Body/equipment mounting directives

CANTER

Australia

FUSO

Body/equipment mounting directives
FEA, FEB, FEC, FGB

Common Section

MITSUBISHI FUSO TRUCK & BUS CORPORATION
KAWASAKI, JAPAN

Contents

1 Introduction

MITSUBISHI FUSO TRUCK & BUS CORPORATION, as the manufacturer of MITSUBISHI FUSO vehicles, publishes this body/equipment mounting directive to provide body manufacturers with important technical information about the basic vehicle. This information must be observed by the body manufacturer in the production of bodies and equipment, fittings and modifications for MITSUBISHI FUSO vehicles.

Due to the large number of body manufacturers and body types, MITSUBISHI FUSO TRUCK & BUS CORPORATION cannot take into account all the possible modifications to the vehicle, e.g. performance, stability, load distribution, center of gravity and handling characteristics, that may result from the design of attachments, bodies, equipment or modifications. For this reason, MITSUBISHI FUSO TRUCK & BUS CORPORATION can accept no body manufacturer liability for accidents or injuries sustained as a result of such modifications to the vehicles if such modifications have a negative impact on the overall vehicle. Accordingly, MITSUBISHI FUSO TRUCK & BUS CORPORATION will only assume liability as vehicle manufacturer within the scope of the design, production and instruction services which it has performed itself.

The body manufacturer is bound to ensure that its bodies and equipment, fittings and modifications are themselves not defective, nor capable of causing defects or hazards to the overall vehicle. If this obligation is violated in any way, the body manufacturer shall assume full product liability. The body/equipment mounting directives enable MITSUBISHI FUSO TRUCK & BUS CORPORATION to instruct the body manufacturer about important aspects that must be observed when mounting its bodies and equipment, fittings and modifications.

These body/equipment mounting directives are primarily intended for the professional manufacturers of bodies, equipment, fittings and modifications for our vehicles. As a result, these body / equipment mounting directives assume that the body manufacturer has suitable background knowledge. If you intend to mount attachments, bodies and equipment on or carry out modifications to our vehicles, please be aware that certain types of work (e.g. welding work on load-bearing components) may only be carried out by qualified personnel. This will avoid the risk of injury while also ensuring that the degree of quality required for the attachments, bodies, equipment and modifications is given.

1.1 The aim of these directives

These directives serve as instructions for the manufacture of attachments, bodies, equipment and modification to other make bodies and major assemblies. These directives are divided into 10 interlinked chapters to help you find the information you require more quickly:

Additional information

The index, in PDF format, is linked to help you find the information you require quickly.

Make absolutely sure that you observe the technical threshold values selected in Section 4 as planning must be based on these values.

Section 6 "Modifications to the basic vehicle" and Section 7 "Construction of bodies" represent the main source of technical information contained in these body/equipment mounting directives.

1.1 The aim of these directives

⚠ Risk of accident

Before installing any attachments, special-purpose bodies, equipment or carrying out any modifications to the basic vehicle and/or its assemblies, you must read the relevant sections of the Owner's Handbook, as well as the operating and assembly instructions issued by the manufacturer of the accessories and items of optional equipment.

You could otherwise fail to recognize dangers, which could result in injury to yourself or others.

The instructions listed herein must be observed in full to maintain the operational reliability and road safety of the chassis and for observance of material defect claims.

Illustrations and schematic drawings are examples only and serve to explain the texts and tables.

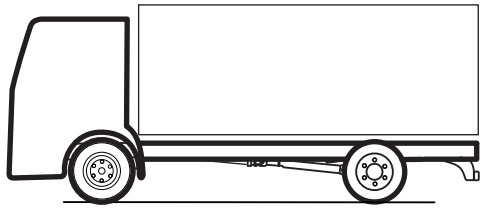
References to regulations, standards, directives etc. are given in keywords and serve for information only.

Additional information is available from any

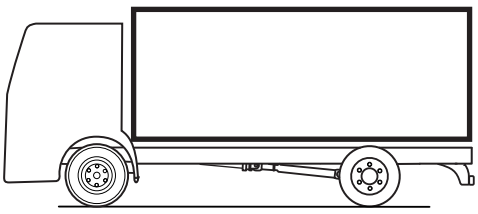
MITSUBISHI FUSO authorized Distributer

Your
MITSUBISHI FUSO TRUCK & BUS CORPORATION

The illustrations below explain the difference between "Basic vehicle" and "Body":



Basic vehicle



Body

1.2 Symbols

The following symbols are used in these directives:

Risk of accident

A warning draws your attention to possible risks of accident and injury to yourself and others.

Environmental note

An environmental note gives you tips on the protection of the environment.

Property damage

This note draws your attention to possible damage to your vehicle.

Additional information

This note points out any additional information.

▷

This symbol indicates the item on which you will find further information on the subject. These items are cross-linked in the PDF file.

1.3 Vehicle safety

⚠ Risk of accident and injury

The use of parts, assemblies or conversion parts and accessories which have not been approved may jeopardize the safety of the vehicle.

Before installing any attachments, special-purpose bodies, equipment or carrying out any modifications to the basic vehicle and/or its assemblies, you must read the relevant sections of the Owner's Handbook, as well as the operating and assembly instructions issued by the manufacturer of the accessories and items of optional equipment.

You could otherwise fail to recognize dangers, which could result in injury to yourself or others.

Official acceptance by public testing bodies or official approval does not rule out safety hazards.

In many countries, parts that make extensive changes to the vehicle can invalidate the general operating permit. Specifically, this concerns parts which:

- change the vehicle type approved in the general operating permit
- could endanger road users
- could adversely affect exhaust emissions or noise levels

ⓘ Additional information

Make absolutely sure that you comply with national registration regulations as attachments, bodies, equipment on or modifications to the vehicle will change the vehicle type approved and may invalidate the general operating permit.

Notes on vehicle safety

MITSUBISHI FUSO recommends

using appropriate parts only for each particular vehicle model.

1.4 Operational safety

Risk of accident

Before installing any attachments, special-purpose bodies, equipment or carrying out any modifications to the basic vehicle and/or its assemblies, you must read the relevant sections of the Owner's Handbook, as well as the operating and assembly instructions issued by the manufacturer of the accessories and items of optional equipment.

You could otherwise fail to recognize dangers, which could result in injury to yourself or others.

Work incorrectly carried out on electronic components and their software could prevent this equipment from working correctly. Since the electronic systems are networked, this might also affect systems that have not been modified.

Malfunctions in the electronic systems could seriously jeopardize the operating safety of the vehicle.

1.5 Accident prevention

Observe the requirements and precautions set out in this manual when carrying out body-building work or modification work.

The body, the attached or installed equipment and any modifications must comply with the applicable laws and ordinances as well as work safety or accident prevention regulations, safety rules and accident insurer requirements.

All technical means shall be used to avoid operating conditions that may be unsafe or liable to cause an accident.

All national laws, directives and registration requirements must be complied with.

The manufacturer of the attachment, body, equipment or conversion or the device manufacturer is responsible for compliance with these laws and regulations.

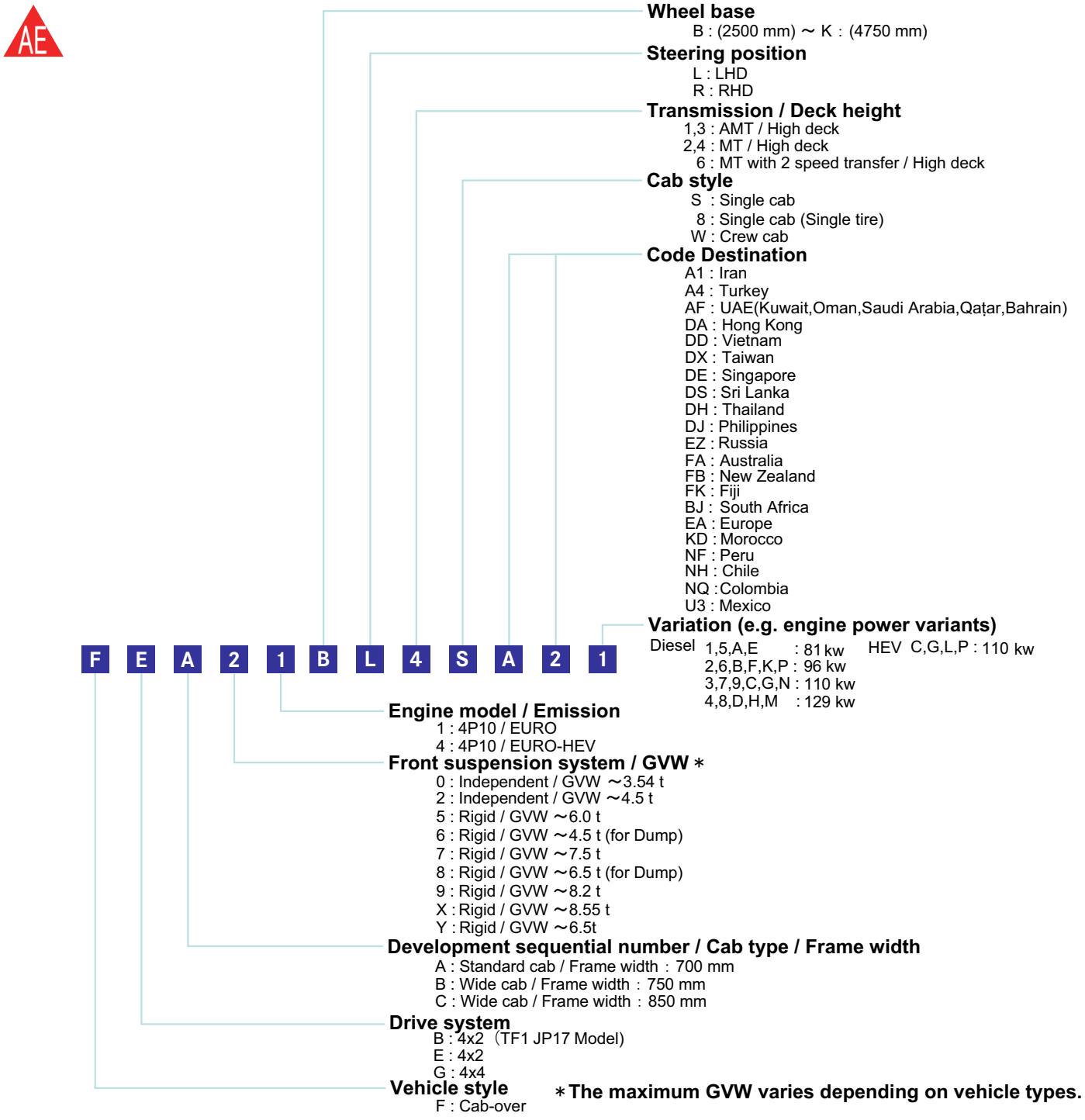
1.6 Note on copyright

All the text, illustrations and data contained in these body/equipment mounting directives are protected by copyright.

If you have any questions, please contact the department responsible ▷ 2.2.

2.1 Vehicle and model designations

2.1.1 Model coding system



Before mounting necessary body parts/equipment, check the model designation and specifications of your vehicle ▷ 10.2.1.

2.2 Technical advice and contact persons

Please log in from the following BODYBUILDER PORTAL URL and contact us.

It is correspondence of only English.

https://bb-portal.mitsubishi-fuso.com/en/

2.3 Product safety

Both the vehicle manufacturer and the body manufacturer must always ensure that they introduce their scopes into the market in a safe condition and that third parties are not at risk of any safety hazard. If this is not adhered to they may be subject to civil, criminal and public law consequences. Every manufacturer is liable for the products it manufactures.

From this, it follows that the vehicle body/conversion manufacturer therefore also bears responsibility for the following:

- the operating and road safety of the body
- the operating and road safety of parts and modifications
- testing and maintaining the operating and handling safety of the vehicle after the body/equipment is mounted (the body and/or equipment must not have a negative effect on the driving, braking or steering characteristics of the vehicle)
- influences of parts on or modifications to the chassis
- consequential damage resulting from the body, attachment, equipment or modification
- consequential damage resulting from retrofitted electrical and electronic systems
- maintaining the operational reliability and freedom of movement of all moving parts of the chassis after the body/equipment is mounted (e.g. axles, springs, propeller shafts, steering, transmission linkage, etc.) even in the case of diagonal torsion between the chassis and the bodies

Be careful of the following points when carrying out body-building or modification work.

Safety design

- Securing adequate safety and reliability, and preparing safety devices (design which is fail-safe and takes account of misoperation and misuse, safety evaluation)
- Storing technical material, drawings and documents during development

Manufacturing quality

- Manufacturing according to the drawings in order to prevent errors, missing parts and defective assembly, and secure high manufacturing quality
- Implementing a quality confirmation inspection, and storing the records of the inspection
  Use the post-body-building/modification inspection sheet.

Preparing an instruction manual and warning indications

- Instruction manual
  Concrete indication of the effect of incorrect operation on the human body, the vehicle, and other locations (elimination of indications that are likely to cause misunderstanding, and also ambiguous expressions)
- Warning indications
  To ensure that the vehicle is used as safely as possible, warning indications must use expressions that are easy to understand and letters that are large enough to read easily, include pictures, and be applied to locations that are readily visible to the driver.

2.4 Ensuring traceability

Hazards in your implement/body which become known after delivery may necessitate supplementary measures in the market (customer notification, warnings, recalls). In order to make these measures as efficient as possible, your product must be traceable after delivery.

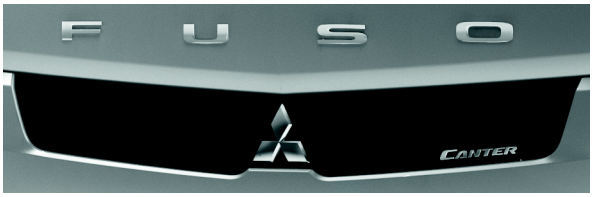
For this purpose and to enable the Federal Office for Motor Vehicles' Central Vehicle Register (ZFZR) or comparable registers abroad to be used for determining which owners are affected, we advise you to promptly file the serial number/identification number of your equipment/add-on part linked to the vehicle identification number for the truck in your databases.
Similarly, it is also advisable to store the addresses of your customers for this purpose and to grant subsequent purchasers the opportunity to register.

2.5 Mitsubishi three diamonds and Fuso emblem

The Mitsubishi three diamonds and Fuso emblem are owned or controlled by MITSUBISHI FUSO.

They must not be removed or affixed in another position.

Mitsubishi three diamonds and Fuso emblems supplied separately must be attached at the points specified by MITSUBISHI FUSO.



Overall appearance of the overall vehicle

If the vehicle fails to comply with the appearance and quality standards as required by MITSUBISHI FUSO TRUCK & BUS CORPORATION, the trademarks such as the Mitsubishi three diamonds and Fuso emblem must be removed.

Third-party trademarks

- may not be affixed next to MITSUBISHI FUSO trademarks

Binding ruling

The MITSUBISHI FUSO Brand Trademark Directive governs the use of trademarks by body manufacturers on integrated bodies mounted on chassis. MITSUBISHI FUSO TRUCK & BUS CORPORATION reserves the right to prohibit the body manufacturer from using MITSUBISHI FUSO trademarks in the event of any violations to this body/equipment mounting directive, including the trademark directive.

- If you have any question, contact the department responsible ▷ 2.2.

2.6 Trademarks

Labels and marks must be applied to the predetermined positions.

For details of the location and method of applying labels and marks, refer to "10.14.2 Labels and markings" ▷ 10.14.2.

2.7 Recycling of components

Environmental note

When planning attachments, bodies, equipment and modifications, and with regard to the legal requirements according to EU Directive 2000/53/EC, and 1907/2006/EC (REACH: Registration, Evaluation, Authorisation (and Restriction) of Chemicals), the following principles for environmentally-compatible design and material selection shall be taken into account.

Materials with risk potential, and restriction by REACH, such as halogen addi-tives, heavy metals, asbestos, CFCs and CHCs, are to be avoided.

- It is preferable to use materials which permit recycling and closed material cycles.
- Materials and production processes are to be selected such that only low quantities of waste are generated during production and that this waste can be easily recycled.
- Plastics are to be used only where they provide advantages in terms of cost, function or weight.
- In the case of plastics, and composite materials in particular, only compatible substances within one material family are to be used.
- For components which are relevant to recycling, the number of different types of plastics used must be kept to a minimum.
- It must be assessed whether a component can be made from recycled material or with recycled elements.
- It must be ensured that components can be dismantled easily for recycling, e.g. by snap connections or predetermined breaking points. These components should generally be easily accessible and should permit the use of standard tools.
- Service products must be capable of being removed simply and in an environmentally responsible manner by means of drain plugs, etc.
- Wherever possible, components should not be painted or coated; colored plastic parts are to be used instead.
- Components in areas at risk from accidents must be designed in such a way that they are damage-tolerant, repairable and easy to replace.
- All plastic parts are to be marked in accordance with VDA code of practice 260, e.g. "PPGF30R".
- EU Directive 2000/53/EC must be complied with.

2.8 Quality system

World-wide competition, increased quality standards demanded by the customer from the product as a whole, national and international product liability laws, new organizational forms and rising cost pressures make efficient quality assurance systems a necessity in all sectors of the automotive industry.

For the reasons quoted above, MITSUBISHI FUSO TRUCK & BUS CORPORATION urgently advises body manufacturers to set up a quality management system with the following minimum requirements:

- Does the quality management system clearly define responsibility and authority?
- Is there a description of processes/workflows?
- Are the contracts checked/is the feasibility of construction checked?
- Are product checks on the basis of specified instructions carried out?
- What provisions are made for the handling of faulty products?
- Are the inspection results documented and archived?
- Do all employees concerned have currently valid proof of the qualification required?
- Is the test equipment systematically monitored?
- Is there a system for labelling materials/parts?
- Are quality assurance measures carried out at suppliers?

3.1 Selecting the chassis

Property damage

When planning attachments, bodies, equipment or modification work, the selected vehicle must be checked to verify whether it fulfils the necessary requirements.

In order to ensure safe operation of the vehicle, it is essential to choose the chassis and equipment carefully in accordance with the intended use.

Along with the selection of the correct vehicle version, the required series and special equipment such as

- Wheelbase
- Engine/Transmission
- Power take-offs
- Axle ratio
- Position of the center of gravity
- Legal registration requirements (e.g. Underrun protection)
- Permissible and technical gross vehicle weight

should be taken into consideration and be appropriate for the intended use.

Property damage

Observe the Model. The axle designation or the load capacity of the tires has only limited relevance to the gross weight of the vehicle.

Additional information

The non-availability of a vehicle version may be an indication that the vehicle is not suitable for the intended application.

<Vehicle with LDWS>
LDWS may be disabled in the following cases:

- Any item which interferes with the camera's field of view exists rear the camera.
- Any equipment(snowplough,etc.) is attached in front of the vehicle.

LDWS: Lane Departure Warning System

3.2 Vehicle modifications

⚠ Risk of accident

Do not carry out any modifications to major assemblies (steering, brake system etc.). Any modifications to the steering and the brake system may result in these systems malfunctioning and ultimately failing. The driver could lose control of the vehicle and cause an accident.

Alterations to the basic vehicle are permitted only within the framework of the procedures described in this body/equipment mounting directive.

The vehicles are shipped after adequate consideration has been given to safety, reliability and mantainability. Ensure that these functions remain intact after body-building or modification work.

The vehicles must still comply with the regulation of the country where the vehicles are used after modifications have been carried out.

Do not change critical safety parts or noise reduction parts because this may cause a serious accident and is also illegal.

When selecting body-building or modification parts, give consideration to strength, robustness and safety, and also strive to minimize weight.

Install body-building or modification parts in such a way that visibility in the forward direction is not impaired.

Take care not to damage or impair the function of parts on the chassis side.

Upon completion of the work, check to see if the manufacturing quality conforms to the design and also if the specified performance and functions have been secured.

Drive the vehicle and confirm that there is no unusual vibration or noise and also that the vehicle performance is stable.

If the method of handling or maintaining the vehicle changes as a result of carrying out body building or modification, prepare an instruction manual and keep a copy in the vehicle, and also apply warning labels to the vehicle.

The body or equipment manufacturer must apply an Intermediate or Final Stage Manufacturer's Label and inform the officially recognized approval authority or inspector of any modifications to the chassis when the vehicle is inspected.

Following all work on the brake system, i.e. even if merely disassembling parts, a complete check (operation, effectiveness and visibility) of the entire brake system must be performed.

D

For Hybrid vehicle:

Never modify or relocate high-voltage equipment.

For details of high-voltage equipment, refer to "6.16 Handling of HEV system" ▷ 6.16.

3.3 Dimensions, weights, overall vehicle height

Risk of accident

The vehicle tire load capacity may not be exceeded by overloading the vehicle beyond its specified gross vehicle weight. The tires could overheat and suffer damage. This could cause you to lose control of the vehicle and cause an accident with possible injury to yourself and others.

Information on the permissible axle loads can be found on the vehicle model plate.

All legal provisions governing the permissible vehicle height must be taken into account when planning bodies.

In countries (and if the vehicle is operated on international services), comply with all the relevant national regulations.

Unit: m

	The permissible vehicle height is limited to max
EU*	4
Hong Kong	3.5
Australia	4.3
New Zealand	4.25
Taiwan	3.8

*: Countries conforming to EC regulations
* For countries not listed above, Vehicle height need to adapt in accordance with each countries local regulations.

Dimensions and weight details can be found in the drawings and technical data. They are based on a vehicle that is fitted with standard equipment. Weight tolerances of ±3% in production must be taken into consideration.

For the minimum mass of the vehicle, refer to "10.2 Specification".

	Weight tolerances
EU*	1230/2012/EC
Hong Kong	374A (Road Traffic regulation)
Australia	ADR43/04 (Vehicle Configuration and Dimensions)
New Zealand	LTR41001 (Vehicle Dimensions and Mass)
Taiwan	02 The requirement of specification for motorvehide

*: Countries conforming to EC regulations
* For countries not listed above, Weight tolerances need to adapt in accordance with each countries local regulations.

The permissible axle loads and the maximum permissible gross vehicle weight specified in the technical data may not be exceeded.

The technical data can be found in the vehicle documents or on the vehicle model plate.

Additional information

Information about changes in weight is available from the department responsible ▷ 2.2.

For details of maximum rear body width, refer to "4.7 Others" ▷ 4.7.

3.3 Dimensions, weights, overall vehicle height

Lamps

The maximum total width of a vehicle should be as shown below in accordance with the specifications for the headlamps and position lamps.

Some versions of the F*A model should be equipped with end outline marker lamps if the overall width is to be more than 2100 mm.

B If the rear body prevents the visibility of the front and side turn signal indicator lamps from meeting the regulatory requirements, additional side turn signal lamps must be installed to ensure compliance with visibility regulations.

Unit: mm

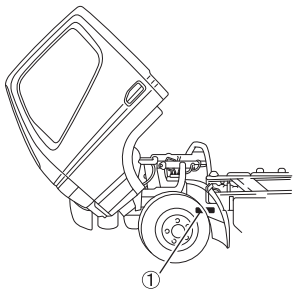
MODEL	Maximum total width of vehicle
F*A	2250
F*B / F*C	2550

3.4 Vehicle type identification data

If presented at the time of repair or parts order, the chassis number ① and engine number ② will facilitate the quick and smooth processing of your requests.

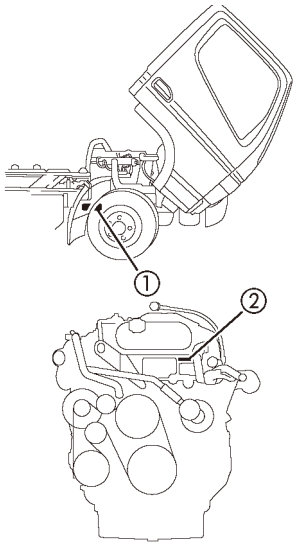
3.4.1 Chassis number

The indicated information varies depending on the country.



Z21444

<Morroco>



Z22117

<Type1>
The chassis number is indicated on the left frame ①, near the left front wheel.

Example: FEC91E – □□□□□□
Chassis number
Vehicle model

<Type2>
The vehicle identification number (V.I.N.) is indicated on the left frame ①, near the front wheel.

Example: JLAFEC91G0K □□□□□□
Chassis number
Vehicle model

3.4.2 Engine number

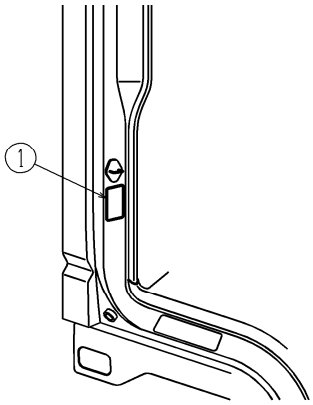
The engine number ② is indicated on the front side of the cylinder head.

