hydraulic oil in hydraulic cylinder will flow back to reservoir of oil pump. So, oil in reservoir may be beyond its permitted volume. At this time, safety valve will operate to make hydraulic oil discharge from oil pump.

Cab

Memo



► **Adjustment of door fit**

ⓘ **Tightening torque**

unit: N•m(kgf•m)

Position	Parts tightened	Tightening torque	Remark
4	Bolt (used for installation of door assembly)	17-26{1.7-2.6}	-
5,6	Bolt (used for installation of upper & lower hinge)	17-26{1.7-2.6}	-
7	Bolt (used for installation of latch eye)	9-14{0.9-1.4}	-

Adjustment of door fit can be done on upper hinge 1, lower hinge 2 and latch eye 3.

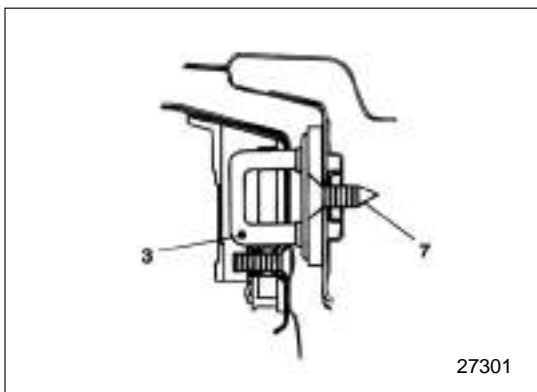
Fit dimension of the door

● **Adjustment of hinge**

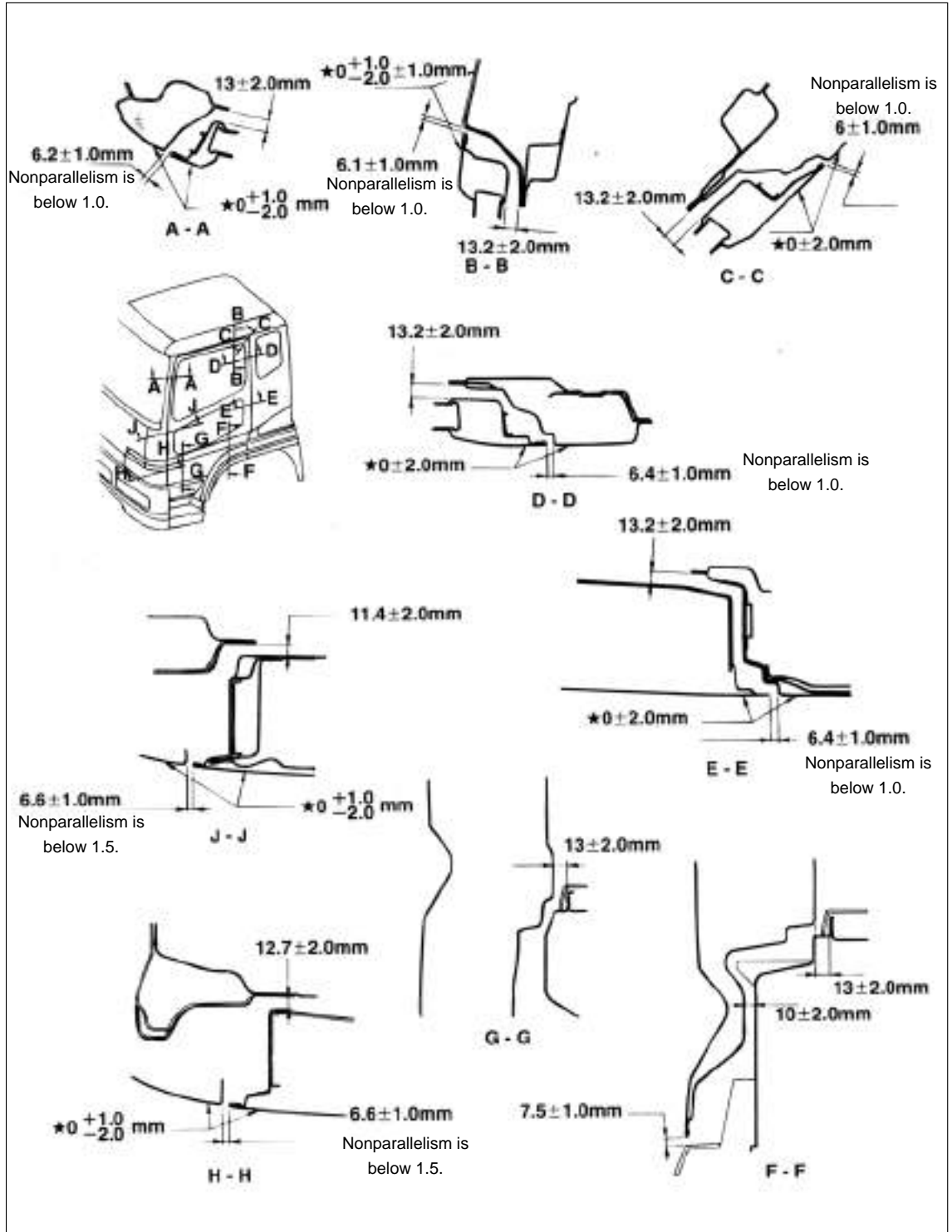
- Use bolt 4 to adjust to even..
- Use bolt 5 and 6 to adjust the clearance. Bolt 5 has washer and take off it before adjustment. After adjustment, it is necessary to attach the washer.
Bolt 6 can be replaced by bolt 5.

● **Adjustment of haltch eye**

Use mounting screw 7 of latch eye 3 to adjust.



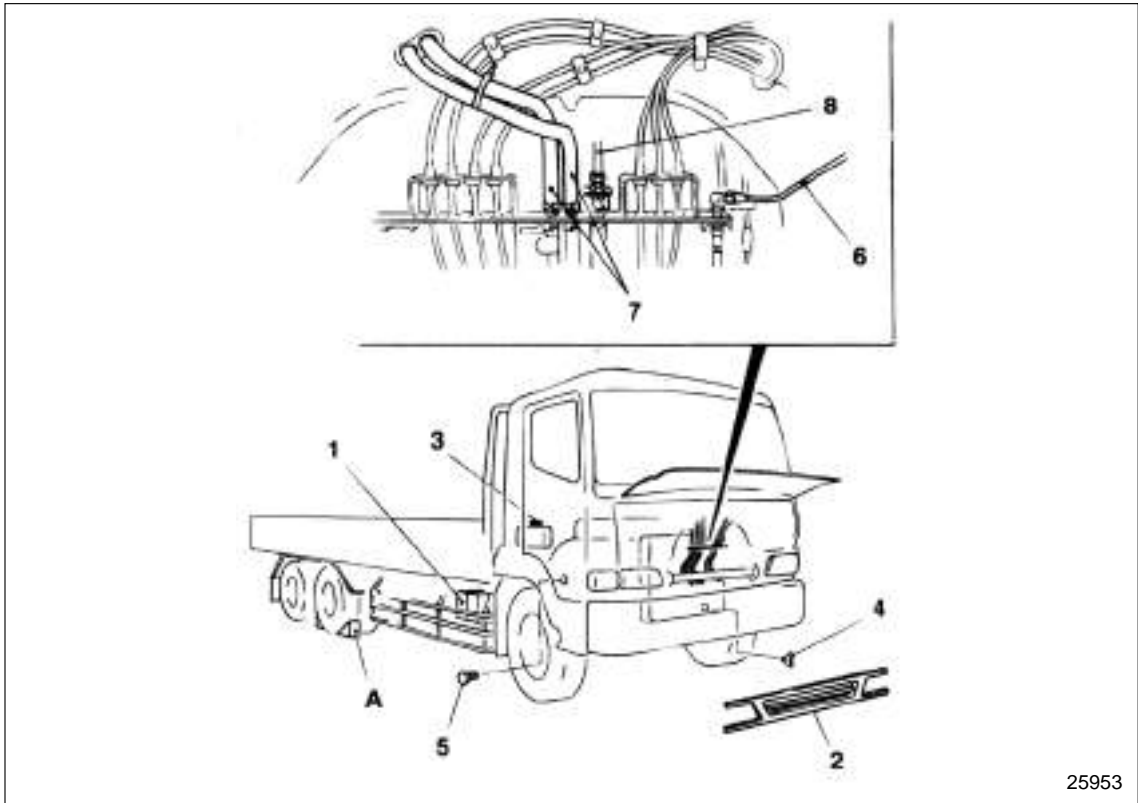
► Fit dimension of the door



★: Dimension of nonparallelism.

Dismantling and Installation of the Cab

► Before disassembling and installing the cab, do the following work



● Dismantling sequence

- | | | |
|--------------------------------|-----------------------------|-----------------------------|
| 1. (o) terminal of the battery | 2. radiator grid | 3. pressure cover work item |
| 4. drain plug of radiator | 5. drain plug of crank case | 6. clutch liquid pipe |
| 7. warmer hose | 8. A/C pipe | |

A: wheel retainer

- Discharge and fill coolant, and deflate
- Discharge and fill clutch liquid and brake liquid, and deflate

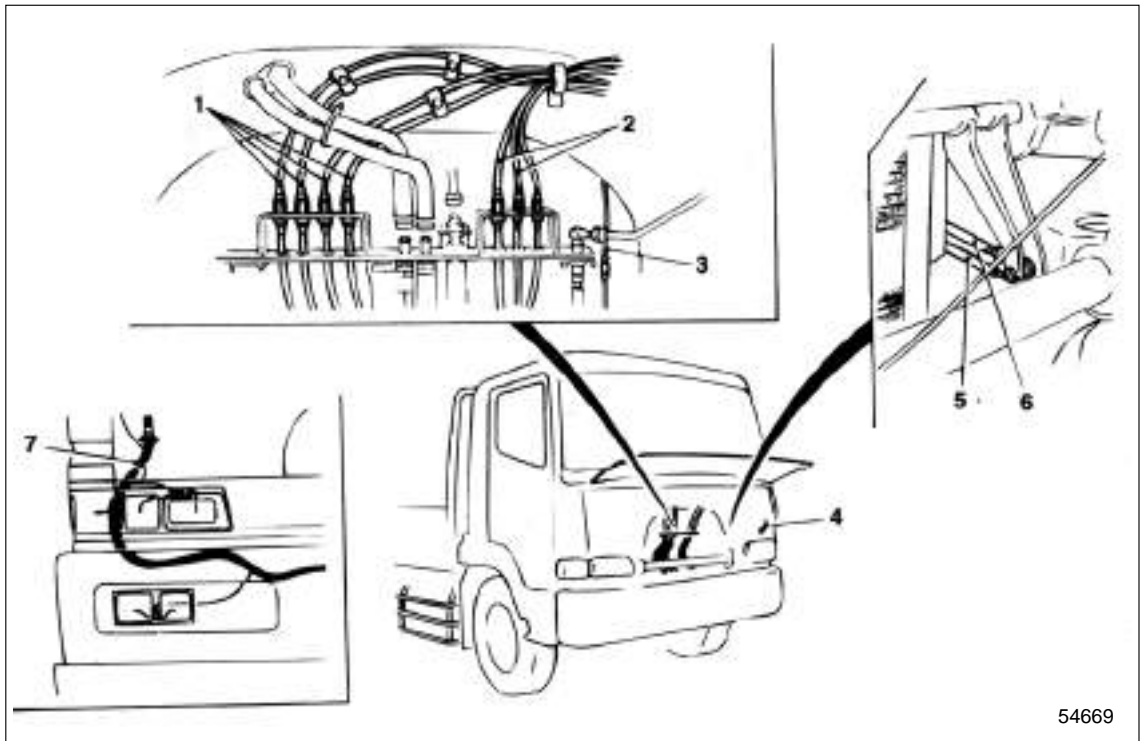
Warning ⚠

- During disassembling and installing the cab, parking brake cannot make the vehicle keep at stop condition. Therefore, you must use wheel retainer A to prevent the vehicle moving.
- Before finishing all the work, do not take away wheel retainer A.

● Installing sequence

It is opposite to disassembling sequence.

Operation for Front End of the Cab



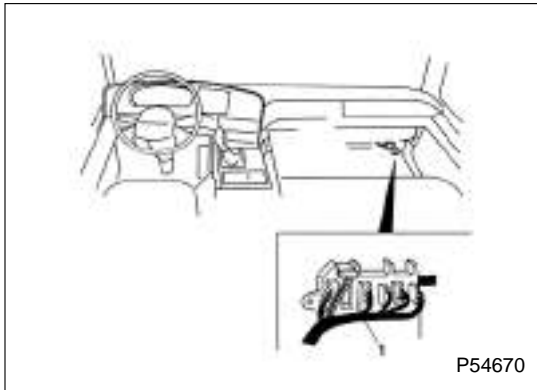
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● Dismantling sequence

1. air pipe (use for brake)
2. air pipe (use for hand control valve)
3. air pipe (use for front automatic levelling valve)
4. air pipe (use for air pressure gauge)
5. shifting rod
6. selecting rod
7. chassis wiring (grounding)

● Installing sequence

It is opposite to disassembling sequence.



► Operation after raising the cab aslant

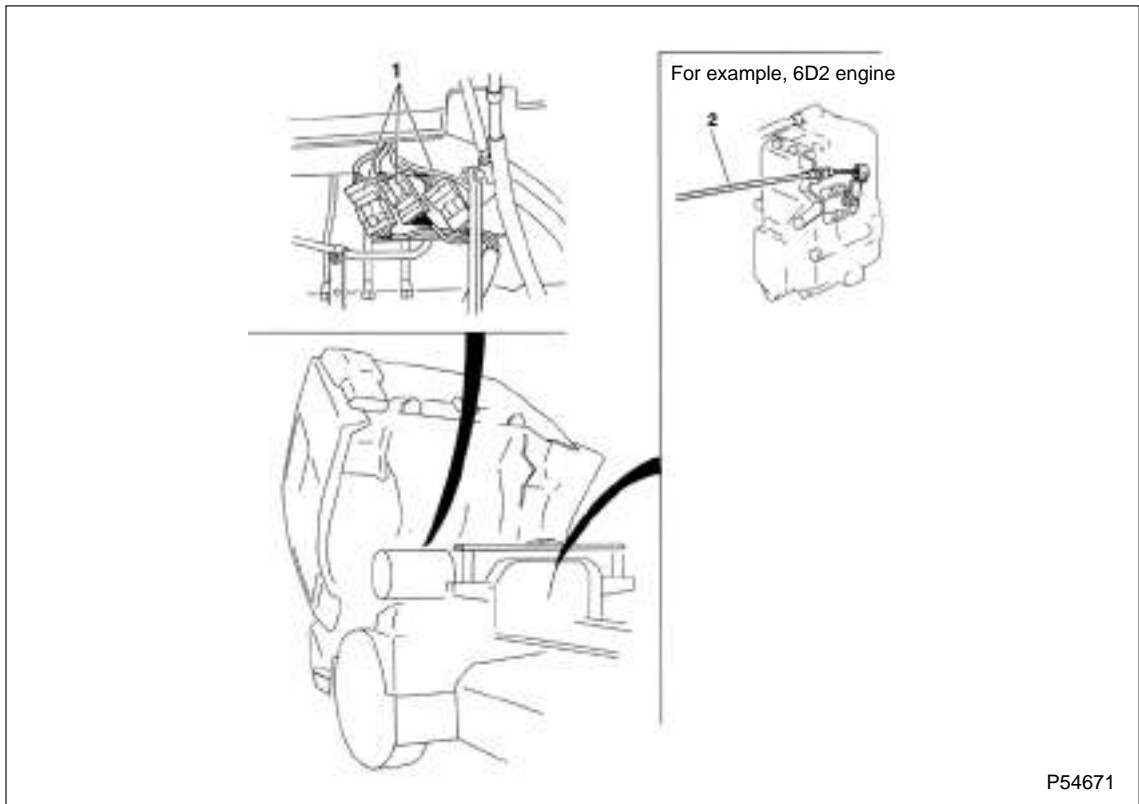
● Dismantling sequence

1 wiring (connector for cab wiring and chassis wiring)

● Installing sequence

It is opposite to disassembling sequence.

Operation after raising the cab aslant



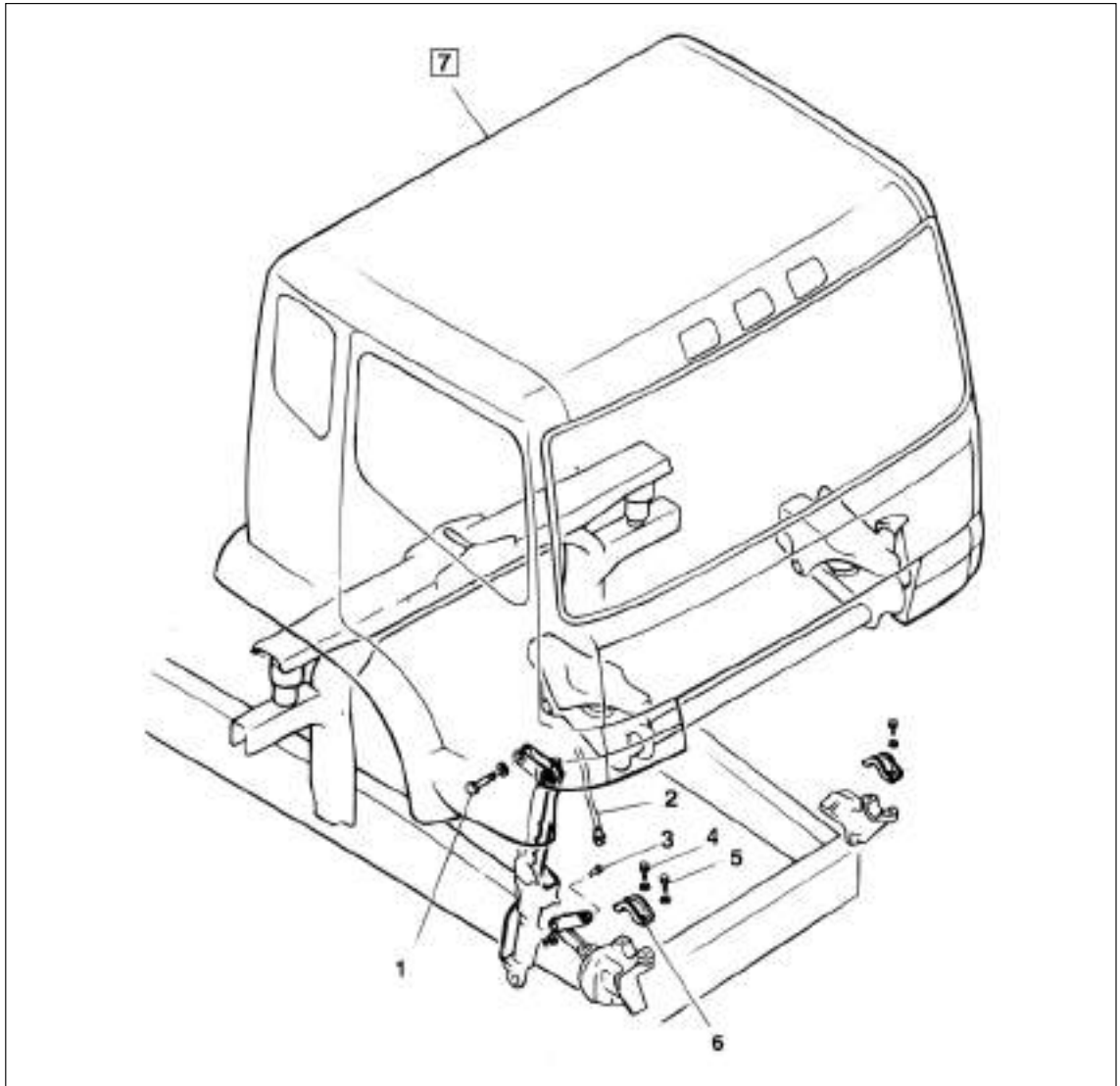
● Dismantling sequence

1. wiring (connector for cab wiring and chassis wiring)
2. stop cable for engine
3. control cable for accelerating pedal

● Installing sequence

It is opposite to disassembling sequence.

► Dismantling and installation of the cab itself (installation of the cab)

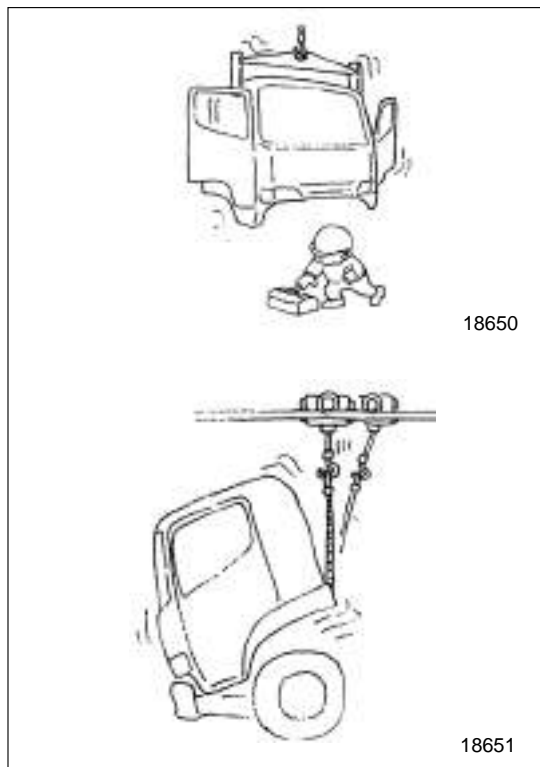


● Dismantling sequence

1. bolt
2. hydraulic oil hose
3. U clamp pin
4. bolt
5. bolt
6. hinge cover of the cab
7. the cab assembly

● Installing sequence

It is opposite to disassembling sequence.



18650

18651

◆ Examining and repairing method

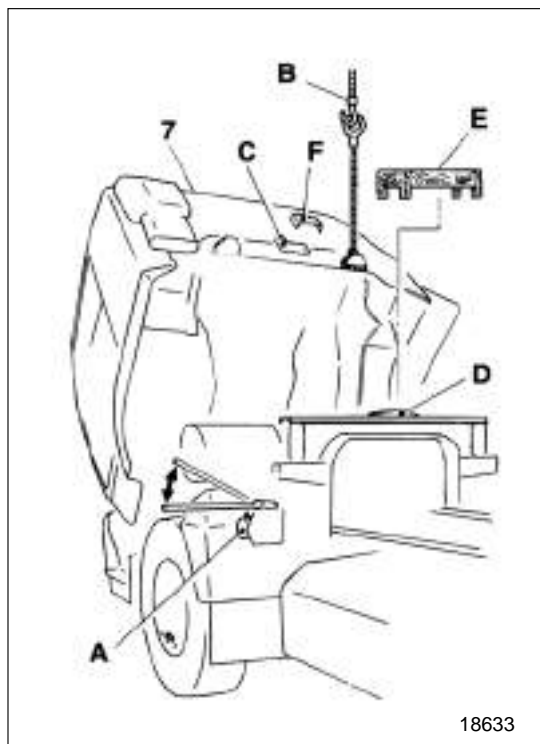
7 The cab assembly

In order to disassemble and install the cab assembly 7, when raise or lower the cab aslant, disconnect or connect all connecting positions of the cab and chassis.

In order to raise or lower the cab aslant, use hand or hoist B to operate tilting oil pump A of the cab.

Warning ⚠

- When the cab assembly 7 is on lifting position, do not go under of it.
- When use hoist B to raise or lower the cab assembly 7, be careful not to make steel cable slide out. During operating the hoist, make bracing cable keep vertical. If there is any situation, move the hoist to appropriate position.



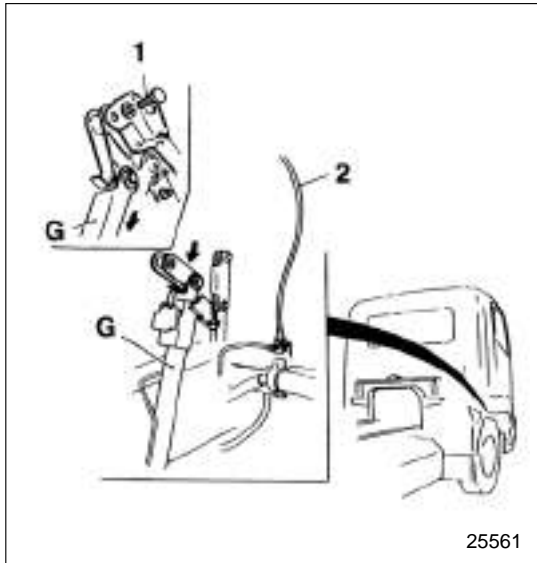
18633

(Disassembly)

- Put tilting oil pump A on UP position.
- Operate tilting oil pump A of the cab with your hands, to make the cab assembly 7 raise aslant.
- After raise the cab aslant fully, install steel cable on backside of the cab tightly. Use hoist B to lower the cab aslant.
- When the cab assembly 7 is descending aslant, ensure that hydraulic latch C is not locked by floating transom D. Use wood block E to cover floating transom. At this situation, disassemble hydraulic latch cover F to avoid it deforming.

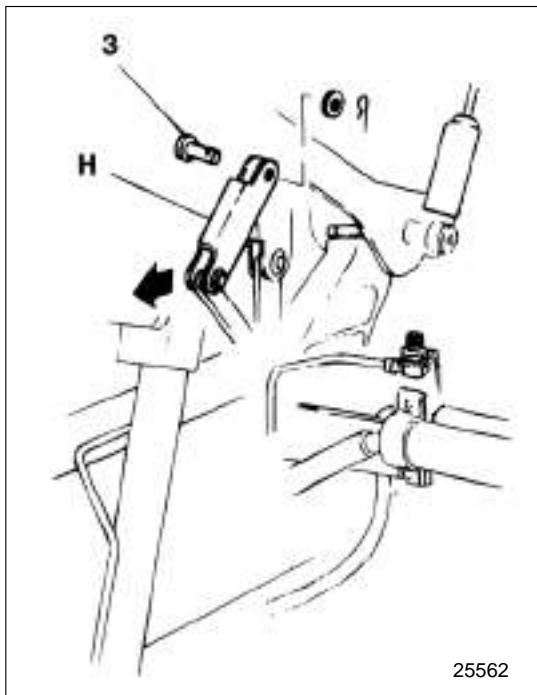
Caution ⚠

If you do not use wood block E to cover floating transom when the cab is descending aslant, after discharged tilting hydraulic oil of the cab, locking condition cannot be relieved. Therefore, floating transom should be always covered.



25561

- Loosen steel cable of hoist B. (Because the cab is lowered aslant, make the steel cable have some loose allowance).
- Put the rod of tilting oil pump A on DOWN position.
- Pump the rod of tilting oil pump A with your hands, to make the cab descend aslant.
- Disassemble fender and all other parts that will hinder disassembly of tilting hydraulic cylinder.
- Disconnect bolt 1.
- Continue to pump the rod of tilting oil pump A with your hands, to make tilting hydraulic cylinder assembly G be on full retracting condition.
- Then, use hoist B to lower the cab aslant. Disconnect hydraulic oil hose 2 and discharge tilting hydraulic oil of the cab.

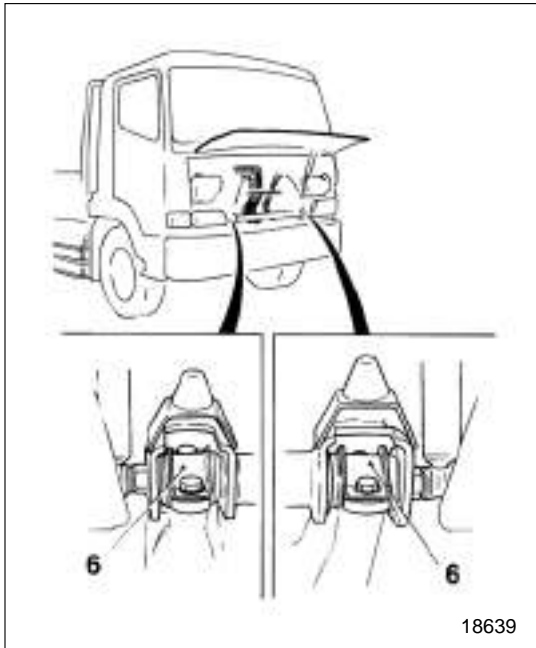


25562

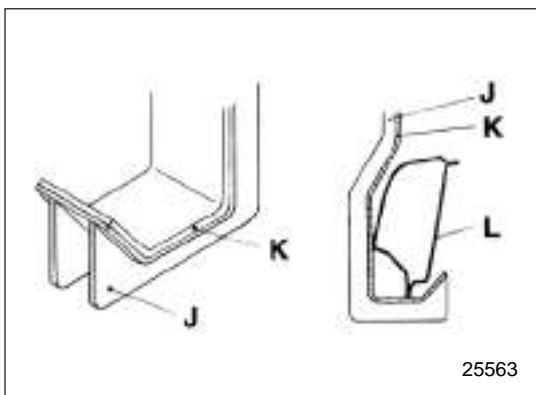
- Disassemble cab support H and clamp pin 3.

Warning ⚠

After disassembled U clamp pin 3, do not raise the cab assembly 7 aslant. If you do like that, the cab assembly will turn over forward. It is very dangerous.



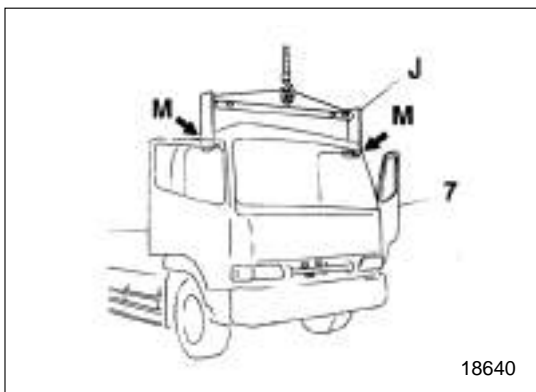
- Disconnect hinge cover 6 of the cab from front side of the cab.



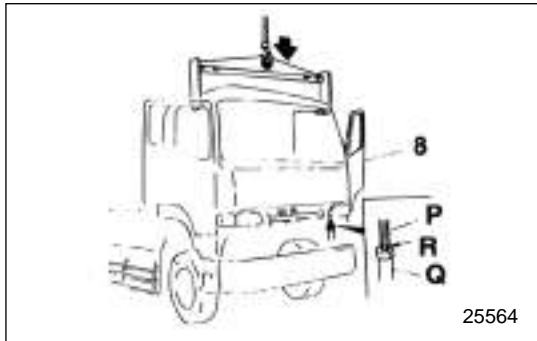
- As shown in the figure, install hoisting accessory J of the cab.

Caution ⚠

- The weight of cab assembly 7 is about 700 kg. Therefore, hoisting accessory J must have enough stiffness to support it.
- Hoisting accessory J must have rubber gasket K, to avoid the roof L deforming when slings the cab.



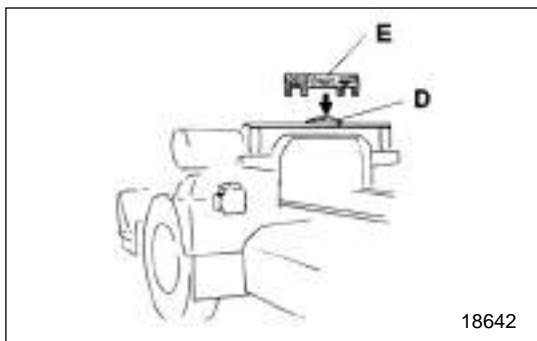
- Mount hoisting accessory J on center of gravity M of the cab assembly 7. To put the hook on the gravity center, we can lift the cab a little bit to verify that the cab can be at level position when being raised.



- Sling the cab assembly 7 slowly. When steering fork N separates from steering shaft P, stop slinging. Before steering fork separates from steering shaft, make match mark Q.

Warning ⚠

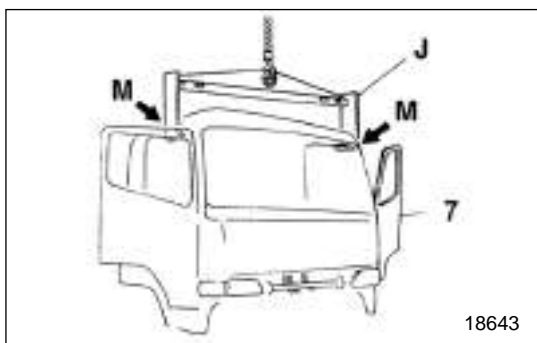
When the cab assembly 7 is on lifting position, do not go under of it.



Caution ⚠

After slung the cab assembly 7 slightly, check if the wiring, bracing cable and hose are disconnected fully.

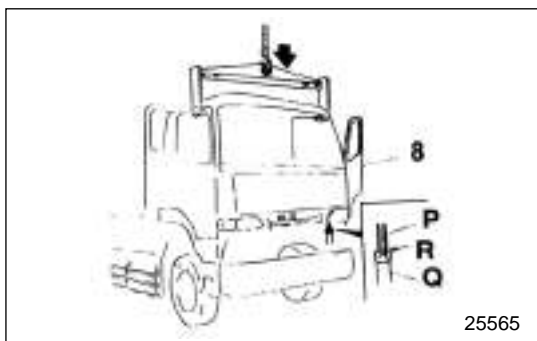
- Then, disassemble the cab assembly 7 completely.
(installation)
- Use wood block E to cover floating transom D. Ensure that hydraulic latch C is not locked by floating transom when installing the cab assembly 7.



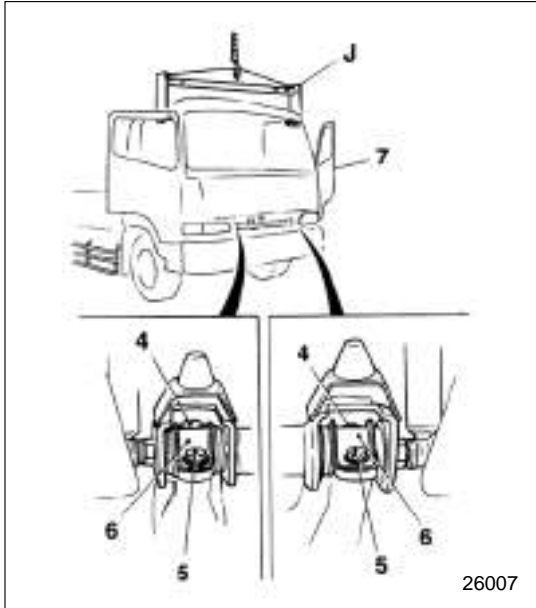
Caution ⚠

If hydraulic latch C is locked by floating transom, it is difficult to relieve. Therefore, do not forget to use wood block E to cover it.

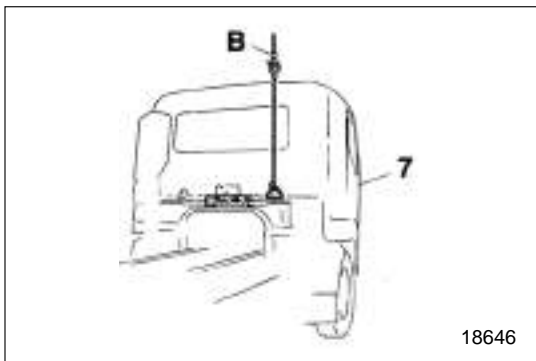
- Mount hoisting accessory J on center of gravity M of the cab assembly 7.



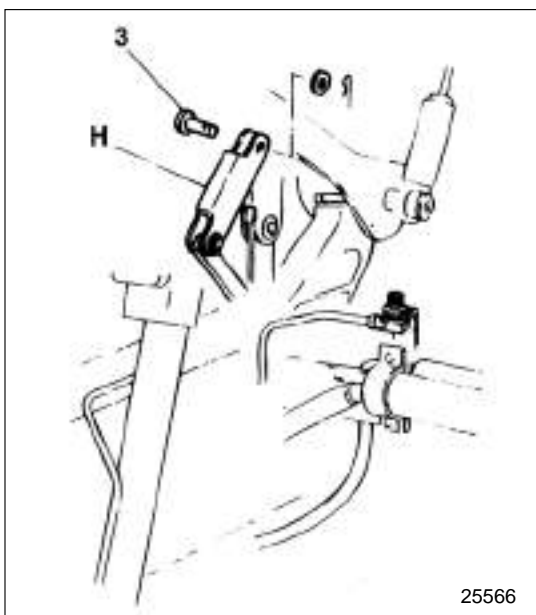
- Lower the cab assembly 7 slowly and keep it at horizontal position. When match mark Q of steering fork and steering shaft is aligned, insert steering fork N into steering shaft P.



- Continue to lower the cab assembly 7 slowly, until the cab assembly is on the cab hinge. At this time, check if left hinge & right hinge of the cab is disturbed. If it needs to be adjusted again, put the cab in position again.
 - After installed hinge cover 6 of the cab, disassemble hoisting accessory J.
 - With regard to hinge cover of the cab, tighten bolt 5 and tighten bolt 4 temporarily.
- After raised the cab aslant, tighten bolt 4 to specified torque.



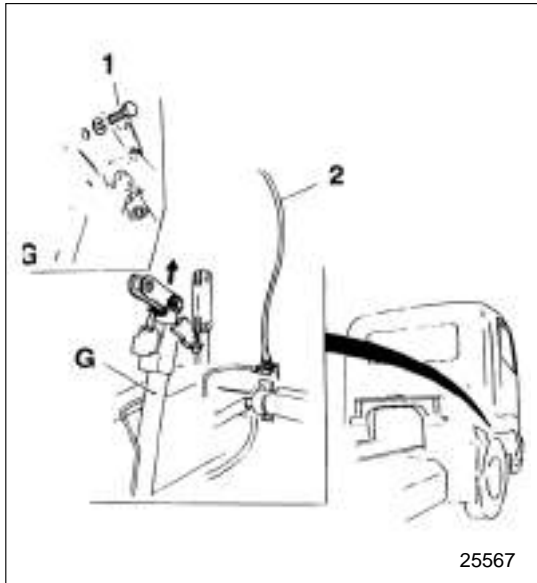
- Because the following step is to tilt the cab assembly 7, use hoist B to suspend the cab tightly.



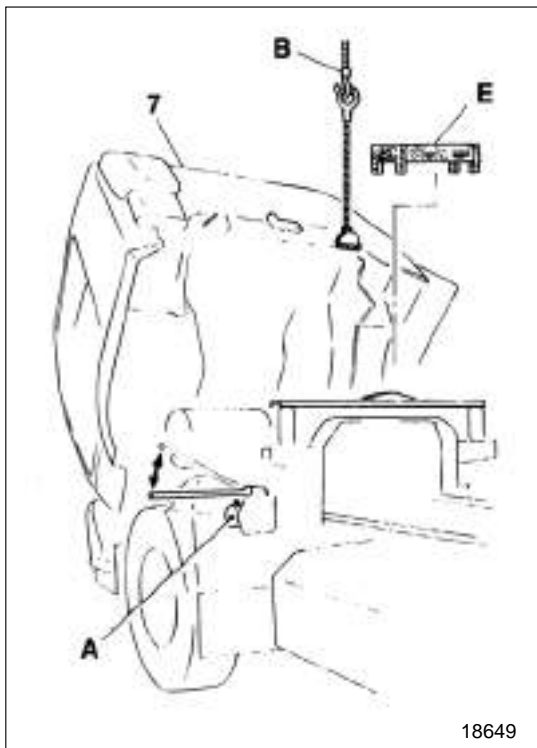
- Install U clamp pin 3.

Warning ⚠

When using hoist B to raise the cab assembly 7 aslant, be careful not to make it exceed required position. Otherwise, the cab assembly will turn over forward. It is very dangerous.

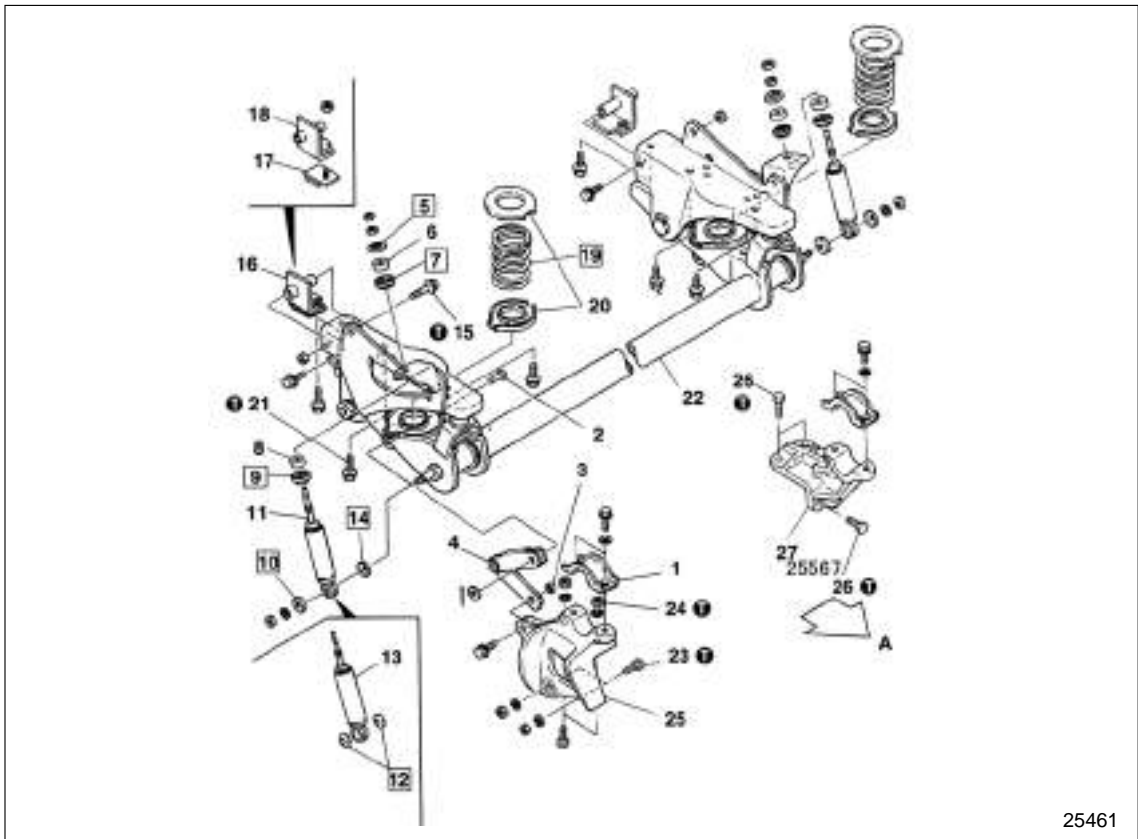


- When installing tilting hydraulic cylinder assembly G of the cab, make it be on protruding position . Therefore, hydraulic oil hose 2 should be installed and fill tilting hydraulic oil.
- Put the rod of tilting oil pump A on UP position, use your hands to pump the oil pump to extend tilting hydraulic cylinder assembly G, then install bolt 1.
- After raised the cab assembly 7 aslant, tighten bolt 4 to specified torque.



- After the cab assembly 7 is installed safely, disconnect hoist B and wood block E. Use your hands to pump the rod of tilting oil pump A, and check if the cab can rise aslant and descend aslant.

Installation for Front End of the Cab



25461

● Breakdown sequence

- | | | |
|------------------------------------|--------------------------|------------------------------------|
| 1. hinge cover for the cab | 2. U clamp pin | 3. washer |
| 4. cab support | 5. upper washer | 6. upper rubber sleeve |
| 7. centering washer | 8. upper rubber sleeve | 9. upper washer |
| 10. eyewasher B | 11. damper assembly | 12. rubber sleeve |
| 13. damper | 14. eyewasher A | 15. bolt |
| 16. stopper assembly | 17. rubber stopper B | 18. bracket |
| 19. spiral spring | 20. inner spring support | 21. bolt |
| 22. connecting arm subassembly | 23. bolt | 24. nut |
| 25. lower bracket for cab hinge LH | 26. bolt | 27. lower bracket for cab hinge RH |
- A: front of the vehicle

Remark

The table above refers to breakdown sequence of right parts.

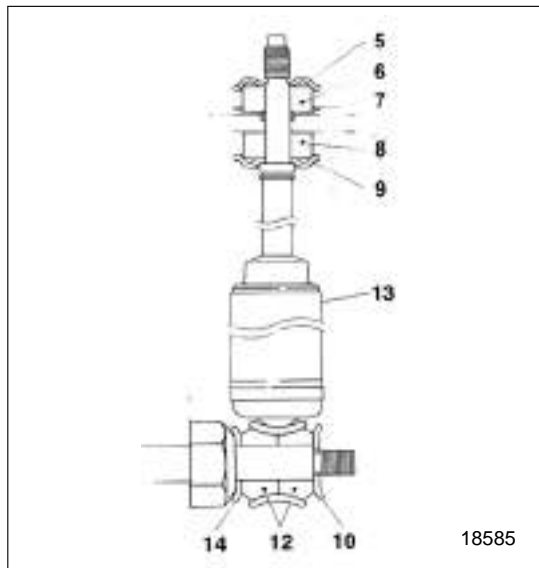
With regard to left parts, it only listed different parts. Breakdown sequence of other parts is the same as right parts.

● **Installing sequence**

It is opposite to breakdown sequence.

ⓘ **Tightening torque**

Position	Positionarts tightened	Tightening torque	Remark
15	Bolt (use for fixing stopper assembly)	90.9-104.5(9.27-10.67)	-
2	Bolt (use for fixing upper bracket of cab hinge and connecting arm assembly)	10(1.0)	-
23,26	Bolt (use for fixing lower bracket of cab hinge)	285-308{29-39}	-
24	Bolt(use for fixing lower bracket of cab hinge)	285-380(29-39)	-



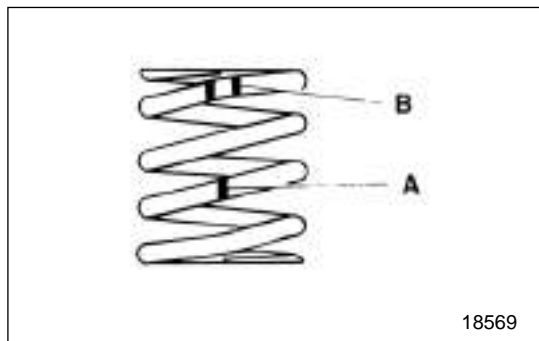
◆ **Examining and repairing method**

5 7 9 1 0 1 2 1 4

Installation of washer and rubber sleeve.

According to the direction in the figure, install washer and rubber sleeve on damper 13.

Upper rubber sleeve 6 and sleeve 8 have no mounting direction.



19 Installation of spiral spring

Identification sign A (single-line paint on second circle of the spring) for right and left spiral spring 19 should have the same color.

If pressing degree of left spring and right spring is different, you can combine them according to the following table.

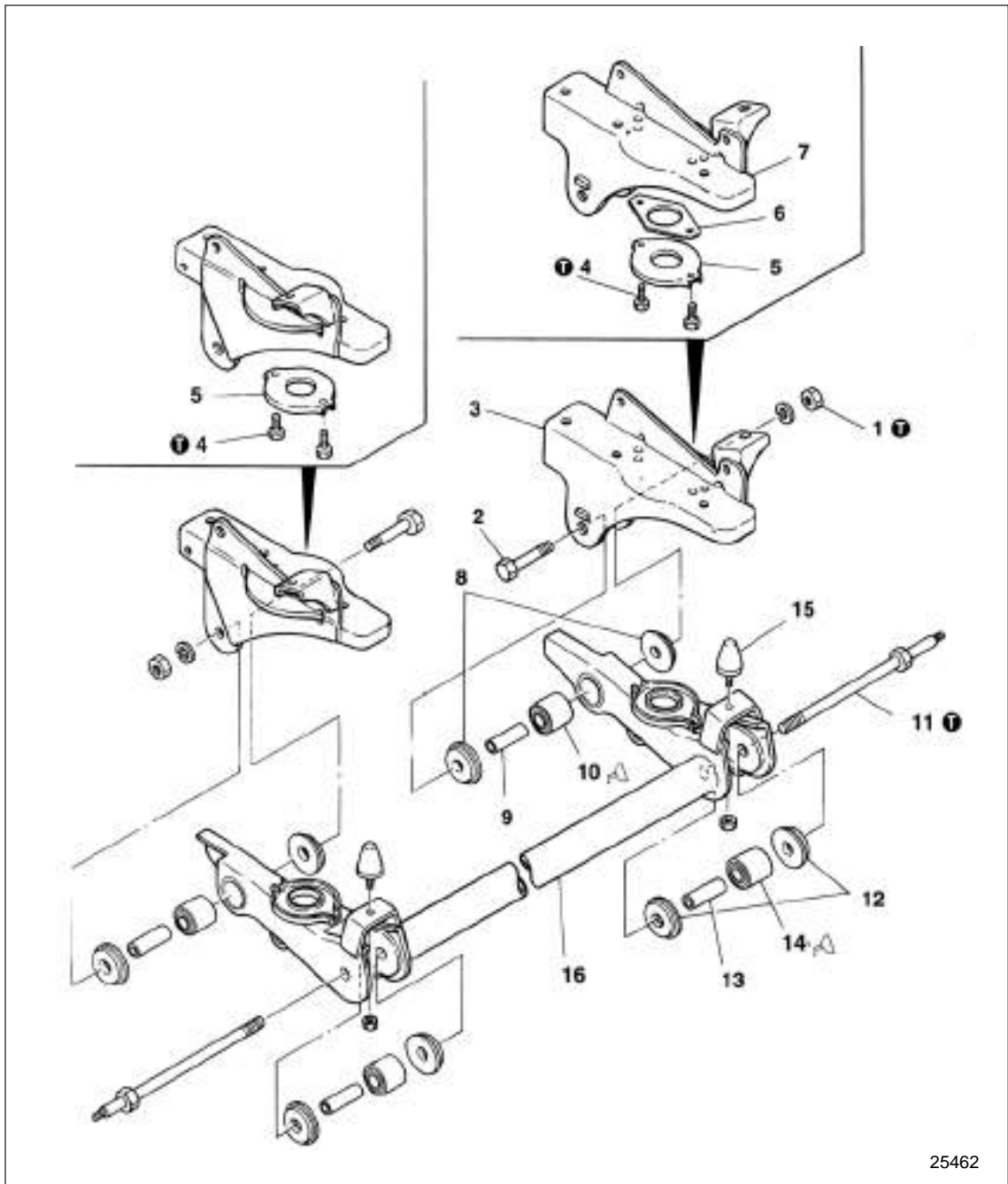
Combination form		1	2	3	4	5	6
Identification	Right spring	White	White	White	Yellow	Yellow	Red
Color A	Left pring	White	Yellow	Red	Yellow	Red	Red

- Free length order is, white >yellow> red. (Difference between white and red is 3.5 mm).
- Right spring must be longer than left spring or equal to left spring.

Remark

Identification sign B (double-line paint) is independent from mounting direction of spiral spring.

► Connecting arm subassembly



25462

● **Disassembly sequence**

- | | | |
|----------------------------------|----------------------------------|------------------------------------------|
| 1. bolt | 2. rear hinge bolt | 3. upper hinge and spring seat assembly |
| 4. bolt | 5. spring seat | 6. gasket (at the side of driver's seat) |
| 7. upper hinge bracket | 8. side bolster of cab hinge | 9. sleeve |
| 10. central bolster of cab hinge | 11. front hinge bolt | 12. side bolster of cab hinge |
| 13. sleeve | 14. central bolster of cab hinge | 15. rubber stopper A |
| 16. connecting arm assembly | | |

Remark

The table above refers to breakdown sequence of left parts. With regard to right parts, it only listed different parts. Breakdown sequence of other parts is the same as left parts.

● **Assembling sequence**

It is opposite to breakdown sequence.

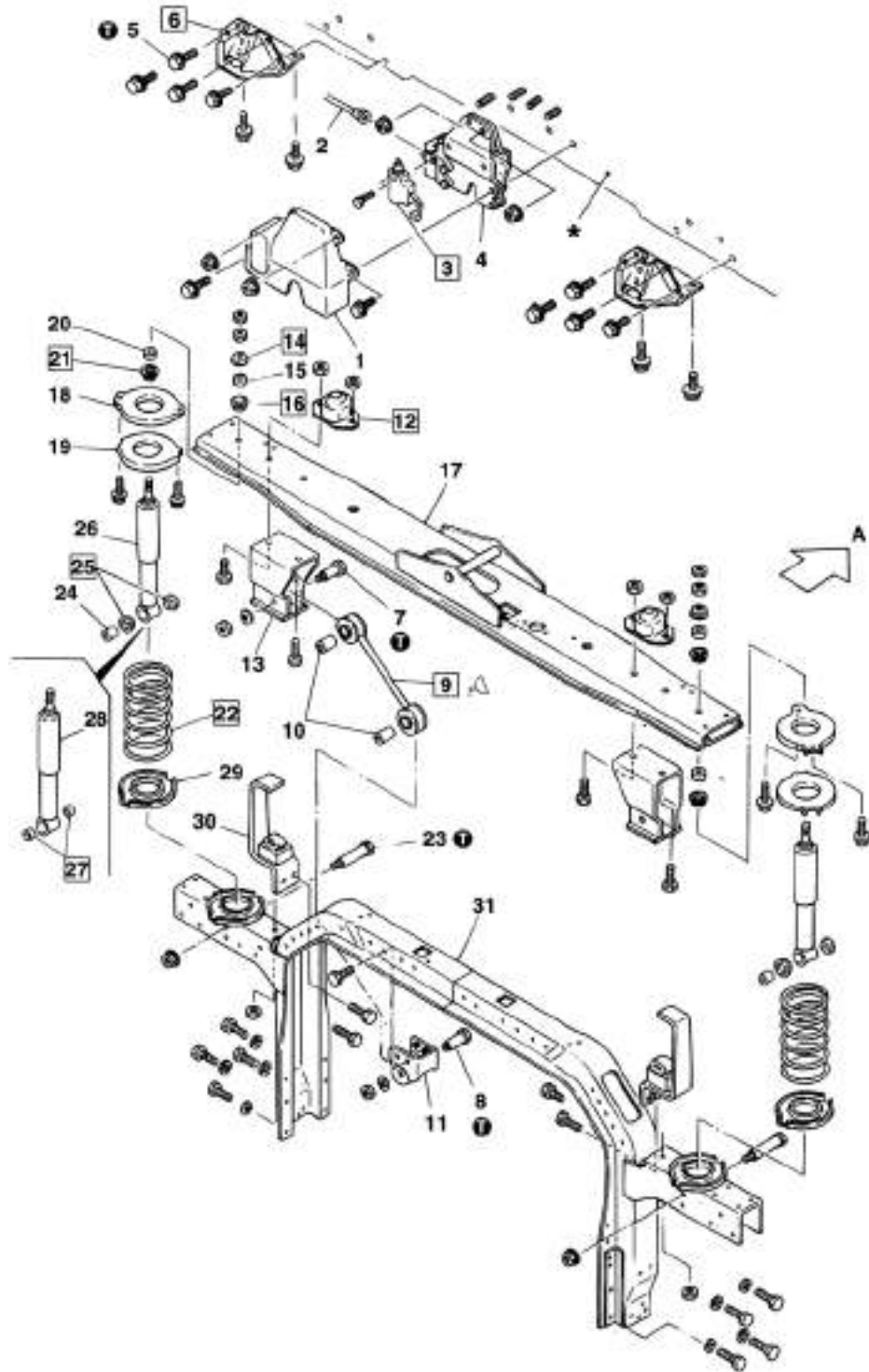
 **Tightening torque**

Position	Position tightened	Tightening torque	Remark
1	Bolt (use for fixing upper bracket of hinge)	290-390(30-40)	-
4	Bolt (use for fixing spring seat)	11.8(1.2)	-
11	Front hinge bolt (use for fixing bolster of cab hinge)	340-390{35-40}	-

 **Lubricant**

Position	Application position	Specified lubricant	Remark
10.14	Inner surface of cab hinge bolster	Chassis grease [NLG1 NO.2 (lithium soap base)]	As needed

Installation for Rear End of the Cab



18077

● **Disassembling sequence**

- | | | |
|--------------------------------------|-------------------------|---------------------------|
| 1. hydraulic latch cover | 13. tie rod bracket B | 25. eyewasher A |
| 2. oil pipe | 14. washer | 26. damper assembly |
| 3. tilting locking switch of the cab | 15. upper rubber sleeve | 27. rubber sleeve |
| 4. hydraulic latch assembly | 16. centering washer | 28. damper |
| 5. bolt | 17. floating transom | 29. inner spring seat |
| 6. bottom bracket | 18. spring seat | 30. rubber stopper |
| 7. cylindrical bolt | 19. inner spring seat | 31. gap bridge of the cab |
| 8. cylindrical bolt | 20. upper rubber sleeve | |
| 9. tie rod | 21. upper washer | A: front of the vehicle |
| 10. sleeve | 22. spiral spring | *: back face of the cab |
| 11. tie rod bracket A | 23. cylindrical bolt | |
| 12. bump rubber | 24. sleeve | |

Remark

The table above refers to breakdown sequence of left parts. Breakdown sequence of right parts is the same as that of left parts.

● **Assembling sequence**

It is opposite to breakdown sequence.

 **Tightening torque**

unit: N·m{kgf·m}

Position	Parts tightened	Tightening torque	Remark
5	Bolt (use for fixing bottom bracket)	34-54(3-5)	-
7,8	Cylindrical bolt (use for fixing tie rod)	210-240(21.4-24.5)	-
23	Cylindrical bolt (use for fixing damper)	60-70{6.3-7.2}	-

 **Lubricant**

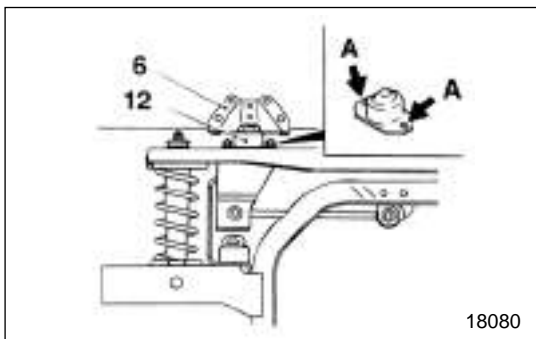
Position	Application position	Specified lubricant	Remark
9	Sliding surface of the tie rod and sleeve	Chassis grease [NLG1 NO.1 (lithium soap base)]	As needed

◆ **Examining and repairing method**

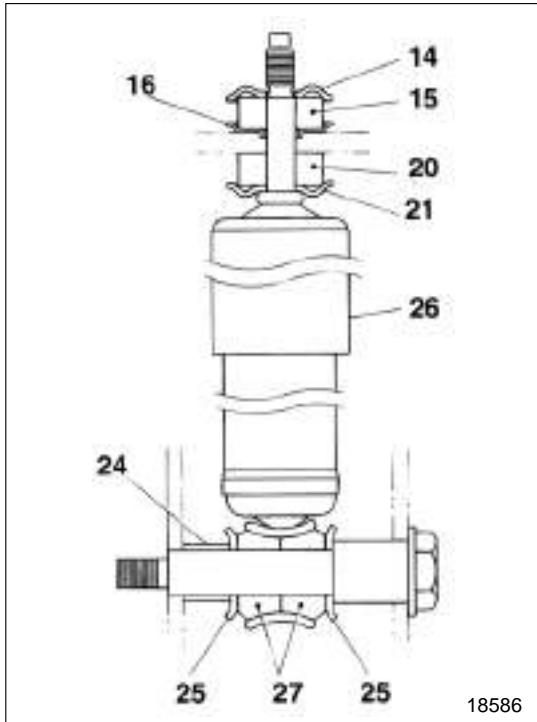
3 Installation of tilting locking switch of the cab
Install tilting locking switch 3 of the cab. When locked by floating transom 17 on hydraulic latch assembly 4, the switch should obtain figured dimension.

6 Installation of bottom bracket
Install bottom bracket 6. First, tighten four bolts 5 having ★, then tighten remaining two bolts having ☆.

9 Installation of tie rod
As shown in the figure, use cylindrical bolt 7 and 8 to install tie rod 9.
A: Front of the vehicle

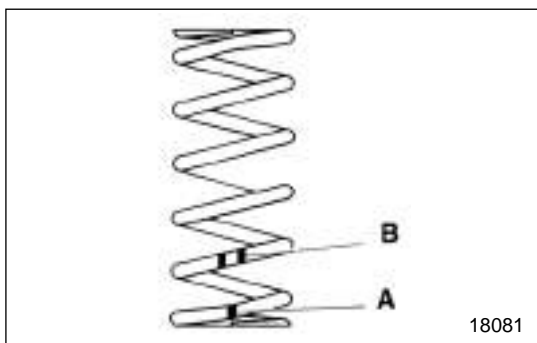


12 Installation of bump rubber
Install bump rubber 12, with its left and right side touching bottom bracket 6 in the same way.
A: Long hole used for adjusting



[14] [16] [21] [25] [27] Installation of washer and rubber sleeve

As the direction in the figure, install washer and rubber sleeve on damper assembly 26. Upper rubber sleeve 15 and sleeve 20 have no mounting direction.



[22] Installation of spiral spring

Identification sign A (line paint on second circle of the spring) for right and left spiral spring 22 should have the same color.

If pressing degree of left spring and right spring is different, you can combine them according to the following table.

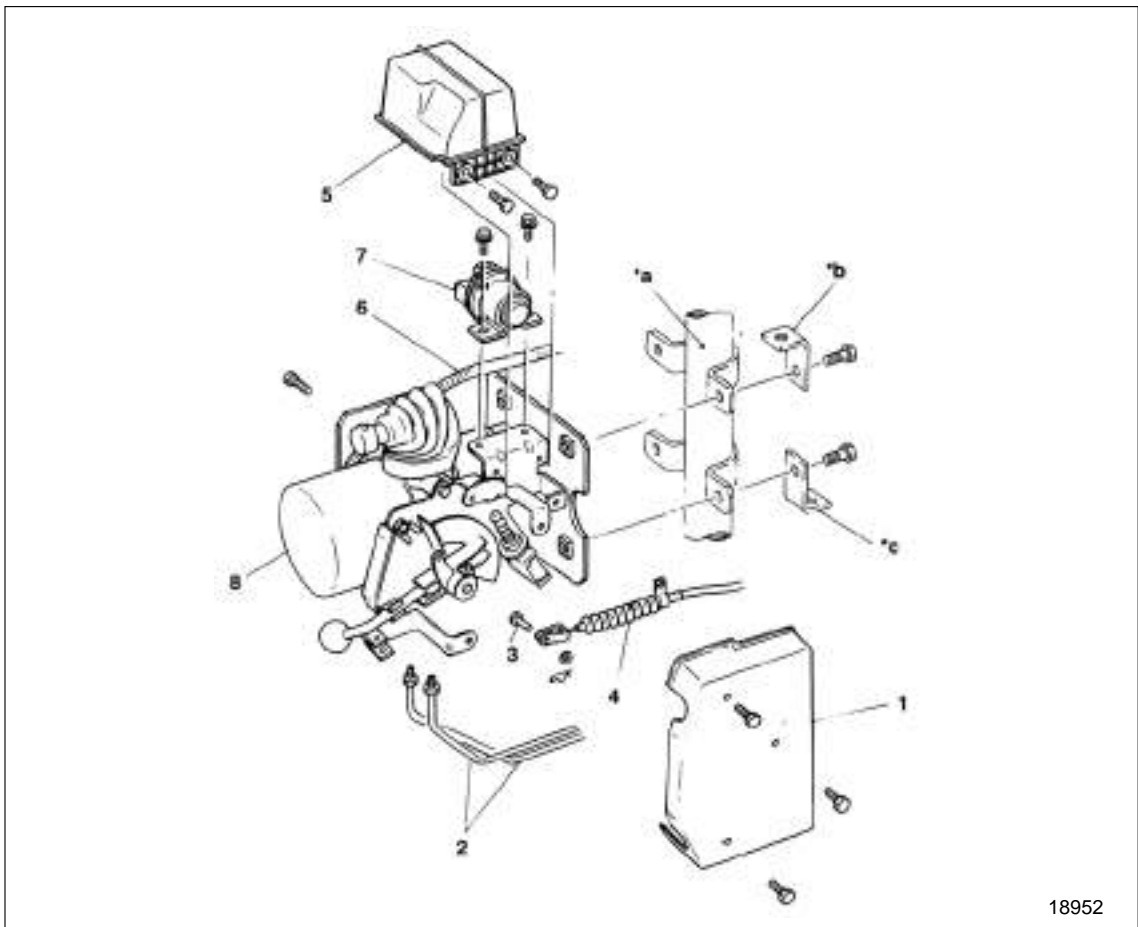
Combination form		1	2	3	4	5	6
Identification	Right spring	White	White	White	Yellow	Yellow	Red
Color A	Left spring	White	Yellow	WRed	Yellow	Red	Red

- Free length order is, white >yellow> red. (Difference between white and red is 3.5 mm).
- Right spring must be longer than left spring or equal to left spring.

Remark

Identification color sign B (double-line paint) is independent from mounting direction of spiral spring 22.

Tilting Oil Pump of the Cab



18952

● Operation before dismantling

Drain tilting hydraulic oil of the cab.

● Dismantling sequence

- | | | |
|--------------------------|--------------------------------|--------------------|
| 1. tilting control cover | 5. tilting relay cover | |
| 2. oil sleeve | 6. wiring | a: fender support |
| 3. U clamp pin | 7. electric tilting relay | b: wiring bracket |
| 4. control cable | 8. tilting oil pump of the cab | c: oi pipe bracket |

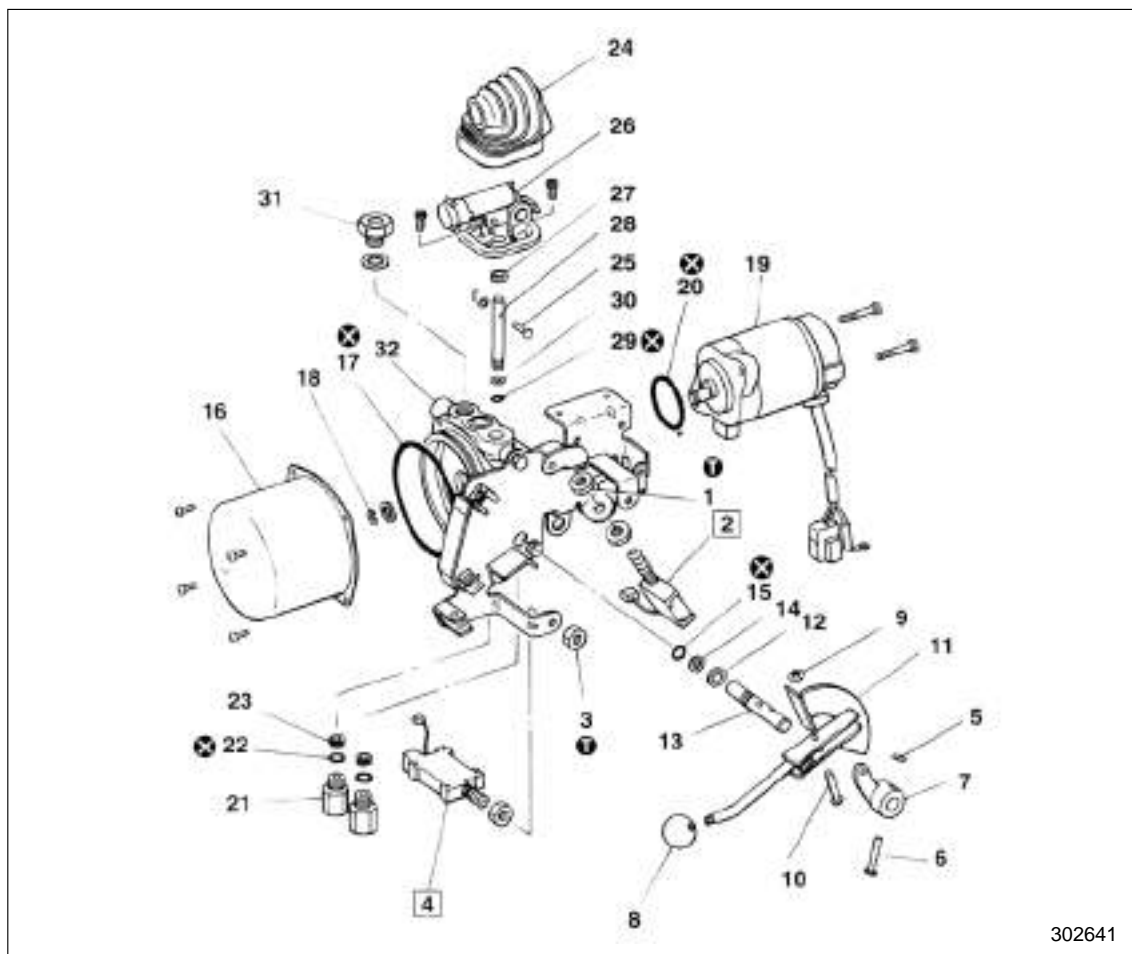
● Installing sequence

It is opposite to disassembling sequence.

● Operation after installation

Fill tiling hydraulic oil of the cab, and deflate.

► Tilting oil pump of the cab



302641

● Disassembling sequence

- | | | |
|------------------------------|---------------------|---------------|
| 1. nut | 13. switching valve | 25. pin |
| 2. UP/DOWN changeover switch | 14. O ring | 26. socket |
| 3. nut | 16. fluid reservoir | 27. seal ring |
| 4. tilting switch of the cab | 17. O ring | 28. piston |
| 5. push rod nut | 18. E ring | 29. O ring |
| 6. pin | 19. DC motor | 30. washer |
| 7. sleeve | 20. O ring | 31. cover |
| 8. knob | 21. pin connector | 32. pump body |
| 9. push rod nut | 22. O ring | |
| 10. pin | 23. filter | |
| 11. rod | 24. shield | |
| 12. C ring | | |

⊗: Parts that cannot be used repeatedly.

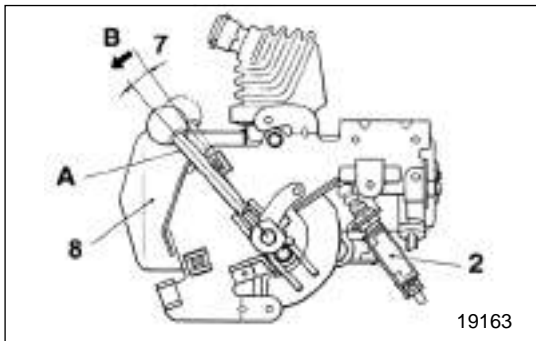
● Assembling sequence

It is opposite to breakdown sequence.

Tightening torque

unit: N•m{kgf•m}

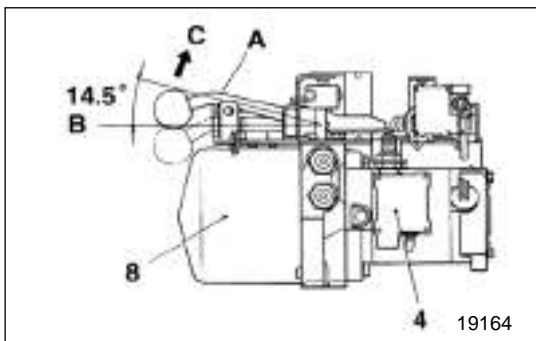
Position	Position Tightened	Tightening torque	Remark
1	Nut (use for installing UP/DOWN changeover switch)	9.8±0.2(1±0.2)	-
3	Nut (use for installing tilting switch of the cab)	9.8±0.2(1±0.2)	-



◆ Examining and repairing method

2 Installation of UP/DOWN changeover switch

- Pull rod A of tilting oil pump 7 to UP side, until it stops at position B. Then, lower it to DOWN side.
- On the position before installing switch, adjust UP/DOWN changeover switch 2. Transform between ON and OFF to adjust.



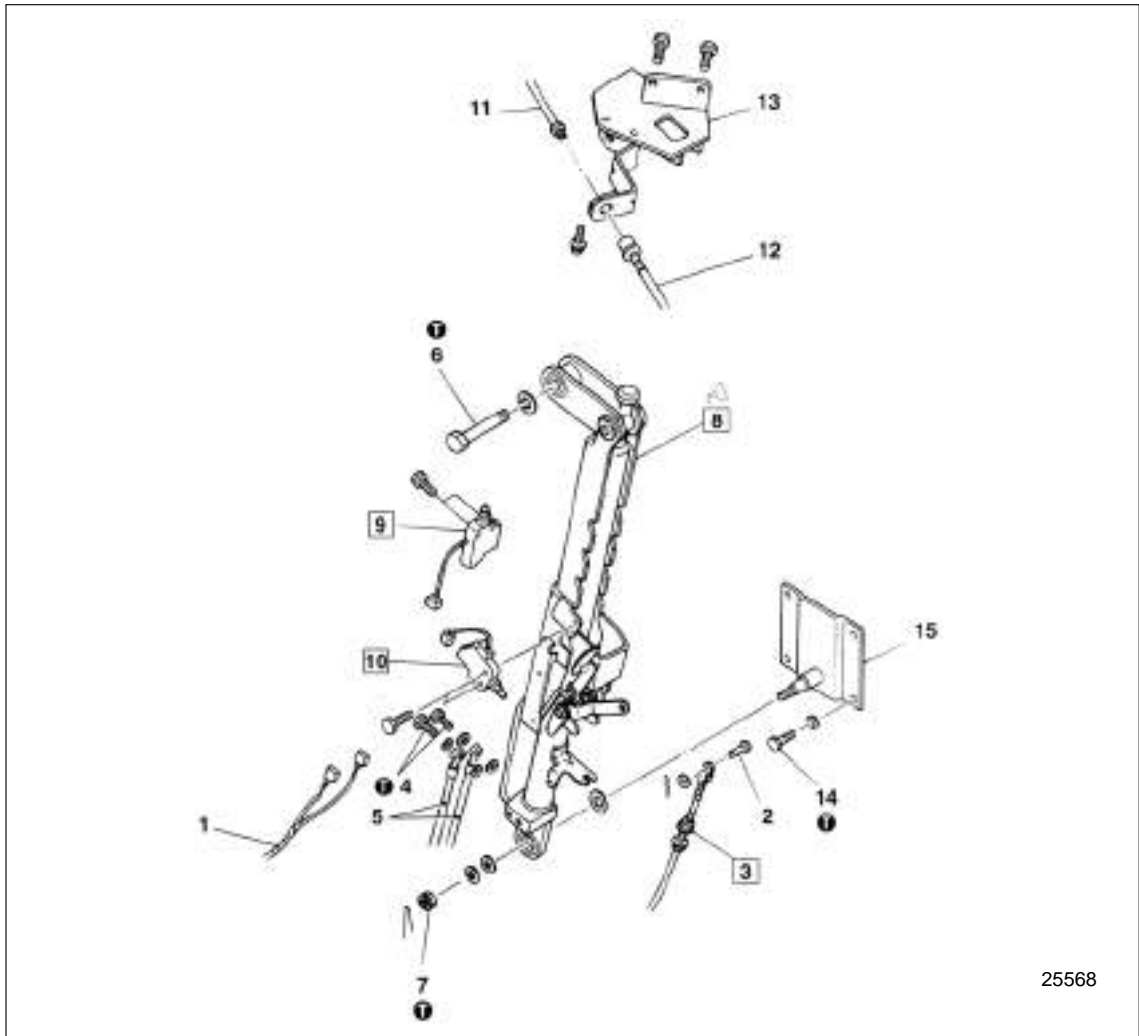
4 Installation of tilting switch of the cab

- As direction C in the figure, pull rod A of tilting oil pump 8 from locking position B to the position that is 14.5° away from position B.
- On the position before installing switch, adjust tilting switch 4 of the cab. Transform between ON and OFF to adjust.
- After installed switch, pull rod A as direction C, then release the rod at ON position of tilting switch 4. Check if this rod is pushed back by spring force of tilting switch, and if the tilting switch is pushed back to OFF position.

Cab

Memo

Tilting Hydraulic Cylinder of the Cab



25568

● Operation before breakdown

Drain tilting hydraulic oil of the cab.

● Disassembling sequence

- | | | |
|-----------------------|-----------------------------------------------------------|-------------------|
| 1. wiring | 7. nut | 13. upper bracket |
| 2. U clamp pin | 8. tilting hydraulic cylinder and rod assembly of the cab | 14. bolt |
| 3. control cable | 9. limit switch for stroke of hydraulic cylinder | 15. lower bracket |
| 4. pipe bolt | 10. tilting complete switch | |
| 5. hydraulic oil hose | 11. oil pipe | |
| 6. bolt | 12. hydraulic oil hose | |

● **Installing sequence**

13→ 12→11→
 ↓
 15→14→8→10→9→8→7→6→5→4→3→2→1

● **Operation after assembly**

Fill tilting hydraulic oil of the cab, and deflate.

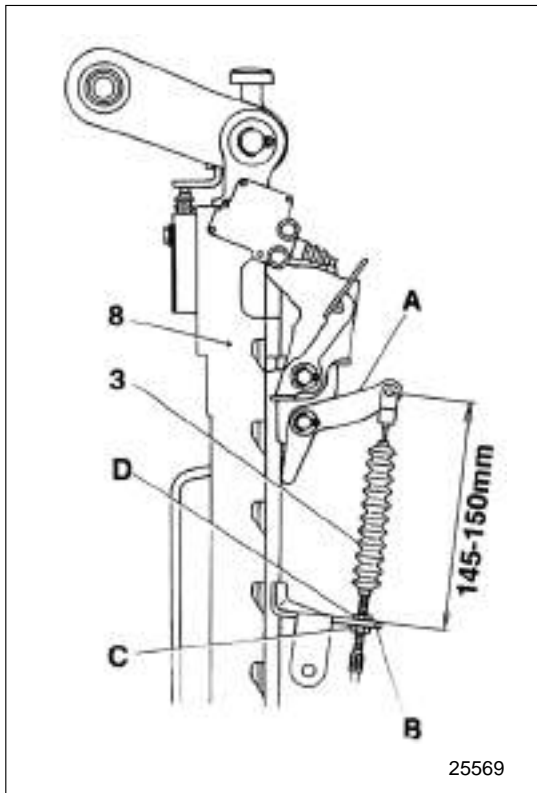
ⓘ **Tightening torque**

unit: N·m{kgf·m}

Position	Position tightened	Tightening torque	Remark
4	Pipe bolt	20(2)	-
6	Bolt (use for fixing tilting hydraulic cylinder and upper bracket)	510-770(52-78)	-
7	Bolt (use for fixing tilting hydraulic cylinder and lower bracket)	60-85(6.0-8.5)	-
14	Bolt (use for fixing lower bracket)	130-180(13-18)	-

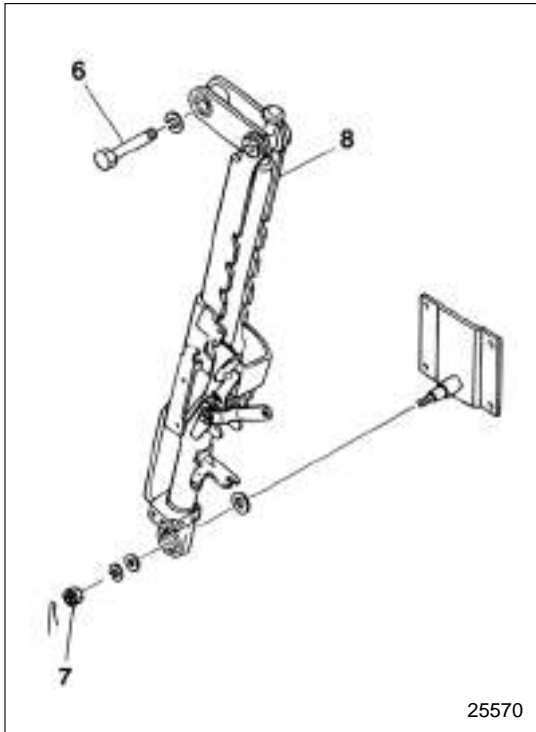
🔑 **Lubricant**

Position	Application position	Specified lubricant	Remark
8	Tilting hydraulic cylinder and rod assembly and sliding surface of lower bracket	Chassis grease [(NLG1 NO.2 lithium soap base)]	As needed



◆ **Examining and repairing method**

- ③ Installation of control cable
- Put rod of tilting oil pump of the cab on UP position.
- Install tip of control cable 3 on rod A of tilting hydraulic cylinder and rod assembly 8, and tighten thread of control cable into guide plate B.
- After nut C contacted with guide plate B, tighten the nut or screw three turns.
- Tighten nut D, then check if figured dimension is among specified limit value.



8] Dismantling of tilting hydraulic cylinder and rod assembly of the cab

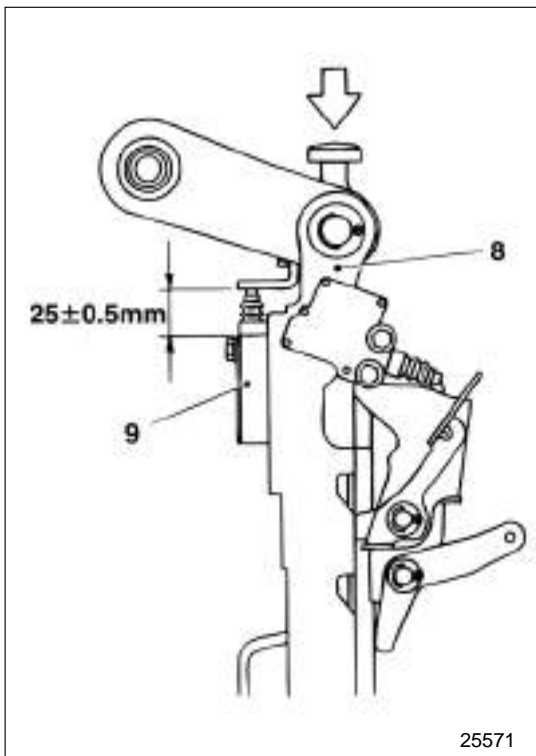
Warning ⚠

It is very dangerous to disassemble tilting hydraulic cylinder and rod assembly 8 under the condition that the cab is raised aslant. Therefore, this operation must be done after the cab descended aslant.

- Disassemble fender and all other parts that will hinder disassembly of tilting hydraulic cylinder and rod assembly 8.
- After disassembled parts 1-5, bolt 6 and nut 7, disassemble tilting hydraulic cylinder and rod assembly 8.

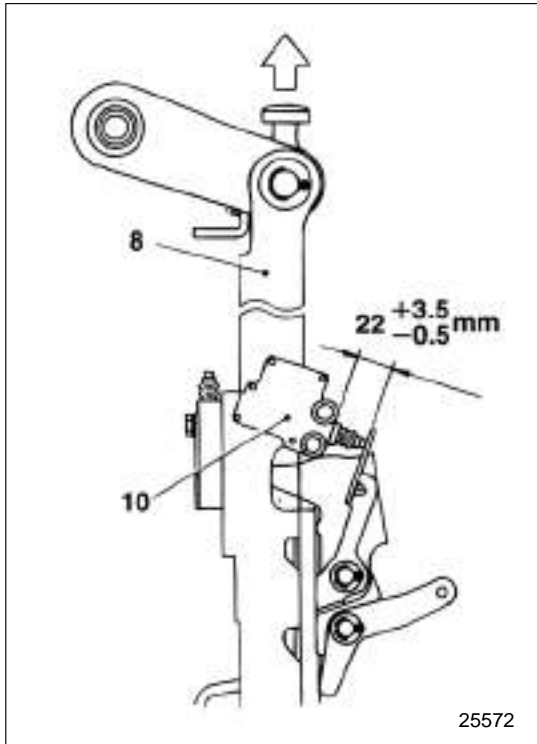
Caution ⚠

When disassembling upper part of tilting hydraulic cylinder and rod assembly 8, do not disassemble U clamp pin on position A.



9] Installation of limit switch for stroke of hydraulic cylinder

When installing limit switch 9 for stroke of hydraulic cylinder, tilting hydraulic cylinder and rod assembly 8 should be on fully retracted position, to obtain figured dimension. At this situation, limit switch 9 for stroke of hydraulic cylinder will be turned off.

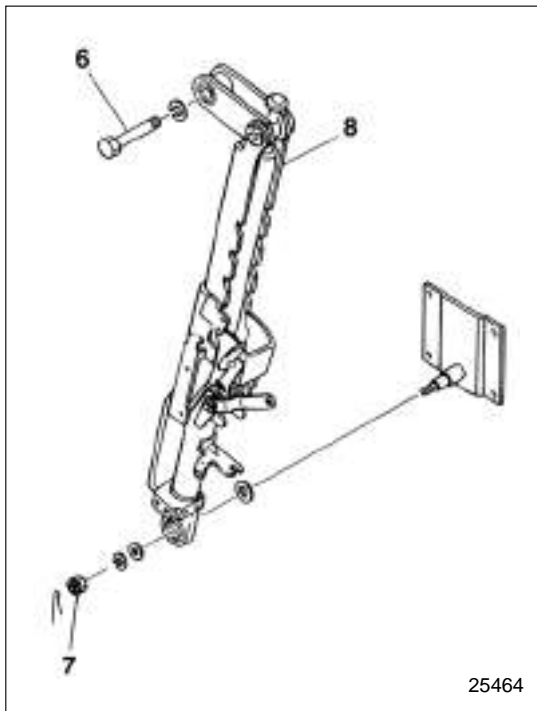


10 Installation of tilting complete switch

When installing tilting complete switch 10, tilting hydraulic cylinder and rod assembly 8 should be on fully extended position, to obtain figured dimension.

At this situation, tilting complete switch 10 will be turned off.

Door



► Door hinge and latch eye

• Dismantling sequence

1. door wiring
 2. locating pin for the door
 3. bolt
 4. bolt
 5. door assembly
 6. bolt
 7. bolt
 8. upper hinge
 9. bolt
 10. bolt
 11. lower hinge
 12. screw
 13. latch eye
 14. door switch
 15. door switch cover
 16. adjusting gasket
- *: locating bracket for the door

Remark

- In order to disassemble upper hinge 8 and lower hinge 11, disassemble front leftover plate in advance.
- In order to disassemble connector of door wiring 1, disassemble lower plate of driver side and lower plate of passenger side.
- Here, it only explained disassembling sequence of right door. Disassembling sequence of left door is the same as this.

• Installing sequence

It is opposite to disassembling sequence.

• Checking and adjusting after installation

Adjust door fit

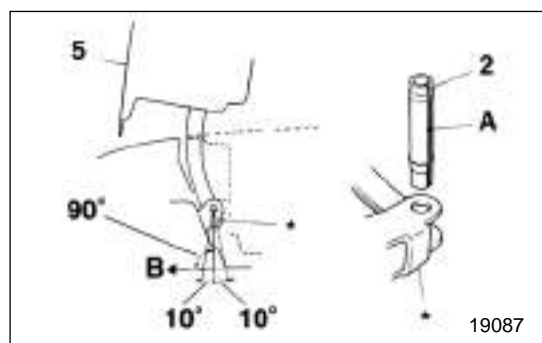
ⓘ Tightening torque

unit: N•m{kgf•m}

Position	Tightened position	Tightening torque	Remark
3,4	Bolt (use for fixing door assembly)	17-26(1.7-2.6)	-
6,7	Bolt (use for fixing upper hinge)	17-26(1.7-2.6)	-
9,10	Bolt (use for fixing lower hinge)	17-26(1.7-2.6)	-
12	Bolt (use for fixing latch eye)	9-14(0.9-1.4)	-

🔧 Lubricant

Position	applyingApplication position	Specified lubricant	Remark
8	Rotating and sliding surface for upper hinge	Chassis grease [(NLG1 NO.1 lithium soap base)]	As needed
11	Rotating and sliding surface for lower hinge	Chassis grease [(NLG1 NO.1 lithium soap base)]	As needed



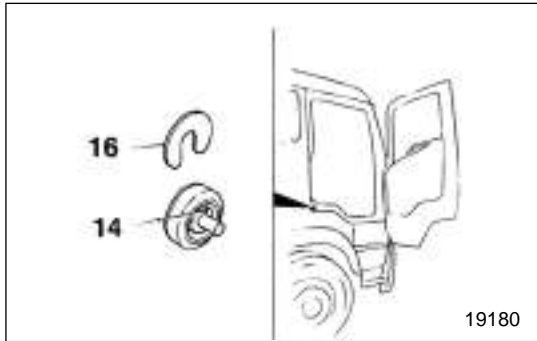
◆ Examining and repairing method

② Installation of locating pin for the door

- Under the condition that door assembly 5 is open fully, insert locating pin for the door 2, with its groove A in figured range.

B: Front of the vehicle

*: ILocating bracket for the door

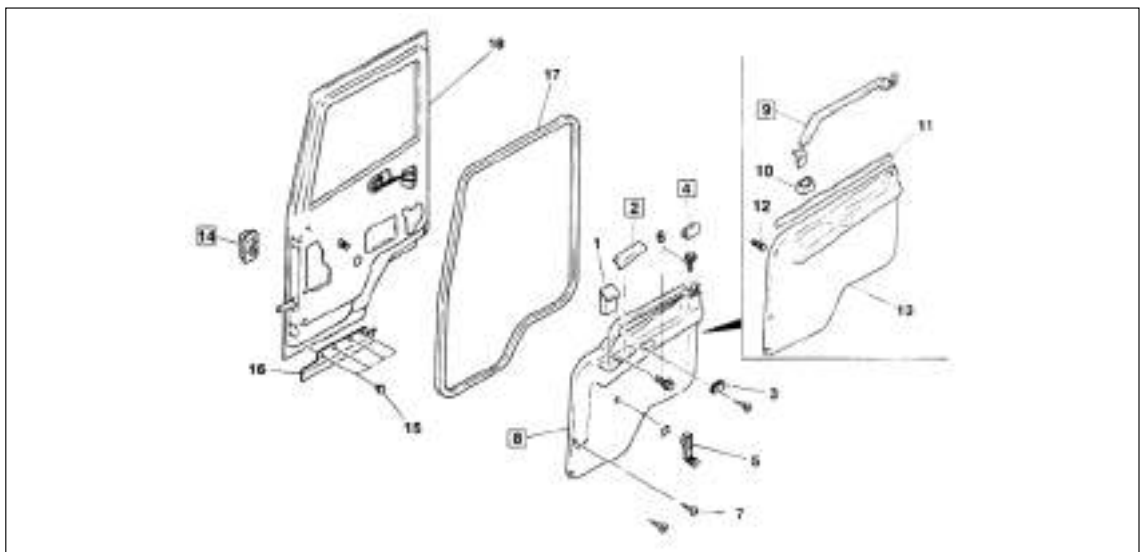


14 Installation of door switch

- Under the condition that door assembly 5 is not close tightly, if warning lamp for the door does not illuminate, reduce adjusting gasket 16 until warning lamp illuminates.
- Under the condition that door assembly 5 is close tightly, if warning lamp for the door illuminates, add adjusting gasket 16 until warning lamp extinguishes.

Adjust the thickness of gasket 16: 0.6 mm/
adjusting gasket.

► Door assembly



● Dismantling sequence

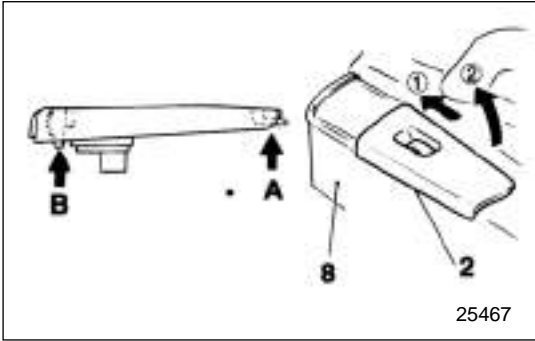
- | | | |
|-------------------------|------------------------------------------------------------------------------|----------------------------------------------|
| 1. ashtray | 2. power window switch
(with power window) switch
without power window | 3. inner handle cover |
| 4. door rod shield | | 5. adjuster handle
(without power window) |
| 6. bolt | 8. door finisher assembly | 9. door rod |
| 7. screw | 11. sealing strip | 12. buckle |
| 10. ashtray | 14. side steering signal lamp | 15. buckle |
| 13. door finisher | 17. sealing strip | 18. door plate assembly |
| 16. splash rubber plate | | |

Remark

- Do not disassemble splash rubber plate 16 and sealing strip 17 unless they are damaged.
- Here, it only explained disassembling sequence of right door. Disassembling sequence of left door is the same as this.

● Installing sequence

It is opposite to breakdown sequence.



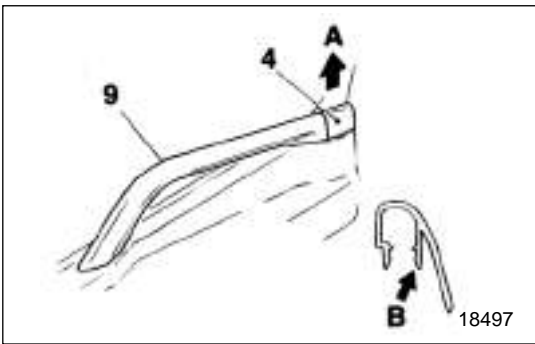
◆ Examining and repairing method

2 Dismantling of power window switch
(Dismantling)

Press power window switch 2 towards front of the vehicle ①, at the same time, lift rear end of power window switch upwards ② to disassemble the switch.

(Installation)

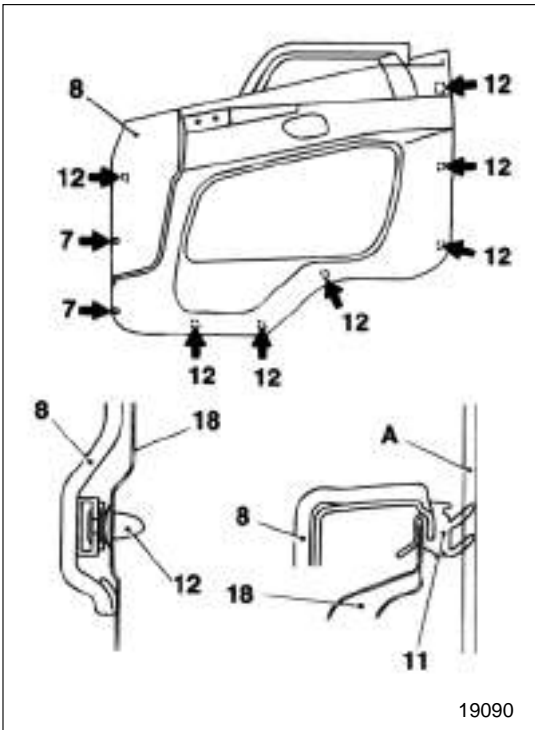
Hang lock claw A of power window switch 2 on door finisher 8, knock on front end of power window switch to make spring B into place.



4 Dismantling of door rod shield

A: Dismantling direction

B: Lock claw



8 Dismantling and installation of door finisher assembly

- Disconnect screw 7 (two places).
- On back face of door finisher assembly 8, there is buckle 12. On the position shown in the figure (7 places), door finisher is fixed on door plate assembly 18. On the position near to buckle, pull door finisher assembly towards yourself with your hands, and disconnect it from door plate assembly.

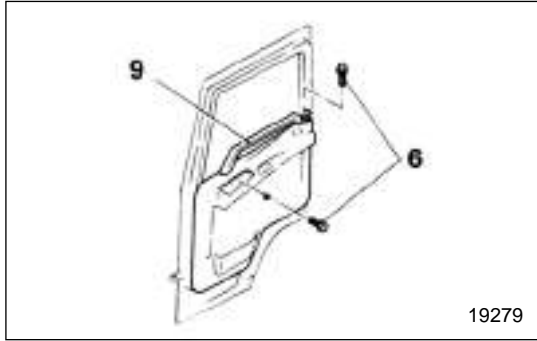
Caution ⚠

Be careful not to damage door finisher assembly 8.

- As sealing strip 11 that is on top of door finisher assembly 8 is fixed on door plate assembly 18, when disassembling door finisher assembly, you should press it upwards.

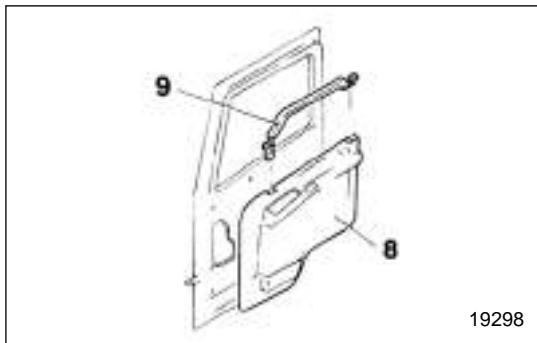
A: Door glass

- It is opposite to disassembling sequence.

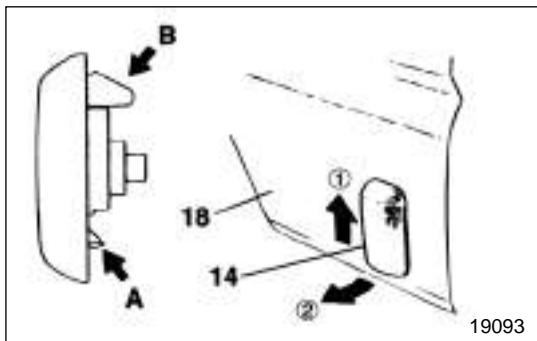


9 Dismantling of door rod

- Disassemble mounting bolt 6 of door rod 9.



- After disassembling door finisher assembly 8, disassemble door rod 9.



14 disassemblyDismantling of side steering signal lamp

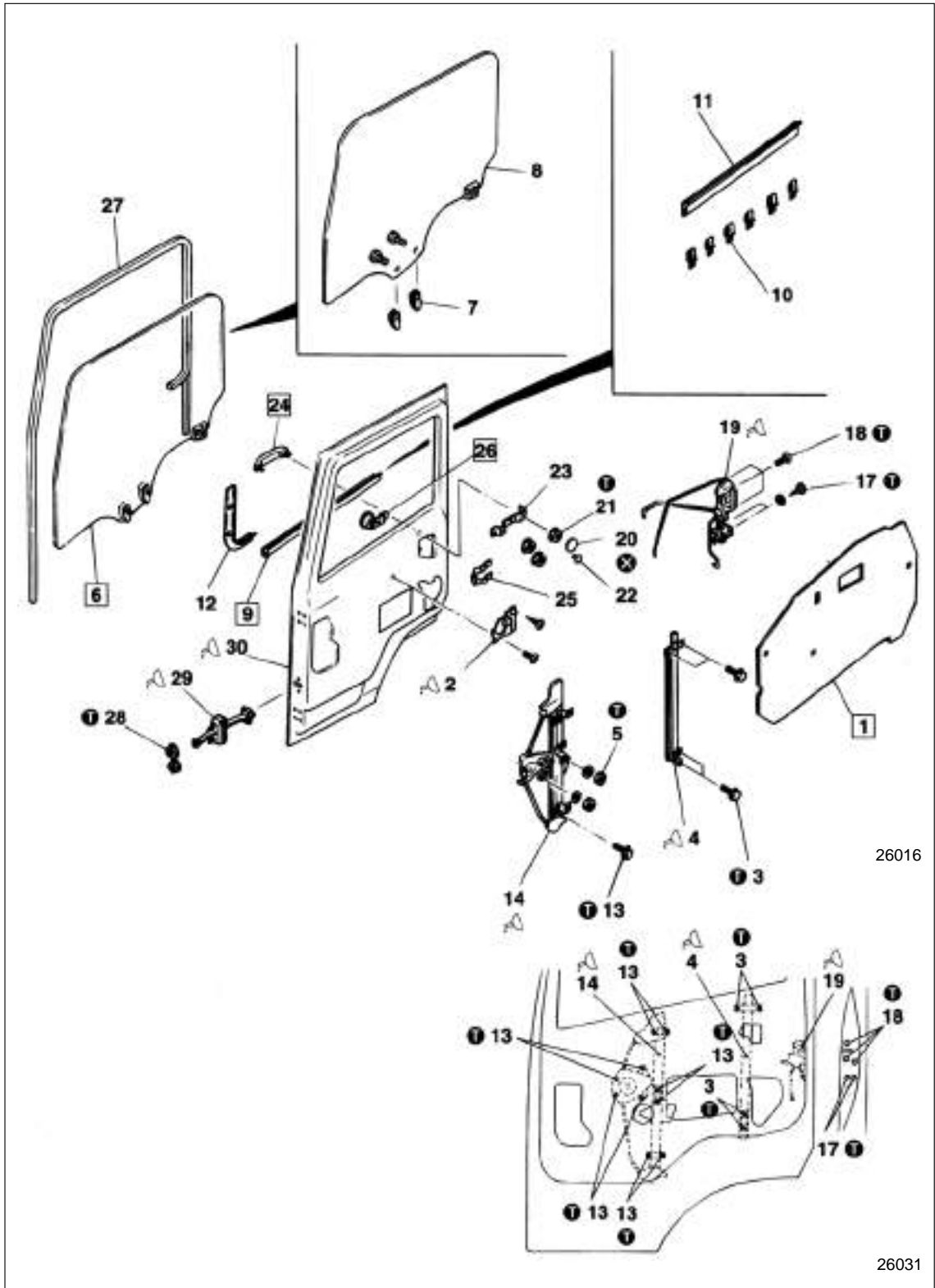
(Disassembling)

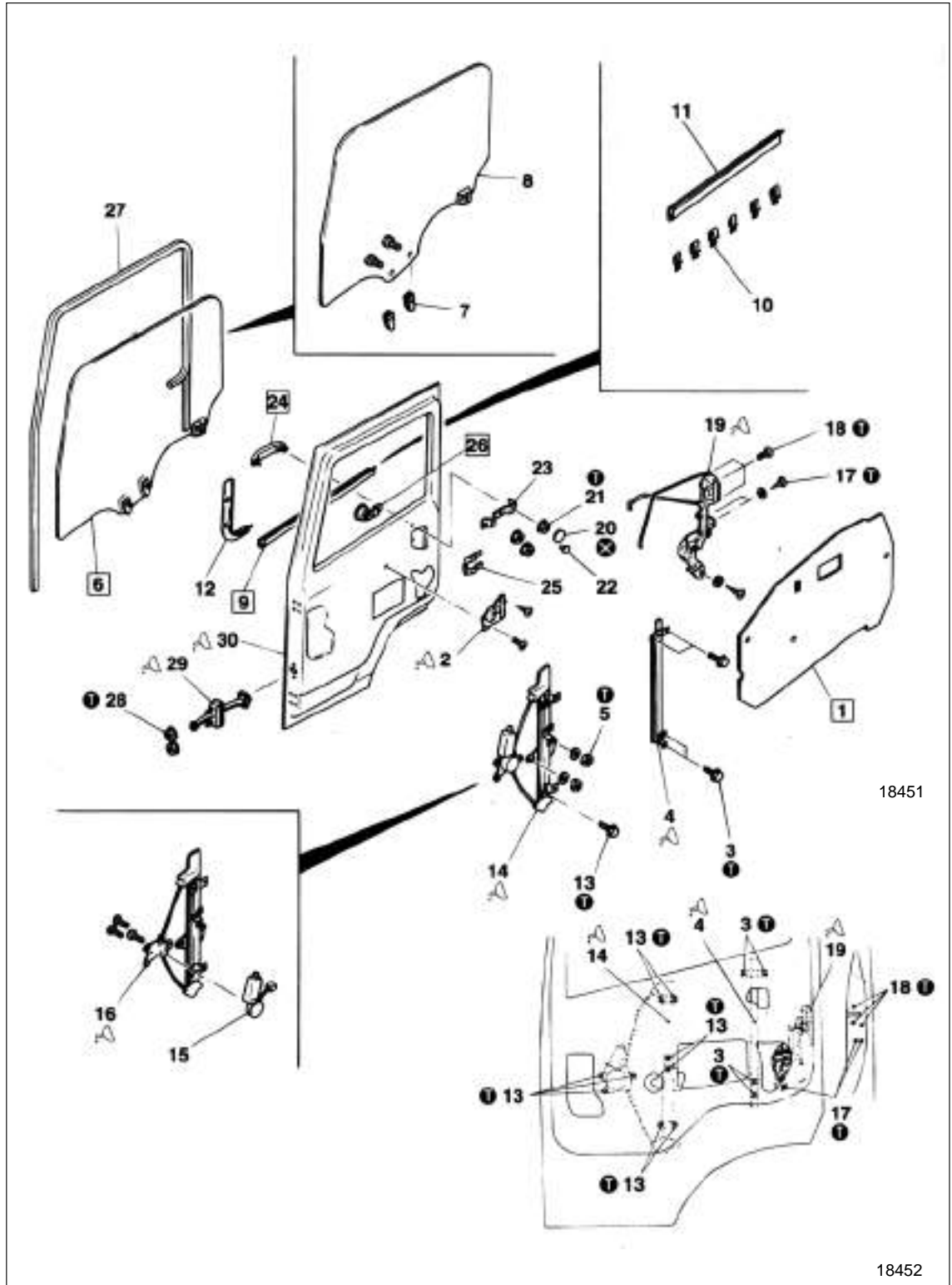
Uplift side steering signal lamp 14 upwards①
At the same time, draw underside of the lamp towards yourself ② to disassemble it.

(Installing)

Hang lock claw A of side steering signal lamp 14 on door plate assembly 18, knock on top of the lamp to make spring B into place.

► Door plate assembly





● **Disassembling sequence**

- | | |
|----------------------------------------------------------------------------------------|------------------------------------------|
| 1. waterproof cover | 2. inner handle (without power window) |
| 3. bolt adjuster and motor assembly | 4. rear guide rail (with power window) |
| 5. nut | 6. door glass assembly |
| 7. glass bearer | 8. door glass |
| 9. insertion strip assembly for decorative band | 10. buckle |
| 11. insertion strip for decorative band | 12. triangle trim |
| 13. bolt | 14. adjuster and guide rail assembly |
| 15. power window motor | 16. adjuster and guide rail assembly |
| 17. screw | 18. screw |
| 19. door lock assembly (without power window)actuator of door lock (with power window) | 21. nut |
| 20. plug | 23. reinforcing plate for outer handle |
| 22. plug | 25. buckle |
| 24. outer handle | 27. lifting groove |
| 26. lock core of the door | 29. restrictor assembly of the door |
| 28. nut | ⊗: Parts that cannot be used repeatedly. |
| 30. door plate | |

Remark

Here, it only explained disassembling sequence of right door. Disassembling sequence of left door is the same as this.

● **Assembling sequence**

It is opposite to breakdown sequence

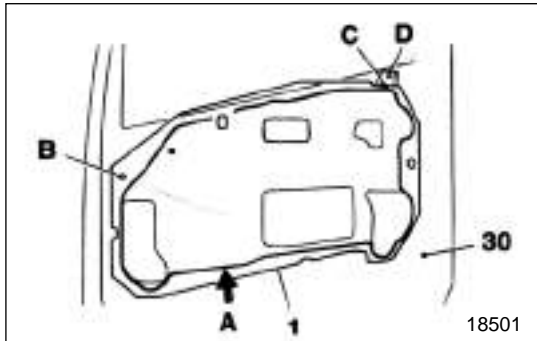
ⓘ **Tightening torque**

unit: N•m{kgf•m}

Position	tightened Position tightened	Tightening torque	Remark
3	Bolt (use for fixing rear guide rail of door window)	10-15(1.0-1.5)	-
5	Nut (use for fixing door glass assembly)	4-6(0.4-0.6)	-
13	NScrew (use for fixing door lock assembly or actuator of door lock)	4-6(0.4-0.6)	-
17	NScrew (use for fixing door lock assembly or actuator of door lock)	4-6(0.4-0.6)	-
18	Screw (use for fixing door lock assembly or actuator of door lock)	4-6(0.4-0.6)	-
21	Nut (use for fixing outer handle)	4-6(0.4-0.6)	-
28	Nut (use for fixing restrictor assembly of the door)	4-6(0.4-0.6)	-

 **Lubricant**

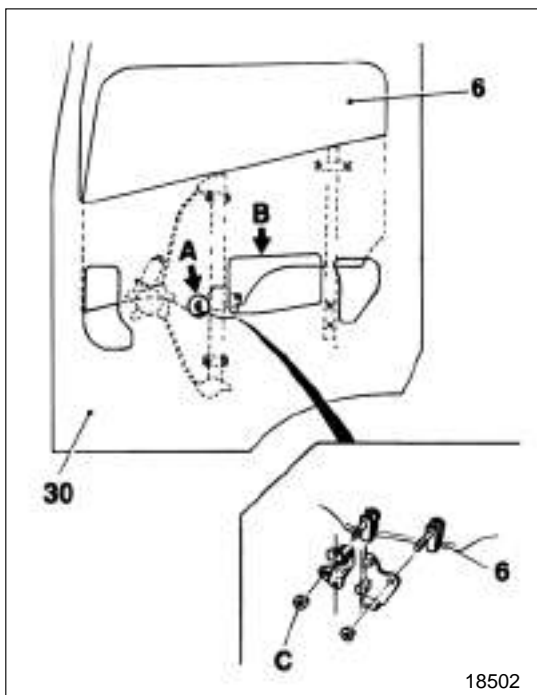
Position	Application position	Specified lubricant	Remark
2	Rotating and sliding surface for inner handle	Grease for wheel bearing [NLG1 NO.2 (lithium soap base)]	As needed
5	Sliding surface for rear guide rail	Chassis grease [NLG1 NO.1 (lithium soap base)]	As needed
14,16	Sliding surface for adjuster and guide rail assembly	Universal grease [NLG1 NO.1] lithium soap base)]	As needed
19	Sliding surface for door lock assembly or actuator of door lock	Universal grease [NLG1 NO.1 (lithium soap base)]	As needed
29	Sliding surface for restrictor assembly of the door	Universal grease [NLG1 NO.1 (lithium soap base)]	As needed
30	Junction surface for waterproof cover of door plate	Butyl adhesive tape	As needed



◆ Examining and repairing method

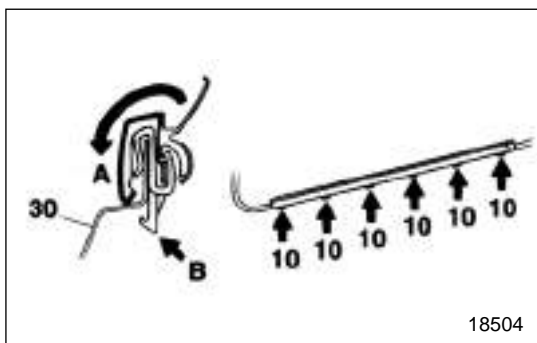
① Installation of waterproof cover

- As shown in the figure, affix butyl adhesive tape A on door plate 30.
- Align locating hole B of waterproof cover 1 to mounting hole of door finisher, making C part of waterproof cover match with bottom end face of door rod bracket D.



⑥ Dismantling and installation of door glass assembly

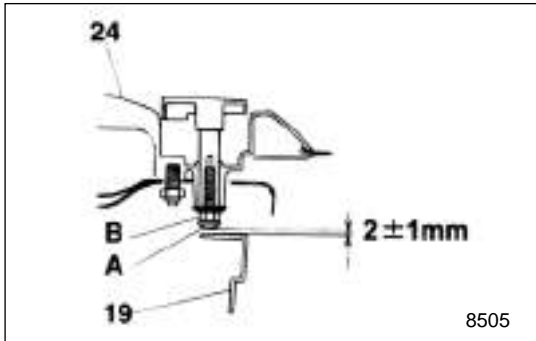
- Move door glass assembly 6 until you can see the nut C of door glass assembly through eyelet A and B of doorplate 30.
- Hold door glass assembly 6 with your hands, at the same time, disconnect nut C.
- Disassemble door glass assembly 6 from door opening.
- Install as opposite order of disassembling sequence.



⑨ Dismantling of insertion strip assembly for decorative band

Disconnect lock claw B of buckle 10, pull insertion strip assembly 9 for decorative band towards yourself, and disconnect it from doorplate 30.

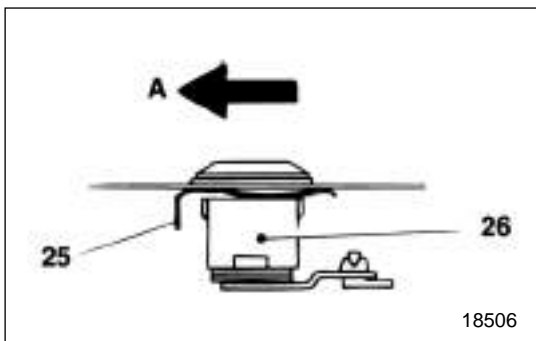
- A: Dismantling direction
- B: Lock claw



24 Installation of the handle

Rotate push-pull bolt A of outer handle 24. Adjust the clearance between push-pull bolt and actuator 19 of the door lock to the dimension indicated in the figure.

B: Locking nut



26 Installation for lock core of the door

According to direction in the figure, use buckle 25 to mount lock core 26 of the door.

A: front of the vehicle

Reflecting Mirror (at the side of driver' s seat)

► Type 1

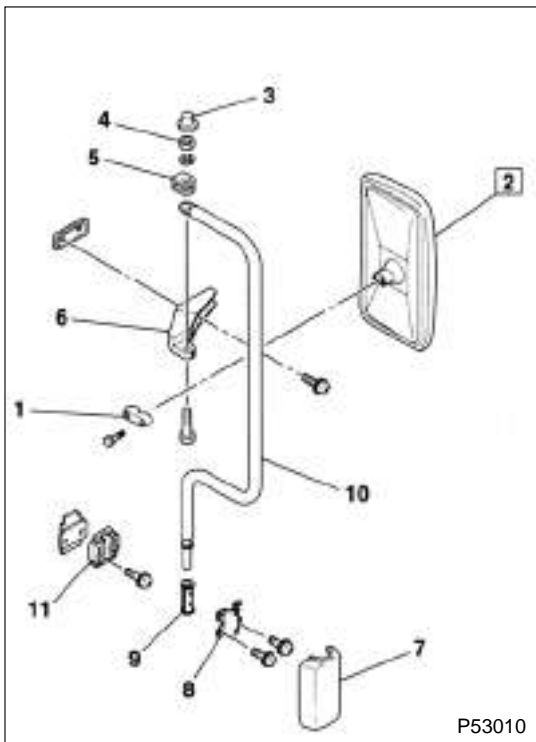
● Dismantling sequence

1. bracket
2. rear view mirror
3. cap
4. nut
5. U washer
6. upper bracket
7. cover
8. bracket
9. shaft collar
10. bracing piece of the mirror
11. lower bracket

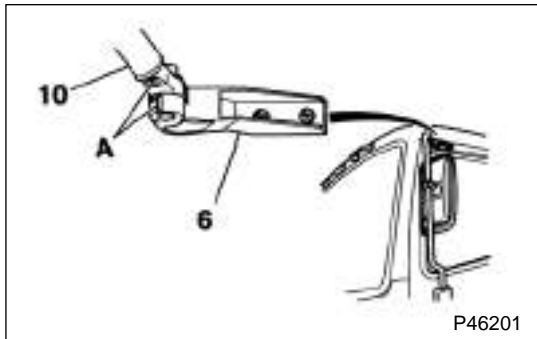
● Installing sequence

It is opposite to disassembling sequence.

● Adjustment after installing

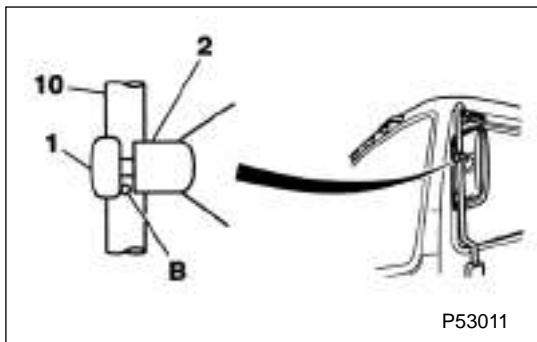


● **Key points for repair**



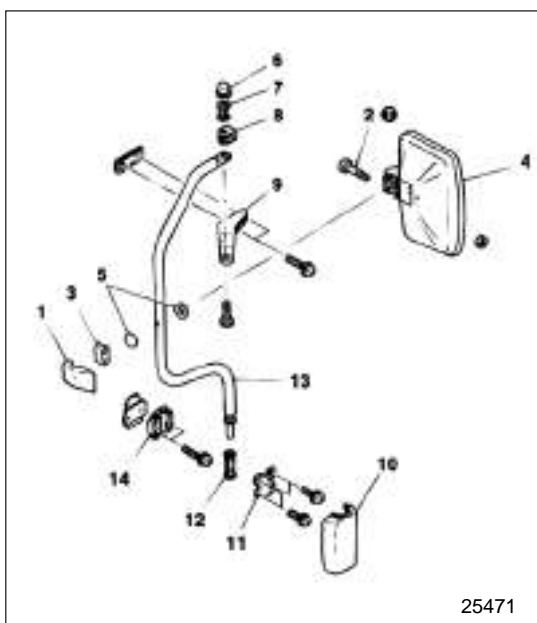
● **Adjustment after installing**

Loosen nut 4. According to match mark A of upper bracket 6 and bracing piece 10 of the mirror, install it.



② Installation of mirror

According to nick position B in the figure, install mirror.



► **Type 2 (optional parts)**

● **Dismantling sequence**

1. cover
2. screw
3. distance ring
4. rear view mirror
5. pivot
6. cap
7. nut
8. U washer
9. upper bracket
10. cover
11. bracket
12. shaft collar
13. bracing piece of the mirror
14. lower bracket

● **Installing sequence**

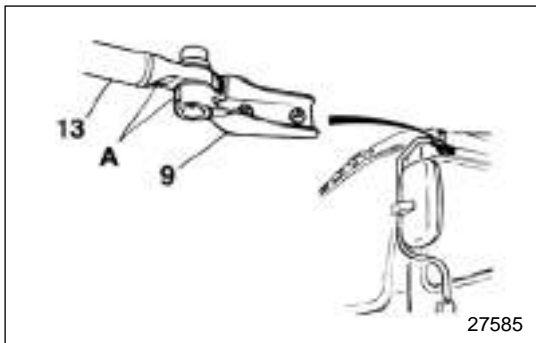
It is opposite to disassembling sequence.

● **Adjustment after installing**

ⓘ **Tightening torque**

unit: N•m(kgf•m)

Position	parts tightened	Tightening torque	Remark
2	Bolt (use for installing rear view mirror)	1.47-1.96{0.15-0.2}	-



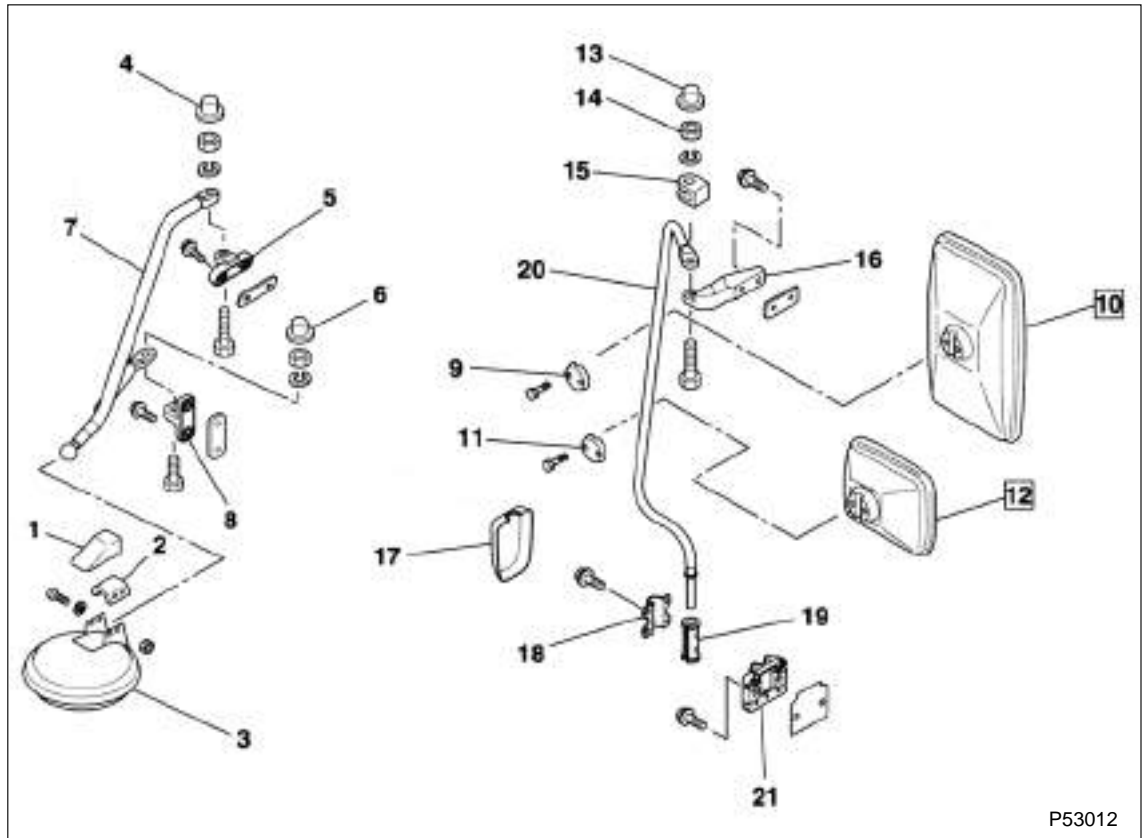
◆ **Examining and repairing method**

● **Adjustment after installing**

After loosening nut 7, adjust bracing piece 13 of the mirror through match mark A on upper bracket 9 and bracing piece of the mirror.

Reflecting Mirror (at the side of assist driver's seat)

► Type 1



P53012

● Dismantling sequence

- | | | |
|---------------------------------------------------------|---------------------------------------------------------|--------------------------------|
| 1. cover | 2. distance ring | 3. lower view mirror |
| 4. cap | 5. upper bracket for bracing piece of lower view mirror | |
| 6. cap | 7. bracing piece of lower view mirror | |
| 8. lower bracket for bracing | 9. bracket | |
| 10. rear view mirror | 11. bracket | 12. sideward lower view mirror |
| 13. cap | 14. nut | 15. U washer |
| 16. upper bracket for bracing piece of rear view mirror | 17. cover | 18. bracket |
| 19. shaft collar | 20. bracing piece of rear view mirror | |
| 21. lower bracket for bracing piece of rear view mirror | | |

● Installing sequence

● Adjustment after installing

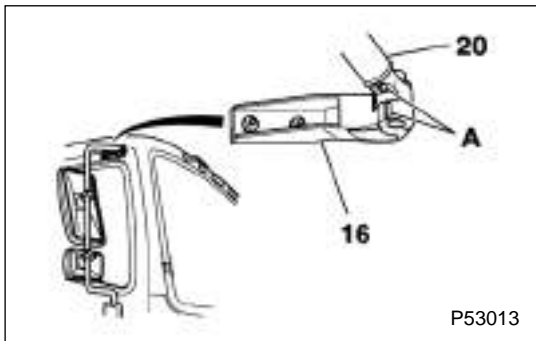
It is opposite to disassembling sequence.

- **Key points for repair**

- **Installing sequence**

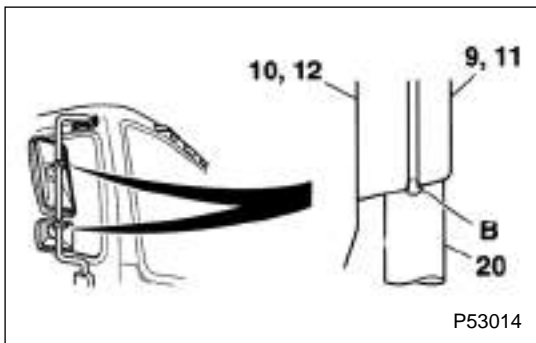
Adjustment after installing

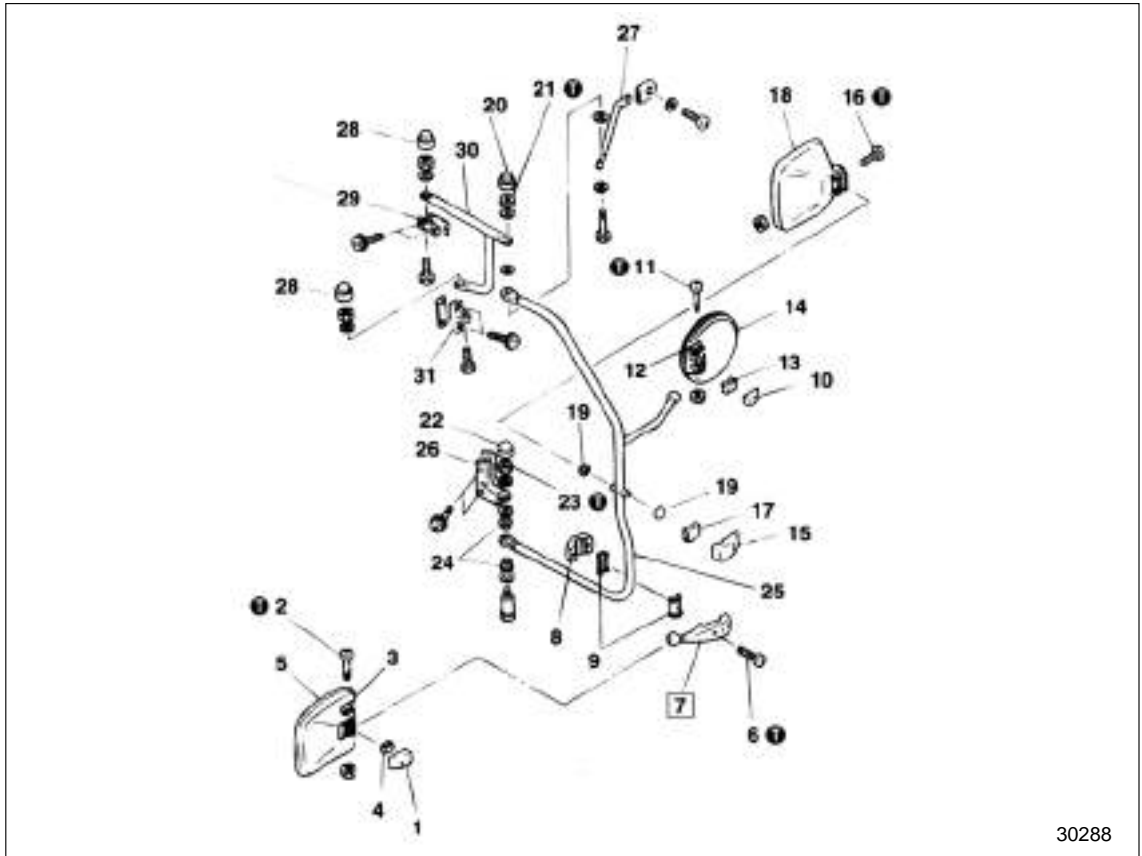
Loosen nut 14. Adjust through match mark A on upper bracket 16 for bracing piece of rear view mirror and bracing piece 20 of rear view mirror.



10 12 Installation of rear mirror 10 and sideward lower view mirror

As shown in the figure, install rear view mirror 10 and sideward lower view mirror 12 according to nick position B.





