

**BODY BUILDER'S DRAWINGS  
AND  
SUPPORTING DATA**



**COE CHASSIS**

**SEPTEMBER 2008**

## INTRODUCTION

This book has been designed to provide information for body and equipment manufacturers who mount their products on the STERLING 360 COE chassis.

We believe that all the detailed information which is essential for that purpose is contained in this book, but if you require any additional data or information, please contact:

|   |
|---|
| STERLING TRUCK CORPORATION<br>12120 Telegraph Road<br>Redford Township, MI 48239<br>Phone: 313/592-4200 |
|---|

BODY BUILDER HOTLINE PHONE #: 503/745-6822

The specifications and descriptions contained in this book are based on the latest product information at the time of publication, but since the design of Sterling 360 is continuously being improved, we must reserve the right to discontinue or change at any time without prior notice.

As a vehicle manufacturer, Sterling neither approves nor disapproves truck chassis modifications or equipment installations because Sterling cannot control the manufacturing techniques of the various body/equipment builders.

## **COMPLIANCE WITH FEDERAL MOTOR VEHICLE SAFETY STANDARDS**

The federal government has established Federal Motor Vehicle Safety Standards (FMVSS) for various categories of motor vehicles and motor vehicle equipment under the provisions of the National Traffic and Motor Vehicle Safety Act of 1966. The Act imposes important legal responsibilities on manufacturers, dealers, body builders and others engaged in the marketing of motor vehicles and motor vehicle equipment.

Vehicles manufactured by Mitsubishi Fuso Truck & Bus (MFTBC) for Sterling Truck Corporation (Sterling) for the subsequent installation of commercial bodies are classified as incomplete vehicles. These vehicles fully comply with certain applicable Motor Vehicle Safety Standards, and partially (or do not) comply with others. They cannot be certified fully because certain components which are required for certification are not furnished. Under present federal regulations, vehicles completed from these units are required to meet all applicable standards in effect on the date of manufacture of the incomplete vehicle, the date of final completion, or date between those two dates, as determined by their final configuration.

MFTBC incomplete vehicles carry in the glove box a document, as shown on the next page, that provides the vehicle types (truck) into which they may appropriately be completed, and the degree to which the incomplete vehicles comply with each of the standards in effect on the date of its manufacture. The completing manufacturer must certify compliance with all applicable standards, but may rely on MFTBC certification for those standards so indicated in the instructions for completing the vehicle document, provided that the instructions for completing the vehicle are followed. Questions may be directed to the Sterling Trucks Applications Group at 503/745-6822.

Alterations, modifications, or additions to the vehicle which affect compliance with FMVSS are not covered by MFTBC certification and are the responsibility of the completing manufacturer. Likewise the completing manufacturer must assume responsibility for compliance with changes in federal requirements that occur after the manufacture of the incomplete vehicle by MFTBC, if he elects to certify compliance as of a later date.



# **INCOMPLETE VEHICLE DOCUMENT**

## **UNITED STATES / CANADA**

**THIS INCOMPLETE VEHICLE MANUFACTURED BY**

*MITSUBISHI FUSO TRUCK AND BUS CORPORATION  
2-16-4, Konan, Minato-ku, Tokyo,  
108-8285 Japan*

**DATE OF MANUFACTURE:**

**VIN:**

**STERLING 360™**

**DO NOT REMOVE**

**THIS DOCUMENT MUST REMAIN WITH THIS VEHICLE  
UNTIL IT IS CERTIFIED AS A COMPLETE VEHICLE.**





| Vehicle Model/Modèle de Véhicule                                      |                  | COE 40/45       |                 | COE 50          |
|---|------------------|-----------------|-----------------|-----------------|
| GVWR/PNBV<br>lb (kg)  |                  | 14050<br>(6375) | 14500<br>(6575) | 17995<br>(8160) |
| GAWR/PNBE<br>lb (kg)  | Front/<br>Avant  | 5360<br>(2430)  | 5360<br>(2430)  | 6390<br>(2900)  |
|   | Rear/<br>Arrière | 9880<br>(4480)  | 9880<br>(4480)  | 12700<br>(5760) |
| Tire/Pneu   |                  | LT215/85R16-E   |                 | LT215/75R17.5-F |
| Rim/Jante   |                  | 16 x 5K         | 16 x 6K         | 17.5 x 6K       |
| Cold Inflation Pressure/<br>Pression de gonflage à froid<br>psi (kPa) | Front/<br>Avant  | 80 (550)        |                 | 100 (690)       |
|   | Rear/<br>Arrière | 80 (550)        |                 | 100 (690)       |
| Vehicle Type/Type de Véhicule   |                  | TRUCK/CAMION    |                 |                 |

Information in this document is furnished pursuant to United States safety regulations (Title 49-Code of Federal Regulations), and the Motor Vehicle Safety Act of Canada to assist intermediate and final stage manufacturers in ensuring conformity with applicable Federal Motor Vehicle Safety Standards.

However, this document is not intended to be a substitute for knowledge of the requirements of such Standards. It is the responsibility of intermediate and final stage manufacturers to be aware of all of the requirements of applicable U.S. and Canadian Motor Vehicle Safety Standards as well as their specific responsibilities as manufacturers with respect to each such Standard.

Any material alteration to this incomplete vehicle made by an intermediate or final stage manufacturer in the process of manufacturing the complete vehicle should be made so that such an alteration will not cause the vehicle or any component, assembly, or system thereof to become non-conforming with any applicable Motor Vehicle Safety Standard.

The statements contained in this documents are made by Mitsubishi Fuso Truck and Bus Corporation on the condition that neither the intermediate nor the final stage manufacturer will make any alteration to this incomplete vehicle which would jeopardize the conformity of the vehicle with any applicable Motor Vehicle Safety Standard.

This incomplete vehicle may be appropriately manufactured into a truck.

THIS INCOMPLETE VEHICLE CONFORMS TO ALL APPLICABLE STANDARDS PRESCRIBED UNDER THE CANADIAN MOTOR VEHICLE SAFETY REGULATIONS IN EFFECT ON THE DATE OF MANUFACTURE. /  
CE VÉHICULE INCOMPLET EST CONFORME À TOUTES LES NORMES QUI LUI ÉTAIENT APPLICABLES EN VERTU DU RÈGLEMENT SUR LA SÉCURITÉ DES VÉHICULES AUTOMOBILES DU CANADA EN VIGUEUR À LA DATE DE SA FABRICATION.



## **LIST OF UNITED STATES AND CANADIAN MOTOR VEHICLE SAFETY STANDARDS APPLICABLE TO TRUCKS WITH GVWR OF MORE THAN 10000 lbs.**

### FMVSS/CMVSS

| No.  | Title   | Page |
|------|---|------|
| 101  | Controls and Displays   | 3    |
| 102  | Transmission Shift Lever Sequence,<br>Starter Interlock and Transmission Braking Effect | 3    |
| 103  | Windshield Defrosting and Defogging Systems   | 3    |
| 104  | Windshield Wiping and Washing Systems   | 3    |
| 105  | Hydraulic Brake Systems   | 3    |
| 106  | Brake Hoses   | 4    |
| 108  | Lamps, Reflective Devices and Associated Equipment                                      | 4    |
| 111  | Rear View Mirrors   | 5    |
| 115  | Vehicle Identification Number (CMVSS ONLY)  | 6    |
| 116  | Motor Vehicle Brake Fluids  | 6    |
| 119  | New Pneumatic Tires for Vehicles other than Passenger Cars                              | 6    |
| 120  | Tire Selection and Rims for Motor Vehicles<br>other than Passenger Cars                 | 6    |
| 124  | Accelerator Control Systems   | 6    |
| 205  | Glazing Materials   | 6    |
| 206  | Door Locks and Door Retention Components  | 7    |
| 207  | Seating Systems   | 7    |
| 208  | Occupant Crash Protection   | 7    |
| 209  | Seat Belt Assemblies  | 7    |
| 210  | Seat Belt Assembly Anchorages   | 7    |
| 302  | Flammability of Interior Materials  | 8    |
| 1100 | Vehicle Emissions (CMVSS only)  | 8    |
| 1106 | Noise Emission (CMVSS only)   | 8    |



## **STATEMENTS REGARDING UNITED STATES AND CANADIAN MOTOR VEHICLE SAFETY STANDARDS**

### **101 – CONTROLS AND DISPLAYS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 101 provided that no alterations are made which affect the location, identification or illumination of any of the controls and displays in the cab or the location, movement or type of seat.

### **102 – TRANSMISSION SHIFT LEVER SEQUENCE, STARTER INTERLOCK AND TRANSMISSION BRAKING EFFECT**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 102 provided that no alterations are made which affect the function, physical or mechanical properties, environment, location or vital spatial clearances of any of the transmission control system components.

### **103 – WINDSHIELD DEFROSTING AND DEFOGGING SYSTEMS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 103 provided that no alterations are made which affect the function, physical or mechanical properties, environment, location or vital spatial clearances of any of the windshield defrosting and defogging system components.

### **104 – WINDSHIELD WIPING AND WASHING SYSTEMS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 104 provided that no alterations are made which affect the function, physical or mechanical properties, environment, location or vital spatial clearances of any of the windshield wiping and washing system components.

### **105 – HYDRAULIC BRAKE SYSTEMS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 105 provided that no alterations are made which affect the function, physical or mechanical properties, environment, location or vital spatial clearances of the components, assemblies or systems, including but not limited to:



Hydraulic brake lines, fittings and routings

Hydraulic brake valves and components

Hydraulic brake reservoirs

Brake assemblies and components (master vac, hydraulic booster, power steering pump, master cylinder, wheel cylinders, etc.)

Tires

Wheelbase

Brake pedal and related mechanical components

Parking brake hand lever, switch, and related mechanical components

The maximum vertical center of gravity specified below must not be exceeded at maximum GVWR and rated front & rear GAWR.

Center of Gravity:

|                   | Maximum Center of Gravity<br>(above ground) [in. (mm)] |
|-------------------|--|
| COE 40/45, COE 50 | 60 (1524)  |

## 106 – BRAKE HOSES

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 106 provided that no alterations are made which affect the function, physical or mechanical properties, environment, location or vital spatial clearances of the components, assemblies or systems associated with hoses and hose end fittings and labeling requirements.

## 108 – LAMPS, REFLECTIVE DEVICES AND ASSOCIATED EQUIPMENT

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 108 if it is completed with a body of 80 (2032) or more inches (mm) in overall width, provided that the following conditions are met:

1. Each of these devices must be properly installed in the completed vehicle and meet all the requirements of FMVSS/CMVSS 108.



a) The following devices when provided, located and/or wired by Mitsubishi Fuso Truck and Bus Corporation meet the requirements of this standard and no alterations shall be made which affect the location, mounting surfaces, function, environment or visibility clearances of these devices:

|   |                            |
|---|----------------------------|
| Headlamps   | License plate lamps        |
| Front side reflex reflectors                      | Back-up lamps              |
| Front identification lamps                        | Rear turn signals          |
| Front parking lamps and turn signals              | Turn signal operating unit |
| Turn signal flasher                               | Taillamps                  |
| Vehicle hazard warning signal flasher             | Stop lamps                 |
| Vehicle hazard warning signal operating unit      | Rear reflex reflectors     |
| Front combination clearance and side marker lamps |                            |

b) The following additional devices are not supplied or installed by Mitsubishi Fuso Truck and Bus Corporation, but must be installed on the van body and meet all the requirements of this standard:

- Rear side marker lamps
- Rear side reflex reflectors
- Rear clearance lamps
- Rear identification lamps
- Intermediate side marker lamps
- Intermediate side reflex reflectors

2. No part of the completed vehicle shall be installed so as to prevent any of the devices listed above from meeting their required photometric output at the specified test points. If such interference exists, the applicable devices may have to be relocated or additional devices added to meet the requirements of FMVSS/CMVSS 108. Any part covered by FMVSS/CMVSS 108 shall not be painted.

3. Manufacturer provided hazard flashers/turn signal flashers are manufactured so as to provide proper flash frequency when utilized with manufacturer provided lamps. Use of any lamps other than manufacturer provided lamps, or use of additional lamps may affect conformity of these flashers with FMVSS/CMVSS 108.



## **111 – REARVIEW MIRRORS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 111 provided that the driver's seat location is not altered and a body installed symmetrical about the vehicle centerline is of no more than 96 inches (2438 mm) in overall width.

## **115 – VEHICLE IDENTIFICATION NUMBER (CMVSS ONLY)**

This incomplete vehicle conforms to CMVSS 115, that every vehicle shall have a vehicle identification number and the identification numbers of any two vehicles manufactured by a manufacturer within a thirty year period shall not be identical.

## **116 – MOTOR VEHICLE BRAKE FLUIDS**

This incomplete vehicle, when completed and equipped with a hydraulic brake system, will conform to FMVSS/CMVSS 116 provided that no alterations are made in the physical or chemical properties of the brake fluid specified for use in hydraulic brake systems.

## **119 – NEW PNEUMATIC TIRES FOR VEHICLES OTHER THAN PASSENGER CARS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 119 provided that (1) no alterations are made to the tires provided and (2) any tires added or used for replacement conform to FMVSS/CMVSS 119.

## **120 – TIRE SELECTION & RIMS FOR MOTOR VEHICLES OTHER THAN PASSENGER CARS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 120 provided that no alterations are made which affect the function, physical or mechanical properties of the wheels or tires.



## **124 – ACCELERATOR CONTROL SYSTEMS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 124 provided that no alterations are made which affect the function, physical or mechanical properties, environment, location or vital spatial clearances of any of the accelerator control system components.

## **205 – GLAZING MATERIALS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 205 provided that no alterations are made which affect the physical or mechanical properties of the glazing materials or the visibility of the marks required by FMVSS/CMVSS 205.

## **206 – DOOR LOCKS AND DOOR RETENTION COMPONENTS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 206 provided that no alterations are made which affect the function, physical or mechanical properties, environment, location or vital spatial clearances of any of the door locks or door retention system components.

## **207 – SEATING SYSTEMS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 207 provided that no alterations are made which affect the function, physical or mechanical properties, environment, location or vital spatial clearances of any of the seating system components.

## **208 – OCCUPANT CRASH PROTECTION**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 208 provided that no alterations are made to the number, location or configuration of the designated seating positions; the location, form or configuration of the windshield header; or the number, placement, installation or model number of the seat belt assemblies of the incomplete vehicle.

## **209 – SEAT BELT ASSEMBLIES**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 209 provided that no alterations or substitutions are made to the seat belt assemblies, attachment hardware or seats provided.



## **210 – SEAT BELT ASSEMBLY ANCHORAGES**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 210 provided that no additional occupant seats or seat belt assembly anchorages are added and provided further that no alterations are made which affect the function, physical or mechanical properties, environment, location or vital spatial clearances of the components, assemblies or systems including but not limited to:

- |  |                      |
|--|----------------------|
| Seat assemblies  | Floor pan assembly   |
| Seat belt routing  | Seat belt assemblies |
| Seat position and/or adjustment capability                             |                      |
| Seat belt anchorage <u>alpha pharma</u> brackets and/or reinforcements |                      |

## **302 – FLAMMABILITY OF INTERIOR MATERIALS**

This incomplete vehicle, when completed, will conform to FMVSS/CMVSS 302 provided that no alterations or substitutions are made which affect any material, part or component listed below and installed in the cab by Mitsubishi Fuso Truck and Bus Corporation:

- |               |                           |
|---------------|---------------------------|
| Seat cushions | Floor covering            |
| Seat backs    | Engine compartment covers |
| Seat belt     | Sun visors                |
| Headlining    |                           |

All trim panels including door, front, rear and side panels

Any other interior materials, including padding and crash deployed elements, that are designed to absorb energy on contact by occupants in the event of a crash.

If the intermediate or final stage manufacturer installs any of the aforementioned items, those items will also have to meet the requirements of FMVSS/CMVSS 302.

## **1100 – VEHICLE EMISSIONS (CMVSS ONLY)**

This incomplete vehicle conforms to CMVSS 1100 provided that no alterations are made to engine air induction system or engine exhaust system.





## **1106 – NOISE EMISSION (CMVSS ONLY)**

This incomplete vehicle, when completed, will conform to CMVSS 1106 provided that no alterations are made to the originally assembled chassis cab unit.

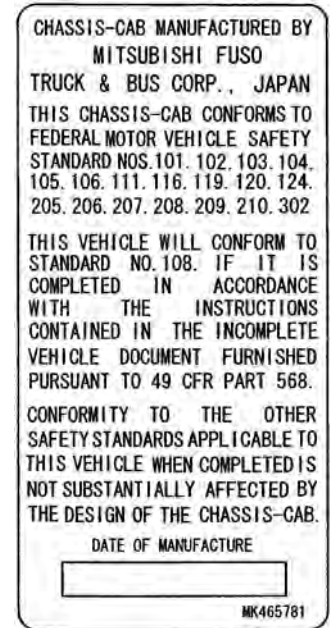
Any item other than those listed above which is used to make a complete vehicle is the responsibility of the final stage manufacturer.

## SAFETY CONFORMANCE

In addition to the Incomplete Vehicle Document, a Safety conformance Label as shown to the right is affixed to all the vehicles when shipped from the factory. This label contains all the FMVSS numbers applicable not only to chassis-cabs but also to completed vehicles if they are completed in accordance with the Incomplete Vehicle Document.

This label is affixed to the door latch post of the left-hand side door.

DO NOT COVER OVER WITH ANY OTHER LABEL.



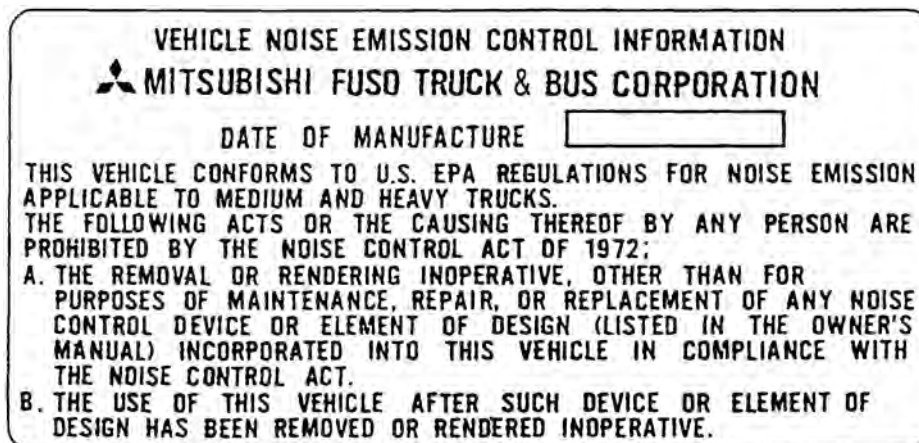
## NOISE REGULATIONS

The U.S. Environmental Protection Agency (EPA) has established noise emission standards applicable to medium and heavy trucks in excess of 10,000 lbs. GVWR manufactured after January 1, 1988 (40 CFR §205.52), requiring that they must conform to an 80 dB (A) maximum noise level when tested pursuant to EPA's test procedures.

Sterling Trucks are built in conformance with EPA Noise Emission Standards. Modified or altered vehicles may increase in noise emissions; compliance with applicable noise standards are the responsibility of the subsequent stage manufacturer.

A sample of Noise Emission Conformity Label is shown below. This label is affixed to all the vehicles when shipped from the factory.

DO NOT COVER OVER WITH ANY OTHER LABEL.



This label is affixed to the left-hand side door panel.

# **PART I**

## **GENERAL PRINCIPLES OF BODY AND EQUIPMENT MOUNTING**

# TABLE OF CONTENTS

|  |       |
|--|-------|
| 1. CLEARANCE BETWEEN THE MOUNTED BODY AND CHASSIS COMPONENTS .....                                   | I-1-1 |
| 1.1 Cab back .....   | I-1-1 |
| 1.2 Around engine .....  | I-1-2 |
| 1.3 Around transmission .....  | I-1-2 |
| 1.4 Above transmission .....   | I-1-3 |
| 1.5 Below transmission .....   | I-1-3 |
| 1.6 Behind transmission .....  | I-1-3 |
| 1.7 Front propeller shaft .....  | I-1-3 |
| 1.8 Rear propeller shaft .....   | I-1-3 |
| 1.9 Front axle, Rear axle, Steering linkage .....  | I-1-3 |
| 1.10 Brake hose (connected to the front and rear wheels) .....                                       | I-1-4 |
| 1.11 Fuel hose and other hoses .....   | I-1-4 |
| 1.12 Exhaust system .....  | I-1-4 |
| 1.13 Rear spring .....   | I-1-5 |
| 2. MOUNTING OF THE BODY FOR EASY INSPECTION, REMOVAL AND<br>INSTALLATION OF CHASSIS COMPONENTS ..... | I-2-1 |
| 2.1 Battery .....  | I-2-1 |
| 2.2 Fuel tank .....  | I-2-1 |
| 2.3 Rear fuel tank .....   | I-2-2 |
| 2.4 Rear spring .....  | I-2-4 |
| 3. CAUTION IN MODIFYING CHASSIS FRAMES .....   | I-3-1 |
| 3.1 Drilling frames (General) .....  | I-3-1 |
| 3.2 Drilling side rails .....  | I-3-1 |
| 3.3 Drilling crossmembers .....  | I-3-3 |
| 3.4 Welding to frame .....   | I-3-4 |
| 3.5 Extension of rear overhang .....   | I-3-5 |
| 3.6 Shortening or extending the frame within the wheelbase .....                                     | I-3-7 |
| 3.7 Reinforcement on side rail .....   | I-3-7 |
| 3.8 Mounting equipment on the side rail .....  | I-3-9 |
| 3.9 Others .....   | I-3-9 |
| 4. CAUTIONS IN MOUNTING A REAR BODY .....  | I-4-1 |
| 4.1 General cautions .....   | I-4-1 |
| 4.2 Sub-frame .....  | I-4-1 |
| 4.3 Attaching with U-bolts .....   | I-4-4 |
| 4.4 Mounting bracket .....   | I-4-5 |
| 4.5 Attaching of the rear combination lamps .....  | I-4-6 |

- 5. INSTALLING REAR FENDER AND MUD GUARD ..... I-5-1
  - 5.1 Installing rear fender ..... I-5-1
  - 5.2 Rear fender mud flap ..... I-5-1
  
- 6. ELECTRICAL WIRING ..... I-6-1
  - 6.1 Additional wiring ..... I-6-1
  - 6.2 Power source for electrical equipment of the body ..... I-6-3
  - 6.3 Installing switch and relay for specially equipped body ..... I-6-6
  - 6.4 Fuse Capacity Chart ..... I-6-7
  
- 7. REAR COMBINATION AND LICENSE PLATE LAMPS ..... I-7-1
  - 7.1 Rear combination lamps ..... I-7-1
  - 7.2 License plate lamp ..... I-7-1
  
- 8. BRAKE LINES ..... I-8-1
  - 8.1 Chassis tubing form and dimension specifications ..... I-8-1
  - 8.2 Making additional tubes ..... I-8-2
  - 8.3 Running additional lines ..... I-8-3
  
- 9. EXHAUST SYSTEM ..... I-9-1
  - 9.1 Modifying the exhaust system ..... I-9-1
  - 9.2 Clearance between exhaust system and other components ..... I-9-1
  
- 10. FUEL TANK ..... I-10-1
  - 10.1 Moving the fuel tank ..... I-10-1
  - 10.2 Fuel tubes ..... I-10-1
  - 10.3 Others ..... I-10-2
  
- 11. PAINTING ..... I-11-1
  - 11.1 Parts not to be painted ..... I-11-1
  - 11.2 Paint spot remover ..... I-11-1
  - 11.3 Cautions on drying after painting ..... I-11-1
  - 11.4 Main external rubber and plastic parts ..... I-11-2
  
- 12. A/T OIL COOLER ..... I-12-1
  - 12.1 Moving the A/T oil cooler ..... I-12-1

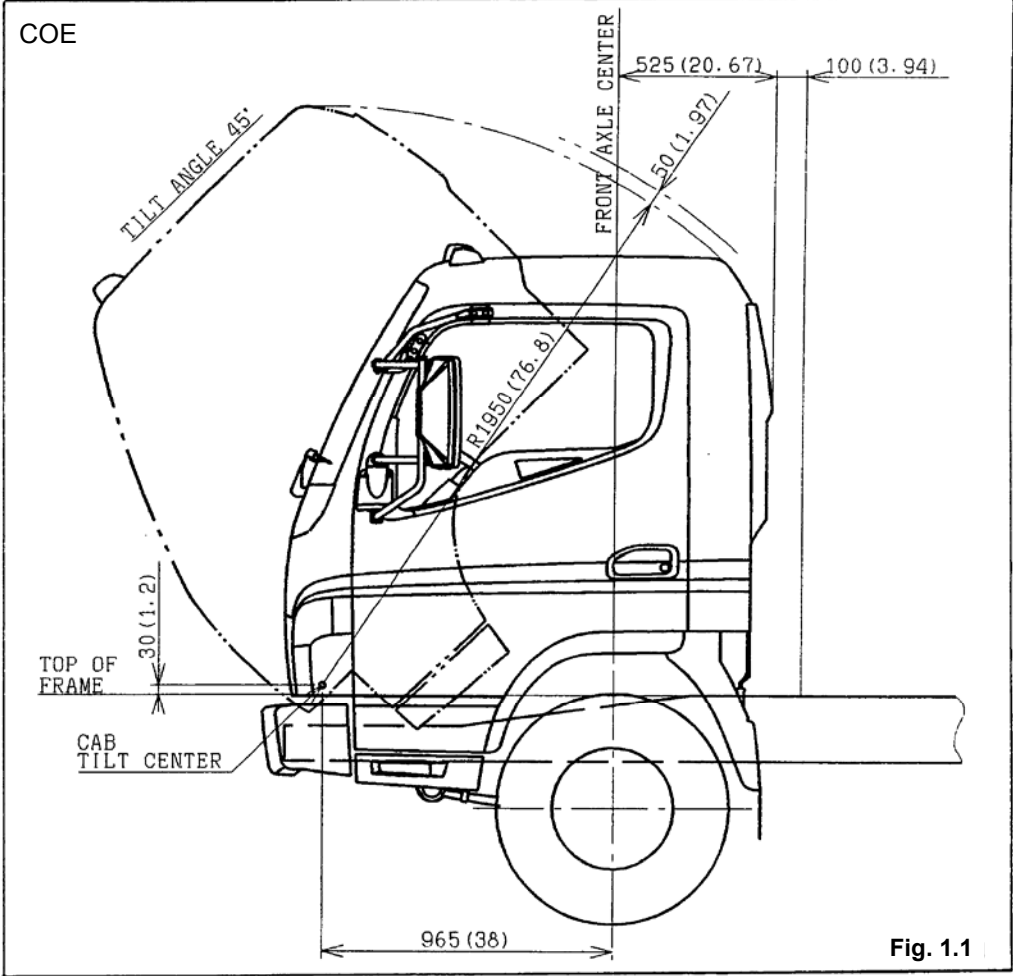
# STERLING 360

## OVERVIEW DESCRIPTION SUMMARY

| MODEL SERIES | VEHICLE MODEL | GVW lbs. (kg)     | WHEELBASE in. (mm) | TRANSMISSION |
|--------------|---------------|-------------------|--------------------|--------------|
| COE30        | COE30115A     | 14,050<br>(6,375) | 114.6<br>(2,910)   | AUTOMATIC    |
|              | COE30134A     |                   | 134.3<br>(3,410)   |              |
|              | COE30152A     |                   | 152.4<br>(3,870)   |              |
| COE45        | COE45115A     | 14,500<br>(6,575) | 114.6<br>(2,910)   |              |
|              | COE45134A     |                   | 134.3<br>(3,410)   |              |
|              | COE45152A     |                   | 152.4<br>(3,870)   |              |
|              | COE45176A     |                   | 176.0<br>(4,470)   |              |
| COE50        | COE50114A     | 17,995<br>(8,160) | 114.6<br>(2,910)   |              |
|              | COE50134A     |                   | 134.3<br>(3,410)   |              |
|              | COE50152A     |                   | 152.4<br>(3,870)   |              |
|              | COE50176A     |                   | 176.0<br>(4,470)   |              |
|              | COE50189A     |                   | 189.4<br>(4,810)   |              |

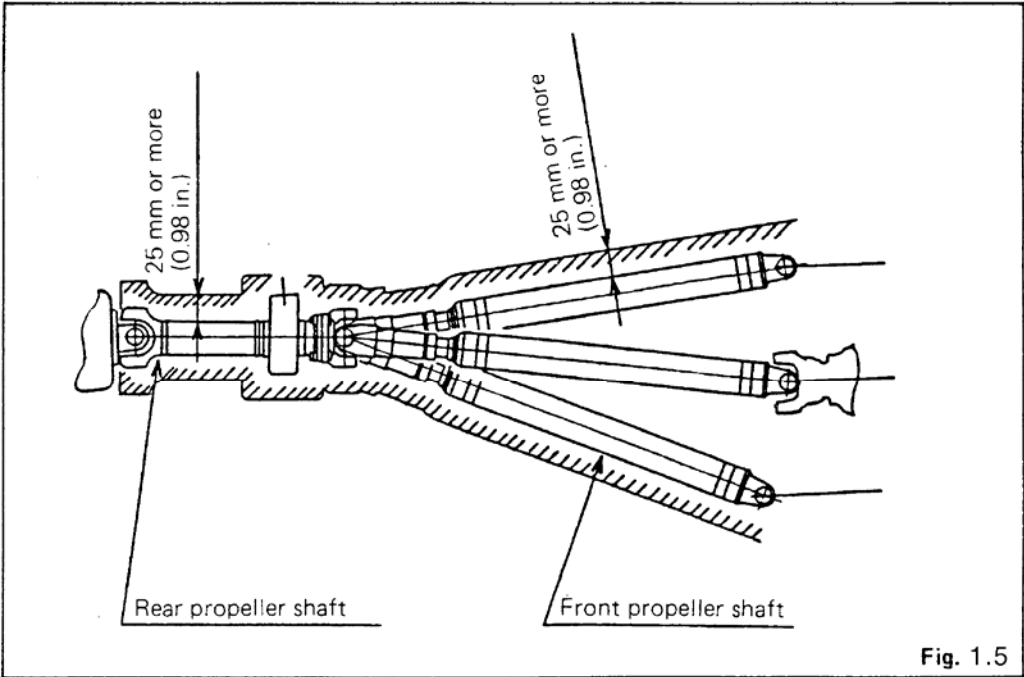
# 1. CLEARANCE BETWEEN THE MOUNTED BODY AND CHASSIS COMPONENTS

The clearance between the mounted body and chassis components should be greater than the values shown below. Pay attention to the position of the mounted body to facilitate the installation and removal of chassis components.

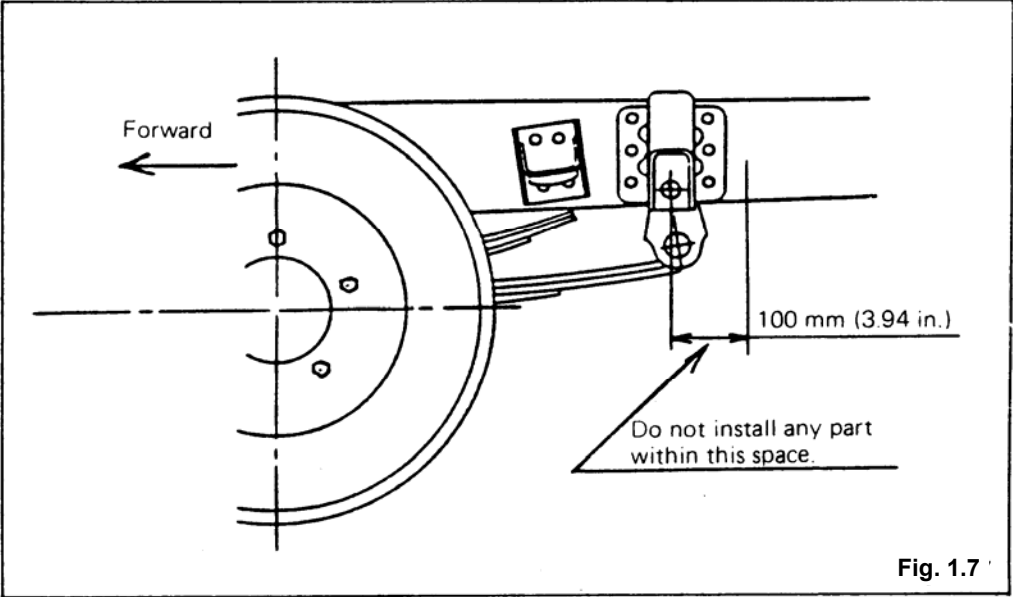
| Location                | Minimum Clearance and Related Cautions   |
|-------------------------|--|
| <p>1.1<br/>Cab back</p> | <p>(1) As the cab tilts, be sure to allow a minimum clearance of 50 mm (1.97 in.) between the cab and the mounted body above the cab.</p> <p style="text-align: right;">UNIT: mm (in.)</p>  <p style="text-align: right;">Fig. 1.1</p> <p>(2) Maintain a clearance of 100mm (3.94 in.) or more between the cab rear surface (rear window panel) and the rear body. Maintain adequate clearance around high heat producing components such as the turbocharger and related hardware. Take appropriate measures such as installation of heat insulation panels, if necessary.</p> <p>(3) When installing the body or equipment near the cab tilt lever (including the release lever), make sure the levers are not interfered with.</p> |

| Location                                 | Minimum Clearance and Related Cautions (Continued)  |
|--|---|
| <b>1.2</b><br><b>Around engine</b>       | Vertical direction: 40 mm (1.57 in.)<br>Horizontal direction: 30 mm (1.18 in.)  |
| <b>1.3</b><br><b>Around transmission</b> | <p>An area of 25 mm (0.98 in.) in circumference should be clear around the transmission to facilitate inspection, removal and installation, except where noted.</p> <div> </div> |
| <b>1.4</b><br><b>Above transmission</b>  | N/A   |
| <b>1.5</b><br><b>Below transmission</b>  | Do not install anything below the transmission so the oil pan can be removed when the transmission oil is changed. (A/T only. Refer to Fig. 1.4)  |
| <b>1.6</b><br><b>Behind transmission</b> | To facilitate transmission removal, allow a minimum clearance of 110 mm (4.33 in.) behind the transmission brake drum. (Refer to Fig. 1.4)  |



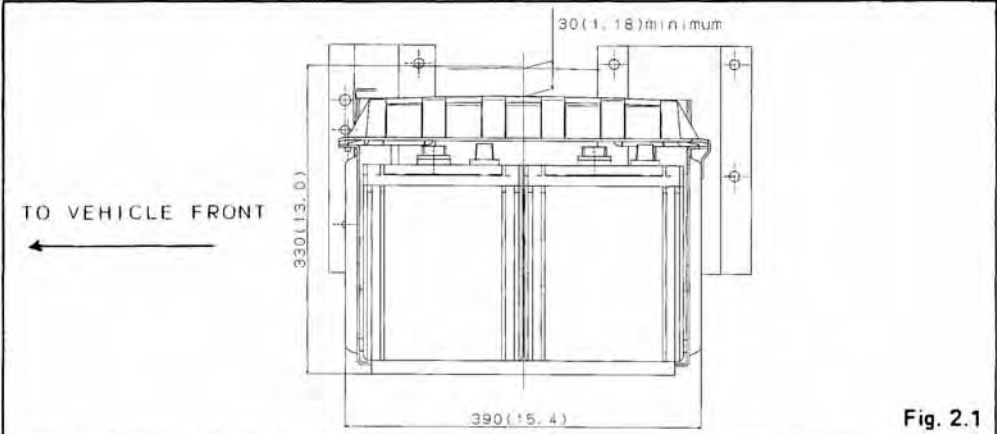
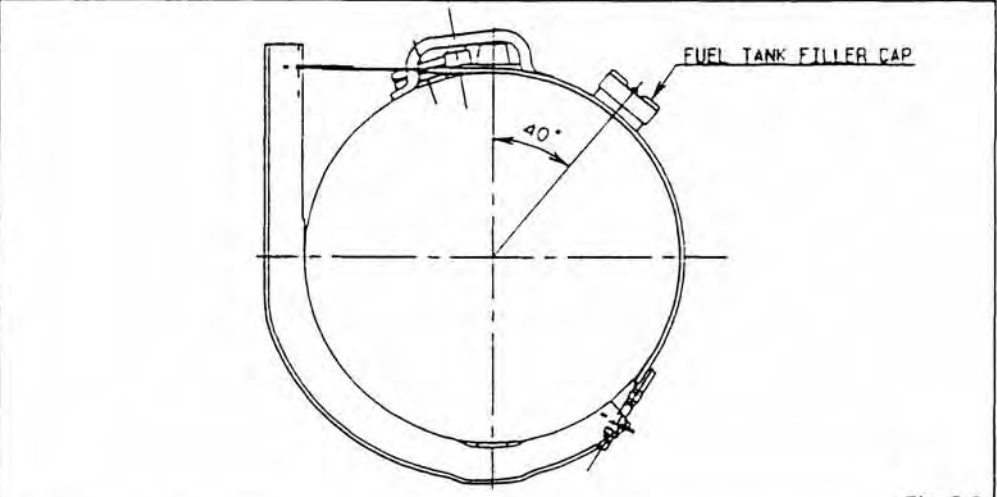
| Location  | Minimum Clearance and Related Cautions (Continued)  |
|---|---|
| <p><b>1.7</b><br/> <b>Front</b><br/> <b>propeller shaft</b></p>                               | <p>Maintain a clearance of 25 mm (0.98 in.) around the front portion of the propeller shaft. (Refer to Fig. 1.5)</p>  <p style="text-align: right;">Fig. 1.5</p> |
| <p><b>1.8</b><br/> <b>Rear</b><br/> <b>propeller shaft</b></p>                                | <p>Maintain a clearance of 25 mm (0.98 in.) around the propeller shaft at the rear axle location. (Refer to Fig. 1.5)</p>   |
| <p><b>1.9</b><br/> <b>Front axle,</b><br/> <b>Rear axle,</b><br/> <b>Steering linkage</b></p> | <p>Maintain a clearance greater than 25 mm (0.98 in.), the moving limits of these parts, from other parts or components.</p>  |

| Location  | Minimum Clearance and Related Cautions (Continued)   |
|---|--|
| <b>1.10</b><br><b>Brake hose</b><br><b>(connected to the front and rear wheels)</b> | Allow 50 mm (1.97 in.) more than the maximum possible extension of the hose during vehicle operation.  |
| <b>1.11</b><br><b>Fuel hose and other hoses</b>                                     | Maintain clearance of 40 mm (1.57 in.) from other parts or components.   |
| <b>1.12</b><br><b>Exhaust system</b>  | <p>(1) To avoid damage by heat from the exhaust pipe or the muffler, keep flammable parts of the mounted body away from such heat sources by 100 mm (3.94 in.) or more. (See 5.2 regarding mudguard rubber.) If impossible, adopt heat insulation measures such as installation of an insulation panel.</p> <div> <p>Measurement A should exceed 100 mm (3.94 in.)</p> <p><b>Fig. 1.6 (top to bottom, left to right)</b></p> </div> <p>(2) Do not mount any component near the exhausty pipe outlet.</p> <p>(3) When modifying the exhaust system, the clearance between the mounted parts and the exhaust system should conform to the specifications described in Section 9 "EXHAUST SYSTEM".</p> |

| Location                           | Minimum Clearance and Related Cautions (Continued)  |
|------------------------------------|---|
| <p><b>1.13</b><br/>Rear spring</p> | <p>Do not install any parts within 100 mm (3.94 in.) of the rear spring shackle.</p>  <p>The diagram shows a side view of a rear spring shackle assembly. On the left, a semi-circular spring is shown with a vertical dashed centerline. An arrow labeled 'Forward' points to the left. To the right of the spring, a shackle is attached to a frame. A dimension line indicates a 100 mm (3.94 in.) clearance zone between the shackle and the frame. A callout box with an arrow pointing to this zone contains the text: 'Do not install any part within this space.'</p> <p style="text-align: right;"><b>Fig. 1.7</b></p> |

## 2. MOUNTING THE BODY FOR EASY INSPECTION, REMOVAL AND INSTALLATION OF CHASSIS COMPONENTS

Following the notes below will allow serviceability of chassis mounted components.

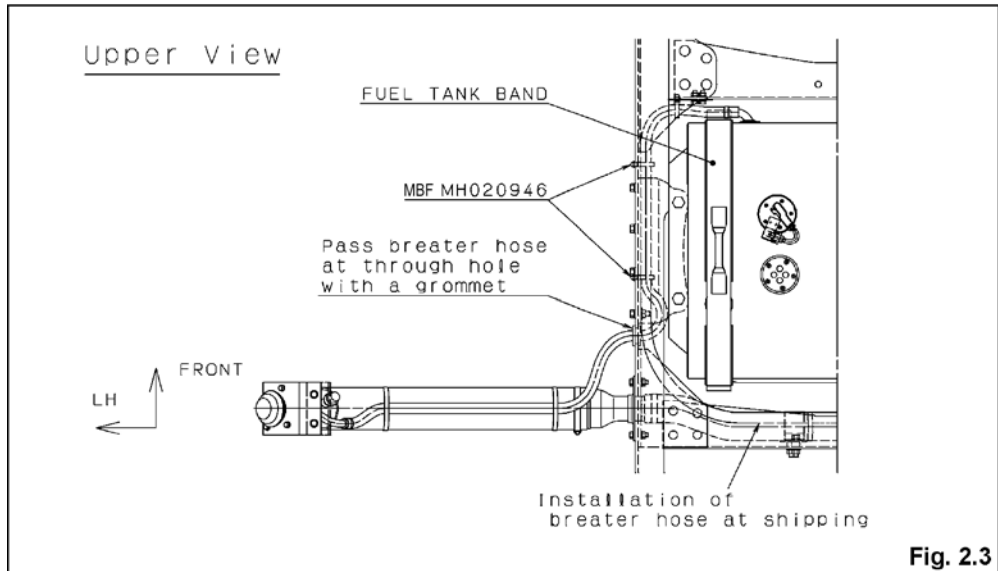
| Location                        | Cautions   |
|---------------------------------|--|
| <p><b>2.1</b><br/>Battery</p>   | <p>Position the rear body so the battery and cover can be inspected, removed and installed without difficulty.</p> <p style="text-align: right;">UNIT. mm (in.)</p> <div style="text-align: center;">  <p>TO VEHICLE FRONT<br/>←</p> <p>330 (13.0)</p> <p>30 (1.18) minimum</p> <p>390 (15.4)</p> <p style="text-align: right;">Fig. 2.1</p> </div>                                       |
| <p><b>2.2</b><br/>Fuel tank</p> | <p>Do not hinder the fuel filler and related parts. Make sure that the cap is positioned correctly when installed. Special attention must be paid to the arrangement of cross members of the rear body.</p> <p style="text-align: right;">UNIT. mm (in.)</p> <div style="text-align: center;">  <p>FUEL TANK FILLER CAP</p> <p>40°</p> <p style="text-align: right;">Fig. 2.2</p> </div> |

| Location                                    | Cautions (Continued)   |
|---|--|
| <p><b>2.3</b><br/><b>Rear fuel tank</b></p> | <p>Use care when installing the rear fuel tank piping. Do not let it interfere with the body.</p> <p>Do not allow foreign material to enter the fuel tank and related parts.</p> <p>Install all fuel hoses so that there is no slack, broken parts and make sure that the hose is free to accept fuel. Hose that is too long may be shortened if required.</p> <p>The temporary rubber cap <u>alpha pharma healthcare</u> on the fuel tank filler frame pass through must be removed.</p> <p>When inserting fuel filler hose MBF MK517156, make sure that the hose is completely against the seat (spool) of the filler pipe. Install in accordance with the illustration printed below. Make sure there is no interference with the breather hose.</p> <p>Remove the two tie wraps that temporarily hold the breather hose in the shipping position.</p> <p>Insert more than 20 mm of the breather hose MBF MK517155 to the filler end pipe and retain it using clamp # MBF MH021302.</p> <p>Position the breather hose using clamps MBF MH020946 to points indicated in the illustration below. Secure breather hose to the filler pipe using tie wraps # MBF ME292602 in two places. Refer to Fig. 2.3, Fig. 2.4 and indicated in PART II Section 12.4 "COE Model Series (Rear fuel tank)".</p> <p>The fuel filler end must be attached to the rear body structure. The rear body structure must be strong enough to support the weight of all components. The filler pipe must not be allowed to project beyond the side of the body.</p> <p>The fuel filler pipe MUST be located at least 6.654 in. (169 mm) above the height of the upper truck frame flange. This will allow satisfactory fill speed.</p> <p>Attach the fuel cap tether. See PART II Section 12.4 "COE Model Series (Rear fuel tank)".</p> <p>The air vent valve inclination must be approximately 25 degrees to vertical.</p> <p>Attach caution label MBF MK518283 where it will be easy to see.</p> <p>Inspect the system and insure that all attaching hardware is secure. Make sure there are no leaks or restrictions.</p> |

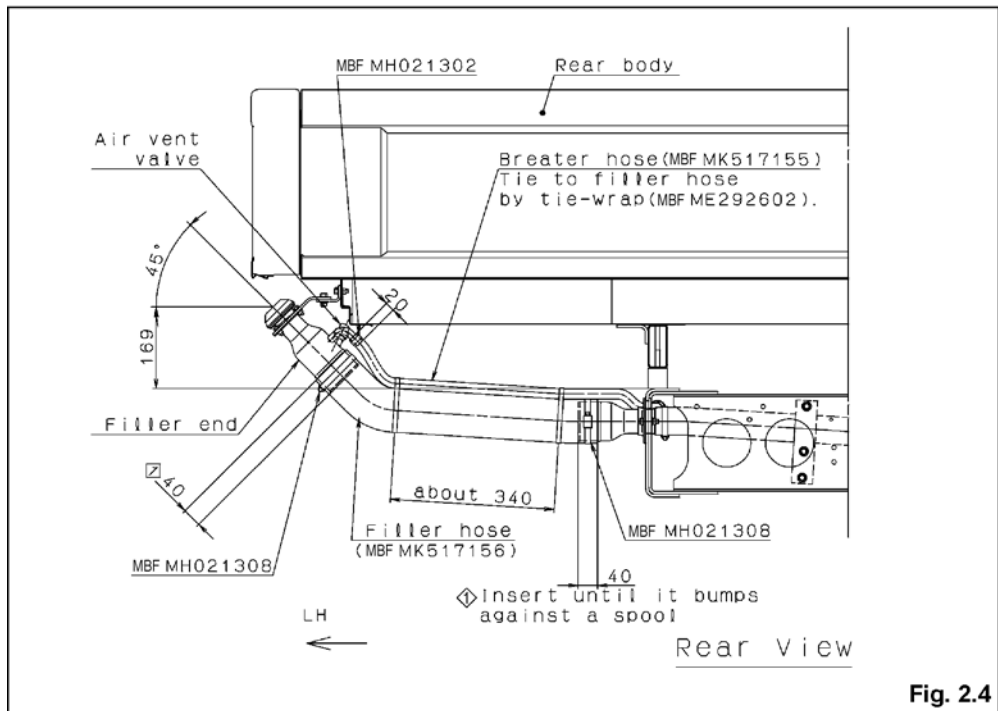
**Location**

**Cautions (Continued)**

**2.3  
Rear fuel tank  
(Continued)**

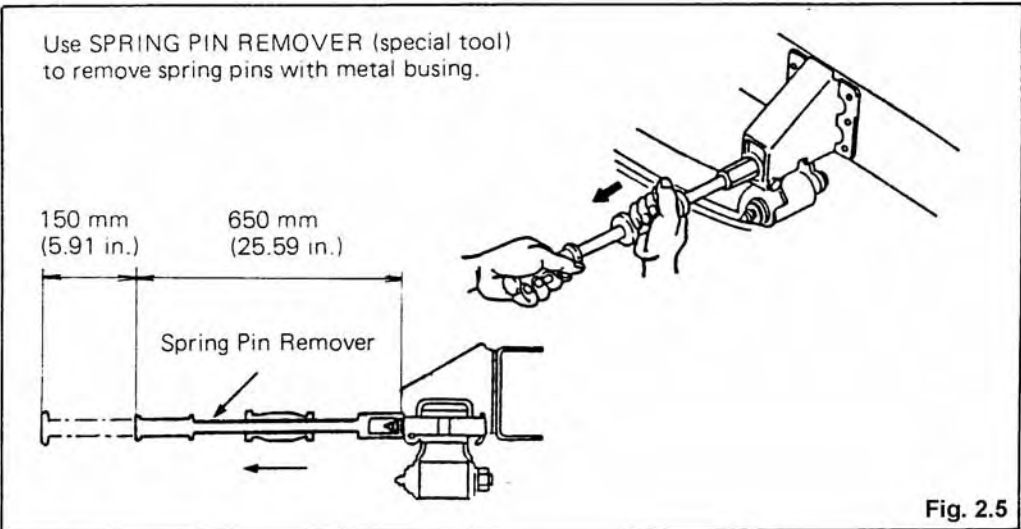


**Fig. 2.3**



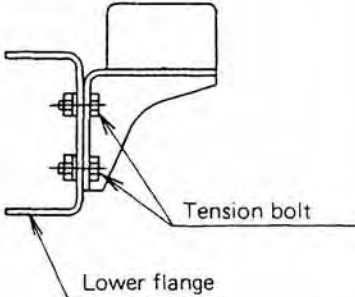
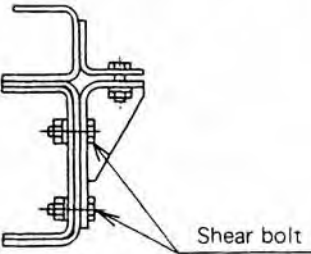
**Fig. 2.4**

| Part          | Tightening torque                   | Remarks                   |
|---------------|-------------------------------------|---------------------------|
| Screw of Clip | 3.9 ± 1.0 [N·m]<br>2.8 ± .7 lb.-ft. | -                         |
| Filler end    | 8 - 12 [N·m]<br>5.9 - 8.9 lb.-ft.   | With tether of filler cap |

| Location                          | Cautions (Continued)   |
|-----------------------------------|--|
| <p><b>2.4</b><br/>Rear spring</p> | <p>Allow adequate clearance around the rear spring pin area.</p> <p>Use SPRING PIN REMOVER (special tool) to remove spring pins with metal busing.</p>  <p style="text-align: right;">Fig. 2.5</p> |

### 3. CAUTION IN MODIFYING CHASSIS FRAMES

Modify the chassis frame according to the procedures described below.

| Modification   | Cautions  |                                    |               |                                    |                                      |                       |                        |
|--|---|------------------------------------|---------------|------------------------------------|--------------------------------------|-----------------------|------------------------|
| <b>3.1</b><br><b>Drilling frames</b><br><b>(General)</b> | (1) Use proper drills. Do not use tools such as a cutting torch to drill holes.<br>(2) Always chamfer the edges after drilling.   |                                    |               |                                    |                                      |                       |                        |
| <b>3.2</b><br><b>Drilling side rails</b>                 | (1) The hole diameters and center-to-center distance of holes should be as follows. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>Hole diameter</th> <th>Center-to-center distance of holes</th> </tr> </thead> <tbody> <tr> <td>Holes for tension bolt or shear bolt</td> <td>11 mm (0.43 in.) max.</td> <td>30 mm (1.18 in.)* min.</td> </tr> </tbody> </table> <p>Note*: Maintain the dimensions of previously drilled holes.</p> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="width: 45%;"> <p>Tension bolt<br/>(Bolts subject to tension)</p>  <p style="text-align: right;">Tension bolt</p> <p style="text-align: right;">Lower flange</p> <p style="text-align: right;"><b>Fig. 3.1</b></p> </div> <div style="width: 45%;"> <p>Shear bolt<br/>(Bolts subject to shearing force)</p>  <p style="text-align: right;">Shear bolt</p> <p style="text-align: right;"><b>Fig. 3.2</b></p> </div> </div> <p>(2) Do not drill holes in the upper flange.</p> <p>(3) Do not drill holes in the lower flange within the wheelbase.</p> <p>(4) Holes in the lower flange should be separated at least 200 mm (7.87 in.) from the crossmember, gusset end, and the spring hanger. (Refer to Fig. 3.4.)</p> <p>(5) The number of holes to be drilled in the lower flange must be one in the lateral direction of the flange, and it must be more than 25 mm (0.98 in.) from the free edge of the flange.</p> |                                    | Hole diameter | Center-to-center distance of holes | Holes for tension bolt or shear bolt | 11 mm (0.43 in.) max. | 30 mm (1.18 in.)* min. |
|  | Hole diameter   | Center-to-center distance of holes |               |                                    |                                      |                       |                        |
| Holes for tension bolt or shear bolt                     | 11 mm (0.43 in.) max.   | 30 mm (1.18 in.)* min.             |               |                                    |                                      |                       |                        |



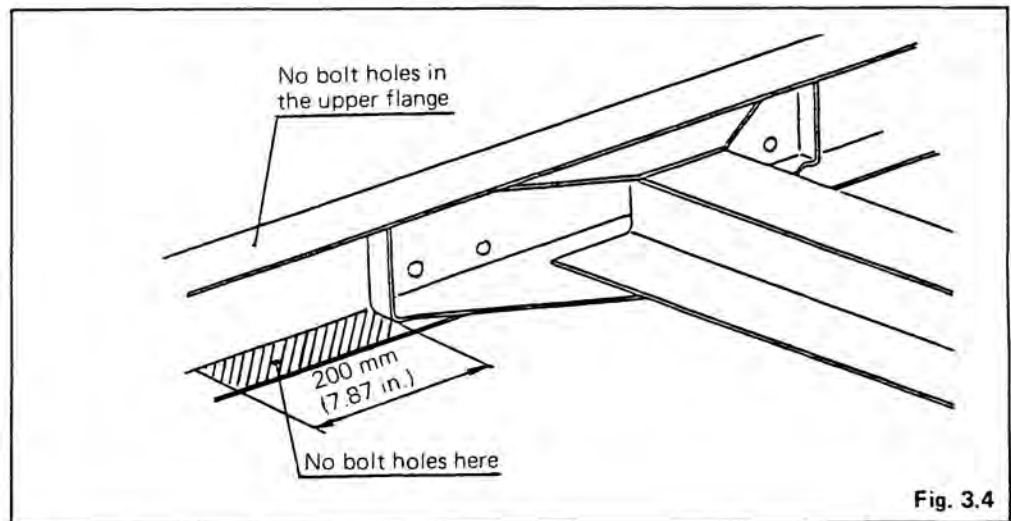
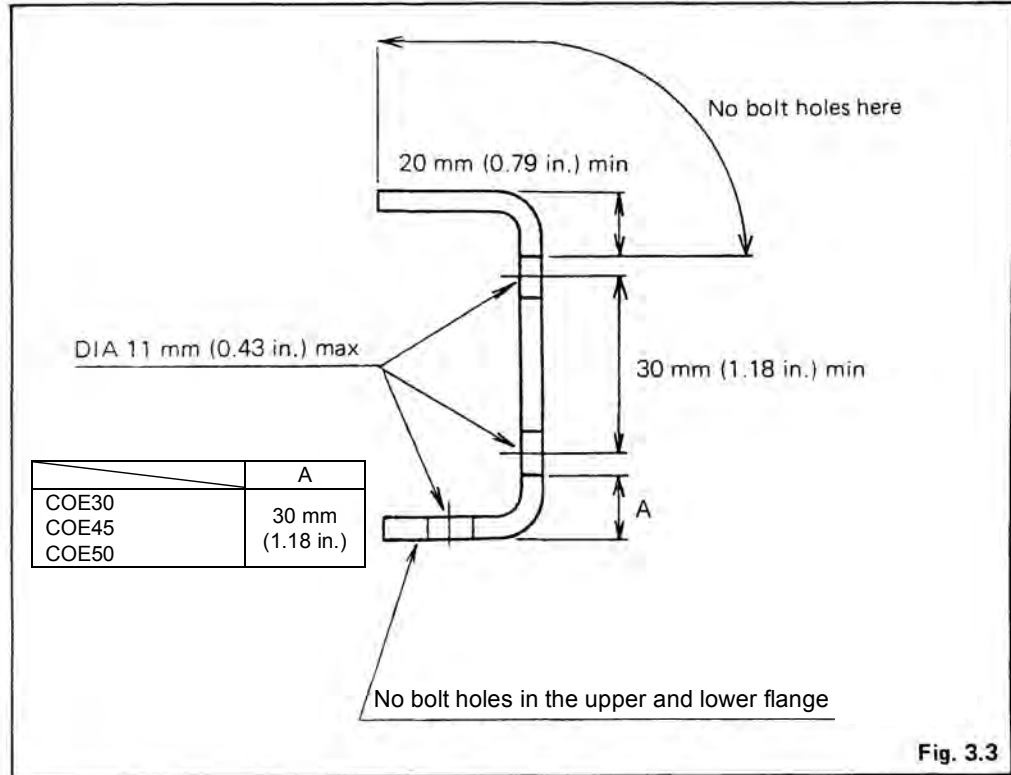
**Modification**

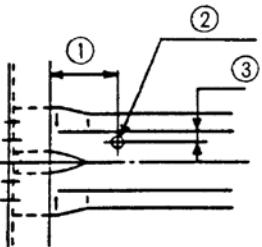
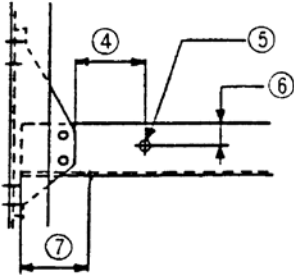
**Cautions (Continued)**

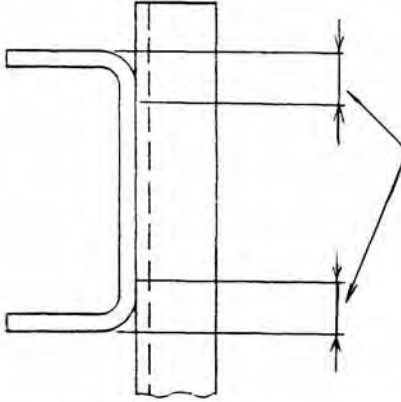
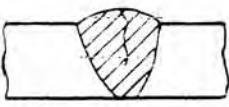
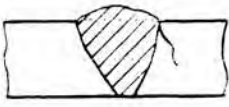
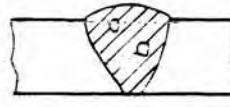
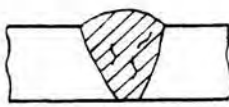
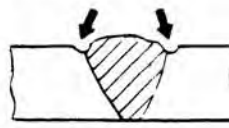
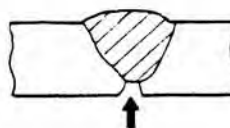
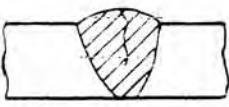
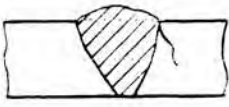
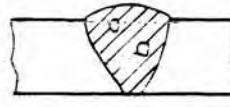
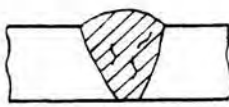
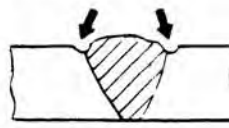
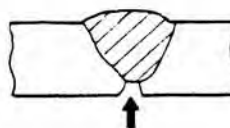
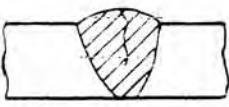
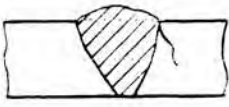
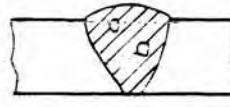
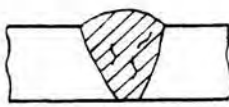
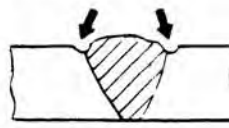
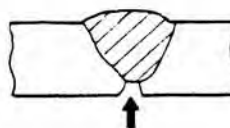
**3.2  
Drilling side rails  
(Continued)**


- (6) Do not drill holes within 20 mm (0.79 in.) from the curved part of the side rail, otherwise the bolt head may be within the radius of the curved surface of the channel.

UNIT: mm (in.)



| Modification   | Cautions (Continued)   |                                    |               |                                    |  |                      |                        |   |   |
|--|--|------------------------------------|---------------|------------------------------------|--|----------------------|------------------------|---|---|
| <p><b>3.3 Drilling crossmembers</b></p>  | <p>(1) The holes and distances between the holes should conform to the values specified in the chart below.</p> <table border="1"> <thead> <tr> <th>Crossmember type</th> <th>Hole diameter</th> <th>Center-to-center distance of holes</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>○ Alligator type (see Fig. 3.5)</li> <li>○ Channel type (see Fig. 3.6)</li> </ul> </td> <td style="text-align: center;">9 mm (0.35 in.) max.</td> <td style="text-align: center;">30 mm (1.18 in.)* min.</td> </tr> </tbody> </table> <p>Note*: Maintain the dimensions of previously drilled holes.</p> <p>(2) Holes should be more than 100 mm (3.94 in.) away from the end of the side rail flange or the end of the gusset.</p> <p>(3) Holes in the web of the channel type crossmember should be 50 mm (1.97 in.) min. from the end of the crossmember. (Refer to Fig. 3.6)</p> <p>(4) Holes in the flange should be more than 25 mm (0.98 in.) from the end.</p> <p>(5) Holes should be drilled more than 20 mm (0.79 in.) from the curved part of the flange.</p> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Alligator type</p>  <p style="text-align: center;">Fig. 3.5</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Channel type</p>  <p style="text-align: center;">Fig. 3.6</p> </div> </div> <div style="margin-top: 20px;"> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>① 100 mm (3.94 in.) min</p> <p>② DIA 9 mm (0.35 in.) max</p> <p>③ 25 mm (0.98 in.) min</p> </td> <td style="width: 50%; vertical-align: top;"> <p>④ 100 mm (3.94 in.) min</p> <p>⑤ DIA 9 mm (0.35 in.) max</p> <p>⑥ 25 mm (0.98 in.) min</p> <p>⑦ 50 mm (1.97 in.) min (Web surface)</p> </td> </tr> </table> </div> | Crossmember type                   | Hole diameter | Center-to-center distance of holes | <ul style="list-style-type: none"> <li>○ Alligator type (see Fig. 3.5)</li> <li>○ Channel type (see Fig. 3.6)</li> </ul> | 9 mm (0.35 in.) max. | 30 mm (1.18 in.)* min. | <p>① 100 mm (3.94 in.) min</p> <p>② DIA 9 mm (0.35 in.) max</p> <p>③ 25 mm (0.98 in.) min</p> | <p>④ 100 mm (3.94 in.) min</p> <p>⑤ DIA 9 mm (0.35 in.) max</p> <p>⑥ 25 mm (0.98 in.) min</p> <p>⑦ 50 mm (1.97 in.) min (Web surface)</p> |
| Crossmember type   | Hole diameter  | Center-to-center distance of holes |               |                                    |  |                      |                        |   |   |
| <ul style="list-style-type: none"> <li>○ Alligator type (see Fig. 3.5)</li> <li>○ Channel type (see Fig. 3.6)</li> </ul> | 9 mm (0.35 in.) max.   | 30 mm (1.18 in.)* min.             |               |                                    |  |                      |                        |   |   |
| <p>① 100 mm (3.94 in.) min</p> <p>② DIA 9 mm (0.35 in.) max</p> <p>③ 25 mm (0.98 in.) min</p>                            | <p>④ 100 mm (3.94 in.) min</p> <p>⑤ DIA 9 mm (0.35 in.) max</p> <p>⑥ 25 mm (0.98 in.) min</p> <p>⑦ 50 mm (1.97 in.) min (Web surface)</p>  |                                    |               |                                    |  |                      |                        |   |   |

| Modification  | Cautions (Continued)  |   |               |               |   |  |   |                    |               |                      |   |  |   |
|---|---|---|---------------|---------------|---|--|---|--------------------|---------------|----------------------|---|--|---|
| <p><b>3.4</b><br/>Welding to frame</p>  | <p>(1) Do not weld any part to the flange of the side rails. Welding on the lower flange within the wheelbase is strictly prohibited.</p> <p>(2) Do not weld anything within 20 mm (0.79 in.) of the curve in the side rail.</p> <div style="border: 1px solid black; padding: 10px;">  <p style="text-align: right;">No welding within<br/>20 mm (0.79 in.)<br/>of this part.</p> <p style="text-align: right;"><b>Fig. 3.7</b></p> </div> <p>(3) Do not weld any item to the frame to hold it temporarily.</p> <p>(4) Clean parts thoroughly with a wire brush and dry them off before welding.</p> <p>(5) Make sure the paint is completely removed, before welding a painted part.</p> <p>(6) Use a low hydrogen type welding electrode. The welding electrode absorbs moisture when it is used, so it is necessary to dry it thoroughly before use.</p> <p>(7) When welding, maintain the optimum welding speed and conditions for the preservation of the welding electrode.</p> <p>(8) Maintain the welding current at the optimum value for safety.</p> <p>(9) Avoid defects such as deposited metal cracking, toe crack, blow holes, slag inclusion, under cut, poor penetration, etc.</p> <div style="border: 1px solid black; padding: 10px;"> <p style="text-align: right;"><b>Fig. 3.8</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 5px;">(1) Deposited metal cracking</td> <td style="text-align: center; padding: 5px;">(2) Toe crack</td> <td style="text-align: center; padding: 5px;">(3) Blow hole</td> </tr> <tr> <td style="text-align: center; padding: 5px;"></td> <td style="text-align: center; padding: 5px;"></td> <td style="text-align: center; padding: 5px;"></td> </tr> <tr> <td style="text-align: center; padding: 5px;">(4) Slag inclusion</td> <td style="text-align: center; padding: 5px;">(5) Under cut</td> <td style="text-align: center; padding: 5px;">(6) Poor penetration</td> </tr> <tr> <td style="text-align: center; padding: 5px;"></td> <td style="text-align: center; padding: 5px;"></td> <td style="text-align: center; padding: 5px;"></td> </tr> </table> </div> | (1) Deposited metal cracking  | (2) Toe crack | (3) Blow hole |  |  |  | (4) Slag inclusion | (5) Under cut | (6) Poor penetration |  |  |  |
| (1) Deposited metal cracking  | (2) Toe crack   | (3) Blow hole   |               |               |   |  |   |                    |               |                      |   |  |   |
|  |   |  |               |               |   |  |   |                    |               |                      |   |  |   |
| (4) Slag inclusion  | (5) Under cut   | (6) Poor penetration  |               |               |   |  |   |                    |               |                      |   |  |   |
|  |   |  |               |               |   |  |   |                    |               |                      |   |  |   |

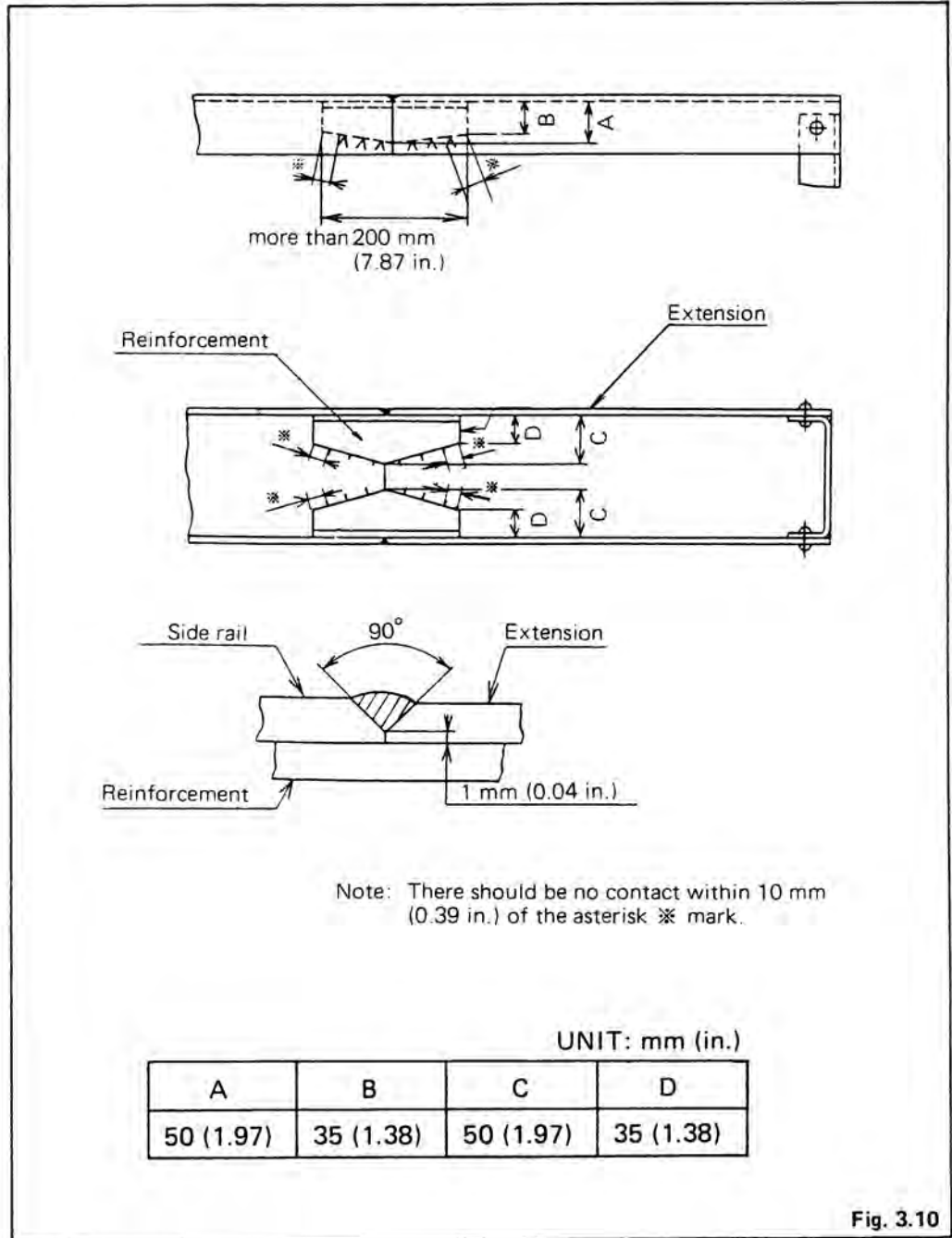
| Modification   | Cautions (Continued)  |
|--|---|
| <p><b>3.4</b><br/>Welding to frame<br/>(Continued)</p> | <p>(10) When connecting the ground cable of the arc welder, make sure to disconnect the negative terminal from the battery. The ground of the welder should be connected to the side rail near the welded part. Never connect around the engine, transmission, propeller shaft, front and rear axles, etc.</p> <p>(11) When performing welding work on the chassis, take proper measures to prevent the tubes, harnesses, rubber parts, springs, etc. from heat or spatter.</p> <p>(12) Do not cool parts off with water after welding.</p> <p><b>CAUTION</b>  _____</p> <p>Before performing electric or arc welding as part of vehicle repair operation, disconnect the negative (-) cable from the battery and the connector from the ECU. The earth cable of the welding machine should be connected to a point as close to the welding area as possible.</p>  |
| <p><b>3.5</b><br/>Extension of rear overhang</p>       | <p>Extension of the rear overhang may be required. Extension procedures are listed below.</p> <p>(1) Added material as an extension member.<br/>Use steel plates of SAPH440 (JIS) (SAE J410 950X or the equivalent) for the frame. The cross section form should be the same as that of the side rail rear end. The plate thickness should be 4.5 mm (0.18 in.)</p> <p>(2) Reinforcement material.<br/>Use the same SAPH440 (JIS) (SAE J410 950X or equivalent) for the frame. The plate thickness should be 3.2 mm (0.13 in.)–4.5 mm (0.18 in.).</p> <p>(3) Rear overhang extension</p> <p>(a) Added material length less than 300 mm (11.8 in.)<br/>Butt weld continuously from the outside as shown in Fig. 3.9, and finish the welded surface by grinding. No reinforcement is required for normal usage, but reinforcement should be added as shown in (3)-(b) in order to support heavy weights on the overhang extension.</p> <div> </div> <p style="text-align: right;"><b>Fig. 3.9</b></p> |

**Modification**

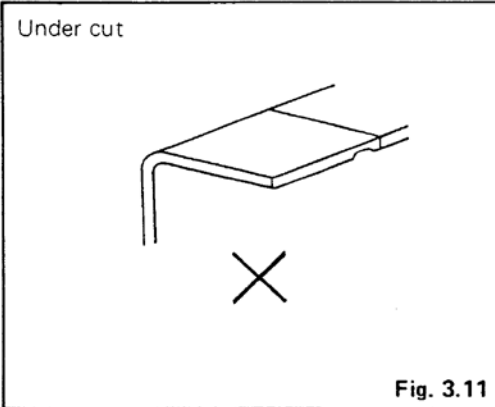
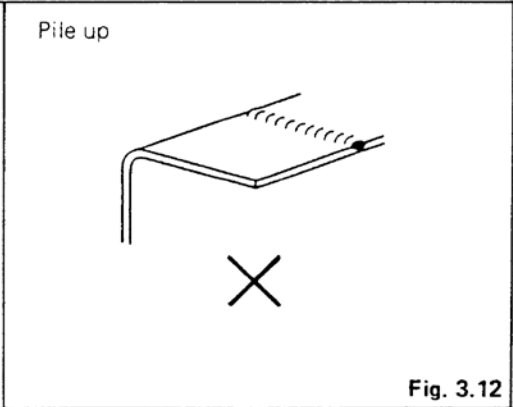
**Cautions (Continued)**

**3.5  
Extension of  
rear overhang  
(Continued)**

- (b) Added material length of 300 mm (11.8 in.) or more  
Attach reinforcement on the inside of the side rail as shown in Fig. 3.10.  
Butt weld the additional material and the side rail continuously, and  
then finish the welded surface by grinding.