Example: 4P10 - □□□□□□
Engine number
Engine model

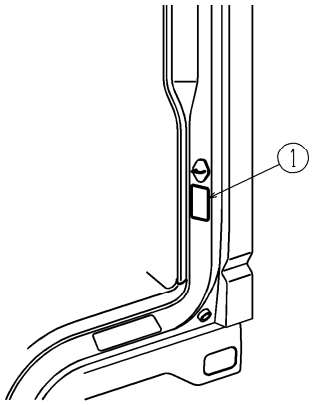
3.4.3 Nameplate

- A nameplate ① is located inside the cab.
  (Except for models for Australia and New Zealand, South Africa)

<Single cab models - 1>
The door opening portion of assistant driver's side

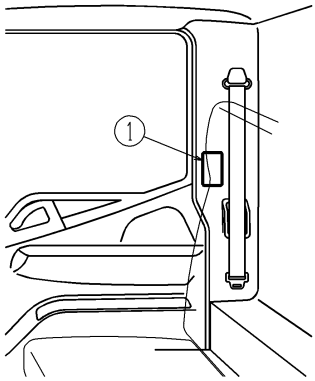


LHD vehicles



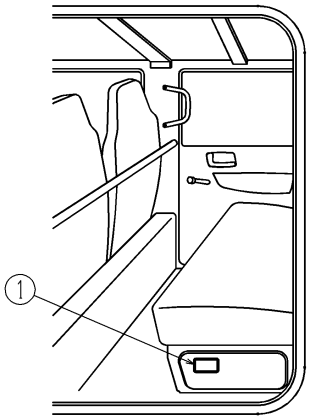
RHD vehicles

<Single cab models - 2>
The door pillar of assistant driver's side

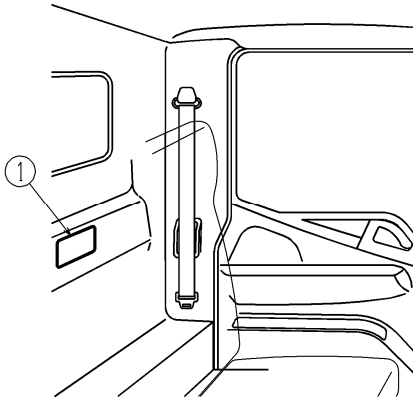


LHD vehicles

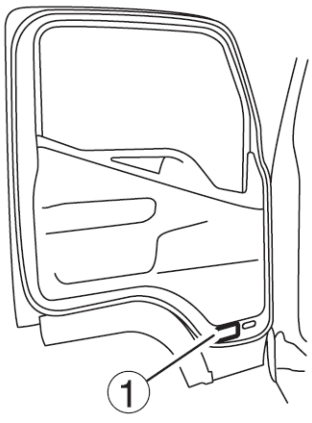
<Crew cab models>
Under the rear seat of left side



<Single cab models - 3>
Under the rear window

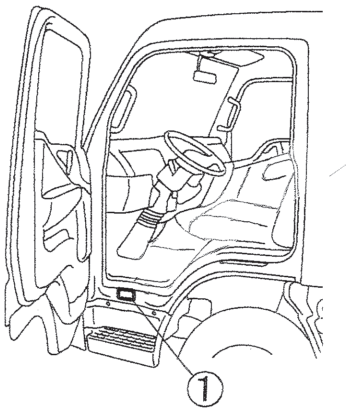


<Single cab model - 4>
Under the door of driver's side



3.4 Vehicle type identification data

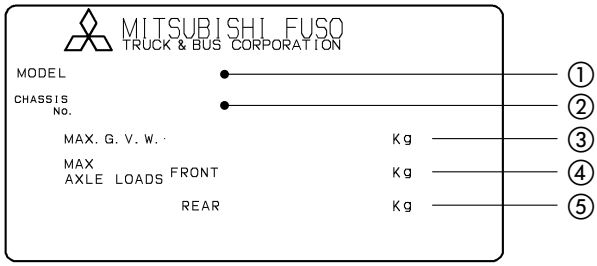
<Single cab model - 5>
The door opening portion of driver's side



Location of name plate	Application
Single cab models - 1	General export, Hong Kong, Singapore, Taiwan, Malaysia, Egypt, Kenya
Single cab models - 2	Peru, Colombia, Algeria
Single cab models - 3	Indonesia, Venezuela, Turkey, Morocco, Iran, Russia
Single cab models - 4	Chile, Sri Lanka, UAE, Thailand, Philippine, Vietnam
Single cab models - 5	Mexico
Crew cab models	General export, Hong Kong, Singapore

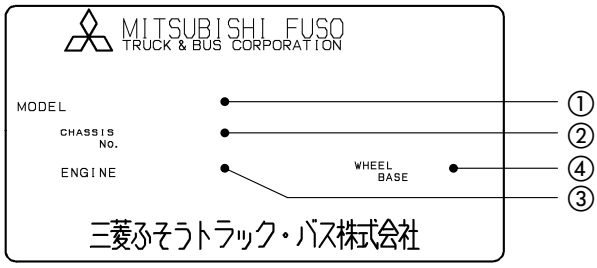
- The nameplate shows the following.
  (Except for models for Australia and New Zealand)

<Type 1>



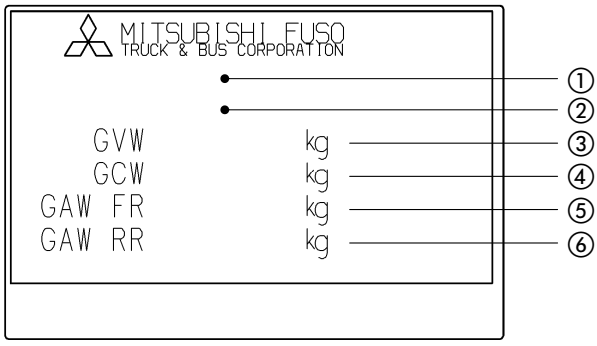
① *Model*
② *Chassis number*
③ *Maximum permitted laden mass of the vehicle*
④ *Maximum permitted load mass for front axle*
⑤ *Maximum permitted load mass for rear axle*

<Type 2>



① *Model*
② *Chassis number*
③ *Engine*
④ *Wheel base*

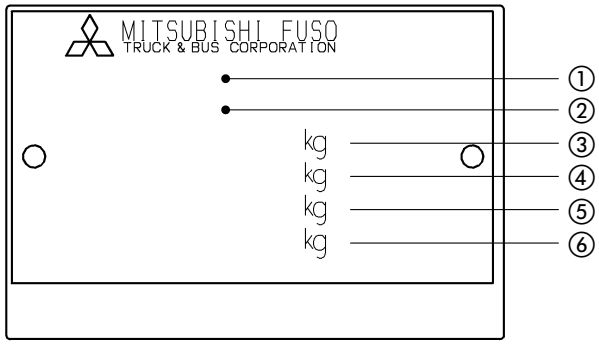
<Type 3>



① *Model & Chassis number*
② *Vehicle identification number*
③ *Maximum permitted laden mass of the vehicle*
④ *Maximum permitted laden mass of the combination*
⑤ *Maximum permitted load mass for front axle*
⑥ *Maximum permitted load mass for rear axle*

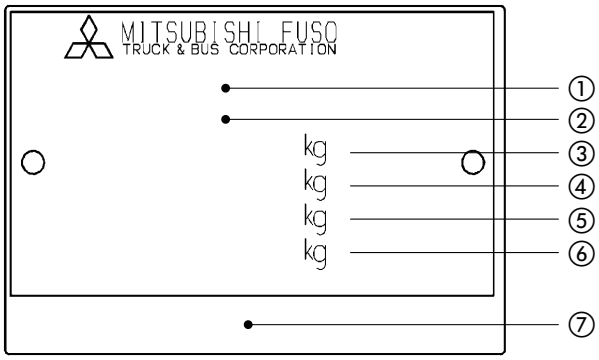
3.4 Vehicle type identification data

<Type 4>



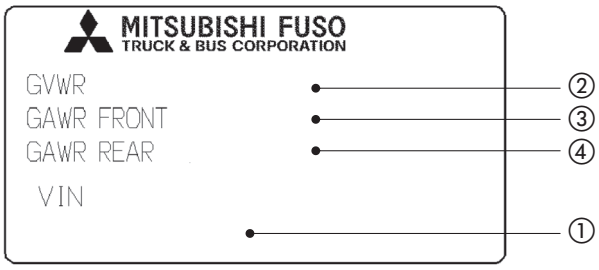
① *Whole vehicle type-approval number*
② *Vehicle identification number*
③ *Maximum permitted laden mass of the vehicle*
④ *Maximum permitted laden mass of the combination*
⑤ *Maximum permitted load mass for front axle*
⑥ *Maximum permitted load mass for rear axle*

<Type 5>



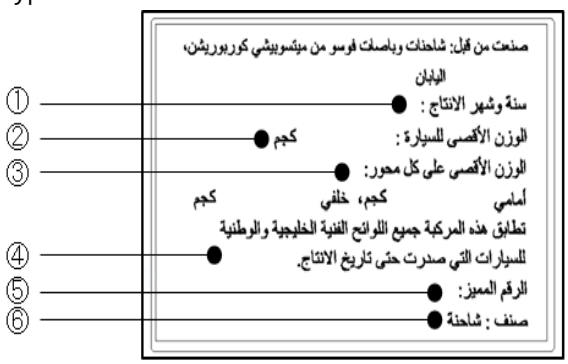
① *Whole vehicle type-approval number*
② *Vehicle identification number*
③ *Maximum permitted laden mass of the vehicle*
④ *Maximum permitted laden mass of the combination*
⑤ *Maximum permitted load mass for front axle*
⑥ *Maximum permitted load mass for rear axle*
⑦ *Model code*

<Type 6>



① *Vehicle identification number*
② *Maximum permitted laden mass of the vehicle*
③ *Maximum permitted load mass for front axle*
④ *Maximum permitted load mass for rear axle*

<Type 7>



①YEAR AND MONTH OF MANUFACTURE
②GROSS EHICLE WEIGHT
③MAXIMUM WEIGHT ON EACH AXLE
④STATEMENT
⑤VIN
⑥TYPE:TRUCK

Type of name plate	Application
Type 1	General export, Singapore, Taiwan, Indonesia, Malaysia, Egypt, Kenya
Type 2	Hong Kong
Type 3	Venezuela, Peru, Colombia, Algeria, Chile, Sri Lanka, Thailand, Philippine, Vietnam
Type 4	Turkey, Morocco, Russia
Type 5	Iran
Type 6	Mexico
Type 7	UAE

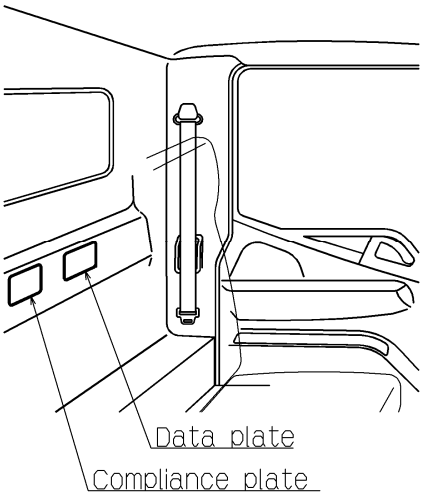
3.4 Vehicle type identification data

- In case of models for Australia and New Zealand

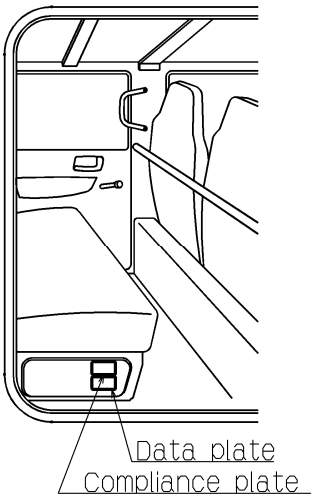
The data plate and the compliance plate are locatedinside the cab.

For accurate information about the plate locations, contact the department responsible since they might be subject to change ▷ 2.2.

<Single cab models>
Under the rear window



<Crew cab models>
Under the rear seat of right side



The data plate shows the following.

① *Model*
② *Vehicle identification number*
③ *Option code*
④ *Paint code*
⑤ *Trim code*

The compliance plate certifies that your vehicle complied with Australian Design Rules at the time of manufacture.

The compliance plate shows the following.

① *Approval number*
② *Category*
③ *Vehicle identification number*
④ *Maximum permitted laden mass of the vehicle*
⑤ *Number of seats*

- In case of models for South Africa, The name plate which contains vehicle model number and the like is attached to the driver's side door opening.

D

3.5 Tires

The body manufacturer must ensure that:

- the largest permissible MITSUBISHI FUSO authorized tires can be fitted.
- the distance between the tire and the mudguard or wheel housing is sufficient even when snow or anti-skid chains are fitted, with the suspension fully compressed (including any twist) (Adherence to valid regulations).
- that the relevant information in the drawings is observed.

If the option of fitting snow and anti-skid chains cannot be guaranteed, the operator should be informed by the body manufacturer (operating instructions).

⚠ Risk of accident

Exceeding the specified tire load-bearing capacity or the permissible maximum tire speed can lead to tire damage or failure. You can lose control of the vehicle, cause an accident and injuries.

For this reason, only fit tires of a type and size approved for your vehicle and observe the tire load-bearing capacity required for your vehicle. Observe tire speed index.

Comply with national regulations governing the approval of tires. These regulations may define a specific type of tire for your vehicle or may forbid the use of certain tire types which are approved in other countries.

! Property damage

If you have other wheels fitted

- the brakes or components of the suspension system could be damaged
- wheel and tire clearance can no longer be guaranteed
- the brakes or components of the suspension system can no longer function correctly.

For FG models:

Be sure to fit tires of the same size and type on all wheels.

B

3.6 Bolted and welded connections

⚠ Risk of accident

Do not modify any bolted connections that are relevant to safety, e.g. that are required for wheel alignment, steering or braking functions.

When unfastening bolted connections make sure that, when work is complete, the connection again corresponds with the original condition.

Welding work on the chassis/body may only be carried out by trained personnel.

The body, the attached or installed equipment and any modifications must comply with the applicable laws and ordinances as well as work safety or accident prevention regulations, safety rules and accident insurer requirements.

i Additional information

Further information on bolted and welded connections can be found in Section 5 "Damage prevention" ▷ 5.2 and Section 6 "Modifications to the basic vehicle" ▷ 6.1.

3.6 Bolted and welded connections

3.6.1 Welded connections

Welding work on the chassis/body may only be carried out by trained personnel.

Property damage

Parts which must not be welded:

- Assemblies such as the engine, propeller shaft, transmission, axles, etc.
- The chassis frame (except frame modifications).

Additional information

Further information on bolted and welded connections can be found in Section 5 "Damage prevention" ▷ 5.2 and Section 6"Modifications to the basic vehicle" ▷ 6.1.

3.7 Soundproofing

The following modifications can lead to noise problems:

- Change of engine model
- Change of reduction gear
- Change of transmission gear
- Replacement of tires with non-registered ones
- Change of exhaust pipe diameter, clamping position or muffler size
- Change of radiator cooling fan size, pitch, number of blades or rotational speed
- Change of air intake duct diameter, shape or length
- Modifications of shielding cover around the engine which can lead to reduced shielding performance or increased ambient temperature inside the shielding cover

Do not modify the vehicle except for those indicated in the body/equipment mounting directives.
Shielding covers around the engine and transmission, muffler with combined exhaust emission control device, and exhaust pipe between exhaust manifold and muffler with combined exhaust emission control device are components to be noise-proofed.

Therefore, never attempt to modify them.
Take utmost care not to damage these components if they are to be removed once and then reinstalled for facilitating mounting works.

- Noise-insulating parts fitted as standard must not be removed or modified.
- The level of interior noise must not be adversely affected.

Additional information

Comply with all national regulations and directives.

D

	Noise regulation	Detail
EU*	70/157/EEC	Article 49.3 of the German licensing regulations (low-noise vehicles) must be observed.
Hong Kong	Chapter 4001	Noise Control (Motor Vehicles) Regulation
Australia	ADR83/00	External Noise
New Zealand	LTR32017	Vehicle Equipment
Taiwan	-	Moter Vehicle Noise Control Standard

*: Countries conforming to EC regulations
* For countries not listed above, Noise control need to adapt in accordance with each countries local regulations.

3.8 Exhaust system

The exhaust system must not be modified.
If modification is unavoidable, consult with the department in charge of the measures ▷ 2.2.

Property damage

The original exhaust system mounting, by this we mean the bracket components including frame-mounted castings, may not be modified. Modifications can lead to damage to the exhaust system.

Additional information

Further information on exhaust system can be found in Section 6 "Exhaust system" ▷ 6.14.

3.8 Exhaust system

3.8.1 Euro VI, Euro V, Euro III

Environmental note

Modifications carried out incorrectly to the routing of the exhaust system upstream of the catalytic converter can result in the leakage of untreated exhaust gas into the environment.

<For Euro VI and Euro V>
To satisfy the Euro V emissions legislation, the BlueTec®, exhaust aftertreatment system is used, which is based on Selective Catalytic Reduction (SCR). BlueTec® diesel technology reduces the nitrogen oxide content of the exhaust gas by the injection AdBlue® (urea dissolved in water). The water-based AdBlue® solution is injected into the hot exhaust gas via a metering valve. The exhaust gas is transformed in the rear silencer with catalytic converter (SCR catalytic converter). This technology requires components for which installation space is needed in the vehicle.

3.8.2 BlueTec® exhaust gas aftertreatment

BlueTec® exhaust gas aftertreatment removes NOx in the exhaust gas.
Do not modify and transfer the following parts because the performance of the system is deteriorated.

- SCR muffler
- Urea tank unit
- Dosing module
- Urea hose

Property damage

Don't take out the power supply for other electric components from the existing fuse.

Especially the function of BlueTec® exhaust gas after treatment can not work when the fuse of system is blowout.

BlueTec® exhaust gas after treatment requires a lot of electric power to work the heating device for freeze proofing in winter or cold region.

3.9 Maintenance and repairs

⚠ Risk of accident and injury

Always have maintenance work performed at a qualified specialist workshop possessing the required expertise and tools in order to perform the necessary work.

MITSUBISHI FUSO recommends a MITSUBISHI FUSO authorized Distributer this work.

It is absolutely essential that all safety-relevant work and all work on safety-relevant systems is performed by a qualified specialist workshop.

Before performing any maintenance work, always read the technical documentation, such as the Instruction Manual and the workshop information. Always have all maintenance work performed at the correct time. If this is not done, malfunctions or failures may occur in systems that could be relevant to safety. This could make you cause an accident, which could result in injury to yourself or others.

Maintenance and repair of the vehicle should not be made unnecessarily difficult by the body.

Maintenance points and major assemblies must be easily accessible.

- The Instruction Manual must be complied with and supplemented as necessary.
- Stowage boxes must be fitted with maintenance flaps or removable rear panels.
- The battery compartment must be sufficiently ventilated, with provision for air to enter and exit.
- Check the condition and capacity of batteries and service them in accordance with the manufacturer's specifications ▷ 3.9.2 and ▷ 3.9.3.

Any additional expenses arising from the body in connection with warranty, maintenance or repair will not be borne by MITSUBISHI FUSO TRUCK & BUS CORPORATION.

3.9.1 Maintenance instructions

The following must be observed by the body manufacturer before delivery of the vehicle:

- Due date of inspection
- Be sure to set up the brake system.
- Check the condition and capacity of batteries and service them in accordance with the manufacturer's specifications.
- Check the headlamp setting or have this checked at a qualified specialist workshop.
- Retighten the wheel nuts to the specified torque.
- Instruction Manual and directives for maintenance of attachments, bodies, installations or conversions, which have been installed by the body manufacturer, must be provided with the vehicle in the language of the country of use.
- MITSUBISHI FUSO recommends adapting to each individual body the scope of maintenance work which has to be carried out on the body, co-ordinating it by means of the valid MITSUBISHI FUSO service systems. This applies both to the scope and type of service work, and for determining the service due dates for servicing intervals based on time elapsed and distance covered.

3.9.2 Preparation for storing the vehicle

Property damage

For vehicle deliveries in winter when roads may be gritted, please clean the vehicle as soon as possible to avoid surface damage, particularly the transmission housing and light-alloy wheels.

The battery may run down if the vehicle is stored for a long time with the key left in the key cylinder, so remove the key before storing the vehicle.

Storage in an enclosed space:

- Clean the overall vehicle.
- Check the oil and coolant levels.
- Inflate the tires to 0.5 bar above the specified tire pressures.
- Release the handbrake and chock the wheels.
- Disconnect the battery and grease battery lugs and terminals.

Storing the vehicle in the open (< 1 month):

- Carry out the same procedure as for storing in an enclosed space.
- Close all air inlets and set the heating system to "Off".

Storing the vehicle in the open (> 1 month):

- Carry out the same procedure as for storing in an enclosed space.
- Fold the windscreen wipers away from the windscreen.
- Close all air inlets and set the heating system to "Off".
- Remove the battery and store it in accordance with the manufacturer's specifications.

Maintenance work on stored vehicles (in storage for > 1 month):

- Check the oil level once a month.
- Check the coolant once a month.
- Check the tire pressures once a month.
- Remove the battery.

Removing the vehicle from storage:

- Check the fluid levels in the vehicle.
- Correct the tire pressures to the manufacturer's specifications.
- Check the battery charge and install the battery.
- Clean the overall vehicle.

3.9.3 Battery maintenance and storage

To avoid damage to the battery, disconnect the battery if the vehicle is to be immobilized for a period of longer than 1 week.

If the vehicle is immobilized for periods of longer than 1 month, remove the battery and store it in a dry place at temperatures of between 0 °C to 30 °C.

Store the battery in an upright position.

The battery charge must be kept above 12.55 V at all times.

Property damage

If the battery voltage drops below 12.1 V, the battery is damaged and it will have to be replaced.

Leaving the vehicle parked up for long periods of time can lead to battery damage. This can be avoided by disconnecting the battery and storing it appropriately.

3.9.4 Work before handing over the modified vehicle

The manufacturer must confirm the work and modifications carried out by making an entry in the Service Booklet.

Checking the overall vehicle

Check the vehicle for perfect condition. All damage must be repaired.

If it is not known how long a vehicle equipped with a hydraulic clutch operating system has been in storage, the brake fluid must be renewed.

Checking the batteries:

Test the battery charge before handing over the vehicle.

Checking the tires

Before handing over the vehicle, check that the tires are inflated to the specified pressure and check the tires for damage. Damaged tires must be replaced.

Checking wheel alignment

When equipment, attachments and bodies have been mounted, it is recommended to have the toe setting checked by a qualified specialist workshop. MITSUBISHI FUSO recommends a MITSUBISHI FUSO authorized Distributer for this work.

It is absolutely essential that all safety-relevant work and all work on safety-relevant systems is performed by a qualified specialist workshop.

Additional information

Further details are available from any MITSUBISHI FUSO authorized Distributer.

3.10 Advanced Emergency Braking System (AEBS)

Active Brake assist operates when there is a danger of collision with the vehicle, and it helps to alleviate collision damage.

- Place the starter switch in the "OFF" position before disconnecting the harness connector of the system control unit.
- For precautions when performing electric welding, refer to 5.2 "Welding work" ▷ 5.2.
- Radar unit and radar unit cover may cause trouble if repainted.
  Mask these parts and components before starting painting to protect them against paint spray.
  Remove radar unit if forced drying around radar unit.
- Contact a MITSUBISHI FUSO authorized Distributor to have calibration of radar if radar unit removed.
- Change to new radar unit if radar get damaged due to fallen
- Do not put any equipment in front of radar view area (fig. radar view area).

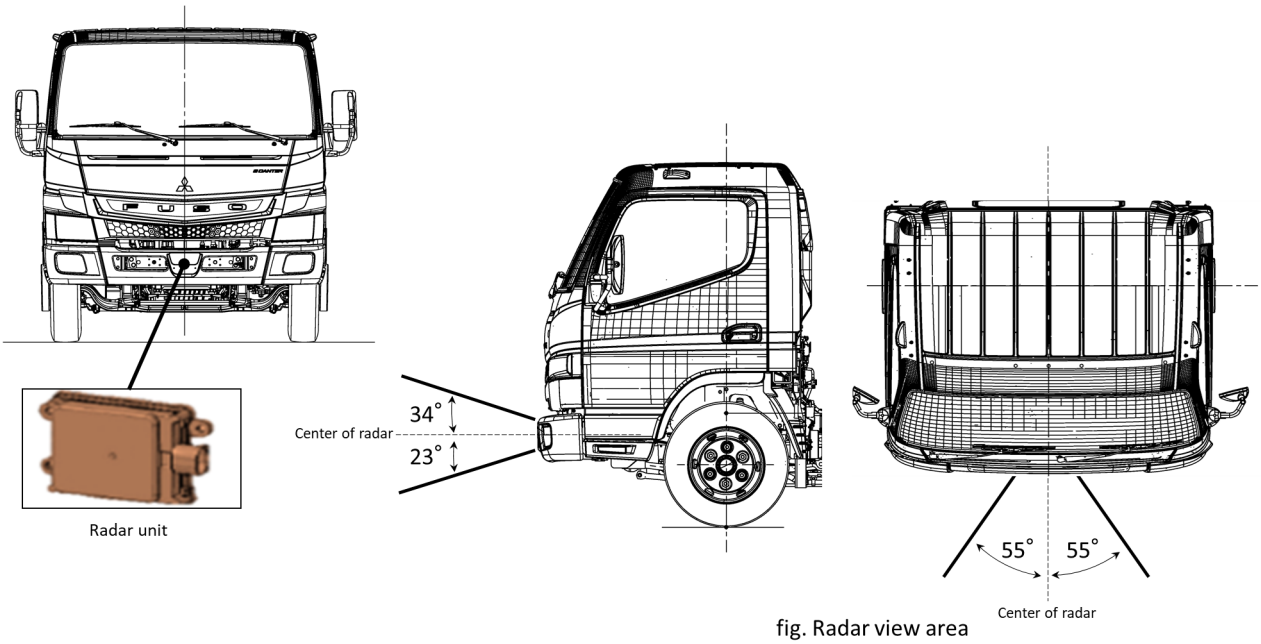


fig. Radar view area

3.11 Lane Departure Warning System (LDWS)

The lane departure warning system alerts the driver with a warning display and buzzer if the driver has left their lane unintentionally.

- Place the starter switch in the "OFF" position before disconnecting the harness connector of the system control unit.
- For precautions when performing electric welding, refer to 5.2 "Welding work" ▷ 5.2
- Camera unit may cause trouble if repainted.
  Mask camera unit before starting painting to protect them against paint spray.
- Check if lane detection is displayed to meter cluster correctly if camera unit removed.
  (Clear lane marking and vehicle speed is over 60km/h).
  Contact a MITSUBISHI FUSO authorized Distributor if lane cannot be detected.
- Change to new camera unit if camera get damaged due to fallen
- Do not put any equipment in front of camera view area (fig. radar view area).