30288

● **Dismantling sequence**

- | | | |
|------------------------------------------------|--------------------------------------------------|----------------------|
| 1. cover | 2. screw | 3. distance ring |
| 4. distance ring | 5. sideward lower view mirror | 6. screw |
| 7. auxiliary braing piece | 8. bracket | 9. gasket |
| 10. cover | 11. screw | 12. distance ring |
| 13. distance ring | 14. lower view mirror | 15. cover |
| 16. screw | 17. distance ring | 18. rear view mirror |
| 19. pivot | 20. cap | 21. nut |
| 22. cap | 23. nut | 24. sleeve |
| 25. braing piece of the mirror | 26. lower bracket for braing piece of the mirror | |
| 27. stay | 28. cap | |
| 29. upper bracket A for braing piece of mirror | | |
| 30. upside for braing piece of mirror | | |
| 31. upper bracket B for braing piece of mirror | | |

● **Installing sequence**

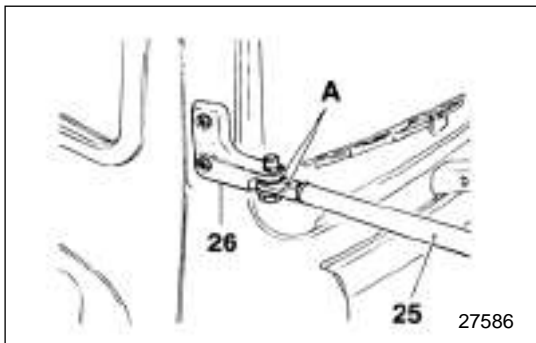
It is opposite to disassembling sequence.

● **Adjustment after installing**

Tightening torque

unit: N•m{kgf•m}

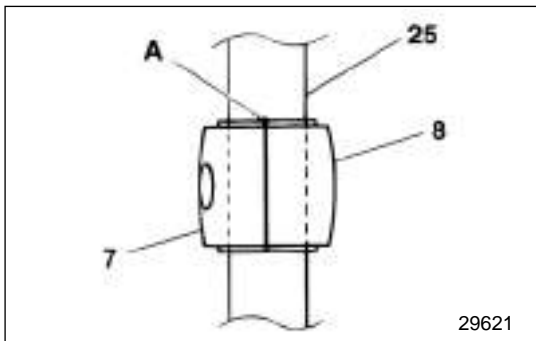
Position	Position tightened	Tightening torque	Remark
2	Screw (use for installing sideward lower view mirror)	1.96-2.94(0.2-0.3)	-
6	Screw (use for installing auxiliary braing piece)	4-6(0.4-0.6)	-
11	Screw (use for installing lower mirror)	1.96-2.94(0.2-0.3)	-
16	Screw (use for installing rear view mirror)	1.96-2.94(0.2-0.3)	-
21	Nut (use for installing braing piece of the mirror)	80-120(8.2-12.0)	-
23	Nut (use for installing braing piece of the mirror)	28-34(2.8-3.4)	-



◆ Examining and repairing method

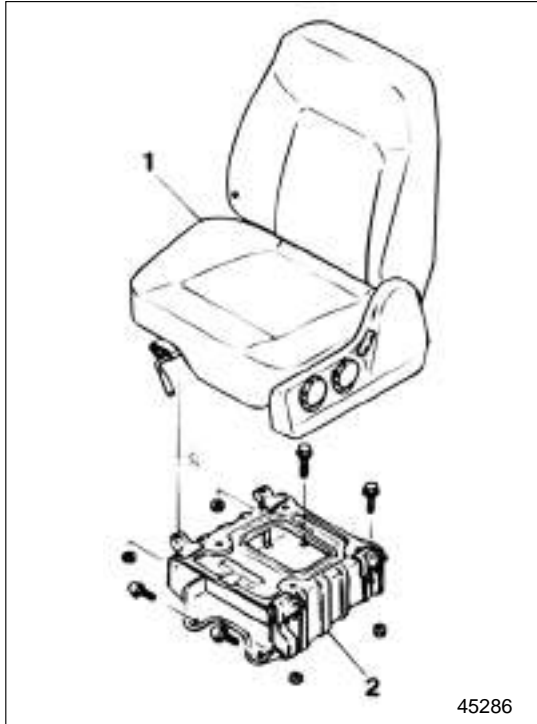
● Adjustment after installing

After loosening nut 23, adjust braing piece 25 of the mirror through match mark A on lower bracket for braing piece 26 of mirror and braing piece of the mirror.



⑦ Installation of auxiliary braing piece

When top side of butt joint for auxiliary braing piece and bracket 8 aligned with match mark A on braing piece 25 of the mirror, install auxiliary braing piece 25.



● **Dismantling sequence**

1. seat assembly
2. driver's seat support

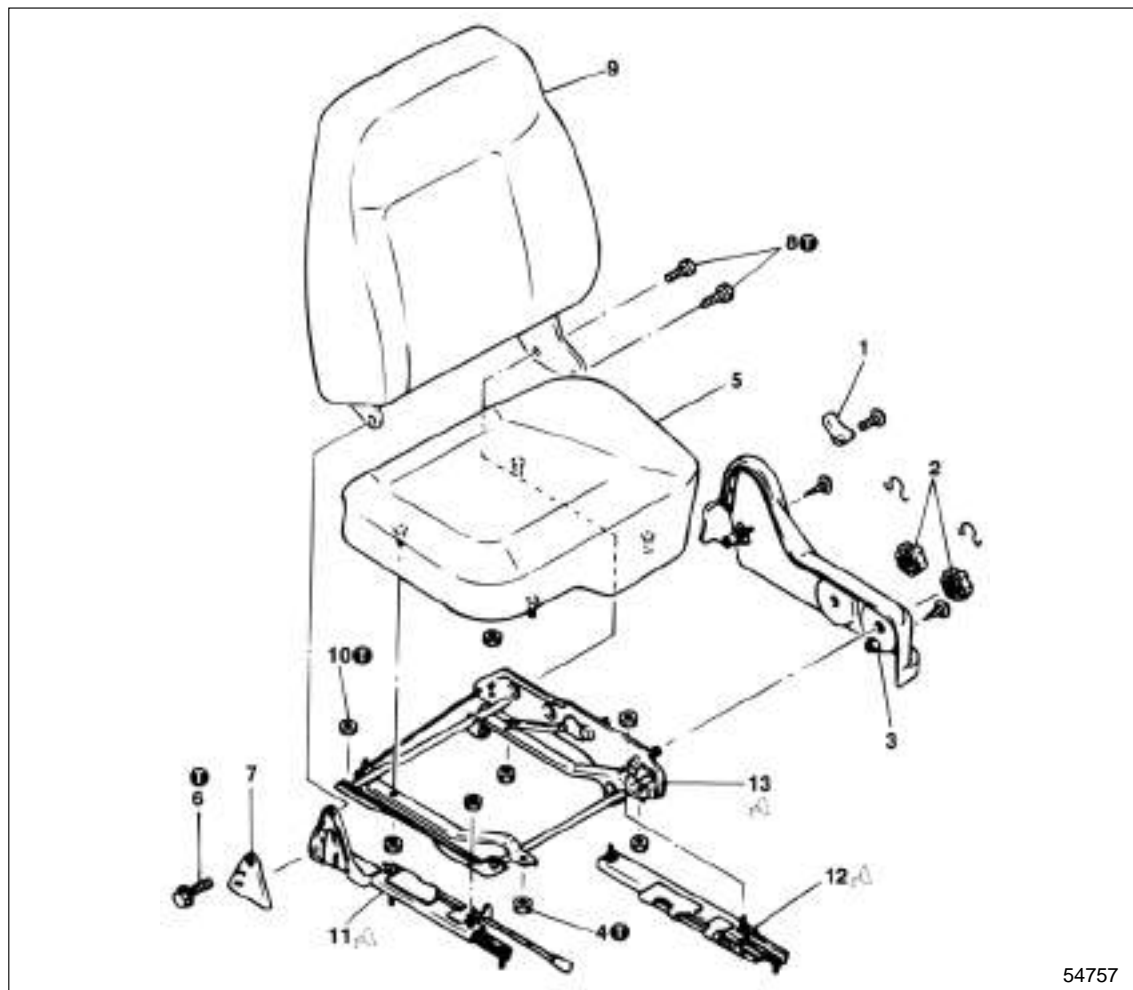
● **Disassembling sequence**

It is opposite to disassembling sequence.

Memo

Driver' s Seat

► Seat assembly



54757

● Disassembling sequence

- | | | |
|--------------------------------------|----------------------------------|-------------------------------|
| 1. tilting adjusting knob | 2. tilting/height adjusting knob | 3. shield |
| 4. nut | 5. seat cushion assembly | 6. screw |
| 7. guard plate | 8. bolt | 9. seat back assembly |
| 10. nut | 11. seat adjuster assembly LH | 12. seat adjuster assembly RH |
| 13. tilting/height adjuster assembly | | |

● Assembling sequence

It is opposite to breakdown sequence.

Tightening torque

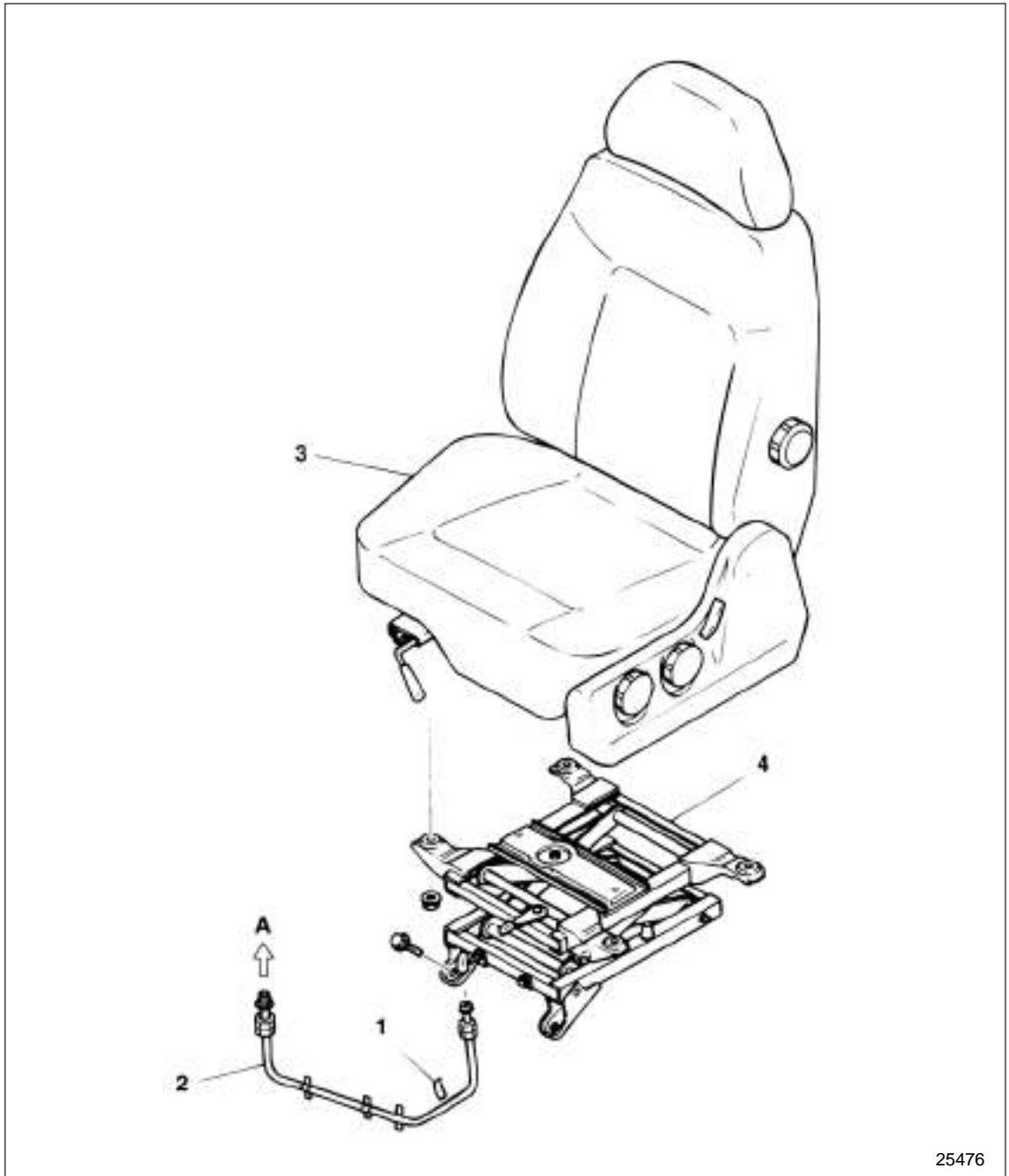
unit: N•m{kgf•m}

Position	Position tightened	Tightening torque	Remark
4	Nut (use for installing seat cushion assembly and tilting/height adjuster assembly)	10-15(1.0-1.5)	-
6	Screw (use for installing seat back assembly and seat adjuster assembly LH)	10-15(1.0-1.5)	-
8	Bolt (use for installing seat back assembly and tilting/height adjuster assembly)	34.3-53.9(3.5-5.5)	-
10	Nut (use for installing seat adjuster assembly LH, RH and tilting/height adjuster assembly)	8.8-13.7(0.9-1.4)	-

Lubricant

Position	Application position		Specified lubricant	Remark
11,12	Spring and sliding position of seat adjuster assembly		Chassis grease [NLG1 NO.1 (lithium soap base)]	As needed
13	Tilting/height adjuster assembly	Meshing and sliding position of gear, rivet and rotating position of shaft	Chassis grease [NLG1 NO.1 (lithium soap base)] hydraulic oil	As needed

Driver' s Seat (air spring type)



25476

● Dismantling sequence

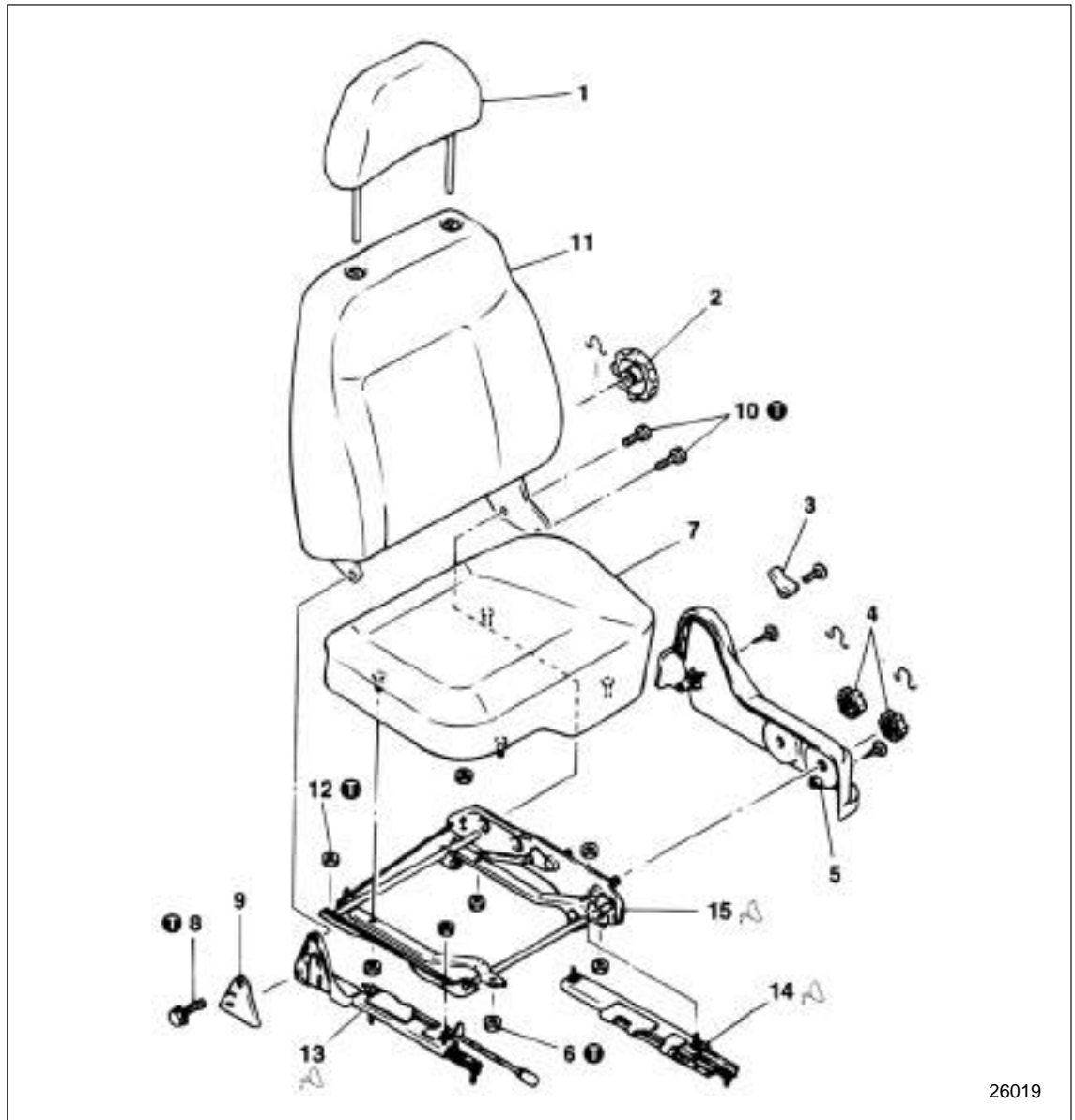
1. adhesive tape
4. air suspension

2. hose assembly
- A: to joint of air pressure gauge

3. seat assembly

Memo

► **Seat assembly**



26019

● **Disassembling sequence**

- | | | |
|----------------------------------|-------------------------------|--------------------------------------|
| 1. head restrain | 2. support knob for haunch | 3. tilting adjusting knob |
| 4. tilting/height adjusting knob | 5. shield | 6. nut |
| 7. seat cushion assembly | 8. screw | 9. guard plate |
| 10. bolt | 11. seat back assembly | 12. nut |
| 13. seat adjuster assembly LH | 14. seat adjuster assembly RH | 15. tilting/height adjuster assembly |

● **Assembling sequence**

It is opposite to breakdown sequence.

Tightening torque

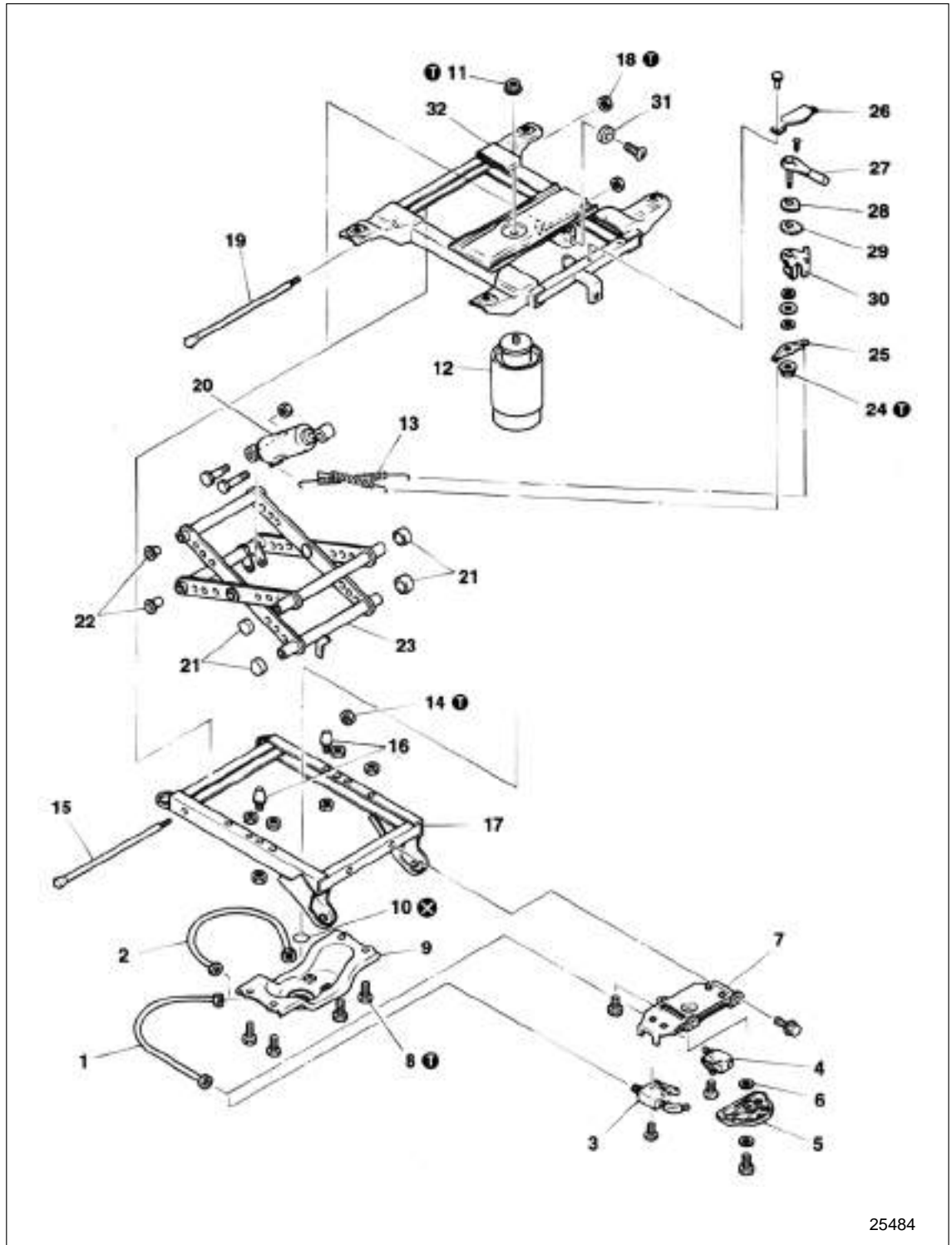
unit: N•m{kgf•m}

Position	Tightened Parts	Tightening torque	Remark
6	Nut (use for installing seat cushion assembly and tilting/height adjuster assembly)	8.8-13.77(0.9)	-
8	Screw (use for installing seat back assembly and seat adjuster assembly LH)	10-15(1.0-1.5)	-
10	Bolt (use for installing seat back assembly and tilting/height adjuster assembly)	34.3-53.9(3.5-5.5)	-
12	Nut (use for installing seat adjuster assembly LH, RH and tilting/height adjuster assembly)	8.8-13.7(0.9-1.4)	-

Lubricant

Position	Application position		Specified lubricant	Remark
13,14	Spring and sliding position of seat adjuster assembly		Chassis grease [NLG1 NO.1 (lithium soap base)]	As needed
15	Tilting/height adjuster assembly	Meshing and sliding position of gear, rivet and rotating position of shaft	Chassis grease [NLG1 NO.1 (lithium soap base)] hydraulic oil	As needed

► Air suspension



25484

● **Disassembling sequence**

- | | | |
|---------------------|------------------|----------------------------------------|
| 1. air pipe | 2. air pipe | 3. mechanical valve |
| 4. mechanical valve | 5. cam | 6. disc spring |
| 7. bracket | 8. bolt | 9. reinforcing plate |
| 10. O ring | 11. nut | 12. air sleeve |
| 13. spring | 14. nut | 15. shaft |
| 16. stopper | 17. lower frame | 18. nut |
| 19. shaft | 20. damper | 21. cover |
| 22. sleeve | 23. link rod | 24. nut |
| 25. arm | 26. plate | 27. rod |
| 28. lock plate A | 29. lock plate B | 30. bracket |
| 31. baffle washer | 32. upper frame | ⊗:Parts that cannot be used repeatedly |

● **Assembling sequence**

It is opposite to breakdown sequence.

⊕ **Tightening torque**

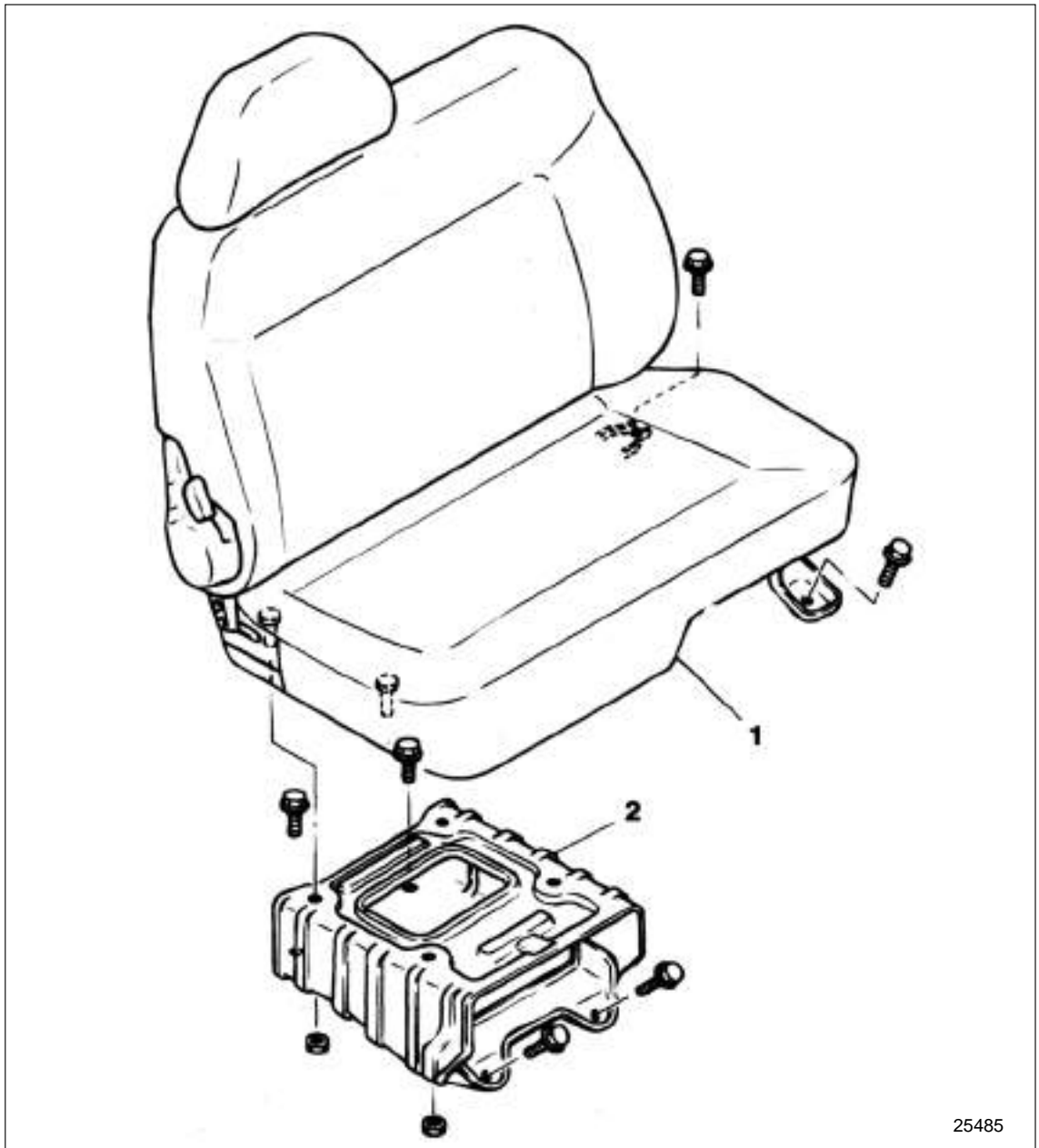
unit: N•m{kgf•m}

Position	Tightened Parts	Tightening torque	Remark
8	Bolt (use for fixing reinforcing plate)	8.8-13.77(0.9)	-
11	Nut (use for fixing air socketed tube)	3.9-5.9(0.4-0.6)	-
14,18	Nut (use for fixing link rod and shaft)	8.8-13.77(0.9)	-
24	Nut (use for fixing the arm)	3.9-5.9(0.4-0.6)	-

 **Lubricant**

Position	Application Position	Specified lubricant	Remark
-	All sliding surfaces	Molybdenum disulfide grease	As needed

Assistant' s seat



25485

- **Dismantling sequence**

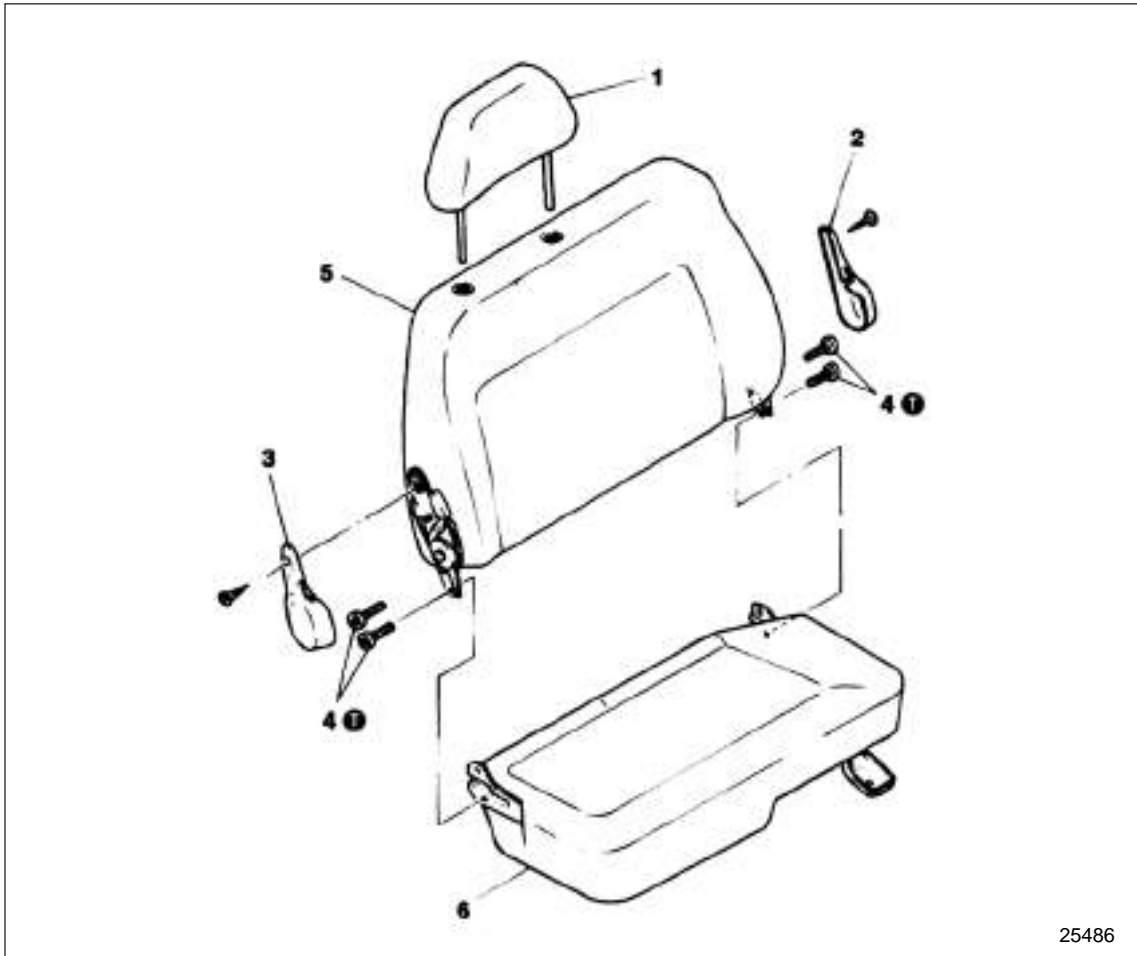
1. Seat assembly

2. Side support for the seat

- **Assembling sequence**

It is opposite to breakdown sequence.

► **Seatseat assembly**



25486

● **Disassembling sequence**

- | | | |
|-----------------------------------|-----------------------|--------------------------|
| 1. head restrain (selecting part) | 2. cap LH | 3. cap RH |
| 4. bolt | 5. seat back assembly | 6. seat cushion assembly |

● **Assembling sequence**

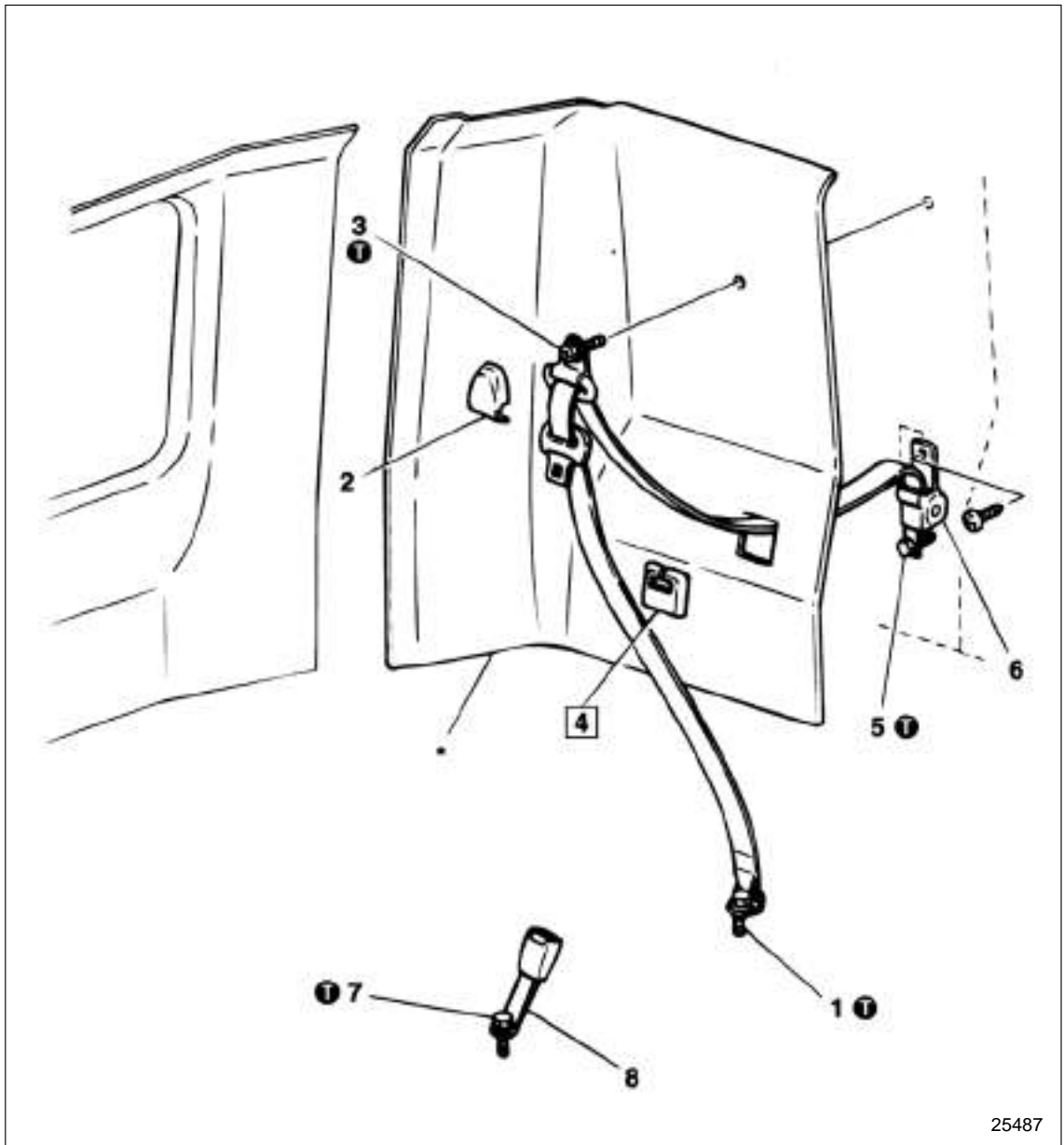
It is opposite to breakdown sequence.

ⓘ **Tightening torque**

unit: N•m{kgf•m}

Position	Position tightened	Tightening torque	Remark
4	Bolt (use for fixing seat back assembly and seat cushion assembly)	34.3-53.9 (3.5-5.5)	-

Safety Belt (at the side of driver' s seat)



25487

● **Disassembling sequence**

- | | | |
|--------------------------|---------------------------------------------|------------------|
| 1. bolt | 2. shield for fastening of shoulder harness | 3. bolt |
| 4. guider of safety belt | 5. bolt | 6. ELR |
| 7. bolt | 8. hasp | *: side finisher |
- ELR:emergency-locking retractor

● **Assembling sequence**

It is opposite to breakdown sequence.

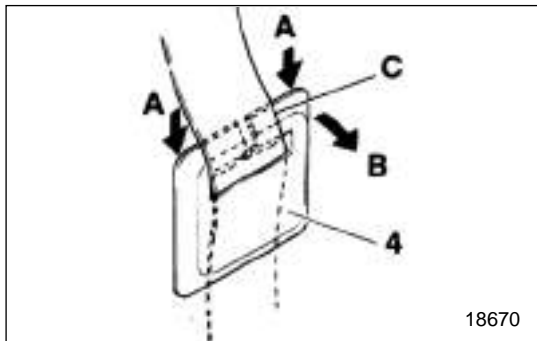
Caution ⚠

Do not try to break down ELR6. Because if you break it down, it will lose its original function.

🔧 **Tightening torque**

unit: N·m{kgf·m}

Position	Position tightened	Tightening torque	Remark
1	Bolt (use for fixing floor fastening)	34.3-53.9(3.5-5.5)	-
3	Bolt (use for fixing fastening of shoulder harness)	34.3-53.9(3.5-5.5)	-
5	Bolt (use for fixing ELR)	34.3-53.9(3.5-5.5)	-
7	Bolt (use for fixing hasp)	34.3-53.9(3.5-5.5)	-

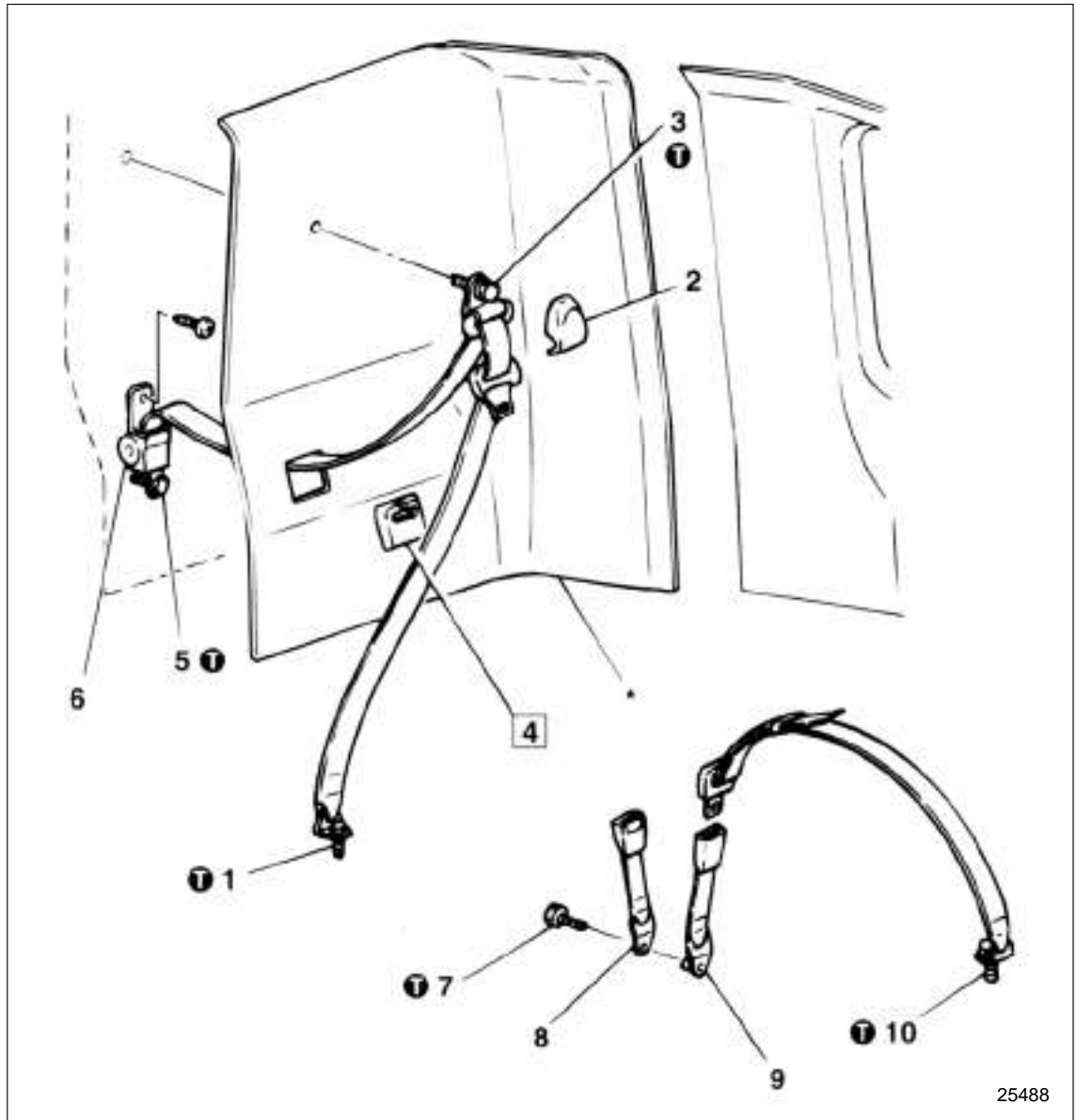


◆ **Examining and repairing method**

- 4 Dismantling of guider of safety belt
Press down guider of safety belt 4 (direction A), at the same time, pull safety belt towards yourself (direction B) and disassemble it.

C: Band

Safety Belt (at the side of assistant' s seat)



● Dismantling sequence

- | | |
|------------------|---------------------------------------------|
| 1. bolt | 2. shield for fastening of shoulder harness |
| 3. bolt | 4. guider of safety belt |
| 5. bolt | 6. ELR |
| 7. bolt | 8. hasp |
| 9. hasp | 10. bolt |
| *: side finisher | ELR: emergency-locking retractor |

● **Installing sequence**

It is opposite to breakdown sequence.

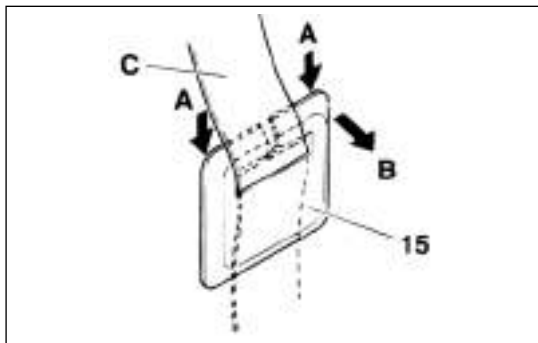
Caution ⚠

Do not try to break down ELR6. Because if you break it down, it will lose its original function.

🔧 **Tightening torque**

unit: N·m{kgf·m}

Position	Position tightened	Tightening torque	Remark
1	Bolt (use for fixing floor fastening)	34.3-53.9(3.5-5.5)	-
3	Bolt (use for fixing fastening of shoulder harness)	34.3-53.9(3.5-5.5)	-
5	Bolt (use for fixing ELR)	34.3-53.9(3.5-5.5)	-
7	Bolt (use for fixing hasp)	34.3-53.9(3.5-5.5)	-
10	Bolt (use for fixing floor fastening)	34.3-53.9(3.5-5.5)	-

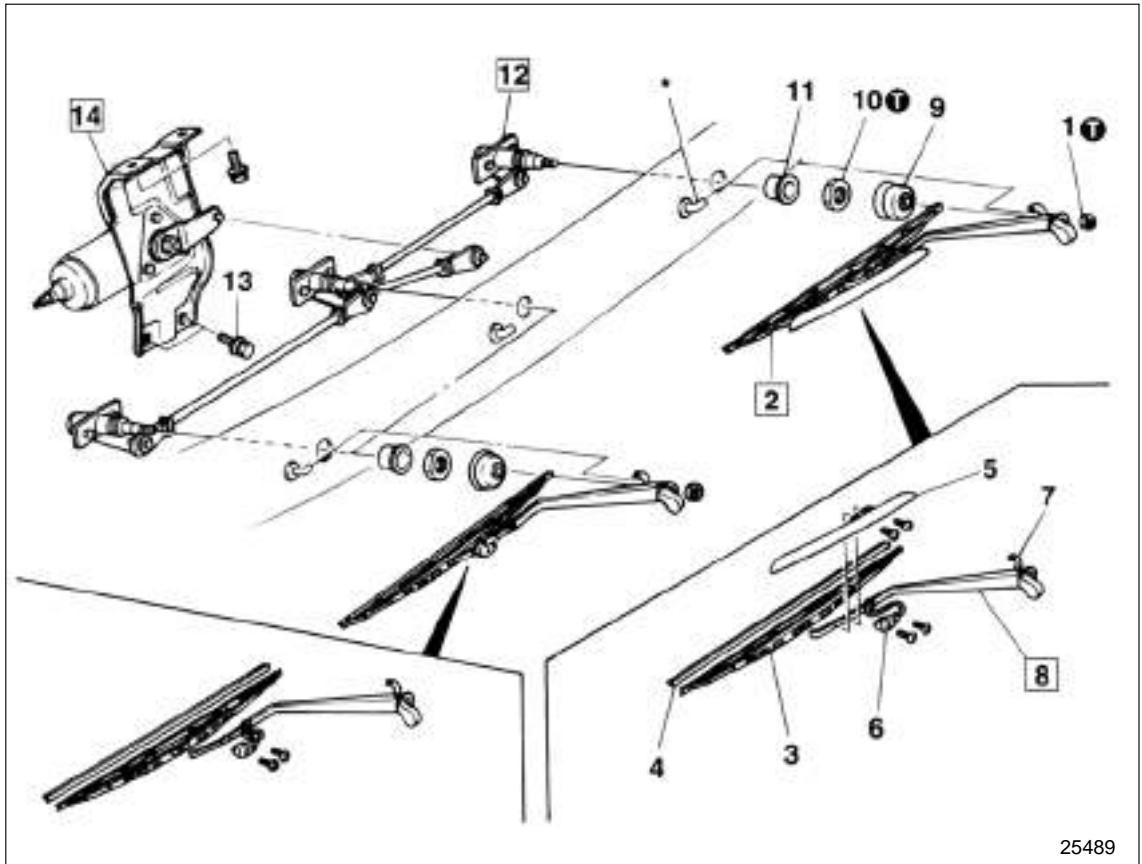


◆ **Examining and repairing method**

- 4 Dismantling of guider of safety belt
Press down guider of safety belt 4 (direction A), at the same time, pull guider of safety belt towards yourself (direction B) and disassemble it.
C: Band

Wiper and Scrubber

► Wiper



25489

● Disassembling sequence

- | | |
|-----------------------------------------------------|--------------------------------------|
| 1. nut | 2. wiper arm and brush assembly |
| 3. wiper brush | 4. rubber gasket of brush |
| 5. baffle plate(only at the side of driver's seat) | 6. scrubber nozzle assembly |
| 7. hose | 8. wiper arm |
| 9. pivot cover | 10. nut |
| 11. sleeve | 12. link rod assembly of wiper |
| 13. bolt | 14. wiper motor and bracket assembly |
| *: hose connector | |

Remark

Connector of wiper motor and bracket assembly 14 is inside of instrument panel. Hence, before breaking down the assembly, disassemble lower plate at the side of driver's seat.

● **Assembling sequence**

It is opposite to breakdown sequence.

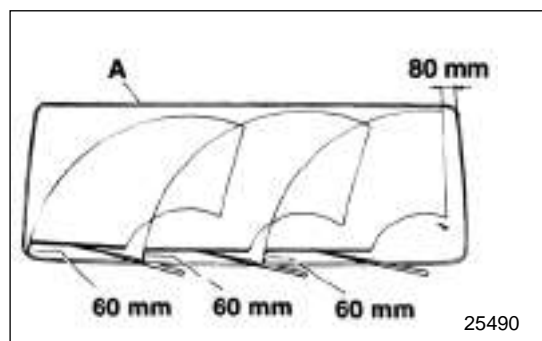
Maintenance standard

Part	Maintenance item		Standard value	Standard value	Correction method
8	The force that wiper arm applies to window glass	At the side of driver's seat	7.55N(770gf)	-	Replace
		Center	6.47N(660gf)		-
		At the side of assistant's seat	5.88N(600gf)		

⊕ **Tightening torque**

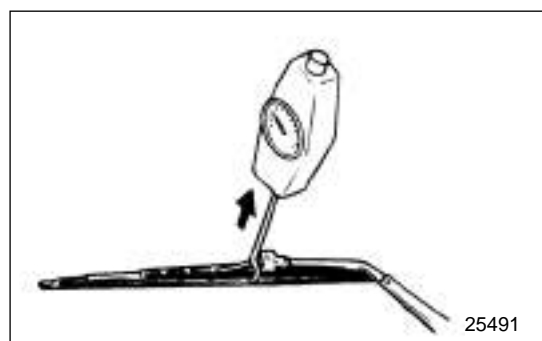
unit: N•m{kgf•m}

Position	Position tightened	Tightening torque	Remark
1	Nut (use for fixing wiper arm and brush assembly)	7.55N(770gf)	-
10	Nut (use for fixing sleeve)	16.7-22.6(1.7-2.3)	-

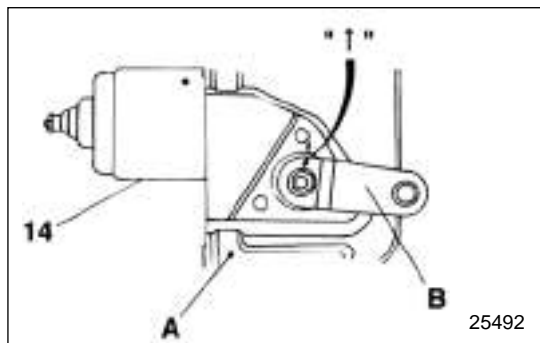


◆ **Examining and repairing method**

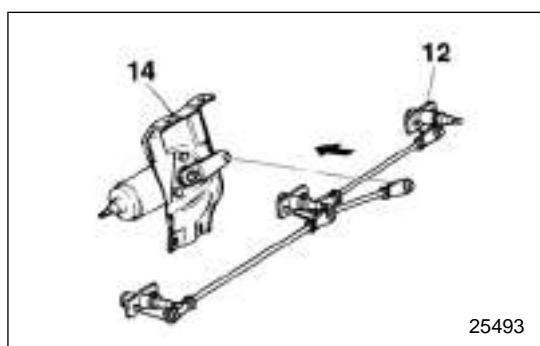
- ④ Installation of wiper arm and brush assembly
- Install wiper arm and brush assembly 2 on link rod assembly 12 of wiper, making distance between face of sealing strip A and brush top be among the figured value.



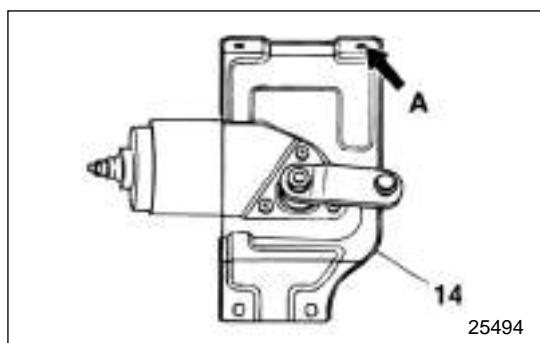
- ⑧ Check of wiper arm
- If indicated value does not accord with standard value, replace wiper arm 8.



- 12 Installation of link rod assembly of wiper
- Align mark "↑" on bracket A of wiper motor and bracket assembly 14 to mark on crank arm B.



- At this situation, press link rod assembly of wiper 12 into wiper motor and bracket assembly 14.

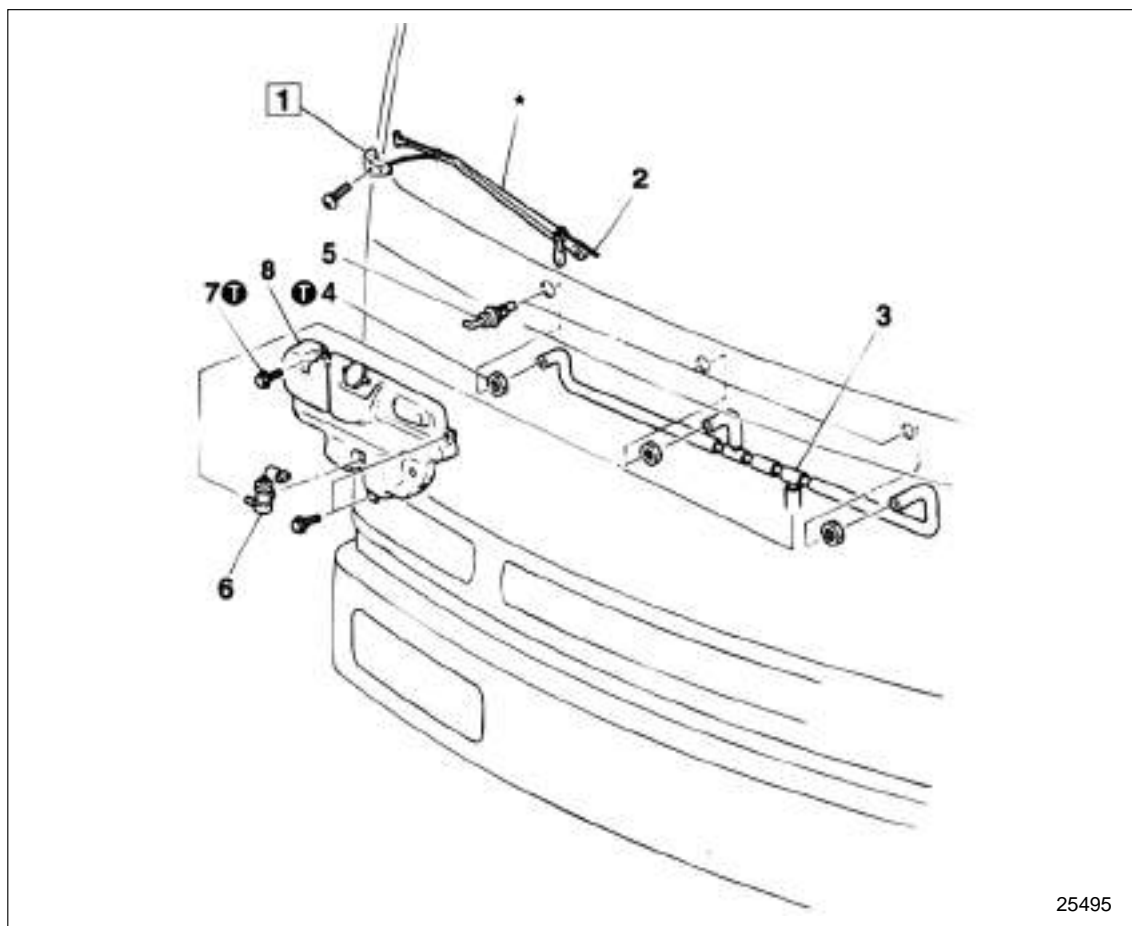


- 14 Installation of wiper motor and bracket assembly 14

There is a hole A on wiper motor and bracket assembly 14. Take this hole as benchmark, when tightening bolt 13, start with hole A.

Memo

► Scrubber



25495

● **Dismantling sequence**

- 1. scrubber nozzle assembly
 - 2. hose
 - 3. scrubber hose assembly
 - 4. nut
 - 5. hose connector
 - 6. scrubber motor
 - 7. bolt
 - 8. cleaning fluid tank
- *: wiper arm and brush assembly

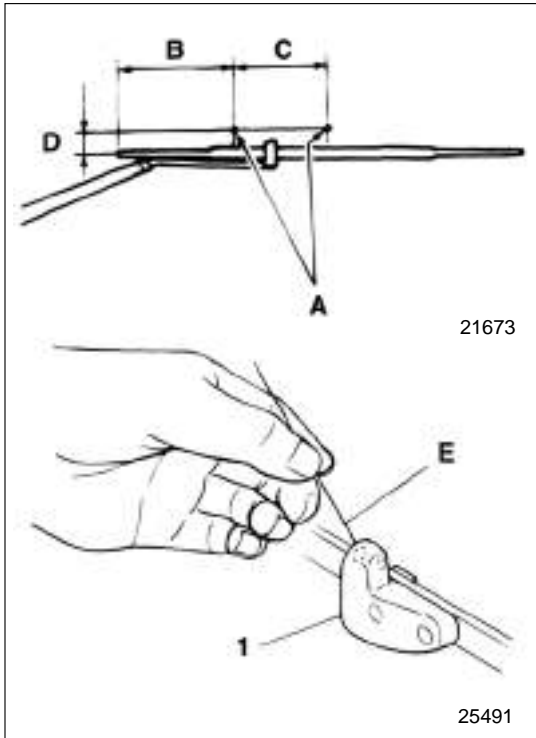
● **Installing sequence**

It is opposite to breakdown sequence.

ⓘ **Tightening torque**

unit: N•m{kgf•m}

Position	Position tightened	Tightening torque	Remark
4	Nut (use for fixing hose connector)	0.6-0.9(0.06-0.09)	-
7	Nut (use for fixing cleaning fluid tank)	8-12(0.8-1.2)	-



◆ Examining and repairing method

I Installation of scrubber nozzle assembly

- Check if objective position A of cleaning fluid accords with the following dimension. (figured position faces inner side of the cab)

unit: mm

	B	C	D
Wiper arm and brush at the side of driver's seat	180	190	15
Central wiper arm and brush	180	190	15
Wiper arm and brush at the side of assistant's seat	180	190	15

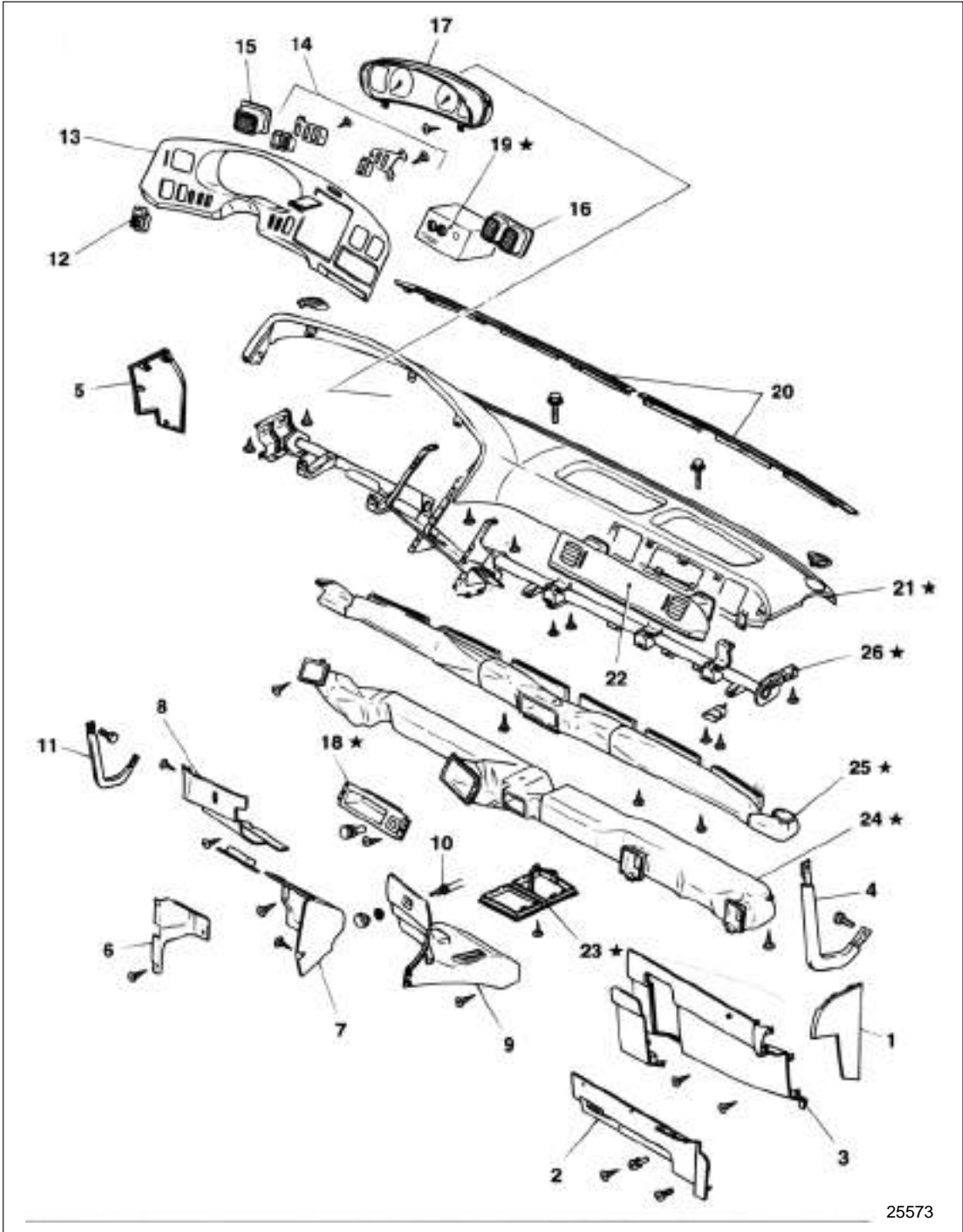
- If objective position A dose not accord with specification, use steel wire E to adjust angle of injecting hole for scrubber nozzle assembly 1.

Caution ⚠


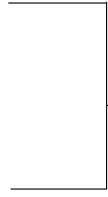

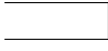


Be careful. Do not make steel wire E damage injecting hole of scrubber nozzle assembly 1.

Instrument Panel

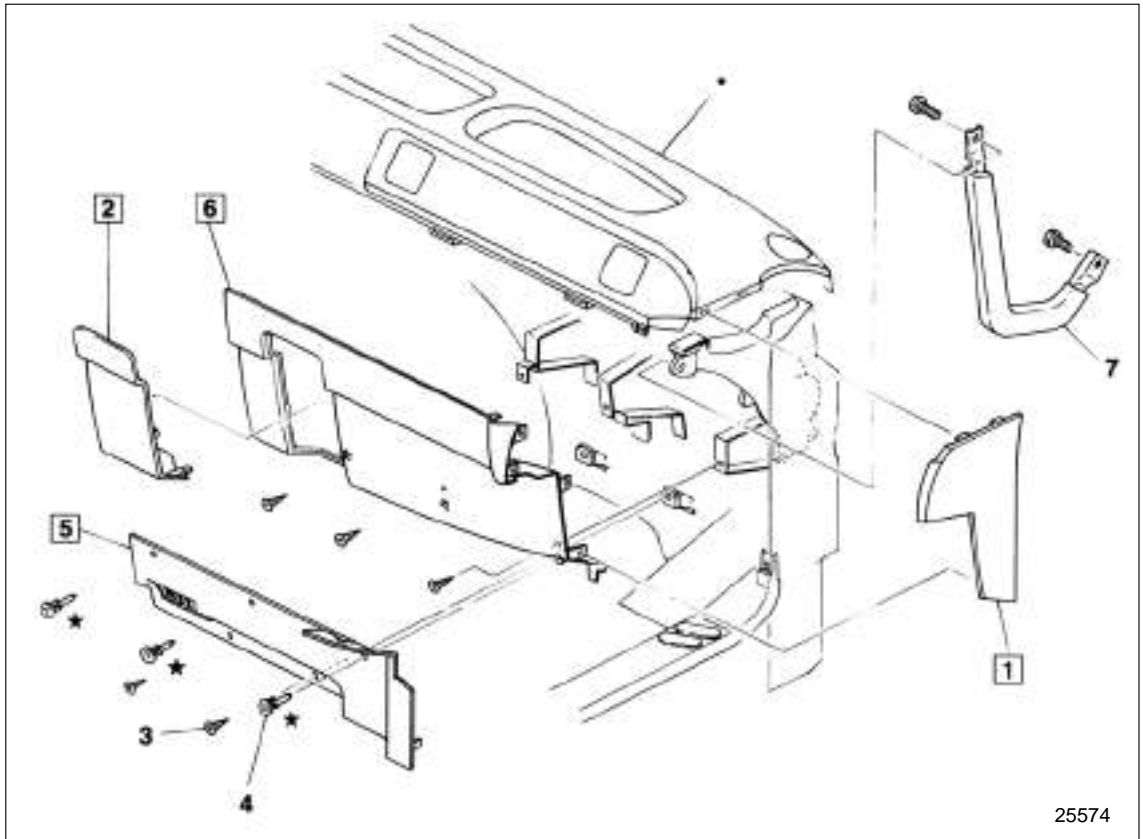
► Composition for installation of instrument panel



This section described necessary operations of six sections for instrument panel (section 1-6) during disassembling. With regard to disassembling sequence and installing sequence of individual part, please refer to related section. The parts that must be disassembled and assembled in other sections are marked with ★, and are described in parentheses. The parts having no ★ can be disassembled and assembled without referring to other sections.

- | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> 1. Side plate at passenger's side 2. Lower plate under passenger's side 3. Lower plate at passenger's side 4. Front gripper |  | <p>Section 1 (lower plate at the side of assistant's seat)</p> |
| <ul style="list-style-type: none"> 5. Side plate at driver's side 6. Outer plate under driver's side 7. Inner plate under driver's side 8. Inner plate under driver's side 9. Lower plate at driver's side 10. Bracing cable |  | <p>Section 2 (lower plate at the side of driver's seat)</p> |
| <ul style="list-style-type: none"> 11. Front gripper 12. Switch 13. Instrument cover 14. Switch 15. Grid of driver panel 16. Grid of central panel 17. Combined instrument ★18. Cigarette lighter plate (section 2) |  | <p>Section 3 (instrument cover, combined)</p> |
| <ul style="list-style-type: none"> ★19. Controller assembly for warmer (section 3) |  | <p>Section 4 (warmer)</p> |
| <ul style="list-style-type: none"> 20. Front defroster grid ★21. Instrument panel (section 1-4) |  | <p>Section 5 (disassembly and installation of instrument panel assembly)</p> |
| <ul style="list-style-type: none"> 22. Grid of passenger panel ★23. Central pipe (section 1-5) ★24. Face pipe (section 1-5) ★25. Defroster pipe (section 1-5) ★26. Frame of instrument panel (section 1-5) |  | <p>Section 6 (instrument panel assembly)</p> |

► Section 1 (lower plate at the side of assistant's seat)



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● Dismantling sequence

1. side plate at passenger's side
3. screw
5. lower plate under passenger's side
7. front gripper

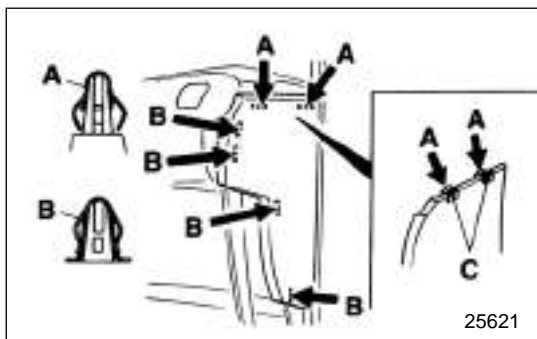
2. filter cover
 4. buckle (mark ★×3)
 6. lower plate at passenger's side
- *: instrument panel assembly

● Installing sequence

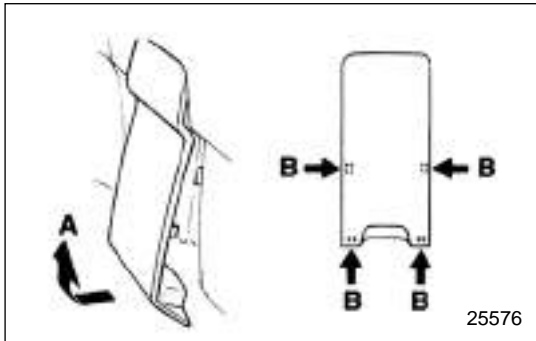
It is opposite to disassembly sequence.

◆ Examining and repairing method

- 1 Dismantling of side plate at passenger's side
 - Uplift lock claw A and B.
 - Pry two top eyelets C and disassemble side plate at passenger's side.



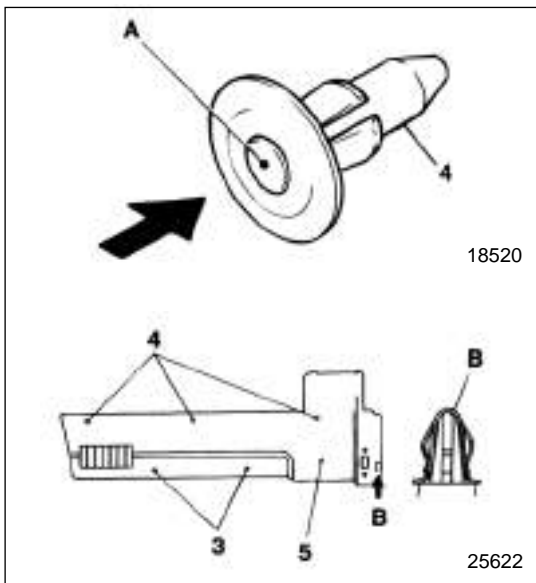
25621



2 Dismantling of filter cover

A: Dismantling direction

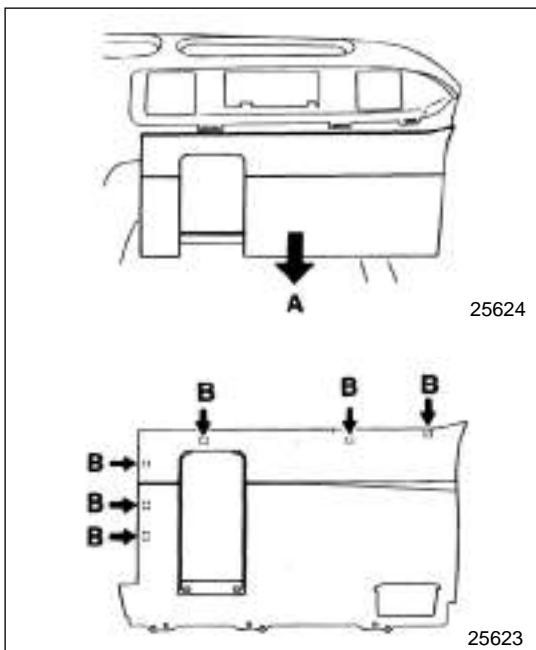
B: Lock claw



5 Dismantling of lower plate under passenger's side

- Disassemble screw 3 (two places)
- Press down position A and disassemble buckle 4 (three places).

B: Lock claw

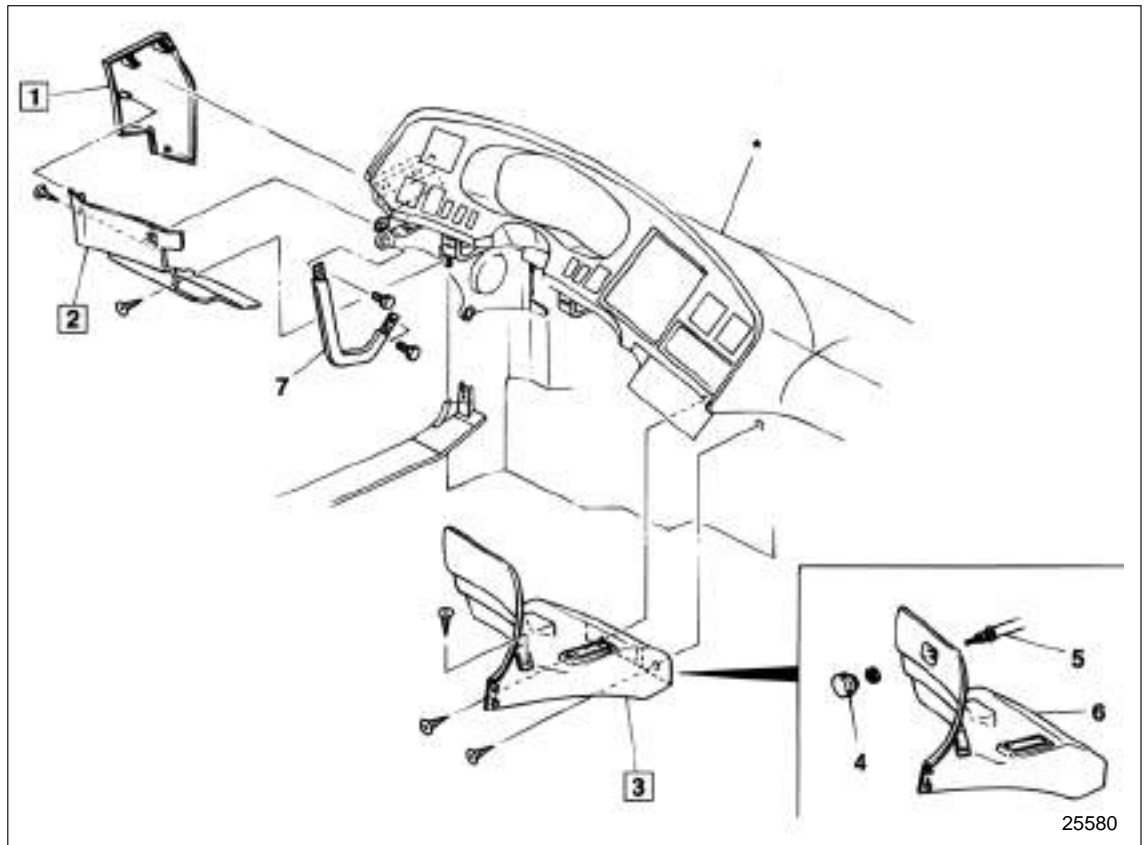


6 Dismantling of lower plate at passenger's side

A: Dismantling direction

B: Lock claw

► Section 2 (lower plate at the side of driver's seat)



● Dismantling sequence

1. side plate at passenger's side
3. lower plate assembly at driver's side
5. bracing cable
7. front gripper

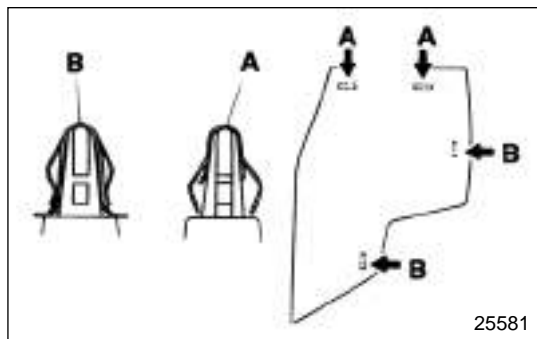
2. upper plate under driver's side
 4. button
 6. lower plate at driver's side
- *: instrument panel assembly

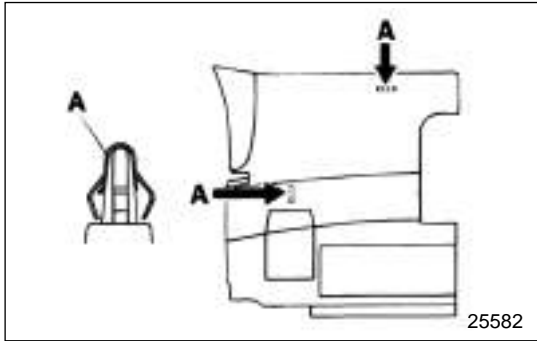
● Installing sequence

It is opposite to disassembly sequence.

◆ Examining and repairing method

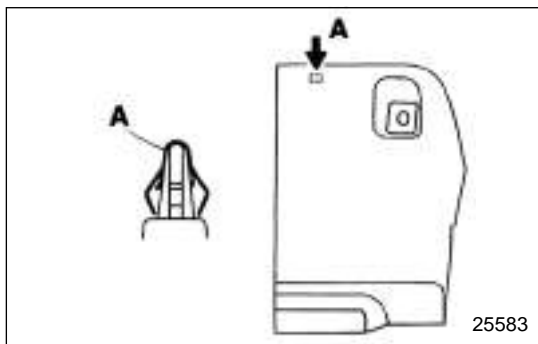
- 1] disassembly of side plate at passenger's side
 A: Lock claw
 B: Lock claw





2 Dismantling of upper plate under driver's side

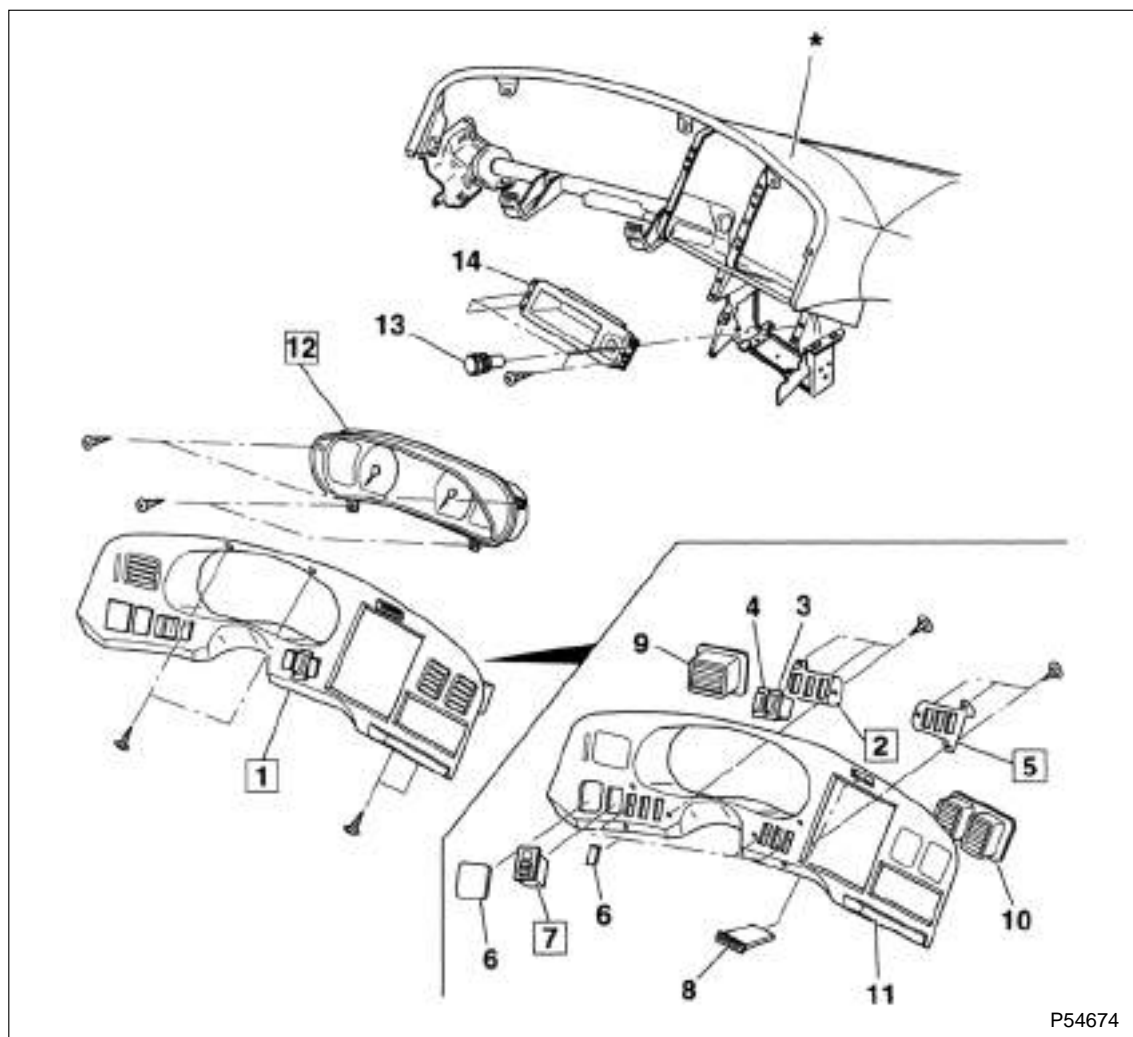
A: Lock claw



3 Dismantling of lower plate at driver's side

A: Lock claw

► Section 3 (instrument cover, combined instrument and switch)



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● Additional operation during dismantling and installation

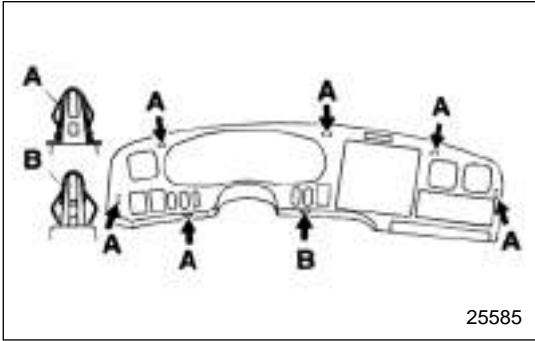
Disassembly and installation of lower plate at the side of driver's seat.

● Dismantling sequence

- | | |
|--------------------------------------|------------------------------|
| 1. instrument cover assembly | 2. switch plate C |
| 3. speed indicator (selecting parts) | 4. personnel lamp |
| 5. switch plate B | 6. plug |
| 7. locking switch of differential | 8. card holder |
| 9. grid of driver panel | 10. grid of central panel |
| 11. instrument cover | 12. combined instrument |
| 13. cigarette lighter | *: instrument panel assembly |

● Installing sequence

It is opposite to disassembling sequence.

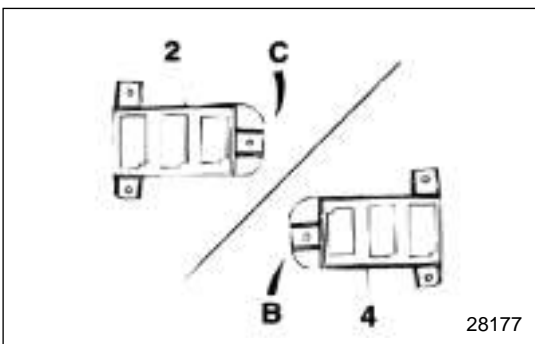


◆ Examining and repairing method

1 Dismantling of instrument cover assembly

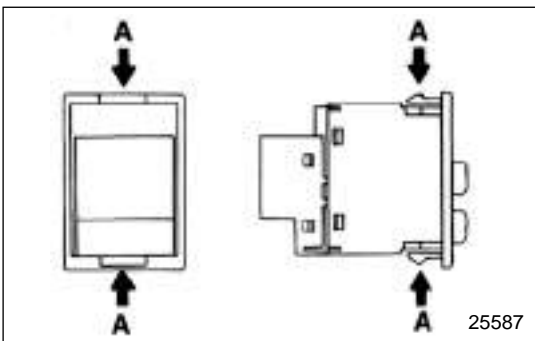
A: Lock claw

B: Lock claw



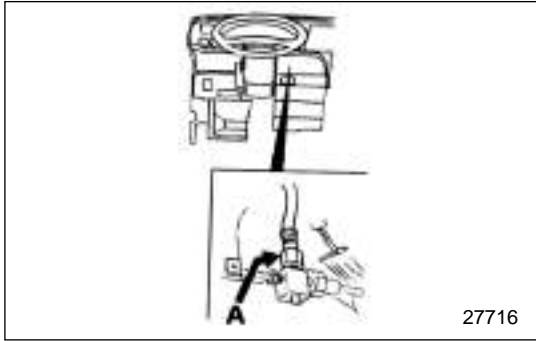
2 5 Installation of switch plate B, C

Switch plate B5 and C2 have their identification sign "B", "C". Before installing switch plate, confirm their identification sign.



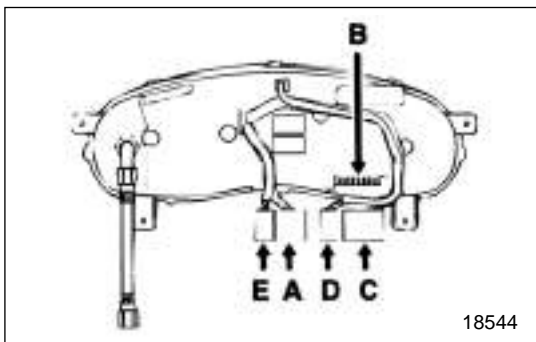
7 Dismantling of locking switch of differential

A: Lock claw



12 Dismantling of combined instrument

- Dismantle pipe A of air pressure gauge shown in the figure.



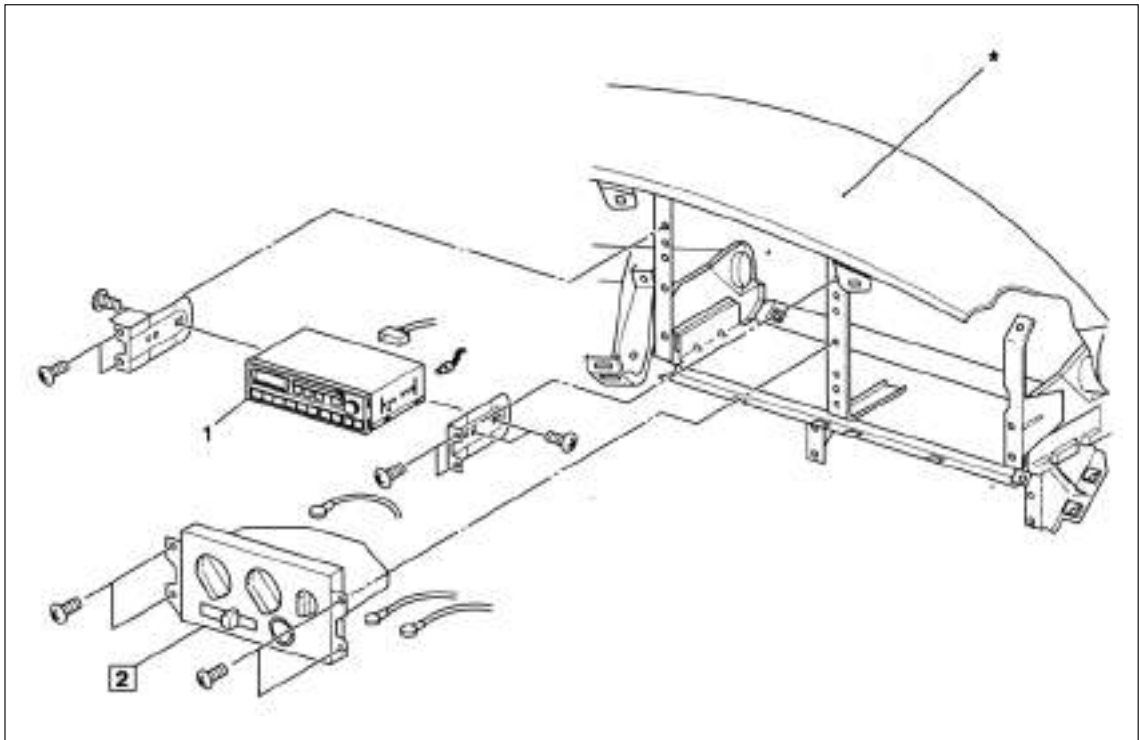
- Before disassembling combined instrument, disconnect connector A-E that connect instrument panel wiring and combined instrument 12.

(the figure is back side)

Quantity of connector pin-out

A	B	C	D	E
10	14	22	4	8

► **Section 4 (warmer)**



● **Additional operation during disassembly and installation**

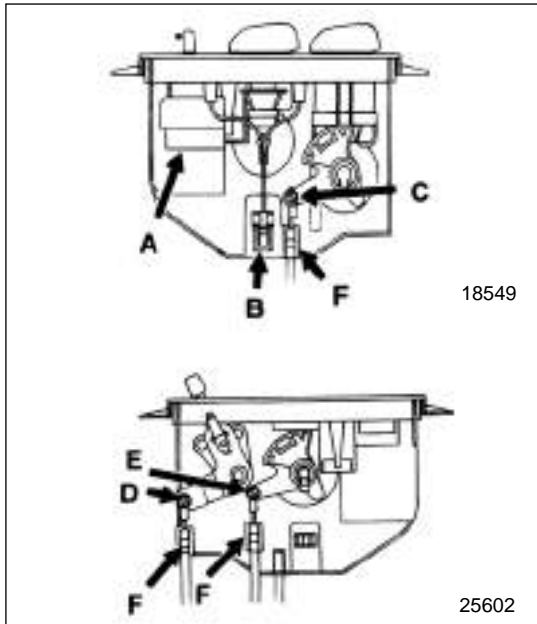
Dismantling and installation of instrument cover.

● **Dismantling sequence**

1. radio (selecting parts)
 2. controller assembly for warmer
- *: instrument panel assembly

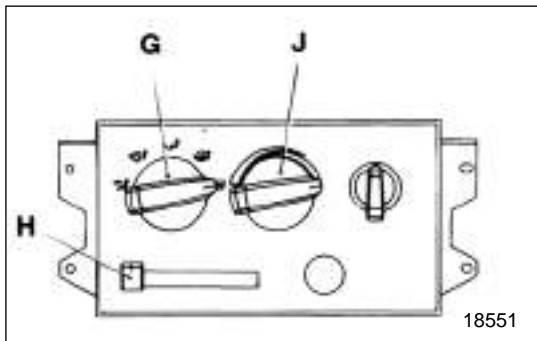
● **Installing sequence**

It is opposite to disassembling sequence.

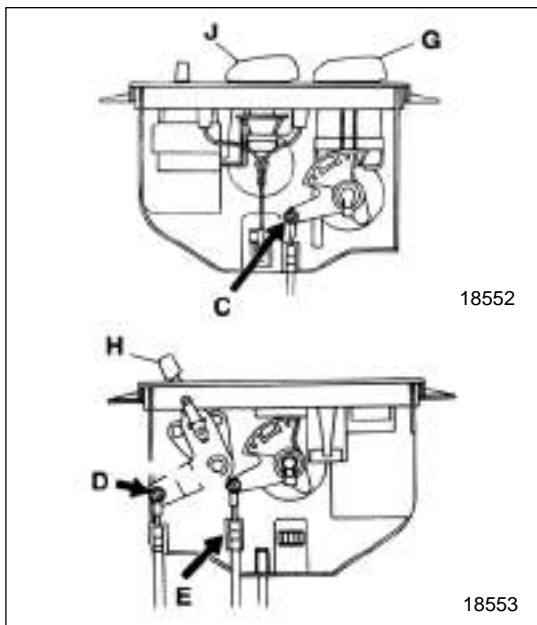


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2 Controller assembly for warmer
(Disassembling)

- Disconnect connector A (8 pin-out) and connector B (2 pin-out) that connect cab wiring and warmer controller assembly 2.
- Make match marks on bracing cable C (use for model change), D (use for interior/exterior air change) and E (use for air control). When installing, refer to these match marks.
- Before disassembling warmer controller assembly, disconnect bracing C (use for model change), D (use for interior/exterior air change) and E (use for air control) that connect warmer parts and warmer controller assembly 2.

Caution ⚠

In order to disconnect bracing cable C, D and E from warmer controller assembly 2, disassemble buckle F at first.

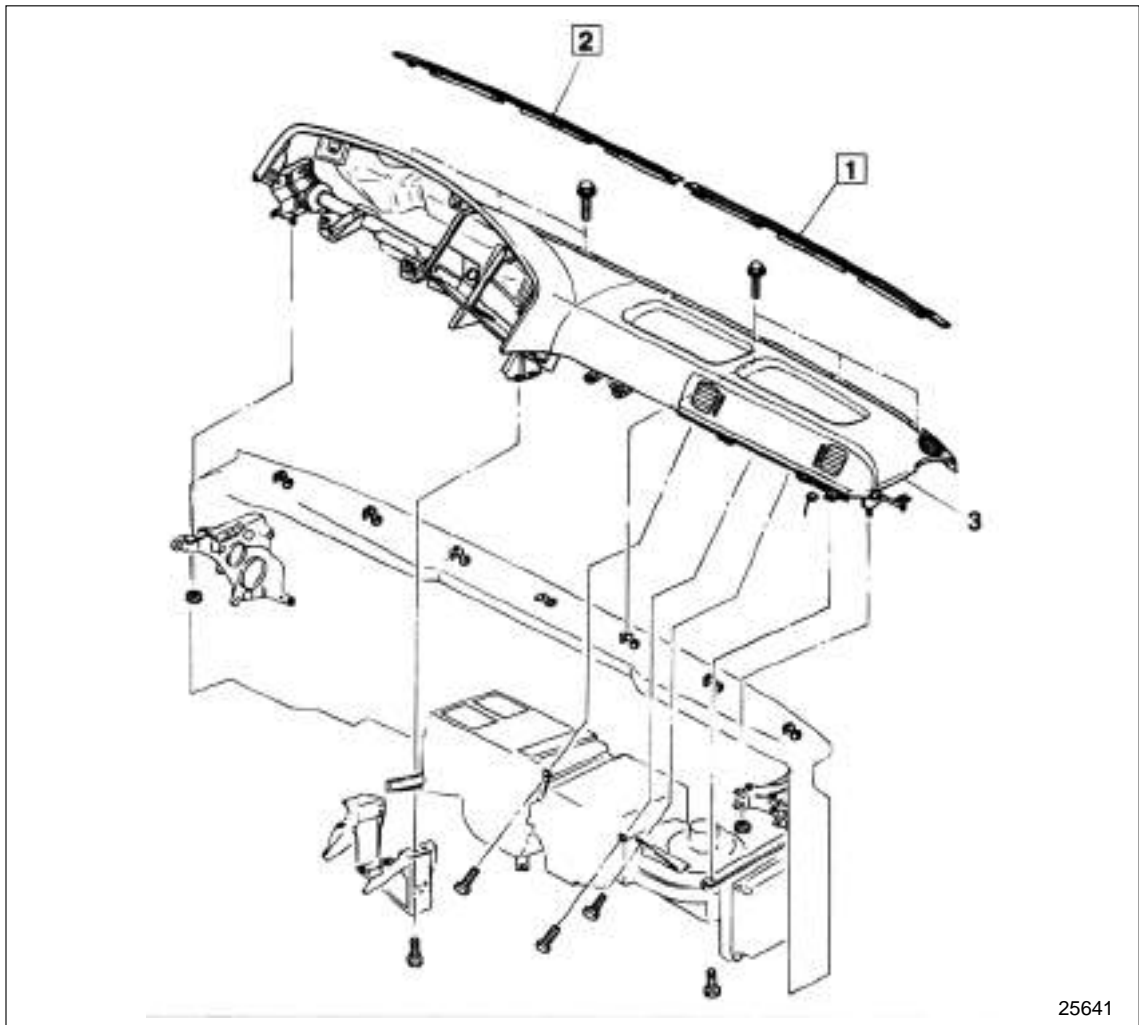
(installation)

- In order to install bracing cable C, D and E of warmer controller assembly 2, put knob G (model change), H (interior/exterior air change) and J (air control) on figured position at first.
- At this situation, install bracing cable C, D and E.

Caution ⚠

- When installing C, D, and E, ensure that they are not distorted.
- After installed bracing cable, check that if C, D and E can move smoothly when moving knob G, H and J.

► **Section 5 (dismantling and installation of instrument panel assembly)**



25641

■ **Additional operation during dismantling and installation**

- Dismantling and installation of lower plate at the side of assistant's seat.
- Dismantling and installation of lower plate at the side of driver's seat.
- Dismantling and installation of instrument cover.
- Dismantling and installation of floor-model control box.

■ **Dismantling sequence**

1. Front defroster grid, LH
2. Front defroster grid, RH
3. Instrument panel assembly

■ **Installing sequence**

It is opposite to disassembling sequence.

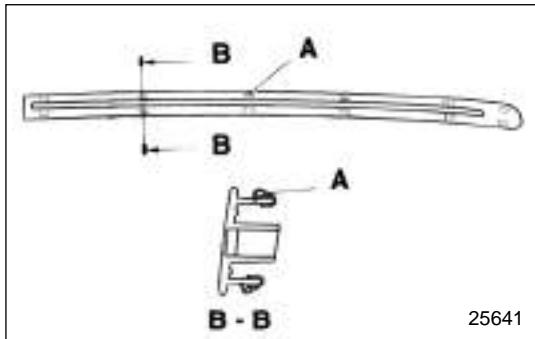
◆ **Examining and repairing method**

① ② Disassembly of front defroster grid RH and LH.

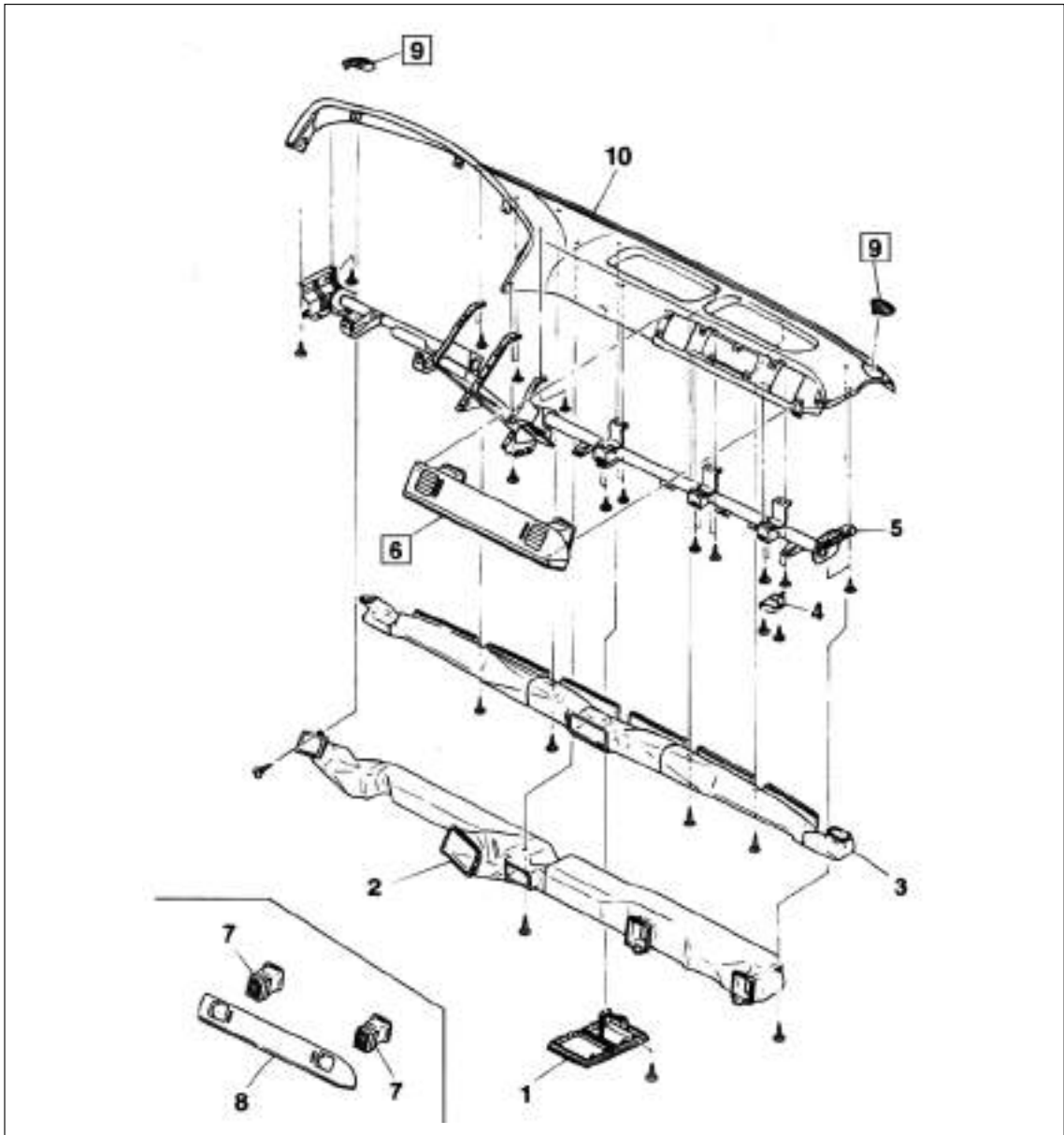
A: Lock claw

Remark

Left figure shows front defroster grid RH2, and front defroster grid LH1 is on its opposite direction.



► Section 6 (instrument panel assembly)



■ Additional operation during dismantling and installation

- Dismantling and installation of lower plate at the side of assistant's seat.
- Dismantling and installation of lower plate at the side of driver's seat.
- Dismantling and installation of instrument cover.
- Dismantling and installation of instrument panel assembly.
- Dismantling and installation of floor-model control box.

■ **Dismantling sequence**

1. central pipe
2. face pipe assembly
3. defroster pipe assembly
4. pulse distributor
5. frame assembly of instrument panel
6. finisher assembly
7. grid of passenger panel
8. finisher
9. side defroster grid
10. upside of instrument panel

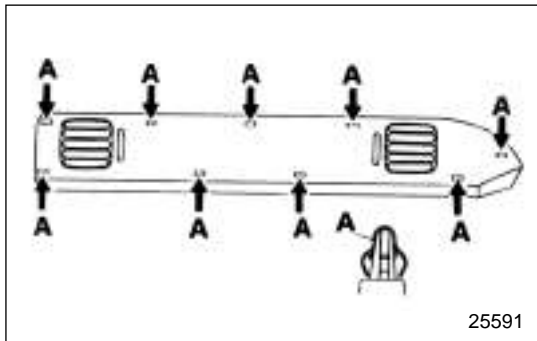
■ **Installing sequence**

It is opposite to disassembling sequence.

◆ **Examining and repairing method**

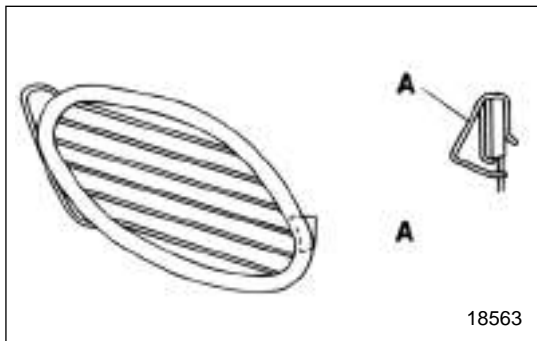
6 Dismantling of finisher assembly

A: Lock claw



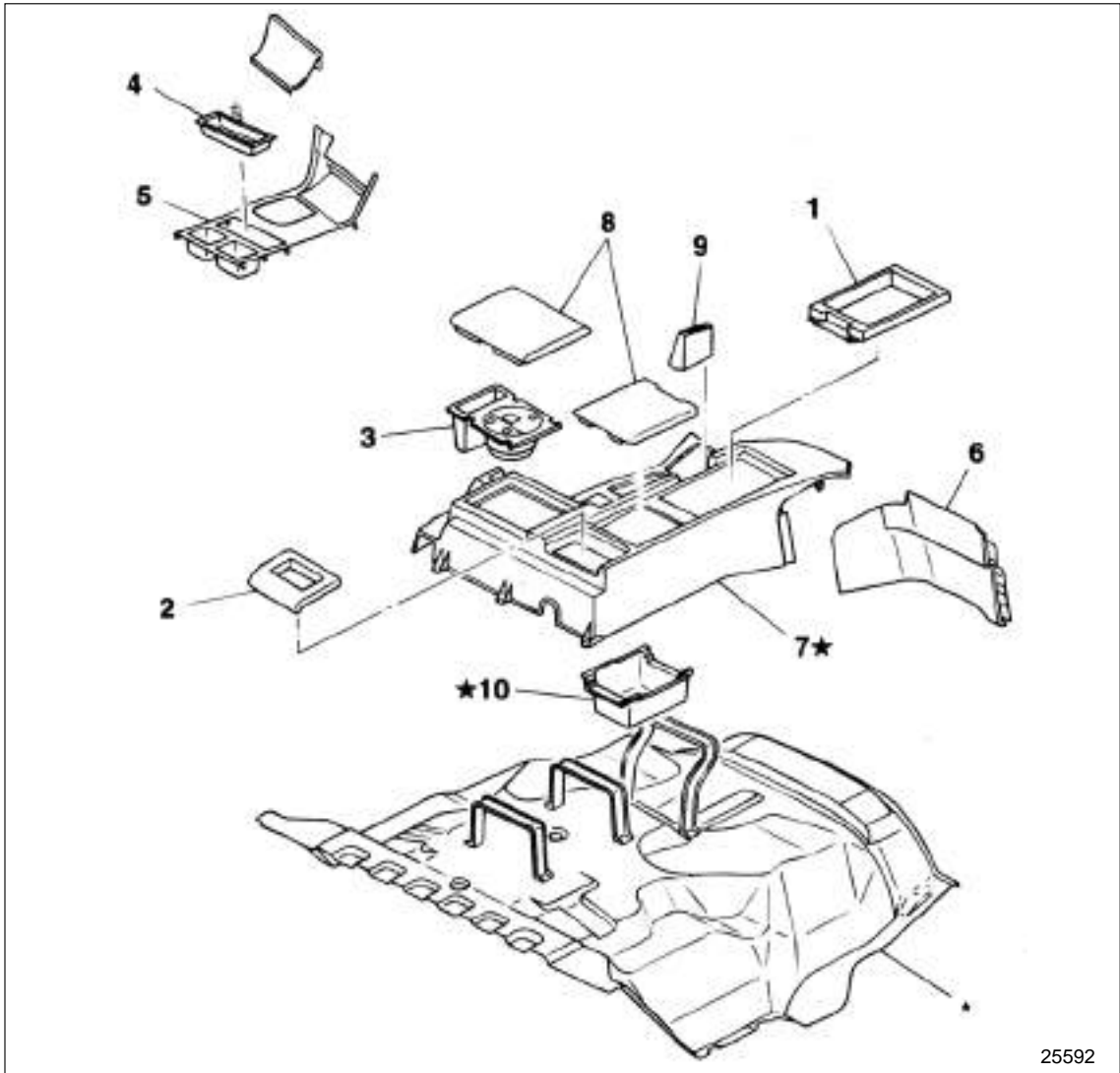
9 Dismantling of side defroster grid

A: Lock claw



Floor-Model Control Box

► Floor-model control box



25592

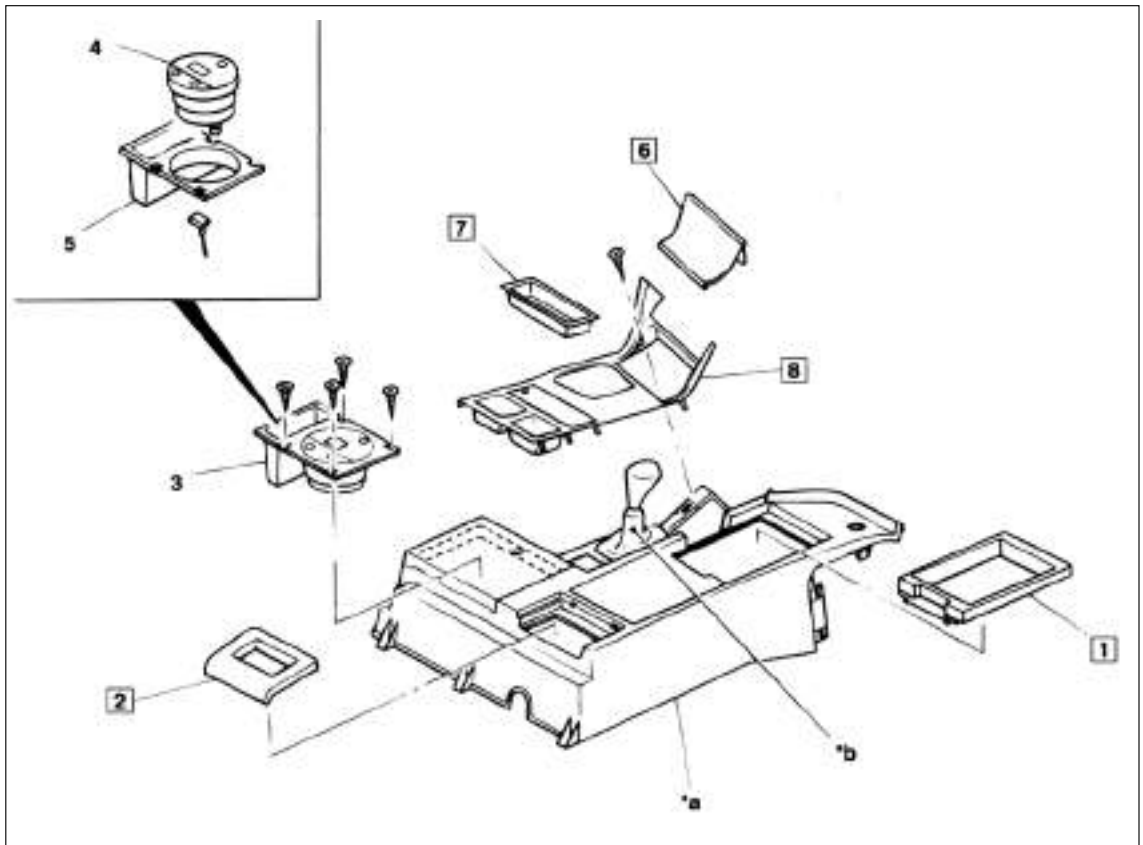
This section described necessary operations for three sections of floor-model control box (section 1-3) during disassembling.

With regard to disassembling sequence and installing sequence of individual part, please refer to related section. The parts that must be disassembled and assembled in other sections are marked with ★, and are described in parentheses. The parts having no ★ can be disassembled and assembled without referring to other sections.

Cab

- 1. cover
 - 2. disc of floor-model control box
 - 3. tachograph
 - 4. disc
 - 5. plate of changeover rod
- section 1
- 6. lower plate at passenger's side
 - ★7. floor-model control box (section 1)
- section 2
- 8. cover
 - 9. teacup holder
 - ★10. small box on floor-model control box (section 2)
- section 3

*: cab floor



► **Section 1**

● **Additional operation during dismantling and installation**

Dismantling and installation of lower plate of instrument panel.

● **Disassembling sequence**

1. control box cover B
 2. tachograph and panel assembly
 3. tachograph and panel
 4. disc of floor-model control box
 5. tachograph and panel
 6. fuse box cover
 7. disc
 8. plate of changeover rod
- *a: floor-model control box assembly
*b: shift lever shield

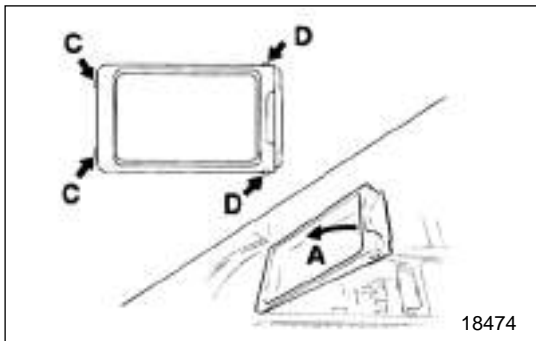
● **Installing sequence**

It is opposite to disassembly sequence.

◆ **Examining and repairing method**

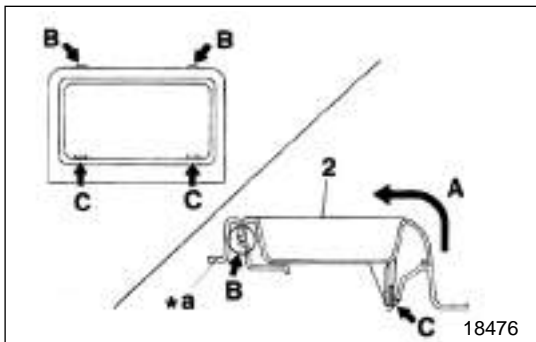
- ① Dismantling of control box cover B

A: Dismantling direction
B: Protrusion
C: Lock claw



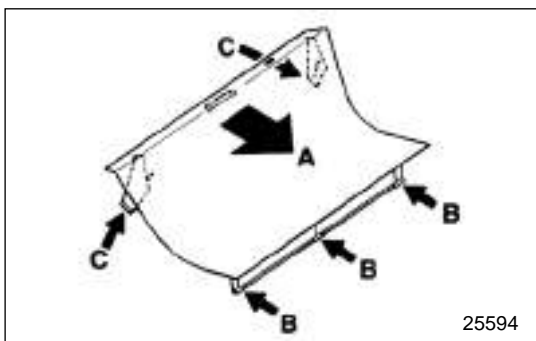
- ② Dismantling of disc of floor-model control box

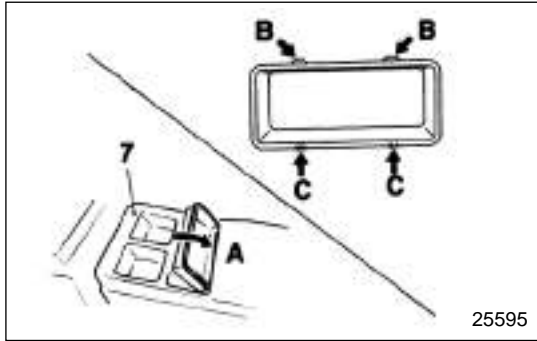
A: Dismantling direction
B: Protrusion
C: Lock claw



- ③ Dismantling of fuse box cover

A: Dismantling direction
B: Protrusion
C: Lock claw



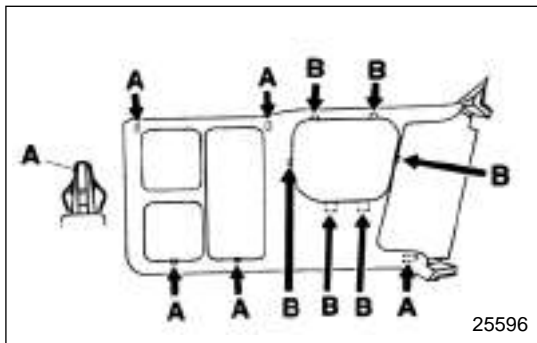


7 Dismantling of switch plate or disc

A: Dismantling direction

B: Protrusion

C: Lock claw



8 Dismantling of plate of changeover rod

A: Lock claw

B: Lock claw (use for installing shield of shift lever *b)

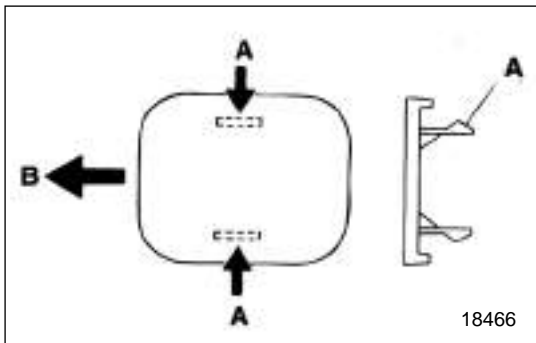
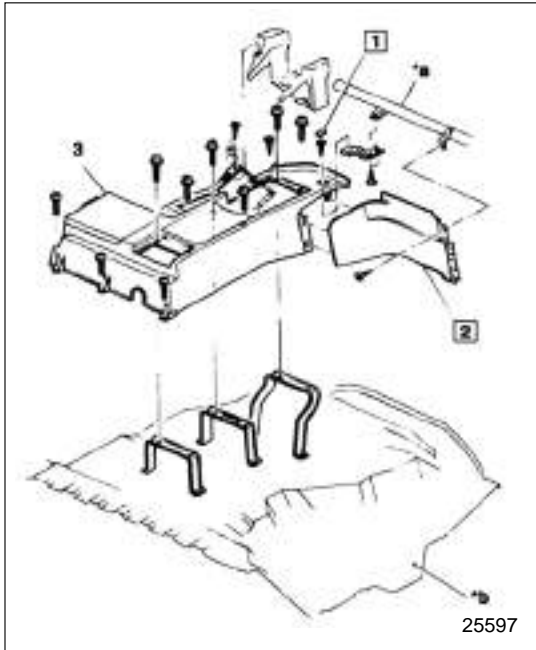
► **Section 2**

● **Dismantling sequence**

1. Cap
 2. Lower plate B at passenger's side
 3. Floor-model control box assembly
- *a: Frame assembly of instrument panel
* : Cab floor

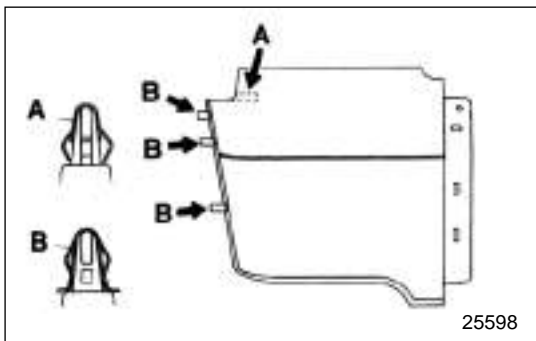
● **Installing sequence**

It is opposite to disassembly sequence.

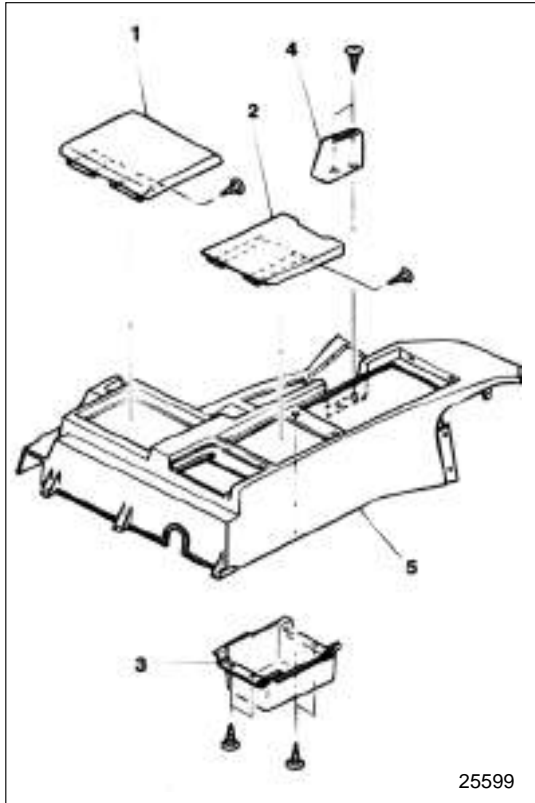


◆ **Examining and repairing method**

- 1 Dismantling of the cap
- A: Lock claw
B: Front of the vehicle



- 2 Dismantling of lower plate B at passenger's side
- A: Lock claw
B: Lock claw



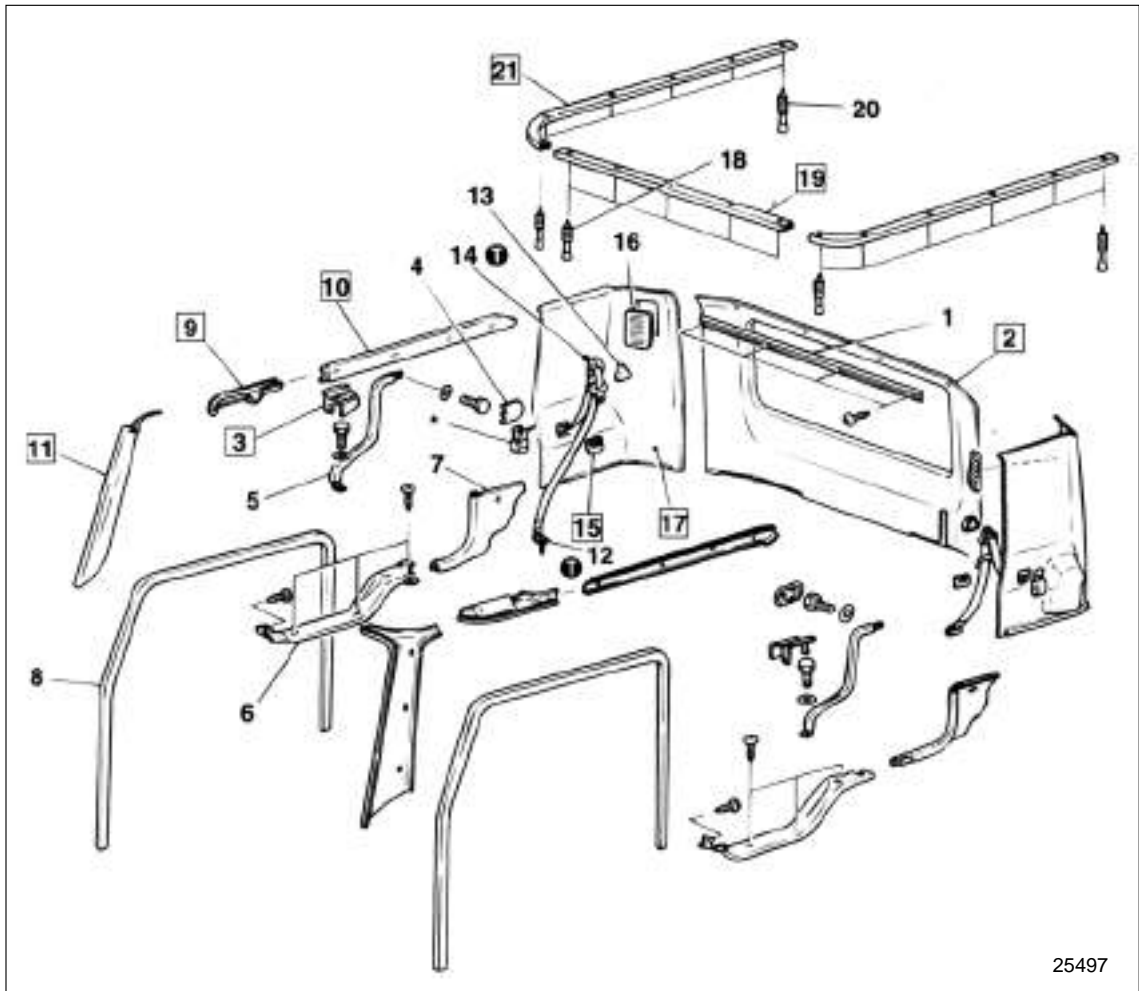
► **Section 3**

1. control box cover A
2. control box cover C
3. small box C on control box
4. teacup holder assembly
5. floor-model control box

● **Installing sequence**

It is opposite to breakdown sequence.

Finisher and Frame



25497

● Additional operation during dismantling and installation

Dismantling and installation of lower plate of instrument panel.

● Dismantling sequence

- | | | |
|----------------------------------------------|------------------------------------------|-------------------------------|
| 1. guide rail for rear curtain | 2. rear finisher | 3. cap |
| 4. cap | 5. rear gripper | 6. front frame plate |
| 7. rear frame plate | 8. sealing strip | 9. finisher for front top cap |
| 10. finisher for rear top cap | 11. finisher for front column | 12. bolt |
| 13. shield for fastening of shoulder harness | 14. bolt (fastening of shoulder harness) | |
| 15. guider of safety belt | 16. interior air outlet finisher | 17. rear finisher |
| 18. pin of guide rail | 19. guide rail for front curtain | 20. rail pin |
| 21. guide rail for front curtain | | |

*: safety belt

Remark

The figure above explained disassembling sequence of right parts. Disassembling sequence of left parts is the same as this.

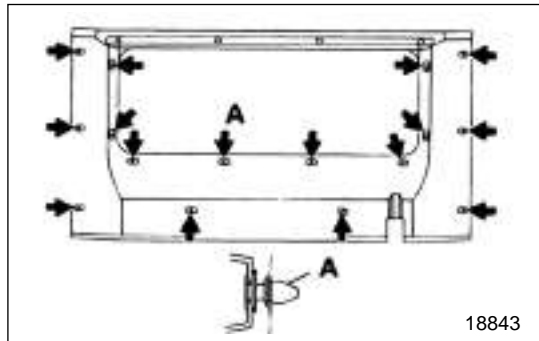
● **Installing sequence**

It is opposite to disassembling sequence.

ⓘ **Tightening torque**

unit: N•m{kgf•m}

Position	Position tightened	Tightening torque	Remark
12	Bolt (use for installing floor fastening)	34.3-53.9(3.5-5.5)	-
14	Bolt (use for installing fastening of shoulder harness)	34.3-53.9(3.5-5.5)	-



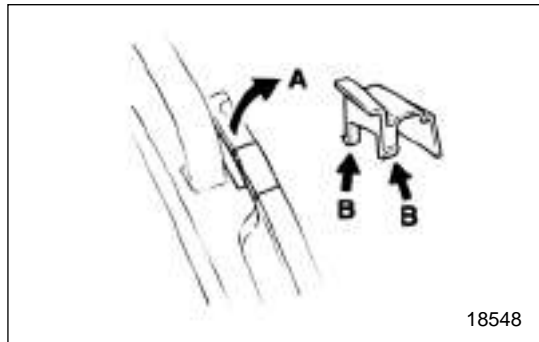
◆ **Examining and repairing method**

② Dismantling of rear finisher

A: Buckle (16 places)

Caution ⚠

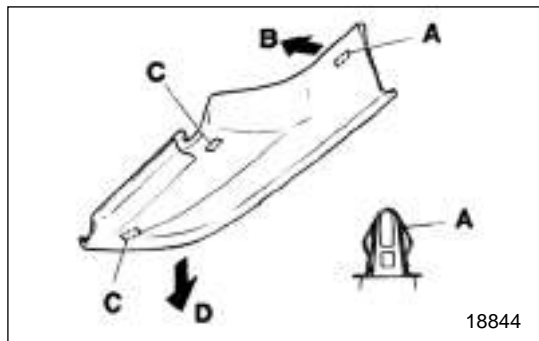
When disassembling buckle A, put your hands close to the buckle and draw it towards yourself to avoid damaging rear finisher 2.



③ Disassembly of cap

A: Disassembling direction

B: Lock claw



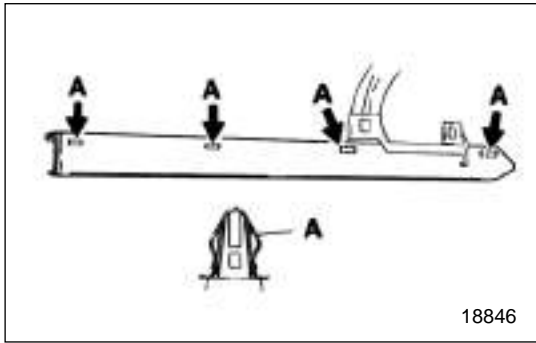
⑨ Disassembly of finisher for front top cap

- Draw finisher for front top cap that is on lock claw A towards direction B.

- After disconnecting lock claw A, draw finisher of lock claw C towards direction D to disassemble it.

Caution ⚠

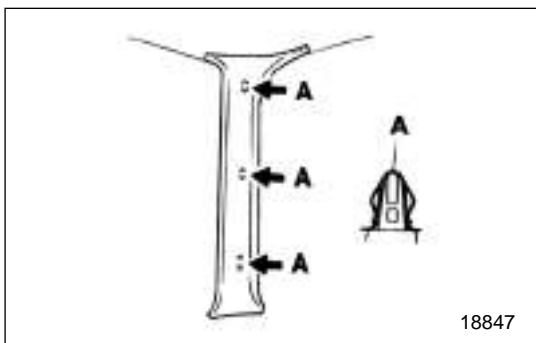
Direction and length of lock claw A and lock claw are different. When disconnecting them, be careful not to damage them.



10 Dismantling of finisher for top cap

A: Lock claw

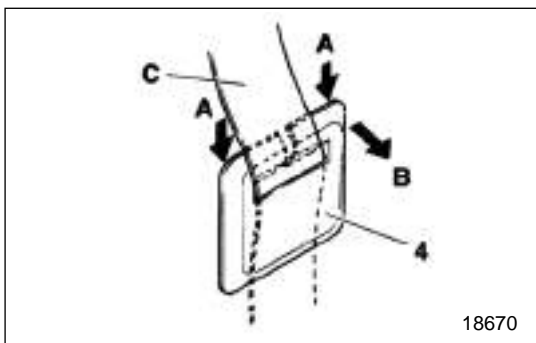
18846



11 Column finisher

A: Lock claw

18847

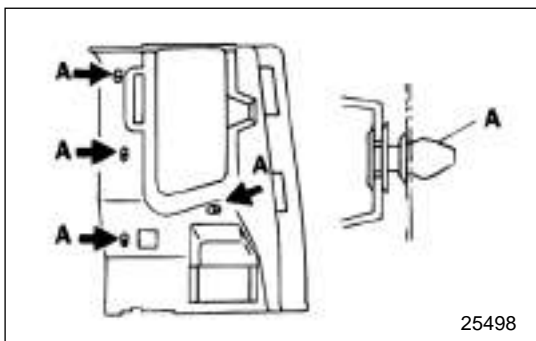


15 Dismantling of guider of safety belt

Press down guider 15 of safety belt (direction A), at the same time, pull its top towards yourself (direction B) and disassemble it.