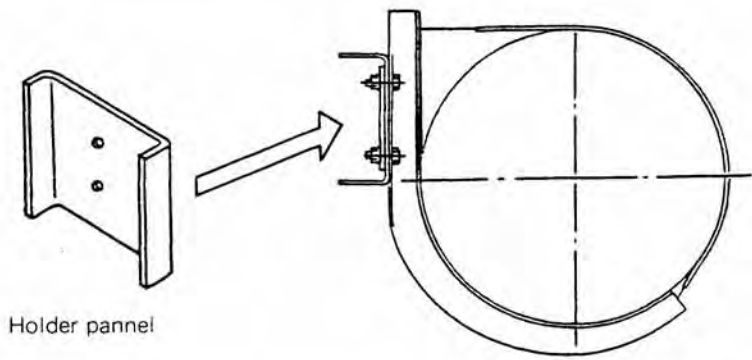
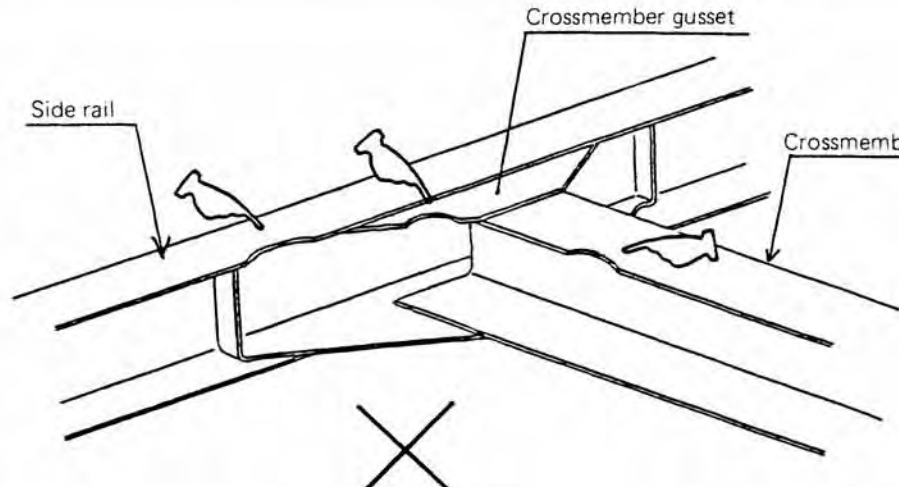


- (4) Exercise great care in welding the reinforcement to the lower face of the rear side rail where it is tapered.

| Modification   | Cautions (Continued)  |
|--|---|
| <p><b>3.5</b><br/> <b>Extension of rear overhang</b><br/> <b>(Continued)</b></p>     | <p>(5) Cautions for finishing the side rails<br/>           Be especially careful when finishing the flange end of the butt-welded side rails. Ensure a clean finish by grinding the weld so it is free of undercut, pileup or convexed bead.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Under cut</p>  <p>Fig. 3.11</p> </div> <div style="text-align: center;"> <p>Pile up</p>  <p>Fig. 3.12</p> </div> </div>  |
| <p><b>3.6</b><br/> <b>Shortening or extending the frame within the wheelbase</b></p> | <p>Frames should not be extended or shortened within the wheelbase because considerations for the propeller shaft length, balancing, position of center bearings, brake piping and harness length are required.<br/>           If this is unavoidable, contact Sterling Trucks for advice at #: 503/745-6822.</p>   |
| <p><b>3.7</b><br/> <b>Reinforcement on side rail</b></p>                             | <p>Avoid adding outside reinforcement to the side rail, as this can actually produce stress concentrations which cause cracks in the frame. If additional reinforcement is absolutely necessary, perform the procedures described below.</p> <ol style="list-style-type: none"> <li>(1) An L-shaped stiffener is recommended. The channel type stiffener should not be used as it produces a gap with the side rail flange.</li> <li>(2) Position the L-shaped stiffeners so the flange will be on the side of the side rail stress that receives the tension (the lower surface within the wheelbase and the upper side for the overhang).</li> <li>(3) Do not align the stiffener ends with the ends of the sub side rail that have already been installed. (Refer to Fig. 3.13)</li> <li>(4) Do not position the ends of the stiffener near stress concentration locations such as the rear surface of the cab, spring hangers, crossmember ends, etc.</li> <li>(5) Do not cut the outer stiffener ends vertically. They should be cut at an angle of less than 45°. (Refer to Fig. 3.13)</li> <li>(6) Attach the stiffeners and the side rail by riveting or plug welding on the web.</li> <li>(7) When drilling rivet holes, the outer stiffeners and side rails should be processed together. The difference between the rivet and hole diameters should be less than 0.7 mm (0.03 in.). The rivet holes should be separated from the side rail corners by 20 mm (0.79 in.).</li> </ol> |

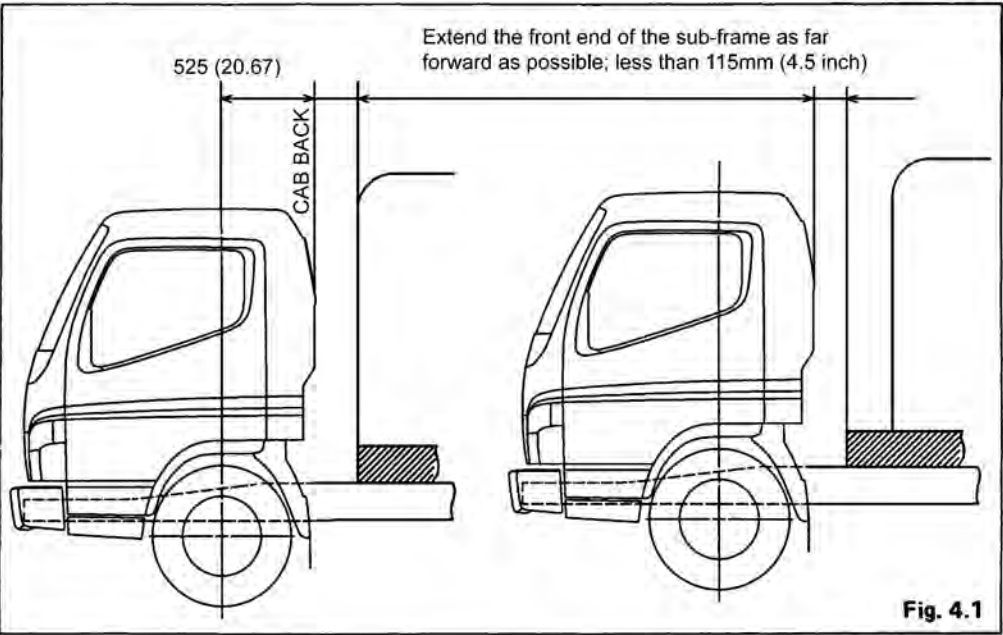
| Modification   | Cautions (Continued)  |
|--|---|
| <p><b>3.7 Reinforcement on side rail (Continued)</b></p> | <ul style="list-style-type: none"> <li>(8) Use rivets which have a 10 mm (0.39 in.) diameter. Arrange them in a zig-zag pattern.</li> <li>(9) Separate rivets and bolts at least 70 mm (2.76 in.) to prevent heat damage or distortion when they are plug welded.</li> <li>(10) Holes for plug welding should be at least 30 mm (1.18 in.) dia and arranged in a zig-zag pattern.</li> <li>(11) Position the end of the stiffeners 25 mm – 30 mm (0.98 in. – 1.18 in.) from the holes for rivets or plug welds.</li> <li>(12) The pitch for rivets and plug welds should be 70 mm – 150 mm (2.76 in. – 5.91 in.). Keep the pitch small near the edge of the stiffener.</li> <li>(13) Do not drill any additional holes in the side rail flange. Only use the holes which have been already drilled in the flange.</li> </ul> <div style="border: 1px solid black; padding: 10px; margin-top: 20px;"> <p>The diagram illustrates the reinforcement of a side rail. It shows a side rail with a front shackle hanger and a sub side rail. Rivets and plug welds are arranged in a zig-zag pattern. The pitch is specified as 70-150 mm (2.76-5.91 in.), with a note that the pitch at the end should be smaller. A 45-degree angle is indicated for the stiffener end. Cautions include: 'Do not align the stiffener end with the sub side rail.', 'Do not connect stiffener to the hanger.', and 'Do not position the end near a crossmember.' The rivet diameter is 10 mm (0.39 in.) or the plug weld diameter is 30 mm (1.18 in.), both arranged in a zig-zag pattern.</p> </div> <p style="text-align: right;"><b>Fig. 3.13</b></p> |



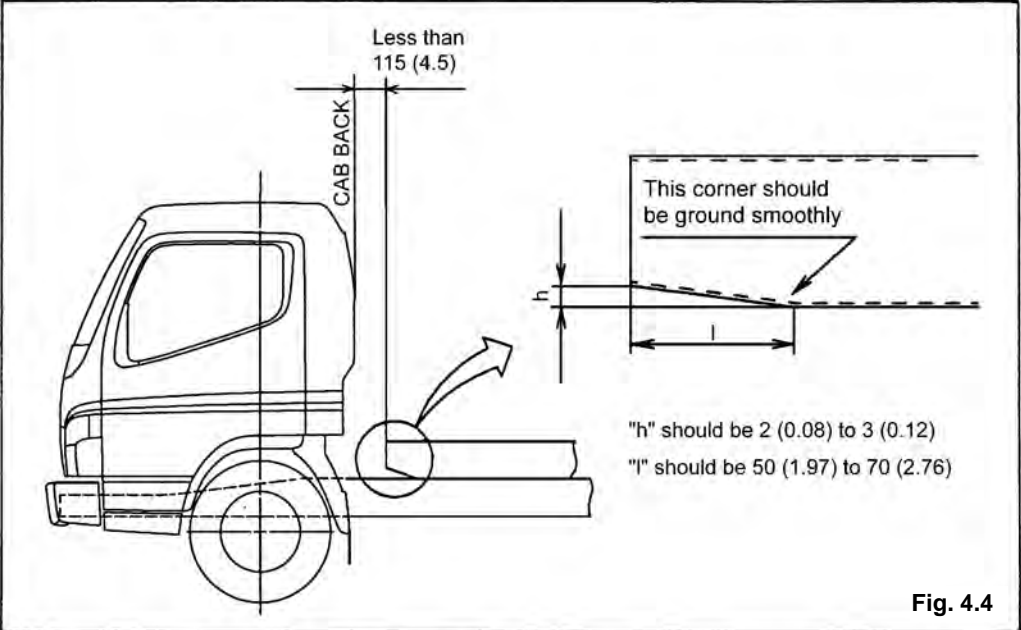
| Modification  | Cautions (Continued)   |
|---|--|
| <p><b>3.8</b><br/> <b>Mounting equipment on the side rail</b></p> | <p>(1) Attach a stiffener to the inside of the side rail as shown in Fig. 3.14 when installing bolts to support heavy components on the side rail overhang. This will prevent cracks in the frame due to resonance of the component if the static load caused by the weight of the component exceeds 100 kg. (220.5 lbs.) of force for each bolt.</p> <div style="border: 1px solid black; padding: 10px;"> <p>Example</p>  <p style="text-align: center;">Holder panel</p> <p style="text-align: right;">Fig. 3.14</p> </div> <p>(2) As a rule, avoid attaching additional equipment together with components (fuel tank, battery, etc.) which are already installed to the frame side. When this is absolutely necessary, increase the size of the bolts, or the number of bolt locations, to decrease the stress on each bolt.</p> |
| <p><b>3.9</b><br/> <b>Others</b></p>                              | <p>Never drill or grind any notches in the side rail, crossmember flange, or crossmember gusset.</p> <div style="border: 1px solid black; padding: 10px;">  <p style="text-align: center;">NO NOTCHES</p> <p style="text-align: right;">Fig. 3.15</p> </div>  |



## 4. CAUTIONS IN MOUNTING A REAR BODY

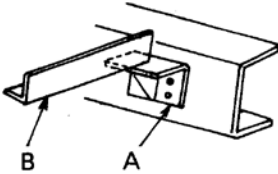
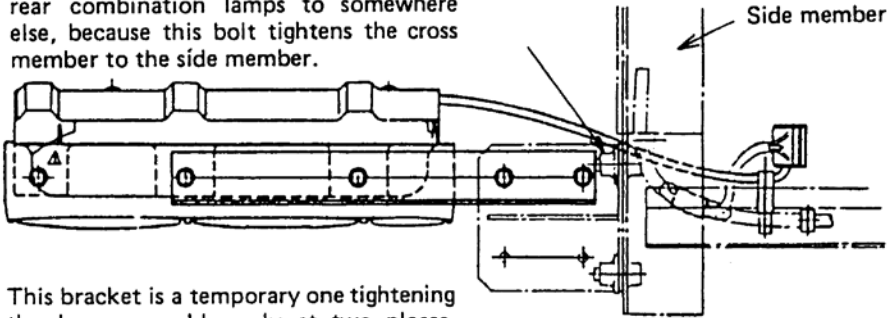
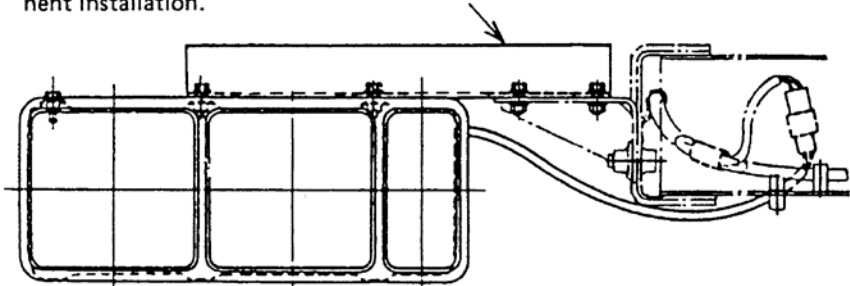
| Location                               | Cautions   |
|--|--|
| <p><b>4.1</b><br/>General cautions</p> | <p>(1) To ensure vehicle safety, reliability and maintenance, do not perform any of the following modifications or alterations to the chassis.</p> <ul style="list-style-type: none"> <li>(a) Cutting any part of the cab or welding anything to the cab.</li> <li>(b) Modifying any part related to the axle, steering, brake or propeller shaft.</li> <li>(c) Modifying brake hoses or vacuum lines. (Use Sterling replacement parts only.)</li> <li>(d) Making any modification to the chassis other than those described in this manual.</li> </ul> <p>(2) Make an effort to minimize the weight of the body mounting so that it will not jeopardize the strength or rigidity of the frame.</p> <p>(3) Be sure to install a sub-frame securely on the chassis frame so as to evenly distribute the load on the vehicle.</p> <p>(4) Do not modify the engine cooling system components, such as blocking the air intakes in the front bumper, or removing the radiator seal rubber, as it may result in decreased performance or engine damage.</p> <p>(5) Always observe any applicable law when modifying parts related to noise suppression, such as the muffler to exhaust pipes.</p> |
| <p><b>4.2</b><br/>Sub-frame</p>        | <p>(1) Install the sub-frame as shown in Fig.4.1 to gradually reduce the stress concentrations in the front end. The front end of the sub-frame should be installed as close to the rear of the cab as possible. Extend the sub-frame as far toward the cab as possible when the rear body is installed far from the cab.</p> <p style="text-align: right;">UNIT: mm (in.)</p>  <p style="text-align: right;"><b>Fig. 4.1</b></p>  |

| Location                                 | Cautions (Continued)  |
|--|---|
| <p>4.2<br/>Sub-frame<br/>(Continued)</p> | <p>(2) Examples of front-end shape of sub-frames</p> <p>(a) Install the sub-frame having the shape as shown in Fig. 4.2 to gradually reduce the stress concentrations in the front end. <span style="float: right;">UNIT: mm (in.)</span></p> <div> <p style="text-align: center;">Extend the front end of the sub-frame as far forward as possible; less than 115mm (4.5 inch)</p> <p style="text-align: center;">525 (20.67)</p> <p style="text-align: center;">CAB BACK</p> <p style="text-align: center;">H</p> <p style="text-align: center;">h</p> <p style="text-align: center;">h</p> <p style="text-align: center;">R<br/>DRILLING</p> <p style="text-align: center;">"1" must not be less than 2/3H<br/>(two thirds of "H")</p> <p style="text-align: center;">"h" should be between a fourth<br/>and a fifth of "H"</p> <p style="text-align: right;"><b>Fig. 4.2</b></p> </div> <p>(b) The shape of the sub-frame front end as shown in Fig. 4.2 is highly desirable. However, if there is enough room behind the cab, the shape as shown in Fig. 4.3 is also acceptable.</p> <div> <p style="text-align: center;">Less than 115 (4.5)</p> <p style="text-align: center;">CAB BACK</p> <p style="text-align: center;">H</p> <p style="text-align: center;">h</p> <p style="text-align: center;">h</p> <p style="text-align: center;">Left open</p> <p style="text-align: center;">Less than 30°</p> <p style="text-align: center;">"h" should be between a fourth<br/>and a fifth of "H"</p> <p style="text-align: center;">Cut off obliquely</p> <p style="text-align: right;"><b>Fig. 4.3</b></p> </div> |

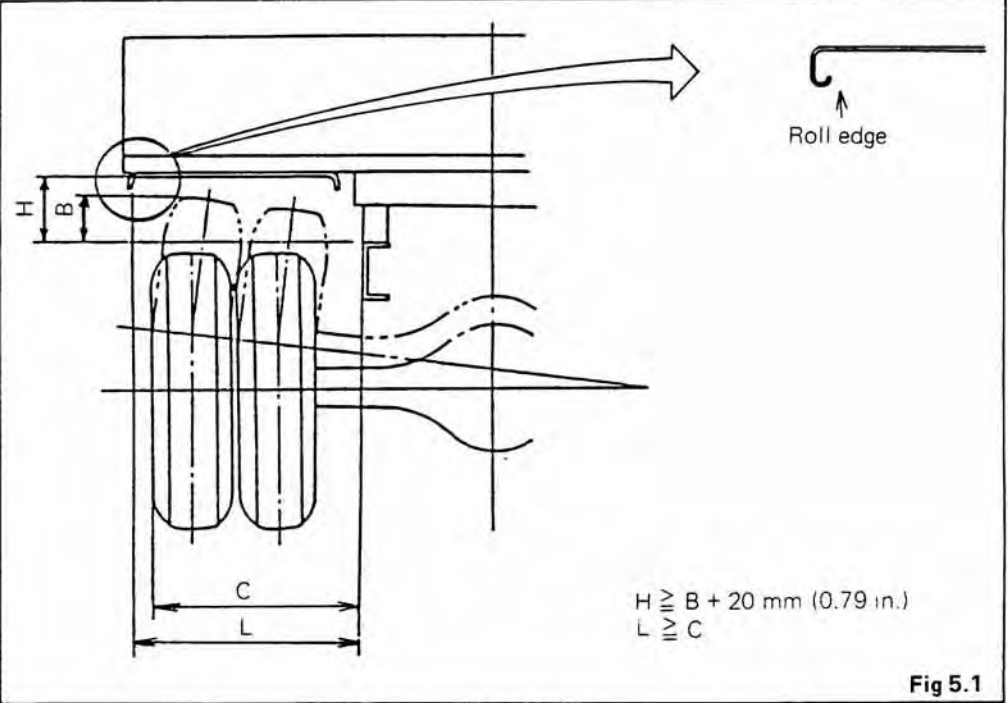
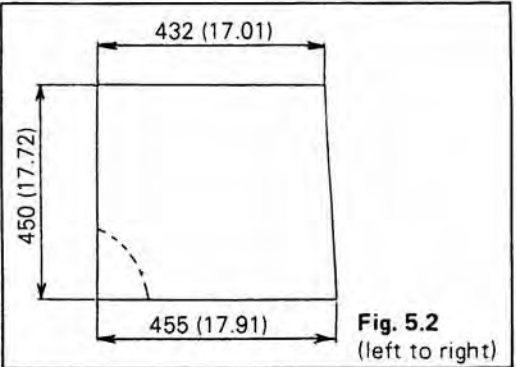
| Location                                 | Cautions (Continued)   |
|--|--|
| <p>4.2<br/>Sub-frame<br/>(Continued)</p> | <p>(c) If it is difficult to shape the front end of the sub-frame as described in Fig. 4.2 and Fig. 4.3, cut it to the shape as shown in Fig. 4.4 before installation.</p>  <p>Fig. 4.4</p> |

| Location                                 | Cautions (Continued)   |
|--|--|
| <p><b>4.3 Attaching with U-bolts</b></p> | <p>(1) Allow sufficient clearance so that the U-bolts for tightening sub-frames or main bolsters do not come in contact with pipes, hoses, wires and harnesses.</p> <p>(2) Do not install U-bolts at the taper-cut position of the sub-frames or main bolster.</p> <div> </div> <p style="text-align: right;"><b>Fig. 4.5</b></p> <p>(3) Place a wooden spacer inside the flange of the side rail to avoid bending when tightening the U-bolts.</p> <p>(4) Use metal spacers in locations subject to heat, such as near the muffler, or other places where it is difficult to place wooden spacers.</p> <div> </div> <p style="text-align: right;"><b>Fig. 4.6</b></p> |

| Location                               | Cautions (Continued)   |
|--|--|
| <p><b>4.4</b><br/>Mounting bracket</p> | <p>When U-bolts cannot be used with a particular body, use mounting brackets in those positions to attach it to the sub-frame. Use the following bracket locations and installation procedures.</p> <p>(a) Attach the mounting brackets to the chassis frame with bolts whenever possible, and follow the procedures described in Section 3, "CAUTION IN MODIFYING CHASSIS FRAMES". Be especially careful not to damage any pipes, hoses, and wiring harnesses attached to or around the frame.</p> <p>(b) Do not attach brackets close to the ends of crossmembers, gussets or stiffeners. Brackets should be installed at least 200 mm (7.87 in.) away from the end of these parts.</p> <div style="border: 1px solid black; padding: 10px;"> <p style="text-align: right;"><b>Fig. 4.7</b></p> </div> |

| Location   | Cautions (Continued)  |
|--|---|
| <p>4.5<br/>Attaching of<br/>the rear comb.<br/>lamps</p> | <p>Do not remove bracket A.<br/>Do not keep the rear comb. lamps on the bracket B. Please install them securely.</p>  <p style="text-align: right;">Fig. 4.10</p> <p>Never remove this bolt when moving the rear combination lamps to somewhere else, because this bolt tightens the cross member to the side member.</p>  <p style="text-align: right;">Side member</p> <p>This bracket is a temporary one tightening the lamp assembly only at two places. Use a more sophisticated one for permanent installation.</p>  <p style="text-align: right;">Fig. 4.11</p> |

## 5. INSTALLING REAR FENDER AND MUD GUARD

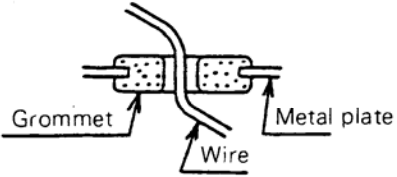
| Location                                     | Cautions   |
|--|--|
| <p><b>5.1</b><br/>Installing rear fender</p> | <p>(1) Install the rear fender so the clearance between the tire and the fender is as large as possible to compensate for bad operating conditions. The standard clearances "H" and "L", between the fender and the upper and side surfaces of the frame, are determined by the values "B" and "C" of the rear axle upper rebound limit indicated in PART II Section 11. "REAR AXLE BOUNCE HEIGHT".</p>  <p style="text-align: right;"><b>Fig 5.1</b></p> <p>(2) Roll over the rear fender edge on the outside to inside of the rear fender as shown in Fig. 5.1 to prevent cracks and maintain safety.</p> <p>(3) The outer edge of the fender should extend beyond outside of the tire.</p> |
| <p><b>5.2</b><br/>Rear fender mud flap</p>   | <p>(1) Standard dimensions of a mud flap are shown in Fig. 5.2.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>This figure is for use on the right side, but the left side is symmetrical.</li> <li>Please cut off the left bottom corner of the mudflap or add a bar to the mudflap to suppress fore-and-aft movement of the mudflap when the vehicle is in motion (see 1.12).</li> </ol> <p style="text-align: center;">UNIT: mm (in.)</p>  <p style="text-align: right;"><b>Fig. 5.2</b><br/>(left to right)</p>  |

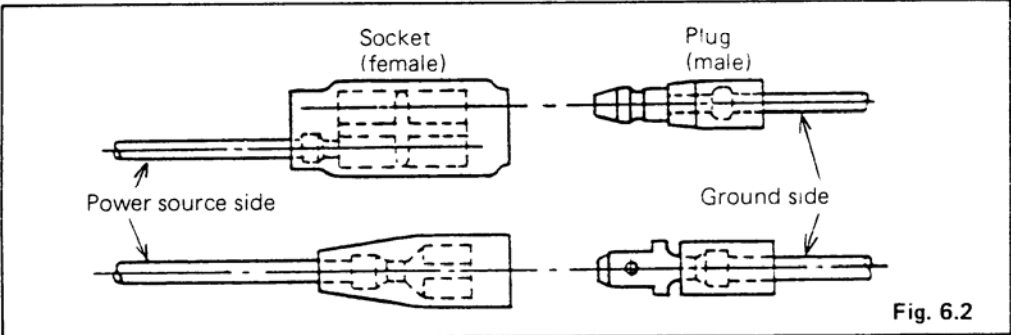
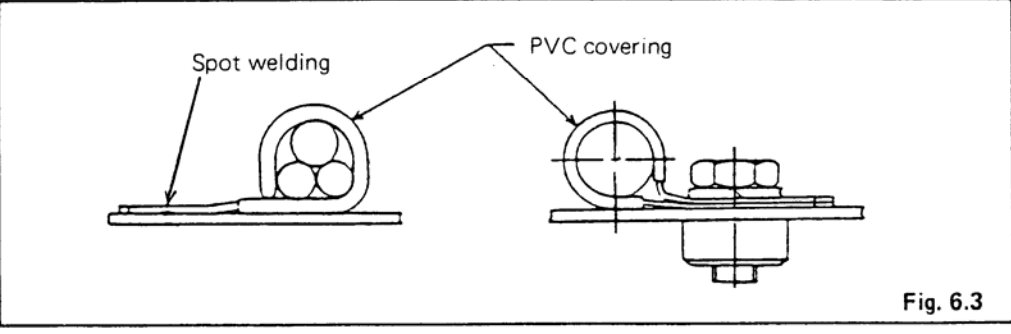
| Location  | Cautions (Continued)  |
|---|---|
| <p>5.2<br/>Rear fender<br/>mud flap<br/>(Continued)</p> | <p>(2) The standard installation dimensions are shown in Fig. 5.3, but they may be increased or decreased to improve splash protection or prevent entanglement in the wheels.<br/>Install a mud flap retaining board as shown in Fig. 5.4 to prevent the flaps from being caught in the wheels, especially for mud flaps which are longer than the specified standard.</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: right;">Fig. 5.3</p> </div> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: right;">Fig. 5.4</p> </div> |



## 6. ELECTRICAL WIRING

Follow the procedures described below when making additions or modifications to the electrical wiring to prevent fires and maintain safety of the brake systems.

| Location                    | Cautions  |
|-----------------------------|---|
| 6.1<br>Additional<br>wiring | <ol style="list-style-type: none"><li>(1) Use wires of the same gauge and color as the original wires when making wiring extensions.</li><li>(2) Connect wires securely by soldering or crimping terminals and then insulate them completely with tape or other material. Never attempt to connect wires by just twisting the stripped ends together.</li><li>(3) Do not use sulfuric acid for soldering.</li><li>(4) Do not extend or shorten the battery cables. In case of change of battery cable wiring due to the transfer of the battery, be sure not to make extension or shortening of the battery cables. Replace the cables with the ones with specified length.</li><li>(5) Be especially careful not to modify the type of clamps, location or slack of wiring connected to movable components between the starter and the frame.</li><li>(6) Wiring should be made along the rear body parts, the frame, etc., and never extend it individually in midair.</li><li>(7) Clamp all wires securely in locations away from moving parts or sharp corners on the chassis and body. Use grommets whenever routing wires through metal plates in order to prevent electrical short circuits due to installation damage. (Fig. 6.1)</li></ol> <div style="text-align: center;"><p>The diagram illustrates a wire being routed through a metal plate. A grommet is used to protect the wire from the sharp edges of the metal plate, preventing electrical short circuits. Labels include 'Grommet', 'Wire', and 'Metal plate'.</p></div> <p style="text-align: right;"><b>Fig. 6.1</b></p> |

| Location   | Cautions (Continued)  |          |           |          |          |                   |  |         |                   |  |
|--|---|----------|-----------|----------|----------|-------------------|--|---------|-------------------|--|
| <p>6.1<br/>Additional wiring<br/>(Continued)</p> | <p>(8) Wires should never pass along brake tubes or fuel lines. Observe the following clearances.</p> <table border="1"> <thead> <tr> <th>Wiring</th> <th>Clearance</th> <th>mm (in.)</th> </tr> </thead> <tbody> <tr> <td>Parallel</td> <td>10 (0.39) or more</td> <td></td> </tr> <tr> <td>Crossed</td> <td>20 (0.79) or more</td> <td></td> </tr> </tbody> </table> <p>(9) Position wires more than 200 mm (7.87 in.) away from parts which become extremely hot such as the exhaust pipe or muffler. Install a heat insulator if heat protection is necessary.</p> <p>(10) Gravel which is thrown up by the wheels can damage lamp wiring. Install metal covers to protect the wiring.</p> <p>(11) Tape wires together with the nearest chassis wiring harnesses if possible.</p> <p>(12) Route wires along the chassis harnesses that are already installed. Wires should be clamped with vinyl tape, and wrapped up widely with thin metal sheets (rubber or vinyl coated). Do not use weak vinyl tape that could fall off soon due to engine heat.</p> <p>(13) Wires connecting engine and transmission components should run along previously installed harnesses to allow them to absorb motion. Also allow adequate slack to prevent them from contacting other components.</p> <p>(14) When connecting plugs, place the female end in the power source side to prevent a short circuit to the body even if the terminal comes off.</p> <div>  <p>Diagram illustrating the correct connection of a plug and socket. The top part shows a plug connected to a socket with the power source side on the plug and ground side on the socket. The bottom part shows the reverse configuration.</p> <p>Fig. 6.2</p> </div> <p>(15) Use coated or protected tape when clamping wires.</p> <div>  <p>Diagram illustrating two methods of wire clamping. The left method shows spot welding of wires to a metal plate. The right method shows wires clamped to a metal plate with a nut and bolt, with PVC covering over the clamping area.</p> <p>Fig. 6.3</p> </div> | Wiring   | Clearance | mm (in.) | Parallel | 10 (0.39) or more |  | Crossed | 20 (0.79) or more |  |
| Wiring   | Clearance   | mm (in.) |           |          |          |                   |  |         |                   |  |
| Parallel   | 10 (0.39) or more   |          |           |          |          |                   |  |         |                   |  |
| Crossed  | 20 (0.79) or more   |          |           |          |          |                   |  |         |                   |  |

| Location   | Cautions (Continued)   |                  |                          |              |                 |                |                     |                   |                     |
|--|--|------------------|--------------------------|--------------|-----------------|----------------|---------------------|-------------------|---------------------|
| <b>6.1<br/>Additional<br/>wiring<br/>(Continued)</b>                       | <p>(16) Bonding or temporary clamps should be used only for additional support.</p> <p>(17) Use standard wiring clamp intervals as shown below:</p> <table border="1"> <thead> <tr> <th>Harness diameter</th> <th>Clamp intervals mm (in.)</th> </tr> </thead> <tbody> <tr> <td>5 (0.20) max</td> <td>300 (11.81) max</td> </tr> <tr> <td>5-10 (0.20-39)</td> <td>approx. 400 (15.75)</td> </tr> <tr> <td>10-20 (0.39-0.79)</td> <td>approx. 500 (19.69)</td> </tr> </tbody> </table> <p>(18) Wires may come in contact with edges of metal parts; increase the number of clamps and cover the edges with protectors to prevent damages due to vibrations.</p>  | Harness diameter | Clamp intervals mm (in.) | 5 (0.20) max | 300 (11.81) max | 5-10 (0.20-39) | approx. 400 (15.75) | 10-20 (0.39-0.79) | approx. 500 (19.69) |
| Harness diameter   | Clamp intervals mm (in.)   |                  |                          |              |                 |                |                     |                   |                     |
| 5 (0.20) max   | 300 (11.81) max  |                  |                          |              |                 |                |                     |                   |                     |
| 5-10 (0.20-39)   | approx. 400 (15.75)  |                  |                          |              |                 |                |                     |                   |                     |
| 10-20 (0.39-0.79)  | approx. 500 (19.69)  |                  |                          |              |                 |                |                     |                   |                     |
| <b>6.2<br/>Power source for<br/>electrical equip-<br/>ment of the body</b> | <p>Use only specified terminals as a power supply for lights and other electrical equipment. Do not add wires to previously installed wiring. Never increase the fuse capacity as this may cause fires due to excessive current flow.</p> <p>(1) Use the terminals described below for the power supply of additional lighting.</p> <p>(a) Connector locations</p> <p>CLEARANCE, IDENTIFICATION and SIDE MARKER LAMPS.</p> <ul style="list-style-type: none"> <li>- Chassis left side, back of the rear cab mount (Fig. 6.5) for front side ramps</li> <li>- Chassis rear crossmember (Fig. 6.5) for rear side ramps</li> </ul> <p>ii. OPTION (L) (used for an additional tail lamp)</p> <ul style="list-style-type: none"> <li>- Back side of the interior panel on the combination meter side. (Fig. 6.6)</li> </ul> <p>(b) The lighting switch inside the cab can be used to control any additional lighting.</p> <p>(c) The total permissible current of additional lighting is 7.6 amps. Refer to the "Fuse Capacity Chart" for further details. (See page I-6-6 and I-6-7)</p> |                  |                          |              |                 |                |                     |                   |                     |

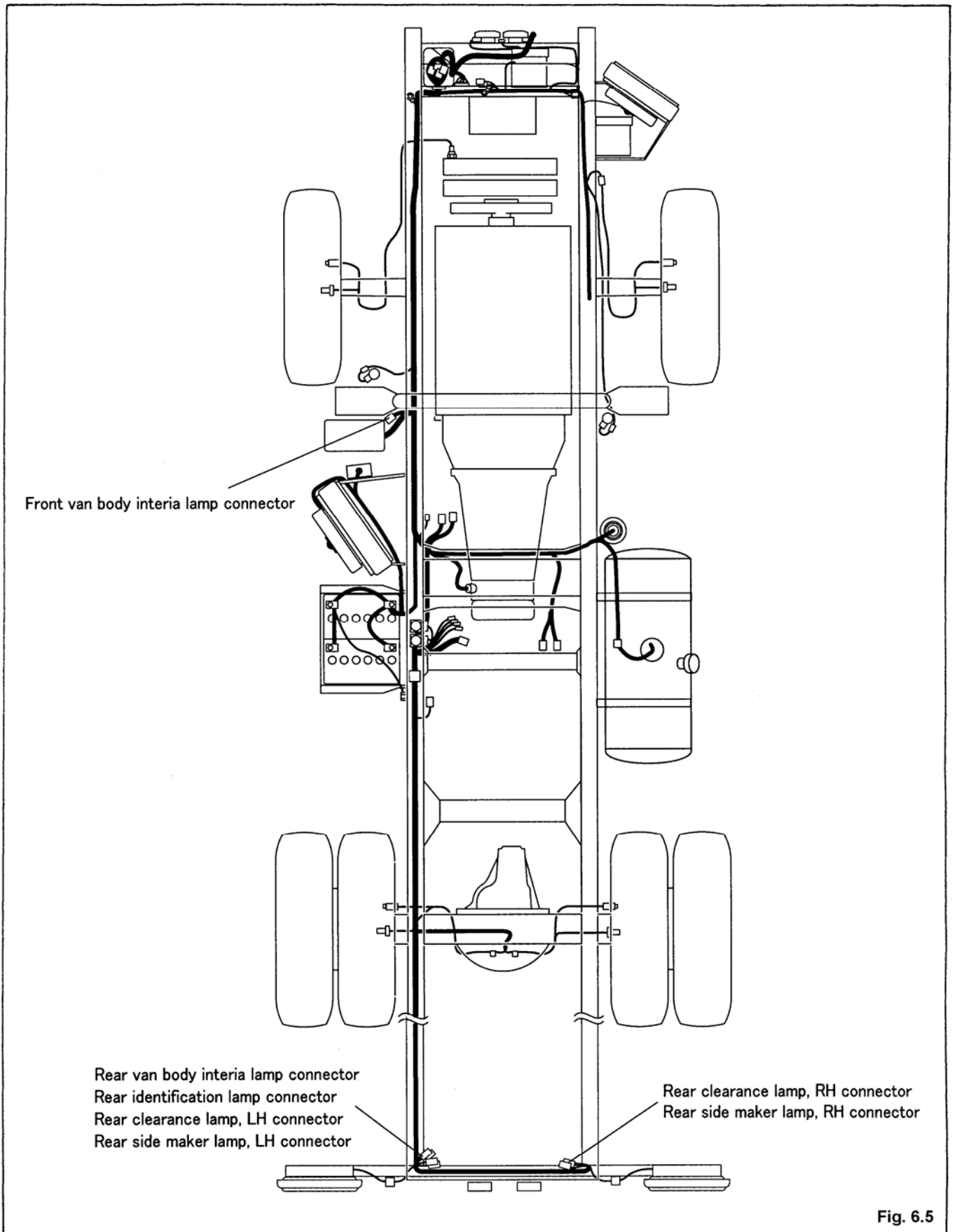
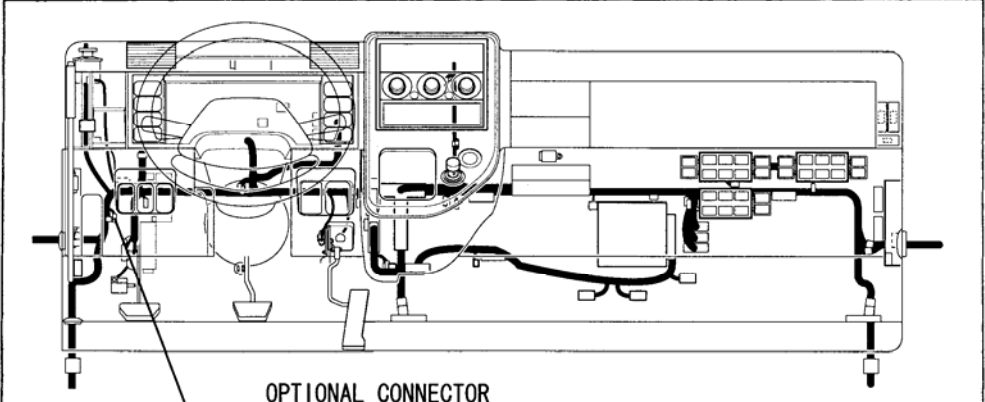
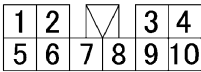
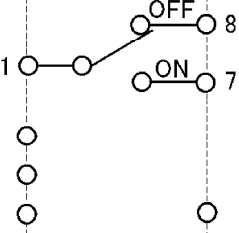

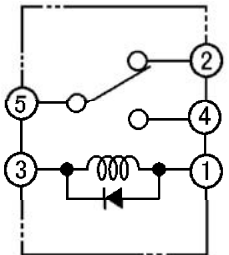
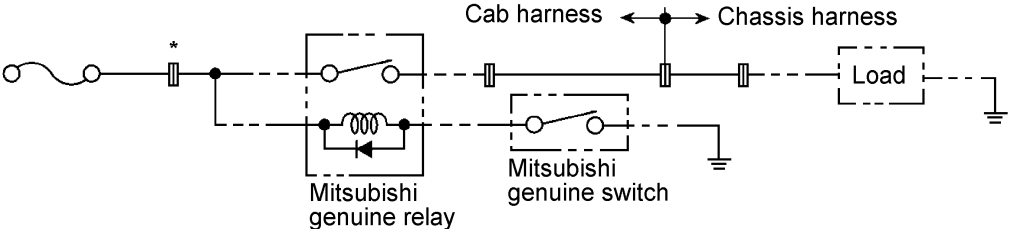


Fig. 6.5

| Location   | Cautions (Continued)  |       |      |   |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |
|--|---|-------|------|---|---|---|---|---|---|---|-----|---------|-------|------|---|------|-----|-----|---|-----|-----|-----|---|--------|---|---|---|------|-----|-----|---|-----|-----|----|---|---|---|---|---|---|---|---|---|---------|-----|---|
| <p>6.2<br/>Power source for electrical equipment of the Body (Continued)</p> | <p>(2) Use the terminals described below as a spare power supply for other types of electrical devices.</p> <p>(a) Connector locations</p> <ul style="list-style-type: none"> <li>i. OPTION (ACC) — Back side of the interior panel on the heater side. (Fig. 6.6)</li> <li>ii. FRONT VAN BODY INTERIOR LAMP — Chassis left side, back of the rear cab mount (Fig. 6.5)</li> <li>iii. REAR VAN BODY INTERIOR LAMP — Chassis rear crossmember (Fig. 6.5)</li> </ul> <p>(b) The OPTION (ACC) terminal is connected to the starter switch. The FRONT and REAR VAN BODY INTERIOR LAMP terminals are not connected to the starter switch.</p> <p>(c) The total permissible current is 3.95A for the VAN BODY INTERIOR LAMP terminal, and 4.97A for the OPTION (ACC).</p> <div style="text-align: center;">  <p>OPTIONAL CONNECTOR</p> <table border="1"> <tr> <td>1</td> <td>2</td> <td style="background-color: black;"></td> <td>3</td> </tr> <tr> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> </table> <table border="1"> <thead> <tr> <th>No.</th> <th>Circuit</th> <th>Color</th> <th>Fuse</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>BATT</td> <td>G-R</td> <td>10A</td> </tr> <tr> <td>2</td> <td>ACC</td> <td>W-R</td> <td>10A</td> </tr> <tr> <td>3</td> <td>GROUND</td> <td>B</td> <td style="text-align: center;">/</td> </tr> <tr> <td>4</td> <td>MAIN</td> <td>L-R</td> <td>10A</td> </tr> <tr> <td>5</td> <td>ILL</td> <td>Y-R</td> <td>5A</td> </tr> <tr> <td>6</td> <td>—</td> <td>—</td> <td style="text-align: center;">/</td> </tr> <tr> <td>7</td> <td>—</td> <td>—</td> <td style="text-align: center;">/</td> </tr> <tr> <td>8</td> <td>IDLE UP</td> <td>R-B</td> <td style="text-align: center;">/</td> </tr> </tbody> </table> </div> <p style="text-align: right;">Fig. 6.6</p> | 1     | 2    |   | 3 | 4 | 5 | 6 | 7 | 8 | No. | Circuit | Color | Fuse | 1 | BATT | G-R | 10A | 2 | ACC | W-R | 10A | 3 | GROUND | B | / | 4 | MAIN | L-R | 10A | 5 | ILL | Y-R | 5A | 6 | — | — | / | 7 | — | — | / | 8 | IDLE UP | R-B | / |
| 1  | 2   |       | 3    |   |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |
| 4  | 5   | 6     | 7    | 8 |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |
| No.  | Circuit   | Color | Fuse |   |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |
| 1  | BATT  | G-R   | 10A  |   |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |
| 2  | ACC   | W-R   | 10A  |   |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |
| 3  | GROUND  | B     | /    |   |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |
| 4  | MAIN  | L-R   | 10A  |   |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |
| 5  | ILL   | Y-R   | 5A   |   |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |
| 6  | —   | —     | /    |   |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |
| 7  | —   | —     | /    |   |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |
| 8  | IDLE UP   | R-B   | /    |   |   |   |   |   |   |   |     |         |       |      |   |      |     |     |   |     |     |     |   |        |   |   |   |      |     |     |   |     |     |    |   |   |   |   |   |   |   |   |   |         |     |   |

| Location   | Cautions (Continued) |  |   |  |  |
|--|----------------------|--|---|--|--|
| <b>6.3</b><br><b>Installing</b><br><b>switch and</b><br><b>relay for</b><br><b>specially</b><br><b>equipped body</b>   | Description          | Mitsubishi P/N   | Permissible current   | Connector (Harness side)   | Circuit diagram  |
|  | Toggle switch        | MK541358, laterally arranged switch (without lighting circuit)   | 2.0A or less  |    | Circuit diagram TYPE-B4 DIAGRAM<br> |
|  |                      | MK541359, longitudinally arranged switch (without lighting circuit)  | 2.0A or less  | Connector type AK10A (MH056885)  |  |
| Relay  | MK420480             | Terminals ⑤ - ④ (Normally open end): 20A or less<br><br>Terminals ⑤ - ② (Normally closed end): 10A or less | <br><br>Connector type EQ5A (MH059820) | <br><br>Terminal ③: Power supply<br>Terminal ①: Ground |  |
| <p>Notes:</p> <ol style="list-style-type: none"> <li>1. Be sure to add the relay to the circuit before the switch for specially equipped body and avoid applying the load current to the switch since the switch can carry less permissible current (2.0A).</li> <li>2. The permissible current for the relay is as shown in the above table. Do not connect any loads which exceed the standard value.</li> <li>3. Typical connection diagram</li> </ol>  <p style="text-align: center;">Marked with * : Points from which the current is taken off.<br/>       ---- : Added wiring</p> |                      |  |   |  |  |

## 6.4 Fuse Capacity Chart

### High-current fuse box

| Fuse No. | Main load                          | Capacity |
|----------|------------------------------------|----------|
| FH1      | Fuse box (S1, A1 to A5, M1 to M12) | 60A      |
| FH2      | Fuse box (B1 to B12)               | 60A      |
| FH3      | Fuse box (B13 to B16)              | 40A      |
| FH5      | Hydraulic booster                  | 60A      |
| FH7      | ABS motor                          | 40A      |
| FH8      | ABS solenoid                       | 40A      |
| B25      | Tail lamp                          | 15A      |
| B27      | Horn                               | 10A      |
| B28      | Air-conditioner                    | 10A      |
| B29      | Condenser fan                      | 25A      |
| B30      | Blower fan                         | 30A      |
| B33      | Van body dome light                | 10A      |
| B34      | ATF cooler fan                     | 20A      |
| B36      | Engine electronic drive unit       | 20A      |
| BATT1    | Alternator                         | 120A     |
| BATT2    | Alternator                         | 120A     |

ABS: Anti-lock brake system

ATF: Automatic transmission fluid

**Fuse box**

| Fuse No. | Main load                      | Capacity |
|----------|--------------------------------|----------|
| A1       | Cigar lighter                  | 15A      |
| A2       | Audio                          | 10A      |
| A4       | Opt (ACC)                      | 10A      |
| B1       | Stop lamp                      | 15A      |
| B2       | Meter                          | 10A      |
| B3       | Turn signal lamp               | 15A      |
| B4       | Opt (B)                        | 10A      |
| B5       | Audio                          | 10A      |
| B6       | Cab lamp                       | 10A      |
| B7       | Power window (driver)          | 30A      |
| B8       | Power window (assistant)       | 30A      |
| B9       | Engine electronic control unit | 20A      |
| B11      | Mirror heater                  | 20A      |
| B12      | Automatic transmission         | 10A      |
| B13      | Tester                         | 15A      |
| B14      | Headlamp (HI)                  | 20A      |
| B15      | Headlamp (LH/LO)               | 20A      |
| B16      | Headlamp (RH/LO)               | 20A      |
| M1       | Backup lamp                    | 10A      |
| M2       | Meter                          | 10A      |
| M3       | Wiper                          | 15A      |
| M4       | Opt (M)                        | 10A      |
| M5       | Relay control                  | 10A      |
| M6       | Automatic transmission         | 10A      |
| M8       | Exhaust brake                  | 10A      |
| M9       | Engine electronic control unit | 5A       |
| M11      | ABS                            | 10A      |
| S1       | Starter                        | 10A      |

**Diagnosis fuse**

| Fuse No.  | Main load    | Capacity |
|-----------|--------------|----------|
| A/T       | Diagnosis    | 5A       |
| A/T       | Memory clear | 10A      |
| ABS       | Diagnosis    | 5A       |
| ABS       | Memory clear | 10A      |
| Engin ECU | Diagnosis    | 5A       |
| Engin ECU | Memory clear | 10A      |

ABS: Anti-lock brake system  
A/T: Automatic transmission  
ECU: Electronic control unit

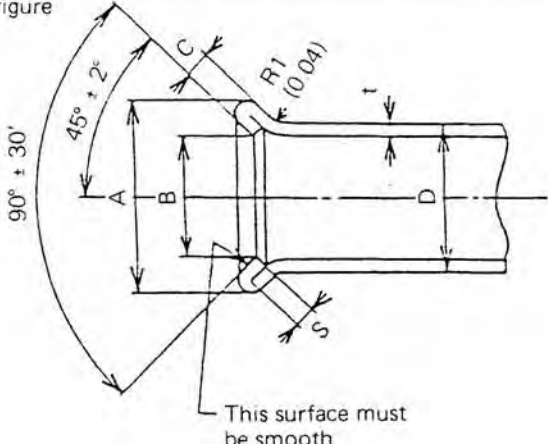


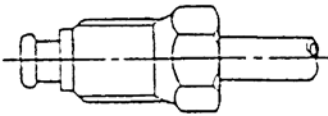
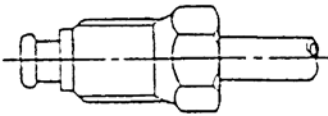
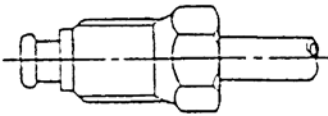
## 7. REAR COMBINATION AND LICENSE PLATE LAMPS

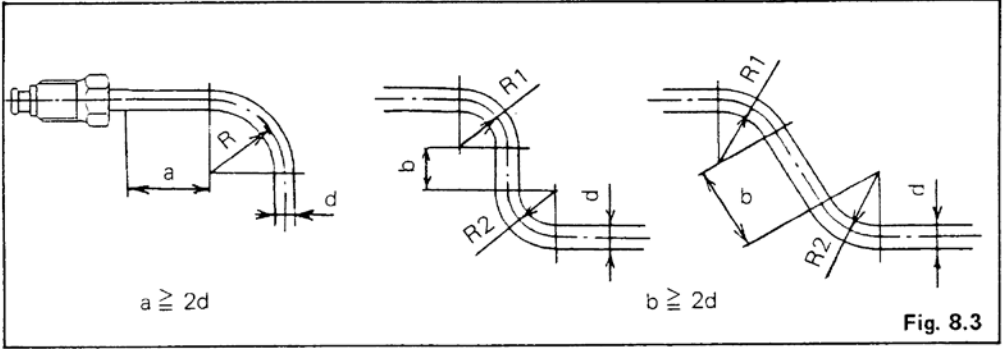
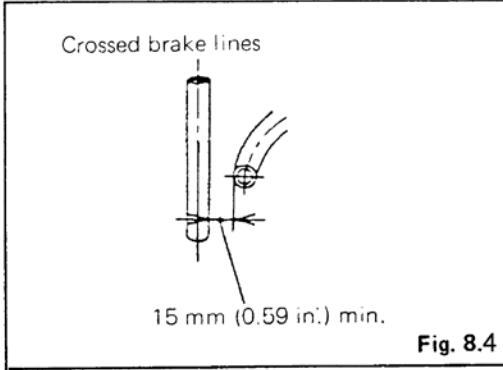
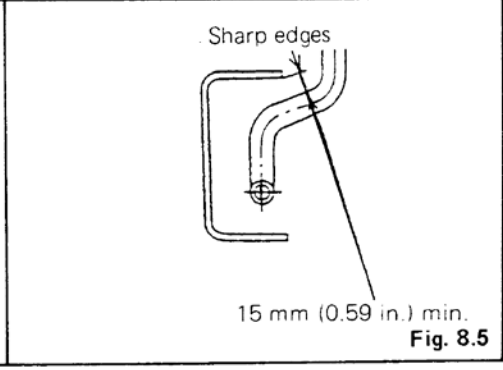
| Location                                     | Cautions   |
|--|--|
| <p><b>7.1</b><br/>Rear combination lamps</p> | <p>(1) Use the rear combination lamps and license plate lamps which have been installed as standard equipment, but don't use the original bracket holding the lamps.</p> <p>(2) Installation dimensions for the rear combination lamps are shown in Fig.7.1.</p> <div> <p>The diagram, labeled Fig. 7.1, illustrates the rear view of a vehicle's lamp assembly. It shows a rear crossmember with a license plate lamp mounted centrally. On either side of the crossmember are rear combination lamps. Each combination lamp contains a turn signal lamp, a tail &amp; stop lamp, and a back-up lamp. A reflex reflector is positioned behind the license plate lamp. The diagram includes several key dimensions and labels:         <ul style="list-style-type: none"> <li>A vertical dimension on the left indicates a height of 60 in. (1.52 m) from the ground surface to the top of the rear combination lamps.</li> <li>A vertical dimension on the far left indicates a height of 15 in. (0.381 m) from the ground surface to the top of the license plate lamp, tail &amp; stop lamp, back-up lamp, and reflex reflector.</li> <li>A horizontal dimension on the right indicates a distance of less than 400 mm (15.74 in.) from the outermost side of the rear body to the center of the rear combination lamps.</li> <li>Labels include: TURN SIGNAL LAMP, TAIL &amp; STOP LAMP, BACK-UP LAMP, Outermost side of rear body, REFLEX REFLECTOR, LICENSE PLATE LAMP, and Rear crossmember.</li> <li>Small asterisks (*) are placed at various points along the lamp assembly, likely indicating specific mounting or adjustment points.</li> </ul> </p></div> <p style="text-align: right;">Fig. 7.1</p> <p>(3) Clamp the harness of the rear combination lamps securely to the rear body and the main bolster by clips. (* Fig. 7.1)</p> <p>(4) Refer to PART II section 15 for more detailed specifications for the rear combination lamp.</p> |
| <p><b>7.2</b><br/>License plate</p>          | <p>Refer to PART II section 14 for detailed installation specifications of the license plate lamp and license plate, and then perform the installation.</p>  |

## 8. BRAKE LINES

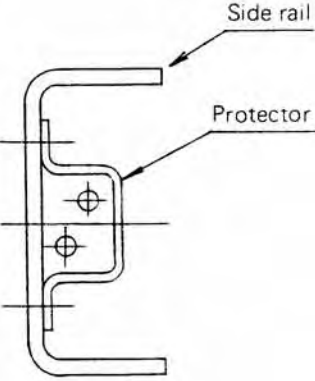
Extreme caution is required in handling brake tubing because of the importance of the components in respect to brake safety. Tubing, joints, and brake components should be protected with covers during mounting work to prevent them from denting, damage, welding sparks, and heat and routing changes of tubing necessary for coupling with trailers, etc., should be performed in accordance with the following cautions.

| Location   | Cautions   |                        |               |               |               |   |        |          |                |                        |                        |               |               |               |   |                |                        |                        |               |               |               |                              |                                     |                |                         |                |                          |
|--|--|------------------------|---------------|---------------|---------------|---|--------|----------|----------------|------------------------|------------------------|---------------|---------------|---------------|---|----------------|------------------------|------------------------|---------------|---------------|---------------|------------------------------|-------------------------------------|----------------|-------------------------|----------------|--------------------------|
| <p><b>8.1</b><br/>Chassis tubing form and dimension specifications</p> | <p>The chassis uses steel brake lines which conform to the following specifications.</p> <p style="text-align: right;">Unit: mm (in.)</p> <table border="1"> <thead> <tr> <th>Nominal Diameter</th> <th>A</th> <th>B</th> <th>t</th> <th>C</th> <th>S min.</th> <th>Material</th> </tr> </thead> <tbody> <tr> <td>4.76<br/>(0.19)</td> <td>6.6-7.1<br/>(0.26-0.28)</td> <td>3.0-3.7<br/>(0.12-0.15)</td> <td>0.7<br/>(0.03)</td> <td>1.4<br/>(0.06)</td> <td>1.0<br/>(0.04)</td> <td rowspan="2">SPCC (JIS)<br/>(ASTM A109 or A366)<br/>Double walled steel tube</td> </tr> <tr> <td>6.35<br/>(0.25)</td> <td>8.6-9.1<br/>(0.34-0.36)</td> <td>4.5-5.2<br/>(0.18-0.20)</td> <td>0.7<br/>(0.03)</td> <td>1.4<br/>(0.06)</td> <td>1.0<br/>(0.04)</td> </tr> </tbody> </table> <p style="text-align: right;">UNIT: mm (in.)</p> <div> <p>Flared end shape figure</p>  <p style="text-align: right;">Fig. 8.1</p> </div> <p>The tightening torques for the flare nuts which connect the brake lines are shown below.</p> <table border="1"> <thead> <tr> <th>Nominal diameter<br/>mm (in.)</th> <th>Tightening torque<br/>N-m (lbs.-ft.)</th> </tr> </thead> <tbody> <tr> <td>4.67<br/>(0.19)</td> <td>12.7-16.7<br/>(9.4-12.3)</td> </tr> <tr> <td>6.35<br/>(0.25)</td> <td>18.6-25.5<br/>(13.7-18.8)</td> </tr> </tbody> </table> | Nominal Diameter       | A             | B             | t             | C   | S min. | Material | 4.76<br>(0.19) | 6.6-7.1<br>(0.26-0.28) | 3.0-3.7<br>(0.12-0.15) | 0.7<br>(0.03) | 1.4<br>(0.06) | 1.0<br>(0.04) | SPCC (JIS)<br>(ASTM A109 or A366)<br>Double walled steel tube | 6.35<br>(0.25) | 8.6-9.1<br>(0.34-0.36) | 4.5-5.2<br>(0.18-0.20) | 0.7<br>(0.03) | 1.4<br>(0.06) | 1.0<br>(0.04) | Nominal diameter<br>mm (in.) | Tightening torque<br>N-m (lbs.-ft.) | 4.67<br>(0.19) | 12.7-16.7<br>(9.4-12.3) | 6.35<br>(0.25) | 18.6-25.5<br>(13.7-18.8) |
| Nominal Diameter   | A  | B                      | t             | C             | S min.        | Material  |        |          |                |                        |                        |               |               |               |   |                |                        |                        |               |               |               |                              |                                     |                |                         |                |                          |
| 4.76<br>(0.19)   | 6.6-7.1<br>(0.26-0.28)   | 3.0-3.7<br>(0.12-0.15) | 0.7<br>(0.03) | 1.4<br>(0.06) | 1.0<br>(0.04) | SPCC (JIS)<br>(ASTM A109 or A366)<br>Double walled steel tube |        |          |                |                        |                        |               |               |               |   |                |                        |                        |               |               |               |                              |                                     |                |                         |                |                          |
| 6.35<br>(0.25)   | 8.6-9.1<br>(0.34-0.36)   | 4.5-5.2<br>(0.18-0.20) | 0.7<br>(0.03) | 1.4<br>(0.06) | 1.0<br>(0.04) |   |        |          |                |                        |                        |               |               |               |   |                |                        |                        |               |               |               |                              |                                     |                |                         |                |                          |
| Nominal diameter<br>mm (in.)   | Tightening torque<br>N-m (lbs.-ft.)  |                        |               |               |               |   |        |          |                |                        |                        |               |               |               |   |                |                        |                        |               |               |               |                              |                                     |                |                         |                |                          |
| 4.67<br>(0.19)   | 12.7-16.7<br>(9.4-12.3)  |                        |               |               |               |   |        |          |                |                        |                        |               |               |               |   |                |                        |                        |               |               |               |                              |                                     |                |                         |                |                          |
| 6.35<br>(0.25)   | 18.6-25.5<br>(13.7-18.8)   |                        |               |               |               |   |        |          |                |                        |                        |               |               |               |   |                |                        |                        |               |               |               |                              |                                     |                |                         |                |                          |

| Location                                | Cautions (Continued)  |   |   |                |              |                |              |                              |                         |                |           |                |           |
|---|---|---|---|----------------|--------------|----------------|--------------|------------------------------|-------------------------|----------------|-----------|----------------|-----------|
| <p>8.2<br/>Making additional tubes</p>  | <p>(1) Use brake tubes of the same material as the tubes connected to the chassis when extending the brake tubes.</p> <p>(2) Only use steel tubes to extend the brake fluid tubes. <u>Never</u> use copper tubes.</p> <p>(3) Use only metric pipe tools, to form the flared end of brake lines as shown in the "Flared end shape figure" in Fig. 8.1. Be careful not to scratch the tubes, or not to damage the mating surfaces when flaring the ends.</p> <p>(4) A brass nut used with steel tubes could cause uneven fitting between the flared surface of the tubes and the mating surface of the joint, resulting in fluid leakage.</p> <p>(5) Use the flare nuts specified in the table below.</p> <table border="1"> <thead> <tr> <th>Nominal diameter of tube<br/>mm<br/>(in.)</th> <th> <div style="text-align: center;">  <p>STERLING Part No.</p> </div> <div style="text-align: right;">Fig. 8.2</div> </th> </tr> </thead> <tbody> <tr> <td>4.76<br/>(0.19)</td> <td>MBF MF651001</td> </tr> <tr> <td>6.35<br/>(0.25)</td> <td>MBF MF651002</td> </tr> </tbody> </table> <p>(6) Use a tubing bending tool to bend the brake lines correctly. Do not use heat to bend the brake lines.</p> <p>(7) The bend curvature R should strictly conform to the minimum allowable bend radius R shown in the table below.</p> <table border="1"> <thead> <tr> <th>Nominal diameter<br/>mm (in.)</th> <th>Bend radius<br/>mm (in.)</th> </tr> </thead> <tbody> <tr> <td>4.76<br/>(0.19)</td> <td>25 (0.98)</td> </tr> <tr> <td>6.35<br/>(0.25)</td> <td>30 (1.18)</td> </tr> </tbody> </table> | Nominal diameter of tube<br>mm<br>(in.) | <div style="text-align: center;">  <p>STERLING Part No.</p> </div> <div style="text-align: right;">Fig. 8.2</div> | 4.76<br>(0.19) | MBF MF651001 | 6.35<br>(0.25) | MBF MF651002 | Nominal diameter<br>mm (in.) | Bend radius<br>mm (in.) | 4.76<br>(0.19) | 25 (0.98) | 6.35<br>(0.25) | 30 (1.18) |
| Nominal diameter of tube<br>mm<br>(in.) | <div style="text-align: center;">  <p>STERLING Part No.</p> </div> <div style="text-align: right;">Fig. 8.2</div>   |   |   |                |              |                |              |                              |                         |                |           |                |           |
| 4.76<br>(0.19)                          | MBF MF651001  |   |   |                |              |                |              |                              |                         |                |           |                |           |
| 6.35<br>(0.25)                          | MBF MF651002  |   |   |                |              |                |              |                              |                         |                |           |                |           |
| Nominal diameter<br>mm (in.)            | Bend radius<br>mm (in.)   |   |   |                |              |                |              |                              |                         |                |           |                |           |
| 4.76<br>(0.19)                          | 25 (0.98)   |   |   |                |              |                |              |                              |                         |                |           |                |           |
| 6.35<br>(0.25)                          | 30 (1.18)   |   |   |                |              |                |              |                              |                         |                |           |                |           |

| Location  | Cautions (Continued)   |
|---|--|
| <p><b>8.2</b><br/>Making additional tubes<br/>(Continued)</p> | <p>(8) The required length of the straight portion of the line end and the bent portion must conform to the dimensions specified in Fig. 8.3.</p>  <p>(9) Use high pressure air nozzle to clean and remove foreign matter from inside the brake lines before use. Use compressed air for cleaning. Cleaning oil is not recommended, but completely remove any residue if it is used.</p> |
| <p><b>8.3</b><br/>Running additional lines</p>                | <p>(1) Avoid crossing brake lines. If this is unavoidable, position each line so it clears the other by more than 15 mm (0.59 in.). (Fig. 8.4)</p>  <p>(2) Position the brake lines so that they are not closer than 15 mm (0.59 in.) to sharp edges of the frame or other parts. (Fig. 8.5)</p>      |

| Location   | Cautions (Continued)  |                  |          |                 |               |                        |                  |             |   |                  |
|--|---|------------------|----------|-----------------|---------------|------------------------|------------------|-------------|---|------------------|
| <p><b>8.3</b><br/>Running additional lines<br/>(Continued)</p> | <p>(3) Securely clamp brake lines with PVC coated clamps or grommets to prevent vibrations when the vehicle is running.</p> <p>(4) The standard brake line clearances are shown in the table below.</p> <p style="text-align: right;">Unit: mm (in.)</p> <table border="1"> <thead> <tr> <th></th> <th>Tube dia</th> <th>Clamp intervals</th> </tr> </thead> <tbody> <tr> <td>Straight tube</td> <td>4.76-10<br/>(0.19-0.39)</td> <td>550 (21.65) max.</td> </tr> <tr> <td>Curved tube</td> <td>↑</td> <td>400 (15.75) max.</td> </tr> </tbody> </table> <p>(5) Brake lines should be laid along the inside web of the side rail whenever possible. When they cross over to the opposite side rail, they should be positioned along the crossmembers. Install the lines more than 10 mm. (0.39) away from bolts and rivets.</p> <p>(6) Make sure the brake fluid lines can be bled easily.</p> <p>(7) Never clamp or tape electrical wires to the brake lines, as this can cause corrosion of the line. Maintain the clearances described in Section 6 "ELECTRICAL WIRING".</p> <p>(8) The clearance between the brake lines and exhaust system components should conform to the specifications in Section 9 "EXHAUST SYSTEM".</p> <p>(9) Position the connection nut in a location where it can be completely tightened without difficulty.</p> <p>(10) Tighten the flare nuts to the torque specified in Section 8.1. Do not tighten the flare nut any further if oil leaks. Loosen the flare nut completely, adjust the mating surfaces, re-thread the nut and then tighten it completely.</p> <p>(11) Never force or tighten any part with a wrench or other tool if problems occur while installing brake lines. Realign the brake lines so the mating surfaces are correctly positioned, and then tighten the flare nut. If possible, first gently thread the nuts by hand, and then tighten them with the designated flare nut wrench.</p> <p>(12) Never install brake lines near the drive shaft or other moving parts.</p> <p>(13) Never change the installation location of the brake hoses.</p> <p>(14) When replacing the brake lines, do not use the fluid which was drained. Drain the fluid completely and replace with new fluid.</p> <p>(15) Install the brake lines so that they are protected from damages caused by flying objects thrown up by the tires.</p> |                  | Tube dia | Clamp intervals | Straight tube | 4.76-10<br>(0.19-0.39) | 550 (21.65) max. | Curved tube | ↑ | 400 (15.75) max. |
|  | Tube dia  | Clamp intervals  |          |                 |               |                        |                  |             |   |                  |
| Straight tube  | 4.76-10<br>(0.19-0.39)  | 550 (21.65) max. |          |                 |               |                        |                  |             |   |                  |
| Curved tube  | ↑   | 400 (15.75) max. |          |                 |               |                        |                  |             |   |                  |

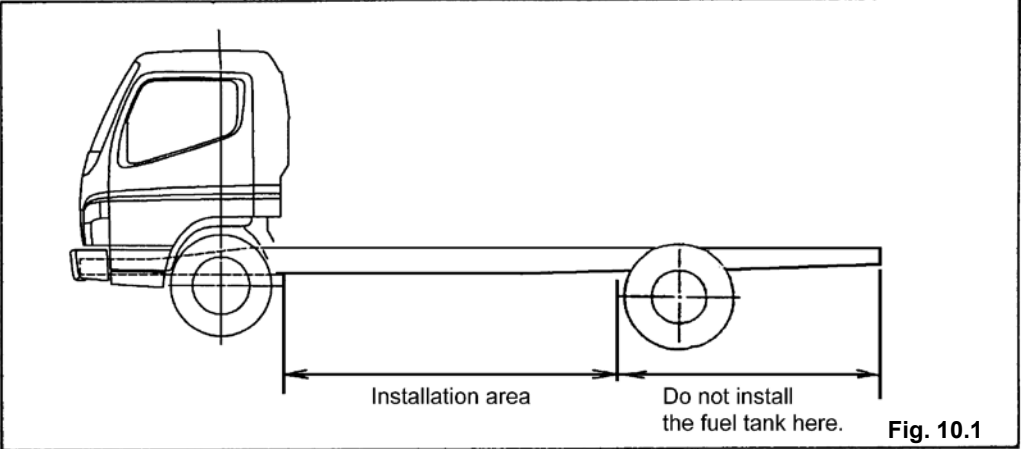
| Location  | Cautions (Continued)   |
|---|--|
| <b>8.3</b><br><b>Running</b><br><b>additional</b><br><b>lines</b><br><b>(Continued)</b> | <p>(16) If it is necessary to protect brake lines against possible damage as described above, install a protective panel as shown below.</p> <ul style="list-style-type: none"><li>(a) Fabricate a protective panel which will not be deformed by flying objects and come in contact with the brake lines.</li><li>(b) Position and shape the protective panel properly (for drain holes, etc.) so water will run freely.</li></ul> <div style="border: 1px solid black; padding: 10px;"><p>Example</p><p>The diagram shows a cross-section of a protective panel. It is a U-shaped component with a flat top surface. The top surface is labeled 'Side rail'. The inner vertical surfaces are labeled 'Protector'. Two circular features, representing drain holes, are shown on the inner vertical surfaces. The panel is positioned to enclose a brake line, which is shown as a curved line passing through the protector.</p><p style="text-align: right;"><b>Fig. 8.6</b></p></div> |

## 9. EXHAUST SYSTEM

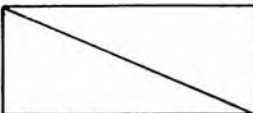
| Location   | Procedure   |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
|--|---|------------|----------------------------|----------|-----------|----------|-----------|---------|------------|---------------|------------|------------|------------|-------|------------|------------------|------------|-----------|------------|-----------|------------|-----------|-----------|---------|------------|----------|------------|-------------------------------|-----------|-----------------|------------|----------------|-----------|--------------|-----------|------------------------|-----------|------|------------|-------------|-----------|-------------------|------------|------------------|------------|
| <b>9.1<br/>Modifying the<br/>exhaust<br/>system</b>                                  | Do not make any adjustments or modifications to the exhaust system at all costs. Making any adjustments or modifications to the exhaust system may cause malfunctions to the OBD/EMD system.  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| <b>9.2<br/>Clearance<br/>between<br/>exhaust system<br/>and other<br/>components</b> | <p>Mount the rear body so that it conforms with the following requirements to ensure fire prevention and vehicle safety.</p> <p>(1) Maintain the clearances shown below when mounting the rear body. Install heat insulators if it is impossible to maintain these clearances.</p> <table border="1"> <thead> <tr> <th>Components</th> <th>Minimum clearance mm (in.)</th> </tr> </thead> <tbody> <tr><td>Air pipe</td><td>80 (3.15)</td></tr> <tr><td>Air tank</td><td>80 (3.15)</td></tr> <tr><td>Battery</td><td>150 (5.91)</td></tr> <tr><td>Brake booster</td><td>100 (3.94)</td></tr> <tr><td>Brake tube</td><td>100 (3.94)</td></tr> <tr><td>Cable</td><td>150 (5.91)</td></tr> <tr><td>Electric harness</td><td>150 (5.91)</td></tr> <tr><td>Fuel tank</td><td>150 (5.91)</td></tr> <tr><td>Fuel tube</td><td>200 (7.87)</td></tr> <tr><td>Mud guard</td><td>50 (1.97)</td></tr> <tr><td>Oil pan</td><td>100 (3.94)</td></tr> <tr><td>Oil pipe</td><td>100 (3.94)</td></tr> <tr><td>Propeller shaft, Differential</td><td>50 (1.97)</td></tr> <tr><td>Rear body floor</td><td>100 (3.94)</td></tr> <tr><td>Shock absorber</td><td>30 (1.18)</td></tr> <tr><td>Spring, Axle</td><td>20 (0.79)</td></tr> <tr><td>Sub frame, Crossmember</td><td>20 (0.79)</td></tr> <tr><td>Tire</td><td>100 (3.94)</td></tr> <tr><td>Vacuum tank</td><td>80 (3.15)</td></tr> <tr><td>Plastic materials</td><td>150 (5.91)</td></tr> <tr><td>Rubber materials</td><td>150 (5.91)</td></tr> </tbody> </table> <p>(2) The clearances between the muffler and or exhaust pipes and the rear body should correspond to the specifications described in Section 1 "CLEARANCE BETWEEN THE MOUNTED BODY AND CHASSIS COMPONENTS".</p> | Components | Minimum clearance mm (in.) | Air pipe | 80 (3.15) | Air tank | 80 (3.15) | Battery | 150 (5.91) | Brake booster | 100 (3.94) | Brake tube | 100 (3.94) | Cable | 150 (5.91) | Electric harness | 150 (5.91) | Fuel tank | 150 (5.91) | Fuel tube | 200 (7.87) | Mud guard | 50 (1.97) | Oil pan | 100 (3.94) | Oil pipe | 100 (3.94) | Propeller shaft, Differential | 50 (1.97) | Rear body floor | 100 (3.94) | Shock absorber | 30 (1.18) | Spring, Axle | 20 (0.79) | Sub frame, Crossmember | 20 (0.79) | Tire | 100 (3.94) | Vacuum tank | 80 (3.15) | Plastic materials | 150 (5.91) | Rubber materials | 150 (5.91) |
| Components   | Minimum clearance mm (in.)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Air pipe   | 80 (3.15)   |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Air tank   | 80 (3.15)   |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Battery  | 150 (5.91)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Brake booster  | 100 (3.94)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Brake tube   | 100 (3.94)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Cable  | 150 (5.91)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Electric harness   | 150 (5.91)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Fuel tank  | 150 (5.91)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Fuel tube  | 200 (7.87)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Mud guard  | 50 (1.97)   |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Oil pan  | 100 (3.94)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Oil pipe   | 100 (3.94)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Propeller shaft, Differential  | 50 (1.97)   |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Rear body floor  | 100 (3.94)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Shock absorber   | 30 (1.18)   |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Spring, Axle   | 20 (0.79)   |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Sub frame, Crossmember   | 20 (0.79)   |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Tire   | 100 (3.94)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Vacuum tank  | 80 (3.15)   |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Plastic materials  | 150 (5.91)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |
| Rubber materials   | 150 (5.91)  |            |                            |          |           |          |           |         |            |               |            |            |            |       |            |                  |            |           |            |           |            |           |           |         |            |          |            |                               |           |                 |            |                |           |              |           |                        |           |      |            |             |           |                   |            |                  |            |

# 10. FUEL TANK


Avoid moving the fuel tank unnecessarily. If it is necessary to do so, follow the cautions listed below and obtain the advice from Sterling.

| Location                                    | Cautions   |                   |                           |                   |                    |             |                |              |                           |             |               |              |                          |
|---|--|-------------------|---------------------------|-------------------|--------------------|-------------|----------------|--------------|---------------------------|-------------|---------------|--------------|--------------------------|
| <p><b>10.1</b><br/>Moving the fuel tank</p> | <p>Install the fuel tank within the wheelbase. Consult Sterling before installing it in other locations.</p>  <p style="text-align: right;">Fig. 10.1</p>   |                   |                           |                   |                    |             |                |              |                           |             |               |              |                          |
| <p><b>10.2</b><br/>Fuel tubes</p>           | <p>Use rubber or metal tubes specified below when changing the fuel lines.</p> <p>(a) Fuel hose</p> <p>Fuel hoses of poor quality may cause a fire. Always use the standard Sterling products described below.</p> <table border="1"> <thead> <tr> <th></th> <th>Inside dia.<br/>mm (in.)</th> <th>Sterling Part No.</th> <th>Length<br/>mm (in.)</th> </tr> </thead> <tbody> <tr> <td>Supply tube</td> <td>11.5<br/>(0.45)</td> <td>MBF MH030410</td> <td>120-20000<br/>(4.72-787.4)</td> </tr> <tr> <td>Return tube</td> <td>7.8<br/>(0.39)</td> <td>MBF MH030400</td> <td>65-20000<br/>(3.94-787.4)</td> </tr> </tbody> </table> <p>Note: Check with Sterling for corresponding details regarding the part numbers and length.</p> |                   | Inside dia.<br>mm (in.)   | Sterling Part No. | Length<br>mm (in.) | Supply tube | 11.5<br>(0.45) | MBF MH030410 | 120-20000<br>(4.72-787.4) | Return tube | 7.8<br>(0.39) | MBF MH030400 | 65-20000<br>(3.94-787.4) |
|   | Inside dia.<br>mm (in.)  | Sterling Part No. | Length<br>mm (in.)        |                   |                    |             |                |              |                           |             |               |              |                          |
| Supply tube                                 | 11.5<br>(0.45)   | MBF MH030410      | 120-20000<br>(4.72-787.4) |                   |                    |             |                |              |                           |             |               |              |                          |
| Return tube                                 | 7.8<br>(0.39)  | MBF MH030400      | 65-20000<br>(3.94-787.4)  |                   |                    |             |                |              |                           |             |               |              |                          |



| Location   | Cautions (Continued)  |                             |                            |   |
|--|---|-----------------------------|----------------------------|---|
| <b>10.2</b><br><b>Fuel tubes</b><br><b>(Continued)</b> | (b) Metal tube  |                             |                            |   |
|  |    | Outside<br>dia.<br>mm (in.) | Thick-<br>ness<br>mm (in.) | Material  |
| Supply tube  |   | 12<br>(0.47)                | 0.9<br>(0.035)             | SPCC (JIS)<br>(ASTM A109 or A366)<br>Single rolled steel pipe |
| Return tube  |   | 10<br>(0.39)                | 0.7<br>(0.03)              |   |
| <b>10.3</b><br><b>Others</b>                           | <ol style="list-style-type: none"> <li>(2) Never extend the fuel lines.</li> <li>(3) Use metal tubing for the fuel line inside the engine compartment.</li> <li>(4) Never modify the clips or move the location of clamps for components in the engine compartment which can be moved.</li> <li>(5) Never install tubes together with electrical wires.</li> <li>(6) Follow the procedures described in Section 9 "EXHAUST SYSTEM" when modifying exhaust system components. Install a heat insulation panel if the specified clearances cannot be maintained.</li> <li>(7) Be sure to position the fuel lines so that if a fuel leak should somehow occur, the fuel will not drip onto the muffler or exhaust pipe. Never connect the fuel lines above the exhaust system.</li> </ol> <ol style="list-style-type: none"> <li>(1) Observe the procedures described in Section 6 "ELECTRICAL WIRING" when modifying the wires connected with the fuel tank.</li> <li>(2) Place the filler port of the fuel tank to allow easy fueling. Refer to Section 4 "CAUTIONS IN MOUNTING A REAR BODY".</li> </ol> |                             |                            |   |