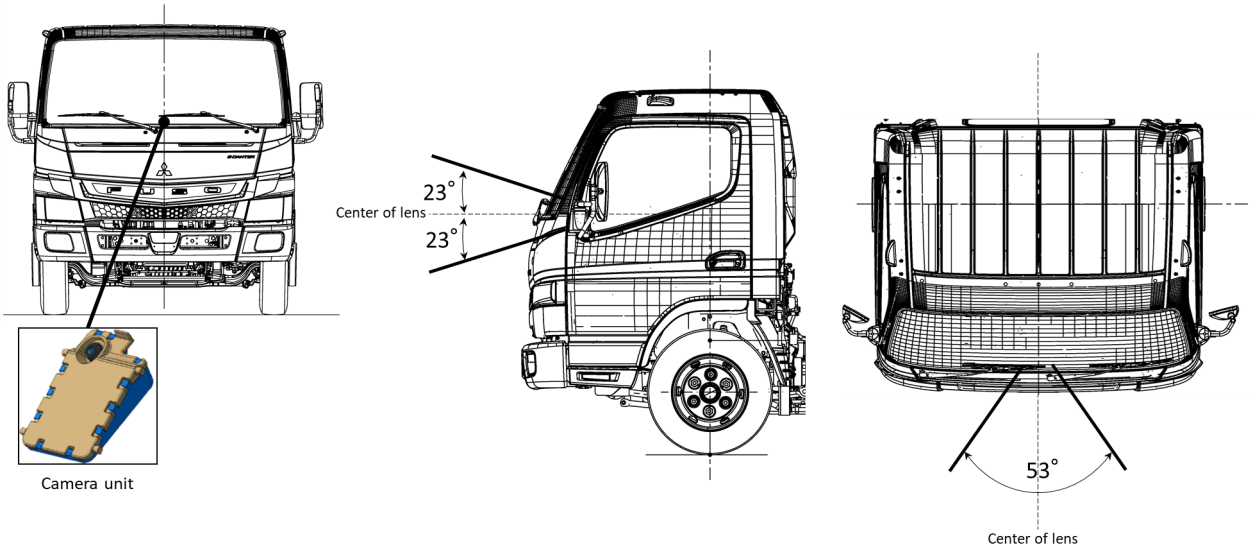


fig. camera view area

3.12 Active Sideguard Assist (BSA)

Active sideguard assist alerts the driver with a collision warning lamp, a warning display and buzzer if the side millimeter wave radar detects any objects within the expected vehicle passing range when turning left or changing lanes.

Preparations

- Turn the starter switch to OFF when performing installation work that involves electric welding.
- Disconnect the negative terminal (-) of the battery cable.
- Ground the welding machine near the welded section.

When painting

Mask radar unit before starting painting to protect it against paint spray.

Removal of the radar unit

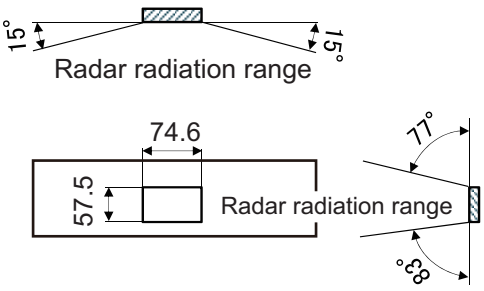
Do not remove the radar unit.
If the radar unit is removed, be sure to consult an authorized MITSUBISHI FUSO distributor or dealer to have the calibration of radar.

When dropped

A radar unit is precision equipment. If it is subjected to impact by dropping, etc., replace it.

Equipment

Do not put any equipment (including side guards) in the radiation range of the radar unit. It may cause a false alarm or malfunction.



Radar radiation range toward surface

3.13 Optional equipment

⚠ Risk of accident and injury

The use of parts, assemblies or conversion parts and accessories which have not been approved may jeopardize the safety of the vehicle.

Before installing any attachments, special-purpose bodies, equipment or carrying out any modifications to the basic vehicle and/or its assemblies, you must read the relevant sections of the vehicle Instruction Manual, as well as the operating and assembly instructions issued by the manufacturer of the accessories and items of optional equipment.

You could otherwise fail to recognize dangers, which could result in injury to yourself or others.

MITSUBISHI FUSO recommends using equipment available as option codes to adapt the vehicle to the body optimally.

All code-specific special equipment is available from your MITSUBISHI FUSO authorized Distributer or from body manufacturer advisors ▷ 2.2.

Optional equipment (e.g. , auxiliary tanks, anti-roll bars, etc.) or retrofitted equipment increases the unladen weight of the vehicle.

When chassis are fitted with different springs or tire sizes, the frame height can change considerably in both the laden and unladen state.

The actual vehicle weight and axle loads must be determined by weighing before mounting.

Not all optional equipment can be installed in any vehicle without problems. This applies, in particular, for retrofitted equipment because the installation space may already be occupied by other components or the special equipment may require other components.

If the current value falls outside the specified range when body building and modification work are performed for electrical parts, a fault is detected, causing a warning lamp to go on and remain on or a function not to operate.

- If an electrical part is to be added or a lamp is to be replaced with an LED lamp, the current value of the electrical part should be ensured to fall within a specified range. This is, however, does not guarantee that the electrical part to be mounted will be fully operational when its current value falls within the specified range.
- For the specified current value, ask your MITSUBISHI FUSO Service Center or body manufacturer advisors ▷ 2.2.
- Some electrical parts to be mounted require that the SAM control unit parameters be changed. For the electrical parts to be mounted, see 8.1.2 SAM-related parts ▷ 8.1.2. Ask your MITSUBISHI FUSO Service Center.
- When adding or replacing a lighting unit, be sure to mount one that complies with the applicable laws and regulations, and observe the regulations governing visibility.

4.1 Vehicle overhang and technical wheelbases

Risk of accident

The body must be designed in such a way that a placing of excessive load weight at the rear is prevented. It is important to comply with the points listed below, otherwise the necessary steering and braking forces for safe vehicle operation cannot be transferred to the road.

- When calculating the length of the vehicle overhang, always take into account the permissible axle loads and the minimum front axle load.
- Comply with the minimum front axle load ▷ 4.3.
- Take the weight of special equipment into consideration when making calculations.

4.1 Vehicle overhang and technical wheelbases

4.1.1 Maximum vehicle overhangs

	Maximum vehicle overhang (U)
Van body	65% of wheelbase
Except Van body	50% of wheelbase

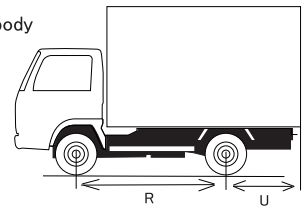
Van body: Body that does not accept load jutting out in the rear of vehicle

Example: Van body, lorry, etc.

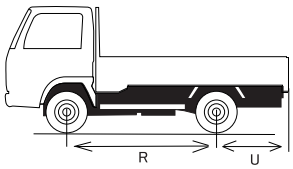
Additional information

All national laws, directives and registration requirements must be complied with.

Van body



Except Van body



R=Wheel base
U=Rear over hang

4.2 Weight distribution, CoG height, anti-roll bars

⚠ Risk of accident

The body must be designed in such a way that a placing of excessive load weight at the rear is prevented. It is important to comply with the points listed below, otherwise the necessary steering and braking forces for safe vehicle operation cannot be transferred to the road.

4.2.1 Weight distribution

Avoid one-sided weight distribution.

The wheel load (1/2 the axle load) may be exceeded by no more than 4%. Observe the tire load capacity.

Example:

- Permissible axle load 5,000 kg
- Permissible wheel load distribution 2,600 kg to 2,400 kg

4.2.2 CoG height

For approval of the vehicle with body/implements mounted, a calculation of the height of the center of gravity of the laden vehicle must be submitted in accordance with EC Brakes Directive 71/320/EEC. The calculation basis for permissible heights of center of gravity can be requested from the responsible department ▷ 2.2.

For CoG height of the kerb weight, see "10.4 Weight distribution table" ▷ 10.4.

MITSUBISHI FUSO cannot vouch for the handling, braking and steering characteristics of vehicles with attachments, installations or modifications for payloads with unfavourable centers of gravity (e.g. rear-mounted. overheight and side-mounted loads). The vehicle body/equipment manufacturer/ converter is responsible for the safety of the vehicle in the case of these bodies.

4.2.3 Stabilizers roll control

Make sure that the vehicle you are building is correctly equipped. MITSUBISHI FUSO provides stabilizers as factory equipment for different model series, and does not offer optional stabilizers for any model.

4.3 Steerability

Risk of accident

The body must be designed in such a way that a placing of excessive load weight at the rear is prevented. The following points must be complied with otherwise the steering and braking forces necessary for safe driving cannot be transmitted.

To ensure sufficient vehicle steerability, the minimum front axle load (25% of gross vehicle weight) must be maintained under all load conditions. Consult the department responsible in the event of any deviations ▷ 2.2.

Property damage

The permissible front axle load must not be exceeded.

Observe the notes on product safety ▷ 2.3.

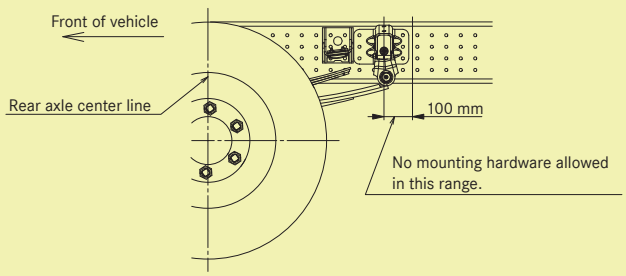
4.4 Clearance for the basic vehicle and bodies

Certain clearances must be maintained in order to ensure the function and operational safety of assemblies.

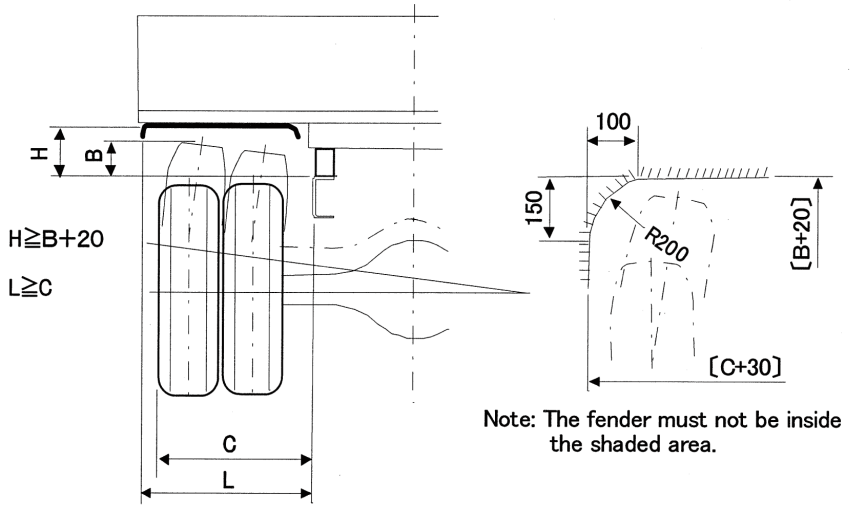
Dimensional data in the body/equipment mounting directives must be observed.

4.4.1 Minimum clearance and notes

The minimum clearance between chassis parts and rear body parts must be kept according to the following table of minimum clearance standard.

Part	Minimum Clearance and Notes
1. Section behind cab	In the section behind the cab, there are a cab tilt locking unit, power steering oil tank, coolant reservoir tank or expansion tank, etc. Ensure there is a clearance of at least 100 mm between the cab and rear body to facilitate trouble-free operation, inspection and filling works. Provide a protector in order to prevent loads from falling from the rear body front window of the dump or other rear body.
2. Areas around engine	Vertical direction 40 mm Lateral direction 30 mm Longitudinal direction 25 mm
3. Clutch and Transmission Assembly	Do not install any rear body part in the area of 100 mm of rear part, because clutch and transmission ass'y is moved backward in the same inclination line of engine, to pull out the clutch spline shaft, when clutch and transmission ass'y is removed from engine.
4. The Surrounding part of Transmission	25 mm at surrounding part of transmission except rear part.
5. Upper part of Transmission	Keep more than 100 mm of clearance between the upper surface of upper cover and the rear body part if possible, because this clearance is used when the transmission upper cover is removed.
6. The surrounding part of the Propeller shaft and the Rear axle	Min. 25 mm of the surrounding part.
7. The brake hose (which connects to the front and rear wheel)	Keep min. 50 mm of clearance at worst. This brake hose is considered to move when vehicle is driven.
8. Other hoses	40 mm
9. Rear springs	The link at the rear end of the main spring may move during traveling. Do not fit any mounting hardware within the range indicated in the figure. 

4.4 Clearance for the basic vehicle and bodies

Part	Minimum Clearance and Notes
10.Space above rear axle	Electrical lines such as the brake hose and wiring harness are laid on top of the rear axle. Provide enough space above the rear axle so that these lines will not come into contact with any of the mounting parts even when the axle is elevated to the highest position. Refer to "Differential and tire bound height" ▷ 10.7.2.
11.Attaching the rear fender	The clearance between the rear fender and tire must be designed to be optimum assuming that the vehicle is traveling in bad conditions. Determine the standard clearance from the fender and top and side surfaces of the frame as follows from dimensions B and C listed in 10.7 "Differential and tire bound height" ▷ 10.7.2. 

4.4 Clearance for the basic vehicle and bodies

<table>
<tr><th>Part</th><th>Minimum Clearance and Notes</th></tr>
<tr><td>12.The exhaust system</td><td>The heat affection and the interference of the exhaust system is a quite important factor in the safety of the vehicle. Keep the clearance between the rear body parts and these parts at least following figures on the table.
Unit: mm
<table>
<tr><th>Parts name</th><th>Minimum Clearance</th></tr>
<tr><td>Fuel hose and pipe</td><td>200</td></tr>
<tr><td>Wiring harness</td><td>150 (*100)</td></tr>
<tr><td>Fuel tank</td><td rowspan="4">150</td></tr>
<tr><td>Battery cable</td></tr>
<tr><td>Rubber parts</td></tr>
<tr><td>Plastic parts</td></tr>
<tr><td>Rear body floor</td><td rowspan="6">100</td></tr>
<tr><td>Brake booster</td></tr>
<tr><td>Brake hose and pipe</td></tr>
<tr><td>Oil pan</td></tr>
<tr><td>Oil pipe</td></tr>
<tr><td>Tire</td></tr>
<tr><td>Vacuum tank</td><td>80</td></tr>
<tr><td>Propeller shaft</td><td rowspan="6">50</td></tr>
<tr><td>Rear axle, Differential</td></tr>
<tr><td>Parking brake cable</td></tr>
<tr><td>Shock absorber bush</td></tr>
<tr><td>Shackle bush</td></tr>
<tr><td>Rear mud guard</td></tr>
<tr><td>Shock absorber</td><td>30</td></tr>
<tr><td>Mounting frame, Additional member etc.</td><td rowspan="2">20</td></tr>
<tr><td>Spring, Axle</td></tr>
</table></td></tr>
</table>

4.4 Clearance for the basic vehicle and bodies

Part	Minimum Clearance and Notes
	For FG models, ensure the clearance around the ATS unit as shown in Fig. 1 and 2.

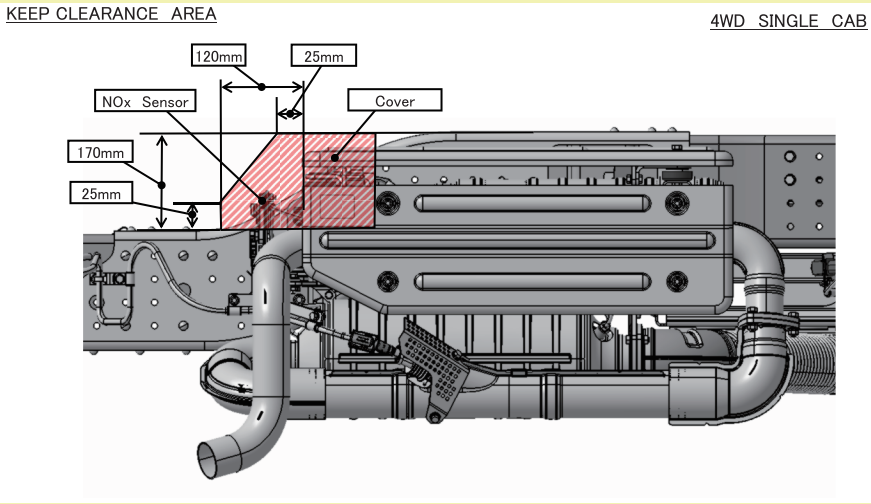


Fig. 1 (Single Cab)

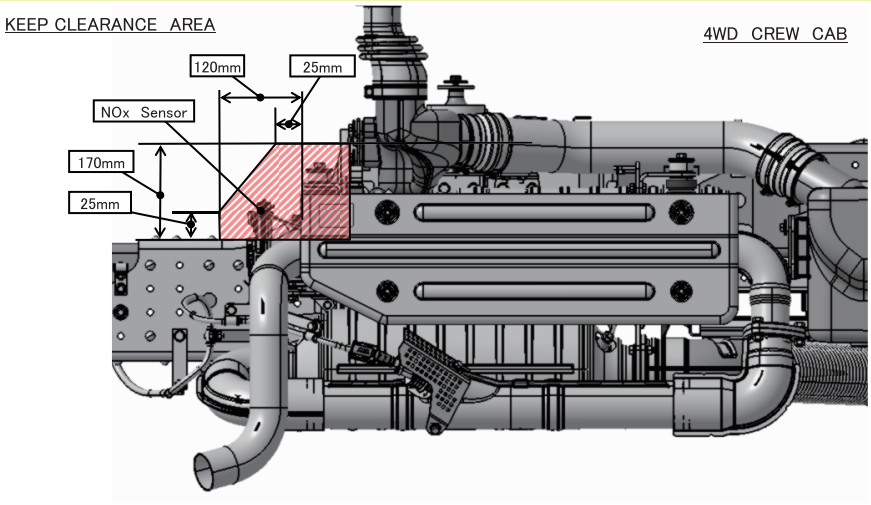


Fig. 2 (Crew Cab)

Note*: When wireharness is covered by heatproof conduit or protection

Do not install a tailpipe under the fuel pipe, hose connection and fuel filter drain tube.

Keep body mounting such as wood and rubber parts away from the muffler built in the emission control system and exhaust pipe by at least 100 mm. If this is impossible, install a heat shield plate to avoid a heat effect and check that there is no safety problem.

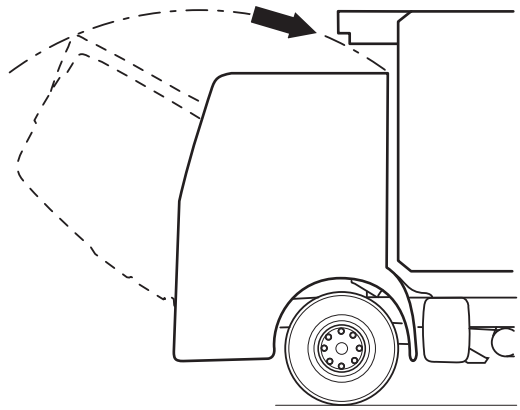
13.Fuel tank	The fuel tank must be mounted so that refilling operations such as opening/closing the filler cap and pouring fuel are not obstructed.
14.Battery	Mounting hardware must be located so that battery removal/installation and inspection as well as battery cover detaching/attaching can be done easily.

Additional information

Read and comply with the relevant sections of the body/equipment mounting directives.

4.4.2 Attachment above cab

- Observe the permissible center of gravity location and the front axle load.
- Make sure that there is sufficient space for tilting Refer to "10.5.1 Chassis cab drawings" ▷ 10.5.1.



N60.80-2157-00

Cab tilting range clearance

4.5 Permissible load on cab roof

When attaching externally mounted parts such as roof deck or ladder onto the roof, take care to prevent the weight of these parts from exceeding 50 kg.

4.6 Vehicle body incline

As far as possible, take steps to ensure that the weight of the body-building part is balanced in the left-right direction. If it is not possible to ensure left-right weight balance, carry out adjustment by adding a counterweight or adding a spacer to the mounting frame, for example.

When carrying out body-building work, be sure to observe the following items in order to ensure that the vehicle does not topple over or become twisted.

- Be sure to carry out the work on flat ground.
- As far as possible, carry out the work with both the front and rear tires on the ground.
- When installing the body, ensure that the chassis is horizontal.
- When installing the body, place it symmetrically on the chassis to prevent it from tilting.

4.6.1 Measuring the tilt of the body

When carrying out body-building work, measure the tilt of the body shown below. If the tilt of the body of the completed vehicle when empty exceeds the target value, correct it.

- Front tilt: ΔHf
  Left-right difference at the headlamp center height "Fig. 1 Front view"
  ΔHf = H1 – H2
  Target: | ΔHf | ≤ 10 mm
- Rear tilt: ΔHr
  Left-right difference at the stop lamp center height "Fig. 2 Rear view"
  ΔHr = h1 – h2
  Target: | ΔHr | ≤ 10 mm
- Twisting in the longitudinal direction of the vehicle: Tw
  Tw = ΔHf – ΔHr = (H1 – H2) – (h1 – h2)
  Target: | Tw | ≤ 10 mm

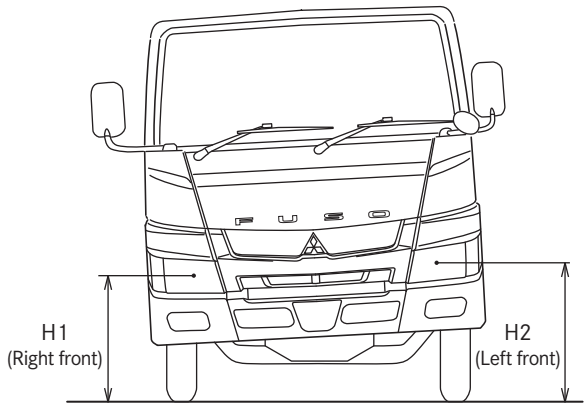


Fig. 1 Front view

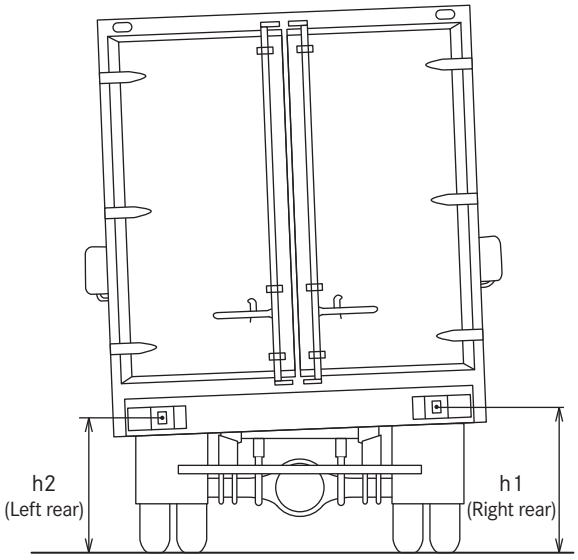


Fig. 2 Rear view

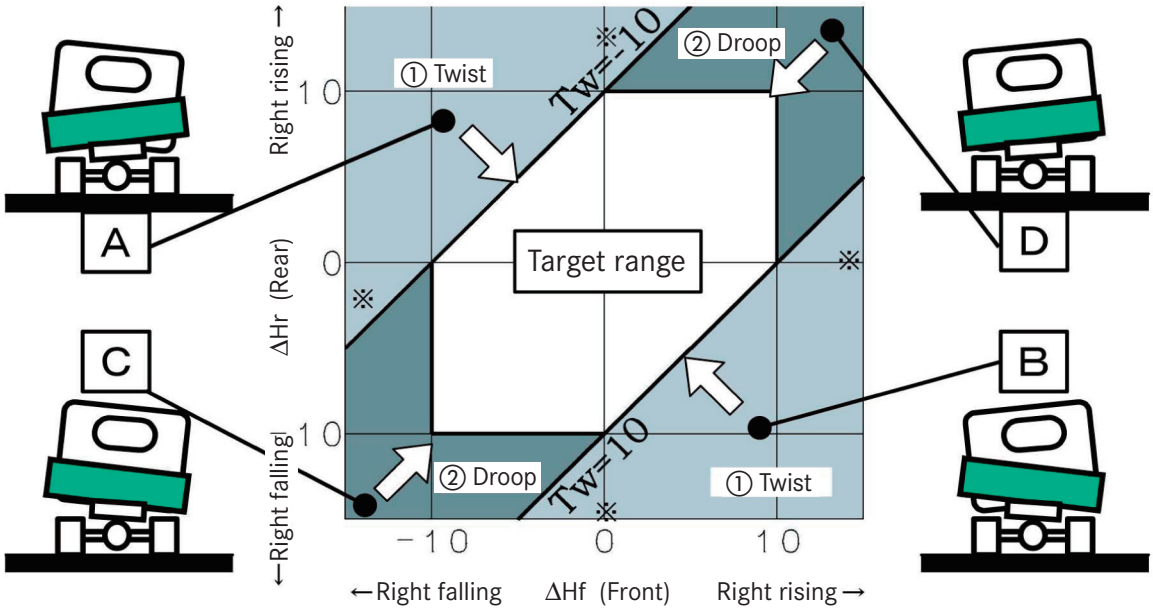
4.6.2 Correction method

The correction method differs depending upon the posture of the actual vehicle.

Check to see which condition of A to D shown in the graph below the measurement results correspond to, and then carry out correction as follows. (Note that if you carry out a different kind of correction, the results may actually become worse.)

Note: Measure the tilt of the body with the body-building part mounted.

Body posture and applicable correction method



Twist correction (In the case of A and B: | Tw | > 10 mm)

When clamping the body-building part, the twist can be corrected by applying a twist to the chassis in the opposite direction.

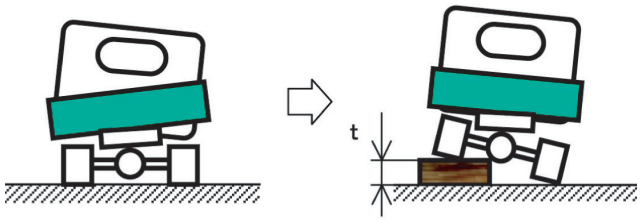
- Place chocks firmly beneath the front wheels.
- In the case of A (Tw < –10), place the left rear wheel on a plate of thickness t corresponding to the amount of twist. In the case of B (Tw > 10), place the right rear wheel on the plate.

Amount of lift-up of the wheel on one side for correcting twist

Unit: mm

Twist "| Tw |"	Plate thickness (lift-up) "t"
10 to 15	100
15 to 20	150

(Lift-up on one side is also permissible.)



- After clamping the body-building part, first slacken all of the clamping bolts. (Take care to ensure that it is safe.)
- Lift the tire onto the plate, and then once again tighten the clamping bolts.
- Lower the tire from the plate, and confirm that there is no looseness in the clamped part or any other part.

Note: In the case of a vehicle whose initial posture corresponds to the vicinity of one of the ※ marks indicated in the diagram "Body posture and applicable correction method" on ▷ 4.6.2 (body is both tilted and twisted), the posture after this correction has been carried out sometimes becomes condition C or D. In such a case, proceed with tilt correction.