C: Band

18670



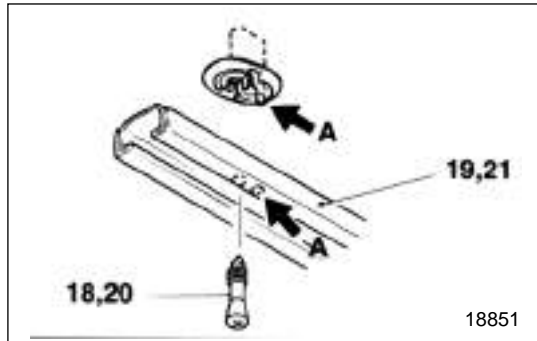
17 Disassembly of side finisher

C: Buckle

Caution ⚠

When disassembling buckle A, put your hands close to the buckle and draw it towards yourself to avoid damaging rear finisher 17.

25498

**19 21** Disassembly of guide rail for front curtain**(Disassembling)**

Guide pin 18 and 20 are screwed-structure. You can use the same method as that of disassembling screw to disassemble them.

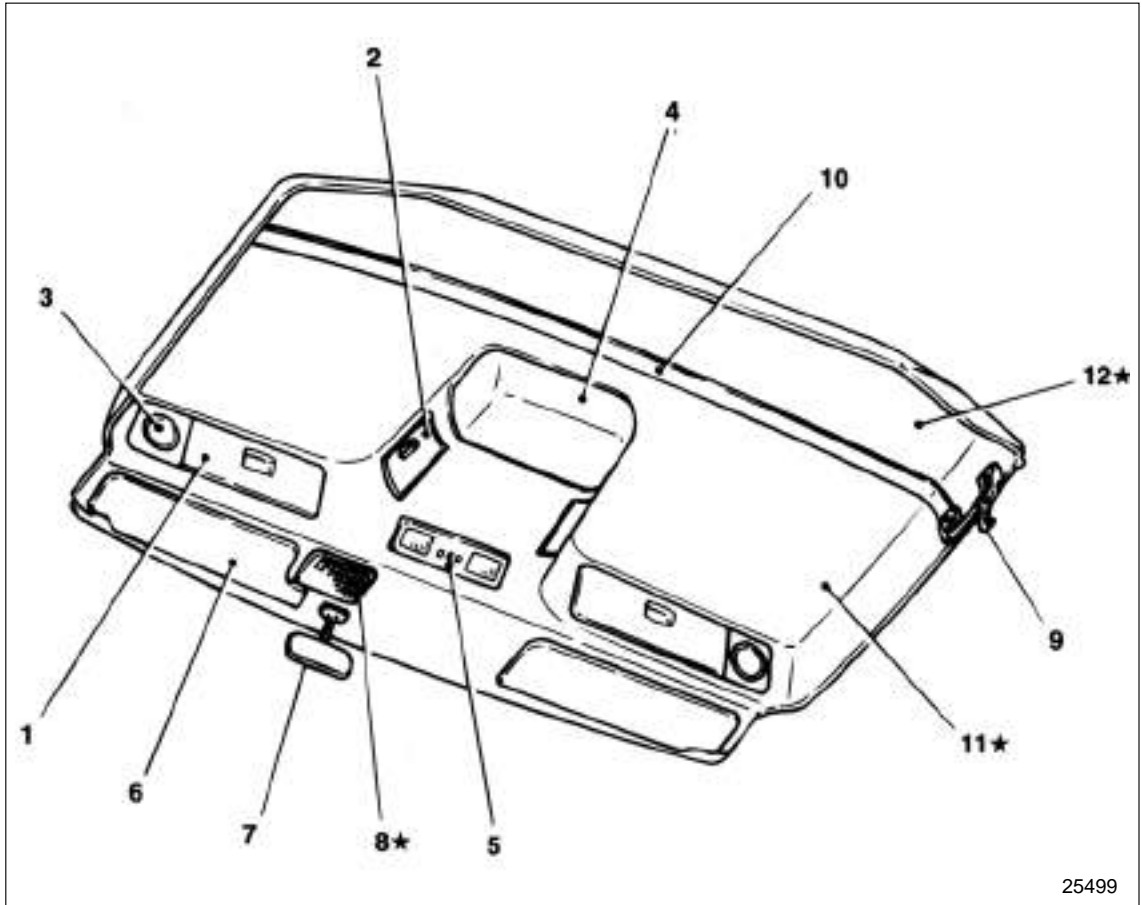
(Installation)

- Align locating hole A of guide rail 19 and 21 for front curtain to locating pin B of grommet, then install guide rail for front curtain.
- With regard to installation of guide pin 18 and 20, press them into position.

Memo

Roof Trim

► **Composition for installation of roof trim**

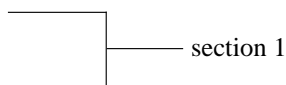


25499

This section described necessary operations of four sections for roof trim (section 1-4) during disassembling.

With regard to disassembling sequence and installing sequence of individual part, please refer to related section. The parts that must be disassembled and assembled in other sections are marked with ★, and are described in parentheses. The parts having no ★ can be disassembled and assembled without referring to other sections.

- 1. front overhead control box
- 2. central overhead control box
- 3. front speaker



- 4. fluorescent lamp
- 5. personnel lamp



6. sun screen

★7. interior rear view mirror



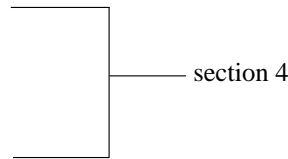
★8. central speaker (section 1, 3)

9. coat hook

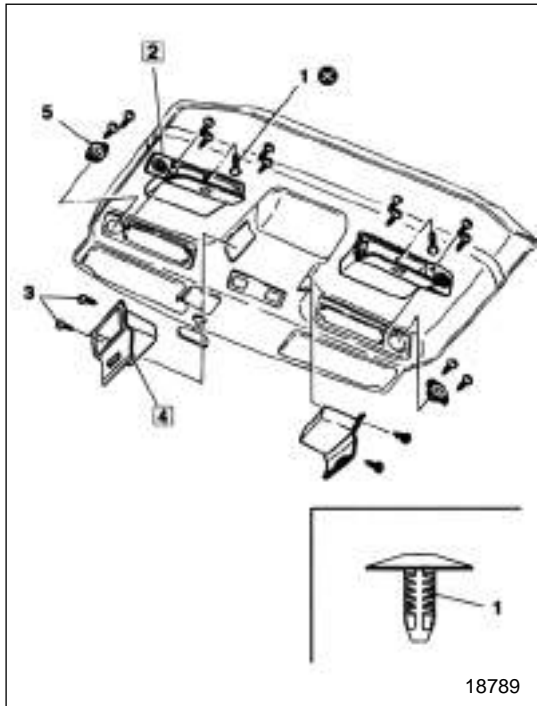
10. guide rail for central curtain

★11. front roof trim (section 1, 3)

★12. rear roof trim (section 1, 3)



► Section 1



● Dismantling sequence

1. buckle
2. front overhead control box assembly
3. screw
4. central overhead control box assembly
5. front speaker

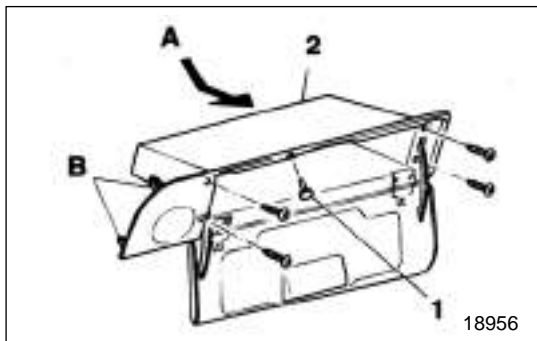
⊗: Parts that cannot be used repeatedly.

Remark

The figure above refers to disassembling sequence of left parts. Disassembling sequence of right parts (For some specification, some parts is not equipped) is the same as left parts.

● Installing sequence

It is opposite to disassembling sequence.

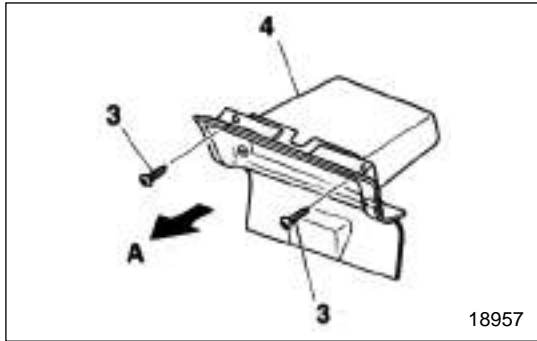


◆ Examining and repairing method

② Dismantling of front overhead control box assembly

A: Dismantling direction

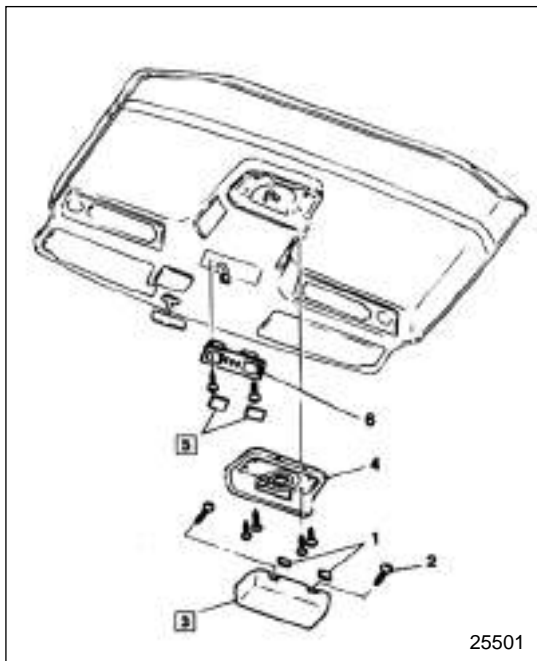
B: Protrusion



4 Dismantling of central overhead control box assembly

Disassemble two screws 3 on upside, and then disassemble central overhead control box assembly 4. It is not necessary to disassemble other screws.

► Section 2



● Dismantling sequence

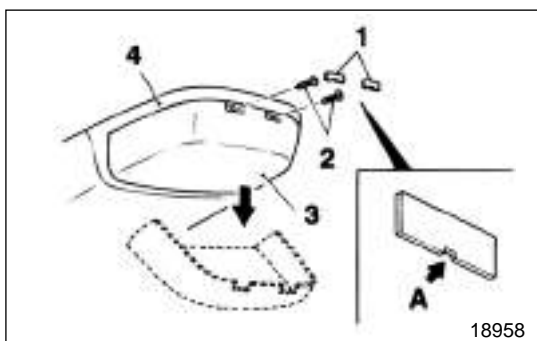
1. cap
2. screw
3. lens
4. fluorescent lamp
5. lens
6. personnel lamp

Remark

For some specification, fluorescent lamp may not be equipped

● Installing sequence

It is opposite to disassembling sequence.

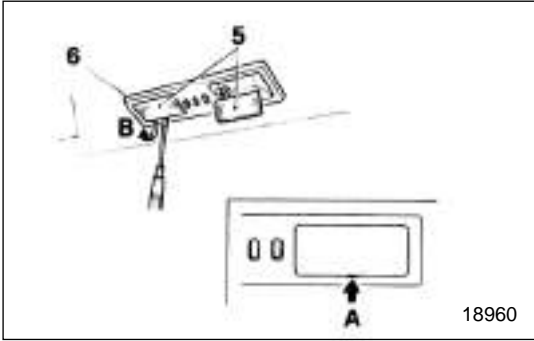


◆ Examining and repairing method

3 Dismantling of lens

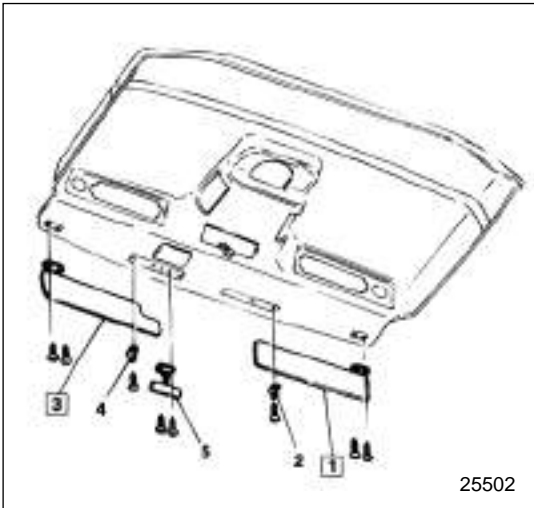
Disassemble cap 1 and screw 2, and then disassemble lens 3.

A: Notch



- 5 Dismantling of lens
 A: Notch for personnel lamp
 B: Dismantling direction

► Section 3



● Dismantling sequence

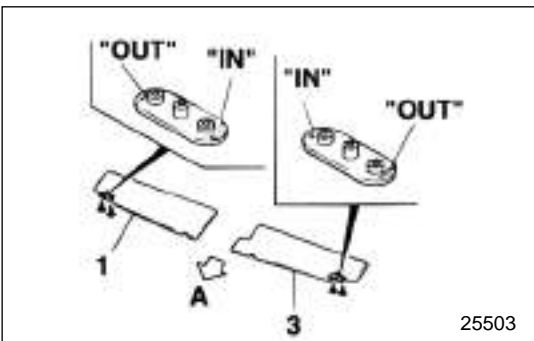
1. sun screen, RH
2. lock hook of sun screen
3. sun screen, LH
4. lock hook of sun screen
5. interior rear view mirror

Remark

For some specification, sun screen may not be equipped

● Installing sequence

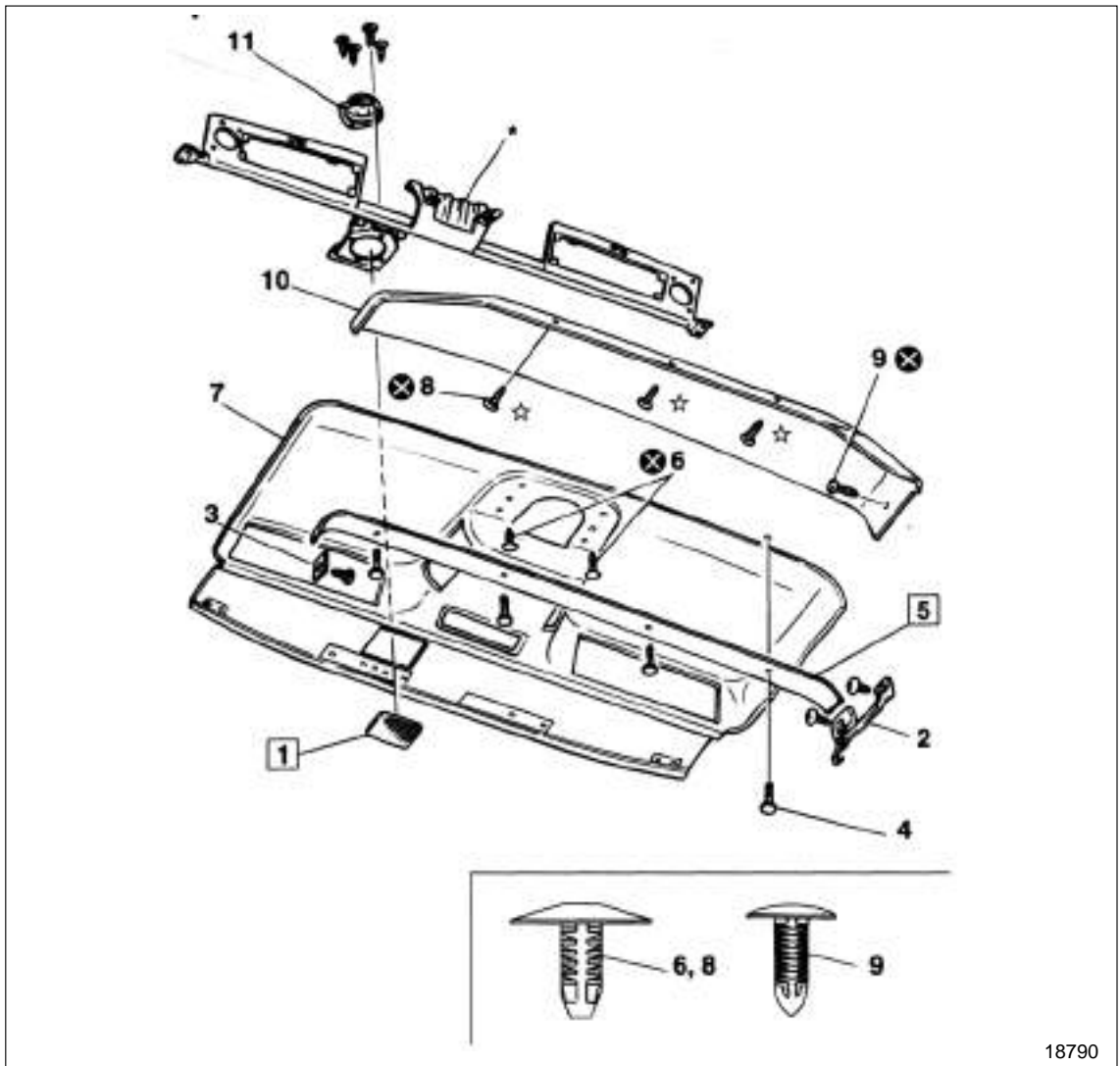
It is opposite to disassembling sequence.



◆ Examining and repairing method

- 1 3 Installation of sun screen
 When installing sun screen 1 and 3, make “IN” mark towards the center of the vehicle.
 A: front of the vehicle

► Section 4



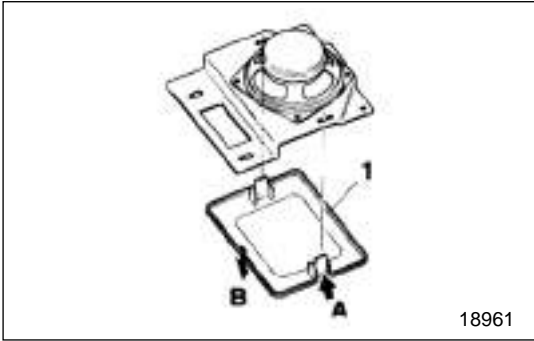
● **Additional operation during dismantling and installation**

Disassembly and installation of finisher for front top cap, finisher for rear top cap, rear finisher and rear side finisher.

● **Dismantling sequence**

1. finisher for central speaker
3. end cap
5. guide rail for central curtain
7. front roof trim
9. buckle (×1)
11. central speaker
- *: frame of overhead control box

2. coat hook
4. pin of guide rail
6. buckle(×2)
8. buckle (mark ☆×3)
10. rear roof trim
- O: Parts that can not be used repeatedly.



● **Installing sequence**

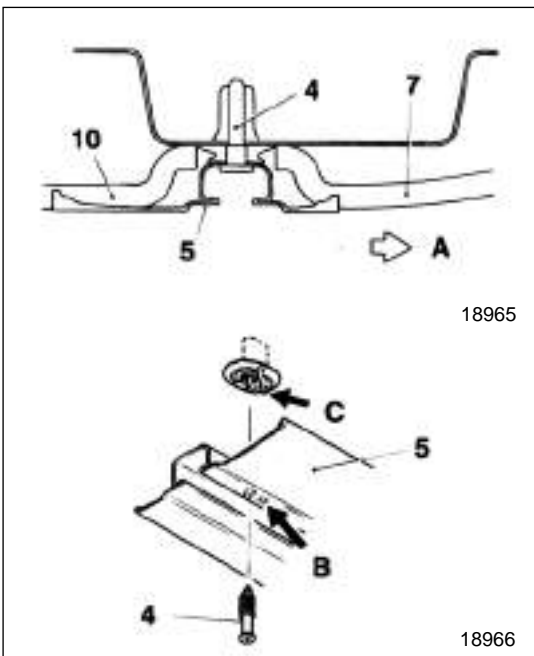
It is opposite to disassembling sequence.

◆ **Examining and repairing method**

1 Dismantling of finisher for central speaker

A: Lock claw (two places)

B:Dismantling direction



5 Guide rail for central curtain

(disassembling)

Guide pin 4 (four places) is screwed-structure. You can use the same method as that of disassembling screw to disassemble them.

(installation)

● Install guide rail for central curtain 5 as figured direction.

A: front of the vehicle

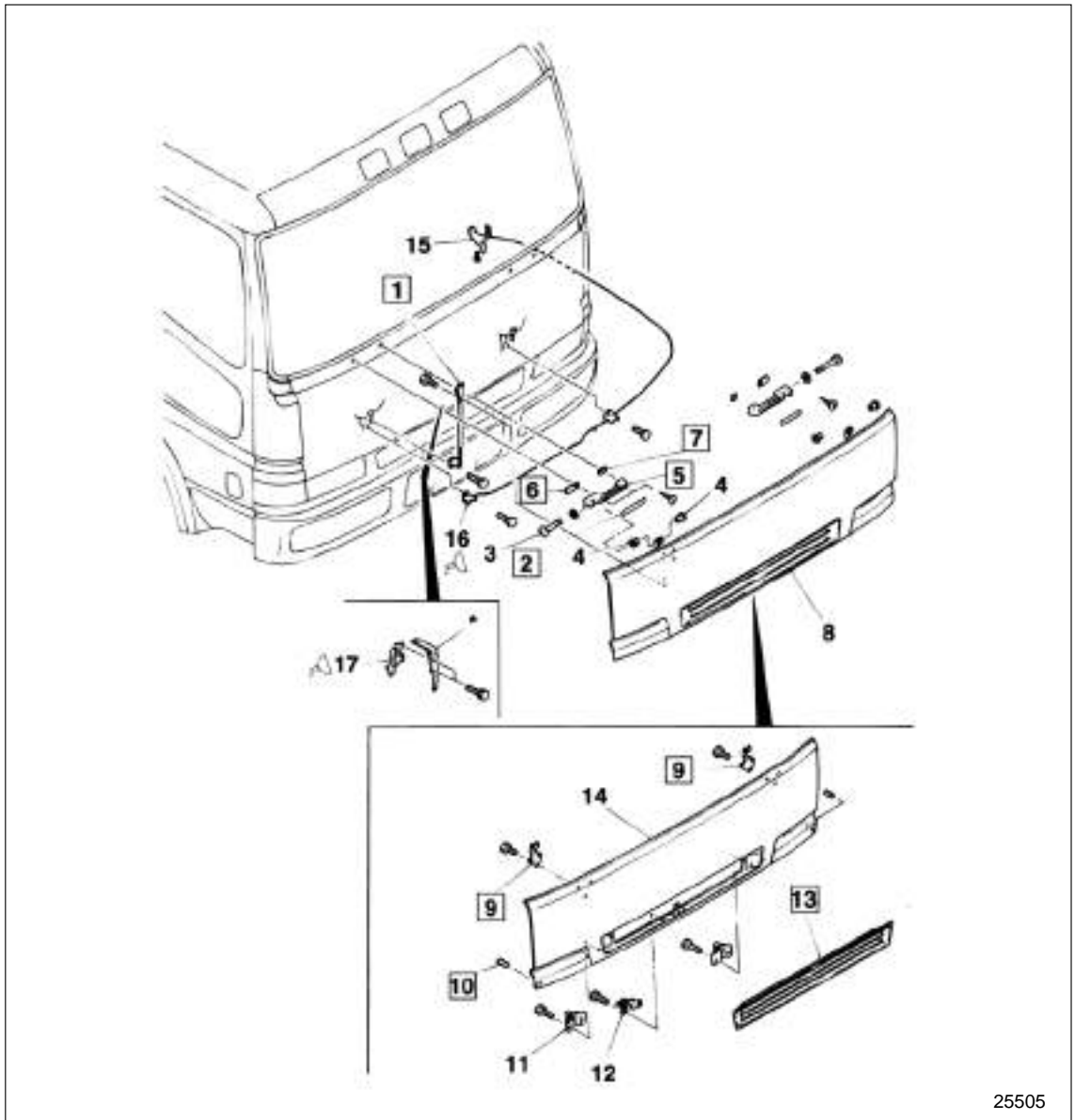
7: front roof trim

10: rear roof trim

● When installing guide rail 5 for central curtain, align locating hole B of guide rail to locating pin C of grommet.

● With regard to installation of guide pin 4, press them into position.

Front Plate



25505

● Dismantling sequence

- | | | |
|------------------------------|------------------------------|-------------------------------|
| 1. pneumatic spring assembly | 2. front gripper cover | 3. hinge pin of front plate |
| 4. sleeve | 5. front gripper | 6. sealing gasket (big) |
| 7. sealing gasket (small) | 8. front plate assembly | 9. front plate hinge |
| 10. buffer part | 11. latch eye of front plate | 12. latch eye of safety latch |
| 13. front upper grid | 14. front plate | 15. lock/release handle |
| 16. front plate latch | 17. safety latch | *: support for central grid |

Warning ⚠

- Open front plate, disassemble pneumatic spring assembly 1, then disassemble front plate 14. Otherwise, it is very dangerous.
- Do not break down pneumatic spring assembly 1 or put it into fire.
- Before throwing away pneumatic spring 1, drill a hole on it to discharge air.

Remark

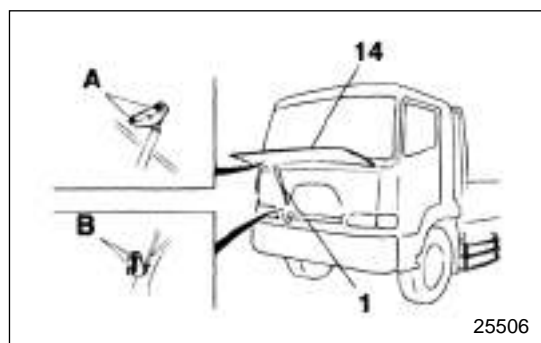
The figure above shows disassembling sequence of right parts. Disassembling sequence of left parts is the same as this.

● **Installing sequence**

It is opposite to disassembling sequence.

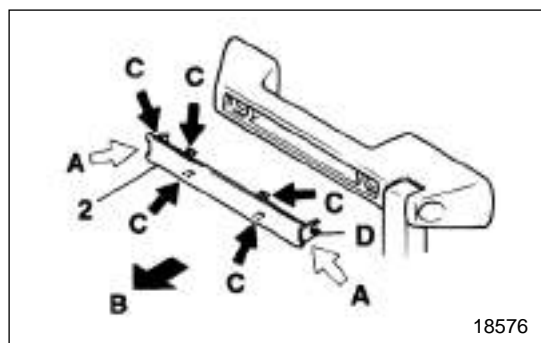
 **Lubricant and/or sealant**

Position	Application position	Specified lubricant and/or sealant	Remark
16	sliding surface of front plate latch	grease for wheel bearing [NLG1 NO.1 (lithium soap base)]	As needed
17	sliding surface of front plate latch	universal grease [NLG1 NO.1 (lithium soap base)]	As needed



◆ **Examining and repairing method**

- 1 Dismantling of pneumatic spring
 - Open front plate (pneumatic spring assembly 1 extended), disconnect mounting bolt on upside A (at plate side). At the same time, support front plate with your hand.
 - Support front plate 14 with your hands, at the same time, lower pneumatic spring assembly 1 slowly.
 - Lower front plate 14 and make it open slightly, disassemble mounting bolt on underside B of pneumatic spring assembly 1 (at cab side).

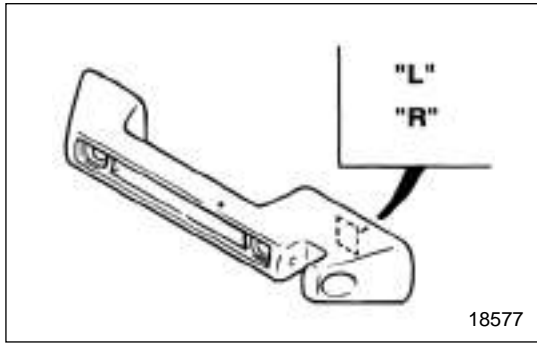


- 2 Dismantling of front gripper cover (disassembling)

Use screwdriver or other tool to pry notch A of front gripper cover 2, to disassemble front gripper cover.

B: Dismantling direction
 C: Lock claw (installation)

Install front gripper cover 2, with its notch D towards outside of the vehicle (at hinge side).

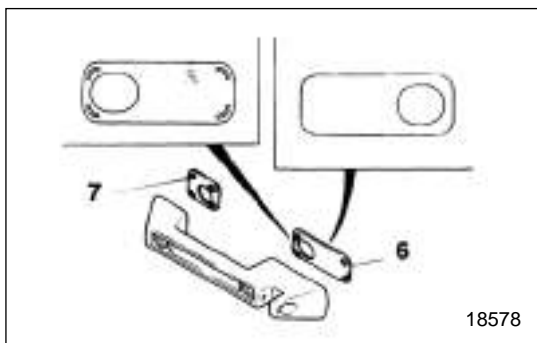


5 Installation of front gripper

On back of front gripper 5, there is left or right identification mark. Before installation, confirm identification mark.

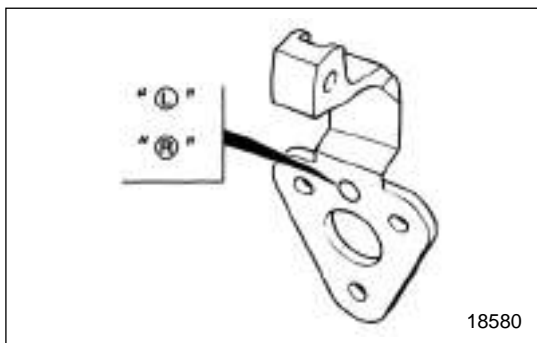
“L”: LH gripper

“R”: RH gripper



6 **7** Installation of sealing gasket

Front side, rear side and shape of sealing 6 & 7 are different. Hence, before installing each sealing gasket, confirm their front side, rear side and shape.

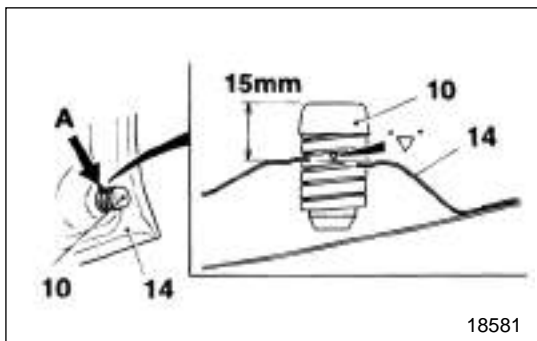


9 Installation of front plate hinge

On back of front plate hinge 9, there is left or right identification mark. Before installing, confirm identification mark.

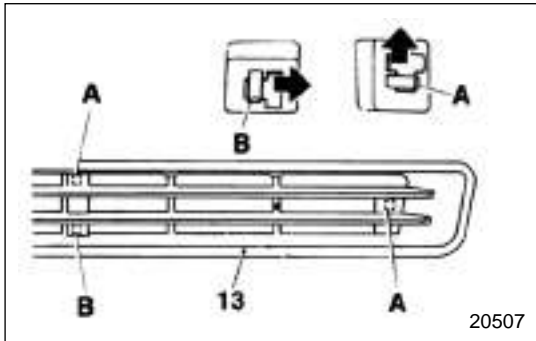
“L”: LH hinge

“R”: RH hinge



10 Installation of buffer plate

- Install buffer plate 10 by screwing , with its upward mark “△”aligning to notch A of front plate 14. Its dimension should accord with figure.
- If buffer part 10 does not accord with stipulation above or is contacted too tightly, adjust it accurately.



13 Front upper grid

(Disassembling)

- Push the buckle B along horizontal direction. At the same time, use flat head screwdriver to uplift end of buckle A that is on mid side, right side and left side of front upper grid 13.
- Draw front upper grid 13 towards front of the vehicle along horizontal direction, and disassemble it.

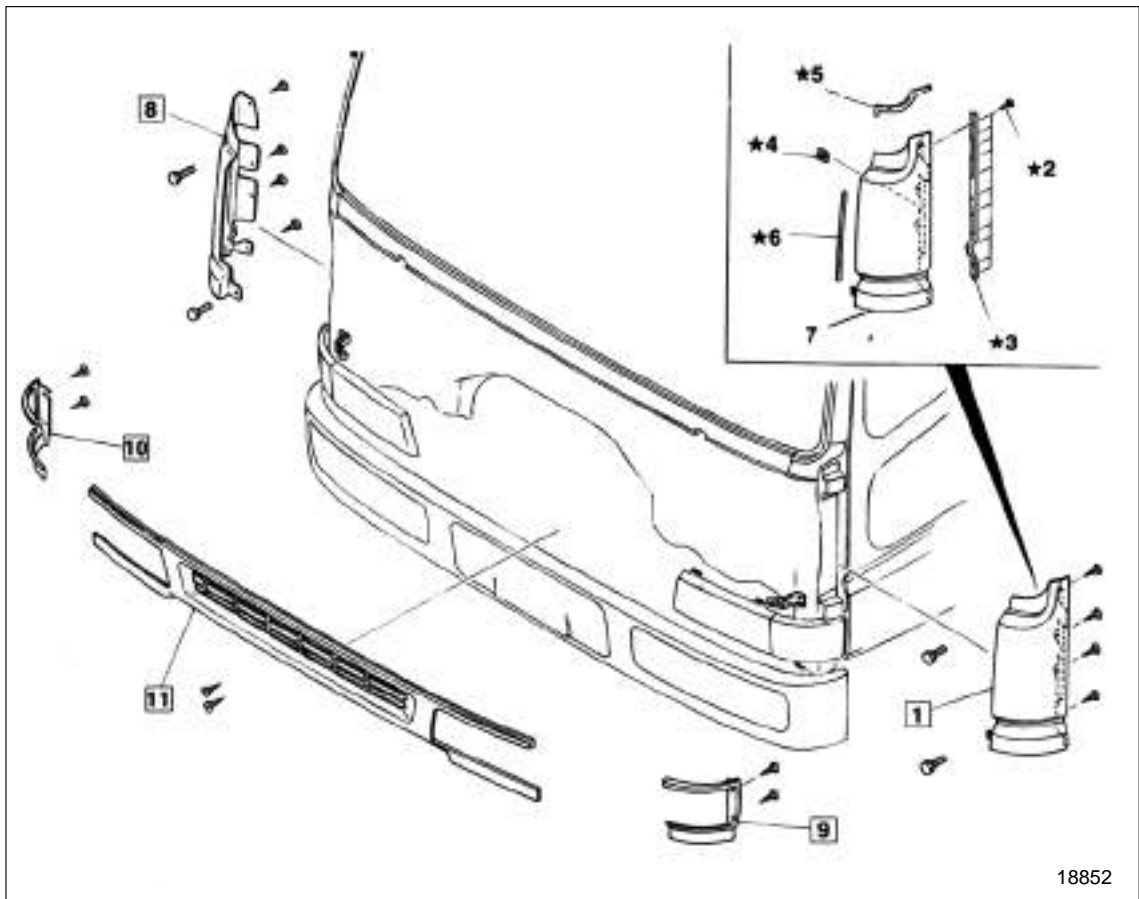
(Installation)

Disassemble buckle A and B that are left on front plate 14. Before installation, install buckle on front upper grid 13.

Cab

Memo

Radiator Grid and Corner Plate



18852

● Disassembling sequence

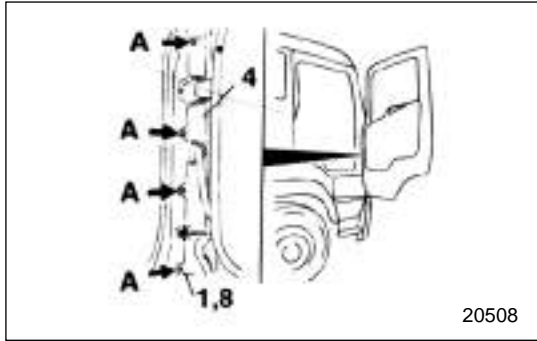
1. front corner plate assembly LH
- ★3. sealing strip for door opening
- ★5. sealing gasket for front corner plate
7. front corner plate
9. lamp cover, LH
11. radiator grid
- ★2. buckle
- ★4. guard plate
- ★6. sealing strip for front plate opening
8. front corner plate assembly RH
10. lamp cover, LH

Remark

Do not disassemble the parts having ★, unless they are damaged.

● Installing sequence

It is opposite to breakdown sequence.



20508

◆ Examining and repairing method

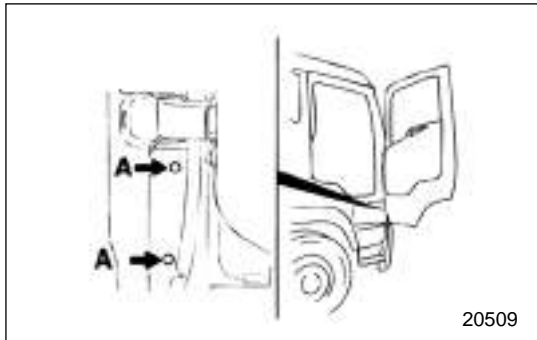
① ⑧ Disassembly and installation of front corner plate assembly LH and RH

- Open the door, and disassemble four screws A on back side.
- Close the door, and disassemble two screws on front side.
- Draw front corner plate assembly LH1 and RH8 towards outside of the vehicle, and disassemble them.
- Install as opposite sequence of disassembling sequence.
- When installing front corner plate assembly, install door wiring in notch of guard plate 4.

After installed front side parts, if you open the door under the condition that front corner assembly LH1 or RH8 protruded the vehicle, the corner plate will impact the door, thus to cause deformation and damage.

⑨ ⑩ Disassembly and installation of lamp cover LH and RH

- Open the door, and disassemble two screws A on back side.
- Close the door, draw lamp cover LH9 and RH10 towards outside of the vehicle, and disassemble them.



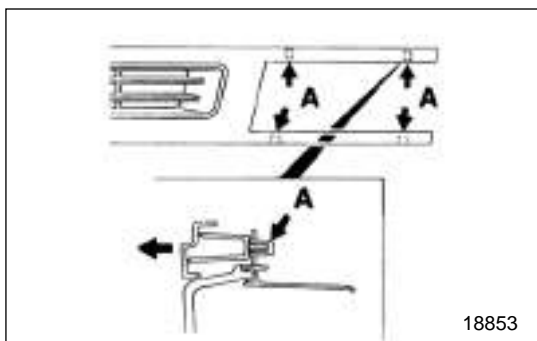
20509

⑪ Dismantling of radiator grid

- Disassemble two screws on mid position.
- On lock claw A, pull radiator grid 11 towards yourself and disassemble it.

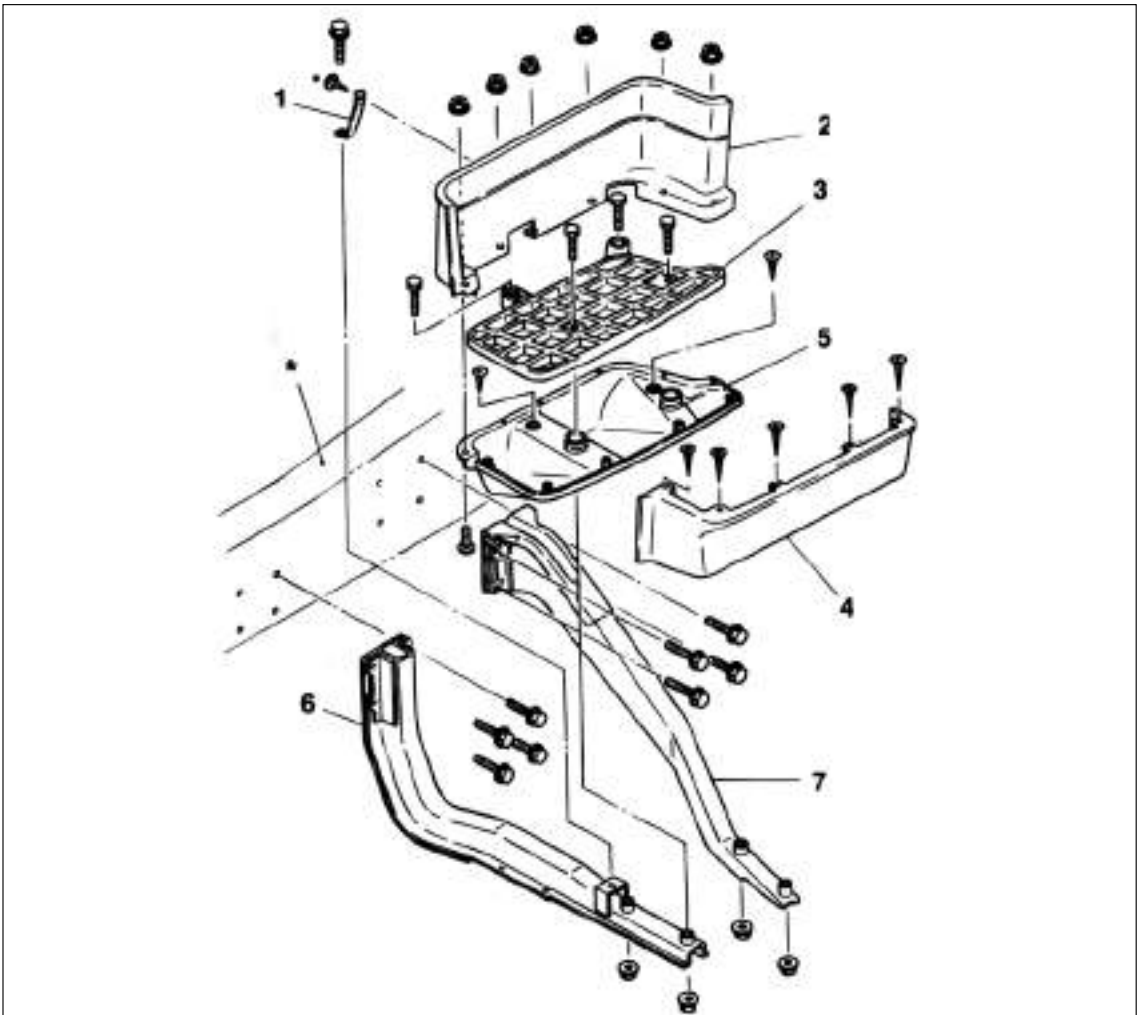
Remark

Lock claw A is installed on left side and right side symmetrically.



18853

Step (#1 step)



● Disassembling sequence

1. baffle support
 2. upper baffle of step
 3. step (#1)
 4. lower baffle of step
 5. bottom housing of step
 6. front step support
 7. rear step support
- *: car frame

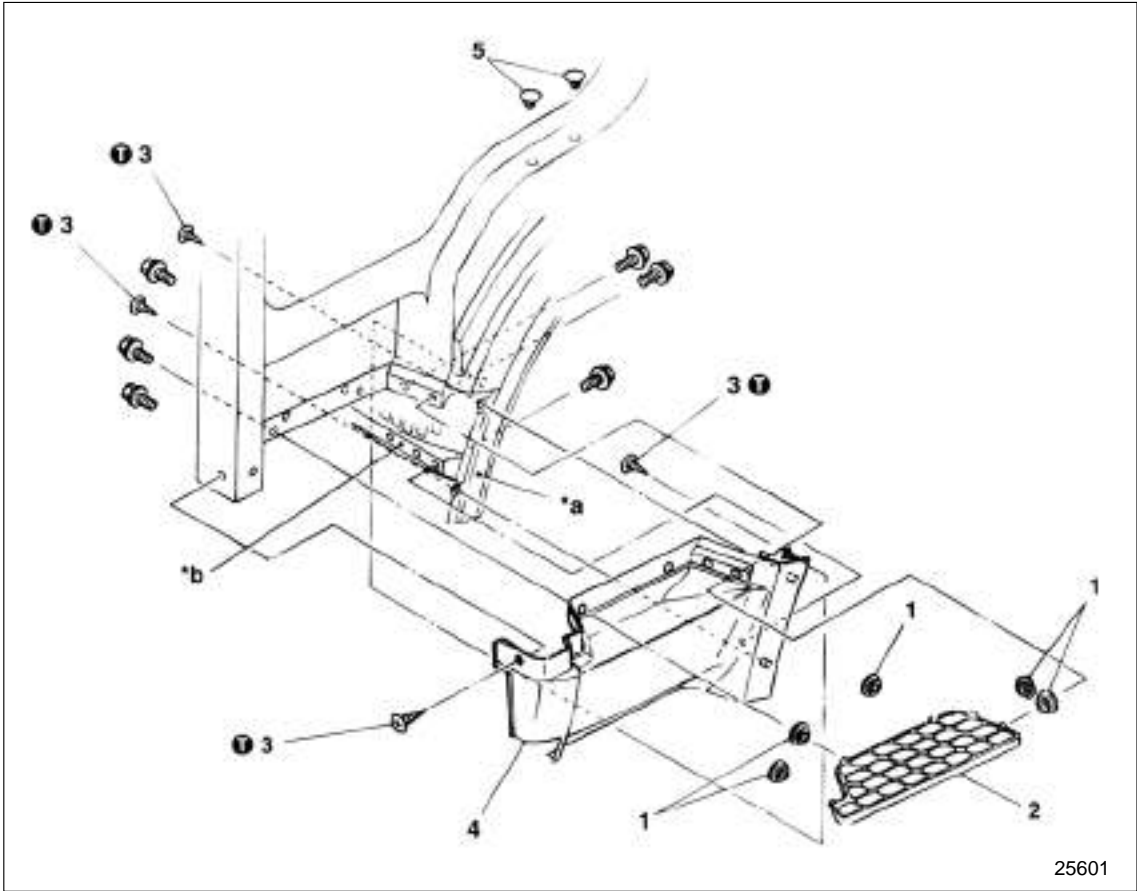
Remark

- The figure above indicates breakdown sequence of left parts. Breakdown sequence of right parts is the same as that of left parts.
- For some specification, lower baffle 4 of step may not be equipped.

● Installing sequence

It is opposite to breakdown sequence.

Step (#2 step)



● **Disassembling sequence**

- 1. washer
- 2. step (#2)
- 3. screw
- 4. step baffle
- 5. crew-plug
- *a. fender assembly
- *b. wheel housing cover

● **Installing sequence**

It is opposite to breakdown sequence.

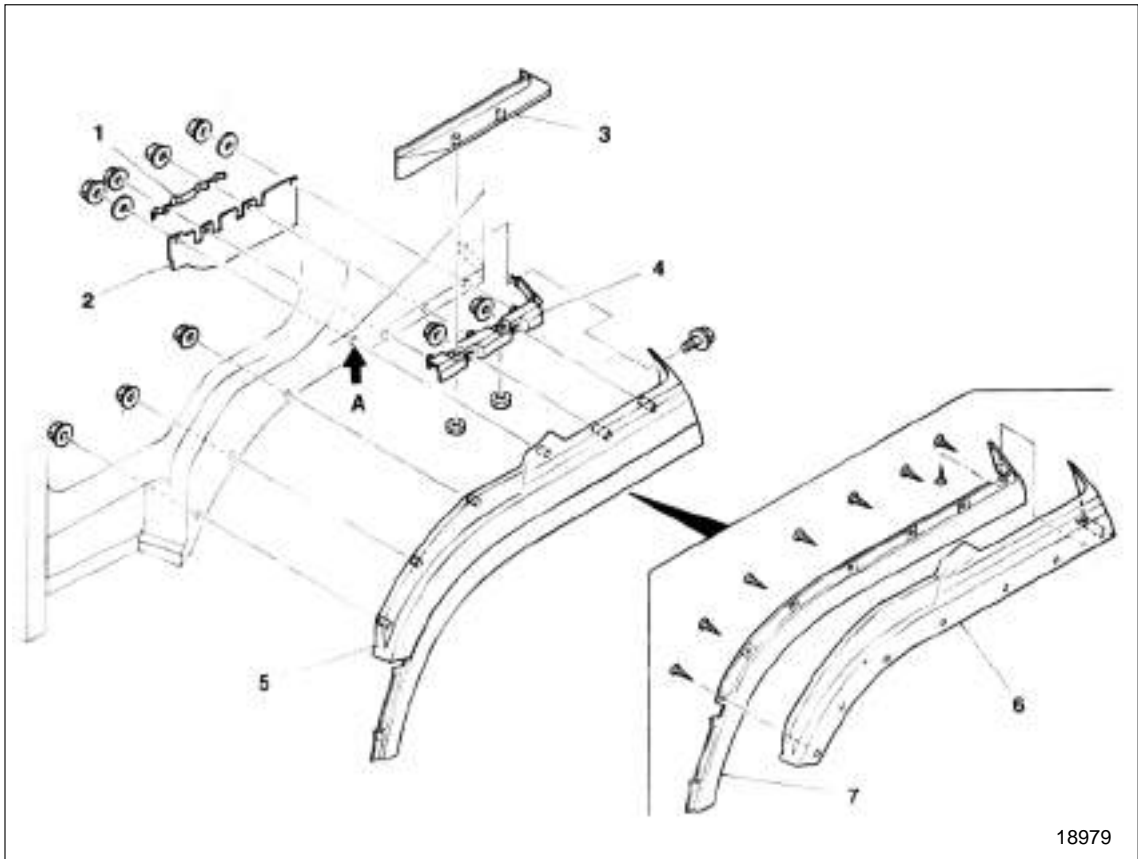
Remark

This figure indicates breakdown sequence of left parts. Breakdown sequence of right parts is the same as that of left parts.

ⓘ **Tightening torque**

Position	Parts tightened	Tightening torque	Remark
3	Screw (use for installing thermal baffle of step)	15.7(1.6)	-

Fender



18979

● Dismantling sequence

1. baffle plate bracket
2. side splash guard
3. rear step
4. fender and rear step bracket
5. fender assembly
6. fender
7. splash guard

Remark

- The figure above indicates breakdown sequence of left parts. Breakdown sequence of right parts is the same as that of left parts.
- For some specification, rear step 3 may not be equipped.

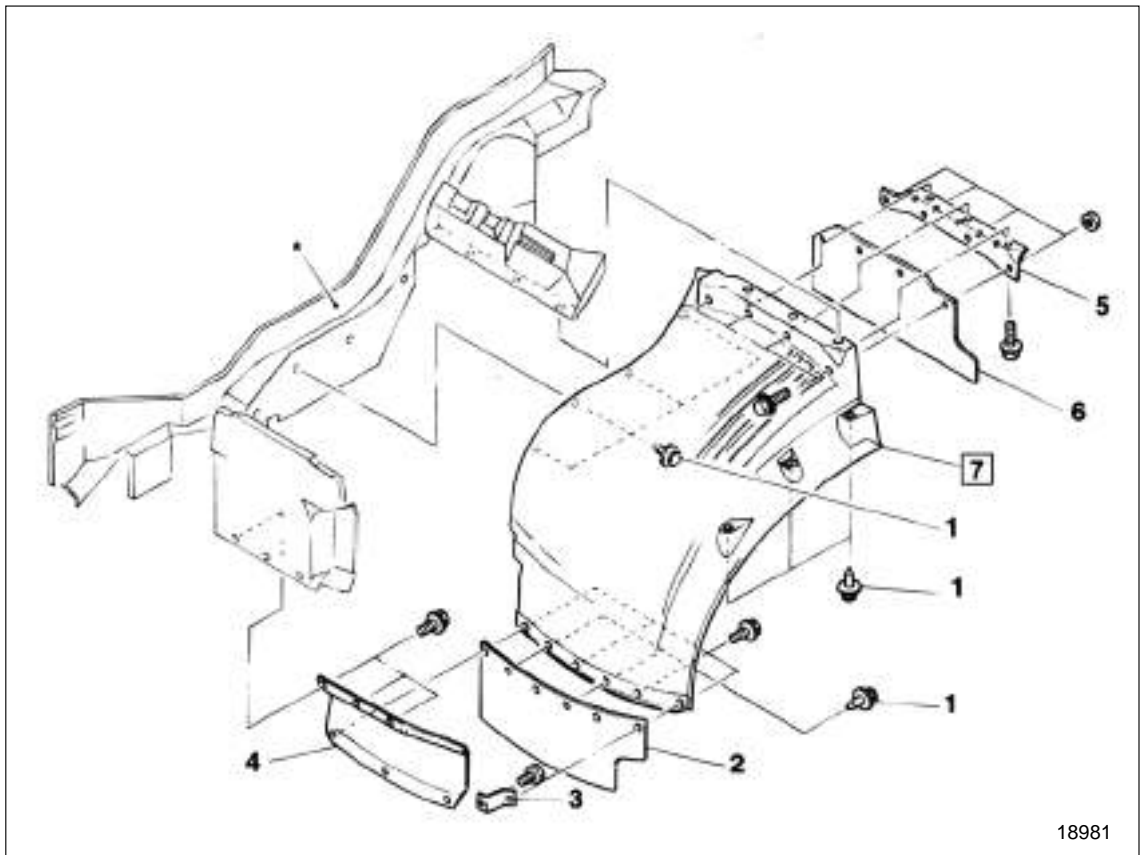
● Installing sequence

It is opposite to disassembling sequence

Caution

When installing fender assembly 5, tighten the nuts on left and right sides from the benchmark hole A alternatively.

Wheel Housing



18981

● Disassembling sequence

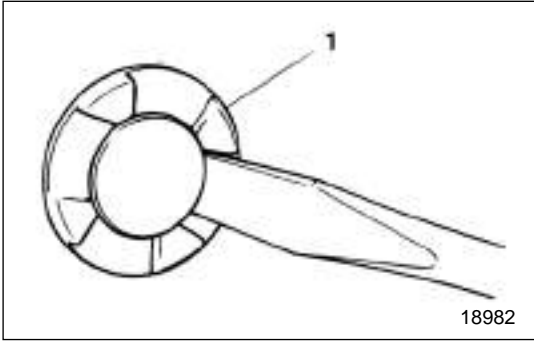
- | | |
|------------------------------------|-----------------------|
| 1. buckle | 2. front splash guard |
| 3. wheel housing support | 4. splash guard |
| 5. support for wheel housing cover | 6. rear splash guard |
| 7. wheel housing cover | |

Remark

The figure above indicates breakdown sequence of left parts. Breakdown sequence of right parts is the same as that of left parts.

● Installing sequence

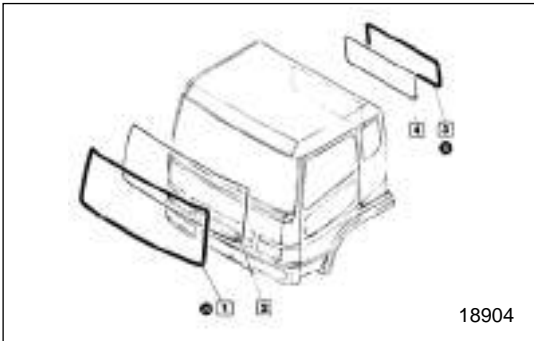
It is opposite to disassembling sequence.



◆ **Examining and repairing method**

7 Dismantling of wheel housing cover
Use screwdriver or other tool to pry buckle 1 that fixes wheel housing cover 7 as shown in the figure and loosen them.

Window Glass

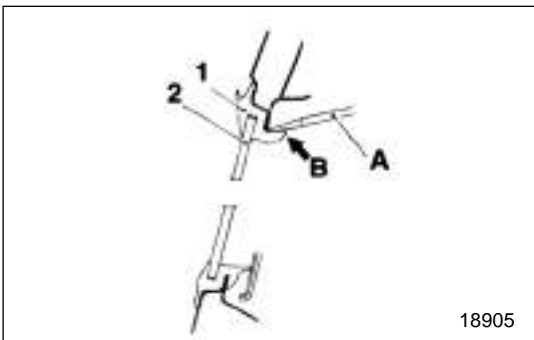


● **Dismantling sequence**

1. sealing strip
 2. windshield
 3. sealing strip
 4. rear glass
- ⊗: Parts that cannot be used repeatedly.

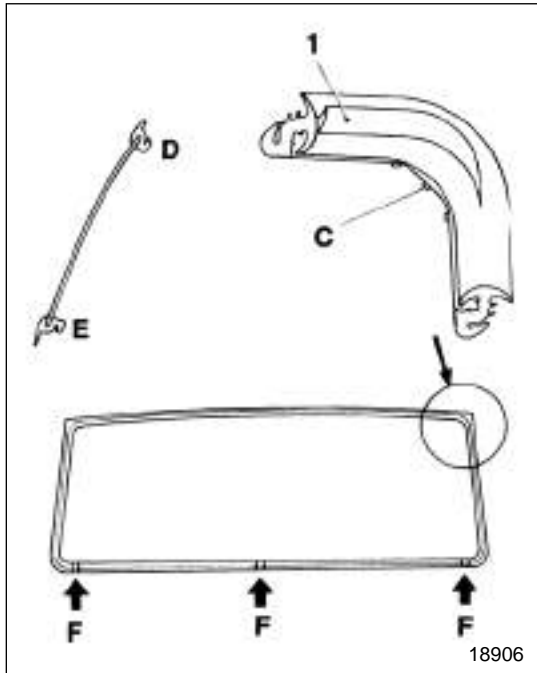
● **Installing sequence**

3 •• 4 •• 1 •• 2



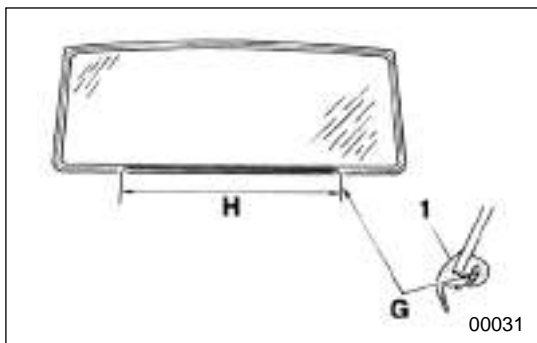
◆ **Examining and repairing method**

1 2 sealing strip, windshield
(disassembling)
When disassembling the windshield 2, use screwdriver A to pry flange B of sealing strip 1, push windshield 2 toward outside of the vehicle and disassemble it.

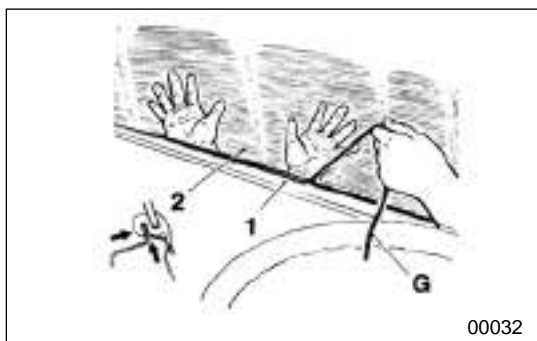


(installation)

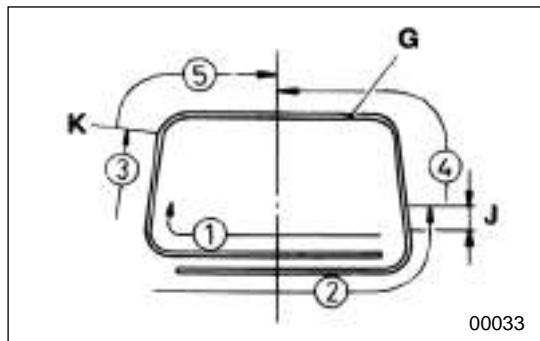
- Install windshield, making benchmark C that is in mid of sealing strip 1 lie in center of windshield corner.
- D: Outside of the vehicle
- E: Inside of the vehicle
- F: Drain hole



- Put one cable G having some strength in cab mounting notch of sealing strip 1, with their H positions overlapping each other.



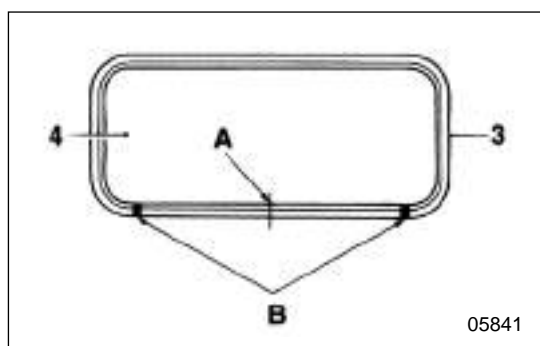
- Push windshield 2 with your hands from outside of the vehicle forcibly. Ask an assistant to be in the cab to draw one end of cable G, and to install inner mounting notch of sealing strip to flange lip of the cab.



- Ask the assistant to pull out cable G as figured number. At the same time, you stand outside of the cab, and use rubber hammer to knock windshield 2 slightly to make it be into position.

J: Distance to starting point of the line is about 100 mm.

K: Distance to end point of the line

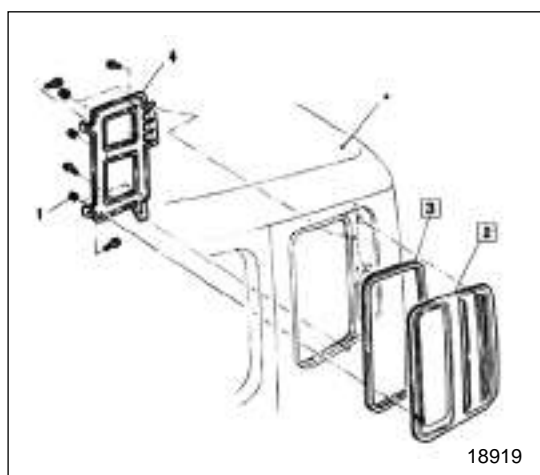


[3] [4] Sealing strip, rear glass

- Install sealing strip 3, making its joint A be in mid position of rear glass 4.

B: Drain hole

- Besides this, use the method that is same as that of windshield sealing strip to examine and repair.



► Rear glass

- Additional operation during dismantling and installation

Dismantling and installation of rear finisher

- Dismantling sequence

1. nut
2. rear finisher
3. sealing strip for side window
4. bracket for rear finisher

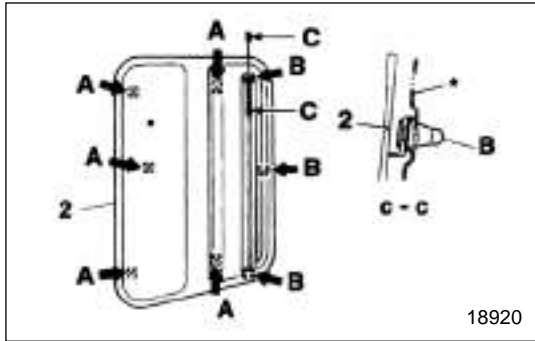
*: cab assembly

Remark

Left figure indicates disassembling sequence of left parts. Disassembling sequence of right parts is the same as that of left parts.

● Installing sequence

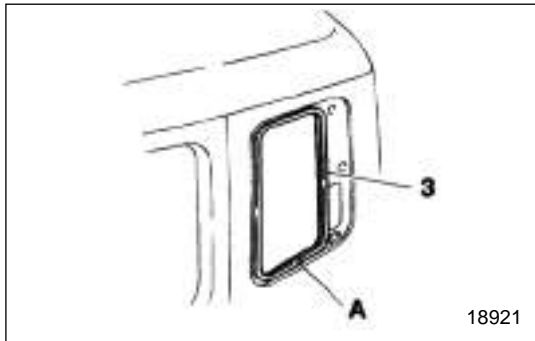
It is opposite to disassembling sequence.



◆ Examining and repairing method

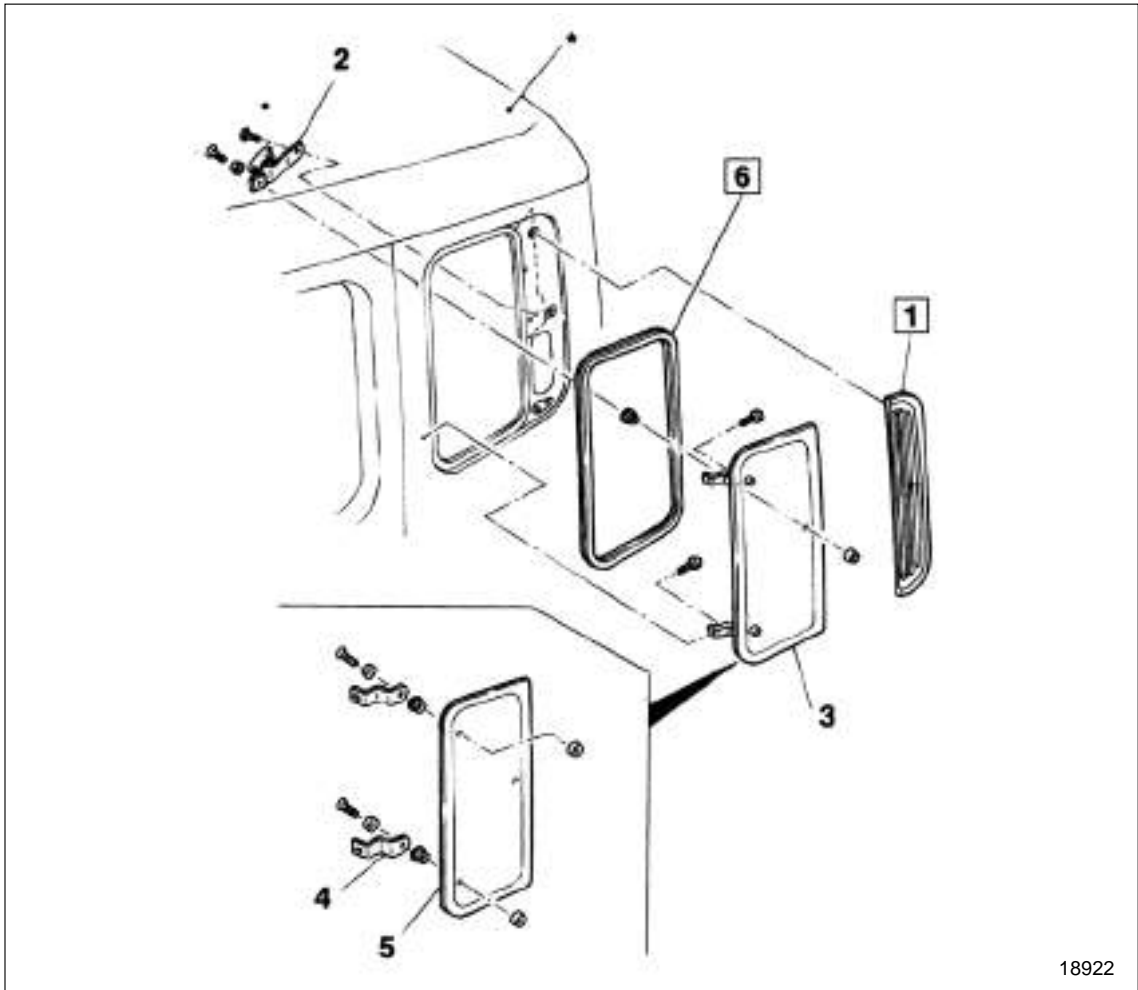
② Dismantling of rear finisher

- In order to disassemble rear finisher 2, disassemble nut 1 (in A position of the figure, together 5 places) at first, then disassemble buckle B (three places).



- ③ Installation of sealing strip for side window
- Install sealing strip for side window, making its joint A be in mid position of the bottom.

► Side window glass (selecting parts)



18922

● Additional operation during dismantling and installation

Dismantling and installation of rear finisher

● Dismantling sequence

1. air outlet finisher
2. link rod assembly for side window
3. side window glass assembly
4. side window hinge
5. side window glass
6. sealing strip for side window

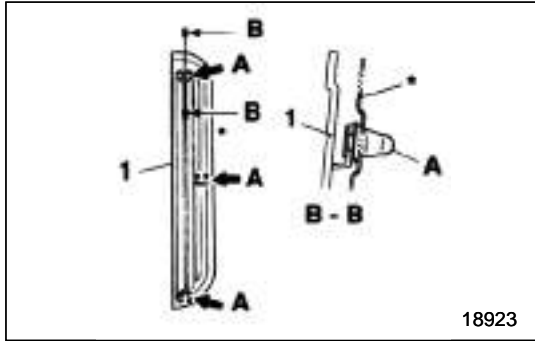
*: cab assembly

Remark

The figure above indicates breakdown sequence of left parts. Breakdown sequence of right parts is the same as that of left parts.

● Installing sequence

It is opposite to disassembling sequence.

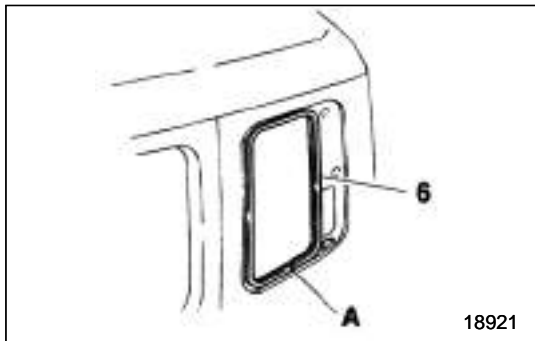


◆ Examining and repairing method

1 Dismantling of air outlet finisher

A: Buckle

*: Cab assembly



6 Installation of sealing strip for side window
Install sealing strip 6 for side window, making its joint A be in mid position of the bottom.

21 Heater, Air Conditioner and Ventilator

21 Heater, Air Conditioner and Ventilator	21-1
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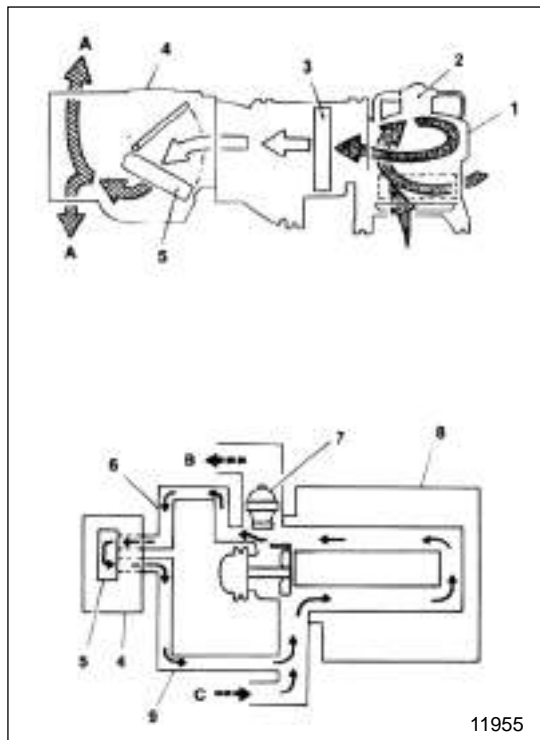
Specifications (home-made air conditioning system)

Heater assembly, cooling assembly and fan assembly 18-30

Item		Specs	
System	Wind shield transfer system	Air mixing	Manual guy cable
		(DEF)	
		(FACE)	
		(FOOT)	
	Inside & outside of vehicle		
Coolant	Kinds	HFC134a	
	Filling quantity (g)	900	
Heater assembly	Manufacturer		Yizheng Yitong Air Conditioning Co., Ltd.
	Heating capacity	W {kcal/h}	5000±500
	Temp. control system		Air mixing type
Cooling assembly	Manufacturer		Yizheng Yitong Air Conditioning Co., Ltd
	Cooling capacity (with air filter)	W {kcal/h}	4000 (3500)
	Filter type		Air filter
Fan assembly	Manufacturer		Yizheng Yitong Air Conditioning Co., Ltd
	Fan motor voltage	V	24
Compressor assembly	Manufacturer		Shanghai Sanden Behr Compressor Co., Ltd.
	Model		HE5H14
	Displacement	ml/rpm	138
	Lubricant	Kinds	R-134a
		Quantity ml	175
Fluid reservoir	Manufacturer		Yizheng Yitong Air Conditioning Co., Ltd
	Capacity	ml	350

Structure and Working Principle

► **Heater**



- 1 Fan assembly
- 2 Fan motor
- 3 Air filter
- 4 Heater assembly
- 5 Heater core
- 6 Heater hose (heater inlet side)
- 7 Thermostat
- 8 Engine
- 9 Heater hose (heater outlet side)

- A: To pipes
- B: To radiator
- C: From radiator

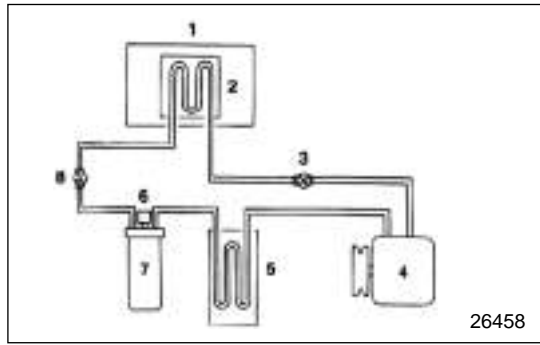
outside air(sucked in)
 inside air(cycling)
 filtered air
 air passing through the heater element
 (warm air)

- The hot engine coolant absorbing heat from the engine 8 does not flow through thermostat 7, but circulates in the way below:

6→5→9→8

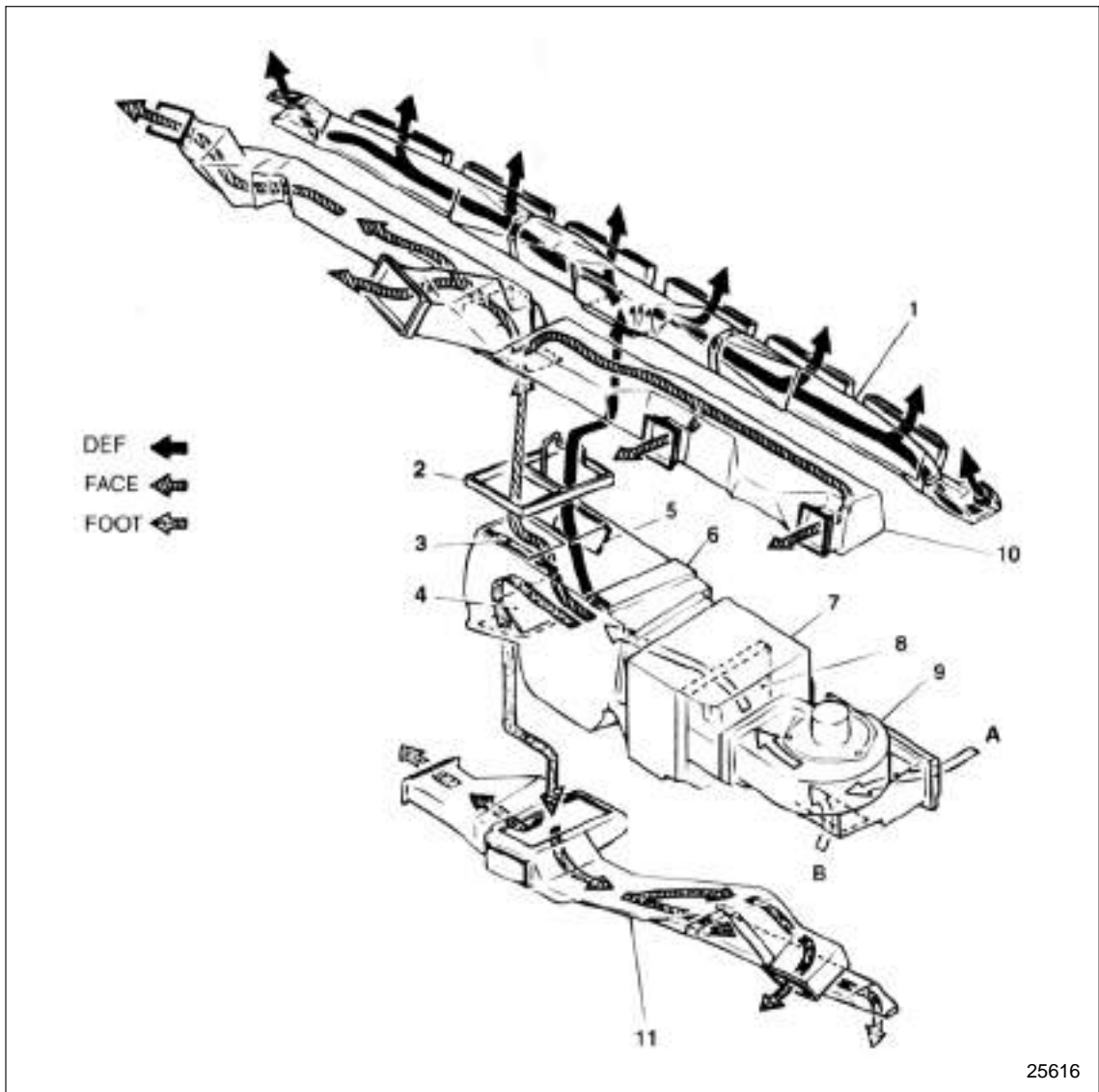
- Air sent from fan assembly 1 to heater assembly 4 is heated by the heater element 5 (heat exchanger). And the heated air is sent to the inside of vehicle through different pipes.

► **Air conditioner**



- 1 Refrigerating assembly
- 2 Evaporator
- 3 LP side aux. valve
- 4 Compressor and electromagnetic clutch
- 5 Condenser
- 6 Double pressure switch
- 7 Fluid reservoir
- 8 HP side aux. valve

► Air pipes

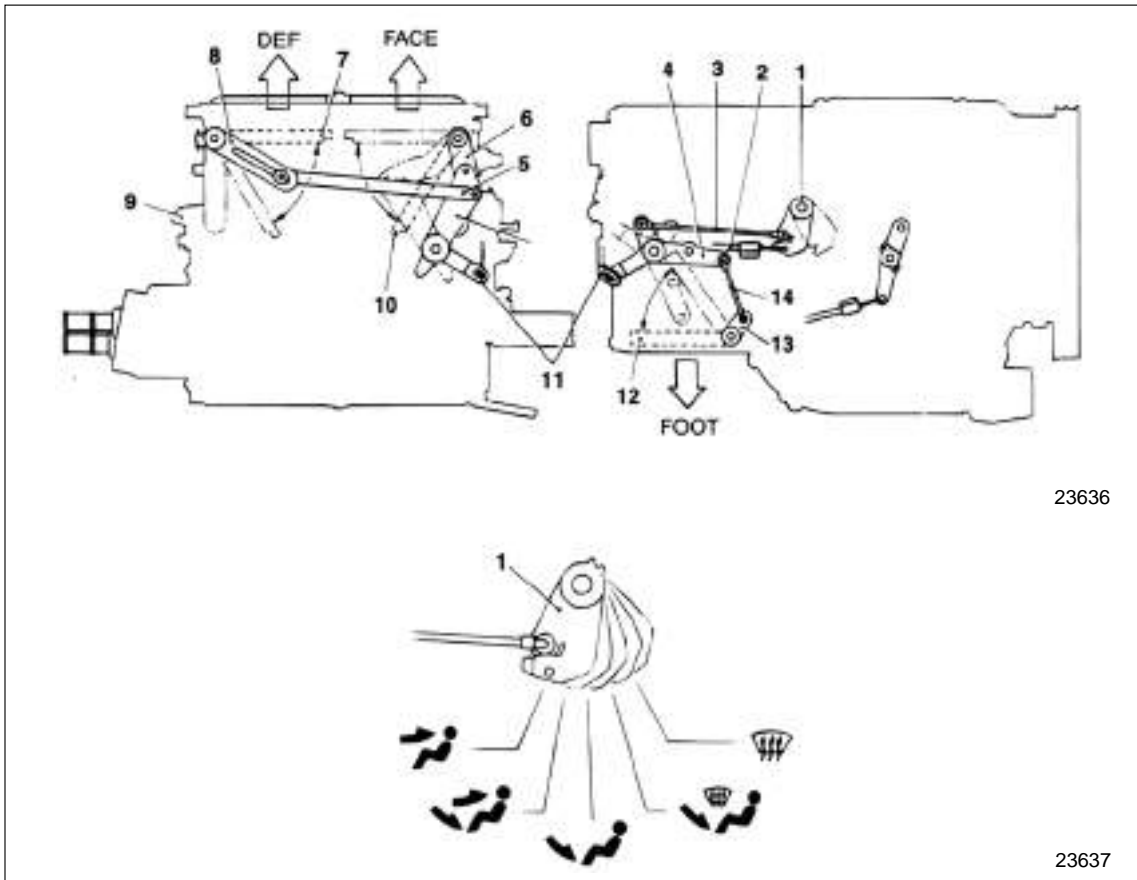


- | | | |
|---------------------------|-------------------------|----------------------|
| 1 Defroster pipe | 2 Central pipe | 3 Wind shield (FACE) |
| 4 Wind shield (FOOT) | 5 Wind shield (DEF) | 6 Heater assembly |
| 7 Cooling device | 8 Air filter | 9 Fan assembly |
| 10 Face pipe | 11 Foot pipe | |
| A: Outside air (incoming) | B: Inside air (cycling) | |

Cycling of outside air A which comes from the fan assembly 9 or inside air B is dependent on whether the wind shields 3,4 and 5 of the heater assembly 6 are open or close, as shown in the figure.

Memo

► Mode change



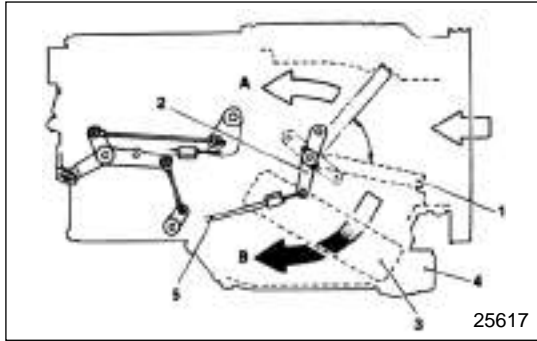
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23637

- | | | |
|-----------------------|---------------------------------------|-----------------------|
| 1 Lever | 2 Control (guy) cable for mode change | 3 Push rod |
| 4 Lever | 5 Lever | 6 Lever |
| 7 Wind shield (DEF) | 8 Lever | 9 Heater assembly |
| 10 Wind shield (FACE) | 11 Lever | 12 Wind shield (FOOT) |
| 13 Lever | 14 Push rod | |

Mode change (open and close the wind shield 7,10 and 12) is realized by moving the control cable 2. The transmission route is as follows:

- 5→8→7 (DEF)
- 11→
- 2→1→3→4 →6→10 (FACE)
- 14→13→12 (FOOT)



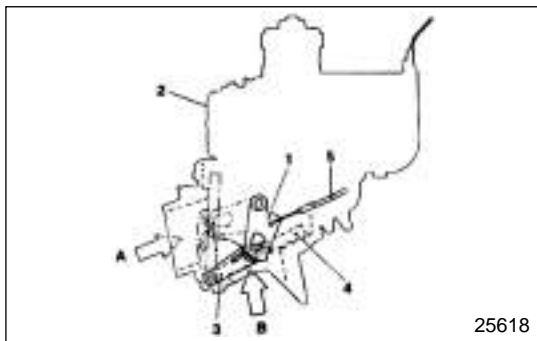
● **Control of air mixing**

- 1 Wind shield
- 2 Lever
- 3 Heater element
- 4 Heater assembly
- 5 Control cable for air mixing

A: Unheated air

B: Warm air

- The opening extent of wind shield 1 can control the flows of both heated air B passing through heater element 3 and the unheated air A.
- The wind shield 1 is operated through the mechanical movement of air-mixing control cable 5, and its transmission route is as follows:
5→2→1



● **Exchange of inside and outside airs**

- 1 Lever
- 2 Fan motor assembly
- 3 Lever
- 4 Wind shield
- 5 Control cable for exchange of inside and outside airs

A: Outside air

B: Inside air

The movement of control cable 5 for inside/outside air change is transferred to wind shield 4 in the route below:

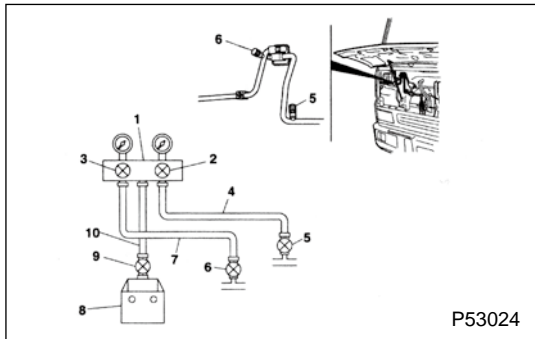
5→1→3→4

3 Troubleshooting

Possible causes	Failures							Remark	
	No air flows out of the vent	Heater not working properly	Control setting of air flow cannot be changed	Air suction through the vent	Temp. control setting cannot be changed.	In-/outside air control cannot be changed.	Control switch hard to use		Air conditioner not working normally
Failure with connector, broken circuit or grounding problem	○		○	○	○	○		○	
Broken fuse	○							○	
Heater pipe clogged, loosened or problem with connection		○							
Failure with pipe connection				○					
Clogged heater assembly		○							
Broken or short-circuited fan motor coil	○								
Melted contact, coil broken or short circuit of fan motor relay	○								
Failure with heater control assembly	○	○	○	○	○	○		○	
Engine –side thermostat not closed		○							
Coolant not enough		○							
Failure with open and close of the mode wind shield			○	○				○	
Failure with open and close of air mixing wind shield				○	○			○	
Failure with open and close of inside/outside air change wind shield				○		○	○		
Difficult sliding or wrong installation of the control cable			○	○		○	○		
Bent connecting rod of assembly control guy cable			○	○		○	○		
Wear or poor lubrication of sliding piece of the connecting rod for control cable of the assembly			○	○		○	○		
Clogged /loose air conditioner pipes or connection problem								○	
Clogged condenser								○	
Crushed condenser element or contamination by foreign matter								○	
Clogged fluid receiver, failure in dryer								○	
Clogged evaporator								○	
Failure in fan resistor								○	
Solenoid clutch biting or failure								○	
Compressor scuffing								○	
Inadequate coolant					○			○	
Melted contact, broken or short-circuited coil in the relay of solenoid clutch								○	
Broken or short circuited of pressure switch coil								○	

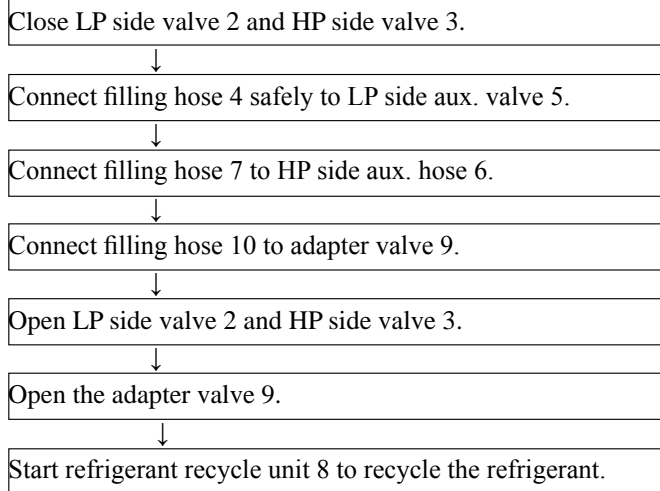
On board Test & Adjustment

► Refrigerant recycling



- 1 Pressure gauge pipe
- 2 LP side valve
- 3 HP side valve
- 4 Filling hose
- 5 LP side aux. valve
- 6 HP side aux. valve
- 7 Filling hose
- 8 Refrigerant recycle unit
- 9 Adapter valve
- 10 Filling hose

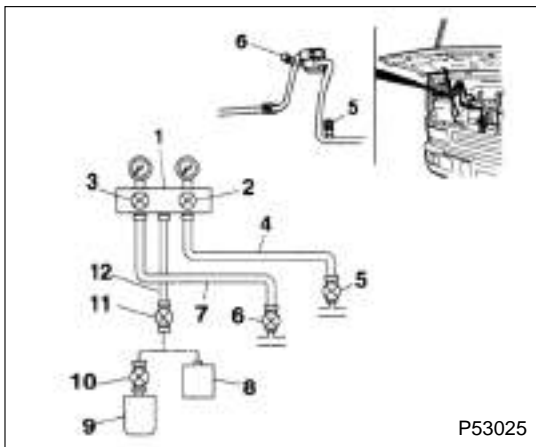
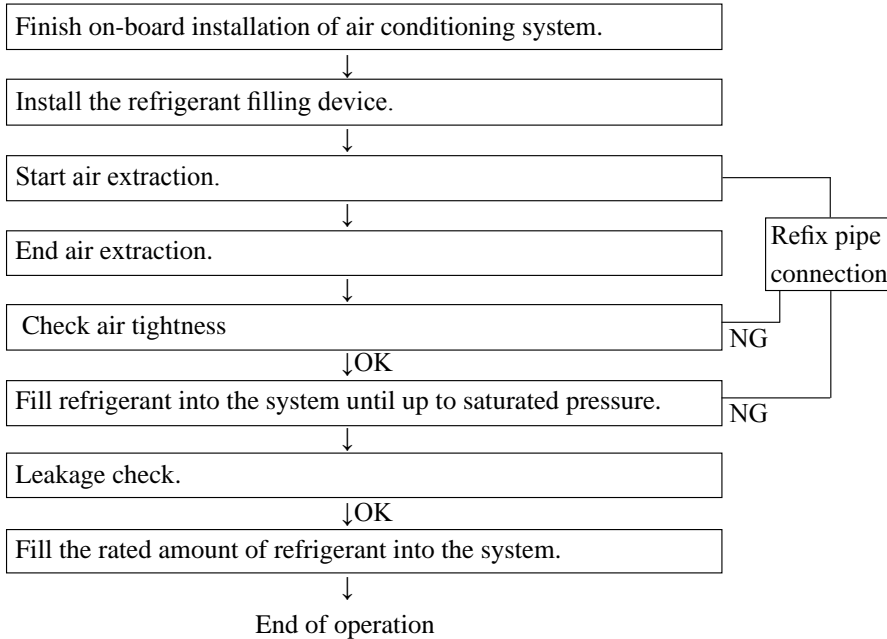
- Recycle the refrigerant as per the flow chart below.
- Installation of refrigerant recycle unit.



► Testing and adjustment of V belt

► **Filling refrigerant into the system**

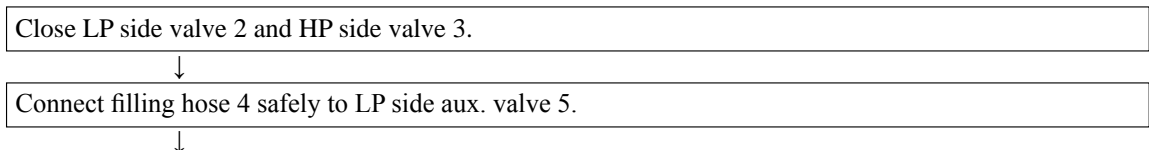
Process flow



- 1 Pressure gauge pipe
- 2 LP side valve
- 3 HP side valve
- 4 Filling hose
- 5 LP side aux. valve
- 6 HP side aux. valve
- 7 Filling hose
- 8 Vacuum pump
- 9 Aux. tank
- 10 Aux. tank valve
- 11 Adapter valve
- 12 Filling hose

P53025

- Fill refrigerant into the system as per the flow chart below.
- Installation of refrigerant filling device.



Heater, Air Conditioner and Ventilator

Connect filling hose 7 safely to HP side aux. valve 6.



Connect filling hose 12 to adapter valve 11.



Air extraction operation



Open LP side valve 2 and HP side valve 3.



Open the adapter valve 11.



Start vacuum pump 8.



Extract air for 10 to 15 minutes before closing the adapter 11.



Stop the vacuum pump 8.



Caution ⚠

- Before closing the vacuum pump, please confirm that the adapter valve is already closed.



Close LP side valve 2 and HP side valve 3.



Wait for 5 minutes with the equipment under the above condition. Check if the hand of pressure gauge on the pipe 1 has not moved to 0.



End the air extraction.



Refrigerant filling process



Close adapter 11, shut down vacuum pump 8, and connect the aux. tank valve 10 (with aux. tank).



Open the aux. tank valve 10, then open the adapter valve 11.



Open LP side valve 2, charge the system with gas refrigerant.



Caution ⚠

- If liquefied refrigerant is filled into the system, then compression of liquid will result in damage to compressor. Keep the aux. tank stand vertically, so as to fill refrigerant into the system in gaseous state.
- Confirm the refrigerant amount by way of inspection window.

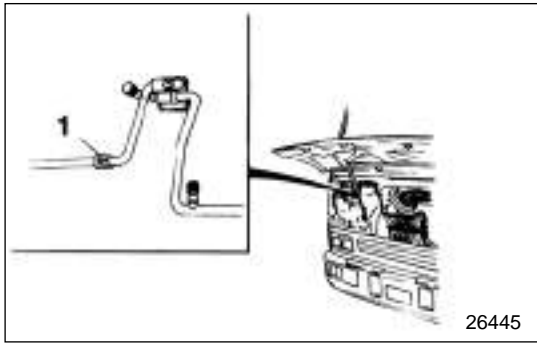


When aux. tank 9 is empty, close the adapter valve 11, change it with a new aux. tank, and go on filling gas in the same way.




If the system stops sucking in refrigerant because the air conditioning circulation pressure comes to a balance in the course of filling, please start the engine, turn on the air conditioner (sign) switch to start up compressor, so as to continue the filling process until specified amount of refrigerant is filled into the system.

► Check of refrigerant






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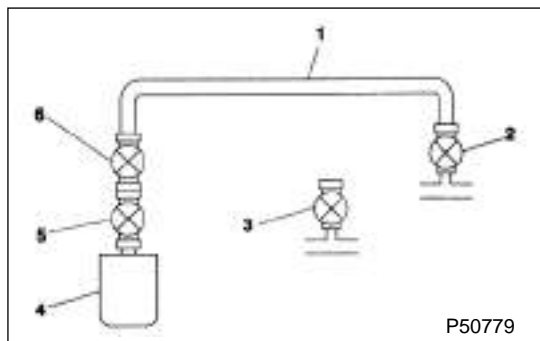
- Observe and check the refrigerant amount, and estimate the refrigerant flowing through sight hole 1.
- Finish the check with the following conditions met.
- Engine speed: 1200rpm
- Air conditioner switch : ON
- Fan switch: max. air flow position
- Temperature adjustable lever: max. refrigeration position
- Inside/outside air selection: upper air
- Doors: all open
- Windows: all open

Caution 

Never run the condenser without refrigerant, or the condenser will be damaged.

	Normal	Inadequate refrigerant in the system	Almost no refrigerant in the system
Observe through the sight hole.	 <p>P06554</p>	 <p>P06553</p>	 <p>P06552</p>
Conditions of HP pipes and LP pipes	HP pipes are hot; LP pipes are cold. The temp. difference is obvious.	HP pipes are warm; LP pipes are cool.	There is no evident temperature difference between HP and LP pipes.

► Refrigerant addition



- 1 Filling hose
- 2 LP side aux. valve
- 3 HP side aux. valve
- 4 Aux. tank
- 5 Aux. tank valve
- 6 Adapter valve

- Add refrigerant as per the flow chart below.

Close adapter valve 6, connect the filling hose 1 safely to the LP side aux. valve 2.

Caution ⚠

If the filling hose 1 is connected to the HP side aux. valve 3, there will be back flows in the refrigeration system, and will bring about damage to the aux. tank 4 and filling hose.

Open and close the adapter valve 6, to vent the air in the filling hose 1.

Close the aux. tank valve 5, and connect the aux. tank 4.

Caution ⚠

• If liquefied refrigerant is filled into the system, then liquid compression will result in damage to compressor. Keep the aux. tank 4 stand vertically, so as to fill refrigerant into the system in gaseous state.

Open aux. tank valve 5, and then close adapter 6.

Start the engine.

Set the air conditioning system at the max. refrigerating state, then turn on the air conditioner switch to start the compressor.

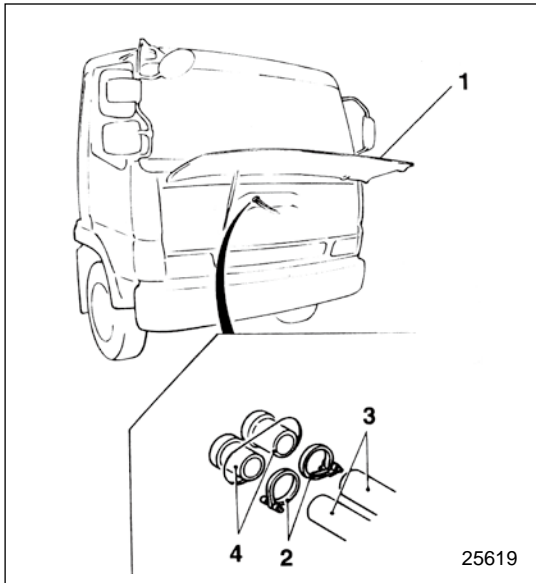
With half of the refrigerant being filled into the system, check the refrigerant amount through the sight hole, Page 55-12.

Observe through the sight hole and make sure that the refrigerant amount has come up to the normal level, and then fill the system again with 50g of refrigerant.

When filling is about to finish, close the adapter valve 6 and aux. tank valve 5. Then remove the filling hose 1 and aux. tank 4.

If there is still refrigerant in the aux. tank 4, close the aux. tank valve 5 and keep it for use for next time when needed.

► Cleaning of heater element

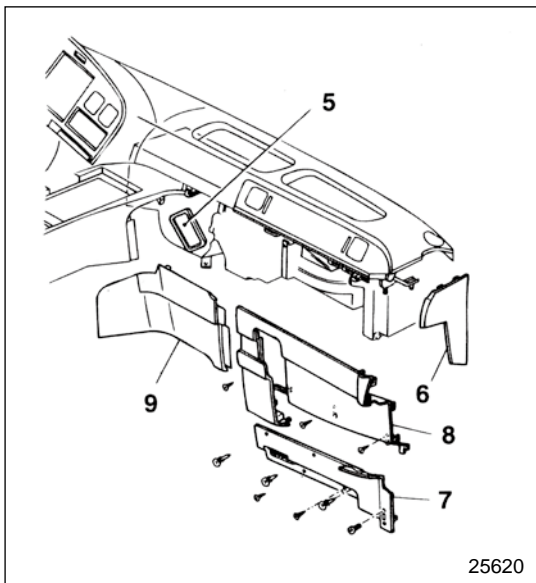


[Disassembly]

- Drain the engine coolant.
- Open the front board 1, remove the clamp 2, take away the heater hose 3 from the heater 4.

Caution

- Take care not to have heater hose 4 deformed, for it is made of soft material.
- Clamp 2 cannot be repeatedly used, and must be changed for a new one after each removal.

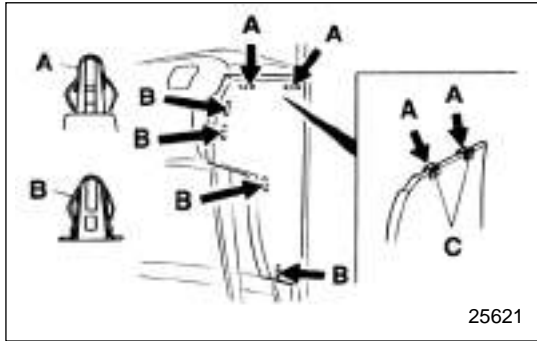


- The following parts must be removed before the heater element cover 5 can be seen clearly.

- * • Side panel 6 on the passenger side
- * • Lower panel 7 on the passenger side
- * • Lower panel 8 on the passenger side

- Lower panel 9 on the passenger side

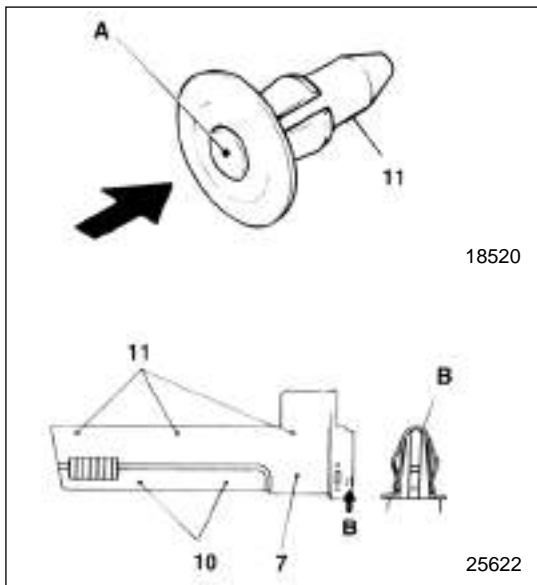
Refer Item (1) and (3) on the next page for removal of parts with mark *.



(1) Remove the side panel 6 on the passenger side.

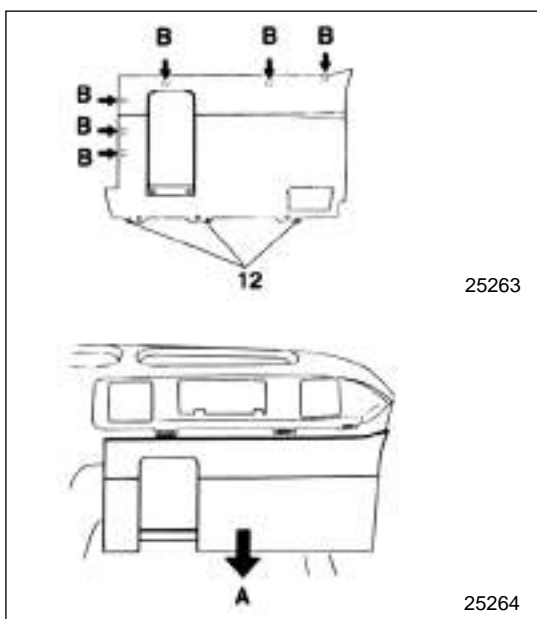
Loosen and remove the fastened lock plate A and B.

- Remove the side panel at the C point of the 2 holes with a pry bar.



(2) Remove the lower panel 7 on the passenger side.

- Remove the bolt 10 (2 places).
- Press and push the buckle 11 at the A point (3 places), and take down the buckle.
B: Lock plate.

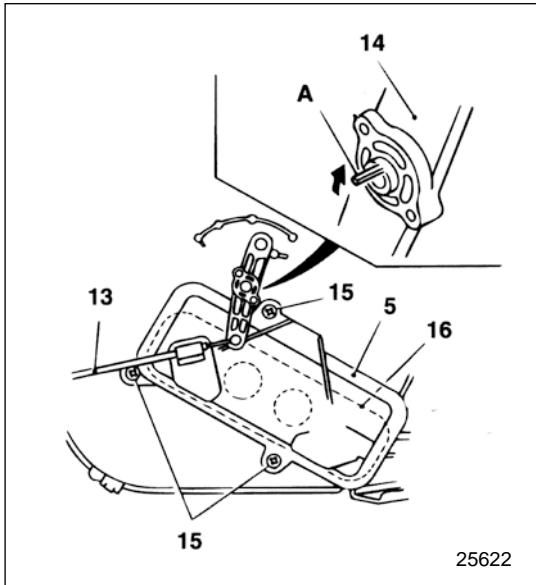


(3) Remove the lower panel 8 on the passenger side

Remove bolt 12 (3 places)

A: Removal direction

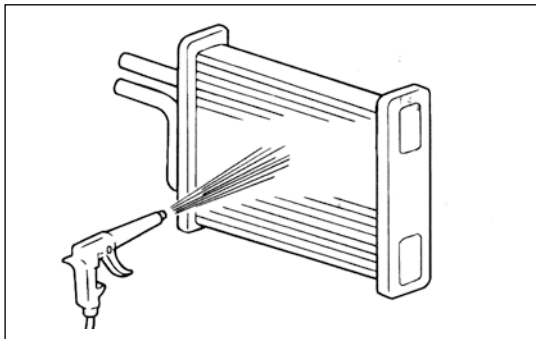
B: Lock plate



- After confirming the heater element cover 5, remove the heater element in the following steps:
- Remove the air-mixing control cable 13.
- In the arrow direction shown, lightly bend the bulging A of the lever and take it down.
- Take down bolt 15 from the 3 places, then remove the heater element cover 5.
- Slowly pull out and take down the heater element 16.

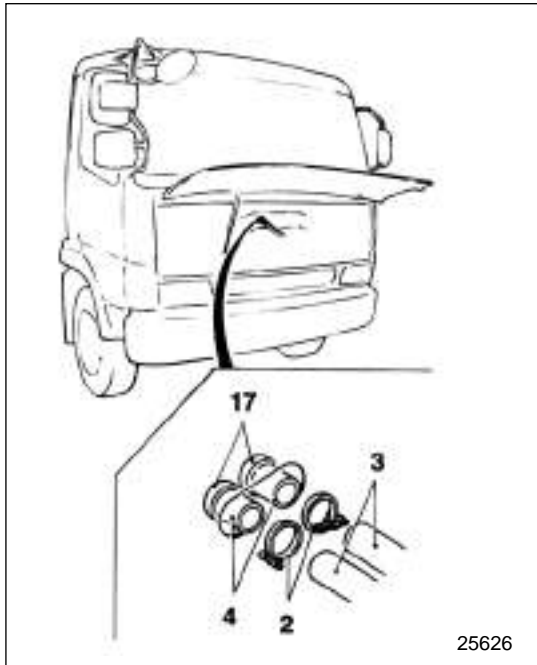
Caution ⚠

Take care not to have the radiator of heater element 16 deformed during disassembly.



[Cleaning]

- Blow away the foreign matters, by compressed air, from the radiator of heater element 16.
- If foreign matters cannot be blown away by compressed air, then manually clean it, with care not to damage it.
- Wash the inside of the heater element 16.



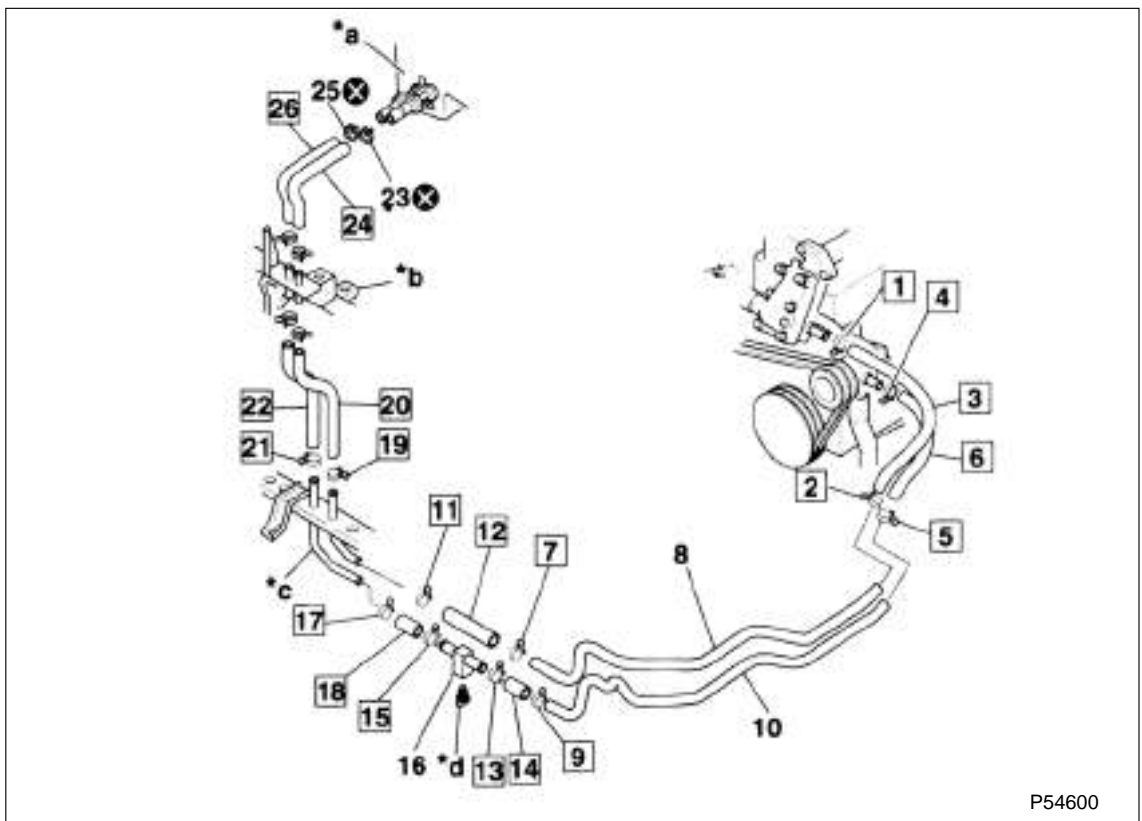
[Installation]

Caution ⚠

Install the heater element in the order contrary to that of the disassembly. Pay attention to the points below.

- Do not over force the heater element 16 into its position, otherwise the heating pipe seal ring 17 on the heater assembly may be damaged by the heater pipe 4.
- Clamp 2 for fixing the heater hose 3 cannot be reused.
- Operate the temperature control lever to check if it is possible to switch over the air mixing wind shield.

Heater Hose



● **Disassembly order**

- | | | |
|------------------------|-------------------------------|--------------------------------|
| 1 Hose clamp | 2 Hose clamp | 3 Heater hose (engine inlet) |
| 4 Hose clamp | 5 Hose clamp | 6 Heater hose (engine inlet) |
| 7 Hose clamp | 8 Heater pipe | 9 Hose clamp |
| 10 Heater pipe | 11 Hose clamp | 12 Heater hose |
| 13 Hose clamp | 14 Heater hose | 15 Hose clamp |
| 16 Heater drain hose | 17 Hose clamp | 18 Heater hose |
| 19 Hose clamp | 20 Heater hose | 21 Hose clamp |
| 22 Heater hose | 23 Clamp | 24 Heater hose (engine outlet) |
| 25 Clamp | 26 Heater hose (engine inlet) | *a: Heater assembly |
| *b: Cabin hose bracket | *c: Frame hose bracket | *d: Drainage cock |

⊗: Parts not to be reused

Caution ⚠

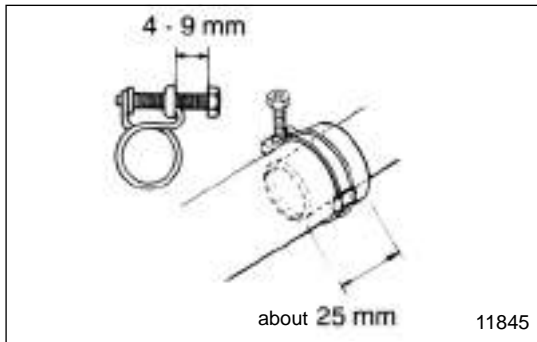
Prior to the heater hose removal, drain away the engine coolant from the radiator.

Remark

The disassembly order is based on the example of 6D2 in this drawing.

● **Installation order**

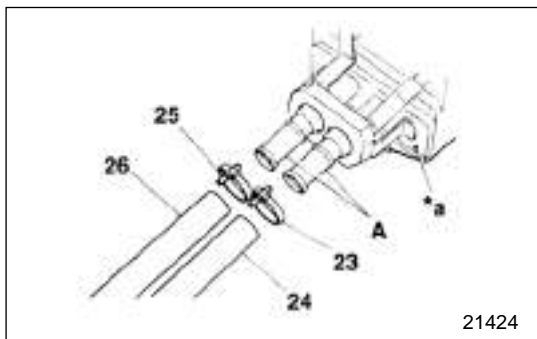
In the order contrary to the disassembly.



◆ **Maintenance method**

1-7-9-11-15-17-22 Fixing of the heater hose and hose clamps

- Measure the overlap shown in the drawing when fixing heater hose.
- Fasten the hose clamp to make it up to the size shown in the drawing.

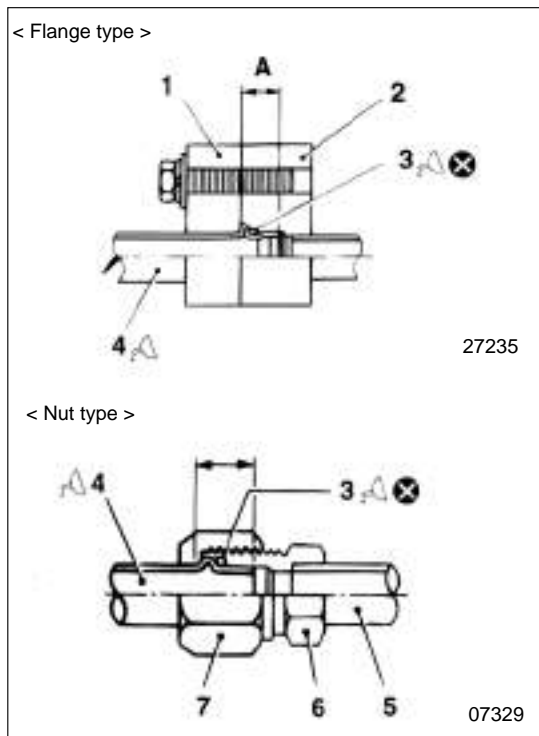


24 26 Removal of heater hose

Caution ⚠

When removing the clamp 23 and 25, and heater hose 24 and 26, take care not to damage the hose fixing location A of heater component *a.

Connection of air conditioner pipe



- 1 Flange (flange type)
- 2 Flange (fixed on the pipe side) (flange type)
- 3 O ring
- 4 Pipe
- 5 Pipe (nut type)
- 6 Pipe connector (nut type)
- 7 Nut (nut type)

A: Applied location of refrigerator grease

⊗: Parts not to be reused

Lube oil

Location	Application position	Specified lube oil	Quantity
3	Whole outer periphery of O ring	Lube oil S-PAG56 for refrigerator	As needed
4	Outer periphery of pipes	Lube oil S-PAG56 for refrigerator	As needed

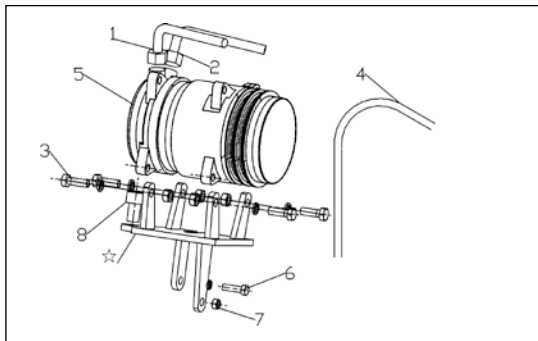
The air conditioner pipe and hose may be connected by flange-type or nut-type connectors. In the course of connecting air conditioner pipe and hose, attention should be paid to the following items. The relevant tightening torques shall be given in the maintenance methods for each system.

Caution

- Seal the connection part by O ring 3. When connection is made, take care not to damage the O ring.
- O ring 3 is only used for refrigerant HFC134a, and not to be reused. O rings provided from Mitsubishi authorized service stations should be used.
- When tightening the nut-type connector, clamp the pipe connector 6 and tighten the nut 7. If the pipe connector rotates, the pipe 5 will be deformed, and consequent refrigerant leakage will occur.

Memo

Compressor and tensioner (Weichai Power Series)



• Disassembly order

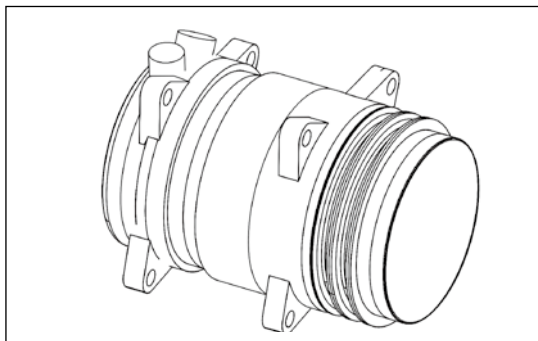
- 1 Discharge hose
- 2 Suction hose
- 3 Bolt
- 4 V belt
- 5 Compressor
- 6 Bolt
- 7 Nut
- 8 Hexagon socket nut
- * Compressor bracket

Caution

Refrigerant must be recovered first before removal of discharge hose 3 and suction hose 4.

• Installation order

Follow the order contrary to that of disassembly.

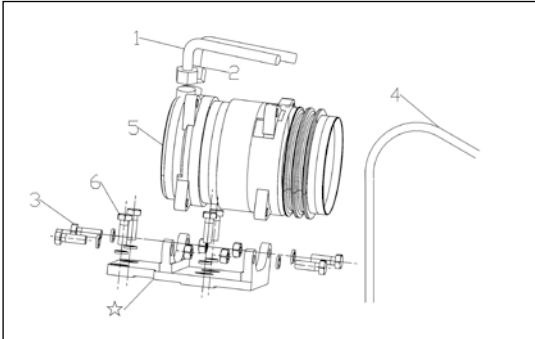


◆ Maintenance method

Compressor check

If the compressor 7 does not work normally, there is oil leakage at the oil seal or there occurs some other failure with the compressor, then it must be sent to Hualing authorized service station for repair.

Compressor and tensioner (Cummins engine series)



• Disassembly order

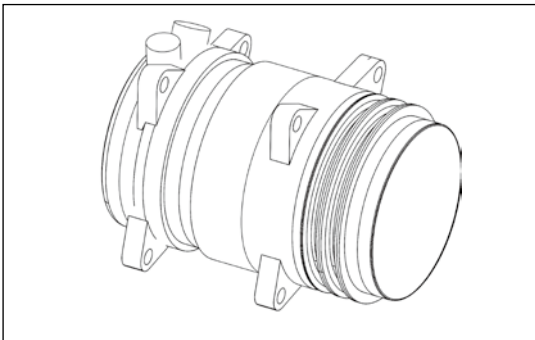
- 1 Discharge hose
- 2 Suction hose
- 3 Nut
- 4 V belt
- 5 Compressor
- 6 Bolt
- *: Compressor bracket

Caution

Refrigerant must be recovered first before removal of discharge hose 7 and suction hose 8.

• Installation order

Follow the order contrary to that of disassembly.

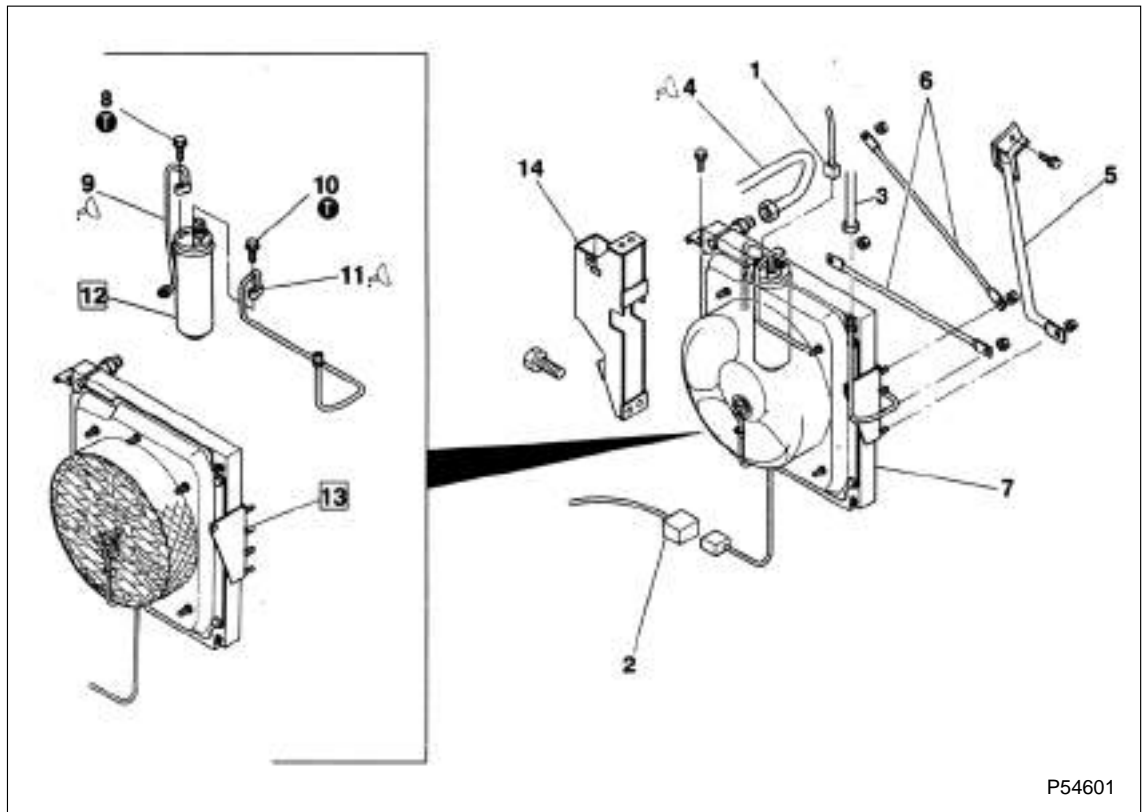


◆ Maintenance method

Compressor check

If the compressor 10 does not work normally, there is oil leakage at the oil seal or there occurs some other failure with the compressor, then it must be sent to Mitsubishi authorized service station for repair.

Condenser and Receiver (6D2)



P54601

• Disassembly order

1 Installation assembly (double pressure switch)

2 Installation assembly (condenser fan motor)

3 Fluid hose

4 Radiation pipe

5 Condenser bracket C

6 Condenser bracket D

7 Condenser and receiver assembly

8 Bolt

9 Liquid pipe

10 Bolt

11 Liquid pipe

12 Fluid reservoir

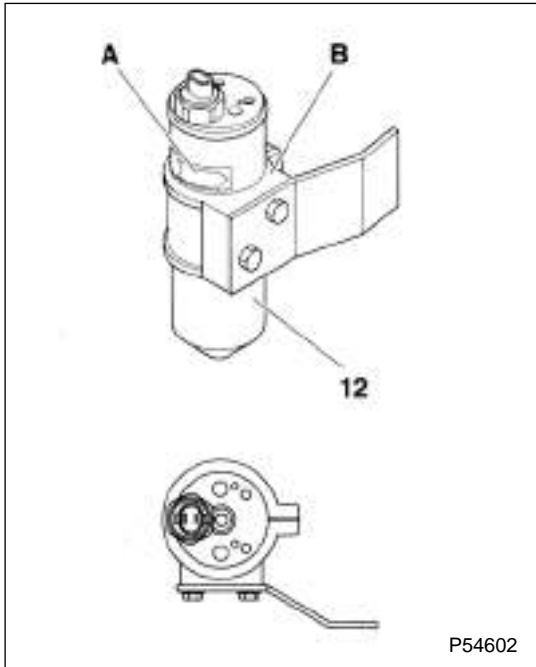
13 Condenser

14 Condenser bracket A

Recover refrigerant before removal of fluid hose 3, radiation pipe 4 and liquid pipes 9 and 11.

• Installation order

Follow the order contrary to that of disassembly.



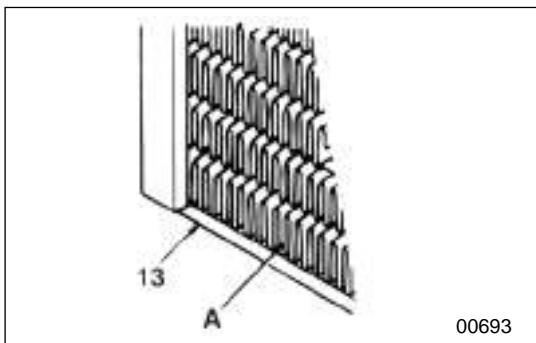
◆ **Key maintenance points**

12 Fluid receiver installation

Do not align with the lower part of tab A and upper part of bracket B during installation.

Caution ⚠

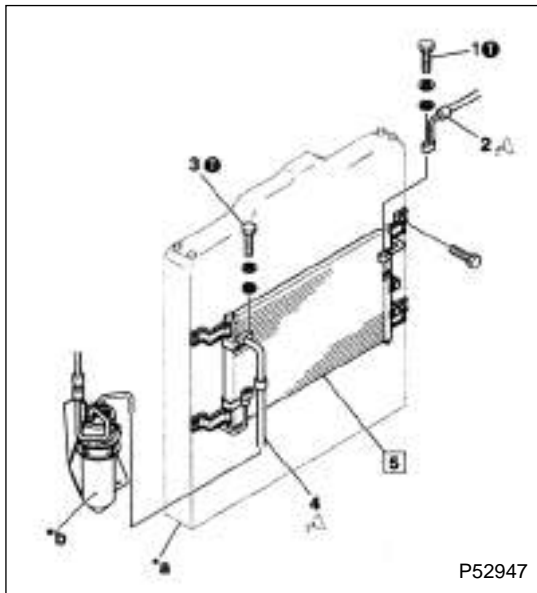
Do not leave any gap under tab A and above the bracket B, otherwise the liquid pipes 9 and 11 cannot be installed correctly. Pay attention to this.



13 Condenser check

The radiating fin A of the condenser 13 should be washed clean on time if clogged due to dirt and dust. Besides, damaged radiating fin may be repaired by a blade.

Condenser <8D2>



• Disassembly order

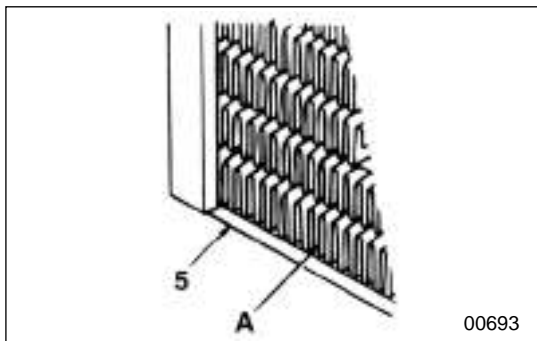
- 1 Bolt
- 2 HP hose
- 3 Bolt
- 4 Fluid pipe
- 5 Condenser
- *a: Radiator
- *b: Fluid reservoir

Caution


Recover refrigerant before removal of HP hose 2 and fluid pipes 4.

• Installation order

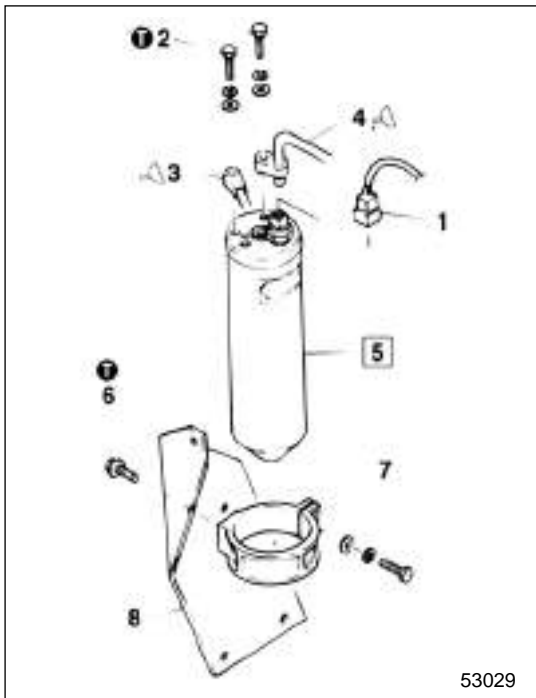
Follow the order contrary to that of disassembly.



◆ Maintenance method

-  Condenser check
- The radiating fin A of the condenser 5 should be washed clean on time if clogged due to dirt and dust. Besides, damaged radiating fin may be repaired by a blade.

Fluid reservoir



53029

• Disassembly order

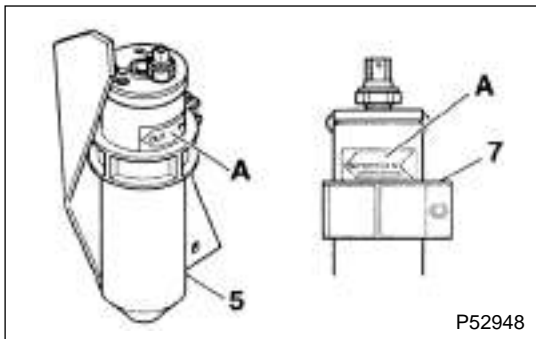
- 1 Wiring
- 2 Bolt
- 3 Fluid pipe (outlet)
- 4 Fluid pipe (inlet)
- 5 Fluid reservoir
- 6 Bolt
- 7 Holder
- 8 Fluid reservoir bracket

Caution

Refrigerant must be recovered before removal of fluid pipe 3 and 4.

• Assembly order

Follow the order contrary to that of disassembly.