# 11. PAINTING

| Location   | Cautions   |
|--|--|
| <p><b>11.1</b><br/>Parts not to be painted</p>           | <p>(1) Do not paint the following parts.</p> <ul style="list-style-type: none"> <li>(a) Caution plates .... VIN plate, Chassis-Cab label, Noise emission conformity label, Engine identification plate, etc.</li> <li>(b) Rubber parts .... Weather stripping, Packing rubber, Rubber hoses, etc.</li> <li>(c) <b>Plastic parts...Front grille, Front cover, Washer nozzle, Step, Fender, Head lamp lens, Battery cover, Air intake ducts, etc.</b></li> <li>(d) Wiper arm and blade, Antenna, Outside mirror and mirror stay, Mud guards, etc.</li> <li>(e) Emblems .... “” mark, <b>STERLING</b>, etc.</li> <li>(f) Cable wires .... Electrical harnesses, Battery cables, Handbrake cable, Speedometer cable, etc.</li> <li>(g) Inside the engine compartment</li> <li>(h) Inside the cab</li> </ul> <p>(2) Be careful not to accidentally get paint on the following items.</p> <ul style="list-style-type: none"> <li>(a) Brake system components</li> <li>(b) Steering system components</li> <li>(c) Axle air vent hole</li> </ul> |
| <p><b>11.2</b><br/>Paint spot remover</p>                | <p>It is important to use proper solvent to wipe off paint on plastic components such as lamps. Because plastics have poor resistance to organic solvents, an improper solvent may cause cracks in plastic components.</p> <ul style="list-style-type: none"> <li>(1) Organic solvents to be used:<br/>kerosene, light oil, antifreeze</li> <li>(2) Organic solvents not to be used:<br/>thinner, turpentine, gasoline, commercial wax, acetone, alcohol, ketone, ester, chloric hydrocarbon</li> </ul>  |
| <p><b>11.3</b><br/>Cautions on drying after painting</p> | <ul style="list-style-type: none"> <li>(1) Remove plastic and rubber parts before painting because they easily deform when being heated. After painting is completed, reassemble these parts. Or perform heat insulation treatment to reduce ambient temperature to 80° C (176° F) or below.</li> <li>(2) Do not remove parts from the steering and brake systems (such as brake hoses, etc.), because mistakes in tightening torques and installation direction during reassembly may cause serious accidents. Set up some device to maintain an ambient temperature of less than 80° C. (176° F)</li> </ul>  |

| Location   | Cautions (Continued) |                                    |               |
|--|----------------------|------------------------------------|---------------|
| <b>11.4</b><br><b>Main external rubber and plastic parts</b> | NO.                  | Part Name                          | Material      |
|  | 1                    | Front grille                       | ASA           |
|  | 2                    | Head lamp lens                     | Polycarbonate |
|  | 3                    | Front & side turn signal lamp lens | PMMA          |
|  | 4                    | Dummy lamp lens                    | PMMA          |
|  | 5                    | Corner bumper                      | Polypropylene |
|  | 6                    | Front cover                        | ABS           |
|  | 7                    | Front cover, side                  | ABS           |
|  | 8                    | Marker lamp                        | PMMA          |
|  | 9                    | Step                               | PP+GF35       |
|  | 10                   | Weather strip (front window)       | Rubber        |
|  | 11                   | Weather strip (rear window)        | Rubber        |
|  | 12                   | Door outer weather strip           | Rubber        |
|  | 13                   | Outside mirror stay packing        | Rubber        |
|  | 14                   | Fender (FE)                        | Polypropylene |
|  | 15                   | N/A                                | N/A           |
|  | 16                   | Delta garnish                      | Polypropylene |
|  | 17                   | Door outside handle (front door)   | PC+PET        |
|  | 18                   | Sash garnish                       | Polypropylene |
|  | 19                   | Glass runchannel                   | TPO           |
|  | 20                   | Front Door beltline molding        | PVC           |
|  | 21                   | Snorkle duct                       | Polypropylene |
| 22   | Air intake silencer  | Polypropylene                      |               |
| Refer to Fig. 11.1 (see page I-11-3)                         |                      |                                    |               |

# MAIN EXTERNAL RUBBER AND PLASTIC PARTS

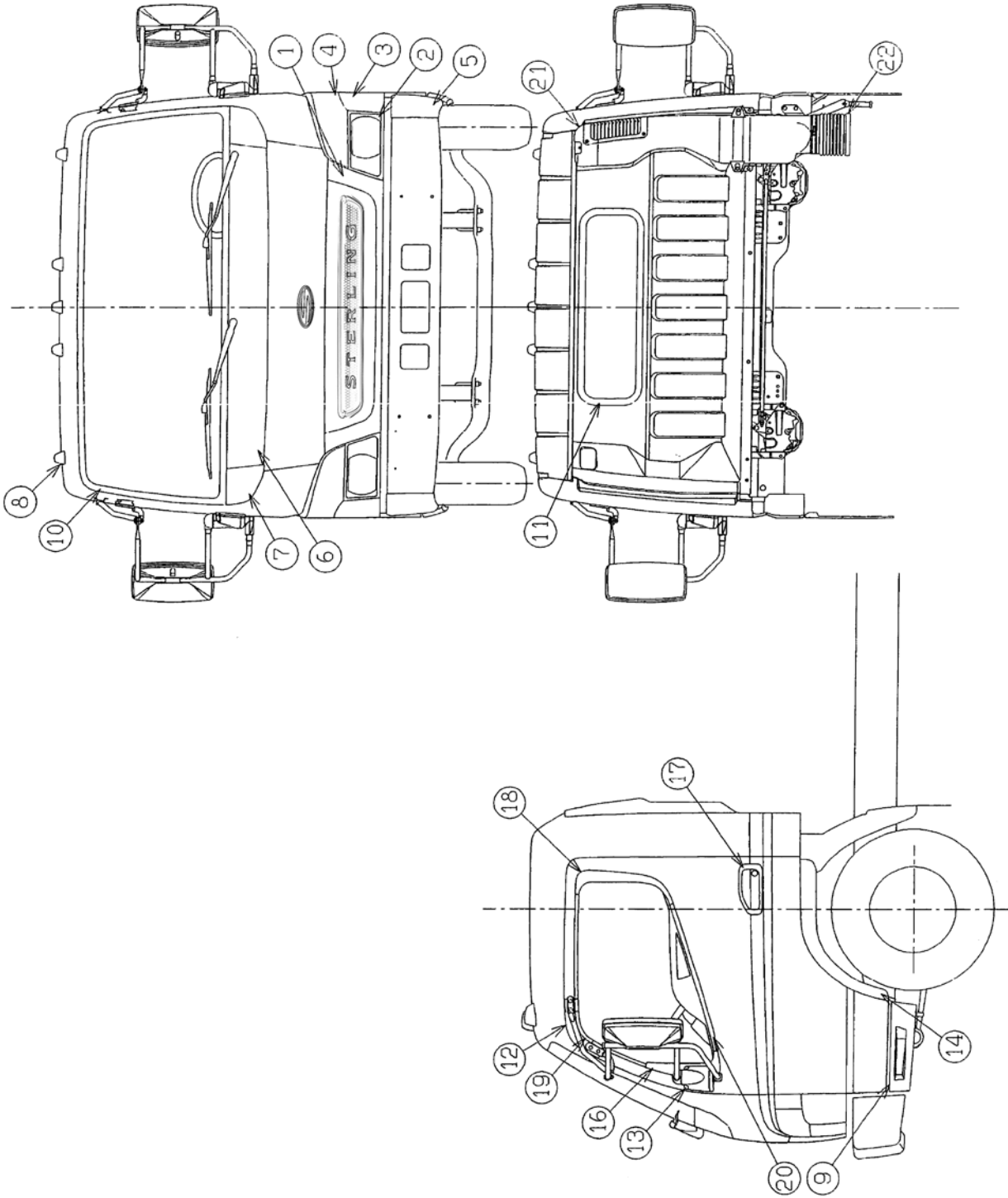
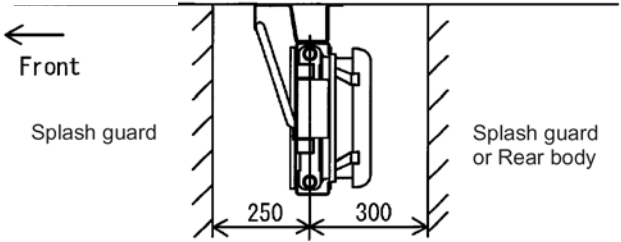


Fig. 11.1

# 12. A/T OIL COOLER

Do not move A/T oil cooler principally.  
If necessary, keep the cautions as shown below.

| Location  | Cautions   |
|---|--|
| <b>12.1</b><br><b>Moving the</b><br><b>A/T oil cooler</b> | <p>(1) Make sure to protect from other equipment<br/>(2) Maintain a clearance around the A/T oil cooler as the drawing shown below.</p> <div><p>COE30<br/>COE45<br/>COE50</p><p>Front</p><p>Splash guard</p><p>Splash guard or Rear body</p><p>250 300</p><p><b>Fig. 12.1</b></p></div> <p>(3) Never extend the A/T oil cooler lines.<br/>(4) After the body is mounted, check the cooling operation.</p> |

## **PART II**

**DRAWINGS AND alpha gen steroids  
TECHNICAL DATA**

# TABLE OF CONTENTS

|   |         |
|---|---------|
| 1. LINE-UP CHART .....                      | II-1-1  |
| 2. TYPICAL BODY LENGTH .....                | II-2-1  |
| 3. CHASSIS CAB DRAWING .....                | II-3-1  |
| 3.1 Chassis cab drawing .....               | II-3-1  |
| 3.1.1 COE30115A, COE45115A, COE50115A ..... | II-3-2  |
| 3.1.2 COE30134A, COE45134A, COE50134A ..... | II-3-4  |
| 3.1.3 COE30152A, COE45152A, COE50152A ..... | II-3-6  |
| 3.1.4 COE45176A, COE50176A .....            | II-3-8  |
| 3.1.5 COE50189A .....                       | II-3-9  |
| 3.2 Cab front and rear view .....           | II-3-14 |
| 4. CHASSIS FRAME ASSEMBLY .....             | II-4-1  |
| 4.1 COE30115A, COE45115A, COE50115A.....    | II-4-1  |
| 4.2 COE30134A, COE45134A, COE50134A.....    | II-4-2  |
| 4.3 COE30152A, COE45152A, COE50152A.....    | II-4-3  |
| 4.4 COE45176A, COE50176A.....               | II-4-4  |
| 4.5 COE50189A .....                         | II-4-5  |
| 5. CROSSMEMBER REAR VIEW .....              | II-5-1  |
| 5.1 COE Series .....                        | II-5-1  |
| 6. FRAME SECTION MODULUS DIAGRAMS .....     | II-6-1  |
| 6.1 COE30115A, COE45115A, COE50115A.....    | II-6-1  |
| 6.2 COE30134A, COE45134A, COE50134A.....    | II-6-2  |
| 6.3 COE30152A, COE45152A, COE50152A.....    | II-6-3  |
| 6.4 COE45176A, COE50176A.....               | II-6-4  |
| 6.5 COE50189A .....                         | II-6-5  |
| 7. FRAME HEIGHT .....                       | II-7-1  |
| 7.1 Tire radius .....                       | II-7-1  |
| 7.2 Front and rear springs .....            | II-7-2  |
| 7.2.1 COE30 .....                           | II-7-2  |
| 7.2.2 COE45 .....                           | II-7-3  |
| 7.2.3 COE50 .....                           | II-7-4  |
| 7.3 Vehicle sprung weight .....             | II-7-5  |

- 8. TIRE AND DISC WHEEL ..... II-8-1
- 9. FRONT AXLE ..... II-9-1
- 10. REAR AXLE ..... II-10-1
- 11. REAR AXLE BOUNCE HEIGHT ..... II-11-1
- 12. FUEL TANK ..... II-12-1
  - 12.1 COE Series ..... II-12-1
  - 12.2 COE Series (Rear fuel tank) ..... II-12-2
- 13. BATTERY BOX ..... II-13-1
- 14. LICENSE PLATE LAMP ..... II-14-1
- 15. REAR COMBINATION LAMP ..... II-15-1
- 16. BRAKES PIPING DIAGRAM ..... II-16-1
  - 16.1 COE30, COE45 ..... II-16-1
  - 16.2 COE50 ..... II-16-2
- 17. ELECTRIC CIRCUIT DIAGRAM ..... II-17-1
  - 17.1 POWER, CHARGE AND GROUND CIRCUIT ..... II-17-1
    - 110** POWER CIRCUIT ..... II-17-1
    - 115** RESERVE POWER CIRCUIT ..... II-17-11
    - 125** BATTERY CHARGING CIRCUIT ..... II-17-12
    - 130** GROUND ..... II-17-13
  - 17.2 STARTING CIRCUIT ..... II-17-23
    - 210** ENGINE STARTING CIRCUIT ..... II-17-23
    - 220** ENGINE PREHEATING CIRCUIT ..... II-17-25
  - 17.3 LIGHTING CIRCUIT ..... II-17-26
    - 310** HEADLAMP CIRCUIT ..... II-17-26
    - 313** DAYTIME RUNNING LIGHT CIRCUIT ..... II-17-27
    - 320** TAIL, CLEARANCE AND LICENSE PLATE LAMPS CIRCUIT ..... II-17-29
    - 325** STOP LAMP CIRCUIT ..... II-17-30
    - 330** TURN SIGNAL AND HAZARD LAMP CIRCUIT ..... II-17-31
    - 340** BACKUP LAMP CIRCUIT ..... II-17-32
    - 345** CAB LAMP CIRCUIT ..... II-17-34



|            |  |          |
|------------|--|----------|
| <b>348</b> | ILLUMINATION LAMP CIRCUIT .....                        | II-17-35 |
| <b>349</b> | IDENTIFICATION LAMP AND SIDE MARKER LAMP CIRCUIT ..... | II-17-36 |
| <b>352</b> | VAN BODY DOME LIGHT CIRCUIT .....                      | II-17-37 |
| 17.4       | METER CLUSTER .....                                    | II-17-38 |
| <b>401</b> | METER CLUSTER INTERNAL CIRCUIT .....                   | II-17-38 |
| <b>412</b> | SPEEDOMETER CIRCUIT .....                              | II-17-39 |
| <b>420</b> | FUEL GAUGE CIRCUIT .....                               | II-17-40 |
| <b>425</b> | WATER TEMPERATURE GAUGE CIRCUIT .....                  | II-17-41 |
| 17.5       | INDICATOR AND WARNING LAMP CIRCUIT .....               | II-17-42 |
| <b>510</b> | PARKING BRAKE INDICATOR CIRCUIT .....                  | II-17-42 |
| <b>515</b> | BRAKE WARNING CIRCUIT .....                            | II-17-43 |
| <b>535</b> | ENGINE OIL LEVEL WARNING CIRCUIT .....                 | II-17-45 |
| <b>536</b> | ENGINE OIL PRESSURE WARNING CIRCUIT .....              | II-17-46 |
| <b>537</b> | OVERHEATING WARNING CIRCUIT .....                      | II-17-47 |
| <b>540</b> | BRAKE PAD WARNING CIRCUIT .....                        | II-17-48 |
| <b>550</b> | CAB TILT WARNING CIRCUIT .....                         | II-17-49 |
| <b>566</b> | FUEL FILTER WARNING CIRCUIT .....                      | II-17-50 |
| 17.6       | CAB SIDE ELECTRICAL CIRCUIT .....                      | II-17-51 |
| <b>610</b> | CIGARETTE LIGHTER CIRCUIT .....                        | II-17-51 |
| <b>612</b> | AUDIO CIRCUIT .....                                    | II-17-52 |
| <b>614</b> | WIPER AND WASHER CIRCUIT .....                         | II-17-53 |
| <b>616</b> | HORN CIRCUIT .....                                     | II-17-54 |
| <b>620</b> | AIR-CONDITIONER CIRCUIT .....                          | II-17-55 |
| <b>622</b> | POWER WINDOW AND AUTO DOOR LOCK CIRCUIT .....          | II-17-57 |
| <b>629</b> | MIRROR HEATER CIRCUIT .....                            | II-17-58 |
| 17.7       | CHASSIS SIDE ELECTRICAL CIRCUIT .....                  | II-17-59 |
| <b>710</b> | EXHAUST BRAKE CIRCUIT .....                            | II-17-59 |
| 17.8       | ENGINE AND TRANSMISSION SIDE ELECTRICAL CIRCUIT .....  | II-17-61 |
| <b>850</b> | TRANSMISSION POWER TAKE-OFF CIRCUIT .....              | II-17-61 |
| 17.9       | OTHER CIRCUIT .....                                    | II-17-62 |
| <b>905</b> | JOINT CONNECTOR (J/C) .....                            | II-17-62 |
| <b>907</b> | DIAGNOSIS SWITCH, MEMORY CLEAR SWITCH .....            | II-17-67 |
|            | ELECTRONICALLY CONTROLLED FUEL SYSTEM CIRCUIT .....    | II-17-68 |
|            | EMISSION CONTROL CIRCUIT .....                         | II-17-74 |
|            | AUTOMATIC TRANSMISSION CIRCUIT .....                   | II-17-78 |
|            | ANTI-LOCK BRAKE SYSTEM CIRCUIT .....                   | II-17-84 |
| 18.        | TRANSMISSION PTO OPENING .....                         | II-18-1  |
| 19.        | PROPELLER SHAFT .....                                  | II-19-1  |
| 19.1       | COE Series .....                                       | II-19-1  |
| 19.2       | COE Series Chart .....                                 | II-19-2  |

20. EXHAUST SYSTEM ..... II-20-1

    20.1 COE 115" WB ..... II-20-1

    20.2 COE 134" WB ..... II-20-2

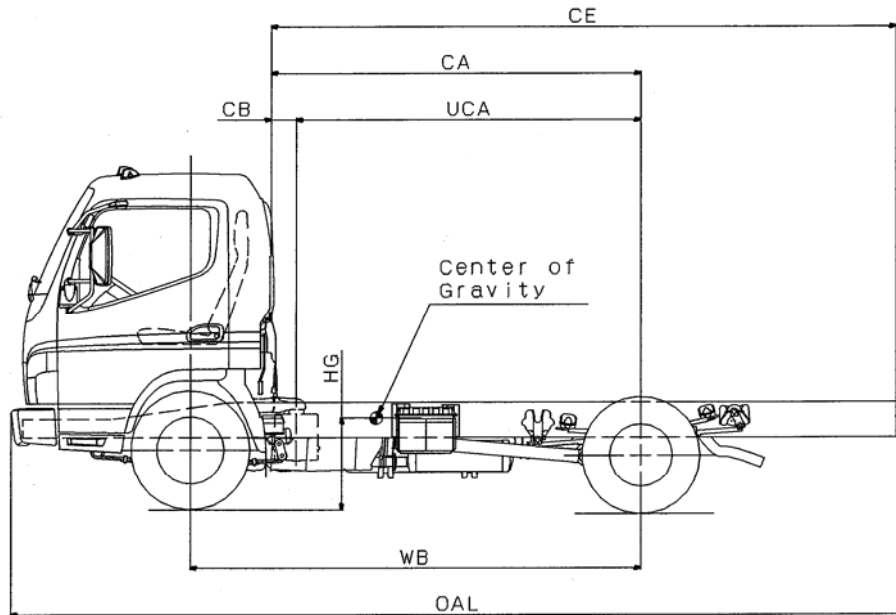
    20.3 COE 152" WB ..... II-20-3

    20.4 COE 176" & 189" WB ..... II-20-4

# 1. LINE-UP CHART

| MODEL SERIES     | VEHICLE MODEL    | GVW lbs (kg)     |                   |                   | BASIC COMPONENTS |          |                       |            |                  | BASIC DIMENSIONS in (mm) |                  |                        |                         |                           | CURB WEIGHT lbs (kg) |                  |                  |                  |                 |                 |                  |                  |                  |                  |
|------------------|------------------|------------------|-------------------|-------------------|------------------|----------|-----------------------|------------|------------------|--------------------------|------------------|------------------------|-------------------------|---------------------------|----------------------|------------------|------------------|------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|
|                  |                  | FRONT            | REAR              | TOTAL             | ENGINE           | HP/RPM   | TRANSMISSION          | GEAR RATIO | TIRES            | WHEELBASE                | OVERALL LENGTH   | OVERALL WIDTH (approx) | OVERALL HEIGHT (approx) | CAB TO REAR AXLE (actual) | FRONT                | REAR             | TOTAL            |                  |                 |                 |                  |                  |                  |                  |
| COE30            | COE30115A        | 5,360<br>(2,430) | 9,880<br>(4,480)  | 12,500<br>(5,670) | 4M50             | 185/2700 | M036A6<br>3.742/0.634 | 5.285      | 215/85R16        | 114.6<br>(2,910)         | 227.2<br>(5,771) | 83.9<br>(2,130)        | 89.4<br>(2,270)         | 93.9<br>(2,385)           | 3,990<br>(1,810)     | 1,910<br>(865)   | 5,900<br>(2,675) |                  |                 |                 |                  |                  |                  |                  |
|                  | 134.3<br>(3,410) |                  |                   |                   |                  |          |                       |            |                  | 246.9<br>(6,271)         | 113.6<br>(2,885) |                        |                         | 4,080<br>(1,850)          | 1,865<br>(845)       | 5,945<br>(2,695) |                  |                  |                 |                 |                  |                  |                  |                  |
|                  | 152.4<br>(3,870) |                  |                   |                   |                  |          |                       |            |                  | 265.0<br>(6,731)         | 131.7<br>(3,345) |                        |                         | 4,145<br>(1,880)          | 1,865<br>(845)       | 6,010<br>(2,725) |                  |                  |                 |                 |                  |                  |                  |                  |
| 114.6<br>(2,910) | 227.2<br>(5,771) | 93.9<br>(2,385)  | 4,010<br>(1,820)  | 1,985<br>(900)    |                  |          |                       |            |                  | 5,995<br>(2,720)         |                  |                        |                         |                           |                      |                  |                  |                  |                 |                 |                  |                  |                  |                  |
| 134.3<br>(3,410) | 246.9<br>(6,271) | 113.6<br>(2,885) | 4,100<br>(1,860)  | 1,930<br>(875)    |                  |          |                       |            |                  | 6,030<br>(2,735)         |                  |                        |                         |                           |                      |                  |                  |                  |                 |                 |                  |                  |                  |                  |
| 152.4<br>(3,870) | 265.0<br>(6,731) | 131.7<br>(3,345) | 4,145<br>(1,880)  | 1,950<br>(885)    |                  |          |                       |            |                  | 6,095<br>(2,765)         |                  |                        |                         |                           |                      |                  |                  |                  |                 |                 |                  |                  |                  |                  |
| 176.0<br>(4,470) | 288.6<br>(7,331) | 155.3<br>(3,945) | 4,180<br>(1,895)  | 1,985<br>(900)    |                  |          |                       |            |                  | 6,165<br>(2,795)         |                  |                        |                         |                           |                      |                  |                  |                  |                 |                 |                  |                  |                  |                  |
| COE50            | COE50115A        | 6,395<br>(2,900) | 12,700<br>(5,760) | 17,995<br>(8,160) |                  |          |                       |            |                  |                          |                  |                        |                         |                           |                      | 215/75R17.5      | 114.6<br>(2,910) | 228.2<br>(5,796) | 83.7<br>(2,126) | 90.0<br>(2,285) | 93.9<br>(2,385)  | 3,925<br>(1,780) | 2,060<br>(935)   | 5,985<br>(2,715) |
|                  | 134.3<br>(3,410) |                  |                   |                   |                  |          |                       |            |                  |                          |                  |                        |                         |                           |                      |                  | 247.9<br>(6,296) | 113.6<br>(2,885) |                 |                 | 3,990<br>(1,810) | 2,040<br>(925)   | 6,030<br>(2,735) |                  |
|                  | 152.4<br>(3,870) |                  |                   |                   |                  |          |                       |            | 266.0<br>(6,756) |                          |                  | 131.7<br>(3,345)       | 4,045<br>(1,835)        |                           |                      |                  | 2,050<br>(930)   | 6,095<br>(2,765) |                 |                 |                  |                  |                  |                  |
|                  | 176.0<br>(4,470) |                  |                   |                   |                  |          |                       |            | 289.6<br>(7,356) |                          |                  | 155.3<br>(3,945)       | 4,025<br>(1,825)        |                           |                      |                  | 2,085<br>(945)   | 6,110<br>(2,770) |                 |                 |                  |                  |                  |                  |
|                  | 189.4<br>(4,810) |                  |                   |                   |                  |          |                       |            | 302.0<br>(7,671) |                          |                  | 168.7<br>(4,285)       | 4,055<br>(1,840)        |                           |                      |                  | 2,095<br>(950)   | 6,150<br>(2,790) |                 |                 |                  |                  |                  |                  |
|                  |                  |                  |                   |                   |                  |          |                       |            |                  |                          |                  |                        |                         |                           |                      |                  |                  |                  |                 |                 |                  |                  |                  |                  |

## 2. TYPICAL BODY LENGTH



1. Sterling suggests the X-marked body length of each model because of stability, commerciality and reliability.
2. The center of gravity of the completed vehicle with a full load should not exceed 60" above ground level and must be located horizontally between the centerlines alpha pharmaceuticals of the front and rear axles

| Vehicle Model           |   | Dimensions, Inch (mm) |                  |                  |              |                  |                  | Body Length (ft) |    |    |    |    |    |    |  |
|-------------------------|---|-----------------------|------------------|------------------|--------------|------------------|------------------|------------------|----|----|----|----|----|----|--|
|                         |   | WB                    | CA               | UCA              | CB           | CE               | OAL              | HG               | 12 | 14 | 16 | 18 | 20 | 22 |  |
| COE30<br>COE45<br>COE50 | D | 114.6<br>(2,910)      | 93.9<br>(2,385)  | 86<br>(2,185)    | 7.9<br>(200) | 158.5<br>(4,025) | 227.2<br>(5,771) | 24.0<br>(610)    | X  | X  |    |    |    |    |  |
|                         | E | 134.3<br>(3,410)      | 113.6<br>(2,885) | 105.7<br>(2,685) | 7.9<br>(200) | 178.1<br>(4,525) | 246.9<br>(6,271) | 24.0<br>(610)    |    | X  | X  |    |    |    |  |
|                         | G | 152.4<br>(3,870)      | 131.7<br>(3,345) | 123.8<br>(3,145) | 7.9<br>(200) | 196.3<br>(4,985) | 265<br>(6,731)   | 24.0<br>(610)    |    |    | X  | X  |    |    |  |
|                         | J | 176<br>(4,470)        | 155.3<br>(3,945) | 147.4<br>(3,745) | 7.9<br>(200) | 219.9<br>(5,585) | 288.6<br>(7,331) | 24.0<br>(610)    |    |    |    | X  | X  |    |  |
|                         | K | 189.4<br>(4,810)      | 168.7<br>(4,285) | 160.8<br>(4,085) | 7.9<br>(200) | 233.3<br>(5,925) | 302<br>(7,671)   | 24.0<br>(610)    |    |    |    |    | X  | X  |  |

Variations to this chart require prior approval from Sterling Trucks Applications Group.

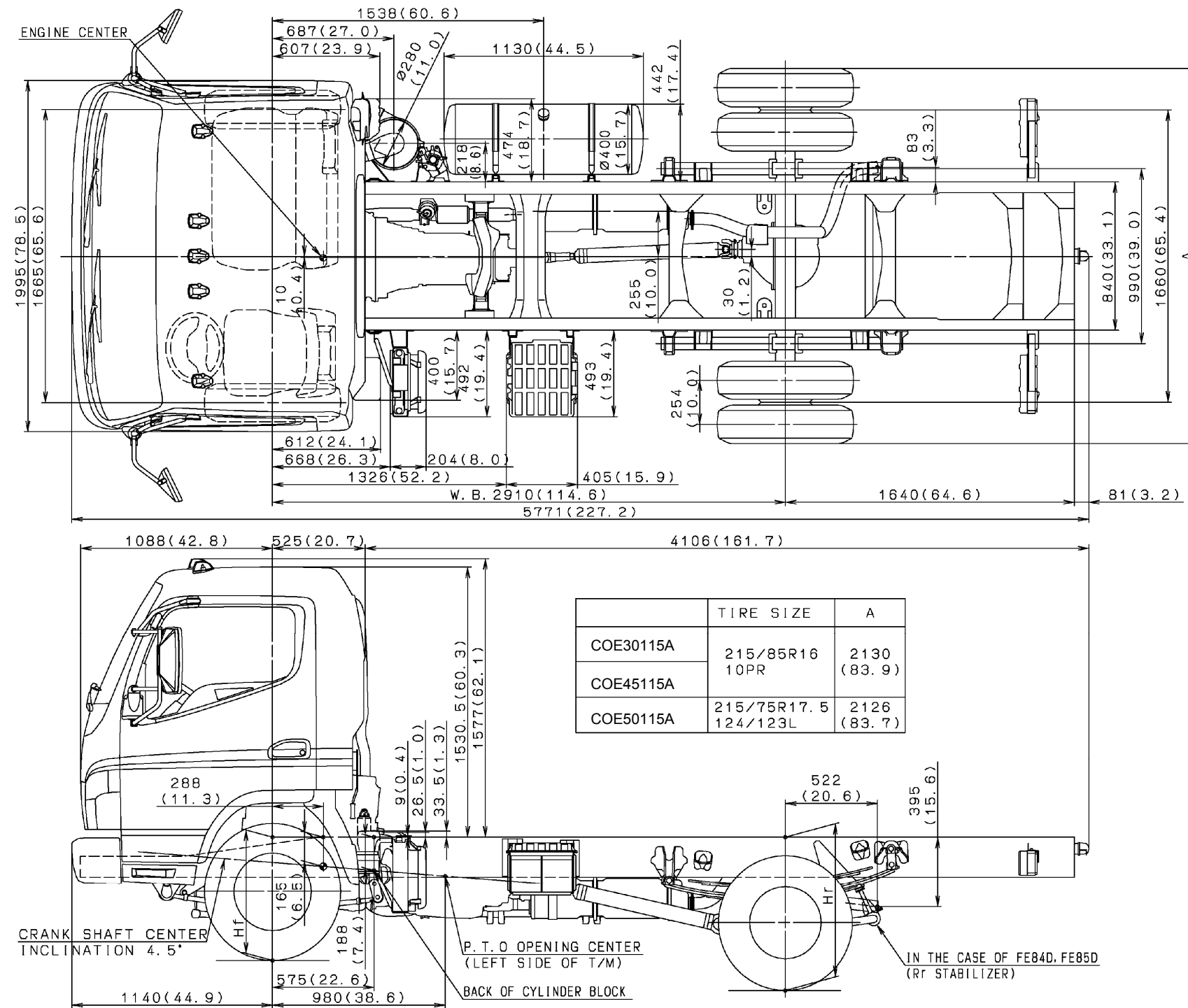
### NOTES:

- (1) Selection of the correct model and wheelbase is dependent on many factors. This chart can serve only as a quick reference guide. It does not preclude the necessity of performing a complete weight distribution analysis, particularly when equipment such as lift gates, reefers or others are required.
- (2) Sterling assumes no liability whatsoever for any damage(s) to person(s) or property caused by utilization of this chart. Selection of the correct model and wheelbase is solely the responsibility of the selling dealers and final stage manufacturer.
- (3) All weight distribution calculations herein are based on water level loading and a cab-to-body clearance on above table.
- (4) When selection of the correct model and wheelbase is made, carefully follow the requirements below;
  - (a) Individual GAWR's and GVWR's must not be exceeded.
  - (b) It is advisable that front axle loading ratio be 33% of total vehicle weight or more for vehicle stability.
  - (c) The length of the rear overhang must comply with state and local regulations, if any.

### 3. CHASSIS CAB DRAWING

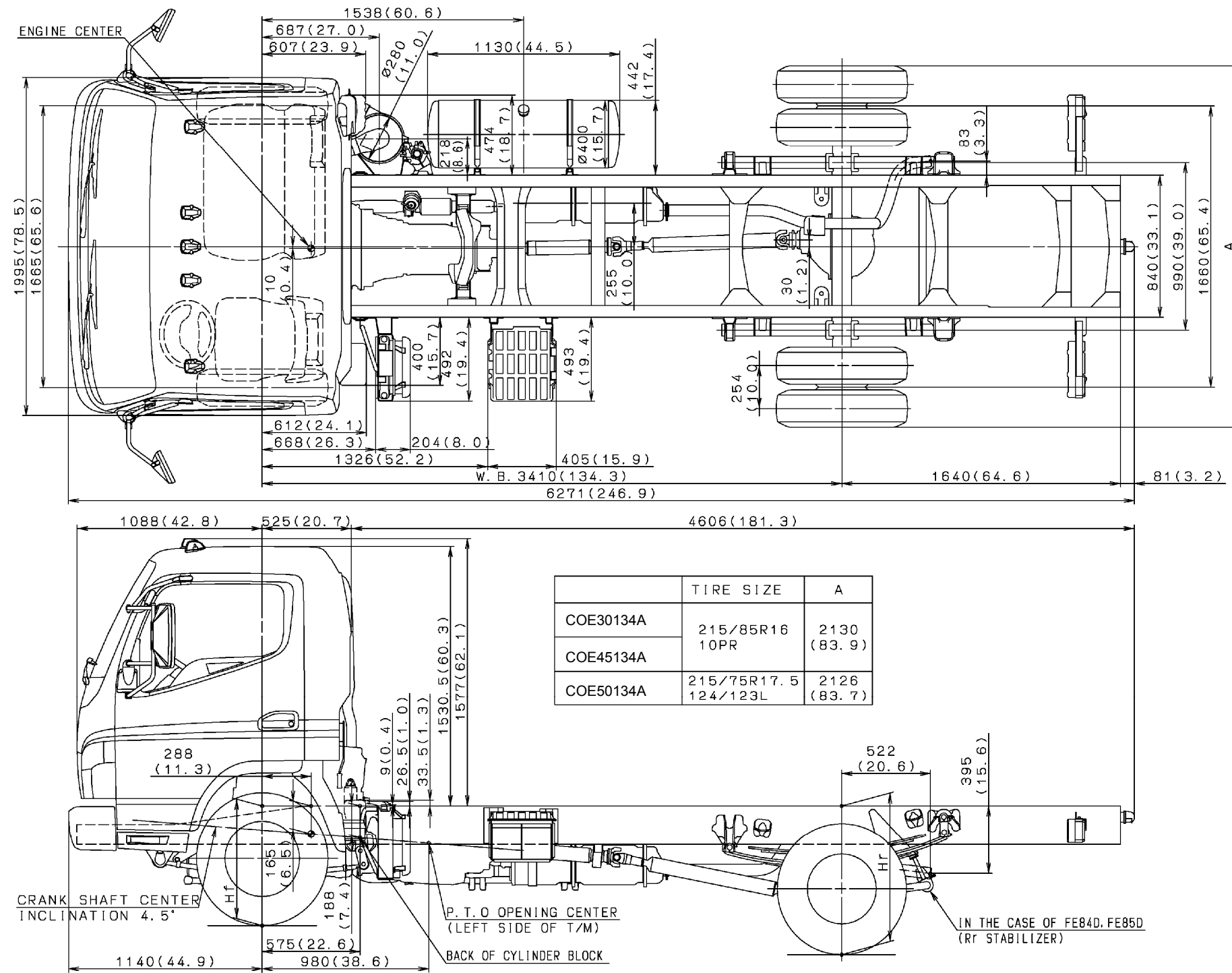
#### 3.1 Chassis cab drawing

#### 3.1.1 COE30115A, COE45115A, COE50115A



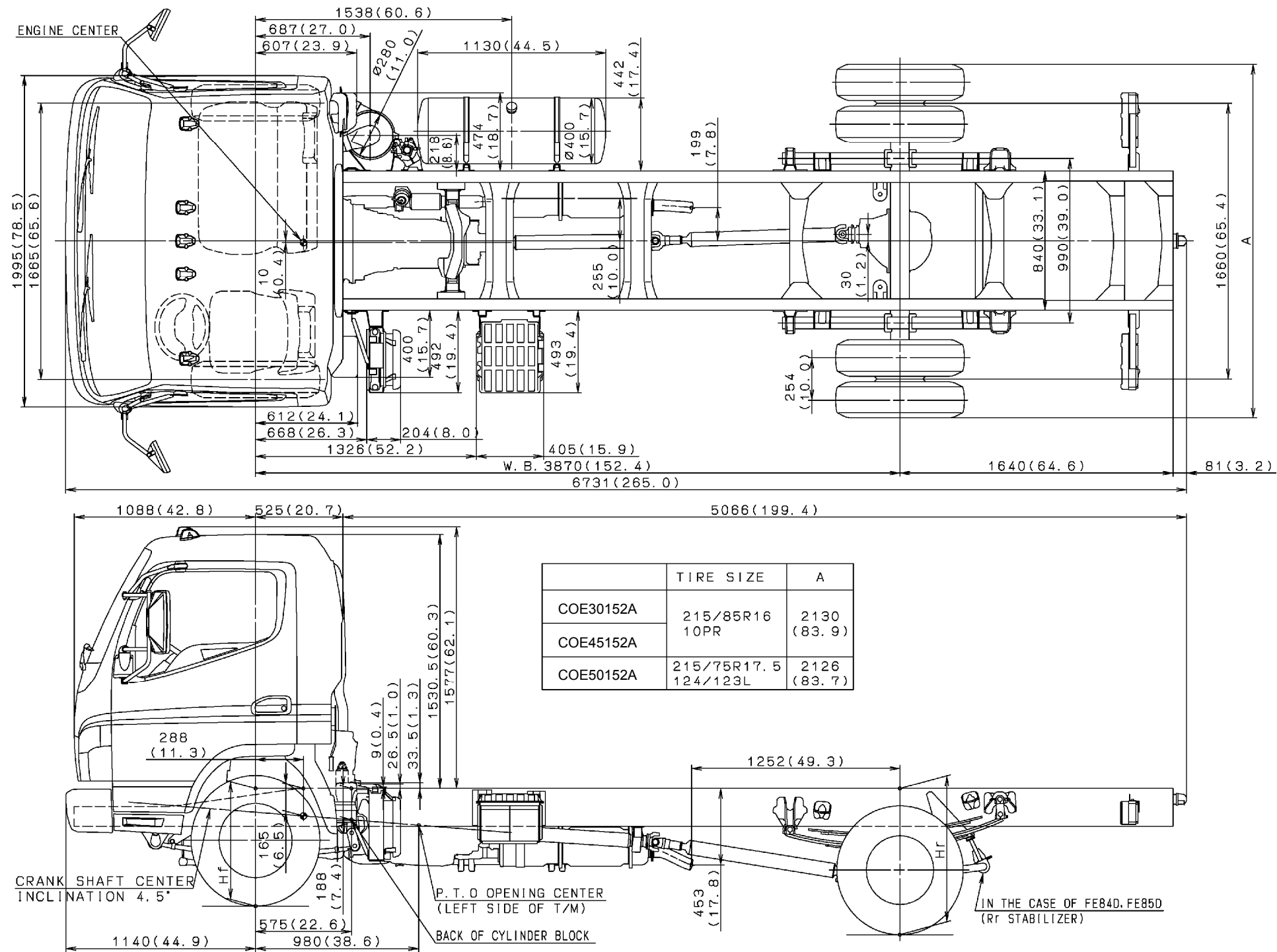
CHASSIS CAB  
DRAWINGS  
COE30115A  
COE45115A  
COE50115A  
UNIT : mm (in.)  
SCALE : 1/30

### 3.1.2 COE30134A, COE45134A, COE50134A



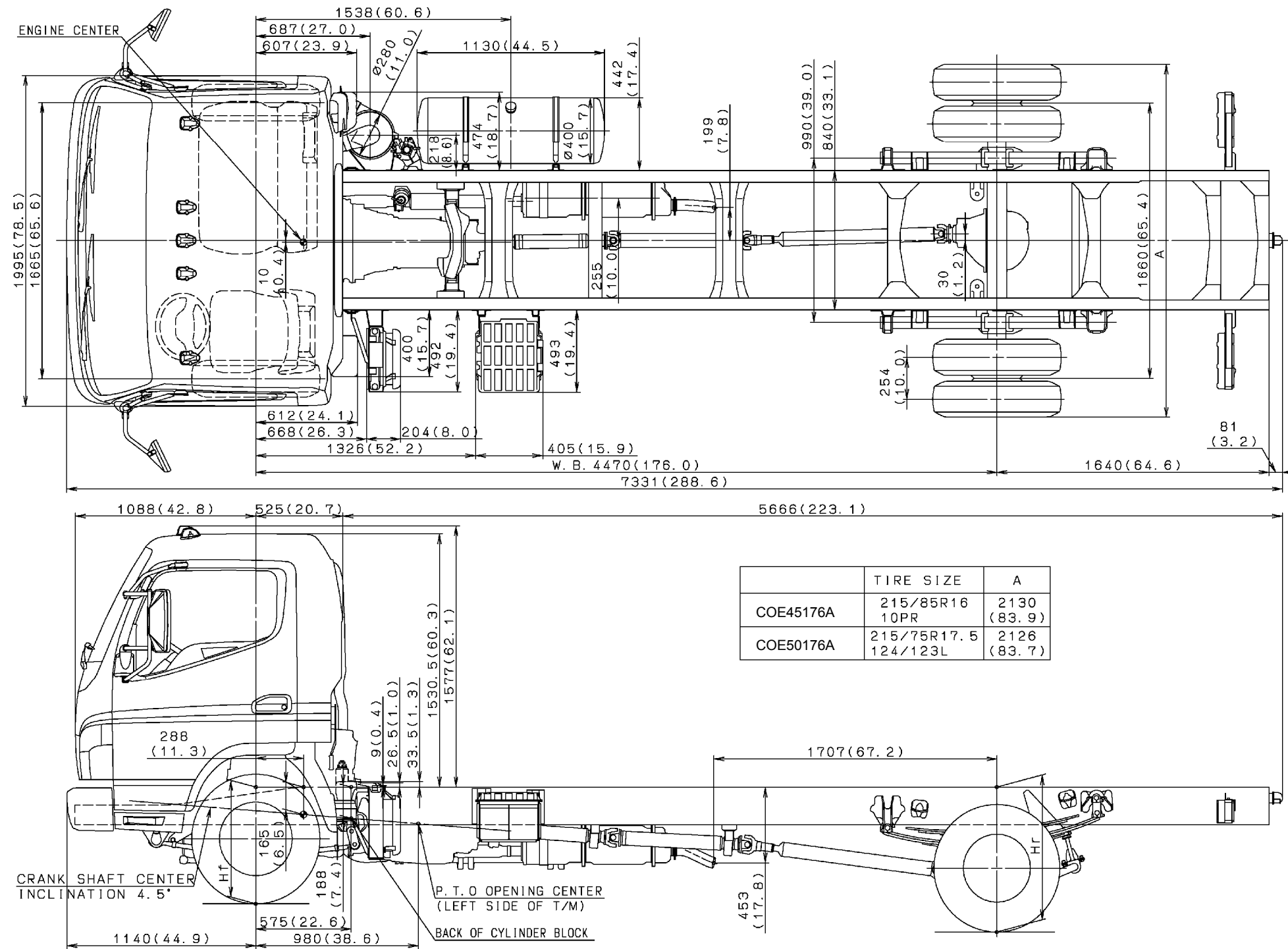
CHASSIS CAB  
DRAWINGS  
COE30134A  
COE45134A  
COE50134A  
UNIT : mm (in.)  
SCALE : 1/30

### 3.1.3 COE30152A, COE45152A, COE50152A



CHASSIS CAB  
DRAWINGS  
COE30152A  
COE45152A  
COE50152A  
UNIT : mm (in.)  
SCALE : 1/30

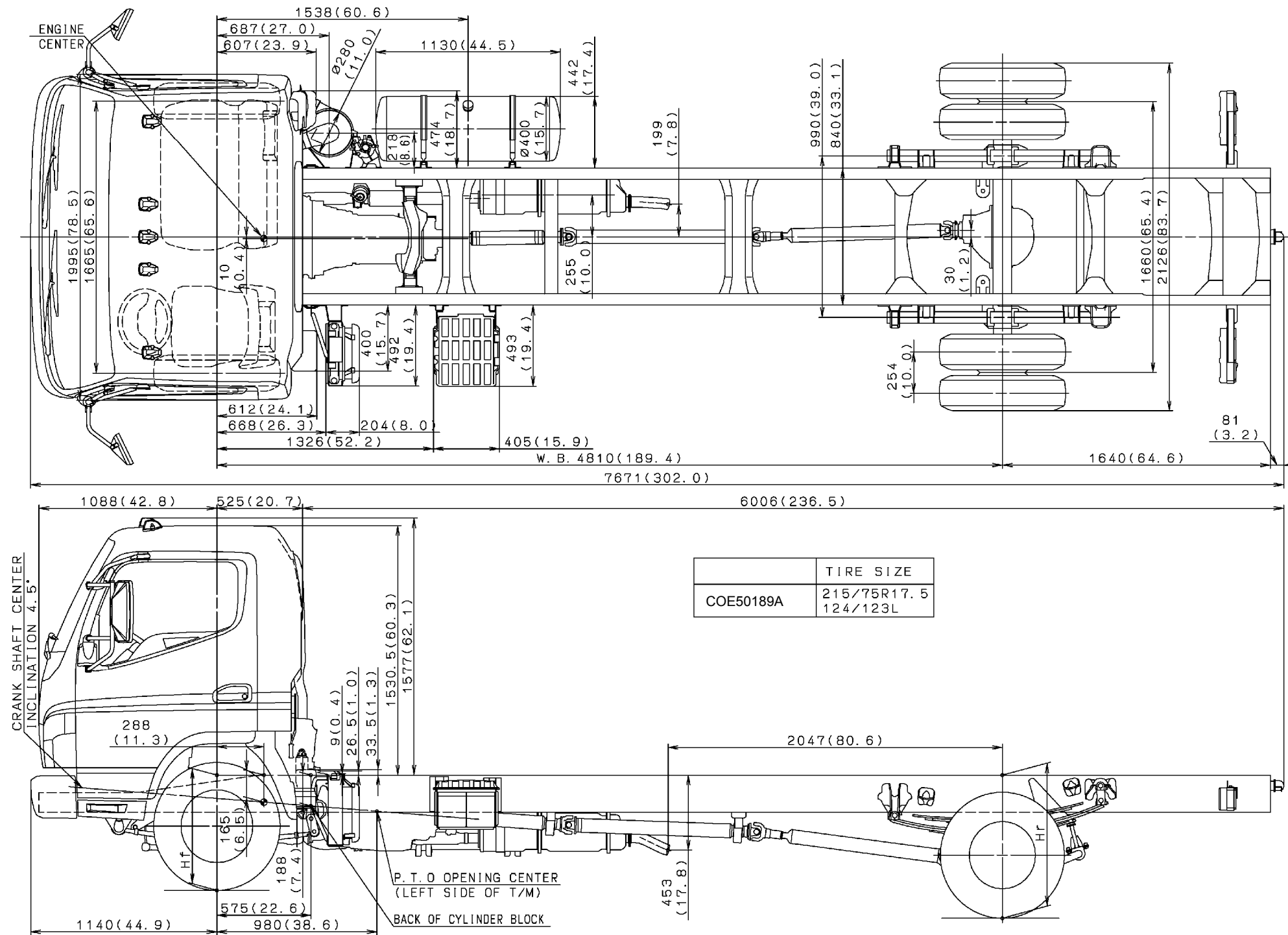
### 3.1.4 COE45176A, COE50176A



CHASSIS CAB  
DRAWINGS  
COE45176A  
COE50176A  
UNIT : mm (in.)  
SCALE : 1/30



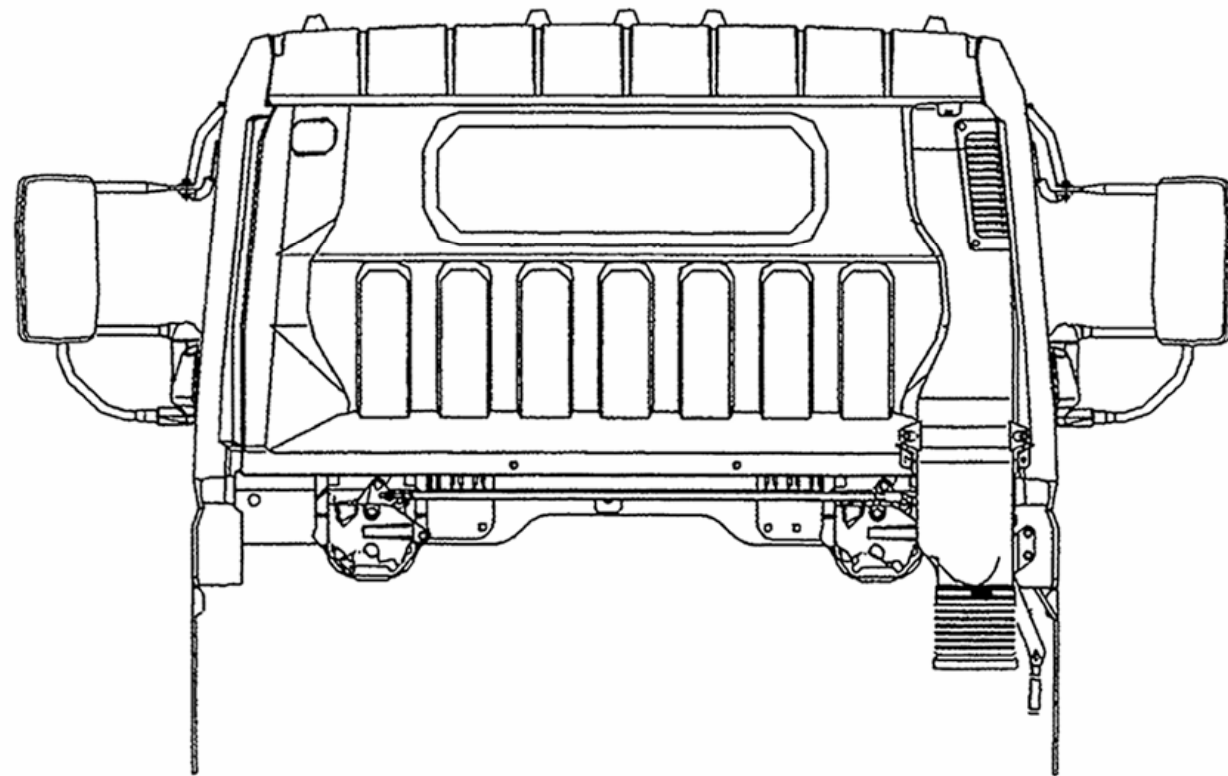
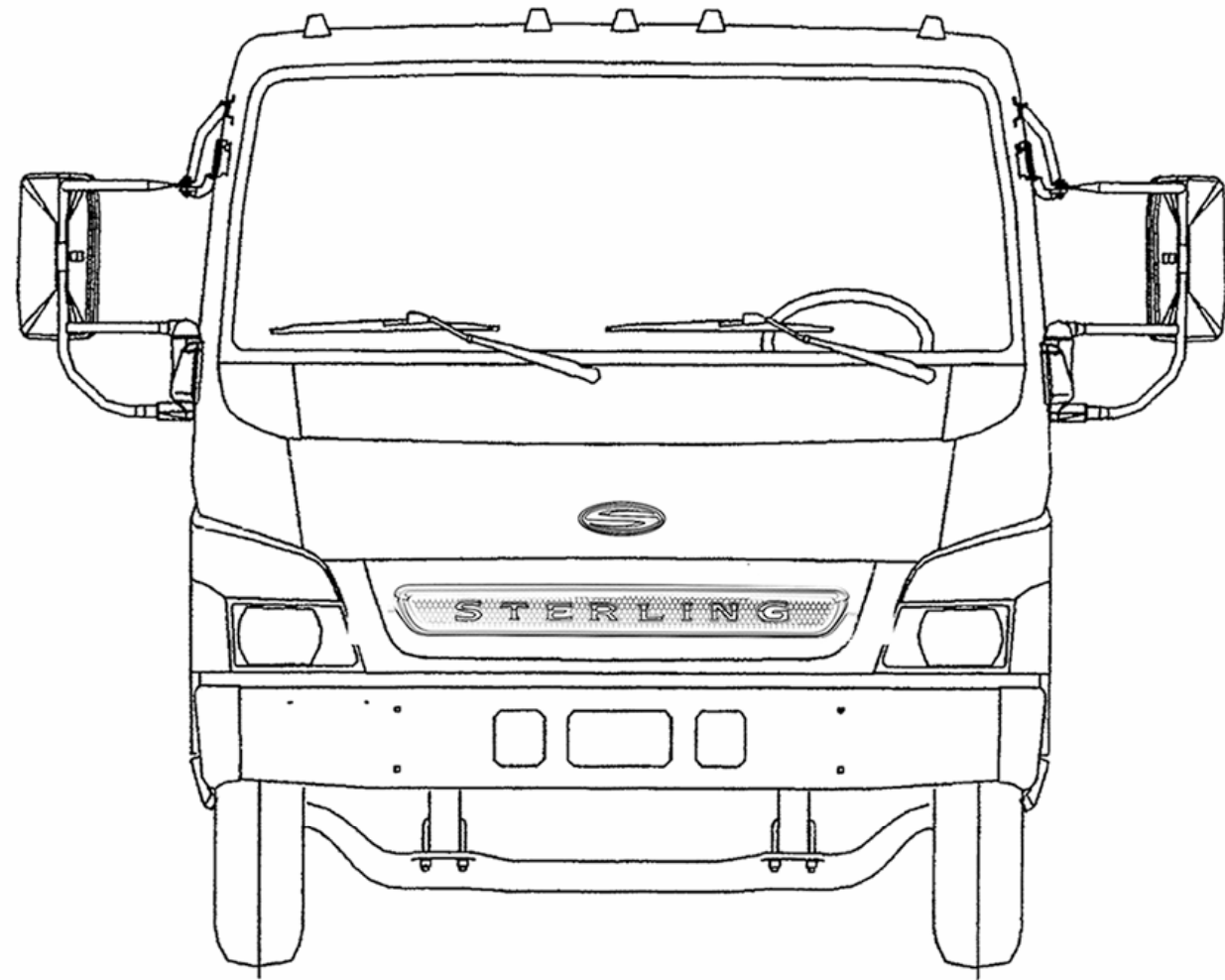
# 3.1.5 COE50189A



CHASSIS CAB  
DRAWINGS

COE50189A  
UNIT : mm (in.)  
SCALE : 1/30

### 3.2 Cab front and rear view



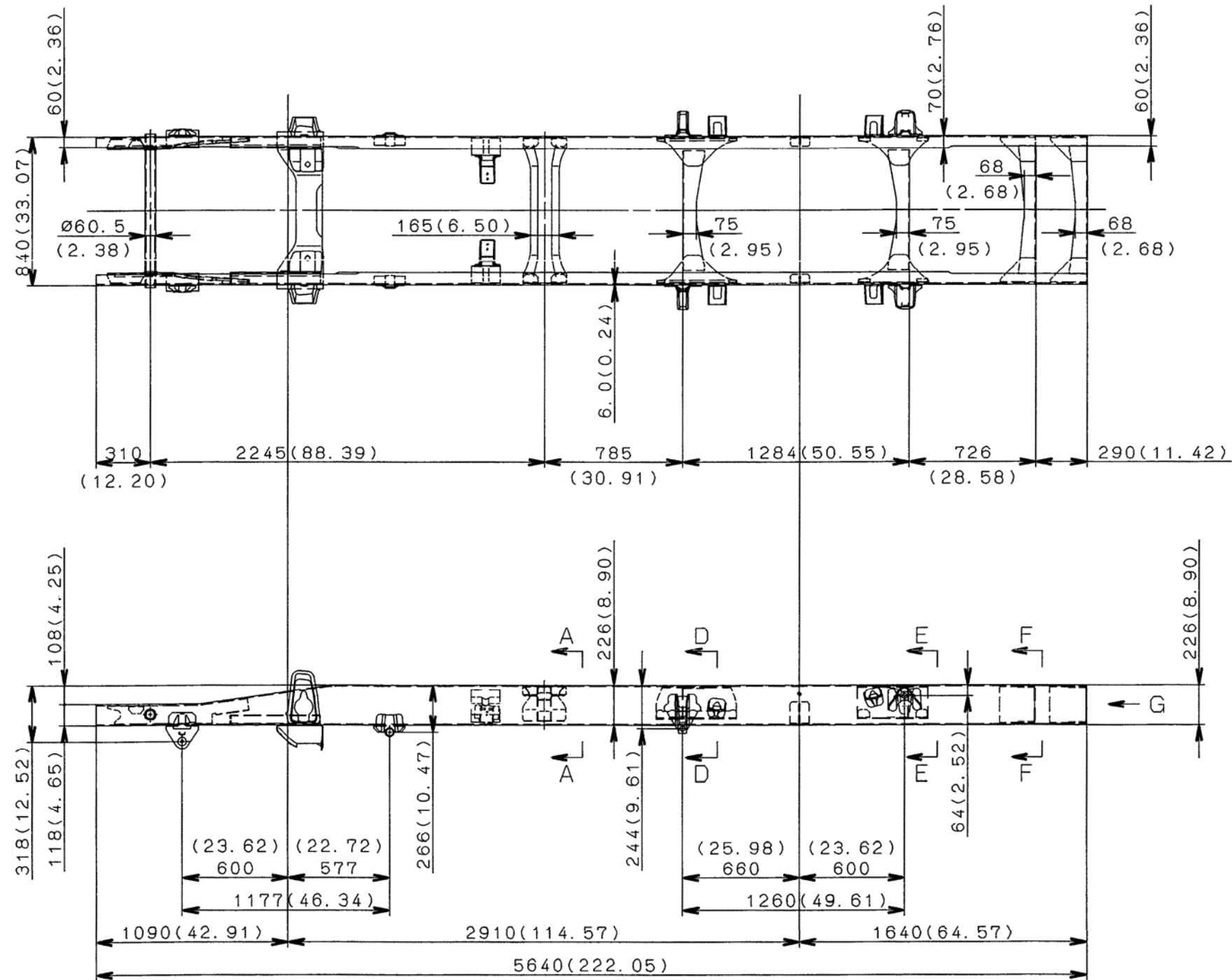
# 4. CHASSIS FRAME ASSEMBLY

## 4.1 COE30115A, COE45115A, COE50115A

COE30115A

COE45115A

COE50115A



UNIT : mm (in.)

SCALE: 1:30

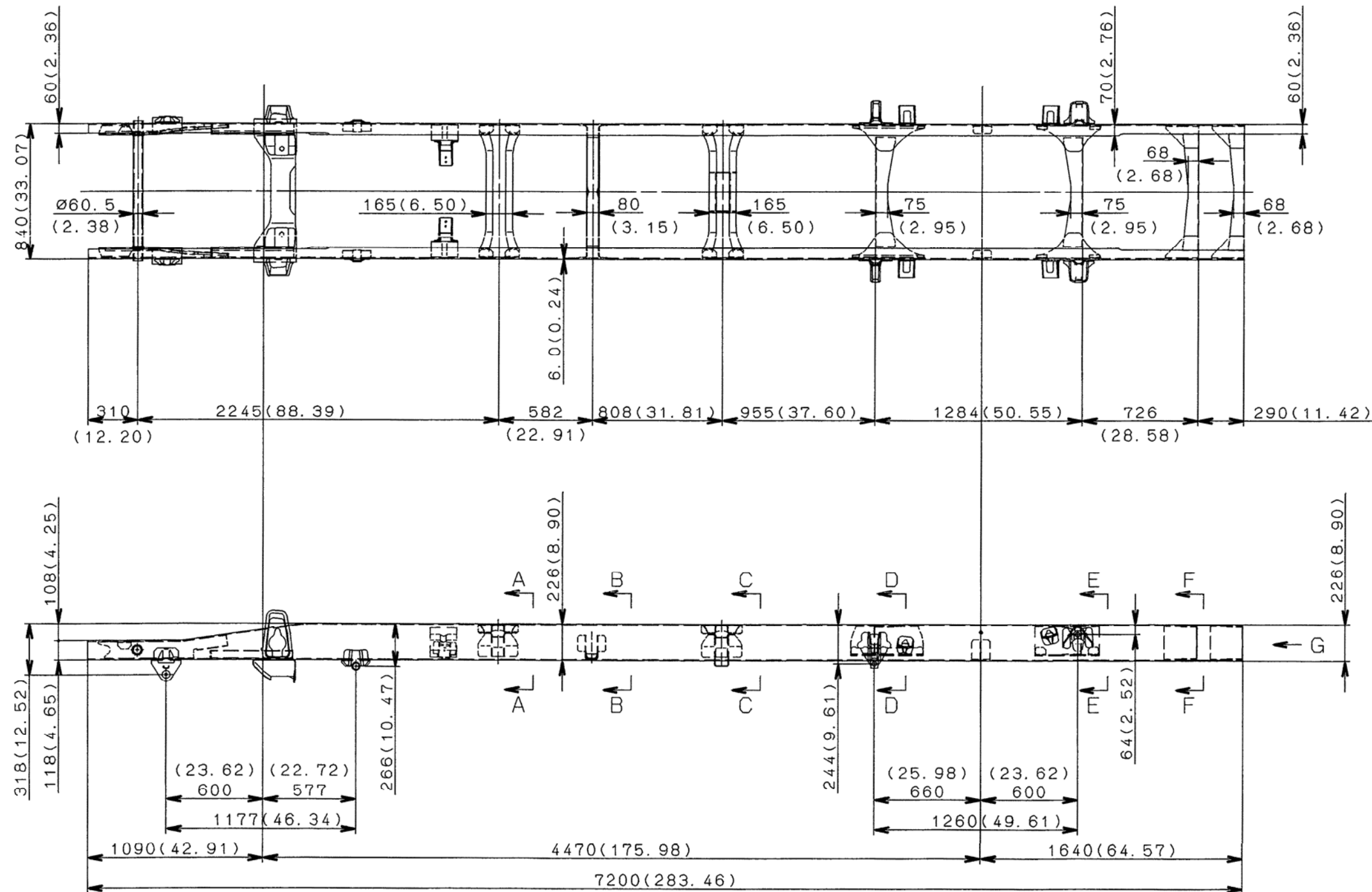
Frame Layout





# 4.4 COE45176A, COE50176A

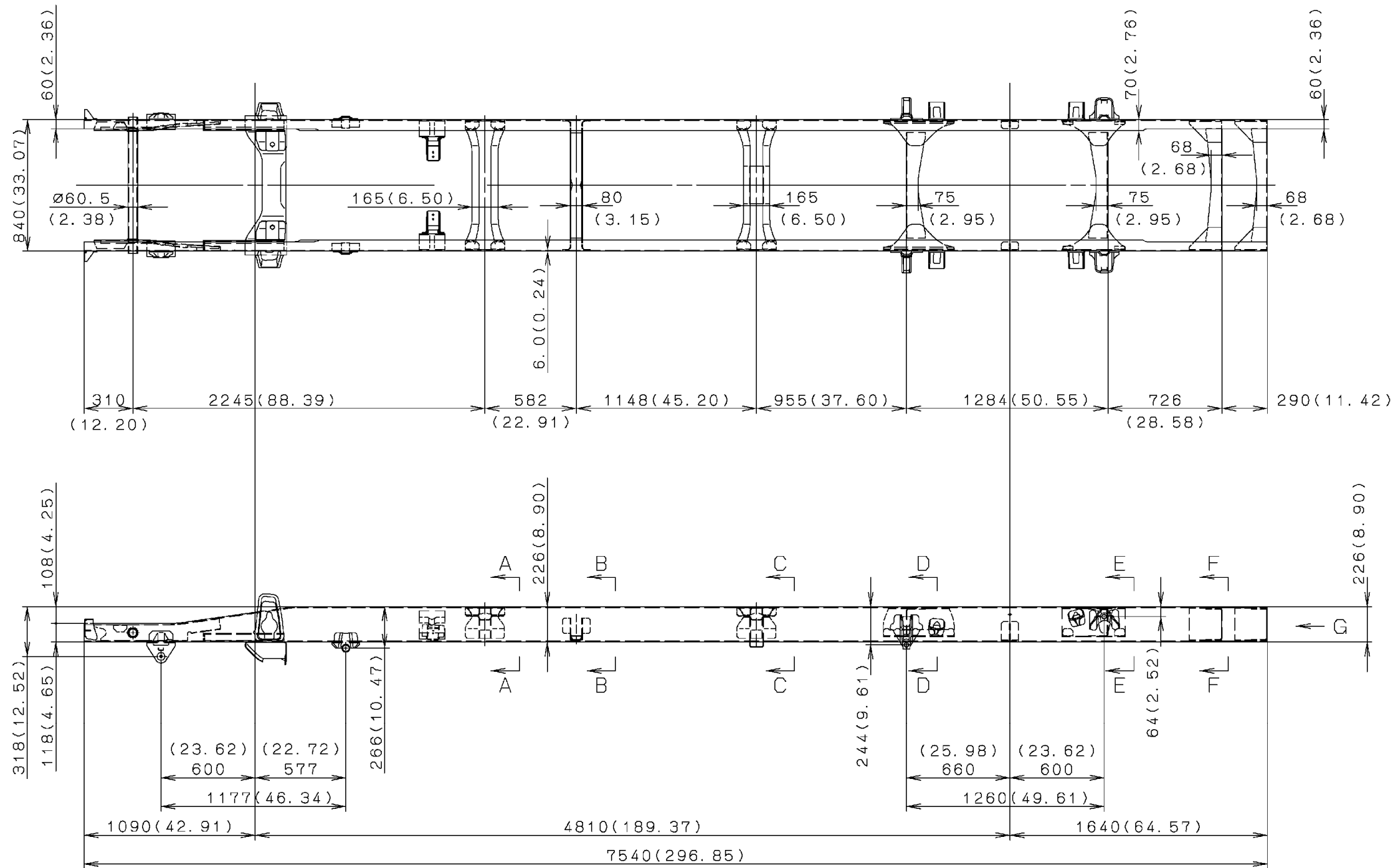
COE45176A  
COE50176A



UNIT : mm (in.)  
SCALE: 1:30  
Frame Layout

# 4.5 COE50189A

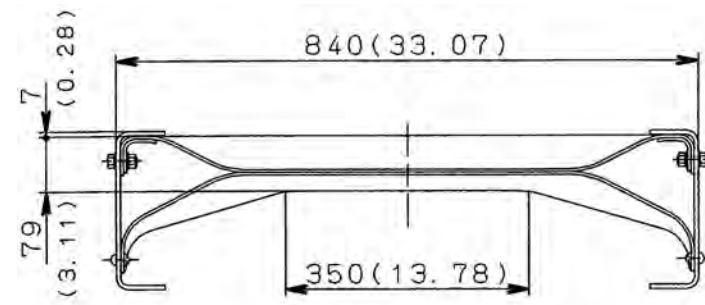
COE50189A



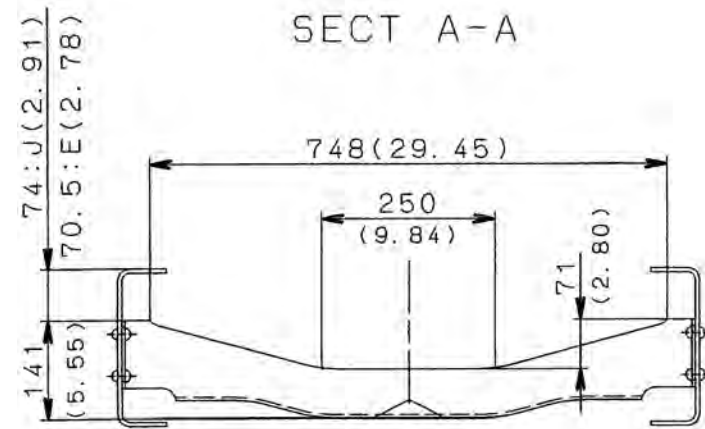
UNIT : mm (in.)  
 SCALE: 1:30  
 Frame Layout

# 5. CROSSMEMBER REAR VIEW

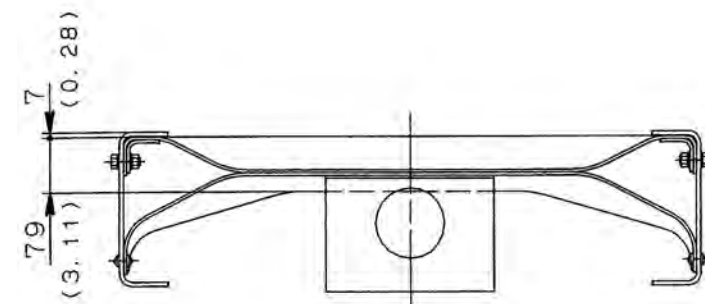
## 5.1 COE Series



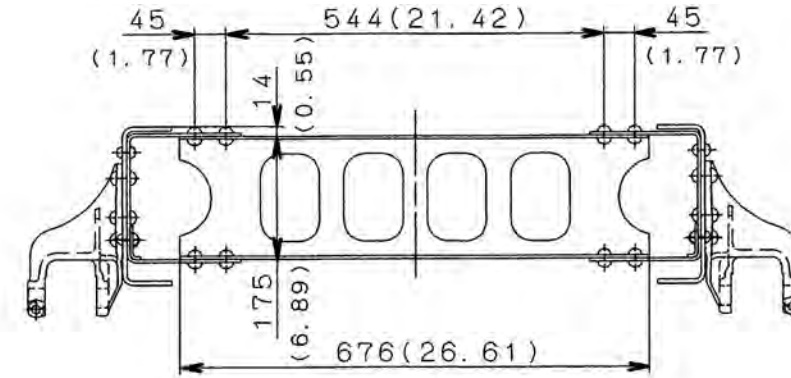
SECT A-A



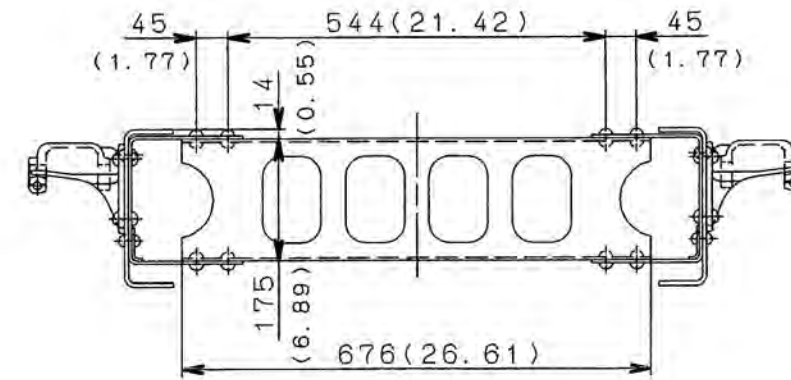
SECT B-B



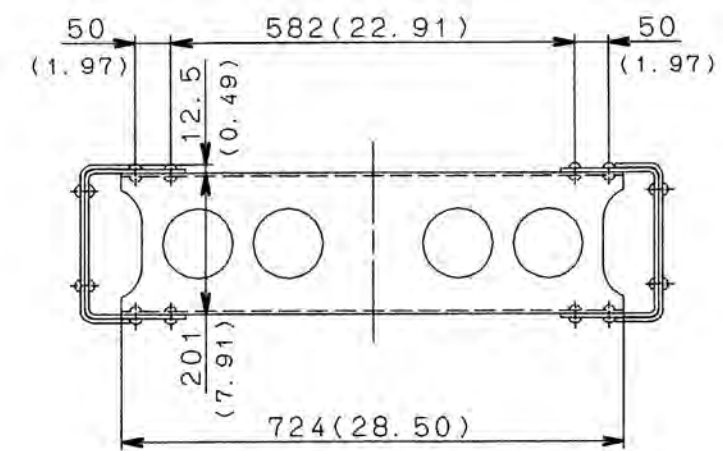
SECT C-C



SECT D-D



SECT E-E



SECT F-F  
G-G

UNIT : mm (in.)