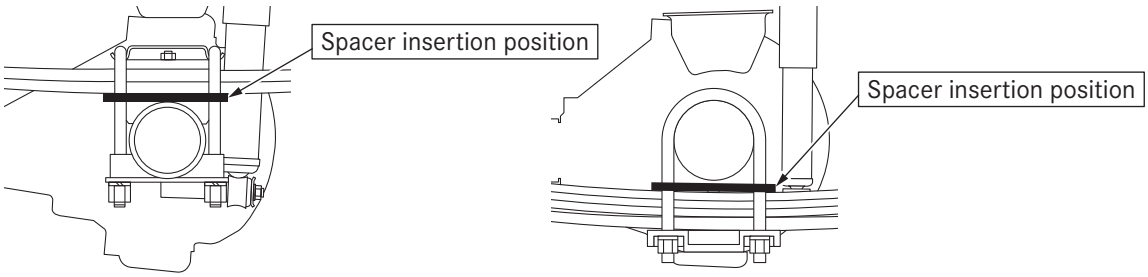
Tilt correction (C and D: | ΔHf | > 10 mm, or | ΔHr | > 10 mm)

With the body-building part clamped to the vehicle, insert a spacer between the axle spring washer and the spring.

By inserting a spacer at either the front wheel or the rear wheel, both the front and rear of the vehicle will be corrected. First, insert a spacer at the rear wheel, and only if correction is insufficient insert a spacer at the front wheel as well.

Note: Regarding the implementation of the following work, please consult with your local MITSUBISHI FUSO dealer.

- Place chocks beneath the front wheels, then jack up the rear axle in order to firmly support the frame or the body-building part.
- Note that the spacer insertion position for an over-slung vehicle (spring is above the axle) is different from that for an under-slung vehicle (spring is beneath the axle).



Over-slung vehicle

Under-slung vehicle

- Remove the center bolt of the spring, then while referring to the table below select a suitable number of spacers, insert them, and retighten the center bolt to the specified torque.

Note: If the length of the center bolt is insufficient, replace the bolt with one that is between one and two orders longer.

Number of spacers to be inserted in order to correct tilt

Unit: mm

Tilt | Hf | or | Hr |	Number of spacers
10 to 14	1
14 to 18	2

Spacer part number and insertion position

Vehicle model	Spacer part number (All t = 4.5)	Insertion position of rear wheel spacer	
		In the case of C (Right falling)	In the case of D (Right rising)
FEA	MB161772	Above left spring	Above right spring
FEB		Below right spring	Below left spring
FEA5, FEB7, FEC, FGB	MB161776	Below right spring	Below left spring

- Clamp the spring to the axle by tightening the U-bolt to the specified torque.

Additional information

If the length of the U-bolt is insufficient, replace the bolt with one which is between one and two sizes longer.

Additional information

- The center bolt for the spring does not need to be loosened.
- If the length of the center bolt is insufficient, replace the bolt with one which is between one and two sizes longer.

- Re-check the tilt, and if the amount of correction is insufficient, insert a spacer at the front wheel as well.
  - Place chocks beneath the rear wheels, then jack up the rear axle in order to firmly support the frame.
  - Insert a spacer (MC110153) between the front axle and the left or right front wheel, whichever is lower (the tilt will be corrected by approximately 5 mm).

If it is still necessary to correct the vehicle tilt even after performing the above corrective procedure, please contact the department responsible.

▷ 2.2

4.7 Others

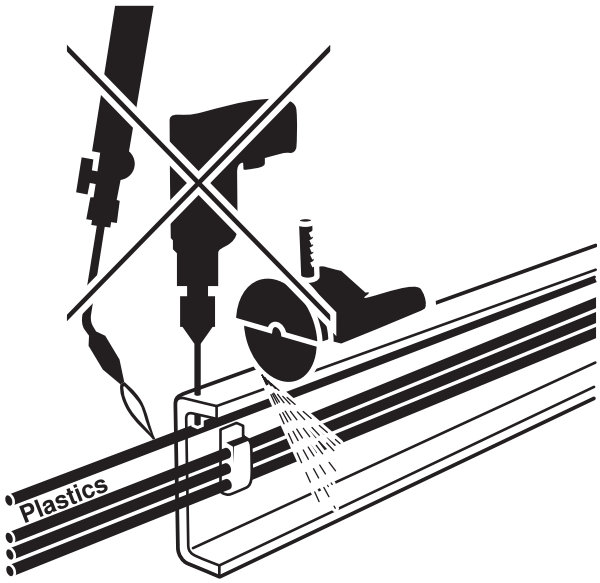
4.7.1 Maximum rear body width <Exclude to Mexico>

The maximum limits on the rear body width is prescribed in the local laws and regulations.
There is a limitation on rear body width for outside Mirror and Lamps.

5.1 Brake hoses/cables and lines

⚠ Risk of accident

Work carried out incorrectly on the brake hoses, cables and lines may impair their function. This may lead to the failure of components or parts relevant to safety.



N00.01-2285-00

- Fuel and hydraulic lines and brake hoses must be covered or removed if necessary before carrying out any welding, drilling and grinding work and before working with cutting disks.
- After installing, fuel lines, hydraulic lines and brake hoses, the system must be tested for pressure loss and leaks.
- No other lines may be attached to brake hoses.
- Lines must be protected from heat by means of appropriate insulation.
- Line routing must be designed to prevent any increase in pressure loss.

Comply with all national regulations and laws.

ⓘ Additional information

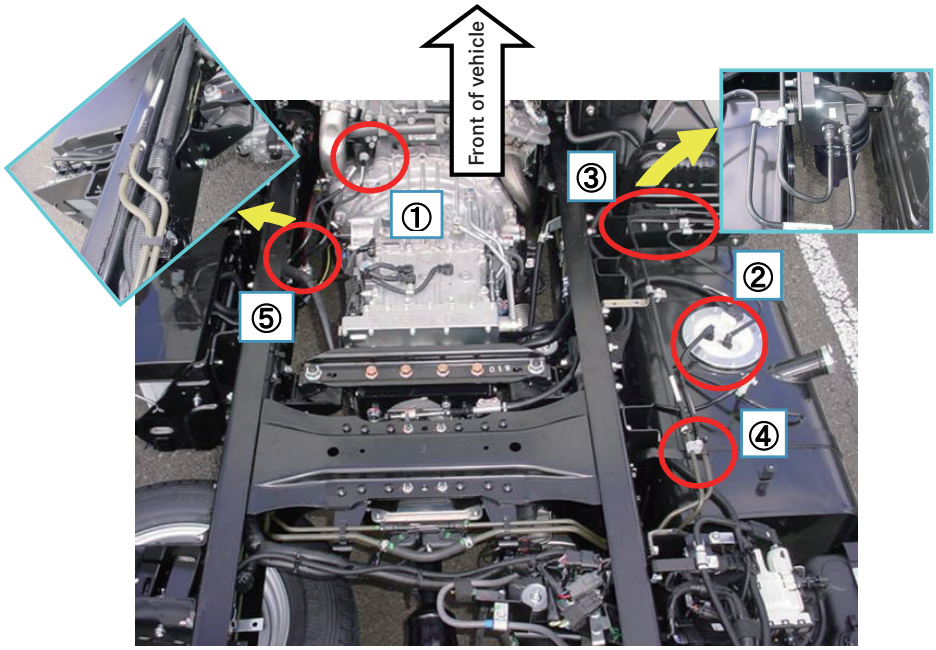
Further information on brake hoses can be found in 6.13 "Brake systems" ▷ 6.13.

5.1 Brake hoses/cables and lines

Precautions for carrying out body building and modification work

Before carrying out work near the parts indicated below, secure a place to stand on other than the vehicle itself. During the work, take care not to pull on the fuel hose or place it where it is likely to be pulled, otherwise fuel will leak from those parts.
In the event that you inadvertently place your foot on, or pull, any of the parts indicated below, start the engine of the vehicle before shipping it from the factory, and then confirm that there is no leakage.

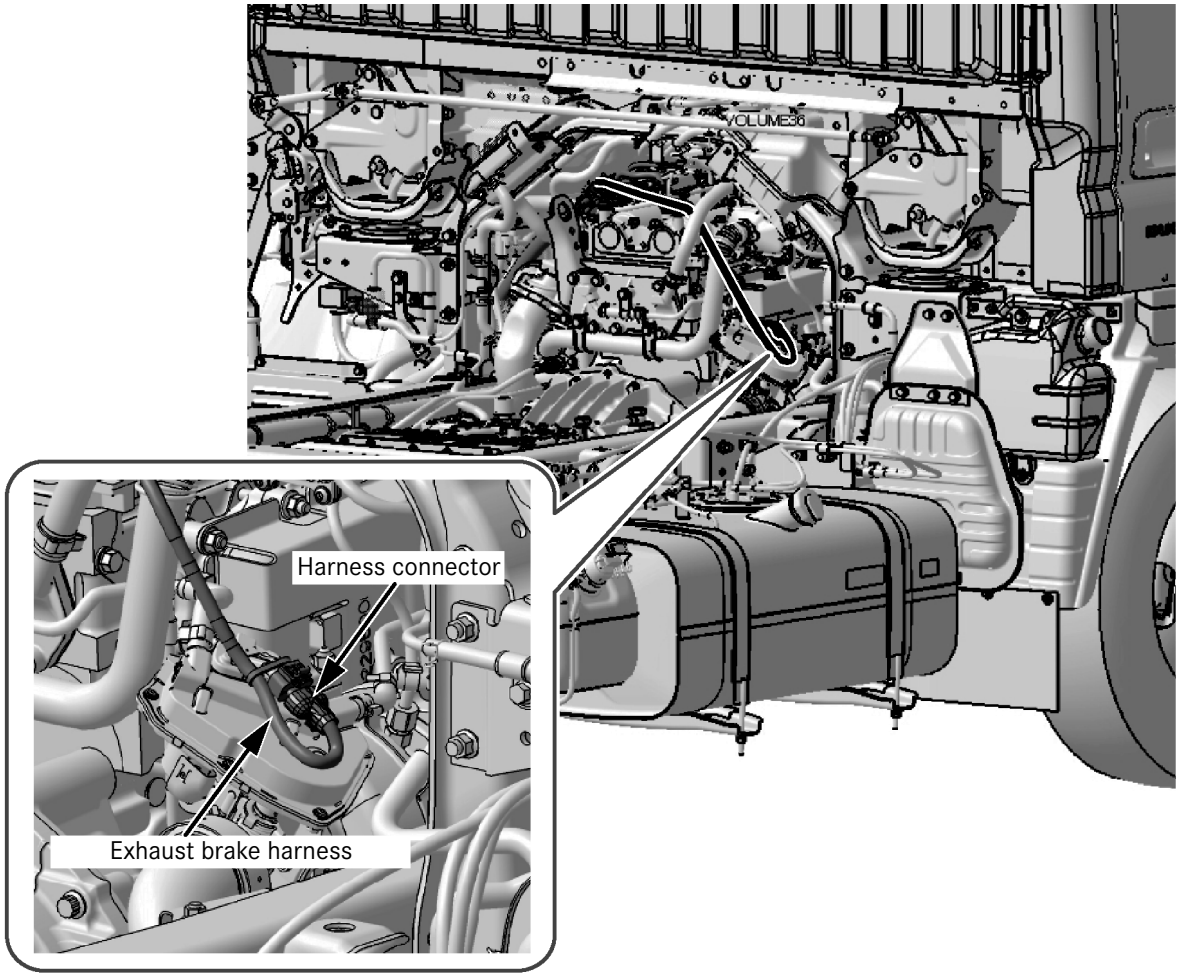
Examples of fuel leakage and parts where leakage occurred



	Part	Precaution
①	Fuel connector at left rear of the engine	• Do not place your foot on the top of the engine. • Do not pull the fuel hose.
②	Top of the fuel tank	• Do not place your foot on the fuel tank.
③	Fuel filter connection part	• Do not place your foot on the fuel hose.
④	Vicinity of the fuel tank and the fuel filter	• Do not place your foot on the fuel hose.
⑤	Intermediate connector of the fuel system on the left side face of the transmission	• Do not place your foot on the fuel hose. • Do not pull the fuel hose.

5.1 Brake hoses/cables and lines

When body-building a single cab vehicle, do not pull on the exhaust brake harness, or place your foot on or stand on the connection part of a connector. This may damage the exhaust brake harness connector or cause the connector to drop out.



5.2 Welding work

⚠ Risk of injury

Welding work in the vicinity of the airbags can cause the restraint system to malfunction.

Welding work near the airbags is strictly forbidden.

The airbag could be triggered or may no longer function correctly.

! Property damage

Do not connect the arc welder ground clamp to assemblies such as the engine, transmission or axles.

Welding work is not permitted on assemblies such as the engine, transmission, axles, etc.

The legal stipulations regarding the transport and storage of airbag units must be observed.

All laws governing explosive substances must be complied with.

The following safety measures must be observed to prevent damage to components caused by overvoltage during welding work:

- Disconnect the positive and negative terminals from the battery and cover them.
- Connect the welding-unit ground terminal directly to the part to be welded.
- Do not touch electronic component housings (e.g. control modules) and electric lines with the welding electrode or the ground contact clamp of the welding unit.
- Before welding, cover spring to protect them from welding spatter. Do not touch springs with welding electrodes or welding tongs.
- Cover the fuel tank and fuel system (lines, etc.) before carrying out welding work.
- Avoid welding work on inaccessible cavities in the cab.
- Welds must be ground down and reinforced with angular profiles to prevent notching from welding penetration.
- Avoid welds in bends.
- The distance from a weld to the outer edge should always be at least 15 mm.
- Avoid defects such as deposited metal cracking, toe crack, blow holes, slag inclusion, under cut, poor penetration, etc.

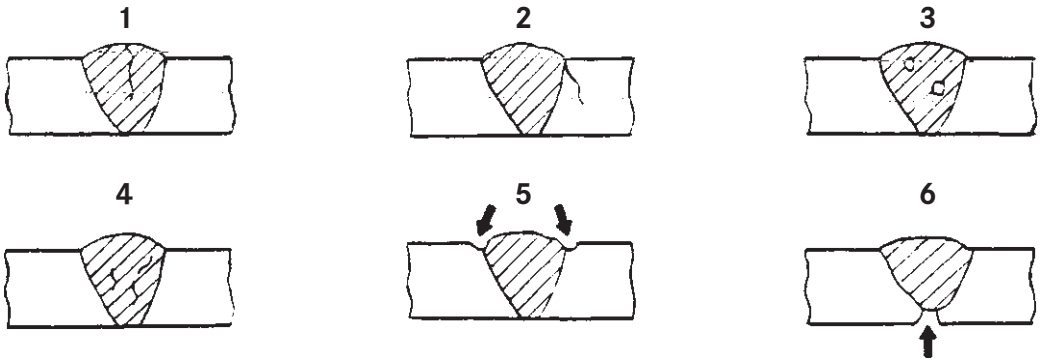


Fig. 1

1 Deposited metal cracking
2 Toe crack
3 Blow hole
4 Slag inclusion
5 Under cut
6 Poor penetration

Additional information

Additional information on welded connections can be found in Section 6 "Modifications to the basic vehicles" ▷ 6.1 and Section 8 "Electrics/electronics" ▷ 8.1.

The following safety measures must be observed to prevent damage to welding parts;

- Do not weld any item to the frame to hold it temporarily.
- Clean parts thoroughly with a wire brush and dry them off before welding.
- Make sure the paint is completely removed, before welding a painted part.
- 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.
- When welding, maintain the optimum welding speed and conditions for the preservation of the welding electrode.
- Maintain the welding current at the optimum value for safety.
- Make several short welding beads rather than one long bead.
- Make symmetrical beads to limit shrinkage.
- Avoid more than 3 welds at any one point.
- Avoid welding in strain hardened zones.
- 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.
- When performing welding work on the chassis, take proper measure to prevent the tubes, harnesses, rubber parts, springs, etc. from heat or spatter.
- Do not cool parts off with water after welding.

Risk of accident and injury

Before performing electric of arc welding as part of vehicle repair operation, disconnect the negative (-) cable from the battery. The ground cable of the welding machine should be connected to a point as close to the welding area as possible.

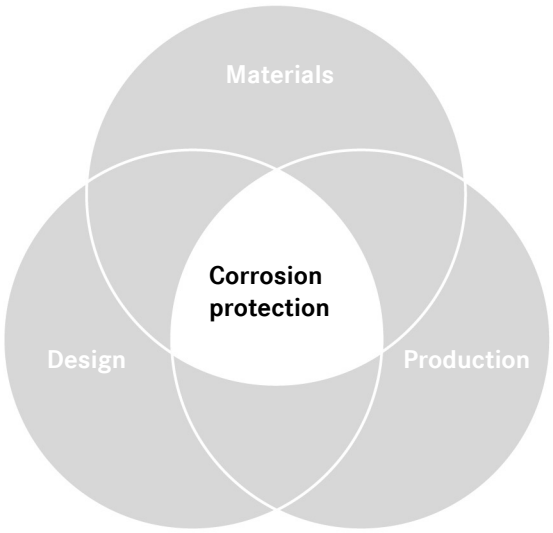
5.3 Corrosion protection measures

General

In order to preserve the durability and quality standard of the vehicle, measures must be taken to protect it against corrosion when the vehicle is modified and after installing bodies and fittings.

Information on the design, execution of work and the requirements of the materials and components to be used with regard to corrosion protection is listed below.

To achieve good corrosion protection, the areas of design (1), production (2) and materials (3) must be perfectly matched.



N97.00-2015-00

Optimum corrosion protection

5.3 Corrosion protection measures

Disassembly of components

If the body manufacturer makes structural modifications to the chassis, the corrosion protection in the affected areas must be restored to match the production standards of MITSUBISHI FUSO. The areas must also be finished with appropriate paintwork. Information on approved MITSUBISHI FUSO refinishing paint suppliers is available on request from the responsible department ▷ 2.2.

Damage to components

If components are damaged during disassembly (scratches, scuff marks), they must be professionally repaired. This applies especially for drilled holes and openings. Two-component epoxy primers are particularly suitable for repair work.

Cutting of components

When cutting and grinding work is carried out, the adjacent painted components must be protected against flying sparks and shavings. Grinding dust and shavings must be carefully removed because these contaminants can spread corrosion. Edges and drilled holes must be cleanly deburred in order to guarantee optimum corrosion protection.

Corrosion protection on reinforcements and fittings

Reinforcements and fittings must receive adequate anti-corrosion priming prior to installation. In addition to galvanising, cataphoretic dip-priming and zinc-rich paint in sufficient coatings have proved satisfactory for this purpose.

5.3 Corrosion protection measures

Corrosion prevention in welding work

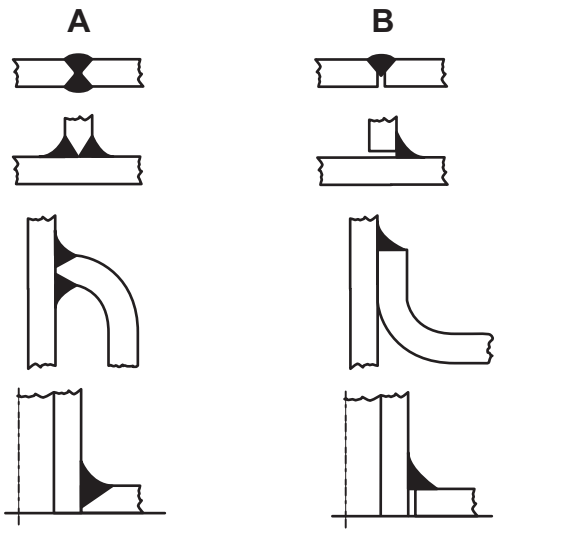
In order to avoid crevice corrosion at weld seams, the welds should be made in accordance with the examples shown.

Preparation

The welding area must be free from corrosion, grease, dirt or similar contamination. If painted surfaces are to be welded, the paint coat must first be removed by grinding or chemical stripping. If this is not done, the paint will burn and the residues can impair corrosion resistance.

After welding work

- Remove drilling shavings.
- Deburr sharp edges.
- Remove any burned paint and thoroughly prepare surfaces for painting.
- Prime and paint all unprotected parts.
- Preserve cavities with wax preservative.
- Carry out corrosion protection measures on the underbody and frame parts.



N31.00-2094-00

Example: Weld seams

A – Suitable
B – Unsuitable

Additional information

Plug and slot welds, particularly on horizontal surfaces, should be avoided due to the risk of corrosion. If they are unavoidable, these welds must receive additional preservation. Furthermore, avoid designs which allow moisture to accumulate. These must be fitted with additional drainage holes or gaps in the weld seam.

5.4 Bolted connections

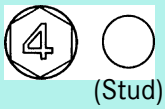
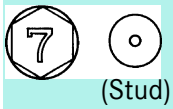
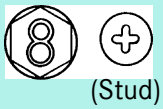
Use the specified bolts and nuts. Unless otherwise specified, tighten to the torques shown in the table below.

Make sure that the thread and washer are dry when tightening.

If strength categories differ between a nut and bolt (or stud bolt), tighten the nut to the torque specified for the bolt.

- Hexagon bolt and stud bolt

Unit: N·m {kgf·m}

Strength category	4T		7T		8T	
Indication / Nominal diameter mm	 (Stud)		 (Stud)		 (Stud)	
M5	2 to 3 {0.2 to 0.3}	–	4 to 6 {0.4 to 0.6}	–	5 to 7 {0.5 to 0.7}	–
M6	4 to 6 {0.4 to 0.6}	–	7 to 10 {0.7 to 1.0}	–	8 to 12 {0.8 to 1.2}	–
M8	9 to 13 {0.9 to 1.3}	–	16 to 24 {1.7 to 2.5}	–	19 to 28 {2.0 to 2.9}	–
M10	18 to 27 {1.8 to 2.7}	17 to 25 {1.8 to 2.6}	34 to 50 {3.5 to 5.1}	32 to 48 {3.3 to 4.9}	45 to 60 {4.5 to 6.0}	37 to 55 {3.8 to 5.7}
M12	34 to 50 {3.4 to 5.1}	31 to 45 {3.1 to 4.6}	70 to 90 {7.0 to 9.5}	65 to 85 {6.5 to 8.5}	80 to 105 {8.5 to 11}	75 to 95 {7.5 to 10}
M14	60 to 80 {6.0 to 8.0}	55 to 75 {5.5 to 7.5}	110 to 150 {11 to 15}	100 to 140 {11 to 14}	130 to 170 {13 to 17}	120 to 160 {12 to 16}
M16	90 to 120 {9.0 to 12}	90 to 110 {9 to 11}	170 to 220 {17 to 23}	160 to 210 {16 to 21}	200 to 260 {20 to 27}	190 to 240 {19 to 25}
M18	130 to 170 {14 to 18}	120 to 150 {12 to 16}	250 to 330 {25 to 33}	220 to 290 {22 to 30}	290 to 380 {30 to 39}	250 to 340 {26 to 35}
M20	180 to 240 {19 to 25}	170 to 220 {17 to 22}	340 to 460 {35 to 47}	310 to 410 {32 to 42}	400 to 530 {41 to 55}	360 to 480 {37 to 49}
M22	250 to 330 {25 to 33}	230 to 300 {23 to 30}	460 to 620 {47 to 63}	420 to 560 {43 to 57}	540 to 720 {55 to 73}	490 to 650 {50 to 67}
M24	320 to 430 {33 to 44}	290 to 380 {29 to 39}	600 to 810 {62 to 83}	540 to 720 {55 to 73}	700 to 940 {72 to 96}	620 to 830 {63 to 85}

- Hexagon flange bolt

Unit: N·m {kgf·m}

Strength category	4T		7T		8T	
Indication / Nominal diameter mm						
M6	4 to 6 {0.4 to 0.6}	–	8 to 12 {0.8 to 1.2}	–	10 to 14 {1.0 to 1.4}	–
M8	10 to 15 {1.0 to 1.5}	–	19 to 28 {2.0 to 2.9}	–	22 to 33 {2.3 to 3.3}	–
M10	21 to 30 {2.1 to 3.1}	20 to 29 {2.0 to 3.0}	45 to 55 {4.5 to 5.5}	37 to 54 {3.8 to 5.6}	50 to 65 {5.0 to 6.5}	50 to 60 {5.0 to 6.5}
M12	38 to 56 {3.8 to 5.5}	35 to 51 {3.5 to 5.2}	80 to 105 {8.0 to 10.5}	70 to 95 {7.0 to 9.5}	90 to 120 {9 to 12}	85 to 110 {8.5 to 11}

- Hexagon nut

Unit: N·m {kgf·m}

Strength category	4T		6T	
Indication / Nominal diameter mm				
	Standard thread	Coarse thread	Standard thread	Coarse thread
M5	2 to 3 {0.2 to 0.3}	–	4 to 6 {0.4 to 0.6}	–
M6	4 to 6 {0.4 to 0.6}	–	7 to 10 {0.7 to 1.0}	–
M8	9 to 13 {0.9 to 1.3}	–	17 to 24 {1.7 to 2.5}	–
M10	18 to 27 {1.8 to 2.7}	17 to 25 {1.8 to 2.6}	34 to 50 {3.5 to 5.1}	32 to 48 {3.3 to 4.9}
M12	34 to 50 {3.4 to 5.1}	31 to 45 {3.1 to 4.6}	70 to 90 {7.0 to 9.5}	65 to 85 {6.5 to 8.5}
M14	60 to 80 {6.0 to 8.0}	55 to 75 {5.5 to 7.5}	110 to 150 {11 to 15}	100 to 140 {11 to 14}
M16	90 to 120 {9.5 to 12}	90 to 110 {9 to 11}	170 to 220 {17 to 23}	160 to 210 {16 to 21}
M18	130 to 170 {14 to 18}	120 to 150 {12 to 16}	250 to 330 {25 to 33}	220 to 290 {22 to 30}
M20	180 to 240 {19 to 25}	170 to 220 {17 to 22}	340 to 460 {35 to 47}	320 to 410 {32 to 42}
M22	250 to 330 {25 to 33}	230 to 300 {23 to 30}	460 to 620 {47 to 63}	420 to 560 {43 to 57}
M24	320 to 430 {33 to 44}	290 to 380 {29 to 39}	600 to 810 {62 to 83}	540 to 720 {55 to 73}

- Hexagon flange nut

Unit: N·m {kgf·m}

Strength category	4T	
Indication / Nominal diameter mm		
	Standard thread	Coarse thread
M6	4 to 6 {0.4 to 0.6}	–
M8	10 to 15 {1.0 to 1.5}	–
M10	21 to 31 {2.1 to 3.1}	20 to 29 {2.0 to 3.0}
M12	38 to 56 {3.8 to 5.5}	35 to 51 {3.5 to 5.2}

5.4 Bolted connections

Preventing contact corrosion

Direct contact between materials with different electrode potentials can lead to corrosion of the less noble material when exposed to moisture and salt ions.