P52948

◆ Maintenance method

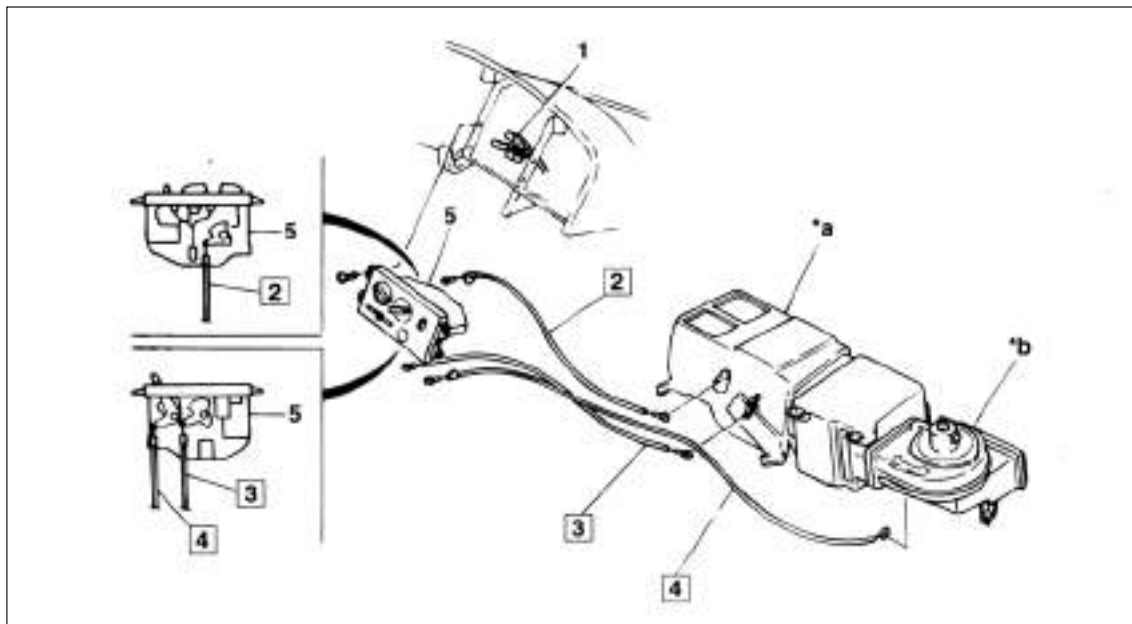
Fluid receiver installation

Install the fluid receiver 5, face tab A to the direction shown, and have the bottom side of tab A flush with the top side of holder 7.

Caution

Take care not to have any gap between the bottom side of tab A and the top side of holder 7, for the gap will hinder the correct fitting of fluid pipe 3 and 4 with the fluid receiver 5.

Heater Control

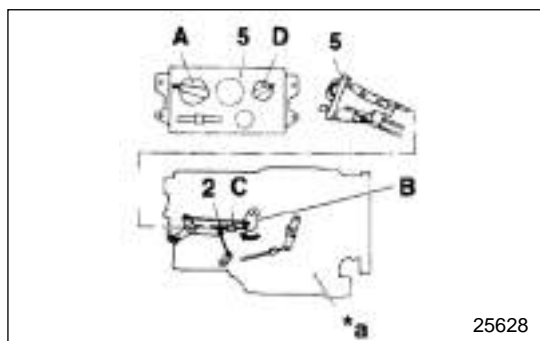


• Disassembly order


- 1 Wiring
- 2 Control cable for mode change
- 3 Control cable for air-mixing
- 4 Control cable for inside/outside air change
- 5 Heater control assembly
- *a: Heater assembly
- *b: Fan assembly

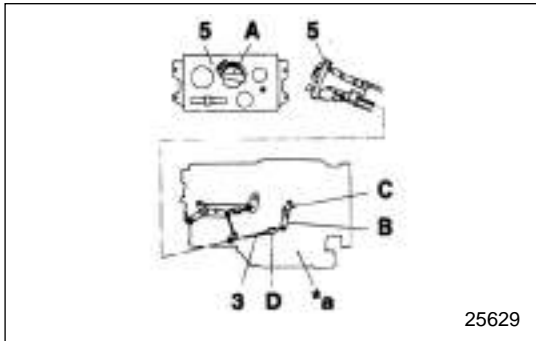
• Installation order

Follow the order contrary to that of disassembly.

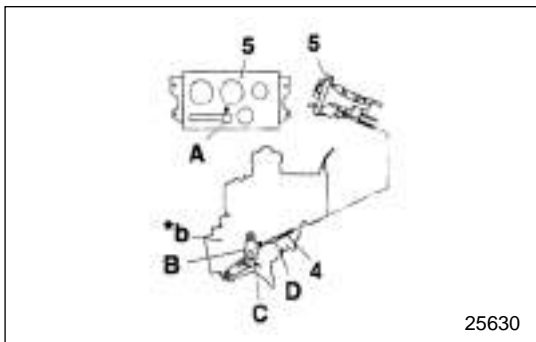



◆ Maintenance method

- 2 Fixing of the control cable for mode change
 - Set the mode change knob A of the heater control assembly 5 at  (FACE) position.
 - Turn the mode change wind shield lever B of heater assembly *a to the end as shown by the arrow.
 - At this moment, fix the control cable 2 for mode change onto the mode change wind shield lever B. Meanwhile, lightly pull the control cable for mode change, and fasten it with clip C.
 - After the control cable 2 for mode change is fixed, set the fan switch D always at HI position, and check the operation by turning the mode change knob A.

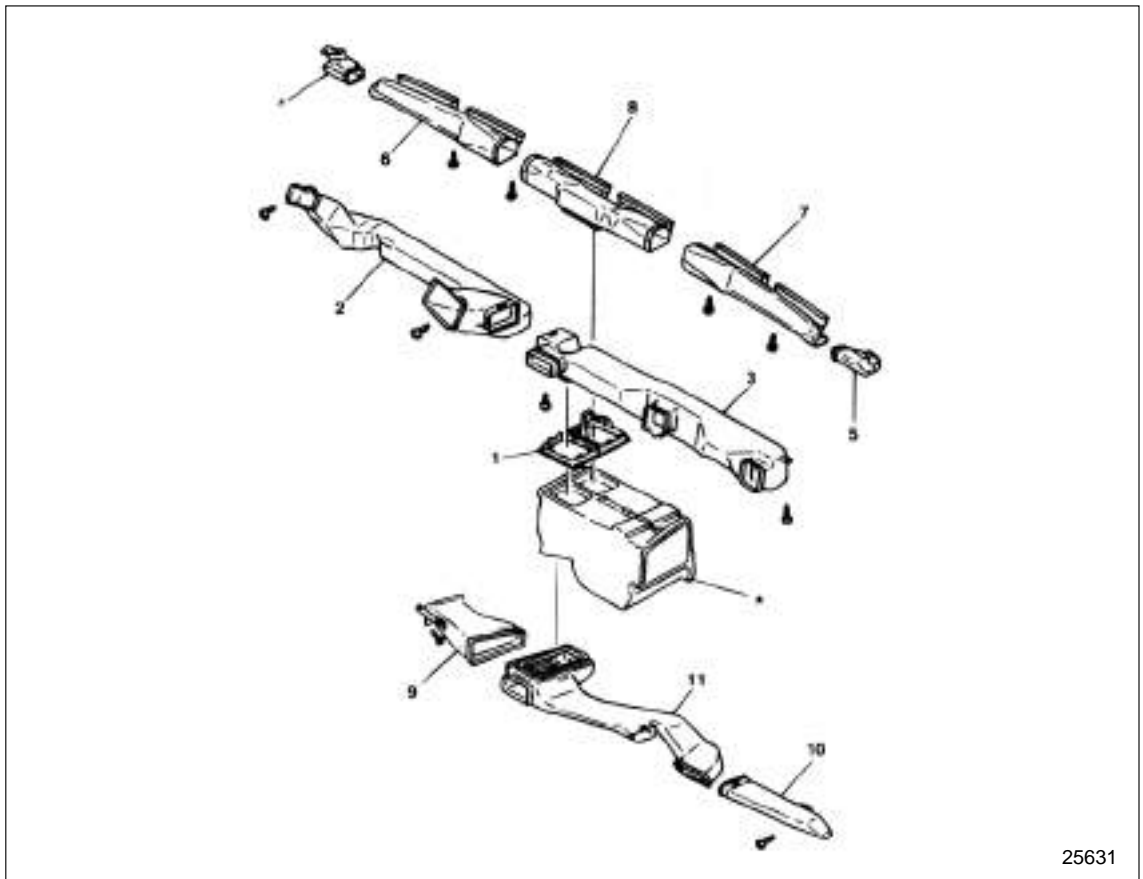


- 3 Fixing of the control cable for air-mixing
- Turn the temperature control knob A of the heater control assembly 5 counterclockwise to the end until the position MAX.COOL.
 - Fix the control cable 3 for air-mixing on the lever B of air-mixing wind shield in the heater assembly *a.
 - Lightly pull the control cable 3 for air-mixing, and fasten the cable with clip D in the contact positioning point C of the air-mixing wind shield lever B.



- 4 Fixing of control cable of inside/outside air change
- Have the inside/outside air change lever A of the heater control assembly 5 set in the  position (outside air).
 - Fix control cable 4 for inside/outside air change on the lever B of inside/outside air change wind shield in the fan assembly *b.
 - Lightly pull the control cable 4 for inside/outside air change, and fasten the cable with clip D in the contact positioning point C of the inside/outside air change wind shield lever B.

Air pipes



25631

• Before disassembly and after installation of air pipes

- 1 Remove and install the dash board assembly.
- 2 Remove and install the floor control box.
- 3 Remove and install the heater assembly.

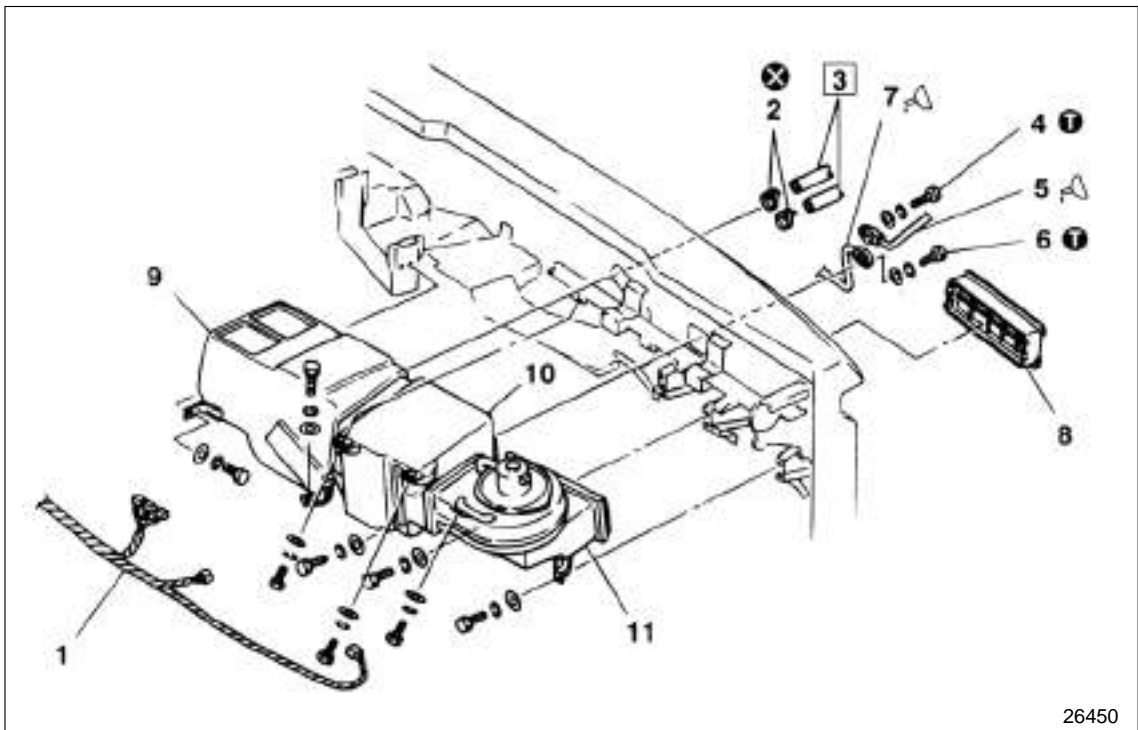
• Disassembly order

- | | |
|------------------------------------------------|------------------------------------------------|
| 1 Central pipe | 2 Pipes before driver |
| 3 Pipes before passengers | 4 Pipes B & RH on the side of defroster |
| 5 Pipes B & LH on the side of defroster | 6 Pipes A & RH on the side of defroster |
| 7 Pipes A & LH on the side of defroster | 8 Central pipe of the defroster |
| 9 Foot pipe on the side of driver's seat | 10 Foot pipe B on the side of assistant's seat |
| 11 Foot pipe A on the side of assistant's seat | *: Heater assembly |

• Installation order

Follow the order contrary to that of disassembly.

Heater Assembly, Refrigeration Assembly and Fan Assembly



26450

- **Before disassembly and after installation of heater assembly and fan assembly**

- 1 Removal and fixing of the lower panel on the side of assistant's seat
- 2 Removal and fixing of the control cable.

- **Disassembly order**

- | | | |
|---------------------------|-----------------|---------------------------|
| 1 wiring | 2 Clamp | 3 Heater hose |
| 4 bolt | 5 pipe | 6 Bolt |
| 7 Pipe | 8 Air filter | 9 heater assembly |
| 10 refrigeration assembly | 11 Fan assembly | ⊗: Parts not to be reused |

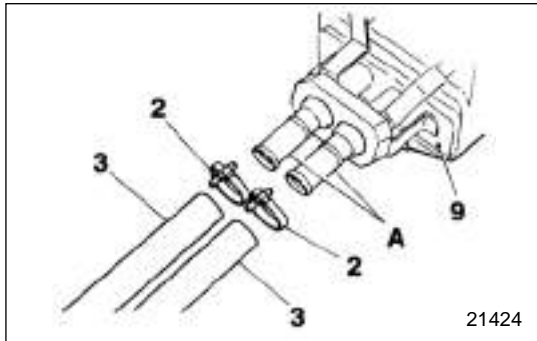
Caution ⚠

The engine coolant should be drained from the radiator before removal of heater hose 3.

- Refrigerant should be recovered before removal of pipe 5 and 7.

- **Installation order**

Follow the order contrary to that of disassembly.

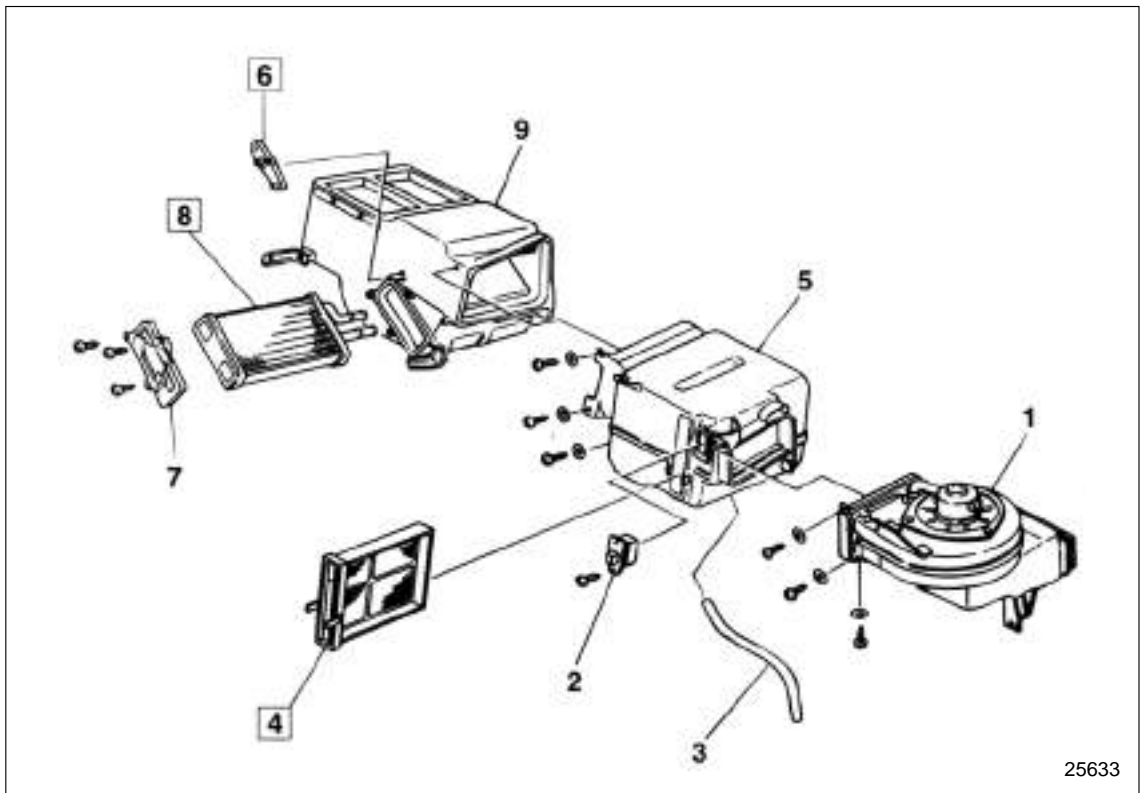


◆ Maintenance method

③ Removal of hose

Caution ⚠

Carefully remove the heater hose, because it is easy to damage the hose that connects to A point of the heater assembly 9.

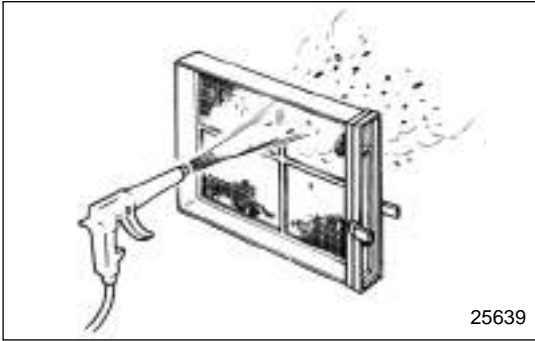


● Disassembly order

- | | | |
|------------------------|--------------------------|-------------------|
| 1 Fan assembly | 2 Fan resistor | 3 Drainage hose |
| 4 Air filter | 5 Refrigeration assembly | 6 Lever |
| 7 Heater element cover | 8 Heater element | 9 Heater assembly |

● Installation order

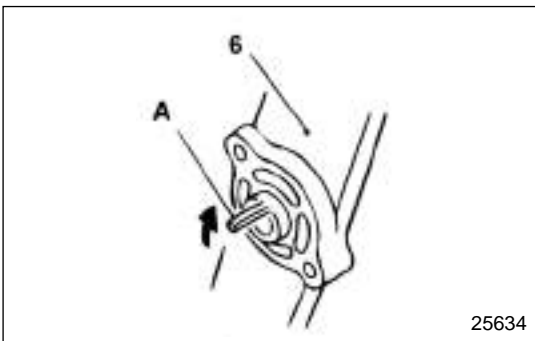
Follow the order contrary to that of disassembly.



◆ **Maintenance method**

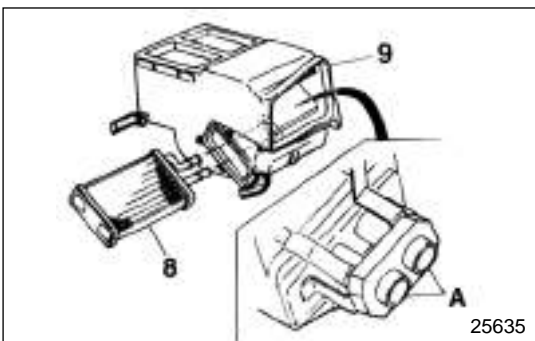
4 Cleaning of air filter

Remove the air filter 4, use water or compressed air to clean dust and other foreign matters away.



6 Removal of lever

In the direction as shown by the arrow, lightly bend the bulging A of lever 6 to remove it.



8 Installation of heater

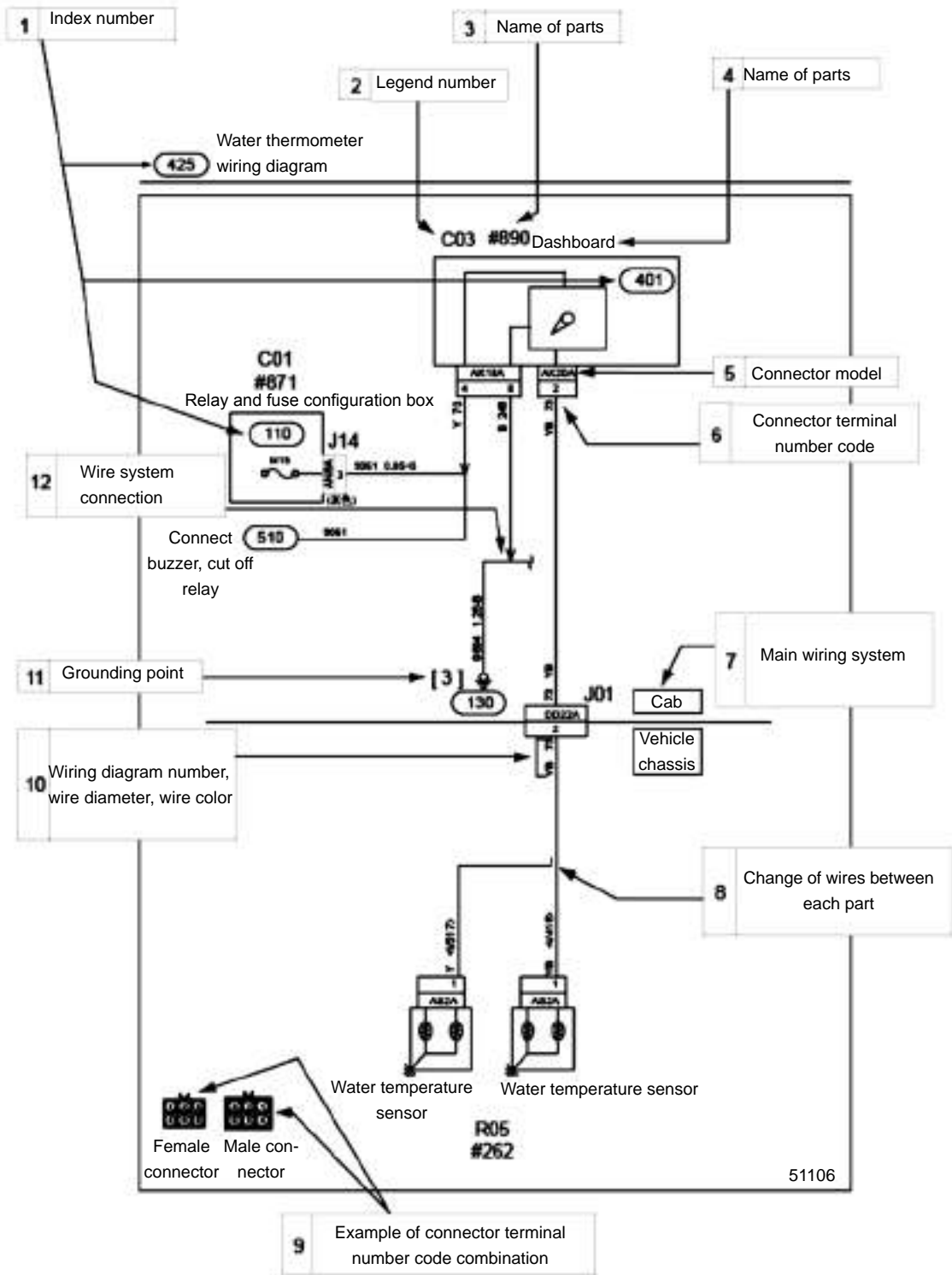
Caution ⚠

Do not over force the heater element 8 into its position; otherwise the heater pipe seal ring A on the heater assembly 9 may be damaged.

22 Electric System

Power supply, Charging and Grounding System Circuit Diagram	22-02
Circuit Diagram of Engine Starting, Parking and Preheating System.....	22-03
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Circuit Diagram of Instrument System.....	22-05
Circuit Diagram of Display and Alarm Lamp	22-06
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Electrical Wiring Diagram of Vehicle Chassis	22-08
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Installation Position of Parts and Components.....	22-11
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How to Read the Electrical Wiring Diagram



1. Index number: -100 - -900

- index number is a circuit diagram number; each circuit diagram has been marked with such number.

2. Legend number: A01-Z99

- legend number is used to indicate the installation position of parts, it is easy to find out the part position by this number, and the installation positions of all the parts are listed in 54-10.

3. Code number: #001-#999


- code number is to indicate the test procedure of an individual part, in the wiring diagram, just by this number, the test procedure of this part can be found out.

4. Name of parts

5. Connector model (model indication)

- used connectors are all included in 23-13.

6. Connector terminal number code

	<p>Female connector terminal number code starts as shown at the upper left corner; male connector terminal number code starts as shown at the lower right corner.</p> <p style="text-align: right;">P50687</p>
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7. Main wiring system

- main wiring system is as shown in the figure

8. Change of wires between each part

- change of wires and lines between each part of the vehicle has been indicated clearly.

9. Example of connector terminal number code combination

- example of connector terminal number code combination has been marked in each wiring diagram.

10. Wiring diagram number, wire diameter and wire color

<p>Number</p> <p>Wire diameter</p> <p>Wire color</p>	<p>"Wire diameter" refers to the cross sectional area of the electric conducting material, for example, "0.85" indicates 0.85 mm², and the unit mm² has been omitted in wiring diagram, the wire with cross-sectional area of 0.5mm² is not marked with diameter and unit, as shown in Fig. below, armored wire is marked with "armored", and indicated with dashed line.</p> <p>Screen</p> <p>Armored</p> <p>Screen</p> <p>Wire core (conductor + insulation)</p> <p>Wrapped wire in the wiring diagram is as shown in Fig. below</p> <p>Wrapped wire</p> <p>Wire color is indicated by the first English letter of the color, the color begins with "B" indicates the following respectively:</p> <ul style="list-style-type: none"> •Black→B, blue→L, brown→Br <p>For the wire with both grounding color and stripes, it is indicated by two English letters.</p> <ul style="list-style-type: none"> RY (red grounding and yellow stripes) GL (green grounding and blue stripes) <p>G (basic color)</p> <p>L (strips color)</p> <p style="text-align: right;">P50680</p>
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11. Grounding point: [1]-[99]

- vehicle wire grounding position, all grounding points are listed in the figure.

12. Connection of each wire system

- arrow on the wire indicates the wire connection position, not indicate the current direction.

► **Wring color**

For example

WR=basic color: white: stripes color: black



(Basic color)

(Stripes color)

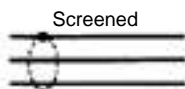
07384

Color	Basic color + stripes color					
W: white	WR: white + red	WB: white + black	WL: white + blue	WG: white + green		
B: black	BW: black + white	BY: black + yellow	BR: black + red	BG: black + green	BL: black + blue	
R: red	RW: red + white	RB: red + black	RY: red + yellow	RG: red + green	RL: red + blue	
Y: yellow	YR: yellow + red	YB: yellow + black	YG: yellow + green	YL: yellow + blue	YL: yellow + blue	
G: green	GW: green + white	GR: green + red	GY: green + yellow	GB: green + black	GL: green + blue	
Br: brown	BrW: brown + white	BrB: brown + black	BrY: brown + yellow	BrR: brown + red		
Sb: sky blue						
L: blue	LW: blue + white	LR: blue + red	LY: blue + yellow	LB: blue + black	LO: blue + orange	LG: blue + green
Lg: light green	LgR: light green + red	LGY: light green + yellow	LgB: light green + black	LgW: light green + white		
O: orange	OL: orange + blue					
P: pink	PB: pink + black	PG: pink + green				
V: violet	VY: violet + yellow	VW: violet + white	VR: violet + red	VG: violet + green		

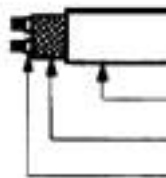
► **Screened wire**

Screened wire is indicated as follows, so as to distinguish from other wiring.

Example



Screened



Armored















Screened

Wire core (conductor + insulation)

07385

► **Element symbol**

Battery	Fuse	Heavy current fuse	Motor	Lamp	Switch

Button switch	Grounding		Diode	Optical radiation diode	Voltage stabilizing diode	Capacitor
						
Transistor		Relay				Three-way solenoid valve
						

► Terminology and unit

The terminology and unit used in this manual are defined as follows:

P This maintenance manual has put forward important warning indications and supplement information under the 4 headers below; the 4 headers indicate respectively the characteristics of these indications and information:

Danger 

Preventive measures to be taken when transporting and handling substances with potential hazards, such as, battery and coolant additive.

Warning 

Preventive indications, failure to observe these indications, severe injury or death accident would occur.

Caution 

Preventive indications, failure to observe these indications, equipment or part damage or destruction accident would occur.

Remarks

Suggestions or supplementary data made for using more effectively or understanding better the related contents.

P Left and right

When facing the vehicle forward direction, the left side and the right side are the left and the right respectively.

P Terminology of maintenance standard

(1) Standard value

The standard dimension value in the design refers to: the design dimension of each part, standard clearance between two parts when assembling and a standard value of an assembly, as the case may be. The value in [] is the basic diameter.

(2) Limit value

When this value of a part exceeds the limit value, this part can never be used any more in its performance and strength and it must be replaced or repaired.

P Tightening torque

Suitable tightening torque is especially significant for performance, therefore, tightening torque has been

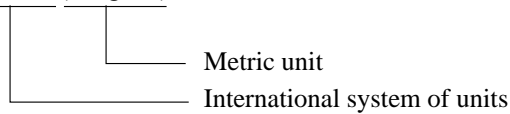
specified at the position to be tightened; where the tightening torque value is not specially specified, tighten according to the standard torque table. The word “wet” must be indicated if it is tightened under wet state, if not indicated, held them as dry state and tighten them according to the specified torque.

► **Units**

The tightening torque and other parameters are given in SI unit, and expressed with metric unit placed in (). Engine specification, performance curve and other items taken from the officially approved documents only use metric unit.

- SI: International system of units

Example: 390 N•m (40kgf•m)



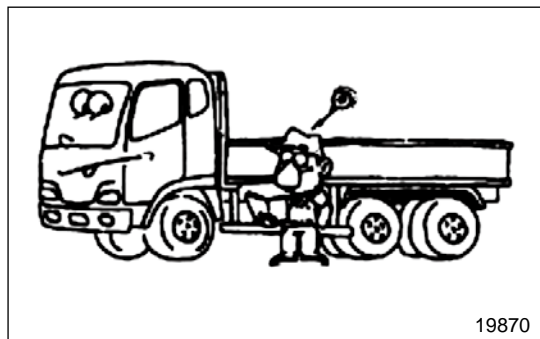
Unit		International System of Units	Conversion Coefficient
Force		N(kgf)	9.80665N(1kgf)
Torque		N•m(kgf•m)	9.80665N•m(1kgfm)
Pressure	Positive pressure	Kpa(kgf/cm2)	98.0665Kpa(1kgf/cm2)
	Vacuum pressure	Kpa(mmHg)	0.133322Kpa(1mmHg)
		Pa(mmH2O)	9.80665Pa(1mmH2O)
Volume		dm3(L)	1dm3(L)
Power		Kw(PS)	0.7355Kw(1PS)
Heat		J(kcal)	4186.05J(1kcal)
Heat quantity		W(kcal/h)	1.16279W(1kcal/h)
Angle		°	-
Temperature		°C	-
Current		A	-
Voltage		V	-
Resistance		Ω	-
Electric power		W	-

22-01 General

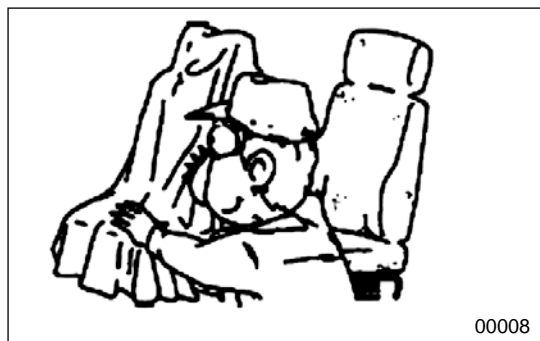
Precautions for maintenance operation.....22-01-2

Structure and Working Principle22-01-13

Precautions for maintenance operation

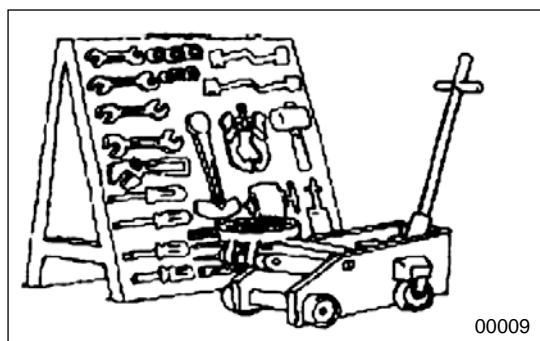


Prior to maintenance operation, listen to telling of the customer, by checking the total running mileage of vehicle, get to know the vehicle's state, and ask the vehicle's service condition and other factors related with the vehicle. In addition, record the necessary data, which will help you effectively in vehicle maintenance.

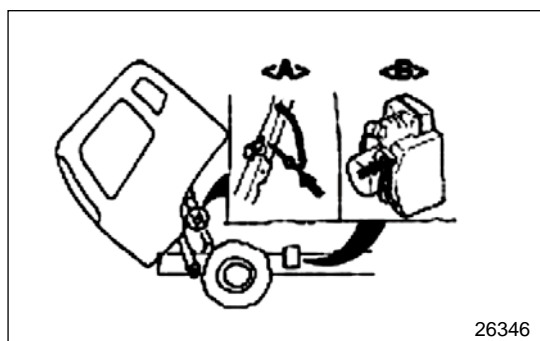


Check the fault position, and analyze the fault cause; make decision what components have to be removed or disassembled according to your diagnosis and inspection, then start the work according to the maintenance method described in this manual.

The maintenance work must be carried out on a flat ground, and make the following preparations before working:



- Cover the cab seat, trimming and floor and the body painted surface with protective cover, so as to prevent them from being polluted and damaged.
- Prepare both general tools and special tools necessary for the maintenance work.



Warning

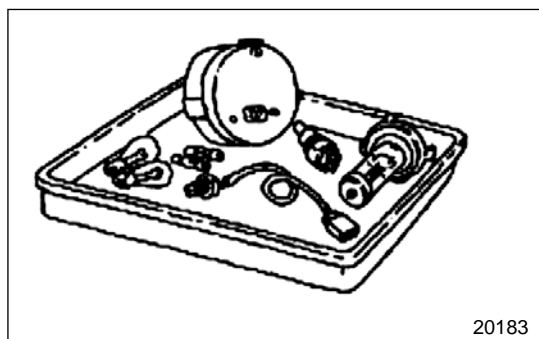
Where special tools are specified in this manual, never try to use other tools, otherwise, the parts and components would be damaged and human injury accident and /or vehicle damage would occur.

When the cab is tilted, never forget to insert the safety pin into the cab stay, so as to prevent the stay from being loosened, and the cab fallen down accidentally due to maloperation of electronic – hydraulic system.

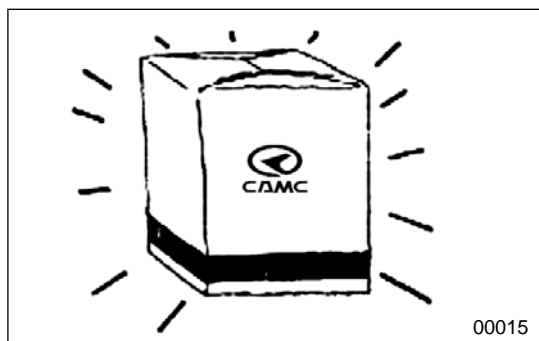


A: Cab manual tilting system

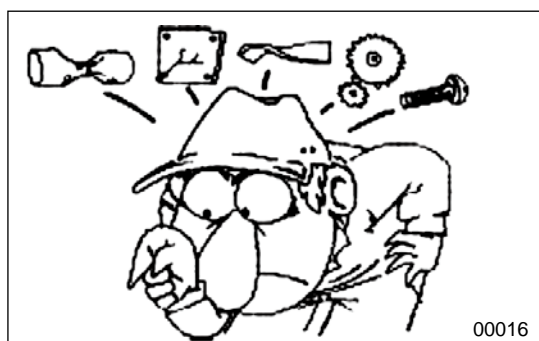
Never wear shoes with oil when working: When working together with fellows or working as a group, agree on rules to be observed by all the concerned in advance, pay attention to safety, avoiding touching of the switch or handle by mistake.



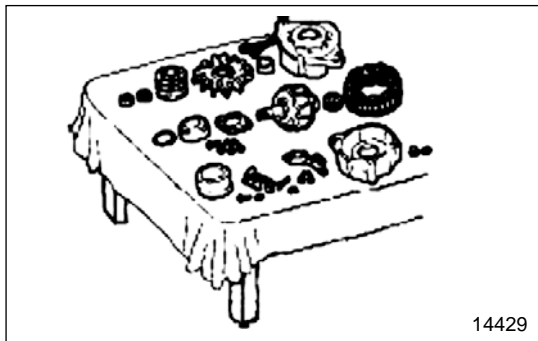
Prepare the replacement parts required by installation.



Oil seal, gasket, "O" ring and other rubber parts, sealing washer and split pin must be replaced when they are removed, and original Hualing accessories must be used.



After disassembling, check visually all the parts and components for wearing, broken, damaged, deformation, aging, rusting, corrosion, and unfree rotating, fatigue, blocking or other possible defects.

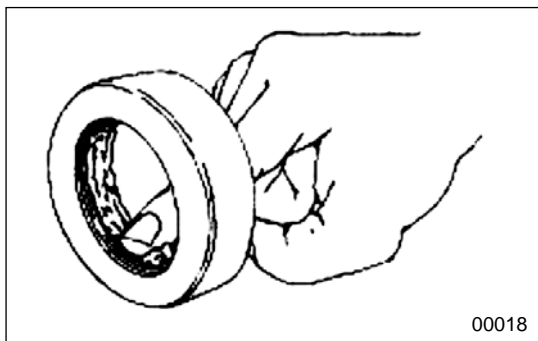


Make matching mark at the joint position of the parts before disassembling, and place the removed parts in good order, thus, it will be helpful for avoiding mistake in assembling later; the matching mark and countermark must be made at the position not affecting the performance and appearance of the part.

Cover these parts when they are removed from the vehicle so as to prevent dust intruding.

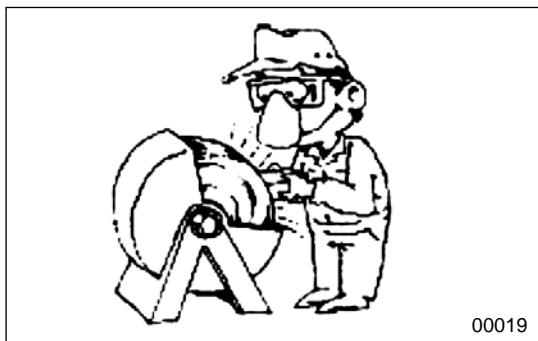
Caution 

- Take care not to get the same parts, similar parts and left/right parts mixed.
- Place the new parts to replace and the original parts (removed parts) separately.

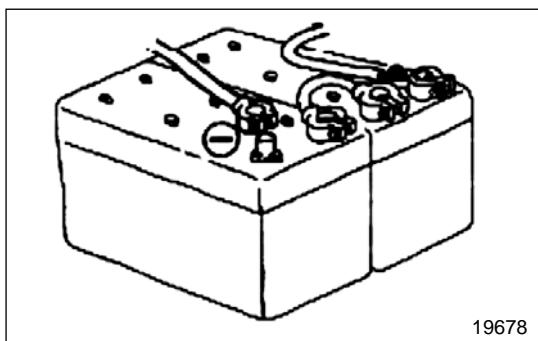


Prior to reassembling, apply specified oil and grease to the U sealing ring, oil seal, dust ring and bearing.

When checking or replacing with new parts, only the specified oil or grease can be applied, wipe out any excessive oil or grease with rag immediately.



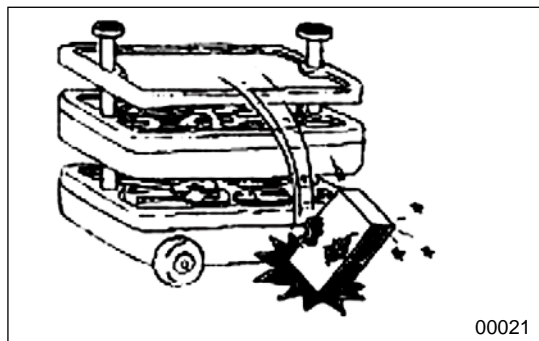
Wear sunglasses when using grinding wheel or welding machine, when gloves are required, pay full attention to safety, note the sharp edges and other things that may injure your hands.



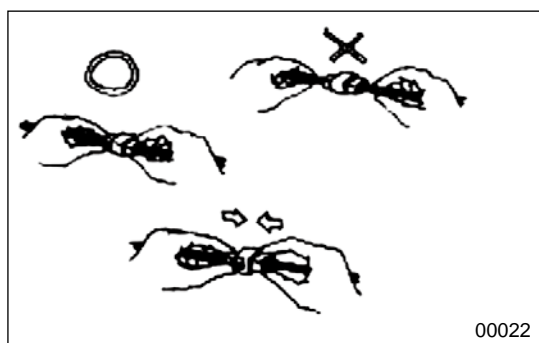
Prior to maintenance work in electric system, disconnect one pole terminal of the battery first so as to prevent short circuit.

Caution 

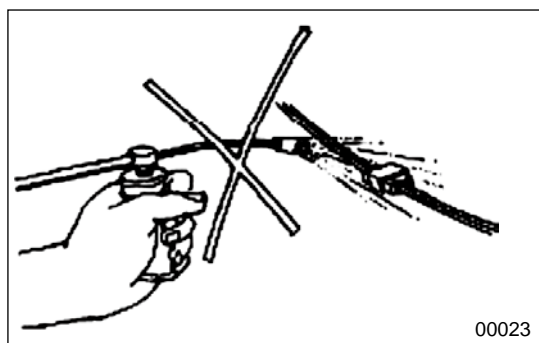
Prior to disconnecting or connecting the battery terminal, do set the starting switch and lamp switch to OFF position; otherwise, the semiconductor devices may be burnt out.



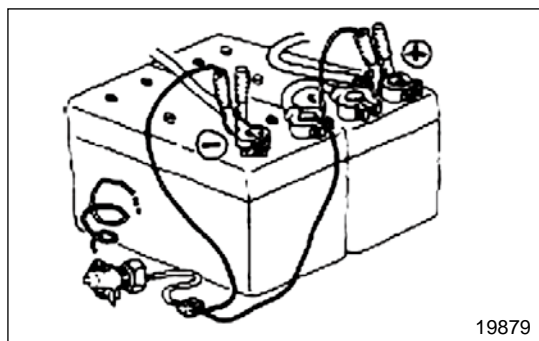
Be careful when operating such elements like sensor, relay, which are liable to be damaged due to shock or heating, never take off the control cover or apply paint to the controller.



When disconnecting the connector, pull the connector body, never pull the wire. When disconnecting the locked type connector, press along the direction shown by arrow first, when reconnecting the locked connector, insert it in until "click" is heard.



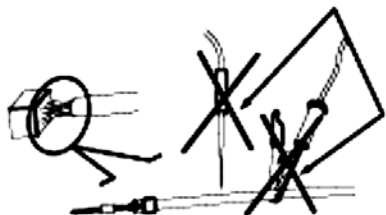
Prior to washing the vehicle, cover the electronic elements so as to keep them dry (covered by the thing like plastic film), never let the wire connector and the sensor get wet, in case it gets wet, wipe it dry immediately.



When applying voltage for test, check first whether the \oplus , \ominus pole cables are connected correctly, then increase the voltage from 0V gradually; never apply voltage higher than the specified value.

Do remember, not all the controllers and sensors are working under 24V battery voltage.

Take care not to puncture the wire insulation skin

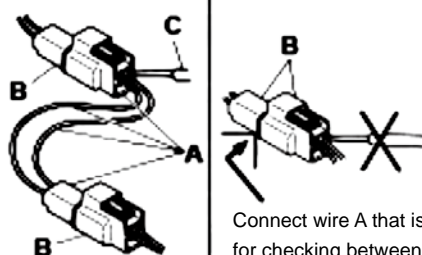


P50395

► Precautions for electrical circuit operation

Caution

- Take care not to puncture the wire insulation skin when using probing pin and alligator clip to check the circuit, otherwise, corrosion of the wire, especially the wiring system of the chassis system will be speeded up.



Connect wire A that is used for checking between the connectors

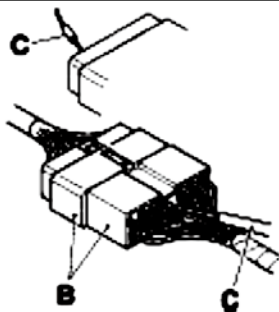
02587

► Check of wire

• Checking with the connector connected

(Waterproof connector)

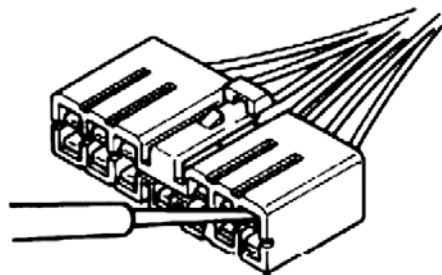
Connect the test wire and connector A between the connector B of the circuit to be checked, use test probe C to contact the connector on the test wire side to check. Do not insert the test probe C into the incoming line side of the waterproof connector, as this would damage the waterproof sealing and lead to rust corrosion.



02588

(Non-waterproof connector)

Insert the test probe C into the incoming line side of the connector to check; for the controller connector requiring using extra-small test probe, as it is even smaller than connector of other model, therefore, it is not allowed to use conventional test probe to insert into the controller connector with difficulty; otherwise, damage would be resulted in.

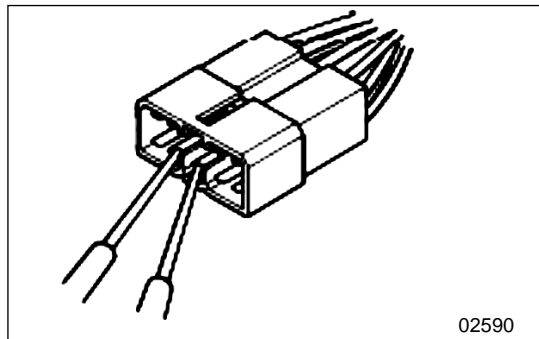


02589

• Checking with the connector disconnected

Check of socket terminal

Insert carefully the test probe into terminal to check, never insert the test probe into the terminal with difficulty, as this may result in connector deformation, and consequently result in poor contact.

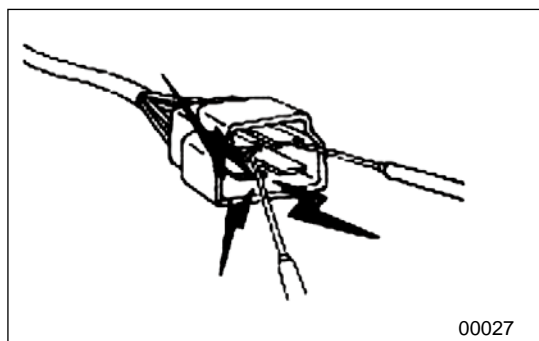


• **Check of plug terminal**

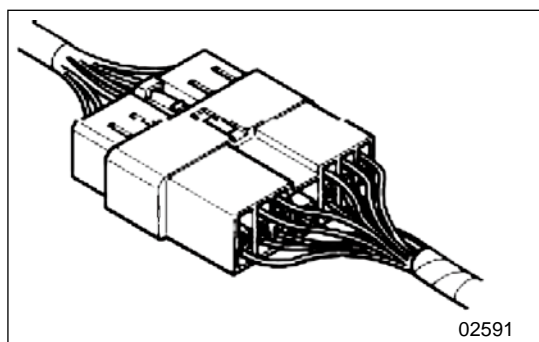
Contact directly the test probe with the pin to check.

Caution ⚠

Take care not to let the plug pin be short-circuited by the test head, for the connector of the controller, short-circuit of pin may lead to damage of internal circuit of the controller.



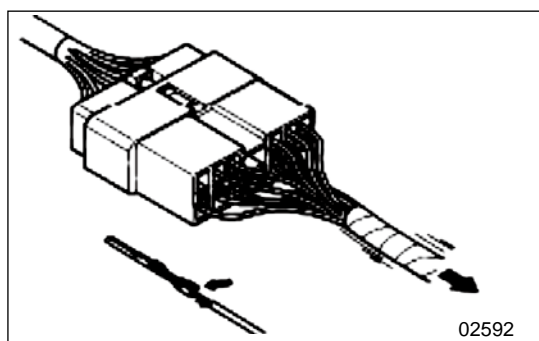
When using multimeter to test whether it is conducted, take care not to connect the test bar to wrong terminal.



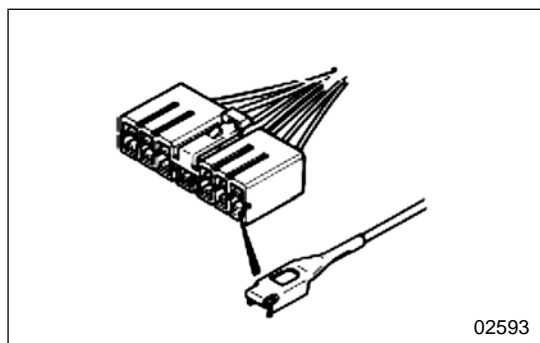
► **Check of connector**

• **Visual checking**

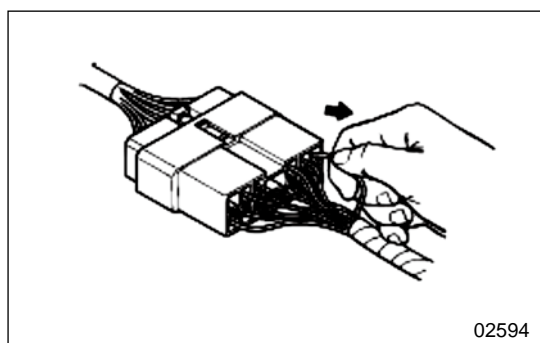
Check whether the connectors are connected together securely.



Check whether the wire is disconnected from the terminal due to pulling of the wire.

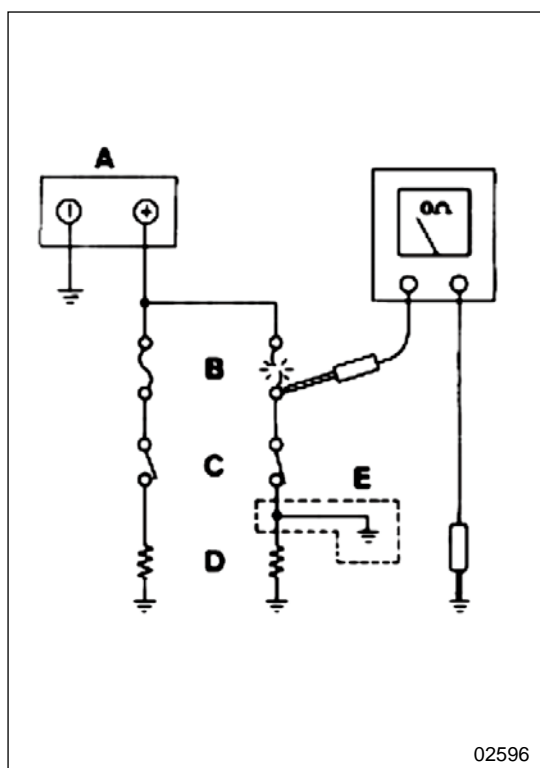


Check whether the socket and the plug terminal are fitted tightly.



Check whether there is poor contact due to terminal loosening, terminal rusting, or terminal polluted by foreign matters.

- Check whether the terminal is loosened
- If the terminal locking plate of the connector is damaged, although the connector housing is connected, yet the plug and socket terminal are not engaged. When checking such terminal, pull gently every wire and observe for any wire slid out of the connector housing.



► Check of fuse when it is burnt out

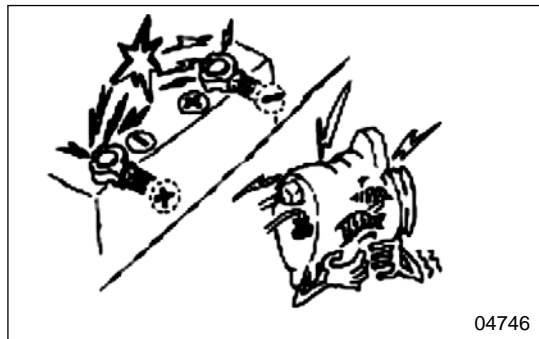
Remove the fuse B, and then measure the resistance between the grounding and the fuse load side.

Then, close each electrical switch connected to the fuse. If the resistance value between a switch and the grounding is zero, it indicates there is short-circuit between this switch and the load. If the resistance value is not zero, it indicates this circuit is short-circuited continuously; the possible reason of fuse burnt may be due to instantaneous short circuit.

Main reasons resulting in short-circuit are as follows:

- Wire between the chassis parts short-circuited.
- Wire insulation destructed due to friction or heating.
- There is aqueous vapor in the connector or the circuit.
- Man-made mistake (element short-circuited accidentally)

- A: battery
- B: fuse
- C: load switch
- D: load
- E: short-circuit



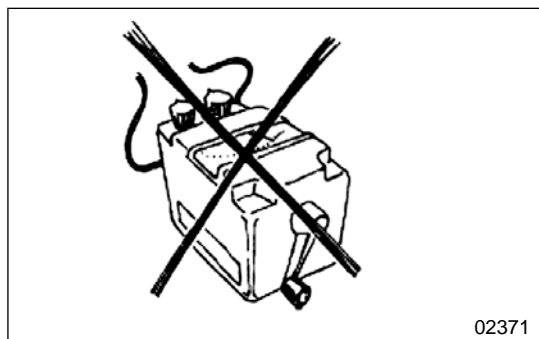
► Precautions for maintenance of AC generator

When maintaining AC generator, observe the following precautions:

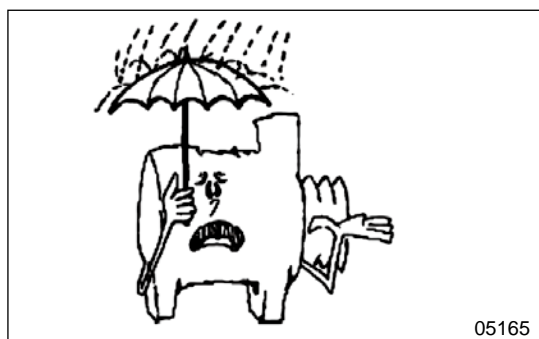
- Never connect the polarity of battery terminal in reverse.
- If the polarity of the battery terminal is reversed, heavy current will flow from the battery to AC generator, resulting in diode and regulator damaged.



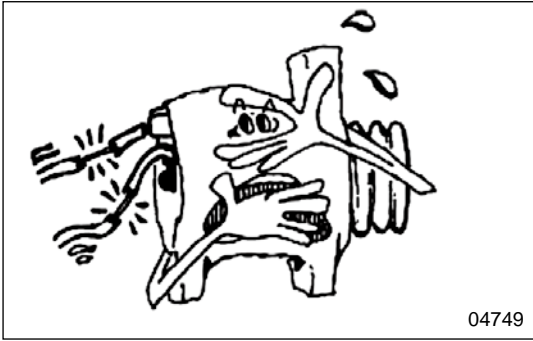
- Never loosen the battery terminal when engine is running, loosening of the battery terminal when engine is running will produce surge voltage, resulting in diode and regulator damaged.



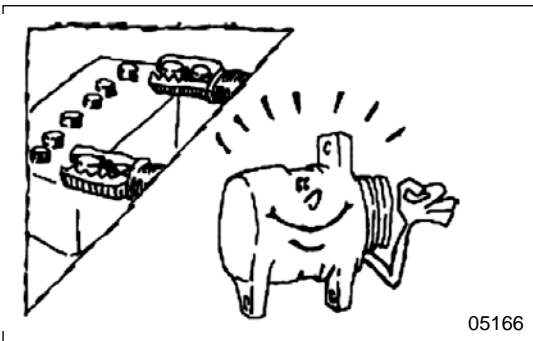
- Never use megohmmeter or other HV multimeter for checking. Using of megohmmeter or other HV multimeter for checking may damage the diode and regulator.



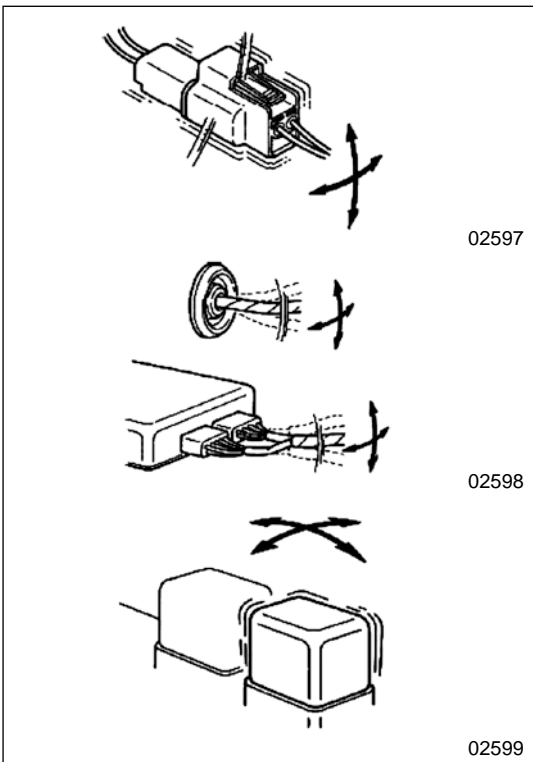
- Keep AC generator dry. Water entering into AC generator may lead to internal short-circuit and damage.



- Never operate AC generator with terminal B and terminal L short-circuited. Short-circuit of terminal B and terminal L may damage diode unit.



- Before use fast charger to make fast charging for the battery, disconnect the battery terminal, if the battery terminal is not disconnected, fast charging may damage the diode and the regulator.



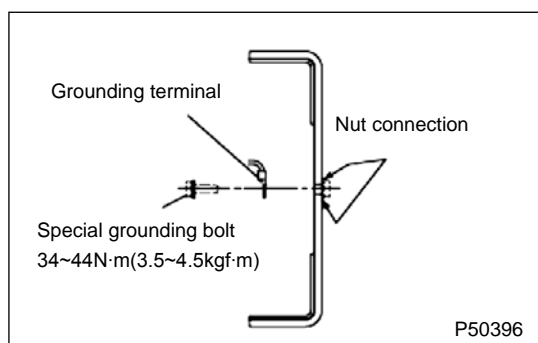
► Discontinuous fault

Discontinuous fault occurs only in certain conditions in normal case. Once these working conditions are confirmed, then the reason for discontinuous fault is easy to locate. First ask the customer under which vehicle running condition and weather condition the discontinuous fault occurred, and the fault occurrence frequency and symptoms. Then make the fault occur again according to these information, and determine whether the fault is caused by vibration, high temperature, or other factors according to the condition in which the fault occurs. If the fault may be caused by vibration, then check whether this fault occurs again by making following inspection for each connector and other parts:

- Move slowly the connector up and down, left and right.
- Move slowly the wire up and down (and), left and right.

- Swing slowly the sensor and other parts with hand.
- Swing slowly the wire on the suspension system or other parts.

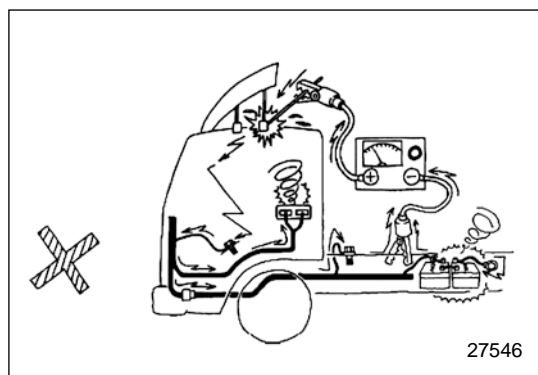
Connectors and other parts to be checked include the connectors and other related parts checked according to the diagnosis code and/or fault symptoms, or the positions considered to produce fault possibly.



► Check of chassis grounding point:

As the bolt of grounding terminal is special bolt, if to remove the special grounding bolt, follow the following procedures:

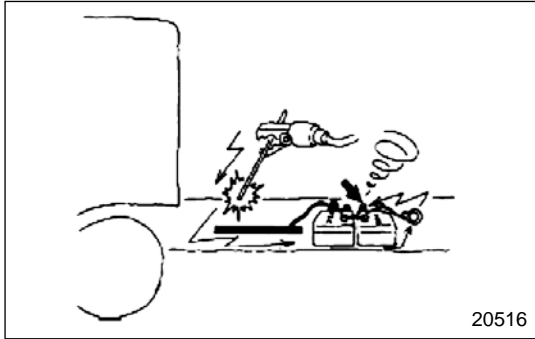
- With grounding bolt removed
- After the grounding bolt is removed, weld the bolt with specified welding machine.
- With the grounding bolt moving
- When moving the special grounding bolt, use special bolt to weld the nut to the iron stand as shown in left Fig., and paint the welded part.



► Precautions for electric arc welding

- When carrying out electric arc welding, if proper measures not taken, the current of the electric welding machine that reaches ground through the vehicle metal parts may damage the control system, other electrical equipment, or even damage the whole wiring system.

While any on-board electrical equipment nearby the electric welding machine and connected with the welding negative pole may undergo even heavier damage.



► **Current return is as shown in Fig. below**

Battery ⊖ negative pole

To avoid damage of battery and other electrical equipment directly connected with the battery, disconnect safely all the wires connected with battery ⊖ negative pole.

The steps are as follows:

- Turn the starter switch to LOCK position.



- Release battery terminal ⊖ negative pole connection.



- Cover the vehicle parts that may be damaged by the electrical welding spark.



- Connect the electric welding machine, negative pole wire to the vehicle body nearest to the welding area, if welding the cab shed, the electric welding machine ⊖ negative pole cannot be connected with the cab, vice versa.

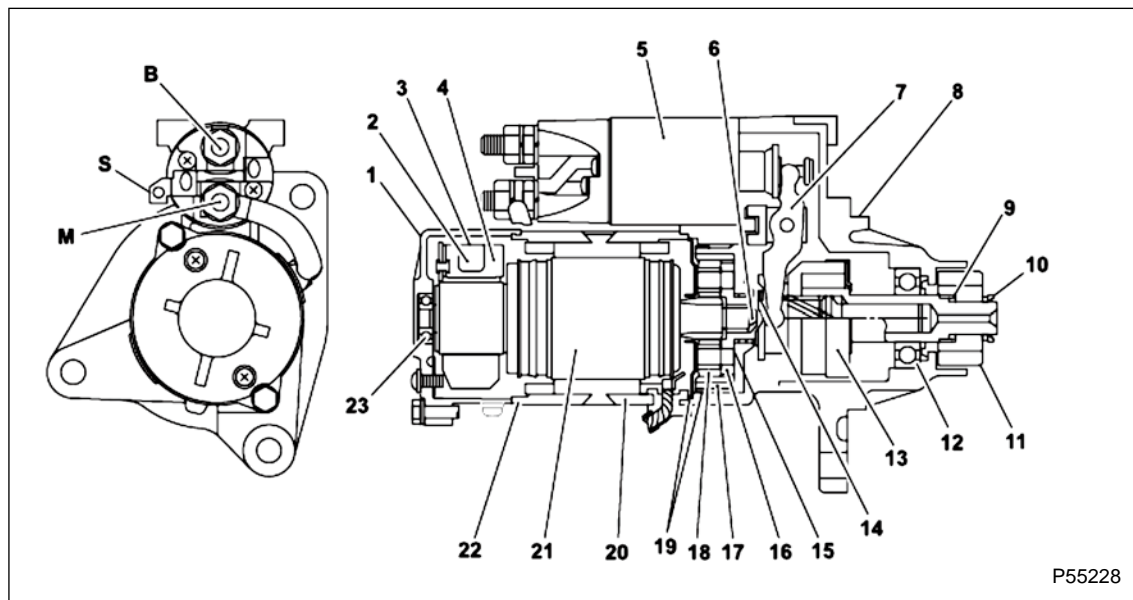


- Adjust the welding current to get it suitable with the part to be welded.

Structure and Working Principle

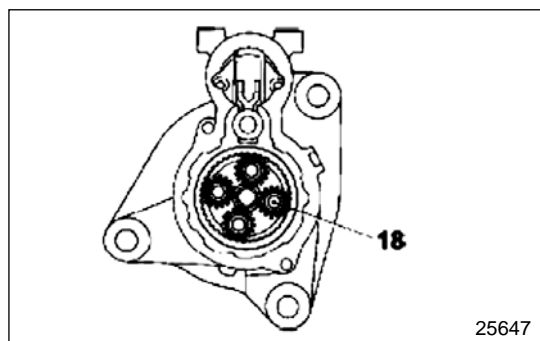
► Starter

(6D2)



P55228

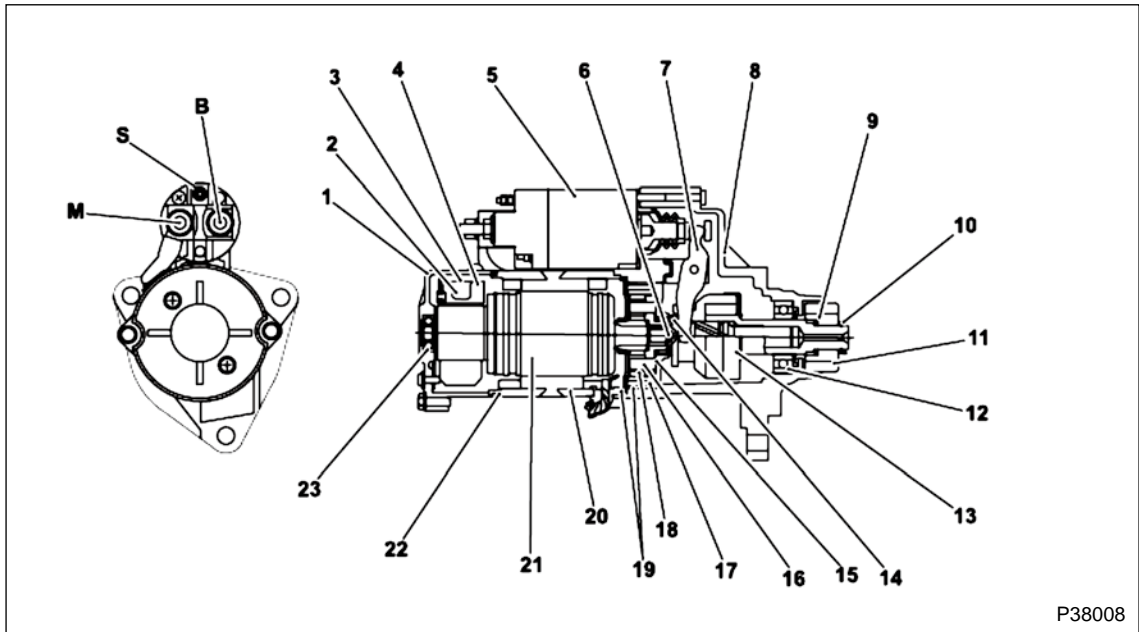
- | | | |
|---------------------------|---------------------------|-----------------------|
| 1. Rear housing | 10. Pinion retaining ring | 19. Gasket |
| 2. Brush | 11. Pinion | 20. Yoke assembly |
| 3. Brush spring | 12. Front bearing | 21. Armature assembly |
| 4. Brush holder | 13. Overrunning clutch | 22. Gasket |
| 5. Electromagnetic switch | 14. E ring | 23. Rear bearing |
| 6. Steel ball | 15. Washer | |
| 7. Lever | 16. Gear shaft assembly | B : Terminal B |
| 8. Front housing | 17. Inner gear assembly | M : Terminal M |
| 9. Spring | 18. Planetary gear | S : Terminal S |



25647

This starter uses planetary gear 18 as its reduction gear unit.

(8DC)



P38008

1. Rear housing

2. Brush

3. Brush spring

4. Brush holder

5. Electromagnetic switch

6. Steel ball

7. Lever

8. Front housing

9. Spring

10. Pinion retaining ring

11. Pinion

12. Front bearing

13. Overrunning clutch

14. E Ring

15. Washer

16. Gear shaft assembly

17. Inner gear assembly

18. Planetary gear

19. Gasket

20. Yoke assembly

21. Armature assembly

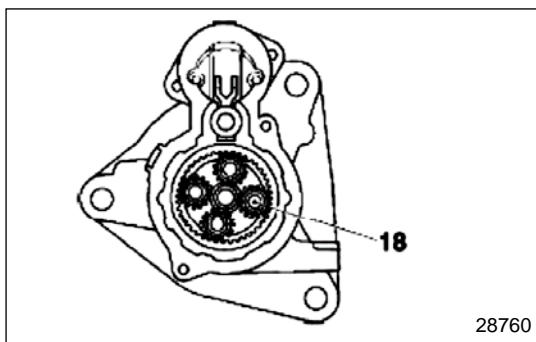
22. Gasket

23. Rear bearing

B : Terminal B

M : Terminal M

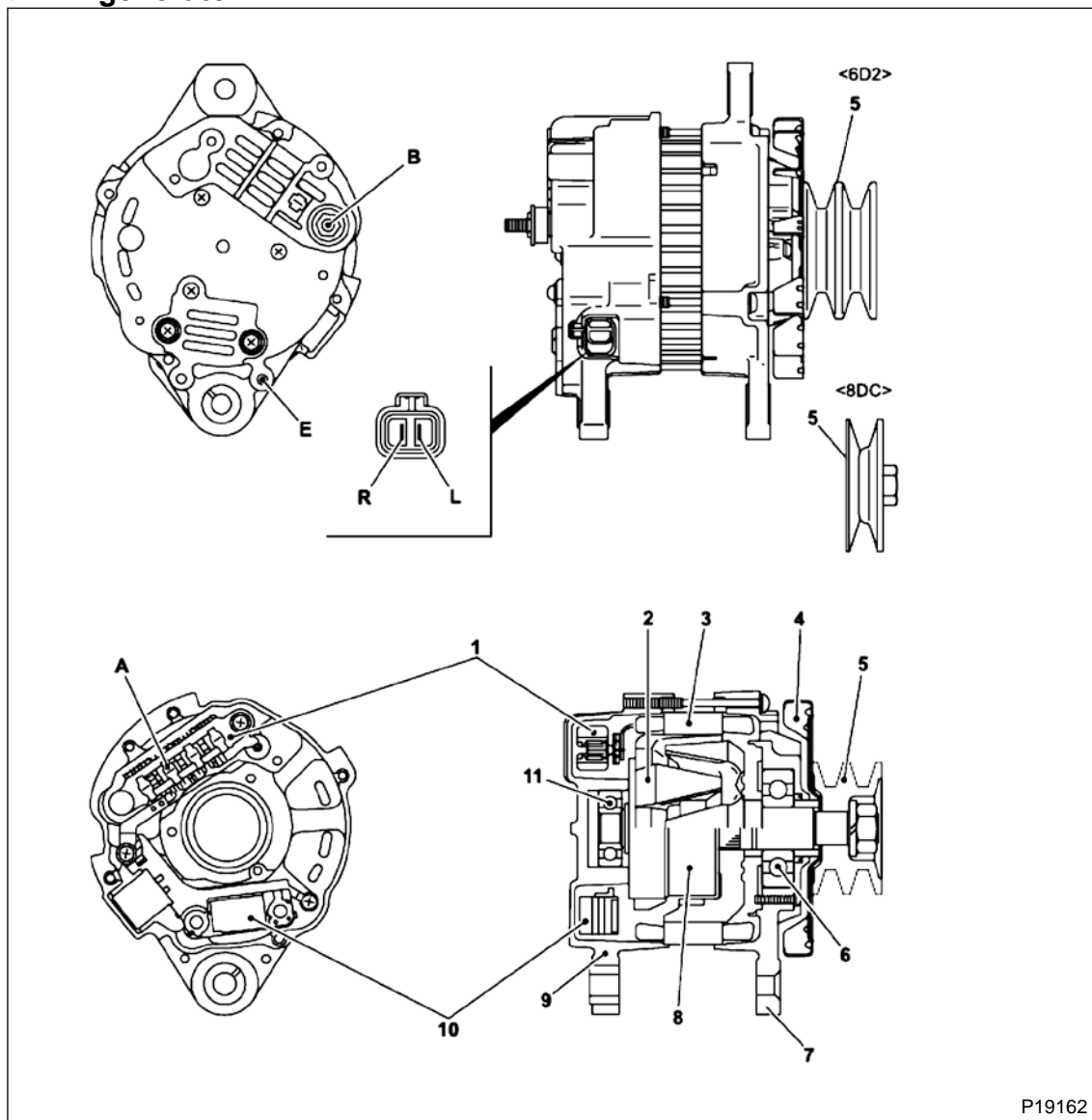
S : Terminal S



28760

This starter uses planetary gear 18 as its reduction gear unit.

► AC generator

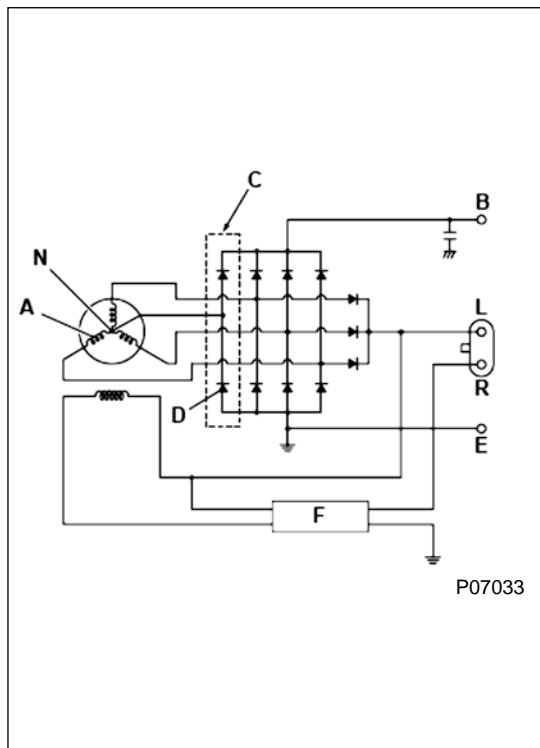


P19162

- 1. Rectifier
- 2. Rotor assembly
- 3. Stator assembly
- 4. Fan
- 5. Belt pulley
- 6. Front bearing

- 7. Front housing
- 8. (Magnetic) field coil
- 9. Rear housing
- 10. Regulator
- 11. Rear bearing

- A : Neutral diode
- B : Terminal B
- E : Terminal E
- L : Terminal L
- R : Terminal R



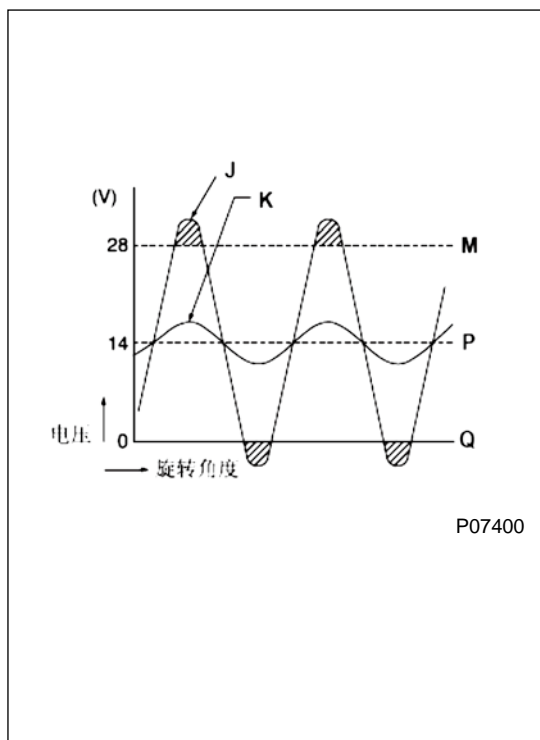
► Characteristics of AC generator with neutral diode

- This AC generator is the same as general AC generator with an exception of additional neutral diodes C and D.
- These neutral diodes C and D can provide higher DC output power than the AC generator without neutral diodes when running at high speed.

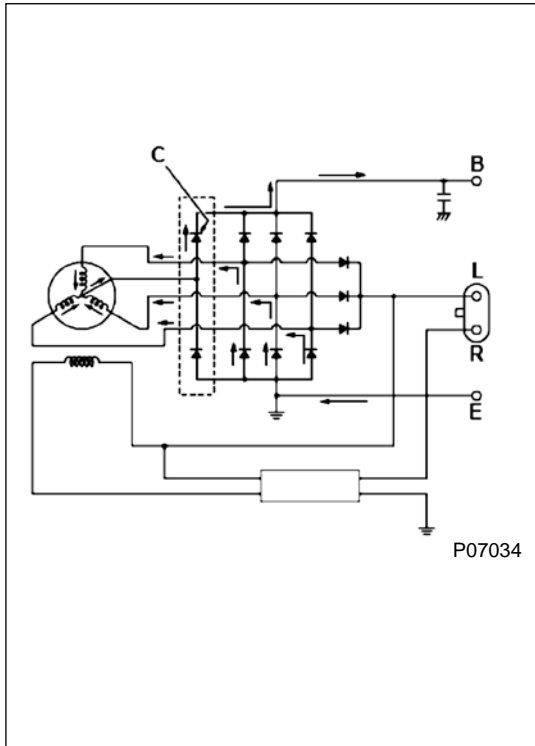
A : Stator coil
 B : AC generator terminal B
 E : AC generator terminal E
 F : IC regulator
 L : AC generator terminal L
 N : Neutral point
 R : AC generator terminal R

► Voltage change of neutral point and working principle of neutral diode

- The voltage of neutral point N changes up and down as the neutral point DC voltage (1/2 of the output voltage) changes, as shown by the central point P in the Fig.
- When AC generator is running at high speed, the voltage at the neutral point N can be increased to higher than the output voltage M (28V) and decreased to lower than grounding voltage Q (0V). In order to adjust these overvoltages and undervoltages (shadow part in the Fig.), the current from the overvoltage is taken out by the neutral diodes C and D, and added to DC output.

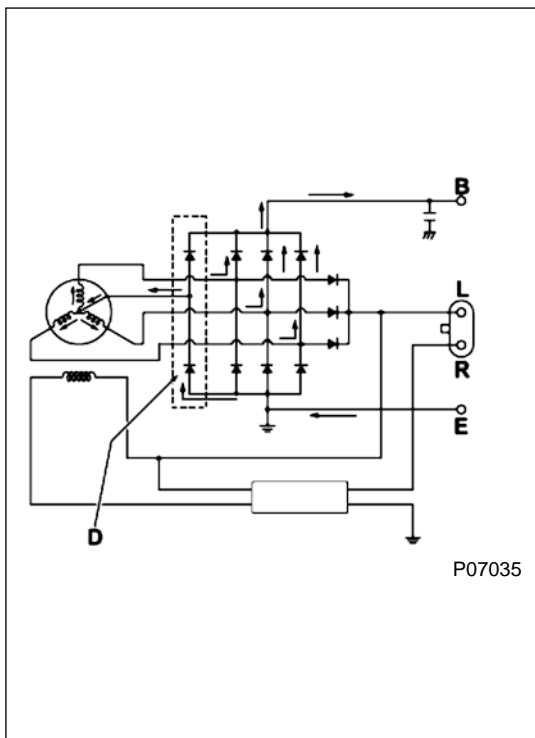


J: Voltage waveform of neutral point at high speed
 K: Voltage waveform of neutral point at low speed
 M: Output voltage
 P: Average voltage of neutral point (1/2 of the output voltage)
 Q: Grounding potential



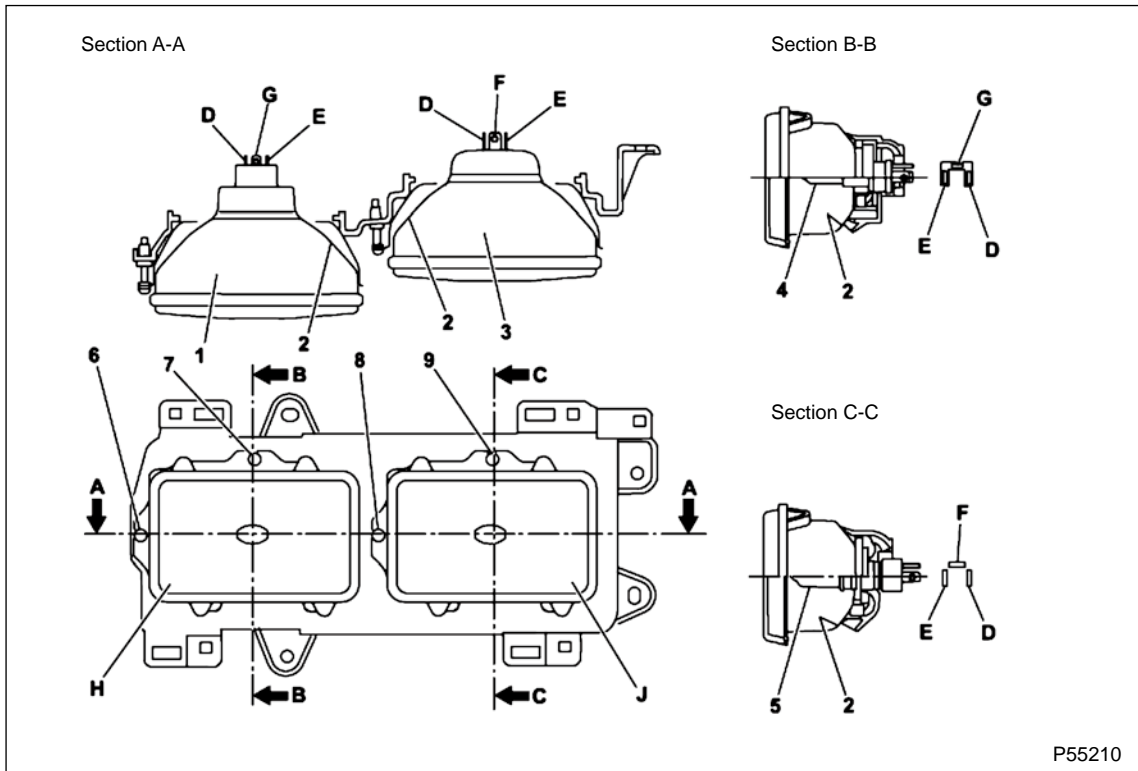
Operation of voltage and potential of neutral diodes C and D is as follows.

- When the neutral point voltage range is at 0~28V, the other 6 diodes are operating, and the neutral diodes are not operating.
- When the neutral point voltage exceeds 28V Forward diode C, increase additional output of DC output to each electrical equipment.



- When the neutral point voltage is decreased to below 0V Backward diode D, supply output through other 3 diodes from the neutral point.

► **Head lamp (square, 4-lamp system, semi-enclosed type)**

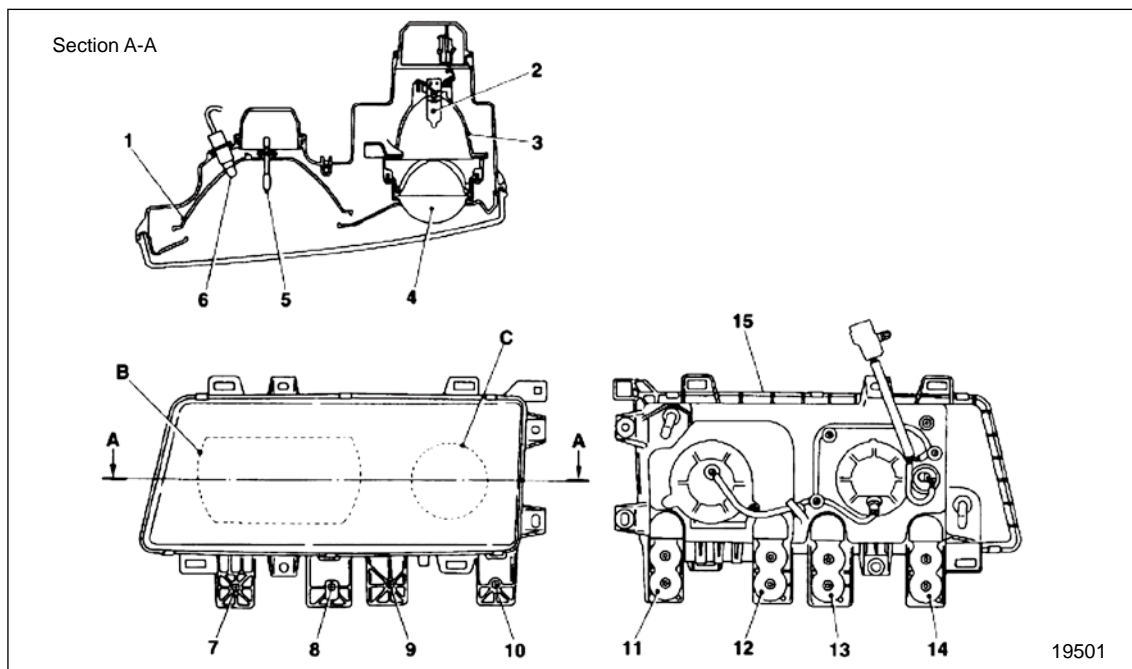


P55210

- | | |
|-----------------------------------------------------------|-------------------------|
| 1. Head lamp assembly (far beam) | D:Far beam terminal |
| 2. Reflector lamp cover | E:Grounding terminal |
| 3. Head lamp (dimmed light) | F:Dimmed light terminal |
| 4. H1 halogen bulb | G:Spare terminal |
| 5. H4 halogen bulb | H:Far beam |
| 6. Screw (far beam H, horizontal direction regulating) | J:Dimmed light |
| 7. Screw (far beam H, vertical direction regulating) | |
| 8. Screw (dimmed beam J, horizontal direction regulating) | |
| 9. Screw (dimmed beam J, vertical direction regulating) | |

The lamp shown in above Fig. is the left side head lamp; the lamp on right side is opposite to this lamp.

► **Head lamp (non-conventional, square, 4-lamp system, semi-enclosed type (option))**



- | | |
|---------------------------------------------------------------------|---------------------------------------------------------------------------|
| 1. Reflector lamp cover | 10 : Screw (dimmed light C, vertical and horizontal direction regulating) |
| 2. H3 halogen bulb | 11 : Driving unit assembly |
| 3. Reflector lamp cover | 12 : Driving unit assembly |
| 4. Capacitor | 13 : Driving unit assembly |
| 5. H1 halogen bulb | 14 : Driving unit assembly |
| 6. Position bulb | 15 : Lamp assembly |
| 7. Screw (far beam B, vertical direction regulating) | |
| 8. Screw (far beam B, vertical and horizontal direction regulating) | B : Far beam |
| 9. Screw (dimmed light C, vertical direction regulating) | C : Dimmed light |

- The head lamp is composed of H1 halogen bulb 5 of the far beam B and H3 halogen bulb 2 of dimmed light C, placed in lamp assembly 15.
- In the lamp assembly 15, H1 halogen bulb 5 and H3 halogen bulb 2 have independent reflector lamp cover 1 and 3, forming respectively the far beam side B and dimmed light side C.
- Utilization of light of the head lamp is adjusted by changing the installation angle of the reflector lamp cover 1 and 3, because the far beam side B and the dimmed light side C are provided respectively with its own reflector lamp cover, therefore, adjustment must be made.
- The installation angle of the reflector lamp cover 1 can be adjusted by rotating the screw 7 and 8. Rotate the screw, and change the installation angle of the inner reflector lamp cover in the lamp assembly 15 through the driving unit assembly 13 and 14.
- The installation angle of the reflector lamp cover 3 can be adjusted also by using screw 9 and 10 to rotate the assembly 11 and 12.
- The lamp shown in above Fig. is the left side head lamp, the lamp on right side is opposite to this lamp.

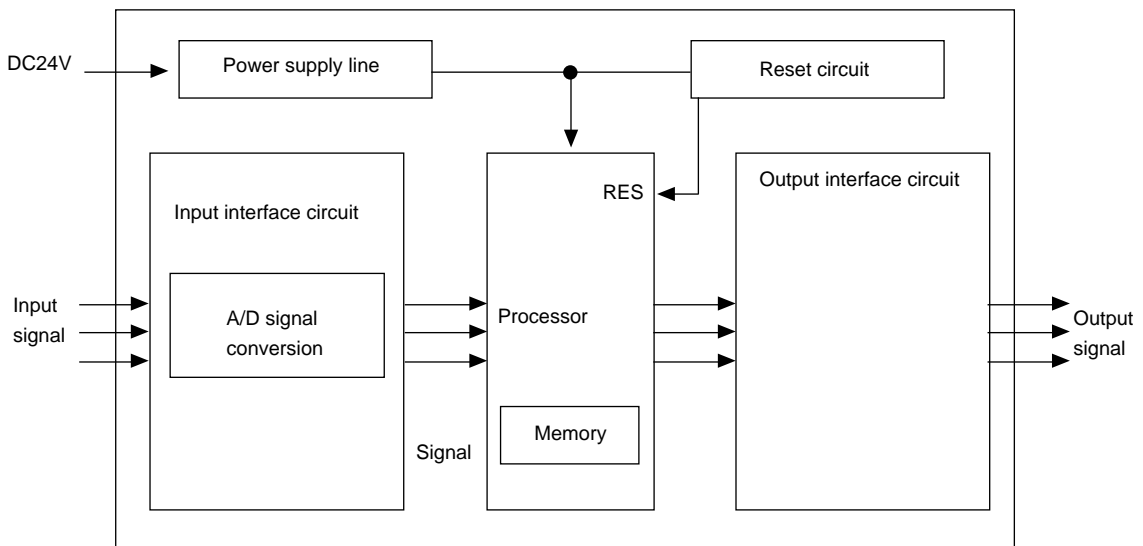
► **MULAC (multi-purpose timing control device and lighting and alarm control device)**

- This control device is a integrated control system with the following control functions:

Windshield washer and wiper gang control operation	23-00-22
Wiper intermittent operation function	23-00-22
Water level alarm function	23-00-22
Starter continuous power supply prevention function	23-00-22

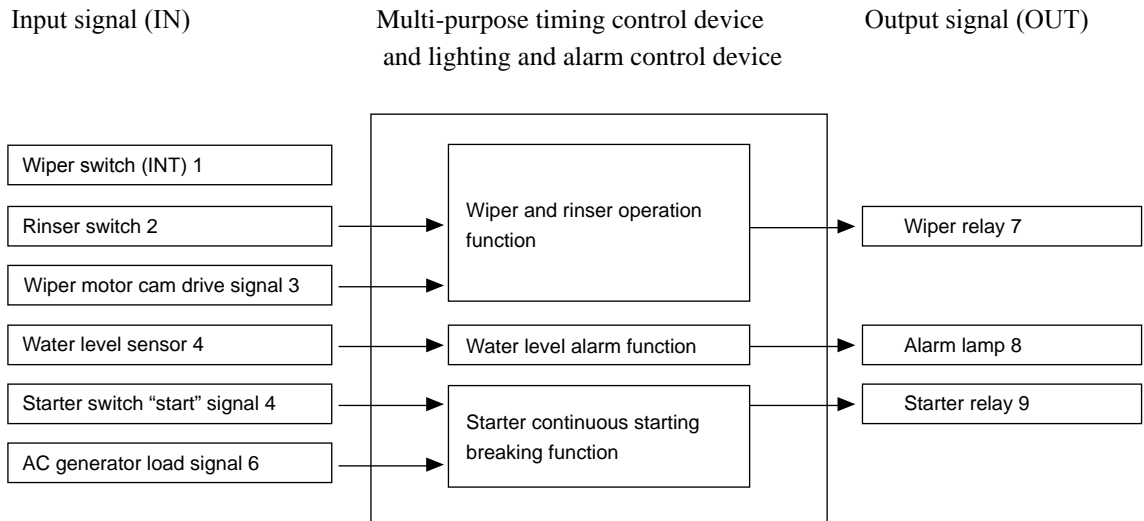
- For every control function, the corresponding sensor and switch will provide the information, they are distributed in the related control system.
- According to the information provided by the sensor and switch, the multi-purpose timing control system and lighting and alarm control device MULAC will execute the above-mentioned control functions through the circuit of itself.

- MULAC internal structural diagram

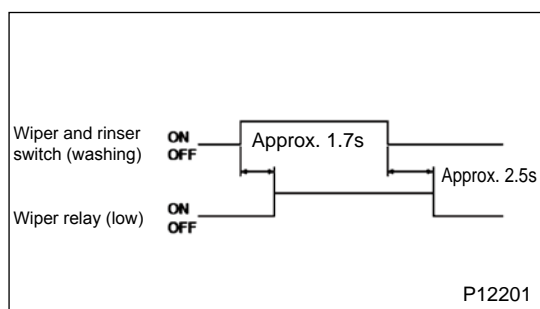


- MULAC control system mainly consists of input interface circuit, processor*a, memory *b, and output interface circuit.
 - *a: Abbreviation of central processing unit in English, which makes comparison of the input signal and the stored signal in the memory, then issue command to the output terminal.
 - *b: Abbreviation of read only memory in English, it reads only the stored information of its own, store the processed data and program, even if the power is off, its stored information will not be deleted.
- Information source, such as sensor, switch, transfer the input signal to the input interface circuit.
- The input interface circuit makes A/D signal conversion */c for the input signal, then transfer the converted signal to the central processing unit.
 - *c: Abbreviation of A/D conversion in English, which converts the analogue signal to digital signal, only the converted data can be processed in the central processing unit.
- The central processing unit makes comparison of the received signal and the data stored in memory, and make judgment, then transmit the result to the output interface circuit.
- Continue operating according to the above-mentioned program, the optimum control of all the systems can be realized.

System functional flow diagram

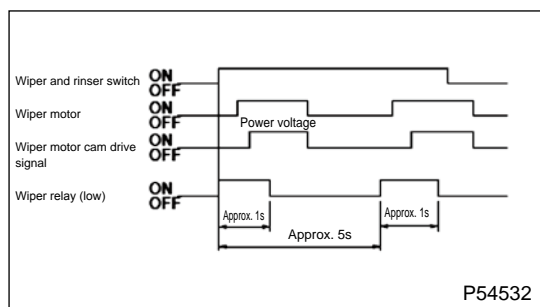


	Signal	Name of parts and components	Main function and operation
1	Wiper discontinuous switch signal	Wiper and riner switch	
2	Wiper switch signal	Rinser switch	
3	Wiper motor cam drive signal	Wiper motor	
4	Engine water level signal	Water level sensor	Engine water level detection
5	Starter switch starting signal	Starter switch	Starter position detection
6	AC generator load signal	AC generator	AC generator load signal output
7	Wiper relay operation signal	Wiper relay (low)	Wiper periodic operation
8	Lamp ON signal	Water level alarm lamp	
9	Safety relay starting signal	Starter	



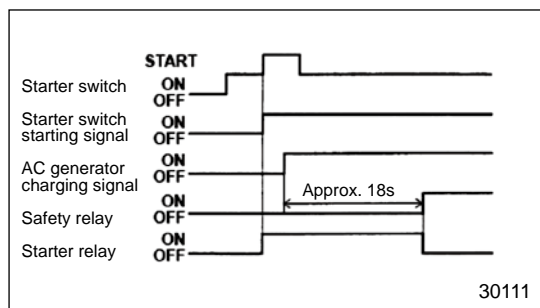
► Windshield rinser and wiper interlocked operation function

- The function of this function is that the wiper can operate for several times at low speed when the windshield washer is turned ON.
- As shown in the Fig., the multi-purpose timing control system and lighting and alarm control device MULAC can make the starting time of the wiper a bit delayed than the washer, so as to operate the wiper relay.



► Wiper periodic operation function

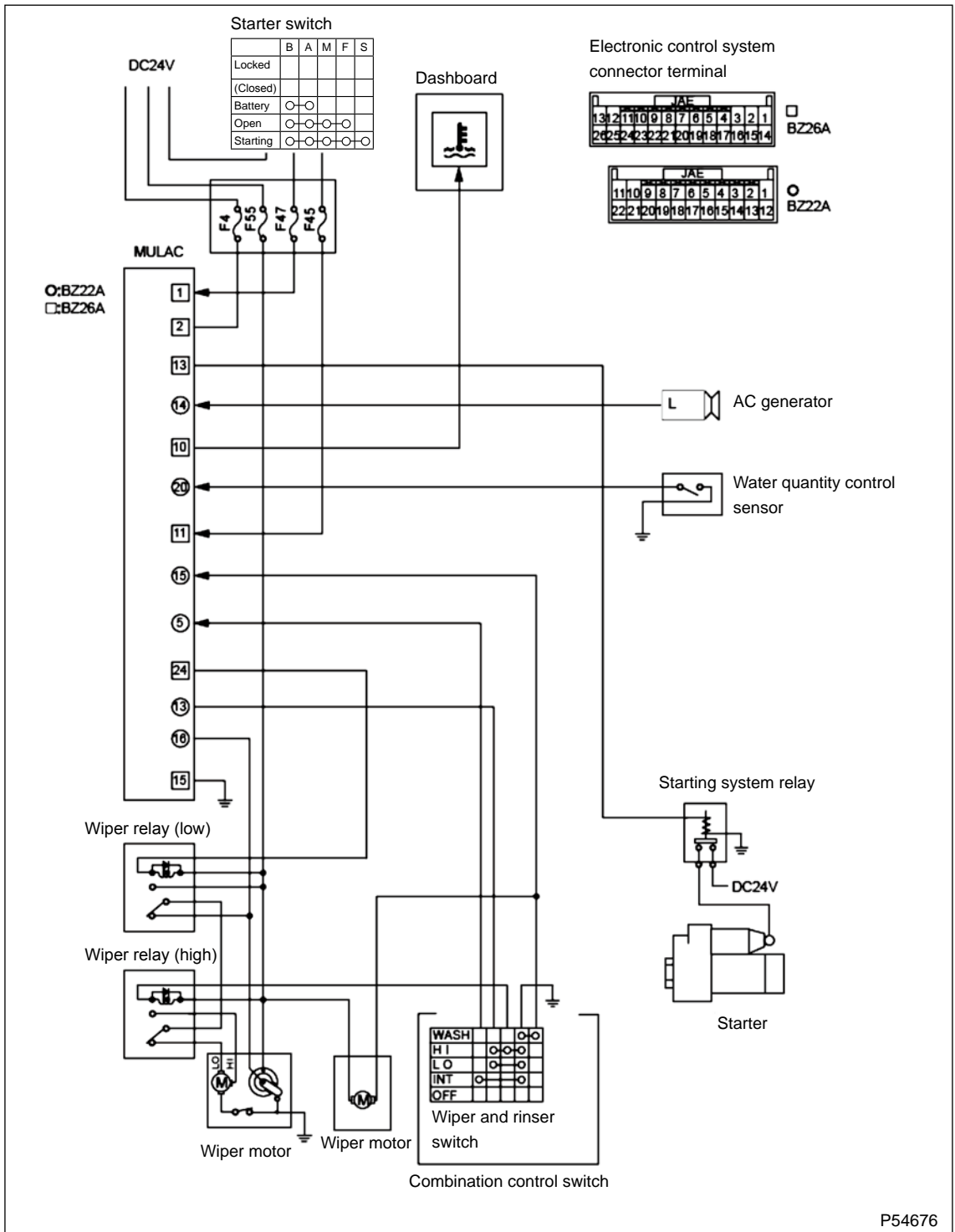
- The multi-purpose timing control system and lighting and alarm control device MULAC is able to control periodic operation of the wiper, as shown in the Fig.



► Starter continuous power supply prevention function

- This function can stop starter from over speed running.
- As the engine started, if the starter's running time exceeds the preset limit, the multi-purpose timing control system and lighting and alarm control device MULAC will hold that the continuous power supply time is too long, and stop power supply to the starter and the starter relay, so as to avoid wearing of the starter.
- As the engine starts, when the preset time is exceeded, the signal coming from AC generator terminal L will operate the safety relay, the safety relay will turn on the contactor.

► MULAC functional structural diagram



P54676

► Power supply and charging

Symptoms		Battery electrolyte reduced too fast	Battery overheated	Battery normal but over discharged	With engine stopped, when the starting switch is turned to ON, charging alarm lamp not lit	AC generator normal but the battery over discharged	Remarks
Connector connection fault, wire broken, grounding fault					○	○	
Fuse burnt						○	
V-belt loosened						○	
V-belt damaged						○	
Battery fault		○				○	
AC generator	Stator coil open circuited			○			
	Stator coil and core short circuited			○			
	Filed coil open circuited			○			
	Rectifier fault			○			
	Regulator fault		○	○	○		
	Line fault			○			
Combination instrument fault					○		

► Engine startup

Symptoms		Starter not operating	Starter operating, but engine not starting			Engine not stopping	Engine unable to preheat	Engine starting with difficult	Remarks
			Pinion not engaged with gear ring	Pinion engaged with gear ring but not rotating	Flywheel rotating but engine not starting				
Possible causes									
Connector connection not good, wire open circuit/short circuit, poor grounding		<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Fuse burnt		<input type="radio"/>				<input type="radio"/>	<input type="radio"/>		
Battery charging insufficient		<input type="radio"/>		<input type="radio"/>					
Starter	Electromagnetic switch contactor jammed or fused	<input type="radio"/>							
	Electromagnetic switch coil open circuited	<input type="radio"/>							
	Overrunning clutch fault			<input type="radio"/>					
	Pinion worn or damaged		<input type="radio"/>						
Starter relay fault		<input type="radio"/>							
Starting switch fault		<input type="radio"/>				<input type="radio"/>			
Flywheel gear ring worn or damaged			<input type="radio"/>						
Fuel cutoff relay fault					<input type="radio"/>	<input type="radio"/>			
Fuel cutoff motor fault					<input type="radio"/>	<input type="radio"/>			
Engine anti-inversion relay fault						<input type="radio"/>			
Engine stop cable broken or damaged					<input type="radio"/>	<input type="radio"/>			
Engine stop cable adjustment improper						<input type="radio"/>			
Intake heater	Intake heater open circuited						<input type="radio"/>	<input type="radio"/>	
	Temperature fuse open circuited						<input type="radio"/>	<input type="radio"/>	
Intake heater fault							<input type="radio"/>	<input type="radio"/>	
Intake heater switch fault							<input type="radio"/>	<input type="radio"/>	

► Lamps

Symptoms	Head lamp				Tail lamp not lit	Fog lamp not lit	Rear fog lamp not lit	Parking lamp not lit	Clearance lamp not lit	Position lamp not lit	License plate lamp not lit	Reversing lamp not lit	Reversing buzzer not buzzing	Remarks
	Head lamp not lit	Head lamp dim	Unable to switch to far beam	Unable to switch to dimmed light										
Possible causes														
Connector connection improper, wire open circuit, grounding fault	○				○	○	○	○	○	○	○	○	○	
Fuse burnt	○				○	○	○	○	○	○	○	○	○	
Battery capacity insufficient		○												
AC generator output insufficient		○												
Bulb burnt out	○				○	○	○	○	○	○	○	○	○	
Bulb power (W) lower than specified value														
Bulb power (W) higher than specified value														
Combination switch	Lamp switch fault	○			○				○	○	○			
	Turn signal lamp switch fault													
	Hazard warning lamp switch fault													
	Dimmer switch fault			○	○									
	Fog lamp switch fault						○							
Relay box	Head lamp relay (far beam, dimmed light) fault	○		○	○									
	Tail lamp relay fault					○			○	○	○			
	Fog lamp relay fault						○							
	Rear fog lamp relay fault							○						
	Parking lamp relay fault								○					
Parking lamp switch fault								○						
Flasher fault														
Reversing lamp switch fault												○	○	
Reversing buzzer fault													○	
Individual special lamp switch fault														
Individual special lamp fault														
Door switch fault														
Fluorescent lamp fault														
Rear fog lamp switch fault							○							

General

Symptoms		Turn-signal lamp (also called as hazard warning lamp)					Individual special lamp not lit	Fluorescent lamp not lit	Lighting lamps for vehicle instruments and radio system not lit	Remarks
		Not flashing	Constantly lit	Flashing frequency too slow	Flashing frequency too fast	Flashing frequency irregular				
Possible causes										
Connector connection improper, wire open circuit, grounding fault		○					○	○	○	
Fuse burnt		○					○	○		
Battery capacity insufficient			○							
AC generator output insufficient			○							
Bulb burnt out		○			○		○		○	
Bulb power (W) lower than specified value					○					
Bulb power (W) higher than specified value				○						
Combination switch	Lamp switch fault									
	Turn-signal lamp switch fault									
	Hazard warning lamp switch fault									
	Dimmer switch fault									
	Fog lamp switch fault									
Relay box	Head lamp relay (far beam, dimmed light) fault									
	Tail lamp relay fault									
	Fog lamp relay fault									
	Rear fog lamp relay fault									
	Parking lamp relay fault									
Parking lamp switch fault										
Flasher fault		○	○	○	○	○				
Reversing lamp switch fault										
Reversing buzzer switch fault										
Individual special lamp switch fault							○			
Individual special lamp fault							○			
Door (lamp) switch fault							○			
Fluorescent lamp fault								○		
Rear fog lamp switch fault										

► Instruments

		Symptoms				Remarks
		Pointer not moving	Pointer not stable	Indication error big	Abnormal sound in instrument	
Possible causes						
Connector connection improper, wire disconnected, grounding fault		○	○			
Fuse burnt						
Internal circuit fault of combination instrument			○	○		
Printed circuit fault of the combination instrument						
Tachometer	Engine speed sensor coil open		○			
	Engine speed sensor installation improper		○	○		
	Tachometer fault		○	○	○	○
Speedometer or tachometer	Vehicle speed sensor fault		○			
	Vehicle speed sensor installation improper			○		
	Specified tyre not used				○	
	Tyre worn or inflation pressure incorrect				○	
	L-connector specified by gearbox not used (different gear ratio)				○	
	Speedometer gear specified by gearbox not used (different gear ratio)				○	
	Installation angle of speedometer gear bush on gearbox improper (not fixed at correct gear ratio position)				○	
	Speedometer or tachometer fault		○	○	○	
Water thermometer	Pulse distributor (6D2)		○	○	○	
	Water temperature sensor fault		○		○	
	Water thermometer fault		○		○	
Fuel gauge	Thermostat not closed		○			
	Fuel level sensor fault		○		○	
	Fuel gauge fault		○		○	

► **Cigarette lighter and acoustical system**

Fault symptoms	Cigarette lighter			Acoustical system								
Possible causes												
Connector connection fault, wire disconnected, grounding fault	○		○ ○					○		○		
Fuse burnt	○		○ ○									
Cigarette lighter fault	○ ○											
Tail lamp relay fault			○									
Antenna or antenna connection fault				○ ○			○					
Radio amplifier fault				○			○ ○ ○ ○					
Radio tuner fault				○ ○ ○			○					
Loudspeaker fault				○ ○ ○ ○			○ ○ ○ ○					
Left right side loudspeaker impedance difference												○

Auxiliary equipment	Noise	Fault symptoms
AC generator	Whistle	When the acceleration pedal reducing pressure suddenly, the sound increased (stopped soon after engine stopped)
Water thermometer	Rustle	Occurred when engine is running (continued for a moment after engine stopped)
Engine oil pressure switch	Click	Depends on the engine speed (not happened when parking)
Fuel level sensor	Rustle	Occurred when the engine accelerating suddenly, or running at uneven road, or starter switch at "ON" position
Flashing device	Put-put	Occurred when turning signal lamp flashing
Horn	Sizzle	Occurred when horn button pressed or released
Wiper motor	Lament sound	Depends on the windshield wiper speed
Rinser motor	Lament sound	Occurred when windshield rinser working

► **Specification**

Battery

Description	Unit	Specification
Model		
Voltage x quantity	V	12×2
Capacity	Ah	135 150

AC generator

Item	Specification	
Manufacturer		
Type	Full wave brushless	
	Full wave with brush	
Model		
Output power	24/50A 24V/550 24V/70A	1500W~2000W

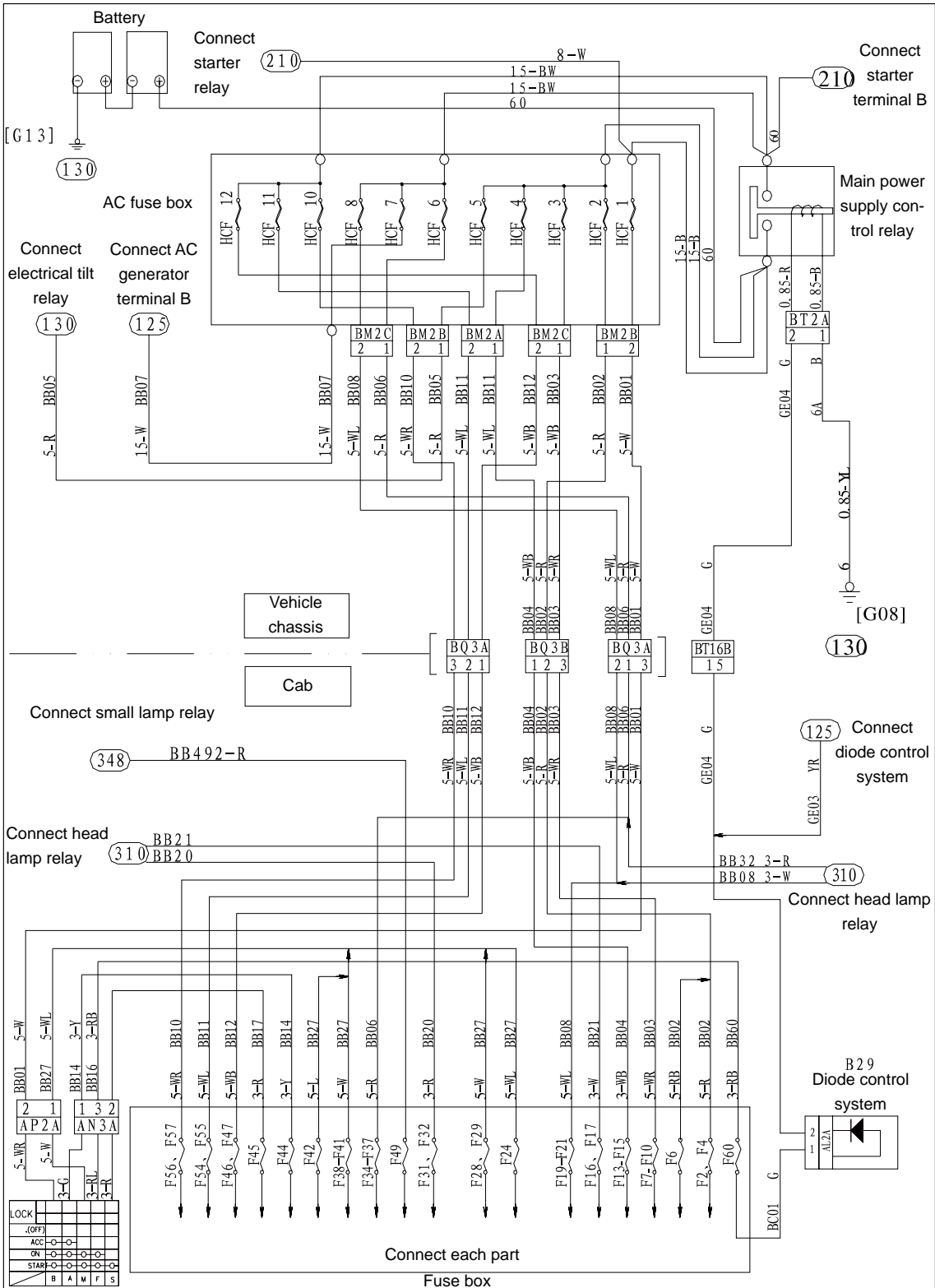
Starter, fuel cutoff motor, intake air heater

Item		Unit	Specification	
Starter	Manufacturer			
	Model			
	Output power	V-KW	24-5.5	24-7.8
	Reduction gear unit		Below 16	
	Electromagnetic switch working voltage	V		
Starter relay	Model			
	Excitation	V-A	24-2.3	
	ON	V	Below 16	
	OFF	V	Below 4	
	Allowable cutoff current	A	200	
Fuel cutoff motor	Working voltage	V	-	Below 16
	Working current	A	-	Below 5
Intake air heater	Capacity	KW-qty	0.5-2.0	1.4-2
	Rated current	V-A	22-90	11-127
Intake air heater relay	Model			
	Excitation current	V-A	24-2.3	
	Voltage ON	V	Below 16	
	Voltage OFF	V	Below 4	
	Allowable cutoff current	A	200	
	Temperature fuse capacity	A	127	

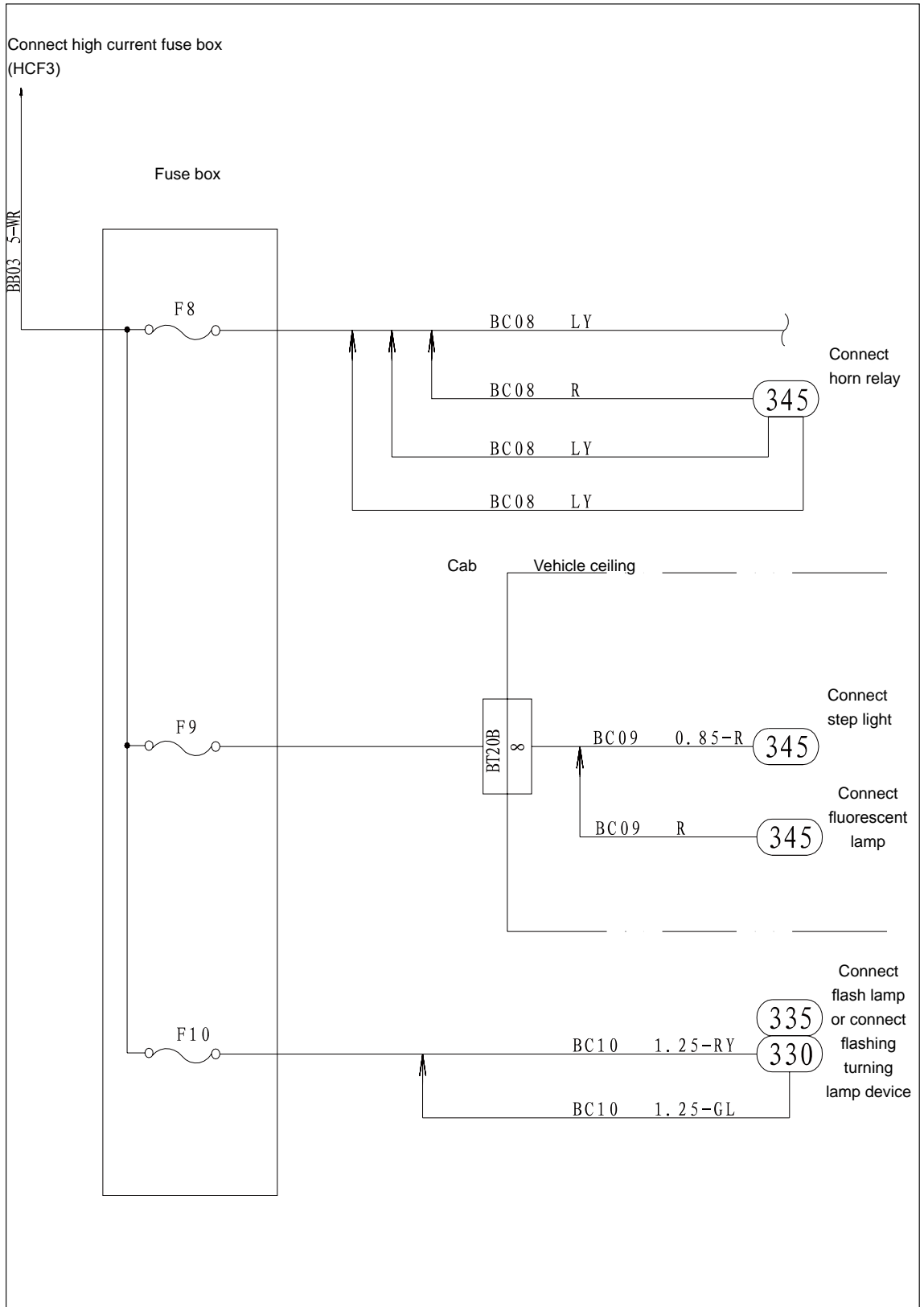
22-02 Power supply, Charging and Grounding System Circuit Diagram

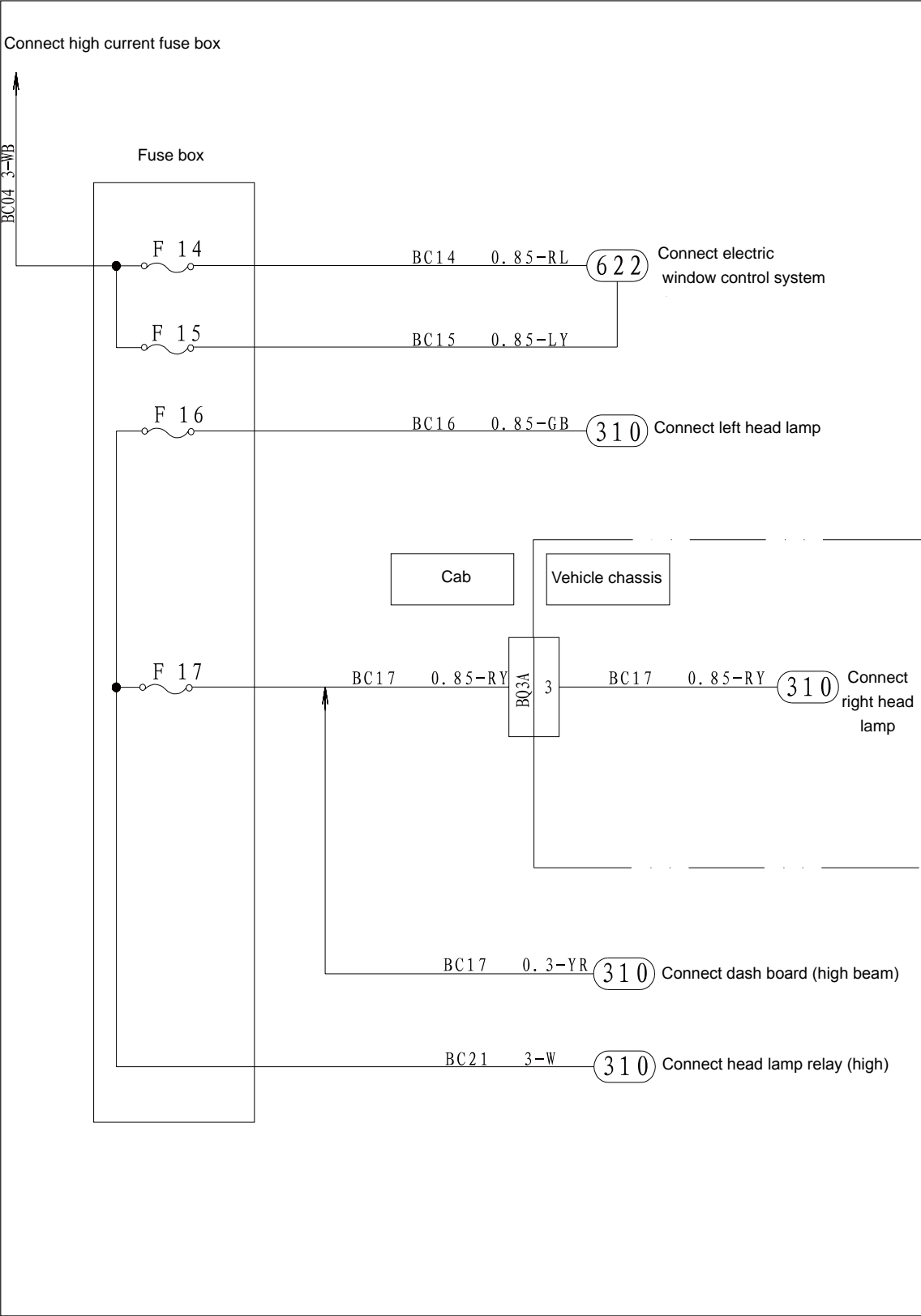
10 Power Supply System Circuit Diagram.....	22-02-2
125 Battery Charging Circuit Diagram	22-02-13
130 Grounding System	22-02-15

110 Power Supply System Circuit Diagram

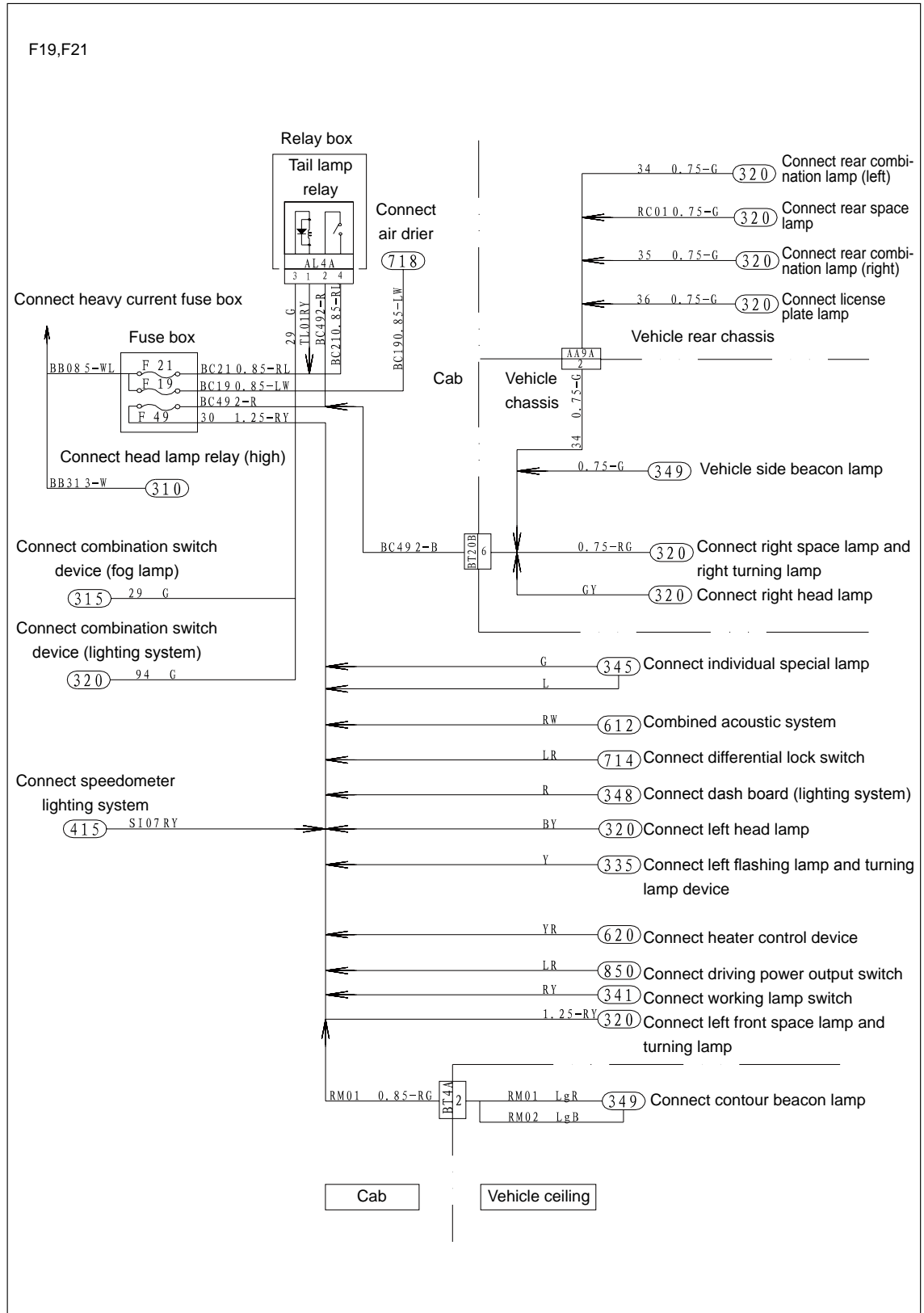


Power supply, Charging and Grounding System Circuit Diagram





Power supply, Charging and Grounding System Circuit Diagram

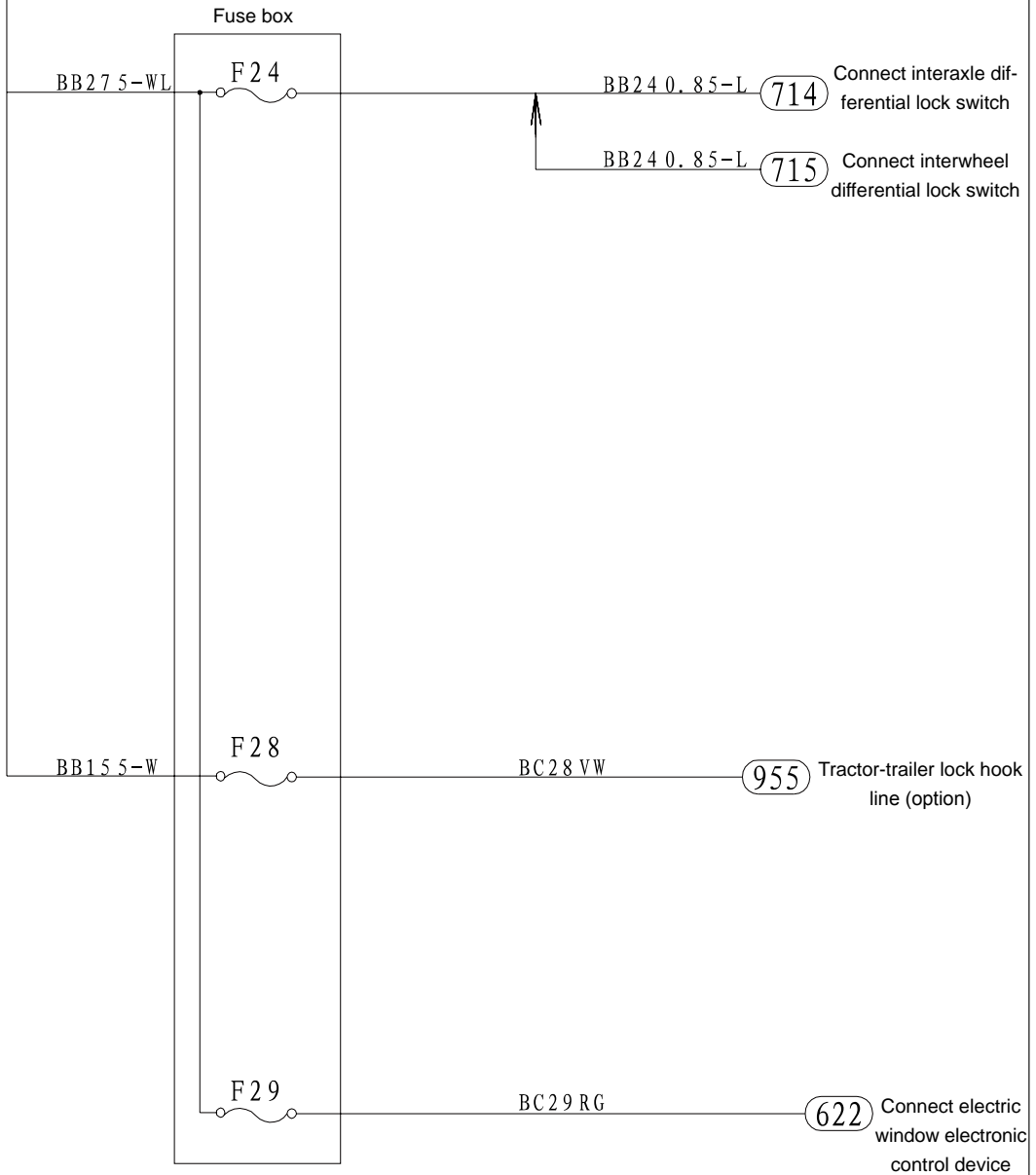


Maintenance Manual for CAMC Automobile

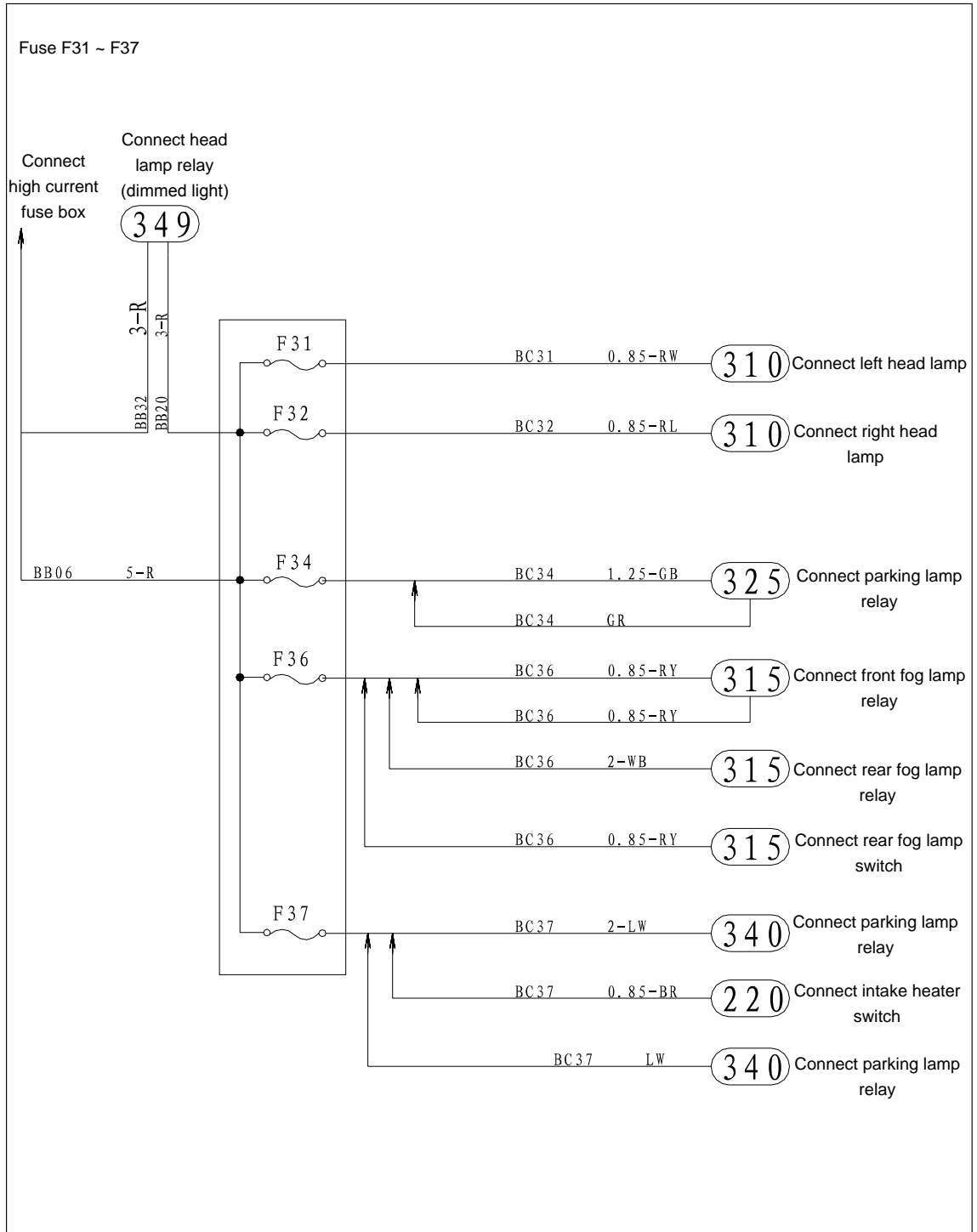
Fuse F24 ~ F29

Connect starter switch
(terminal N)