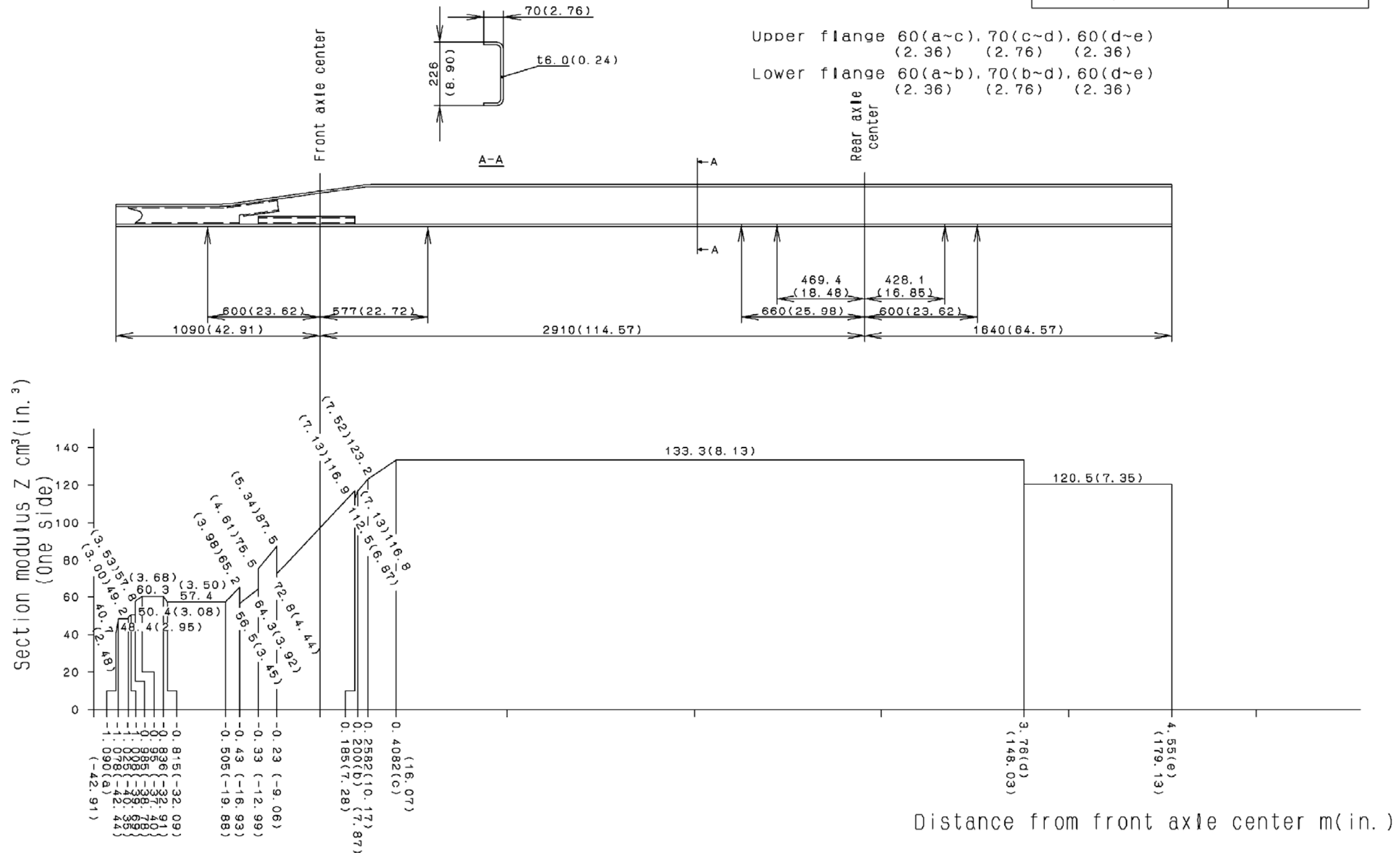


# 6. FRAME SECTION MODULUS DIAGRAMS

## 6.1 COE30115A, COE45115A, COE50115A

Model FE80DDZ Chassis frame section modulus(one side)

|                      |             |
|----------------------|-------------|
| Side-member material | HTP540(JIS) |
| Tensile strength MPa | 540         |
| Yield point MPa      | 390         |

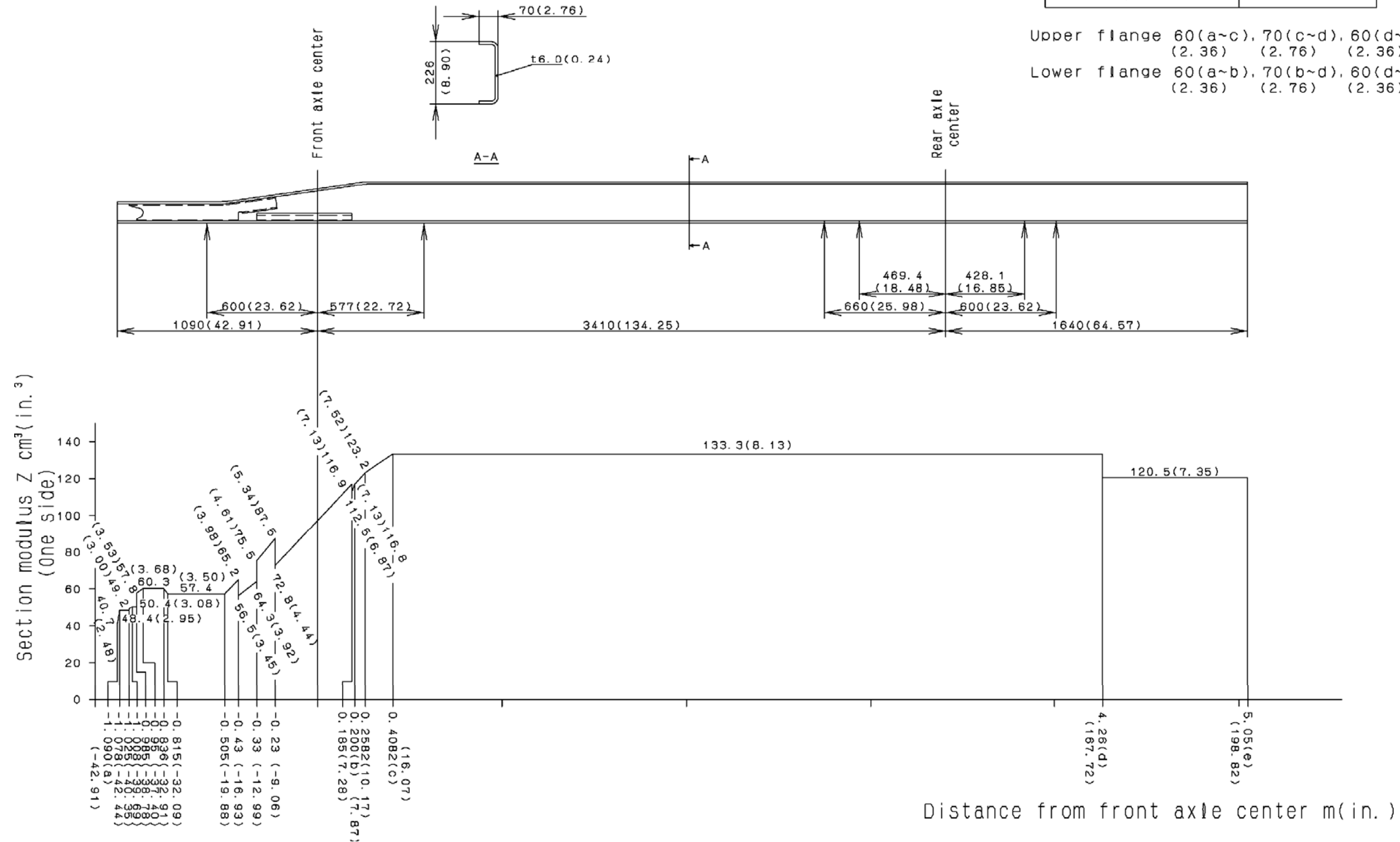


## 6.2 COE30134A, COE45134A, COE50134A

Model FE80DEZ Chassis frame section modulus(one side)

|                      |             |
|----------------------|-------------|
| Side-member material | HTP540(JIS) |
| Tensile strength MPa | 540         |
| Yield point MPa      | 390         |

Upper flange 60(a~c), 70(c~d), 60(d~e)  
 (2.36) (2.76) (2.36)  
 Lower flange 60(a~b), 70(b~d), 60(d~e)  
 (2.36) (2.76) (2.36)

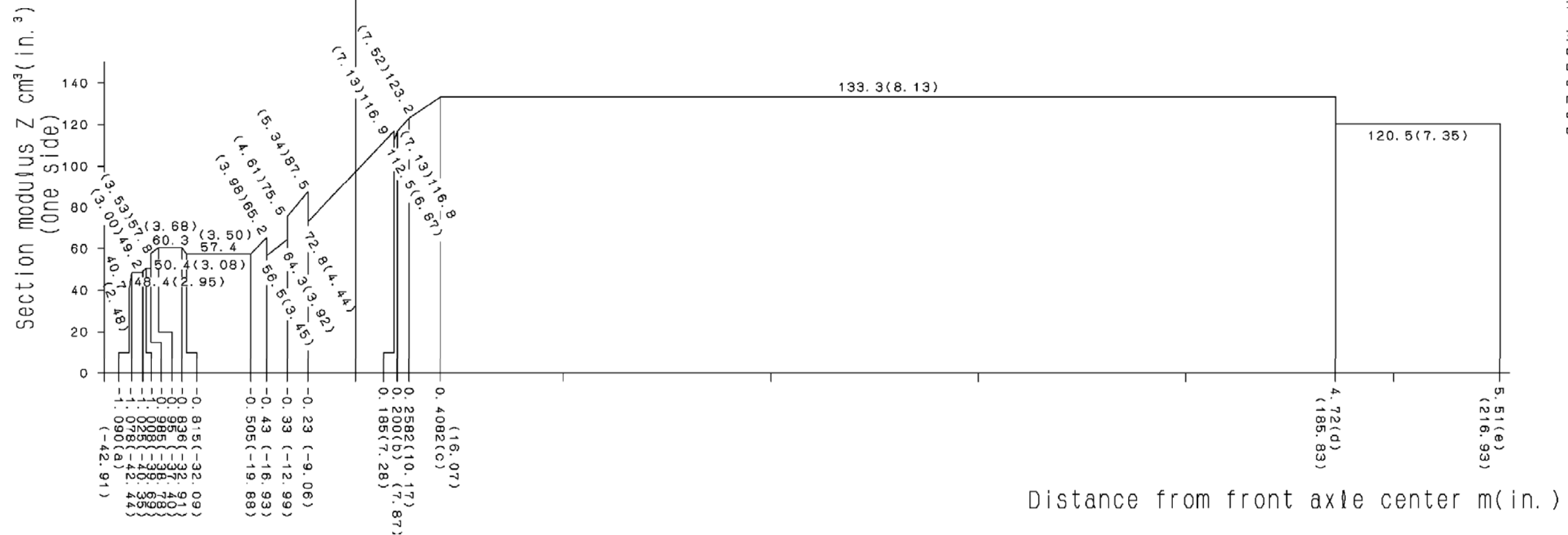
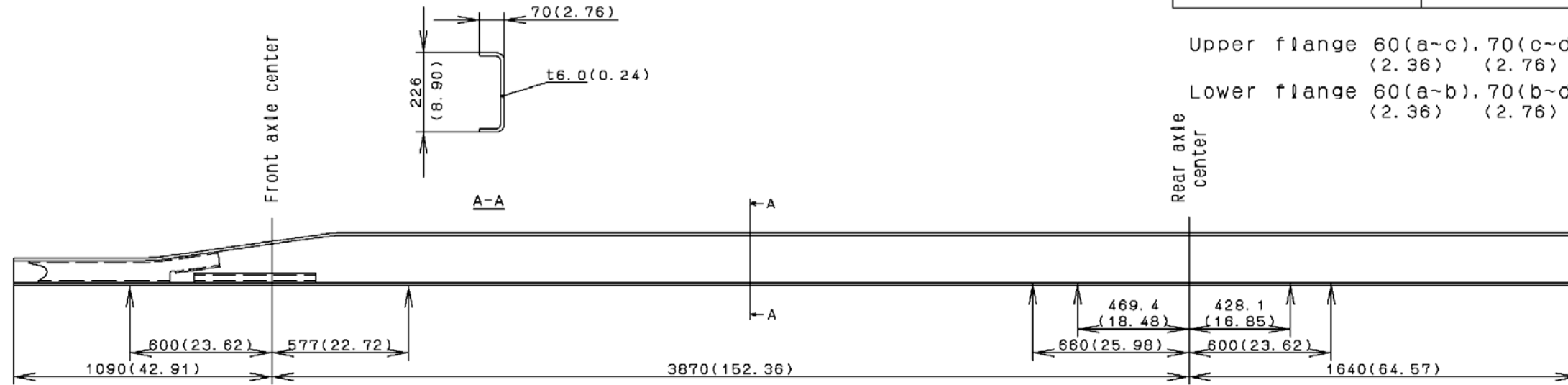


# 6.3 COE30152A, COE45152A, COE50152A

Model FE8DDGZ Chassis frame section modulus(one side)

|                      |             |
|----------------------|-------------|
| Side-member material | HTP540(JIS) |
| Tensile strength MPa | 540         |
| Yield point MPa      | 390         |

Upper flange 60(a~c), 70(c~d), 60(d~e)  
 (2.36) (2.76) (2.36)  
 Lower flange 60(a~b), 70(b~d), 60(d~e)  
 (2.36) (2.76) (2.36)



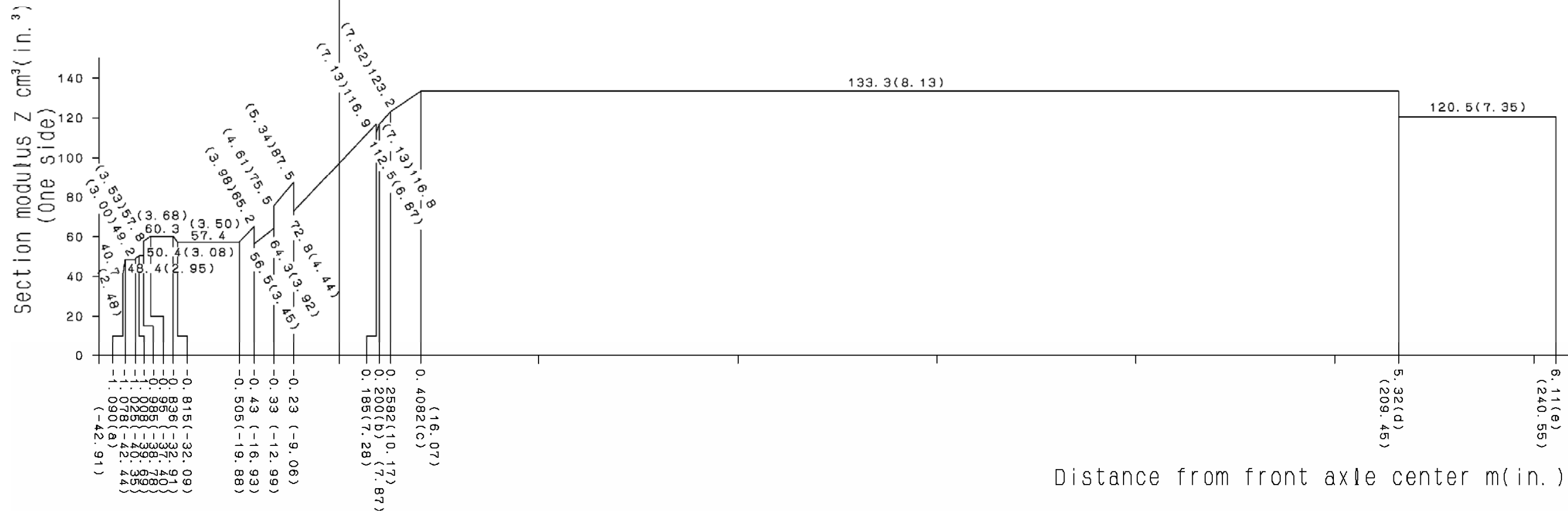
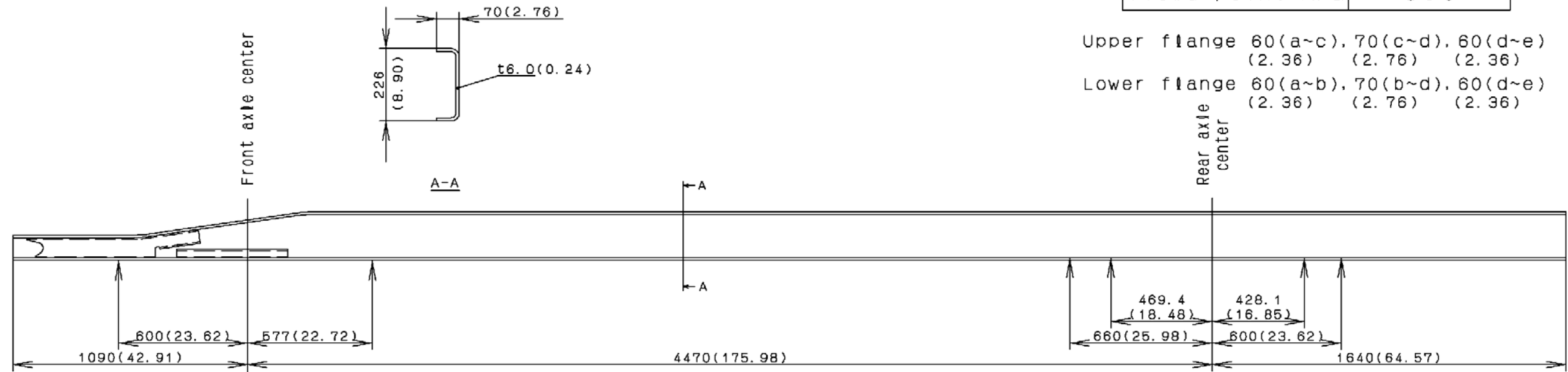
FRAME SECTION MODULUS

# 6.4 COE45176A, COE50176A

Model FE8DDJZ Chassis frame section modulus(one side)

|                      |             |
|----------------------|-------------|
| Side-member material | HTP540(JIS) |
| Tensile strength MPa | 540         |
| Yield point MPa      | 390         |

Upper flange 60(a~c), 70(c~d), 60(d~e)  
 (2.36) (2.76) (2.36)  
 Lower flange 60(a~b), 70(b~d), 60(d~e)  
 (2.36) (2.76) (2.36)

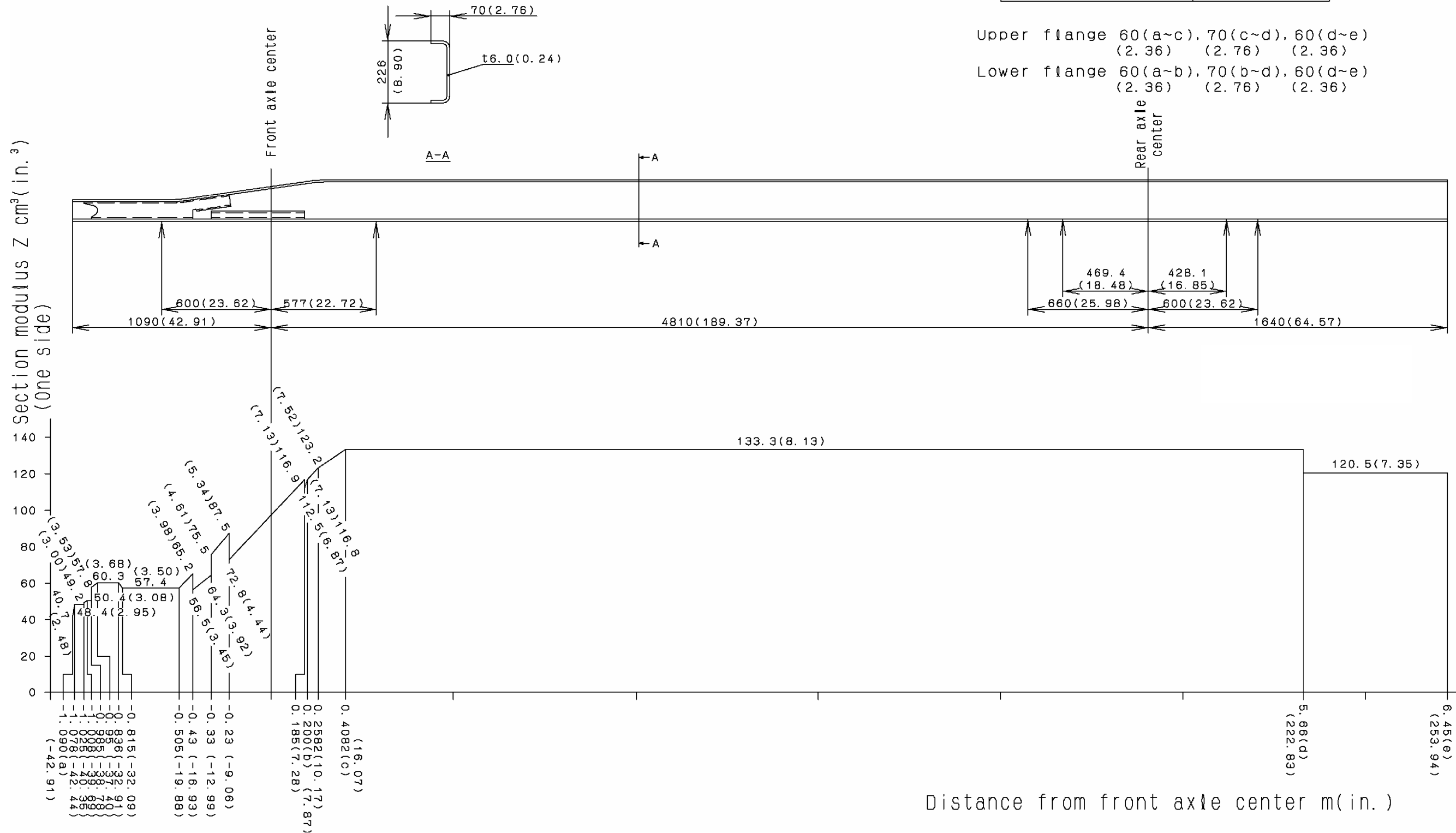


# 6.5 COE50189A

Model FE85DKZ Chassis frame section modulus(one side)

|                      |             |
|----------------------|-------------|
| Side-member material | HTP540(JIS) |
| Tensile strength MPa | 540         |
| Yield point MPa      | 390         |

Upper flange 60(a~c), 70(c~d), 60(d~e)  
 (2.36) (2.76) (2.36)  
 Lower flange 60(a~b), 70(b~d), 60(d~e)  
 (2.36) (2.76) (2.36)



# 7. FRAME HEIGHT

## 7.1 Tire radius

(Ground to top of Frame at Front & Rear Axle center)

Calculating the formulas

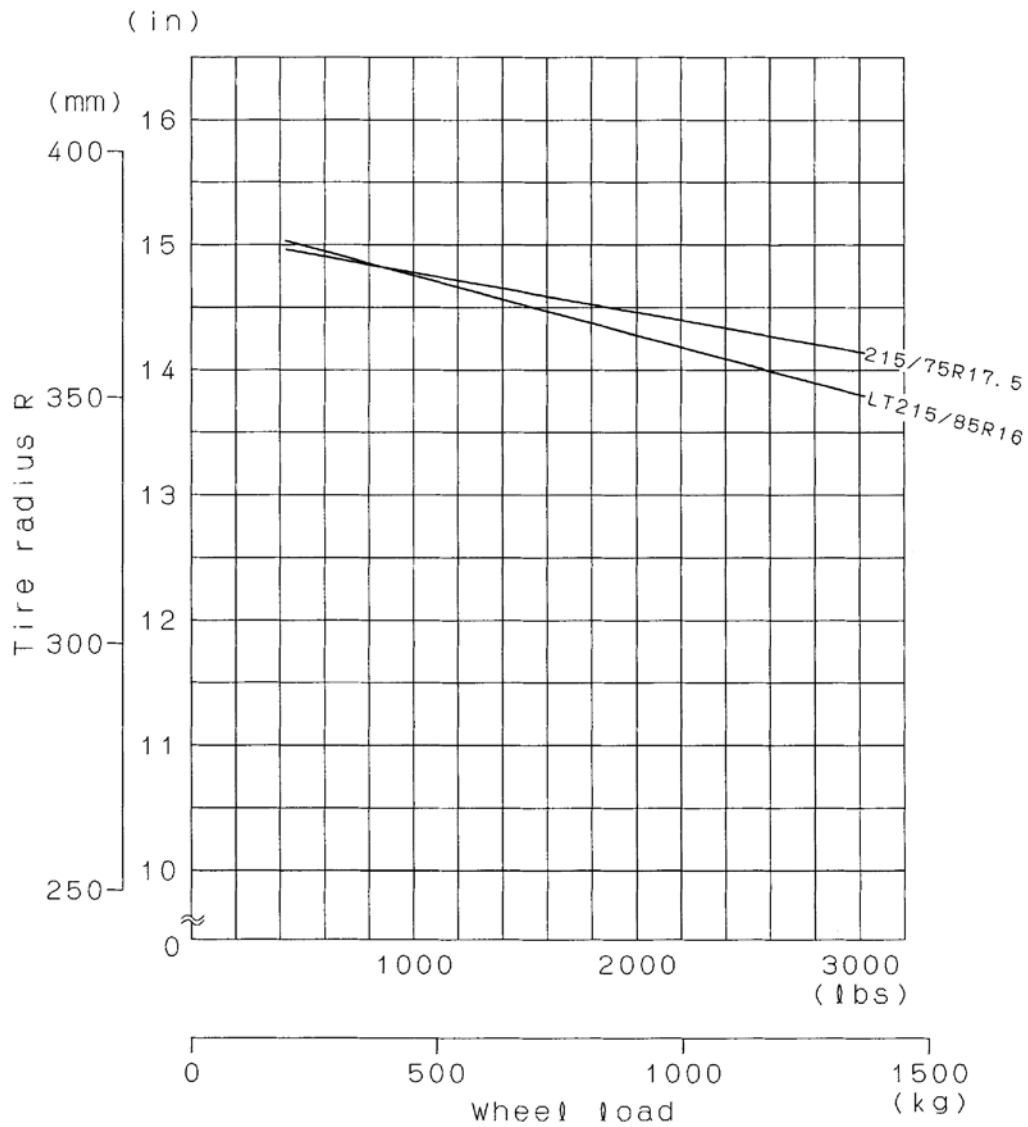
$$H_f = h_f + R_f \text{ (Frame height, Front)}$$

$$H_r = h_r + R_r \text{ (Frame height, Rear)}$$

$h_f$  : Distance from top to front wheel center (see section 9 : Front and Rear springs)

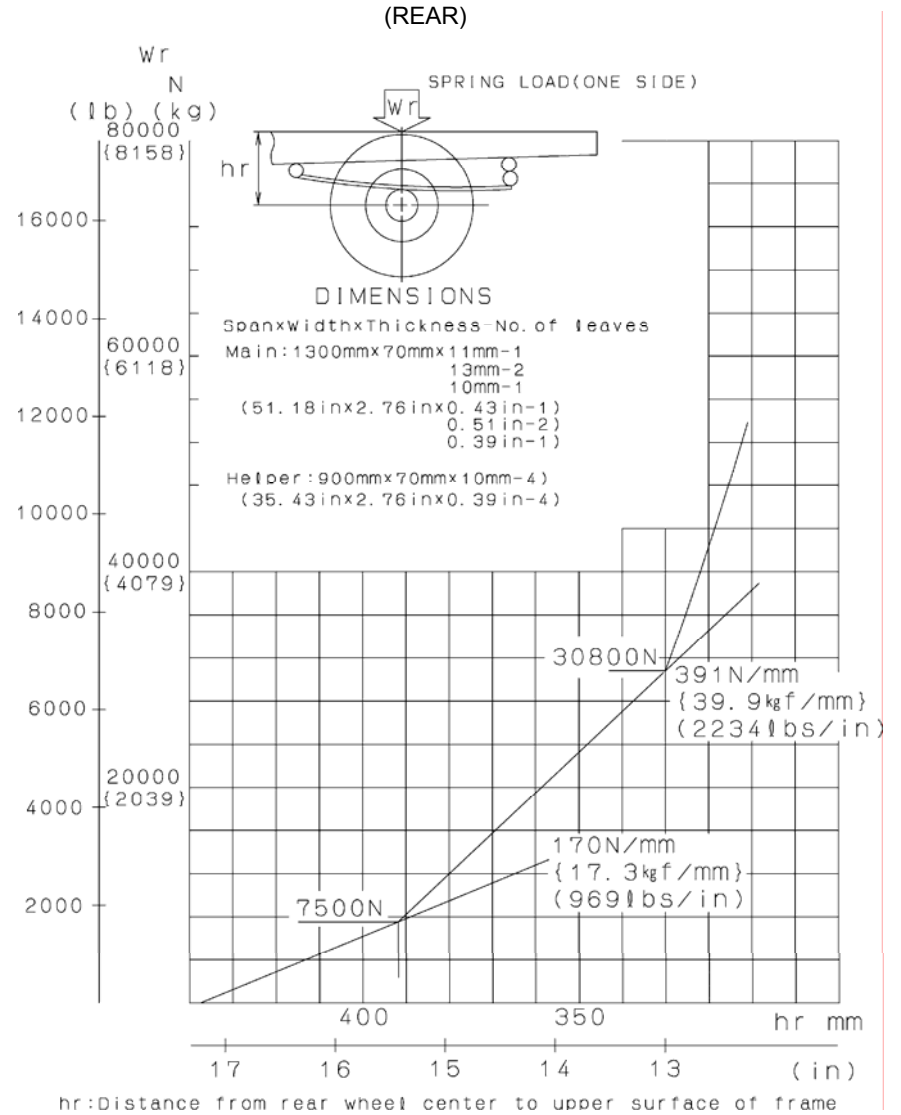
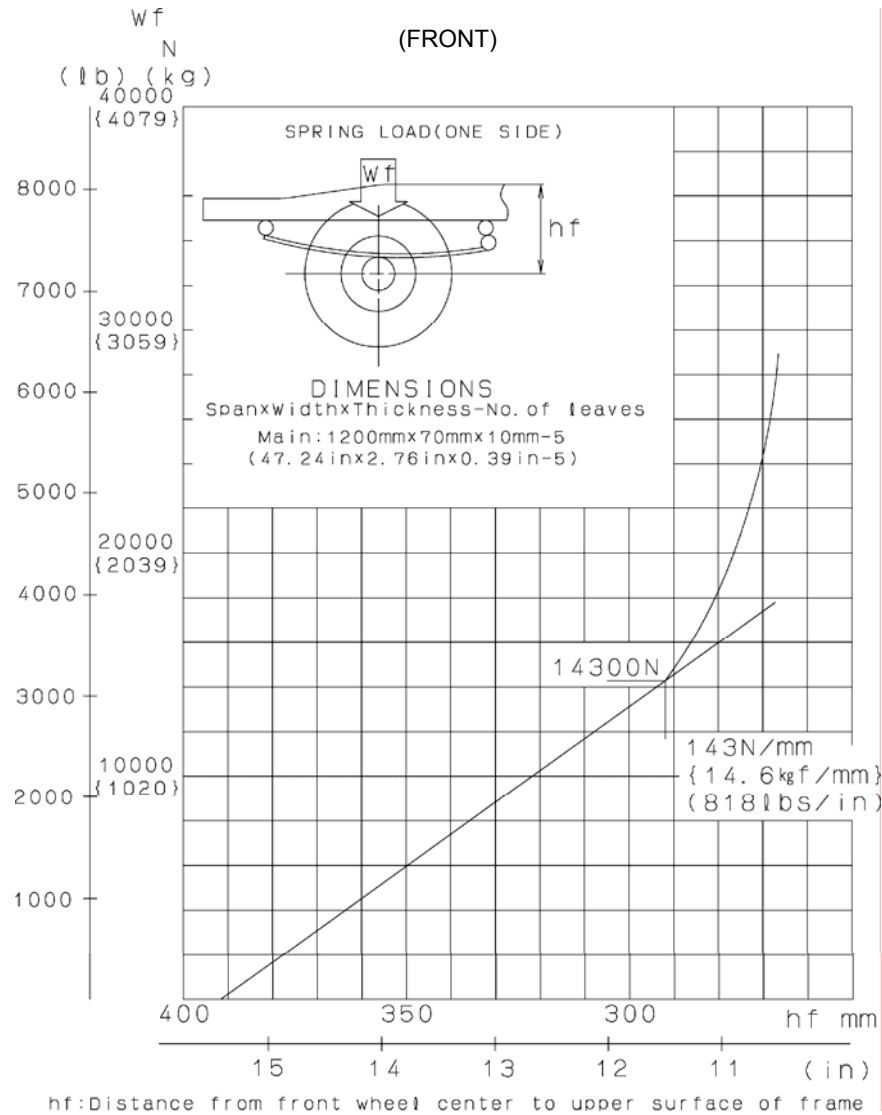
$h_r$  : Distance from top to rear wheel center (see section 9 : Front and Rear springs)

$R_f, R_r$  : Tire radius (See following Tire chart following.)

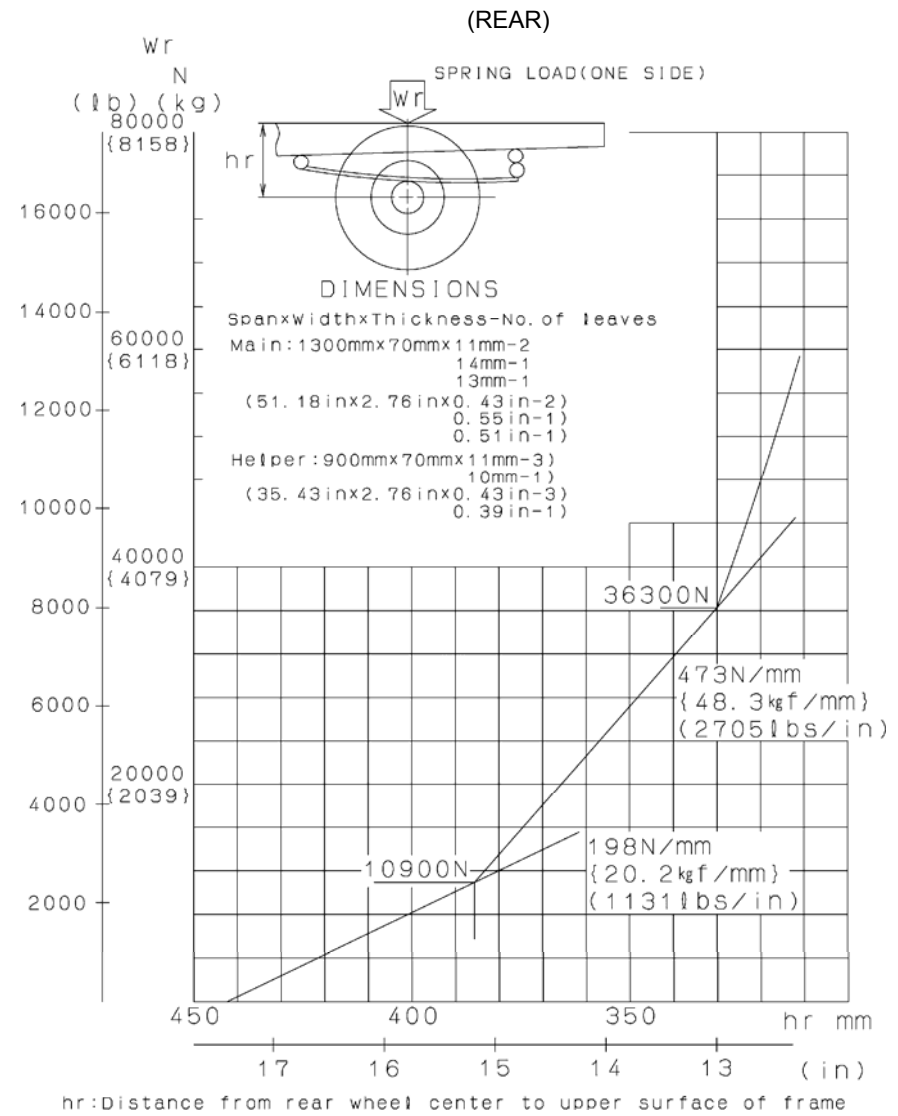
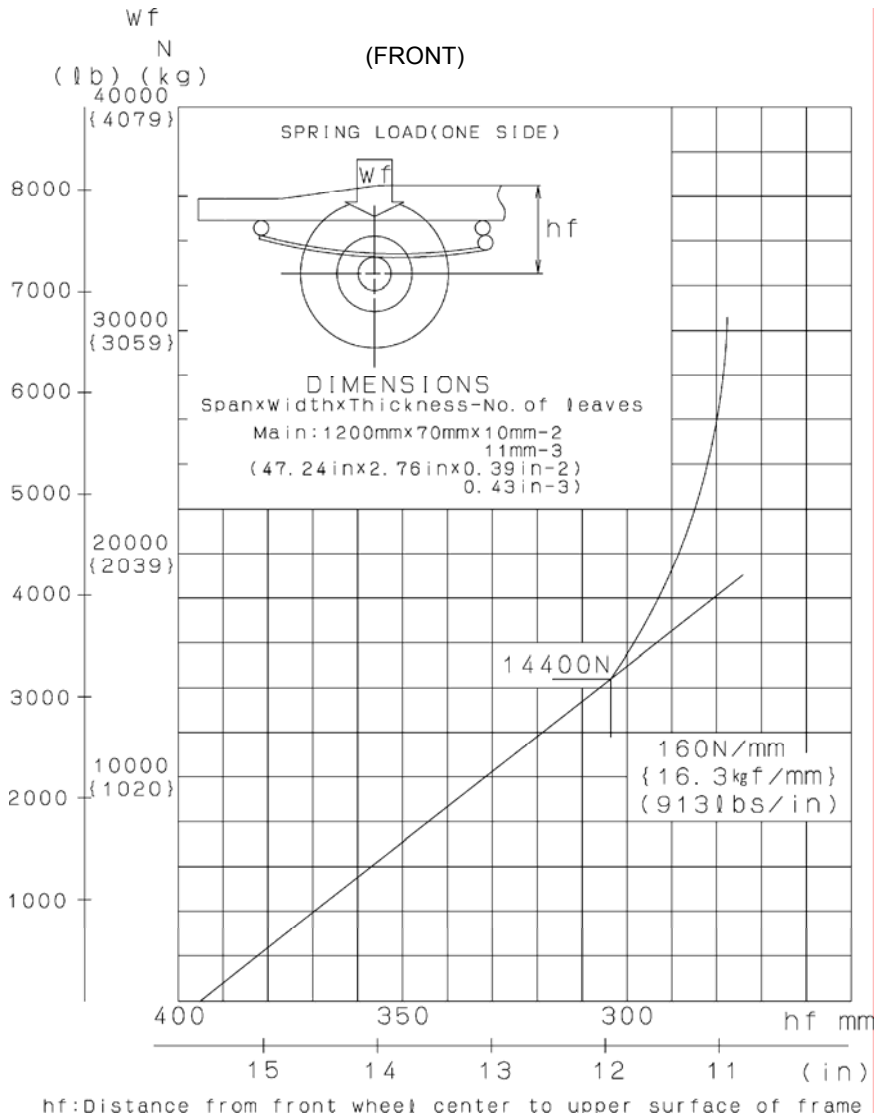


# 7.2 Front and rear springs

## 7.2.1 COE30

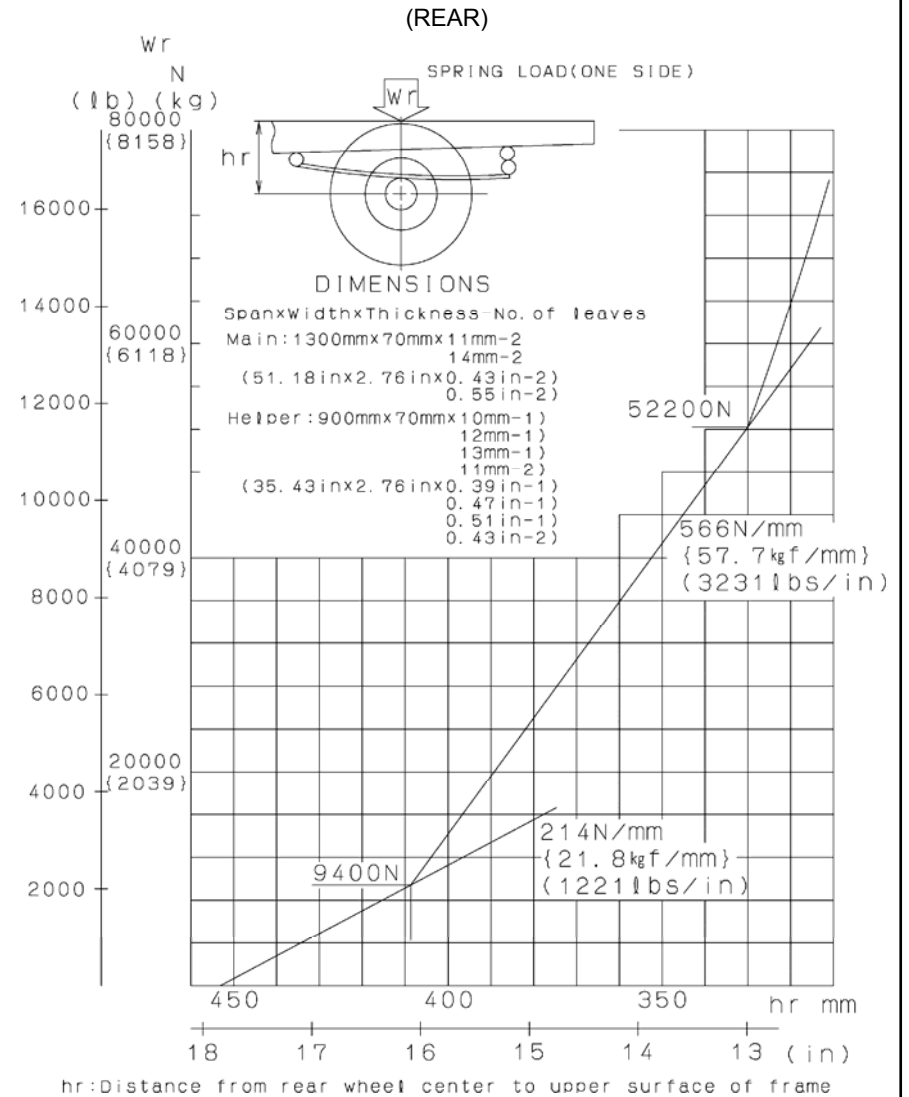
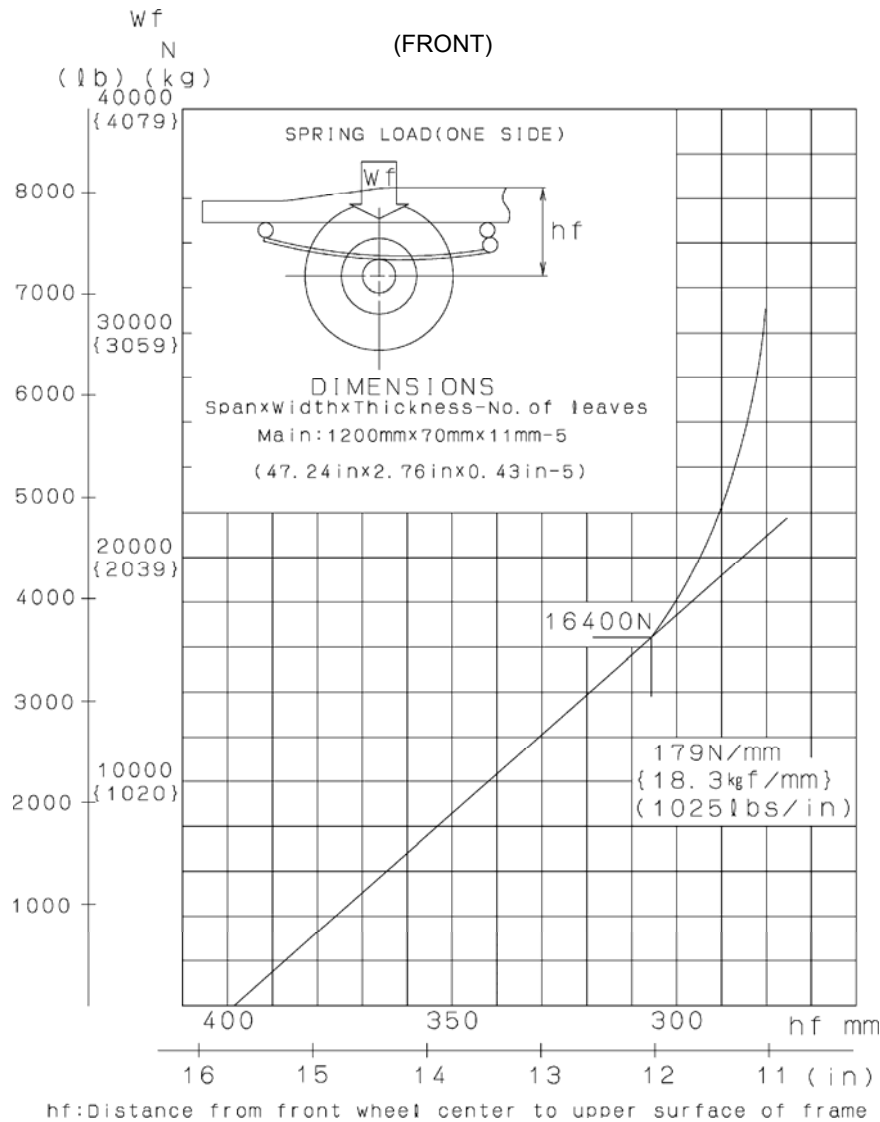


# 7.2.2 COE45





# 7.2.3 COE50



## 7.3 Vehicle sprung weight

| Vehicle Model          | Sprung Weight lbs (kg) |              |                  |
|------------------------|------------------------|--------------|------------------|
|                        | Front                  | Rear         | Total            |
| COE30115A<br>COE45115A | 3,330<br>(1,510)       | 750<br>(340) | 4,080<br>(1,850) |
| COE30134A<br>COE45134A | 3,415<br>(1,550)       | 685<br>(315) | 4,100<br>(1,865) |
| COE30152A<br>COE45152A | 3,470<br>(1,575)       | 710<br>(320) | 4,180<br>(1895)  |
| COE45176A              | 3,485<br>(1,580)       | 750<br>(340) | 4,235<br>(1,920) |
| COE50115A              | 3,265<br>(1,480)       | 715<br>(325) | 3,980<br>(1,805) |
| COE50134A              | 3,350<br>(1,520)       | 660<br>(300) | 4,010<br>(1,820) |
| COE50152A              | 3,395<br>(1,540)       | 685<br>(310) | 4,080<br>(1,850) |
| COE50176A              | 3,415<br>(1,550)       | 730<br>(330) | 4,145<br>(1,880) |
| COE50189A              | 3,450<br>(1,565)       | 720<br>(325) | 4,170<br>(1,890) |

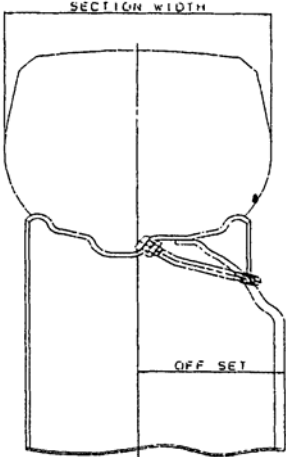
# 8. TIRE AND DISC WHEEL

## TIRE

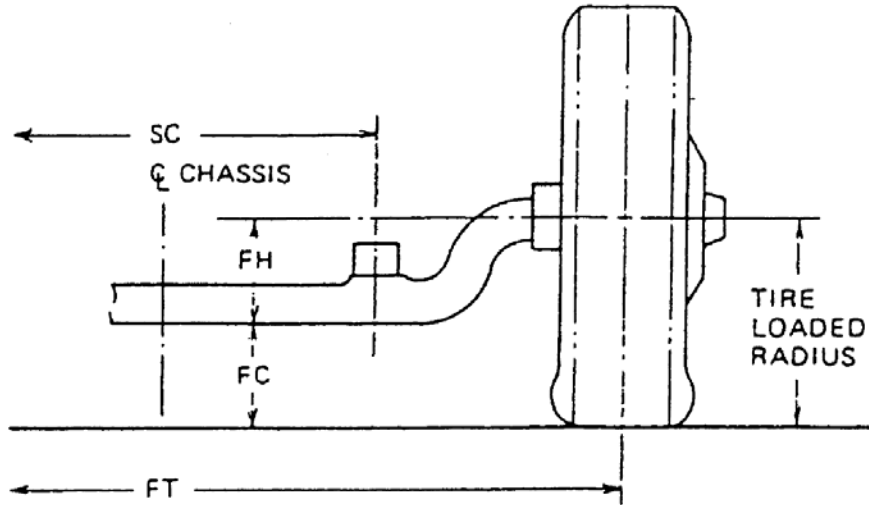
| VEHICLE MODEL | TIRE SIZE   | PLY RATING | LOAD RANGE | RIM WIDTH in. | TIRE DIMENSION               |                           | LOAD CAPACITY PER AXLE    |                        | MAXIMUM INFLATION PRESSURE<br>kPa (psi) |
|---------------|-------------|------------|------------|---------------|------------------------------|---------------------------|---------------------------|------------------------|---|
|               |             |            |            |               | OVERALL DIAMETER<br>mm (in.) | SECTION WIDTH<br>mm (in.) | FRONT SINGLE<br>kg (lbs.) | REAR DUAL<br>kg (lbs.) |   |
| COE30         | LT215/85R16 | 10         | E          | 6             | 772 (30.4)                   | 216 (8.5)                 | 2430 (5360)               | 4480 (9880)            | 550 (80)                                |
| COE45         |             |            |            |               |                              |                           |                           |                        |   |
| COE50         | 215/75R17.5 | 12         | F          |               | 767 (30.2)                   | 212 (8.3)                 | 3200 (7055)               | 6200 (13669)           | 690 (100)                               |

## DISC WHEEL

| VEHICLE MODEL | WHEEL SIZE | BOLT HOLES | BOLT CIRCUIT DIAMETER<br>mm (in.) | OFFSET<br>mm (in.) | THICKNESS OF DISC | RIM TYPE                 |
|---------------|------------|------------|-----------------------------------|--------------------|-------------------|--------------------------|
| COE30         | 16X6K      | 5          | 208 (8.2)                         | 127 (5.0)          | 9 (0.4)           | 1 PIECE<br>(DROP CENTER) |
| COE45         |            | 6          | 222.25 (8.75)                     |                    |                   |                          |
| COE50         | 17.5X6.00  |            |                                   |                    |                   |                          |



# 9. FRONT AXLE



| VEHICLE MODEL | FRONT AXLE |                       | TIRE SIZE               | FT<br>mm (in.) | SC<br>mm (in.) | FH<br>mm (in.) |
|---------------|------------|-----------------------|-------------------------|----------------|----------------|----------------|
|               | MODEL      | CAPACITY<br>kg (lbs.) |                         |                |                |                |
| COE30         | F200T      | 2400 (5290)           | LT215/85R16 (16x6K)     | 1665 (65.55)   | 807 (31.77)    | 177 (6.97)     |
| COE45         | F300T      | 2500 (5510)           |                         |                |                |                |
| COE50         | F350T      | 2900 (6390)           | 215/75R17.5 (17.5x6.00) | 1665 (65.55)   | 807 (31.77)    | 177 (6.97)     |

## DEFINITIONS

FT : Front tread

SC : Spring to spring distance

FH : Distance between the center line of tire and the bottom of front axle

FC : Front axle clearance

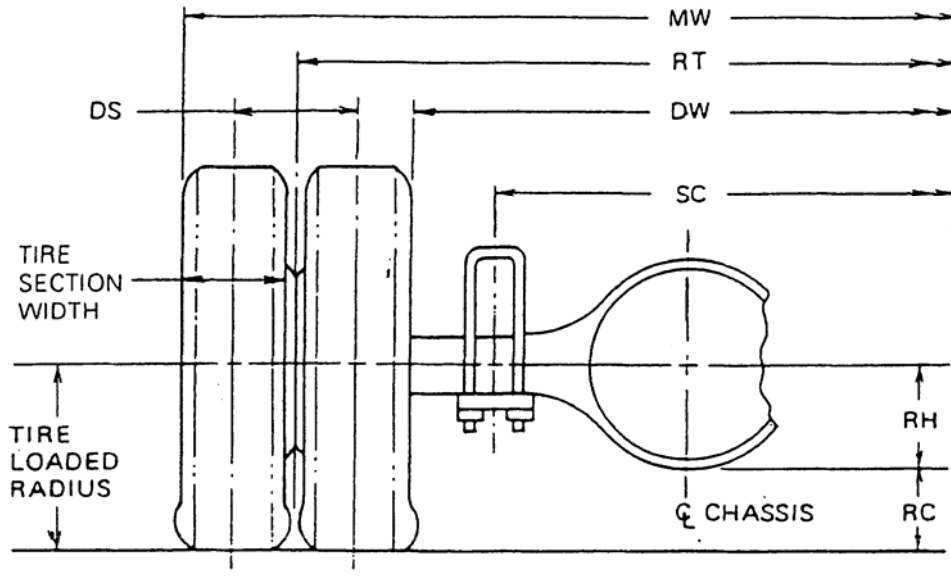
Minimum clearance between the front axle and the ground-line

TIRE LOADED RADIUS : See section 7: FRAME HEIGHT "Tire radius" (PAGE II-7-1)

Formula for calculating front axle clearance

$$FC = \text{Tire loaded Radius} - FH$$

# 10. REAR AXLE



| VEHICLE MODEL | REAR AXLE |                       | TIRE SIZE                  | RT<br>mm (in.) | SC<br>mm (in.) | RH<br>mm (in.) | DS<br>mm (in.) |
|---------------|-----------|-----------------------|----------------------------|----------------|----------------|----------------|----------------|
|               | MODEL     | CAPACITY<br>kg (lbs.) |                            |                |                |                |                |
| COE30         | R033T     | 4300 (9480)           | LT215/85R16<br>(16x6K)     | 1650 (64.96)   | 990 (38.98)    | 182.5 (7.19)   | 254 (10.00)    |
| COE45         |           | 4500 (9920)           |                            | 1660 (65.35)   |                |                |                |
| COE50         | R035T     | 5760 (12700)          | 215/75R17.5<br>(17.5x6.00) | 1660 (65.35)   | 990 (38.98)    |                |                |

## DEFINITIONS

- RT : Rear tread
- SC : Spring to spring distance
- RH : Distance between the center line of tire and the bottom of rear axle
- DS : Dual tire spacing
- DW : Minimum distance between the inner surface of rear tires
- MW : Overall width of vehicle
- RC : Rear axle clearance  
Minimum clearance between the rear axle and the ground-line

TIRE SECTION WIDTH : See section 8: "TIRE AND DISC WHEEL" (PAGE II-8-1)

TIRE LOADED RADIUS : See section 7: FRAME HEIGHT "Tire radius" (PAGE II-7-1)

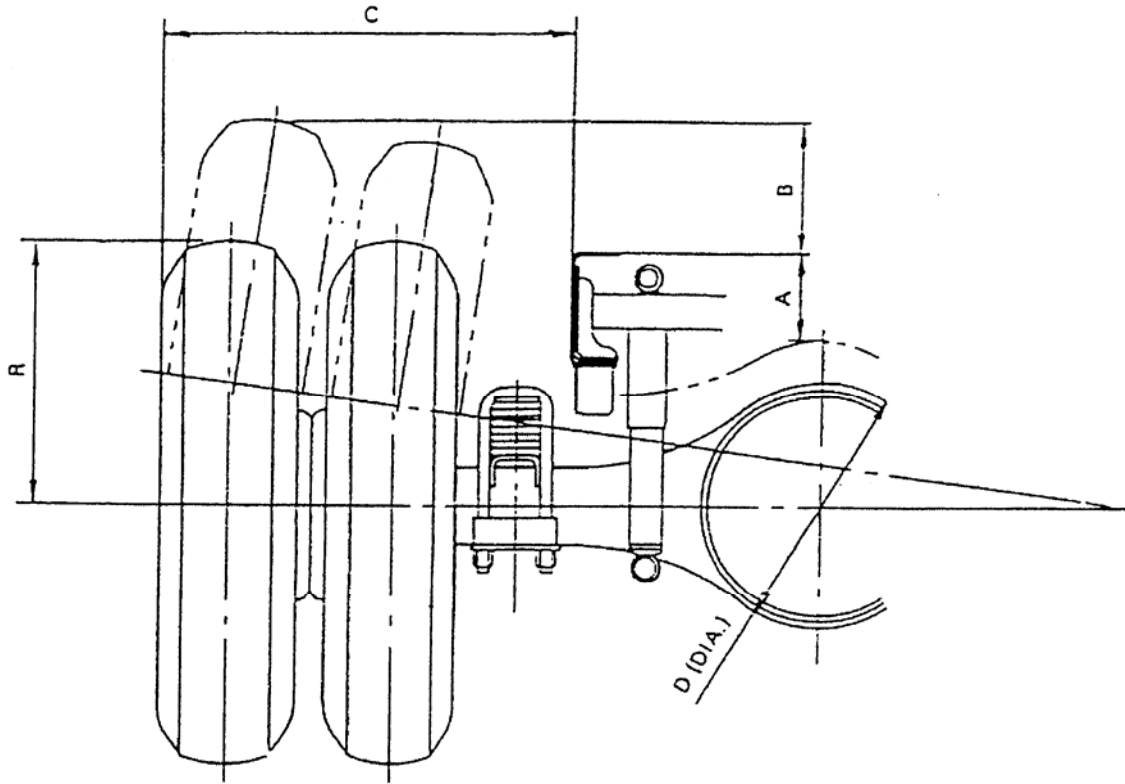
Formula for calculating front axle clearance

$$DW = RT - DS - \text{TIRE SECTION WIDTH}$$

$$MW = RT + DS + \text{TIRE SECTION WIDTH}$$

$$RC = \text{TIRE LOADED RADIUS} - RH$$

# 11. REAR AXLE BOUNCE HEIGHT



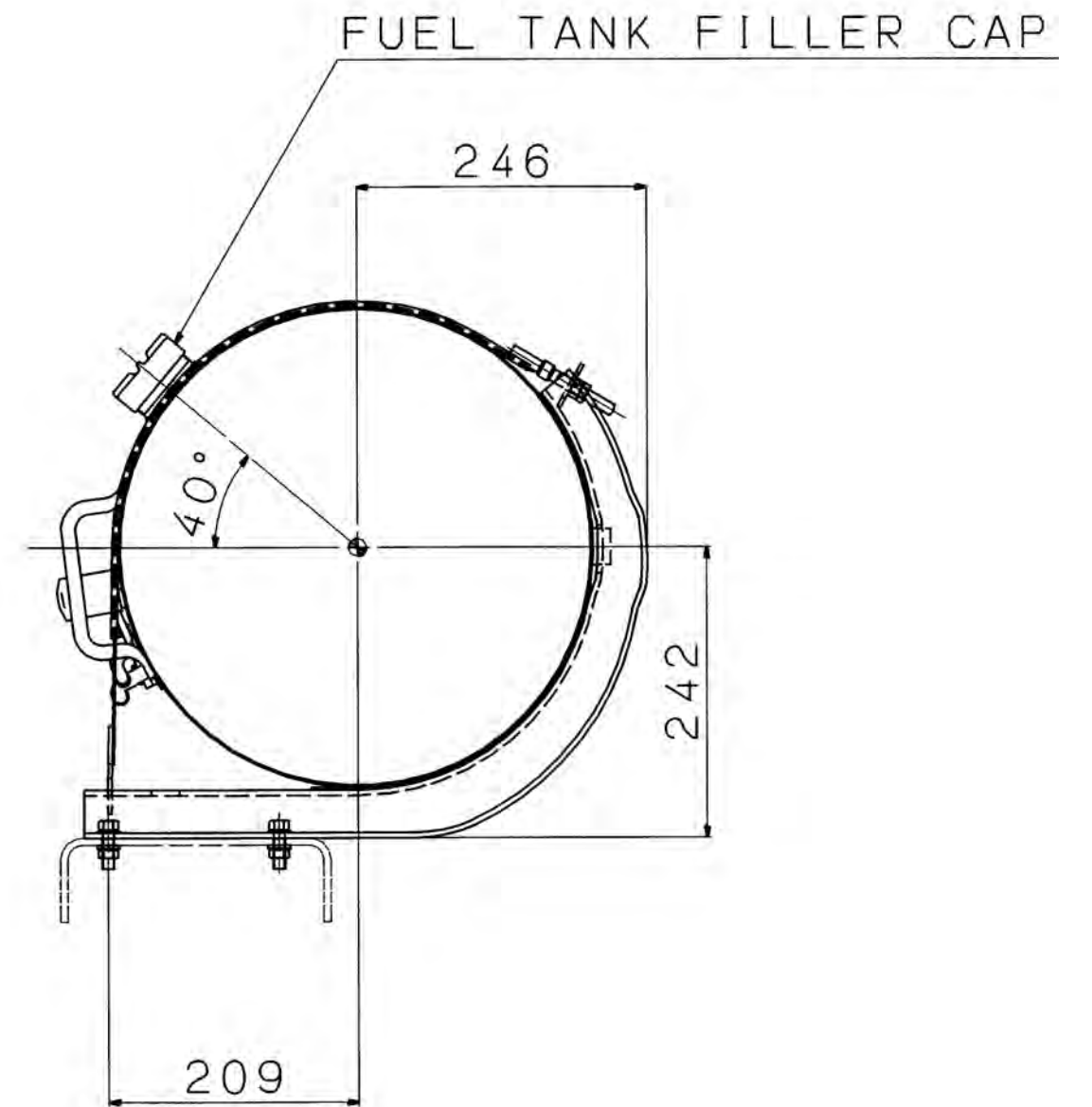
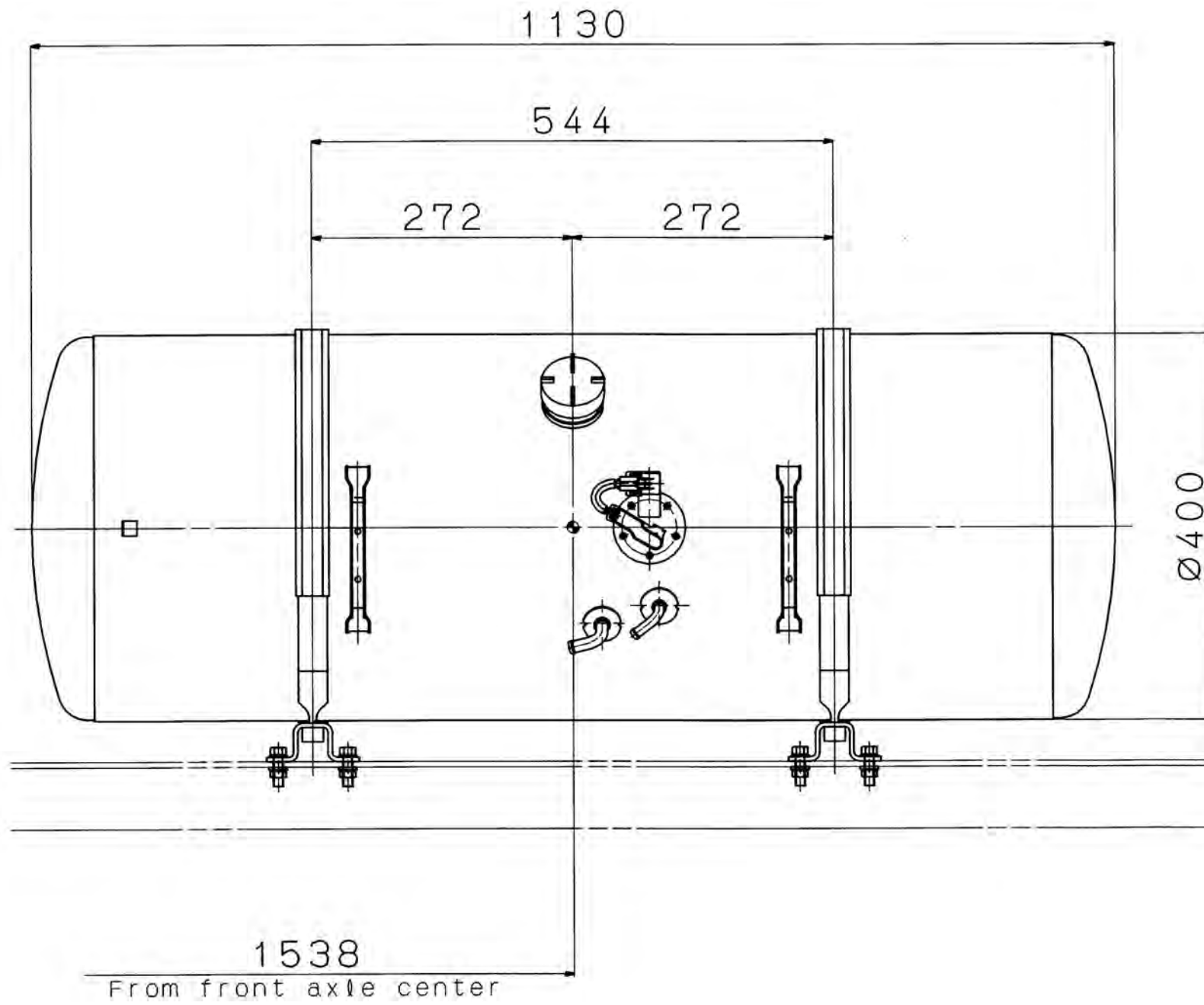
| MODEL | TIRE SIZE     | R             | A <sup>(1)</sup> | B <sup>(2)</sup> | C <sup>(3)</sup> | D           |
|-------|---------------|---------------|------------------|------------------|------------------|-------------|
|       |               | mm (in.)      | mm (in.)         | mm (in.)         | mm (in.)         | mm (in.)    |
| COE30 | LT215/85R16   | 396.5 (15.61) | 180 (7.09)       | 105 (4.13)       | 645 (25.39)      | 365 (14.37) |
| COE45 | LT215/85R16   | 396.5 (15.61) | 180 (7.09)       | 105 (4.13)       | 650 (25.59)      |             |
| COE50 | LT215/75R17.5 | 393.5 (15.49) | 180 (7.09)       | 105 (4.13)       | 648 (25.51)      |             |

## NOTES:

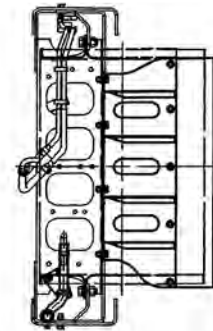
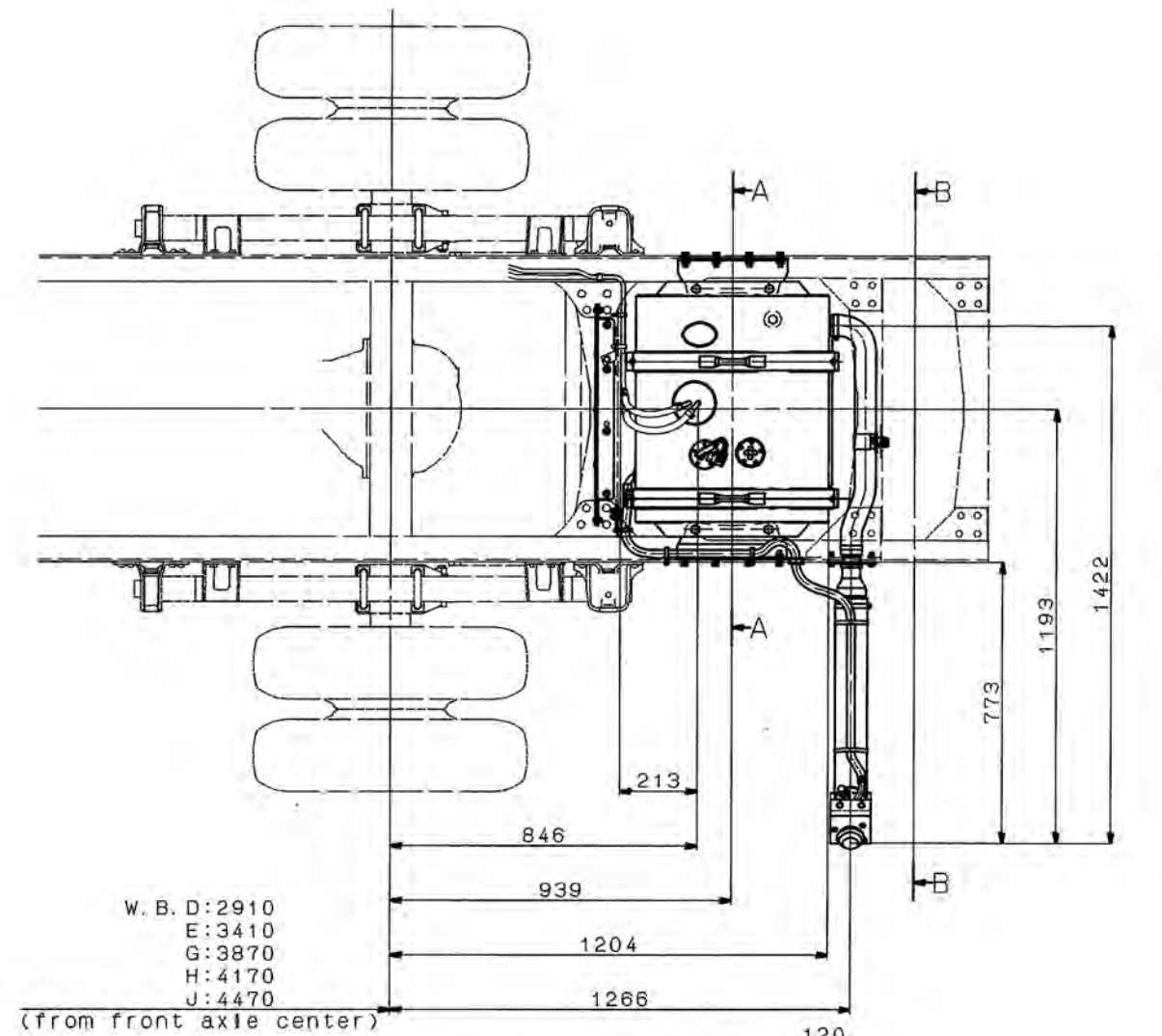
- (1) "A" indicates the distance between the top of rear axle and the upper face of frame in extreme bump position.
- (2) "B" indicates the distance between the top of tire and the upper face of frame in bump position.
- (3) "C" indicates the distance between the side wall of tire and the web face frame.