When selecting materials, avoid the following combinations:

- Chrome/nickel-steel with aluminium
- Chrome/nickel-steel with zinc-coated steel

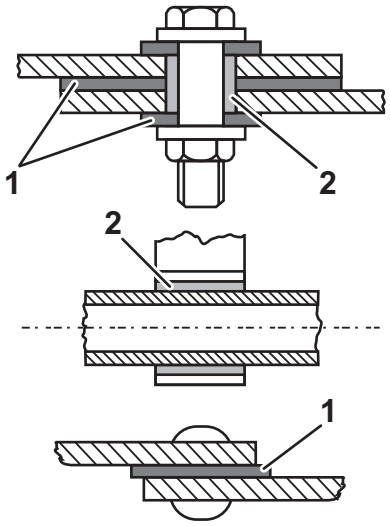
Insulation by coating

Contact corrosion can be prevented by using insulation such as washers, sleeves or bushings. Even in this case, however, the connecting points must not be persistently exposed to moisture.

Vehicle cleaning and care

When the vehicle is handed over to the body manufacturer, it must immediately be cleaned of salt and dirt. If it is to be stored for some time, the vehicle must be preserved.

During modification it must be ensured that load-bearing components are additionally protected against aggressive chemicals and environmental influences. If the vehicle comes into contact with chemicals or salts (e.g. snow-clearing operations), it must be cleaned thoroughly at regular intervals.



N31.00-2093-00

1 Insulating washer
2 Insulating sleeve

Property damage

A conductive connection occurs if two different metals are brought into contact with each other through an electrolyte (e.g. air humidity). This causes electrochemical corrosion and the less base of the two metals is damaged. The further apart the two metals are in the electrochemical potential series, the more intense electrochemical corrosion becomes.

For this reason, electrochemical corrosion must be prevented by insulation or by treating the components accordingly, or it can be minimized by selecting suitable materials.

5.5 Painting work

Environmental note

Paints and lacquers are harmful to health and to the environment if they are not handled correctly.

Dispose of paints and lacquers in an environmentally responsible manner.

General precautions

- If you removed parts, be sure to re-install them in their original positions.
- If you removed any labels, obtain new labels and apply them to the same positions from which you removed the old labels.
- Paint compatibility should be checked when repainting. In order to avoid color variations on painted bodies, MITSUBISHI FUSO recommends that paints be used only if they have been tested and approved for the vehicle model in question. There may be paint colors and parts not available for some vehicle types. Contact the MITSUBISHI FUSO authorized Distributer to confirm which colors or parts are available for the vehicle.

5.5.1 Areas which must not be repainted

S

If you repaint the following parts and areas, trouble may occur. For this reason, before repainting the body areas or nearby engine, apply masking tape or other protective material to these areas and engine to prevent them from being exposed to paint.

If you removed parts, be sure to re-install them in their original positions. Also, if you removed any labels, obtain new labels and apply them to the same positions from which you removed the old labels.

- Sealing surfaces
- Windows
- Cotact areas between the wheels and wheel hubs, contact areas between the disk wheels of the double tires
- Contact areas for wheel nuts
- Brake hose and brake associated parts
- Various vinyl tubes and identification tape
- Breathers on transmission, axles, etc.
- Disk brakes and disk rotors <Vehicle with disk brakes>

L

B

- Inner parts of drum brakes <Vehicle with durm brakes>
- Inner surface of brake drums <Vehicle with durm brakes>
- Contact areas between hubs and brake drums <Vehicle with drum brakes>
- Door locks
- Door retainers in the rear door hinges
- Spring mounting area
- Rubber hoses
- Cab suspension, engine, chassis suspension and steering system rubber or plastic parts
- Electric control unit
  TCU (Transmission Control Unit)
  SAM (Body electronics control unit with integrated relay and fuse)
- Electrical wiring and connectors
- Lamps, switches, batteries and other electrical parts, high-voltage equipment and other related parts <HEV>

B

- Drive shaft connecting flange (propeller shaft, PTO output shaft)
- Piston rods for the hydraulic and pneumatic cylinders
- Control valves for the air lines
- Various caution plates and nameplates
- Rubber or polypropylene parts for cab
  - Weatherstrips
  - Outside mirror bodies
  - Mud guard aprons
  - Washer nozzles
  - Splash aprons
  - Mud guards
  - Steps
  - Fenders
  - Runchannels
  - Bumper corner covers
  - Packing rubbers (mirror fitting, antenna fitting, and grip fitting bases)
  - Antenna
  - Radar cover

R

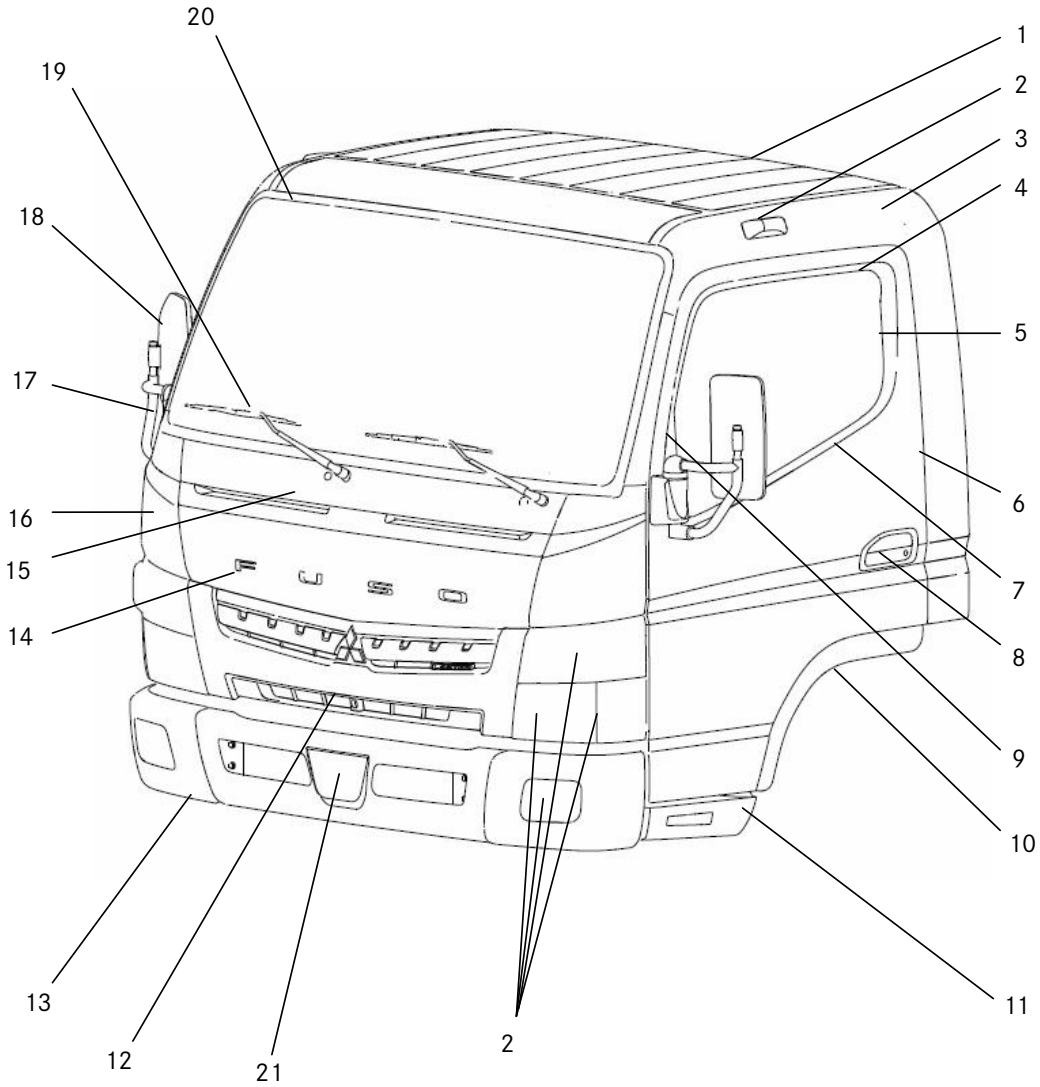
- The following parts should not be repainted for appearance reasons.
  - Emblems (such as FUSO)
  - Outside mirror stays
  - Fenders
  - Wiper arms and blades
  - Antenna and its bracket
  - High-voltage battery box side cover <HEV>

B

5.5.2 Precautions to be observed when drying the paint

- Forced drying
  In order to protect resin and rubber parts, ensure that the temperature of the painted surface does not exceed 80°C.
  If the temperature is likely to exceed 80°C, either remove the following parts or take steps to protect them from heat.

Parts to be removed or shielded from heat when repainting at temperatures exceeding 80°C



1 *Rear window weatherstrip (cab)*
2 *Lamp, etc*
3 *Screw seal Washer*
4 *Door runchannel*
5 *Door sash garnish*
6 *Door weatherstrip*
7 *Door beltline molding*
8 *Door outer handle*
9 *Door delta garnish*
10 *Fender*
11 *Step*
12 *Front grille (Including caps screws for fitting hole in cab)*
13 *Bumper corner cover*
14 *Emblem*
15 *Front cover*
16 *Corner panel including caps for mounting*
17 *Door stay*
18 *Outside mirror*
19 *Wiper*
20 *Windshied weatherstrip*
21 *Radar cover*

- Natural drying
  There is no need to remove resin or rubber parts from the vehicle.

Note 1. Acrylic lacquer type paint may be prone to blistering. For details, ask the paint manufacturer/supplier.

2. Be sure to sand the surfaces before repainting, otherwise the paint film may not adhere well.

5.5.3 Painting vehicles prior to shipment

- Cab

Part name	Painting specifications		
	Body color (color name)	Color code	Paint manufacturer
Outside of cab (body color)	Natural white	AC17031	Kansai Paint
	Sonic blue	CTB10000	Nippon Paint
	Forest green	CTG10058	Nippon Paint
	Arcadia silver	CTH10090	Dai Nippon Toryo
	Light blue	AC17120	Dai Nippon Toryo
	Shannon blue	AC17089	Nippon Paint
	Jupiter green	AC17010	Kansai Paint
	Fiji green	AC17088	Kansai Paint
	Bright orange	AC17024	Kansai Paint
	Mars red	AC17023	Kansai Paint
	Warm silver	AC17130	Dai Nippon Toryo
	Active yellow	CFY10013	Kansai Paint
	Ice blue-silver	CFH10002	Dai Nippon Toryo

- Chassis

Part name	Paint specifications	
Frame	RN chassis black or Emaron MS chassis black	Dai Nippon Toryo
Axles [front and rear]	Chassis Super MZ or chassis black M	Dai Nippon Toryo
Propeller shaft	RM chassis super black	Dai Nippon Toryo
Spring	Spring black No. 1000	Dai Nippon Toryo
Fuel tank	Acrose No. 6000	Dai Nippon Toryo

5.5.4 Repainting of the cab

- When a standard-color-coated cab is repainted, plastic and rubber parts on it should be removed where possible to protect them from adverse effects.

Removable parts	Parts to be masked
• Emblems • Front grille *1 • Corner panels *1 • Front cover • Steps • Fenders • Wipers • Antenna • Lamps • Outside mirrors, mirror stays • Bumper corner covers • Heat protector (at back of cab) • Sealing washers for screws • Radar cover	• Door outer handles • Weatherstrips *2 • Caution labels • Door delta garnish • Door runchannels • Door sash garnish • Door beltline moldings

R

*1 The caps covering the holes in the cab for mounting the radiator grille and corner panels cannot be reused once removed. Replace them with new ones.

Part name	Part No.
Clip	MK676916 (MITSUBISHI FUSO part number)

*2 Before reinstalling removed door weatherstrips, check their plastic clips for deformation in claws and defects preventing smooth insertion. Any defective clips must be replaced with new ones.

Part name	Part No.
Clip	MK402586 (MITSUBISHI FUSO part number)

- Before the cab is shipped from the factory, it is coated with a non-sanding type high-adhesion natural white paint only. However, in order to completely remove oil, grease and other contaminants from the surfaces to be painted, it is recommended that you sand these surfaces.
  Paint other than natural white is not high-adhesion paint. When using paint of a different color, be sure to sand the surfaces to be painted before applying the paint.
  (Sanding procedure: Sand the surfaces uniformly with #400 sandpaper until the gloss disappears from the surface.)

- Repainting the cab
  Paint
  When repainting the cab with lacquer or urethane paint, it is recommended that you use one of the following kinds of paint because it has been confirmed that they form a high-adhesion film even when applied without sanding the surfaces to be painted.

Manufacturer	Name of paint
Kansai Paint	Retan PG80 Retan PG60 Acric #1000
Rock Paint Co., Ltd.	38 Line Co-Rock 79 Line Rock Ace 73 Line Hi Rock 35 Line Rock Lacquer
Isamu Paint Co., Ltd.	AU21 Hi-Art #3000

Manufacturer	Name of paint
Dai Nippon Toryo Co., Ltd.	Auto V Top Monarch Auto Squall Auto Acrose Super Auto Swift Acrytan 1000 T-300LINE
Nippon Paint Co., Ltd.	Nax Mighty Lac Nax Sperio Nax Besta Nippe Acrylic

For brands other than the above, you must confirm whether or not it is necessary to sand the surfaces to be painted, by asking the paint manufacturer, for example.

- Outline of repair-painting using arcadia silver or warm silver paint
  Carry out repair-painting using arcadia silver (CTH10090) or warm silver (AC17130) paint, by means of the following procedure.

Process	Description of work
1. Preparing faulty areas for repainting	Remove graining and runs by wet-rubbing with #400 sandpaper, and after the surface is smooth, finish by wet-rubbing with #600 – 800 sandpaper. If there are areas where the paint film is insufficiently thick, wet-rub them with #800 sandpaper. If there are areas on the outside of the above which are to be coated with clear paint, wet-rub them with #1500 sandpaper.
2. Degreasing and masking	Air-blow areas to be repair-painted and also the vicinity thereof, carry out degreasing with a silicone remover, and then carry out masking as necessary.

Process	Description of work
3. Applying an intermediate coat	If the substrate (ED) is visible through the baked paint film, apply an intermediate coat. • Apply the intermediate coat to a thickness which is sufficient to adequately hide exposed ED areas. The film thickness should be 15 – 20 µm. • Wipe away misted areas using thinner. • Wait 3 to 5 minutes to allow the paint film to set, then force-dry it at 80°C for 15 minutes. • After force-drying, allow the paint film to cool down, then wet-rub the intermediate coat with #600 waterproof sandpaper. • Using #800 waterproof sandpaper, finish the base painting area (the outer side of the intermediate coat) by wet-sanding. * If the substrate (ED) is not exposed, there is no need to apply an intermediate coat. Paint used: Primer surfacer STX-2K-HS 2-liquid type paint hardener 25 % 2-liquid type paint thinner 10 % (STX-2K-TH-0D)
4. Applying the base coat	First determine the color of the base repair-painting areas, and then shade the peripheral areas. Do not apply a thick coat to the base. (12 – 15 µm) Lightly apply one coat of paint to the areas which the mist of the base coat (17130 colors) reach (shaded areas). Promptly proceed to the next process within 2 to 3 minutes (before the paint becomes touch-dry). In some cases this process can be omitted. [Paint blending] Use the undiluted paint after filtering it. Return the unused paint to its original container and store it. If the area to be repair-painted is small, you can carry out shading more easily by adding a further 10 to 20 % of thinner to reduce the viscosity and also spraying at a lower air pressure. Wait for about 7 minutes to allow the paint to set, and then apply clear paint. [Mixing ratio of paint] Base coat AC-17130 (quick-drying) 100 (VOLUME) (When the room temperature is between 10 and 20°C) Base coat thinner 11070 approx. 70 (16 – 18 seconds by the use of Iwata cup*3) (When the room temperature is between 20 and 25°C) Base coat thinner 11050 (Standard 20°C) (When the room temperature is between 25 and 35°C) Base coat thinner 11040

Process	Description of work
5. Clear painting	Lightly mist-coat all of the areas to be repair-painted, finish continuously with one wet coat of paint, and then immediately shade the mist area. [Mixing ratio of paint] 2-liquid type paint Clear 20 – 60 100 2-liquid type paint MS hardner 50 2-liquid type paint Thinner quick-drying Approx. 10 (18 – 20 seconds by the use of Iwata cup*3) [Mixing ratio for ombre painting] Clear paint blended according to the above 10 2-liquid type paint Thinner For shading 11031 50 * The blended clear paint can be used for up to about 4 hours at normal temperature.
6. Drying	After applying clear paint, wait for 2 to 3 minutes to allow it to set, then force-dry it at 80°C for 15 minutes.

*3: The Iwata cup:
is a simple paint viscometer, viscocity cup, NK-2 produced by ANEST IWATA Corporation.

For details, please address inquiries to MITSUBISHI FUSO's authorized Distributer.

5.5.5 Procedure for painting plastic parts

- Do not paint, bake or dry plastic parts of the cab while they are installed. Remove plastic parts and paint them as described below. It is recommended that you use the paint and painting method indicated in the table below.

Paint manufacturer	Dai Nippon Toryo Co., Ltd.
Paint type	Acrylic and urethane type
Name of paint	Planitto #3000
Curing agent	Planitto #721 curing agent
Blending ratio	Main ingredient : Curing agent = 100 : 15
Diluting thinner	Planitto #30 thinner
Paint viscosity	12 – 14 seconds/by the use of Iwata cup*1
Dry film thickness	20 – 35 µ
Setting	Normal temperature × 5 – 10 minutes
Drying the paint film	60 – 70° × 30 – 40 minutes Touch-drying ≈ 15 – 20 minutes
Pre-treating the surface to be painted	1. Sanding white painted surfaces 2. IPA degreasing 3. Air blow
Painting method	Hand spraying with gun

Note 1. Acrylic lacquer type paint may be prone to blistering. For details, ask the paint manufacturer/supplier.

2. Be sure to sand the surfaces before repainting, otherwise the paint film may not adhere well.

*1: The Iwata cup:
is a simple paint viscometer, viscocity cup, NK-2 produced by ANEST IWATA Corporation.

- Custom vehicles and optional plated parts cannot be repainted.

- Solvent for removing contamination
  Synthetic resin used for the grille, and so on, do not readily withstand organic solvents. For this reason, if you select the wrong kind of solvent for wiping such a part, cracks may occur and also marks may remain on the surface of the part.

- Organic solvents which can be used
  - Kerosene
  - Light oil
  - Anti-freeze
  - Wax spray can (Nihon Parkerizing Co., Ltd.) Neo lider
  - Industrial soap
  - Unigold
  - Car Spray 99

- Solvents which must not be used
  - Paint thinner
  - Turpentine
  - Gasoline
  - Escort
  - Origin veil
  - Torepika
  - Emulsion wax
  - Commercially available wax
  - Acetone
  - Reagent alcohol (The Japanese Pharmacopoeia Grade 1)
  - Ketones
  - Esters
  - Chlorinated hydrocarbon

5.5.6 Laminated glass

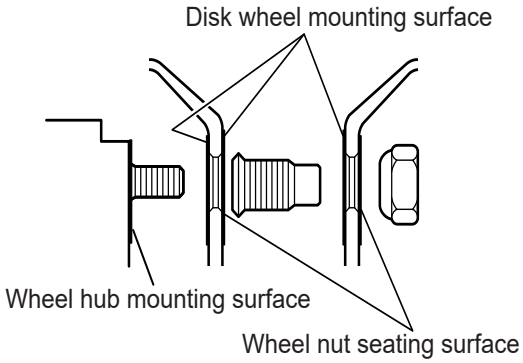
- When a repainted cab body is forced-dried, the temperature should not exceed 100 °C and the process must be completed within 60 minutes. When using a temperature above 100 °C, cover the glass surfaces with shields to prevent them from being heated beyond 100 °C or remove the glass.
- Laminated glass is marked by a double slash (//) in the lower left corner.

5.5.7 Painting the disk wheels

Disk wheels are sometimes painted in the specified color in addition to the original paint on the wheels as shipped by the wheel manufacturer. However, this could lead to loose wheel nuts depending on the thickness of the paint coating.

Prohibition of additional painting

- Do not apply additional painting to disk wheel mounting surfaces, wheel nut seating surfaces and wheel hub mounting surfaces. This makes the paint coating thicker, which could lead to loose wheel nuts. If additional painting has been applied, remove it and clean the surface with a wire brush.



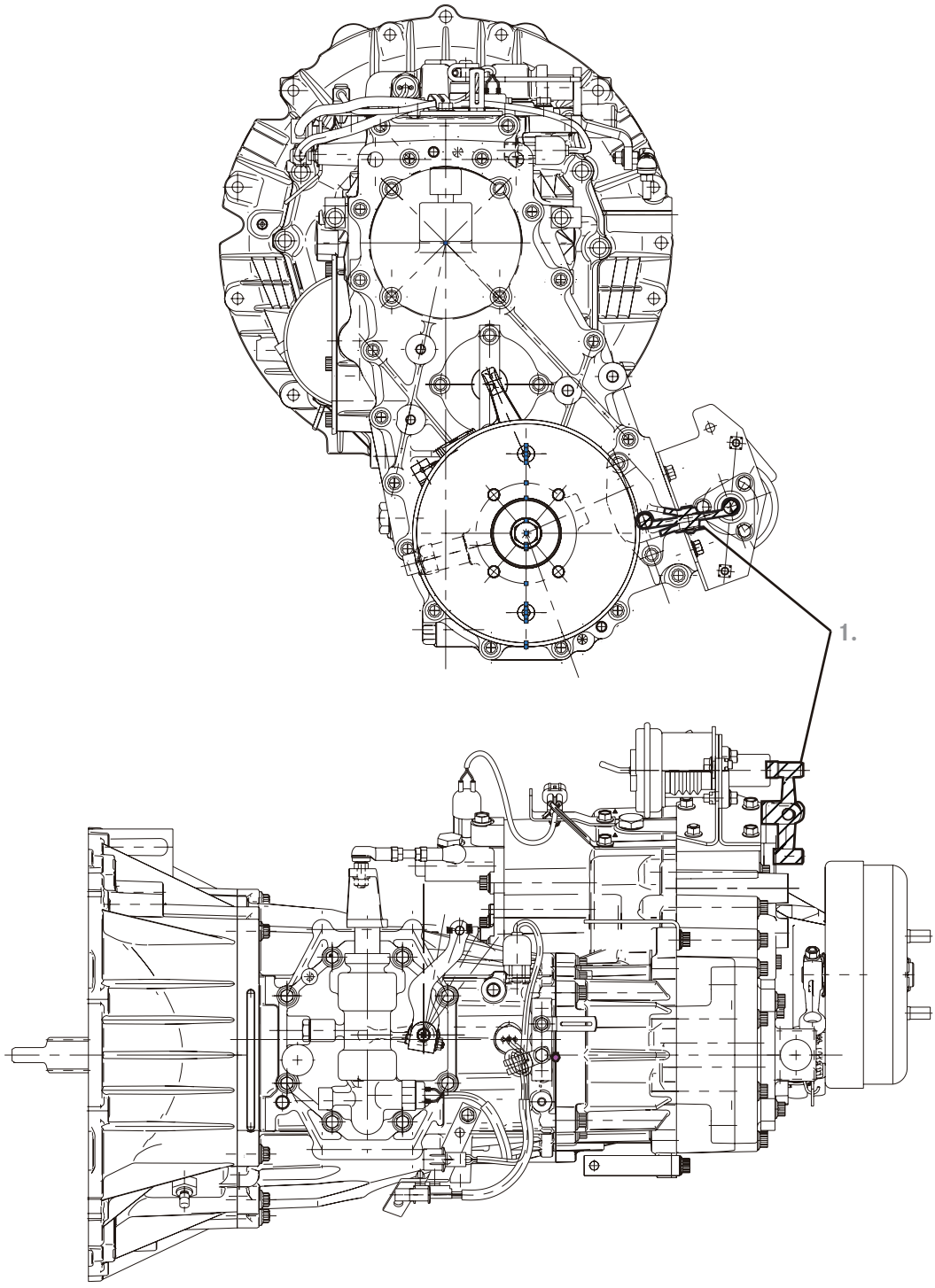
- If you removed parts, securely re-install them in their original positions. If you peeled off labels, obtain new labels and stick them in their original locations.

Tire rotation

- If additional paint on a disk wheel mounting surface becomes the mounting surface for the mating part (wheel hub or wheel) as a result of tire rotation, remove the paint on the wheel mounting surface and wheel nut seating surface and clean the surfaces with a wire brush before installing the disk wheel. If it is installed without removing the paint, the thick paint coating could lead to loose wheel nuts.

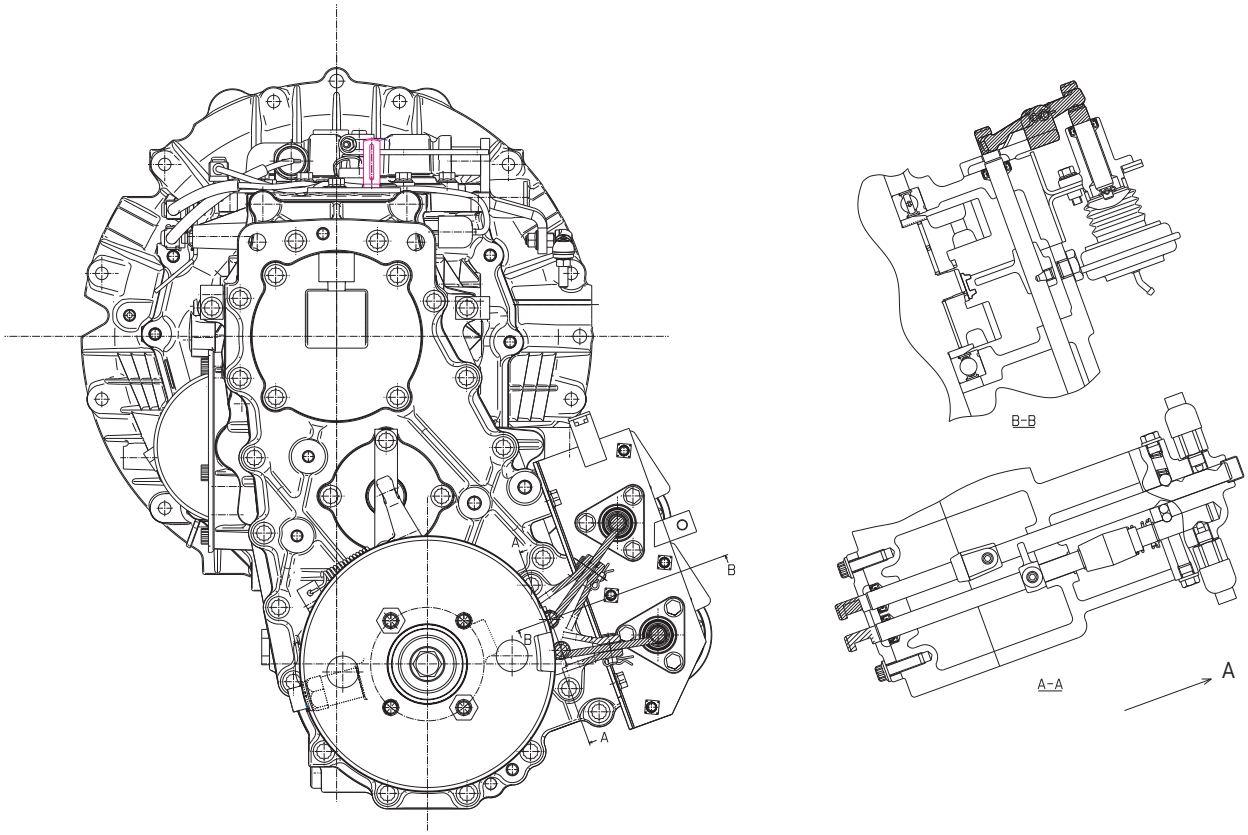
5.5.8 Painting the Transmission with transfer <FG>

- Before painting the transmission, be sure to mask the hatched sections shown in the illustration below to prevent the adhesion of paint, otherwise there will be problems in shifting between 2WD and 4WD.