349



Power supply, Charging and Grounding System Circuit Diagram



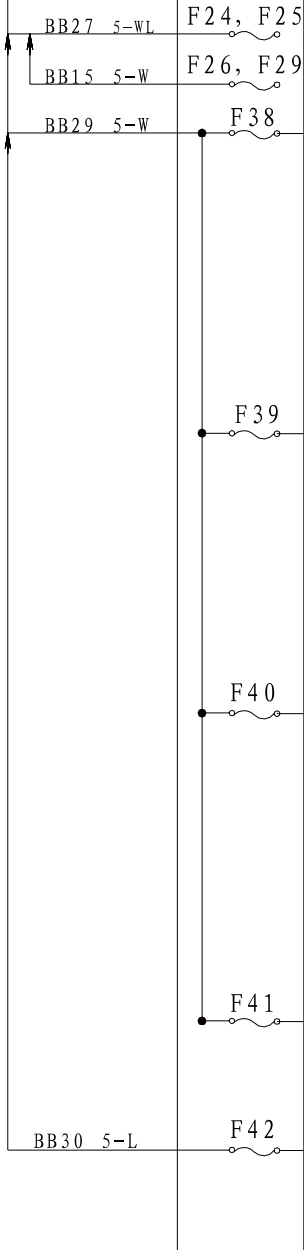
Maintenance Manual for CAMC Automobile

Fuse F38 ~ F42

Connect starter switch
(terminal M)

310

Fuse box



BC38 0.85-L 220 Connect cold starting switch

167 L 850 Connect PTO relay

BC38 GW 850 Connect PTO switch

194 RW 710 Connect exhaust brake switch in combination switch

BC39 0.85-GB 401 Connect dash board

BC39 Br 412 Speed controller

415

BC39 GY 515 Parking brake release inspection switch

BC40 0.85-YR 401 Connect dash board

415 Connect speed inspection switch

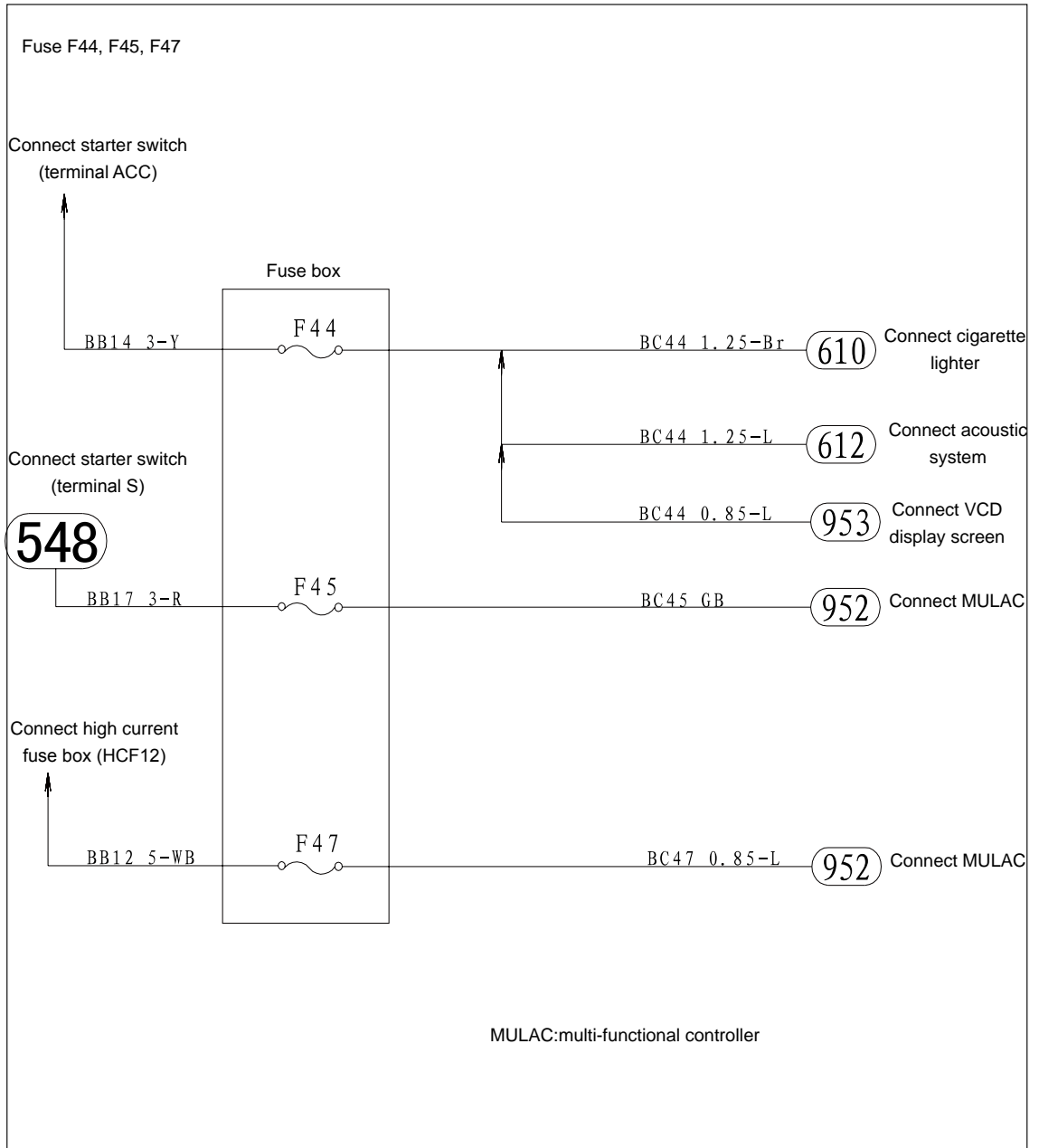
BC41 YB 620 Connect electromagnetic clutch relay

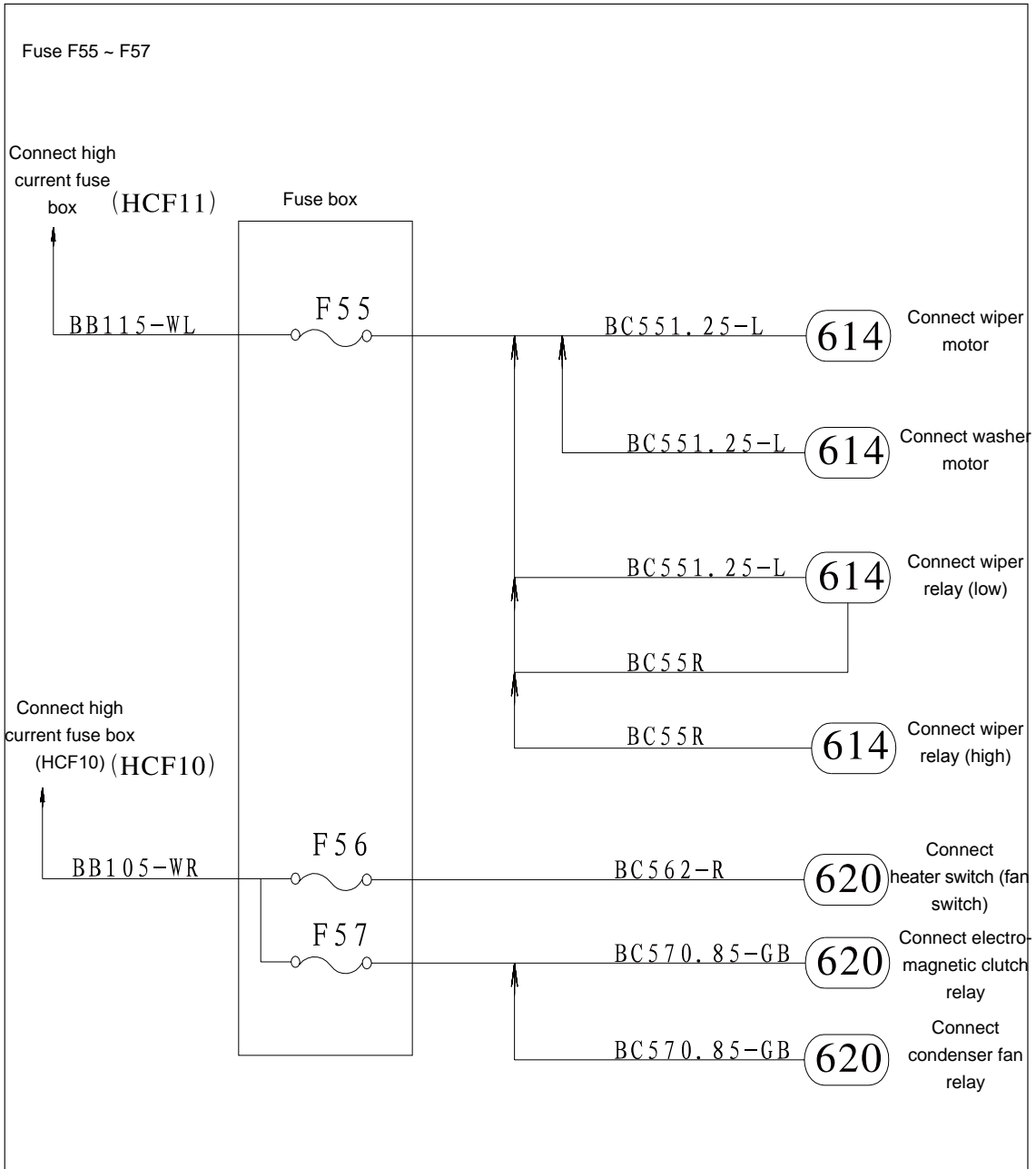
BC41 LB 620 Connect condenser fan relay

BC42 R 310 Connect front head lamp relay (dimmed light)

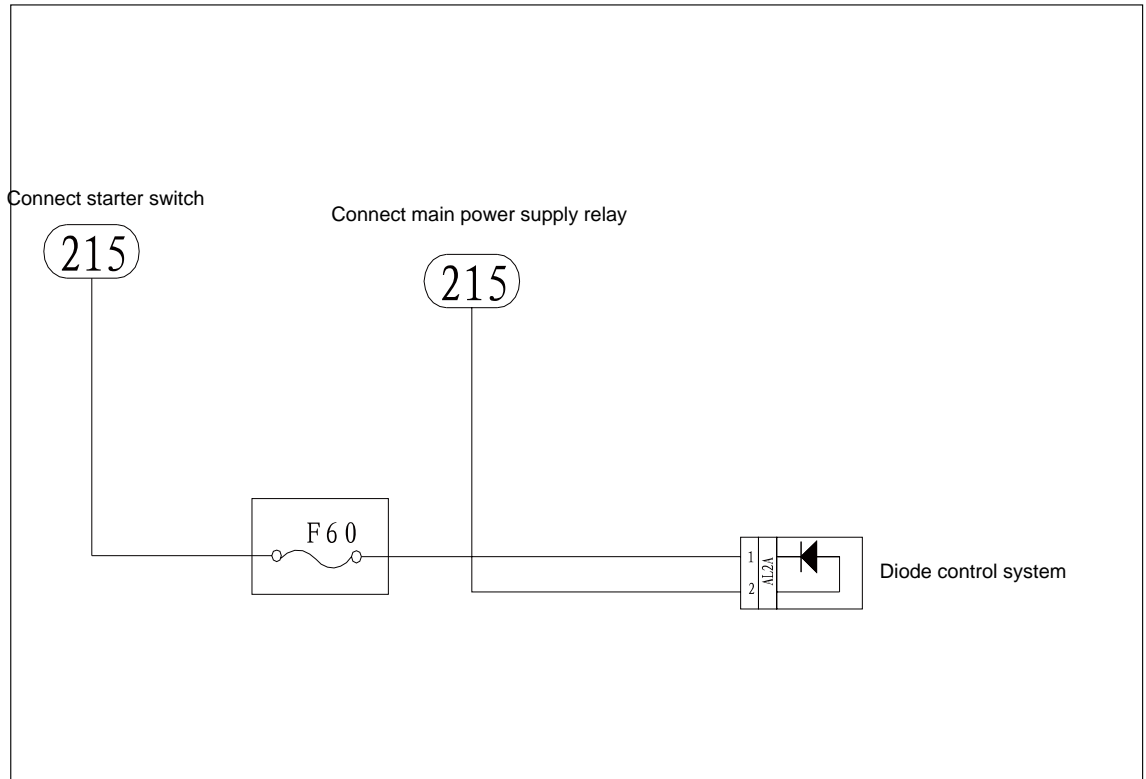
BC42 LR 310 Connect front head lamp relay (far beam)

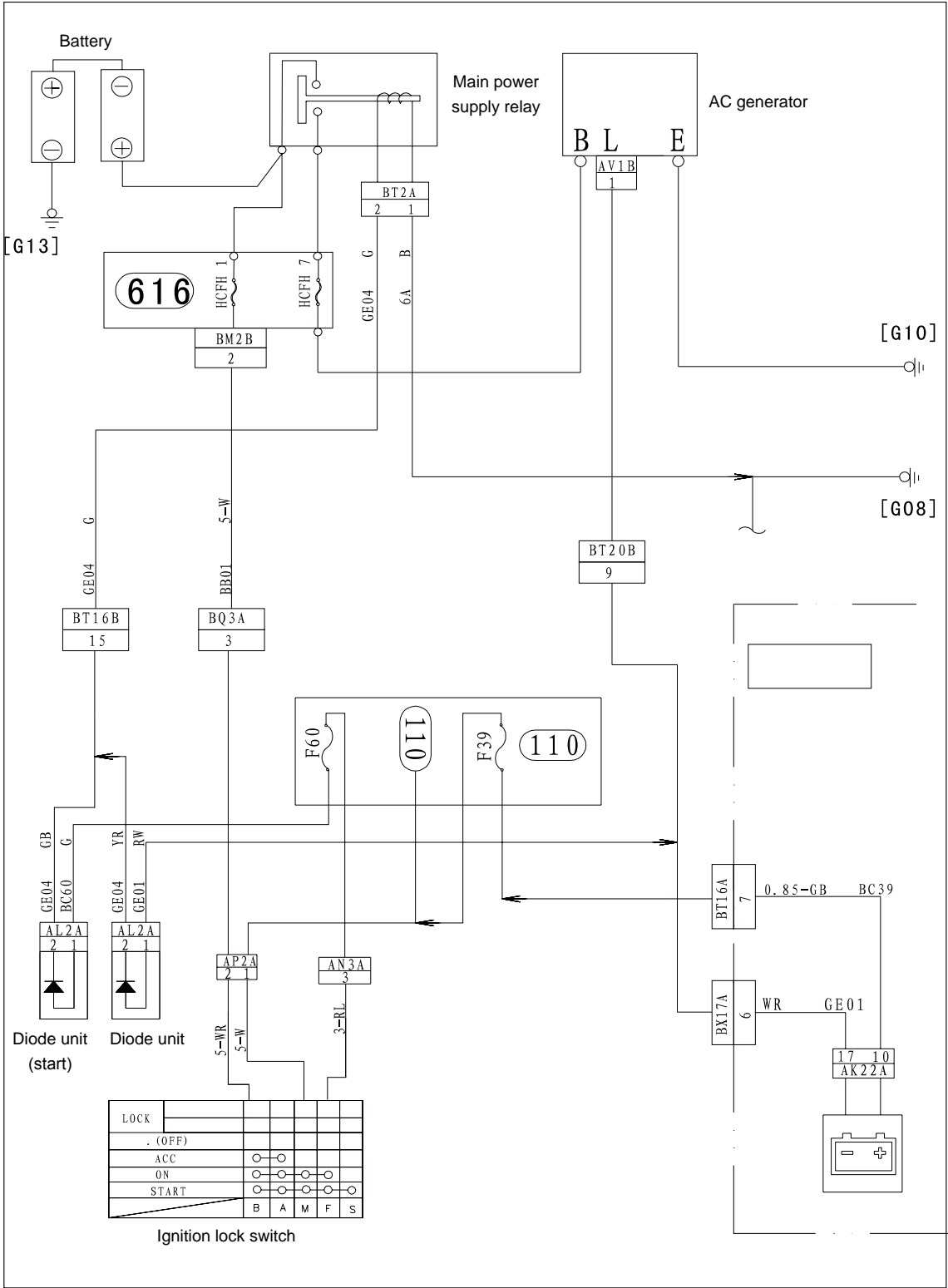
Power supply, Charging and Grounding System Circuit Diagram





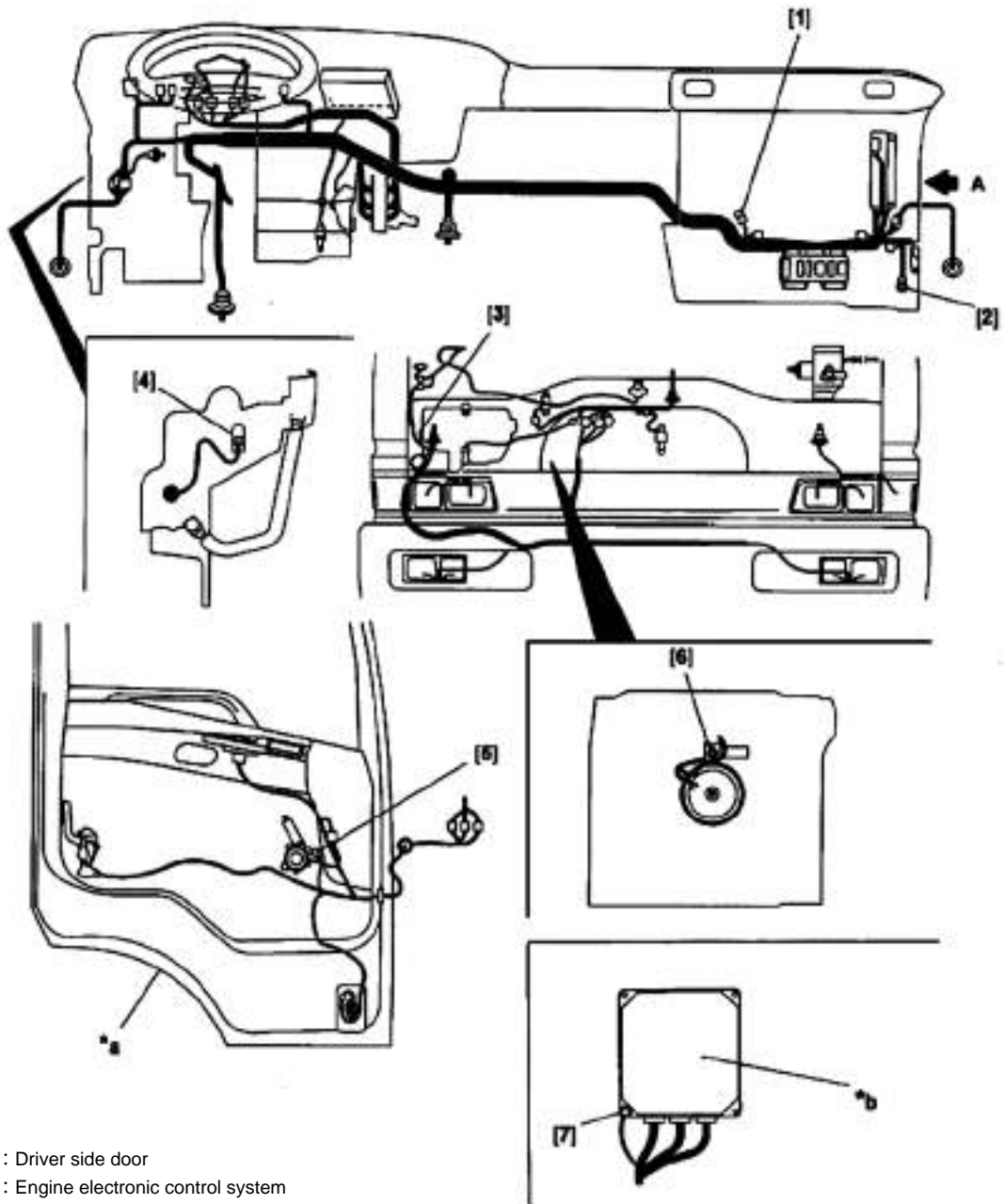
Power supply, Charging and Grounding System Circuit Diagram





125 Battery Charging Circuit Diagram

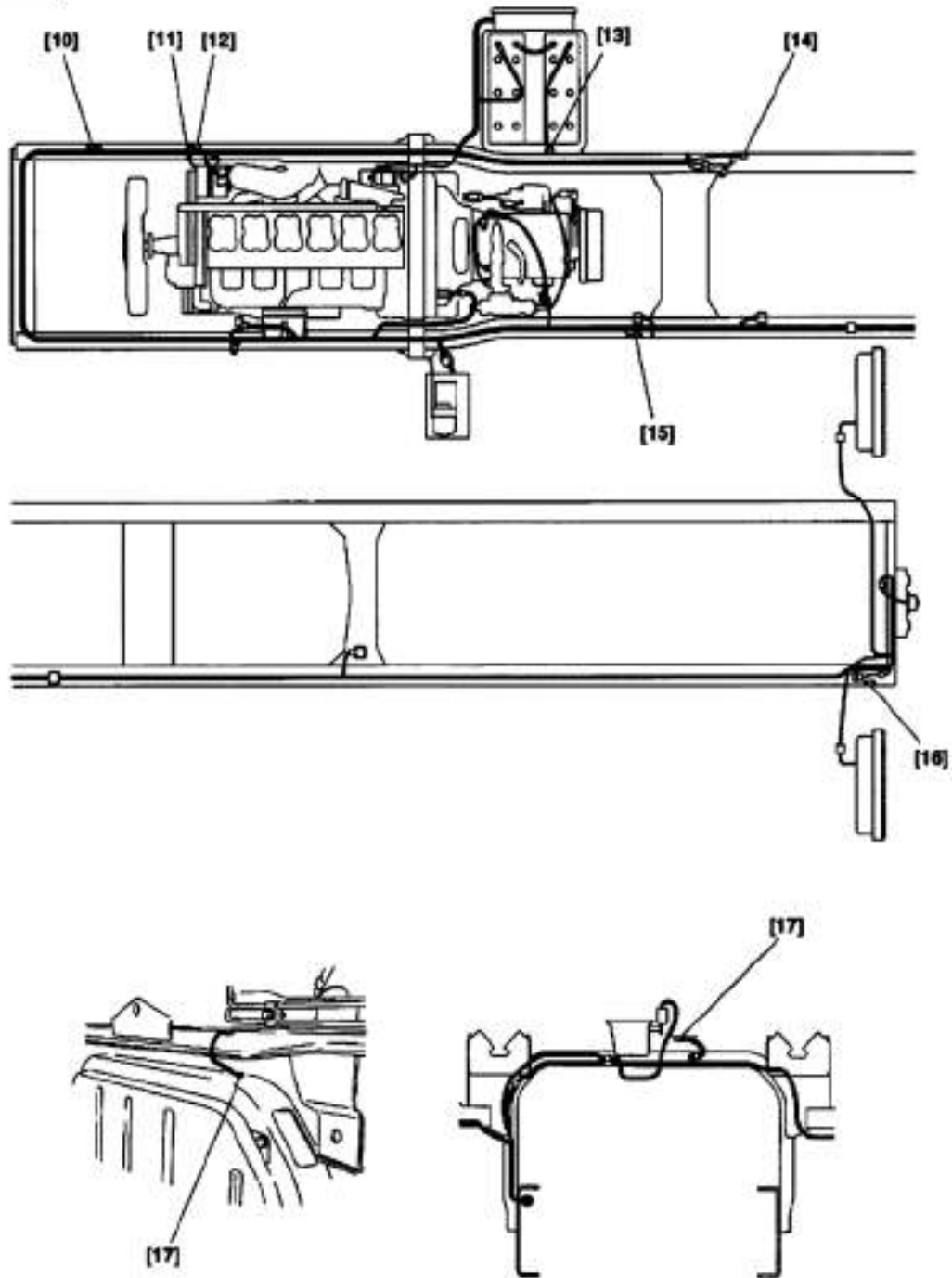
[1] - [7]



*a : Driver side door

*b : Engine electronic control system

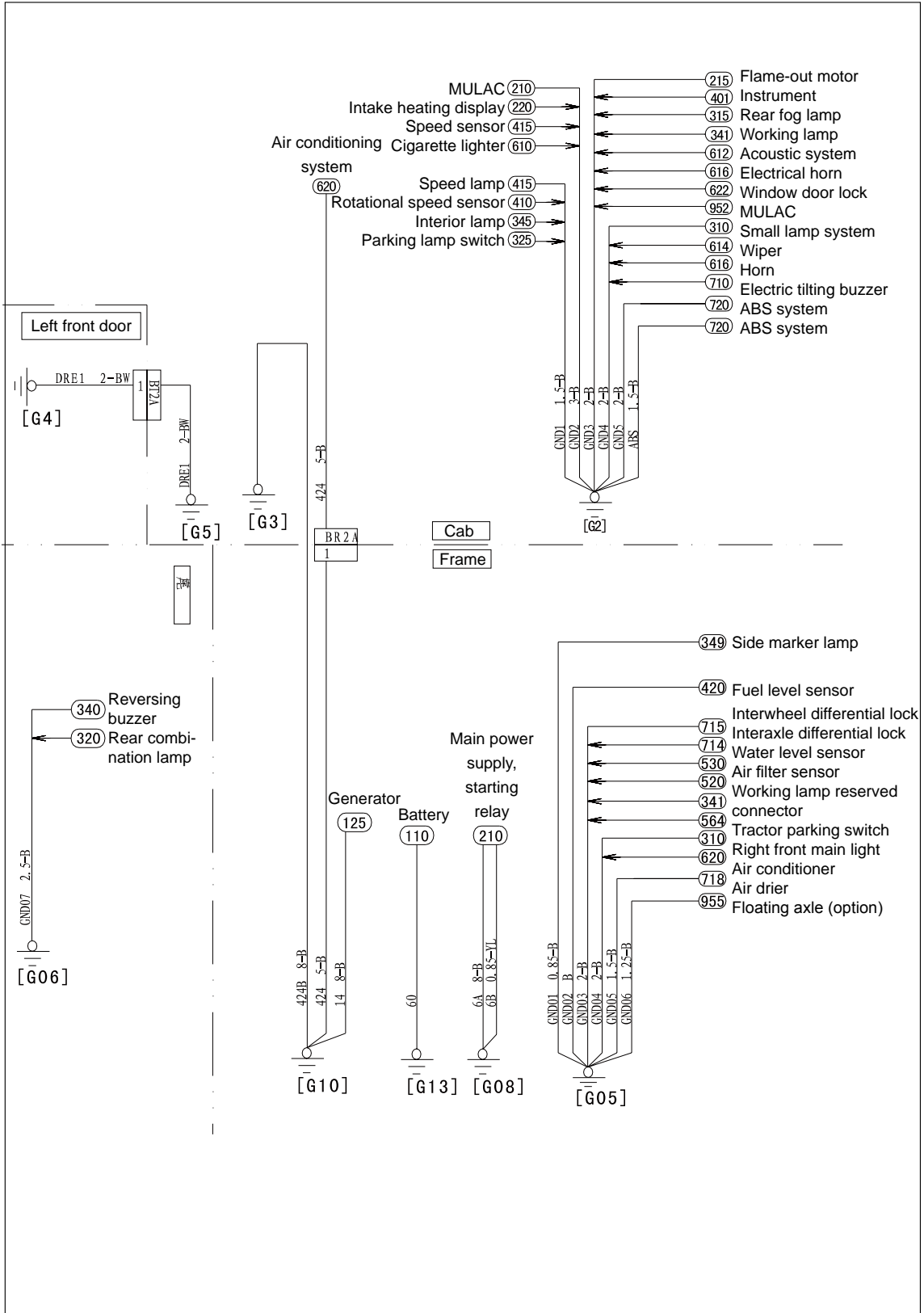
[10]-[17]



130 Grounding System

Position	Circuit No.	Wire diameter – wire color	Remarks
1	424	5-B	
2	20	2-B	
	160	1.25-B	
	246	1.25-B	
	3217	B	
	1829	2-B	
3	210	8-B	Chassis wire
4	DRE1	2-BW	
	EE99	1.25-B	<FV517>
5	DRE1	2-BW	Driver side door
6	EH01	W	
7	EE1	B	<FV517>
10	210	8-B	
	424	5-B	
	CAE1	5-B	
	EE01	1.25-B	
	EE04	1.25-B	
	EE05	1.25-B	
11	-	60	Engine grounding (flat copper wire)
12	14	8-B	AC generator grounding
13	-	60	Battery grounding
14	6	0.85-Y	
15	19	2-B	
	74	B	
16	37	0.85-B	
	38	0.75-B	
	RFE1	0.75-B	
17	-	8-B	Cab gap bridge grounding

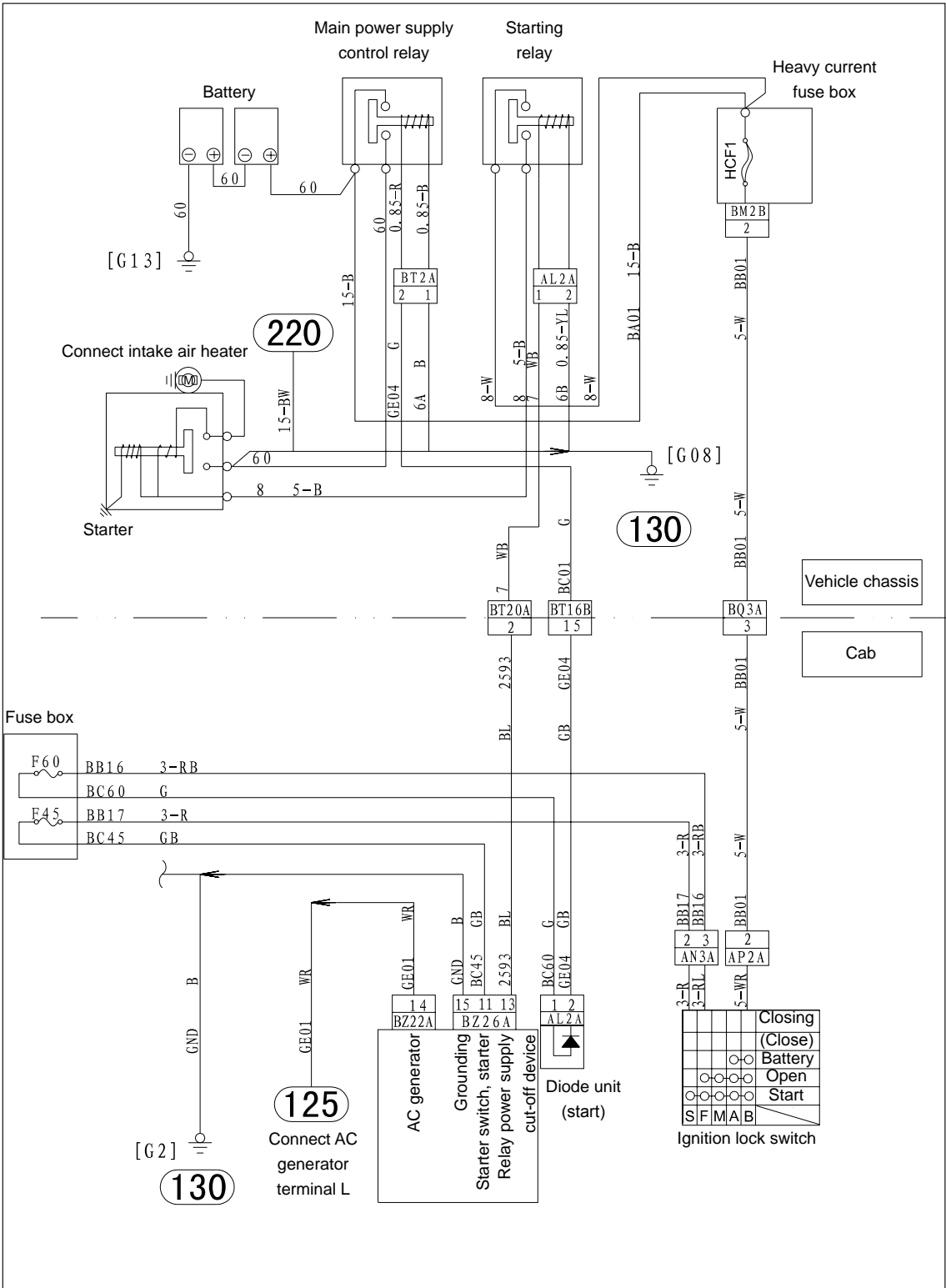
Maintenance Manual for CAMC Automobile



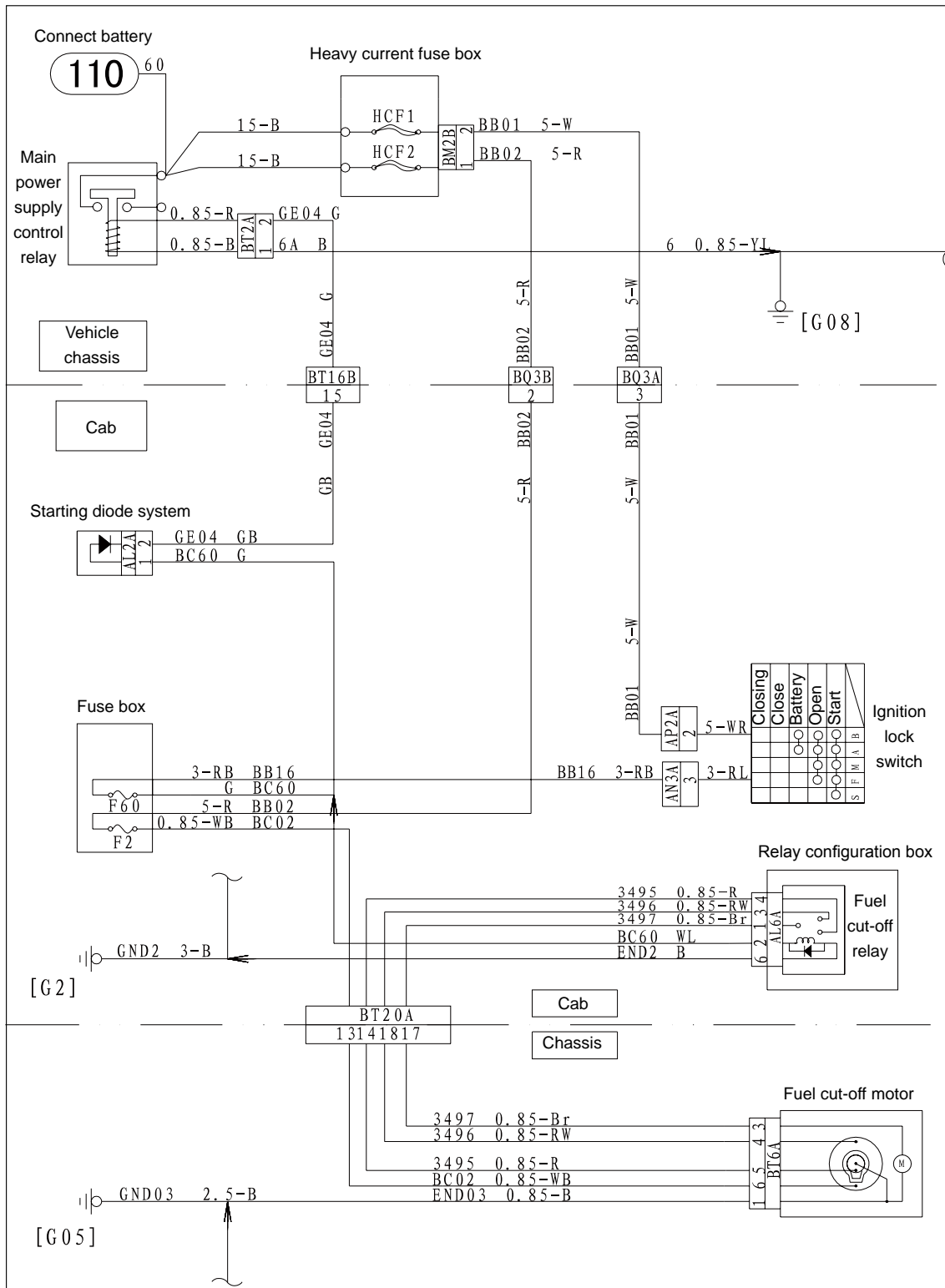
22-03 Circuit Diagram of Engine Starting, Parking and Preheating System

210 Circuit Diagram of Engine Starting System	22-03-2
215 Circuit Diagram of Engine Parking System	22-03-3
220 Circuit Diagram of Engine System	22-03-4

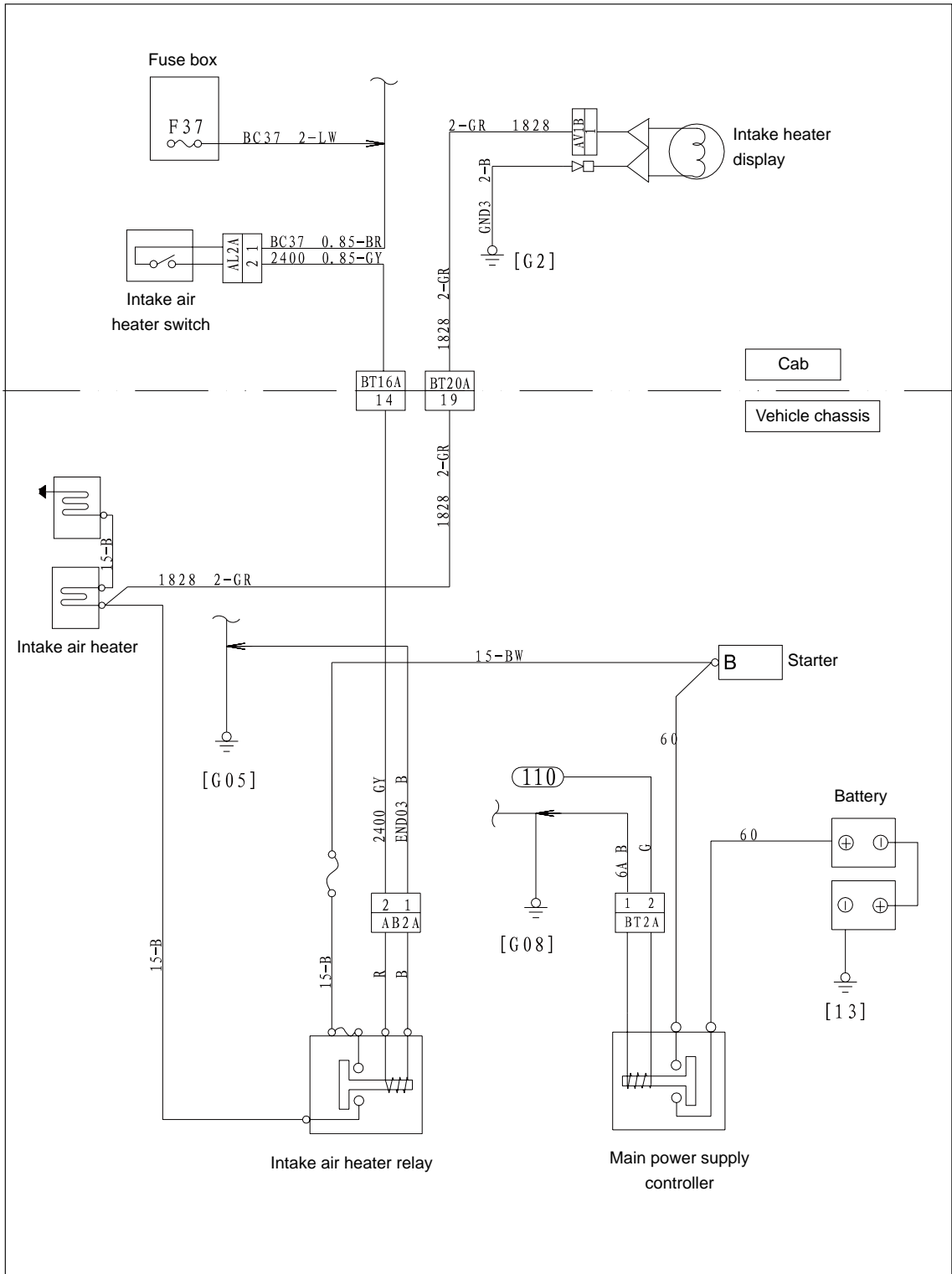
210 Circuit Diagram of Engine Starting System



215 Circuit Diagram of Engine Parking System



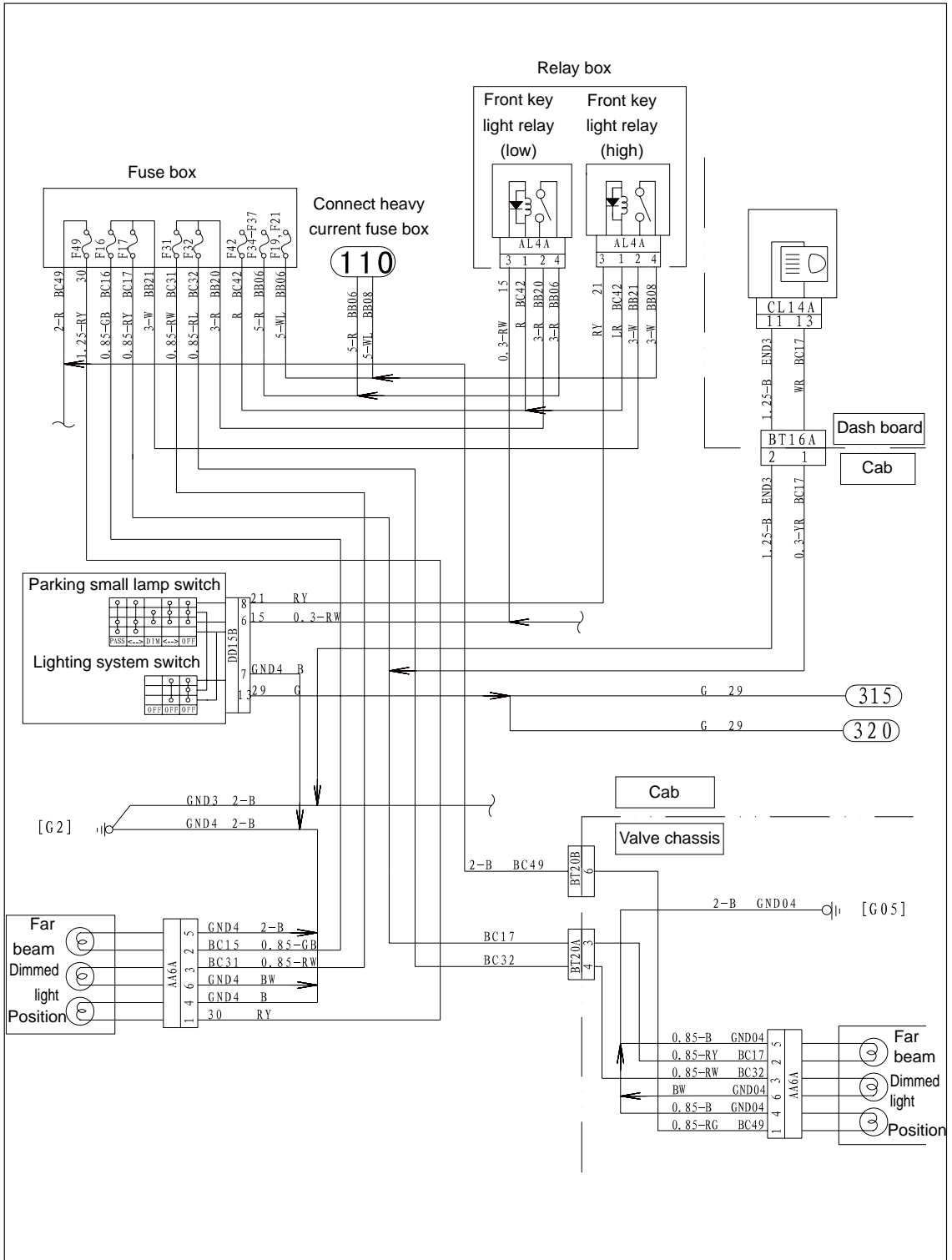
220 Circuit Diagram of Engine System



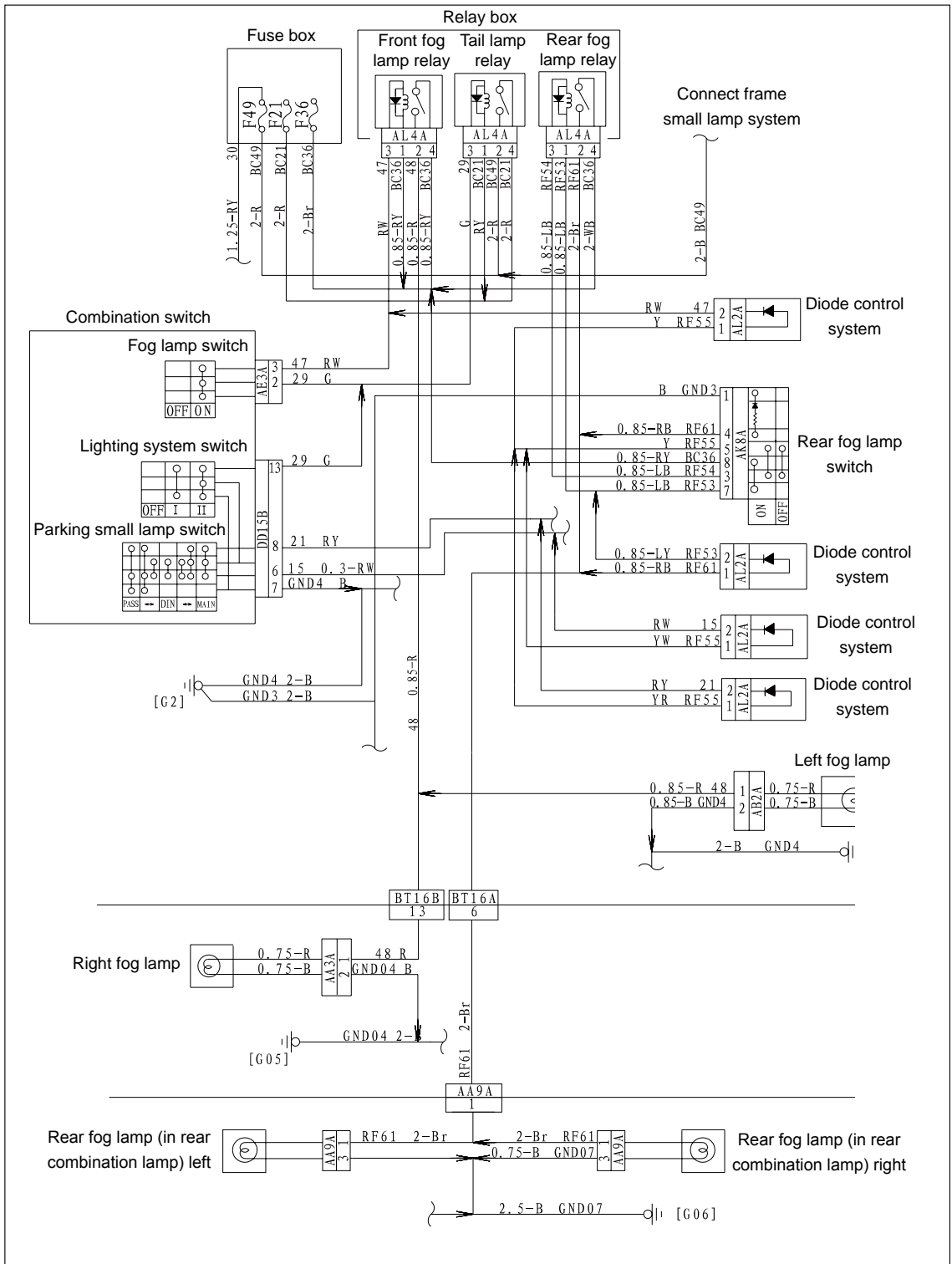
22-04 Circuit Diagram of Lamplight System

310 Wiring Diagram of Head Lamp	22-04-2
315 Wiring Diagram of Fog Lamp	22-04-3
320 Wiring Diagram of Tail Lamp, Space Lamp and License Plate Lamp	22-04-4
325 Wiring Diagram of Parking Lamp	22-04-5
330 Wiring Diagram of Turning Signal and Hazard Warning Lamp.....	22-04-6
335 Wiring Diagram of Turning Lamp.....	22-04-7
340 Wiring Diagram of Reversing Lamp	22-04-8
342 Wiring Diagram of Working Lamp	22-04-9
348 Wiring Diagram of Illuminating Lamp.....	22-04-10
349 Wiring Diagram of Marker Lamp.....	22-04-11

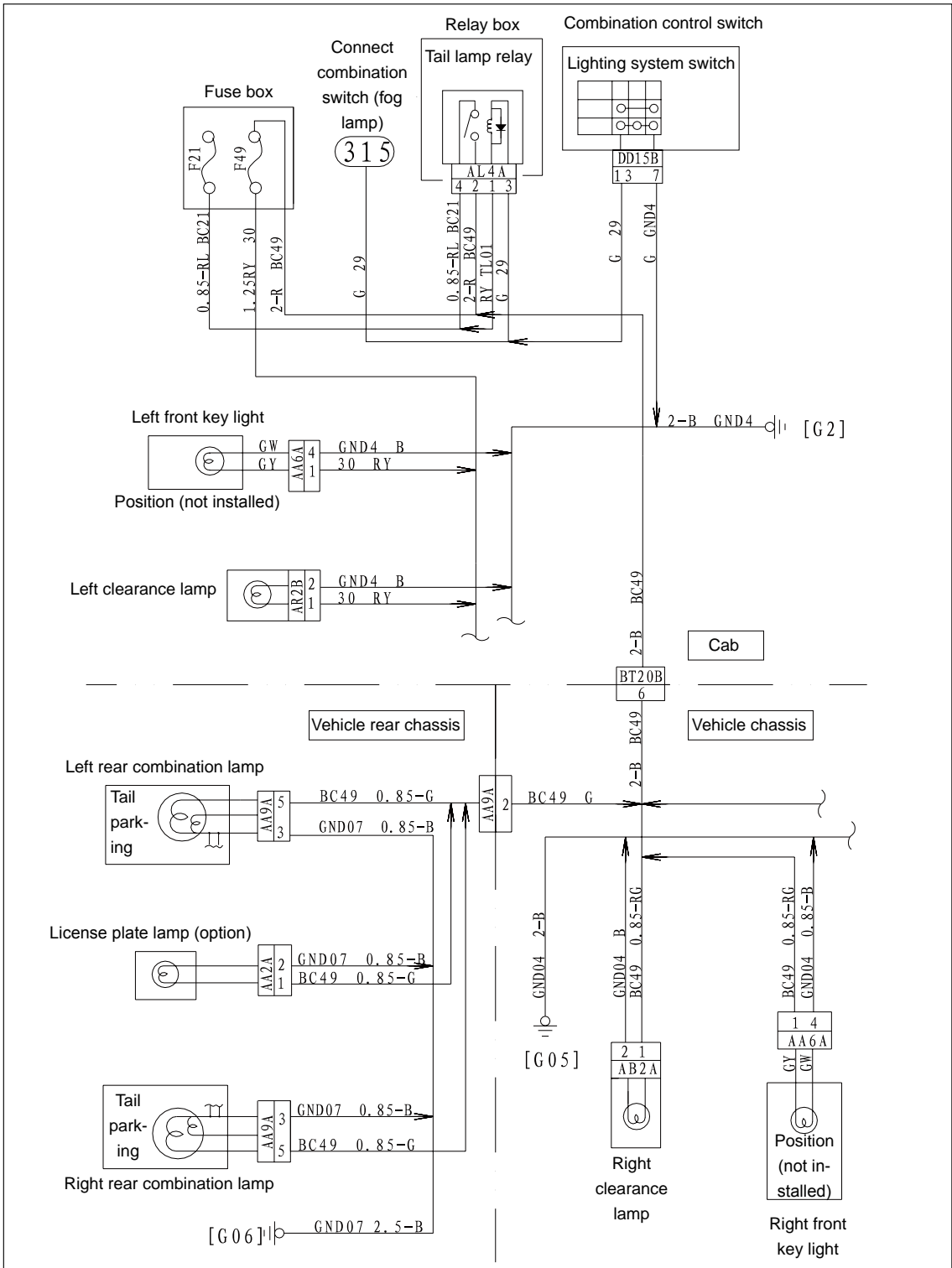
310 Wiring Diagram of Head Lamp



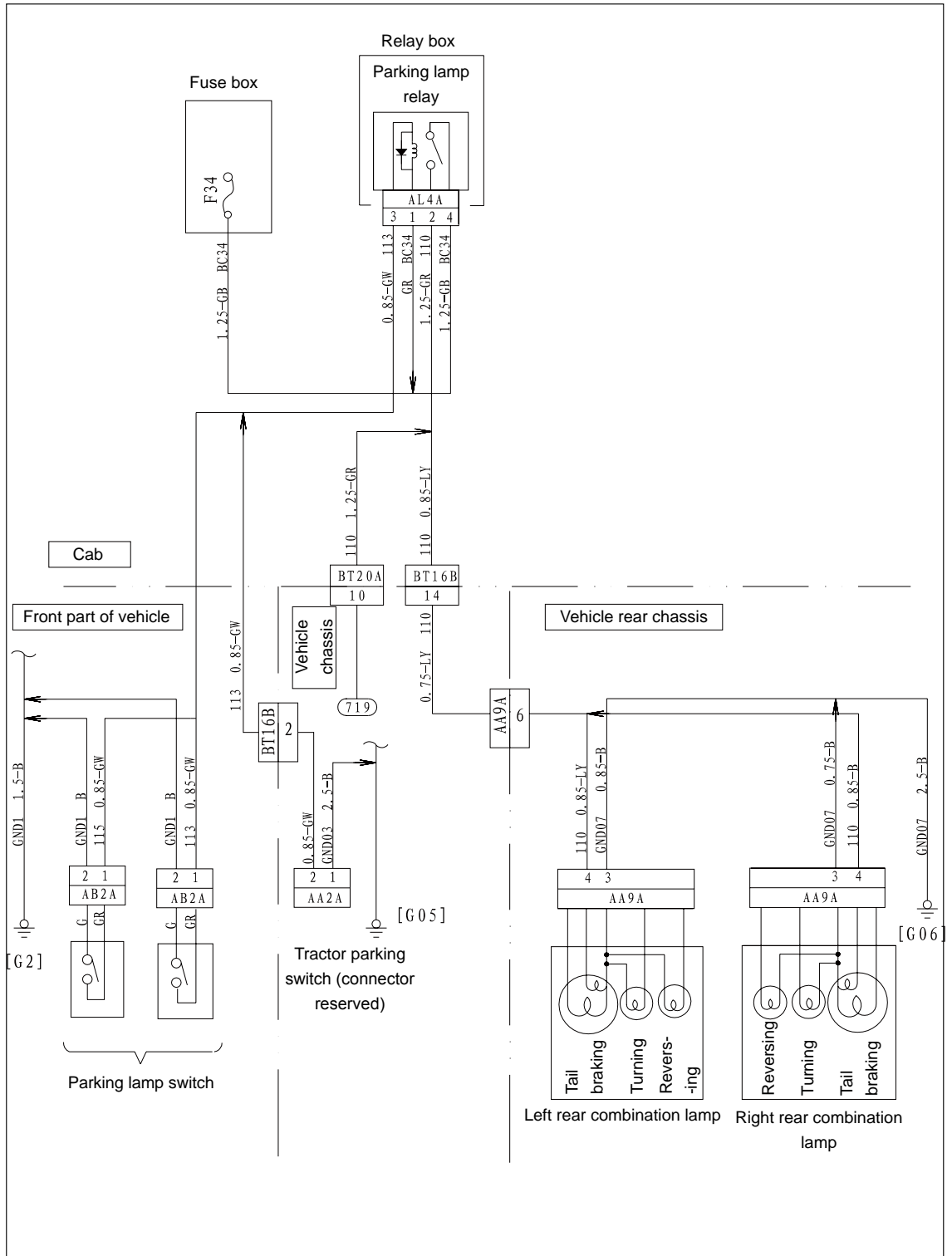
315 Wiring Diagram of Fog Lamp



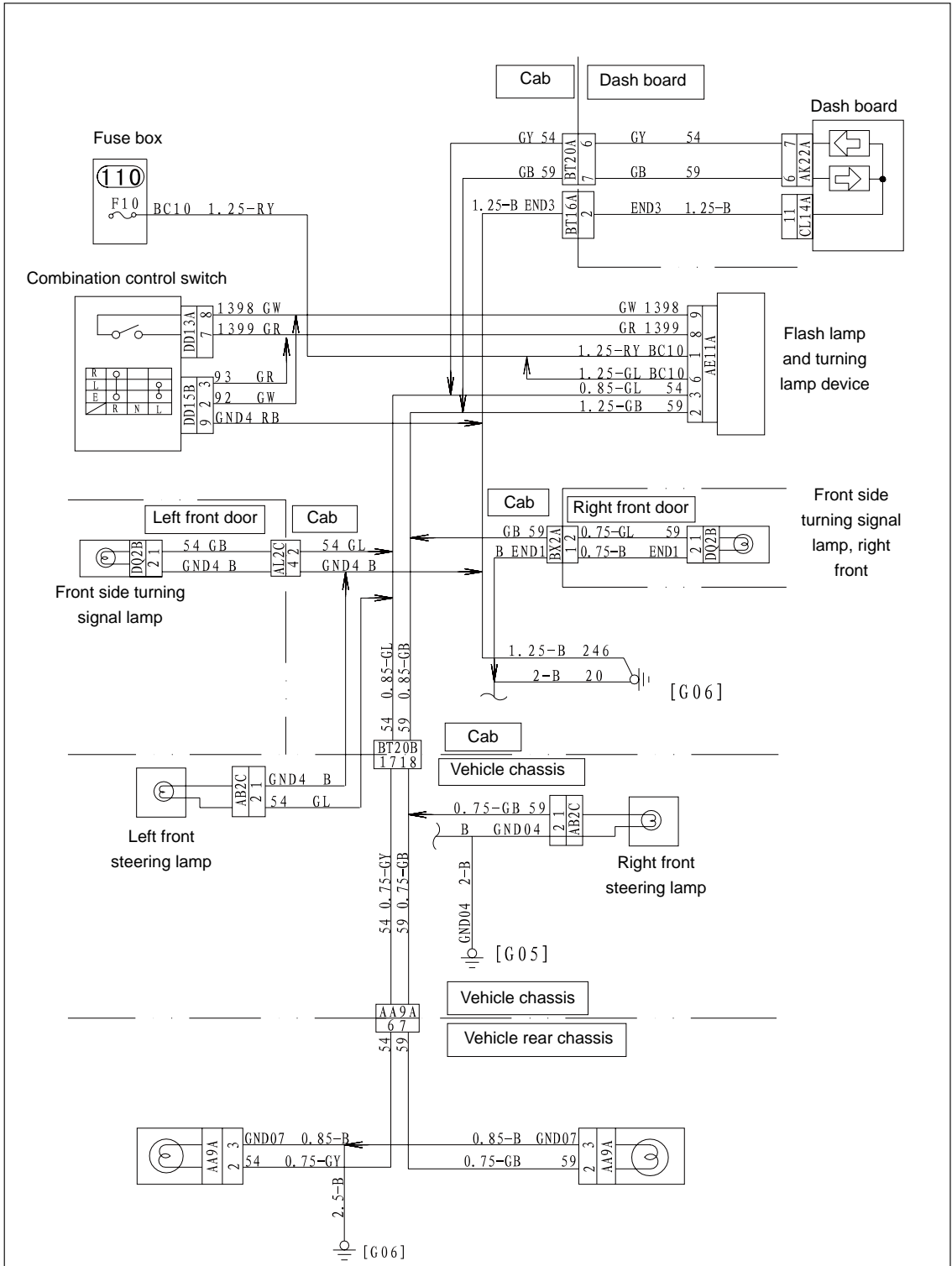
320 Wiring Diagram of Tail Lamp, Space Lamp and License Plate Lamp



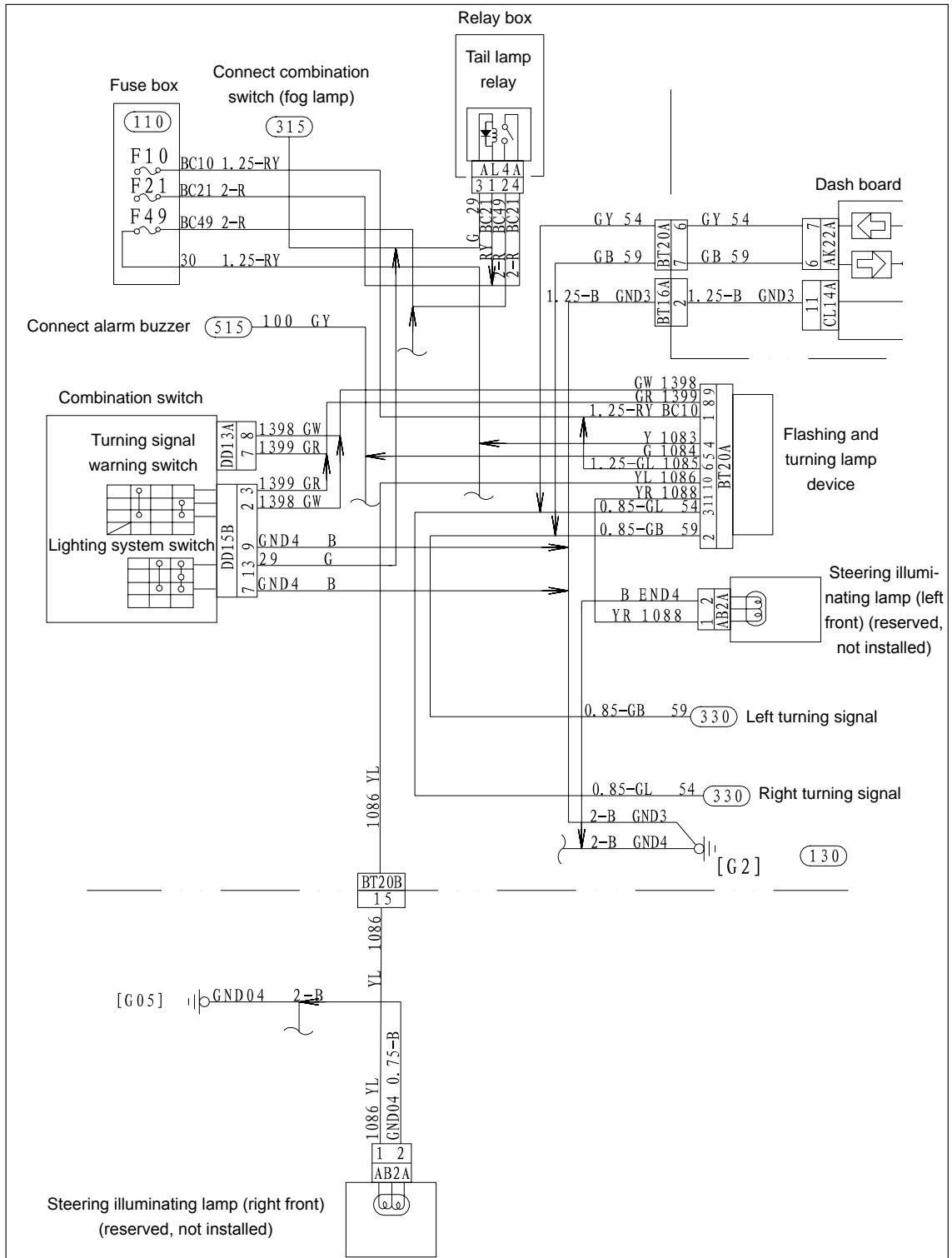
325 Wiring Diagram of Parking Lamp



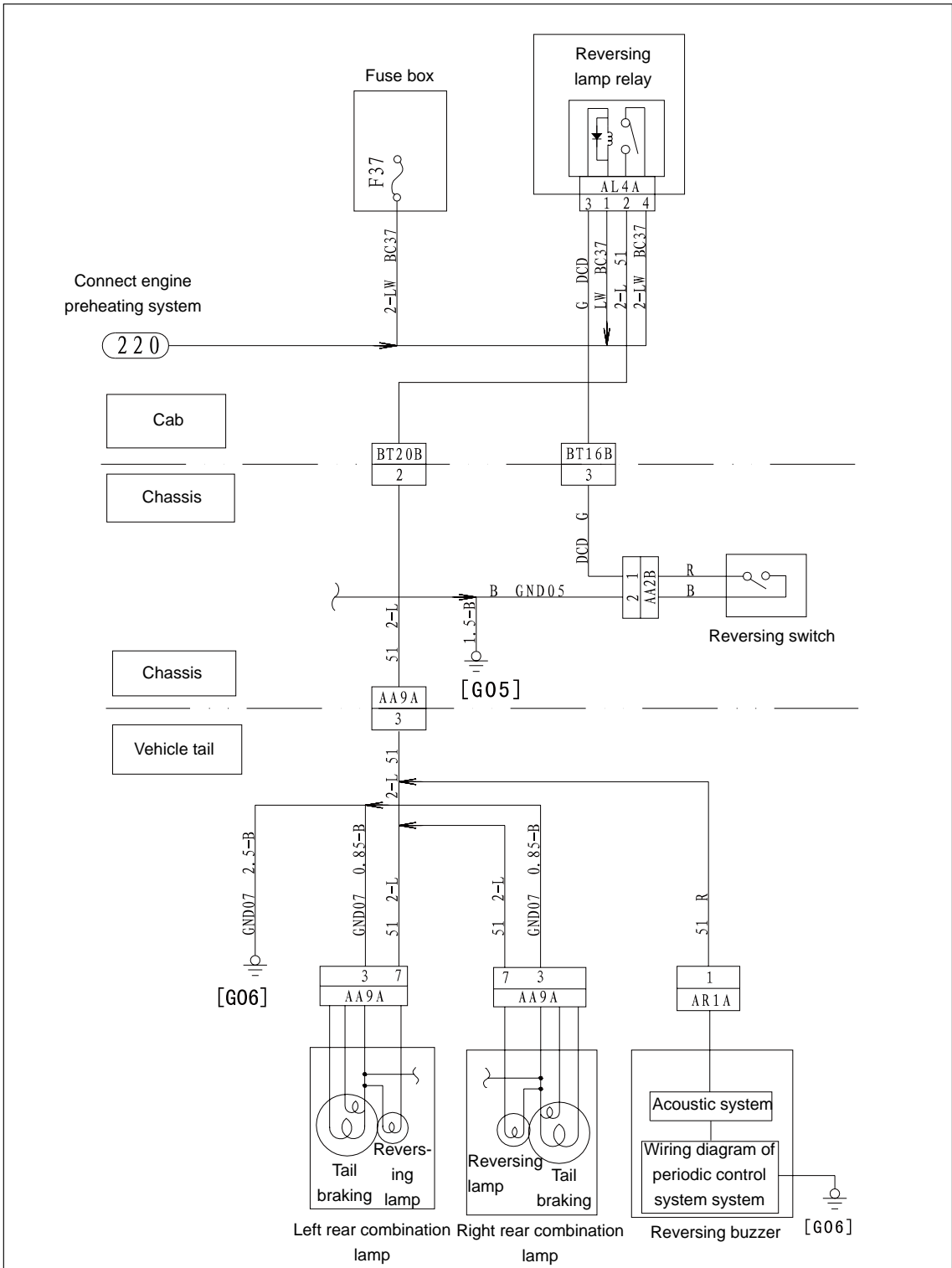
330 Wiring Diagram of Turning Signal and Hazard Warning Lamp



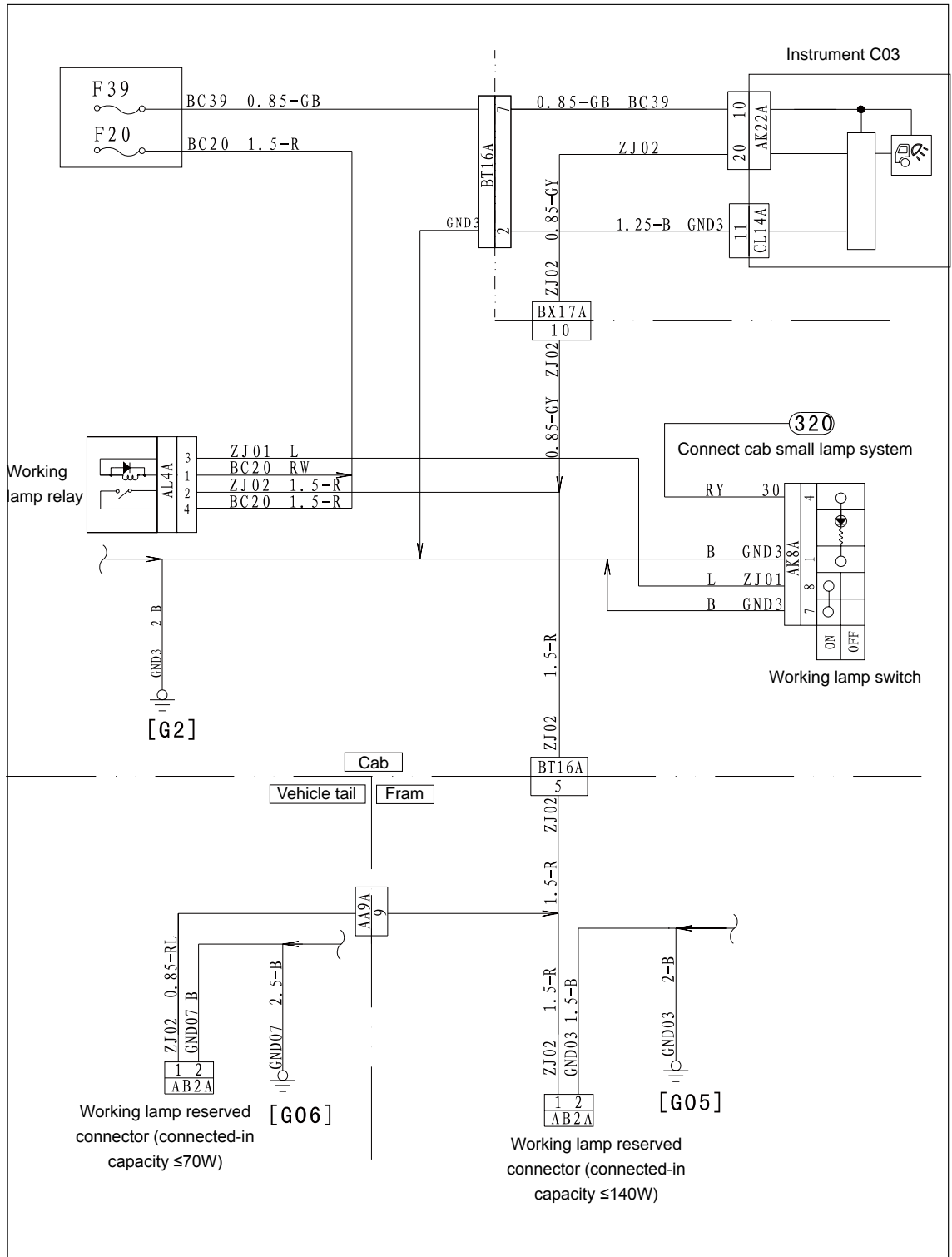
335 Wiring Diagram of Turning Lamp



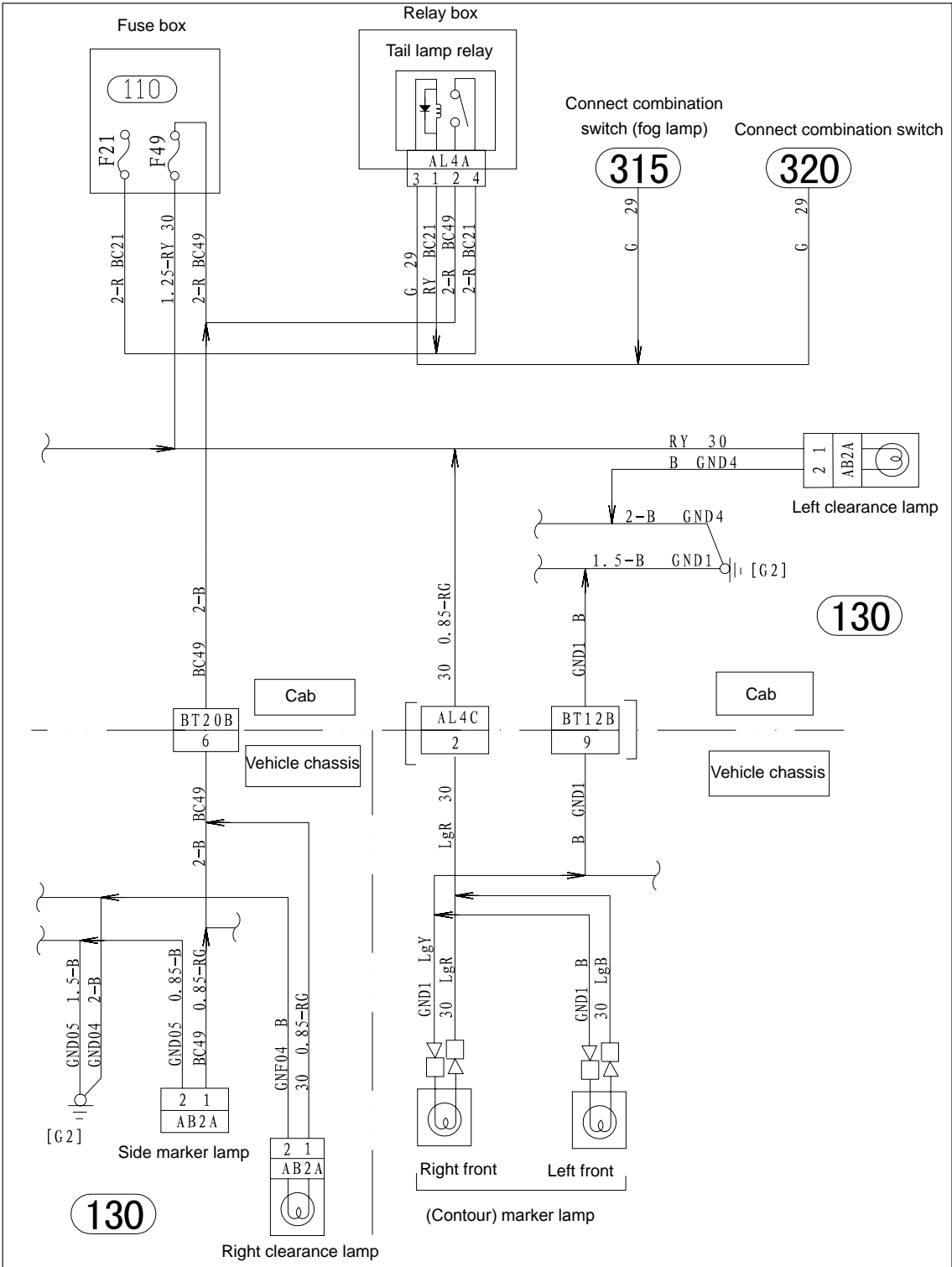
340 Wiring Diagram of Reversing Lamp



342 Wiring Diagram of Working Lamp



349 Wiring Diagram of Marker Lamp

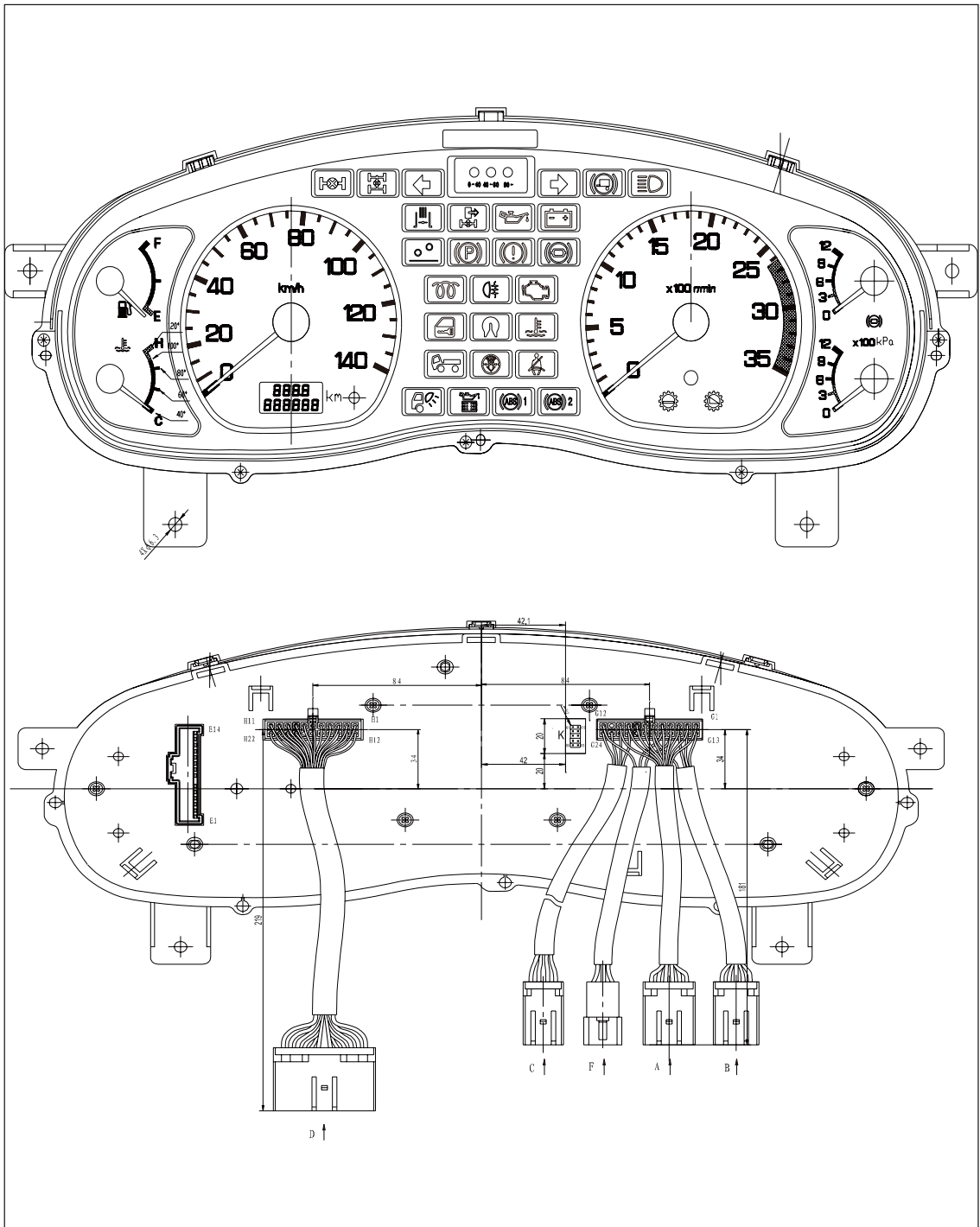




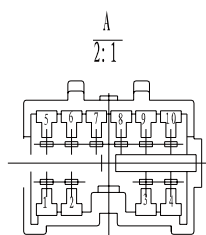
22-05 Circuit Diagram of Instrument System

401	Combination Instrument Functional Diagram	22-05-2
401	Combination Instrument Plugging Connector Functional Diagram	22-05-3
401	Circuit Diagram of Rotating Speed (with Speed Sensor)	22-05-5
411	Circuit Diagram of Rotating Speed (Engine Taking Rotating Speed Signal - STEYR Hangzhou Engine Series)	22-05-6
412	Circuit Diagram of Speedometer	22-05-7
415	Running Recorder and Speed Display Instrument Lamp Circuit (Optional).....	22-05-8
420	Circuit Diagram of Fuel Gauge	22-05-9
421	Circuit Diagram of Water Thermometer	22-05-10

401 Combination Instrument Functional Diagram

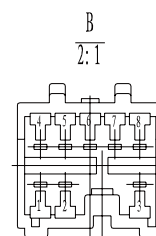


401 Combination Instrument Plugging Connector Functional Diagram



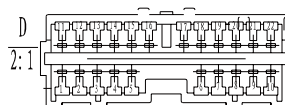
A plug wire function

Plug pin No.	Color	Function
1	Red	Door not closed 1
2	R/W	Coupler
3	Yellow	Coupler
4	Brown	Preheating
5	-	Spare
6	Light blue	Interwheel differential negative pole
7	White	Cab tilting
8	Green	Water temperature too high
9	Y/B	Engine fault 2
10	Black	Engine fault 1



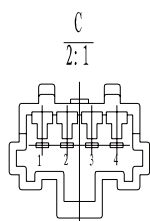
B plug wire function

Plug pin No.	Color	Function
1	-	Spare
2	Green	Low gear
3	White	Top gear
4	G/Y	Safety belt
5	Brown	Rear fog lamp indication
6	-	Spare
7	Blue	Lighting
8	Brown	Door not closed 2



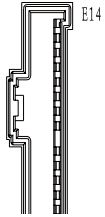
D22 core plug function definition

Plug pin No.	Function	Plug pin No.	Function
1	Exhaust brake 1	12	Spare
2	Floating axle	13	Air pressure
3	Exhaust brake 2	14	Braking alarm
4	Interaxle differential +	15	Buzzer
5	Trailer brake	16	Engine cold start
6	Turning right	17	Charging indication
7	Turning left	18	Oil pressure
8	Air filter blocked	19	Oil filter
9	Interwheel differential +	20	Working lamp
10	Instrument positive power supply 24V	21	Parking brake
11	ABS1	22	Power take off



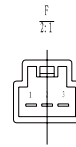
C plug wire function

Plug pin No.	Color	Function
1	Black	Speed 1
2	Yellow	Speed 2
3	Green	Speed 3
4	Orange	Speed lamp negative pole



E14 core plug function definition

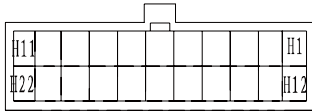
Plug pin No.	Function
1	Positive power supply
2	Far beam indication
3	Negative pole
4	Negative pole
5	Fuel sensor signal
6	Temperature sensor signal
7	Speed sensor signal
8	Lamp ground
9	Speed sensor signal
10	Lamp positive power supply
11	Speedometer ground
12	Engine speedometer signal
13	Buzzer input
14	ABS-2



F plug wire function

Plug pin No	Color	Function
1	Red	Constant power 24W
2	Light blue	Upper air pressure
3	Yellow	Lower air pressure

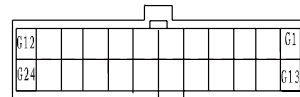
H22 core socket



H22 core socket function definition

Plug pin No.	Color	Function	Plug pin No.	Color	Function
1	White	Exhaust brake 1	12		Spare
2	Light blue	Interaxle differential+	13	Light blue	Air pressure
3	Blue	Exhaust brake 2	14	White	Brake alarm
4	Green	Interwheel differential	15	Green	Buzzer
5	Y/B	Trailer brake	16	Y/B	Engine cold start
6	Black	Turning right indicator	17	Black	Charging indication
7	Red	Turning left indicator	18	Red	Oil pressure
8	W/R	Air filter blocked	19	W/R	Oil filter
9	Yellow	Floating axle+	20	Yellow	Working lamp
10	Brown	Instrument positive power supply 24V	21	Brown	Parking brake
11	Blue	ABS1	22	Blue	Power take off

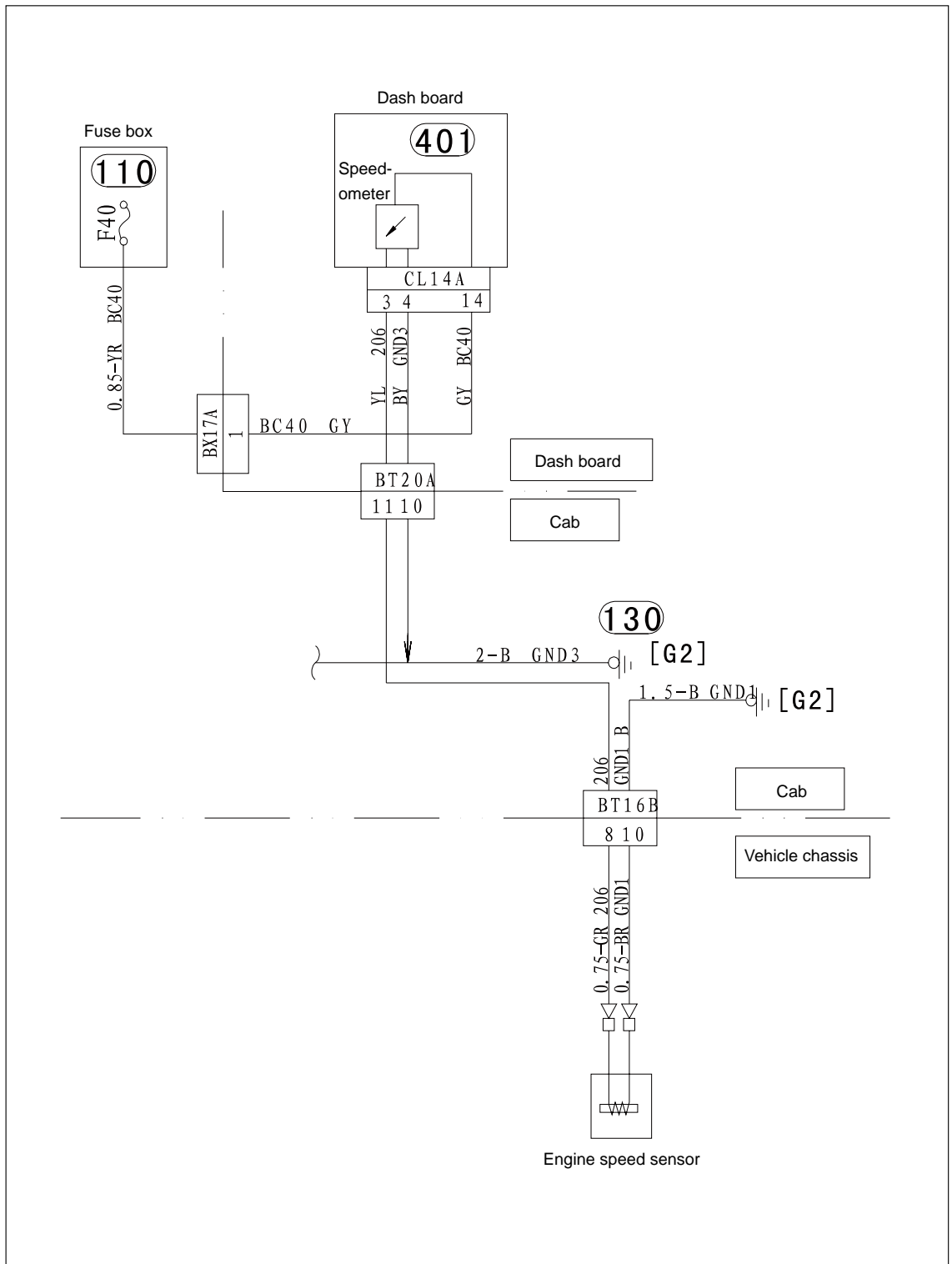
G24 core socket



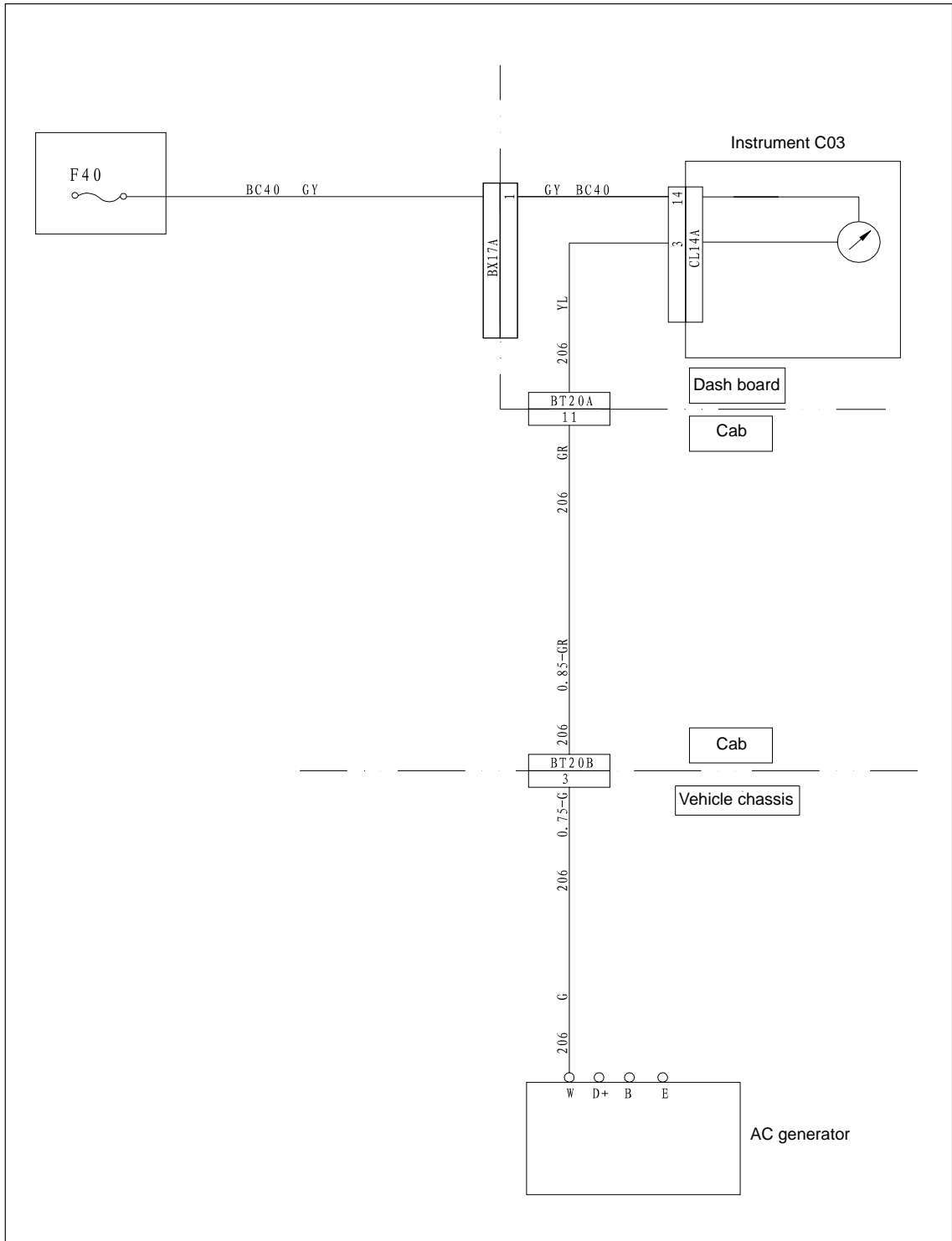
G24 core socket function definition

Plug pin No.	Function	Plug pin No.	Function
1	Door not closed 1	13	Low gear
2	Coupler spare -	14	Top gear
3	Coupler spare +	15	Safety belt
4	Preheating	16	Lower air pressure
5	Rear fog lamp indication	17	Upper air pressure
6	Interaxle differential negative pole	18	Lighting
7	Cab tilting	19	Door not closed 2
8	Water temperature too high	20	Spare
9	Engine fault 2	21	Speed 1
10	Engine fault 1	22	Speed 2
11	Spare	23	Speed 3
12	Constant power 24V	24	Speed negative pole

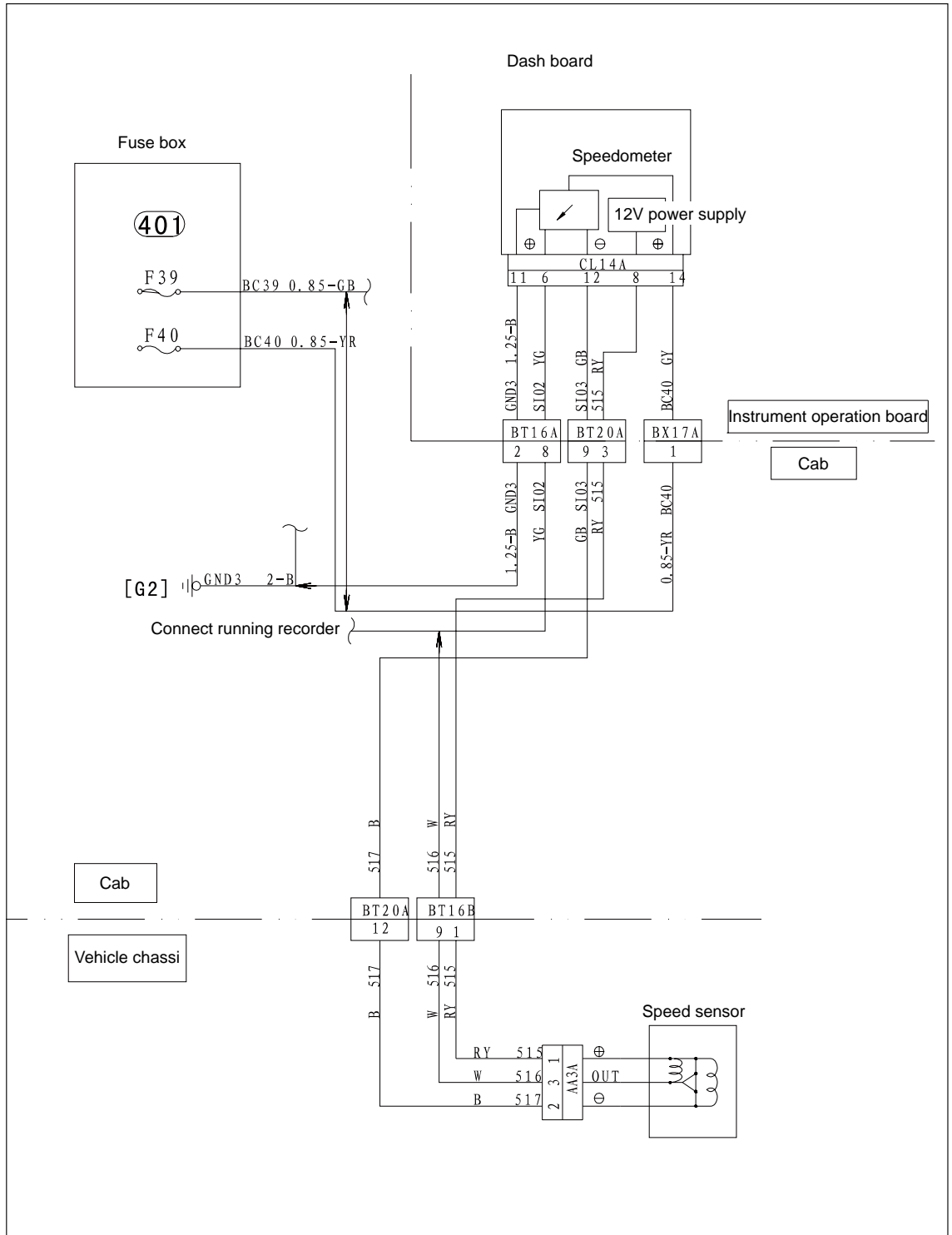
401 Circuit Diagram of Rotating Speed (with Speed Sensor)



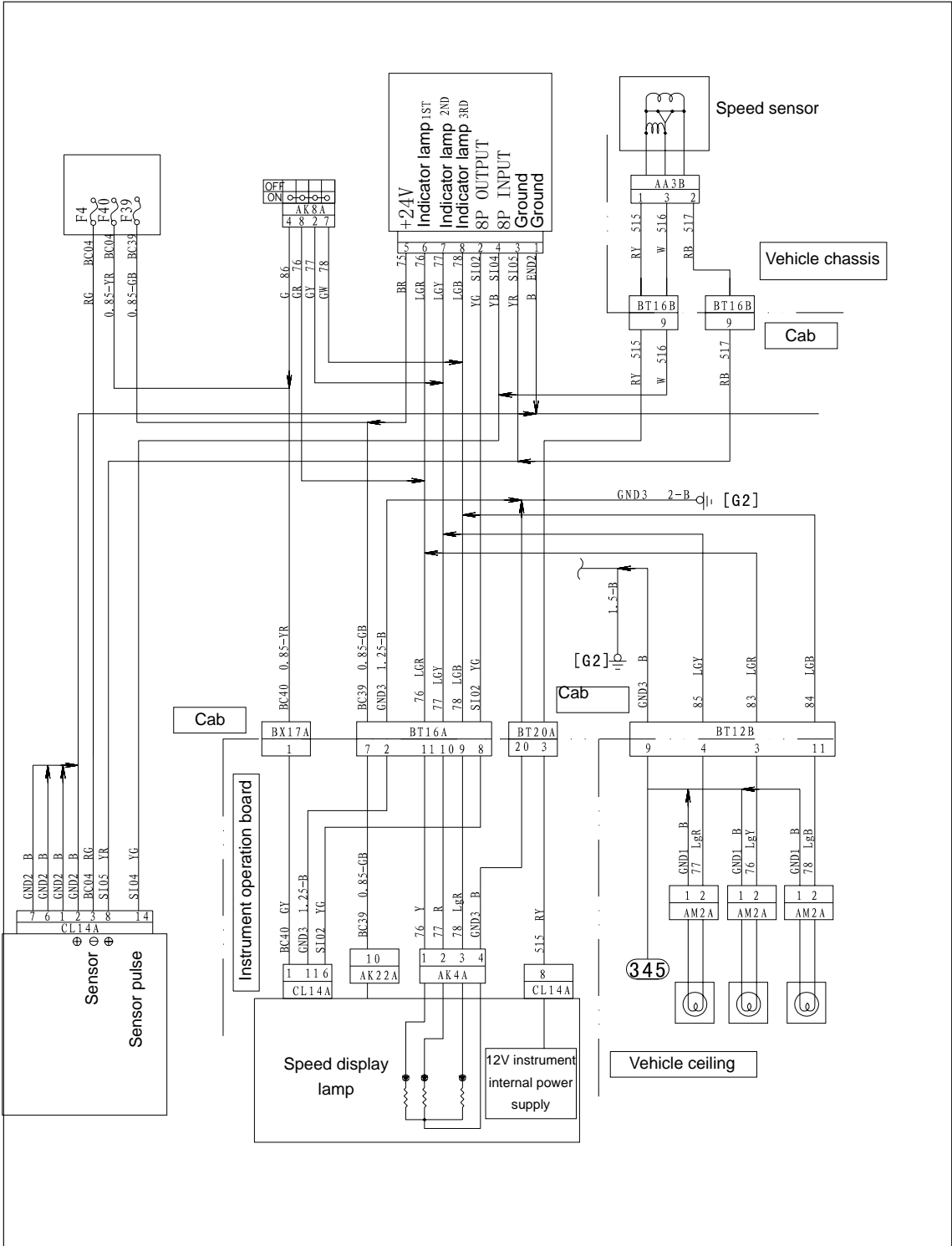
411 Circuit Diagram of Rotating Speed (Engine Taking Rotating Speed Signal – STEYR Hangzhou Engine Series)



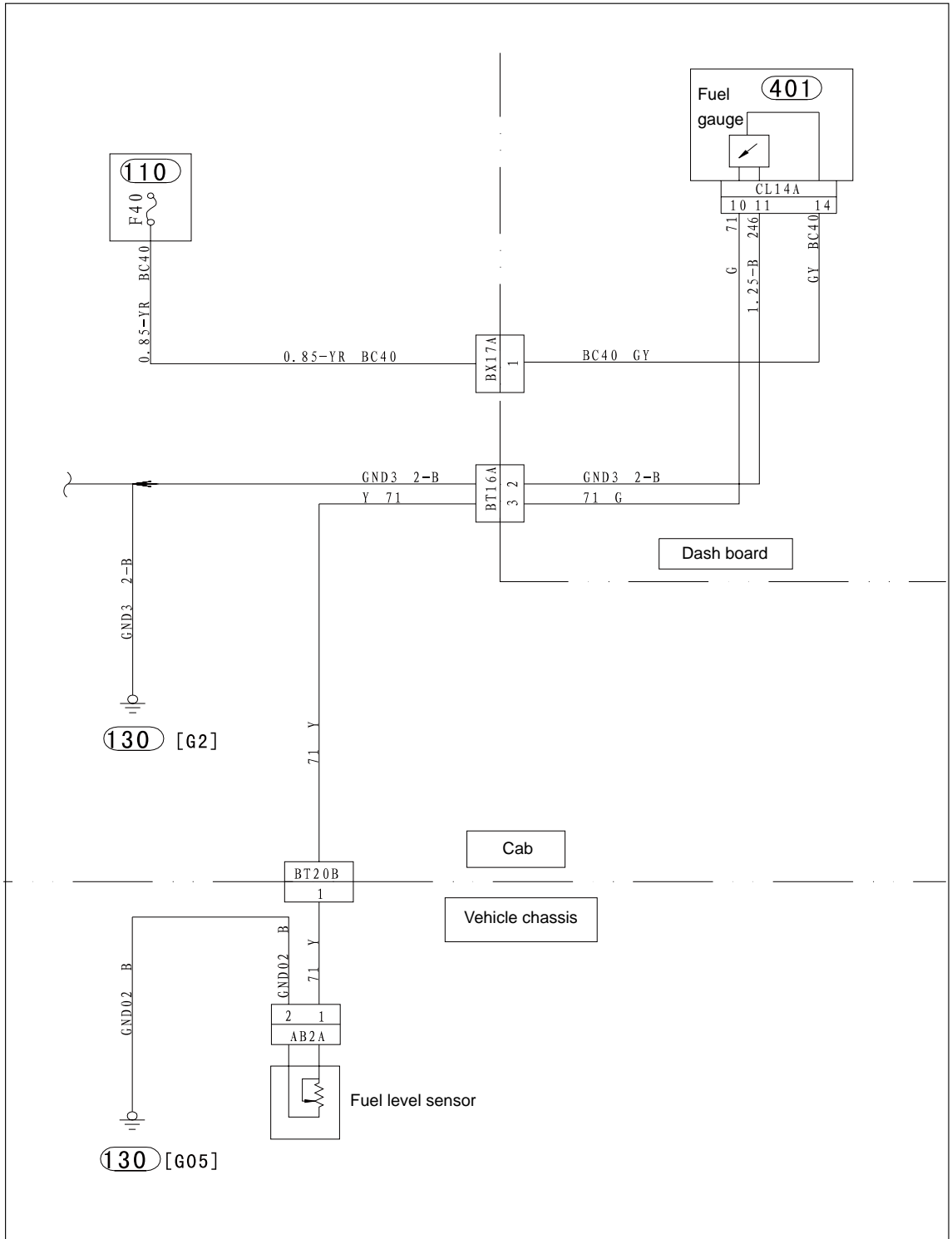
412 Circuit Diagram of Speedometer



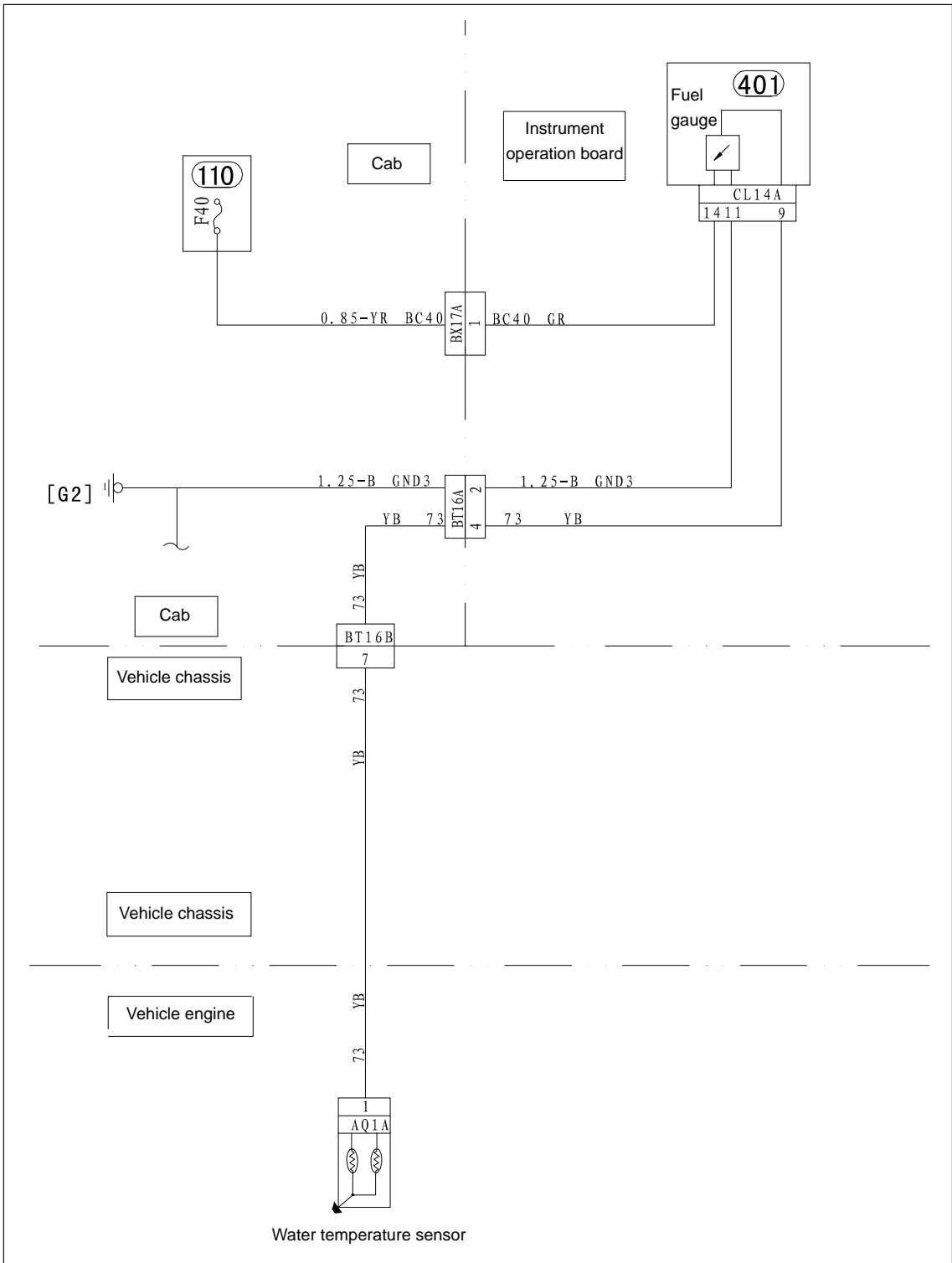
415 Running Recorder and Speed Display Instrument Lamp Circuit (Optional)



420 Circuit Diagram of Fuel Gauge



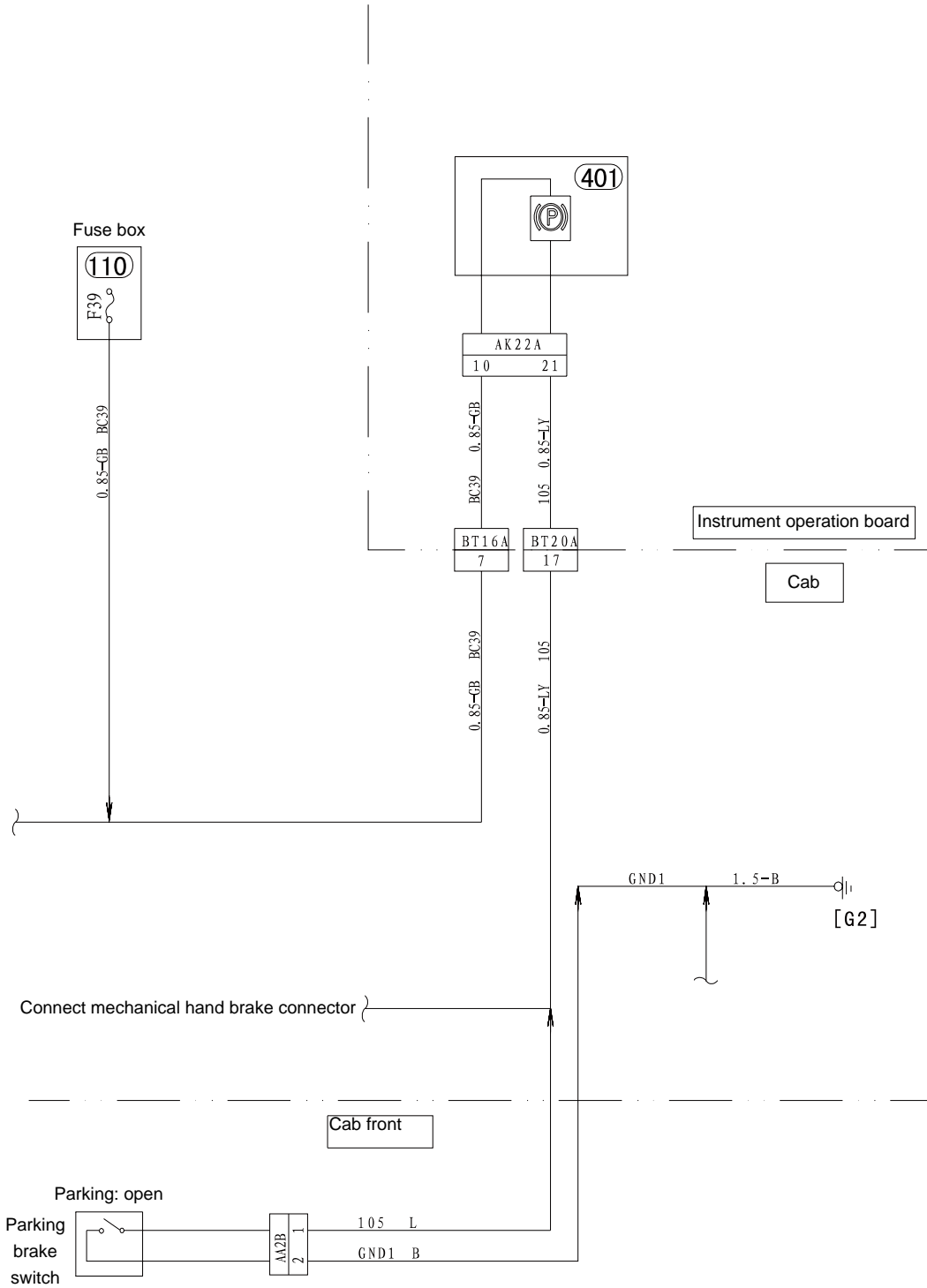
421 Circuit Diagram of Water Thermometer



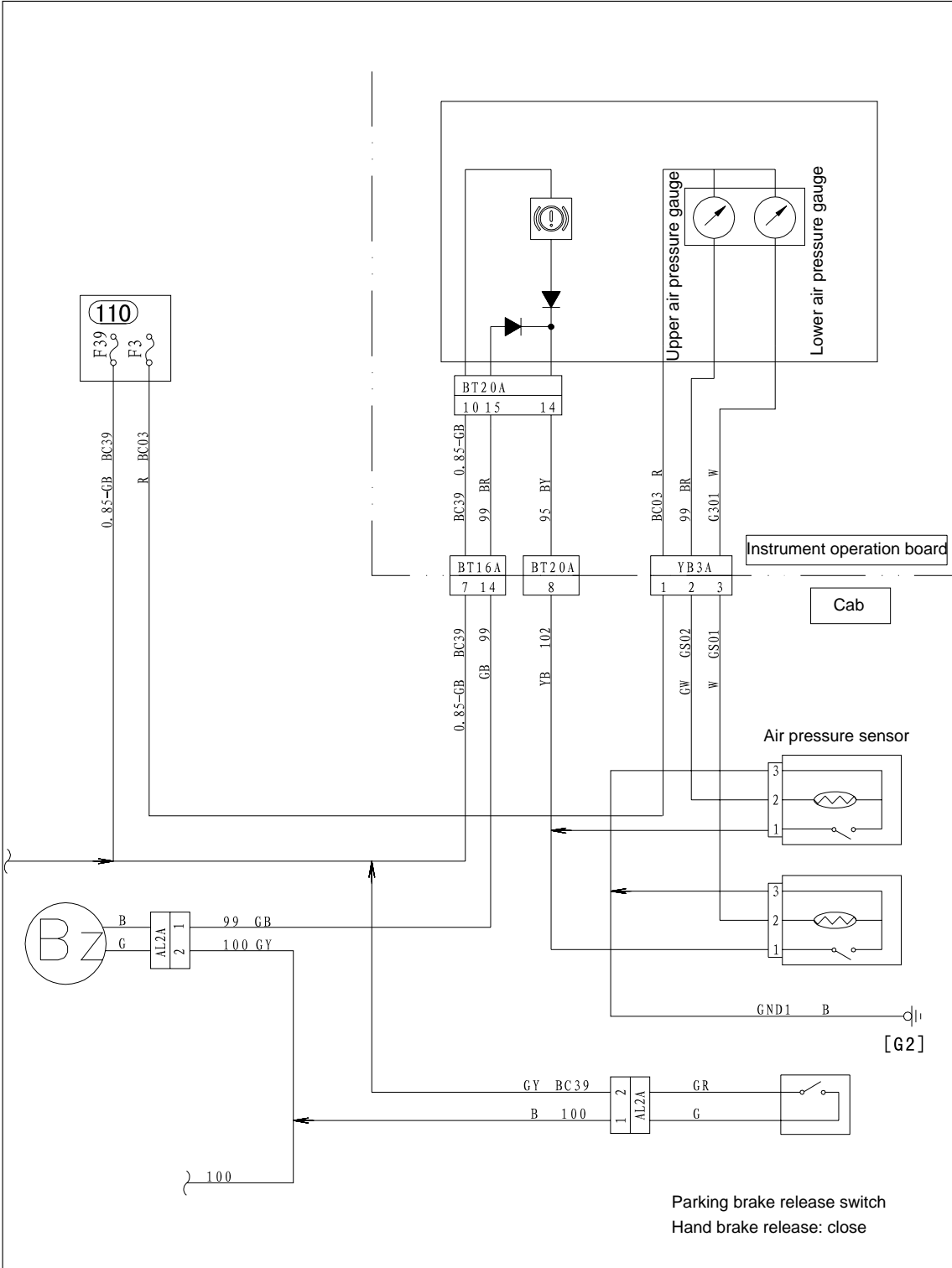
22-06 Circuit Diagram of Display and Alarm Lamp

510 Circuit Diagram of Parking Brake Alarm	22-06-12
515 Circuit Diagram of Brake Alarm System	22-06-13
520 Circuit Diagram of Air Filter Display	22-06-14
521 Circuit Diagram of Top/low Gear Switch (Optional)	22-06-15
522 Circuit Diagram of Tractor Brake Display (Optional)	22-06-16
530 Circuit Diagram of Water Level Alarm System	22-06-17
536 Circuit Diagram of Engine Oil Pressure Alarm System	22-06-18
537 Circuit Diagram of Engine Water Temperature too High Alarm System	22-06-19
538 Circuit Diagram of Engine Oil Filter Blocked Alarm System	22-06-20
550 Circuit Diagram of Cab Electric Tilting Alarm System	22-06-21

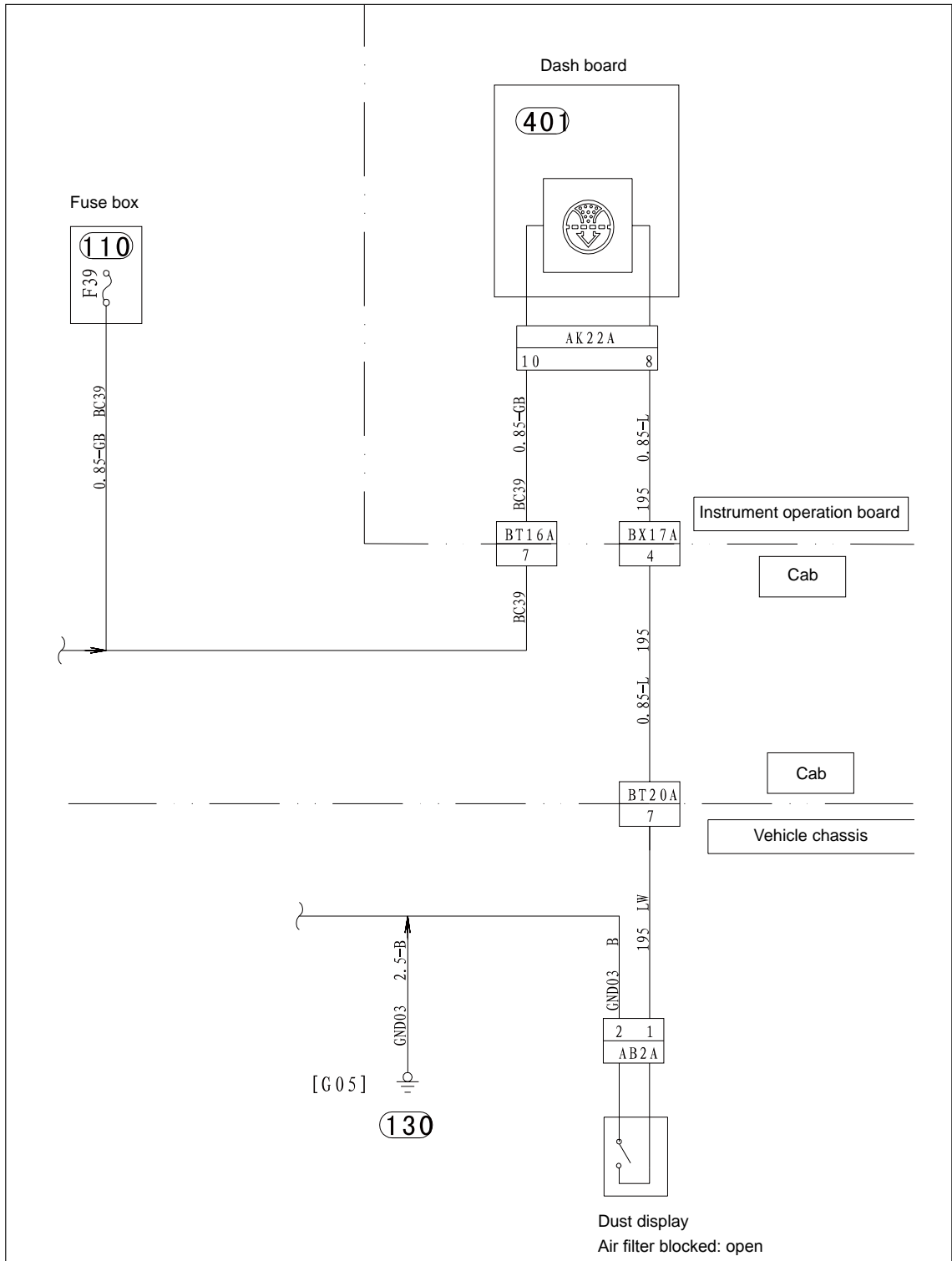
510 Circuit Diagram of Parking Brake Alarm



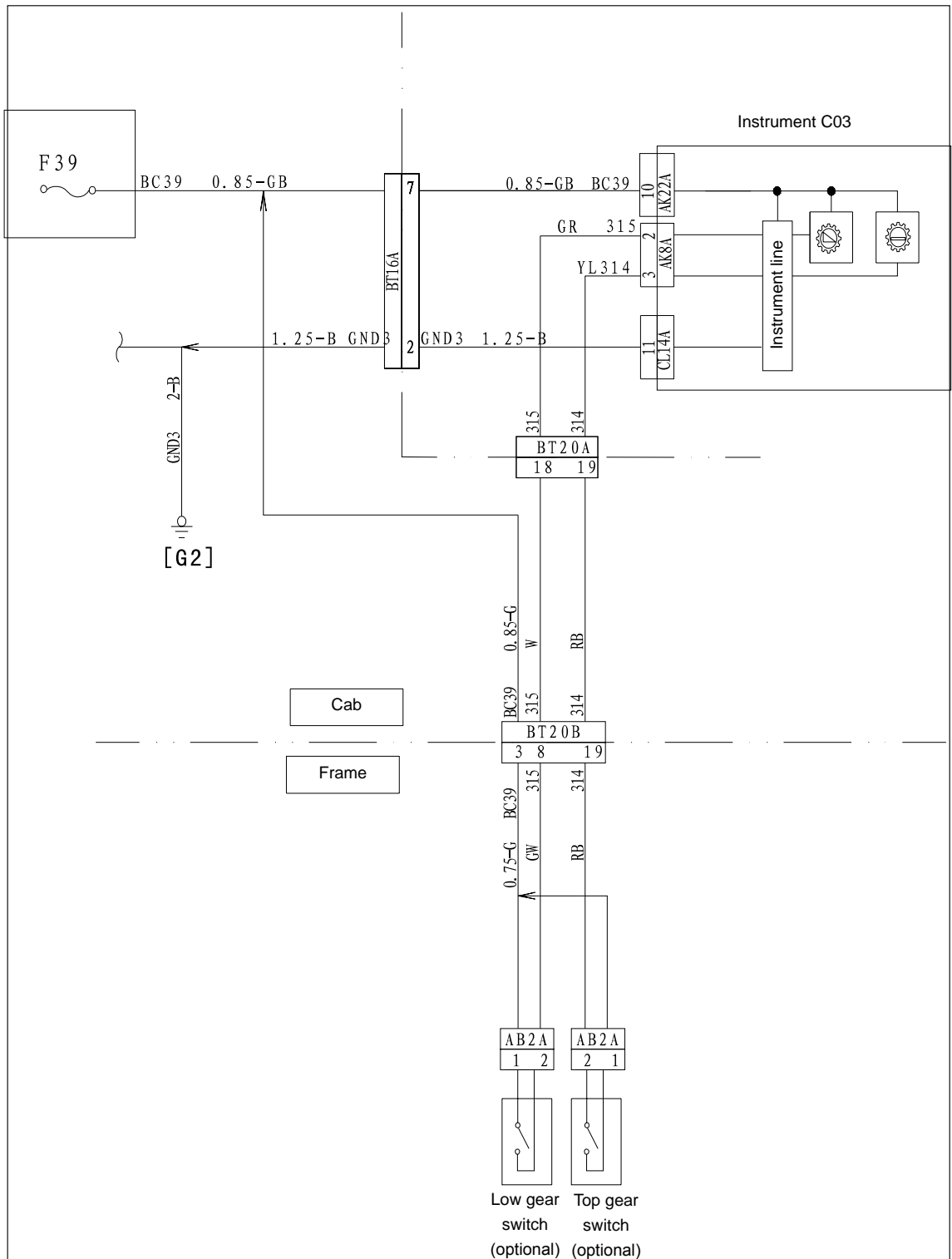
515 Circuit Diagram of Brake Alarm System