## 12. FUEL TANK

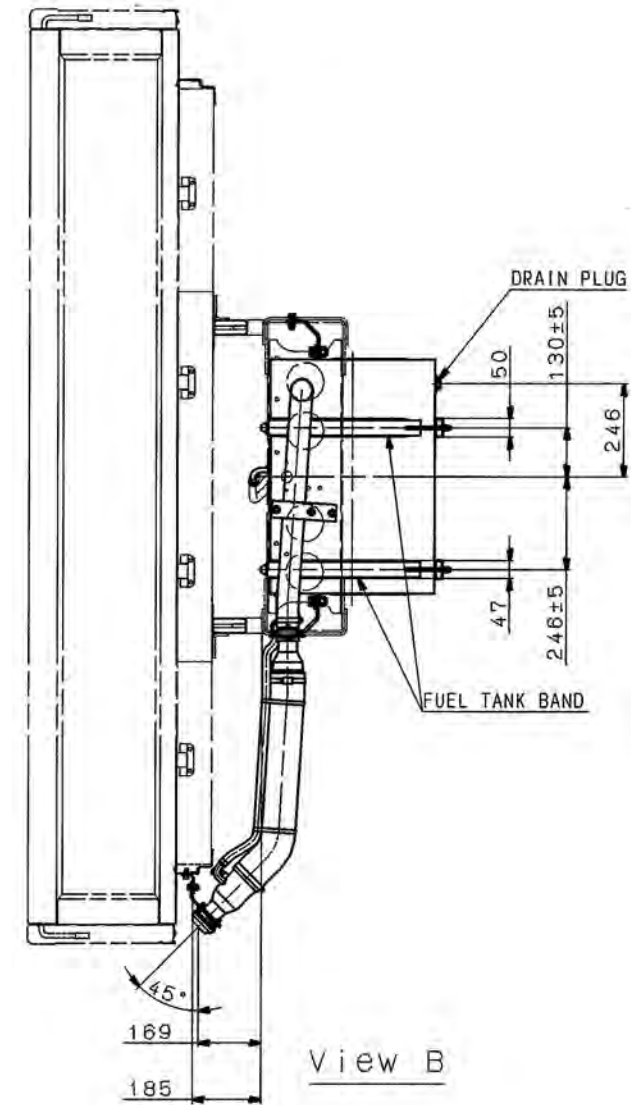
### 12.1 COE Series



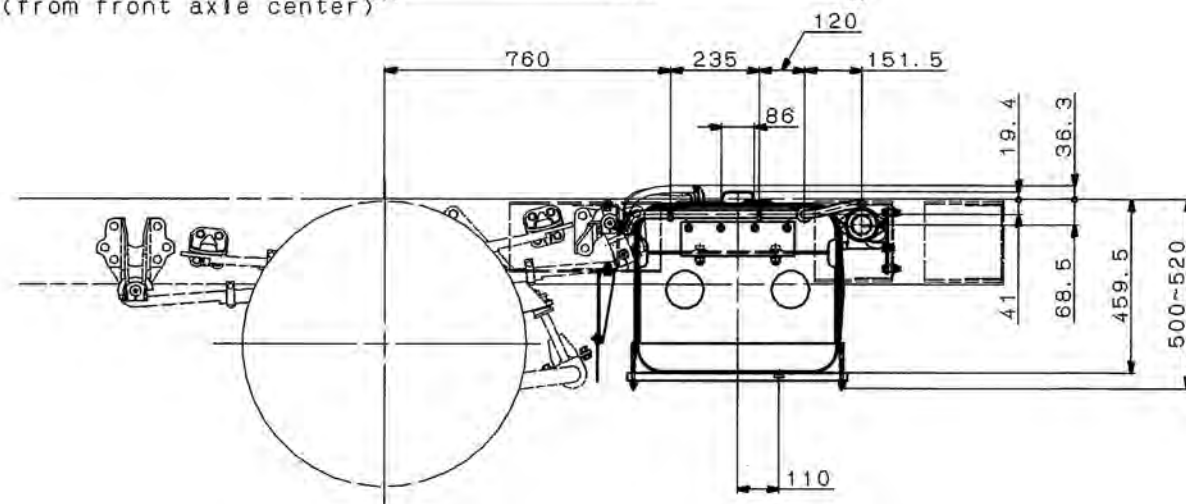
## 12.2 COE Series (Rear fuel tank)



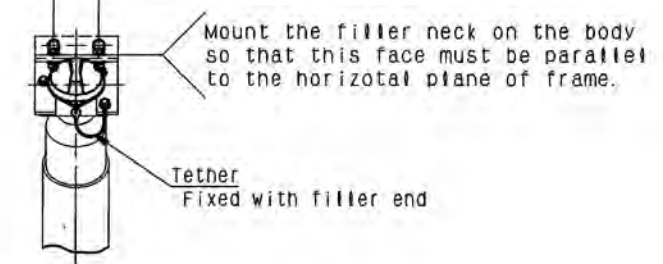
View A



View B



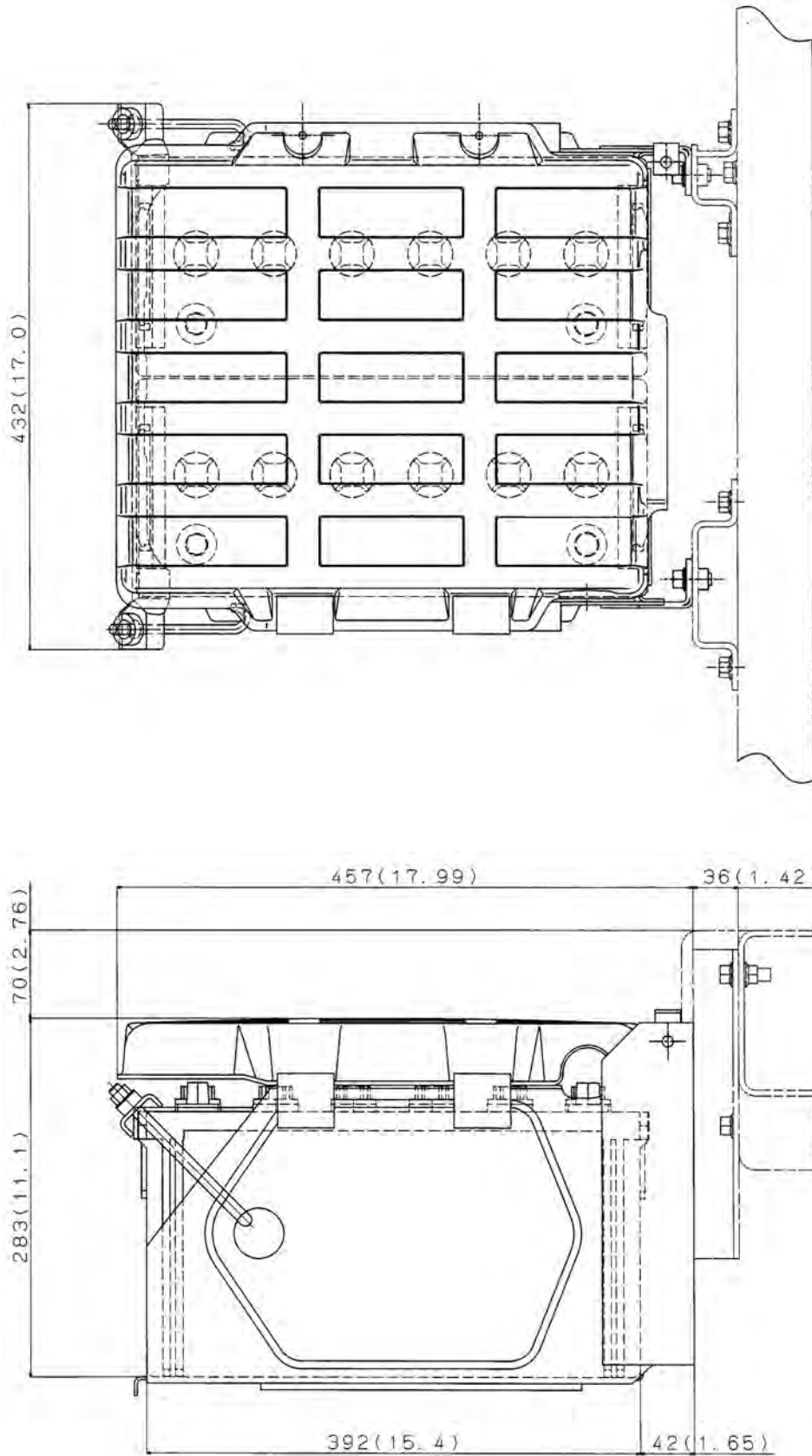
60



Detail Filler Opening

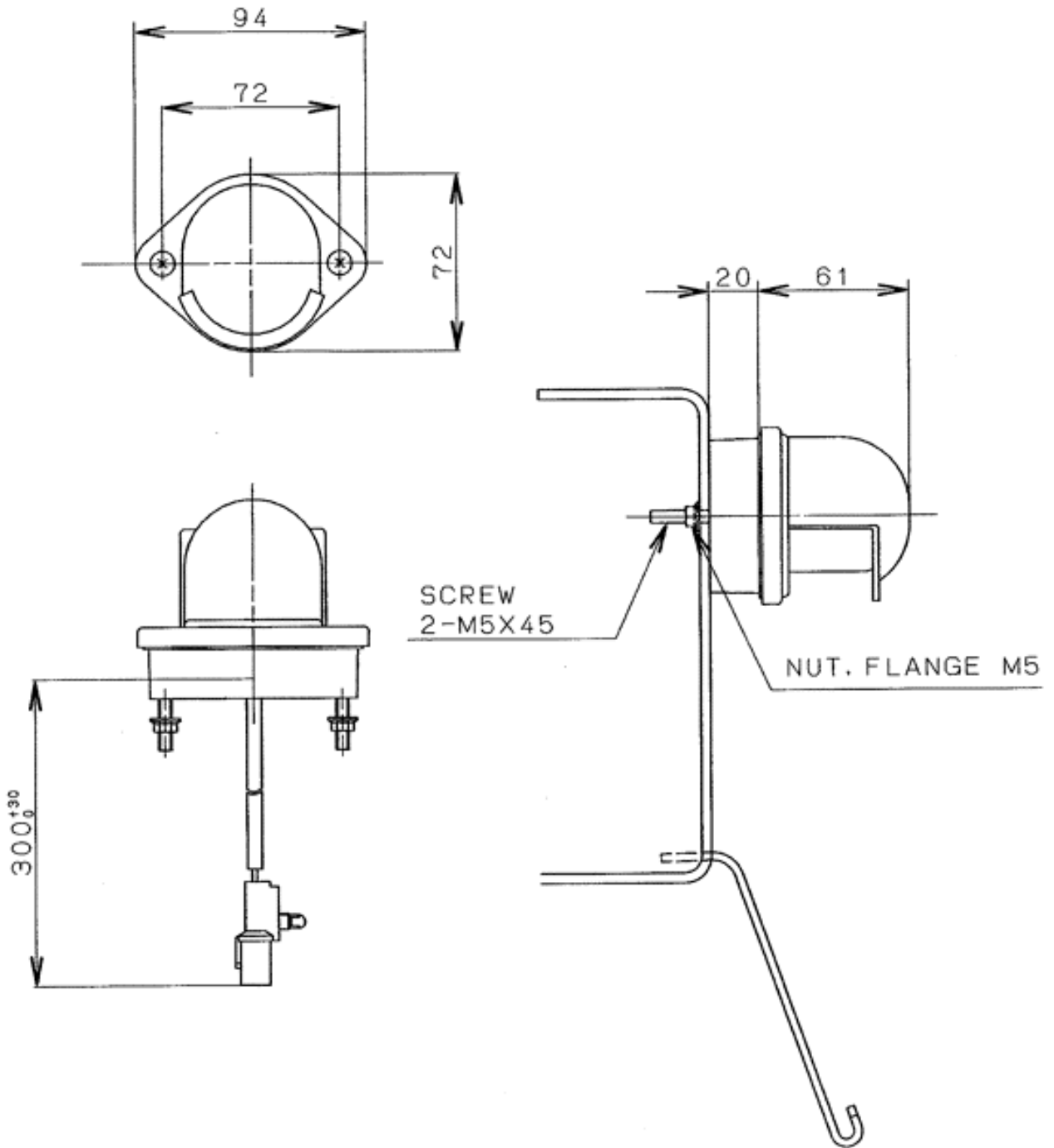


# 13. BATTERY BOX

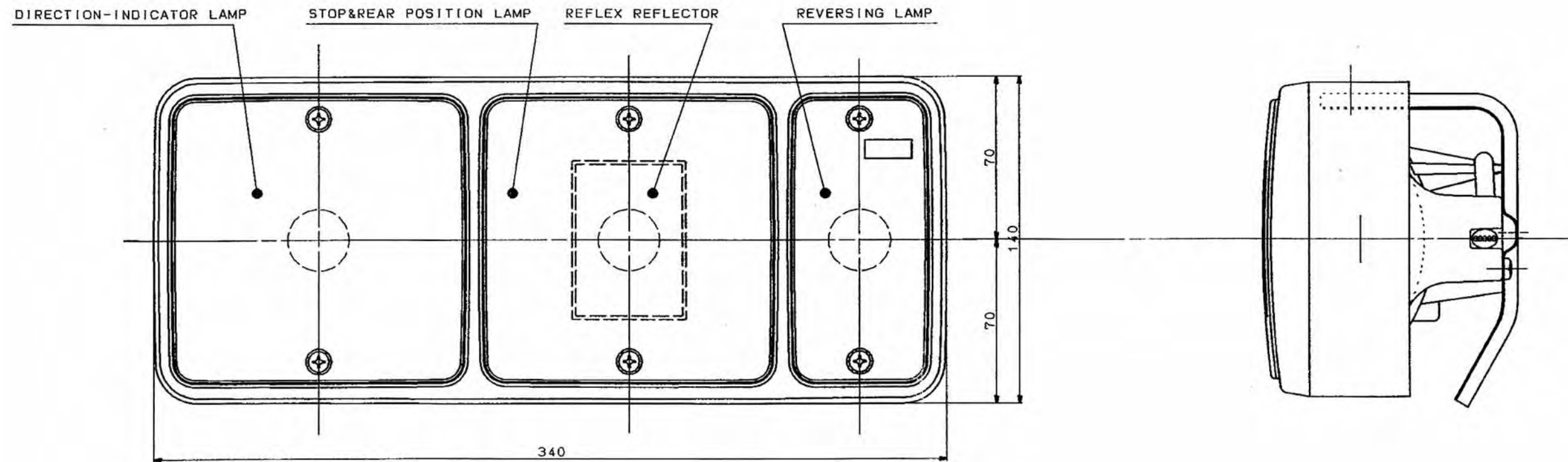
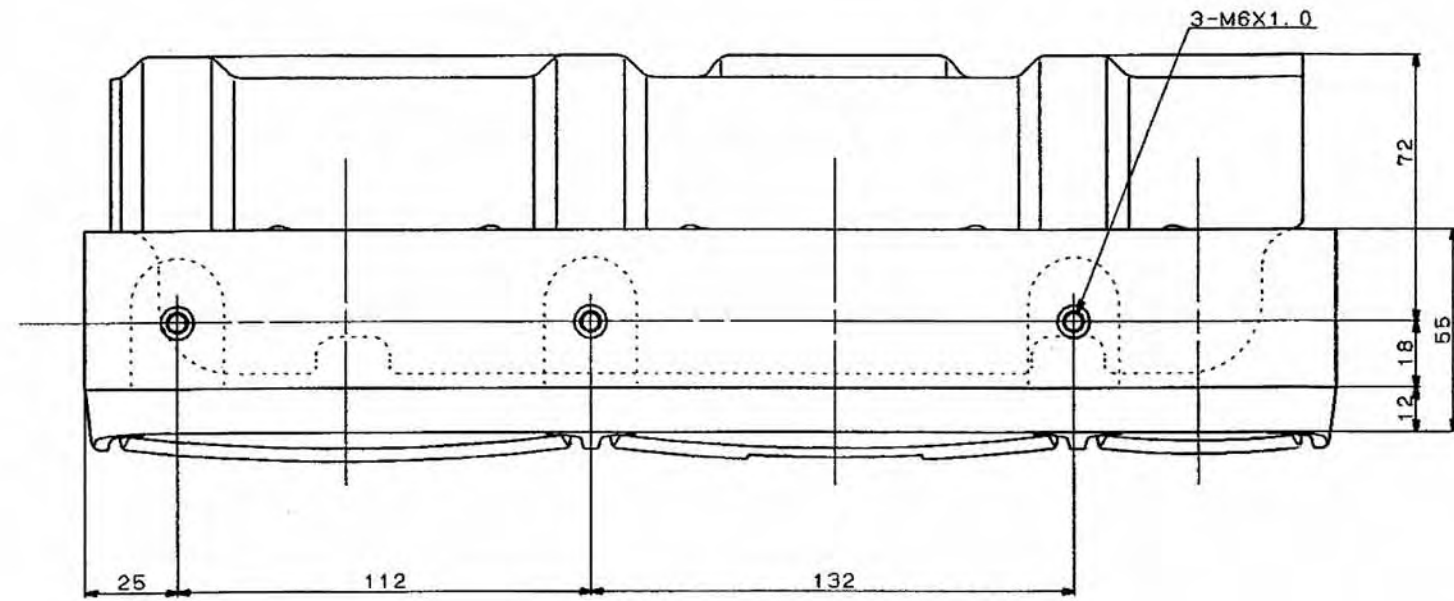


UNIT : mm (in.)

# 14. LICENSE PLATE LAMP



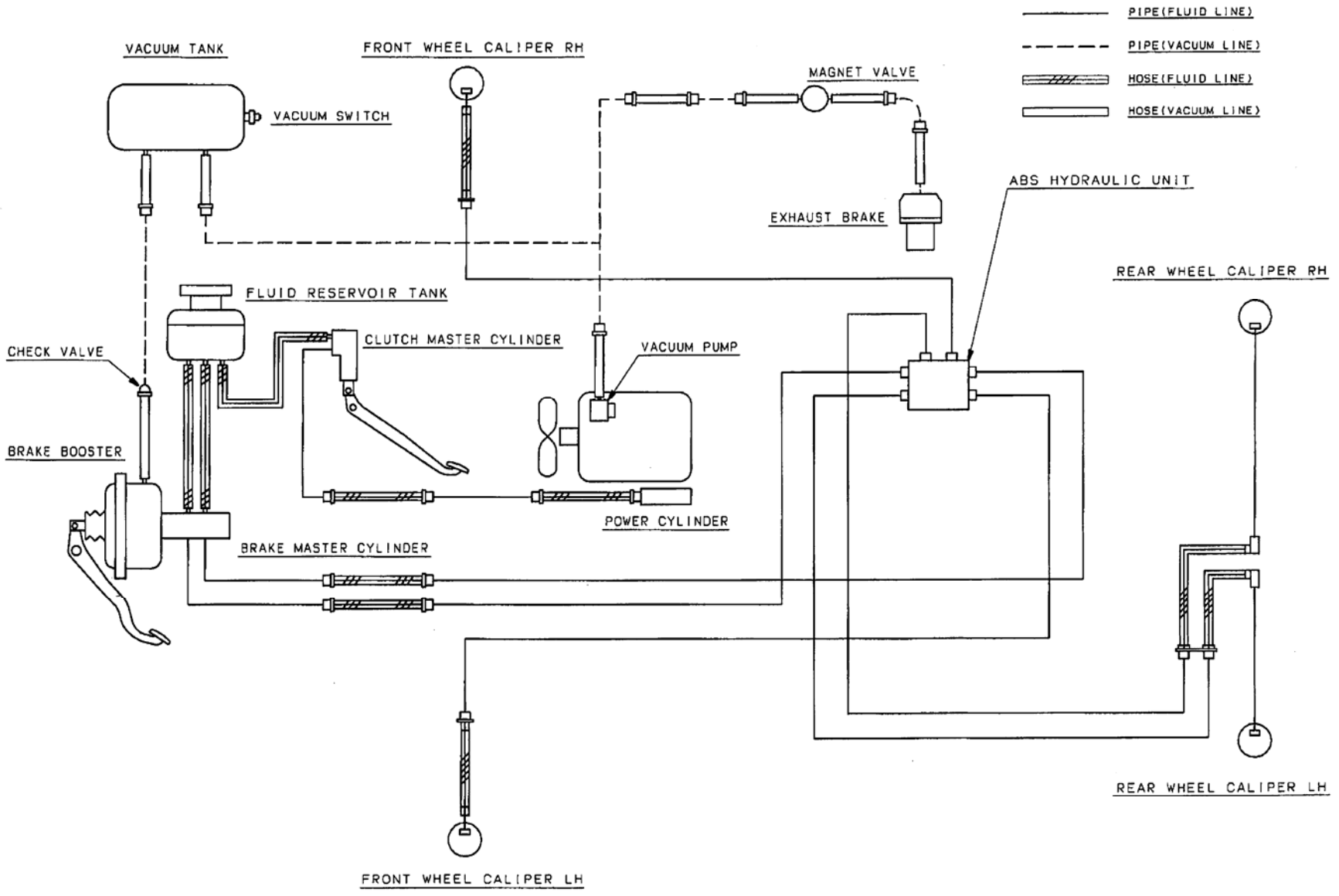
# 15. REAR COMBINATION LAMP



# 16. BRAKES PIPING DIAGRAM

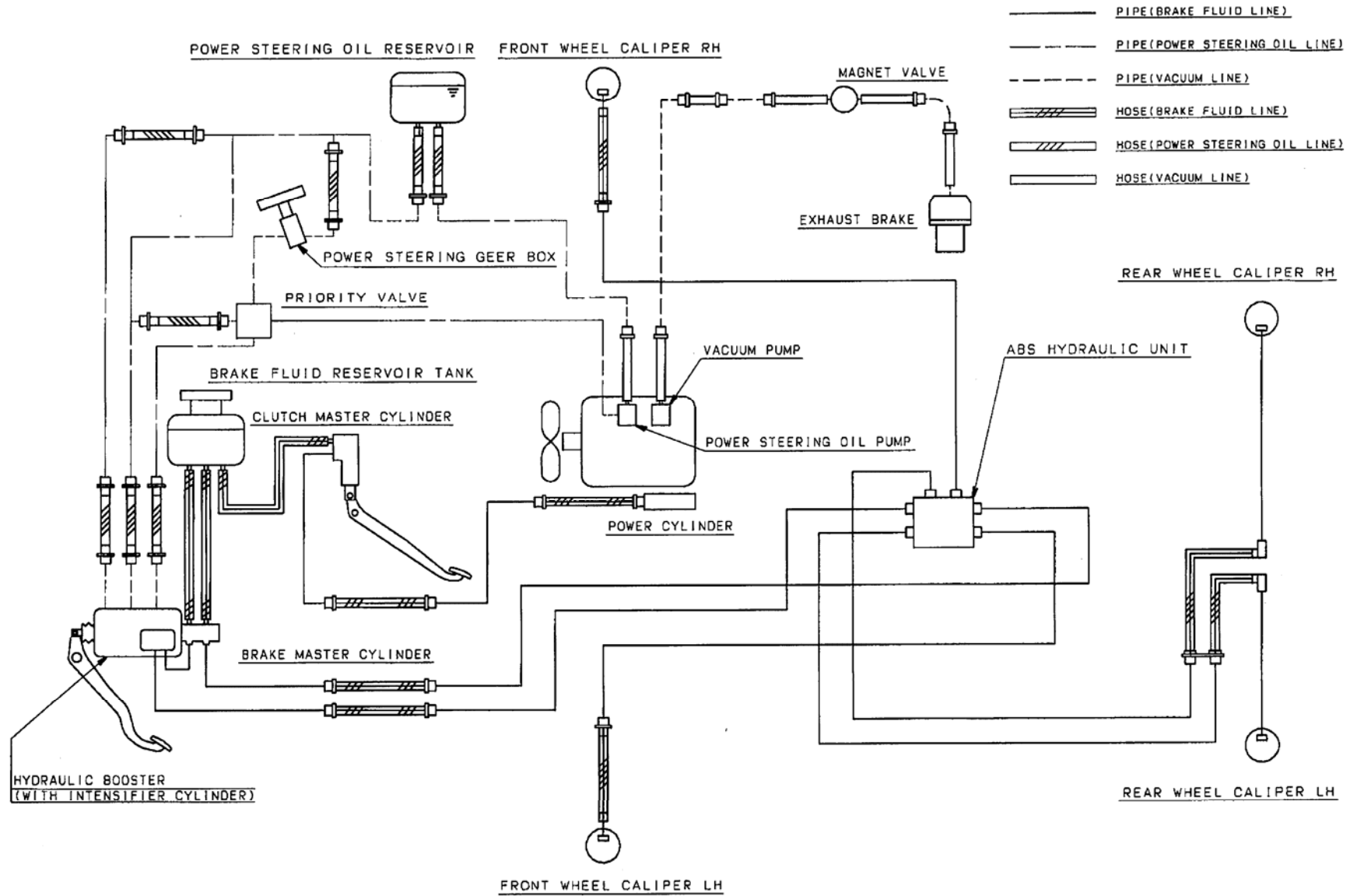
## 16.1 COE30, COE45

STERLING 360 COE II-16-1



# 16.2 COE50

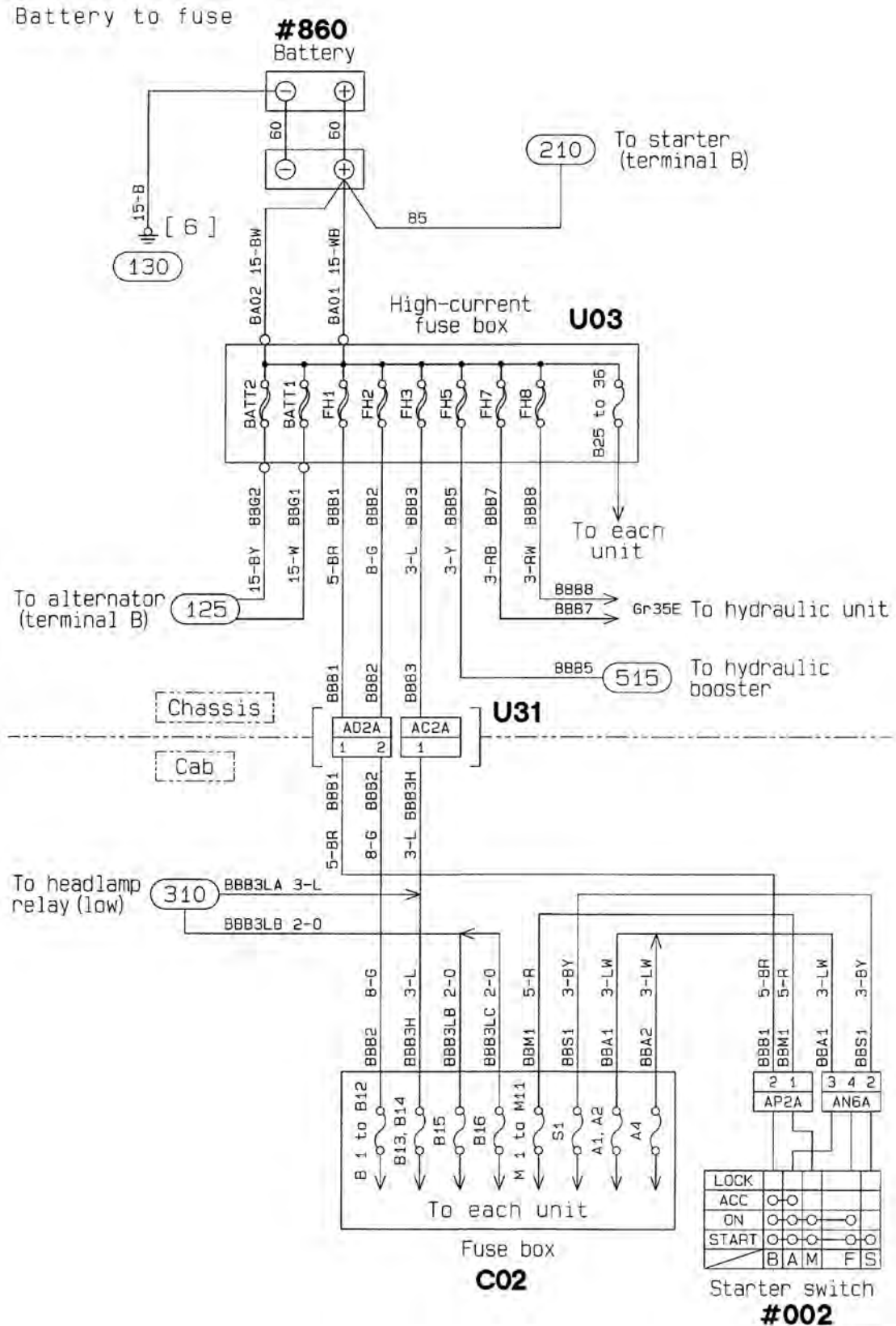
STERLING 360 COE II-16-2



# 17. ELECTRIC CIRCUIT DIAGRAM

## 17.1 POWER, CHARGE AND GROUND CIRCUIT

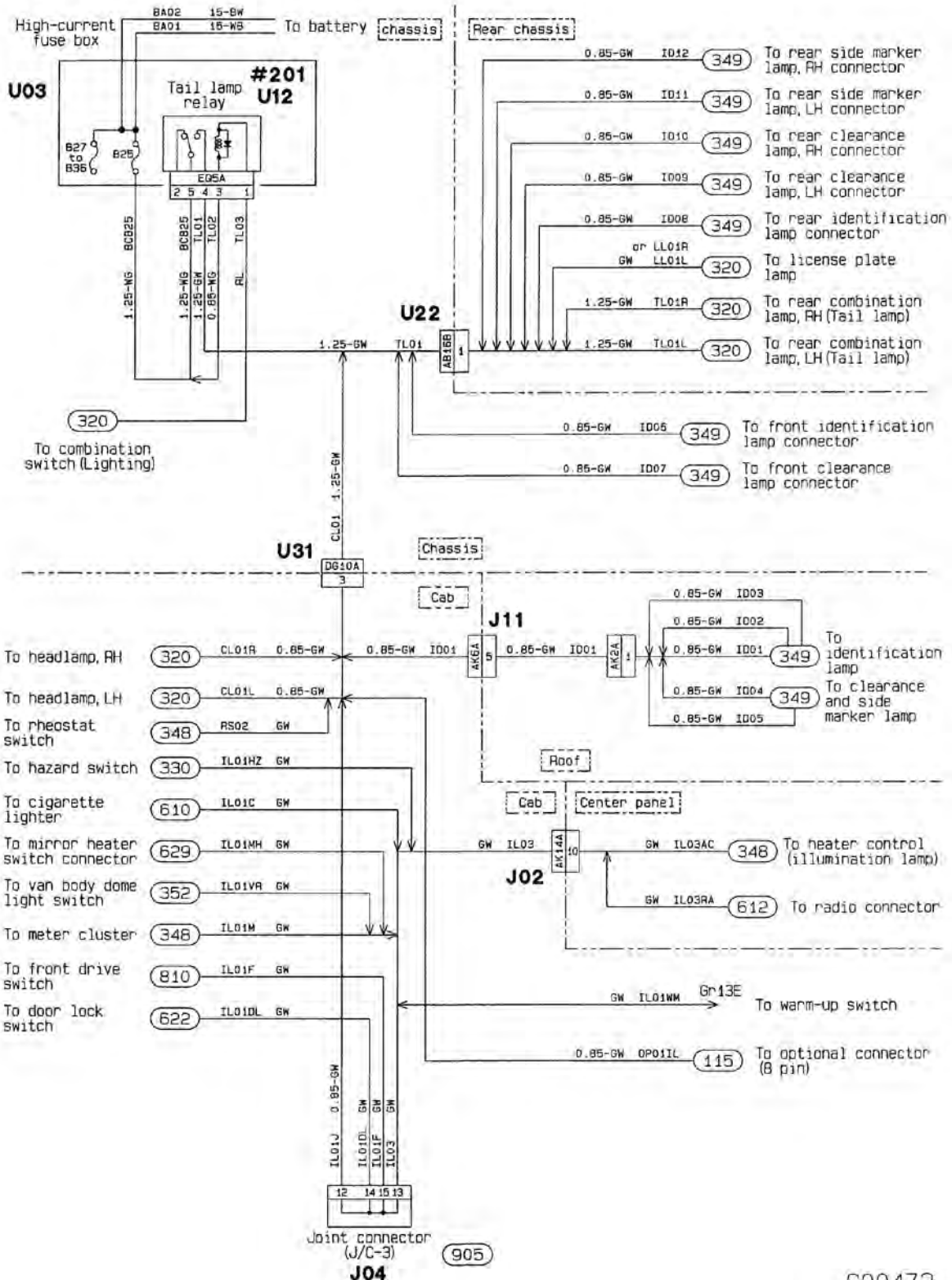
### 110 POWER CIRCUIT



C00467

**110 POWER CIRCUIT**

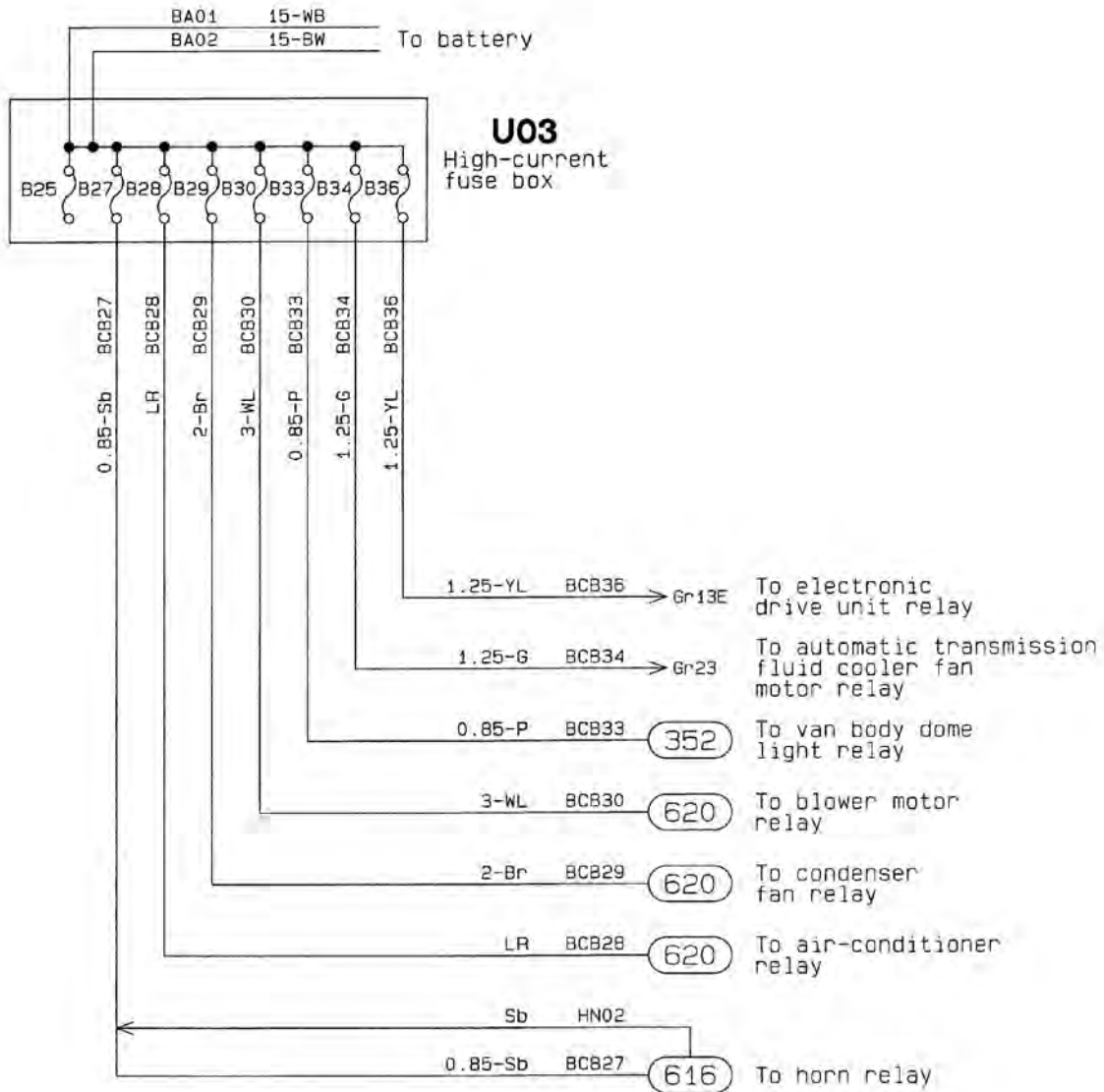
High-current fuse box  
(Fuse B25)



C00472

**110 POWER CIRCUIT**

High-current fuse box  
(Fuse B27 to B36)

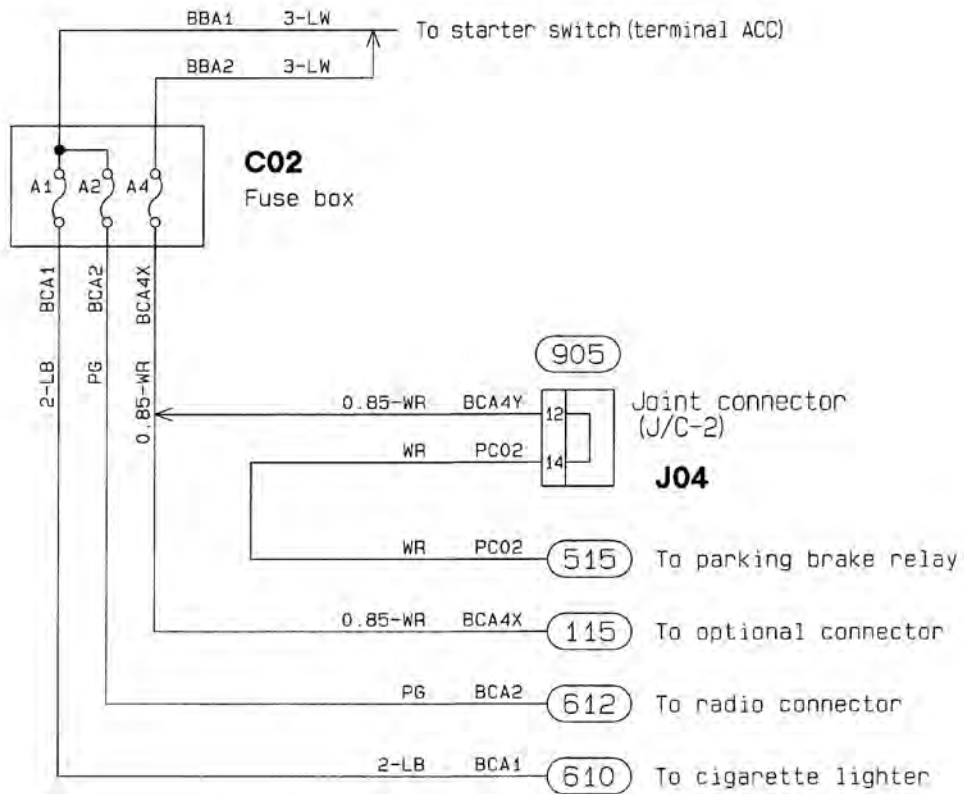


C00473



**110 POWER CIRCUIT**

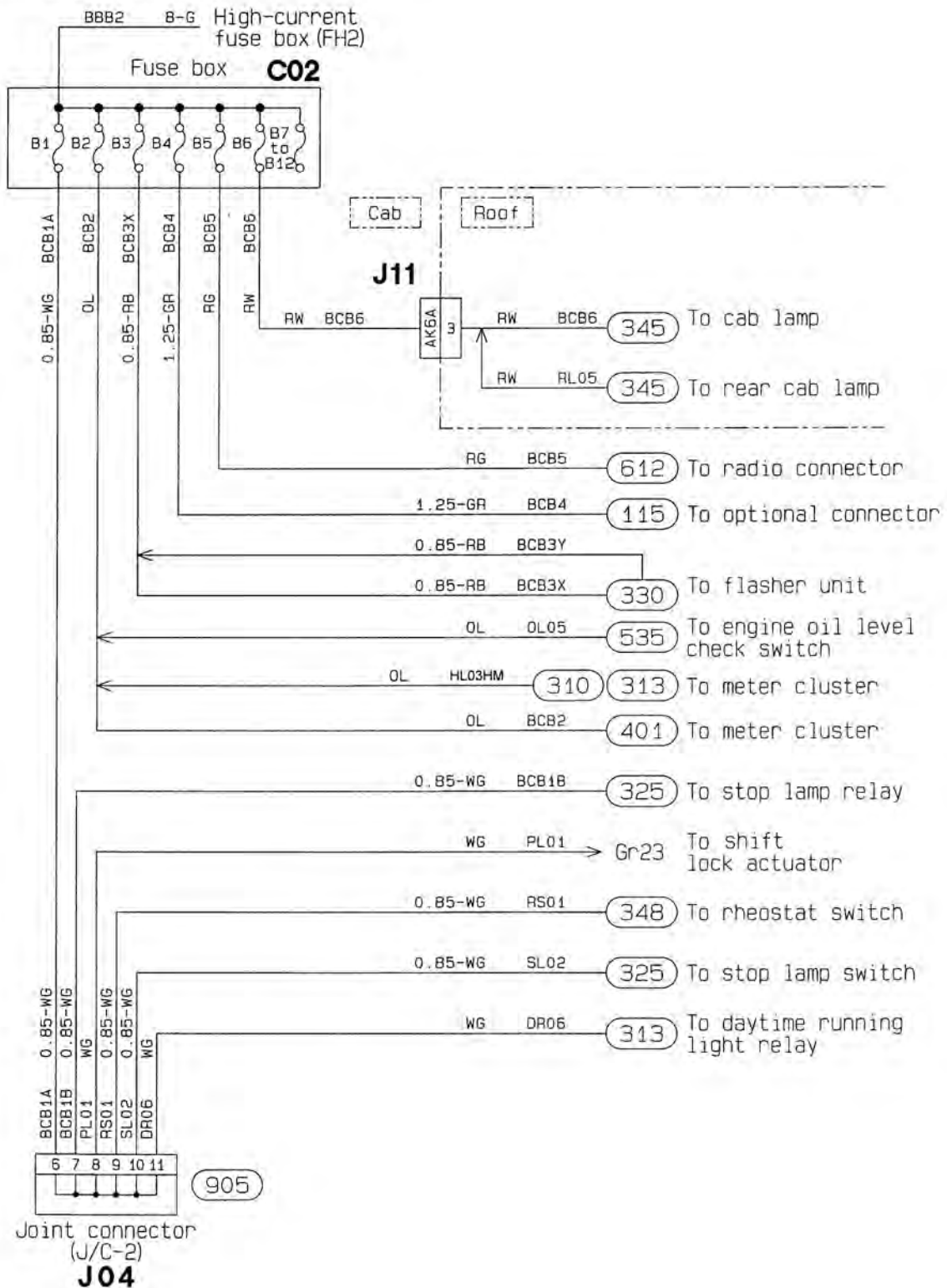
Fuse box  
(Fuse A1 to A4)



C00469

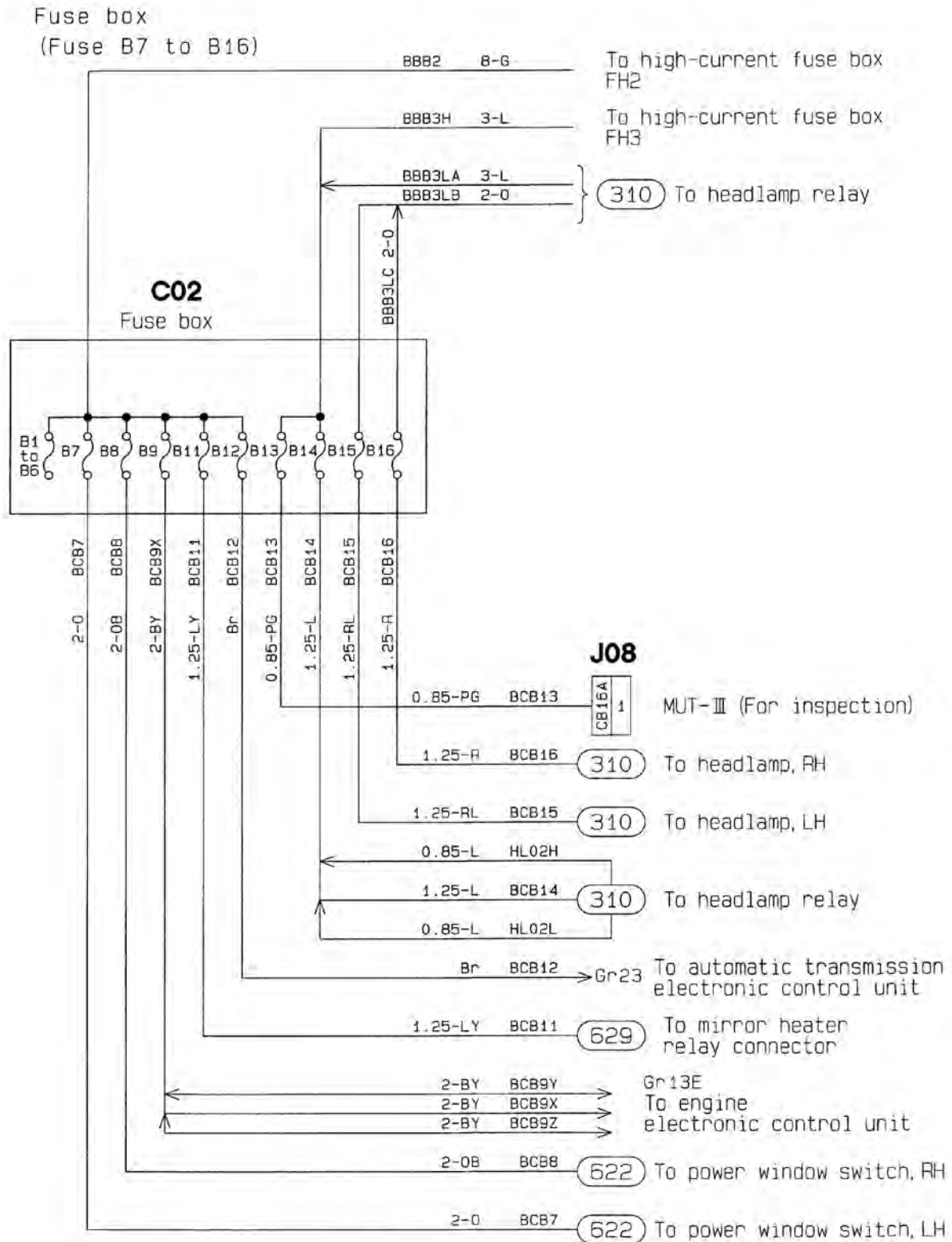
**110 POWER CIRCUIT**

Fuse box  
(Fuse B1 to B6)



C00470

**110 POWER CIRCUIT**

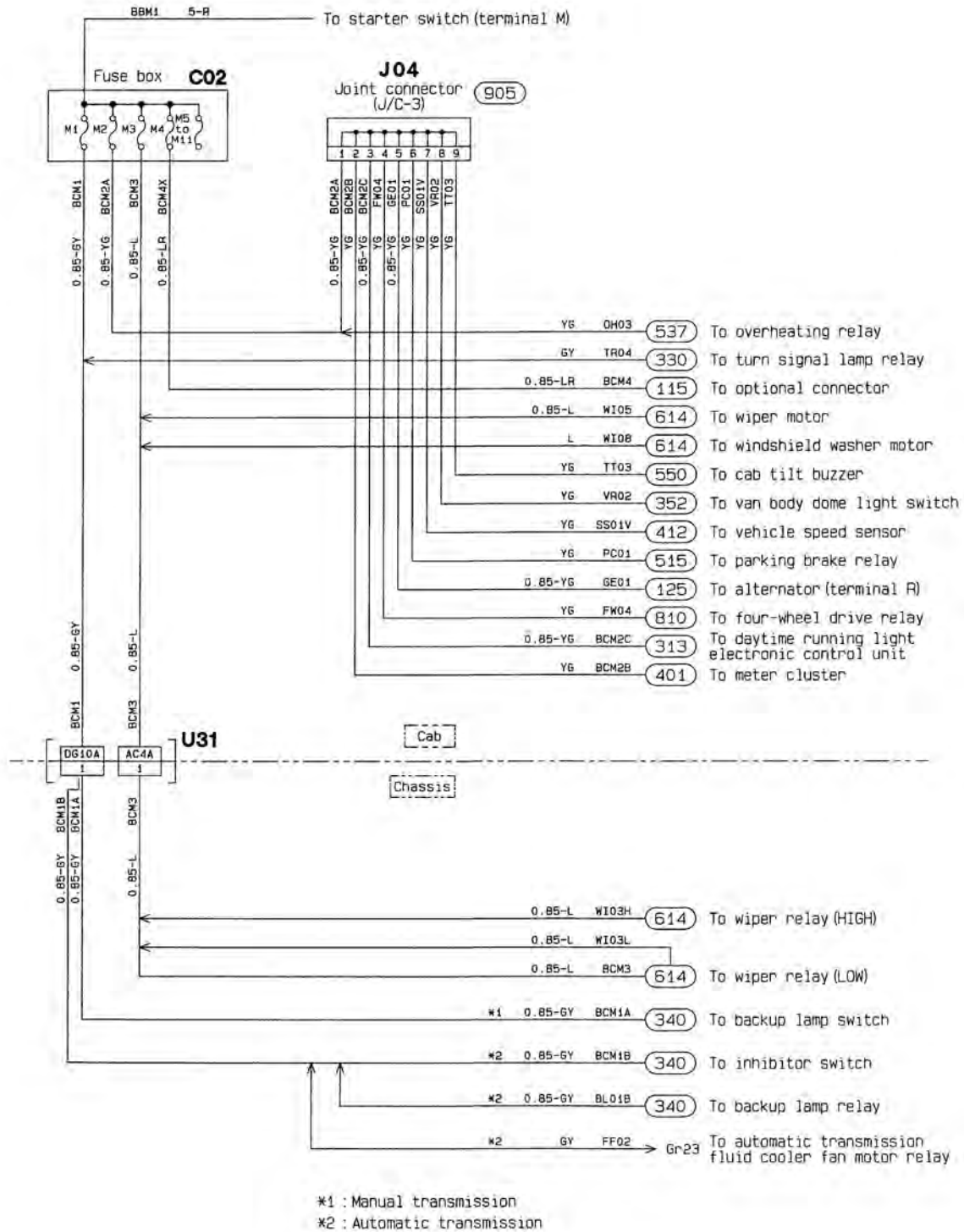


MUT : Multi-use tester

C00471

# 110 POWER CIRCUIT

Fuse box  
(Fuse M1 to M4)

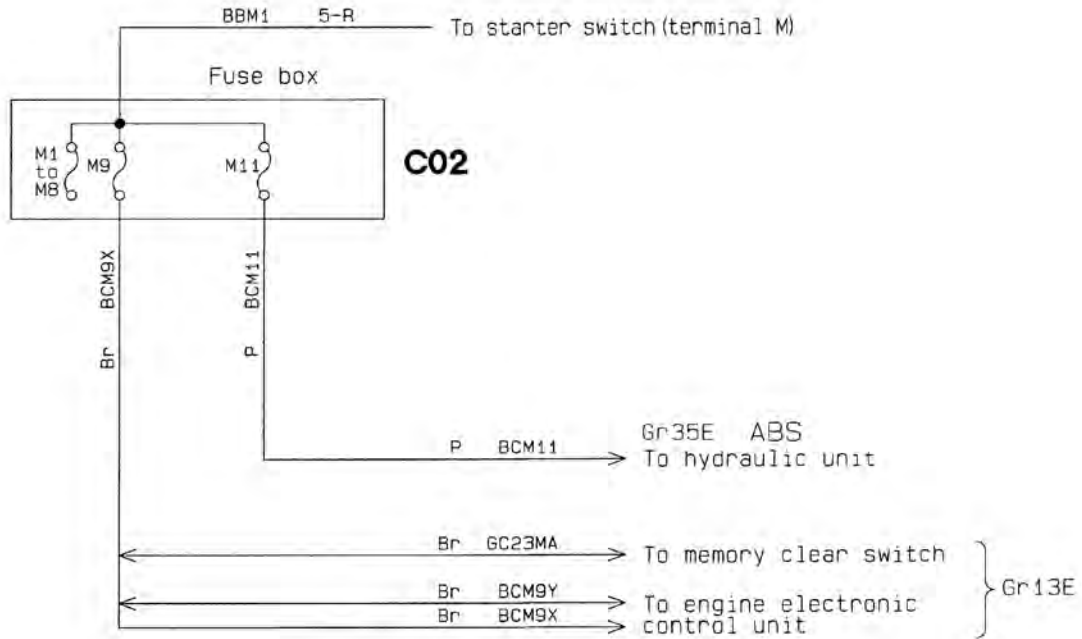


C00474



**110 POWER CIRCUIT**

Fuse box  
(Fuse M9 to M11)

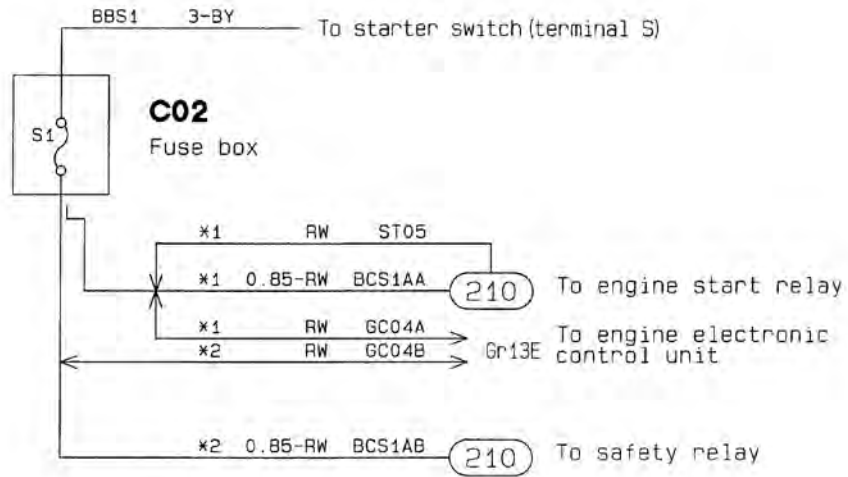


ABS: Anti-lock brake system

C00476

# 110 POWER CIRCUIT

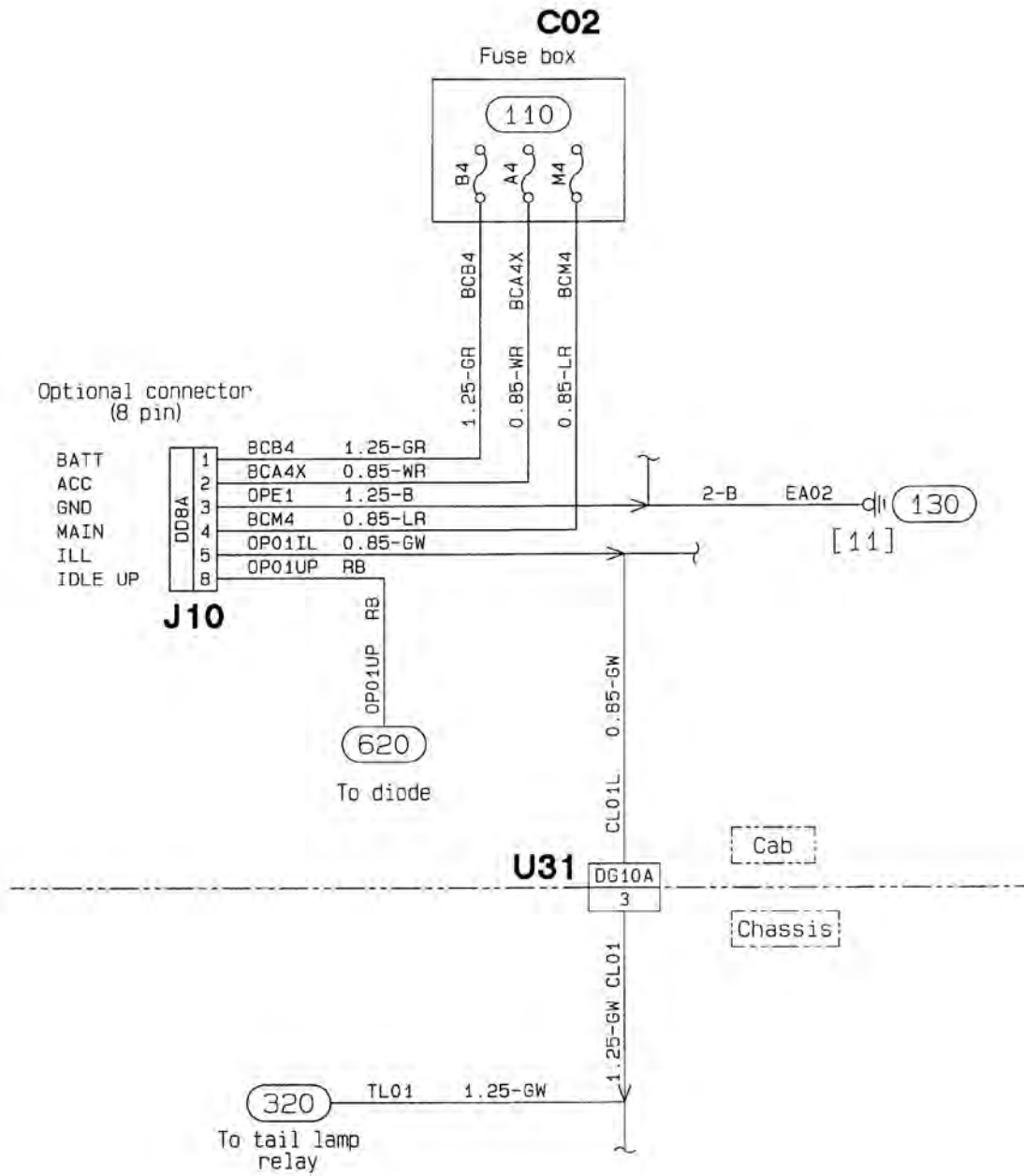
Fuse box  
(Fuses S1)



\*1 : Manual transmission  
\*2 : Automatic transmission

C00468

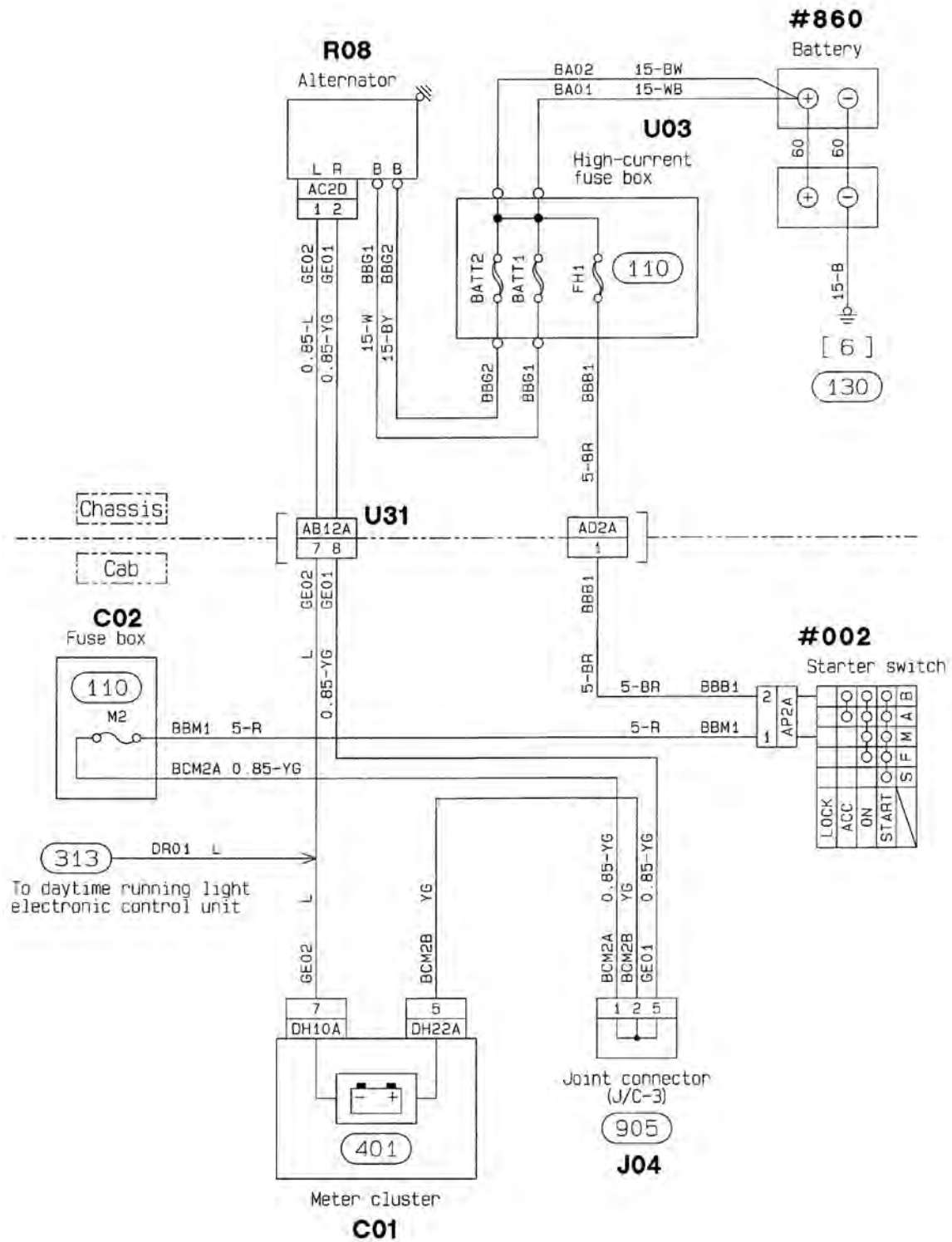
**115 RESERVE POWER CIRCUIT**



C00477



**125 BATTERY CHARGING CIRCUIT**

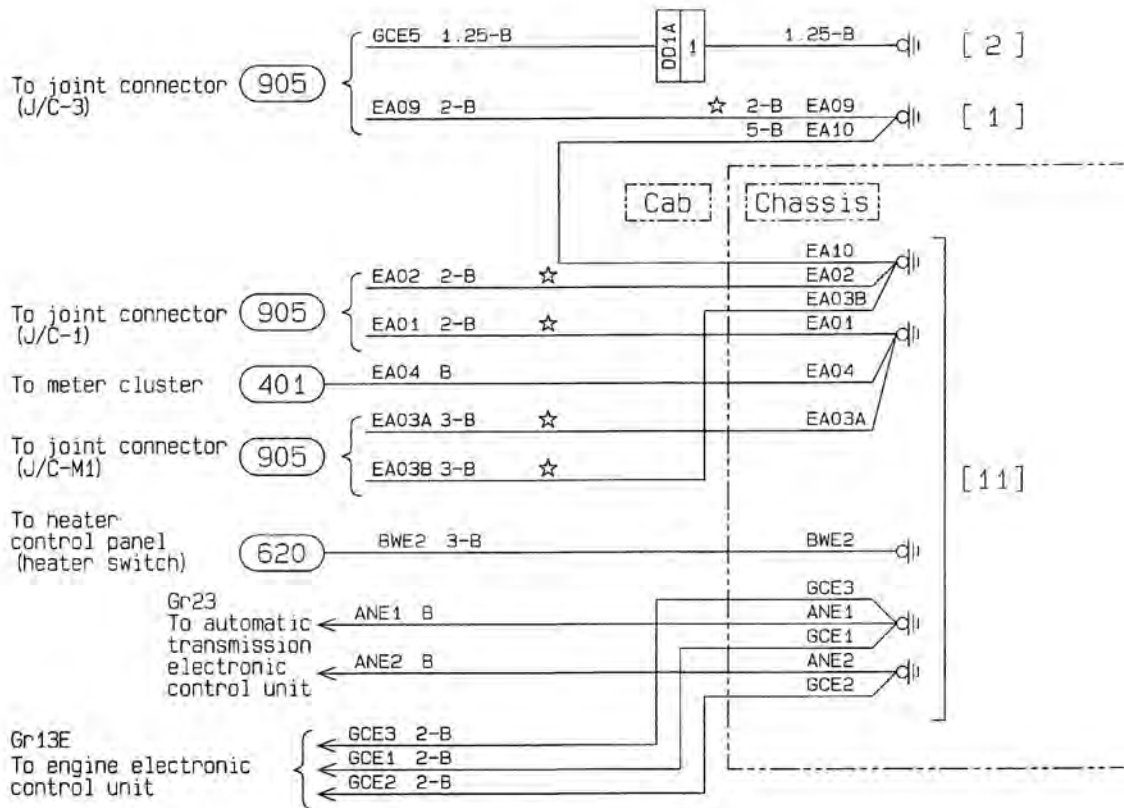


C00478

# 130 GROUND

Entire ground

- This diagram indicates grounding points.
- See the following pages for branching of grounding (wiring for ☆) (in circuit No. order)

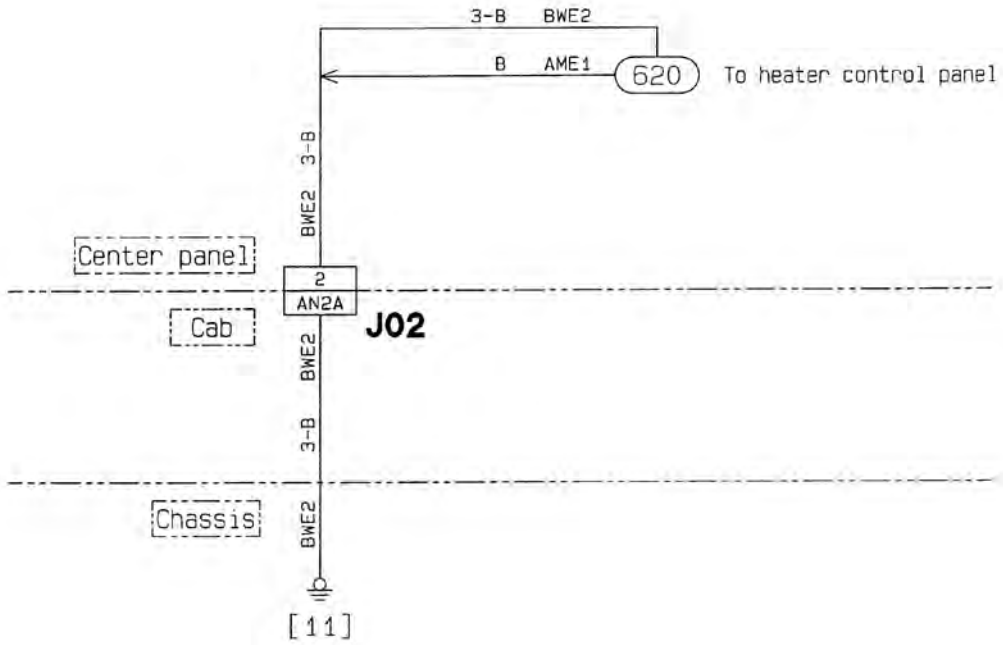


C00479-1



**130 GROUND**

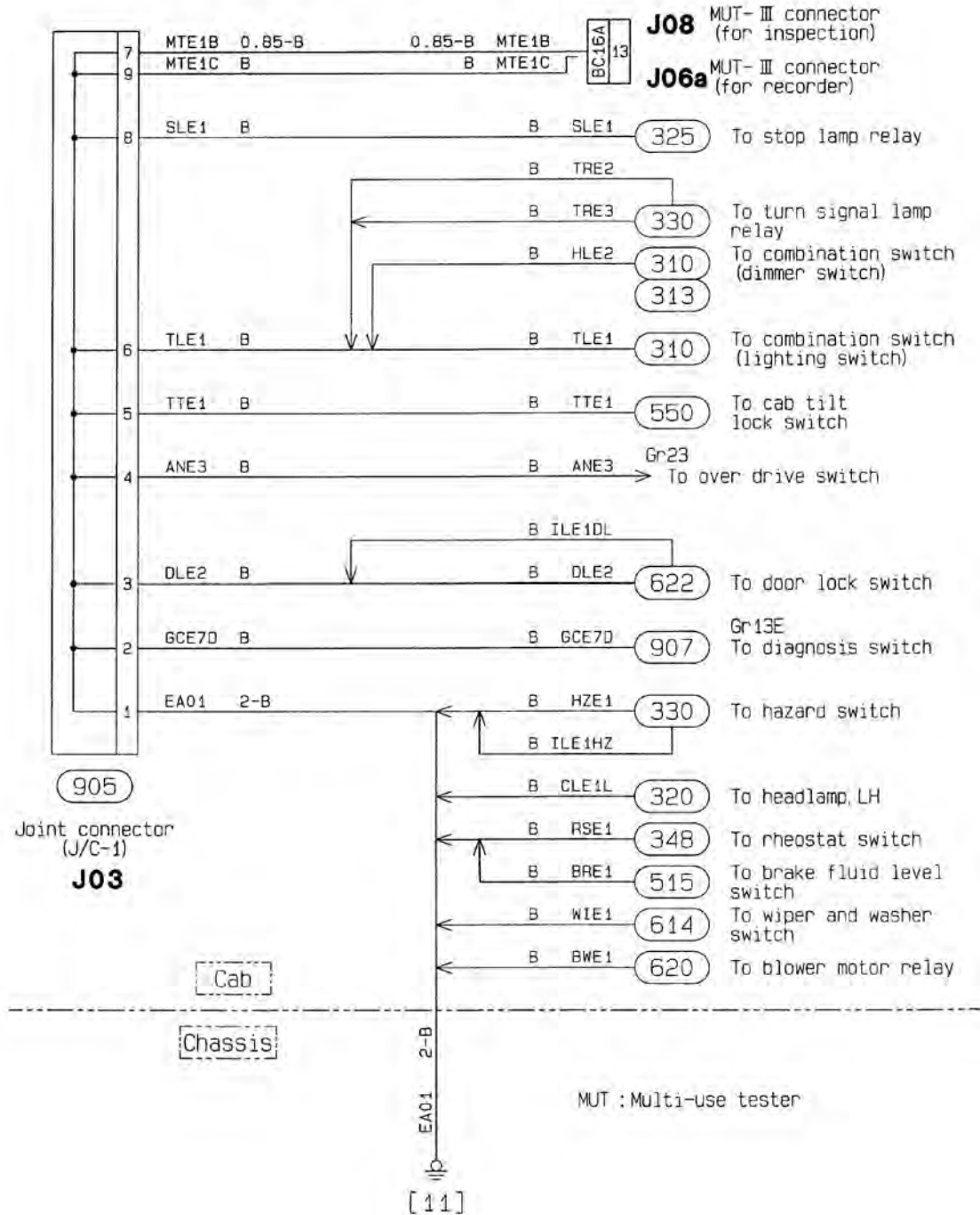
Circuit No. BWE2 chassis ground



C00480

**130 GROUND**

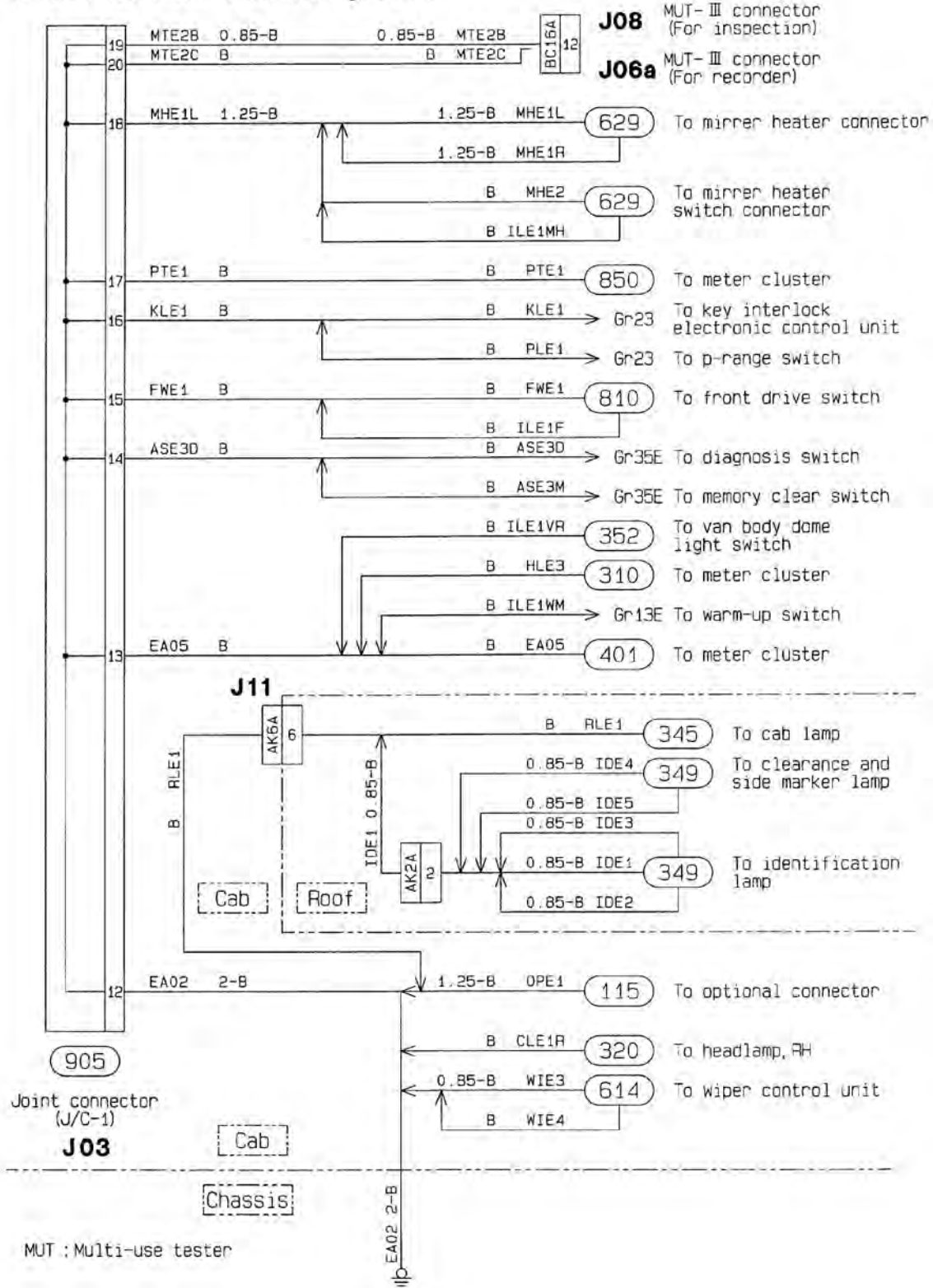
Circuit No. EA01 chassis ground



C00481

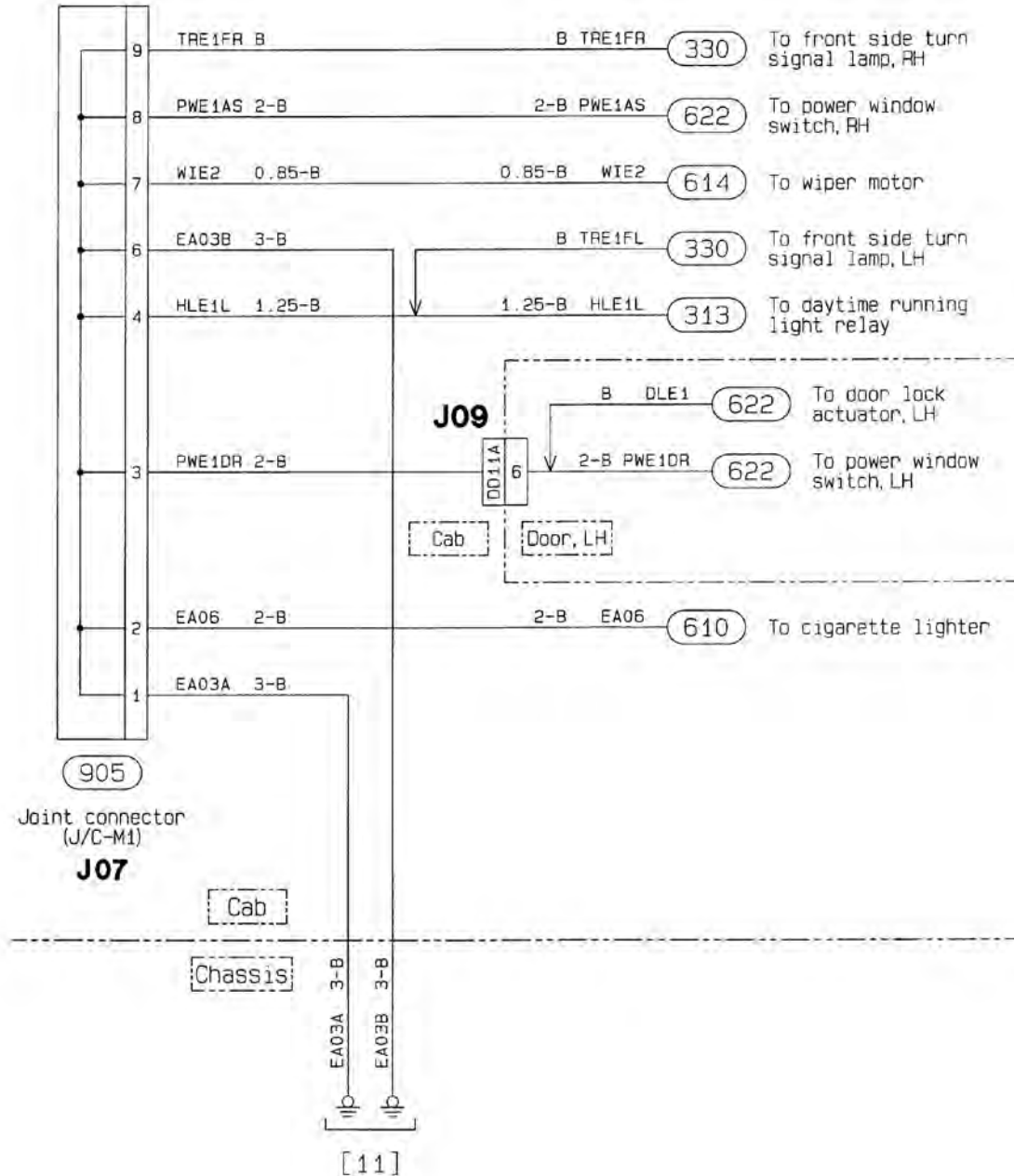
**130 GROUND**

Circuit No. EA02 chassis ground



**130 GROUND**

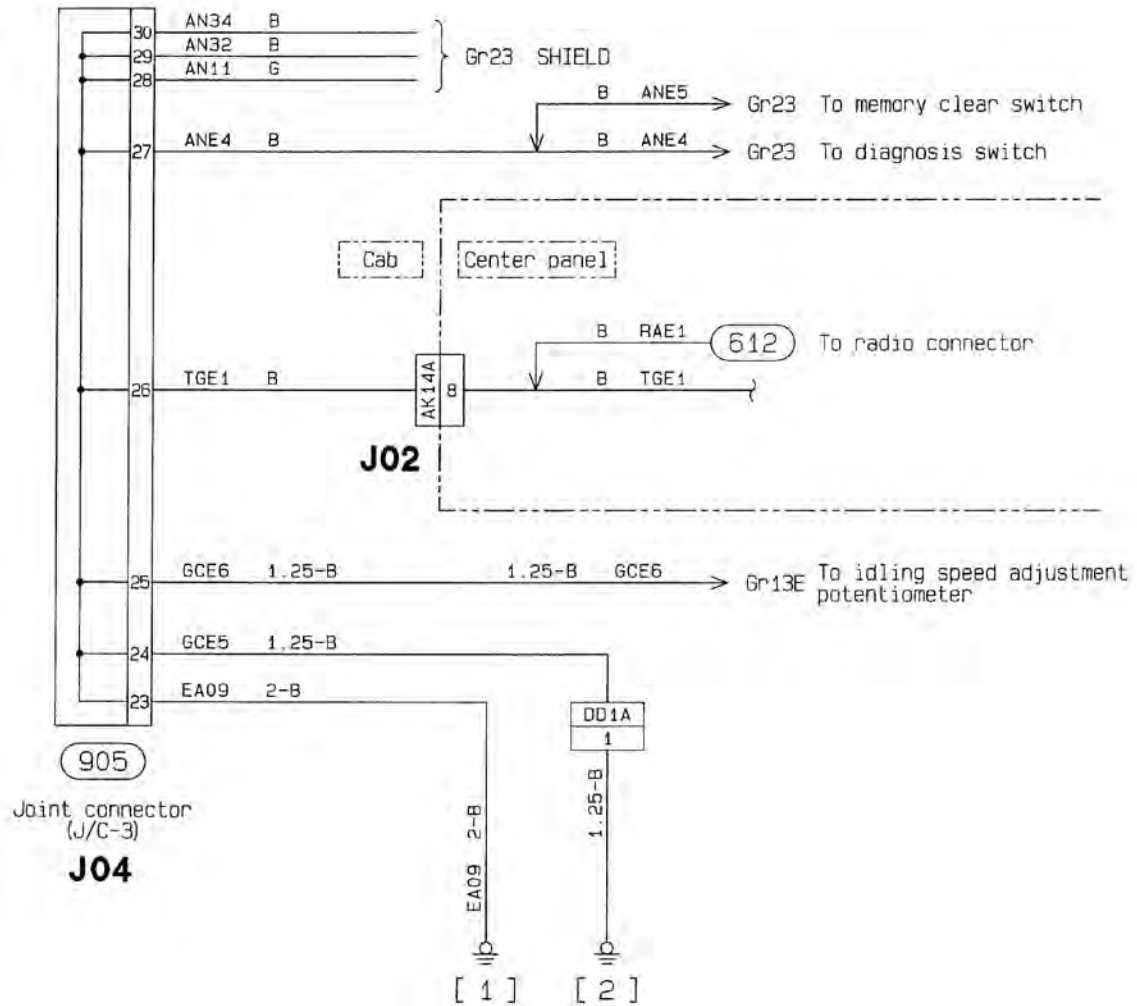
Circuit No. EA03A, EA03B chassis ground



C00483

**130 GROUND**

Circuit No. EA09 cab ground

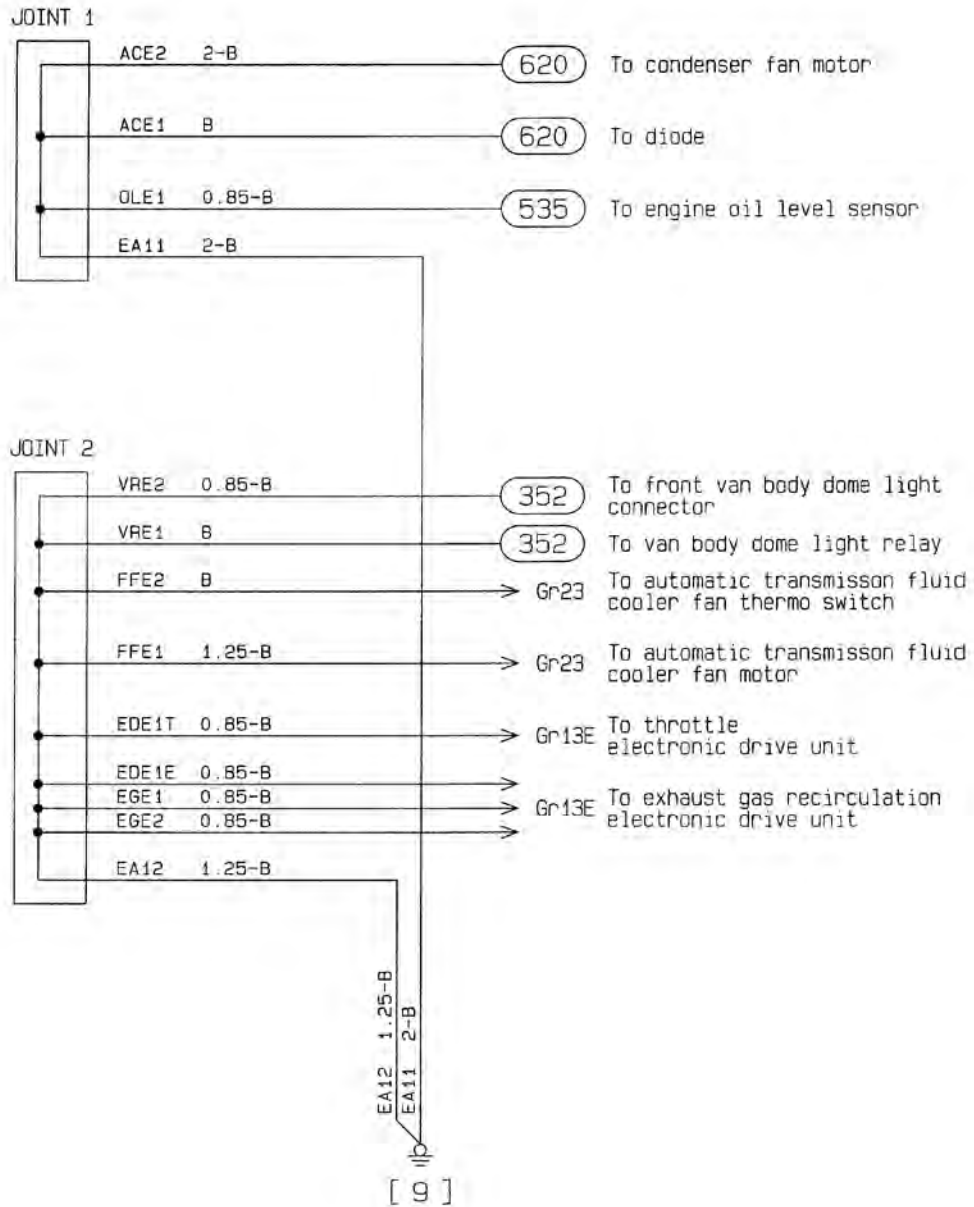


C00484



**130 GROUND**

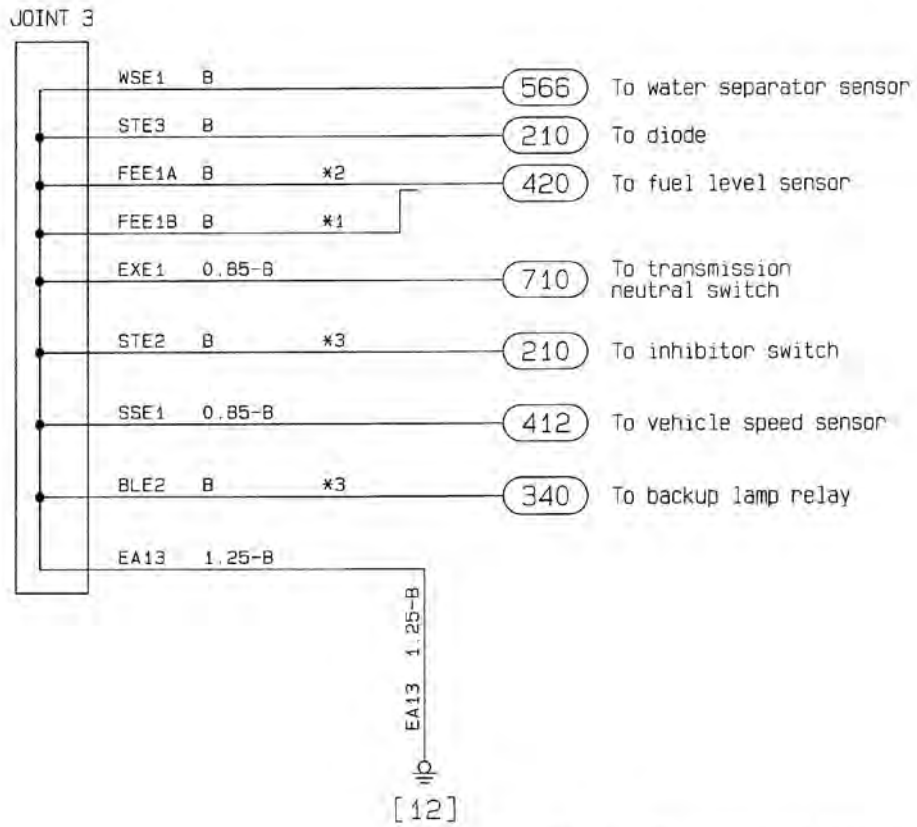
Circuit No. EA11, EA12 chassis ground



C00485

**130 GROUND**

Circuit No. EA13 chassis ground

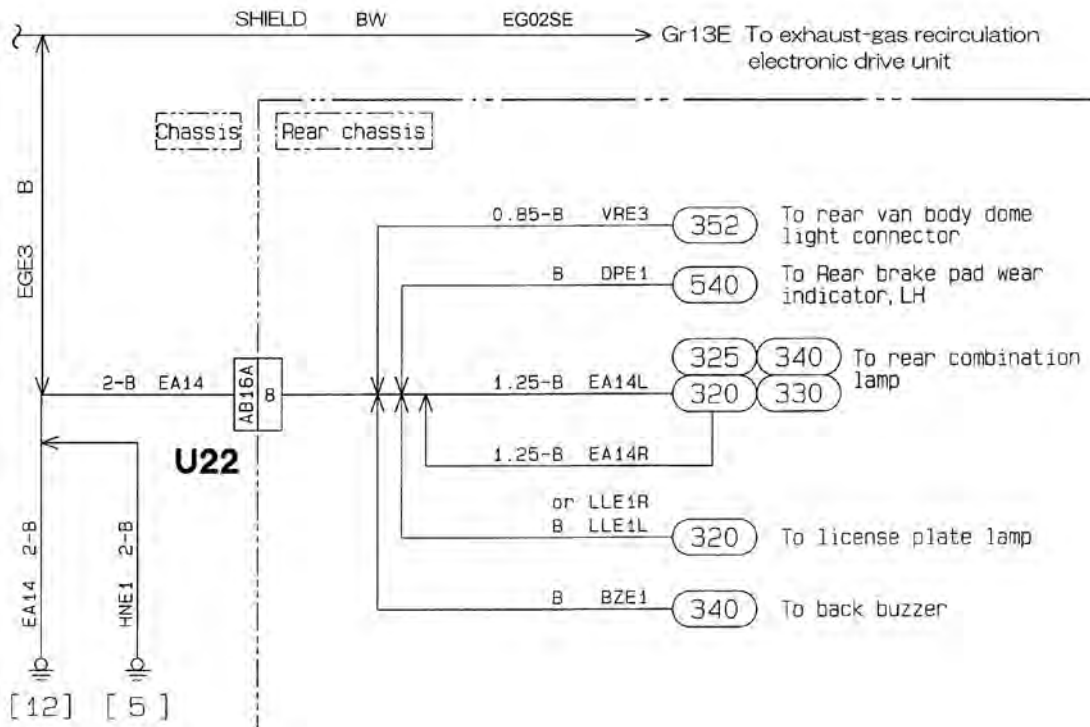


- \*1 : Fuel tank equipped near overhang
- \*2 : Except \*1
- \*3 : Automatic transmission