1. Prohibit area

<FG High-Low Transfer>



A. Prohibit area

5.6 Chassis springs

5.6.1 Leaf springs

- Only use spring leaves which have been tested and approved for the vehicle model in question. Reinforcement by installing additional spring leaves is not permitted.
- Do not damage the surface or the corrosion protection of the spring leaves when carrying out installation work.
- Before carrying out welding work, cover the spring leaves to protect them against welding spatter. Do not touch springs with welding electrodes or welding tongs.

5.7 Tilting the cab

⚠ Risk of injury

Before tilting the cab, please make sure that you read the "Tilting the cab" section in the detailed Instruction Manual.

You could otherwise fail to recognize dangers, which could result in injury to yourself or others.

5.8 Towing and tow-starting

⚠ Risk of accident and injury

Before towing or tow-starting, please make sure that you read the "Towing" section in the detailed Instruction Manual. You could otherwise fail to recognize dangers and cause an accident, which could result in injury to yourself or others.

Property damage

Failure to observe the instructions in the Instruction Manual can result in damage to the vehicle.

5.9 Risk of fire

⚠ Risk of fire

Work on live electrical lines carries a risk of short circuit.

Before starting work on the electrical system, disconnect the on-board electrical system from the power source, e.g. battery.

With all bodies make sure that neither flammable objects nor flammable liquids can come into contact with hot assemblies (including through leakages in the hydraulic system) such as the engine, transmission, exhaust system, turbocharger, etc.

Appropriate caps, seals and covers must be installed on the body in order to avoid the risk of fire.

5.10 Electromagnetic compatibility (EMC)

The different electrical consumers on board the vehicle cause electrical interference in the vehicle's electrical circuit. At MITSUBISHI FUSO, electronic components installed at the factory are checked for their electromagnetic compatibility in the vehicle.

When retrofitting electric or electronic systems, they must be tested for electromagnetic compatibility and this must be documented.

The equipment must have been granted type approval in accordance with EC Directive 2009/19/EC and must bear the "e" mark.

The following standards provide information on this:

- DIN50498
- DC11224 (EMC component requirements)
- DC10613 (EMC vehicle requirements)
- EU Directive 2009/19/EC

Additional information

The notes on operating safety and vehicle safety in Section 1 "Introduction" ▷ 1.3 and ▷ 1.4 must be complied with.

5.11 Storing and handing over the vehicle

Storage

To prevent any damage while vehicles are in storage, MITSUBISHI FUSO recommends that they be serviced and stored in accordance with the manufacturer's specifications ▷ 3.9.2 and ▷ 3.9.3.

Handover

To prevent damage to the vehicle or to repair any existing damage, MITSUBISHI FUSO recommends that the vehicle be subjected to a full function check and a complete visual inspection before it is handed over ▷ 3.9.4.

6.1 General

Risk of injury

Do not modify any bolted connections that are relevant to safety, e.g. that are required for wheel alignment, steering or braking functions.

When unfastening bolted connections make sure that, when work is complete, the connection again corresponds with the original condition.

Welding work on the chassis/body may only be carried out by trained personnel.

The body, the attached or installed equipment and any modifications must comply with the applicable laws and directives as well as work safety or accident prevention regulations, safety rules and accident insurer requirements.

Additional information

Further information on bolted and welded connections can be found in Section 3 "Planning of bodies" ▷ 3.6 and Section 5 "Damage prevention" ▷ 5.1.

- Never modify (weld, padding, additional work, etc.) or heat critical safety parts such as the axle, steering, brake, suspension related components, propeller shaft. If you study the movement of critical safety parts owing to unavoidable circumstances, be sure to consult with contact personnel for body mounting and modification. "2.2 Technical advice and contact persons" ▷ 2.2

Main critical safety parts

- Knuckle arm
- Knuckle arm bolt
- Tie rod assembly
- Tie rod arm
- Tie rod arm bolt
- Axle
- Steering shaft assembly
- Power steering booster
- Power steering booster bracket
- Pitman arm ball stud
- Steering drag link
- Steering ball stud
- Steering universal yoke
- Steering slip joint
- Steering spider
- Brake hose, brake pipe
- Brake booster
- Air tank, vacuum tank
- Wheel bolt
- Wheel nut
- Spring bracket
- Spring U-bolt
- Propeller shaft

Observe the following precautions during body building work.

Failure to observe any of them could damage an engine or intake system part.

- Do not run the engine with the air cleaner removed.
- Do not allow paint or organic solvent (including evaporated gas) to be drawn into the engine intake system.
- Do not heat the engine intake system from the outside.

6.2 Chassis frame material

If the frame is extended, the material of the extension element and reinforcing bracket must have the same quality and dimensions as the standard chassis frame.

Some models shown in the table below may not be released in your market.

Model	Material/part					
	Side rail		Stiffener ①	Stiffener ②	Stiffener ③	Stiffener
	MJSH440 (S355J2C+N)	HTP540 (S500MC)	MJSH440 (S355J2C+N)	HTP540 (S500MC)	MJSH440 (S355J2C+N)	MJSH440 (S355J2C+N)
FEA01, 21	×	–	×	×	–	–
FEA51	×	–	×	×	–	–
FEA61	×	–	×	×	–	–
FEA91,FEAY1	×	–	×	×	×	–
FEB21	–	×	×	×	–	–
FEB51	×	–	×	×	–	–
FEB71,FEBY1	×	–	×	×	–	–
FEB74	×	–	×	×	–	–
FEB91	×	–	×	×	–	–
FEC71	–	×	–	–	–	×
FEC81	–	×	–	–	–	×
FEC91	–	×	–	–	–	×
FECX1	–	×	–	–	–	×
FGB71	×	–	×	×	–	–

Note: For the member dimensions and the position of stiffener ① or stiffener ②, refer to "10.6.2 Frame section modulus" ▷ 10.6.2.
For further information of the material, refer to "7.1.1 Body mounting methods" ▷ 7.1.1.

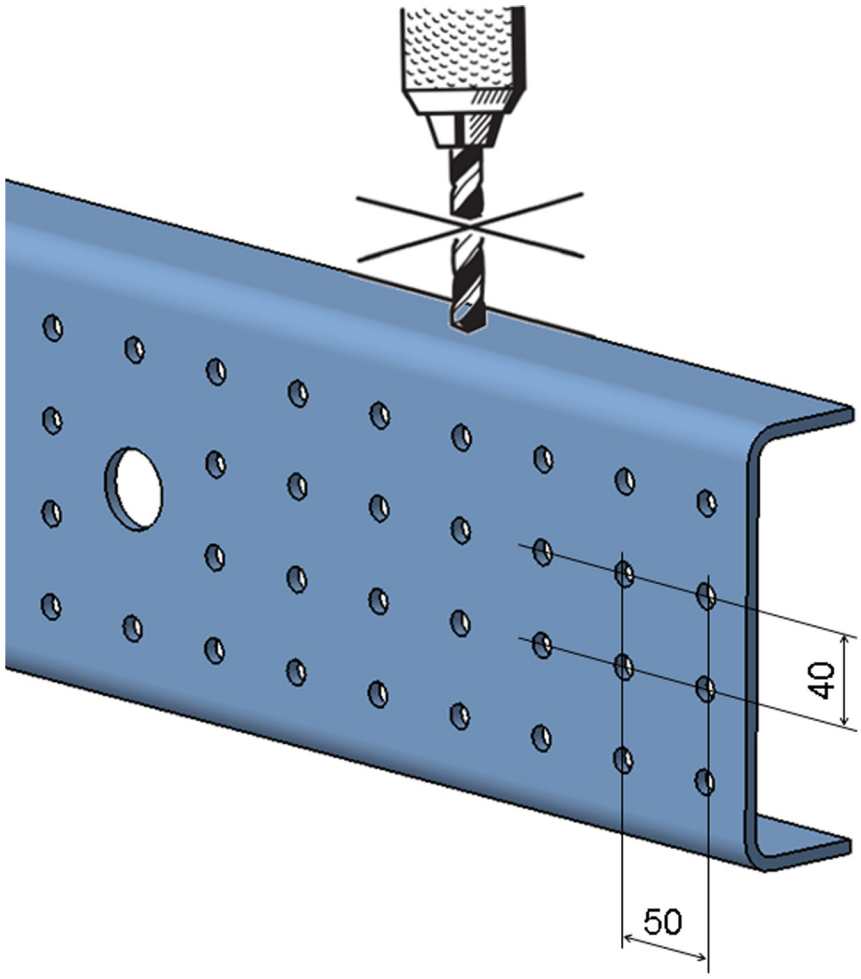
6.3 Drilling work on the vehicle frame

Drilling holes in side rail

Holes have been drilled in the side rail at regular intervals (longitudinal pitch 50 mm, vertical pitch 40 mm). Use the existing holes. Never drill holes in the upper and lower surfaces of the flange.

As a rule, no holes may be enlarged. If it is absolutely necessary to enlarge one, keep its diameter within ϕ13.

No load may be applied to the center of the web of the side rail (diaphragm effect). If this is unavoidable, make sure that there is a large area of support on both sides of the web.



6.3 Drilling work on the vehicle frame

Drilling work on the crossmembers

- The holes and distances between the holes should conform to the values specified in the chart below.

Crossmember type	Hole diameter	Center-to-center distance of holes
• Alligator type (see Fig. 1) • Channel type (see Fig. 2)	9 mm max.	30 mm* min.

Note*: Maintain the dimensions of previously drilled holes.

- Holes should be more than 100 mm away from the end of the side rail flange or the end of the gusset.
- Holes in the web of the channel type crossmember should be 50 mm min. from the end of the crossmember. (Refer to Fig. 2)
- Holes in the flange should be more than 25 mm from the end.
- Holes should be drilled more than 20 mm from the curved part of the flange.

Alligator type

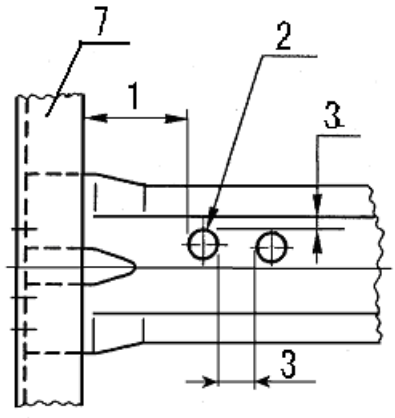


Fig. 1

1 100 mm min
2 DIA 9 mm max
3 25 mm min
4 20 mm min

Channel type

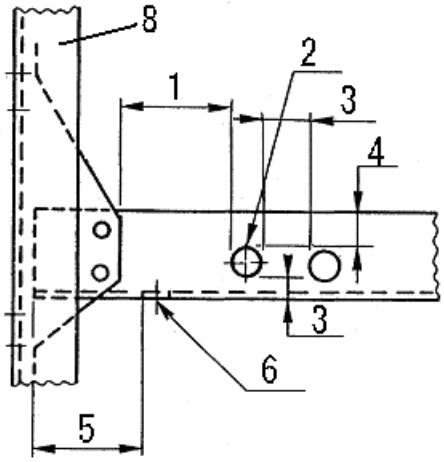


Fig. 2

5 50 mm min (Web surface)
6 DIA 13 mm max (Web surface)
7 Side rail
8 Gusset

6.4 Welding work on the vehicle frame

Welding anything onto chassis frame is prohibited in principle, as the welding increases the risk of cracks in the member. For detailed instructions about rear body mounting, see 7.2 "Mounting Frame" ▷ 7.1.2.

Additional information

Further information on welded connections can be found in Section 5 "Damage prevention" ▷ 5.2.

6.5 Reinforcement

• Cab back crane reinforcement procedure

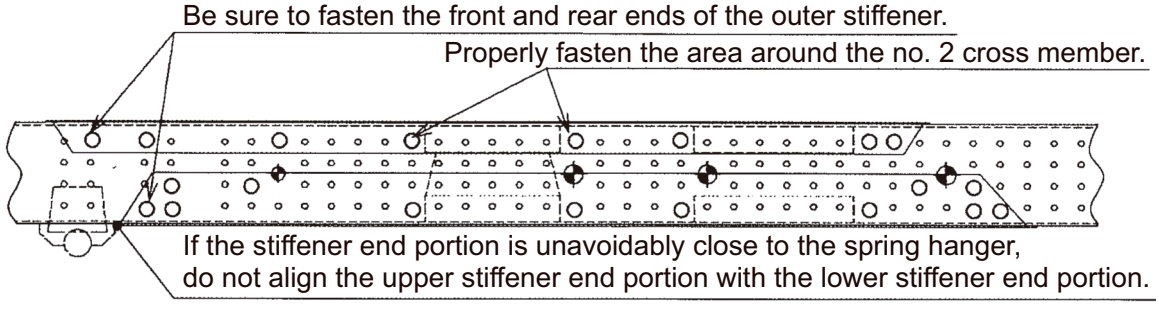
Adding an outer stiffener to the side rail causes the reinforcement end portion of the locally reinforced frame to undergo a sudden change in rigidity, making cracking more likely to occur. Reinforcement is thus not necessary for ordinary applications. Be sure, however, to reinforce the frame in areas near the crane mounting on which stress is locally concentrated during crane operations. The following show examples of reinforcement:

- Do not position the end portion of the outer stiffer on the end portion of the sub-side rail located inside the side rail.
- Do not position the stiffener end portion on the cab rear surface, near the spring hanger, on the cross member end portion, or any other load concentrating portions. If it is unavoidably close to the spring hanger, do not align the upper stiffener end portion with the lower stiffener end portion.
- Do not cut the outer stiffener end portion vertically. Cut it obliquely at an angle of 45° or more.
- Connect the outer stiffener and side rail through riveting or bolting on the web surface.
  Bolt M10: Flange bolt 10T
  Nut M10: Flange nut 6T
  Tightening torque: 90–110 N·m {9–11 kgf·m}

Additional information

Do not clamp the outer stiffener using the grounding bolt. Clamp the urea tank bracket (plastic) using a tightening torque of between 21 and 31 N·m.

- Use ϕ10 rivets or M10 bolts. Use a riveting machine for driving rivets in place.
- Do not set a rivet of the same diameter a second time in the same position. An ϕ11 rivet may be driven a second time in a position, in which a ϕ10 rivet was set, only if the dimension between an end portion and the rivet hole edge measures 25 mm or more.
- Be sure to fasten the front and rear ends of the outer stiffener.
- Properly fasten the area around the no. 2 cross member.
- Set rivets and bolts at a pitch of 200 mm or less. A smaller pitch should be used in areas near the outer stiffener end portion.
- A poorly machined, substantially U-shaped stiffener, when fitted in the side rail, can produce a clearance in the flange portion, adversely affecting the installation. Use L-shaped stiffeners both at the upper and lower portions.
- To obtain an adequate seating area for the nuts and bolts, use a diameter of ϕ11 for the holes in the outer stiffener, and do not make the holes oblong.
- If a chassis part straddles the outer stiffener, do not use a plain washer to adjust the level difference, but instead add a spacer (25×160 approx.) which has the same thickness as that of the outer stiffener.
- Do not clamp the outer stiffener using the bolts at the four corners of the outer side of the cross member and the transmission mount.



6.6 Modifications to the wheelbase

The wheelbase should not be extended or shortened because considerations for the propeller shaft length, balance, position of center bearings, brake piping and harness length are required.

If this is unavoidable, contact the department responsible ▷ 2.2.

6.6.1 Prohibition on modifying the propeller shaft

⚠ Risk of accident

It is strictly prohibited to modify the propeller shaft by welding or other means to change its length.

An improperly modified propeller shaft may cause vibration during operation, which in turn may cause cracks and fractures in the clutch housing, separation of the propeller shaft, and other dangerous conditions, possibly resulting in a serious accident.

6.7 Frame modifications

- The maximum permissible axle loads must not be exceeded, while the minimum front axle load must be exceeded.
- Rear underride guard: fastened in the same way as on a standard vehicle.
- Extend the mounting frame to the end of the frame.

6.7.1 Precautions for modification

In the case that a rear body of special design is mounted or the vehicle is to be used in special conditions, use utmost care that neither the structure nor the strength of the frame is impaired during mounting or modification work.
When mounting a rear body of special design, pay full attention to even weight distribution on the frame.
Refer to "10.6.2 Frame section modulus" ▷ 10.6.2.
Attaching stiffeners, drilling holes or welding objects to the frame can affect the strength of the frame greatly, possibly resulting in a deformed or cracked frame. Avoid performing any unnecessary reinforcement, drilling or welding work on the frame.

6.7.2 Extending and shortening

- Frame rear overhang extending procedure
  Perform the following steps to extend the frame rear overhang.

  - Extension members

Extension member		Reinforcement		Electrode	
Material	**Thickness**	**Material**	**Thickness**	**Shielded metal arc welding**	**CO_2 gas shielded arc welding**
SAPH440 (S355MC), HTP540 (S500MC)	Same as the side rail	SAPH440 (S355MC)	3.2 - 4.5 mm	Illuminite base, for 540 MPa, D4301 or equivalent as per JIS Z3211	YGW11 or equivalent as per JIS Z3312

    As high tensile strength steel (540 MPa class) hardens more easily at welds than automotive structural steel (SAPH440), follow the instructions below.

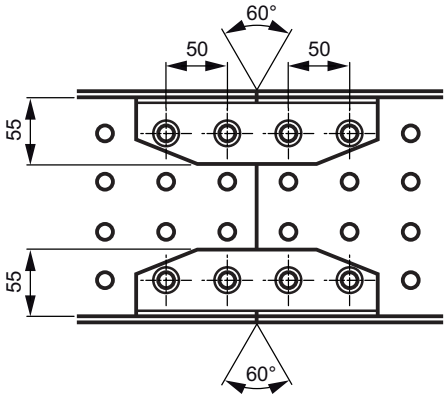
    (a) Be sure to use a low-hydrogen type electrode. Especially, where the weld must have the same strength level as the base metal, use a low hydrogen, high tensile strength type electrode.
    (b) Short weld beads are more likely to crack due to low hardening rate, so in areas requiring many short weld beads, perform continuous welding instead.

- Extending and shortening procedure

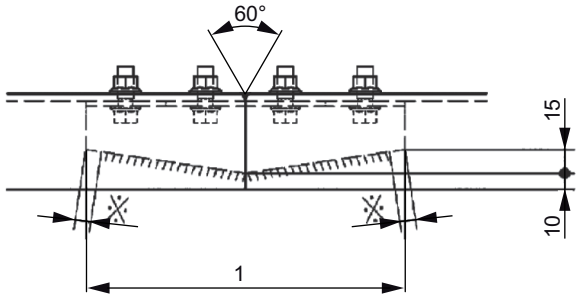
Comply with the reinforcement procedure illustrated below.

The reinforcement member should be bolted at two points each in the base metal and extension member. Use M10 bolts (8T) and nuts (6T) and a tightening torque of 60 to 80 N·m {6 to 8 kgf·m}.

Use utmost care about finishing the flange end face of the side rail butt welded joint. Carefully finish it with a grinder to ensure that the end face is free of undercut or padding protrusions. Make also sure that there is no step between the side rail and extension member. Smoothly finish any steps.



N31.00-2214-00

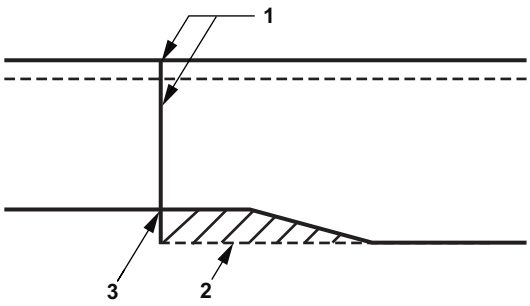


N31.00-2212-00

1 More than 200 mm

Additional information

The length of 20 mm marked with ※ should not be welded.



N31.00-2213-00

1 Finish surface with a grinder
2 Eliminate any steps
3 Finish end face with a grinder

- Cautions for finishing the side rails.
  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 convex bead.

Under cut

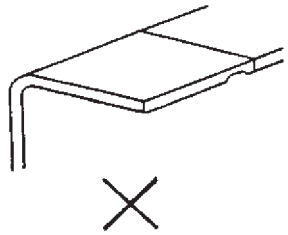


Fig. 3

Pile up

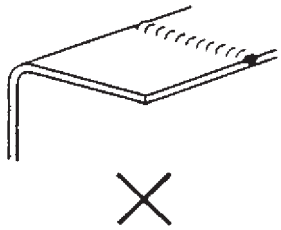


Fig. 4

6.7.3 Others

Never drill or grind any notches in the side rail, crossmember flange, or crossmember gusset.

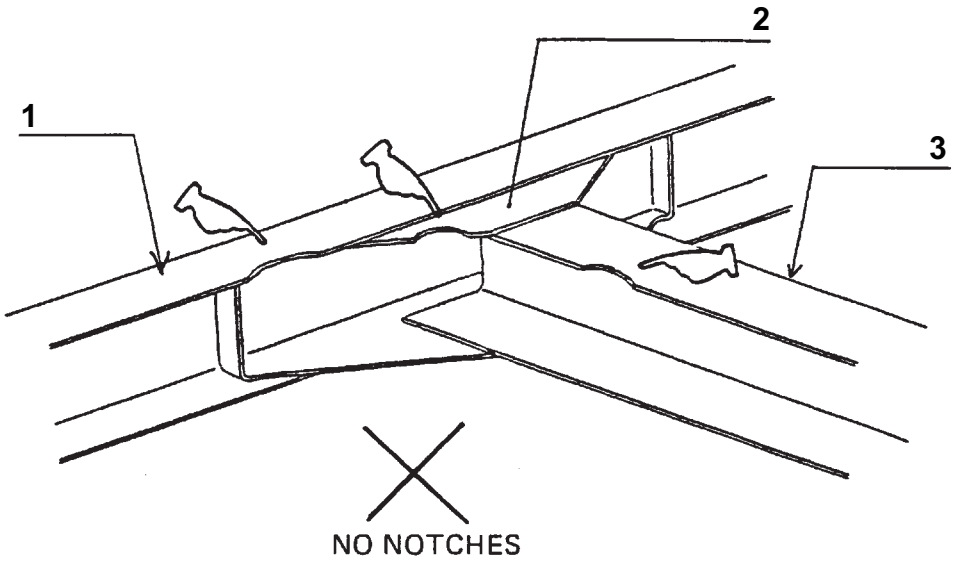


Fig. 1

1 Side rail
2 Crossmember gusset
3 Crossmember

6.8 Mounting of implements and auxiliary components

⚠ Risk of accident

The use of parts, assemblies or conversion parts and accessories which have not been approved may jeopardize the safety of the vehicle.

Before installing any attachments, special-purpose bodies, equipment or carrying out any modifications to the basic vehicle and/or its assemblies, you must read the relevant sections of the vehicle Instruction Manual, as well as the operating and assembly instructions issued by the manufacturer of the accessories and items of optional equipment.

You could otherwise fail to recognize dangers, which could result in injury to yourself or others.

Official acceptance by public testing bodies or official approval does not rule out safety hazards.

All national laws, directives and registration requirements must be complied with.

6.8.1 Mounting equipment on the side rail

- Attach a stiffener to the inside of the side rail as shown in Fig. 1 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 of force for each bolt.

Example:

- 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.

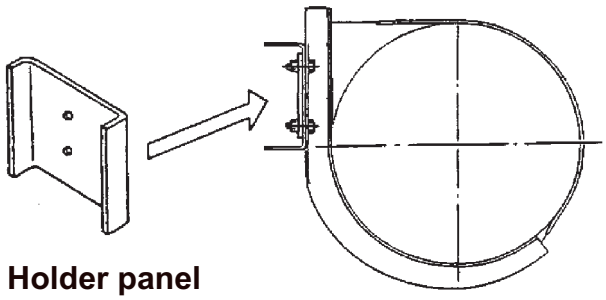


Fig. 1

6.8.2 Wheel chocks

Mounting

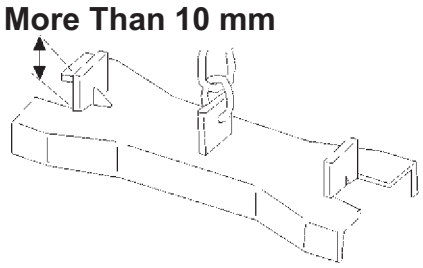
- In a suitable bracket so that they cannot rattle.
- Secured to prevent loss.
- Ensure good accessibility.

6.8.3 Spare tire carrier

- Install under the frame, on the side of the frame or on the body in accordance with the chassis drawing.
- It must be easily accessible and easy to handle.
- The Spare tire - carrier
  When remodelling the tire carrier, followings must be paid attention:
  (a) A single worker can easily remove or attach the tire.
  (b) Interference is not caused with parts other than the intended stopper when tightening the tire on the tire carrier.
  (c) The worker can attach even burst tires.
  (d) The tightening section is prevented from becoming loose.
  Example 1: Clamped tire-carrier
    - The tightening bolt must be 30 mm or longer.
    - Double nuts must be used for tightening.
    - The structure having a height difference for preventing falling on the bracket.
    - The structure having a stopper for preventing tightening nuts and bolts from falling.