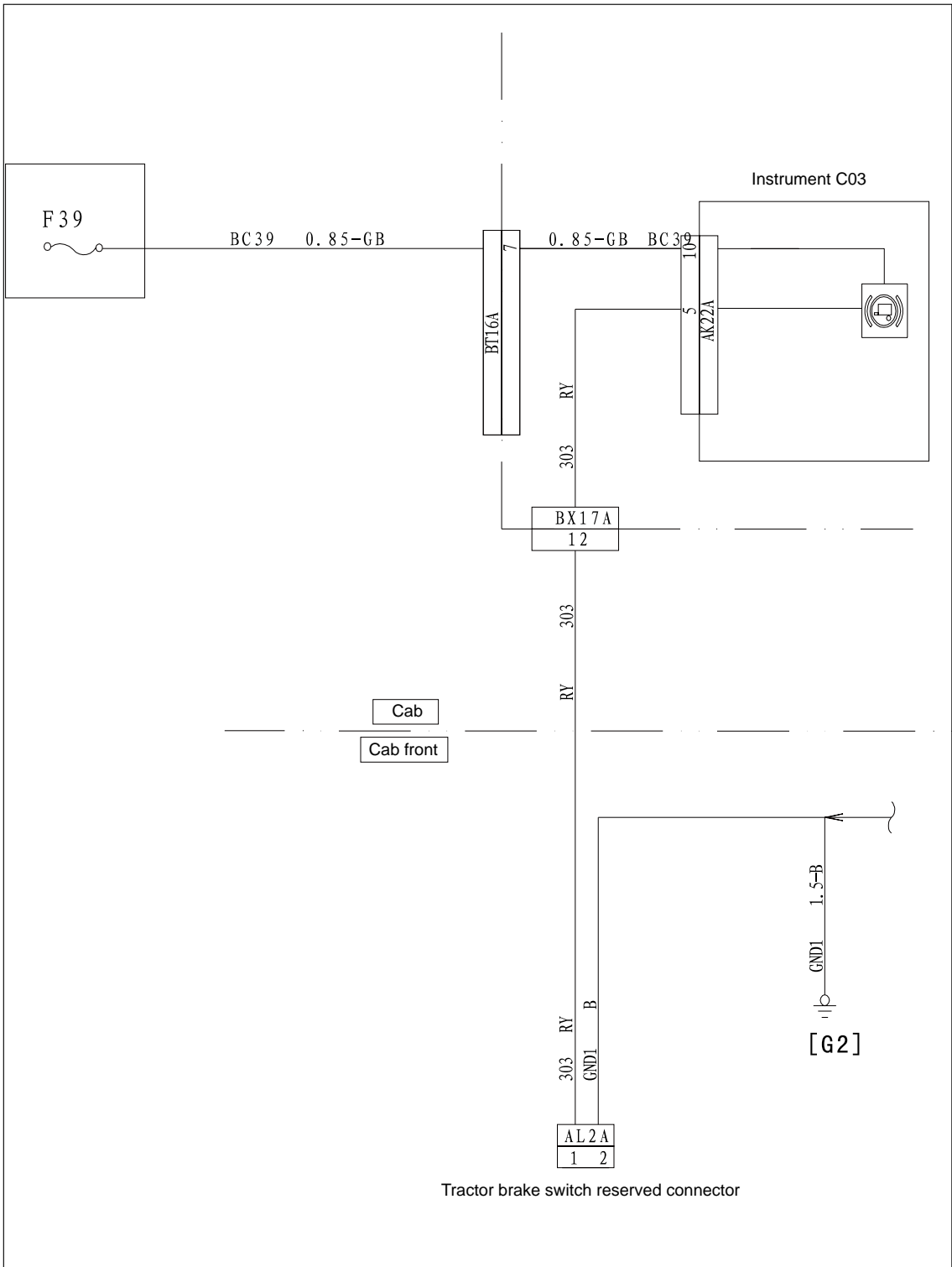
520 Circuit Diagram of Air Filter Display



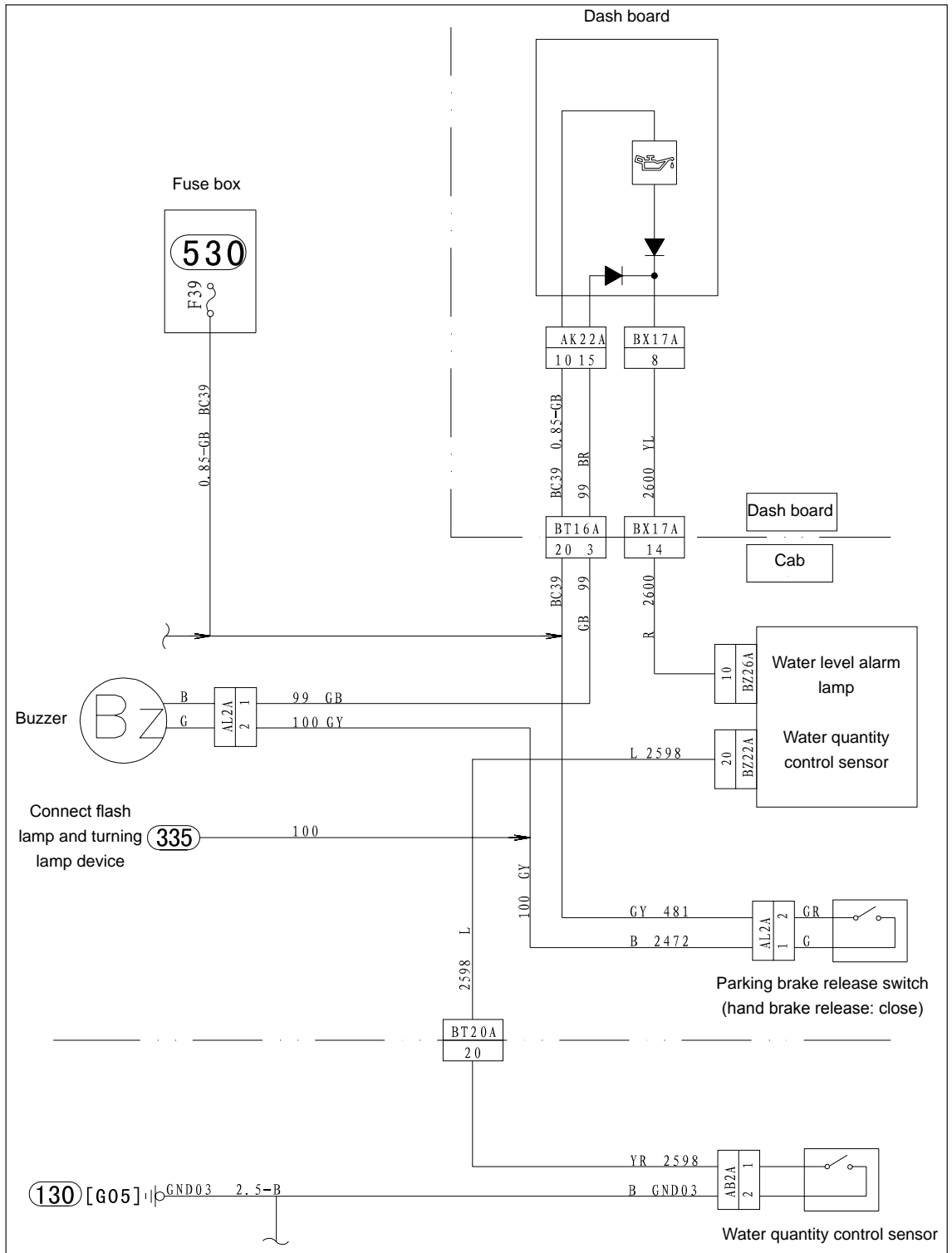
521 Circuit Diagram of Top/low Gear Switch (Optional)



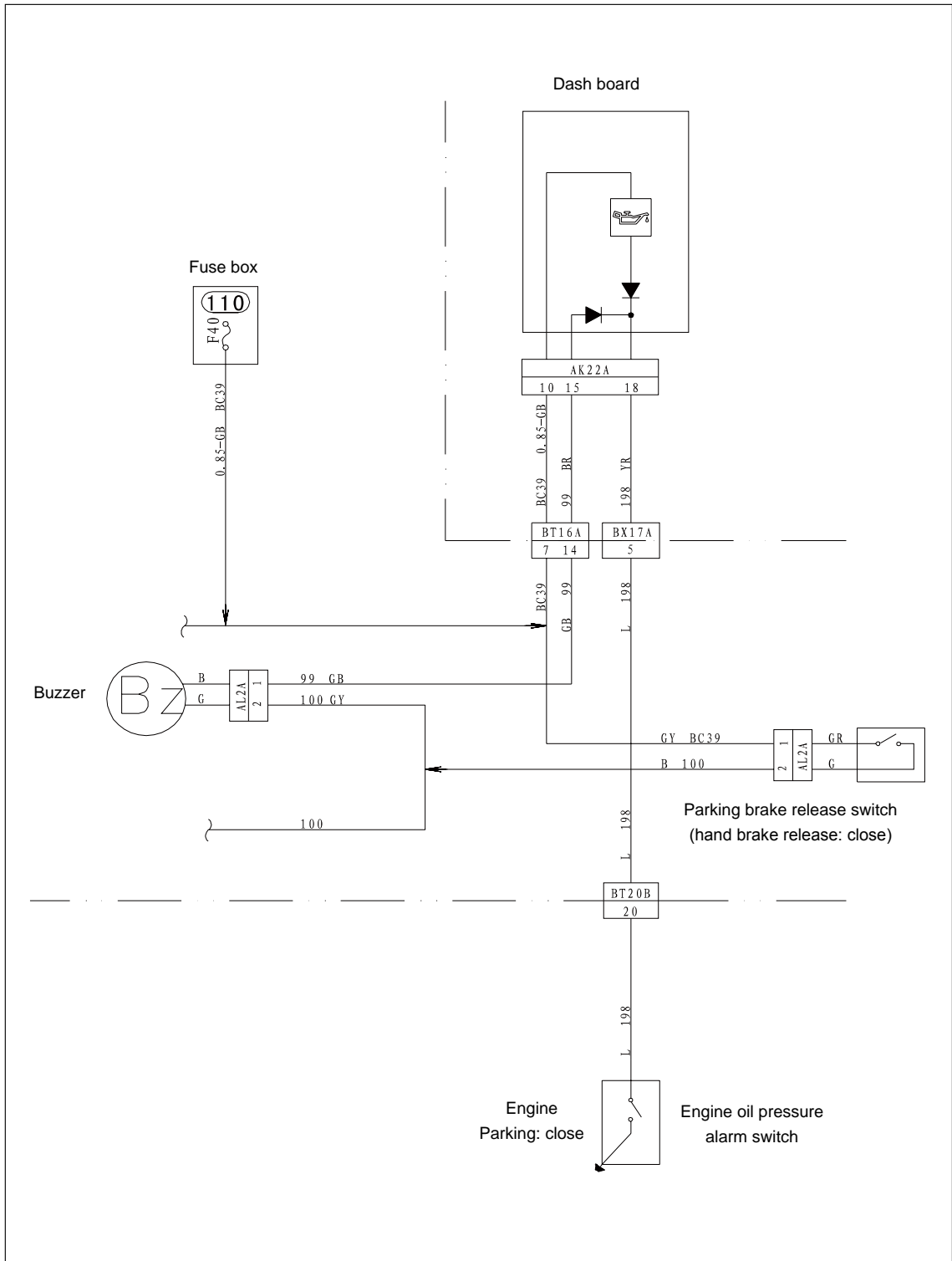
522 Circuit Diagram of Tractor Brake Display (Optional)



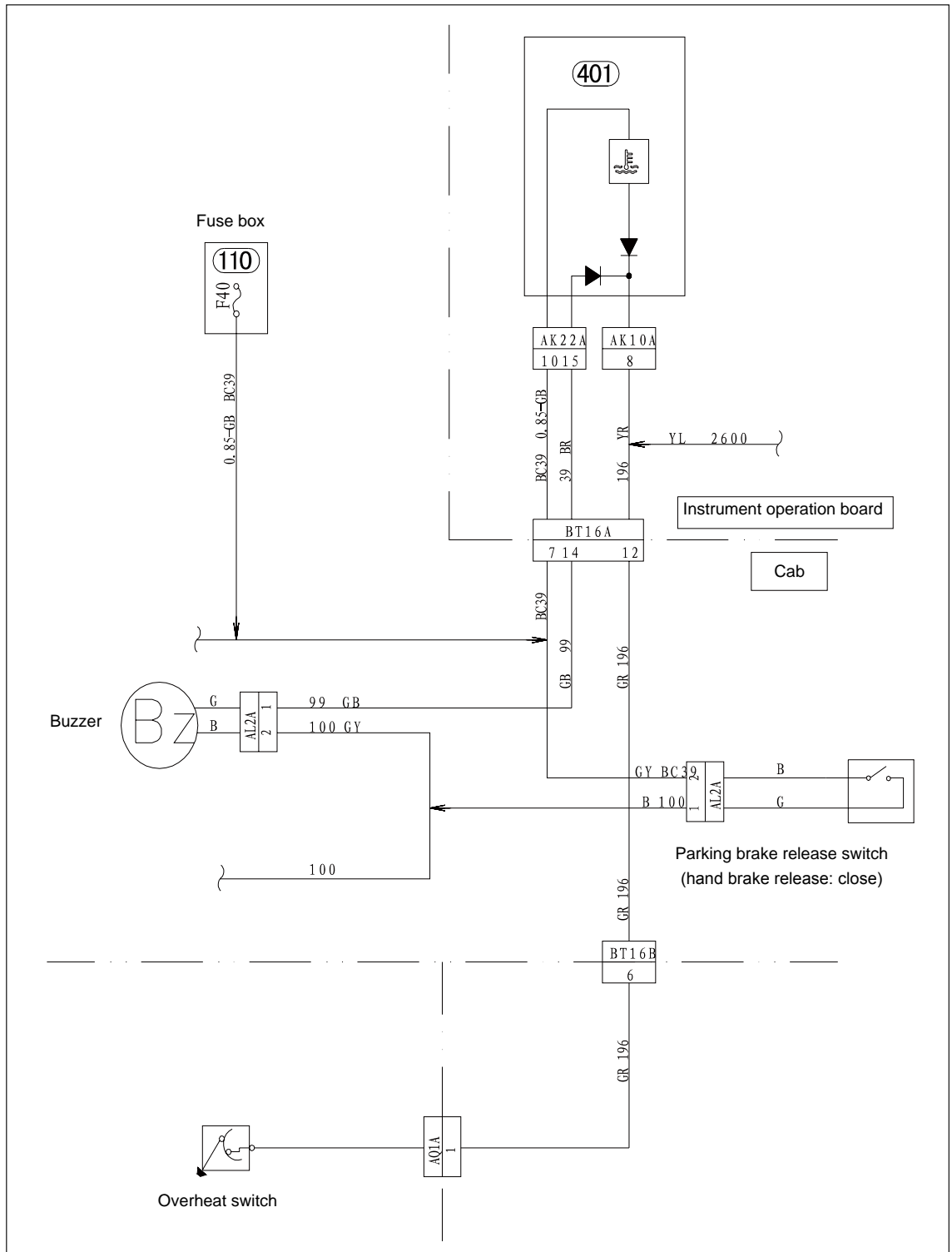
530 Circuit Diagram of Water Level Alarm System



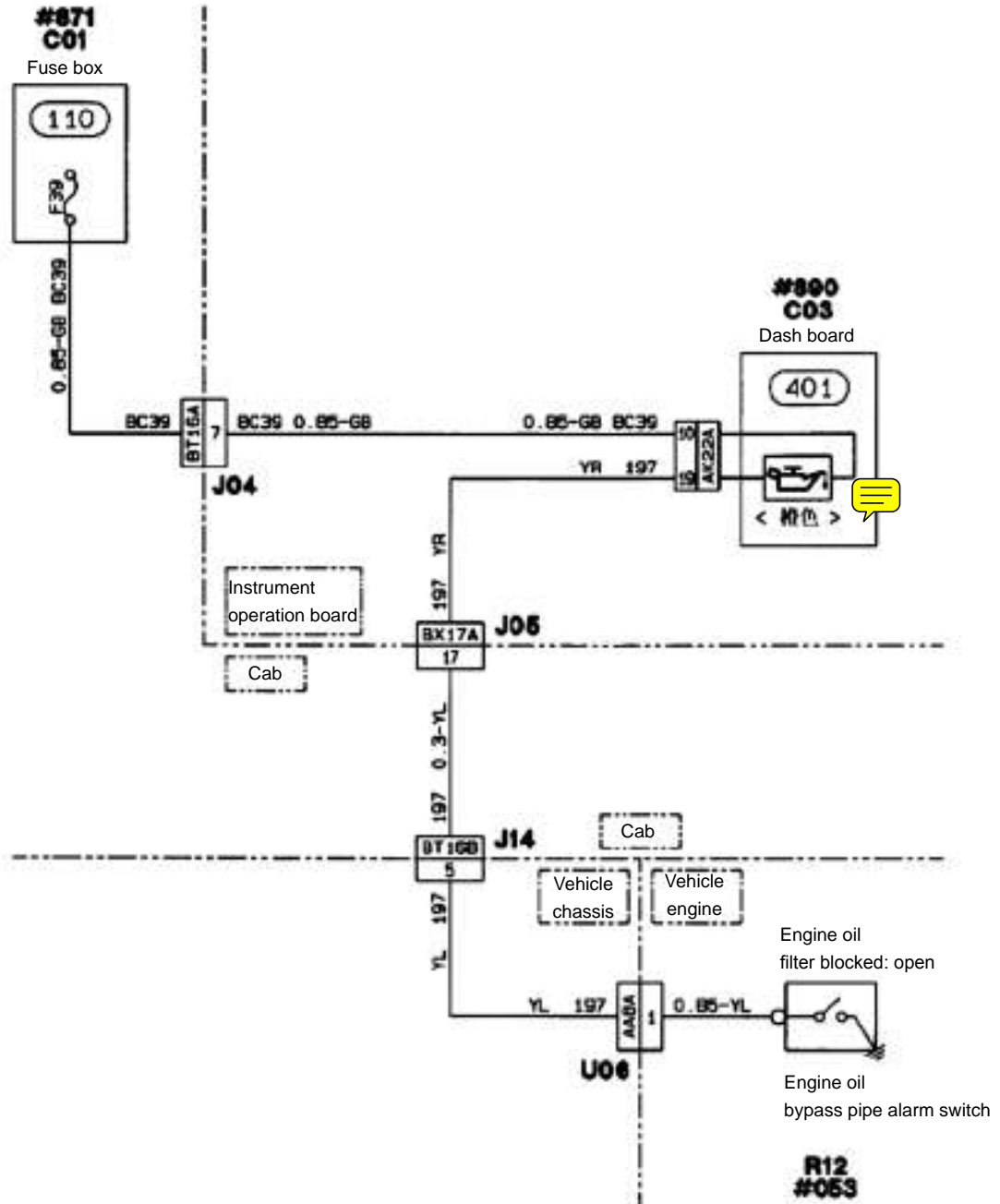
536 Circuit Diagram of Engine Oil Pressure Alarm System



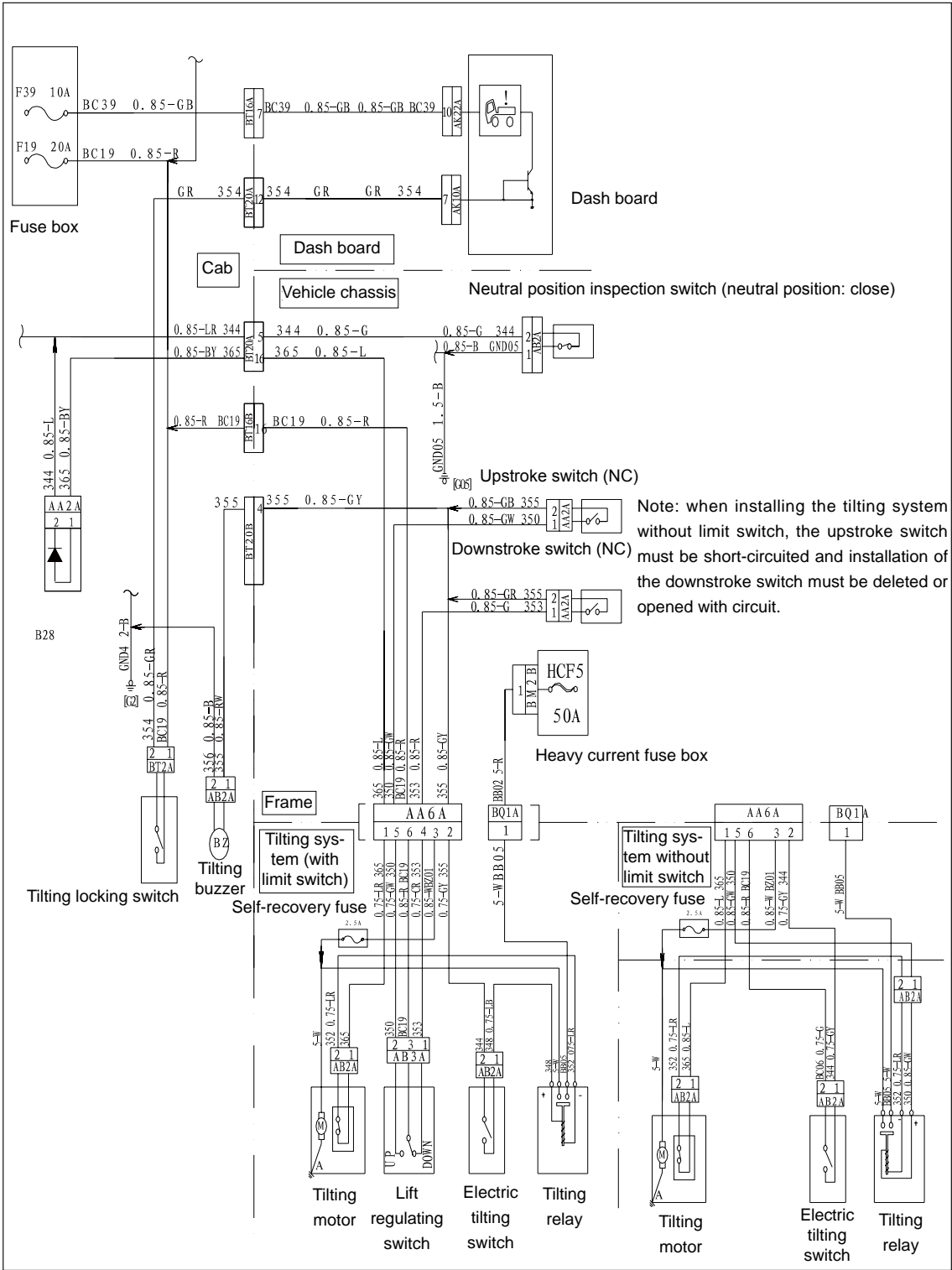
537 Circuit Diagram of Engine Water Temperature too High Alarm System



538 Circuit Diagram of Engine Oil Filter Blocked Alarm System



550 Circuit Diagram of Cab Electric Tilting Alarm System

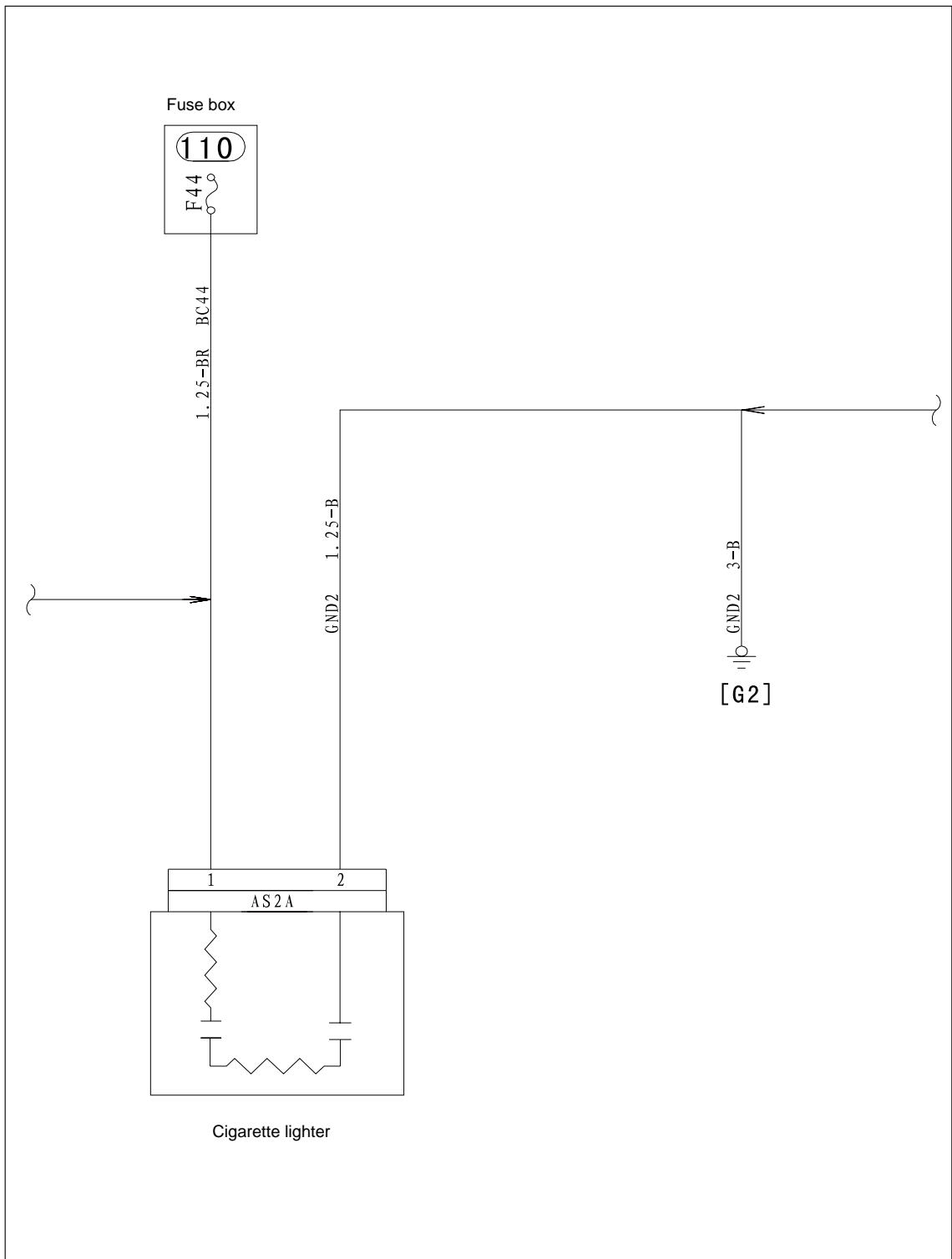




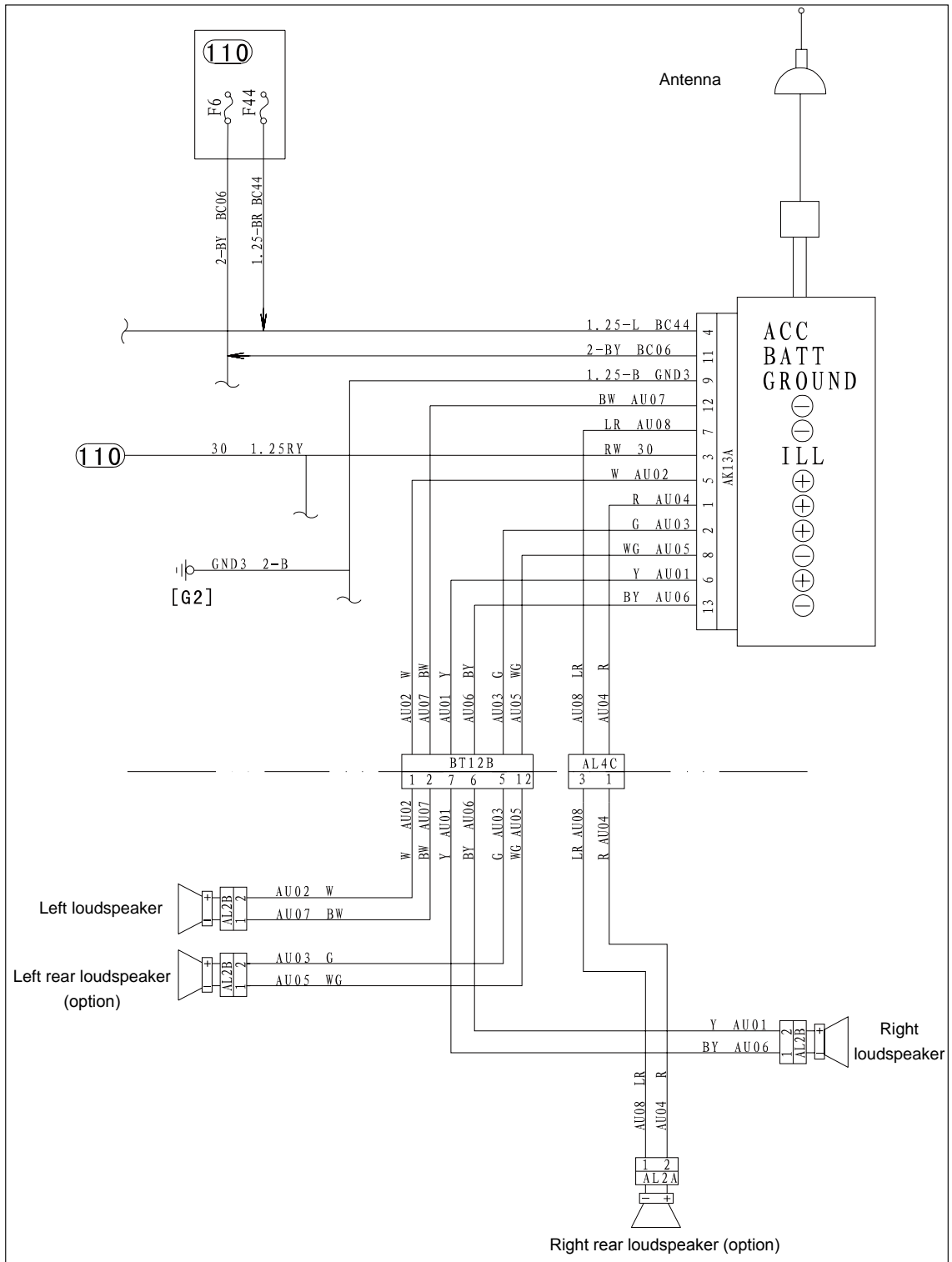
22-07 Electric Wiring Diagram of Cab

610 Circuit Diagram of Cigarette Lighter	22-07-2
612 Circuit Diagram of Acoustic System (Cassette, CD, MP3)	22-07-3
614 Circuit Diagram of Wiper and Washer	22-07-4
615 Circuit Diagram of Electric Horn System	22-07-5
616 Circuit Diagram of Cold Start	22-07-6
620 Circuit Diagram of Air Conditioning System	22-07-7
622 Circuit Diagram of Electric Door, Window and Auto Door Lock System	22-07-8
650 Circuit Diagram of Cab Electric Tilting	22-07-9

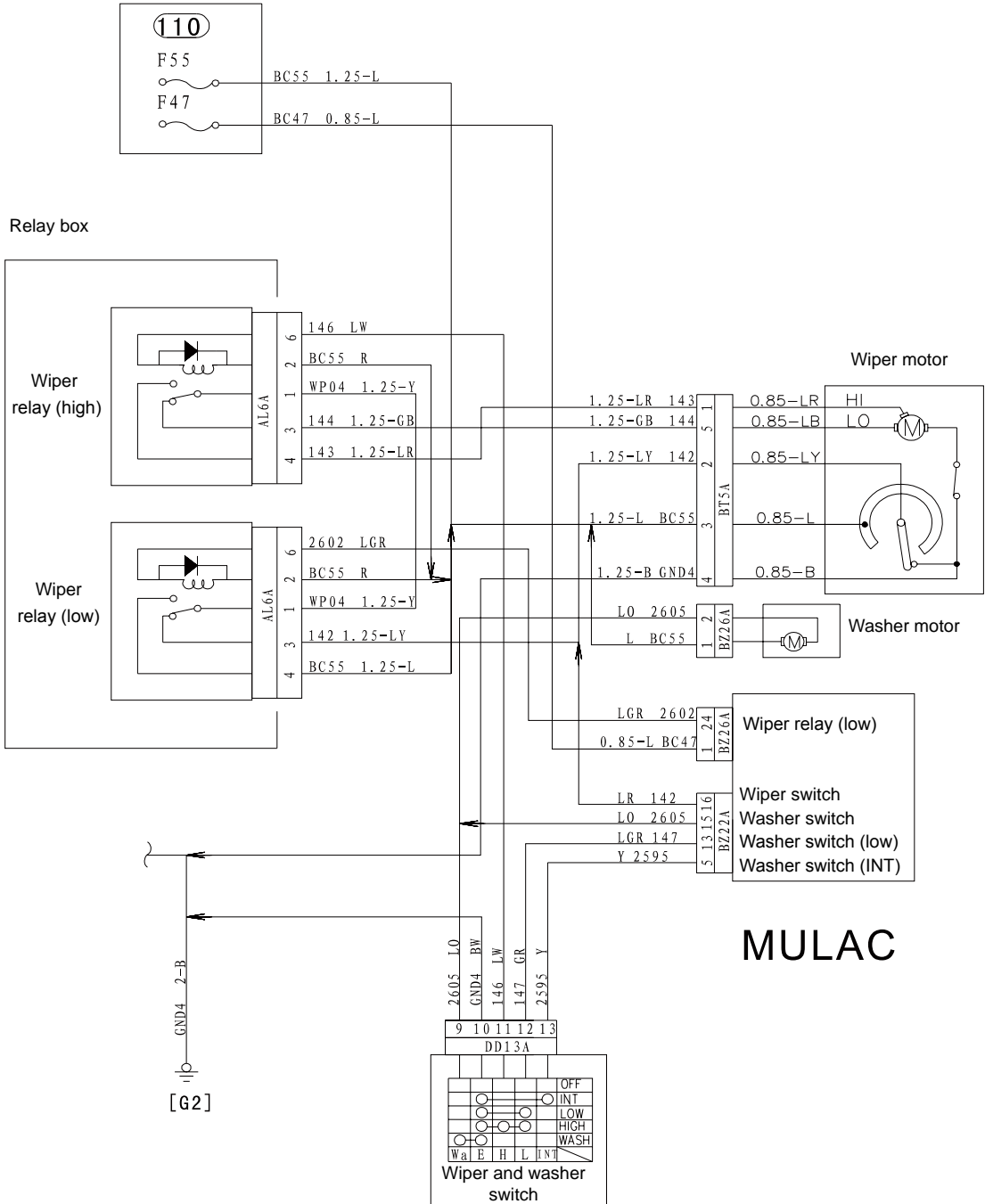
610 Circuit Diagram of Cigarette Lighter



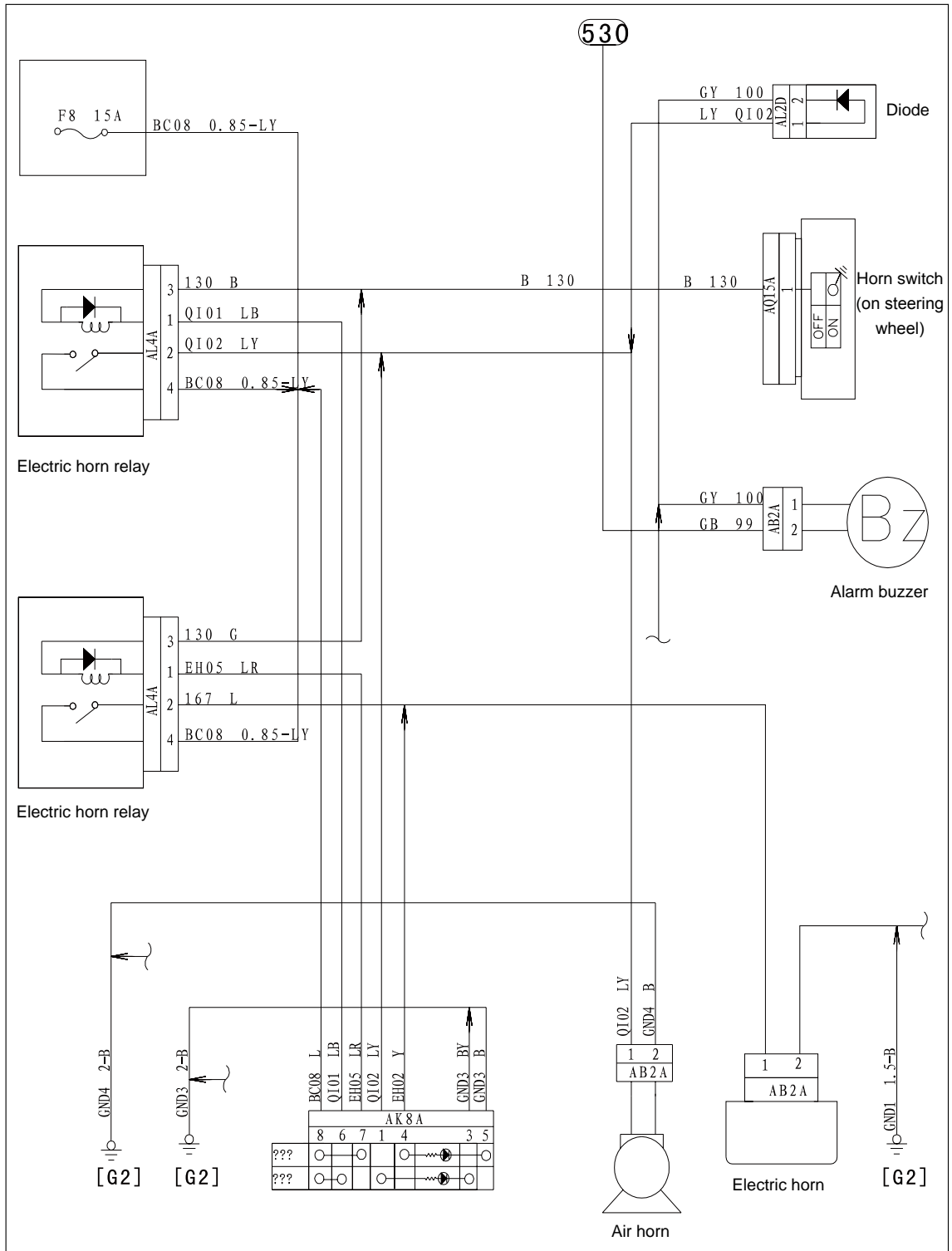
612 Circuit Diagram of Acoustic System (Cassette, CD, MP3)



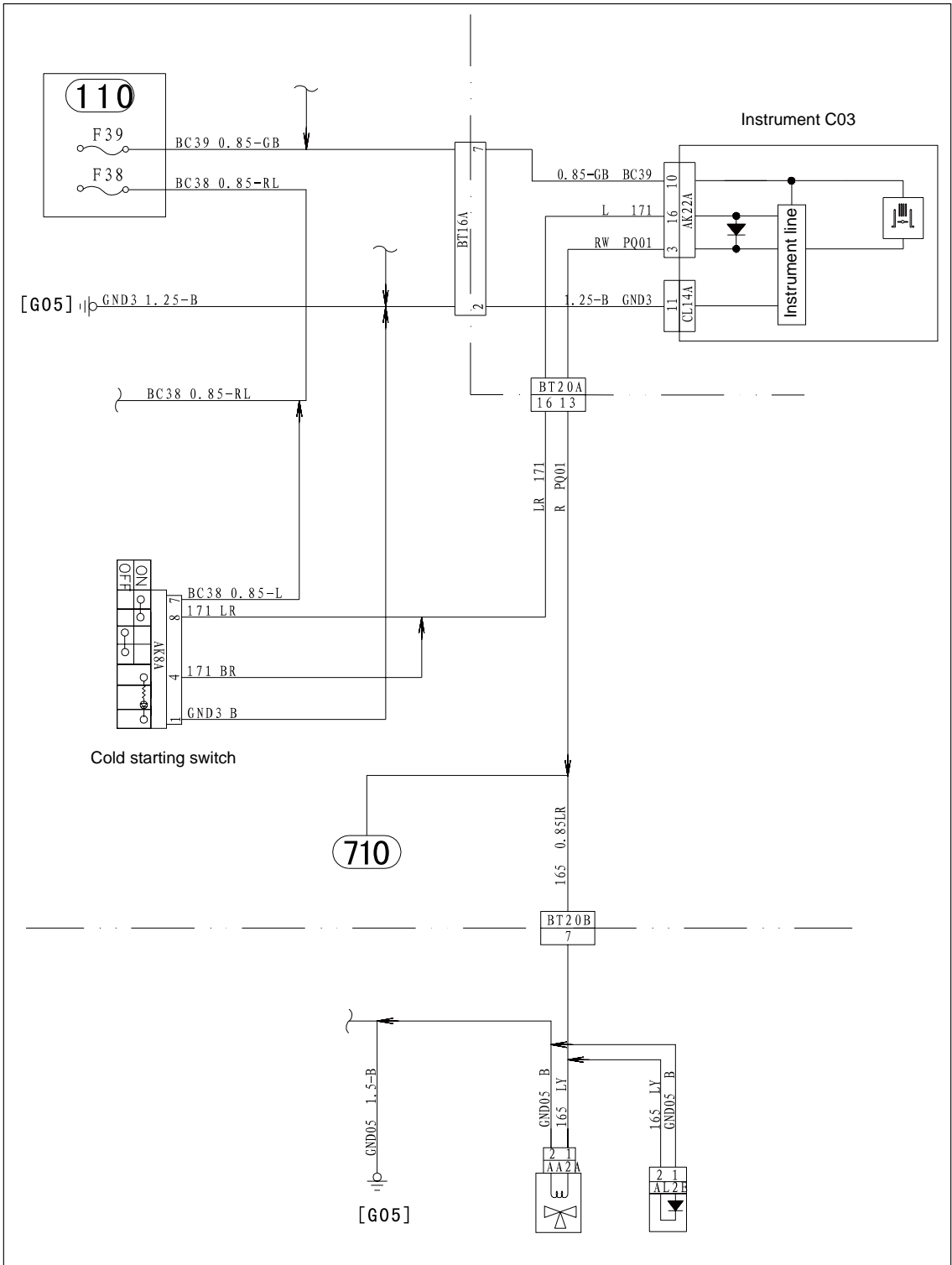
614 Circuit Diagram of Wiper and Washer



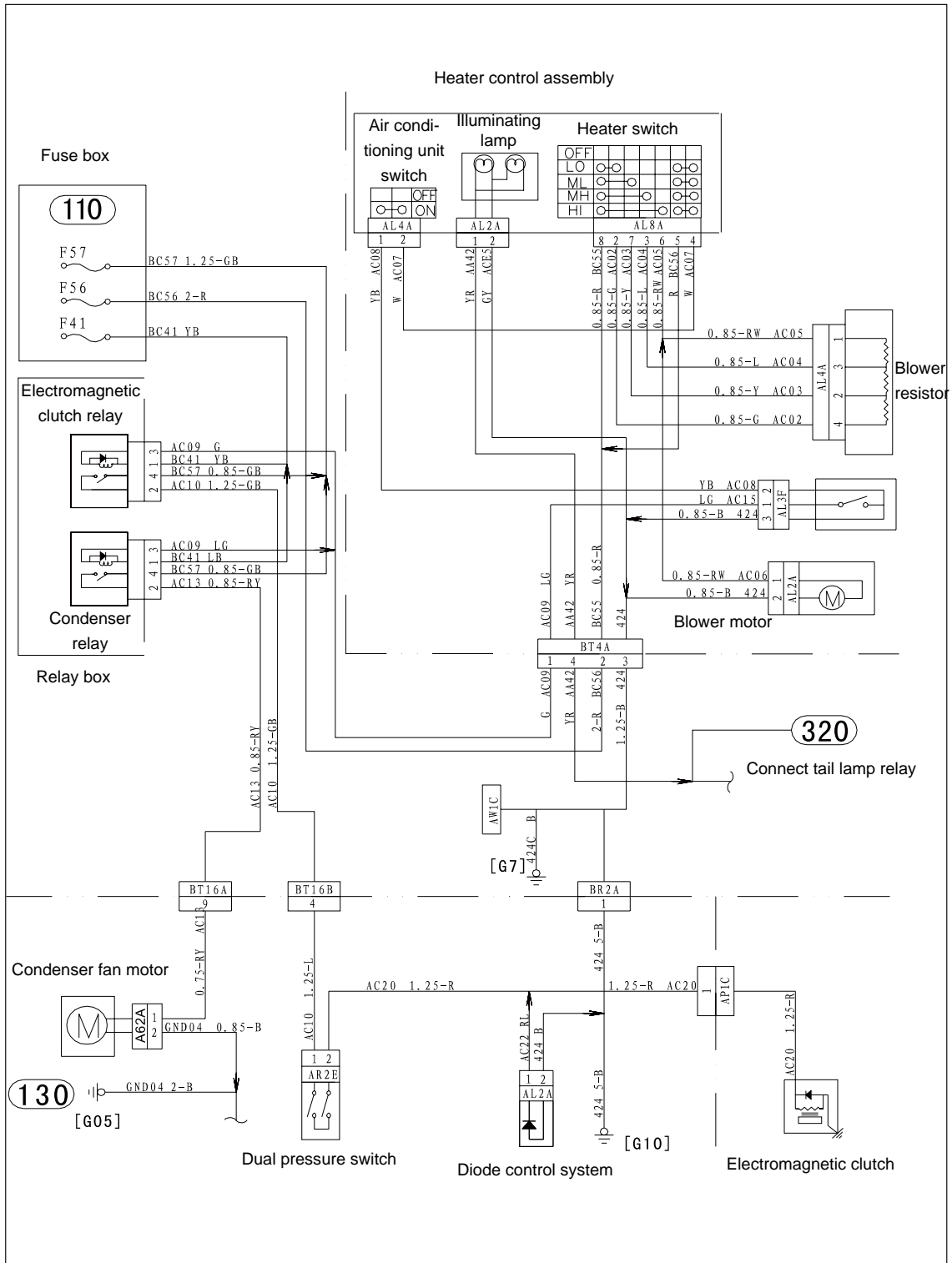
615 Circuit Diagram of Electric Horn System



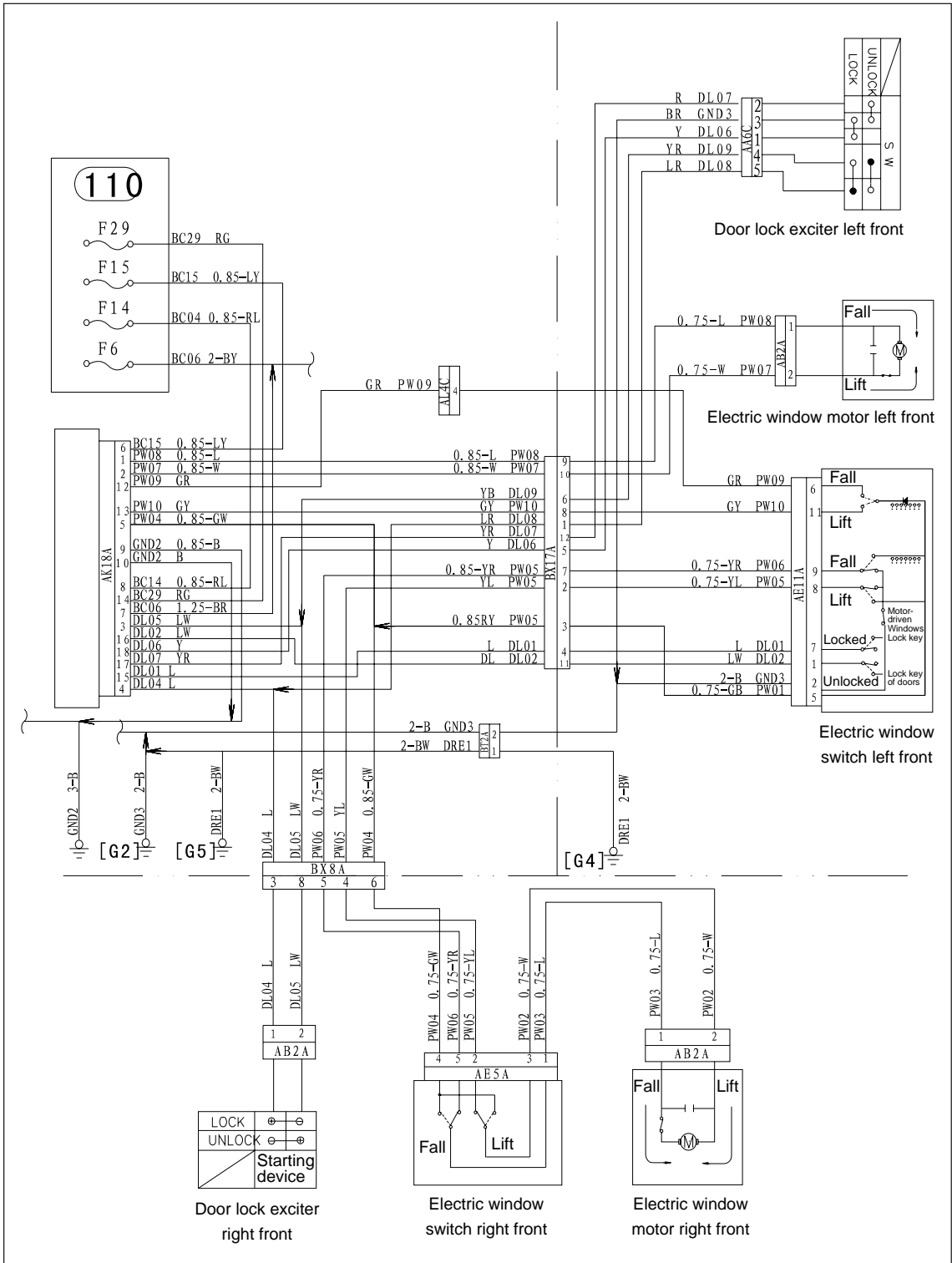
616 Circuit Diagram of Cold Start



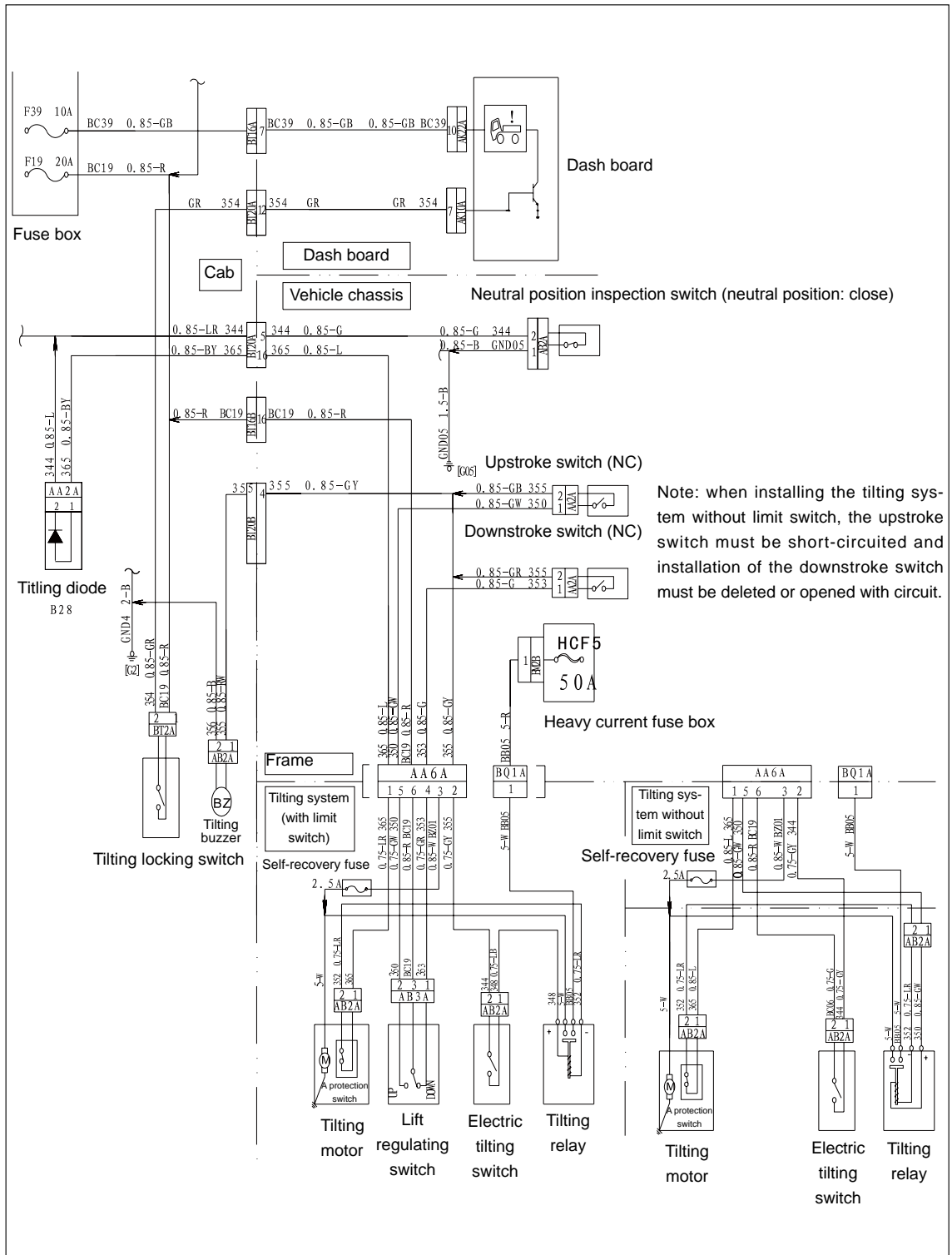
620 Circuit Diagram of Air Conditioning System



622 Circuit Diagram of Electric Door, Window and Auto Door Lock System



650 Circuit Diagram of Cab Electric Tilting

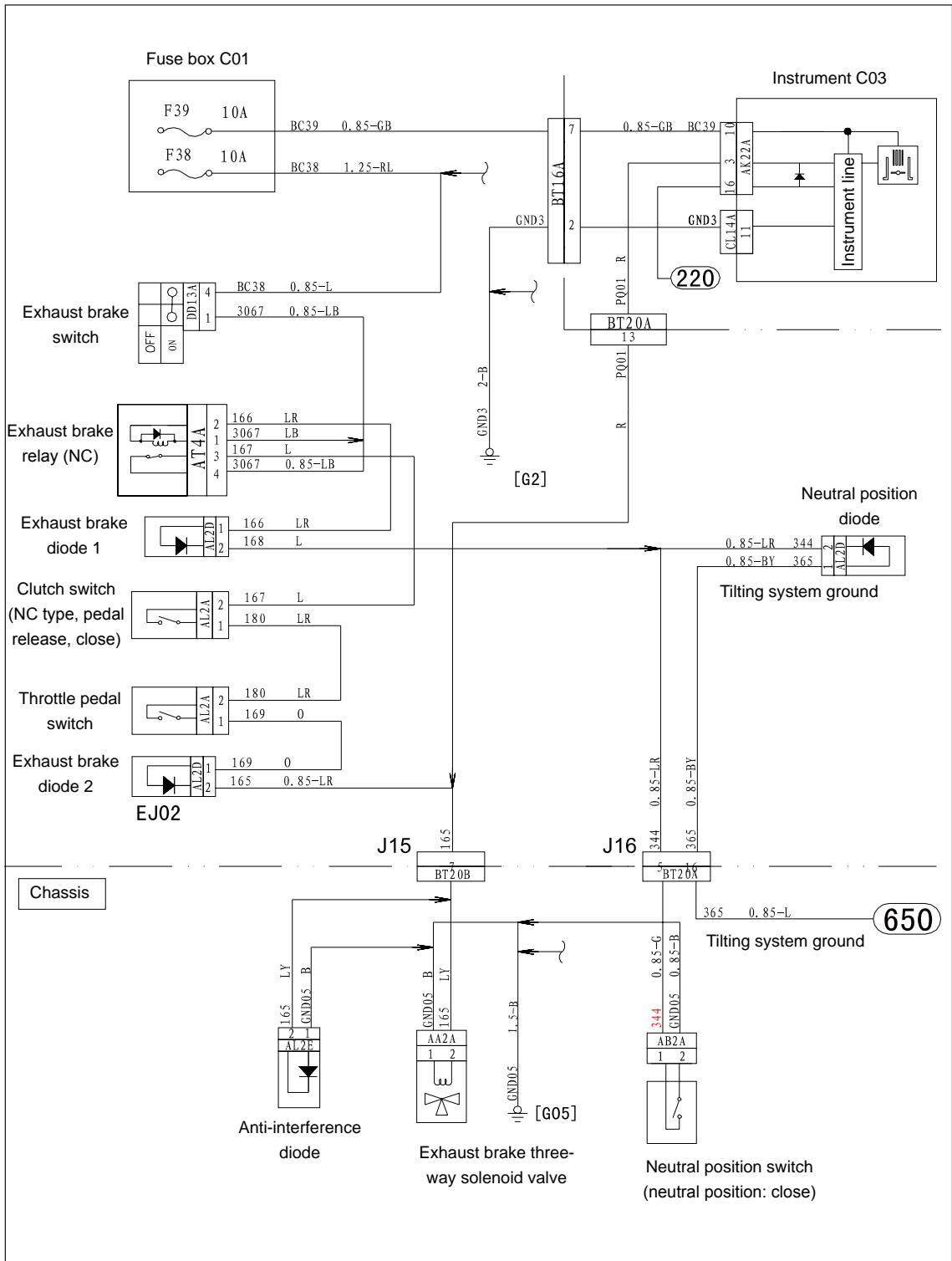




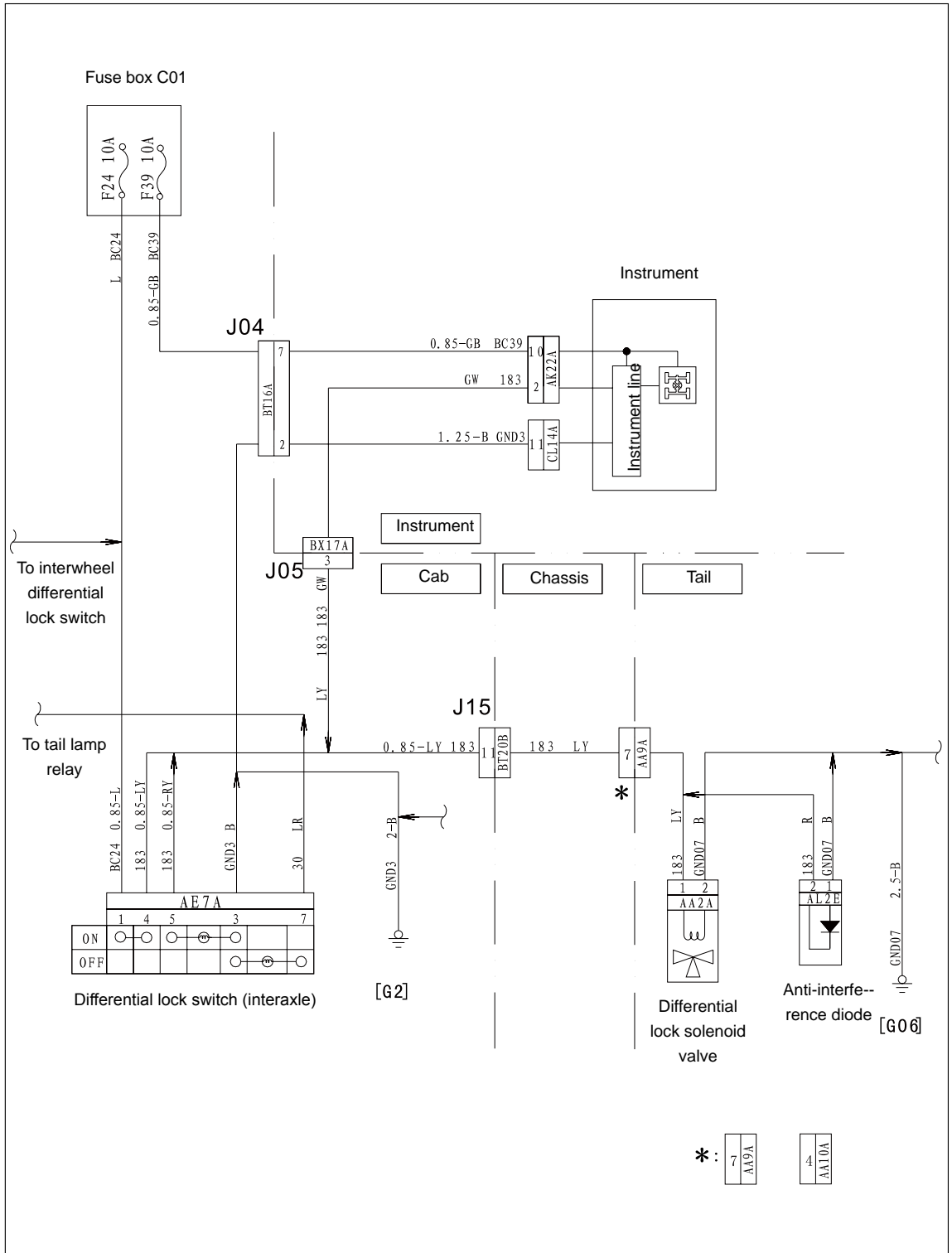
22-08 Electrical Wiring Diagram of Vehicle Chassis

710 Circuit Diagram of Exhaust Brake System	22-08-2
714 Circuit Diagram of Interaxle Differential	22-08-3
715 Circuit Diagram of Interwheel Differential	22-08-4
718 Circuit Diagram of Air Drier	22-08-5
720 Circuit Diagram of Tractor 7-hole Socket	22-08-6
721 Circuit Diagram of Tractor 7-hole Socket (ABS)	22-08-7
Circuit Diagram of Tractor 7-hole Socket (ABS).....	22-08-8

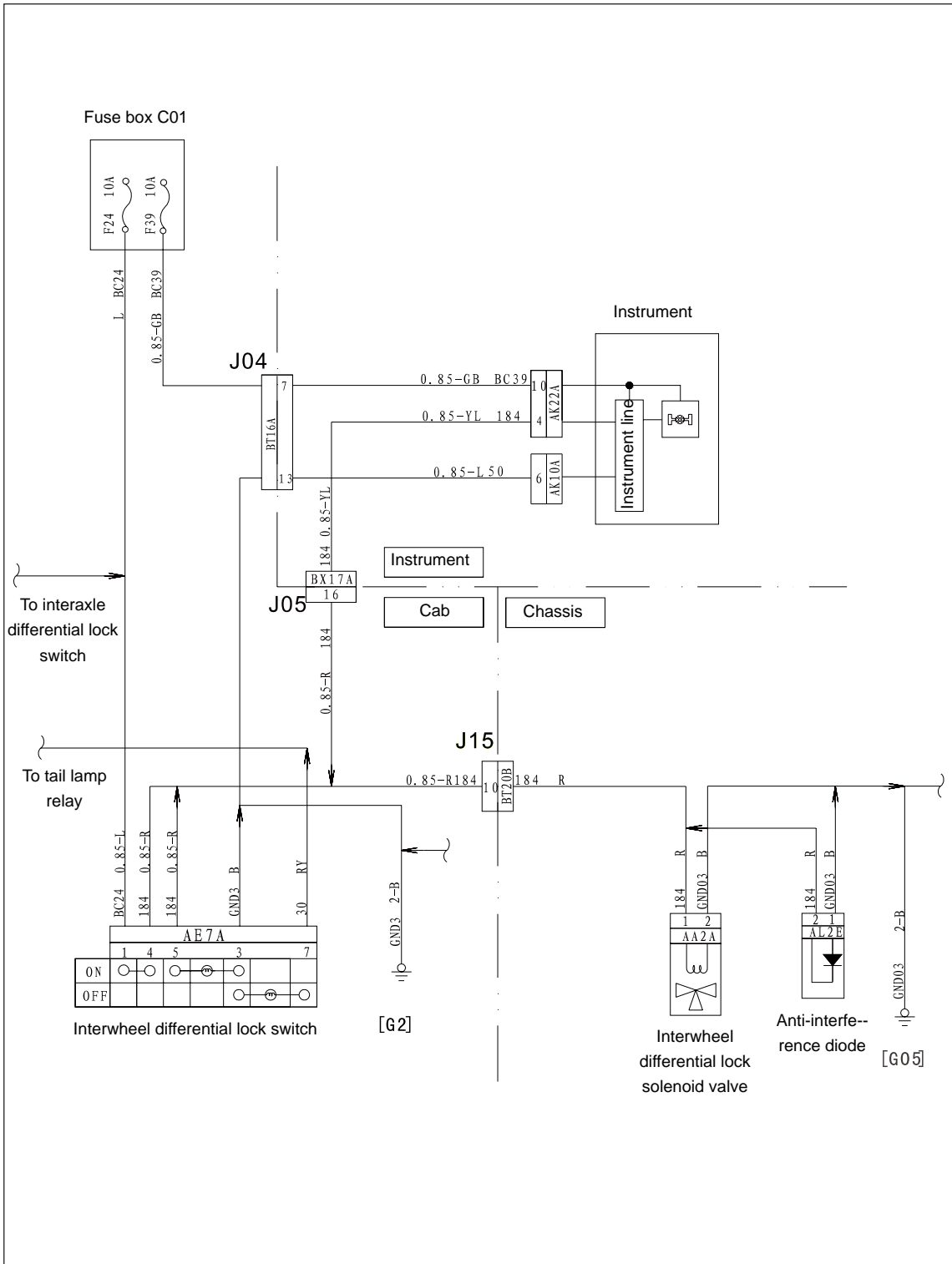
710 Circuit Diagram of Exhaust Brake System



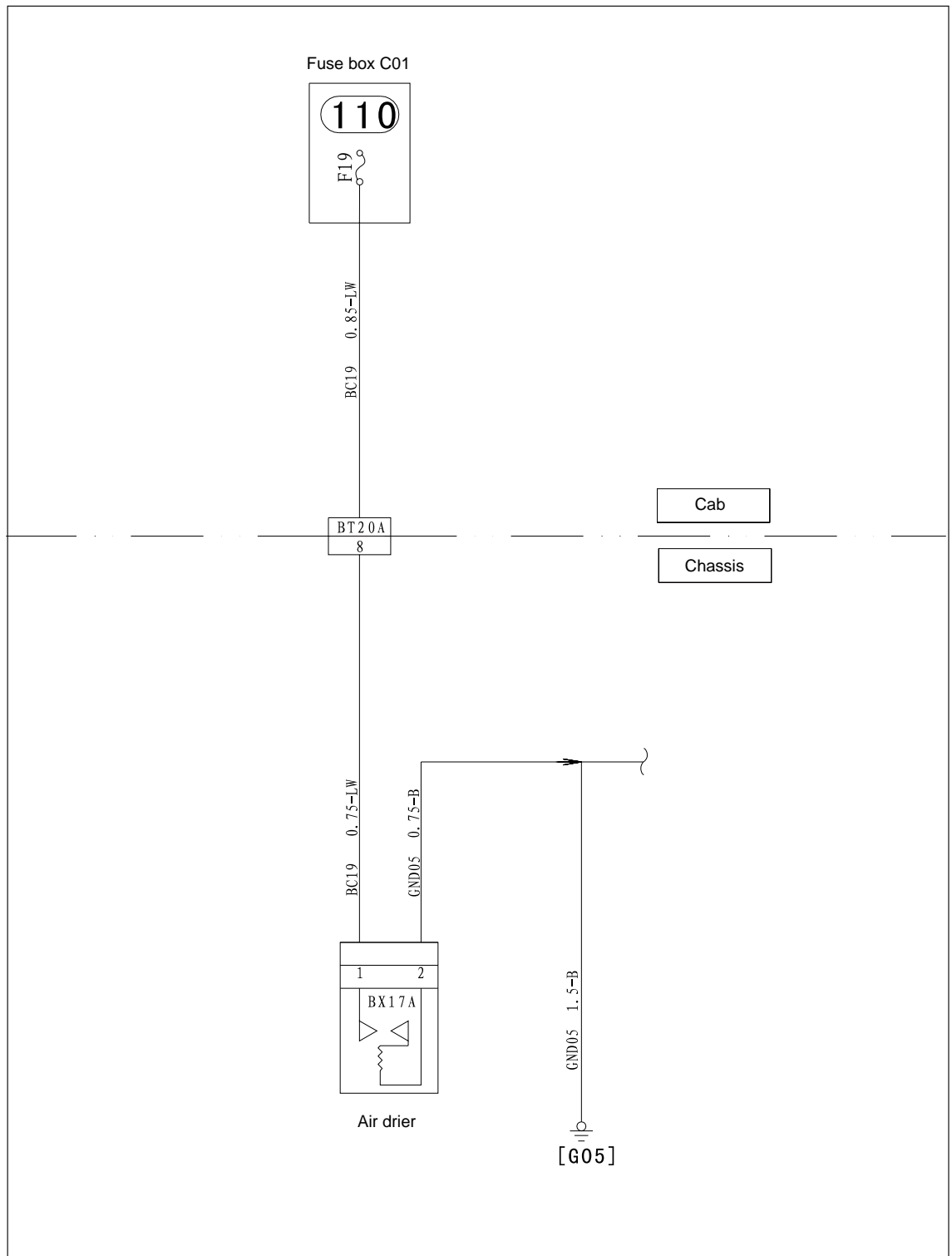
714 Circuit Diagram of Interaxle Differential



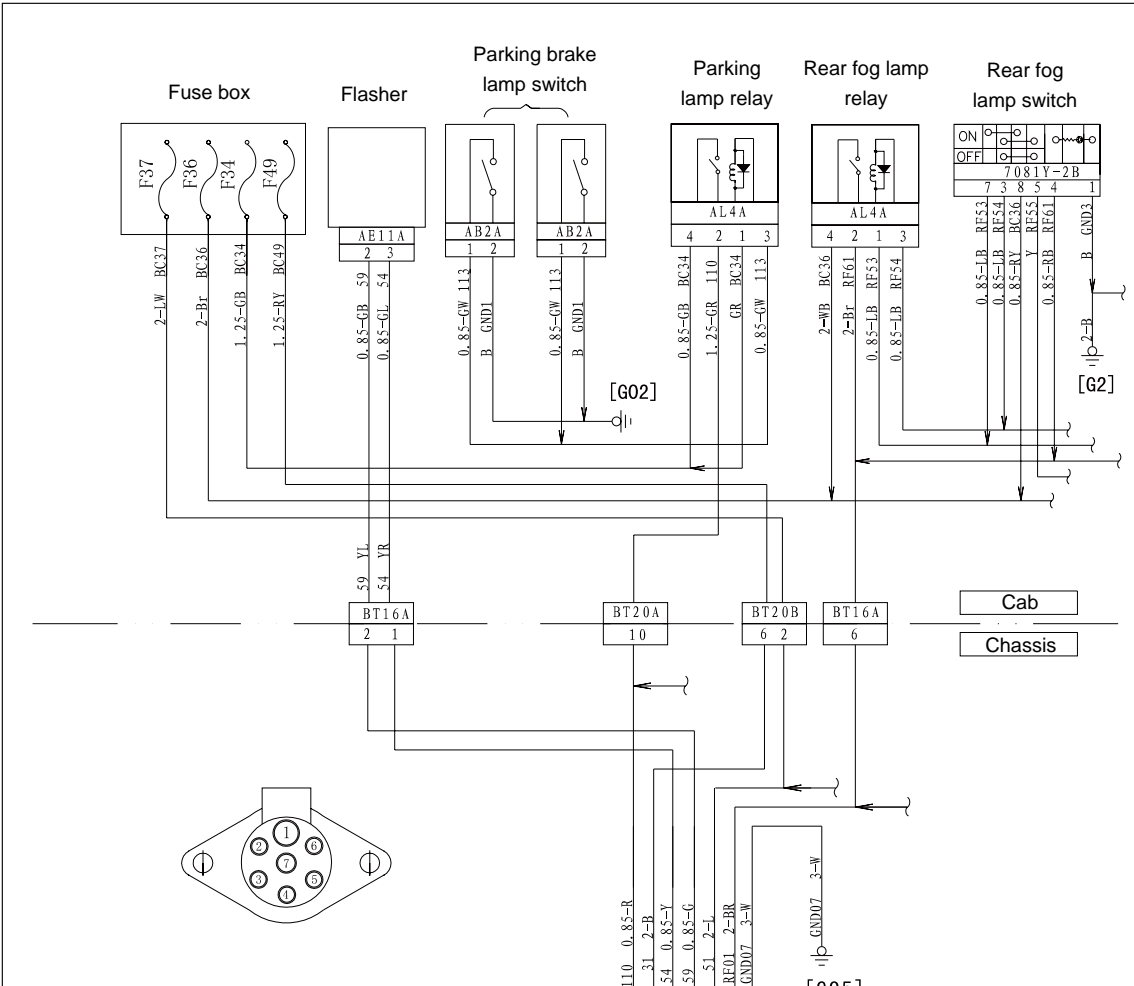
715 Circuit Diagram of Interwheel Differential



718 Circuit Diagram of Air Drier



720 Circuit Diagram of Tractor 7-hole Socket



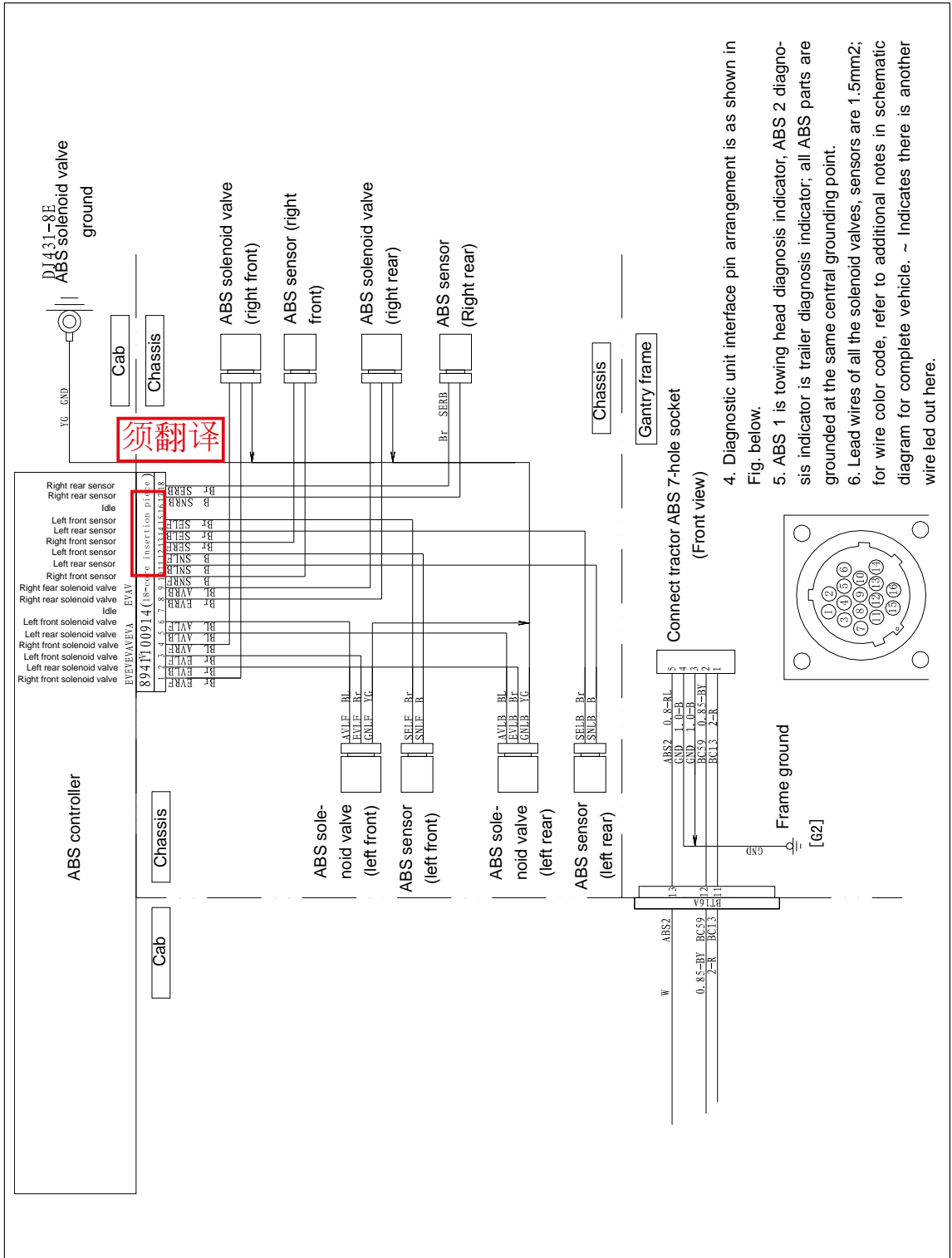
Tractor 7-hole socket view direction: seeing from incoming direction of the socket, rear view.

Note: Below is the function of each pin and its corresponding color (in correspondence with the yellow label on the harness).

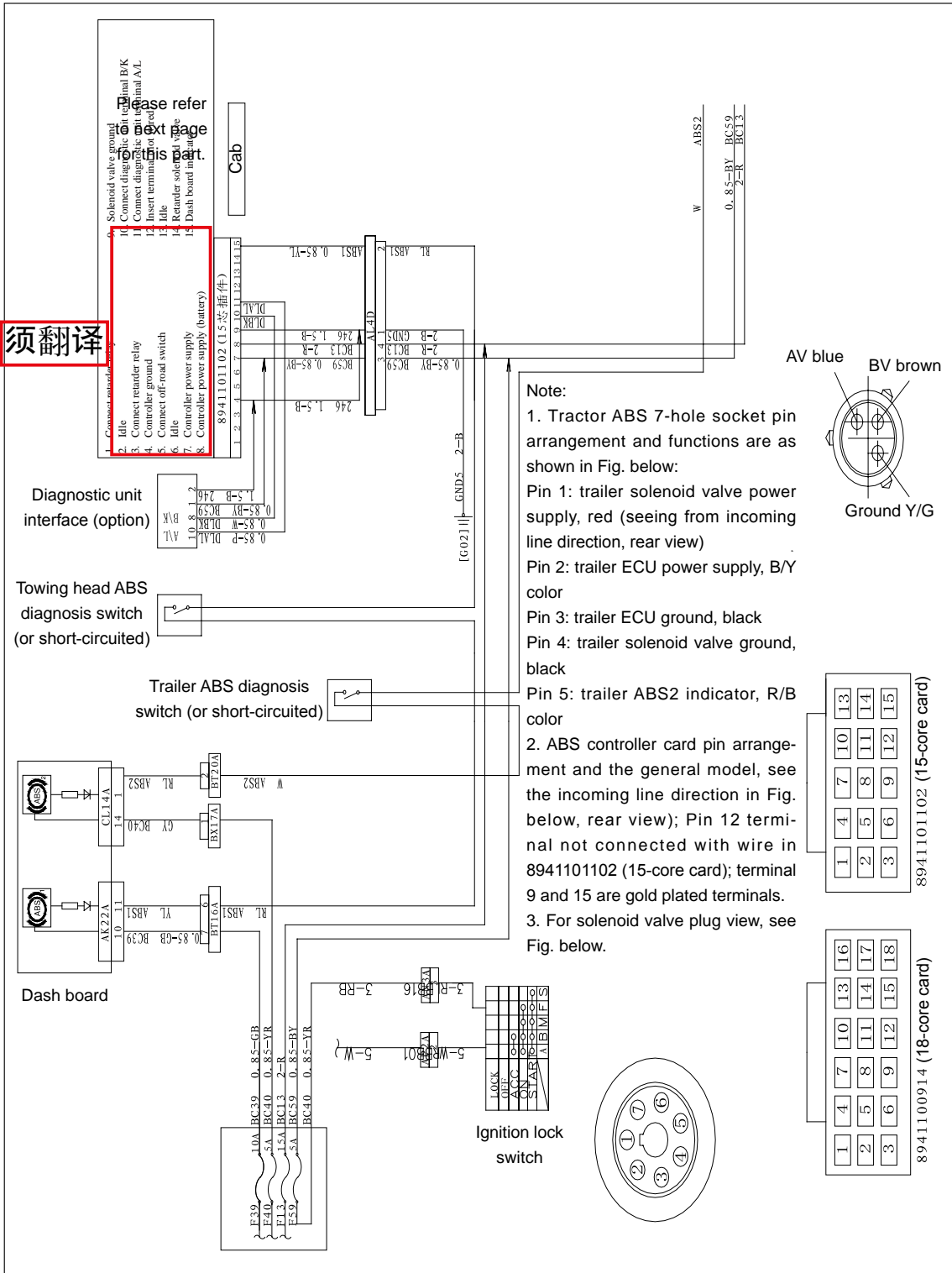
Pin No.	Function	Color	Trailer connected-in capacity	??
1	Ground	W		3mm ²
2	Small lamp, license plate, side indicator lamp	B	≤300W	2mm ²
3	Left turning signal lamp	Y	21W	0.85mm ²
4	Brake lamp	R	21W	0.85mm ²
5	Right turning signal lamp	G	21W	0.85mm ²
6	Rear fog lamp	Br	≤200W	2mm ²
7	Reversing lamp	Bl	≤200W	

7-pin jumper socket (tractor)

721 Circuit Diagram of Tractor 7-hole Socket (ABS)



Circuit Diagram of Tractor 7-hole Socket (ABS)



Circuit Diagram of Tractor 7-hole Socket (ABS)

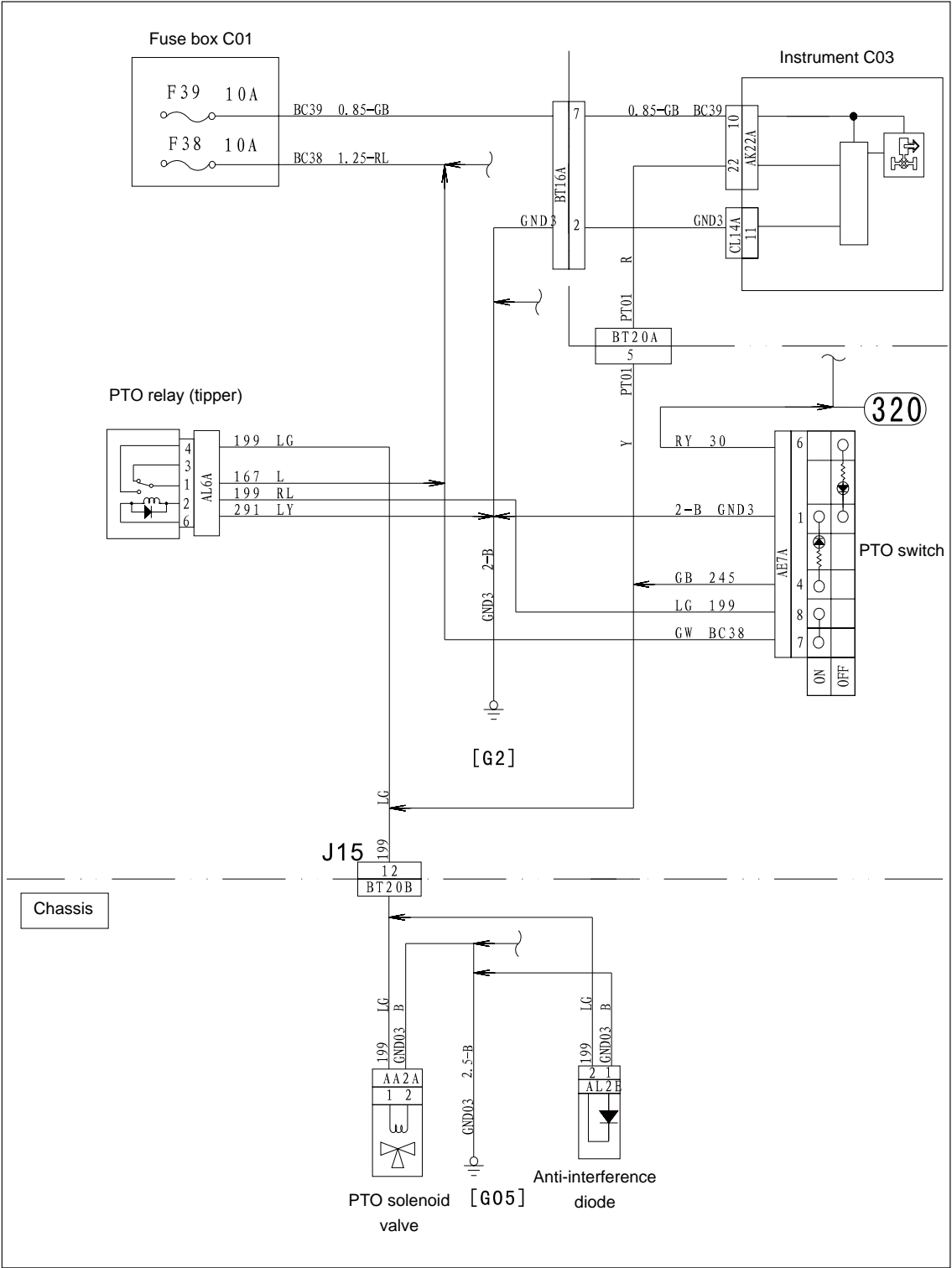
1. Connect retarder relay
2. Idle
3. Connect retarder relay
4. Controller ground
5. Connect off-road switch
6. Idle
7. Controller power supply
8. Controller power supply (battery)
9. Solenoid valve ground
10. Connect diagnostic unit terminal B/K
11. Connect diagnostic unit terminal A/L
12. Insert terminal (not wired)
13. Idle
14. Retarder solenoid valve
15. Dash board indicator



22-09 Circuit Diagram of Engine and Driving Device

850 Circuit Diagram of PTO (Power Take off) 22-09-2

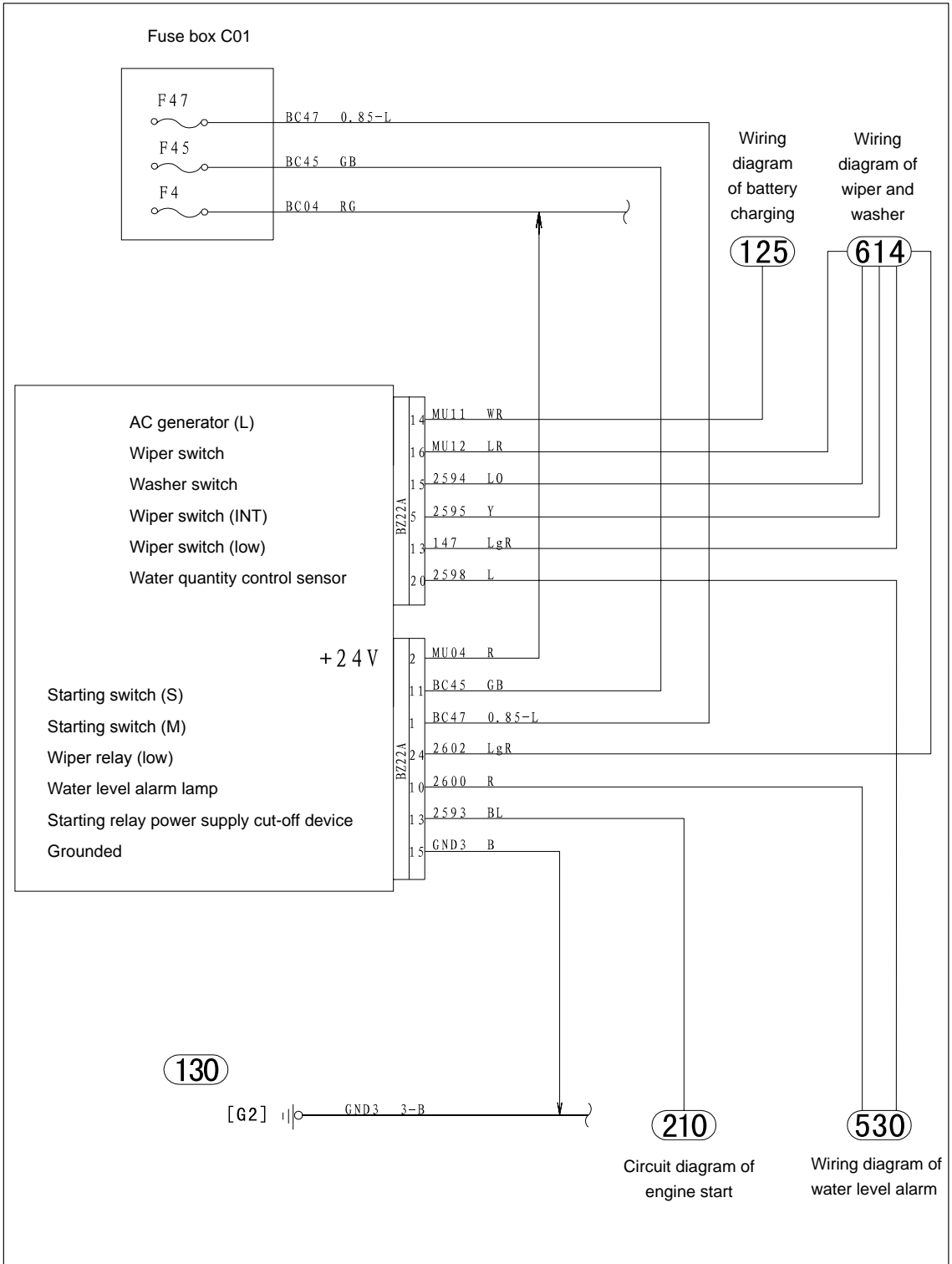
850 Circuit Diagram of PTO (Power Take off)



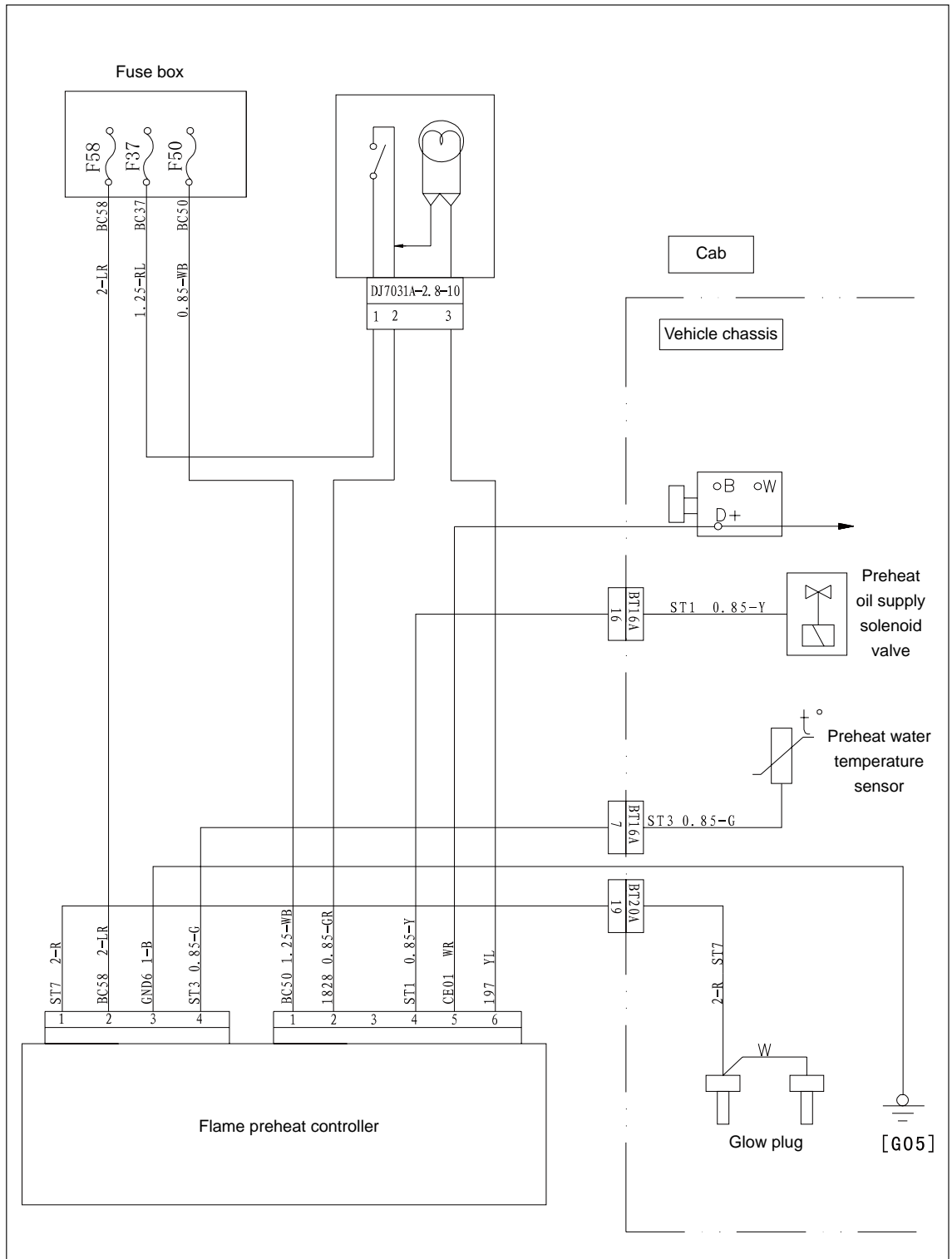
22-10 Other Circuit Diagrams

952	Circuit Diagram of Multi-purpose Timing Control Device and Lighting and Alarm Control device (MULAC).....	22-10-2
954	Circuit Diagram of Weichai Series Engine Preheat System	22-10-3
955	Circuit Diagram of Weichai Series Engine Flame-out	22-10-4

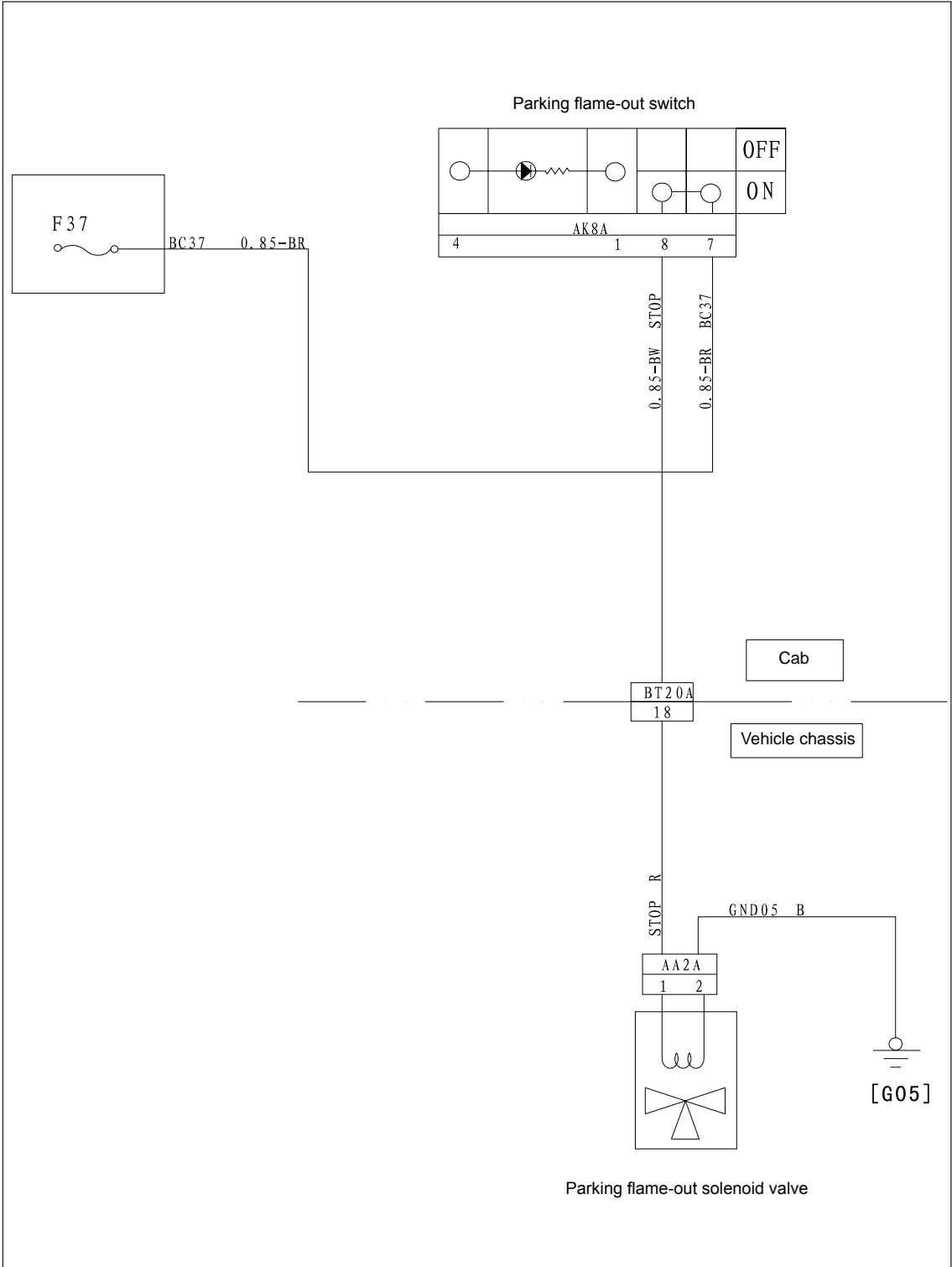
952 Circuit Diagram of Multi-purpose Timing Control Device and Lighting and Alarm Control device (MULAC)



954 Circuit Diagram of Weichai Series Engine Preheat System



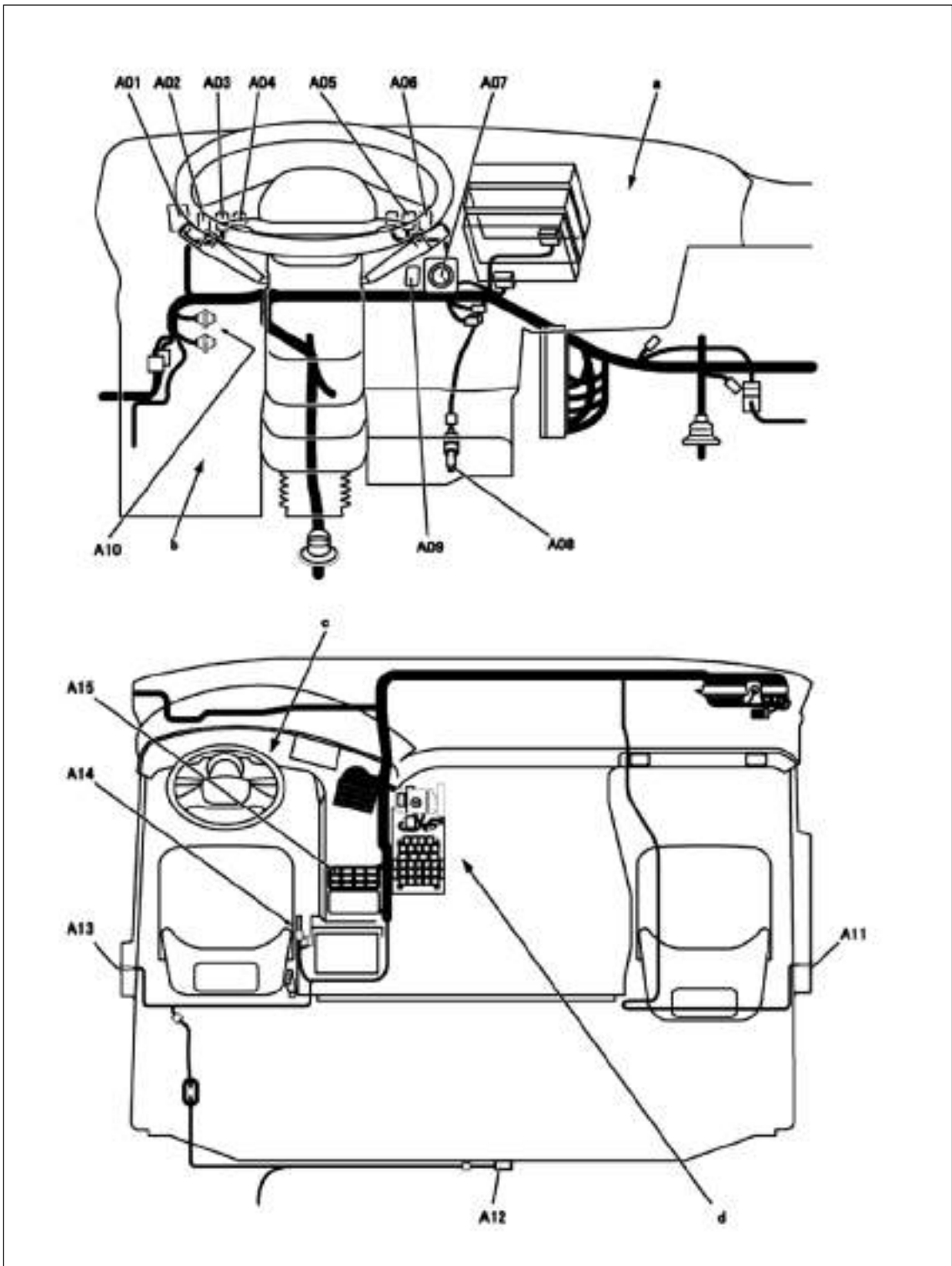
955 Circuit Diagram of Weichai Series Engine Flame-out



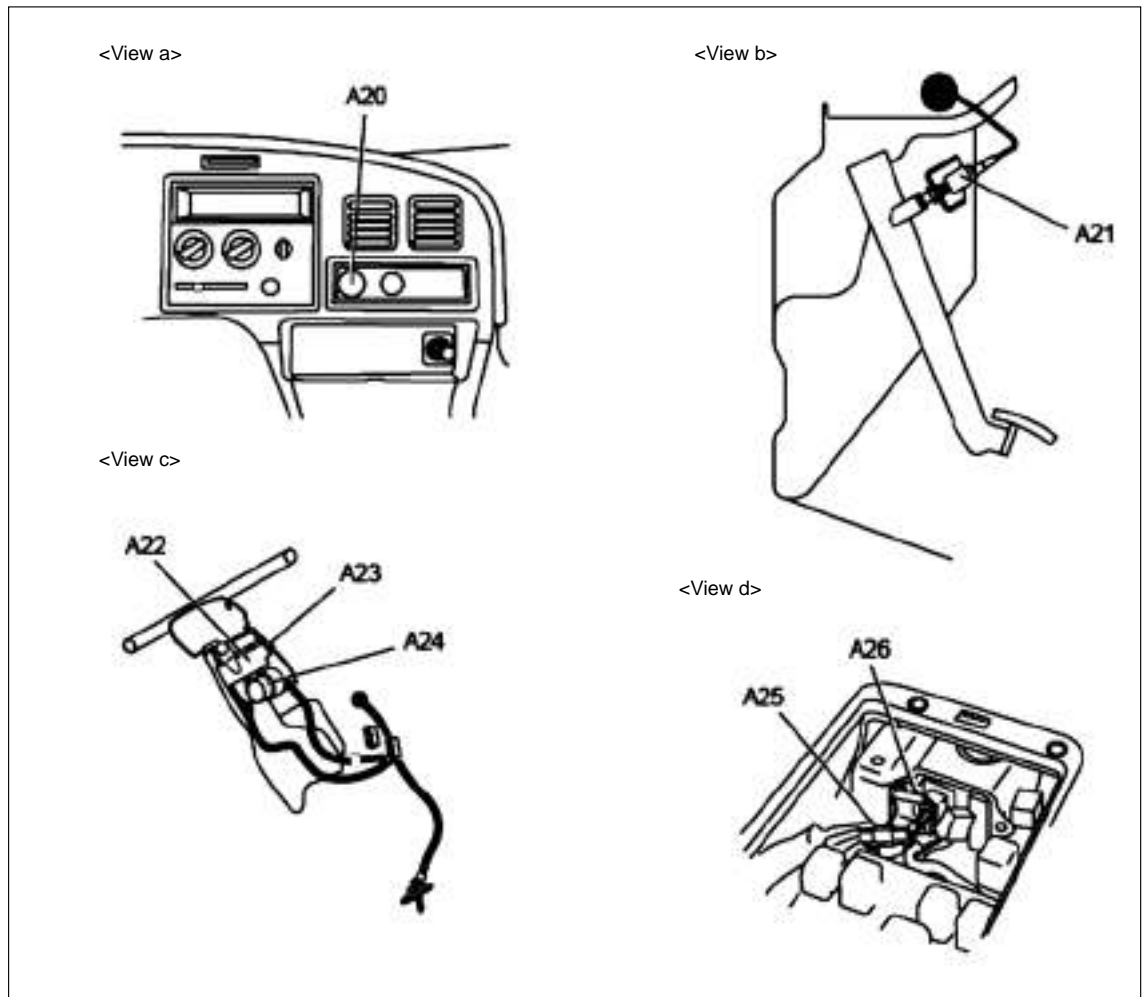
22-11 Installation Position of Parts and Components

A Various switches	22-11-2
B Relay and controller system	22-11-4
C Fuse, instrument, sensor, buzzer and motor	22-11-7
D Air conditioning unit system	22-11-8
E Door electrical control system	22-11-9
F Vehicle ceiling	22-11-10
G Cab	22-11-11
H Cab tilting system	22-11-12
J Main harness and connector	22-11-13
R Engine system	22-11-15
S Driving device	22-11-16
T Switch and sensor	22-11-17
T Switch and sensor	22-11-18
U Fuse and connector	22-11-19
V Solenoid valve and motor	22-11-20
W Buzzer and indicator	22-11-21
X Others	22-11-22

A Various switches



Installation Position of Parts and Components

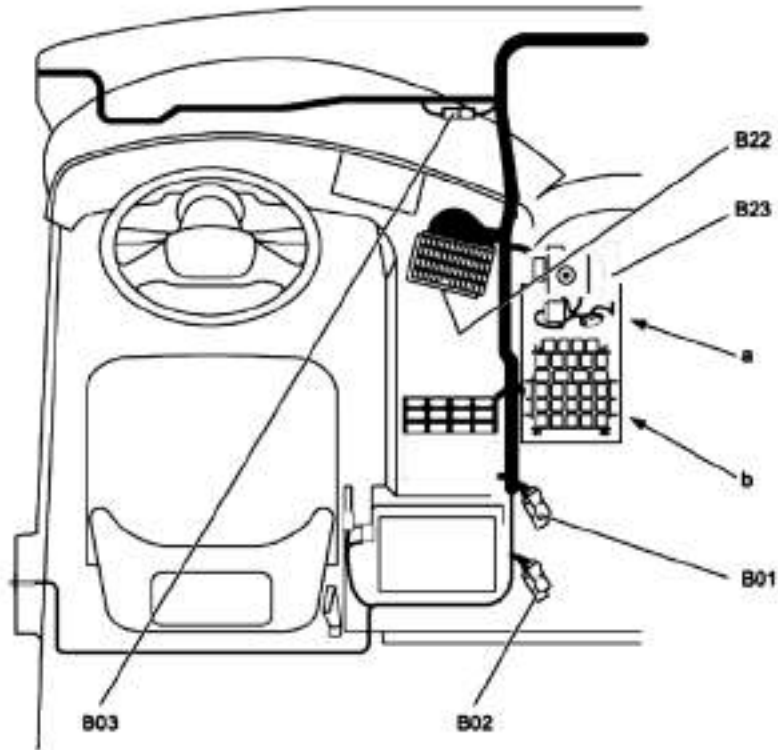


► Those without code means no corresponding parts

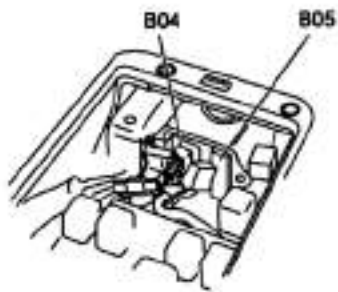
A01	Differential lock switch	A12	Cab tilting locking switch
A02	Cold starting switch	A13	Left front door switch
A03	Speed display switch	A14	Parking brake release switch
A04	Driven electric output switch	A15	Individual special lamp switch
A05	Rear fog lamp switch	A20	Intake heater switch
A06	Safety control switch	A21	Clutch switch
A07	No-load speed regulation pot	A22	Combination switch
A08	Acceleration switch	A23	Fog lamp switch
A09	Driven control switch	A24	Starter switch
A10	Low air pressure switch	A25	Storage clearing switch
A11	Right front door switch	A26	Identification switch

B Relay and controller system

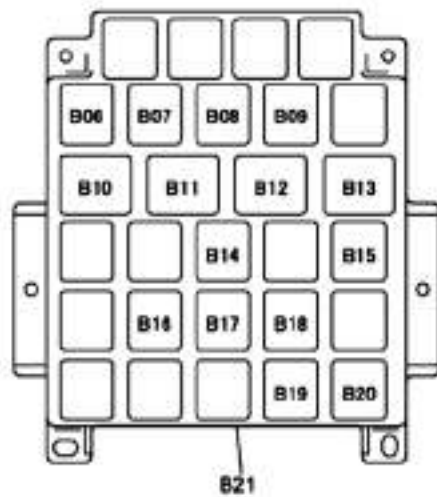
B01-30



<View a>



<View b>



Installation Position of Parts and Components

B01	Diode control system	B16	Parking lamp relay
B02	Diode control system	B17	Key light relay (high)
B03	Diode control system	B18	Key light relay (low)
B04	Flash lamp and turning lamp device	B19	Rear fog lamp relay
B05	Speed display relay	B20	Horn relay
B06	Prestroke cut-off relay	B21	Relay box
B07	Exhaust brake relay	B22	Electric window ECU
B08	Fog lamp relay	B23	MULAC
B09	Tail lamp relay	B24	Fuel filling rate regulating resistance speed control resistance
B10	Driving force output relay <output power> Driving control relay <not output power>	B25	Pulse distributor
B11	Fuel cut-off relay	B26	Engine ECU
B12	Wiper relay (high)	B27	Diode control system
B13	Wiper relay (low)	B28	Diode control system
B14	Condenser fan relay	B29	Diode control system
B15	Electromagnetic clutch relay	B30	Diode control system

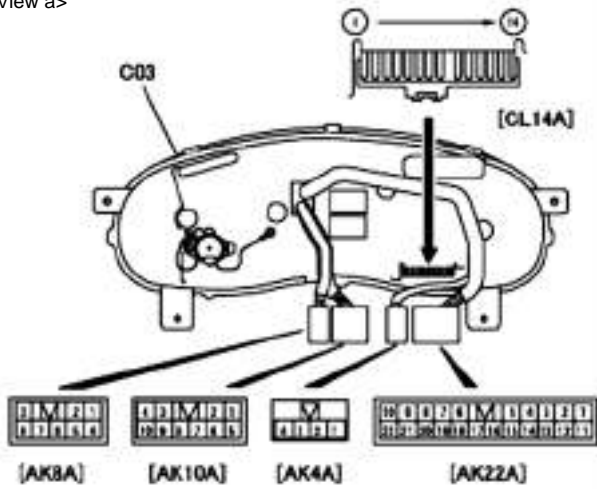
MULAC: (multi-purpose timing control device and lighting and alarm control device) :

Connector model display []

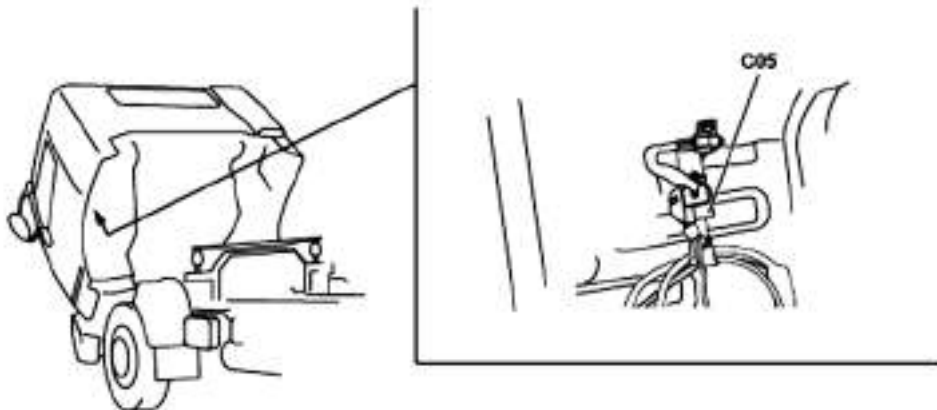
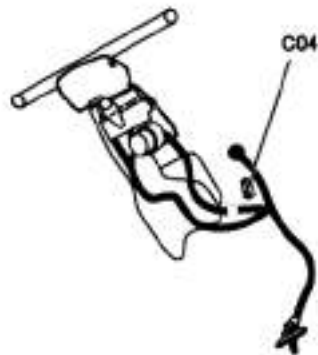
C01~20



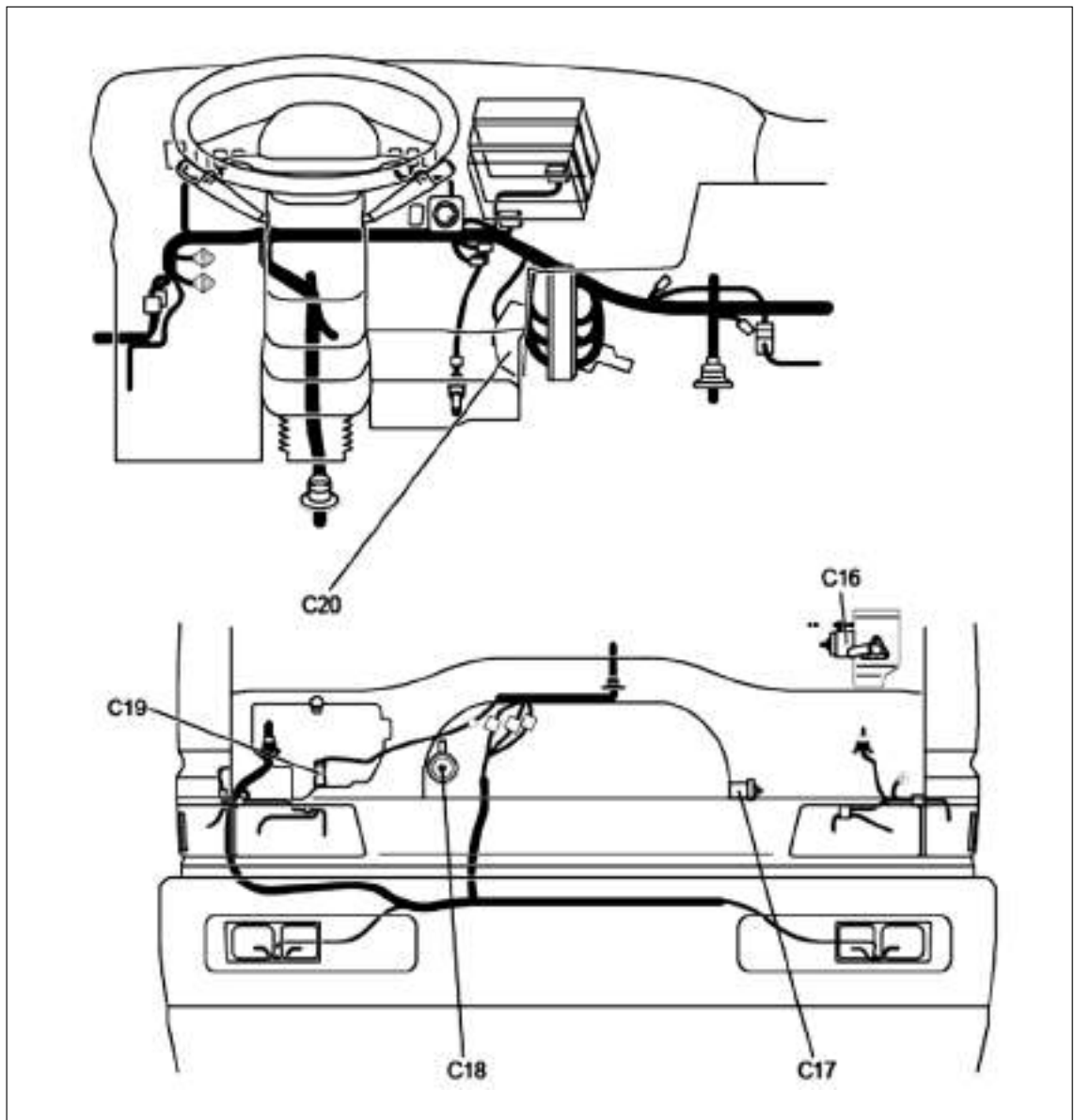
<View a>



<View b>



C Fuse, instrument, sensor, buzzer and motor

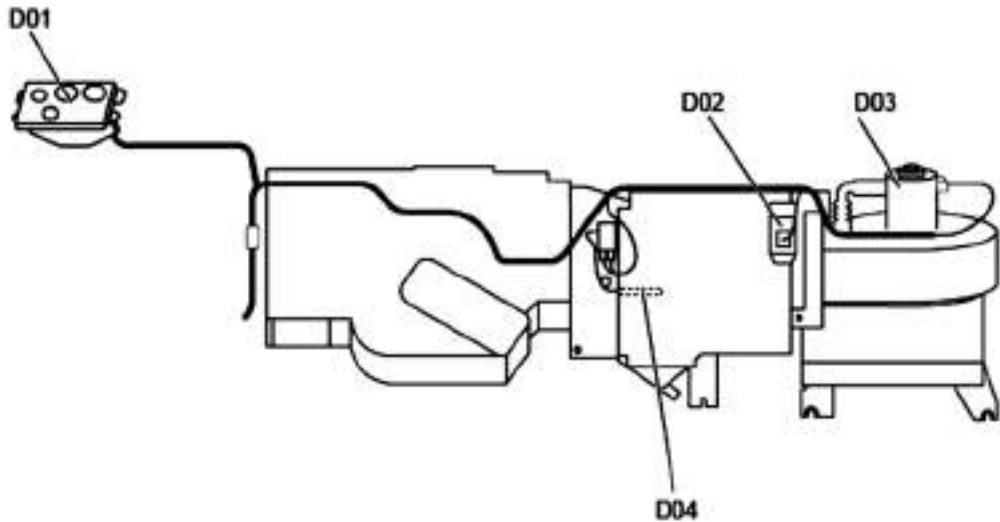


► Those without code means no corresponding parts

C01	Fuse box	C16	Wiper motor
C02	Fast recorder	C17	AC generator pedal position sensor
C03	Instrument combination	C18	Electric horn
C04	Alarm buzzer	C19	Windshield washer motor
C05	Electric tilting buzzer	C20	Fuel cut-off motor

D Air conditioning unit system

D01~04

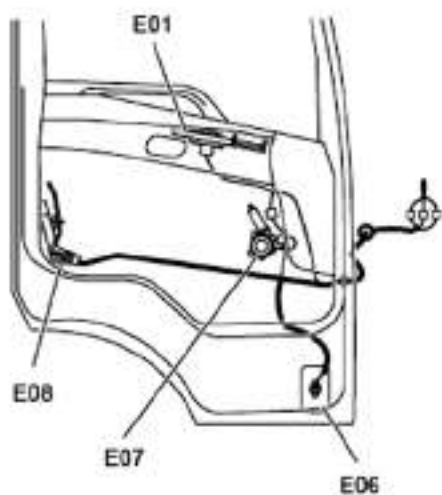


- D01 Heater control device
- D02 Air compressor resistance
- D03 Air compressor motor
- D04 Temperature automatic regulator

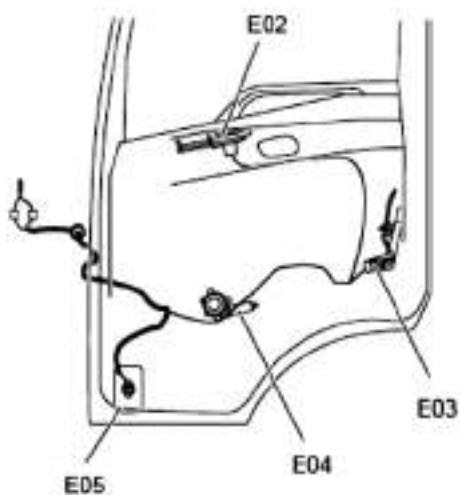
E Door electrical control system

E01~08

<Cab door>



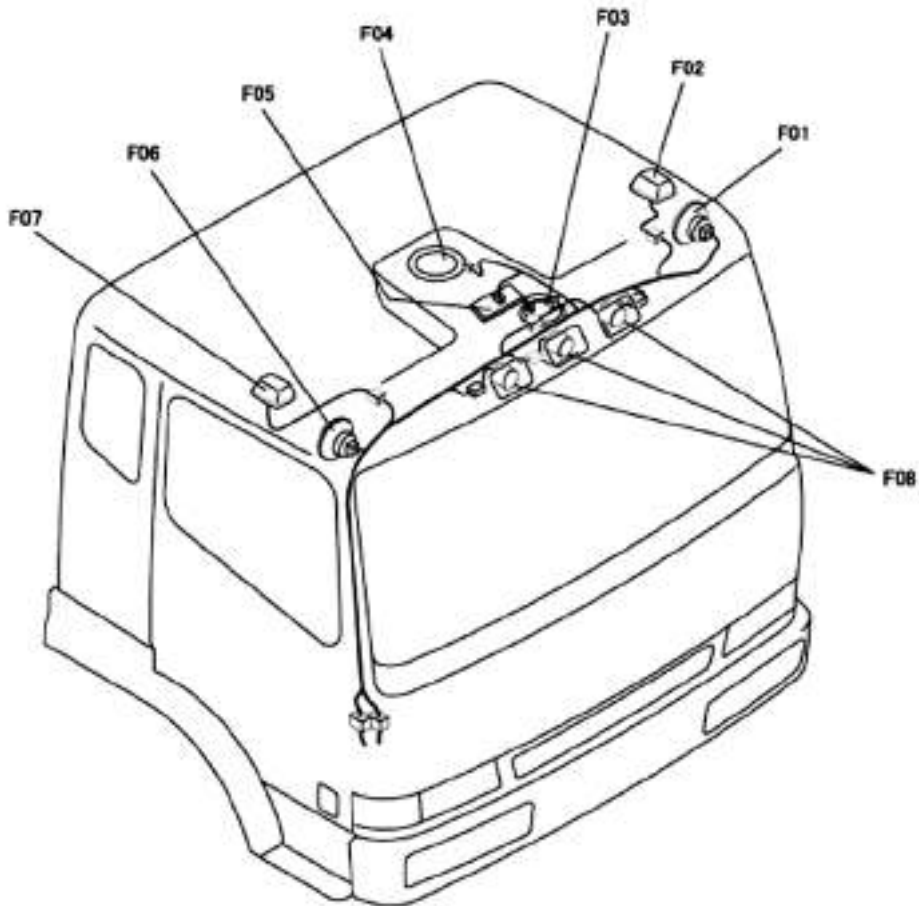
< Assistant cab door >



- E Door electric control system
- E01 Electric window switch left front
- E02 Electric window switch right front
- E03 Door lock exciter right front
- E04 Right electric window motor
- E05 Right front side turning signal lamp
- E06 Left front side turning signal lamp
- E07 Left electric window motor
- E08 Door lock exciter left front

F Vehicle ceiling

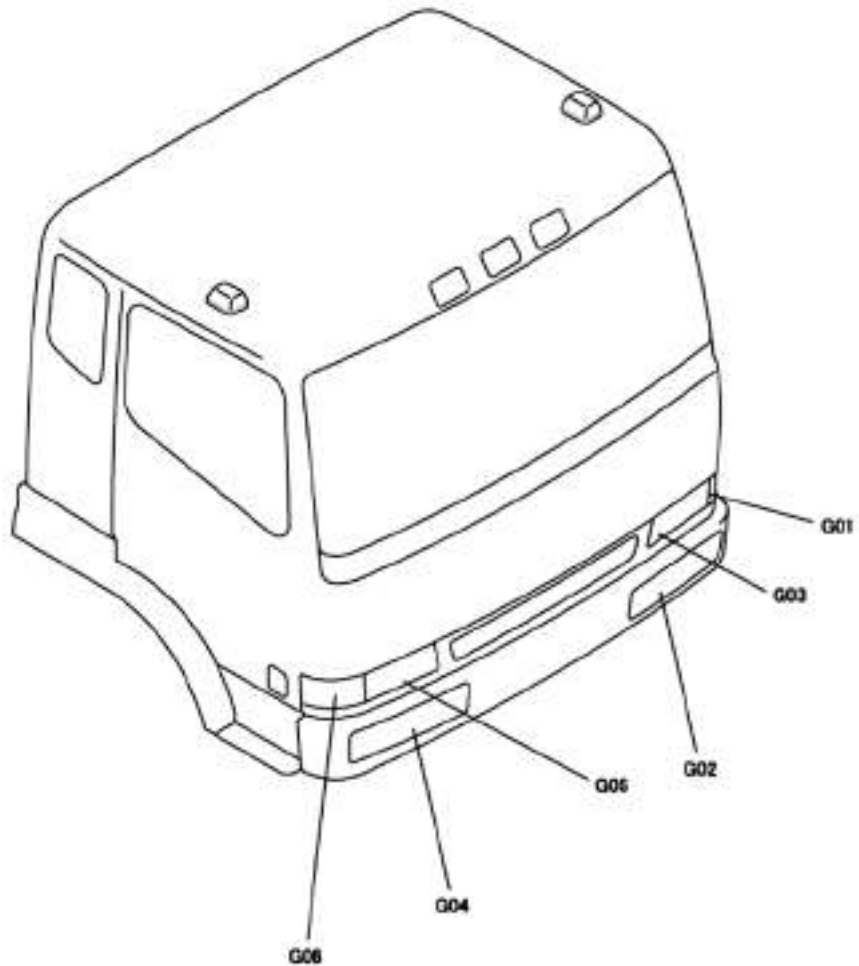
F01~08



- F01 Left front loudspeaker
- F02 Clearance marker lamp left front
- F03 Central loudspeaker <three horns>
Right front loudspeaker <two horns>
- F04 Fluorescent lamp
- F05 Individual special lamp
- F06 Right front loudspeaker <three horns>
- F07 Clearance marker lamp right front
- F08 Speed display lamp

G Cab

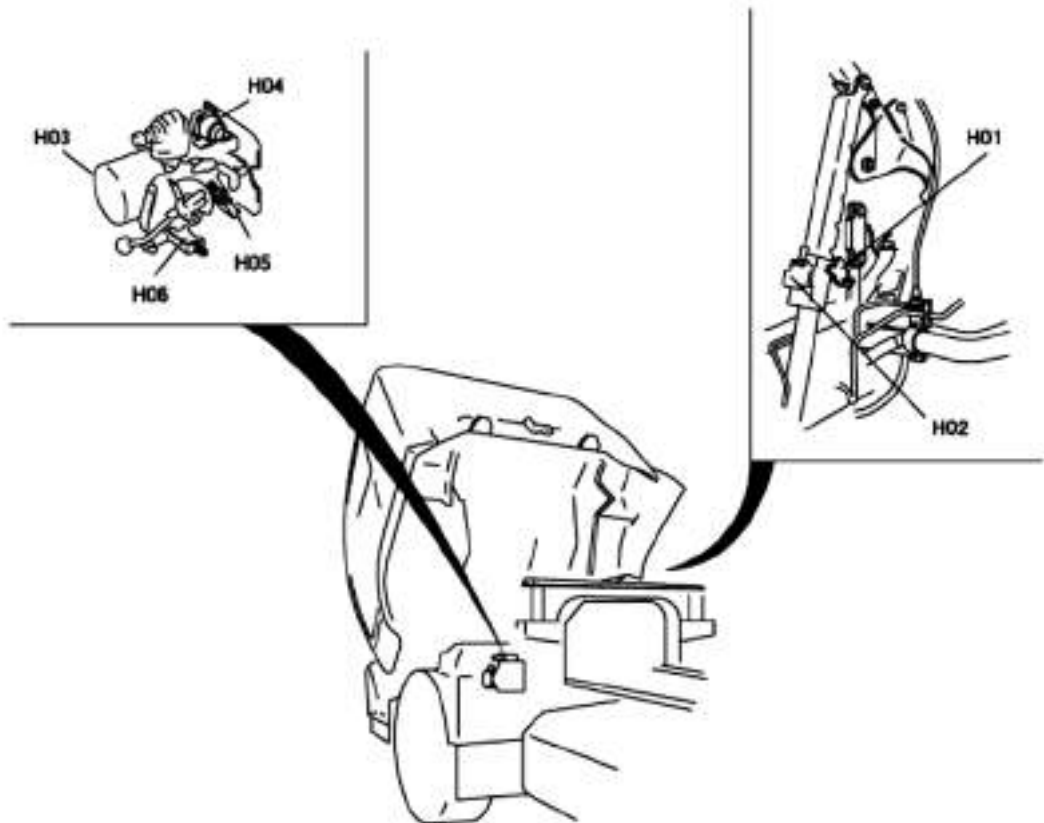
G01~08



- G01 Left front space lamp
Left front space and turning lamp <option>
- G02 Left front combination lamp
- G03 Left front key light
- G04 Right front combination lamp
- G05 Right front key light
- G06 Right front space lamp
Right front space and turning lamp<option>