C00486

**130 GROUND**

Circuit No. EA14 chassis ground

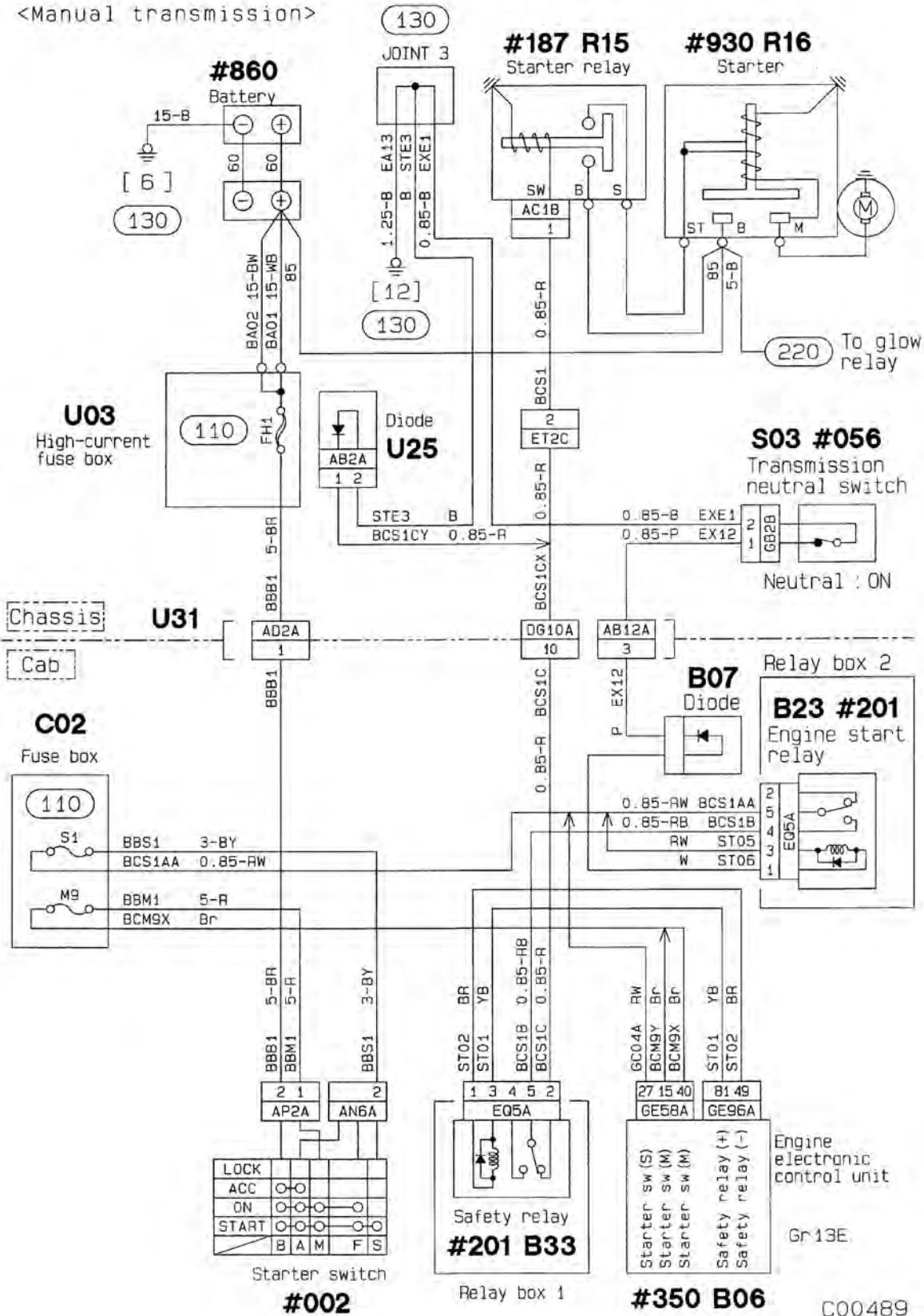


C00487

# 17.2 STARTING CIRCUIT

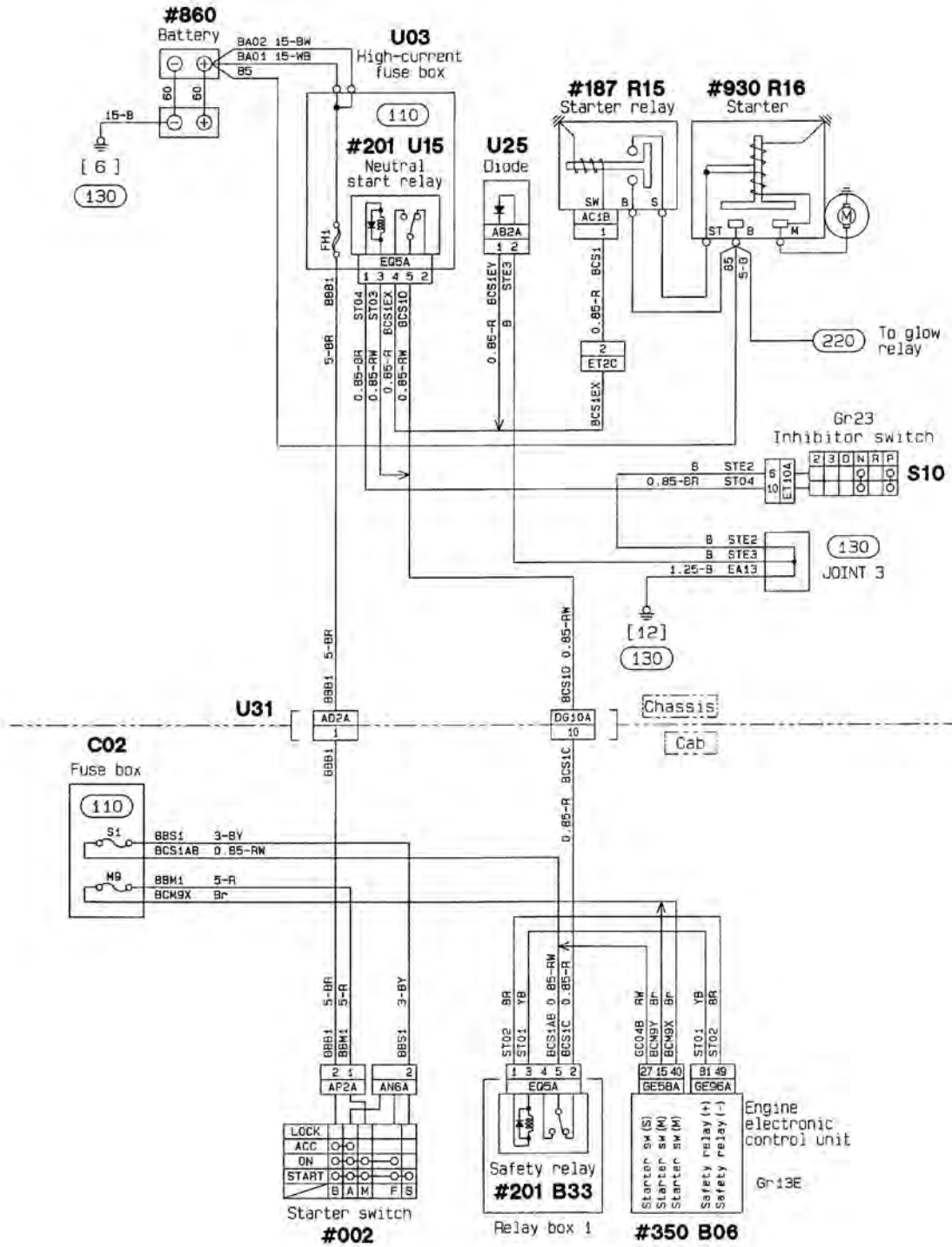
## (210) ENGINE STARTING CIRCUIT

<Manual transmission>



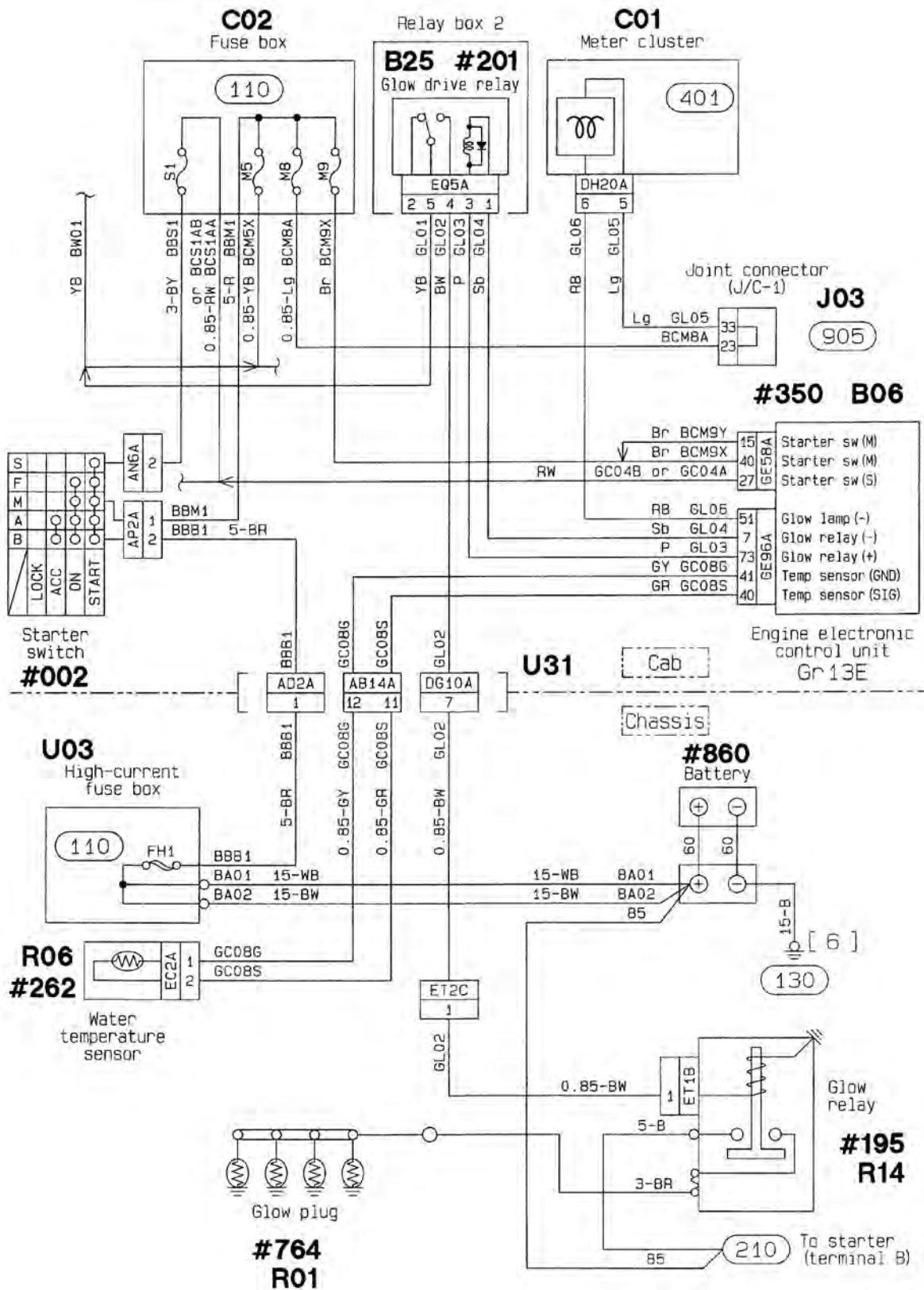
# 210 ENGINE STARTING CIRCUIT

<Automatic transmission>



C00490

**220 ENGINE PREHEATING CIRCUIT**



C00491

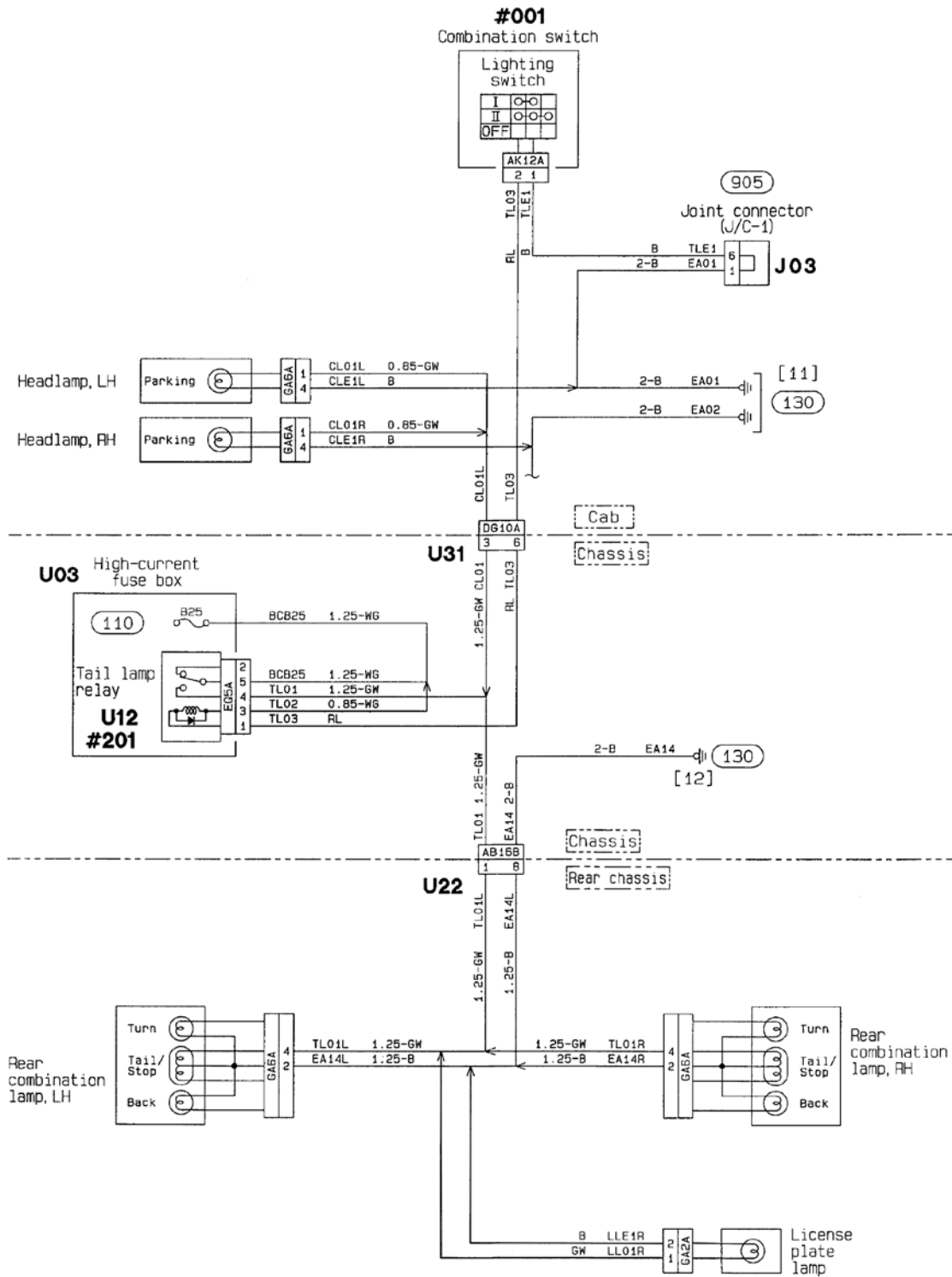






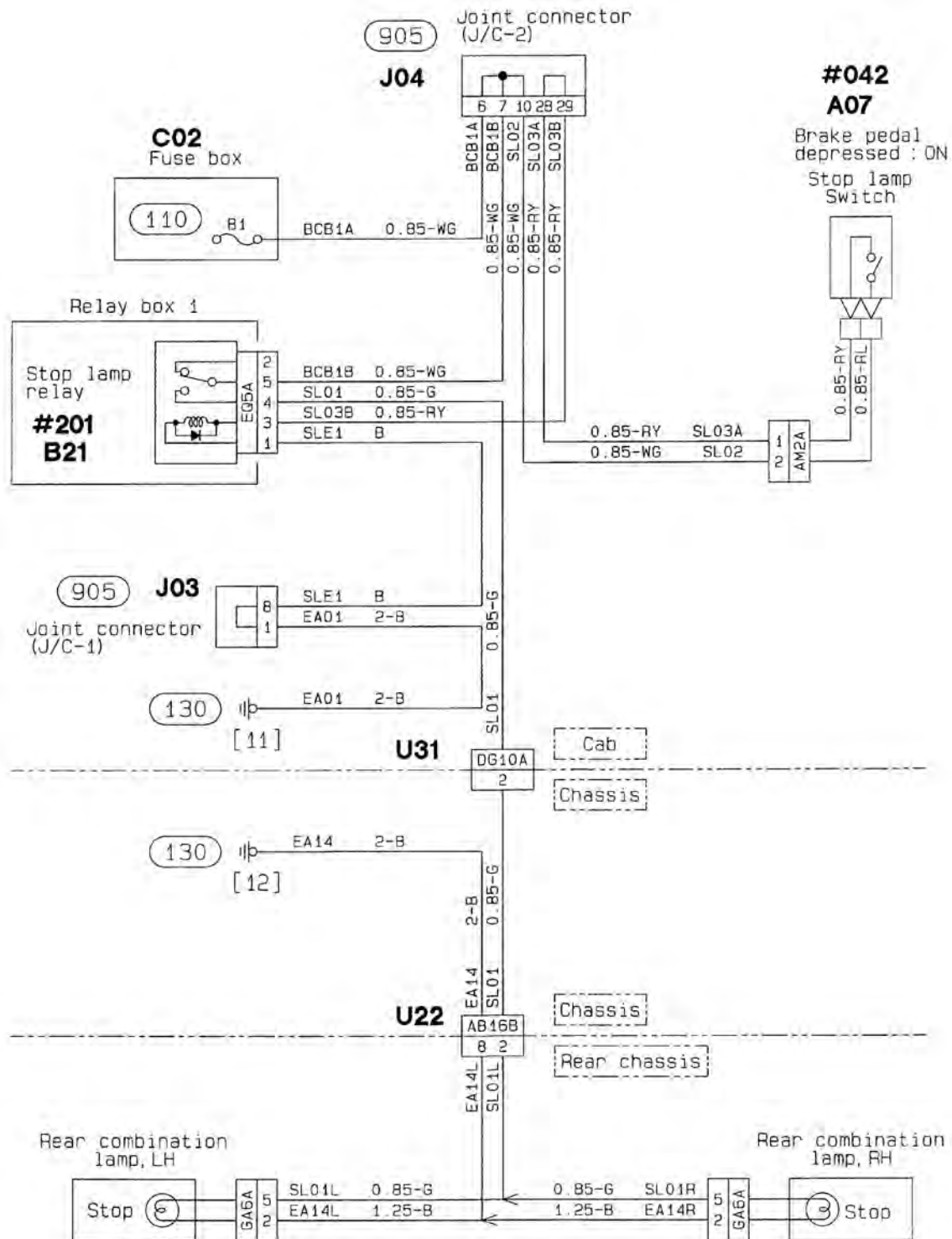


# 320 TAIL, CLEARANCE AND LICENSE PLATE LAMPS CIRCUIT



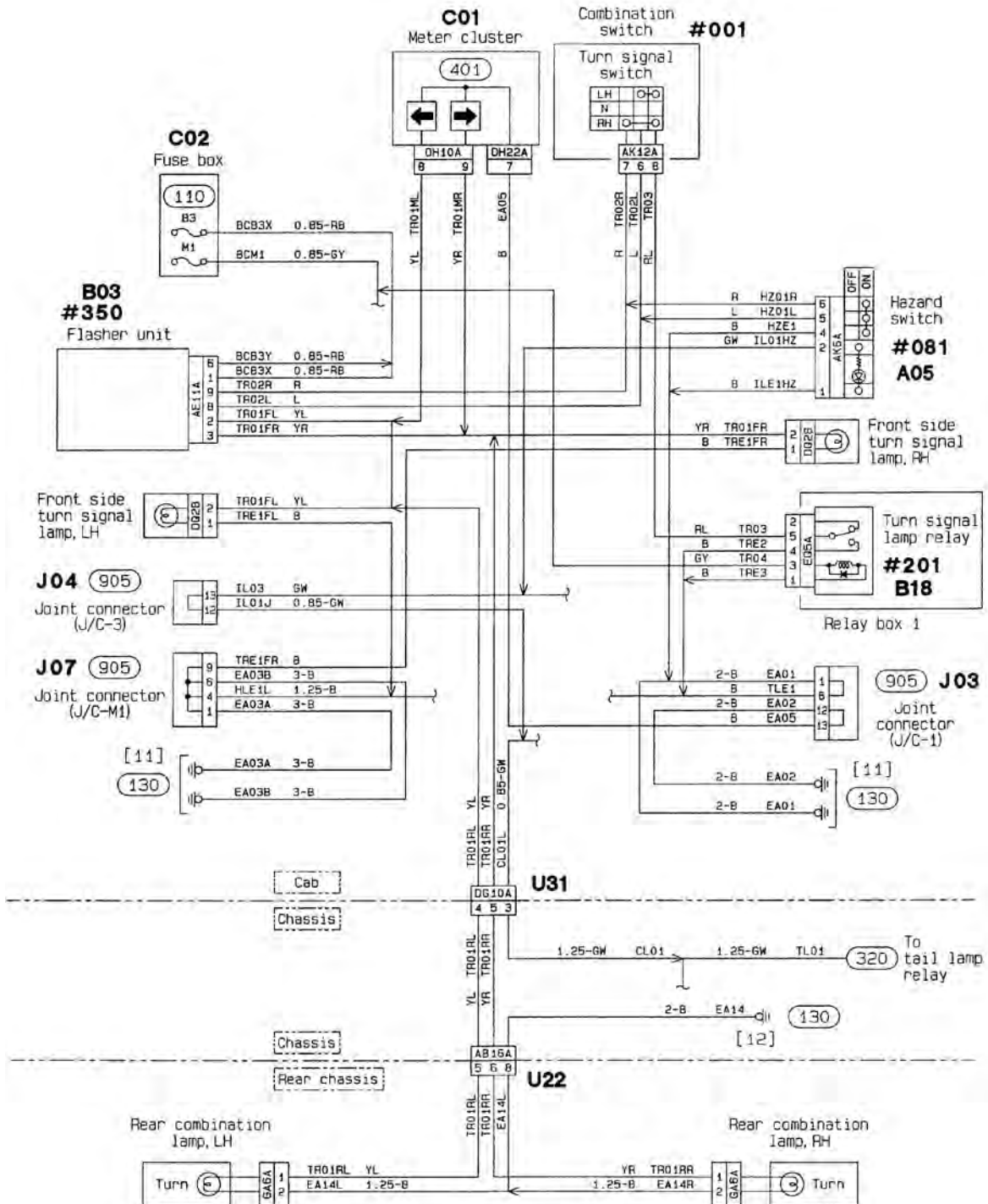
C00495

# 325 STOP LAMP CIRCUIT



C00496

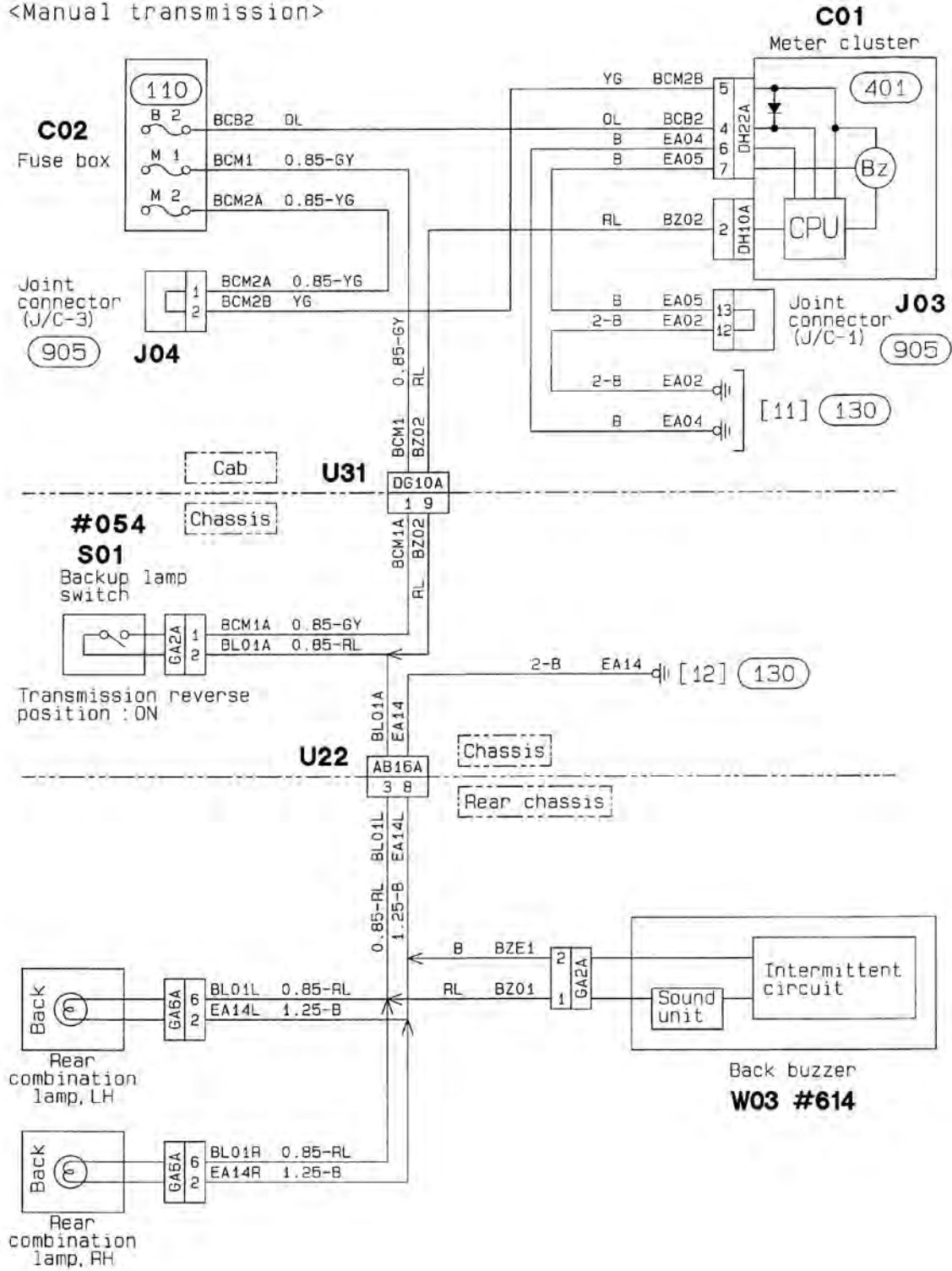
# 330 TURN SIGNAL AND HAZARD LAMP CIRCUIT