  Example 2: Hoisted tire-carrier
    - The structure must have a spring inserted below the hoisting plate.
    - The structure must prevent reverse rotation of the hoisting shaft.
    - The structure must have a lock for preventing the tire from falling

  (e) The tightening bolt must be M10, 7 T strength or an equivalent product. (clamped tire-carriers)
  (f) The tire shape must limit movement in the forward, backward, left and right directions. (clamped tire-carriers)
  (g) Take care to prevent injury when hoisting tires. (hoisted tire-carriers)
  (h) Tightening bolts must be tightened to a torque of at least 49 Nm and by a force at least 290 N at handles. The tire-carrier must be designed to have enough contact area to support the tire securely. (hoisted tire-carriers)
  (i) The height difference on the lifter must be at least 10 mm, or the lifter must be of a shape that enables the same effect. (hoisted tire-carriers)



  (j) When manufacturing the carrier, apply a tensile load of 4900 N or more on the lifter. (hoisted tire-carriers)
  (k) Affix a Caution Plate indicating the recommended tightening torque 49 Nm at a position that can be easily seen during operation.

6.8 Mounting of implements and auxiliary components

- Carry out the following tests with the carrier attached to the body or in a similar state.
  (a) Tensile strength test
  (clamped tire-carrier)
  Apply the following load face down at the center of the disk wheel with a tire attached to the carrier.

  $P = W \times \alpha \times \beta$

  P : Test load
  W : tire of maximum set weight
  α : Load multiple of 2.5
  β : Required safety ratio of 1.3

  (hoisted tire-carrier)
  Apply the following load face down via the hoisting plate.

  $P = (Po \times \gamma \pm W \times \alpha) \times \beta$

  P : Test load
  Po : Load applied on chain by tightening torque during standard tightening
  W : tire of maximum set weight
  α : Load multiple of 2.5
  β : Required safety ratio of 1.3
  γ : Load multiple of 1.5

  As a result of this test, carrier components must be free from detrimental deformation.

(b) Hoisting strength test
(hoisted tire carrier)
Fix the hoisting plate, and apply the following torques on the carrier.

$T = To \times \gamma \times \beta$

T : Test torque
To : Standard tightening torque
β : Required safety ratio of 1.3
γ : Load multiple of 1.5

As a result of this test, carrier components must be free from detrimental deformation.

(c) Operating durability
Hoist a tire of maximum allowable weight, tighten to a torque of 49 Nm, and then winch down. Repeat this series of operations 200 times. (This test needs be carried out continuously.) As a result of this test, operation must remain uninterrupted and carrier components must be free from detrimental deformation.

(d) Looseness resistance
Increase and decrease vibrations of 1 g (9.8 m/sec2) (need not be 1 g during resonance vibrations) and 8.3 Hz to 50 Hz (500 to 3,000 times per minute) on the supporting device in the vertical direction of the carrier mount continuously for one hour taking at least 5 minutes for each reciprocal movement.
As a result of this test, the carrier device must be free from detrimental looseness.

Crank handle (reference)

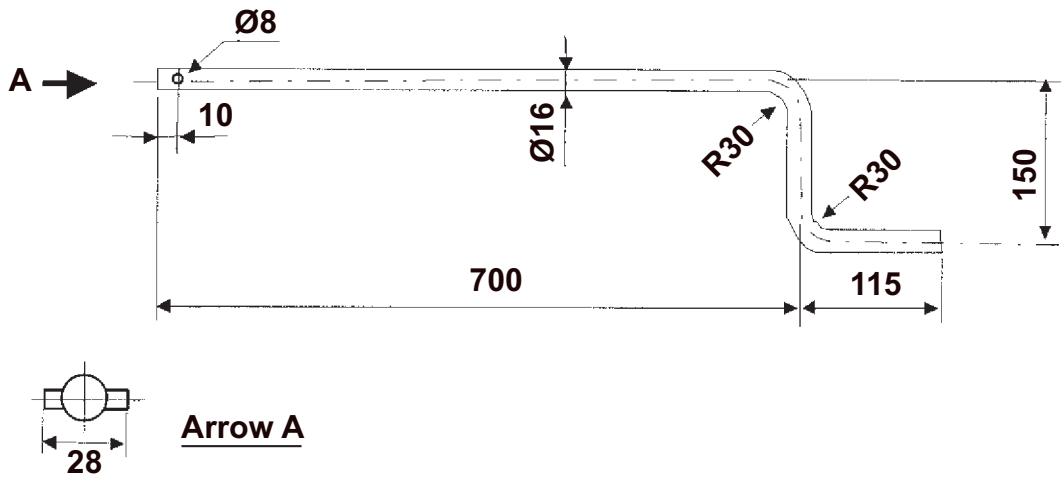


Fig. 2

6.8.4 Mudguards and wheel arches

- The distance from the tire to the mudguard or wheel arch must be sufficient, even when snow chains or anti-skid chains are fitted and at full spring compression (including under torsion). The dimensional data in the tender drawings must be observed.
- On chassis with standard bore holes for mudguard brackets, use these bore holes to secure the brackets.

6.8.5 Front underrun protection <Vehicle with front underrun protection>

All class N2 vehicles put into circulation must comply with UN Regulation R93 (front underrun protection) in order to conform with Directive 2007/46/EC, Annex II. The intended operation of a vehicle is to a great extent determined by the bodywork, so that the structure, design and equipment of the chassis must be carefully considered both with and without the front underrun protection. It is not possible to retrofit a front underrun protection on Canter. MITSUBISHI FUSO recommends that the approval and intended use be clarified with the authorities responsible beforehand.

6.8.6 Rear underrun protection <Vehicle with rear underrun protection for R58-02>

AD

Rear underrun protection should be installed in compliance with UN regulation R58 and in accordance with the drilling work instructions.

- the distance between the rear of the vehicle and the final rear axle is more than 1,000 mm
- the ground clearance of the chassis as well as the main body parts exceeds 700 mm for the unladen vehicle across the entire width.

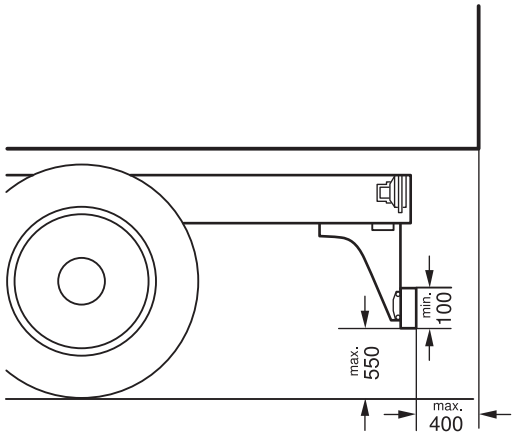
Exceptions to this regulation are semitrailer tractor vehicles, machines and vehicles whose purpose cannot be fulfilled if an underrun protection is fitted.

If an underrun protection is required, it must comply with UN Regulation R58.

The underrun protection must be mounted as far back as possible.

Installation dimensions:

- maximum height of underrun protection (unladen vehicle) above road surface: 550 mm.
- maximum width = width of rear axle (outer tire edge).
- minimum width: = Width of rear axle – 100 mm on each side (widest axle is authoritative)
- crossmember section height at least 100 mm.
- edge radius at least 2.5 mm.



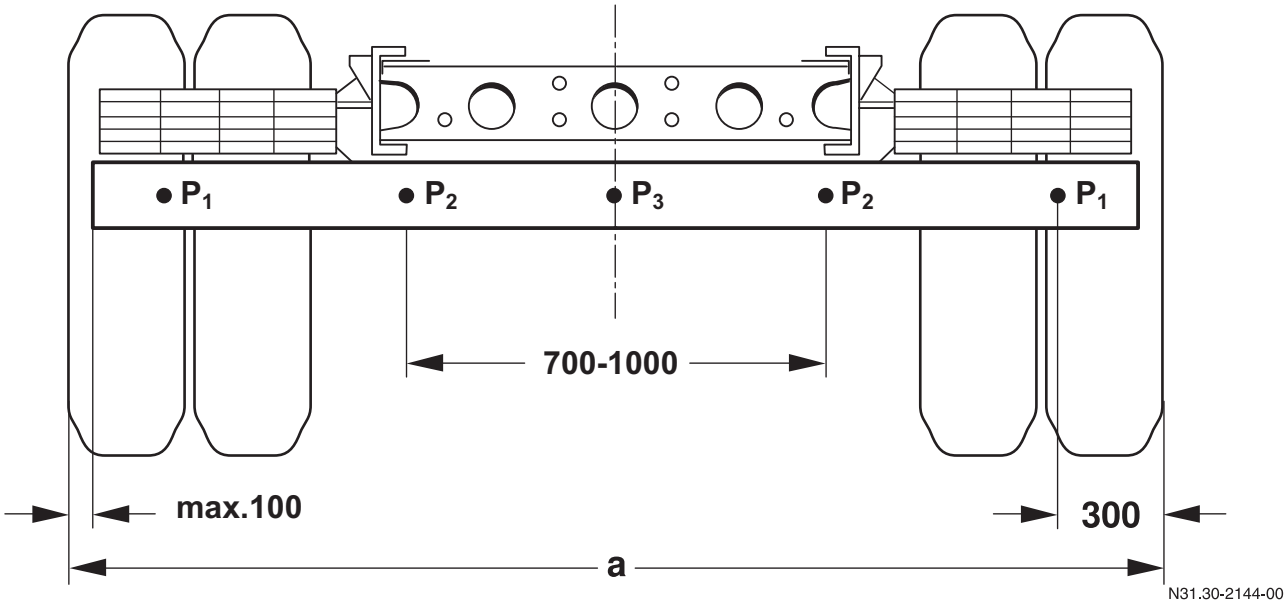
N31.30-2143-00

The rear underrun protection fitted at the factory complies with UN Regulation R58. No modifications may be made. If modifications are unavoidable, they must be clarified in advance with the vehicle licensing agency responsible.

6.8 Mounting of implements and auxiliary components

Check strength of underrun protection and its mounting in accordance with UN Regulation R58.

At maximum deformation, the distance from the end of the body to the end of the underrun protection at the load points may not exceed 400 mm.



a = Rear axle width
P_1, P_2, P_3 = Load application points

6.8 Mounting of implements and auxiliary components

AD

<Vehicle with rear underrun protection for R58-03>

In Germany, Article § 32b of the German vehicle licensing regulations requires an underrun protection when

- the distance between the rear of the vehicle and the final rear axle is more than 1,000 mm
- the ground clearance of the chassis as well as the main body parts exceeds 550 mm for the unladen vehicle across the entire width.

Exceptions to this regulation are semitrailer tractor vehicles, machines and vehicles whose purpose cannot be fulfilled if an underrun protection is fitted.

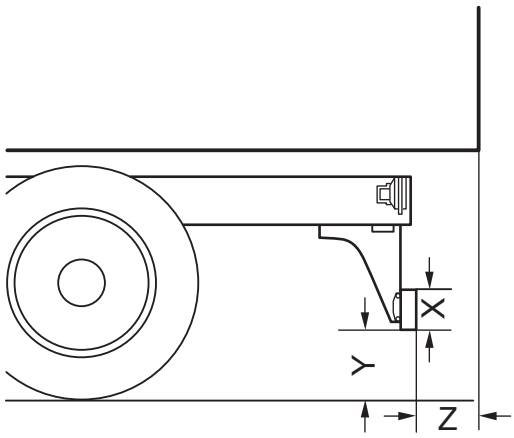
If an underrun protection is required, it must comply with UN regulation R58.

The underrun protection must be mounted as far back as possible.

Installation dimensions:

			GVW ≤ 8ton	GVW > 8ton
Cross member section height	**X**		Min.100	Min.120
Maximum height of the underrun protection(unladen vehicle) above the road surface	**Y**		Max.550	Max.450 (Air suspension) Max.500 (Steel suspension)
Maximum Distance from the end of the body to end of the underrun protection	**Z**	**At installed condition**	Max.350	Max.300
		During application of test forces at P1, P2, P3	Max.400	

- Maximum width: = width of the rear axle (outer tyre edge).
- Minimum width: = Width of the rear axle-100mm on each side (widest axle is authoritative)
- Edge radius at least 2.5mm

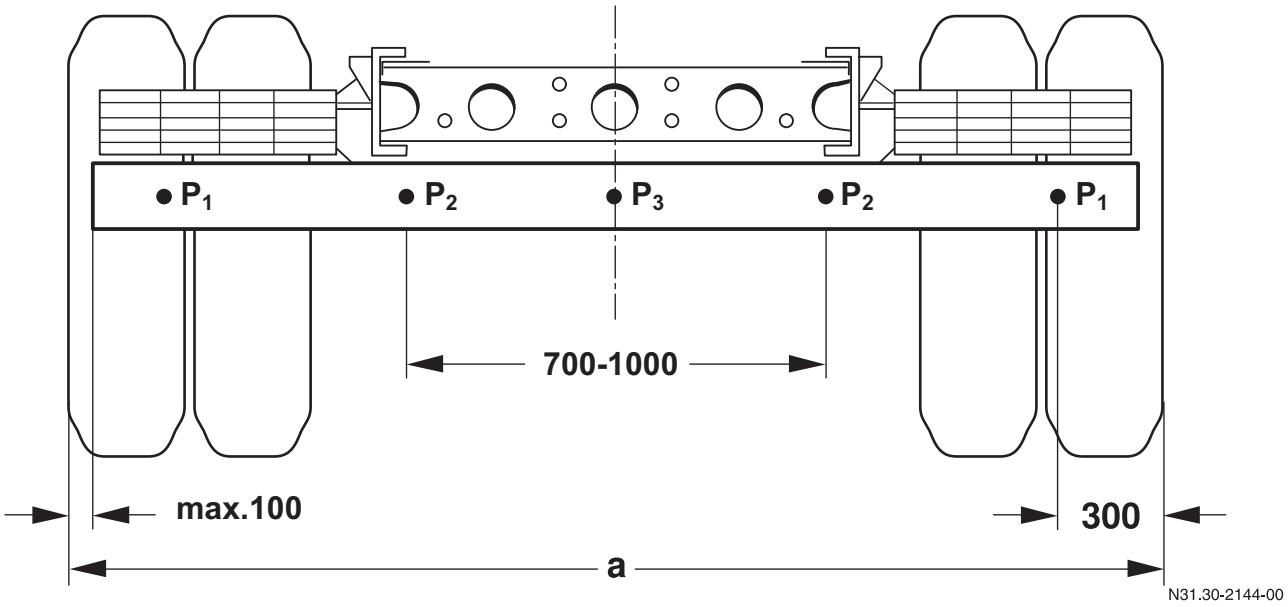


N31.30-2143-00

The rear underrun protection fitted at the factory complies with UN regulation R58. No modifications may be made. If modifications are unavoidable, they must be clarified in advance with the vehicle licensing agency responsible.

6.8 Mounting of implements and auxiliary components

Check strength of underrun protection and its mounting in accordance with UN regulation R58.



a = Rear axle width
P_1, P_2, P_3 = Load application points

6.8.7 Side underrun protections

Mount components in accordance with local regulations.

6.9 Cab

Modifications to the cab must not have a negative effect on the operation or strength of assemblies or control elements or on the strength of load-bearing parts.

The tilting cab must not be fixed rigidly to the bodywork. If any interventions to the cab are planned they must be co-ordinated with the department responsible ▷ 2.2.

- The content relating to in Section 2.5 Mitsubishi three diamonds and Fuso emblem must be complied with ▷ 2.5.

Attaching the roof deck

Roof

- When attaching externally mounted parts such as roof deck or drag foiler onto the roof, use the exclusive mounting holes provided on the roof. (See Figs. 1 and 2.)
- Prevent the weight of externally mounted parts attached to the roof from exceeding 50 kg. (See Figs. 1, 2 and 4.)
- Use nickel-chrome plated stainless steel bolts and washers.
- Take special care to prevent the body from becoming scratched when attaching externally mounted parts.
- Insert packing between externally mounted parts and the body to prevent rusting. Use RC710CP (EPDM) rubber or equivalent with a thickness of 2 mm or less and a hole diameter of 8 mm (for ozone crack prevention).
- After attaching externally mounted parts, coat the entire periphery of the mounting bolts with sealer.
- The top coat of paint must be applied to externally mounted parts before attaching to the roof. (See Fig. 3.)

B

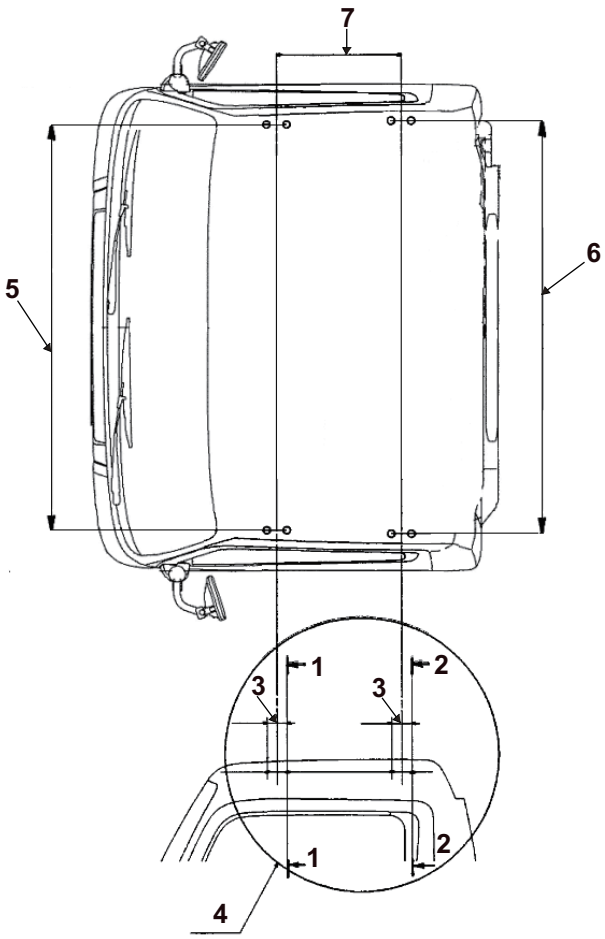
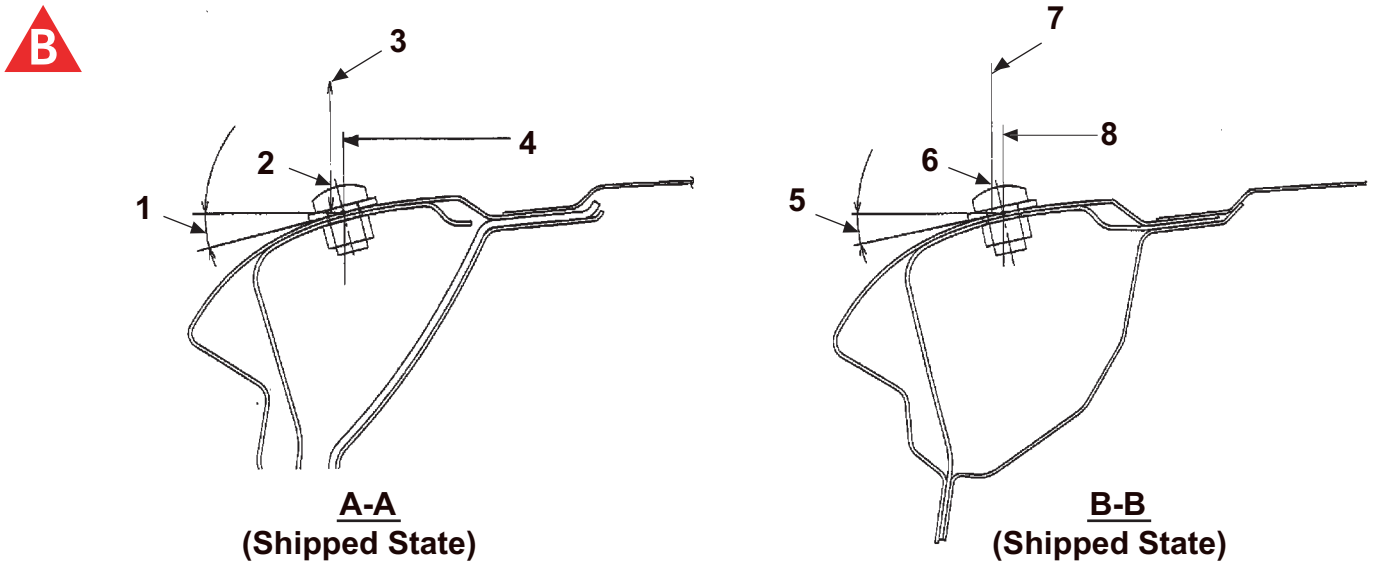
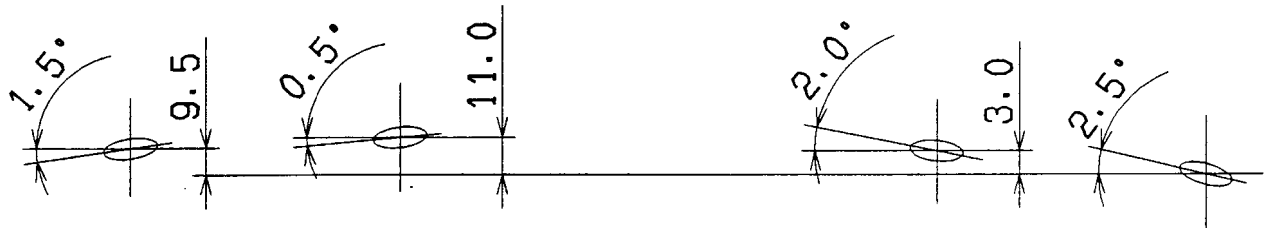


Fig. 1

1 Section A-A
2 Section B-B
3 80
4 Detail C
5 1408 (Standard cab)
1664 (Wide cab)
1364 (Standard and high roof cab)
6 1436 (Standard cab)
1694 (Wide cab)
1394 (Standard and high roof cab)
7 500



DETAIL C (1) <Standard cab>



DETAIL C (2) <Wide cab, Standard and high roof cab>

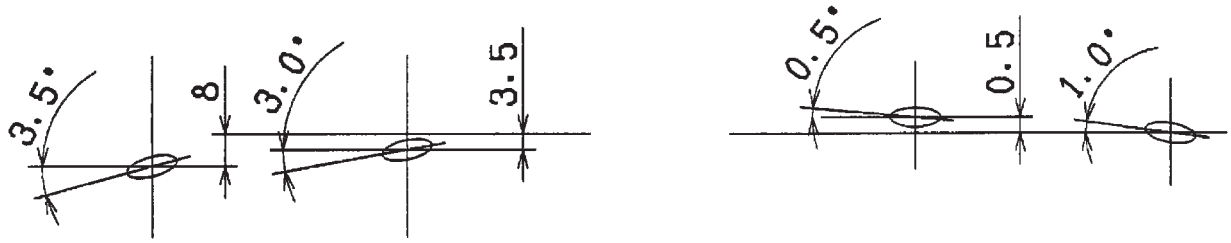


Fig. 2

1 *14.5° (Standard cab)*
16.5° (Wide cab, Standard and high roof cab)
2 *32.5 (Standard cab)*
31.0 (Wide cab)
29.0 (Standard and high roof cab)
3 *Roof top*
4 *1408 (Standard cab)*
1664 (Wide cab)
1364 (Standard and high roof cab)
5 *12.0° (Standard cab)*
14.5° (Wide cab, Standard and high roof cab)
6 *21.5 (Standard cab)*
34.5 (Wide cab)
32.5 (Standard and high roof cab)
7 *Roof top*
8 *1436 (Standard cab)*
1694 (Wide cab)
1394 (Standard and high roof cab)

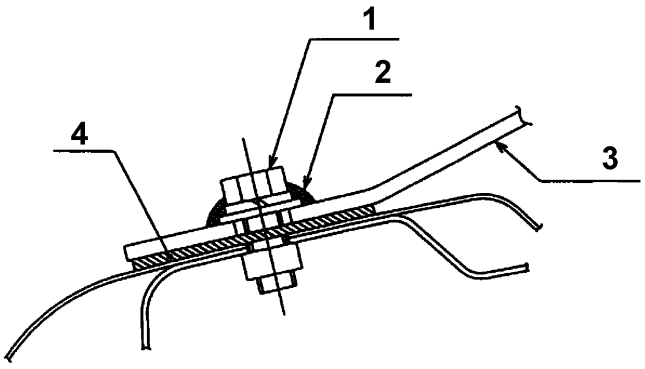


Fig. 3

1 Use washer and bolt with plain washer
2 Coat periphery with sealer
3 Roof deck or drag foiler
4 Rubber packing

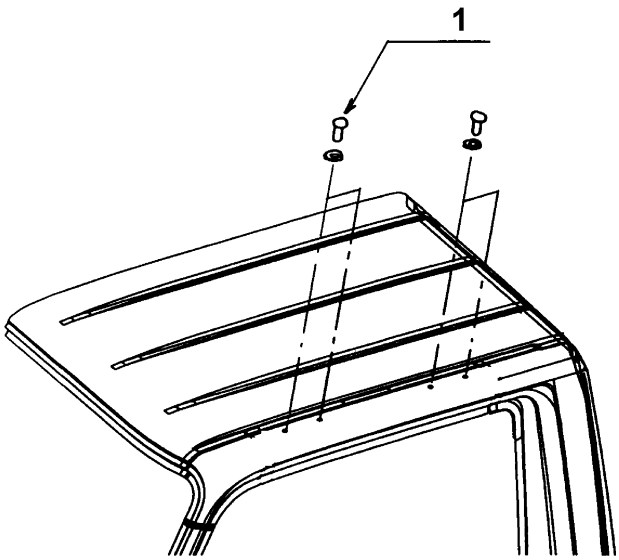


Fig. 4

1 Bolt and washer: Left/right total 8 places
(For roof deck or drag foiler)

6.10 Seats and seat belt

⚠ Risk of injury

Modifications to or work incorrectly carried out on a restraint system (seat belt and seat belt anchorages, belt tensioner or airbag) or its wiring, could cause the restraint systems to stop functioning correctly, e.g. the airbags or belt tensioners could be triggered inadvertently or could fail in accidents in which the deceleration force is sufficient to trigger the airbag. For this reason, never carry out modifications to the restraint systems.

Comply with all national regulations and directives.

The retrofitting of original seats and/or bench seats is only permitted and possible if the necessary preinstallations exist in the vehicle, such as suitable floor assembly, reinforced cab/cab suspension. For all other seat retrofittings, corresponding evidence (belt checks, tensile tests) is required as part of an endorsement check carried out by the department responsible ▷ 2.2.