H Cab tilting system

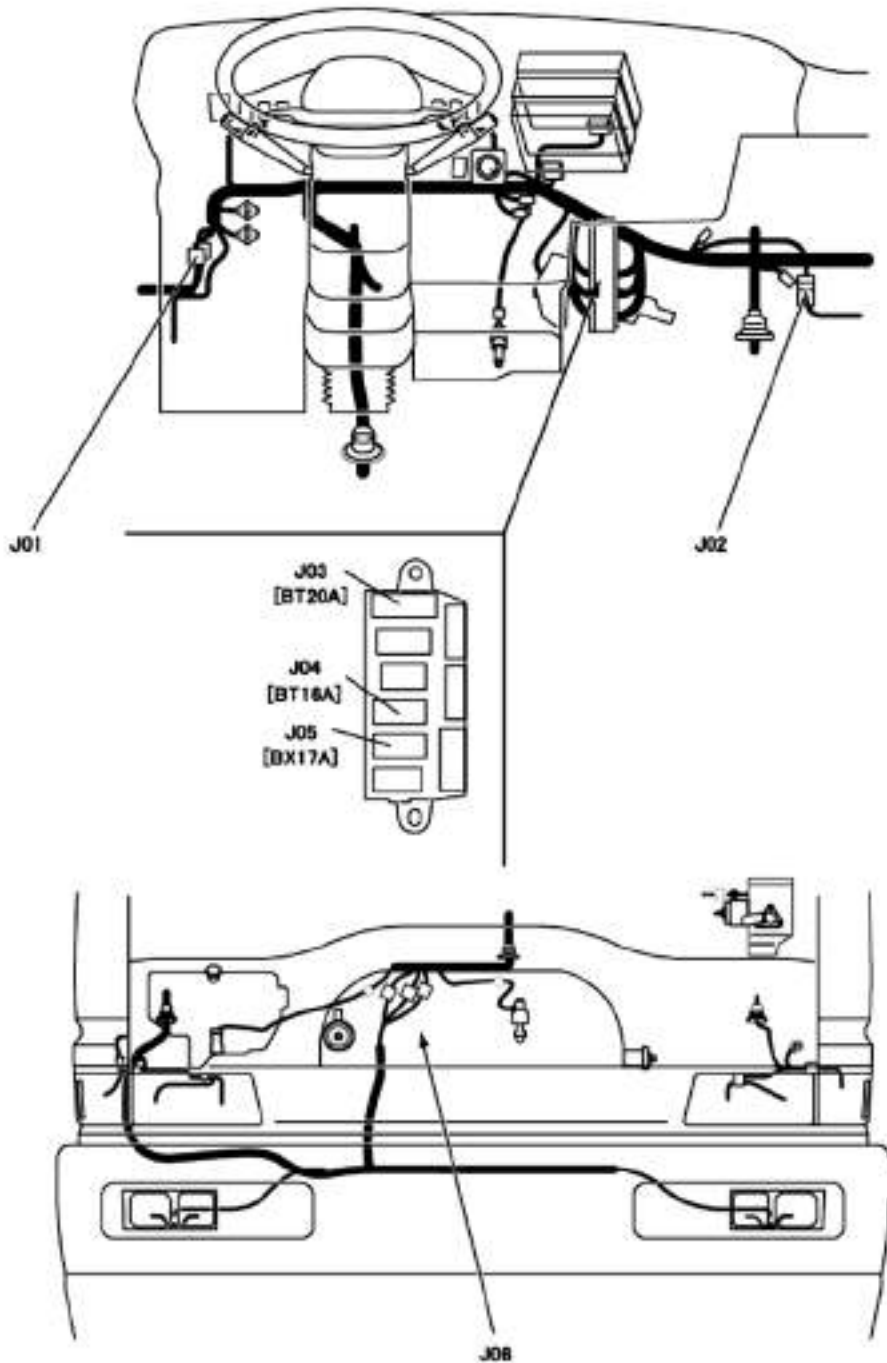
H01~08

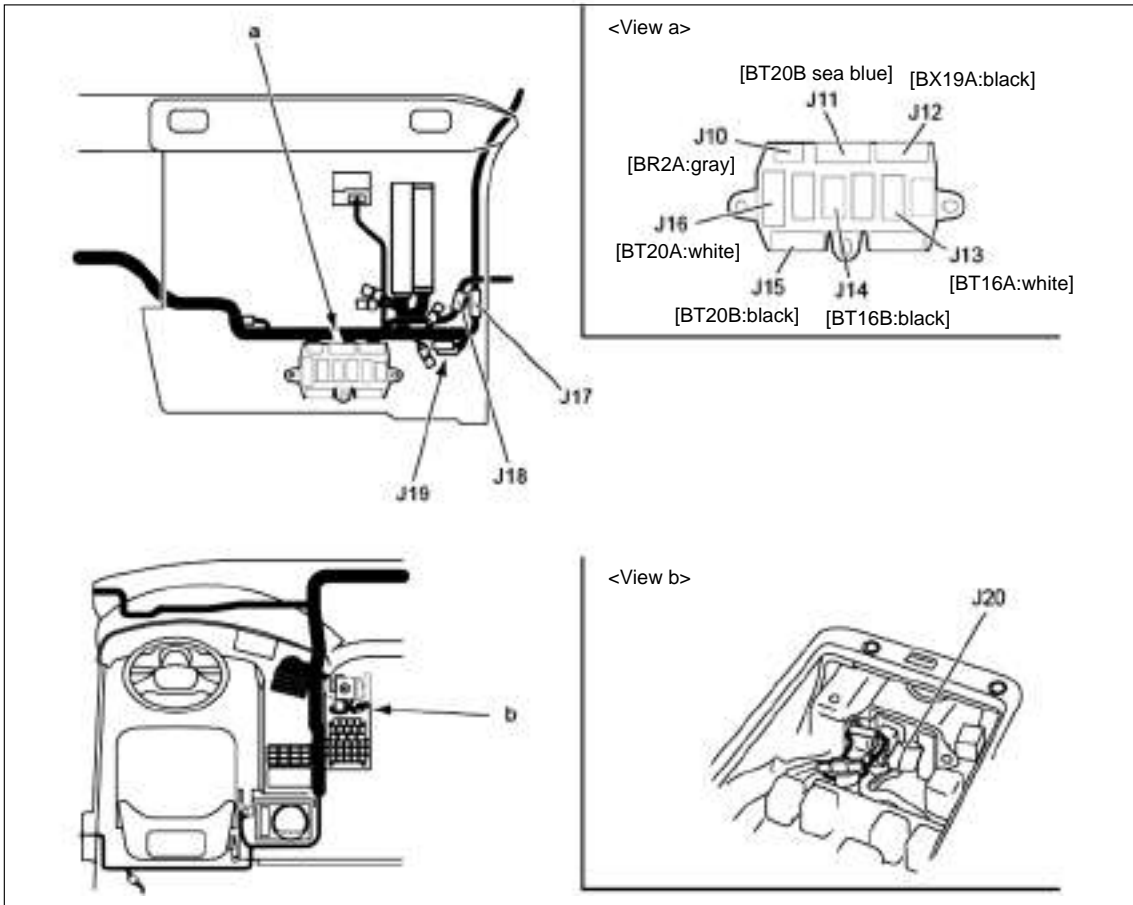


- H01 Tilting completion conversion switch
- H02 Sleeve stroke control switch
- H03 Cab tilting oil pump motor
- H04 Electric tilting relay
- H05 Lift/fall conversion switch
- H06 Electric tilting line switch

J Main harness and connector

J01~20



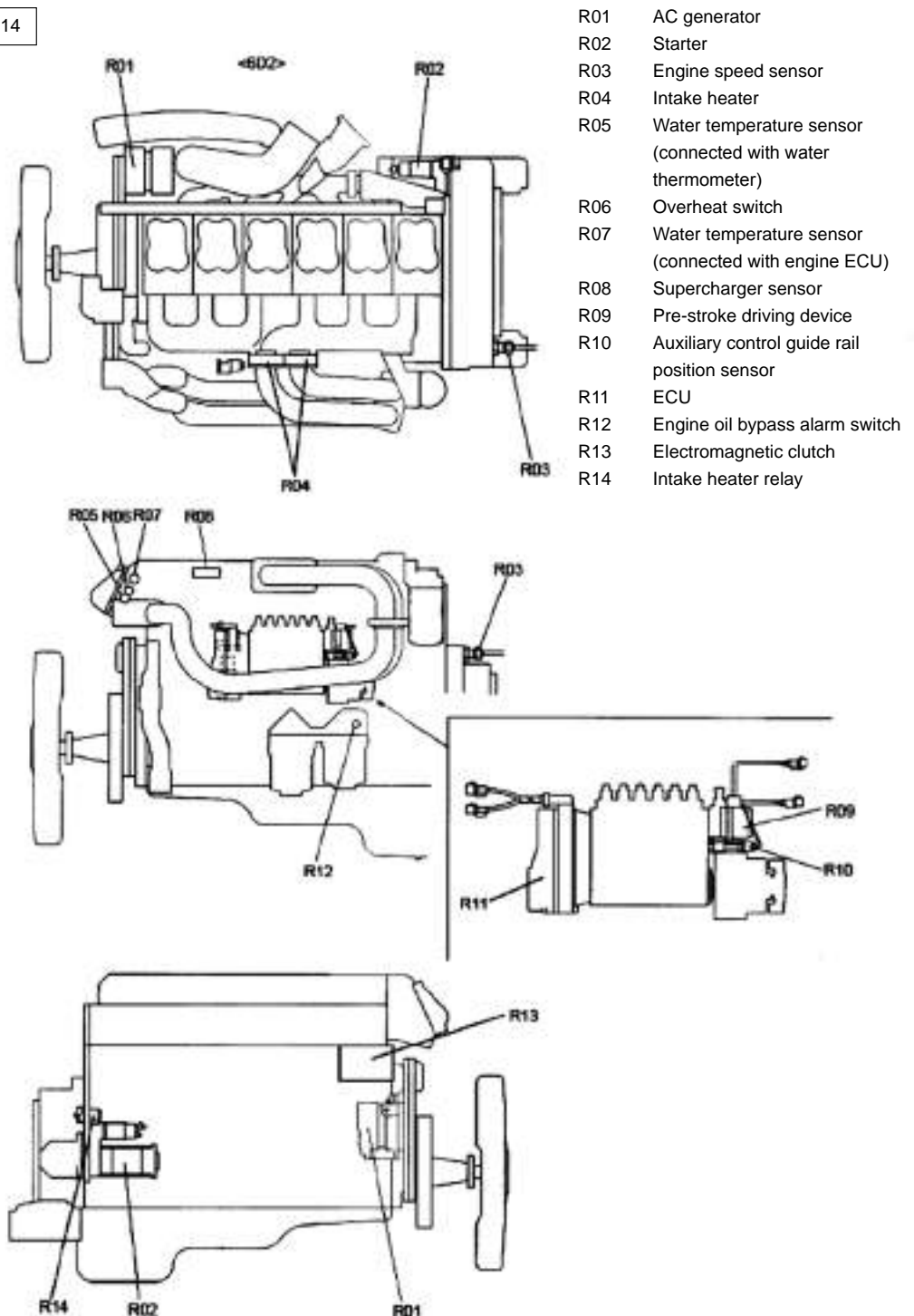


► Those without code means no corresponding parts

- | | | |
|-----|---------------------------------------------------------------------|---------------------------------------------------------------------------|
| J01 | Connect cab wiring system and door wiring system, left front | Connector model and color display []
Connector model: connector color |
| J02 | Connect cab wiring system and air conditioning unit wiring system | |
| J03 | Connect cab wiring system and equipment control panel wiring system | |
| J04 | Connect cab wiring system and equipment control panel wiring system | |
| J05 | Connect cab wiring system and equipment control panel wiring system | |
| J06 | Connect cab wiring system and chassis wiring system | |
| J10 | Connect cab wiring system and chassis wiring system | |
| J11 | Connect cab wiring system and ECU | |
| J12 | Connect cab wiring system and ECU | |
| J13 | Connect cab wiring system and chassis wiring system | |
| J14 | Connect cab wiring system and chassis wiring system | |
| J15 | Connect cab wiring system and chassis wiring system | |
| J16 | Connect cab wiring system and chassis wiring system | |
| J17 | Connect cab wiring system and ceiling wiring system | |
| J18 | Connect cab wiring system and door wiring system right front | |
| J19 | Short plugging connector | |
| J20 | Multimeter plugging connector (16-pin) | |

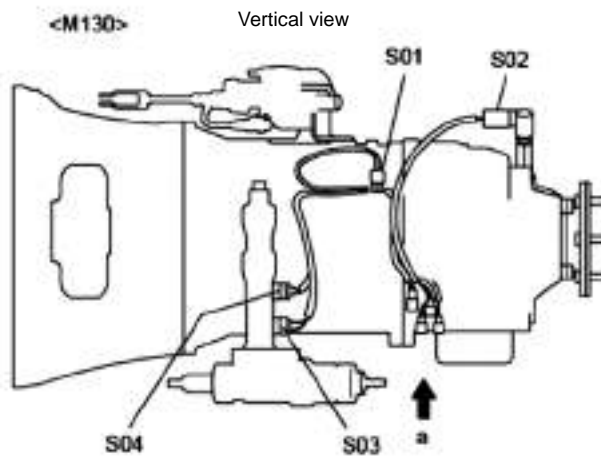
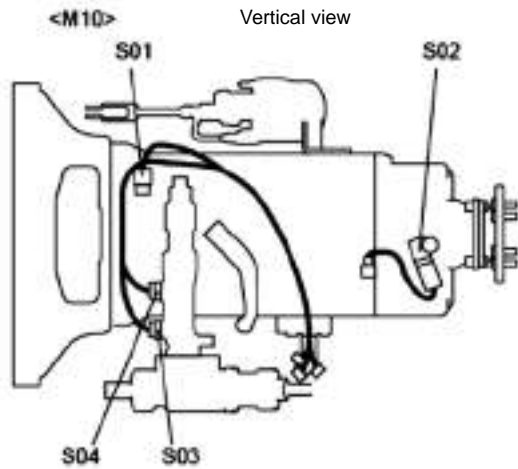
R Engine system

R01~14

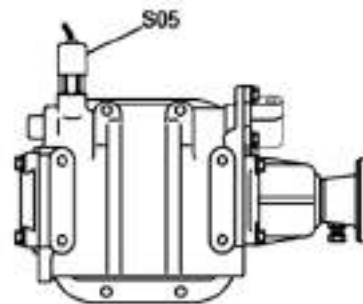


S Driving device

S01~05



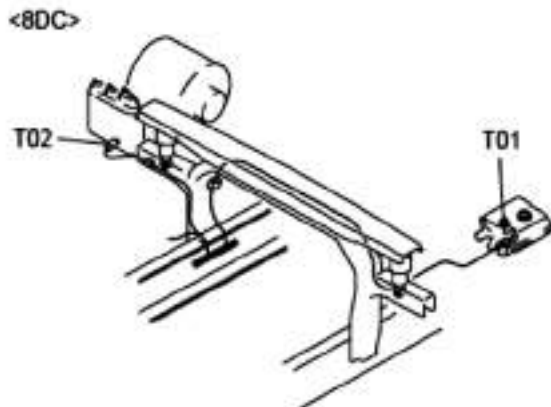
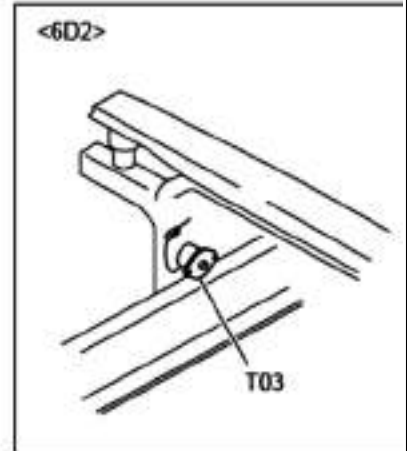
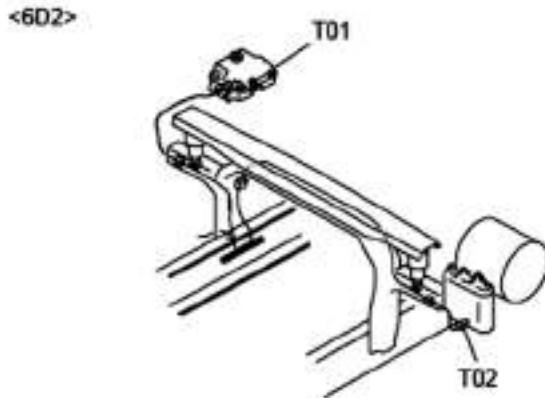
Driving force output type (view a)



- S01 Spare lamp switch
- S02 Speed sensor
- S03 Gear shifting switch
- S04 Driving neutral position switch
- S05 Driving force output control switch<tippler>

T Switch and sensor

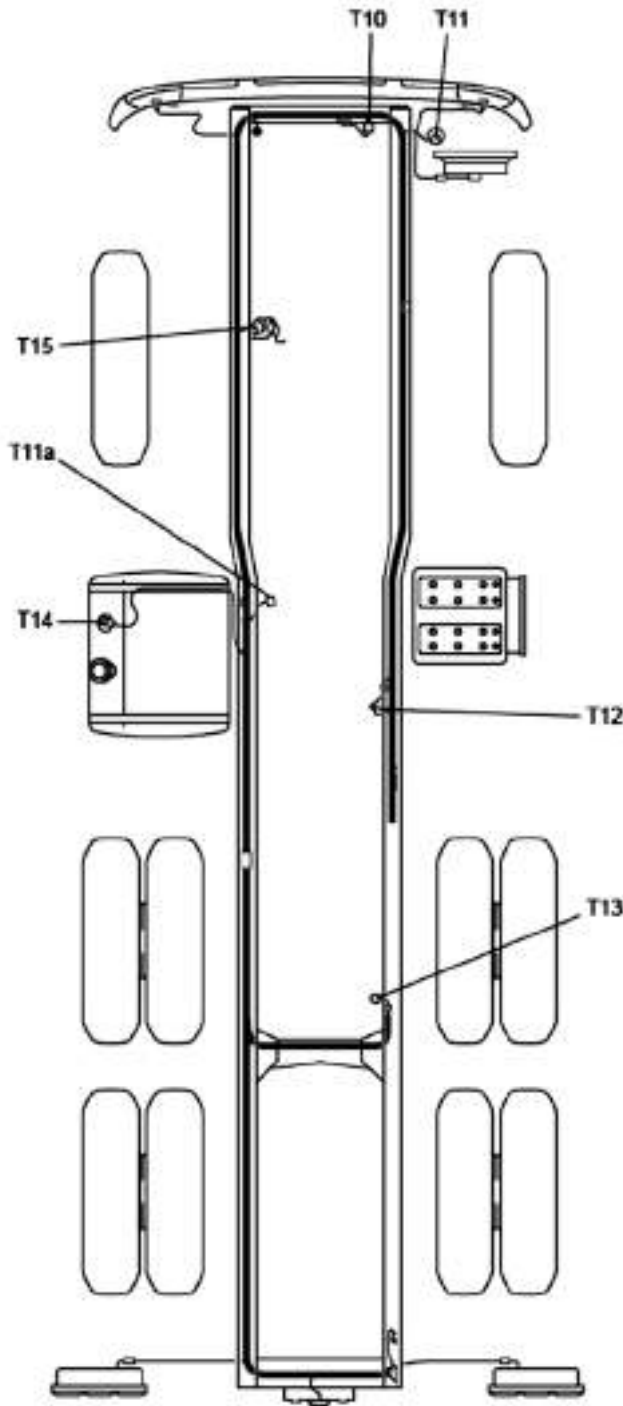
T01~03



- T01 Water quantity control sensor
- T02 Dust display
- T03 Auxiliary equipment load sensor

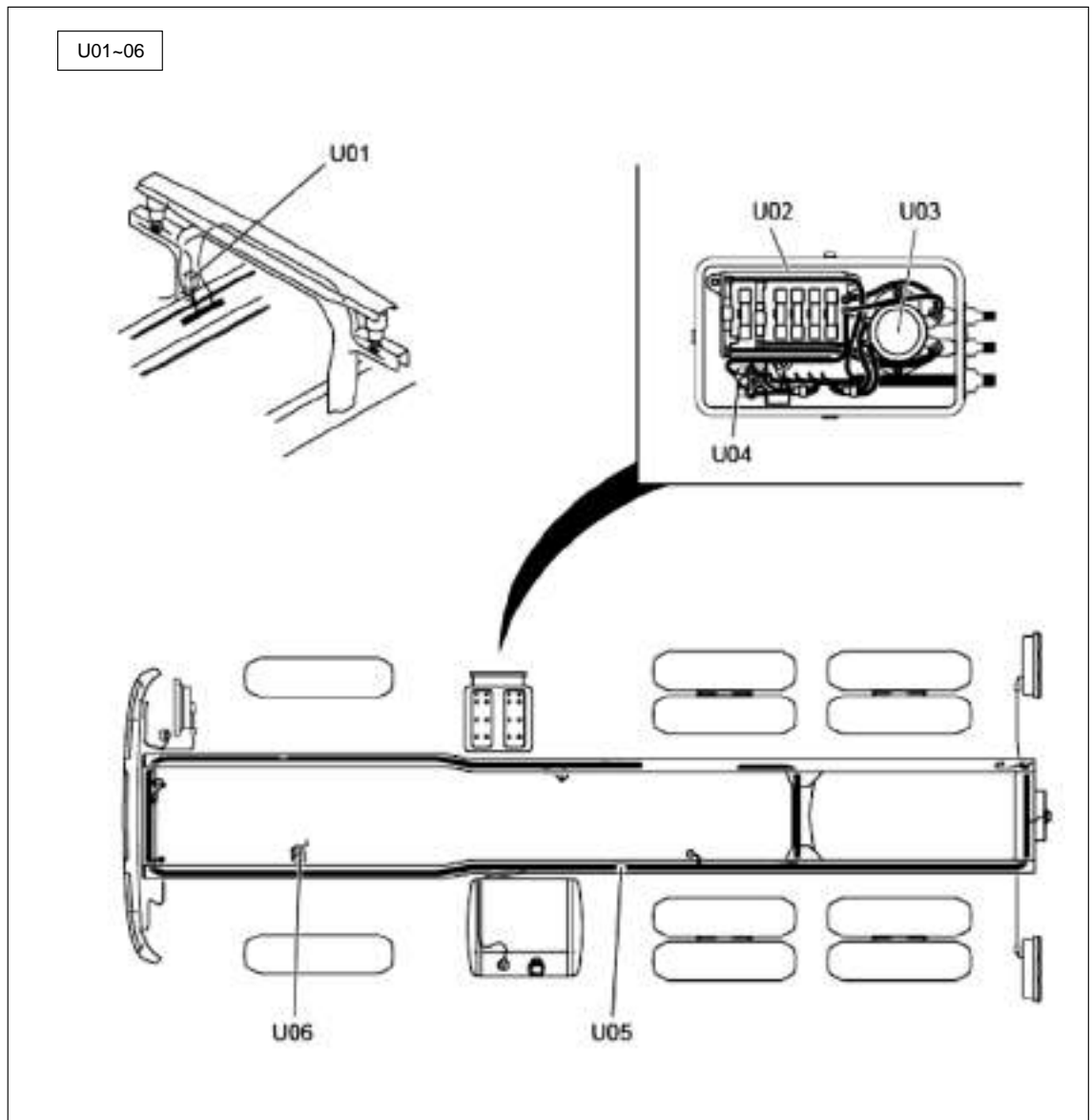
T Switch and sensor

T01~15



- T10 Parking lamp switch
- T11 Bidirection pressure switch
- T11a Driving power supply cut-off control switch
- T12 Parking lamp switch
- T13 Parking brake switch
- T14 Fuel level sensor
- T15 Engine oil pressure switch

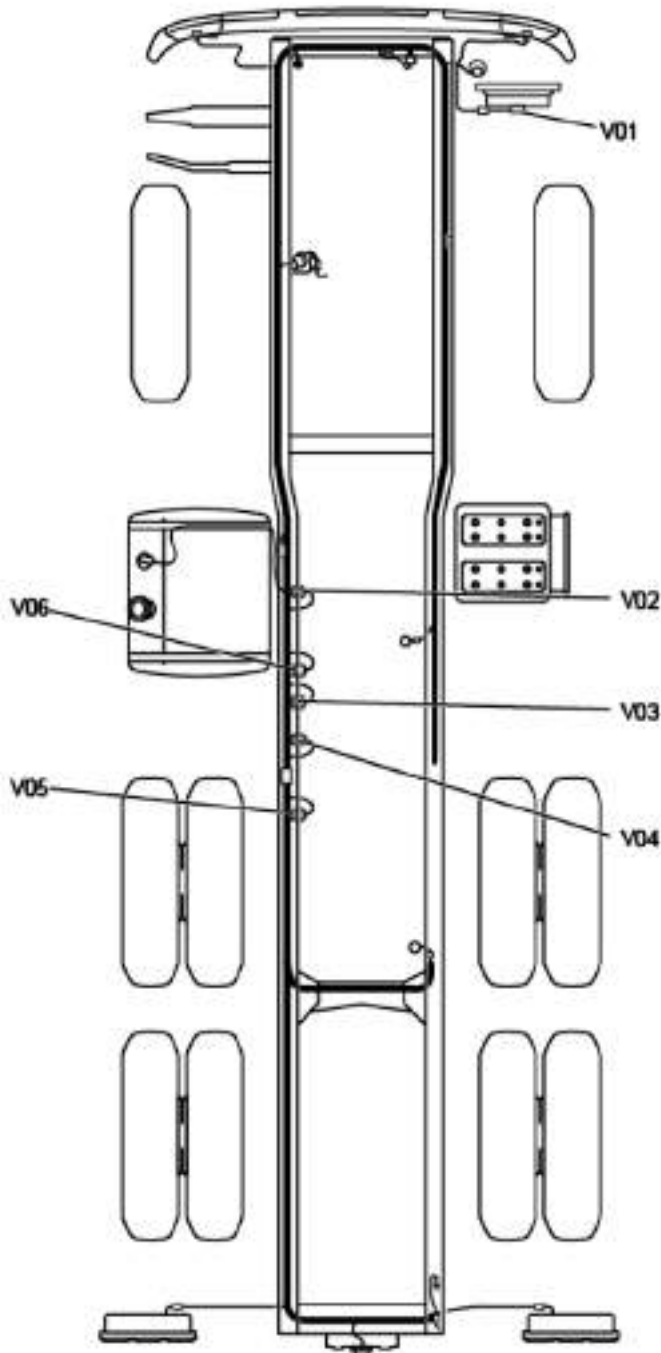
U Fuse and connector



- U01 Connect chassis wiring system and tilting oil pump wiring system
- U02 Heavy current fuse box
- U03 Main power supply relay
- U04 Starter relay
- U05 Vehicle chassis and engine chassis
- U06 Vehicle chassis and engine chassis
Connect wiring system

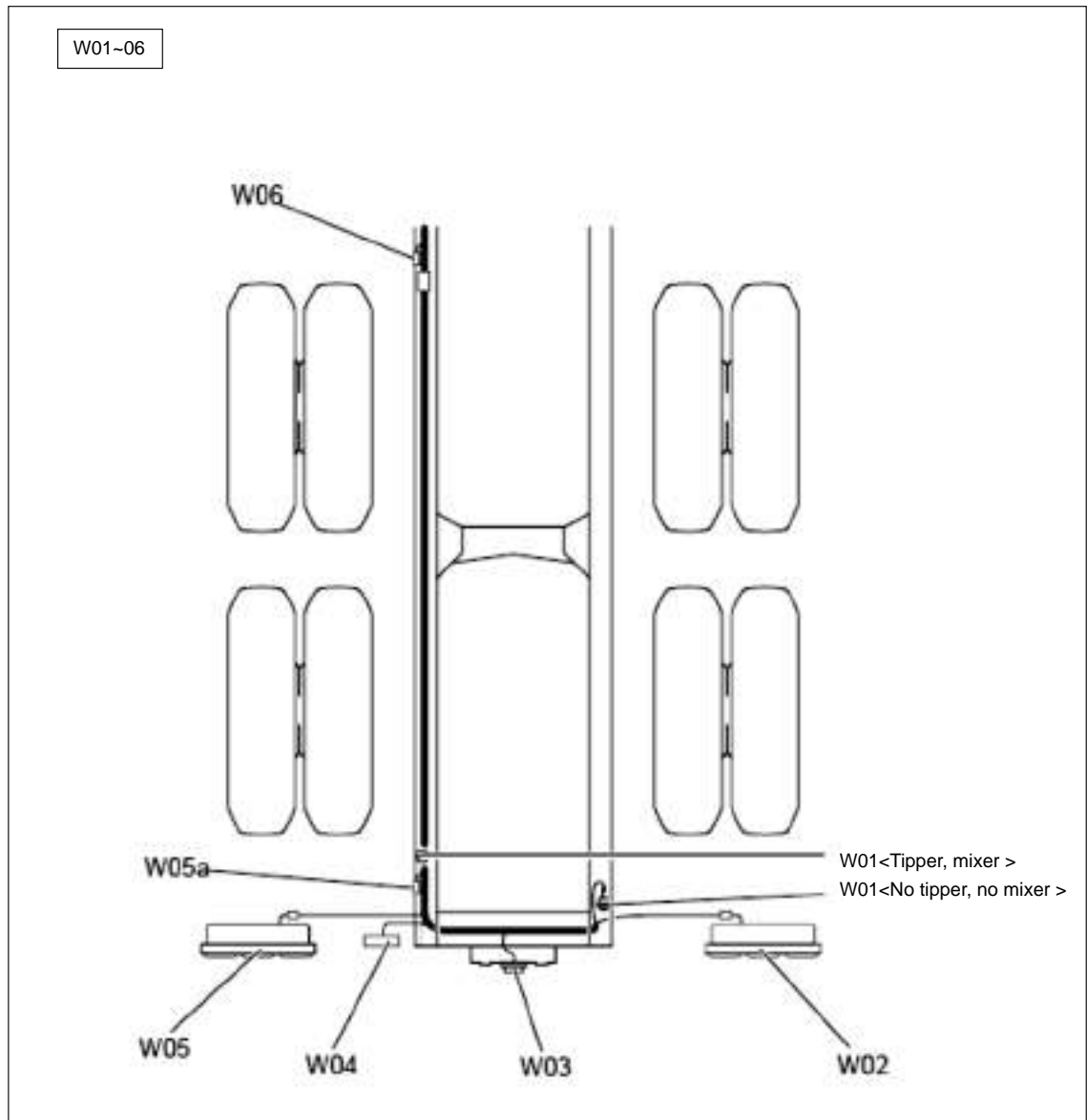
V Solenoid valve and motor

V01-06



- V01 Condenser fan motor
- V02 Driving control three-way solenoid valve
- V03 Exhaust brake three-way solenoid valve
- V04 Inertia pressing three-way solenoid valve
- V05 Differential locking three-way solenoid valve
- V06 Driving force output three-way solenoid valve

W Buzzer and indicator

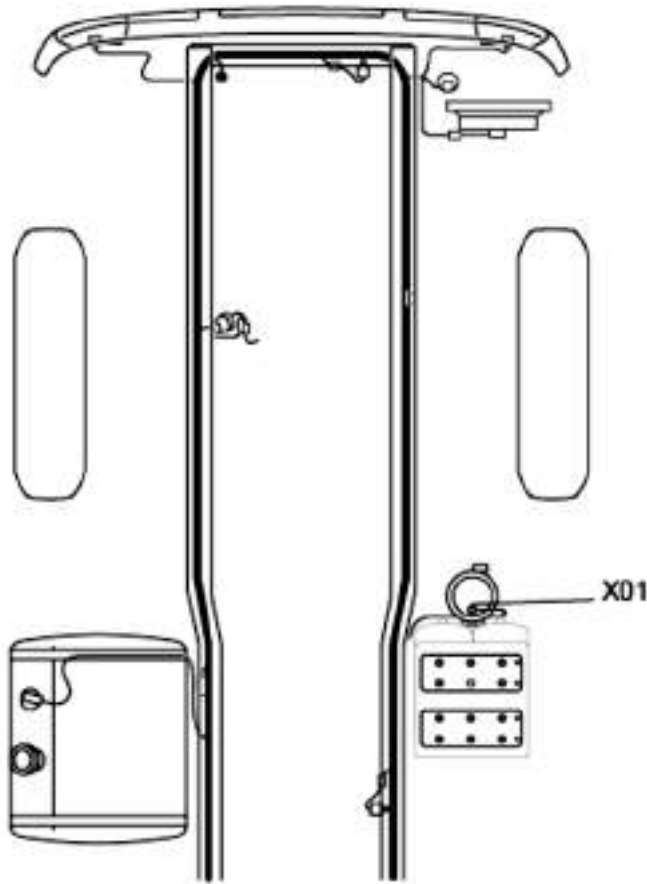


► Those without code means no corresponding parts

- W01 Rear buzzer
- W02 Right rear combination lamp
- W03 License plate lamp
- W04 Rear fog lamp
- W05 Left rear combination lamp
- W05a Rear space lamp
- W06 Side marker lamp

X Others

X01



22-12 Detection of Parts and Components

# 001~ #179 Switches	22-12-2
#180~#249 Relays	22-12-15
#250~#349 Sensors	22-12-18
#350~ #409 Control systems	22-12-20
#410~#509 Motors	22-12-21
#510~#559 Regulators	22-12-24
#560~#609 Solenoid valves	22-12-25
#610~#649 Buzzers and horns	22-12-26
#650~ #699 Lamps	22-12-27
#750 ~ #859 Others	22-12-28
#860 Battery	22-12-31
#870~#889 Fuses	22-12-34
#890 Combination instrument (Cummins engine series)	22-12-38
#890 Combination instrument (Weichai engine series)	22-12-39

001~ #179 Switches

► #001 Check of combination switch

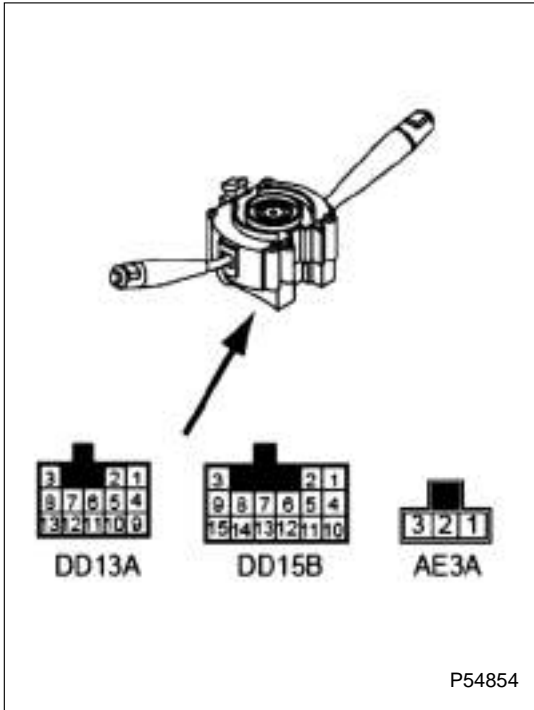
- Check conducting condition according to the table below

In the table, it must be conducted between terminals p and p

- If any fault found, replace the combination switch

Connection table of AE3A connector

		②	③	①
Fog lamp Switch	OFF			
	ON	O	O—O	O

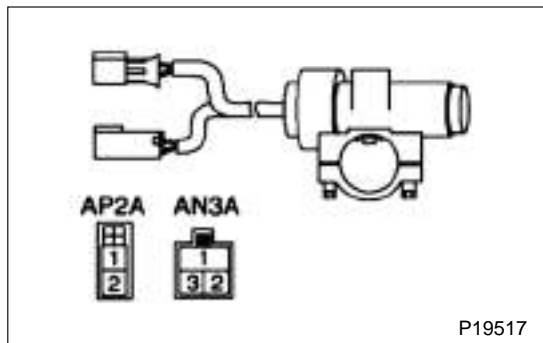


Detection of Parts and Components

	DD15B	①	②	③	⑨	⑦	⑧	⑤	⑥		Local ground
Lamp switch	OFF										
	I					○	—			○	
	II					○	—	○	—	○	
Dimmer switch	Main						○	○	⊙		
	↕						○	○	⊙		
	Dimmer							○	○		
	↕						○	○	⊙		
	Cut in						○	○	—	⊙	
Turning signal lamp switch	LH		○	—	○						
	N (neutral position)										
	RH			○	—	○					
Horn switch	OFF										
	ON	○	—								○

► Only unconventional, square, semi-enclosed (projection-type) head lamp, jumper terminal ⊙ is conducted

	DD13A	⑤	⑥	⑨	⑦	①	⑧	④	⑩			
Wiper and washer switch	OFF											
	INT (intermittent)								○	—		○
	LO (low speed)								○	—	○	
	HI (high speed)								○	—	○	○
	WASH (washer)			○	—				○			
Exhaust brake switch	OFF											
	ON					○	—	○				



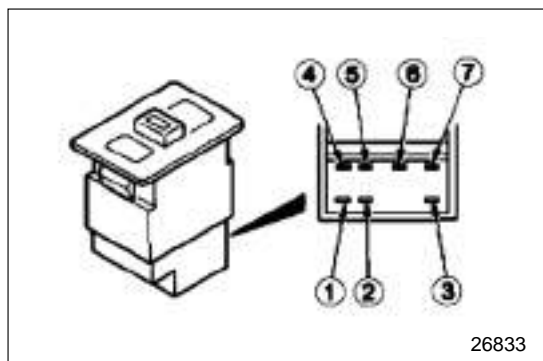
► #002 Check of starting switch

- Check conducting condition according to the table below

	AP2A		AN3A		
	②	①	①	③	②
LOOK					
[OFF]					
ACC	○	—	○		
ON)	○	○	○	○	
START	○	○	○	○	○
	B	M	ACC	F	S

○ — ○ :Indicating it is conducted between terminals

- If any fault found, replace the starting switch. Part 37.



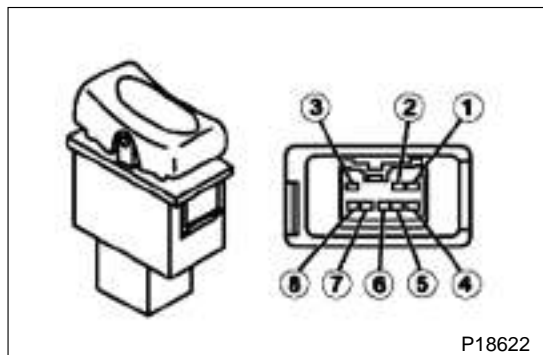
► #005 Check of switch
(Check of differential locking switch)

- Check conducting condition according to the table below

	①	④	⑤	Valve(operation indicating lamp)	③	Valve (night lamp)	⑦
	UNLOCK					○	⊙
LOCK	○	○	○	⊙	○		

○ — ○ :Indicating it is conducted between terminals

- If any fault found, replace the differential locking switch



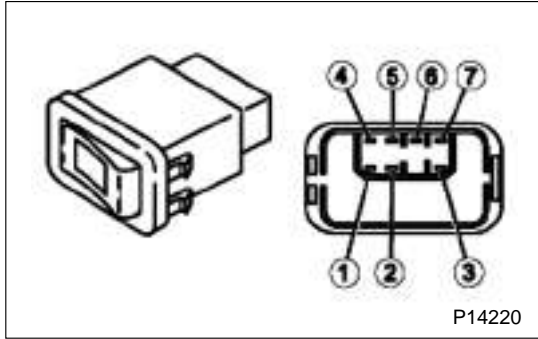
(Check of rear fog lamp)

- Check conducting condition according to the table below

	⑦	③	⑧	⑤	④	LED(operation indicating lamp)	①
	ON	○		○		○	—
OFF		○	○				

○ — ○ :Indicating it is conducted between terminals

- In case any fault found, replace the rear fog lamp



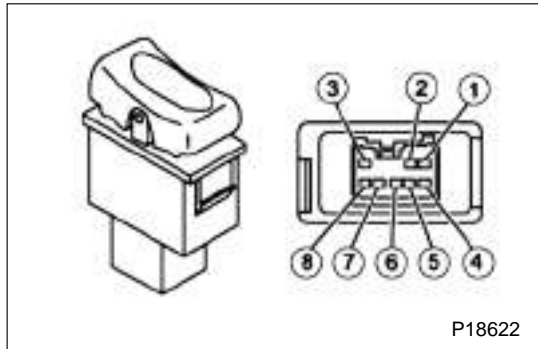
(Check of injection pump governor control switch)

- Check conducting condition according to the table below

	①	⑤	⑦	LED(operation indicating lamp)	③	LED (Night lamp)	②
ON	○	○	○	—	○	○	○
OFF					○	○	○

○—○:Indicating it is conducted between terminals

- If any fault found, replace the injection pump governor control switch



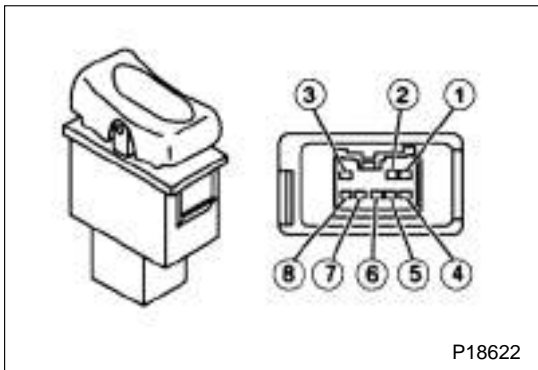
(Check of T/MPTO switch)

- Check conducting condition according to the table below

	①	⑤	⑦	LED(operation indicating lamp)	③	LED (Night lamp)	②
ON	○	○	○	—	○	○	○
OFF					○	○	○

○—○:Indicating it is conducted between terminals

- If any abnormality occurs, exchange the switch



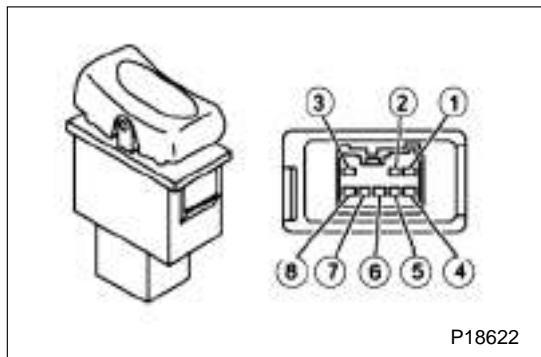
► #012 Check of cold starting switch

- Check conducting condition according to the table below

	⑦	⑧	④	LED(operation indicating lamp)	①
ON	○	○	○	—	○
OFF					

○—○:Indicating it is conducted between terminals

- If any fault found, replace the cold starting switch



P18622

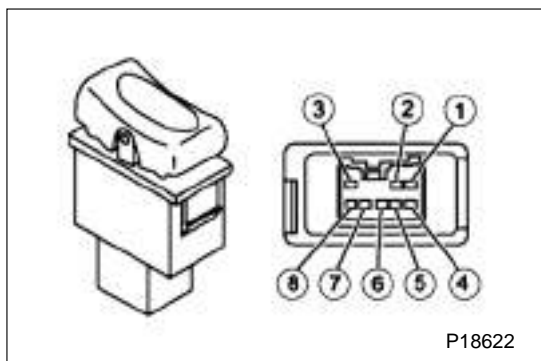
► **#013 Check of speedometer lamp switch**

- Check conducting condition according to the table below

	⑦	②	⑧	④
ON	○	○	○	○
OFF				

○ — ○ :Indicating it is conducted between terminals

- If any fault found, replace the speedometer lamp switch



P18622

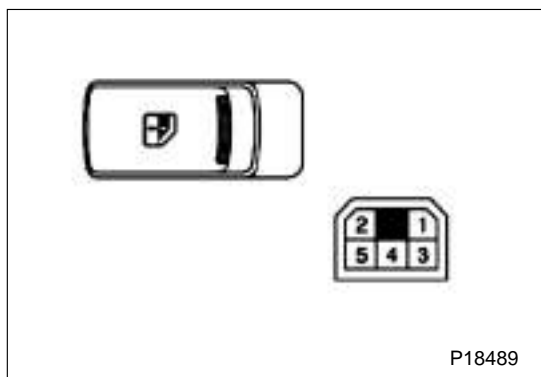
► **#014 Check of individual special lamp switch**

- Check conducting condition according to the table below

	⑦	②	⑧	④	③	LED(operation indicating lamp)	①
	○	○		○			○
N (neutral)							
	○	○			○		○

○ — ○ :Indicating it is conducted between terminals

- If any fault found, replace the individual special lamp switch



P18489

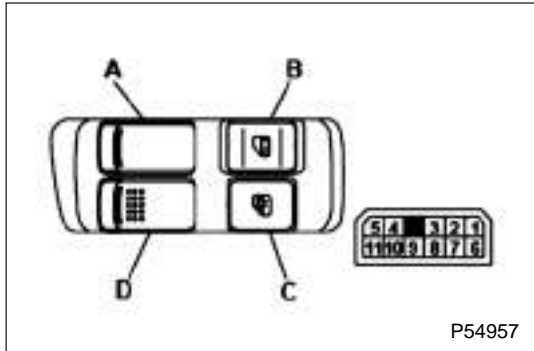
► **#026 Check of electric window switch (assistant driver side)**

- Check conducting condition according to the table below

	①	②	③	④	⑤
UP	○			○	
M (middle position)		○	○		
Down	○			○	○

○ — ○ :Indicating it is conducted between terminals

- If any fault found, replace the electric window switch



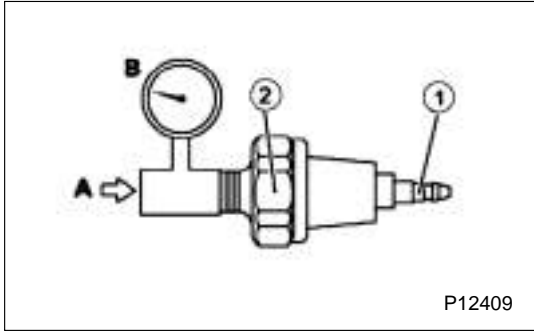
► **#027 Check of electric window switch (driver seat side)**

- Check conducting condition according to the table below

		②	⑤	①	⑦	⑨	⑧	⑥	①
Window switch D on driver side	Up		○	—				○	
	M (middle position)								
	Down		○	—					○
Window switch A on assistant driver side	Up		○	—		○			
	M (middle position)								
	Down		○	—				○	
Window lock switch C on assistant driver	Unlock	○	—			○			
	Lock							○	
Door lock switch	Unlock	○	—	○					
	Lock	○	—	○					

○ — ○ : Indicating it is conducted between terminals

- If any fault found, replace the electric window switch



► #028 Detection of low air pressure switch

Check the switch according to the steps below, if any fault found, replace the switch.

(1) Detect when there is no air pressure

Confirm the continuity between terminal ① and terminal ②.

(2) Detect with air pressure applied

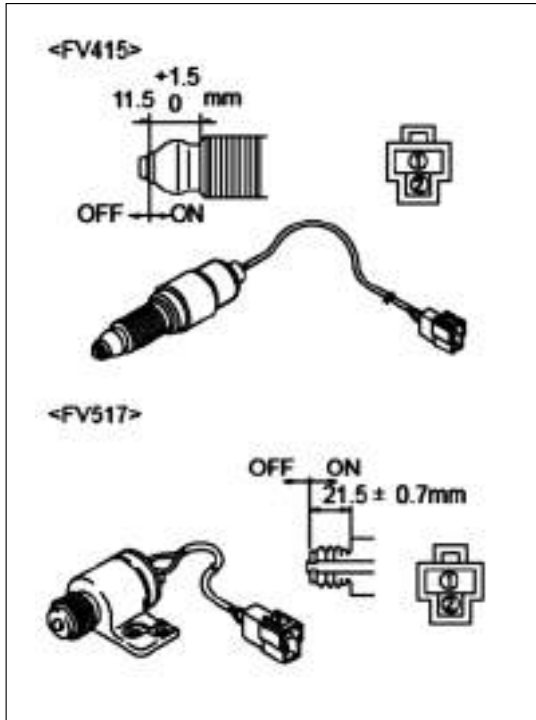
- Apply air pressure A to switch gradually starting from 0kpa(0kgf/cm²).
- Measure the air pressure value at the moment when the continuity between terminal ① and terminal ② has not been detected out, check whether this value complies with the standard pressure value.

B: Air pressure gauge

Standard value (When air pressure is supplied ON-OFF)	470-559kpa (4.8-5.7kgf/cm ²)
----------------------------------------------------------	---------------------------------------------

Standard value (When air pressure is supplied ON-OFF)	470-559kpa (4.8-5.7kgf/cm ²)
----------------------------------------------------------	---------------------------------------------

- When the supplied air pressure reaches 785kpa(8kg/cm²), decrease gradually the air pressure.
- Measure the air pressure value at the moment when the continuity between terminal ① and terminal ② has not been detected out, check whether this value complies with the standard pressure value.



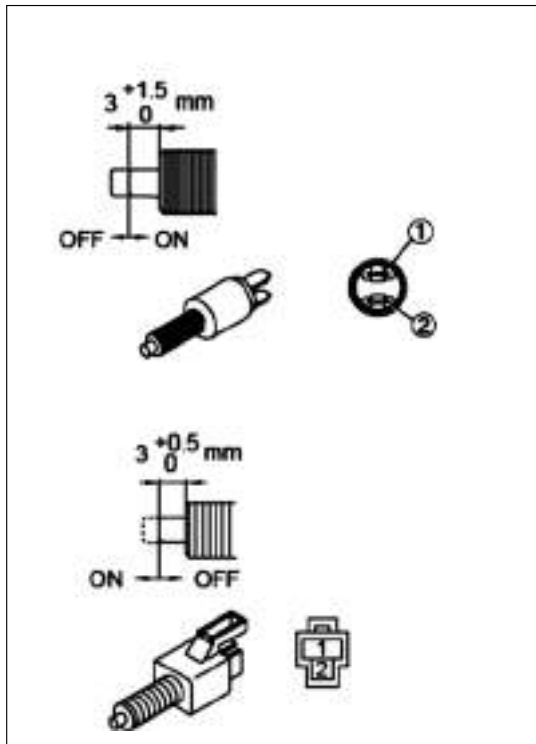
► #029 Check of acceleration pedal switch

- Check conducting condition according to the table below

	①	②
OFF		
ON	○ — ○	○ — ○

○ — ○ :Indicating it is conducted between terminals

- If any fault found, replace the acceleration pedal switch. Part 13.



► #031 Check of clutch switch

- Check conducting condition according to the table below

	①	②
OFF		
ON	○ — ○	○ — ○

○ — ○ :Indicating it is conducted between terminals

- If any fault found, replace the clutch switch. Part 21.



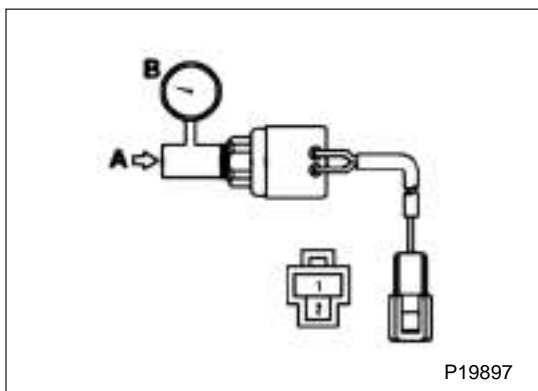
► #035 Check of door switch

- Check conducting condition according to the table below

	①	②
OFF		
ON	○ — ○	○ — ○

○ — ○ :Indicating it is conducted between terminals

- If any fault found, replace the door switch. Part 42.



► #037 Check of parking brake release detection switch

Check the switch according to the steps below, if any fault found, replace the switch. Part 36.

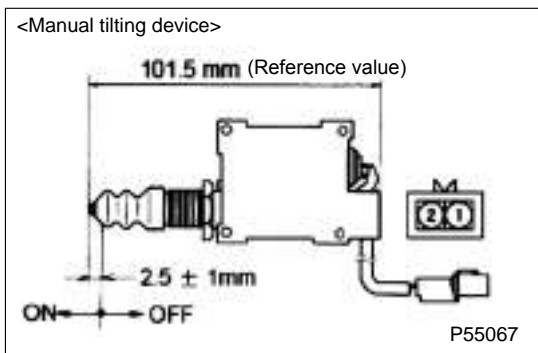
- (1) Detect when there is no air pressure
Confirm the continuity between terminal ① and terminal ②.

- (2) Detect with air pressure applied

- Apply air pressure A to switch gradually starting from 0kpa(0kgf/cm²).
- Measure the air pressure value at the moment when the continuity between terminal ① and terminal ② has not been detected out, check whether this value complies with the standard pressure value.

B:Air pressure gauge

Standard value (Working pressure)	29±9.8Kpa(0.3± 0.1kpgcm ²)
--------------------------------------	-------------------------------------------



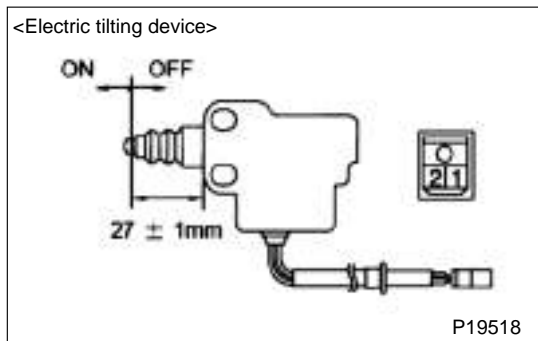
► #039 Check of driver's seat tilt locking switch

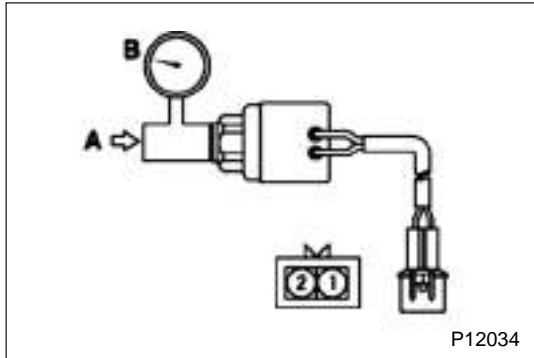
- Check conducting condition according to the table below

	①	②
OFF		
ON	○ — ○	○ — ○

○ — ○ :Indicating it is conducted between terminals

- If the conducting condition is abnormal, replace the tilt completion switch and cylinder stroke detection switch. Part 42.





► #042 Check of parking lamp switch

Check the switch according to the steps below, if any fault found, replace the switch.

(1) Detect when there is no air pressure

Confirm there is no continuity between terminal ① and terminal ②.

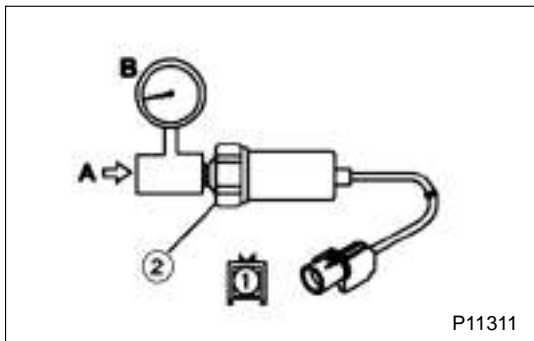
(2) Detect with air pressure applied

- Apply air pressure A to switch gradually starting from 0kpa(0kgf/cm²).

- Measure the air pressure value at the moment when the continuity between terminal ① and terminal ② has not been detected out, check whether this value complies with the standard pressure value.

B:Air pressure gauge

Standard value (working pressure)	29±9.8Kpa(0.3±0.1kpgcm ²)
--------------------------------------	---------------------------------------



► #044 Check of oil pressure switch

Check the switch according to the steps below, if any fault found, replace the switch.

(1) Detect when there is no air pressure

Confirm there is no continuity between terminal ① and terminal ②.

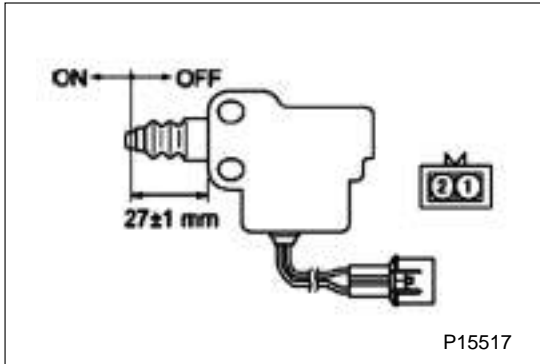
(2) Detect with air pressure applied

- Apply air pressure A to switch gradually starting from 0kpa(0kgf/cm²).

- Measure the air pressure value at the moment when the continuity between terminal ① and terminal ② has not been detected out, check whether this value complies with the standard pressure value

B:Air pressure gauge

Standard (Working pressure)	49±9.8Kpa(0.5±0.1kpgcm ²)
-----------------------------	---------------------------------------



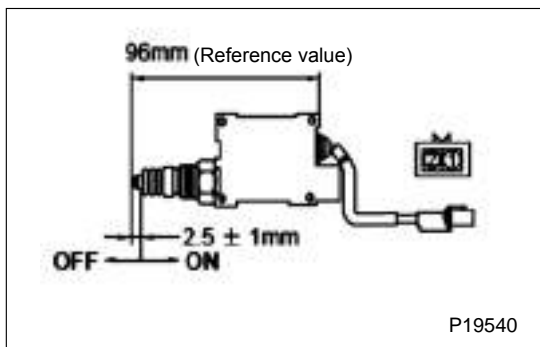
► #045 Check of tilt completion switch and cylinder stroke check switch

- Check conducting condition according to the table below

	①	②
OFF		
ON	○ — ○	○ — ○

○ — ○ :Indicating it is conducted between terminals

- If the conducting condition is abnormal, replace the tilt completion switch and cylinder stroke check switch. Part 42.



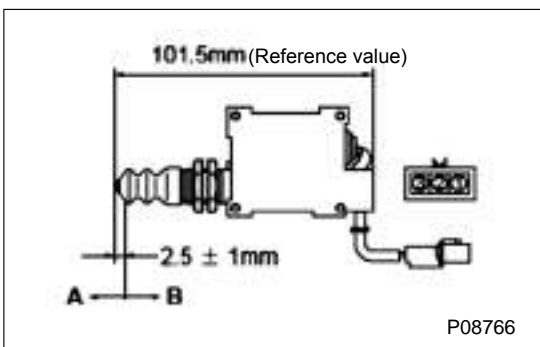
► #046 Check of electric tilting switch

- Check conducting condition according to the table below

	①	②
OFF		
ON	○ — ○	○ — ○

○ — ○ :Indicating it is conducted between terminals

- If the conducting condition is abnormal, replace the electric tilt switch. Part 42.



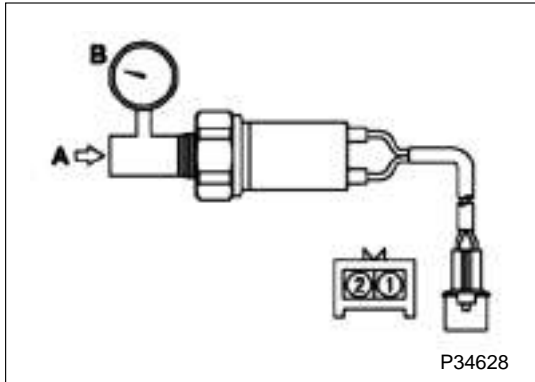
► #047 Check of UP/DOWN changeover switch

- Check conducting condition according to the table below

	①	②	③
A	○ — ○		
B		○ — ○	

○ — ○ :Indicating it is conducted between terminals

- If the conducting condition is abnormal, replace the UP/DOWN changeover switch. Part 42.



► #048 Test of parking brake switch

Check the switch according to the steps below, if any fault found, replace the switch.

(1) Detect when there is no air pressure

Confirm there is no continuity between terminal ① and terminal ②.

(2) Detect with air pressure applied

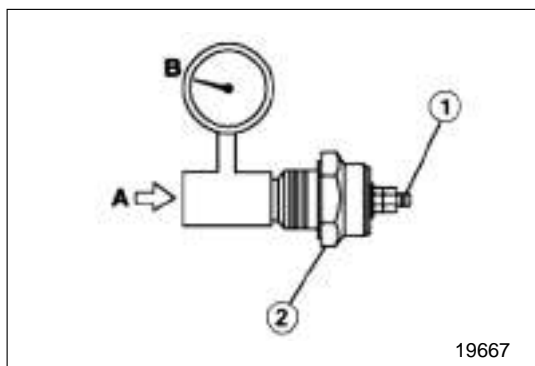
- Apply air pressure A to switch gradually starting from 0kpa(0kgf/cm²).
- Measure the air pressure value at the moment when the continuity between terminal ① and terminal ② has not been detected out, check whether this value complies with the standard pressure value

B:Air pressure gauge

Standard value (When air pressure is supplied ON-OFF)	461-599kpa (4.7-5.7kgf/cm ²)
-------------------------------------------------------------	---------------------------------------------

- When the supplied air pressure A reaches 785kpa(8kg/cm²), decrease the air pressure gradually.
- Measure the air pressure value at the moment when the continuity between terminal ① and terminal ② has not been detected out, check whether this value complies with the standard pressure value

Standard value (When air pressure is supplied ON-OFF)	441-559kpa (4.5-5.5kgf/cm ²)
-------------------------------------------------------------	---------------------------------------------



► #053 Check of engine oil bypass alarm switch

Check the switch according to the steps below, if any fault found, replace the switch. Part 12.

(1) Detect when there is no air pressure

Confirm there is no continuity between terminal ① and terminal ②(body).

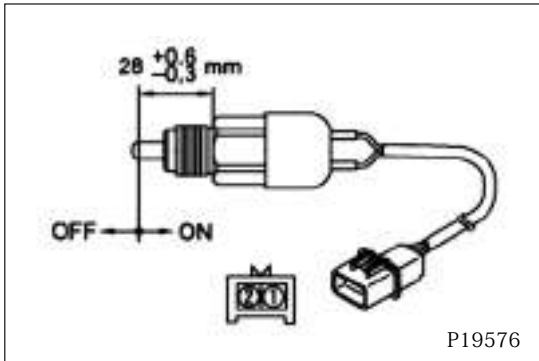
(2) Detect with air pressure applied

- Apply air pressure A to switch gradually starting from 0kpa(0kgf/cm²).
- Measure the air pressure value at the moment when detecting the continuity between terminal

① and terminal ②, check whether this value complies with the standard value

B: Air pressure gauge

Standard value (Control pressure)	340^{+40}_0 kpa ($3.5^{+0.06}_0$ kpg/cm ²)
--------------------------------------	-----------------------------------------------------------



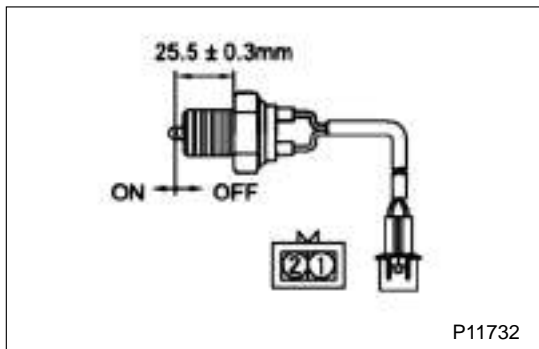
► #054 Check of reversing lamp switch

• Check conducting condition according to the table below

	①	②
OFF		
ON	○ — ○	○ — ○

○ — ○: Indicating it is conducted between terminals

• If any fault found, replace the reversing lamp switch. Part 22.



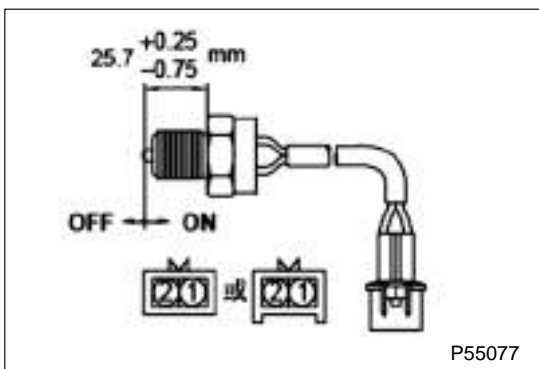
► #055 Check of shifting check switch

• Check conducting condition according to the table below

	①	②
OFF		
ON	○ — ○	○ — ○

○ — ○: Indicating it is conducted between terminals

• If any fault found, replace the shifting inspection switch. Pat 22.



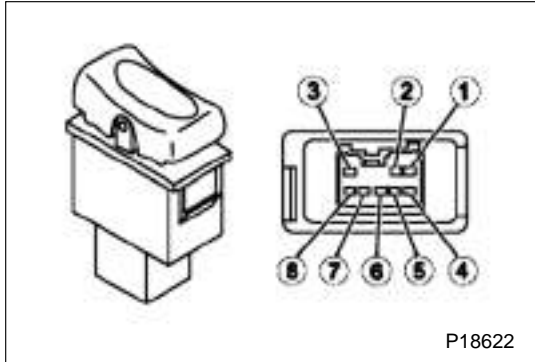
► #056 Check of gearbox neutral position switch

• Check conducting condition according to the table below

	①	②
OFF		
ON	○ — ○	○ — ○

○ — ○: Indicating it is conducted between terminals

• If any fault found, replace the gearbox neutral position switch. Part 22.



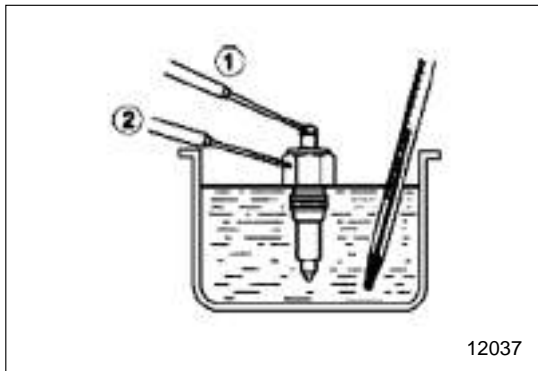
► **#081 Check of hazard warning switch**

- Check conducting condition according to the table below

	⑦	⑧	①	LED (Night lamp)	⑥
ON	○—○		○	—	○
OFF			○	—	○

○ — ○ : Indicating it is conducted between terminals

- If any fault found, replace the hazard warning lamp switch.



► **#160 Test of thermal switch**

- Place the switch into a container containing oil.
- Increase the oil temperature to the specified value and agitate the oil.
- Measure respectively the end temperature on ① and ② (body).

Standard value Temperature	When temperature increased (ON-OFF)	110±2.5°C
	When temperature decreased (ON-OFF)	99.5-112.5°C

- If the measured temperature is deviated from the standard value, replace the switch. Part 14.

#180~#249 Relays

► **#180 Check of relay (NC, 4-pin)**

	①	②	③	④
With power OFF	○—○		○—○	
With power ON	⊕	⊖	○—○	

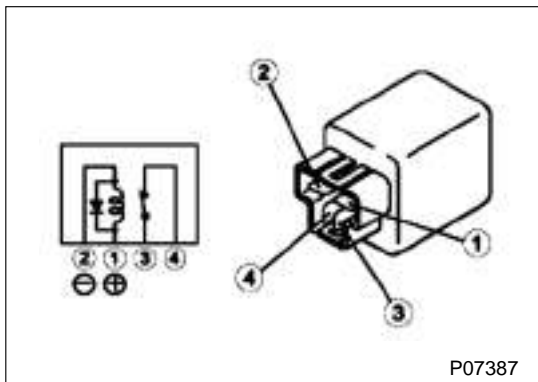
- Check conducting condition and operation according to the table below.

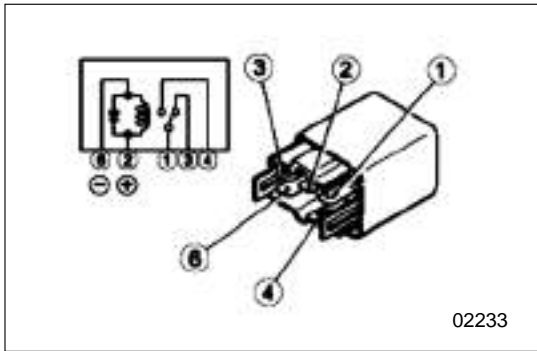
○ — ○ : Indicating it is conducted between terminals

⊕ — ⊖ : Indicating to apply 24VDC voltage to terminal

○ — ○ : Indicating it is not conducted between terminals

- If any fault found, replace the relay.





02233

► **#182 Check of relay (NC, 6-pin)**

	①	②	③	④	⑥
With power OFF	○ — ○		○		
		○			○
With power ON	○			○	
		⊕			⊖

- Check conducting condition and operation according to the table below.

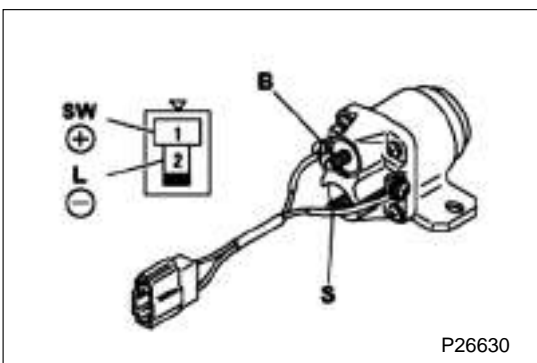
○ — ○ :Indicating it is conducted between terminals

⊕ — ⊖ :Indicating to apply 24VDC voltage to terminal

- If any fault found, replace the relay.

► **#183 Check of relay**

- As this relay cannot be checked individually before being installed to the vehicle, therefore, wiring, switch and the related parts in each system must be checked.
- If the related parts not fault, but the system still has problem, replace the relay.



P26630

► **#187 Check of starter relay**

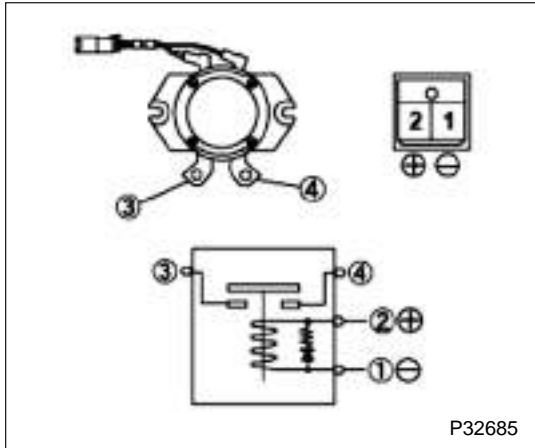
- Check conducting condition between terminals according to the table below.

	B	B	L	SW
With power OFF			○ — ○	
With power ON	○ — ○		⊖ — ⊕	

○ — ○ :Indicating it is conducted between terminals

⊕ — ⊖ :Indicating to apply 24VDC voltage to terminal

- If the conducting and operation condition abnormal, replace the main power supply relay.



► #188 Check of main power supply relay

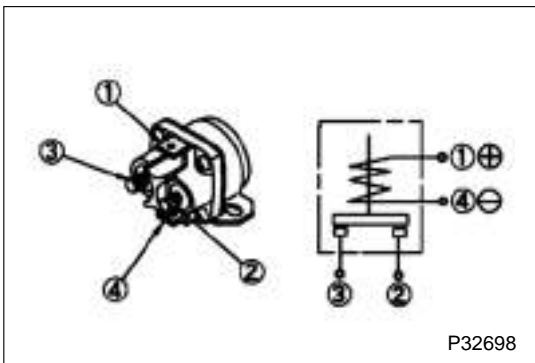
- Check conducting and operation condition between terminals according to the table below

	①	②	③	④
With power OFF	○—○			
With power ON	⊖—⊕		○—○	

○—○:Indicating it is conducted between terminals

⊕—⊖:Indicating to apply 24VDC voltage to terminal.

- If the conducting and operation condition abnormal, replace the main power supply relay.



► #189 Check of electric tilting relay

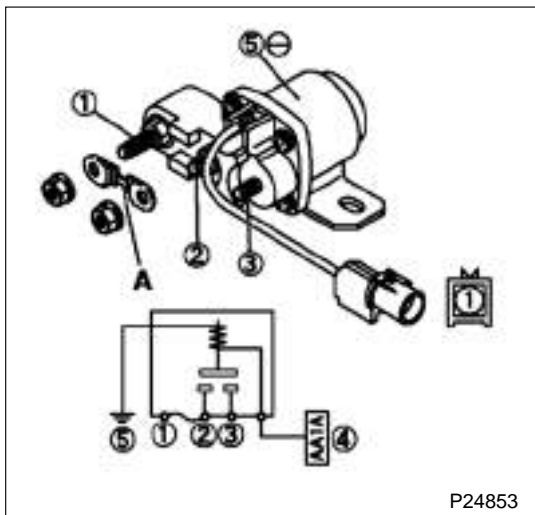
- Check conducting condition between terminals according to the table below

	①	④	③	②
With power OFF	○	○		
With power ON	⊕	⊖	○	○

○—○:Indicating it is conducted between terminals

⊕—⊖:indicating to apply 24VDC voltage to terminal

- If the conducting condition abnormal, replace the electric tilting relay.



► #190 Check of intake heater relay

(1) Check of intake heating relay

If any fault found, replace the fuse A(127A)

(2) Check of intake heater relay

- Check conducting condition according to the table below

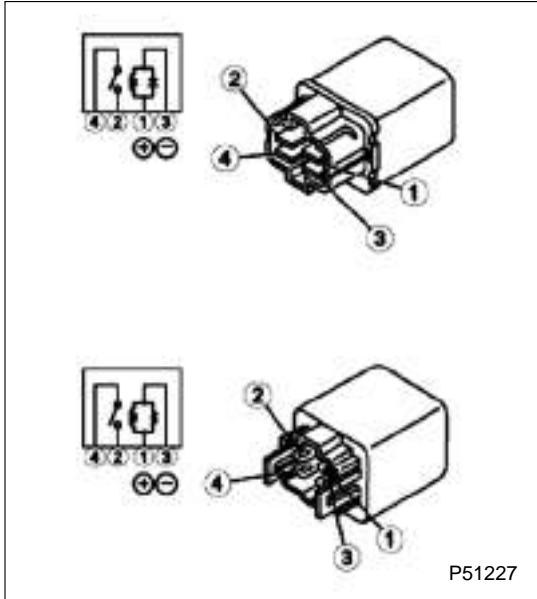
	①	②	③	④	⑤ (body)
With power OFF	○	○		○	○
With power ON	○	○	○	⊕	⊖

○—○:Indicating it is conducted between terminals

⊕—⊖:Indication to apply 24VDC voltage to terminal

A:fuse A(127A)

- If any fault found, replace the intake heater relay



P5127

► **#204 Check of relay (NC, 4-pin)**

- Check conducting condition and operation according to the table below

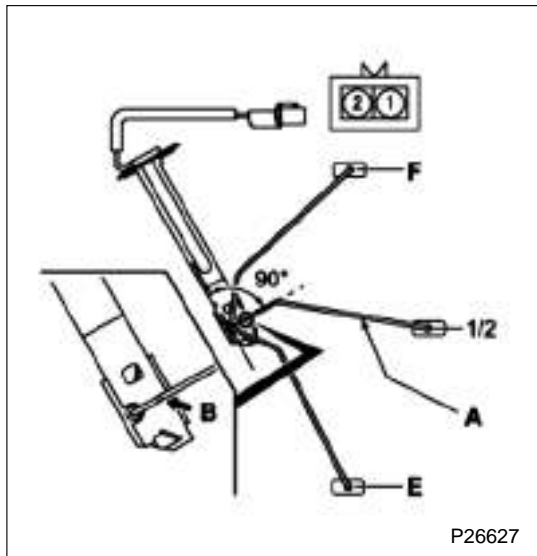
	①	②	③	④
With power OFF	○	—	○	
With power ON	⊖	⊕		○

○ — ○ :Indicating it is conducted between terminals

⊕ — ⊖ :Indication to apply 24VDC voltage to terminal

- If any fault found, replace the relay.

#250~#349 Sensors



P26627

► **#258 Check of fuel level sensor**

- Measure the resistance between terminal ① and terminal ② with floating arm A stopping between positions E and F and with the floating arm A at projected part B (1/2 position) of the fuel level sensor.

Standard value	FULL (F position)	$0 \pm 2 \Omega$
	1/2	$50 \pm 3 \Omega$
	EMPTY(E position)	$150 \pm 10 \Omega$

- If the measured value exceeds the standard value, replace the fuel level sensor. Part 13.

► **#259 Check of water level sensor**

- Check conducting condition between terminals according to the table below

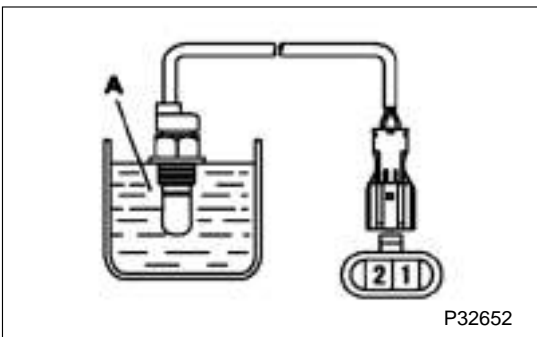
	①	②
With water drained	○	○
With water filled in		

○ — ○ :Indicating it is conducted between terminals

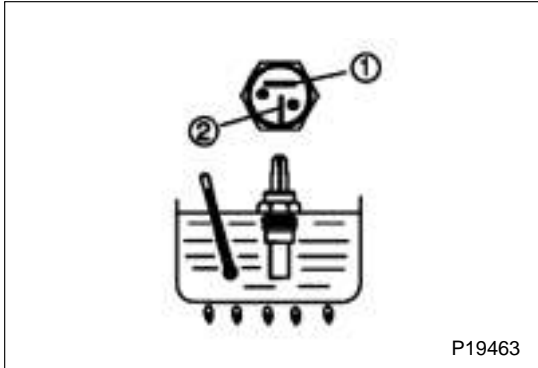
- If the conducting condition is abnormal, replace the water level sensor.

Part 14.

A:Engine coolant



P32652



P19463

► **#262 Check of water temperature sensor**

(Water thermometer)

- Place the sensor into a container containing oil.
- Increase the oil temperature to the specified value, agitate the oil.
- Measure respectively the impedance value between terminal ① and the body.

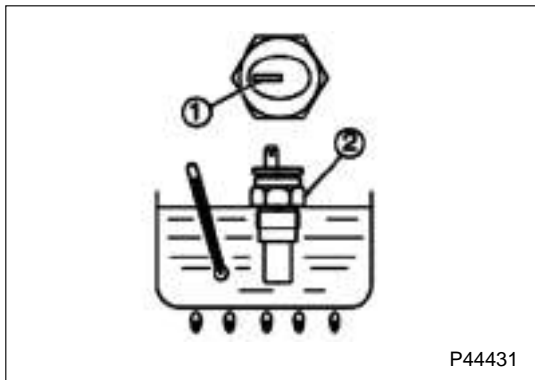
Terminal ①: water thermometer connection

Terminal ②: not used

Standard value	① – body (water thermometer contact surface)	50°C	(Reference value)
		80°C	51.9 \pm 4.9 Ω – 4.4
	100°C	27.4 \pm 1.9 Ω – 1.2	

- If the measured value is deviated from the standard value, replace the sensor.

Part 14.



P44431

(Engine control system)

- Place the sensor into a container containing oil.
- Increase the oil temperature to the specified value, agitate the oil.
- Measure respectively the impedance value between terminal ① and terminal ②.

Standard value	20°C	3.25K Ω (Reference value)
	60°C	620 \pm 62 Ω
	80°C	300 Ω (reference value)

- If the measured value is deviated from the standard value, replace the sensor.
- Remove and install sensor. Part 14.

► **#263 Check of engine speed sensor**

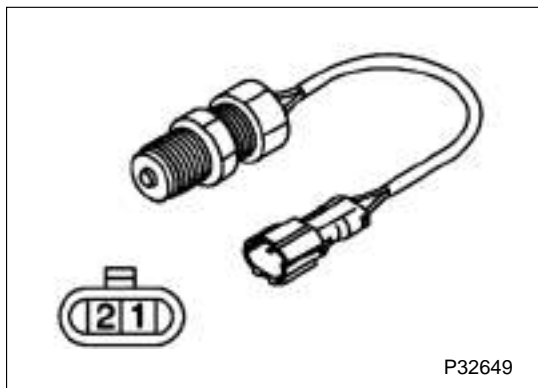
- Measure resistance between terminal ① and terminal ②

Limit value	2.2 \pm 0.2K Ω
-------------	-------------------------

- If the measured value is not within the standard value, replace the engine speed sensor.

Note: ⚠

When the tightening torque of engine speed sensor does not comply with the requirement, the



P32649

sensor may not have output signal. In this case, tighten the engine speed sensor to the specified torque. Part 11.

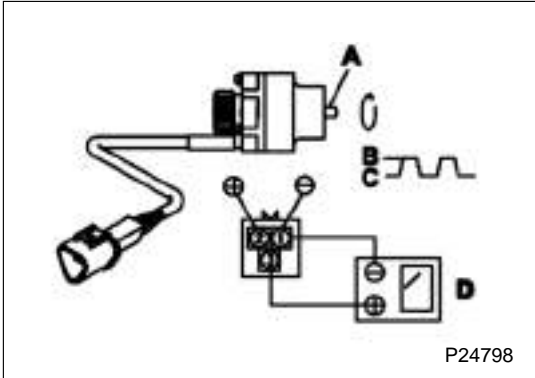
► **#265 Detection of speed sensor**

Detect the sensor according to the steps below, if any fault found, replace the sensor. Part 22 (602).

- Turn ON power between terminal ① and terminal ②, rotate slowly the speed sensor button A.
- Measure the maximum voltage value (pulse voltage peak value B) and the minimum voltage (pulse voltage valley value C) between the terminal ① and terminal ③.

D:Detection instrument

Standard value	Pulse voltage valley value	Below 0.5V
	Pulse voltage peak value	8±1V

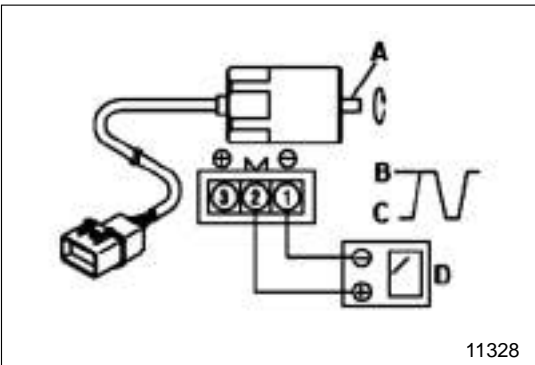


(8DC)

- Apply 24VDC voltage between terminal ① and terminal ③, rotate slowly the speed sensor part A.
- Under this state, measure the maximum voltage (pulse voltage peak value B) and the minimum voltage (pulse voltage valley value C) between terminal ① and treatment ②.

D:Detection instrument

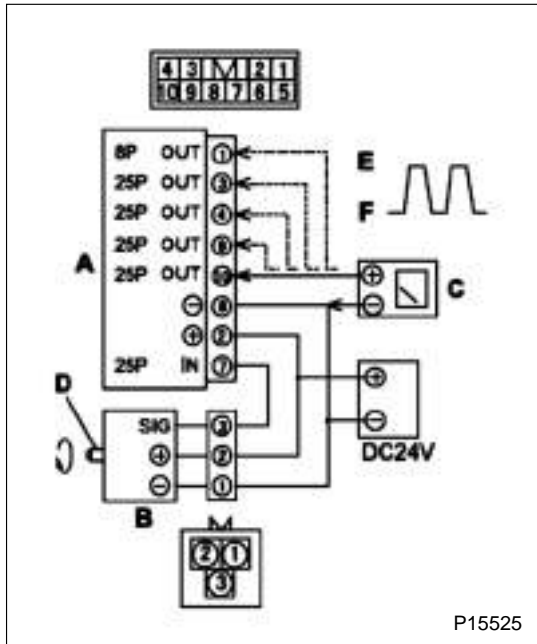
Standard	Pulse voltage valley value	Below 1.5V
	Pulse voltage peak value	24V -(Below 1.5V)



#350~ #409 Control systems

► **#350 Check of controller and other devices**

- As these devices cannot be checked individually before being installed to the vehicle, therefore, wiring, switch and the related parts in each system must be checked.
- If the related parts not fault, but the system still has problem, replace the corresponding controller or other devices.



P15525

► #351 Detection of pulse distributor

• Connect pulse distributor A according to the Fig.:

B: Speed sensor (25-pulse) :

C: Detection instrument

- Turn slowly the shaft D of the speed sensor B with hand, measure the maximum voltage (high pulse voltage E) and the minimum voltage (low pulse voltage F) of each output terminal ①, ③, ④, ⑨, ⑩ and terminal ⑧ of the pulse distributor A.

Standard value (output voltage)	8-pulse	Pulse voltage valley	Below 1.5V
		Pulse voltage peak	8±1V
	25-pulse	Pulse voltage valley	Below 0.6V
		Pulse voltage peak	8±1V

Pulse distributor A

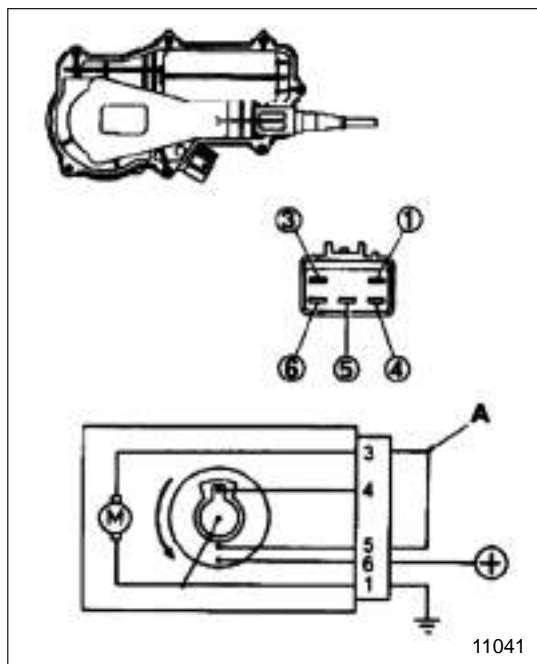
#410~#509 Motors

► #410 Maintenance of oil cut-off motor

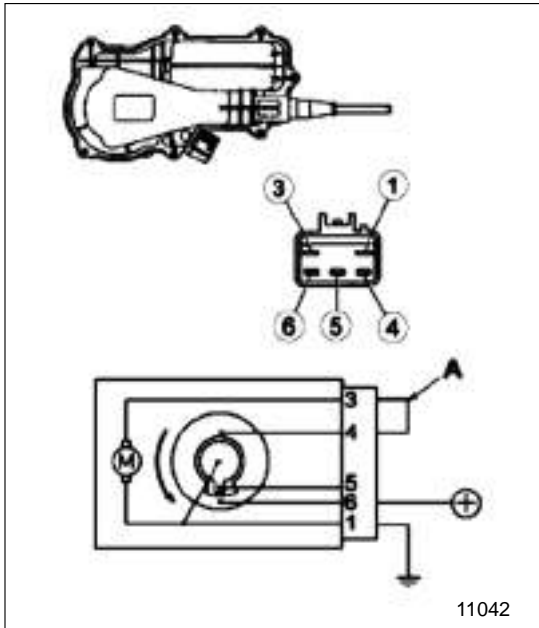
Check whether the operation of oil cut-off motor is normal, if any fault found, replace the motor.

(1) Set the starting switch to position OFF (oil cut-off state)

- Use wire A that is used for checking to connect between terminal ③ and terminal ⑤.
- Apply 24VDC voltage to terminal ① and terminal ⑥, check whether the oil cut-off motor is running.

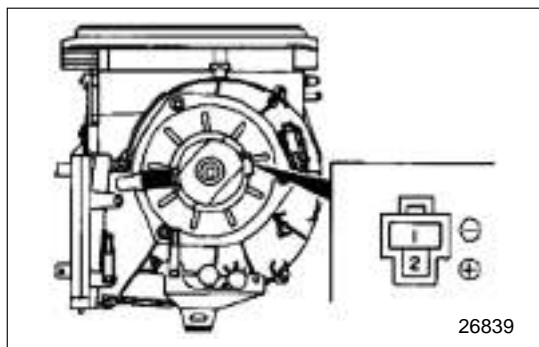


11041



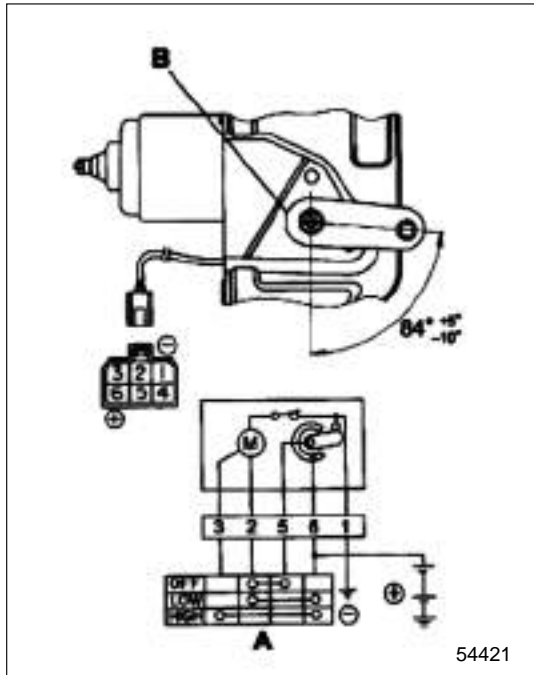
(2) Set the starting switch to position ON (non oil cut-off state)

- Use wire A that is used for checking to connect terminal ③ and terminal ④.
- Apply 24VDC voltage between terminal ① and terminal ⑥, and check the operating condition of the oil cut-off motor.



► **#411 Check of blower motor**

- Apply 24VDC voltage between terminal ① and terminal ②, and check whether the blower motor starts operation.
- If any fault found, replace the blower motor.



► **#422 Check of wiper motor**

- As shown in the figure, connect one switch to the wiper motor.

A: Switch

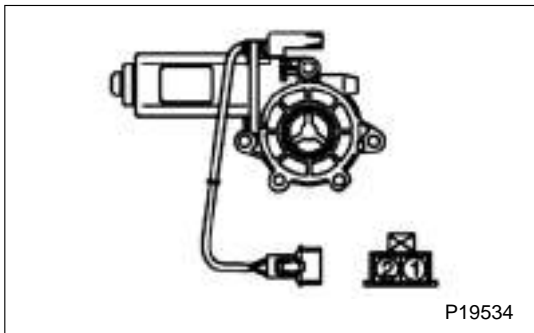
- Check whether the wiper motor operation is normal according to the steps below, if any fault found, replace the wiper motor. Part 42.

(1) Check motor operation

- Set switch A to position HIGH, check whether the wiper motor runs at high speed.
- Set switch to position LOW, check whether the wiper motor runs at low speed.

(2) Check auto stop information

- Set switch A to position LOW, let the wiper motor run at low speed.
- When the crank arm B is not at a position of auto stop position (outside the angle shown in the figure), set the switch A to position OFF.
- Check and observe whether the crank arm B stops at auto stop position (within the angle shown in the figure).



► **#423 Check of electric window motor**

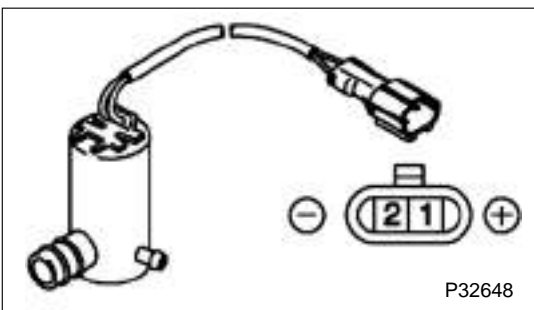
- Check the operation condition of the electric window according to the steps below.

⊕—⊖: Indicating to apply 24VDC voltage to terminal

	①	②
UP	⊖	⊕
DOWN	⊕	⊖

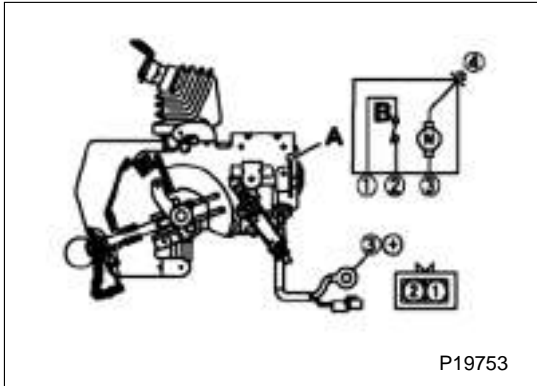
- If any fault found, replace the electric window motor.

Part 42.



► **#428 Check of windshield washer motor**

- Apply 24VDC voltage between terminal ① and terminal ②, and check whether the windshield washer motor starts running.
- If any fault found, replace the windshield washer motor. Part 42.



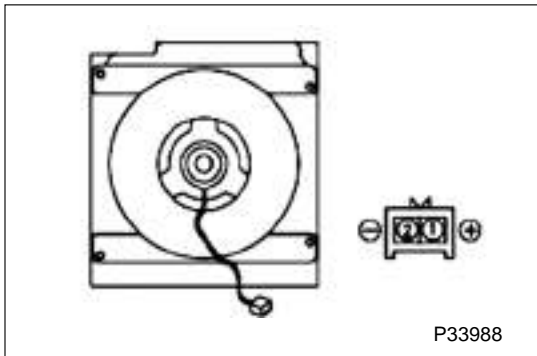
► **#430 Check of cab tilting oil pump motor**

Check whether the cab tilting oil pump motor operates normally. If any fault found, replace the motor A. Part 42.

- Confirm it is conducted between terminals ① and ②.

B: Thermo switch

- When applying 24VDC voltage between terminal ③ and terminal ④ (body), make sure the cab tilting oil pump motor A is running.

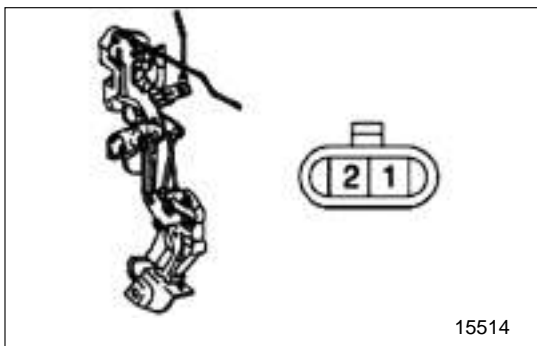


► **#431 Detection of condenser fan motor**

- Confirm the motor is running normally after the power between terminal ① and terminal ② is connected.

- If any fault found, replace the condenser assembly. Part 55.

#510~#559 Regulators



► **#510 Check of door lock actuator (assistant side)**

- Check the operation condition according to the table below

	①	②
LOOK	⊕	⊖
UNLOCK	⊖	⊕

⊕—⊖: Indicating to apply 24VDC voltage to terminal

- If any fault found, replace the door lock actuator (driver side). Part 42.



► **#511 Check of door lock actuator (driver side)**

- Check the conducting and operation condition according to the table below

	①	②	③	④	⑤
LOCK		○—○		⊖—⊕	
UNLOCK	○—○			⊕—⊖	

○—○:Indicating it is conducted between terminals

⊕—⊖:Indicating to apply 24VDC voltage to terminal

- If any fault found, replace the door lock actuator (driver side). Part 42.

#560~#609 Solenoid valves

► **#565 Check of three-way solenoid valve**

Check whether operation of the three-way solenoid valve is normal according to the steps below. If any fault found, replace the solenoid valve.

Air return table (○—○:indicating it is connected between connectors)

	Input port B	output port A	Exhaust port C
ON	○—○		
OFF		○—○	

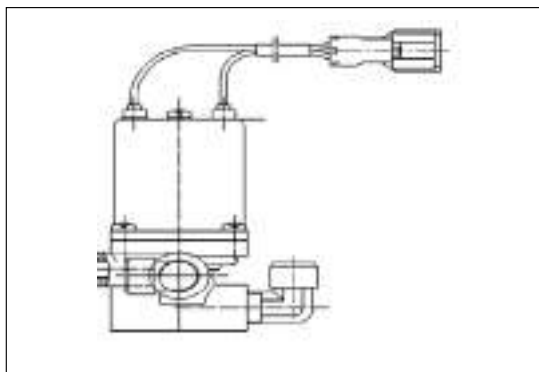
(1) Check of operation

- Apply 24VDC voltage to terminal ① and terminal ②, increase slowly from 0V.
- When the three-way solenoid valve starts operation (listen to the operation sound of the solenoid valve), measure the voltage (minimum working voltage)

Standard value (minimum working voltage)	Below 20V
------------------------------------------	-----------

(2) Air-tight test

- With three-way solenoid valve in operating
- Turn OFF the output port A

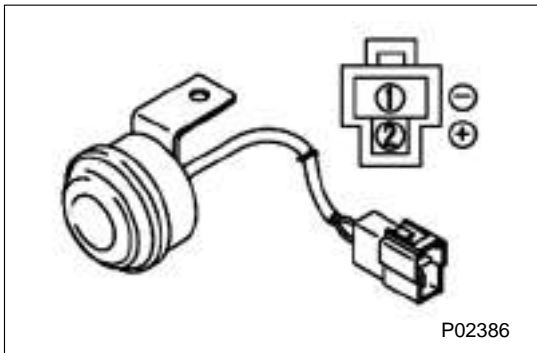


- Apply 24VDC voltage between terminal ① and terminal ②.
- When applying 1MPa(10kgf/cm²) air pressure to the input port B, make sure no air leaks from the exhaust port C.
- With three-way solenoid valve not in operating
When apply 1MPa(10kgf/cm²) air pressure to the input port B, make sure no air leaks from the exhaust port A and C.

#610~#649 Buzzers and horns

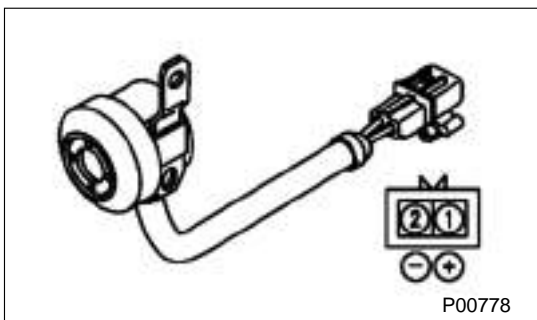
▶ #611 Check of warning buzzer

- Apply 24VDC voltage between terminal ① and terminal ②, and check whether the buzzer is operating.
- If any fault found, replace the warning buzzer.



▶ #613 Check of electric tilting buzzer

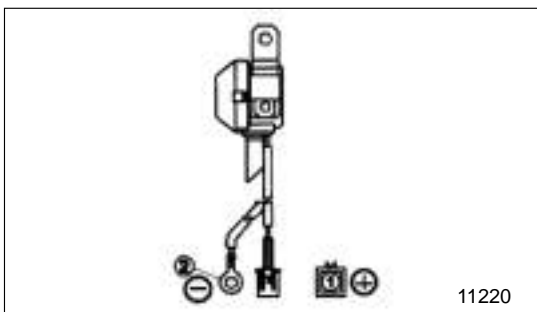
- Bridge the 24VDC voltage onto the terminal ① and terminal ②, and check whether the electric tilting buzzer is operating.
- If any fault found, replace the electric tilting buzzer.

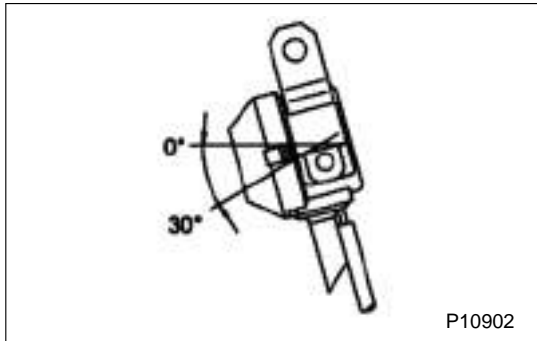


▶ #614 Reversing buzzer

[Check]

- When applying 24VDC voltage between terminal ① and terminal ②, make sure the reversing buzzer buzzes discontinuously.
- If any fault found, replace the reversing buzzer.



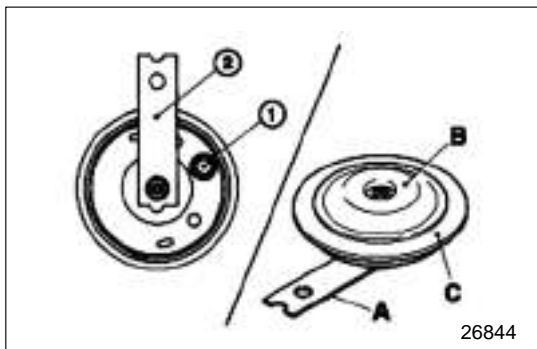


Installation

Install the reversing buzzer to the frame according to the range shown in the figure.

Caution

The asymmetric fixing angle of the reversing buzzer is to prevent the water in the reversing buzzer to be drained out correctly. Be sure to install the reversing buzzer to correct angle.

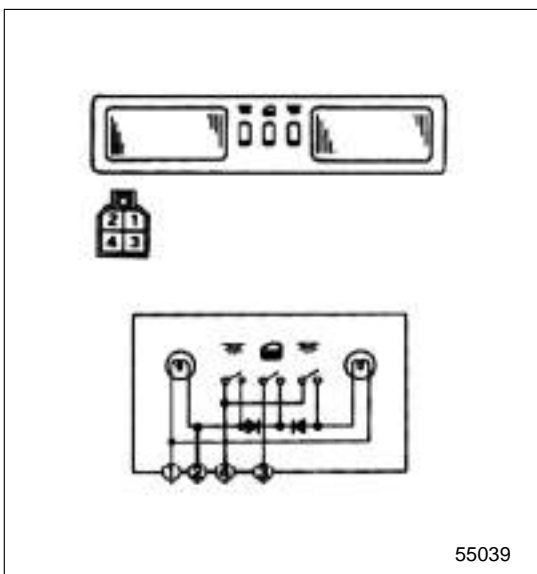


► #615 Check of electric horn

Caution

- Do not bend or damage the bearing piece A, otherwise, tone quality of the electric horn will change, or the volume becomes lower.
- Apply 24VDC voltage (non-polarity) between terminal ① and terminal ② (bearing piece A) to confirm sound of the electric horn.
- If any fault found, replace the electric horn.
- If there are foreign matters on the resonator B or vibrating reed C, clear them.

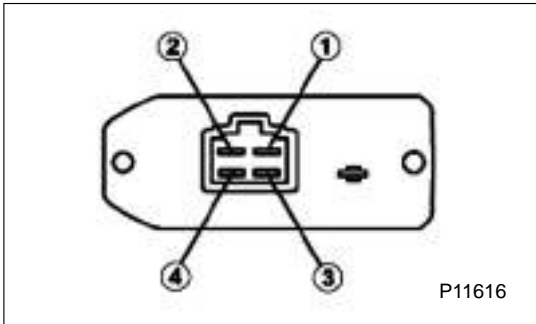
#650~ #699 Lamps



► #652 Check of individual special lamp

- Install the bulb, and check the conducting condition in terminals ①-④ according to the circuit diagram shown in left.
- If any fault found, replace the individual special lamp.

#750 ~ #859 Others

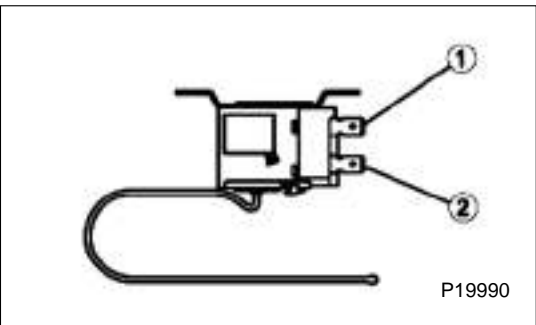


► #750 Check of blower resistor

- Measure resistance between terminals ① and ② (MIDDLELOW), terminals ① and ③ (MIDDLEHIGH) and terminals ① and ④ (LOW).

Standard value	MIDDLELOW	① - ②	3.34Ω
	MIDDLEHIGH	① - ③	1.16Ω
	LOW	① - ④	7.37Ω

- If the measured value exceeds the standard value, replace the resistor.

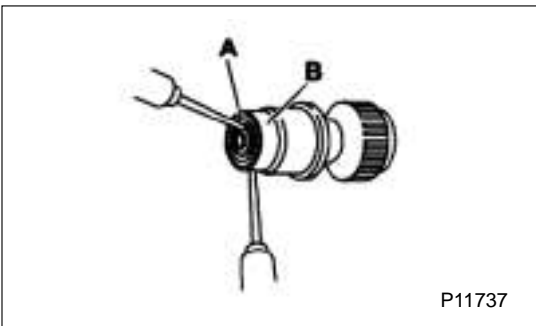


► #751 Check of thermostat

- Rise or lower the temperature around the thermostat, and measure the temperature when circuit between terminals ① and ② starts conducting and opening.

Standard value (working temperature)	ON	(4.6°C)
	OFF	1.6±1°C

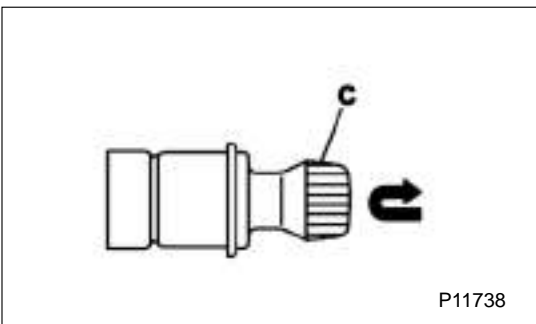
- If the measured value exceeds the standard value, replace the thermostat.



► #754 Check of cigarette lighter

Check whether the cigarette lighter operates normally according to the following steps, if any fault found, replace the cigarette lighter.

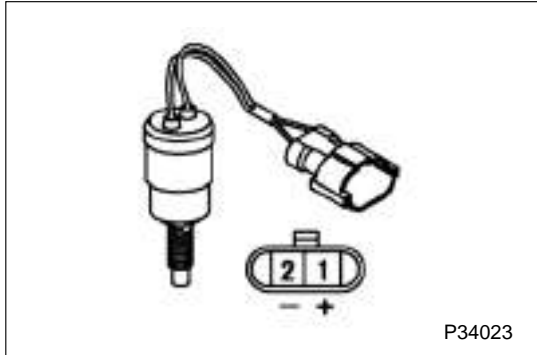
- Make sure the electrical heating element A and body B are conducted.



- Make sure it returns back to its original position immediately when plug C is pushed in by hand.
- Set the starting switch to position ACC or ON.
- Push the plug C into the socket in cab.
- Measure the time required for automatic return of plug C.

Standard value	15±5s
----------------	-------

- Observe whether the electrical heating element A becomes red – hot.



► **#757 Check of dust-proof indicator**

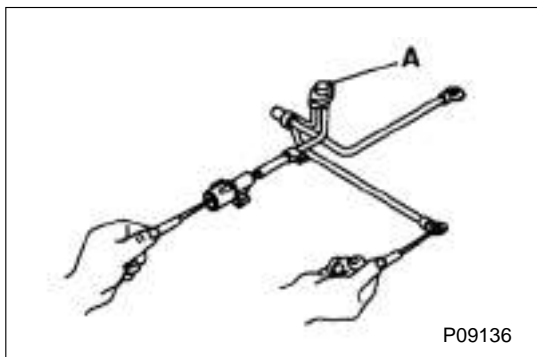
Check whether the dust-proof indicator operates normally according to the steps below, if any fault found, replace the indicator.

- Before applying air pressure to the dust-proof indicator, make sure it is not conducted between terminals ① and ②(FV415).
- When applying negative pressure $9.12 \pm 0.7 \text{pa}$ ($68 \pm 5.3 \text{mmHg}$) to the dust-proof indicator, make sure it is conducted between terminals ① and ②.

Part 15.

<FV517>

- When applying negative pressure $12.75 \pm 0.7 \text{kpa}$ ($96 \pm 5.3 \text{mmHg}$) to the dust-proof indicator, make sure it is conducted between terminals ① and ②. Part 15.



► **#758 Air drier**

(1) Check of thermostat

When checking the following, if thermostat is found abnormal, replace the thermostat.

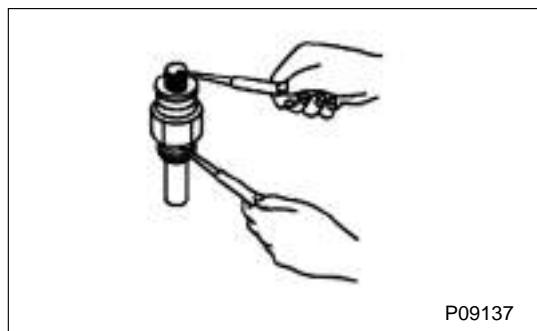
Part 35.

- When thermostat part A temperature is decreased to 0°C , make the temperature rise slowly, and measure the temperature when terminals ① and ② are conducted and make it comply with the standard value.

Standard value (when temperature lowered ON-OFF)	$4 \pm 4^\circ\text{C}$
--------------------------------------------------	-------------------------

- When thermostat part A temperature rises to 20°C , lower the temperature slowly, and measure the temperature when terminals ① and ② are conducted, make it comply with the standard value.

Standard value (when temperature lowered ON-OFF)	$16 \pm 4^\circ\text{C}$
--------------------------------------------------	--------------------------



(2) Check of heater

- Measure temperature when it is conducted between terminals ① and ②.
- If any fault found, replace the heater. Part 35.

► #763 Check of heater control assembly

(1) Check of blower switch A

- Check the conducting condition according to the table below

	⑧	②	⑦	③	⑥	⑤	④	①	②
OFF									
LO	○—○					○—○			
ML	○—○	○—○				○—○			
MH	○—○		○—○			○—○			
HI	○—○			○—○		○—○			
					○—○	○—○			

○—○:Indicating it is conducted between terminals

- If any fault found, replace the blower switch A or heater control assembly.

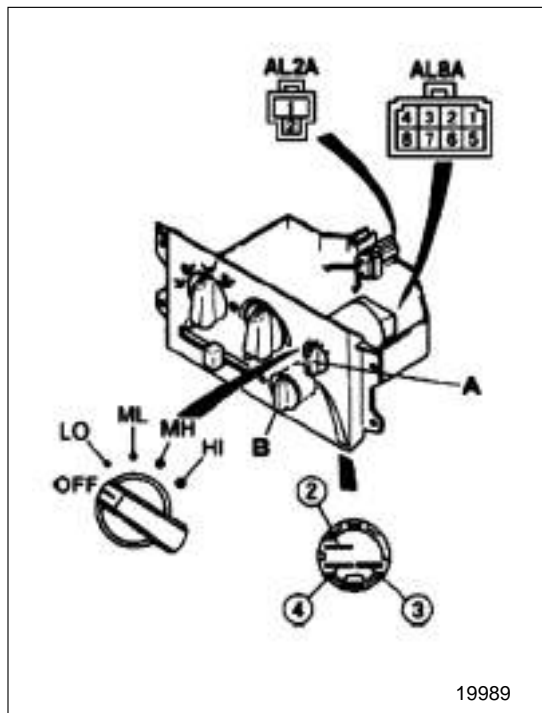
(2) Check of air conditioning unit switch B

- Check the conducting condition according to the table below

	①	②
LOOK	—	—
UNLOCK	○	○

○—○:Indicating it is conducted between terminals

- If any fault found, replace the air conditioning unit switch B.



19989

#860 Battery

Danger

- As battery produces inflammable hydrogen, special attention must be paid to the following :
- Do not short circuit the battery and the pole terminal
- Keep spark and burning cigarette far away from the battery
- Do not bring metal products near to the battery
- As electrolyte of the battery is dilute sulfuric acid, which is corrosive, wear protective glasses and rubber gloves to protect the eyes and arms when operating.

Warning

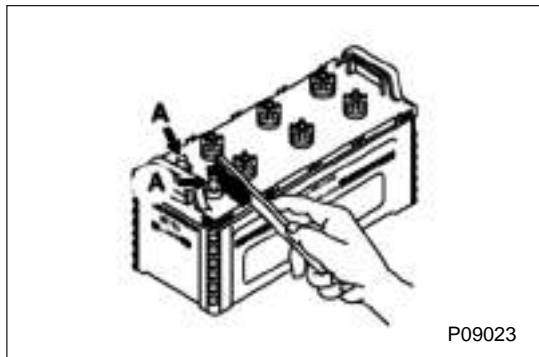
- When removing the connecting wire of the battery, remove the connecting wire of the battery negative pole first.

Caution

- When connecting the battery connecting wire, make sure all the electric switches in the vehicle are at position OFF.
- Connect the positive wire of battery first, and then connect the negative pole wire.
- The wire that is opened must be avoided to contact the battery pole so as to avoid short-circuit.

Service standard

Position	Maintenance items	Standard value	Limit value	Correction method
—	Battery electrolyte specific gravity (20°C)	1.280	Below 1.220	Charge or replace



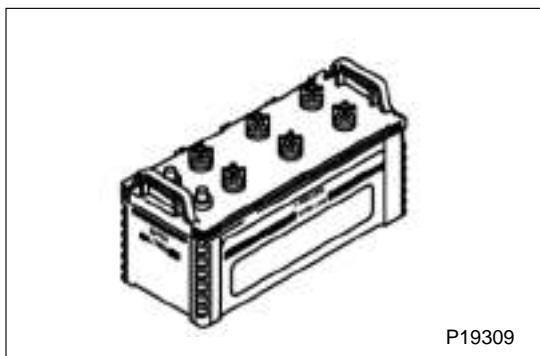
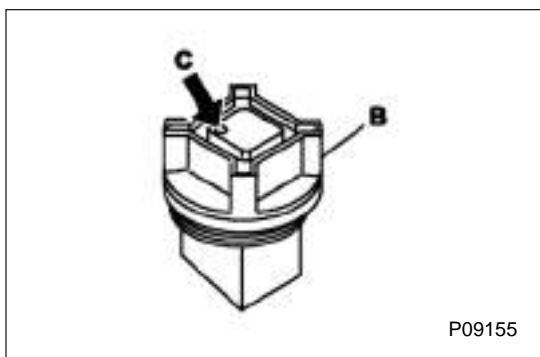
► Check of battery

(1) Visual check

- If terminal A is rusted, clean it with steel wire brush.
- If cracking or damage is found on the battery, replace the battery, as the cracking or damage may cause leaking of electrolyte

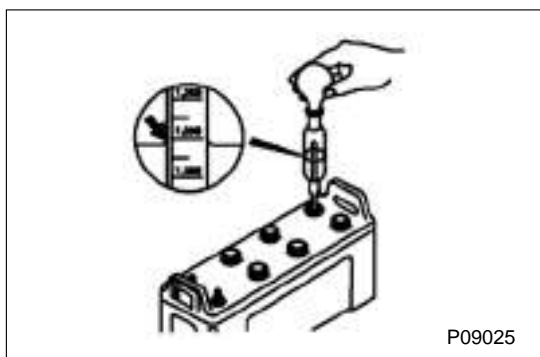
Caution

- Do apply grease to pole side of terminal A, as it is liable to rust.
- If vent C of ventilation plug B is blocked, clear this vent.



(2) Check of level

- Check whether the battery electrolyte is between UPPER and LOWERLEVEL scale line.
- If the level is lower than the LOWERLEVEL scale line, remove the ventilation plug B to make up distilled water or electrolyte to get the level to be at UPPERLEVEL scale line.



(3) Measurement of specific gravity

Measure the battery electrolyte specific gravity. If the measured value is lower than the limit value, recharge it.

Remarks:

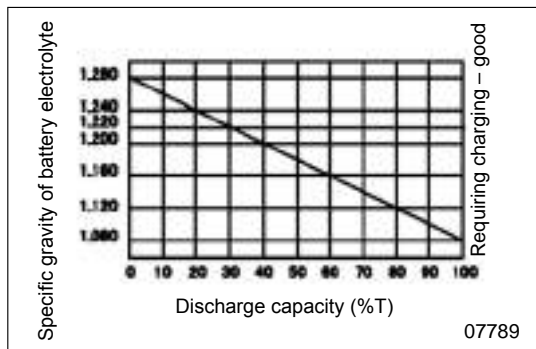
Specific gravity of electrolyte may have some changes under difficult temperature. Use the following formula to obtain the specific gravity at 20°C, and take it as reference.

$$S_{-20} = S_t + 0.0007(t - 20)$$

S₂₀: Specific gravity at standard 20°C

S_t: Specific gravity measured at t°C

T: Temperature of battery electrolyte



(4) Charging

- Under normal condition, battery must be removed from the vehicle for charging. However, if charging is made in the vehicle, be sure to disconnect the grounding cable before charging.
- When charging the battery, all the ventilation plugs must be removed.
- The recommended charging time and electrolyte are as shown in table below, so as to avoid overcharging.

	Charging current (A)	Charging time (H)	Electrolyte temperature upper limit (°C)
Normal charging	5h rated capacity /10	{*discharge capacity (Ah)charging current (A)× 1.2 (to 1.5)	45
Fast charging	5h rated capacity /1.5	0.5	55

* Discharge capacity (Ah)=5h rated capacity (Ah) × [discharge capacity %]/100

- Calculate discharge capacity with chart on left (%)
- For battery electrolyte, dilute sulfuric acid prepared with sulfuric acid and pure water or distilled water must be used.

Danger ⚠

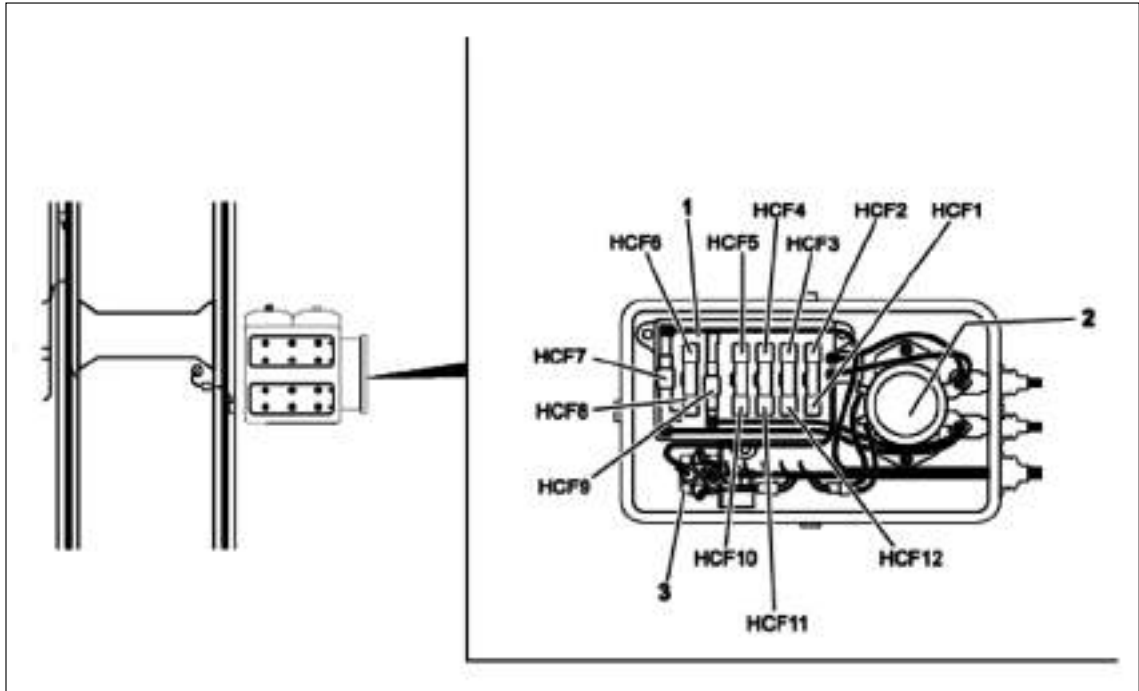
- When charging battery, keep open fire far away from the battery, so as to avoid explosion.
- When charging, take care not to produce sparks, so as to avoid danger.
- When electrolyte level is lower than “Low level” , do not charge, as this may shorten the battery life, get hot or explosion, therefore, make sure the electrolyte is filled to normal level before charging.

Warning ⚠

- When charging, never let the electrolyte level get high and spill over
- At the end of charging, turn tightly the outlet bolt B, wash with water the sulfuric acid left on battery surface, then wipe it dry.

#870~#889 Fuses

► #870 Heavy current fuse box



- 1 High AC fuse box
2 Main power supply breaker
3 Starting system relay

Danger ⚠

- To avoid possible injury, when removing the heavy current fuse (HCFE-HCF12), disconnect the connection of battery negative pole - first, and wrap with tape.

#860

- So long as connected with battery negative pole ⊖, each fuse is always live.
- Battery supplies voltage to fuse under following conditions:
HCF1 – HCF5 always connected with battery

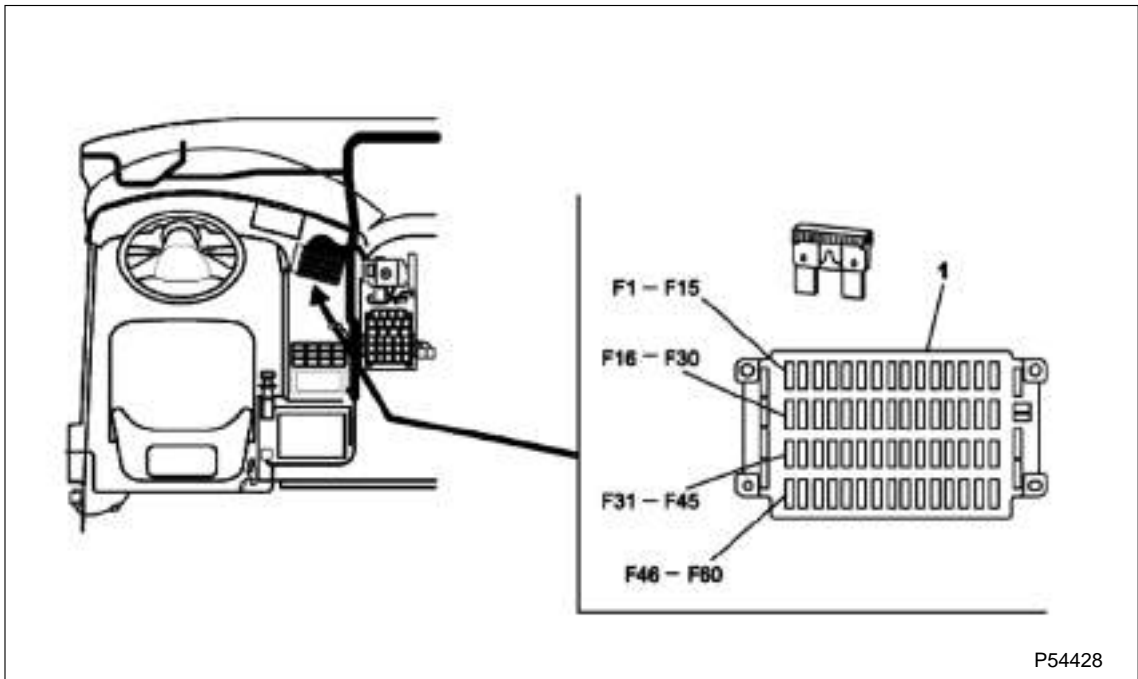
Warning ⚠

- If fuse is burnt out, locate the cause and repair, then replace the fuse.
- Make sure the fuse comply with the set ampere value.

Detection of Parts and Components

Fuse No.	Main Loads	Capacity
HCF1	Starting switch (terminal B)	50A
HCF2	Fuse box (F2 ~ F6)	50A
HCF3	Fuse box (F8 ~ F10)	50A
HCF4	Fuse box (F14, F15)	50A
HCF5	Electric tilting relay <electrohydraulic cab tilting system (option)>	50A
HCF6	Fuse box (F34 ~ F37), head lamp relay	50A
HCF7	AC engine (terminal B)	50A
HCF8	Fuse box (F19, F21) head lamp relay	50A
HCF10	Fuse box (F156, F57)	50A
HCF11	Fuse box (F55)	50A
HCF12	Fuse box (F47)	50A

► #871 Fuse box



P54428

1 Fuse box

Danger ⚠

- To avoid possible injury, when removing the heavy current fuse, disconnect the connection of battery negative pole \ominus first, and wrap with tape.
- So long as connected with battery negative pole -, each fuse is always live.
- Battery supplies voltage to fuse under following conditions:
- F2-F15 are always connected with battery
- When the starter switch is at position "ON": F24, F25, F26, F29, F38, F41, F42
- When the starter switch is at position "ACC": F44
- When starter switch is at position "START": F45

Warning ⚠

- If fuse is burnt out, locate the cause and repair, then replace the fuse.
- Make sure the fuse comply with the set ampere value.