C00497

# 340 BACKUP LAMP CIRCUIT

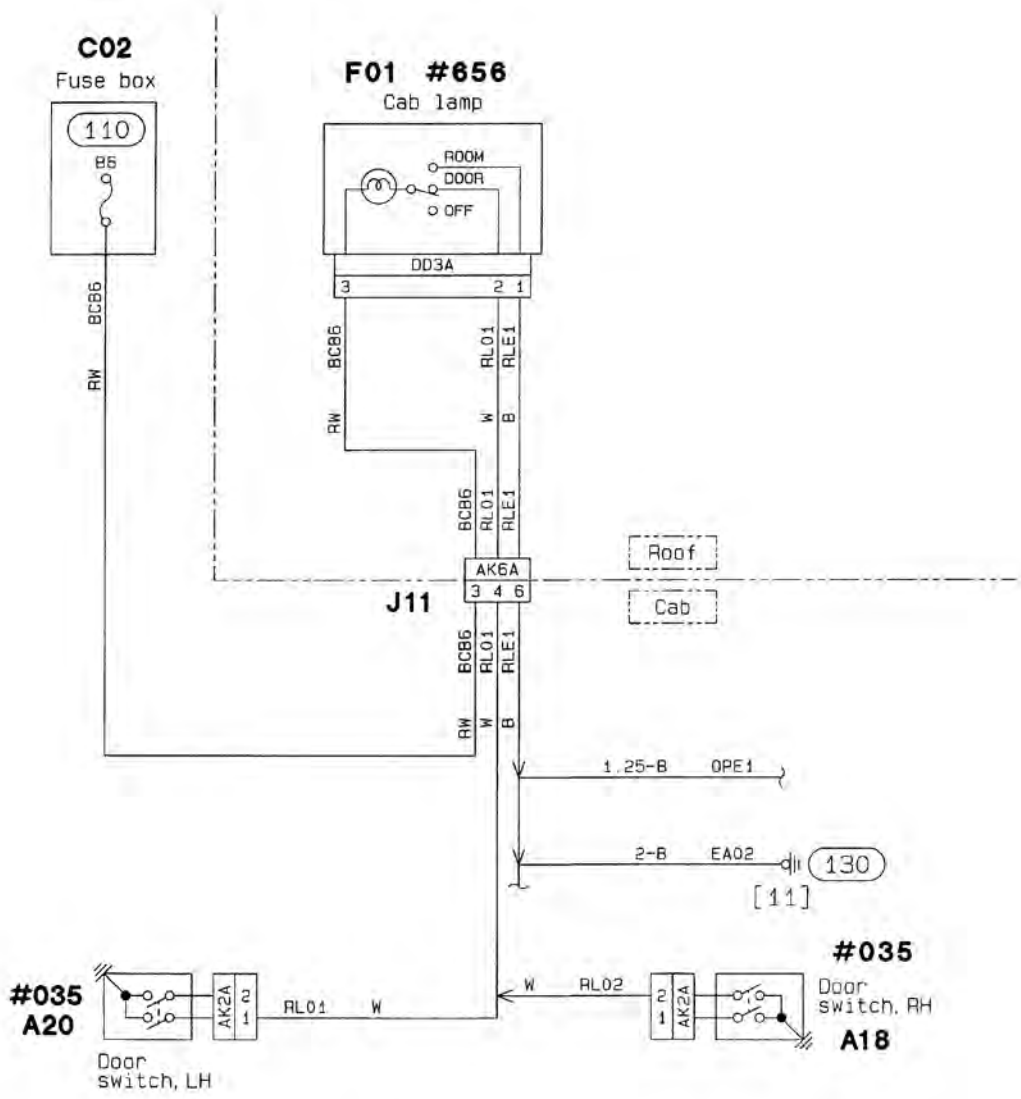
<Manual transmission>



C00498

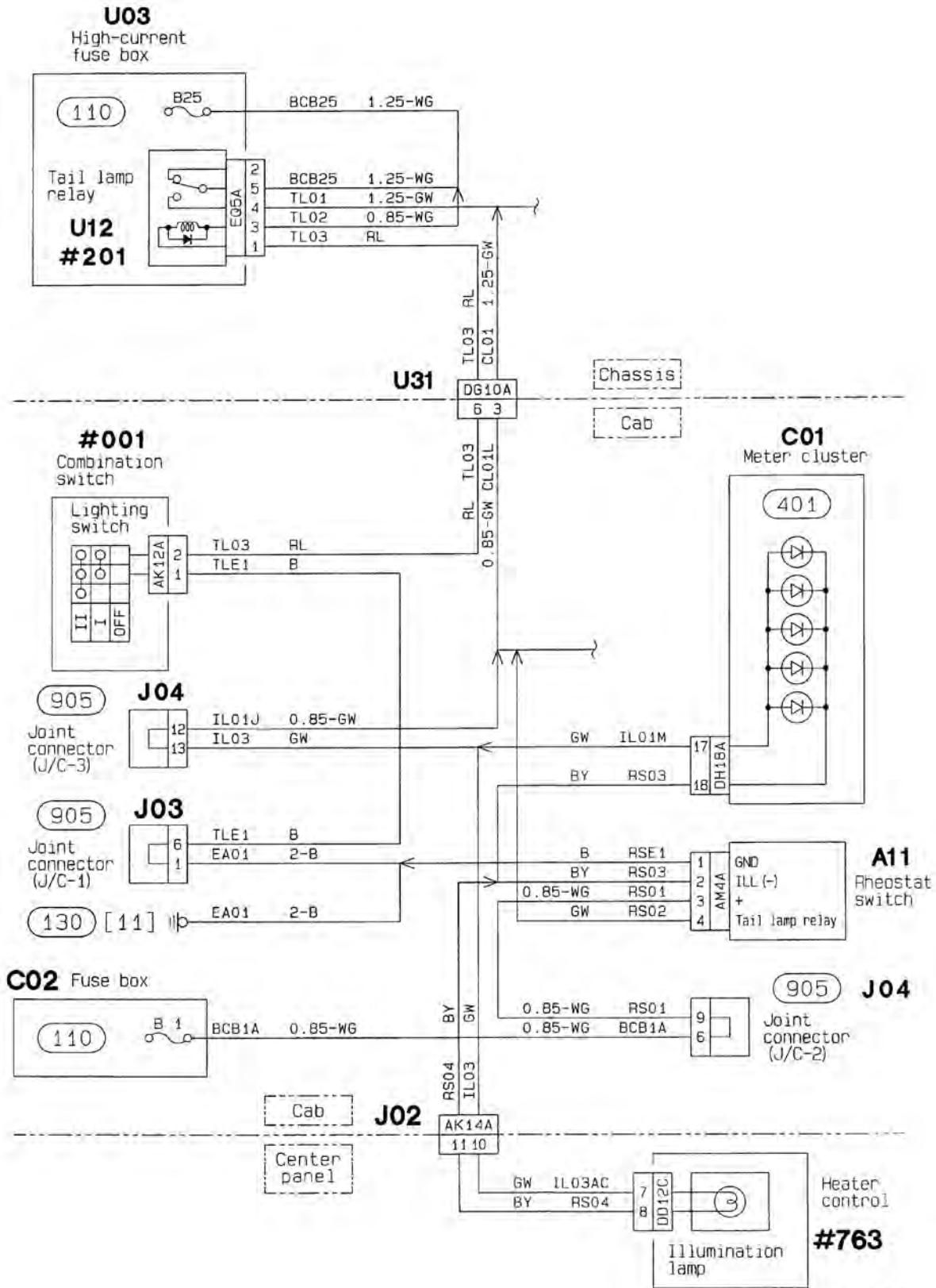


**345 CAB LAMP CIRCUIT**



C00500

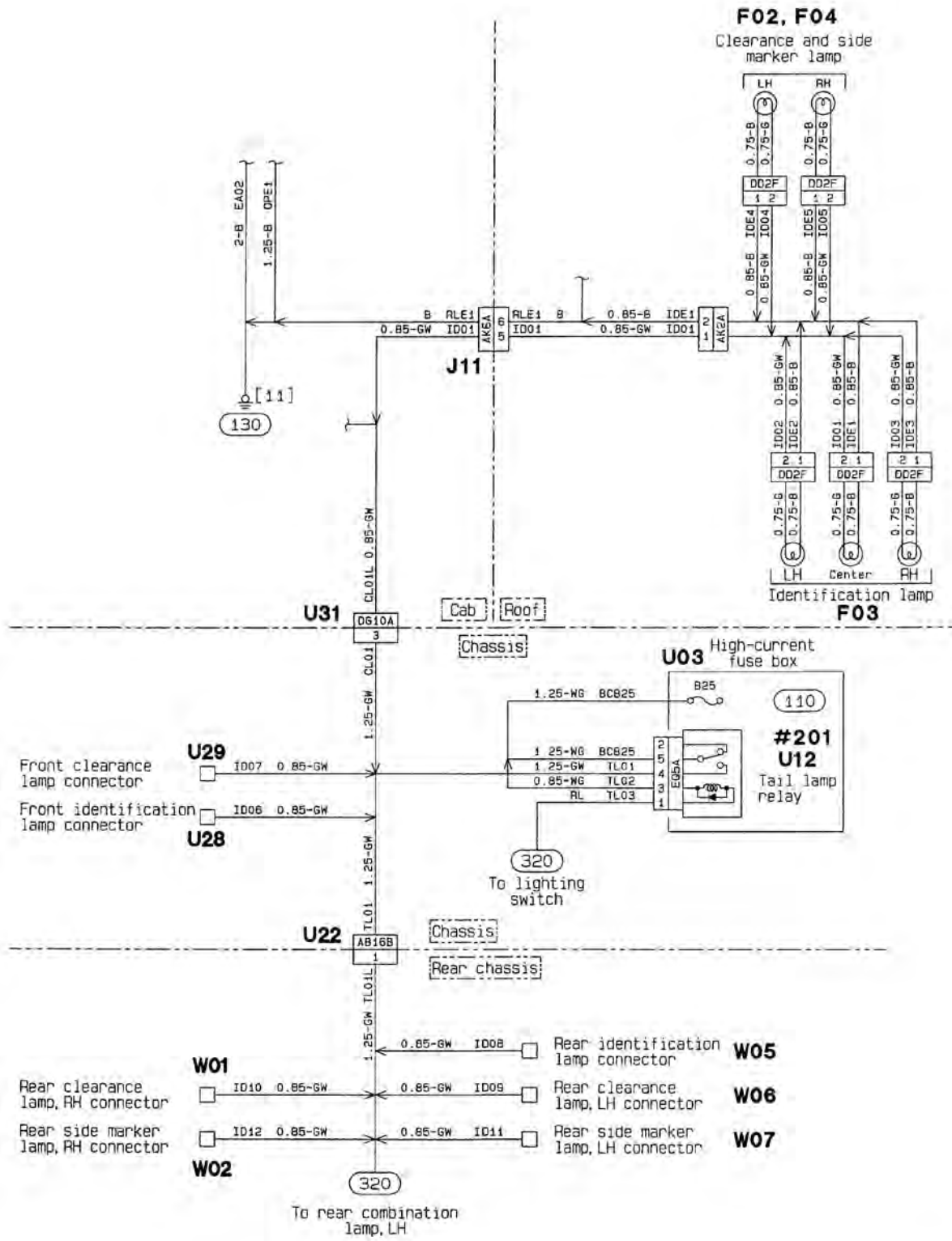
**348** ILLUMINATION LAMP CIRCUIT



C00502

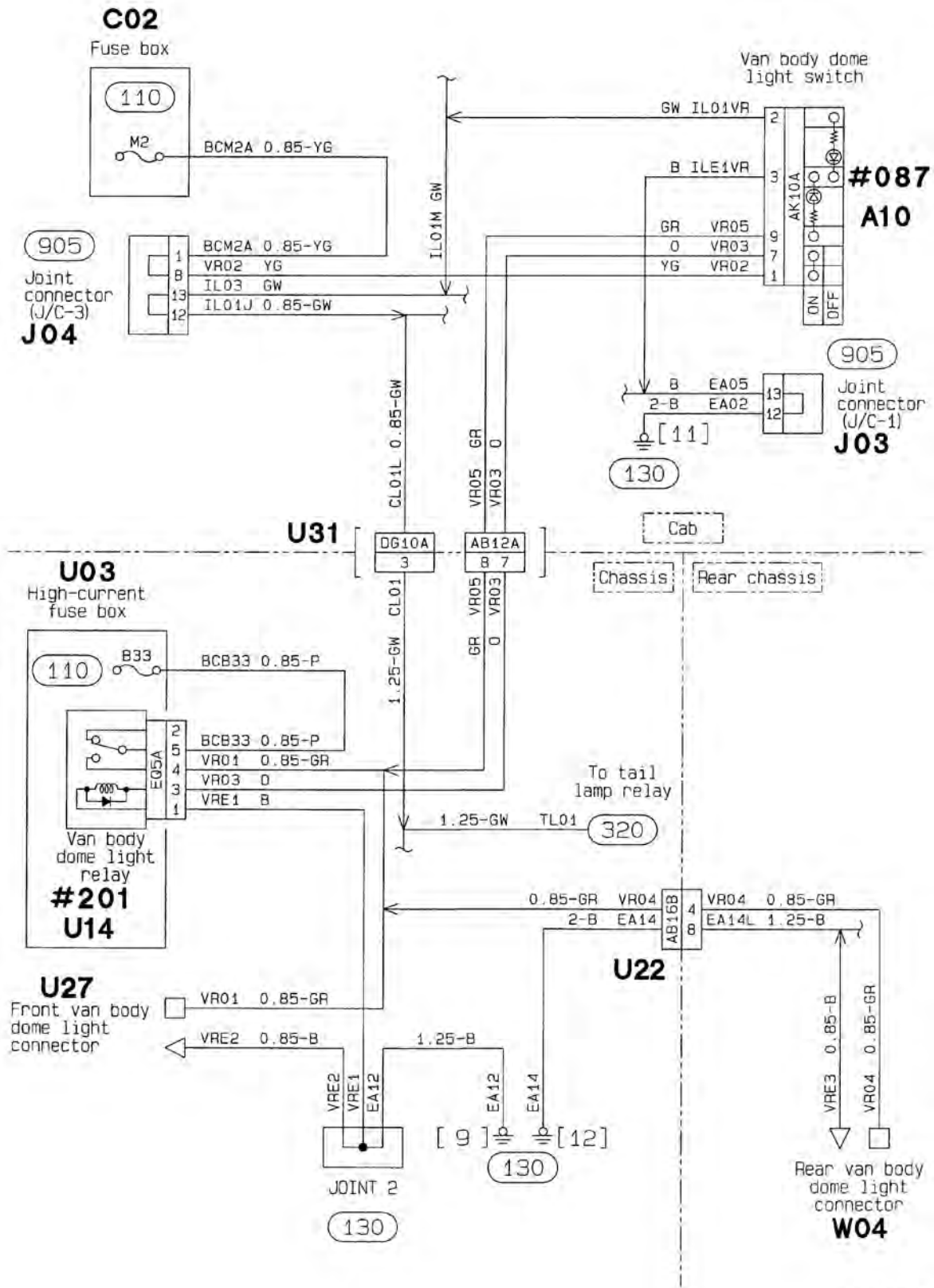


**349 IDENTIFICATION LAMP AND SIDE MARKER LAMP CIRCUIT**



C00503

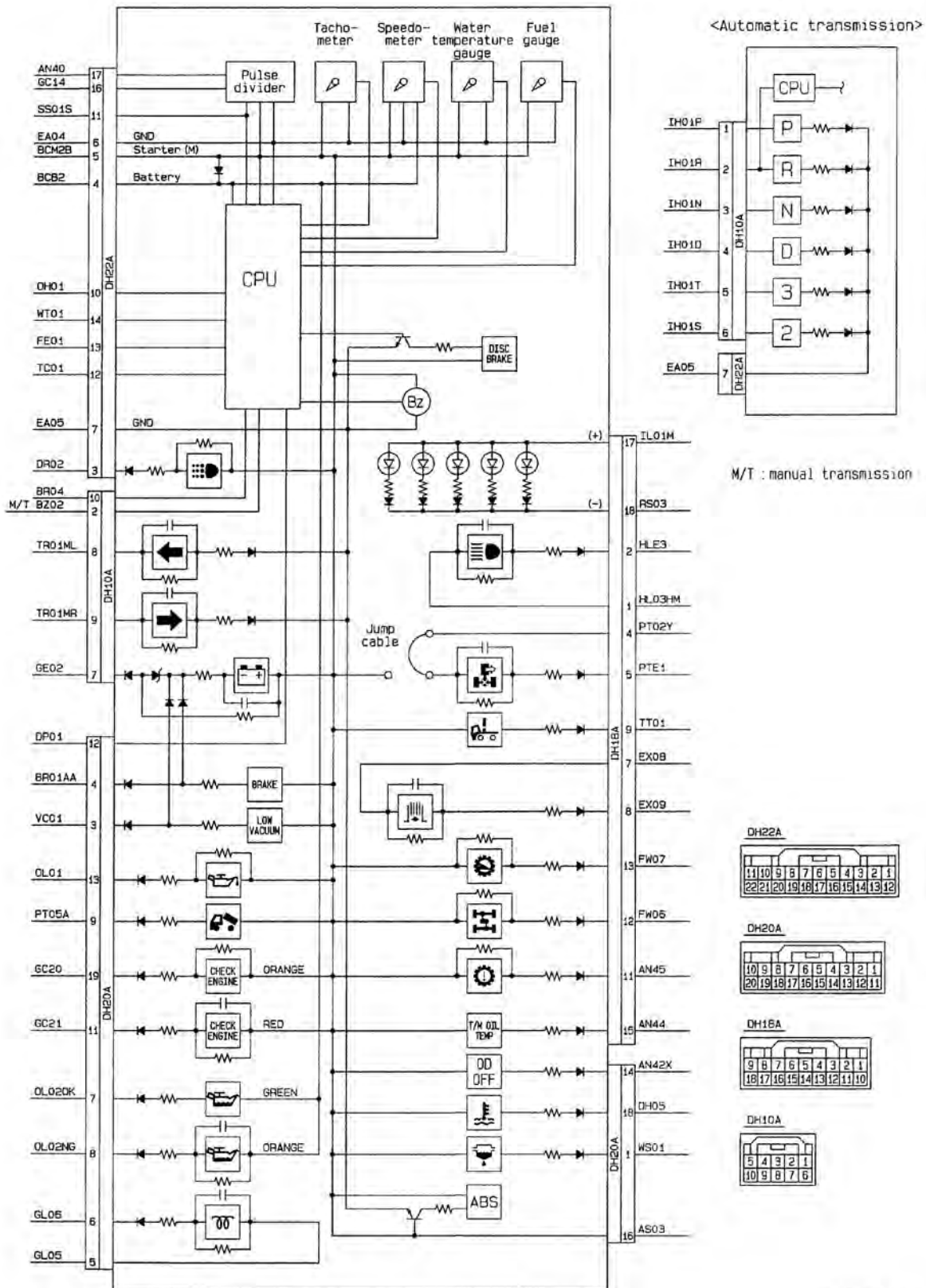
**352 VAN BODY DOME LIGHT CIRCUIT**



C00504

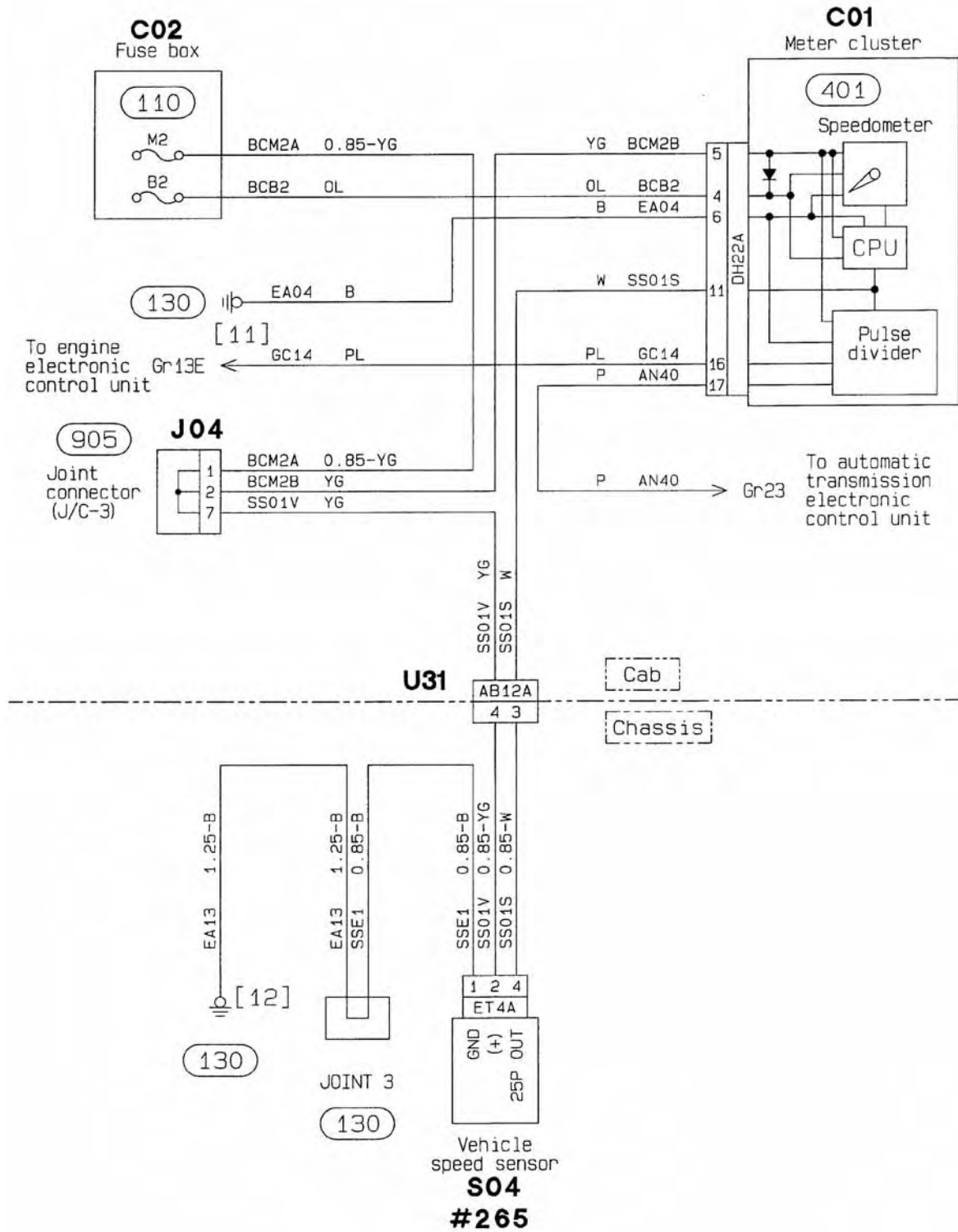
# 17.4 METER CLUSTER

## 401 METER CLUSTER INTERNAL CIRCUIT



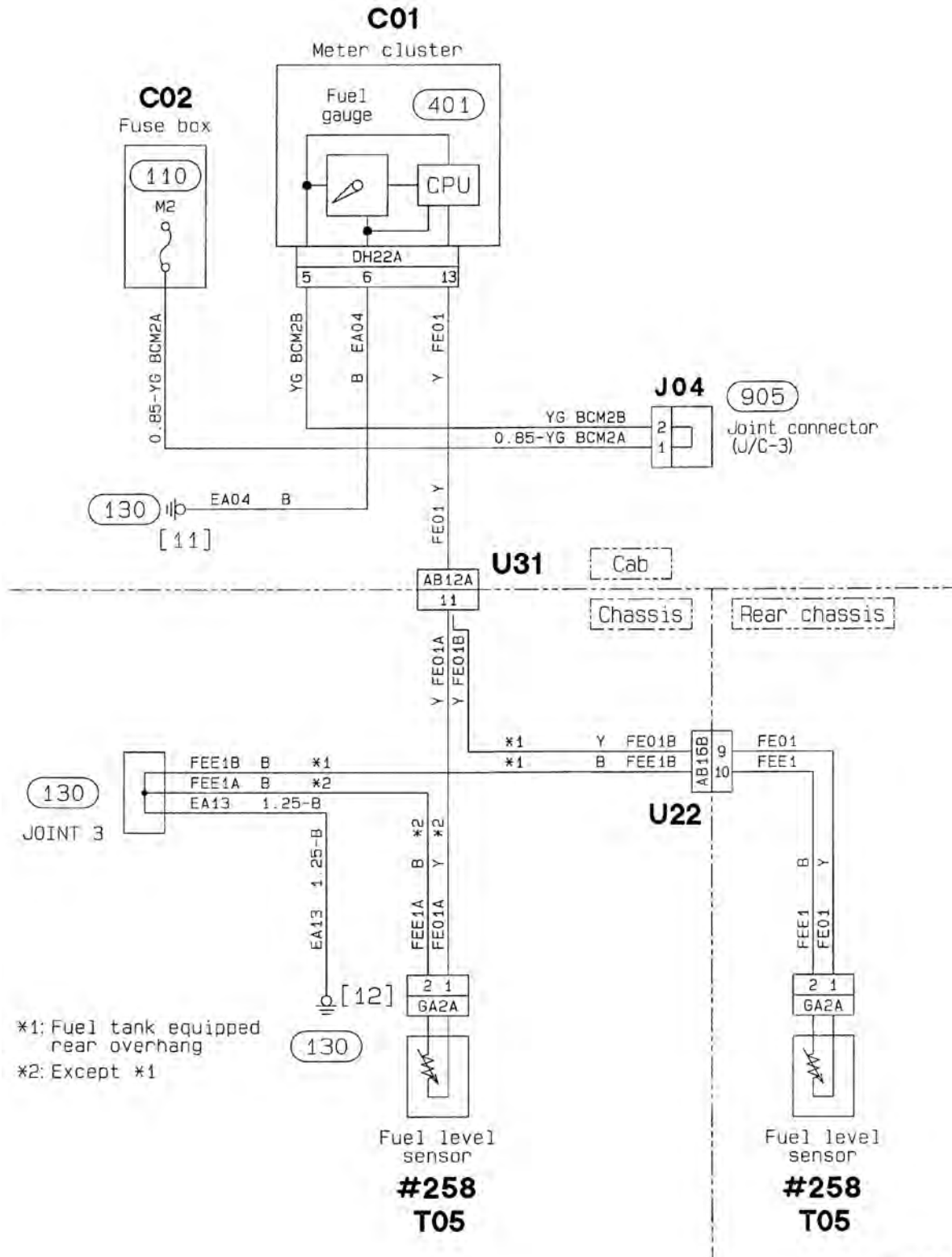
C00505

**412 SPEEDOMETER CIRCUIT**



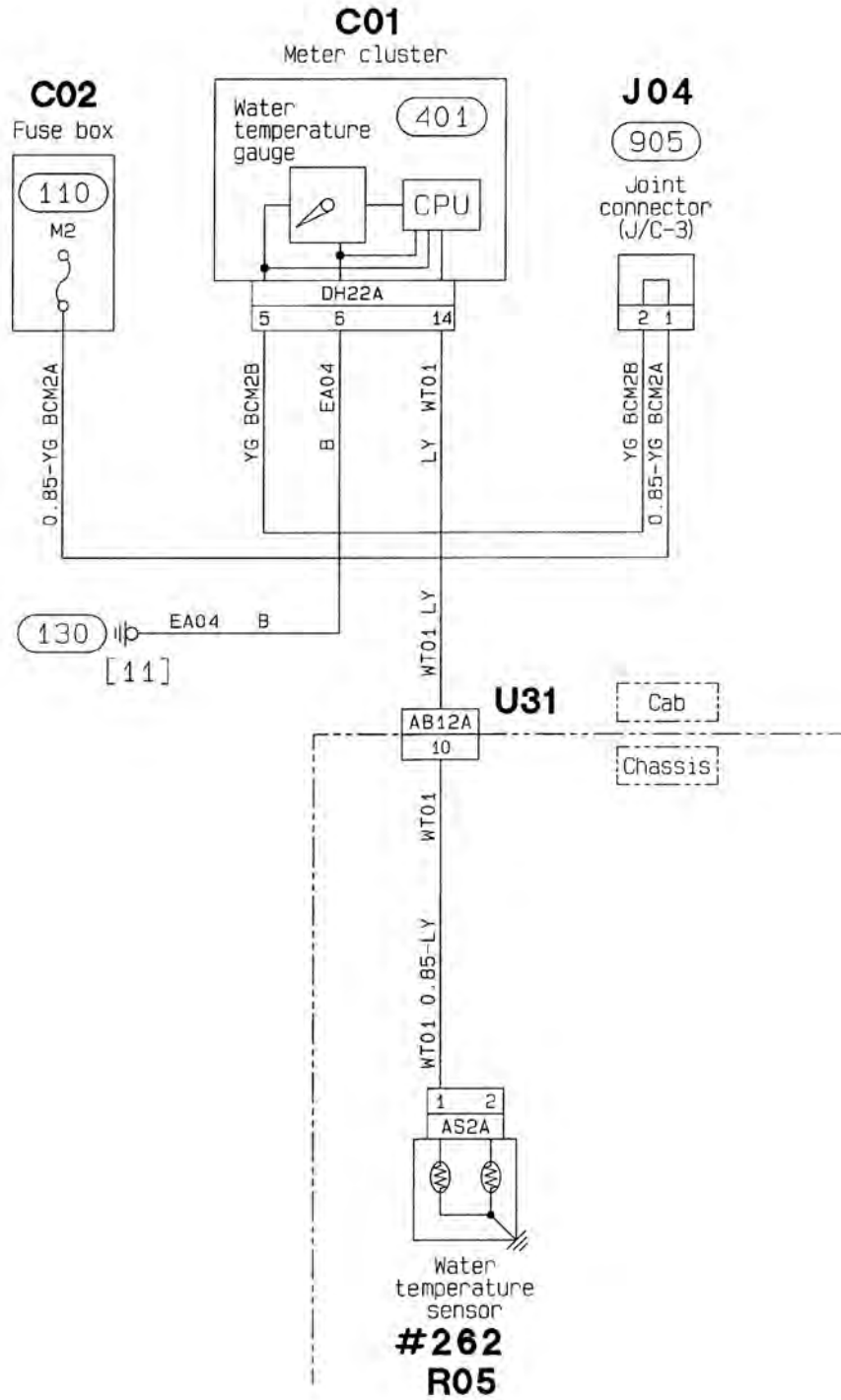
C00506

**420 FUEL GAUGE CIRCUIT**



C00508

**425 WATER TEMPERATURE GAUGE CIRCUIT**

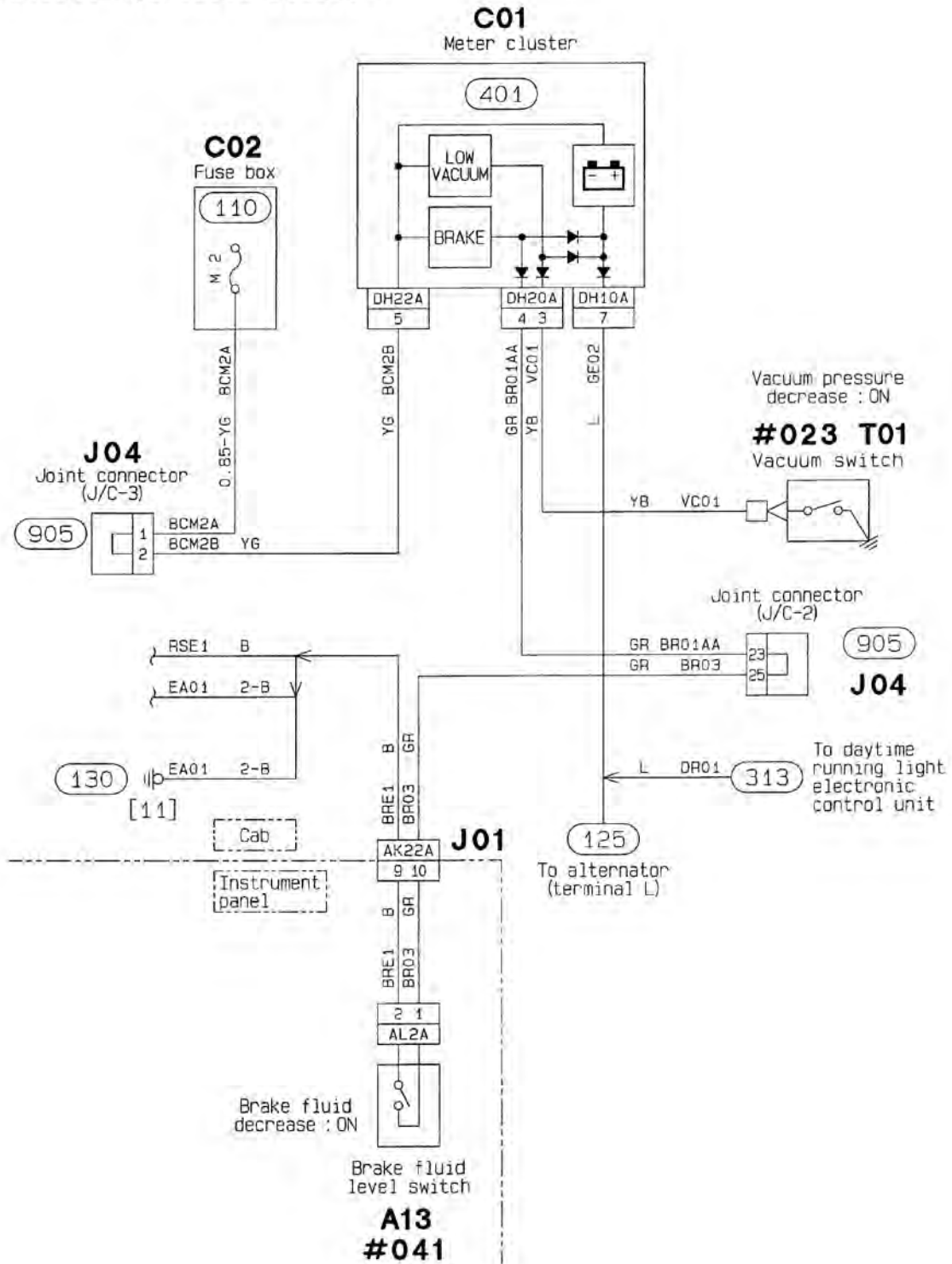


C00509



**515 BRAKE WARNING CIRCUIT**

<Except hydraulic booster>

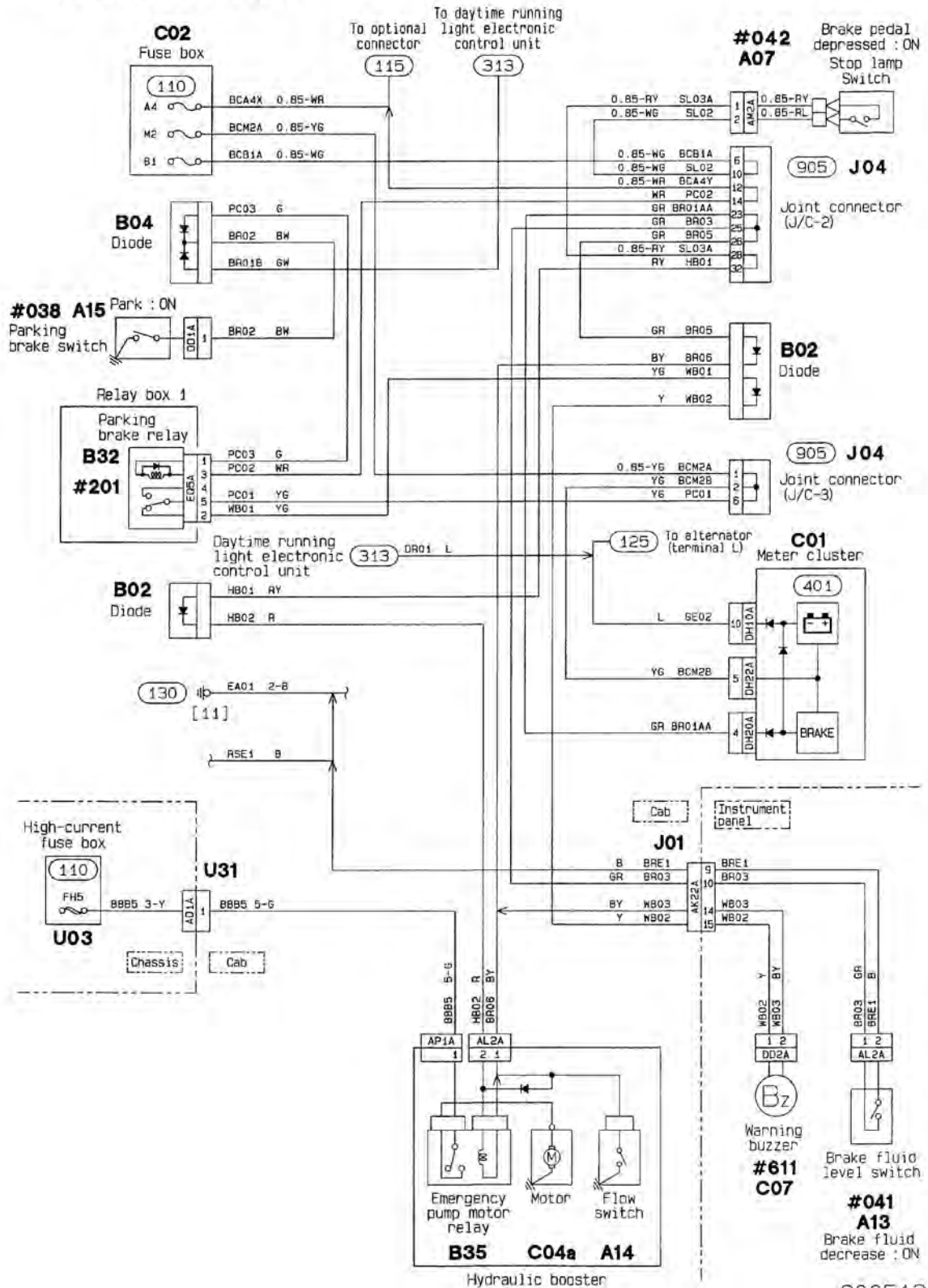


C00511



# 515 BRAKE WARNING CIRCUIT

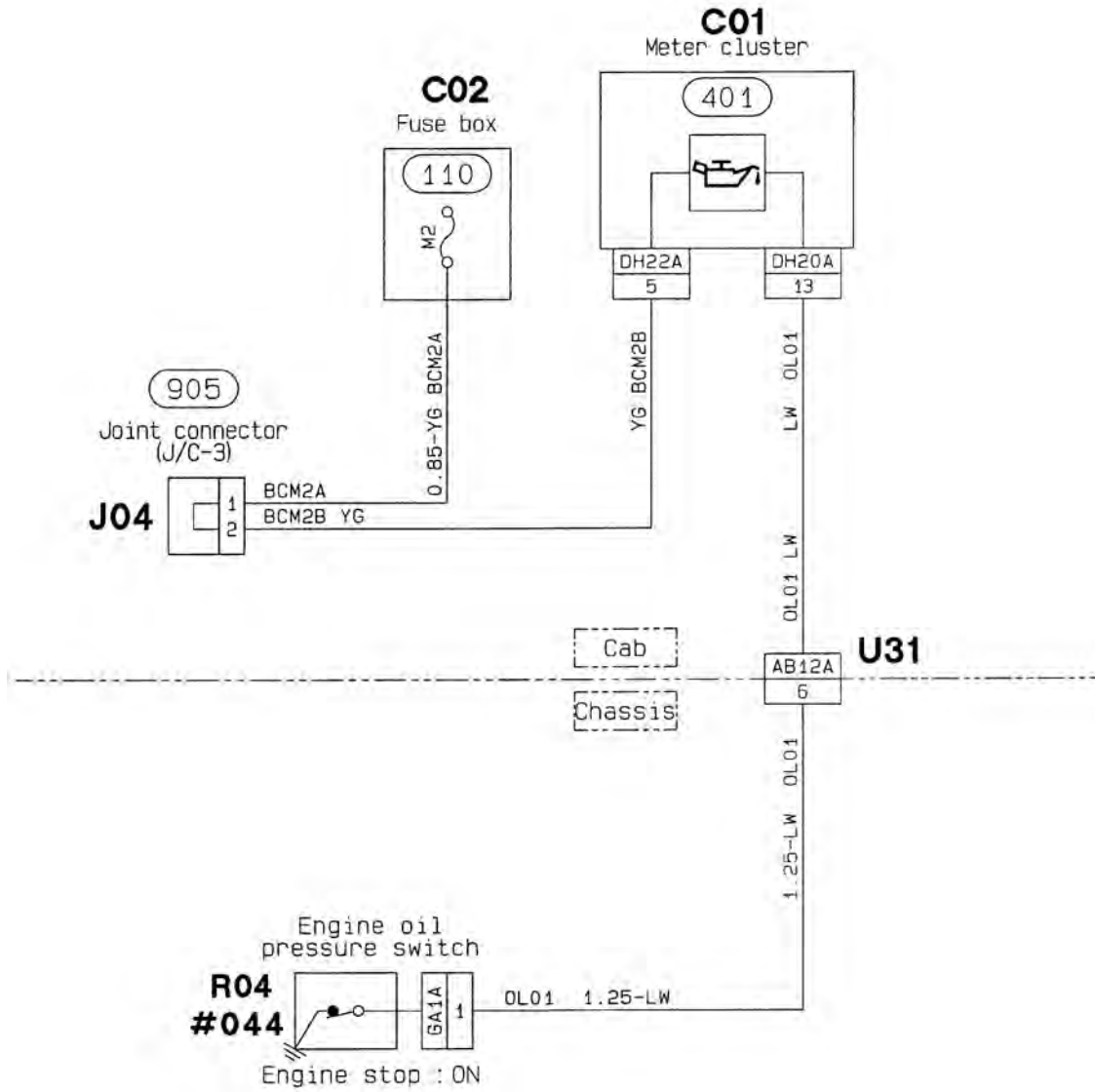
<Hydraulic booster>



C00512

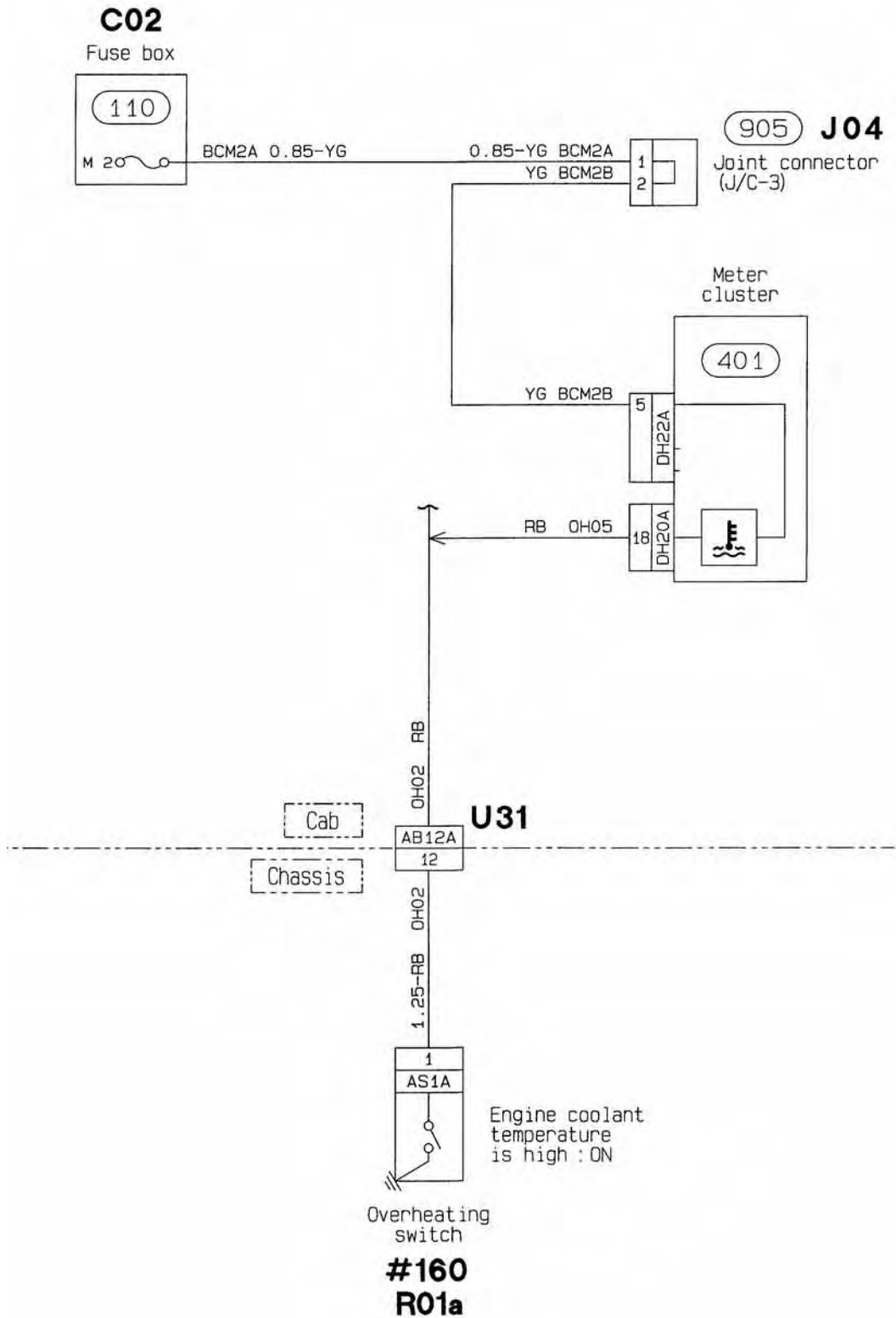


**536 ENGINE OIL PRESSURE WARNING CIRCUIT**



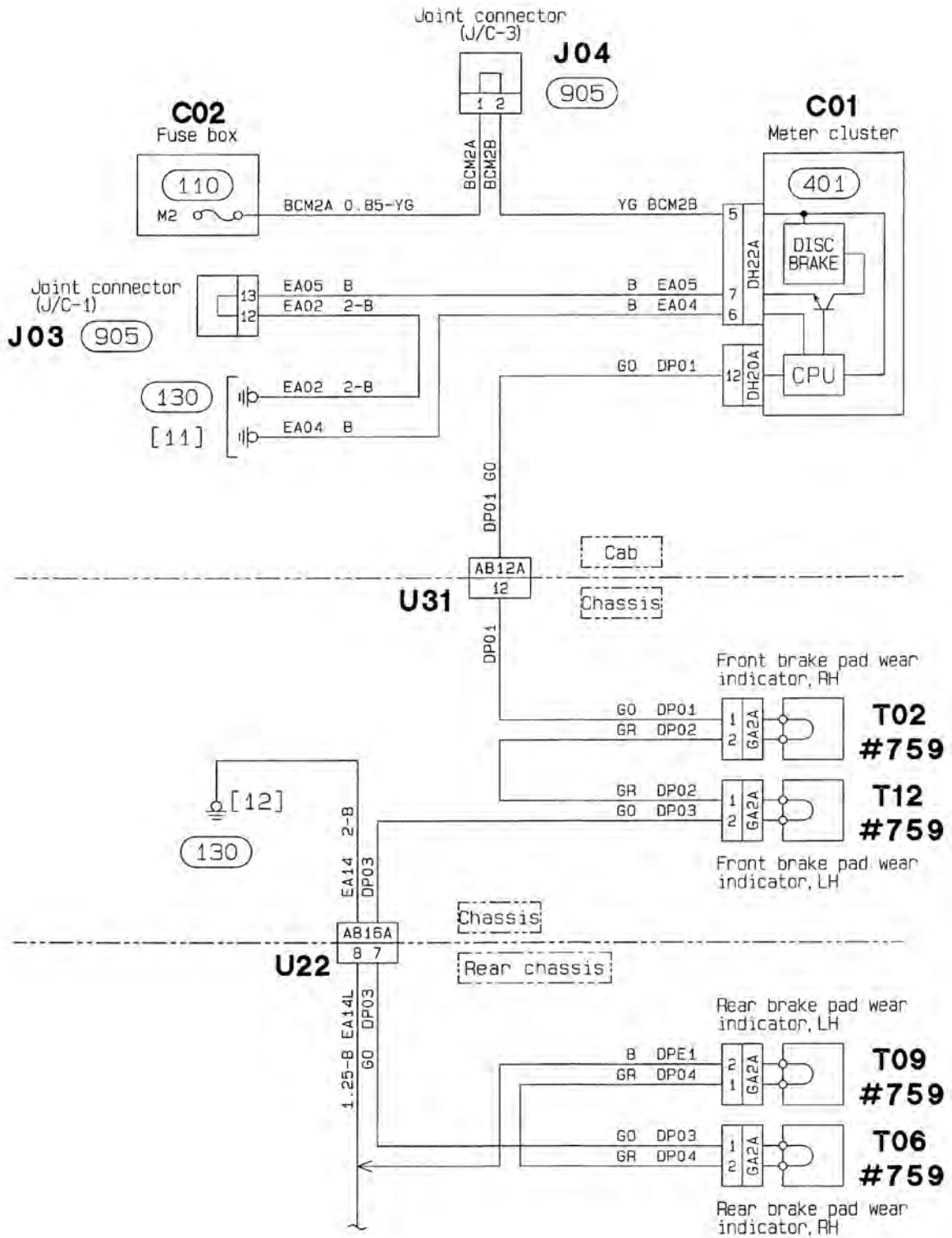
C00514

**537 OVERHEATING WARNING CIRCUIT**



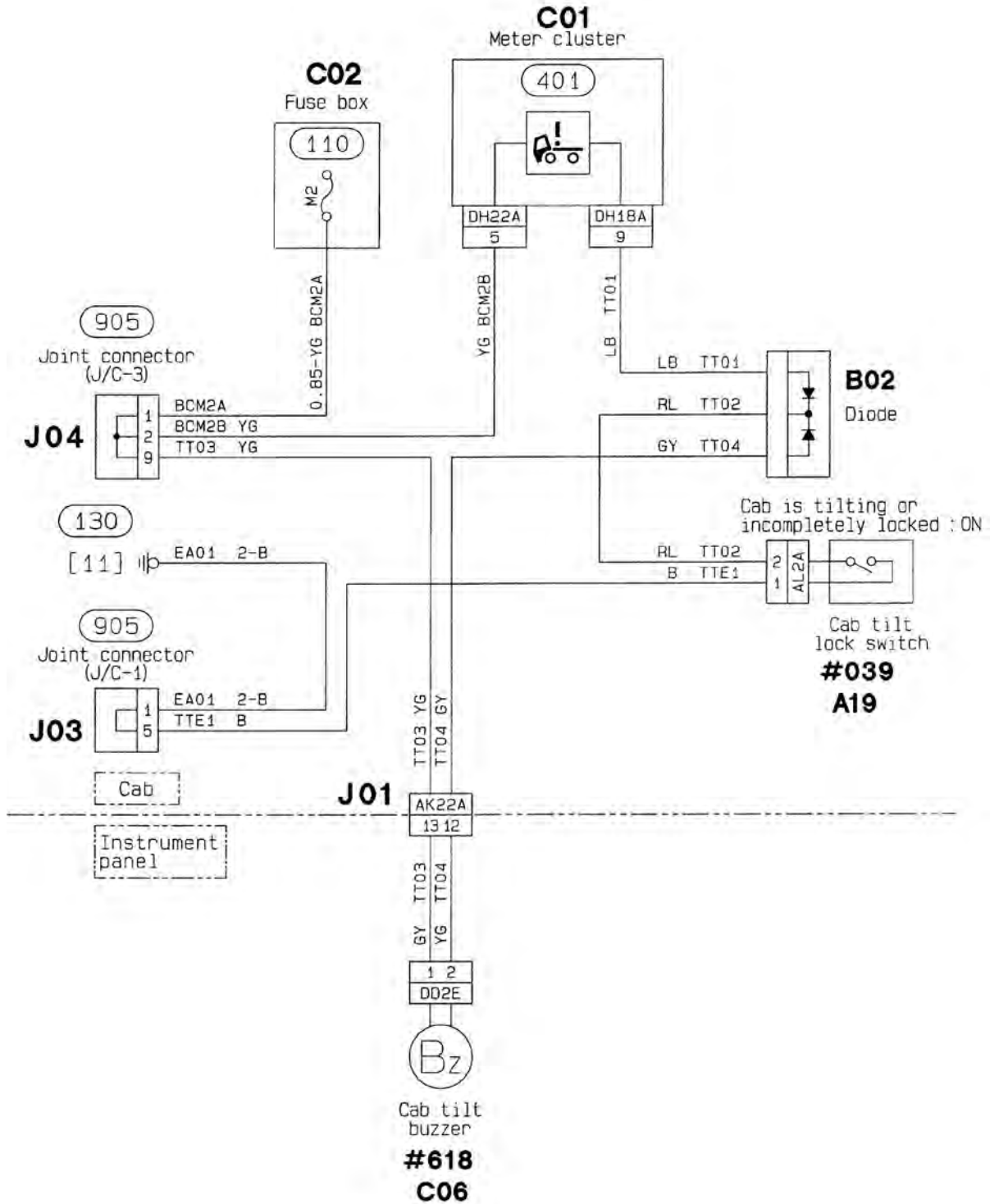
C00515

**540 BRAKE PAD WARNING CIRCUIT**



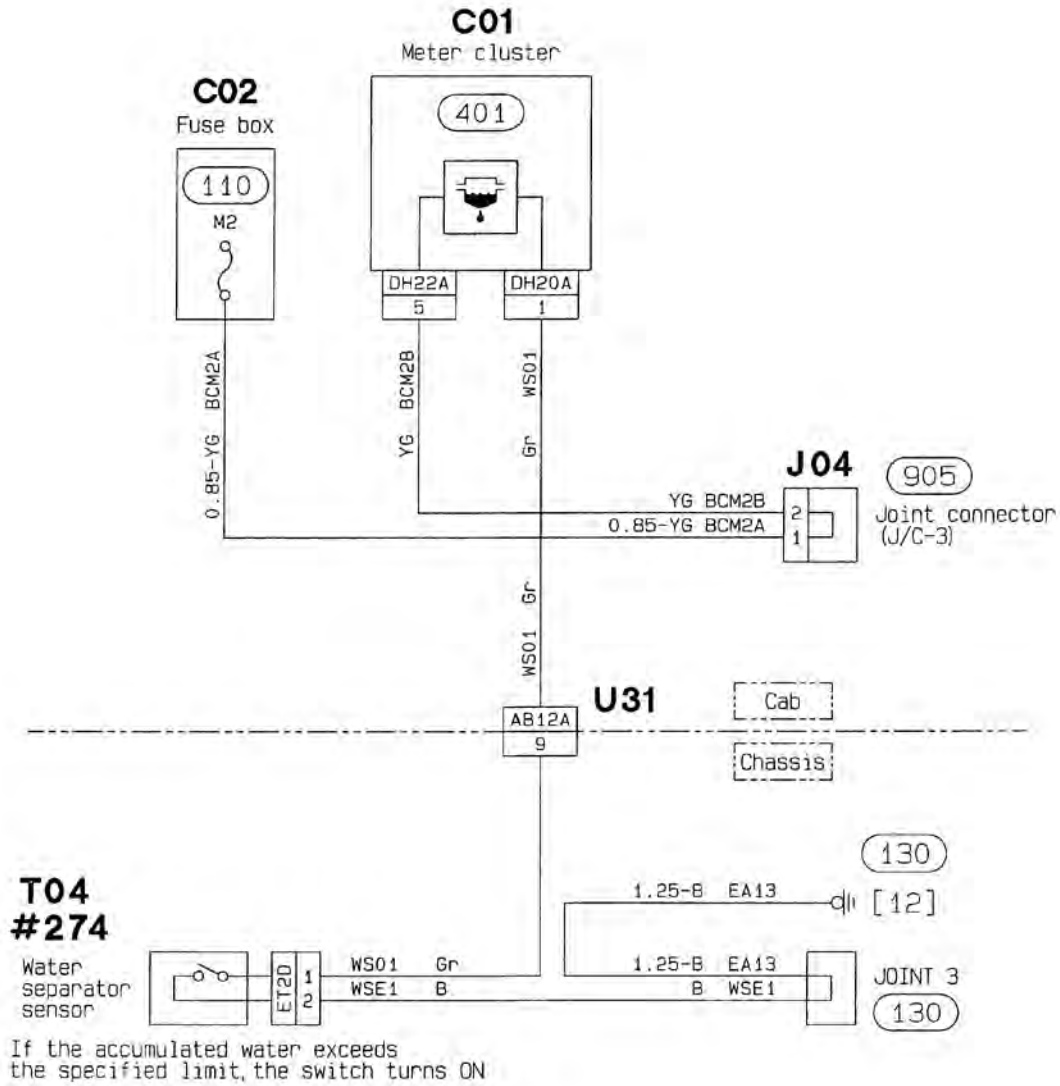
C00516

**550 CAB TILT WARNING CIRCUIT**



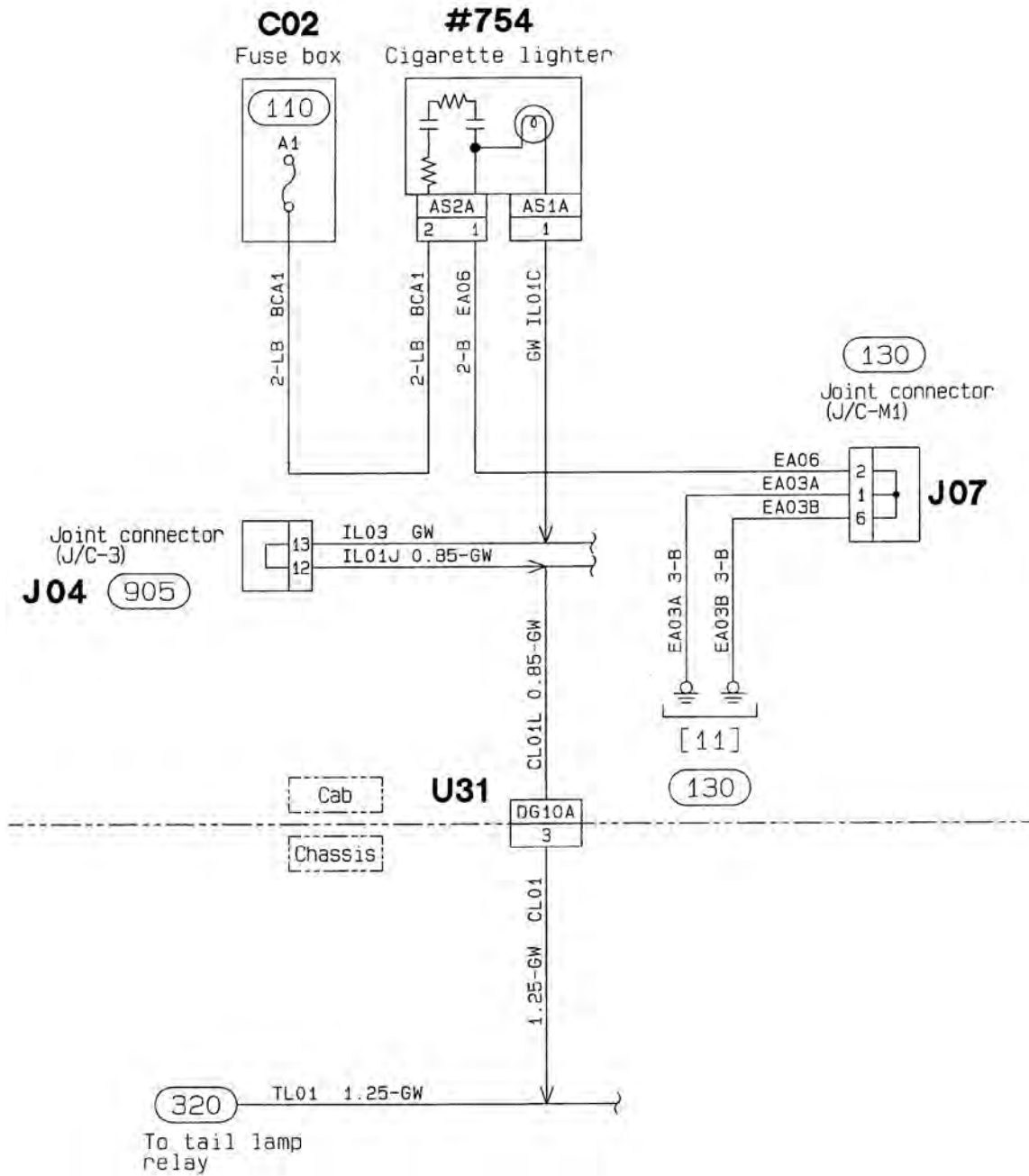
C00517

**566 FUEL FILTER WARNING CIRCUIT**



C00518

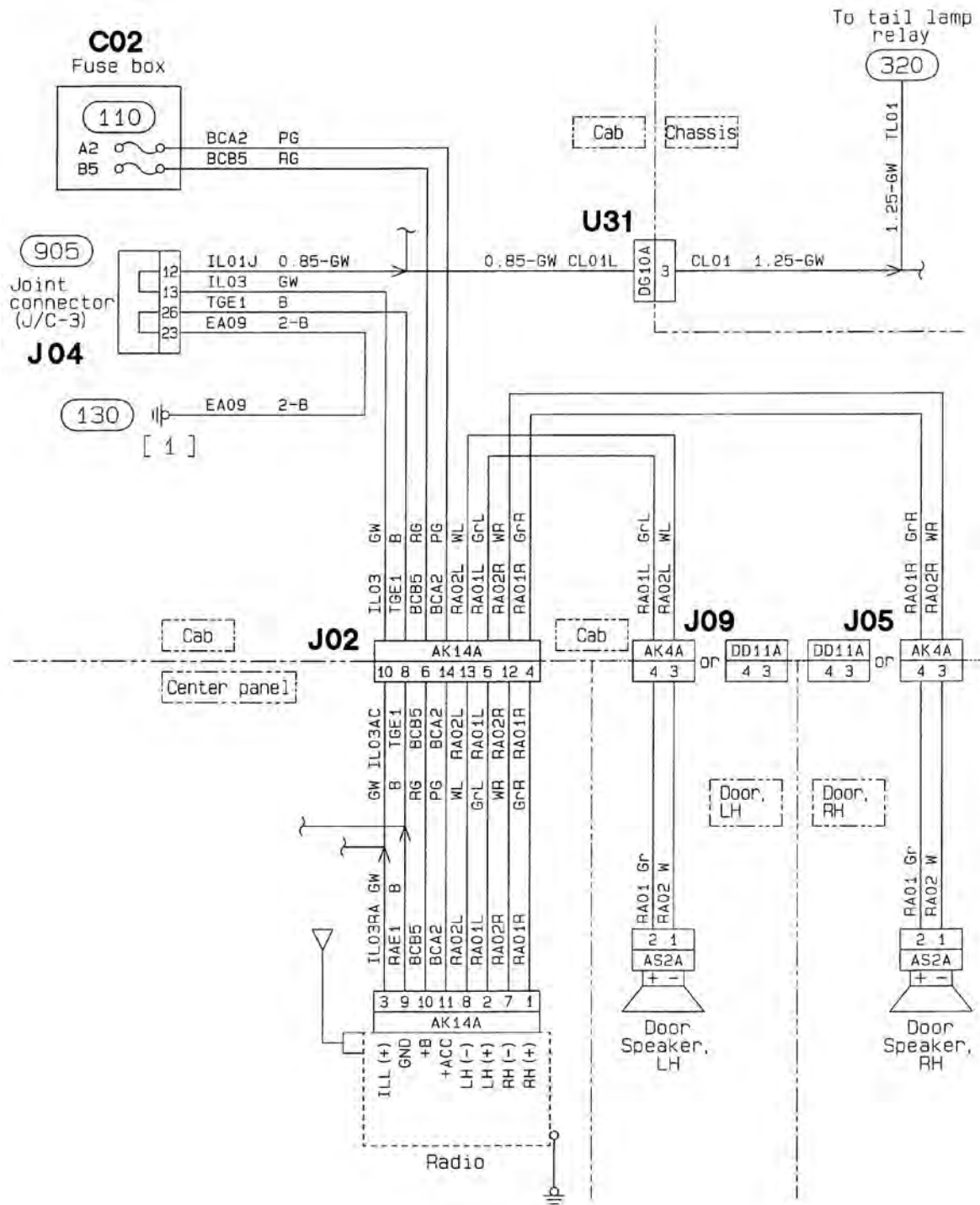
**17.6 CAB SIDE ELECTRICAL CIRCUIT**  
**610 CIGARETTE LIGHTER CIRCUIT**



C00519

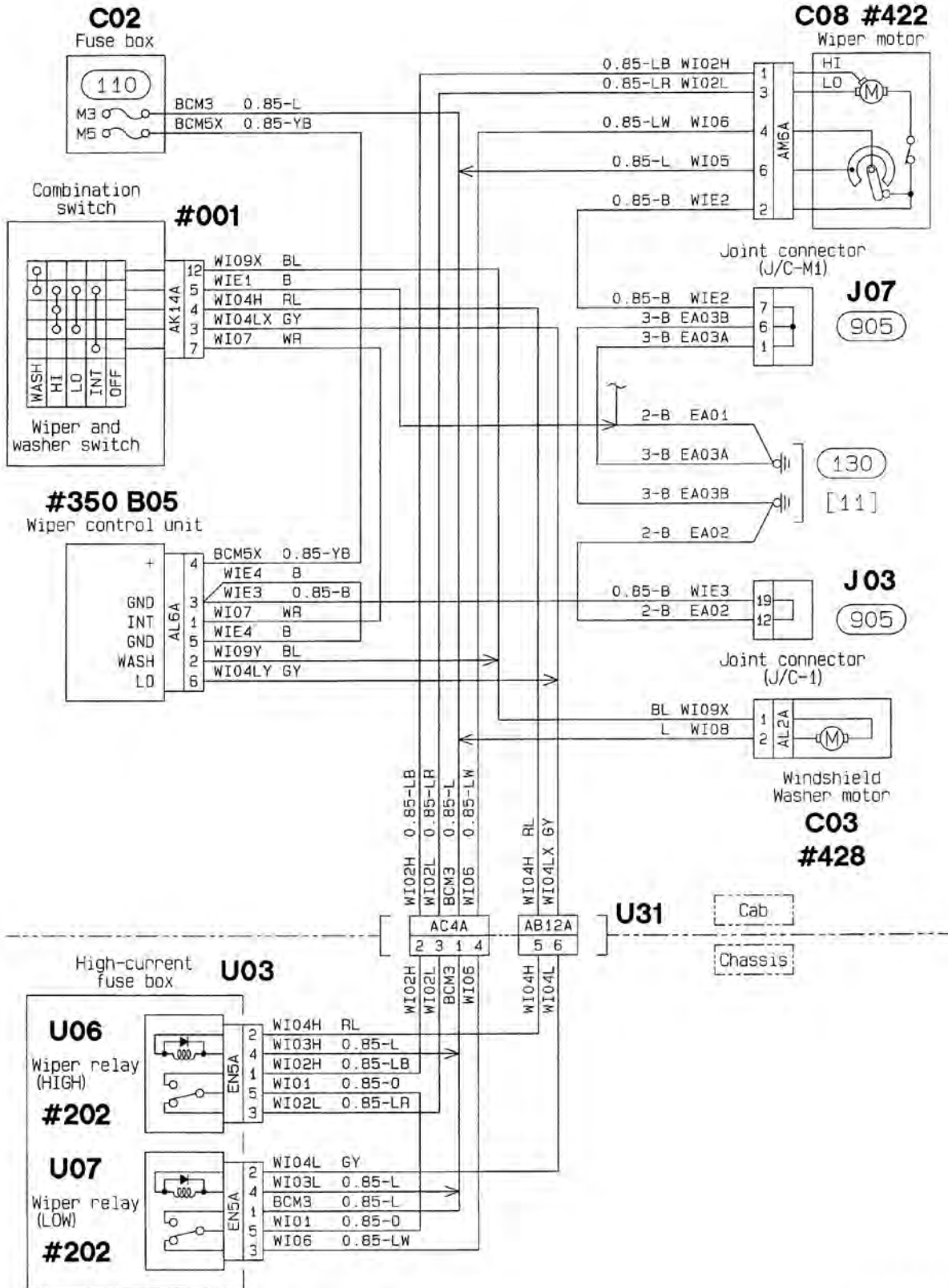


**612 AUDIO CIRCUIT**



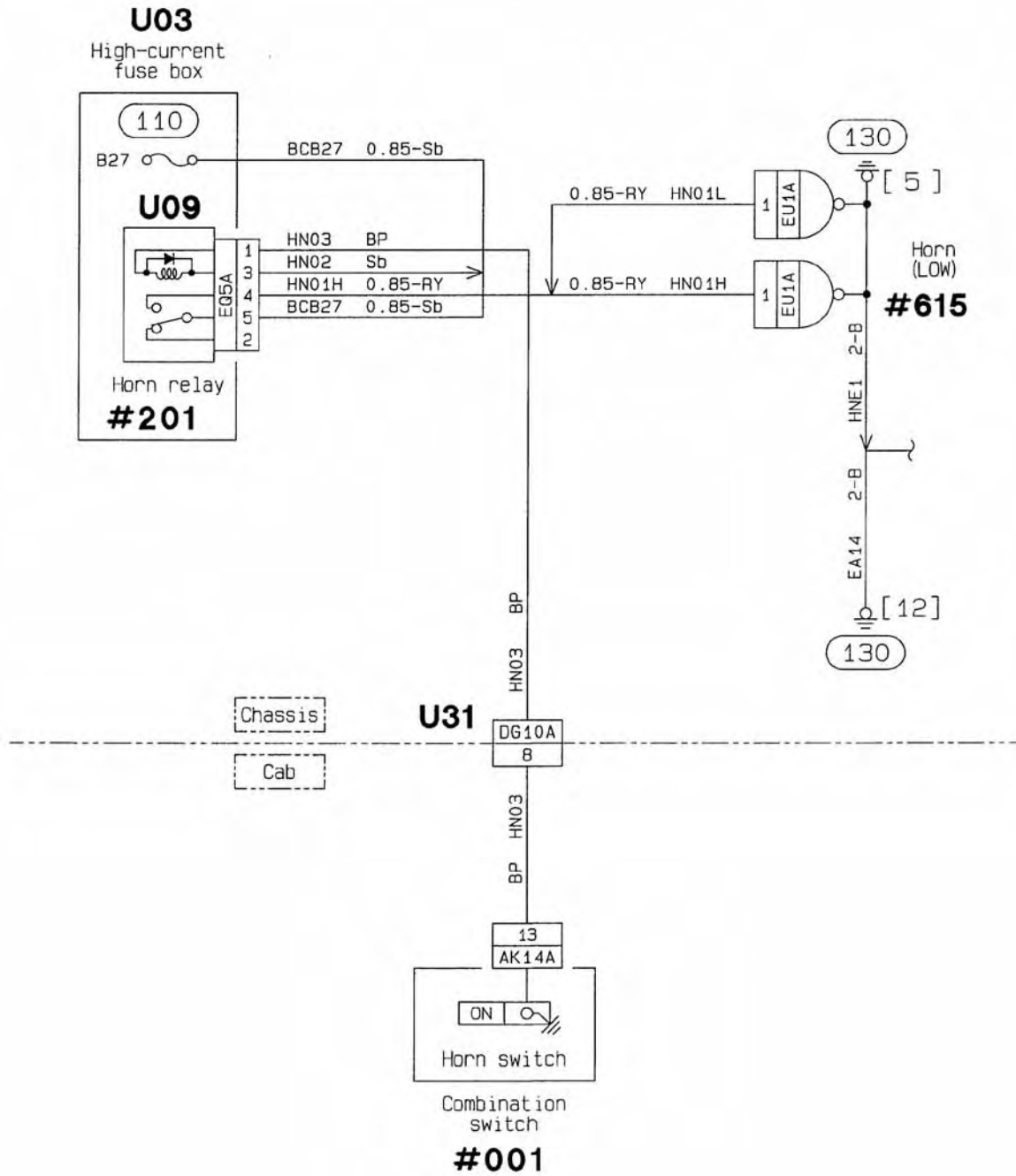
C00520

**614 WIPER AND WASHER CIRCUIT**



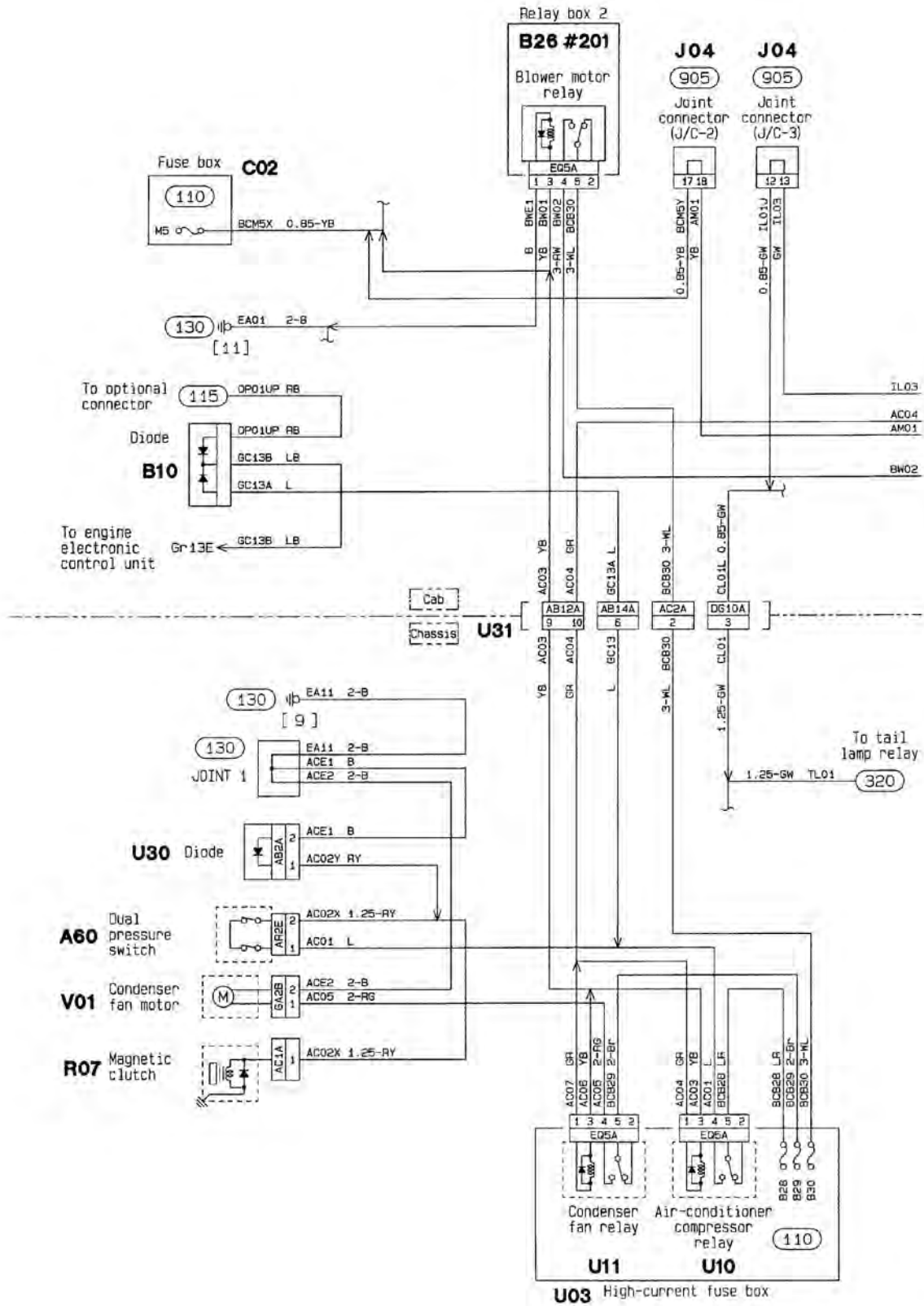
C00521

**616 HORN CIRCUIT**



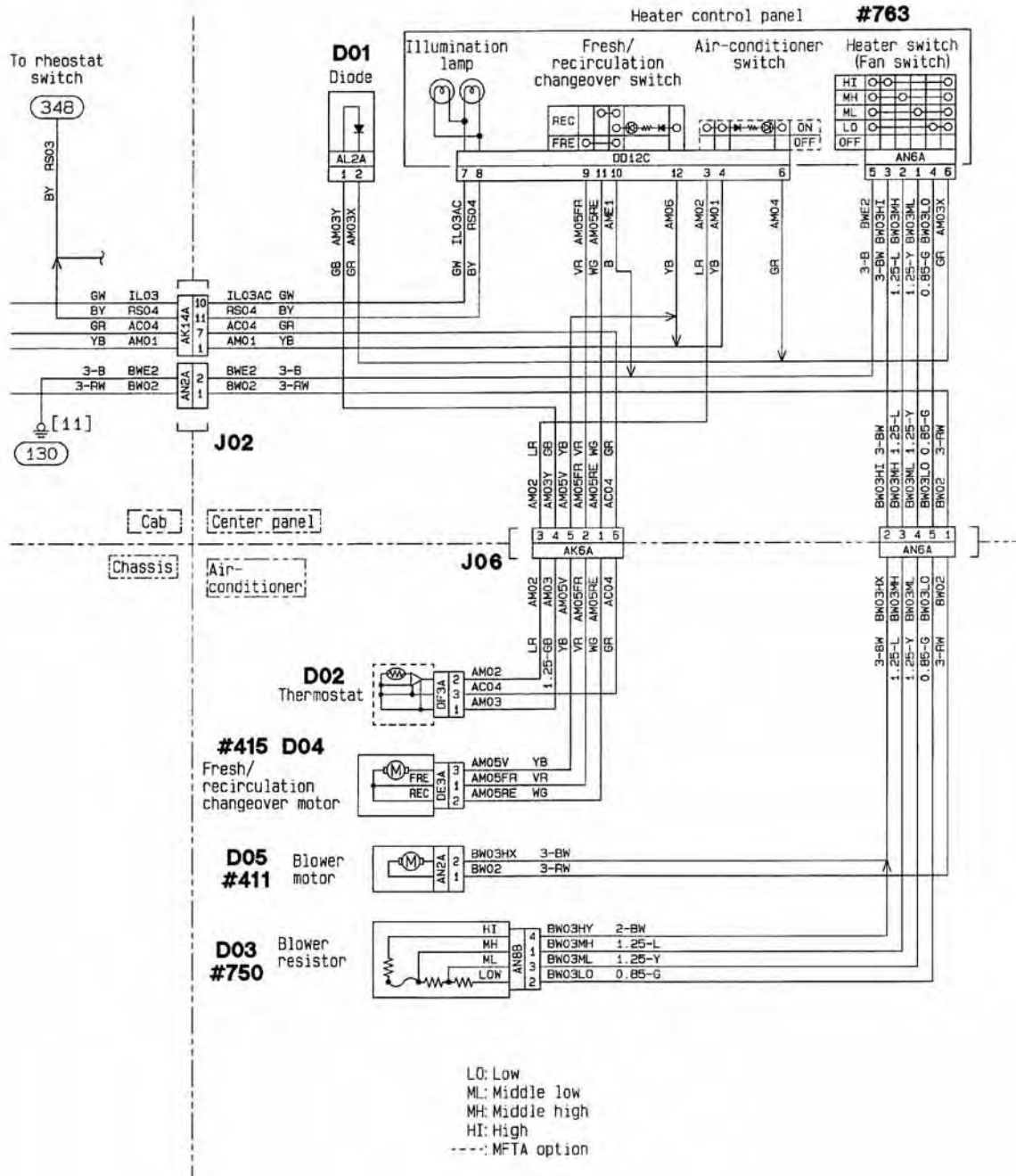
C00522

**620 AIR-CONDITIONER CIRCUIT**



C00523-1

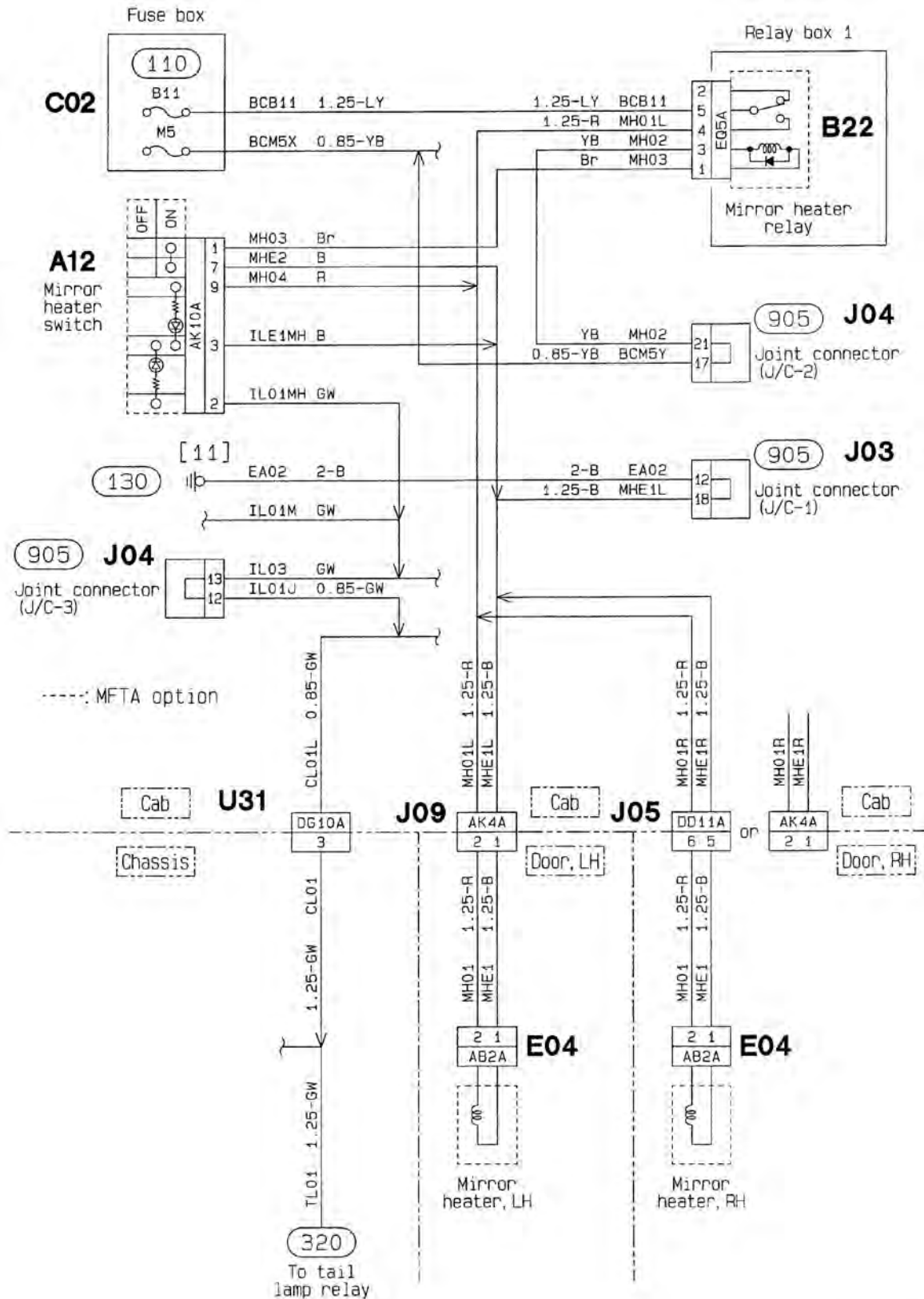
**620 AIR-CONDITIONER CIRCUIT**



C00523-2



**629 MIRROR HEATER CIRCUIT**

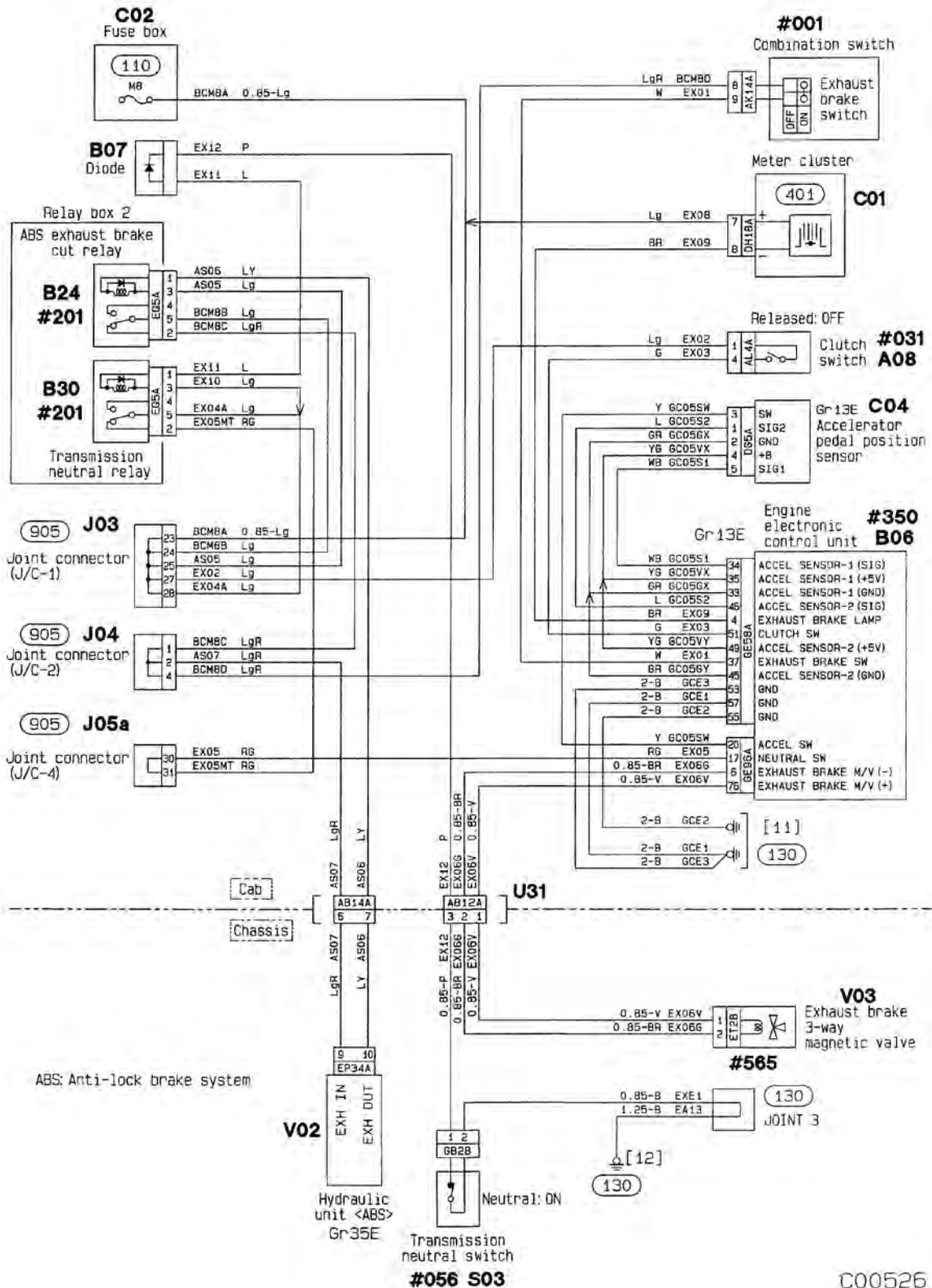


C00525

# 17.7 CHASSIS SIDE ELECTRICAL CIRCUIT

## 710 EXHAUST BRAKE CIRCUIT

<Manual transmission>

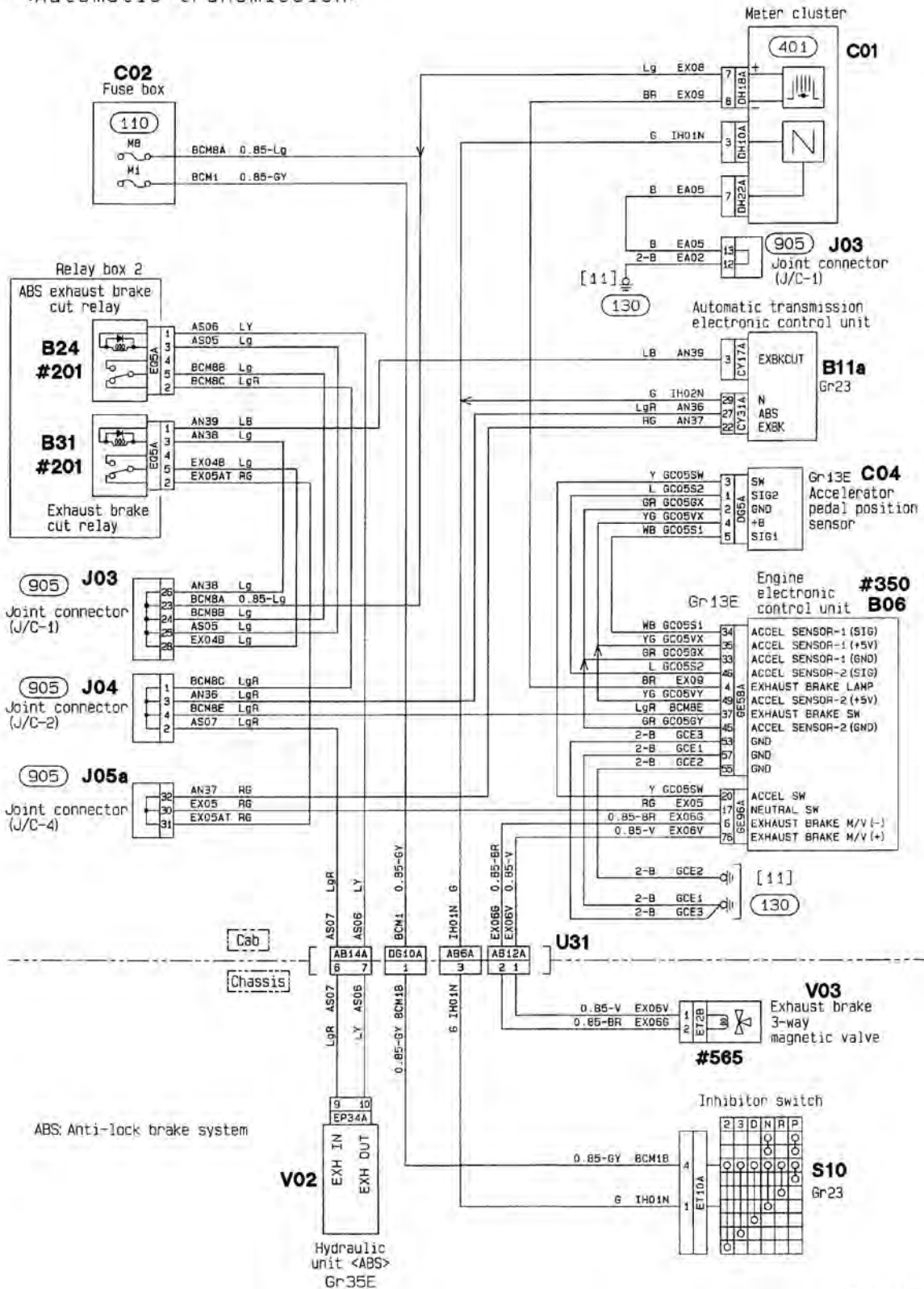


C00526



# 710 EXHAUST BRAKE CIRCUIT

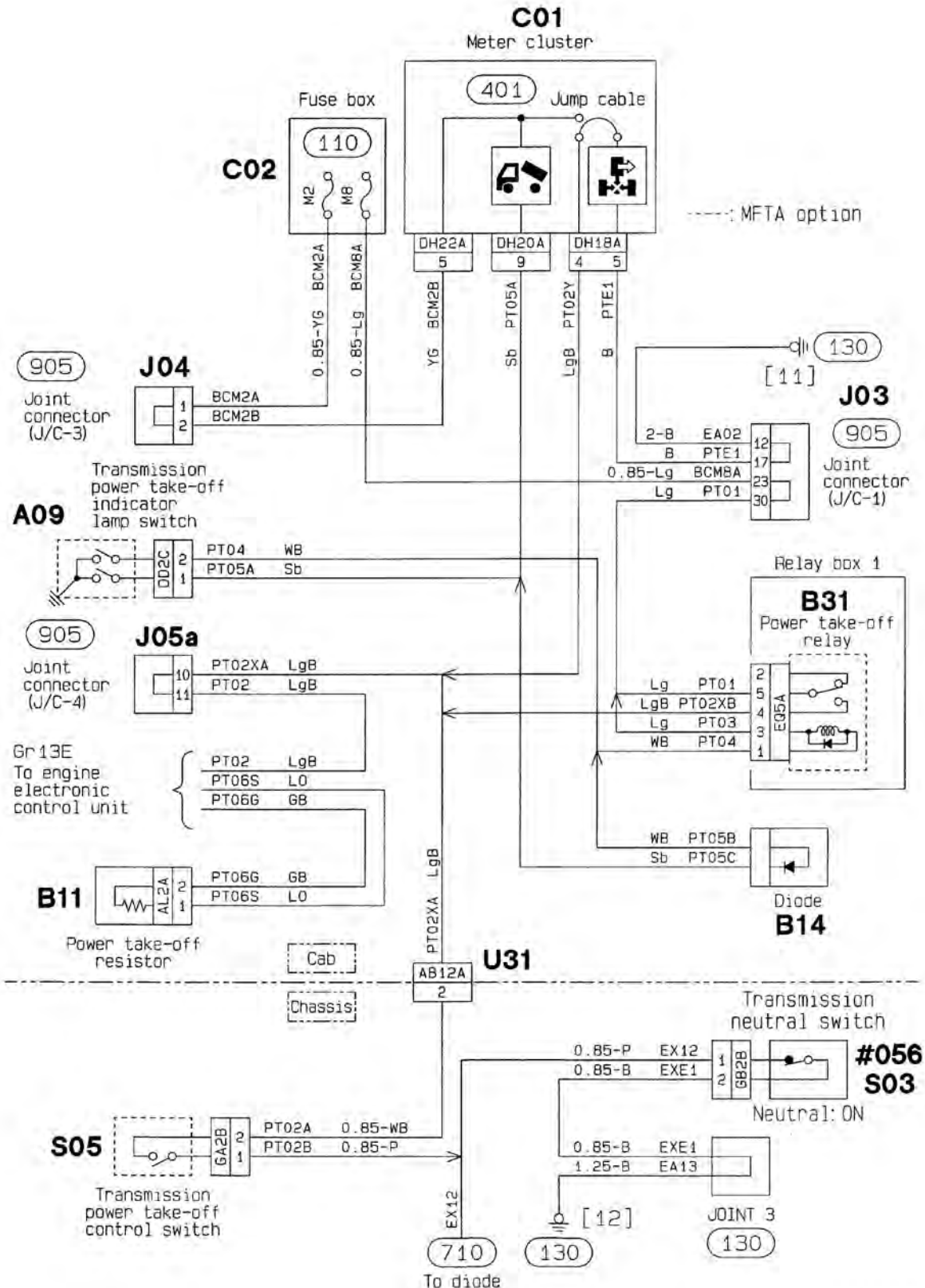
<Automatic transmission>



C00545

# 17.8 ENGINE AND TRANSMISSION SIDE ELECTRICAL CIRCUIT

## 850 TRANSMISSION POWER TAKE-OFF CIRCUIT

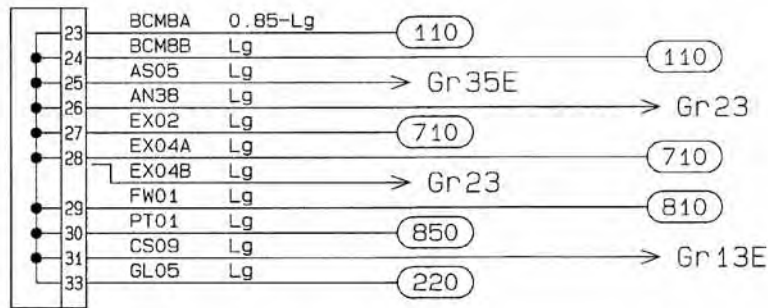
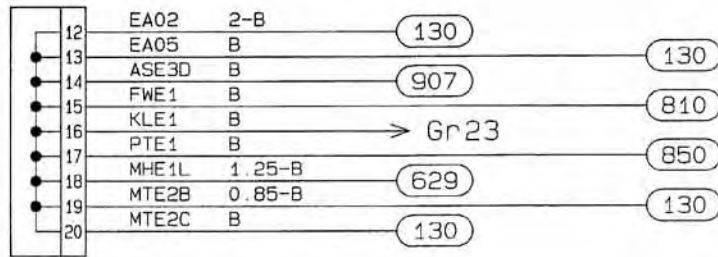
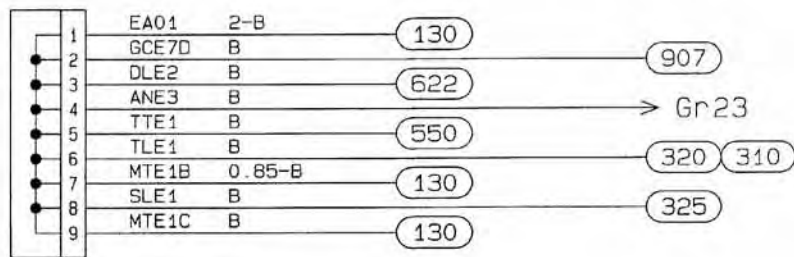


C00528

**17.9 OTHER CIRCUIT**  
**905 JOINT CONNECTOR (J/C)**

(J/C-1)

|       |       |       |      |      |                |       |       |       |    |      |
|-------|-------|-------|------|------|----------------|-------|-------|-------|----|------|
| 1     | 2     | 3     | 4    | 5    | 6              | 7     | 8     | 9     | 10 | 11   |
| EA01  | GCE7D | DLE2  | ANE3 | TTE1 | TLE1           | MTE1B | SLE1  | MTE1C | X  | —    |
| 12    | 13    | 14    | 15   | 16   | 17             | 18    | 19    | 20    | 21 | 22   |
| EA02  | EA05  | ASE3D | FWE1 | KLE1 | PTE1           | MHE1L | MTE2B | MTE2C | X  | —    |
| 23    | 24    | 25    | 26   | 27   | 28             | 29    | 30    | 31    | 32 | 33   |
| BCMBA | BCM8B | AS05  | AN3B | EX02 | EX04A<br>EX04B | FW01  | PT01  | CS09  | X  | GL05 |

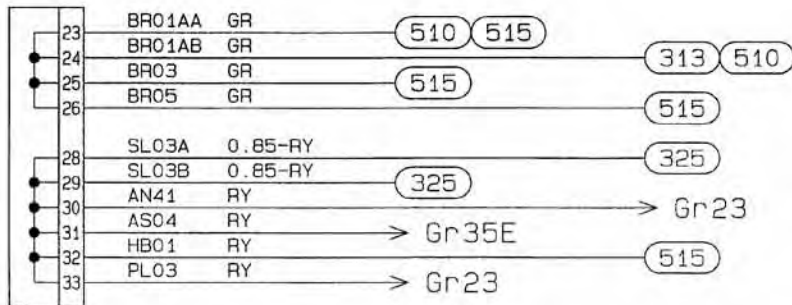
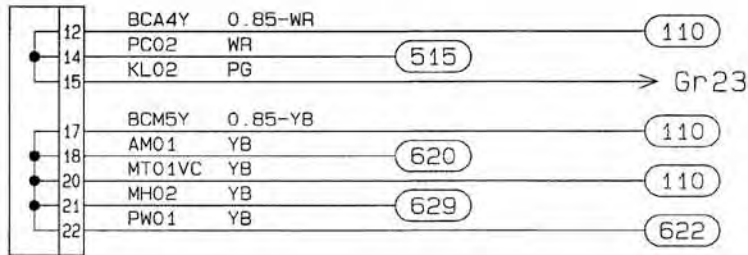
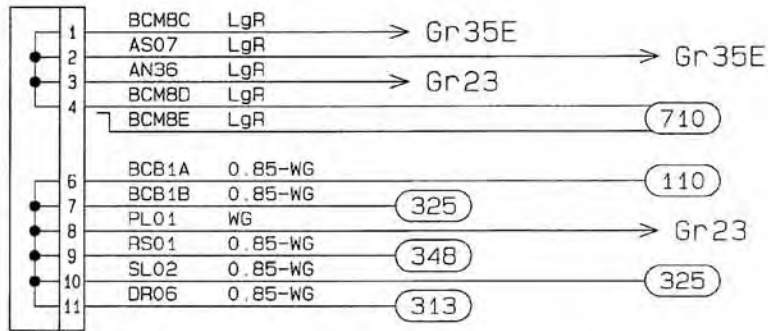


C00529

**905 JOINT CONNECTOR (J/C)**

(J/C-2)

|                  |      |      |                |       |       |       |      |        |      |      |
|------------------|------|------|----------------|-------|-------|-------|------|--------|------|------|
| 1                | 2    | 3    | 4              | 5     | 6     | 7     | 8    | 9      | 10   | 11   |
| BCMBC            | AS07 | AN36 | BCM8D<br>BCM8E | X     | BCB1A | BCB1B | PL01 | RS01   | SL02 | DR06 |
| 12               | 13   | 14   | 15             | 16    | 17    | 18    | 19   | 20     | 21   | 22   |
| BCA4Y            | —    | PC02 | KL02           | X     | BCM5Y | AM01  | —    | MT01VC | MH02 | PW01 |
| 23               | 24   | 25   | 26             | 27    | 28    | 29    | 30   | 31     | 32   | 33   |
| BR01AA<br>BR01AB | BR03 | BR05 | X              | SL03A | SL03B | AN41  | AS04 | HB01   | PL03 |      |

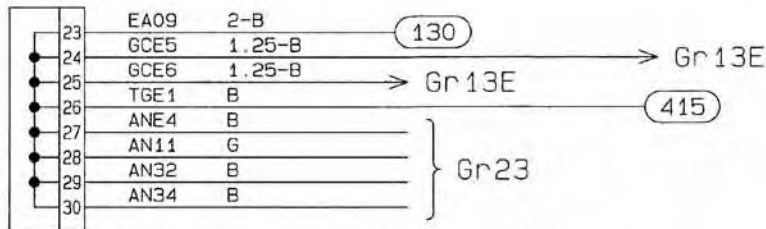
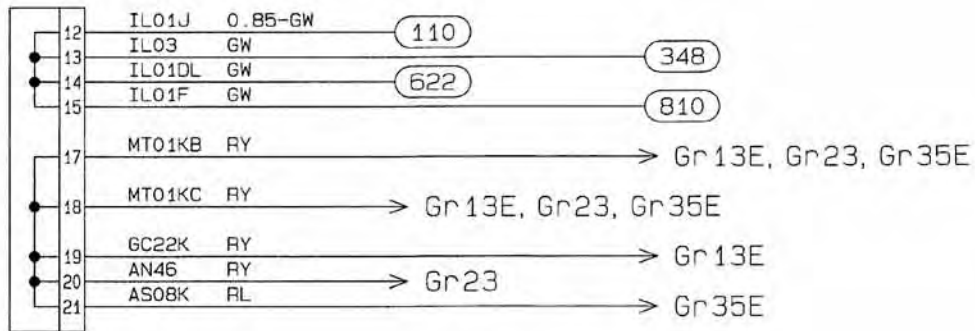
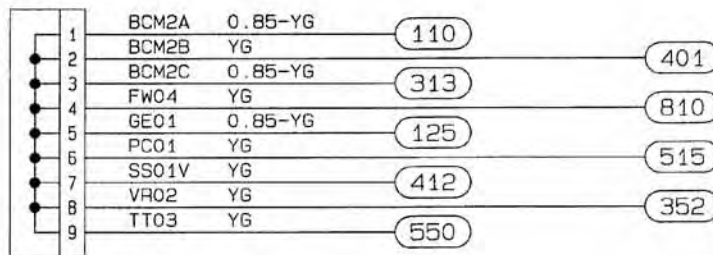


C00530

**905 JOINT CONNECTOR (J/C)**

(J/C-3)

|       |       |        |       |      |        |        |       |      |       |    |
|-------|-------|--------|-------|------|--------|--------|-------|------|-------|----|
| 1     | 2     | 3      | 4     | 5    | 6      | 7      | 8     | 9    | 10    | 11 |
| BCM2A | BCM2B | BCM2C  | FW04  | GE01 | PC01   | SS01V  | VR02  | TT03 |       | —  |
| 12    | 13    | 14     | 15    | 16   | 17     | 18     | 19    | 20   | 21    | 22 |
| IL01J | IL03  | IL01DL | IL01F |      | MT01KB | MT01KC | GC22K | AN46 | AS08K | —  |
| 23    | 24    | 25     | 26    | 27   | 28     | 29     | 30    | 31   | 32    | 33 |
| EA09  | GCE5  | GCE6   | TGE1  | ANE4 | AN11   | AN32   | AN34  | —    |       | —  |

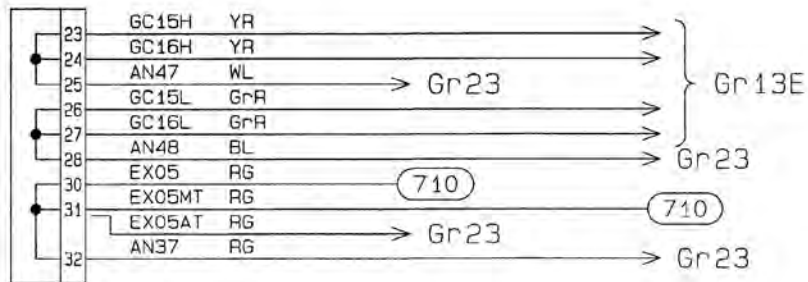
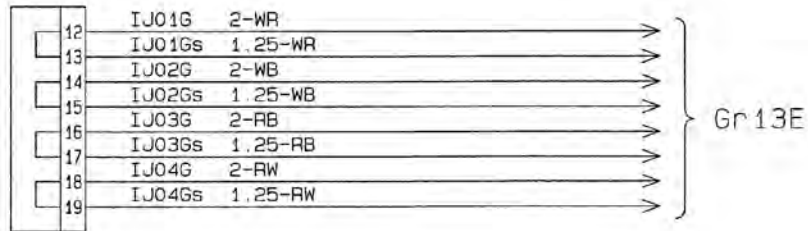
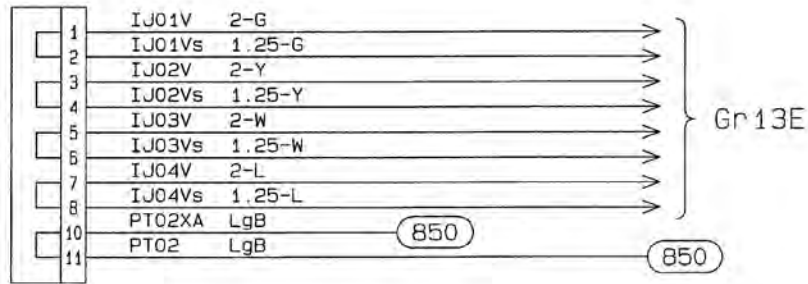


C00531

**905 JOINT CONNECTOR (J/C)**

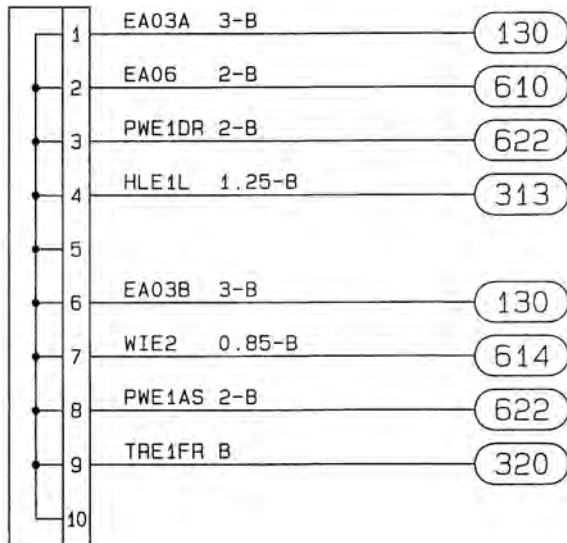
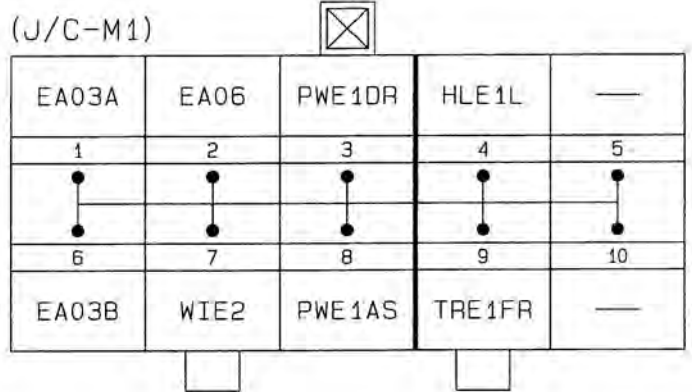
(J/C-4)

|       |        |       |        |       |        |       |        |                  |        |      |
|-------|--------|-------|--------|-------|--------|-------|--------|------------------|--------|------|
| 1     | 2      | 3     | 4      | 5     | 6      | 7     | 8      | 9                | 10     | 11   |
| IJ01V | IJ01Vs | IJ02V | IJ02Vs | IJ03V | IJ03Vs | IJ04V | IJ04Vs | X                | PT02XA | PT02 |
| 12    | 13     | 14    | 15     | 16    | 17     | 18    | 19     | 20               | 21     | 22   |
| IJ01G | IJ01Gs | IJ02G | IJ02Gs | IJ03G | IJ03Gs | IJ04G | IJ04Gs | X                | —      | —    |
| 23    | 24     | 25    | 26     | 27    | 28     | 29    | 30     | 31               | 32     | 33   |
| GC15H | GC16H  | AN47  | GC15L  | GC16L | AN48   | X     | EX05   | EX05AT<br>EX05MT | AN37   | —    |



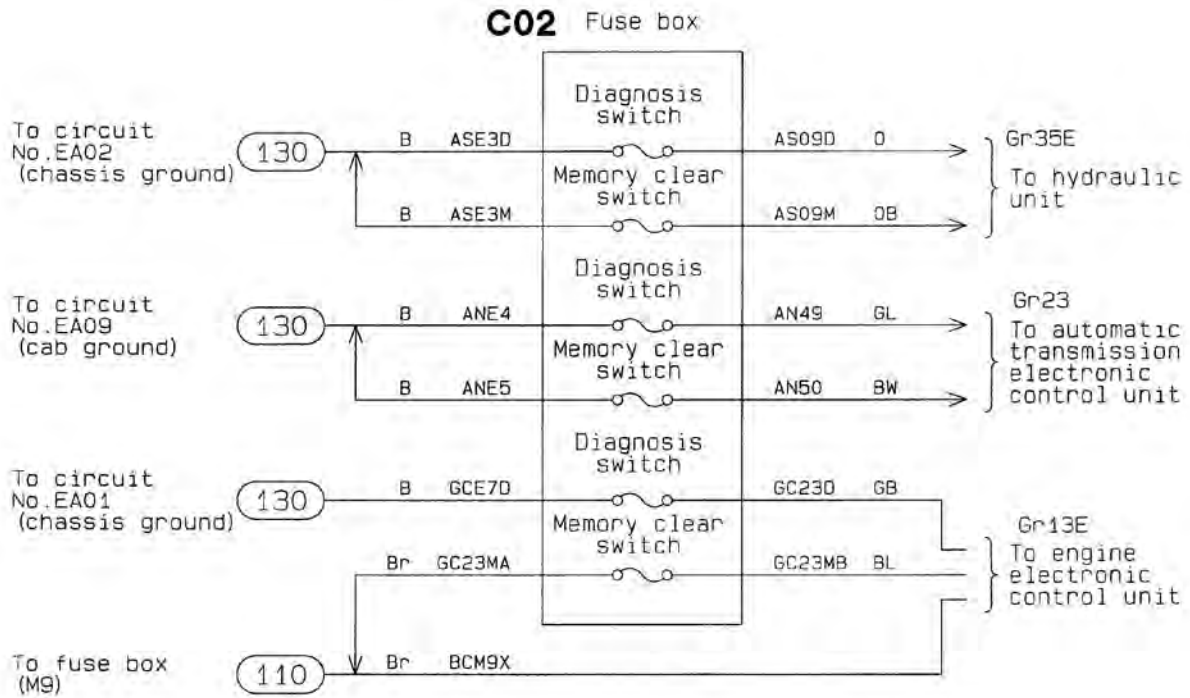
C00532

**905** JOINT CONNECTOR (J/C)



C00533

**907** DIAGNOSIS SWITCH, MEMORY CLEAR SWITCH

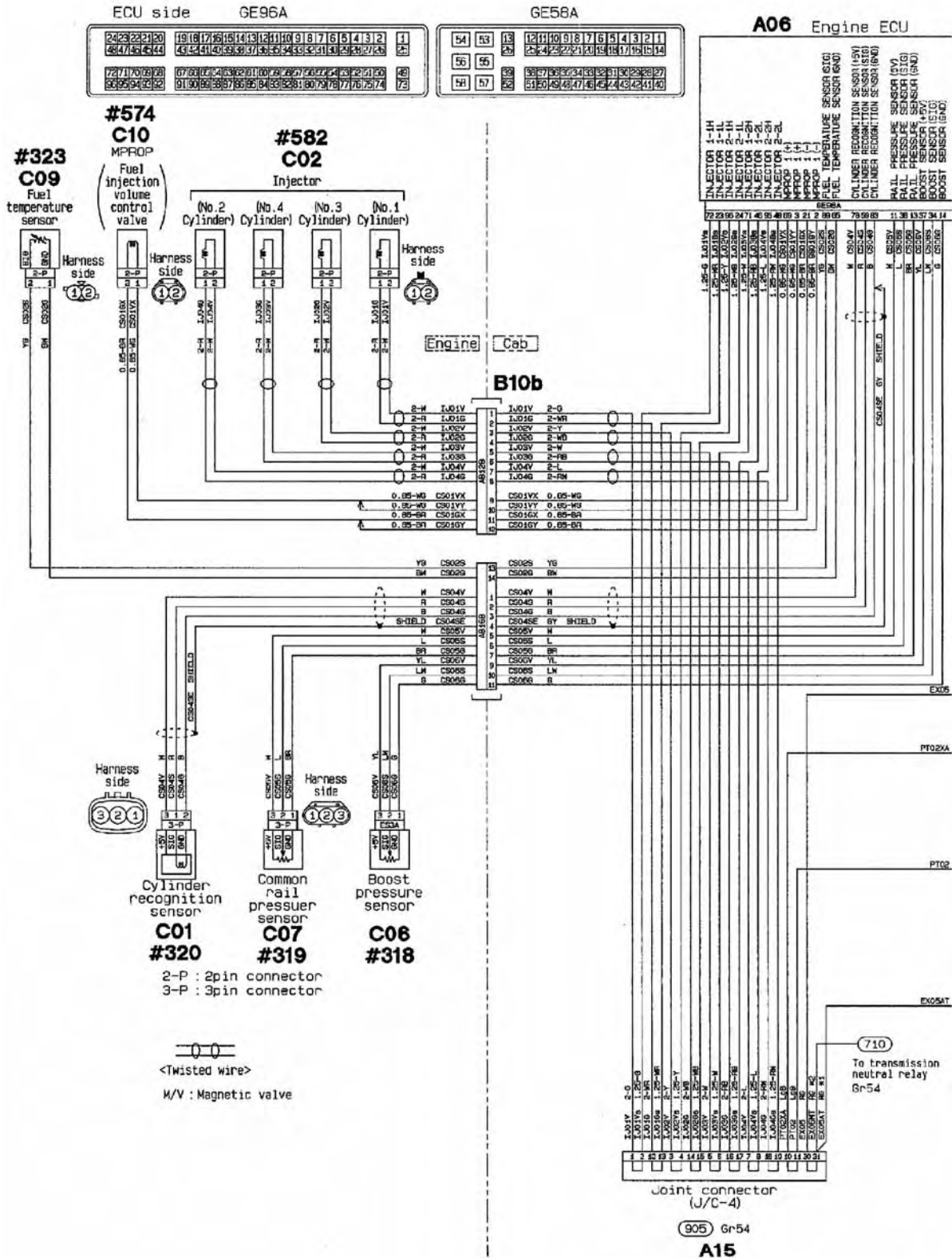


The fuse is substituted for diagnosis switch and the memory clear switch.