Detection of Parts and Components

Fuse No.	Main Loads	Fuse Capacity	Fuse No.	Main Loads	Fuse Capacity
F1			F31	Left front lamp dimmed light	10A
F2	Flame-out motor	10A	F32	Right front lamp dimmed light	10A
F3	Instrument	5A	F33	-	-
F4	Running recorder	5A	F34	Parking lamp relay	10A
F5	-		F35	-	-
F6	Acoustic system window controller	20A	F36	Fog lamp	15A
F7	Maintenance lamp	7.5A	F37	Preheat switch reversing lamp	15A
F8	Horn	15A	F38	Exhaust brake gearbox TPO	10A
F9	Step lamp, fluorescent lamp	5A	F39	Instrument	10A
F10	Flasher	15A	F40	Instrument	5A
F11	-		F41	Air conditioning system	5A
F12	-		F42	Head lamp relay	5A
F13	ABS	15A	F43	-	-
F14	Electric window (left)	15A	F44	Acoustic system and cigarette lighter	10A
F15	Electric window (right)	15A	F45	Starter signal	5A
F16	Left front far beam lamp	10A	F46	Ice box (option)	7.5A
F17	Right front far beam lamp	10A	F47	MULAC	5A
F18	-		F48		-
F19	Air drier, tilting system	10A	F49	Cab small lamp	10A
F20	Working lamp relay	15A	F50		-
F21	Small lamp relay	15A	F51		-
F22	-		F52		-
F23	-		F53		-
F24	Differential lock	10A	F54	Floating axle relay (option)	7.5A
F25			F55	Wiper and washer	15A
F26			F56	Air conditioning and warm air	15A
F27	-		F57	Air conditioning system	10A
F28	Truck switch (tractor)	5A	F58	Flame-out solenoid valve (option)	5A
F29	Door, window controller	5A	F59	ABS	5A
F30	-		F60	Main power supply relay flame-out motor	5A

#890 Combination instrument (Cummins engine series)

Basic error								
Indicating instrument	Indicating speed (km/h)	20	40	60	80	100	120	140
Speedometer	Actual speed (km/h)	17-20	35-40	55-60	75-80	95-100	114-120	-
	Signal frequency (Hz)	20f	40f	60f	80f	100f	120f	-
	Maximum range of mileage counter 999999km	Maximum range of short distance counter 999.9km			Gear ratio i			
Fuel gauge	Indicated oil level	E	1/2			F		
	Reference resistance (Ω)	130	50			5		
	Permissible error (total arc length)	$\pm 10\%$ of marking scale total arc length						
Thermometer	Indicated temperature ($^{\circ}\text{C}$)	C(40°)	Second scale line (60°)	Third scale line (80°)	Red white dividing line (100°)		H(120°)	
	Reference resistance (Ω)	350	140	82	44		26	
	Permissible error ($^{\circ}\text{C}$)	± 8						
Electronic tachometer	Nominal rotating speed	500	1000	1500	2000	2500	3000	
	Corresponding frequency (Hz)	1150	2300	3450	4600	5750	6900	
	Permissible error (r/min)	± 50	± 75	± 75	± 100	± 125	± 150	-
	And flywheel tooth number: determined according to engine and gearbox				Alarm point $\geq 2600 \pm 100$ r/min (set according to requirement)			
Barometer	Indicated pressure (100kpa)	0	3	4.5	6	9	12	
	Reference resistance (Ω)	10	71	99	124	172-180		-
	Permissible error (100kpa)	± 0.8	± 0.8	± 0.45	± 0.8	0	-	

#890 Combination instrument (Weichai engine series)

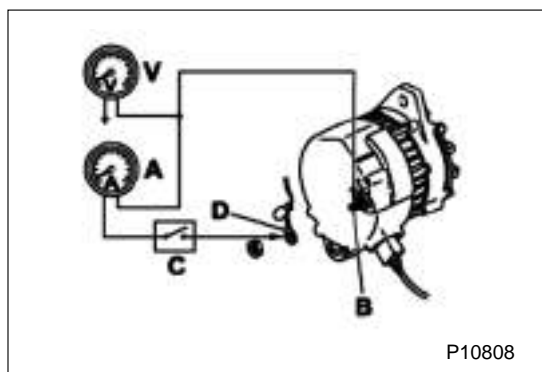
Basic error								
Indicating instrument	Indicated speed (km/h)	20	40	60	80	100	120	140
Speedometer	Actual speed (km/h)	17-20	35-40	55-60	75-80	95-100	114-120	-
	Signal frequency (Hz)	20f	40f	60f	80f	100f	120f	-
	Maximum range of mileage counter 999999km	Maximum range of short distance counter 999.9km			Gear ratio i			
Fuel gauge	Indicated oil level	E		1/2		F		
	Reference resistance (Ω)	130		50		5		
	Permissible error (total arc length)	$\pm 10\%$ of marking scale total arc length						
Thermometer	Indicated temperature ($^{\circ}\text{C}$)	C(40°)	Second scale line (60°)	Third scale line (80°)	Red white dividing line (100°)		H(120°)	
	Reference resistance ($^{\circ}\text{C}$)	350	140	82	44		26	
	Permissible error ($^{\circ}\text{C}$)	± 8						
Electronic tachometer	Nominal rotating speed (r/min)	500	1000	1500	2000	2500	3000	
	Corresponding frequency (Hz)	157.5	315	472.5	630	787.6	945	
	Possible error (r/min) (r/min)	± 50	± 75	± 75	± 100	± 125	± 150	-
	And flywheel tooth number: determined according to engine and gearbox					Alarm point $\geq 2600 \pm 100$ r/min (set according to requirement)		
Barometer	Indicated pressure (100kpa)	0	3	4.5	6	9	12	
	Reference resistance (Ω)	10	71	99	124	172-180		-
	Permissible error (100kpa)	± 0.8	± 0.8	± 0.45	± 0.8	0		-



22-13 Test and Adjustment on Vehicle

#950 Check of AC generator	22-13-2
#951 Check of regulator	22-13-3
#960 Aiming of headlamp	22-13-4

#950 Check of AC generator



► Performance test

- Connect the instrument to AC generator as shown in the figure.

A: Ammeter (100ampere)
 B: AC generator terminal B
 C: Switch
 D: Terminal
 V: Voltmeter

Warning

- To avoid possible human injury, before wiring, do remember to disconnect the battery - pole terminal and wrap it with insulating tape, when the battery pole terminal is powered ON, battery voltage is always applied to terminal B.
- When connecting to switch C, the wire diameter used must be the same as or larger than the wire connected to chassis of terminal B.

- Connect the switch C, the voltmeter V must indicate the battery voltage.
- Start generator
- Connect all the switches on the vehicle immediately
- Engine accelerates immediately to the speed below, and measure the output current of the AC generator.

Engine	Speed(rpm)
6D2	Approx. 2100
8D2	Approx. 1900

- If the measured value is above 70% of the rated current, then this AC generator is normal.

Voltage	Output current
24V	50A

Remarks

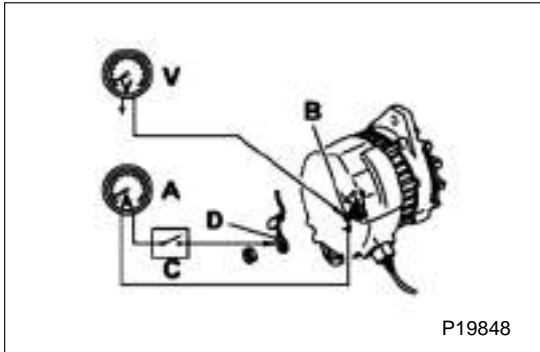
Inspection on vehicle is just simple inspection; test bench must be used for accurate inspection.

#940

#951 Check of regulator

► Maintenance standard

Position	Maintenance item	Standard value	Limit value	Correction method
-	Regulating voltage of regulator	28.5±0.5V	-	Replace



- Connect the instrument to AC generator as shown in the figure.
A: Ammeter (100ampere)
B: AC generator terminal B
C: Switch
D: Terminal
V: Voltmeter

Warning

- To avoid possible human injury, do remember to disconnect the battery pole terminal and wrap it with insulating tape before wiring, when the battery - pole is powered ON, battery voltage is always applied to terminal B.
- When connecting to switch C, the wire diameter used must be the same as or larger than the wire connected to chassis of terminal B.

- Connect the switches for turning OFF lamp, heater, etc., so that no additional load will be added when checking.
- Connect switch C, then start engine.
- When the engine rotating speed is increased to the proper rotating speed listed below, if the output current is below 5A, measure the voltage at terminal B.

Engine	Speed (rpm)
6D2	Approx. 2100
8D2	Approx. 1900

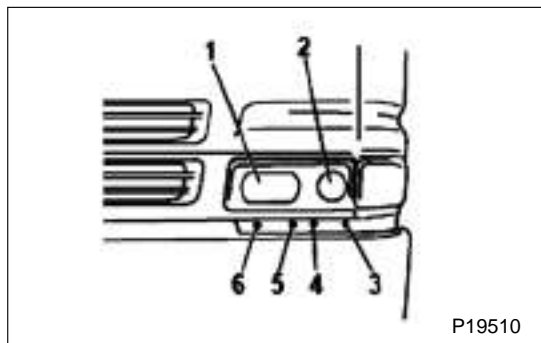
Caution

If the output current is within 5~10A, the measured value (regulation voltage) will be a bit lower. 28V-0.2 ~ 0.3V

- If the output current is above 5A, you may choose one of the two methods below.
- Let the engine rotate for a moment, then charge the battery.
- Replace the original battery with fully charged battery.
- If the measured value exceeds the range, check again at the test bench.

#940

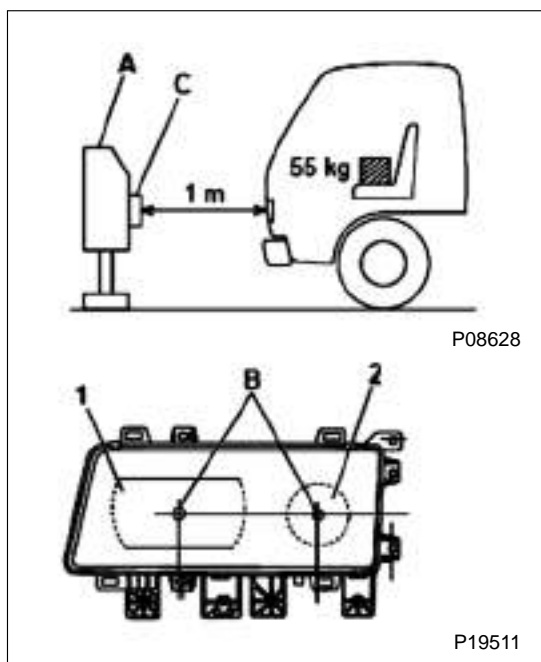
#960 Aiming of headlamp



P19510

- 1: Main beam
- 2: Sub-beam
- 3: Screw (sub-beam, vertical and horizontal direction adjustment)
- 4: Screw (sub-beam, vertical direction adjustment)
- 5: Screw (main beam, vertical and horizontal direction adjustment)
- 6: Screw (main beam, vertical direction adjustment)

Irregular, square, 4-lamp system type head lamp is so designed that optical axis of main beam 1 can be moved when the screws 5 and 6 are turning; optical axis of sub-beam 2 can be moved when the screws 3 and 4 are turning.



P08628

P19511

► Preparations before adjustment

Warning

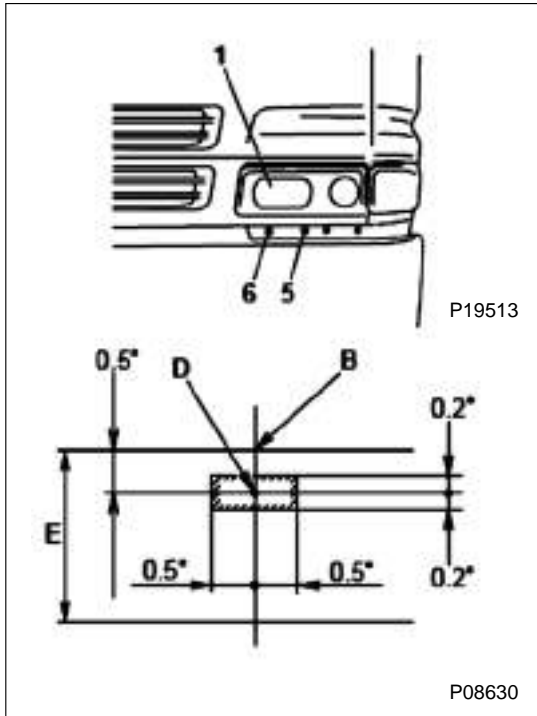
Do place wheel catch before the tyre.

- Be sure the vehicle is at no-load state
- Charge the tyre to specified pressure. Part 31.
- Place a load of 55kg that is equivalent to a person's weight in the driver seat.
- Start engine, charge the battery fully.
- Align the aiming of headlamp measurement unit A with center B of the main beam 1 or sub-beam 2 of the left side or right side head lamp. (Left side head lamp is shown in the figure)
- Cover all the lamps that are not to be adjusted, so as to avoid lamplight leaking.

► Adjustment

Warning

The time to cover the lamplight shall not exceed 10min; otherwise heat produced by the lamp fixtures may cause fire.



Adjustment of main beam

- Turn on the main beam 1
- Take the following steps to adjust the optical axis of main beam 1 (maximum brightness point) D to the position shown in the figure.
- Vertical direction adjustment: turn screw 5 and 6.

Caution ⚠

Turn screws 5 and 6 by the same measure to adjust the optical axis according to the above-mentioned sequence.

- Horizontal direction adjustment: turn screw 5
Adjust the optical axis of the main beam 1 of both the left and right side to the position shown in the figure.

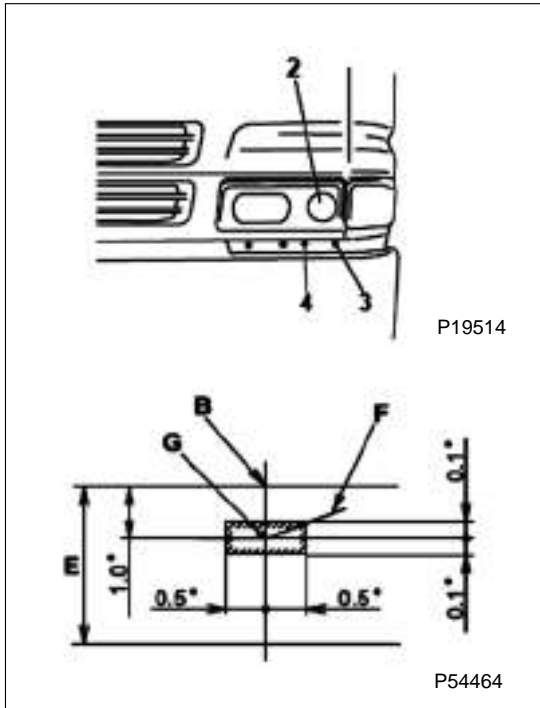
Allowance range of adjustment

B: Lamp center

E: Distance between head lamp center and ground

	Adjustment direction of optical axis							
	Right head lamp				Left head lamp			
	Upward	Downward	Leftward	Rightward	Upward	Downward	Leftward	Rightward
Screw 5	(CW)	(CCW)	(CW)	(CCW)	(CW)	(CCW)	(CCW)	(CW)
Screw 6	(CW)	(CCW)	—	—	(CW)	(CCW)	—	—

The screw turning direction shown in the table is the direction seen from the front.




Adjustment of sub-beam

- Turn on sub-beam 2
- Carry out the following operation steps so as to adjust the dividing line turning point G of the sub-beam 2 to the position shown in the figure.
- Vertical direction adjustment: turn screws 3 and 4.

Caution

Turn screws 3 and 4 by the same measure to adjust optical axis according to the above-mentioned sequence.

- Horizontal direction adjustment: turn screw 3. Adjust the optical axis of sub-beam 2 of both left and right side to the position shown in the figure.













 Allowance range of adjustment

B: Lamp center

E: Head lamp center height from ground

F: Dividing line

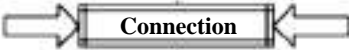


































G: Dividing line turning point

	Adjustment direction of optical axis							
	Right head lamp				Left head lamp			
	Upward	Downward	Leftward	Rightward	Upward	Downward	Leftward	Rightward
Screw 3	 (CW)	 (CCW)	 (CW)	 (CCW)	 (CW)	 (CCW)	 (CCW)	 (CW)
Screw 4	 (CW)	 (CCW)	—	—	 (CW)	 (CCW)	—	—


































The screw turning direction shown in the table is the direction seen from the front.

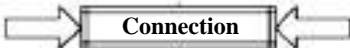

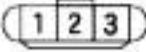
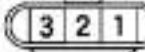










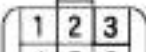
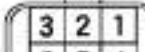


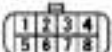





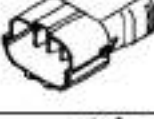








22-14 Structural Diagram of Connector

Maintenance Manual for CAMC Automobile




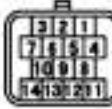


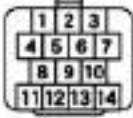







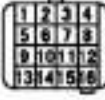



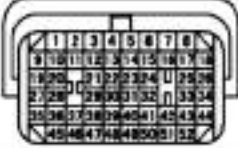
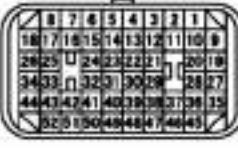


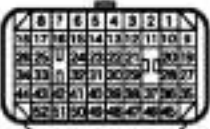









Model (coding and pin numbers)				
AA 1 A			 	 
AA 2 A				
AA 2 B				
AA 3 A				
AA 3 B				
AA 4 A				
AA 4 B				
AA 6 A				

Structural Diagram of Connector









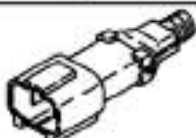







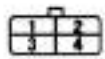
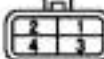

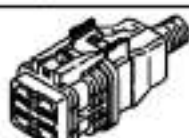














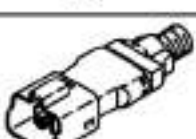
Model (coding and pin numbers)				
AA 1 A				
AA 2 A				
AA 2 B				
AA 3 A				
AA 3 B				
AA 4 A				
AA 4 B				
AA 6 A				

Model (coding and pin numbers)				
AB 3 B				
AB 4 A				
AB 6 A				
AB 6 B				
AB 8 A				
AB 8 B				
AB12A				
AB12B				

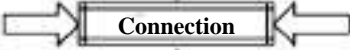
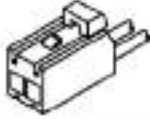


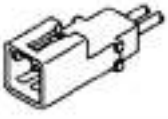



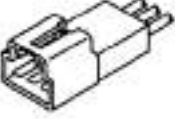
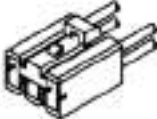



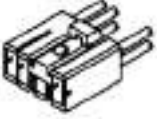

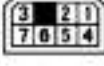


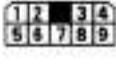



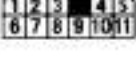














Structural Diagram of Connector

Model (coding and pin numbers)				
AB14A				
AB14B				
AB16A				
AB16B				
AB52A				
AB52B				
AC 1 A				
AC 1 B				

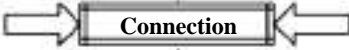













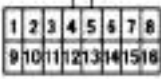

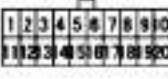

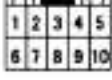



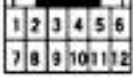
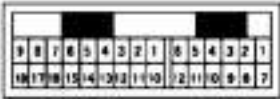

Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
AC 2 A				
AC 2 B				
AC 2 C				
AC 3 A				
AC 4 A				
AC 4 B				
AD 1 A				
AD 2 A				
AD 2 B				







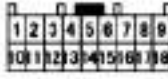

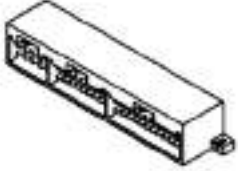

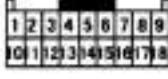
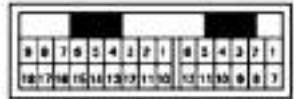


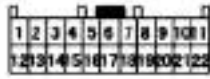
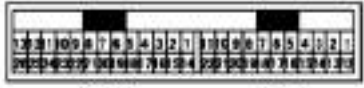
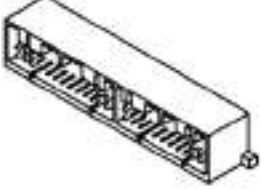
Structural Diagram of Connector

Model (coding and pin numbers)			
AE 2 A		 	
AE 3 A		 	
AE 5 A		 	
AE 7 A		 	
AE 9 A		 	
AE11A		 	
AE13A		 	
AE15A		 	
AE16A		 	

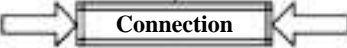
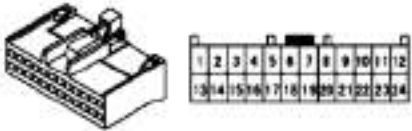
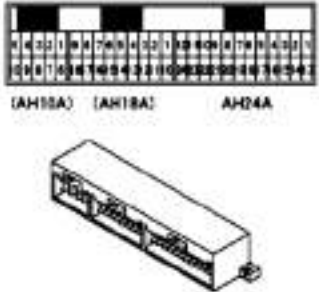
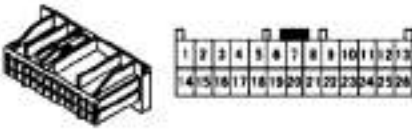
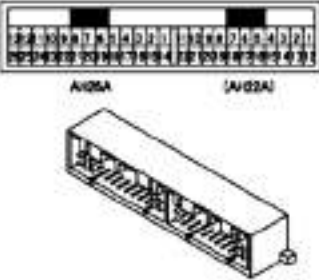






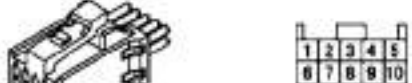
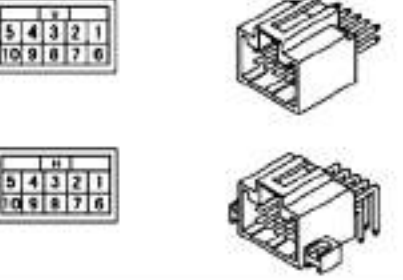
Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
AE16B				
AE16C				
AE17A				
AG16A				
AG20A				
AH10A			 <p>AH10A (AH18A) (AH24A)</p>	
AH12A			 <p>(AH18B) AH12A</p>	



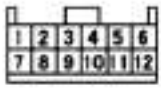
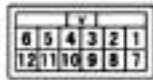
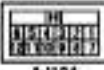
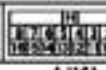
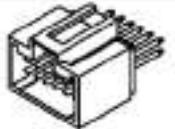


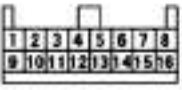

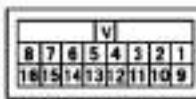
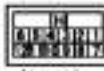








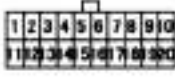
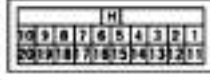
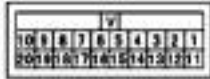
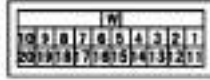
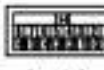





Structural Diagram of Connector

Model (coding and pin numbers)		
AH12B		
AH16A		
AH18A		
		 <p style="text-align: center;">(AH10A) AH18A (AH24A)</p> 
AH18B		
		 <p style="text-align: center;">AH18B (AH12A)</p> 
AH22A		
		 <p style="text-align: center;">(AH22A) AH22A</p> 

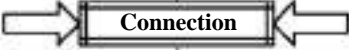



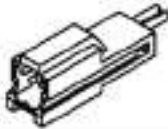












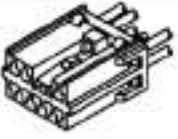
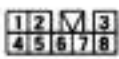
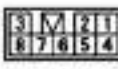










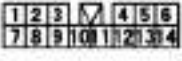




Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)		
AH24A		
AH26A		
AJ 2 A		
AJ 4 A		
AJ 8 A		
AJ10A		

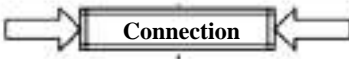









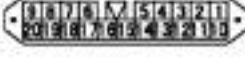





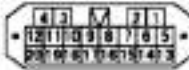












Structural Diagram of Connector

Model (coding and pin numbers)				
AJ12A			<div style="text-align: center;">  </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <p>AJ12A</p> </div> <div style="text-align: center;">  <p>AJ16A</p> </div> </div>	 
AJ16A			<div style="text-align: center;">  </div> <div style="text-align: center; margin-top: 10px;">  </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <p>(AJ12A)</p> </div> <div style="text-align: center;">  <p>AJ16A</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <p>AJ16A</p> </div> <div style="text-align: center;">  <p>(AJ20A)</p> </div> </div>	   
AJ20A			<div style="text-align: center;">  </div> <div style="text-align: center; margin-top: 10px;">  </div> <div style="text-align: center; margin-top: 10px;">  </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <p>(AJ16A)</p> </div> <div style="text-align: center;">  <p>AJ20A</p> </div> </div>	   


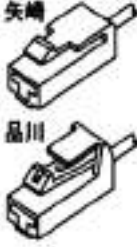


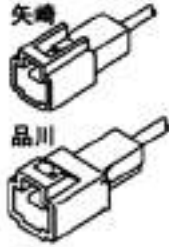



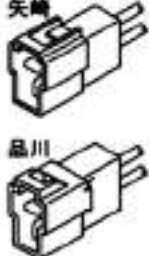
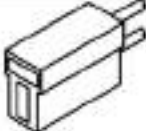


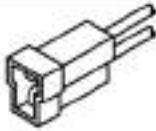



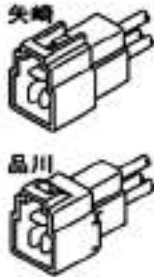
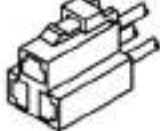







Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
AK 2 A				
AK 3 A				
AK 4 A				
AK 6 A				
AK 8 A				
AK10A			 	 
AK12A				
AK14A			 	 

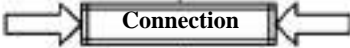
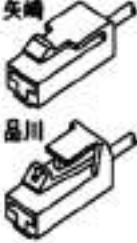



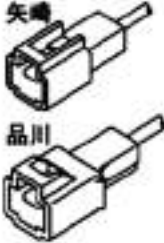





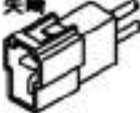
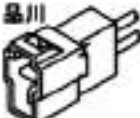
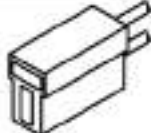


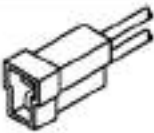






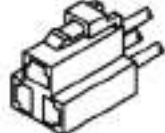







Structural Diagram of Connector







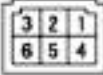
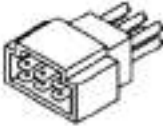

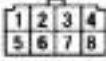













Model (coding and pin numbers)	 Connection	
AK18A	 	   
AK20A	 	   
AK20B	 	   
AK22A	 	   
AK22B	 	 

Maintenance Manual for CAMC Automobile





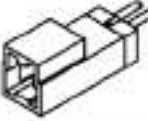















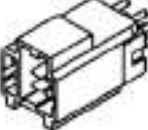

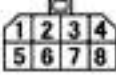



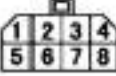




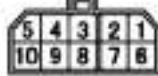


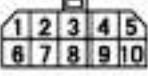
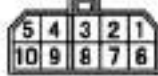

Model (coding and pin numbers)				
AL 1 A				
AL 2 A				
AL 2 B				
AL 3 A				
AL 3 B				
AL 3 C				

Structural Diagram of Connector

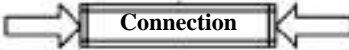







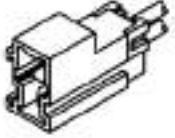




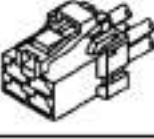


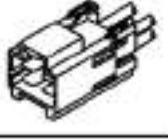
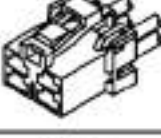


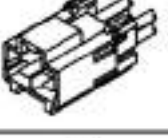



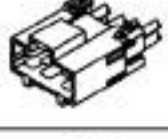
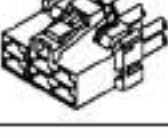


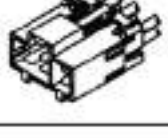
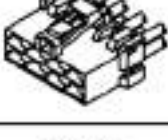
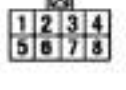
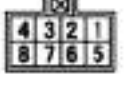
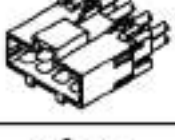
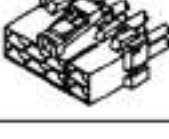
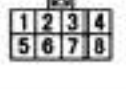

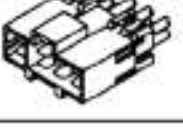
Model (coding and pin numbers)				
AL 1 A	 			 
AL 2 A	 			 
AL 2 B				
AL 3 A	 			 
AL 3 B				
AL 3 C				

Model (coding and pin numbers)	 Connection			
AL 6 A	 矢崎  品川		 矢崎  品川	
AL 6 B			 	
AL 8 A	 矢崎  品川		 矢崎  品川	
AL 8 B			 	
AM 2 A			  	
AM 2 B			  	

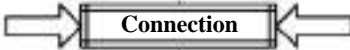



















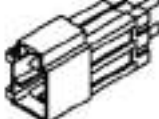








Structural Diagram of Connector

Model (coding and pin numbers)				
AM 2 C				
AM 4 A				
AM 4 B				
AM 6 A				
AM 6 B				
AM 8 A				
AM 8 B				
AM10A				
AM10B				

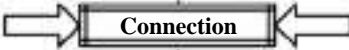
















Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
AN 1 A				
AN 2 A				
AN 3 A				
AN 4 A				
AN 4 B				
AN 6 A				
AN 6 B				
AN 8 A				
AN 8 B				


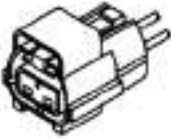





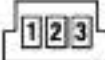

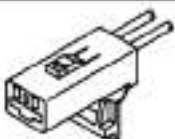



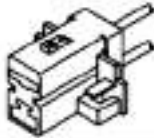





Structural Diagram of Connector

Model (coding and pin numbers)				
AP 1 A				
AP 1 B				
AP 2 A				
AP 2 B				
AP 2 C				
AQ1A				
AQ 3 A				
AQ 3 B				
AQ 5 A				

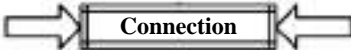


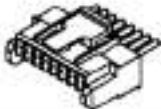


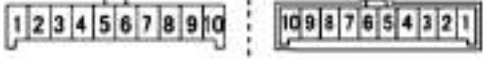






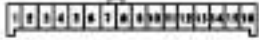
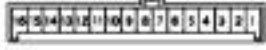

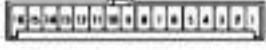
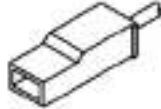

Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)		
AQ 6 A		
AQ 8 A		
AQ12A		
AR 2 A		
AR 2 B		
AR 2 C		
AR 2 D		
AR 2 E		
AR 2 F		


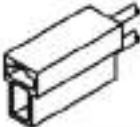

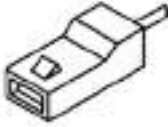


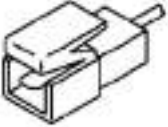
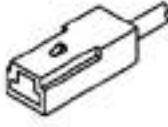


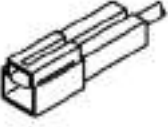



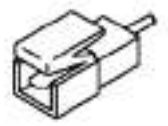
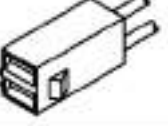


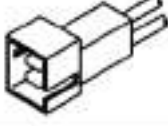





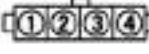
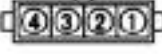





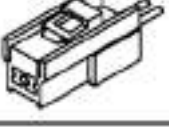



Structural Diagram of Connector

Model (coding and pin numbers)		
AR 2 G		
AR 2 H		
AR 3 A	 	 
AS 1 A		
AS 2 A		
AS 2 B		
AT 4 A		
AU 2 A		 



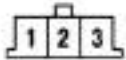
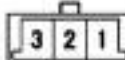








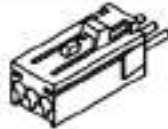


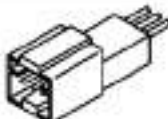

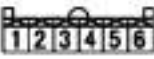
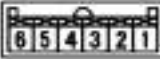


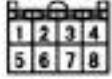

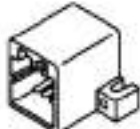

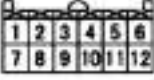
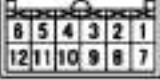


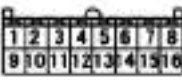






Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)		
AU 6 A		
AU 8 A		
AU10A		
AU12A		
AU13A		
AU16A		
AU16B		 
AU16C		 
AV 1 A		

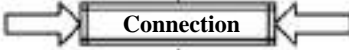

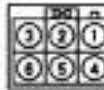
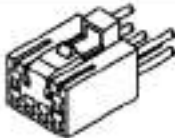
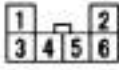
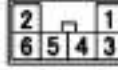

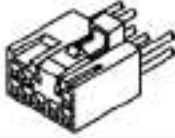
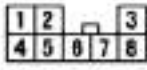
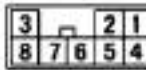

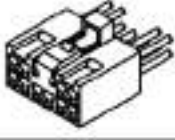
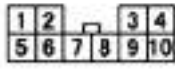
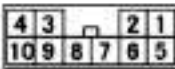


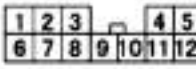
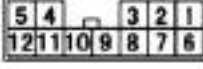

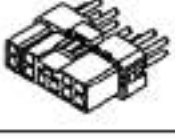
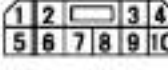
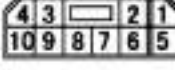


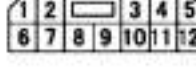
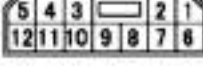


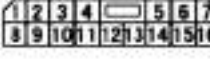
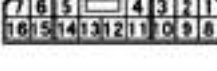


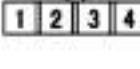
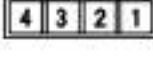

Structural Diagram of Connector

Model (coding and pin numbers)				
AV 2 A				
AW 1 A				
AW 1 B				
AW 1 C				
AW 2 A				
AX 2 A				
AX 4 A				
AY 2 A				
AZ 2 A				






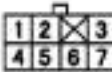
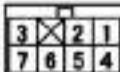

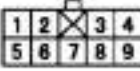


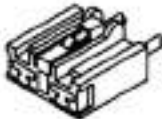





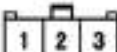
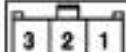








Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
BA 3 A				
BB 2 A				
BB 3 A				
BC 3 A				
BD 6 A				
BD 8 A				
BD12A				
BD16A				
BD20A				











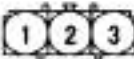
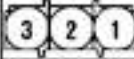














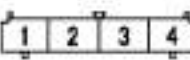
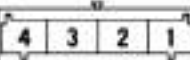
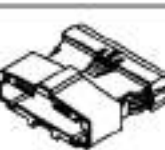

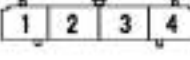
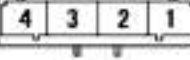

Structural Diagram of Connector

Model (coding and pin numbers)				
BE 6 A				
BF 6 A				
BF 8 A				
BF 10A				
BF 12A				
BG 10A				
BG 12A				
BG 16A				
BH 4 A				






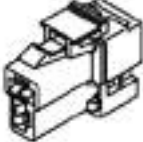

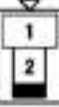










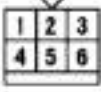
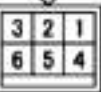


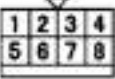
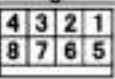

Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
BJ 5 A				
BJ 7 A				
BJ 9 A				
BM 2 A				
BM 2 B				
BM 2 C				
BM 3 A				
BN 1 A				
BP49A				



























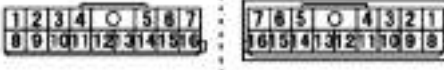

Structural Diagram of Connector

Model (coding and pin numbers)				
BQ 1 A				
BQ 2 A				
BQ 3 A				
BQ 3 B				
BR 1 A				
BR 2 A				
BR 4 A				
BR 4 B				



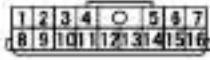



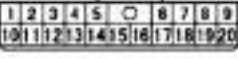
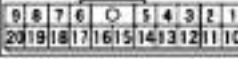


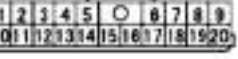



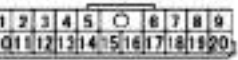










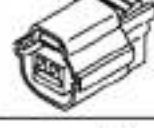


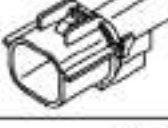


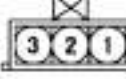

Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
BS 1 A				
BS 2 A				
BS 3 A				
BS 4 A				
BS 6 A				
BS 8 A				








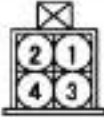






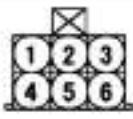
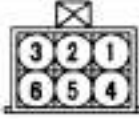



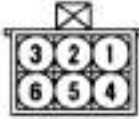



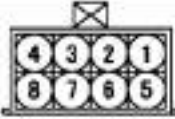


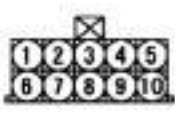
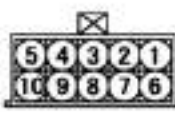




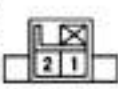


Structural Diagram of Connector




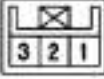
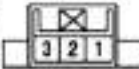



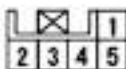

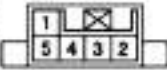





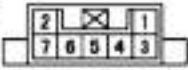



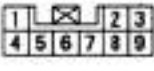
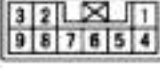





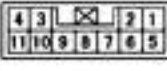


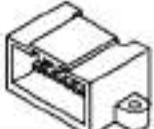
Model (coding and pin numbers)			
BT 2 A			
BT 3 A			
BT 4 A			
BT 6 A			
BT 8 A			
BT10A			
BT12A			
BT16A			
BT16B			

Maintenance Manual for CAMC Automobile



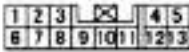
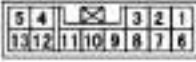

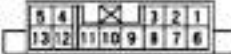



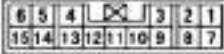




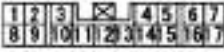
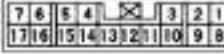


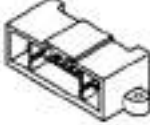


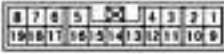





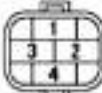
Model (coding and pin numbers)	 Connection			
BT16C				
BT20A				
BT20B				
BT20C				
BU 4 A				
BU 6 A				
BW 2 A				
BW 2 B				
BW 3 A				





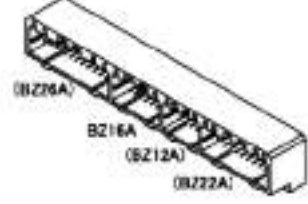
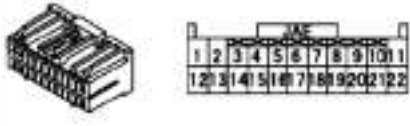
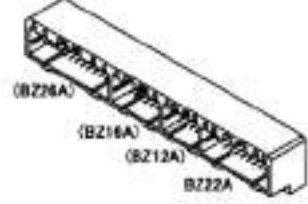
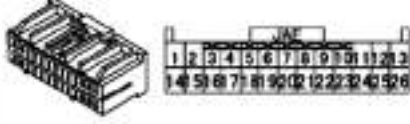
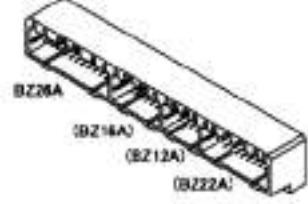




Structural Diagram of Connector

Model (coding and pin numbers)	 Connection			
BW 3 B				
BW 4 A				
BW 4 B				
BW 6 A				
BW 6 B				
BW 8 A				
BW10A				
BX 2 A			 	 

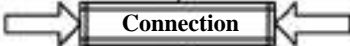








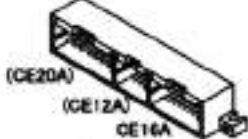




Model (coding and pin numbers)				
BX 3 A			 	 
BX 5 A			 	 
BX 7 A			 	 
BX 9 A			 	 
BX11A			 	 

Structural Diagram of Connector


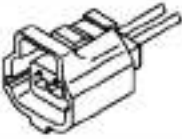


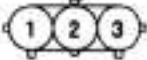

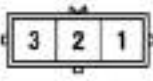
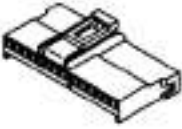







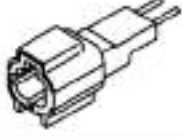
Model (coding and pin numbers)		
BX13A	 	   
BX15A	 	   
BX17A	 	   
BX19A	 	   
BY 4 A	 	

Model (coding and pin numbers)		
BZ12A		
BZ16A		
BZ22A		
BZ26A		
CA 2 A		
CB16A		
CD35A		




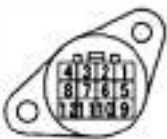


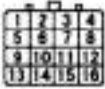
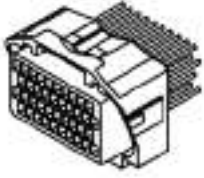





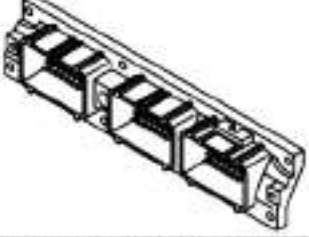


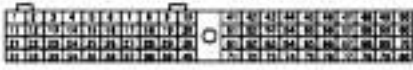
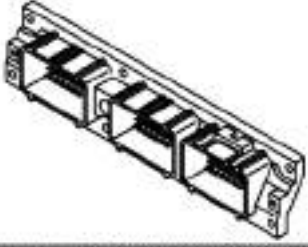

Structural Diagram of Connector

Model (coding and pin numbers)		
CD55A		
CE 2 A		
CE 4 A		
CE12A		
CE16A		
CE20A		
CF21A		
CH 2 A		





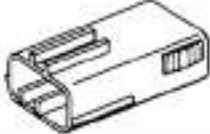
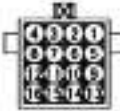




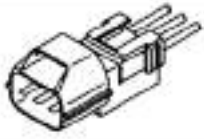








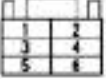

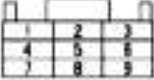
Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)																																										
CH 2 B																																										
CH 3 A		 																																								
CK 3 A																																										
CL14A																																										
CM28A		<table border="1" data-bbox="539 989 784 1068"> <tr> <td>1</td><td>2</td><td>3</td><td colspan="3">JAE</td><td>4</td><td>5</td><td>6</td><td>7</td> </tr> <tr> <td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td> </tr> <tr> <td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td> </tr> <tr> <td>28</td><td>29</td><td>30</td><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td> </tr> </table>	1	2	3	JAE			4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	2	3	JAE			4	5	6	7																																	
8	9	10	11	12	13	14	15	16	17																																	
18	19	20	21	22	23	24	25	26	27																																	
28	29	30	31	32	33	34	35	36	37																																	
CM30A		<table border="1" data-bbox="518 1166 784 1244"> <tr> <td>1</td><td>2</td><td>3</td><td colspan="3">JAE</td><td>4</td><td>5</td><td>6</td><td>7</td> </tr> <tr> <td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td> </tr> <tr> <td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td> </tr> <tr> <td>28</td><td>29</td><td>30</td><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td> </tr> </table>	1	2	3	JAE			4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	2	3	JAE			4	5	6	7																																	
8	9	10	11	12	13	14	15	16	17																																	
18	19	20	21	22	23	24	25	26	27																																	
28	29	30	31	32	33	34	35	36	37																																	
CM35A		<table border="1" data-bbox="525 1342 784 1421"> <tr> <td>1</td><td>2</td><td>3</td><td colspan="3">JAE</td><td>4</td><td>5</td><td>6</td><td>7</td> </tr> <tr> <td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td> </tr> <tr> <td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td> </tr> <tr> <td>28</td><td>29</td><td>30</td><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td> </tr> </table>	1	2	3	JAE			4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	2	3	JAE			4	5	6	7																																	
8	9	10	11	12	13	14	15	16	17																																	
18	19	20	21	22	23	24	25	26	27																																	
28	29	30	31	32	33	34	35	36	37																																	
CN 2 A		  																																								

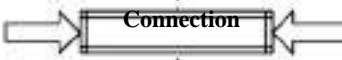

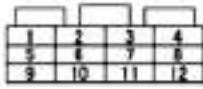

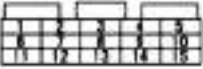



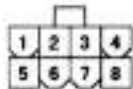

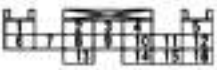
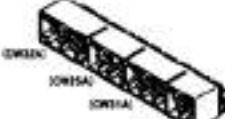





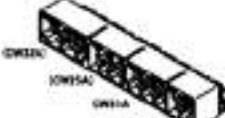






Structural Diagram of Connector

Model (coding and pin numbers)		
CN12A	 	 
CN16A	 	
CP40A	 	 
CP40B	 	  <div style="display: flex; justify-content: space-around; width: 100%;"> (CP80A) CP40B </div>
CP80A	 	  <div style="display: flex; justify-content: space-around; width: 100%;"> CP80A (CP40B) </div>






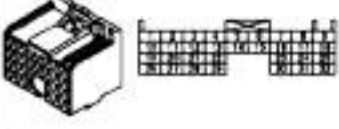


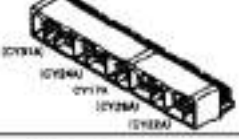

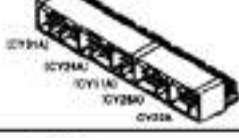

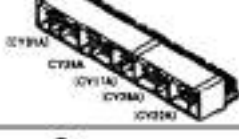
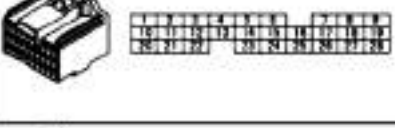

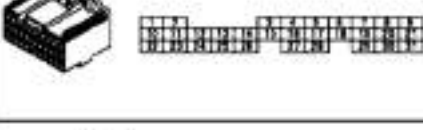
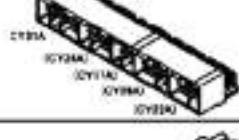


Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
CQ 2 B				
CQ 3 A				
CR16A				
CS 2 A				
CT 3 A				
CT 3 B				
CT10A				
CU 6 A				
CU 9 A				













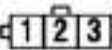
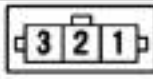




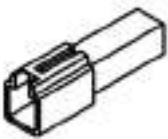







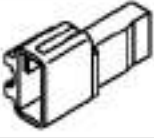
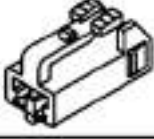


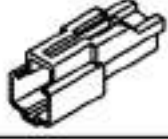



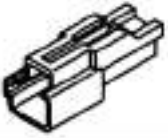
Structural Diagram of Connector

Model (coding and pin numbers)			
CU12A			
CU15A			
CU17A			
CV8A			
CW16A			
CW25A			
CW31A			
CW32A			
CX30A			






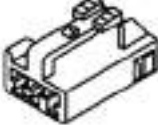


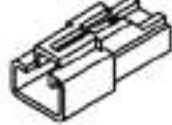








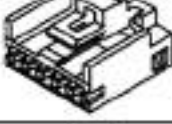
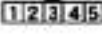
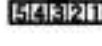
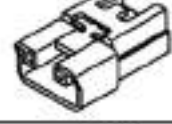




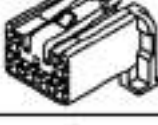







Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)		
CX32A		
CX32B		
CX32C		
CY17A		
CY22A		
CY24A		
CY26A		
CY31A		
DA20A		



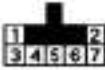

























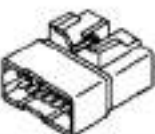







Structural Diagram of Connector

Model (coding and pin numbers)				
DA22A				
DA25A				
DB 2 A				
DC 3 A				
DD 1 A				
DD 2 A				
DD 2 B				
DD 2 C				
DD 2 E				















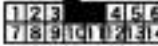






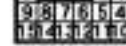


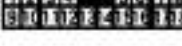
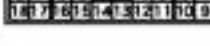


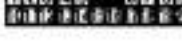
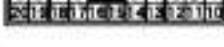





Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
DD 2 F				
DD 3 A				
DD 4 A				
DD 4 C				
DD 5 A				
DD 6 A				
DD 6 B				
DD 6 C				
DD 6 E				


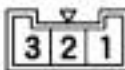
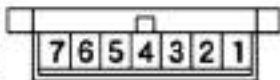
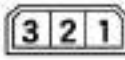
















Structural Diagram of Connector

Model (coding and pin numbers)				
DD 7 A				
DD 8 A				
DD 9 A				
DD 10A				
DD 10B				
DD 11A				
DD 12A				
DD 12B				
DD 12C				

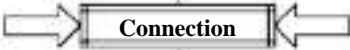







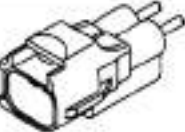



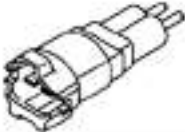


















Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
DD13A				
DD13B				
DD14A				
DD14B				
DD15A				
DD15B				
DD18A				
DD20A				
DD22A				




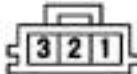







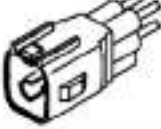



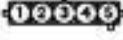










Structural Diagram of Connector

Model (coding and pin numbers)				
DE 3 A				
DE 7 A				
DF 3 A				
DG 1 A				
DG 1 B				
DG 1 C				
DG 1 D				
DG 2 A				
DG 2 B				






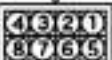


















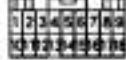



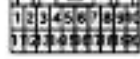
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Model (coding and pin numbers)				
DG 2 C				
DG 2 D				
DG 2 E				
DG 2 F				
DG 2 G				
DG 2 H				
DG 2 J				
DG 2 K				
DG 2 L				




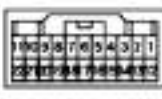


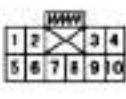
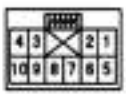


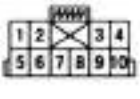
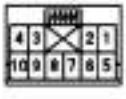






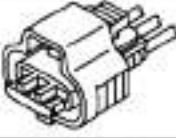


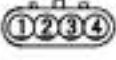
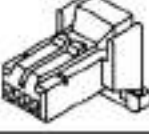

Structural Diagram of Connector

Model (coding and pin numbers)				
DG 3 A				
DG 3 B				
DG 4 A				
DG 4 B				
DG 5 A				
DG 5 B				
DG 5 C				
DG 5 D				
DG 6 A				



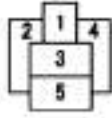



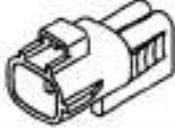















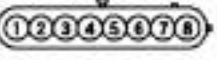


Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
DG 6 B				
DG 8 A				
DG 8 B				
DH 2 A				
DH 5 A				
DH10A				
DH14A				
DH16A				
DH20A				





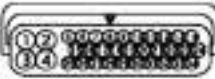

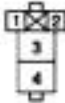


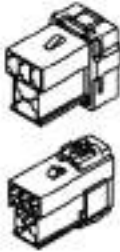
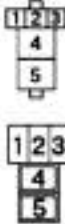






Structural Diagram of Connector

Model (coding and pin numbers)				
DH22A				
DJ10A				
DJ10B				
DK 2 A				
DK 4 A				
DL 4 A				
DM 3 A				
DM 4 A				
DN 4 A				





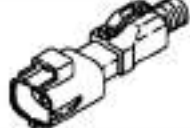











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Model (coding and pin numbers)			
DP 5 A			
DQ 2 A			 
DQ 2 B			
DQ 2 C			
DQ 3 A			 
DQ 4 A			
DQ 4 B			 
DQ 8 A			
EN 4 A			














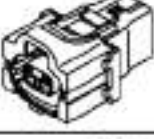




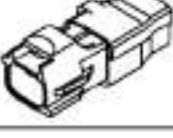




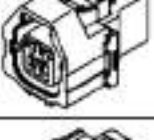





Structural Diagram of Connector

Model (coding and pin numbers)		
EN 5 A		
EP34A		
EQ 4 A		
EQ 4 B		
EQ 5 A		
EQ 5 B		
ER 2 A		
ER 6 A		


















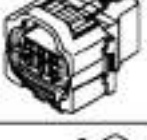





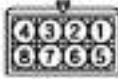

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Model (coding and pin numbers)		
ER 8 A		
ES 2 A		 
ES 2 B		
ES 2 C		
ES 3 A		
ES 4 A		 
ET 1 A		 
ET 1 B		
ET 2 A		






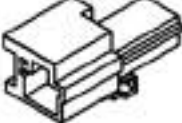



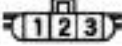




Structural Diagram of Connector

Model (coding and pin numbers)				
ET 2 B				
ET 2 C				
ET 2 D				
ET 2 F				
ET 2 G				
ET 2 L				
ET 3 A				
ET 3 B				
ET 3 C				

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Model (coding and pin numbers)				
ET 4 A				
ET 4 B				
ET 5 A				
ET 5 B				
ET 5 D				
ET 6 A				
ET 6 B				
ET 6 C				
ET 8 A				



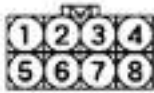
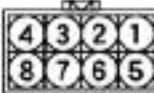



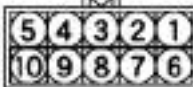


























Structural Diagram of Connector

Model (coding and pin numbers)		
ET 8 B		
EU 1 A		
EV 2 A		
EW12A		
EX 5 A		
EY 3 A		
EZ 3 A		
FA 5 A		
FB55A		











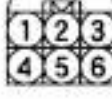
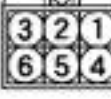


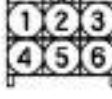



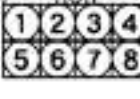
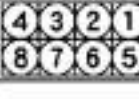


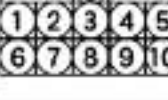
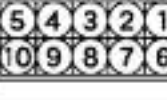






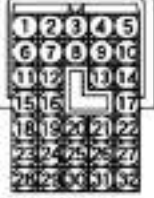


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Model (coding and pin numbers)				
GA 1 A				
GA 2 A				
GA 2 B				
GA 3 A				
GA 3 B				
GA 4 A				
GA 4 B				
GA 6 A				
GA 6 B				











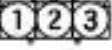
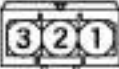


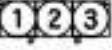
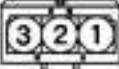


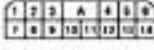
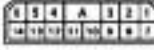

Structural Diagram of Connector

Model (coding and pin numbers)				
GA 8 A				
GA10A				
GA12A				
GB 1 A			 	
GB 2 A				
GB 2 B				
GB 3 A				
GB 3 B				

Maintenance Manual for CAMC Automobile

Model (coding and pin numbers)				
GB 4 A				
GB 4 B				
GB 6 A				
GB 6 B				
GB 8 A				
GB 10A				
GB 12A				
GC32A				

Structural Diagram of Connector

Model (coding and pin numbers)				
GD 1 A				
GD 2 A				
GD 3 A				
GD 3 B				
PE14A				



Appendix: Common Troubles of CAMC Automobile

Cab.....	23-2
Engine.....	23-3
Clutch.....	23-21
Transmission.....	23-25
Axle.....	23-25
Frame.....	23-30
Air Conditioning.....	23-31
Electrical Appliance.....	23-33
Braking.....	23-33
Steering.....	23-34

Cab

► Cab unable to tilt

Firstly, judge the tilter installed into the cab is of Jiuyang or of Zhong'ou. For Jiuyang tilter, check the causes from following items:

① Motor at soundless state

- a. Check fuse F6, HCF-5.
- b. Check the lifting-control switch of the motor
- c. Check whether the tilting completion switch is powered on
- d. Check the neutral gear shifting switch (to confirm that the buzzer works)
- e. Check the electric tilting switch
- f. Check the electric tilting relay (to confirm whether the motor is damaged)

② Motor at sound state

- a. With air or with oil shortage in tilting motor
- b. Internal leakage, damage or low pressure of tilting motor oil pump
- c. Internal leakage or valve blocking of tilting cylinder
- d. Check whether the cab can be jacked up

For Zhong'ou tilter, check the causes from following items:

- ① Check whether the motor has sound
- ② Check fuse, relay and button switch
- ③ Check for air or oil shortage
- ④ Check whether the oil pipe is blocked and whether the oil cylinder has internal leakage

► The Door Glass unable to lift

If the door glass can't be lifted, judge from the following items:

- ① Check whether the door glass lifter fuse and circuit are normal.
- ② Check whether the switch and the door glass controller are normal.
- ③ Check whether the lifter motor is powered on or burned and check whether the lifter cable is broken or gets stuck.
- ④ Check whether the fixing bolts of the glass track and that of glass are loosened and check whether the glass track is normal.

► Abnormal sound in cab

Abnormal sound in cab shall be judged from the following points:

- ① Check whether the locking mechanism for tilting is in good condition.
- ② Check whether the buffer rubbers on both sides of the portal frame touch and match completely.
- ③ Check whether the front and rear shock absorbers are failed to work.
- ④ Check whether all the connection parts of the cab become loosened or damaged (whether the connection between Zhong'ou tilting oil cylinder and the cab becomes loosened. Because there is no connection

hinge at the connection between the oil cylinder and the cab, causing that the cab can't be buffered and that the top end of the oil cylinder collides with the cab, then a buffer rubber should be added on the end).

⑤ Check whether the front wheel fender is in friction with front wheel.

► Water leaking in cab

Water leaking in cab shall be judged from the following points:

① Check whether the sealing of the speed meter indicating lamp is good.

② Check whether there is water leakage in skylight, replace it or apply with glass cement.

Engine

► Impossible startup of engine

Impossible startup of engine shall be judged from the following points:

① Electric circuit

a. Check whether the battery has power.

b. Check whether connection of the fuse, starting switch, starting relay, main power relay, starter attract-iron switch, starter coil and carbon brush, multi-function timer, startup line are completely secure.

c. Check whether ECU is damaged.

② Oil passage

a. Check whether the fuel pump oil supply passage is blocked (check filter element, oil-water separator).

b. Check whether the oil supply pump (manual oil pump) is damaged.

c. Check whether the oil pump fuel return valve (fuel return screw) is damaged.

d. Check whether there is air in HP, LP oil passage.

③ Mechanism

a. Check air distribution timing, oil injection timing.

b. Check whether the starter gear and the flywheel gear are damaged.

c. Check whether the flywheel gear ring is slipping.

d. Check whether the exhaust braking is turned OFF.

e. Oil pump rack is jammed or trunk-piston worn, oil nozzle not working.

► Black smoke from engine

The methods for judging black smoke from engine are as follows:

① Check whether air intake of the filter element is free.

② Check whether the turbocharger is damaged.

③ Check whether the fuel injection timing is lagging.

④ Check whether the fuel injection quantity is excessive.

⑤ Check whether the fuel nozzle pressure is too low, whether the atomization is not good.

⑥ Cylinder compression ratio not enough, fuel cannot be combusted completely.

⑦ For engine with fuel electronic control system (whether there is fault for ECU, prestroke, electronic

sub-governor).

- ⑧ Whether the exhaust brake valve is at closed state.

► White smoke from engine

The methods for judging white smoke from engine are as follows:

- ① Fuel injection timing of engine is early.
- ② Moisture content in fuel is too high.
- ③ Check whether the cylinder gasket is damaged (slight amount of water in cylinder).
- ④ Check whether ECU and prestroke of the engine with fuel electronic control system is damaged.

► Blue smoke from engine

The methods for judging blue smoke from engine are as follows:

- ① Check whether consumption of the engine oil is reduced, whether it fires oil.
- ② Whether the piston ring, cylinder sleeve is worn.
- ③ Whether the valve oil seal is damaged.
- ④ Whether the turbocharger has internal leaking or been damaged.
- ⑤ Whether the crankcase breather is blocked, crankcase air pressure increased.

► Exhaust brake not working

The methods for judging exhaust brake not working are as follows:

- ① Check the fuse and relay.
- ② Check whether the clutch switch, throttle switch, neutral position switch, exhaust brake switch are in good condition.
- ③ Check whether the exhaust brake valve cylinder and the three-way (solenoid) valve are in good condition.
- ④ Check whether ECU is damaged for engine with ECU.
- ⑤ Check whether the exhaust brake cylinder, flap are jammed, damaged, whether the fixing bolt comes off.

► Engine power insufficient due to fuel system

Position to check	Fault causes	Countermeasures
Fuel pipeline	Blocked due to dirty fuel	Clean the fuel pipe or replace the fuel pipe
Fuel filter element	Filter element blocked	Replace the fuel filter element
Fuel pump	Fuel outlet leaking, piston leaking	Replace the damaged part

► Starter unable to run

Position to check	Fault causes	Countermeasures
Battery	Cable head loosened, or rusted	Clean the head, and tighten the head
	Battery discharging, electric quantity weakened	Charge or replace the battery
Fuse	Fuse short-circuited	Replace the fuse
Starting switch	Starting switch and starting relay damaged	Replace the switch or relay

Position to check	Fault causes	Countermeasures
Starting motor	Attracted-iron switch and relay damaged	Repair or replace the attracted-iron switch
	Motor damaged	Repair or replace the motor

► **Starter able to work, but engine unable to run**

Position to check	Fault causes	Countermeasures
Battery	Cable head loosened, or rusted	Clean the head, and tighten the head
	Battery discharging, electric quantity weakened	Charge, or replace the battery
Starting motor	Motor pinion damaged	Replace the pinion
	Attracted-iron switch damaged	Repair, or replace the attracted-iron switch
	Brush worn, spring weakened	Replace the brush, or the spring
Engine	Pulling of piston, crankshaft bearing blocked	Repair and replace the related parts
	Other parts damaged	Replaced the damaged parts

► **Engine unable to start again after stopping running**

Position to check	Fault causes	Countermeasures
Fuel system	Fuel pipeline has air	Remove the air by fuel supply pump
Engine stop mechanism	Engine stop mechanism out of work	Replace the engine stop mechanism
	Control line adjustment incorrect	Re-adjust the control line
Electrical control system	Error occurred	Check and repair electric circuit

► **Fuel unable to enter the injection pump, resulting in engine unable to start**

Position to check	Fault causes	Countermeasures
Fuel	No fuel in the fuel tank	Fuel up
Fuel pipeline	Fuel pipeline blocked, or damaged	Repair, or replace the damaged part
	Connector loosened	Replace the seal, fasten the connector
Fuel filter	Fuel filter blocked	Replace the fuel filter
Fuel system	Fuel system has air	Repair the leaking, and remove the air

Position to check	Fault causes	Countermeasures
Fuel supply pump	Fuel supply pump filter screen blocked	Clean the fuel supply pump filter screen
	Fuel supply pump out of work	Repair, or replace the fuel supply pump

► **Fuel entered the injection pump, engine unable to start**

Position to check	Fault causes	Countermeasures
Engine stop button	Stop button not returned	Repair, make the stop button return to normal place, clear the error record
	Ignition switch unable to return to OFF position	Pull the ignition switch to ACC position, start again Clear the error record on the recorder
Control unit	Poor connection contact	Check and re-connect
Fuel	Fuel brand not matching with ambient temperature	Select correct fuel brand
	Fuel contains water	Replace the fuel
Fuel system	Air entered the injection pump	Use fuel supply pump to remove air in the fuel
Injector	Fuel nozzle sintered, dripping, poor atomization	Replace the fuel nozzle
	Fuel injector has low pressure while opening.	Adjust or replace the fuel nozzle
Fuel injection pump	The control rack of fuel injection pump out of work	Repair or replace

► **Engine idle unstable**

Position to check	Fault causes	Countermeasures
Engine stop button	Stop button not return	Repair, make the stop button return to normal place
		Pull the ignition switch to ACC position, and restart Clear the error record on the recorder
Fuel system	Fuel system leaking or blocked	Repair or replace the damaged part
	Fuel system has air	Use fuel supply pump to remove the air from the fuel system
	Water entered the fuel system	Drain dirty liquid or replace fuel
Fuel filter	Pollutants blocked the fuel filter	Replace the filter or the filter element
Idle control system	Switch or wire error	Check the control system
Acceleration control system	Acceleration control system adjustment incorrect	Adjust the acceleration control system

Appendix: Common Troubles of CAMC Automobile

Position to check	Fault causes	Countermeasures
Fuel nozzle	Fuel nozzle sintered	Replace the fuel nozzle
	Fuel nozzle open pressure low Injection condition incorrect	Correct and replace the fuel nozzle
Fuel injection pump	Fuel outlet valve failed to work, there are oil drops after fuel injection	Replace the oil outlet valve
	Injection timing adjustment incorrect	Adjust the injection timing
	Insufficient fuel injection	Adjust the fuel amount
	Piston spring damaged	Replace the piston spring
	Piston worn	Replace the piston
	Fuel pump camshaft worn	Replace the camshaft
	Tappet worn	Replace the tappet
Air valve clearance	Air valve clearance adjustment improper	Re-adjust the air valve clearance
Cylinder compression pressure	Cylinder gasket damaged	Replace the related damaged parts
	Cylinder sleeve and piston ring worn	
	Air valve and valve seat seal not tight	
Engine support cushion	Damaged	Replace
Camshaft	Camshaft flange worn	Replace the camshaft

► Engine power insufficient

Position to check	Fault causes	Countermeasures
Air filter	Air filter blocked	Clean or replace the air filter
Fuel	There are water and foreign matters in fuel	Replace the fuel
Electric control system	Error occurred	Check the fault code, check the electric circuit
Fuel filter	Filter element blocked	Replace the fuel filter or filter element
Fuel supply pump	Screen blocked or fuel supply pump failed to work	Repair or replace the fuel supply pump
Fuel nozzle	Fuel nozzle sintered	Replace the fuel nozzle
	Fuel nozzle open pressure low Injection condition incorrect	Correct and replace the fuel nozzle
Fuel injection pipe	Fuel injection pipe damaged or blocked	Replace the fuel injection pipe
Fuel injection pump	Fuel outlet valve failed to work, there are oil drops after fuel injection	Replace the oil outlet valve
	Fuel injection timing adjustment incorrect	Adjust the fuel injection timing
	Piston worn	Replace the piston
	Fuel pump camshaft worn	Replace the camshaft
	Tappet worn	Replace the tappet

Position to check	Fault causes	Countermeasures
Supercharger	Supercharger compensation pipe damaged or cracked	Replace the supercharger pipe
	Exhaust too less, intake insufficient	Repair or replace the related parts
	Supercharger damaged	Replace the supercharger
Cylinder compression pressure	Cylinder gasket air leaking	Replace the related part
	Cylinder sleeve piston ring worn, sintered, damaged	
	Installation incorrect	
Air valve clearance	Air inlet and exhaust valve clearance incorrect	Adjust the air valve clearance
Air valve spring	Air valve spring become weak or damaged	Replace the air valve spring
Exhaust system	Exhaust pipe carbon deposited and blocked	Clear the exhaust pipe carbon deposit
Camshaft	Camshaft flange worn	Replace the camshaft

► **Too much fuel consumption**

Position to check	Fault causes	Countermeasures
Fuel system	Fuel leaking	Repair and replace the related parts of the fuel system
Air filter	Air filter blocked	Clean or replace the air filter
Thermostat	Damaged	Replace
Engine oil	Oil viscosity too thick or too thin	Use oil with correct brand
Fuel nozzle	Fuel nozzle injection pressure too low, atomization not good	Adjust or replace the fuel nozzle
Fuel injection timing	Injection advance or lag	Adjust the fuel injection timing
Electric control system	Error occurred	Check the fault code, clear the fault
Exhaust brake system	Exhaust brake valve opening not sufficient	Correct or replace
Braking	Time delay fault or speed reducer fault	Check, repair, or replace
Supercharger	Air leaking	Repair the supercharger
	Supercharger damaged	Replace the supercharger
Air valve clearance	Air valve clearance adjustment improper	Re-adjust the air valve clearance
Cylinder compression pressure	Cylinder gasket damaged	Replace the related parts
	Cylinder sleeve and piston ring worn	
	Air valve and valve seat seal not tight	
Air valve spring	Air valve spring weakened, damaged	Replace the air valve spring

► **Too much oil consumption caused by engine**

Appendix: Common Troubles of CAMC Automobile

Position to check	Fault causes	Countermeasures
Engine oil	Too much oil filled	Fill oil as specified
Oil seal and gasket	Oil leaking from oil seal and gasket	Replace the oil seal and gasket
Breather	Breather blocked	Clean the breather
Air intake exhaust valve and air valve guide	Valve stem and valve guide worn	Replace the air valve and valve guide
Valve stem oil seal	Valve stem worn, oil seal leaking	Replace the valve stem and oil seal
Cylinder compression pressure	Cylinder gasket air leaking Cylinder sleeve and piston ring worn, Air valve and seat installation incorrect	Replace the related parts
Supercharger	Sealing ring worn or damaged	Replace
Air compressor	Piston ring worn or damaged	Replace

► Engine overheated

Position to check	Fault causes	Countermeasures
Cooling water	Cooling water insufficient	Add cooling water
Clutch fan	Clutch fan silicone oil leaking	Replace the clutch fan
Fan belt	Slipping caused by loosened fan belt	Replace the fan belt
Radiator	Radiator cap failed to work or middle part blocked	Replace the radiator cap, clean the radiator
Water pump	Water pump failed to work	Repair or replace the water pump
Cylinder head and cylinder block plug	Cooling water leaking caused by plug failure	Replace the plug
Thermostat	Thermostat failed to work	Replace the thermostat
Cooling system	Cooling system clogged by foreign matters	Clean and remove the foreign matters
Injection timing	Injection timing adjustment improper	Adjust the injection timing

► Oil pressure not high

Position to check	Fault causes	Countermeasures
Engine oil	Oil viscosity not correct, oil quantity not sufficient	Replace the oil, fill up to the specified scale
Oil pressure gauge or indicating lamp	Oil pressure gauge failed to work	Repair or replace the oil pressure gauge
	Oil indicating lamp not lit	Replace the indicating lamp
Oil filter	Oil filter blocked	Replace the oil filter element and bypass filter element
Safety valve and bypass valve	Safety valve sintered	Replace the safety valve
	Bypass valve spring becomes weak.	Replace the bypass valve spring

Position to check	Fault causes	Countermeasures
Oil pump	Oil pump strainer blocked	Clean the oil pump strainer
	Oil pump worn	Replace the oil pump
Rocker shaft	Rocker shaft bush worn	Replace the rocker shaft bush
Camshaft	Camshaft and bearing worn	Replace the camshaft and bearing
Crankshaft and bearing	Crankshaft and bearing worn	Replace the crankshaft and bearing
Lube oil spray control valve	Lube oil spray valve not closed tightly	Replace the lube oil control valve

► Abnormal noise of engine

1. Engine having slap?

Position to check	Fault causes	Countermeasures
Fuel	Fuel used not correct	Select fuel of correct brand
Injection timing	Fuel injection timing advanced	Adjust the injection timing
Fuel nozzle	Injection pressure not correct, fuel atomization not good	Correct or replace the fuel nozzle
Cylinder compression pressure	Cylinder gasket leaking, piston ring damaged	Replace the cylinder gasket or piston ring
Fuel injection pump	Fuel nozzle defect	Replace the fuel nozzle
	There are oil drops after fuel injection	

2. Noise caused by exhaust leaking

Position to check	Fault causes	Countermeasures
Exhaust pipe	Exhaust pipe connection loosened	Tighten the exhaust pipe connection
	Exhaust pipe damaged	Replace the exhaust pipe
Fuel nozzle or preheating plug	Fuel nozzle or preheating plug loosened, leaking	Replace the gasket, tighten the fuel nozzle or preheating plug
Exhaust manifold	Exhaust manifold connection loosened	Tighten the exhaust manifold
Cylinder head gasket	Cylinder gasket damaged	Replace the cylinder gasket

3. Continuous noise caused by engine

Position to check	Fault causes	Countermeasures
Fan belt	Belt loosened	Check and adjust the belt tension
Cooling fan	Cooling fan loosened	Tighten the cooling fan
Water pump bearing	Water pump bearing worn or damaged	Replace the water pump bearing
Generator bearing	Generator bearing worn or damaged	Replace the generator bearing
Air valve clearance	Intake/exhaust valve clearance adjustment improper	Adjust the air valve clearance

4. High abnormal noise when engine running fast

Position to check	Fault causes	Countermeasures
Air valve clearance	Intake/exhaust valve clearance adjustment improper	Adjust the air valve clearance
Rocker	Rocker damaged	Replace the rocker
Crankshaft thrust bearing	Crankshaft and bearing worn or damaged	Replace the crankshaft or bearing
Crankshaft and connecting rod bearing	Crankshaft and connecting rod bearing worn	Replace the crankshaft or connecting rod bearing
Connecting bush and piston pin	Connecting rod bush worn	Replace the connecting rod bearing
Piston and cylinder sleeve	Piston and cylinder sleeve worn	Replace the piston and cylinder sleeve
	Foreign matters entered the cylinder sleeve	

► Generator fault?

1. Battery electricity used up

Position to check	Fault causes	Countermeasures
Drive belt of generator	Loosened	Adjust the belt tension
Battery electrolyte	Too low	Add
Battery terminal	Terminal open circuit or internal open circuit	Replace the battery
Fuse	Burnt out	Replace the fuse
Fuse-base and fuse	Poor contact	Repair
Specific percentage of electrolyte	Incorrect	Adjust the electrolyte concentration
Starter switch and regulator wiring	Element damaged or poor contact	Repair
Generator and regulator wiring	Element damaged or poor contact	Repair
Generator grounding line	Disconnected	Repair
Regulator voltage	Not correct	Repair
Diode circuit	Damaged	Repair
Generator stator coil	Coil grounded or damaged	Repair or replace the stator coil
Generator rotor coil	Damaged	Repair
Power load	Too heavy	Check the power generation capacity at rated speed

2. Battery overcharged

Position to check	Fault causes	Countermeasures
Wiring and cable head	Line contact not good or open-circuited	Wire correctly
Voltage regulator	Poor grounding	Repair
	Voltage regulating too great	Re-adjust

Position to check	Fault causes	Countermeasures
Voltage regulator	Regulator damaged	Replace the regulator

3. Charging indicator lamp flashing or voltmeter indication fluctuating

Position to check	Fault causes	Countermeasures
Fan belt	Belt loosened	Adjust
Starting switch	Poor switch contact	Replace the starting switch
Related wiring	Poor contact or damaged	Re-connect or replace the wire

4. Charging indicator lamp is ON, but not lit when the generator is running

Position to check	Fault causes	Countermeasures
Starter switch wiring	Loosened	Re-connect
Generator and fuse wiring	Wire impedance too high	Replace the wire
Starter switch contact point	Damaged	Replace the starter switch

5. Abnormal noise of generator

Position to check	Fault causes	Countermeasures
Generator bearing	Bearing damaged	Fill grease or replace the bearing
Generator stator coil	Coil wire exposed	Replace the stator coil
	Coil short-circuit	Replace the stator coil
Generator belt	Belt loosened	Adjust the belt tension
Diode	Damaged	Replace
Generator rotor	Rotor interferes with stator	Repair

6. Fuse burnt out by charging circuit

Position to check	Fault causes	Countermeasures
Terminal	Grounded	Repair
Generator diode	Damaged	Replace the diode
Voltage regulator	Exceeded the specified value	Replace the regulator
Battery connection	Wiring inversed	Connect correctly

7. Battery not charged at all

Position to check	Fault causes	Countermeasures
Battery	Battery damaged	Replace
Regulator	Regulator terminal not connected or loosened	Repair
	Regulator broken	Replace
Generator	Generator coil opened, grounded or short-circuited, or diode damaged	Replace
Line	Wire or ammeter opened, short-circuited or poor contacted	Repair

8. Battery not charged fully

Position to check	Fault causes	Countermeasures
Battery	Battery damaged	Replace
Line	Wire opened, short-circuited or contact not good	Repair
Generator belt	Generator driving belt loosened	Adjust the belt tension
Generator	Delaminated short-circuit existing in stator coil	Replace
	Diode damaged	Replace
	Terminal contact not good	Repair
Regulator	Regulator broken	Replace
	Regulator terminal not connected or loosened	Repair

9. Current not stable while charging

Position to check	Fault causes	Countermeasures
Line	Line opened, poor contacted or will open soon	Repair
Generator	Generator driving belt loosened	Adjust the belt tension
	Stator coil will become short-circuited or open soon	Repair
	Terminal contact not good	Repair
Regulator	Regulator broken	Replace
	Regulator terminal not connected or loosened	Repair

► The fault of starting motor

1. Starter and attracted-iron switch unable to operate

Position to check	Fault causes	Countermeasures
Battery	Battery electrolyte level too low	Add electrolyte
	Low percentage of battery electrolyte	Charge or replace the electrolyte
	Battery switch contact not good	Replace
Ignition switch	Ignition switch damaged	Replace
Starter electromagnetic switch	Attracted-iron coil and iron core out of work	Replace
	Attracted-iron switch coil damaged	Replace
	Stator (field) coil damaged	Replace
Starter	Rotor coil damaged	Replace
	Fixed coil damaged	Replace

2. Electromagnet-switch operating, starting motor failing to run

Position to check	Fault causes	Countermeasures
Battery	Battery electrolyte level too low	Add electrolyte
	Low percentage of battery electrolyte	Charge or replace the electrolyte
Starting circuit	Poor contact	Repair

Position to check	Fault causes	Countermeasures
Electromagnetic switch cable head	Poor contact	Replace the cable head
Motor shaft sleeve	Sleeve worn	Replace the sleeve
Motor rotor	Rotor short-circuited	Repair or replace the rotor
Starting relay	Poor contact of starter relay contact point or inserted terminal	Repair or replace

3. Slow rotating speed of starter

Position to check	Fault causes	Countermeasures
Electromagnetic circuit switch	Poor contact	Repair
Motor shaft sleeve	Shaft sleeve worn out seriously	Replace
Motor rotor	Rotor coil short-circuited	Repair or replace

4. Starter running, but engine unable to start

Position to check	Fault causes	Countermeasures
Motor pinion	Motor gear and flywheel gear not engaged	Repair or replace motor clutch and connecting rod
Overrunning clutch	Slipping	Replace
Motor shaft sleeve	Worn out seriously	Replace

5. Abnormal noise from starter motor

Position to check	Fault causes	Countermeasures
Motor shaft sleeve	Worn out seriously	Replace
Motor gear and driving device	Worn out seriously	Replace the overrunning clutch and the driving device
	Clutch jammed	Lubricate or replace the overrunning clutch
Overrunning clutch internal gear	Worn out seriously	Replace the overrunning clutch
Motor shaft sleeve	Worn out seriously	Replace

6. Pinion advancing but not engaged with the ring gear

Position to check	Fault causes	Countermeasures
Battery	Battery capacity low	Charge the battery
Motor gear and flywheel gear	Pinion or ring gear teeth worn	Replace the pinion/ring gear
	Pinion shaft stuck with dust, jammed	Lubricate or repair

7. Motor started after the pinion and ring gear engaged, but the engine not running

Position to check	Fault causes	Countermeasures
Starter	Clutch slipping	Replace the clutch or starter

Position to check	Fault causes	Countermeasures
Flywheel gear ring	Reduction gear broken	Replace the reduction gear or starter
	Flywheel gear damaged	Replace the flywheel gear ring

8. Pinion and ring gear engaged, but the engine not running

Position to check	Fault causes	Countermeasures
Battery	Battery capacity low	Charge the battery
Starter	Wiring at terminal loosened	Repair
	Armature or exciting coil short-circuited	Replace the starter
	Rectifier dirty	Clean the rectifier or replace the starter
	Brush spring force weakened or brush worn out	Replace the brush spring or brush
Starter	Bearing locked	Replace the bearing or starter
Electromagnetic switch	Poor contact of electromagnetic switch contact point	Replace the electromagnetic switch

9. After engine started and the starter switch released, the starter motor not stopping running

Position to check	Fault causes	Countermeasures
Starter switch	Starter switch contact point unable to spring back completely	Replace the starter switch
Starter relay	Starter relay contact point unable to spring back completely	Replace the starter relay
Starter electromagnetic switch	Electromagnetic switch coil short-circuited	Replace the electromagnetic switch

► The problem of exhaust turbocharger

1. Output power of engine less than its normal state

Position to check	Fault causes	Countermeasures
Air filter	Air filter blocked	Clean or replace the air filter
Intake pipe and hose	Intake blocked	Repair or replace
Air compressor and intake manifold	Connector loosed and resulting in leaking	Repair
Turbine and exhaust manifold	Connector loosed and resulting in leaking	Repair
Exhaust pipe and muffler	Too much carbon deposition, resulting in clogging	Clean or replace
Crankcase breather	Blocked	Clean or replace
Compressor impeller	Damaged due to bumping	Replace
Turbine wheel	Damaged due to bumping	Replace
	Too much carbon deposition	Replace
Turbocharger rotator	Big resistance or serious wearing	Replace

2. Blue smoke or black smoke out of engine

Position to check	Fault causes	Countermeasures
Air filter or intercooler	Blocked	Clean, repair or replace
Supercharger oil seal	Oil seal leaking	Replace the oil seal
Supercharger oil return pipe	oil return blocked	Repair or replace
Crankcase breather	Blocked	Clean
Compressor impeller	Damaged due to bumping	Replace
Turbine wheel	Damaged due to bumping	Replace
Supercharger lubricating oil passage	Blocked	Clean or replace

3. Oil consumption increased due to supercharger damaged

Position to check	Fault causes	Countermeasures
Crankcase breather	Blocked	Clean
Supercharger oil seal	Oil seal leaking	Replace the oil seal
Supercharger oil return pipe	Oil return blocked	Repair or replace
Compressor impeller	Damaged due to bumping	Replace
Turbine wheel	Damaged due to bumping	Replace
Supercharger lubricating oil passage	Blocked	Clean or replace
Oil pressure	Pressure increased	Replace

4. Exhaust supercharger producing abnormal noise

Position to check	Fault causes	Countermeasures
Intake and exhaust interface	Blocked	Repair
Intake and exhaust system	Damaged	Repair
Interface gasket	Rotating jammed	Replace
Supercharger turning part	Impeller interfered with casing	Repair or replace
Compressor impeller	Impeller damaged	Replace
	Impeller interfered with casing	Repair or replace
Turbine wheel	Wheel damaged	Replace
	Too much carbon deposition in wheel	Clean or replace
Engine oil	Oil level too low	Fill to normal level
	Oil polluted	Replace the oil
Supercharger oil supply pipe	Blocked	Repair or replace
Turbine casing	Too much carbon deposition	Clean
Compressor casing	Too much dirt	Clean
Turbine shaft bearing	Bearing worn	Replace

5. Supercharger turning parts worn seriously

Position to check	Fault causes	Countermeasures
Engine oil	Polluted	Replace
	Oil of incorrect brand used	Replace
Supercharger oil pipe	Oil pipe blocked	Clean or replace
Supercharger oil seal	out of work	Replace
Supercharger casing oil return pipe	Blocked	Clean or replace
Turbine shaft	Having oil sludge and carbon deposition	Replace
Engine lube oil quantity	Lube oil insufficient	Fill to correct position

6. When abnormality or vibration occurred

Position to check	Fault causes	Countermeasures
Supercharger lubrication	The cause is that the bearing has fault or poor contact between the rotating part and the external part. Unable to replace oil, foreign matters entering the oil filling pipe, driving while the oil filter blocked or damaged and repeatedly starting and stopping the vehicle running will all lead to bearing damage.	Check and replace
Supercharger rotating part	If there is no abnormality in the lube oil system, but the damage found is due to the contact between the rotating part and the external part, this is most likely due to unbalance of the rotating part or shaft bent. This is because worn bearing was used or the foreign matters in air damaged the turbine or compressor wheel.	Check and replace

7. Turbocharger function is normal, but the output value decreased

Position to check	Fault causes	Countermeasures
Supercharger	Waste gas leaking	Repair or replace
Muffler	Exhaust resistance become too big due to exhaust pipe muffler deformed or carbon deposited	Repair or replace
Turbine and air filter	Compressor exhaust side leaking or air filter became dirty	Clean or replace
Compressor	Dirty inside the compressor	Clean
	Carbon deposited in rotor shaft	Check or replace

8. Exhaust pipe or intake pipe oil leaking or exhaust becoming white

Position to check	Fault causes	Countermeasures
Supercharger oil return pipe	Oil level increased due to oil distributor getting dirty or blocked	Clean or replace
Supercharger oil return pipe	Oil drain tube blocked, pressed or deformed	Repair or replace
	Piston ring worn or piston ring groove worn excessively	Replace
	Piston ring damaged due to bearing fault	Repair or replace

► Coolant level warning lamp constantly lit

① Fault analysis

Coolant level warning lamp lit can be divided into two statuses. One is false display status (engine water temperature, coolant in expansion jug are normal by site inspection), which is electrical system fault. The other is true display status (coolant is reduced in the expansion jug by site inspection), which is cooling system fault.

② Test procedure

1) Electrical fault – the ground signal of instrument warning lamp mainly comes from two points. One is from engine overheat switch, another is from water level sensor.

a. Pull out overheat switch wire card, check the ground signal of overheat switch with digital multimeter. If it says “YES”, replace the switch. If it says “NO”, test the ground signal of switch card wire G/R. If it shows “YES”, test the 12-core G/R ground signal in 16-core socket of the third row of the combined card above the throttle pedal in the cab. If the result is “YES”, it means this point to overheat switch wire grounded. If the result is “NO”, to be continued.

b. Test the ground signal of the 14-core R line in 17-core socket of the fourth row of the combined card above the throttle pedal. If it says “NO”, it means that instrument is fault. If it says “YES”, test the ground signal of the 20-core L line in 22-core card of multi-function timer. If the result is “NO”, it means the multi-function timer is fault. If the result is still “YES”, test the ground signal of the 1-core Y/R in 2-core card of the water level sensor. If the result is still “YES”, it means the wire between this point and the multi-function timer card is fault. If the result is “NO”, it means the water level sensor is fault.

c. Main test parts: water level sensor, overheat switch, multi-function timer, instrument.

2) Cooling system fault– check the water quantity in the compensation tank in front of the cab at vehicle ambient temperature, if the water quantity increased, it indicates the coolant flows into the compensation tank through the expansion tank when the engine coolant is heated and expanded. When the engine is stopped at ambient temperature, the coolant in the compensation tank does not flow back to the expansion tank because of vacuum pressure effect. Maintenance concept: one is to reduce the expansion capacity of coolant (coolant temperature not exceeding 95°C). Another is to enhance the return condition of the vacuum pressure.

a. Radiator – when the coolant is at major cycle, touch the tank with palm. The tank is divided into top, middle and bottom sections. If the hand felt temperature difference is big at the same position of the mid-

- dle and bottom section but the left, middle and right position is different, it may be that the radiator core strip is blocked (the position where hand felt temperature lower is the position the core strip blocked), it can be disassembled for cleaning.
- b. Fan coupler – when the engine water temperature is higher, the temperature difference of the upper and lower water chamber of the radiator is not big, engine speed $\geq 1800\text{rpm}$, gentle breeze is felt at the engine side cover, you may inspect the airfoil, replace the coupler.
- c. Water pump – coolant is at major cycle, with thermostat opening normal, after idle running for 3min, place the palm at the front middle section of the radiator to feel the temperature, at this time, increase the engine speed to 1800rpm. If the hand felt temperature increases rapidly, it indicates the water pump flow is good, otherwise, repair the water pump and adjust the V belt tension (10kgf)
- d. Thermostat – after inspection by referring to C, remove the thermostat and put it into water cup to heat, when the water temperature in the cup reaches 82°C , the thermostat valve must be at initial opening. When the water temperature $\leq 95^{\circ}\text{C}$, the valve must be at full open position, lifting $\geq 10\text{mm}$.
- e. Expansion tank cover – pressure cover sealing rubber gasket must be tightly against the expansion tank mouth, no coolant leaking is allowed, internal pressure valve opening pressure is normal ($50\pm 9\text{kpa}$). Part change method can be used in the field.
- f. Open the expansion tank cover, increase the engine speed to 2000rpm under hot vehicle status and maintain for 3min to check whether there is air bubble in the tank. YES, check the parts like cylinder gasket.
- g. With the vehicle at ambient temperature, watch each connection rubber hose of the cooling system for volume change due to deformation (sunken), and whether the vacuum pressure is decreased and coolant return affected.
- h. If the installation condition permits, the water level difference between the compensation tank and the expansion tank can be reduced properly.
- i. With the engine water temperature normal, expansion tank coolant shorted, and the compensation tank water level normal, you may check whether each part of the cooling system is leaking, such as, air warming radiator, radiator, connecting rubber hose, pump water seal, air compressor upper cover.

► Oil increasing phenomenon during engine running

① Fault analysis

During running of engine, oil plays the role of lubricating, cleaning, sealing, cooling, and buffering. Of which, slight amount of oil will whisk into combustion chamber to fire through piston ring, valve oil seal, etc., or leak through air compressor and lubrication part oil seal, gasket, its consumption capacity is proportional to the engine running time and performance, therefore, oil increasing belongs to abnormal phenomenon. For such phenomenon, we analyzed there are two possible factors, one is engine coolant entered the engine sump, the other is fuel entered.

② Test procedure

Pull out the engine oil scale and take proper amount of oil to watch its color, if it is in white, it indicates the oil is emulsified by the coolant. There is leakage between the cooling system and the lubrication system. You may check the parts like oil cooler, air compressor, cylinder gasket sealing performance, wet cylinder sleeve water seal, cylinder body casting easting pit (such phenomenon is few). If the oil color

remains unchanged, you may check its viscosity, if the viscosity becomes thin, fuel may enter. Then you may make suction examination in the field, the method is as follows: take a piece of white paper, take 2 ~ 3 drops of oil from the engine sump with oil scale and drop them on the white paper, watch its oil drop pattern edge within 5min, if the edge pattern is faint and dispersed in irregular pattern, fuel may be mixed in the oil. At this time, you may check mainly the piston sealing performance of the fuel supply pump in the injection pump, oil return pipe of the injector part (6WF1 oil return pipe is hidden in valve rocker chamber cover cap), injector piston needle valve coupling part dripping, etc.

Oil cooler

Taken from the cylinder for pressure airtight test

Air compressor

As there is cooling water channel in its upper cover, when the casing has sand hole, coolant is very liable to flow into the engine sump, you may make pressure airtight test.

Cylinder gasket sealing

Ask whether high temperature occurred during previous service of the engine, e.g., high temperature caused by poor radiating of water tank, poor working condition of silicon oil fan coupler and long time running at high temperature. At this time, you may check the cylinder head bolt tightening torque, if too low, disassemble the cylinder head to watch carefully the cylinder gasket water seepage print (adjacent place of each cylinder oil return hole and water channel hole). Give serious consideration when determining this operation.

Cylinder liner water seal

With engine flame out at hot state, coolant level normal, remove the engine sump, place a plastic film under the crankcase, observe the plastic film for any water drops in 1 hour.

Cylinder block

Pressure gastight test

Injector dripping

Adopt oil cut-off method of cylinder-by-cylinder when engine is running at idle state, when an oil of a cylinder cut-off, engine running speed not changed obviously, remove the injector of this cylinder and make a bench test. When the field condition not permitted, injection pump may be used, with fuel nozzle connection exposed, start the motor to run the engine and observe whether it is dribbling.

Injector oil return pipe

Remove the engine valve chamber hood, fill pressure gas into oil return pipe, use foam to check external pipe for leaking.

Injection pump

Method of new part replacement test (mainly check the plunger O ring in the fuel supply pump).

③ Oil increasing quantity or consumption quantity measurement

- a. Park the vehicle to be tested at flat ground, pull up the parking brake. Engine stops at hot state.
- b. Screw off the sump drain plug, drain the oil to a clean container and start timing. Screw in the sump plug after drain for 10min, weigh the oil in the container (assuming the weight value as A kg), then fill it into the engine.
- c. Fill fully the fuel tank and make a position mark, run the vehicle with normal procedure.
- d. When the fuel consumption of the fuel tank reaches half or more than 100L, weigh the oil in the container (weight value is assumed as B kg) at the same condition of the original test place, hot state and drain time.
- e. Meter the fuel filled to the tank marked position (metering value is assumed as C L).
- f. $[A-B] \div C$ =oil consumption capacity kg/L when engine consuming every liter of fuel.
 $[B-A] \div C$ =oil increasing capacity kg/L when engine consuming every liter of fuel.

Clutch

► Clutch releasing not completely

The methods to judge the clutch releasing not completely are as follows:

- ① Check whether the free stroke of the clutch pedal is too big.
- ② Check whether the release lever inner end is too low.
- ③ Check whether the release lever inner end is in the same plane.
- ④ Check whether the clutch plate is too thick.
- ⑤ Check whether the clutch plate is installed correctly.
- ⑥ Check whether the clutch plate steel disc is warped and deformed, whether the friction lining is broken.
- ⑦ Check whether the clutch plate moves freely on the spline shaft.

► **Clutch abnormal noise**

The methods to judge the clutch abnormal noise are as follows:

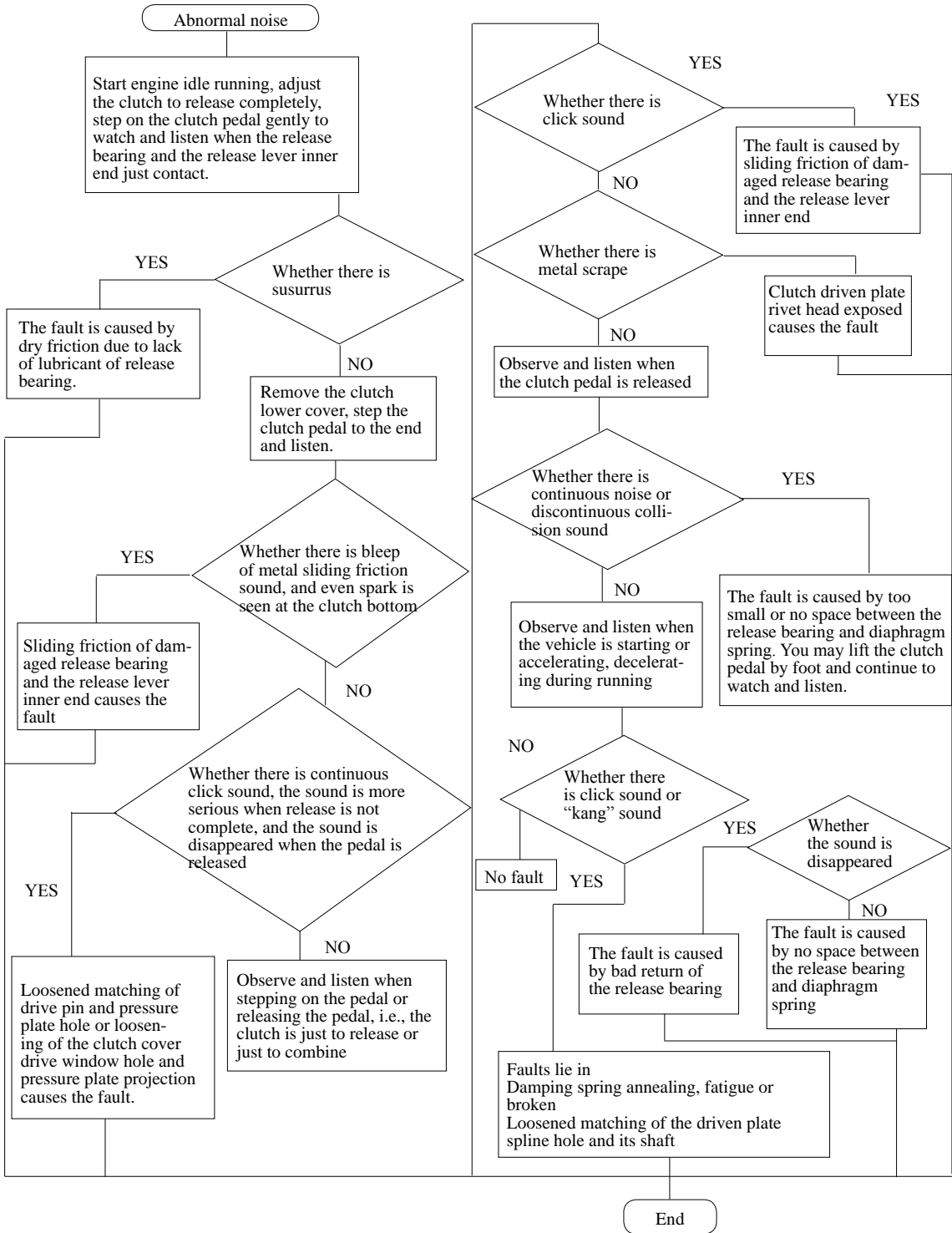


Fig. 2 Diagnosis procedure for clutch abnormal noise

► **Clutch slipping?**

The steps for handling clutch slipping are as follows:

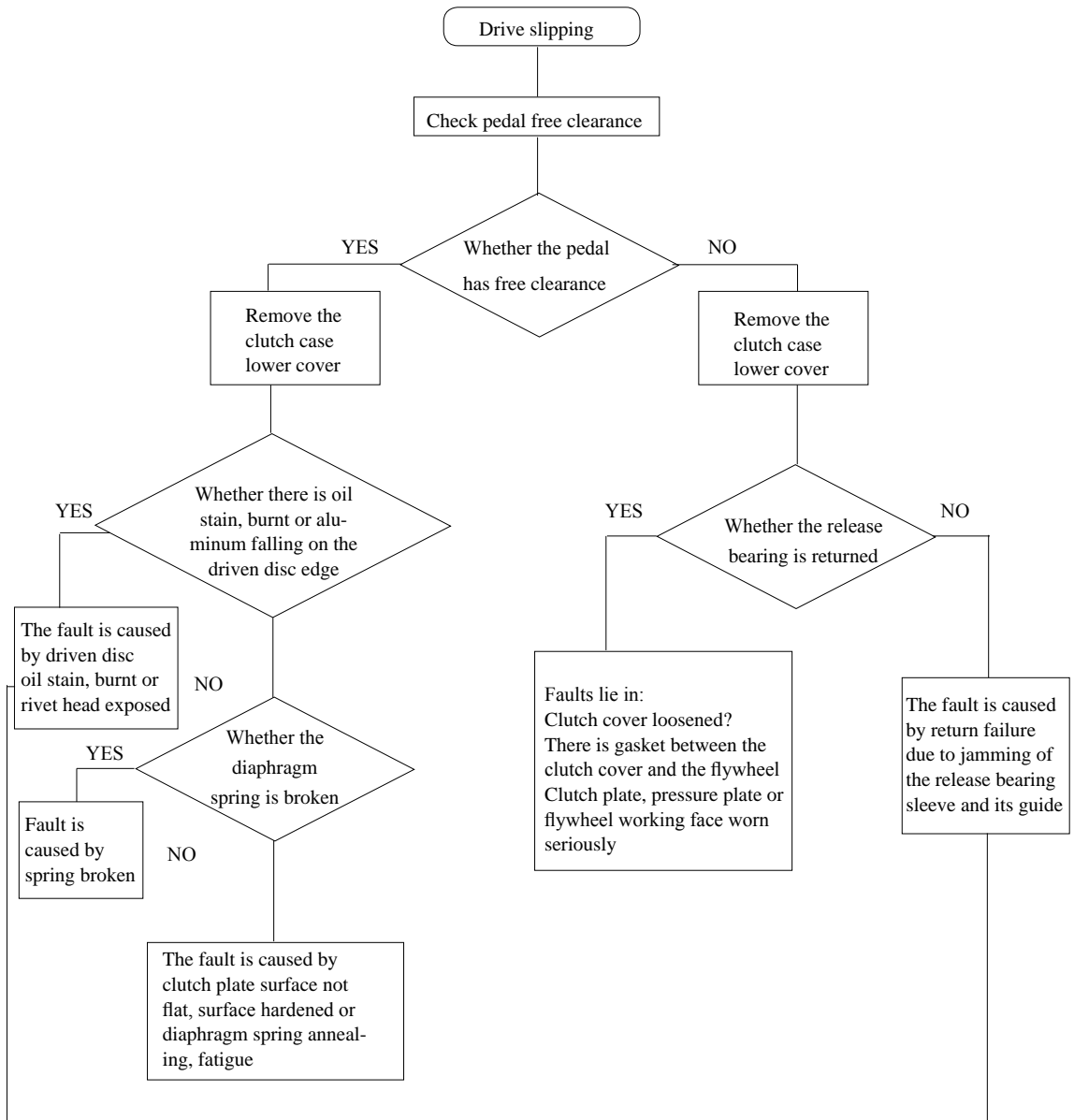


Fig. 3 Clutch drive slipping procedure

► **Clutch jitter when starting**

The steps to judge the clutch jitter when starting are as follows:

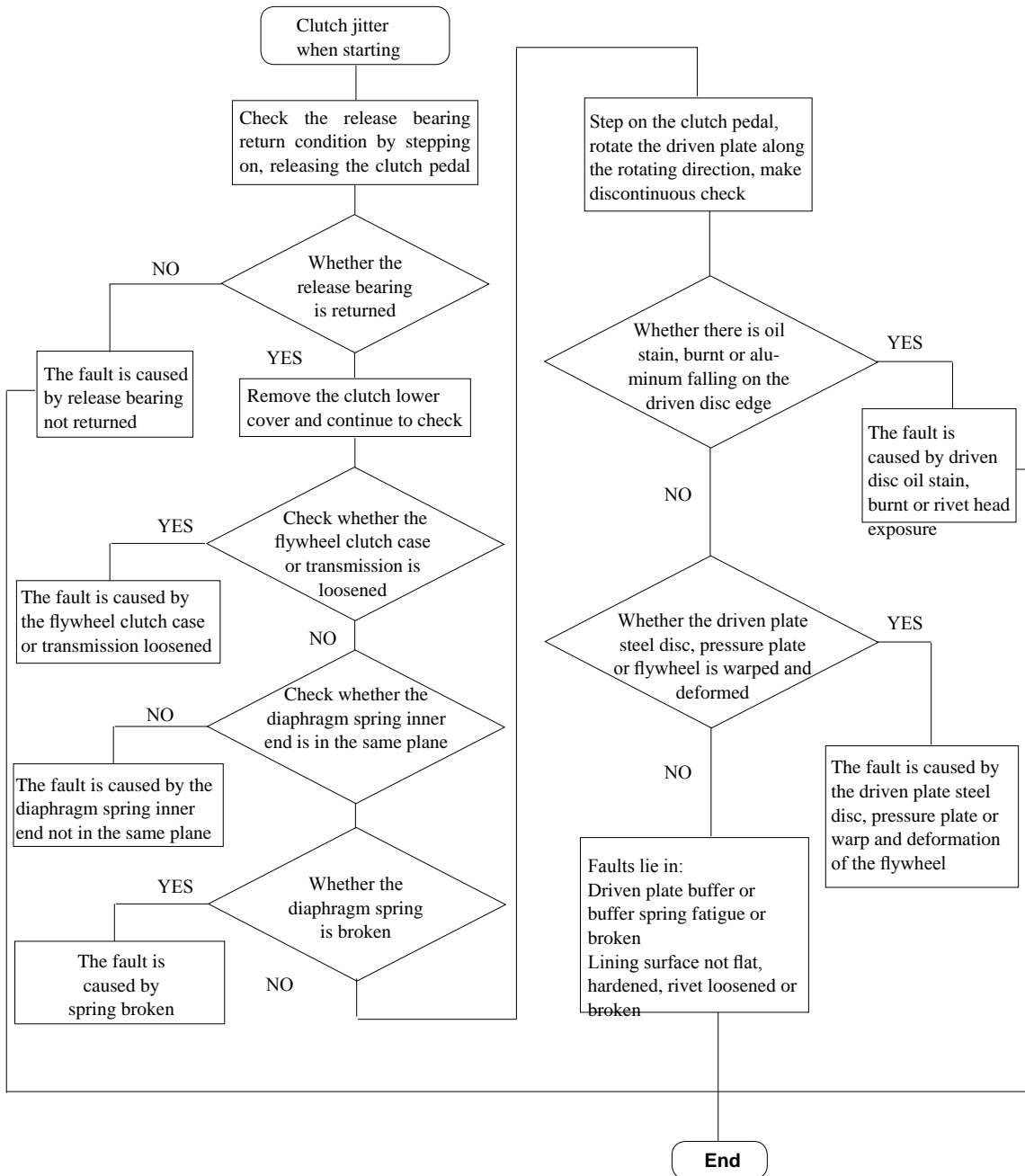


Fig. 4 Diagnosis procedure for clutch jitters when starting

Transmission

► Unable to shift into front row gear or easy to throw out of gear when vehicle is running or starting

When it is unable to shift into the transmission front row gear, it indicates gears R, 1, 3, 5, 7 are fault, this is because the gear lever is not properly adjusted, when the front row gear is shifted too shallow, the rear row gear is shifted too deep, the fault can be cleared just by adjusting the gear lever length or moving the gear lever support, making the gear lever be between the front row gear and the rear row gear; if the front row gear is shifted too shallow, unable to shift into the reverse gear, and when gears 3, 7 are shifted, they are easy to be out-of mesh, at this time, we not only have to adjust the gear lever length, but also have to check the gear lever support for deformation. And also, when the rear row gear is difficult to be shifted into, or it is easy to be out of gear when it is shifted into, its adjustment method is similar to the above, but the adjustment of the gear lever is in the other way round.

► Unable to shift into reverse gear when vehicle reversing, or, unable to shift into 7th gear, 8th gear when running at high speed?

Operating of Shanxi FAST transmission is composed of gear selection and gear shifting, the reverse gear and 7th gear, 8th gear are at both sides of the gear selection area respectively, if unable to shift into the reverse gear, the possible fault is when the gear selection lever is moved to left to the limit position, the select shifting block on the transmission has not entered completely the reverse shift fork yet, when shifting, it will have the phenomenon of shifting into two forks of the reverse gear and the first gear at the same time, unable to shift into the gear, or, out of mesh, shifted into the first gear. Here, the select lever length has to be adjusted, to get the lever longer, or if the lever support is deformed, support bolt loosened, the support has to be adjusted and fixed as well. When the select lever is selected to the reverse groove, and shifted into the reverse gear, when starting and running, it is easy to be out of mesh, this is because the shifted depth is not enough, we have to adjust the gear lever length, or adjust the gear lever support; when there is fault inside the transmission, e.g., accident shifting, shifter collar worn and loosened, the transmission has to be disassembled to clear the fault. And also, the 7th gear, 8th gear are on the right side, it may fail to shift into the 7th gear, 8th gear due to incorrect gear selection; and the 7th gear, 8th gear are high speed gears, such case as synchronizer of the auxiliary transmission abnormally worn, the fault of the double H diverter valve and gear shifting cylinder, it may also affect shifting into the 7th gear, 8th gear. In a word, when the transmission has problem, only by giving all round consideration and making thorough analysis, can the fault be cleared correctly.

Axle

► Interaxle differential burnt out?

We found in our service that few of users' interaxle differential is burnt out, and it is burnt out after new differential is replaced. When the case is serious, even the planetary gear and spider are sintered together. There are two main reasons for burning of the interaxle differential: one is lack of oil, and the other is

speed ratio of the intermediate axle and the rear axle incorrect.

Intermediate axle final reduction gear and transition transmission gearbox are lubricated by splash, while the position of the inter-rear-axle differential is the highest, therefore, the lubrication condition of the interaxle differential is relatively poor. In case of short of oil, even a very small amount, it will threaten the interaxle differential. When filling oil for new vehicle, or replacing gear oil, the fresh oil must be filled in from the filler on the interaxle differential housing, and filled up to the intermediate axle transition transmission gearbox inspection port.

We also found during our service that few of users overlooked the original speed ratio when replacing only the driven, driving conic gear of the intermediate axle or the rear axle, as a result, the difference of the speed ratio of the replaced driven, driving conic gear of the intermediate axle or the rear axle will lead to high speed differential running of the interaxle differential during running, plus the lubrication condition of the differential itself is not that good, the differential will be burnt out soon.

Therefore, when replacing the driven, driving conic gear, number of teeth of the replaced driven, driving conic gear must be the same as the original ones.

► Axle abnormal sound

When abnormal sound is found on drive axle, first to judge it is from the intermediate axle or the rear axle, then to judge its basic position. Special attention must be paid when sudden obvious sound occurs. Check immediately. When checking the position with abnormal sound, jack up completely the intermediate axle (or rear axle) with jack, start the engine and keep at low gear, let the jacked axle rotate slowly, and observe the position with abnormal sound. When carrying out this operation, pay attention to safety and take necessary safety measures.

The main reasons for intermediate axle abnormal sound are as follows:

1) The fixing bolt of the driven conic gear is dropped out or loosened

As the coupling bolts were applied with sliding adhesive when assembling the driven conic gear, and the torque is not enough, as a result, the bolt become loosening, even dropped out completely after running for a period of time. Such abnormal sound always occurs suddenly, irregularly and the sound is loud. At this time the vehicle can never be run by force, it must be disassembled for inspection.

When repairing and replacing the driven conic gear, Letai 262 thread anti-loosing glue must be applied at the thread of the coupling bolt and tight it with specified torque.

2) Gear damaged

Some teeth would be damaged during running due to many reasons. Such abnormal sound is also produced suddenly, and quite obvious, it must be disassembled for inspection immediately.

3) Bearings fall apart

Intermediate axle has 7 bearings, abnormal sound caused by bearing falling apart is also quite obvious,

the part with abnormal sound must be located, and then disassembled for inspection. Special attention must be paid to the two tapered roller bearings of the interaxle differential, a position easy to have problems, the installation direction of drive wheel cover plate must be correct.

4) Differential lock engagement sleeve jerky motion

Interwheel differential lock engagement sleeve spline cap loosened makes the engagement sleeve jerky motion that would produce collision sound of the two engagement sleeves. Interaxle differential lock pin jerky motion will also produce slap, such abnormal sound is also the mechanical bumping sound without rule.

5) Differential gear burnt out

Interwheel differential and interaxle differential planetary gear and axle shaft gear burnt or teeth damaged all would produce obvious noise. The above noise produced due to mechanical parts damaged always occurred suddenly and is extremely evident. In case such abnormal sound is encountered, disassemble immediately for inspection, continuous running is not allowed; otherwise, even more serious consequence would occur.

6) Continuous noise and such continues noise increases as the load and running speed increase. Such abnormal sound is often caused by bearing pitting corrosion, gear wearing, gear clearance too small or too big, cone gear tooth face contact position deviation, etc. Although such abnormal sound is not dreadful, it must be disassembled for inspection when the case is serious; otherwise the fault would be expanded.

When such abnormal sound is produced after replacing the driving, driven conic gear, it indicates the gear clearance or the thickness of the installation distance adjusting shim is not correct, resulting in contact of the two tooth faces not at proper position. The driving, driven conic gears are ground in pairs, if the replaced gears are not a pair of matching gear, such abnormal sound would be produced definitely and impossible to eliminate.

When repairing and disassembling the driving, driven conic gear, keep the installation distance adjusting shims in good condition, when reassembling, install the original shims, otherwise, driving, driven conic gear engagement noise would be produced due to deviation of the adjusting shims.

7) There is no abnormal sound when vehicle is running normally, but once the speed is reduced and oil is removed, there are hums. This is normally caused by hurt of the rear tooth face or pitting corrosion. Such slight sound will not interfere the overall situation, but when it is getting serious, it must be disassembled for inspection.

8) Gear clearance is too big, each spline shaft, hole loosened, when accelerating rapidly or starting, there is screech, and an obvious feeling of loosening.

► Axle heating

There may be three reasons for axle getting hot: too much lube oil or lack of lube oil, bearing pressed too tight.

Lack of lube oil, the mechanical parts cannot be lubricated, which would make the parts get heated. While excessive lube oil would also produce overheat phenomenon. If the press force of the differential supporting bearing, driving gear shaft supporting bearing is too big, it will also produce the overheat phenomenon. The later can be solved by adjusting the thickness of the shim.

► Oil leaking

Oil leaking fault has many factors in addition to the problem of the oil seal itself. For example, some users complain that when a position is leaking oil, but by replacing the oil seal the problem still cannot be solved. This indicates the reason of oil leaking does not lie in the oil seal itself. First check whether the axle case or transition transmission breather is blocked. If the breather is blocked, the heat produced by the mechanical parts operating would make the air expanded and produce pressure, force the lube oil to be extruded from the oil seal. Oil leaking due to the oil seal outer ring and seat hole loosened is always neglected by the user. The method to solve such problem is to clean the oil seal outer ring and the seat hole before installation, apply Letai 603 cylindrical fixing glue to the oil seal outer ring before placing in the oil seal.

► Tire wearing

There are many factors to lead to tire wearing, for instance, steel rim deformation, axle head bearing loosening, big pressure difference between double row tire. But for dual axle, tire wearing has another reason, axle dislocation.

Such cases as wearing and loosening of balance shaft bushing of the dual axle, damage of balance suspension thrust rod rubber bearing, seal off of balance thrust bar support and axle case would result in axle dislocation.

► Intermediate, rear driving axle half-axle oil seal leaking

Intermediate, rear driving axles are two-stage driving axles of median deceleration and wheel planet gear deceleration, therefore, they have greater ground clearance and total reduction ratio; the driving axle and the wheel reductor lube oil is at two positions, not connected with each other, sealing and partition is made mainly by the half-axle oil seal.

Leaking of half-axle oil seal will make the lube oil in driving axle reduced, affecting normal lubrication, intensifying wearing of mechanical parts, thus, resulting in early damage. Leaking of half-axle oil seal makes the lube oil flow to wheel reductor, resulting in increasing of the oil level in wheel reductor and destroying the oil seal. And it flows to the brake drum, causing bad braking, and threatening safe running.

The following points are the main reasons of half-axle oil seal leaking:

- ① Excessive oil in the driving axle reductor, the oil level exceeds the normal height.
- ② The breather of the driving axle reductor is blocked, when running, the oil temperature raised, pressure increased, the oil is extruded out and leaking from the oil seal.
- ③ The oil seal is deteriorated and aged, loss of sealing function.
- ④ Installation of oil seal not correct.
- ⑤ Installation of the oil seal and the half-axle sleeve is too loose, the quality of the half-axle oil seal is

not good, the size is not correct.

⑥ Half-axle journal is worn, dimension changed.

⑦ Hub bearing loosened, reductor bearing loosened, the half-axle jitters up and down, sealing of the oil seal is not good.

► **Parts of intermediate, rear axle wheel reductor repaired and replaced**

When the wheel planet gear reductor has the following defects, it must be repaired or replaced.

(1) Working surface of planet gear, internal gear, and sun gear ground gear seriously worn or gear teeth broken.

(2) Matching surface of the planet gear shaft journal and planet gear inner hole and needle roller bearing has severe wearing trace.

(3) Side clearance of sun wheel gear splined hole and half-axle spline wearing exceeds 0.6mm.

(4) Side clearance of gear ring, splined hole and axle head spline wearing exceeds 0.8mm.

(5) Inner, outer thrust washer of planet gear scuffed or has severe wearing trace.

Inner, outer thrust washer of sun gear scarred or has severe wearing trace.

► **Cause of braking weak, brake drum hot and the remedies**

(1) **The following points are the reasons:**

A. Effect of road: continues downgrade, avoiding obstacles when turning. If brake is often used to control the speed, sliding friction time of the shoe and brake drum will be increased, making the brake drum temperature rise rapidly, heat fading phenomenon increased, friction coefficient decreased greatly, and the braking effect decreased (i.e. braking weak).

B. Drive operation improper: not make full use of exhaust to brake, improperly overused braking, resulting in too frequent contact (times) and long time contact of the brake shoe and brake drum, causing the brake drum to get hot, and brake weak.

C. Braking clearance too small, brake drum deformed, make the shoe contact the brake drum frequently, and become hot.

D. Brake shoe return spring loose and soft, broken, difficult to release from braking, result in the brake drum hot, braking weak.

E. Brake shoe rusted is also the reason of braking weak and brake drum hot.

F. Exhaust of air braking control valve not complete, result in slow releasing from braking.

(2) **Remedies**

A. Control strictly the speed of the vehicle. If it is at continues downgrade, turning and obstacles are too much, use as much as possible the engine exhaust brake to meet the purpose of deceleration. Use the

brake equally, so long as the sliding friction time of the brake shoe and the brake drum is reduced, heating of the brake drum can be controlled to certain range, and the heat fading phenomenon will be decreased to minimum, thus, effective braking is ensured under emergency case.

B. Check and adjust the clearance between brake shoe and brake drum timely, keep it in the specified standard, if the brake drum is deformed seriously, repair and replace it.

C. Replace the brake shoe return spring, and check returning condition of the brake shoe.

D. Disassemble the brake shoe, grind the shoe pin shaft, copper sleeve, and add small amount of lithium base grease.

E. Air braking valve (master cylinder) must exhaust completely after braking, if not completely, it will lead to slow releasing from braking, prolonging of sliding friction time of the brake shoe and the brake drum, making the brake drum temperature rise rapidly. Disassemble the air braking valve for cleaning. According to the service condition, incomplete exhaust of the brake control valve is mainly due to foreign matters inside the valve, which makes the piston jammed.

Frame

► **Frame cracking from the fixing bolt hole of the intermediate and rear axles' rubber cushion block**

The methods to handle the frame cracking from the fixing bolt hole of the intermediate and rear axles' rubber cushion block are as follows:

- ① Remove the superstructure of the whole vehicle.
- ② Remove the intermediate and rear axles, balance axle and propeller shaft.
- ③ Separate the 4th, 5th and 6th cross-members and tail beam from the side member.
- ④ Remove the bolts and rivets of the coupling auxiliary plate, gusset plate, and side rail. Remove the auxiliary plate and gusset plate.
- ⑤ Mend the cracking part of the side rail.
- ⑥ Mend the gusset plate.
- ⑦ Correct the deformed part of the side member.
- ⑧ Remove rust and dirt from the side member, gusset plate and the lengthened auxiliary plate to be replaced before installation.
- ⑨ Re-rivet the 4th cross member, 5th cross member, 6th cross member and tail beam.
- ⑩ Install the intermediate and rear axles, balance axle, and propeller shaft.
- ⑪ Install the upper structures.
- ⑫ Remove the original cushion block; and replace it with new-type cushion block.

► **Precautions while handling:**

- ① When carrying out cold riveting, make sure the side member, auxiliary plate and gusset plate are clean, and no impurity at the various cold riveting connection planes. Use the original holes on the side rail as

far as possible; when holes have to be added, make sure there are no bolt holes or the process holes in the same positions of the side member.

② All welds shall use J506 welding rod.

③ After welding, strike the weld end immediately and its surrounding with a hammer so as to increase strength of the weld and eliminate the stress, preventing it from cracking later.

④ After the auxiliary plate lengthened, one rivet has to be cold riveted at both the front and rear position of the cracking.

⑤ The front of the new auxiliary plate is lengthened to the spare tire carrier, 2010mm from the center of the auxiliary plate.

⑥ The rear of the new auxiliary plate is lengthened to the tail beam, 1760mm from the center of the auxiliary plate.

Air Conditioning

► Air conditioner not refrigerating

The steps to judge the air conditioner not refrigerating are as follows:

① The system does not produce cold air, having lost the refrigeration function. The possible reasons may be:

a. The driving belt is too loose or has been broken, unable to drive the compressor to work; if the belt is too loose, adjust it by the adjustment screw; if it is broken, replace it. If the belt tightener wheel bearing is jammed or damaged, repair it or replace it.

b. The refrigerant is leaking seriously; owing to the function of low atmospheric pressure protective switch, the compressor cannot be started; if the leaking position can be seen from the exterior, screw tight the leaking connection joint; if the pipeline has obvious crack, replace the pipeline of the air conditioner; if the leakage cannot be seen outwardly, check the system pressure by using an air conditioner manifold pressure gauge; if the pressure is high, the low atmospheric pressure reading is zero. Or after vacuuming, the pressure gauge would appear rising, and then, the system must be charged with air. By using the soapsuds to find out the leaking position, after handling, vacuum it again; re-check it to confirm there is no leakage any more, then fill it with Freon.

c. The compressor bearing is damaged, which can be determined by using the sound measurement method; if there is abnormal sound, the bearing has to be replaced.

② The refrigerant is insufficient: watch through pressure gauge and sight glass, if there are good air bubbles in the window, it indicates the refrigerant is insufficient; if there are few air bubbles in the window, it indicates the refrigerant is moderate; if there is no air bubble and there is fluid flowing, it indicates there is excessive refrigerant.

③ The system is blocked by dirt. Owing to long-time operation of the compressor, the impurity from the

mechanical wear or dirt falling off the inner walls of the system parts due to the refrigerant action has blocked the dry solution stock bottle or the expansion valve. Then, check it with pressure gauge; if the low pressure side appears in vacuum, the high pressure gauge indicates very low pressure, and the front and rear pipes of the dry bottle and the expansion valve are frosted or iced, the outlet air is not cold, and there is no big change after it is turned off and restarted, which indicates the system is blocked; replace the dry bottle and expansion valve.

④ The condenser fan does not work. The reason is that the long operation of the fan with strong electric current. The air conditioner relay contact can be easily heated, causing poor contact. Check mainly the air conditioner fuse, relay, panel control device and air conditioning switch.

⑤ Compressor electromagnetic clutch is slipping, repair or replace the magnetic clutch.

⑥ The evaporator air passage is blocked by dust and foreign matters: when the air conditioner is working, Freon in the evaporator must absorb massive quantity of heat from the pipe wall, forming some water drops; then the dust and foreign matters inside the vehicle are sucked by the fan into the evaporator and stuck on the pipe wall, which is likely to block the air passage; turn on the air conditioner when checking, if the air at the outlet is very small and not cold, it indicates there are dust and foreign matters on the evaporator surface, which must be cleaned off promptly.

⑦ The external circulation air valve is not closed, and the air from outside of the vehicle enters the cab, causing poor refrigeration: open the external circulation.

⑧ The compressor is damaged, and there is internal leakage: use a pressure gauge to check; if it is at the low pressure side, it indicates the pressure is too high, but if it is at the high pressure side, it indicates the pressure is too low. The compressor has abnormal knocking, and the temperature difference between the high and low pressure sides of the compressor housing is not big, it indicates the compressor valve plate bearing and sealing plate are damaged; repair or replace.

⑨ The condenser has a poor cooling function: check it with a pressure gauge. If the high pressure gauge reading is too high, check whether the condenser fan is working normally and whether the condenser chip is blocked up by dust and dirt.

⑩ The temperature inside the cab is not ideal, the engine speed is very high, and the air amount of the fan is also very high. If the temperature inside the driver's cab is not ideal, check the thermostatic switch.

► No warm air from the heating system

The steps to judge no warm air from the heating system are as follows:

- ① Check whether the fan is working, whether the air passage switch is ON, and whether the cooling-heating change-over lever is on the hot position.
- ② Check whether the water temperature of the engine is normal.
- ③ Check whether the heater pipeline and heater water pipe is blocked up.
- ④ Check if the air deflection vane is damaged.

Electric Appliance

► CD not working

The steps to judge CD not working are as follows:

- ① Check whether the electric circuit and fuse are normal and in good condition.
- ② Check whether CD is jammed and becomes inoperative.
- ③ Check whether the loudspeakers work normally.
- ④ Check whether the operation of CD is normal.

► Windscreen wiper not working

The steps to judge the windscreen wiper not working are as follows:

- ① Check whether the fuse, relay, multipurpose timer, wiper switch, and wiper motor are in good condition.
- ② Check whether the wiper connecting rod ball head is too tight.
- ③ Check whether the wiring and cards are in good contact.

► Electric horn not working

The steps to judge electric horn not working are as follows:

- ① Check whether the fuse, relay, and horn change-over switch are in good condition.
- ② Check whether the minus earth is in good condition.
- ③ Check whether the horn is in good condition.
- ④ Check whether the air horn solenoid valve is in good condition.

► Steering light not working

The steps to judge steering light not working are as follows:

- ① Check whether the bulb and fuse of the steering light are damaged.
- ② Check whether the switch and flasher are working normally.
- ③ As to the steering light of new style vehicle, the steering light can be turned on only when the vehicle is moving.
- ④ Check the related wiring.

Braking

► Braking weak

The steps to judge weak braking are as follows:

- ① Check whether the brake hub and brake disc are seriously worn out.
- ② Check whether the braking distance is too big and (whether) the air pressure is too low.
- ③ Check whether the brake disc has stain.
- ④ Check whether the brake cylinder, brake master cylinder is leaking, jammed.
- ⑤ Check whether the relay valve is leaking.

- ⑥ Check whether the friction lining is too hard or improperly bound.
- ⑦ Check whether the adjusting arm is damaged and braking distance is improperly adjusted.
- ⑧ Check whether the cam is worn out and the wheel hub is out of round.
- ⑨ Check whether the brake shoe pin and cam shaft are rusted and jammed (slow braking).

► Brake locked

The steps to judge brake locked are as follows:

- ① Check whether there is too much resistance when the vehicle is starting to run and whether the sliding performance is normal.
- ② Check whether the hub temperature is too high and whether the gap of the brake shoe and brake hub is too small.
- ③ Check whether the brake cam shaft returning to the position is normal, if the shoe and shoe pin is well lubricated, and if there is any jamming.
- ④ Check whether the brake master cylinder and relay valve are damaged, leaking and jammed.
- ⑤ Check whether the brake cylinder and manual control valve are damaged, and leaking.
- ⑥ Check whether the quick release valve is normal and whether the braking line is blocked or damaged.

Steering

► 8×4 model double front axle scrubbing

Steps for handling 8×4 model scrubbing are as follows:

- (1) Adjust the pressing strength of the front wheel hub bearing (standard value is 20~55N).
- (2) The air pressure of the tires must be equal; the standard value is: 725Kpa.
- (3) Adjust the 1st and 2nd axle toe in (standard value: bias rubber tire: 0-2mm; radial-ply tire:-2-0mm).
Note: the tread of the wheels on the same axle must be the same; the toe in value of the 1st and 2nd axles must be the same.
- (4) The left front wheel moves 15m forward along the set straight line.
- (5) Measure the central distance between the end covers of the front and rear ball seats of the 1st axle draglink, the standard value is: 920mm (if there is a deviation in the standard value of the central distance, it indicates that the draglink is deformed).
- (6) Use plumb to check verticality of knuckle arm, note: as the steering gear body is inclined in positioning when installing, the knuckle arm has to be inclined backward by 1 degree.
- (7) Use plumb to check the verticality of floating arm (the verticality can be measured at the points of the oil nozzle of the float arm support pin and of the ball head pin central hole, which can be moved backward by 1degree).

- (8) The verticality of the floating arm can be changed by using telescopic drag link; note: when making adjustment, lock the steering wheel; after the drag link is adjusted, the floating arm must be at the gravity vertical angle.
- (9) Measure the central distance between the end covers of the front and rear ball seats of the 2nd axle drag link, the standard value is: 845mm; note: if the central distance exceeds the standard value, the drag link might be deformed (error can be adjusted and corrected if the standard value is within 5mm).
- (10) The left wheel of the vehicle 1st axle moves forward for 15m along the set straight line, and the left wheel of the 2nd axle must also move forward along the set straight line. If the left wheel of the 2nd axle has not moved forward along the straight line, it shows that the verticality of the floating arm has not been correctly adjusted, or the drag link of the 2nd axle is deformed.
- (11) Measure the left and right axle base of the 1st and 2nd axles by using a plumb hanging from the end cover center of the 1st and 2nd axle ends.
- (12) If the axle base is different, loosen the U-bolt at the right side of the 2nd axle to adjust the axle base by moving the right wheel of the rear axle; after adjustment, the left and right axle bases must be equal.
- (13) Adjust the 4 steering angle limit bolts of the 1st and 2nd axles to guard against over-steering. Note: for the steering angles, when turning left, it should not be more than 43 degrees; when turning right, no more than 37 degrees. When turning to limiting angle, the limit bolts should press against H beam.

► Steering vibration

The steps to judge steering vibration are as follows:

- (1) The front wheel bearing worn out.
- (2) The kingpin and bush are excessively worn out (steering linkage and kingpin are poorly lubricated).
- (3) Steering knuckle deformed.
- (4) Wheel alignment not properly adjusted (check the camber angle, caster angle and toe in).
- (5) Joints of couplers and steering shaft are worn out (spline coupling band).
- (6) The steering wheel shaft is loosened; the steering knuckle tie rod, steering arm, steering knuckle arm or ball head of the steering linkage are loosened.
- (7) Steering shaft bearing loosened.
- (8) The gap between the steering arm and locking nut is too large.
- (9) The wheels are seriously worn out; tire bead is rounded due to wearing.
- (10) There is air inside the steering gear oil passage.
- (11) The fixing screw of the steering gear is loosened.
- (12) The tires, wheel hubs, brake drum are not balanced.
- (13) The wheel on the hub is loosened (bolts are not tightened up).
- (14) The wheel hubs play; the axle journal bolts are loosened.
- (15) The fatigue degrees of the spring steel sheets and shock absorbers on both sides are not equal.

► Be pulled to one side direction

The steps to judge pulling to one side direction are as follows:

- ① Tire pressures are not the same, it is pulled to one side direction with lower pressures.
- ② The brake is pulling to one side (the braking forces of the two front wheels are not equal).
- ③ The left and right axle bases are not equal (the difference is above 10mm).
- ④ The hardness of the front steel plates are not equal.
- ⑤ The axle journal nuts of single side hub become loosened, and the bearing damaged.
- ⑥ The adjustment of the camber angle is not correct, generally, the steering declines toward to the side with larger camber angle.
- ⑦ The U-bolts of the leaf spring become loosened, the front axle plays.
- ⑧ The U-bolts of the leaf spring of the rear axle become loosened. When they move to one side, it will be pulled to one side direction.
- ⑨ The oil distribution valve of steering gear is not distributed in a balanced way, causing uneven distribution of the steering force.