C00534

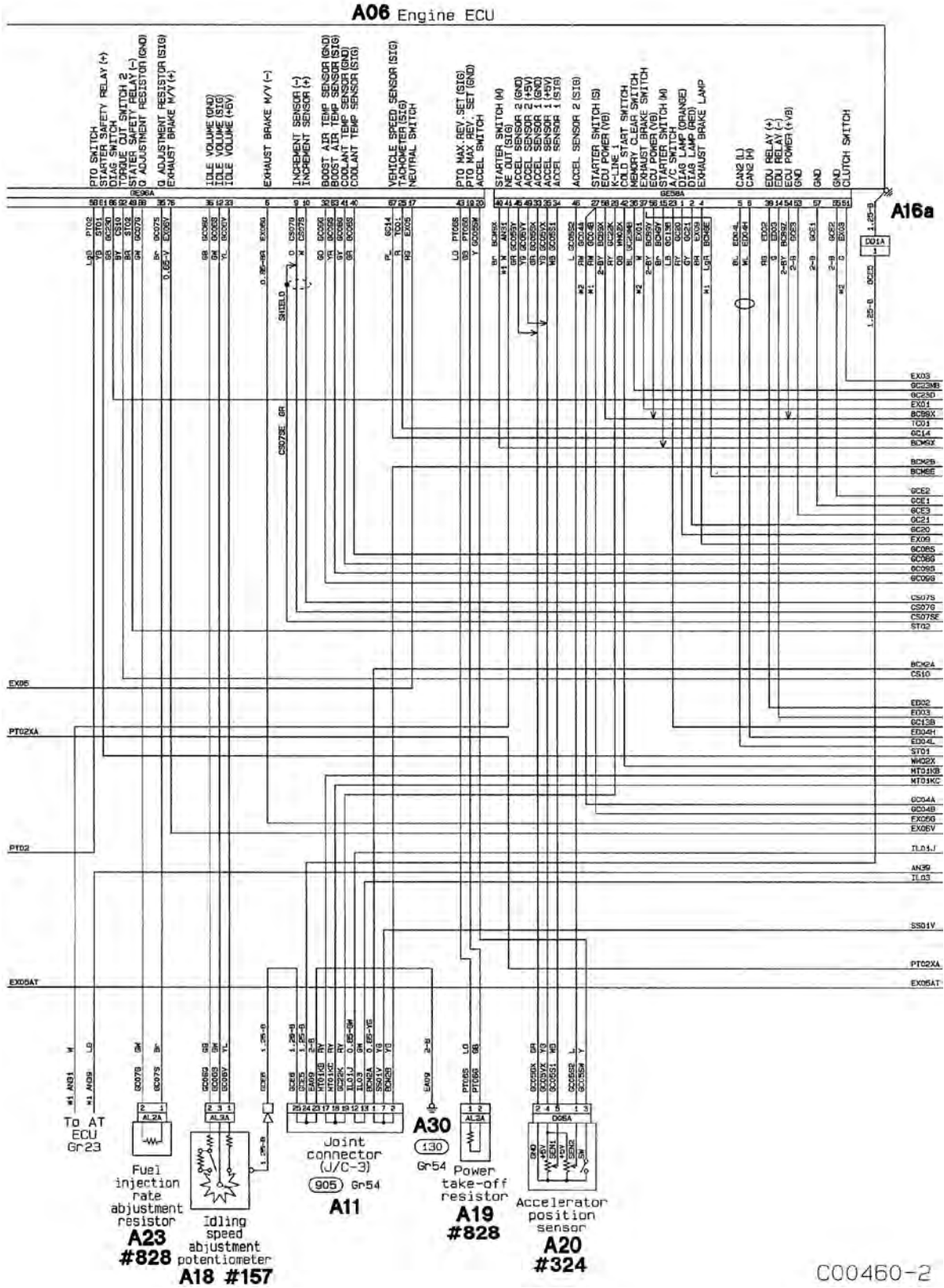


# ELECTRONICALLY CONTROLLED FUEL SYSTEM CIRCUIT



C00450-1

# ELECTRONICALLY CONTROLLED FUEL SYSTEM CIRCUIT

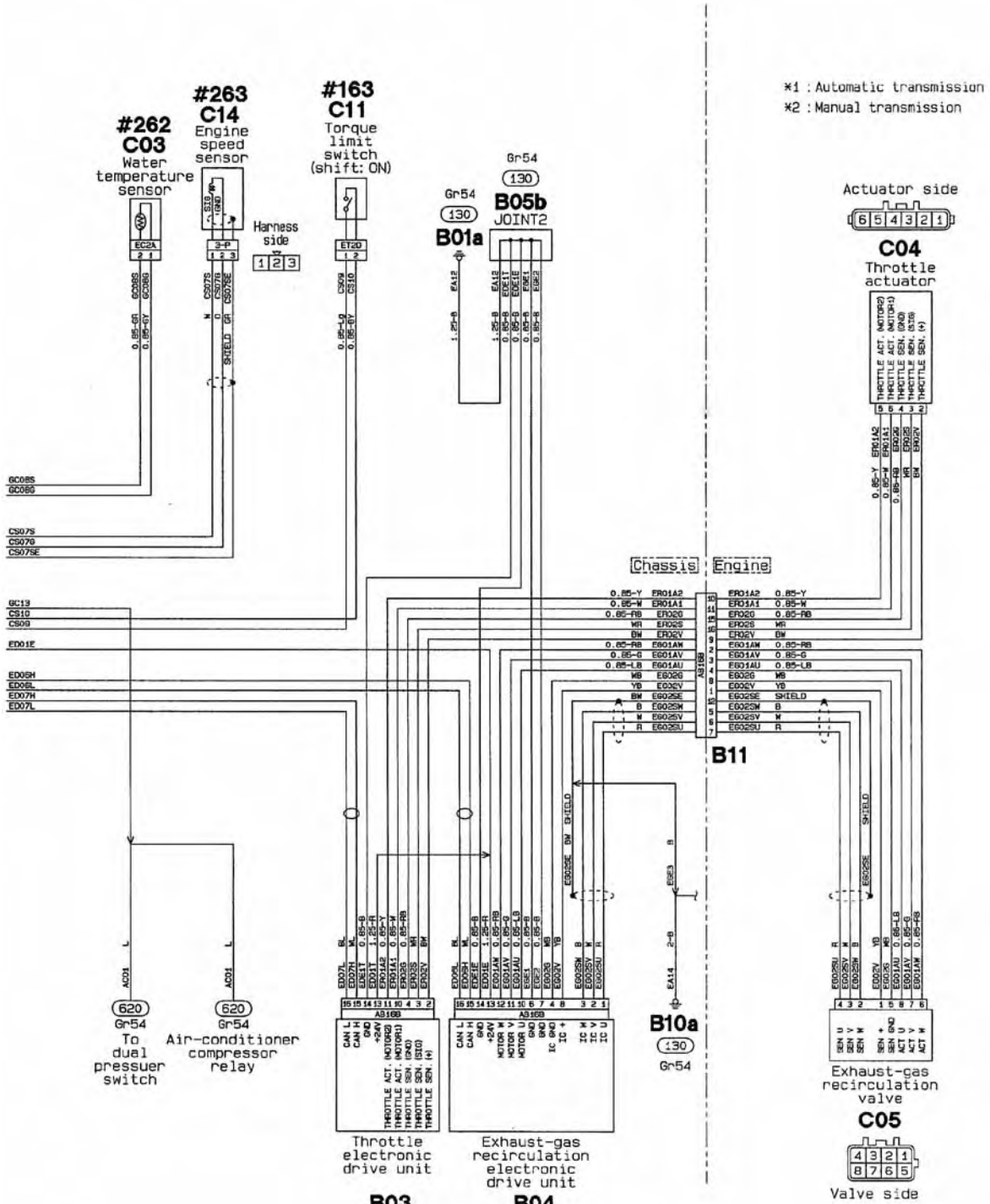






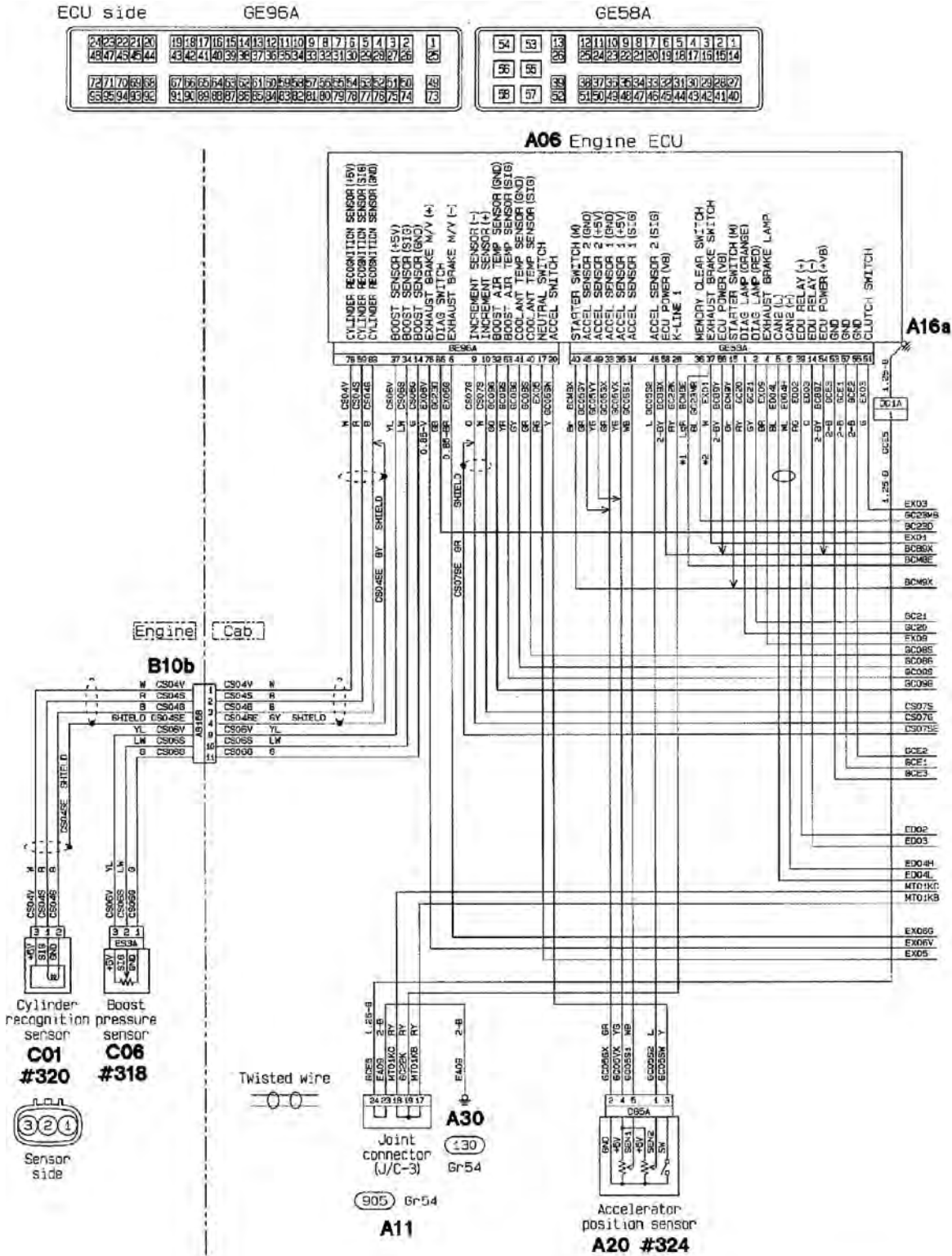


# ELECTRONICALLY CONTROLLED FUEL SYSTEM CIRCUIT



C00460-6

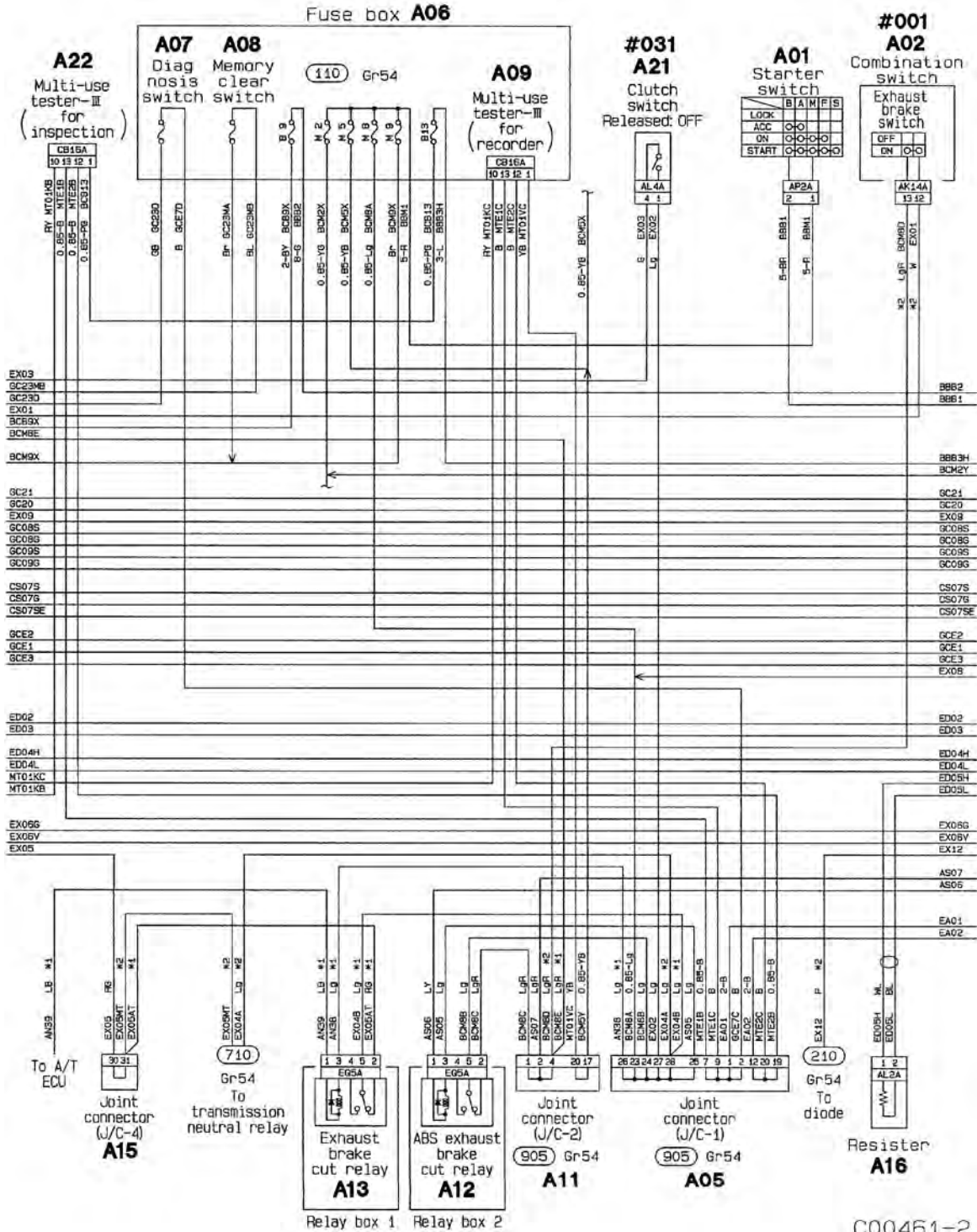
# EMISSION CONTROL CIRCUIT



C00461-1



# EMISSION CONTROL CIRCUIT

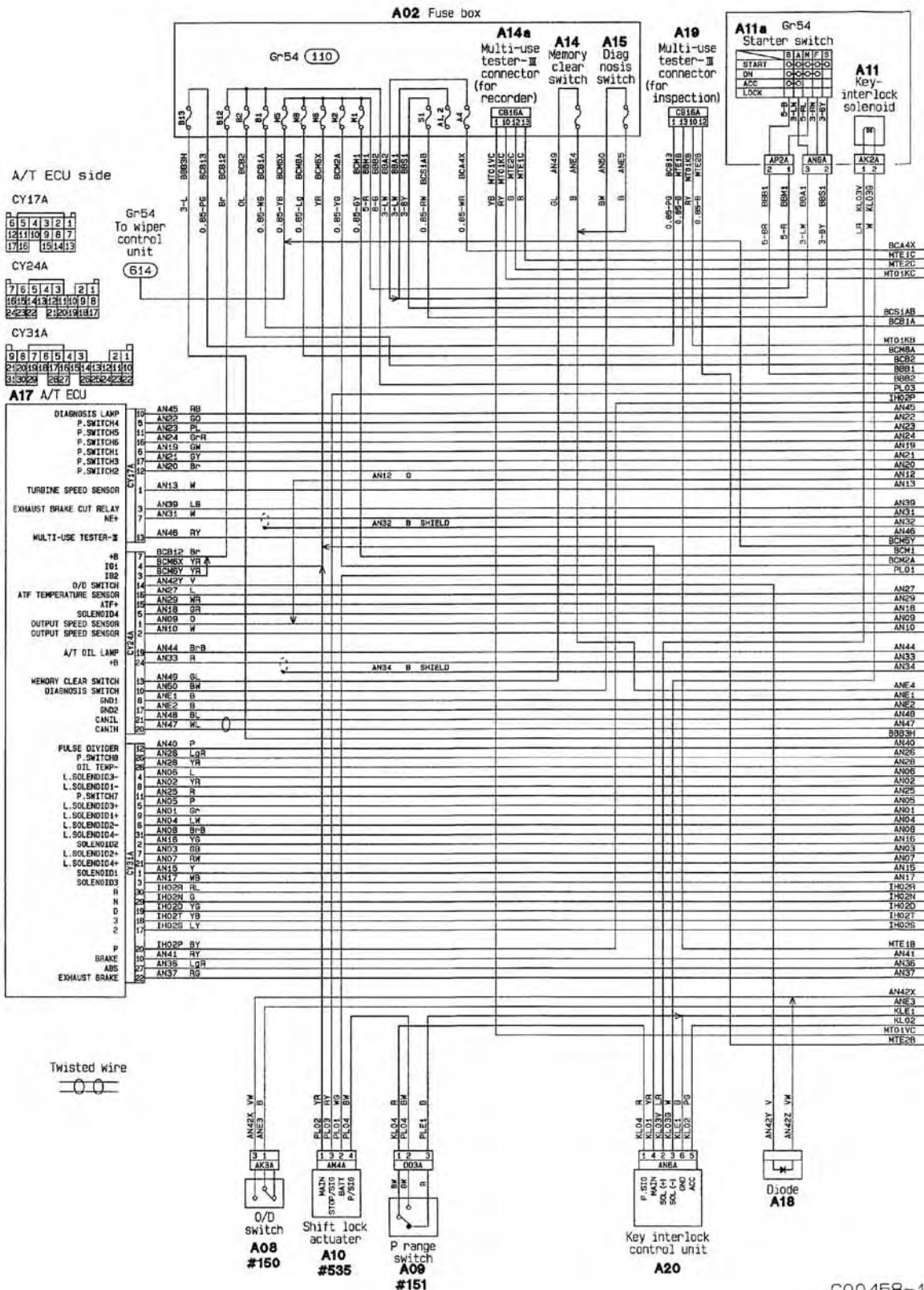






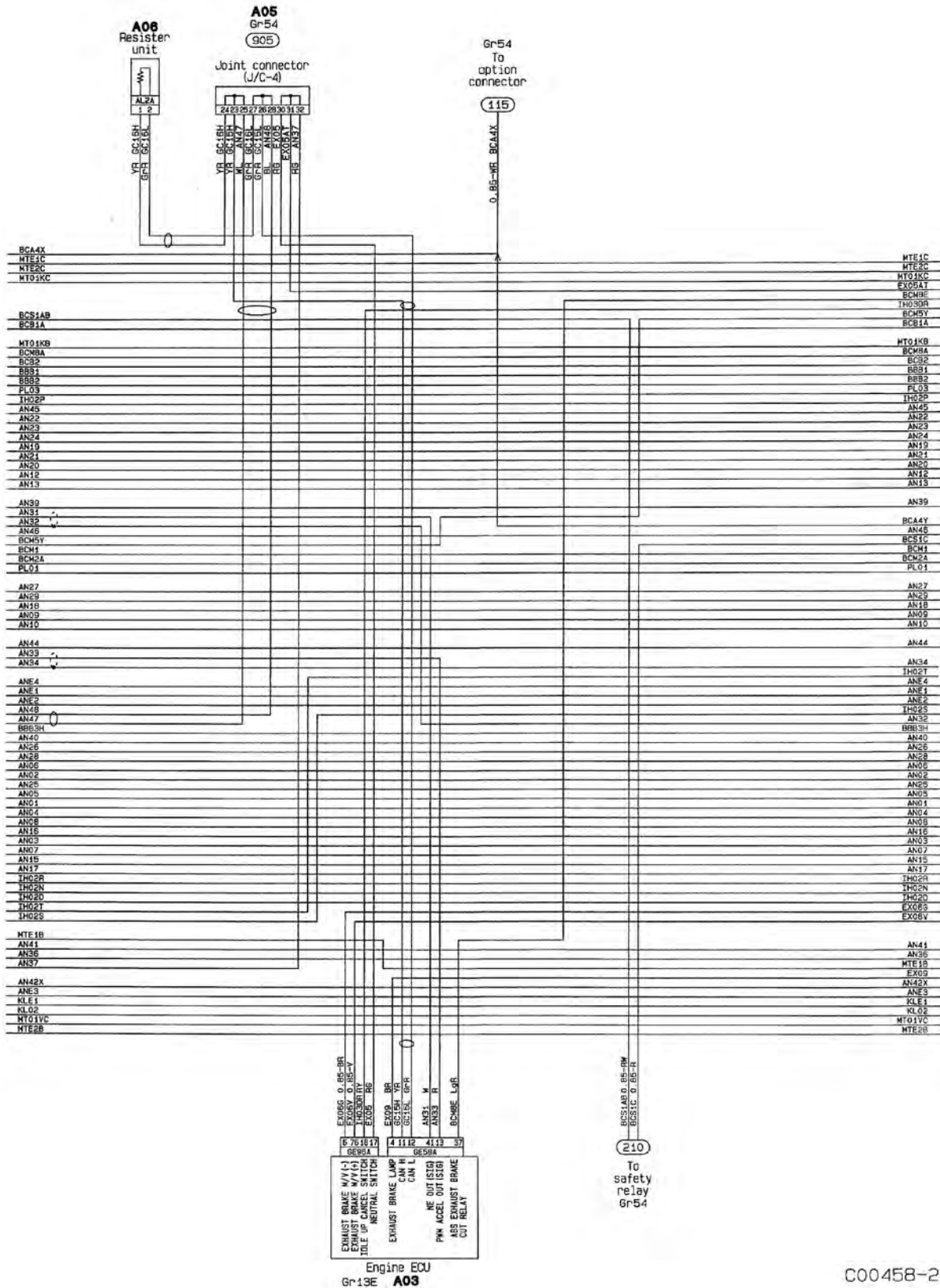


# AUTOMATIC TRANSMISSION CIRCUIT

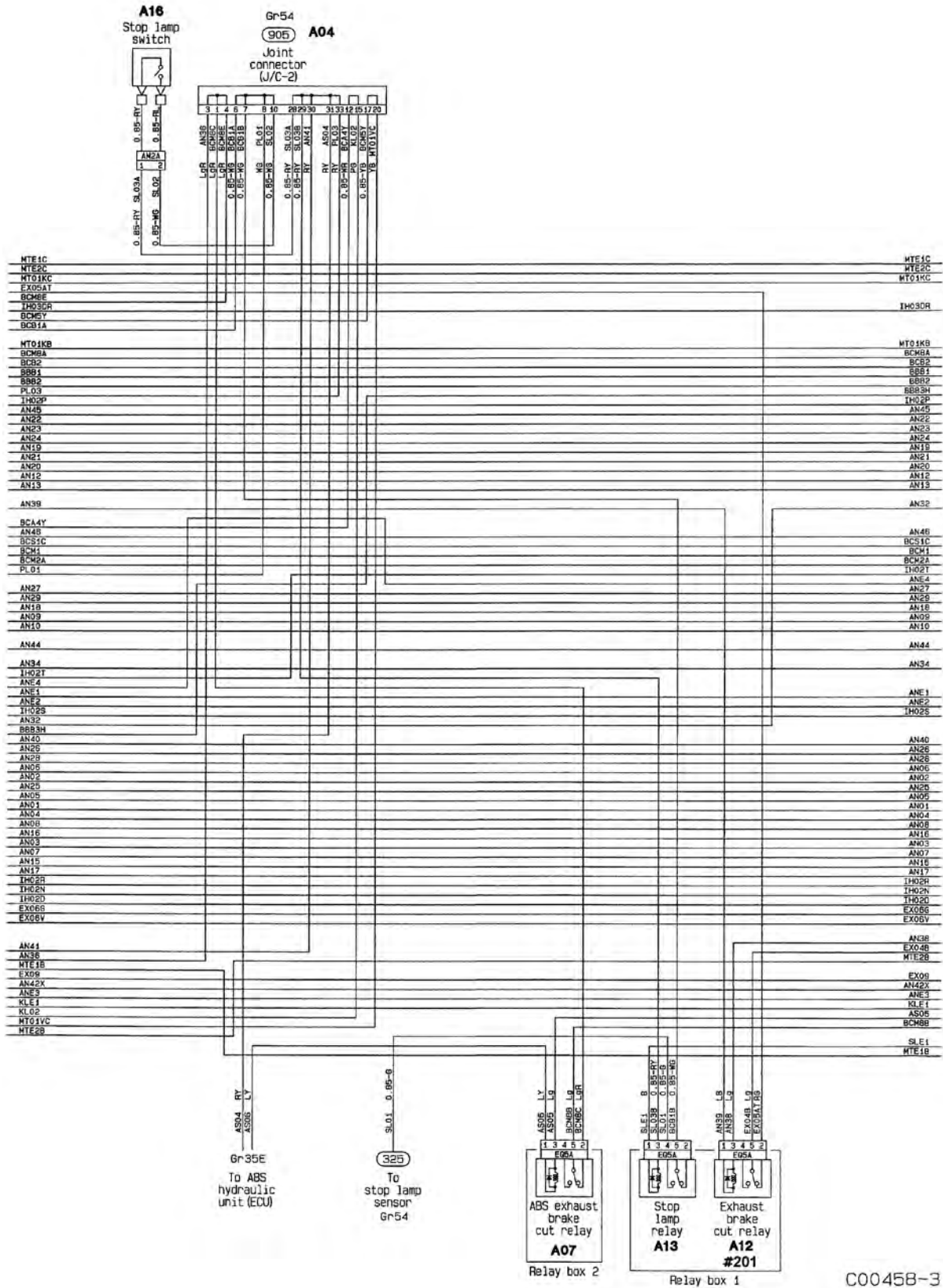


C00458-1

# AUTOMATIC TRANSMISSION CIRCUIT

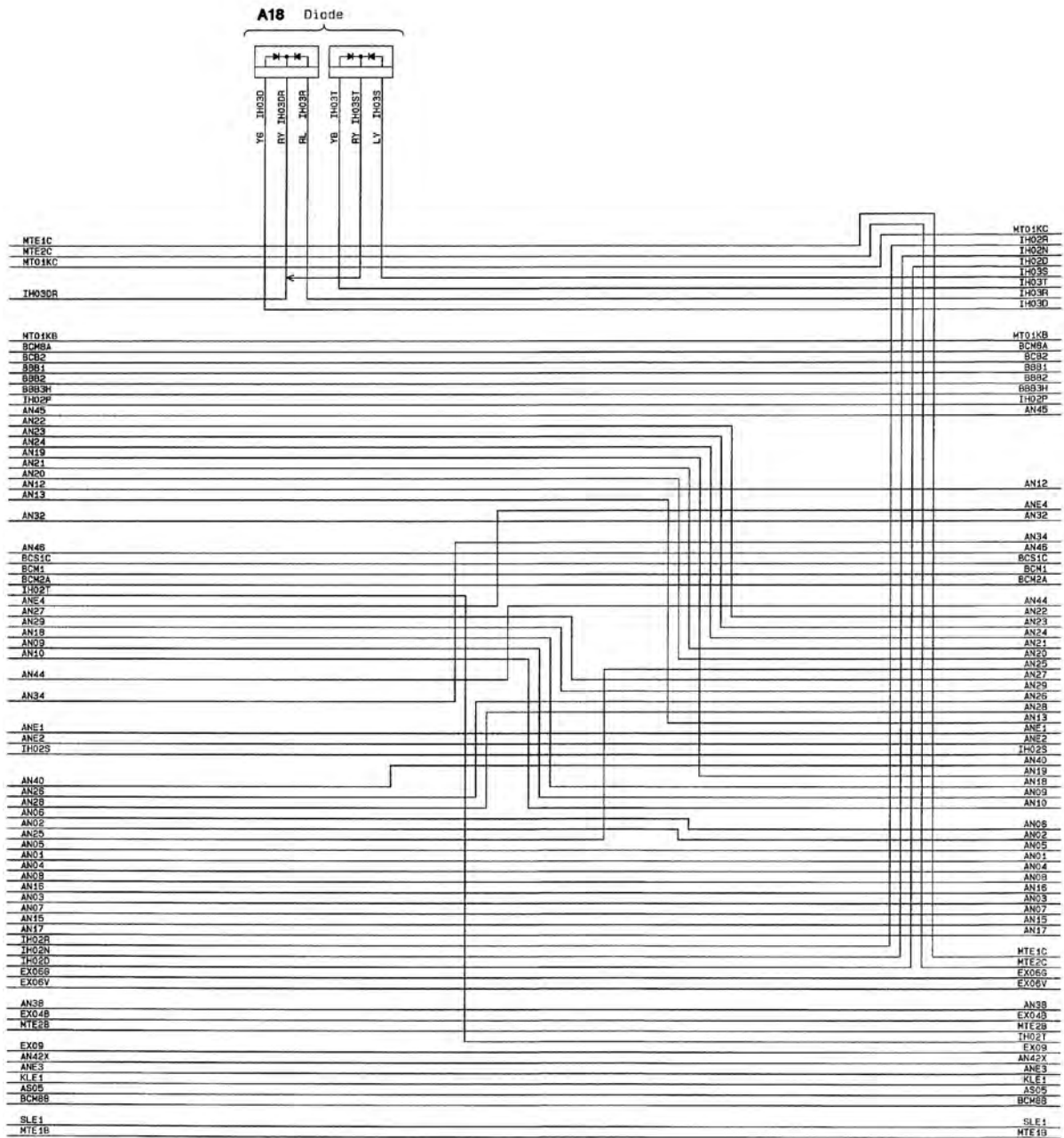


# AUTOMATIC TRANSMISSION CIRCUIT



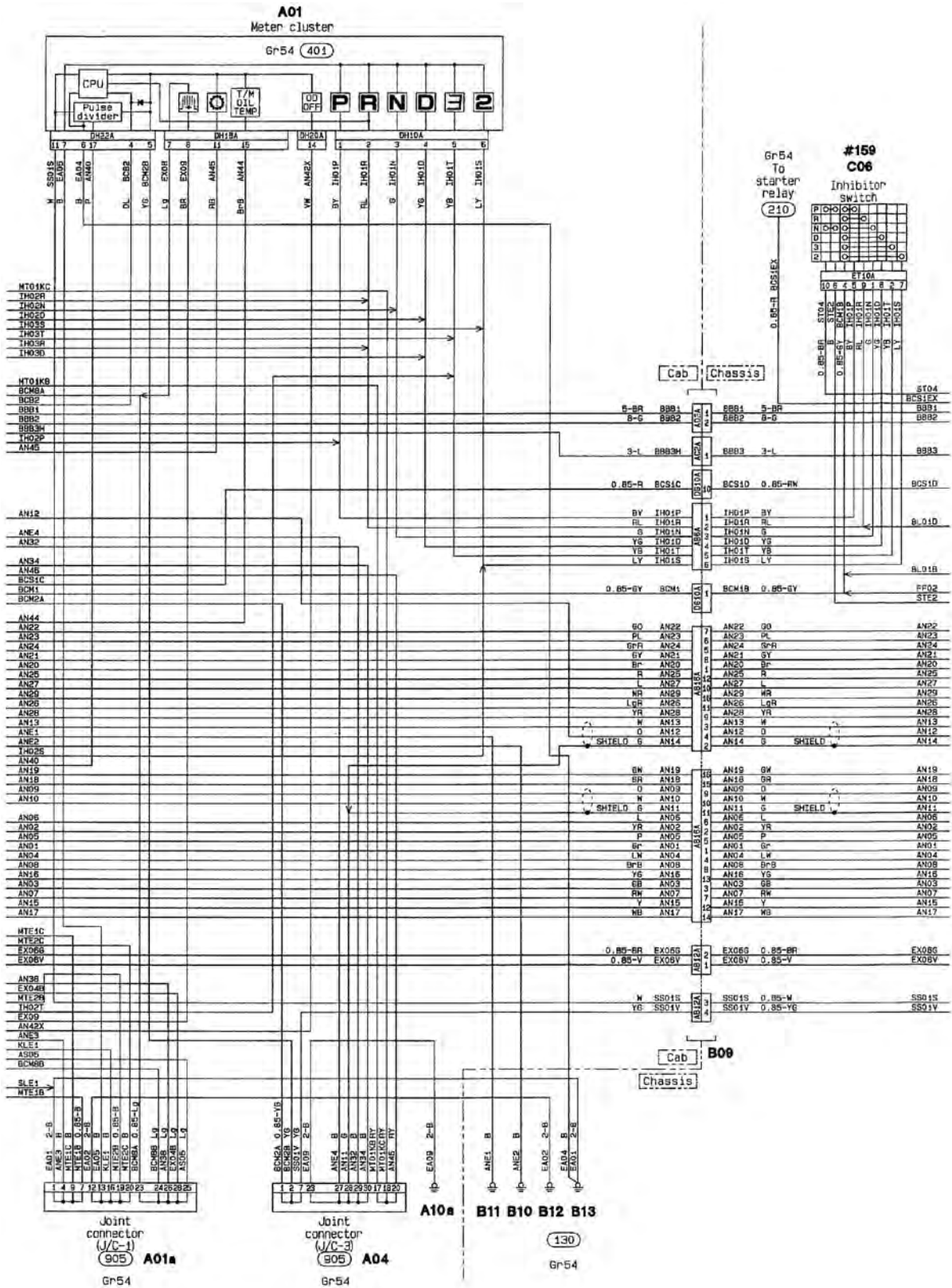
C0045B-3

# AUTOMATIC TRANSMISSION CIRCUIT



C00458-4

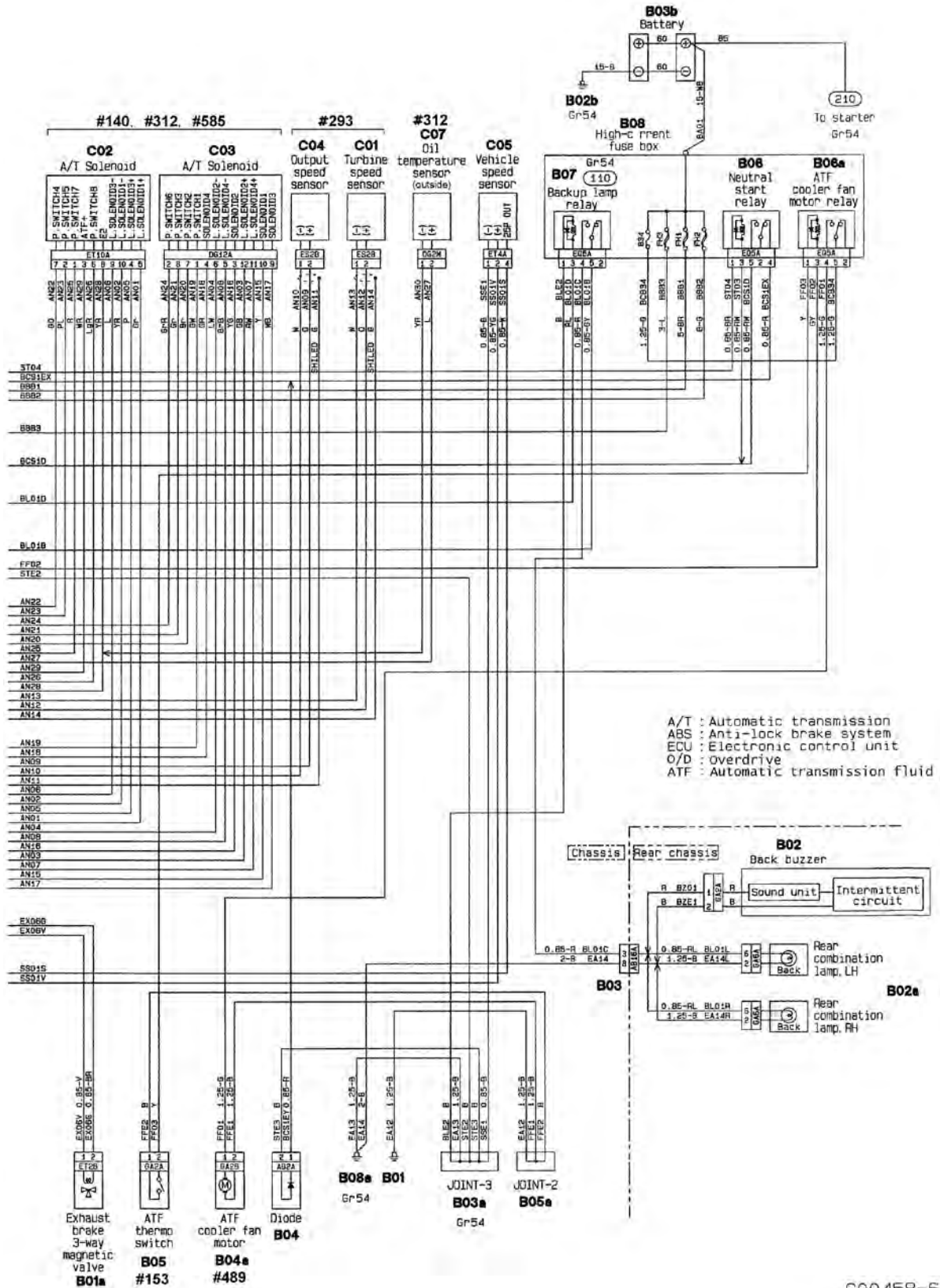
# AUTOMATIC TRANSMISSION CIRCUIT



C00458-5



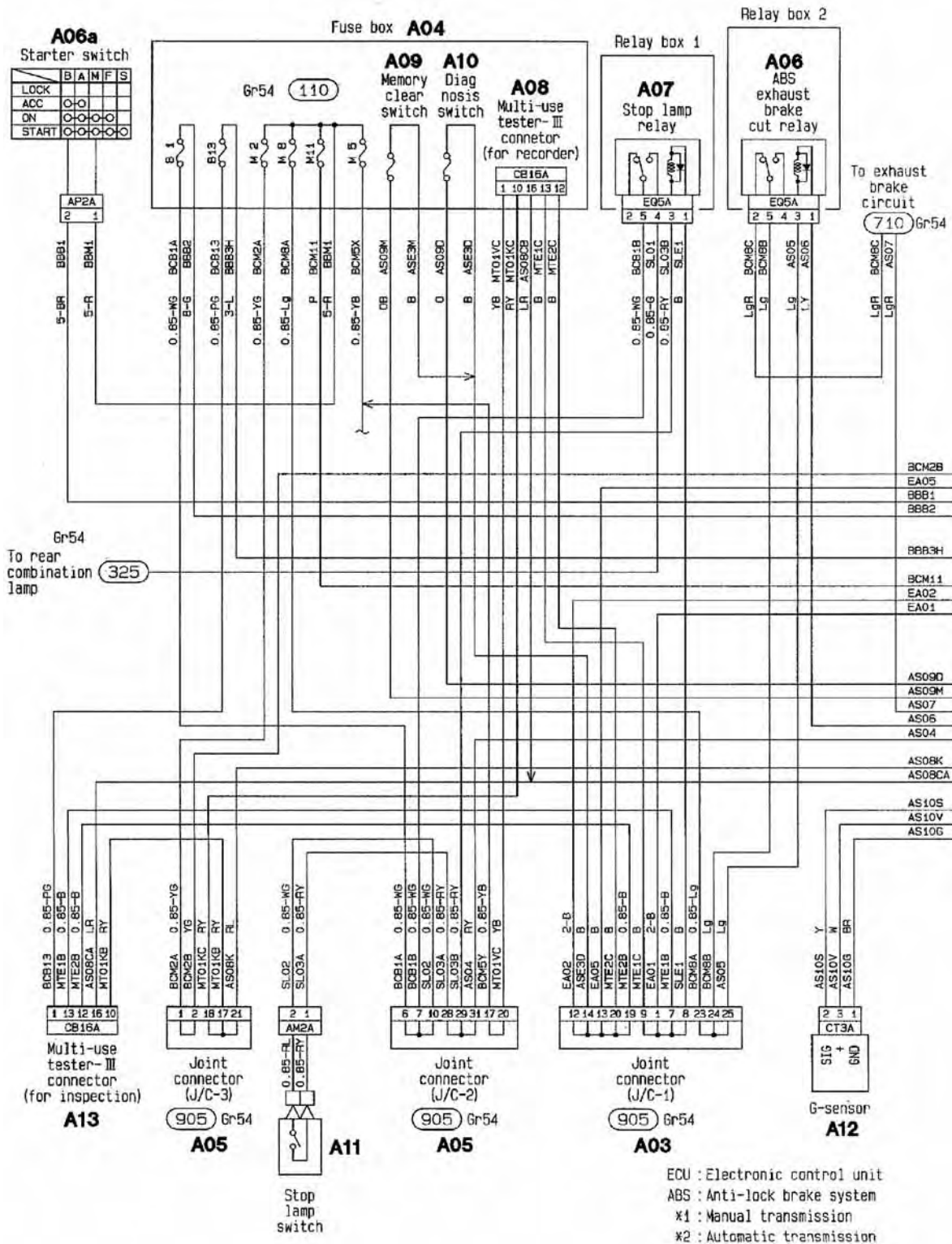
# AUTOMATIC TRANSMISSION CIRCUIT



C00458-6

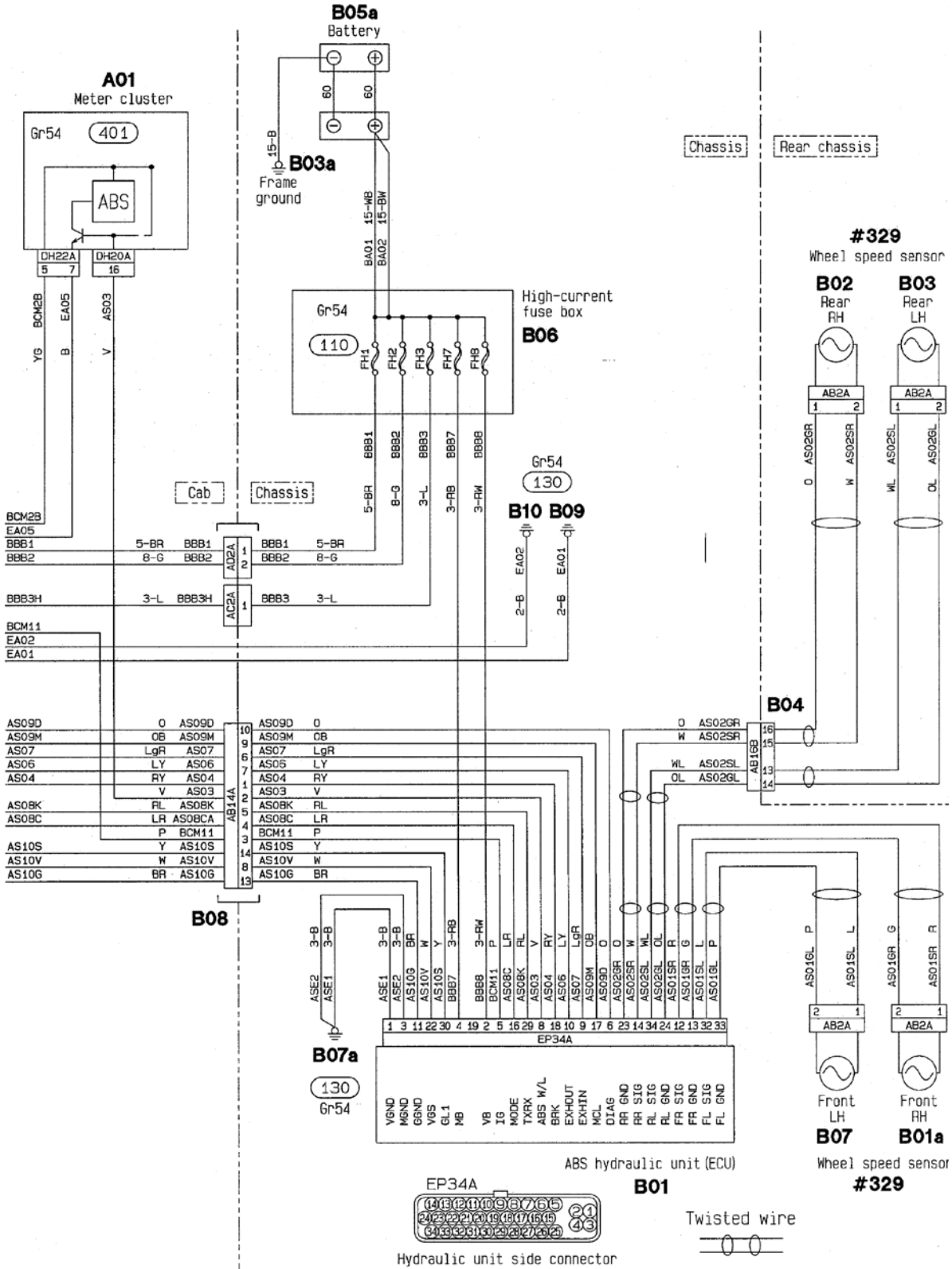


# ANTI-LOCK BRAKE SYSTEM CIRCUIT



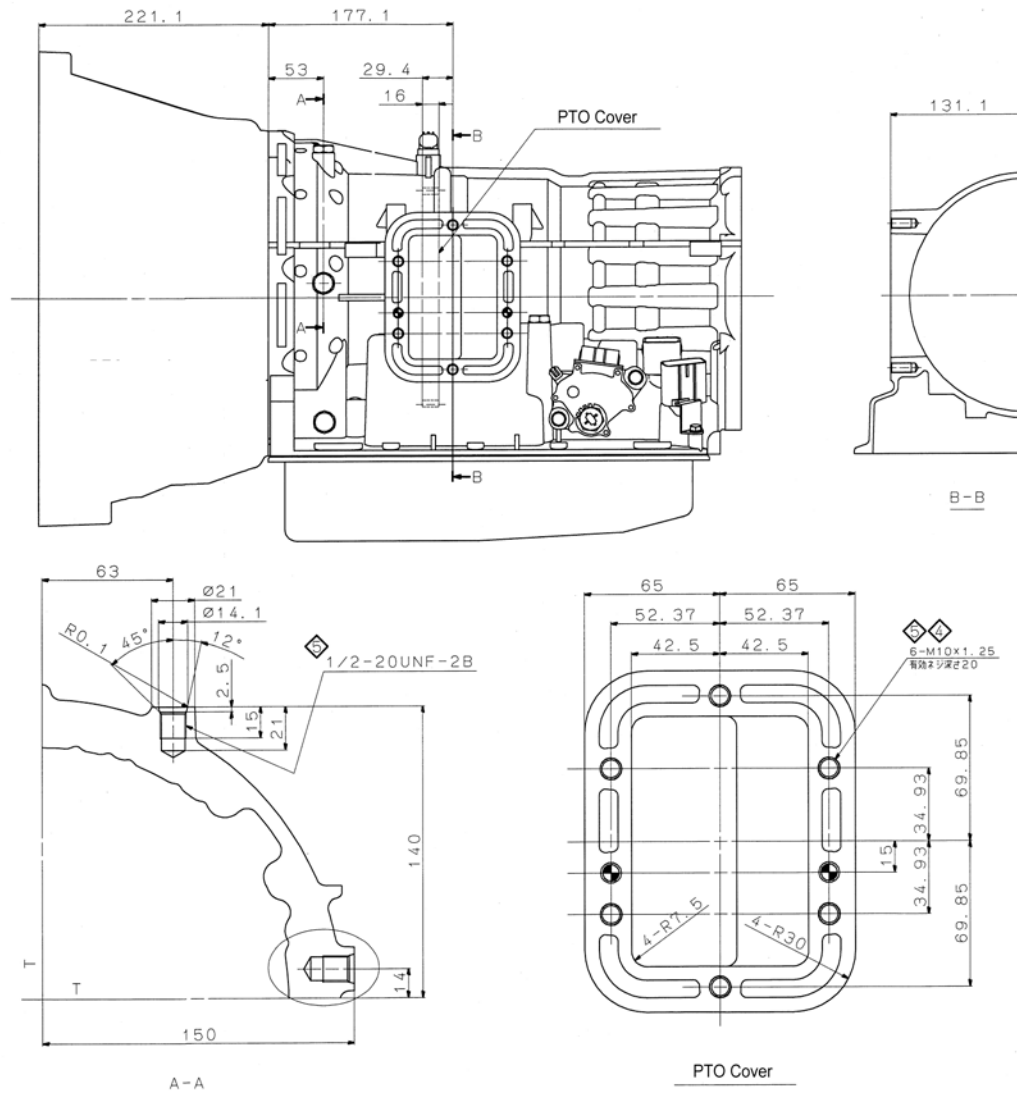
C00459-1

# ANTI-LOCK BRAKE SYSTEM CIRCUIT



C00459-2

# 18. Transmission PTO Opening



### 5.Screw Torque

Stud Bolt for attaching the PTO units (6points) :25~29Nm  
 Connector for attaching the pipe (2points) : 19~24Nm

4.The stud bolts for attaching the PTO units must have thread length less or equal to 17.5mm to prevent contact with internal parts of transmission.

And appicate sealant before assembly because some of the holes are penetrated through.

### 3.PTO gear spec.

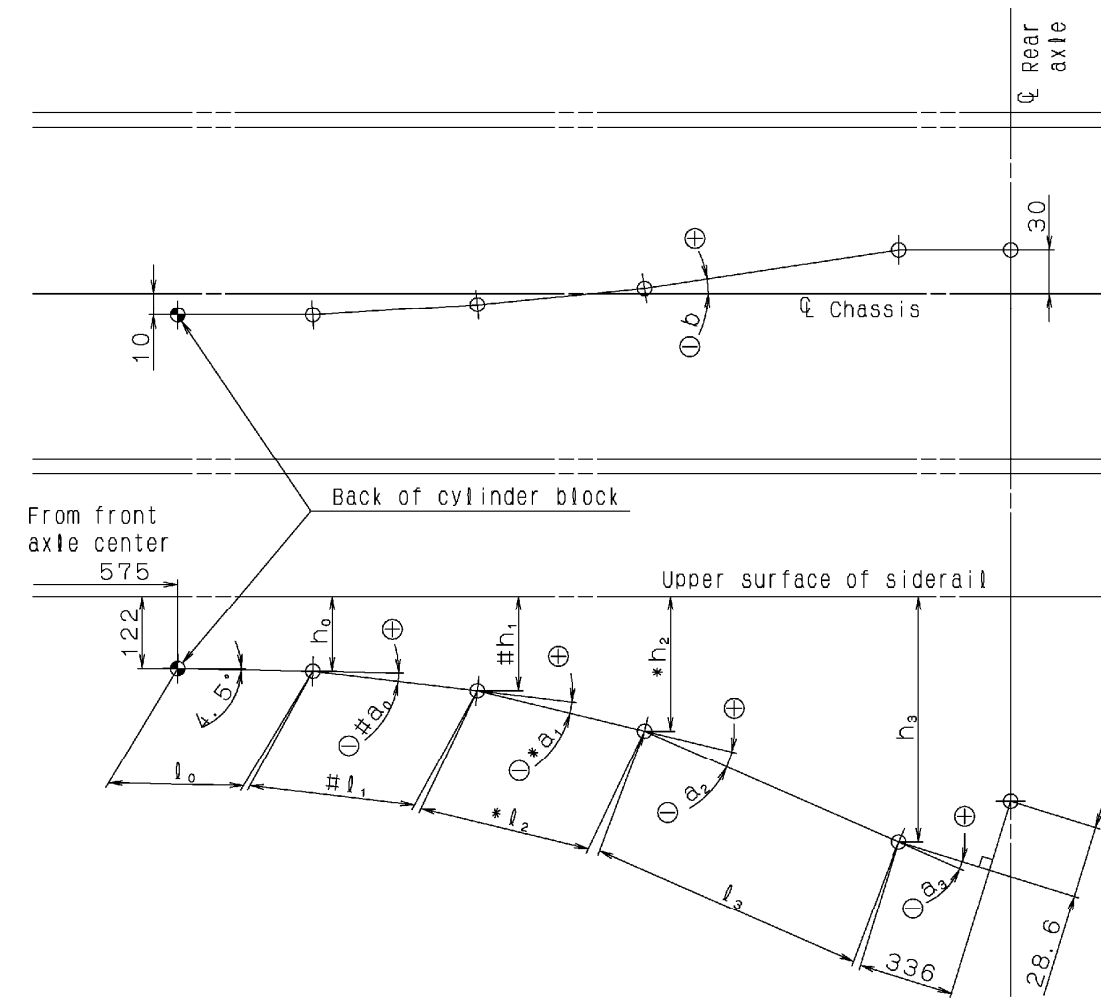
|                             |                  |
|-----------------------------|------------------|
| No. of Teeth                | 69               |
| Normal Module               | 3                |
| Normal Pressure Angle       | 20               |
| Helix Angle & Hand of Helix | 0                |
| Lead                        | -                |
| Standard Pitch Circle Dia.  | 207.000          |
| Standard Circle Dia.        | 194.516          |
| Whole Depth                 | 6.78             |
| True involute form diameter | 201.072          |
| Crowning                    | 0.005 ± 0.010    |
| Transverse tooth thickness  | (4.578 0 -0.098) |
| Measurement Over Pins       | 216.902 0 -0.238 |
| Center Distance             | (6.0) 147.500    |

2.The direction of PTO gear rotation : same as the engine rotation

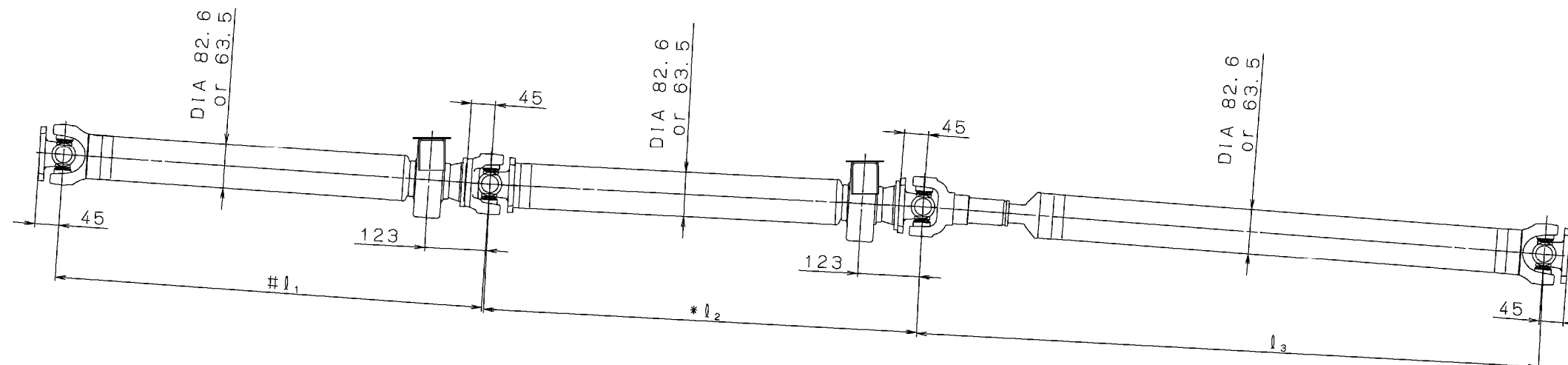
1.Permissible torque : 18.6kgf.m (on the PTO output gear)

# 19. PROPELLER SHAFT

## 19.1 COE Series



Note Dimension marked by # are not applicable only to 1-propeller models.  
Dimension marked by \* are applicable only to 3-propeller models.



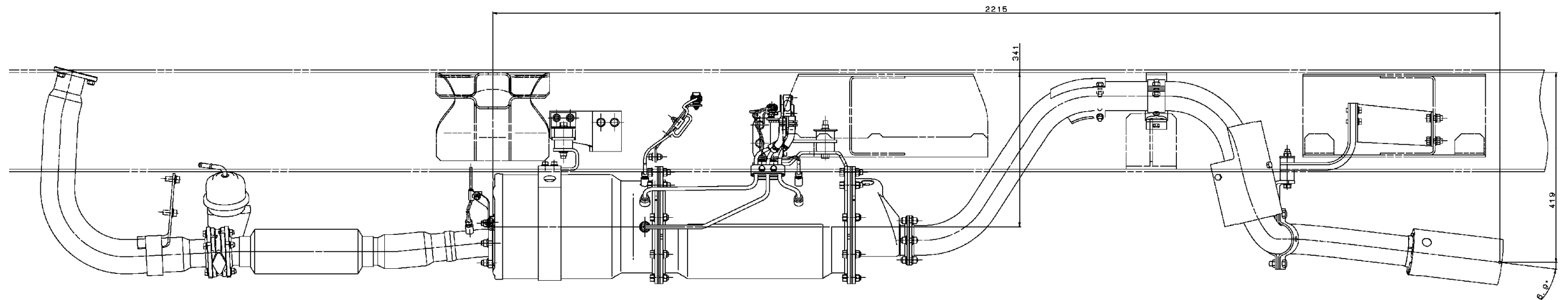
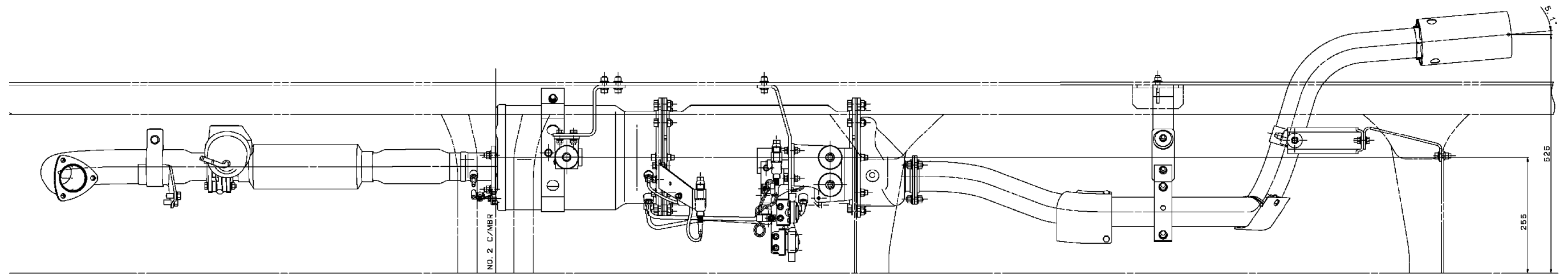
## 19.2 COE Series Chart

| MODEL SERIES | VEHICLE MODEL | ENG CTR TO JOINT in (mm) | PROPELLER SHAFT TRUE LENGTH in (mm) |       |                 | JOINT POINT in (mm) |                 |       |               | JOINT ANGLE in (mm) |       |               |         |      |     |      |     |
|--------------|---------------|--------------------------|-------------------------------------|-------|-----------------|---------------------|-----------------|-------|---------------|---------------------|-------|---------------|---------|------|-----|------|-----|
|              |               | $l_0$                    | $l_1$                               | $l_2$ | $l_3^*$         | $h_0$               | $h_1$           | $h_2$ | $h_3^*$       | $a_0$               | $a_1$ | $a_2^*$       | $a_3^*$ | $b$  |     |      |     |
| COE30        | COE30115A     | 35.4<br>(900)            | -                                   | -     | 41.6<br>(1,057) | 10.3<br>(262)       | -               | -     | 12.8<br>(324) | -                   | -     | 1.1           | 0.0     | 2.2  |     |      |     |
|              | COE30134A     |                          | 22.4<br>(568)                       |       | 38.9<br>(988)   |                     | 11.9<br>(301)   |       |               | 0.5                 |       | 2.7           | -2.1    | 1.6  |     |      |     |
|              | COE30152A     |                          | 35.0<br>(888)                       |       | 44.4<br>(1,128) |                     | 12.5<br>(318)   |       |               | 0.8                 |       | 3.4           | -3.1    | 1.4  |     |      |     |
| COE45        | COE45115A     | 35.4<br>(900)            | -                                   | -     | 41.6<br>(1,057) | 10.3<br>(262)       | -               | -     | 12.8<br>(324) | -                   | -     | 1.1           | 0.0     | 2.2  |     |      |     |
|              | COE45134A     |                          | 22.4<br>(568)                       |       | 38.9<br>(988)   |                     | 11.9<br>(301)   |       |               | 0.5                 |       | 2.7           | -2.1    | 1.6  |     |      |     |
|              | COE45152A     |                          | 35.0<br>(888)                       |       | 44.4<br>(1,128) |                     | 12.5<br>(318)   |       |               | 0.8                 |       | 3.4           | -3.1    | 1.4  |     |      |     |
|              | COE45176A     |                          | 25.1<br>(638)                       |       | 32.0<br>(813)   |                     | 45.9<br>(1,166) |       |               | 12.0<br>(305)       |       | 13.7<br>(347) | 0.6     | 0.9  | 4.1 | -4.5 | 1.5 |
| COE50        | COE50115A     | 35.4<br>(900)            | -                                   | -     | 41.6<br>(1,057) | 10.3<br>(262)       | -               | -     | 12.8<br>(324) | -                   | -     | 1.1           | 0.0     | 2.2  |     |      |     |
|              | COE50134A     |                          | 22.4<br>(568)                       |       | 38.9<br>(988)   |                     | 11.9<br>(301)   |       |               | 0.5                 |       | 2.7           | -2.1    | 1.6  |     |      |     |
|              | COE50152A     |                          | 35.0<br>(888)                       |       | 44.4<br>(1,128) |                     | 12.5<br>(318)   |       |               | 0.8                 |       | 3.4           | -3.1    | 1.4  |     |      |     |
|              | COE50176A     |                          | 25.1<br>(638)                       |       | 32.0<br>(813)   |                     | 45.9<br>(1,166) |       |               | 12.0<br>(305)       |       | 13.7<br>(347) | 0.6     | 0.9  | 4.1 | -4.5 | 1.5 |
|              | COE50189A     |                          | 45.4<br>(1,153)                     |       | 45.9<br>(1,166) |                     | 13.6<br>(345)   |       |               | 1.8                 |       | 3.1           |         | -4.4 |     |      |     |

NOTE: \* is at the upper bounce limit (at the full-stroke).

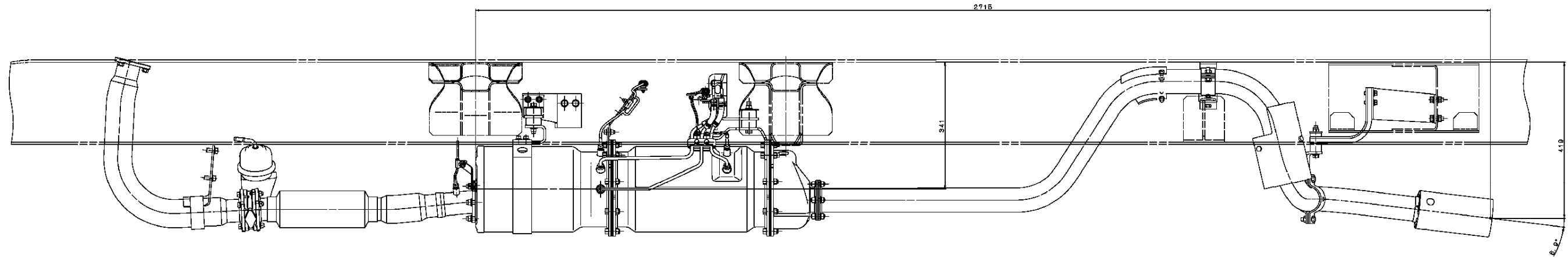
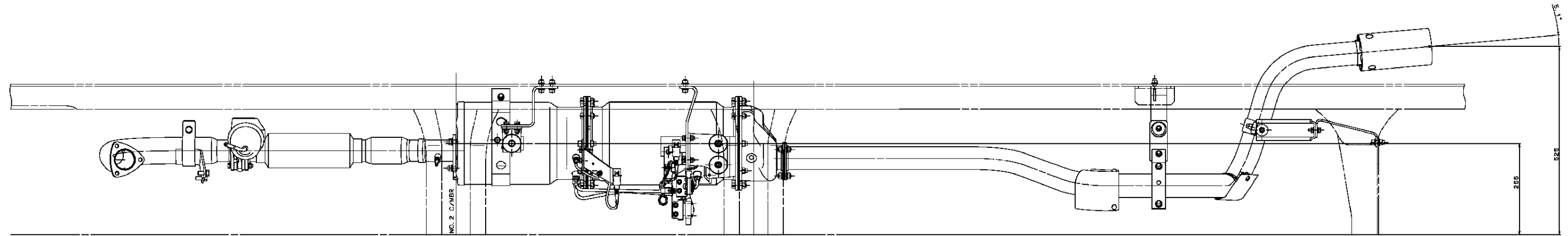
# 20. EXHAUST SYSTEM

## 20.1 COE 115" WB



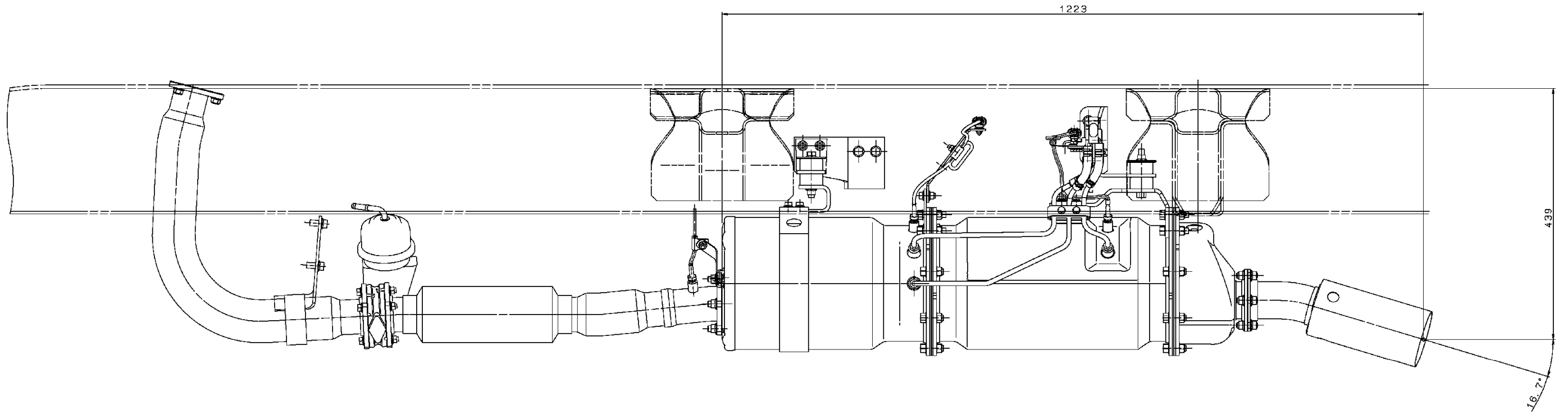
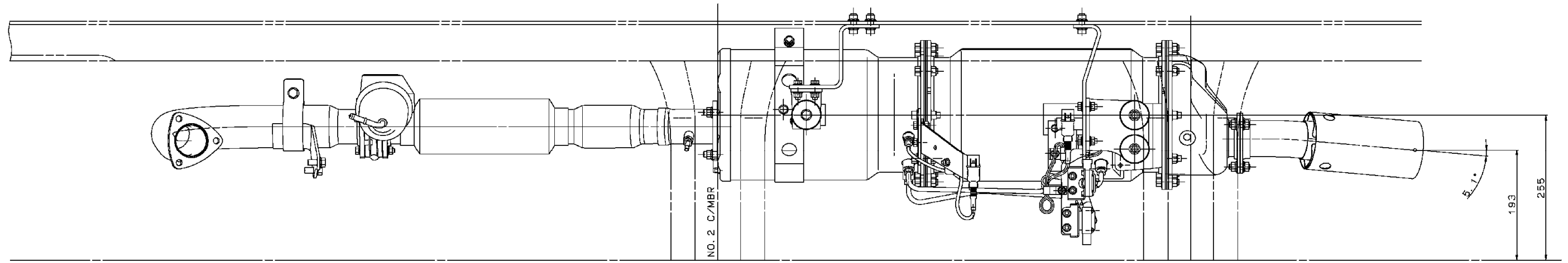
UNIT :mm

# 20.2 COE 134" WB



UNIT : mm

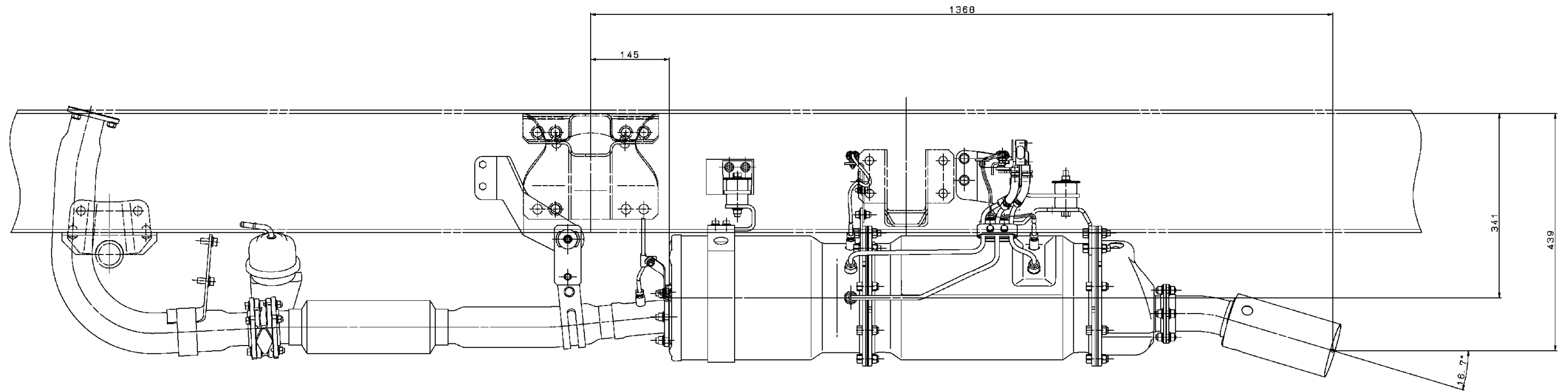
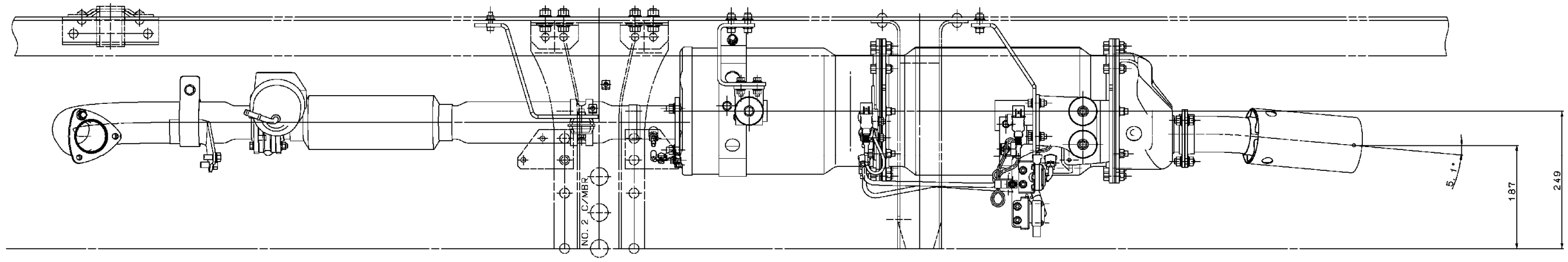
# 20.3 COE 152" WB



UNIT : mm



# 20.4 COE 176" & 189" WB



UNIT : mm

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**BODY BUILDER'S DRAWINGS  
AND  
SUPPORTING DATA  
STERLING 360  
COE CHASSIS**

**STERLING TRUCK CORPORATION**

DECEMBER 2007

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