Unit: mm

6.11 Power take-offs

6.11.1 Transmission driven power take-off

- The PTO output shaft turns backward relative to the engine revolution.
- The durable life time under rated operation is 500 hours.
- For details of power take-off, see ▷ 10.9.

Engine	Transmission model	PTO revolution ratio (relative to engine revolution)	Permissible output shaft torque/speed N·m/rpm [kgf·m/rpm]	PTO control	Part number		Remarks
					Output	PTO assembly	
4P10	M038S5 (MT) M038S6 (AMT)	0.644 (MT) 0.655 (AMT)	147/2000 [15/2000]	Wire type (for dump trucks)	Directly coupled to pump	ME530972	Dump truck
			196/1500 [20/1500]	Vacuum type	Flange type	ME536138	MT
						ME530661	AMT
					Adapter type	ME536139	MT
						ME530666	AMT
		0.638 (MT) 0.651 (AMT)	196/1500 [20/1500]	Vacuum type	Direct connection type	ME536976	*
		0.723 (MT) 0.727 (AMT)	392/1500 [40/1500]	Vacuum type	Flange type	ME536881	MT
						ME536882	AMT

*: The PTO output shaft rotate in the same direction with the engine revolution, others are rotate in the opposite direction.

Cab back engine control (accelerator sensor for body building)

- The movement of the cable from the built body is converted to a corresponding electrical signal to thereby control the engine speed.
- To retrofit the cab back control, data must be modified of the engine ECU and SAM control unit. The power take-off is enabled only after the data has been modified. Consult the MITSUBISHI FUSO authorized Distributer.

- Detail of Accelerator Sensor

<OLD: ~June 2021>

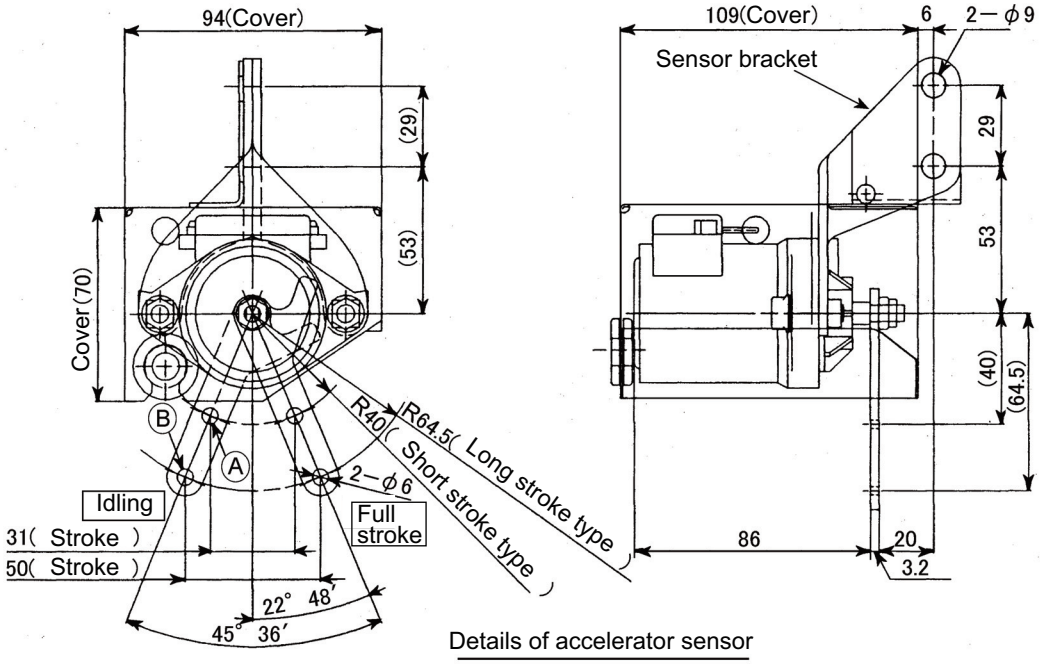


Fig. 1

- Lever Stroke

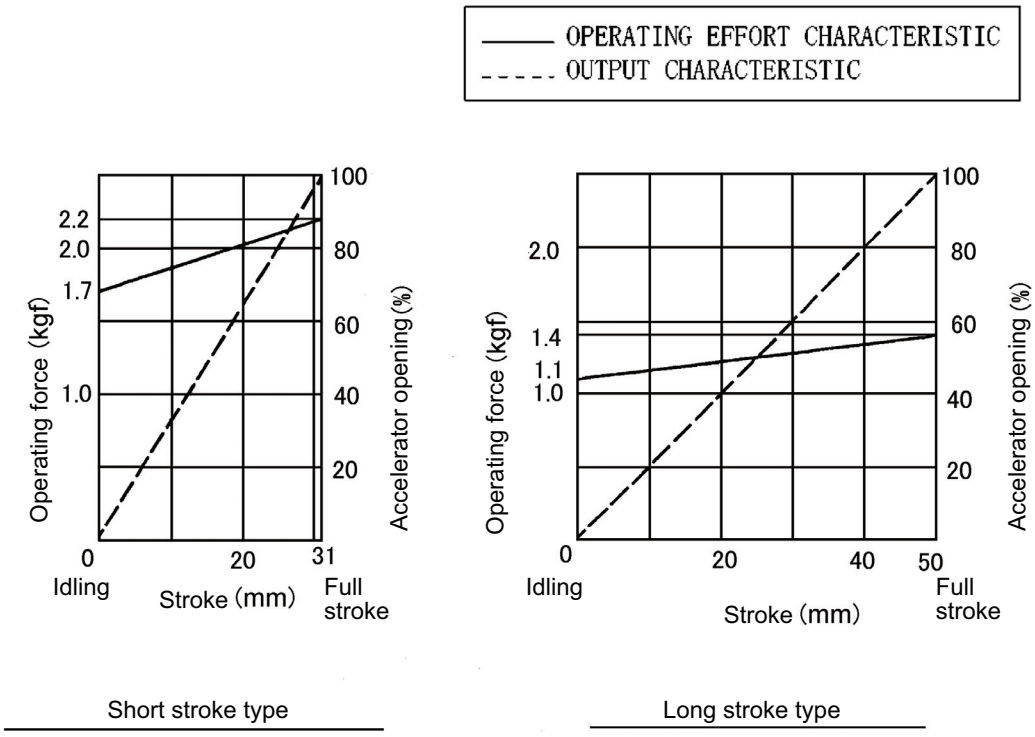
It's able to choose 2 kinds of lever stroke by choosing a clevis hole of the accelerator sensor lever Table 3.

Table 3 (Accelerator Sensor Specification)

	LEVER HOLE	LEVER STROKE	LEVER OPERATING EFFORT N {kgf}		LEVER LENGTH
			AT IDLE	AT FULL STROKE	
SHORT STROKE TYPE	(A)	31	17 N {1.7 kgf}	22 N {2.2 kgf}	40.0
LONG STROKE TYPE	(B)	50	11 N {1.1 kgf}	14 N {1.4 kgf}	64.5

- Sensor Output Characteristic

Output characteristic and operating effort are as following figure.



- Detail of Accelerator Sensor

<NEW: July 2021~>

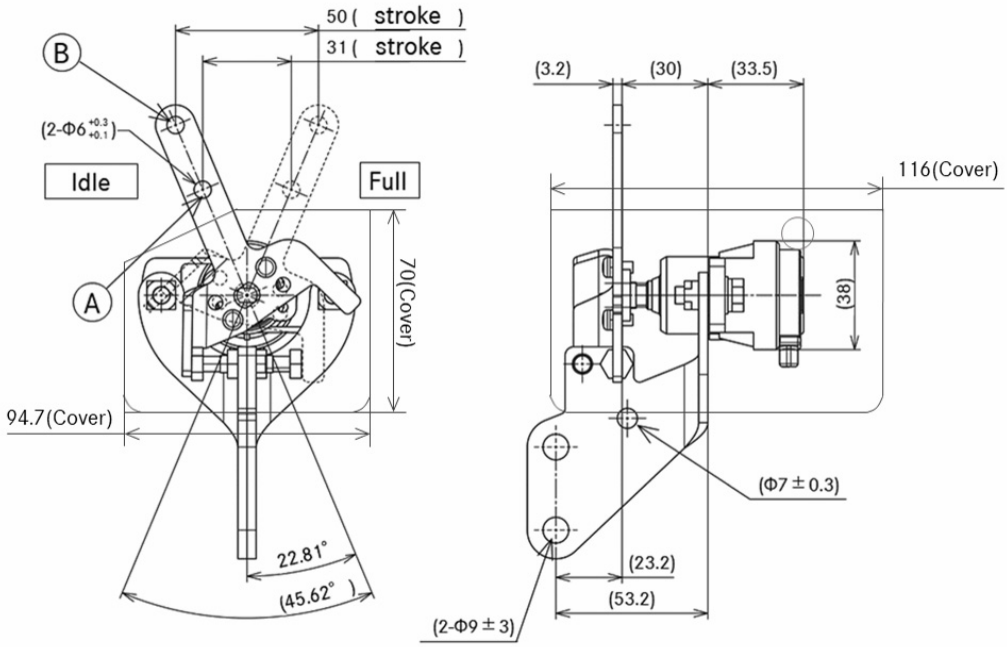


Fig. 1

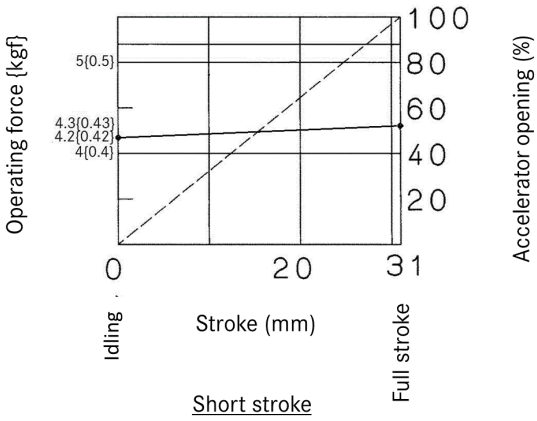
- Lever Stroke

It's able to choose 2 kinds of lever stroke by choosing a clevis hole of the accelerator sensor lever Table 3.

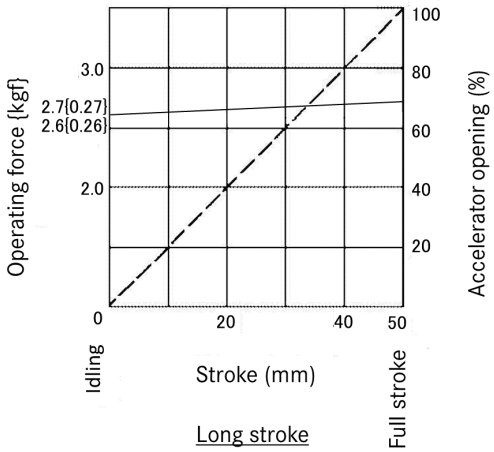
Unit: mm

Table 3 (Accelerator Sensor Specification)

	LEVER HOLE	LEVER STROKE	LEVER OPERATING EFFORT N {kgf}		LEVER LENGTH
			AT IDLE	AT FULL STROKE	
SHORT STROKE TYPE	(A)	31	4.2 {0.42}	4.3 {0.43}	40.0
LONG STROKE TYPE	(B)	50	2.6 {0.26}	2.7 {0.27}	64.5



Short stroke



Long stroke

- Installation of the accelerator sensor

Connecting the harness

The connector of the accelerator sensor on the chassis side is set at a rearward portion on the left of the cab as illustrated below. Connect it to the accelerator sensor by using a sub-harness.

Installing the accelerator sensor

Install the accelerator sensor by using the bracket attached to it. Install the sensor together with the cover.

Precautions:

(a) Install the accelerator sensor at a location free from water splashed from a high pressure vehicle washing system or gravel or mud water flown from a tire. Be also careful about dust, high temperature, vibration, and interference with other parts and fit a cover.

(b) Ensure that the accelerator sensor lever is pulled in the direction in parallel with the lever stroke direction and that the lever is free of bend or twist.

(c) Do not adjust the stopper bolt of the accelerator sensor.

(d) Adjust the control on the built body side so as to reach its full stroke before the accelerator sensor.

(e) Fix the connector and harness in place with a band clip or similar device to prevent them from being loose.

(f) Do not drop or give strong impact to the sensor. Do not disassemble the sensor, as an erratic operation or failure could result.

(g) Do not use the return spring force of the Position the accelerator sensor when returning the body part/equipment side control.

Portion in which the accelerator sensor connector is set on the chassis side

Fig. 2

List of set parts

Unit: mm

Part Number	Description	Sub-harness length[mm]
ML343597	SENSOR ASSY,CAB BACK CONTROL	-
MK648545	HARNESS,CAB BACK CONTROL	2500
ML235685	SUB HARNESS ACCEL SENSOR	180

6.11.2 Governor

(1) Electronically controlled governor

The electronically controlled governor (electronic governor) automatically switches to a special equipment governor during PTO operation.

The vehicle can be mounted with a cab back engine control (sensor-based) for engine control during PTO operation.

For the cab back engine control, see ▷ 6.11.1.

For governor performance, see ▷ 10.3.3.

Engine model	Governor model	Governor characteristics	Engine control	Operation	Applicable vehicle model (Note 4)		Remarks
4P10T2, 4, 6	Electronically controlled	Normal engine governor	–	–	Standard vehicle	Vehicles not equipped with PTO	[Note 1]
		Special equipment governor	Sensor-based	PTO-ON	Special equipment vehicle	Vehicles with transmission PTO	[Notes 2 and 3]

Notes:
1. Retrofitting a standard vehicle with a PTO requires a change of SAM parameters including the engine ECU. Consult the contact person ▷ 2.2.
2. Retrofitting the cab back control requires a change of engine ECU parameters. Consult the contact person.
3. On a vehicle equipped with the cab back control, the accelerator pedal is inoperative while the PTO is ON. (This can, however, be changed by selecting a new control number.)
4. Only the transmission PTO is set for the model 4P10 engine.

(2) Governor characteristics

For the special equipment governor, governor characteristics during PTO operation can be selected by selecting the control number (Additional information 1). Only with the vehicle with PTO, #1 has been factory-selected for models not equipped with the cab back control. To change the governor characteristics according to body building, use the table shown below to find the control number appropriate for the need.

If the PTO is retrofitted on the standard vehicle, select the control number according to body building from among those shown in the table below (Additional information 1).

<Special equipment governor characteristics and engine control systems relative to the control numbers>

Control number	Special equipment governor characteristics		Engine control system	
	Governor type	Max. speed	Accelerator pedal	Cab back control
#1	Soft	①	○	×
#2	Hard	Ⓐ	○	○
#3	Soft	①	×	○
#4	Hard	Ⓐ	×	○
#5	Soft	②	○	○
#6	Hard	Ⓑ	×	○
#7	Soft	③	×	○
#8	Soft	④	×	○

Additional information

- The control number can be selected by changing the engine ECU parameters. Consult the department responsible ▷ 2.2.
- In any case, characteristics are the normal engine one and the cab back sensor is inoperative when the PTO is OFF.
- If both the cab back sensor and accelerator pedal are operated at the same time, the engine is controlled by whichever has a greater input.
- For max. speed codes shown in the table above, see ▷ 10.3.3.

6.12 Installation of propeller shafts

The modification of extending or shortening the wheelbase or additional installation of a gear box to the drive line requires the modification of the propeller shaft. If the propeller shaft is improperly modified such as a change in the pipe length by welding to the main unit of the propeller shaft, vibration caused by the propeller shaft can lead to a serious trouble or accident such as cracks and rupture of the clutch housing and falling-off of the propeller shaft. Therefore, the modification of the propeller shaft is strictly prohibited.

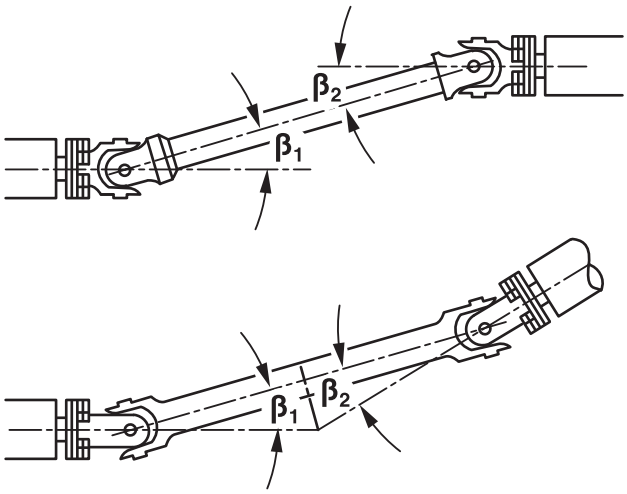
If the modification of the propeller shaft is necessary due to a customer's request or body mounting layout, be sure to consult with contact personnel for body mounting and modification. (▷ 2.2)

Observe the following when installing propeller shafts:

- Installation guidelines of the propeller shaft manufacturer.
- If necessary, fit several propeller shafts with intermediate bearings.
- The flanging surfaces must be completely flat.
- The angular offsets must be identical at both universal joints ($ß_1 = ß_2$). They must not be greater than 6° or less than 1°.
- Balancing plates must not be removed.
- Make sure that the marks are aligned on the propeller shafts during installation.
- Eliminate any vibrations, e.g. by optimising the propeller shaft angles.

6.12 Installation of propeller shafts

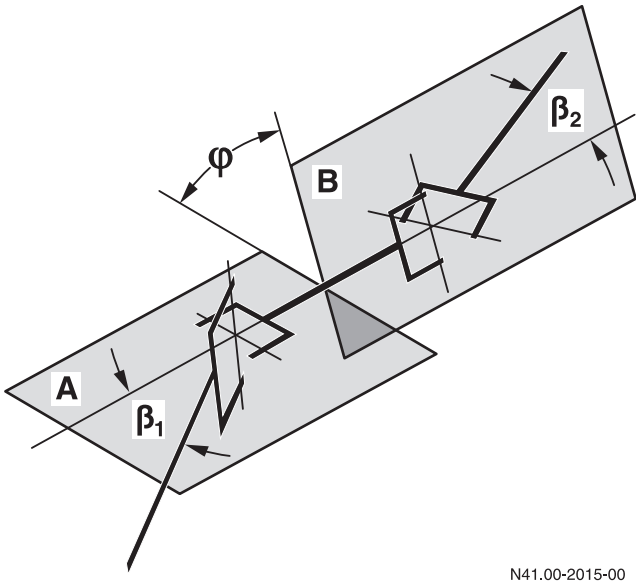
6.12.1 Types of angular offset



N41.00-2014-00

Angle in one plane (two-dimensional offset)

$\beta_1 = \beta_2$
Upper = Z-type offset
Lower = W-type offset



N41.00-2015-00

Angles in two planes (three-dimensional offset)

$\beta_1 = \beta_2$

With three-dimensional offset, the input and output shafts intersect in different planes (combined W- and Z-offset).

In order to compensate for any irregularities, the inner joint fork must be offset.

Property damage

Failure to observe these instructions could result in damage to the major assemblies.

6.13 Brake systems

Risk of accident

Work carried out incorrectly on the brake system may impair its function. This may lead to the failure of components or parts relevant to safety. This could cause you to lose control of the vehicle and cause an accident with possible injury to yourself and others.

All accident prevention regulations must be complied with when working on the vehicle.

Comply with all national regulations and laws.

Additional information

After any modifications the brake system must be tested for proper operation and approved by a technical inspection authority otherwise the operating permit will be invalidated.

Further information can be found in Section 5 "Damage prevention" ▷ 5.1.

ESP (Electronic Stability Program)

<Vehicle with ESP>

- Be sure not to change the engine power, transmission, final ratio (except option), tire size, suspension, system or wheelbase.
- Be sure not to alter ESP - associated devices, sensors, harnesses or connectors in any way.

Disk brake

Property damage

Do not impede cooling by attaching spoilers below the bumper, additional hub caps or brake disk covers, etc.

6.13.1 Chassis tubing form and dimension specifications

The chassis uses steel brake lines which conform to the following specifications.

(Double Flare type) Unit: mm

Nominal diameter D	A	B	t	C	S min.	Material	Tightening torque * N·m {kgf.cm}
4.75 4.76	6.6-7.1	3.0-3.7	0.7	1.4	1.0	SPCC (JIS) (ASTM A109 or A366) Double walled steel tubes	13-17 {1.3-1.7}
6.35	8.6-9.1	4.5-5.2	0.7	1.4	1.0		19-26 {1.9-2.6}
8	10.5-11.0	6.2-6.9	0.7	1.4	1.6		29-39 {3.0-4.0}
10	13.0-13.5	8.2-8.9	0.7	1.4	1.6		39-50 {4.0-5.1}
12	15.0-15.7	9.8-10.5	0.9	1.8	1.6		77-90 {7.5-8.9}
15	18.1-18.8	12.7-13.4	1.0	2.0	1.6		85-100 {8.3-9.8}

* The tightening torques for the flare nuts which connect the brake lines.

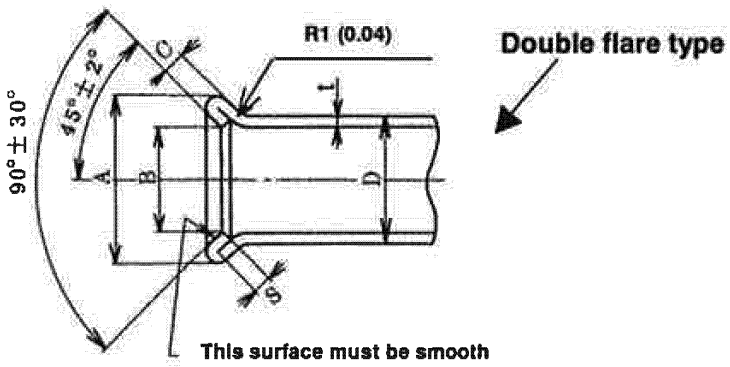


Fig. 1 (1/2)

(ISO Flare Type) Material is the same as Double Flare types. Unit: mm

Nominal diameter	D_1 ±0.07	D_2 ±0.18	D_3 +0.3 -0.2	D_4 min.	T ±0.07	l ±0.3
4.75	4.75	7.1	3.2	4.7	0.7	2.5
4.76	4.76					
6.35	6.35	8.8	4.8	6.3		

D4 is an outside diameter on the sealing surface. The surface-roughness is $\sqrt[3.2]{\lambda\tau 0.8}$

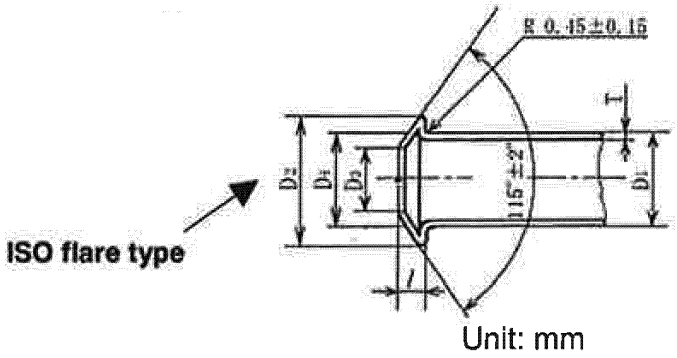
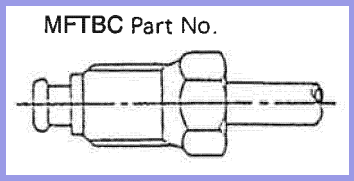


Fig. 2 (2/2)

6.13.2 Making additional tubes

- Only use brake tubes of the same material as the tubes connected to the chassis when extending the brake tubes.
- Only use steel tubes to extend the brake fluid tubes. Never use copper tubes.
- Only use metric pipe tools to form the flared end of brake lines as shown in the "Flared end shape figure" in Fig. 1. Be careful to not scratch the tubes, or damage the mating surfaces when flaring the ends.
- A brass nut used with steel tubes could cause uneven fitting between the flared surface of the tubes and the connecting surface joint, resulting in fluid leakage.
- Use the flare nuts specified in the table below.

Nominal diameter of tube mm	 Fig. 2
4.75 4.76	MF651001 (Double flare type) MK678335 (ISO flare type)
6.35	MF651002 (Double flare type) MK678336 (ISO flare type)

- Use a tubing bending tool to bend the brake lines correctly. Do not use heat to bend the brake lines.
- The bend curvature R should strictly conform to the minimum allowable bend radius R shown in the table below.

Nominal diameter mm	Bend radius mm
4.75 4.76	25
6.35	30

- The required length of the straight portion of the line end and the bent portion must conform to the dimensions specified in Fig. 3.

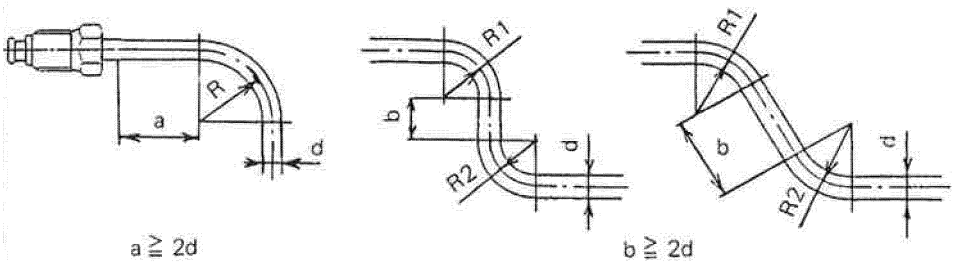


Fig. 3

- 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.

6.13.3 Running additional lines

- Avoid crossing brake lines. If this is unavoidable, position each line so it clears the other by more than 15 mm. (Fig. 4)

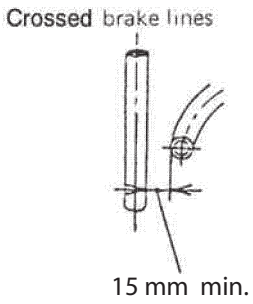


Fig. 4

- Position the brake lines so that they are not closer than 15 mm to sharp edges of the frame or other parts. (Fig. 5)

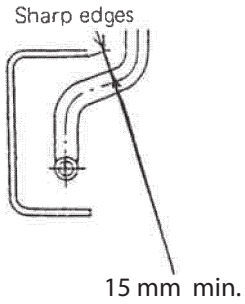


Fig. 5

- Securely clamp brake lines with PVC coated clamps or grommets to prevent vibrations when the vehicle is running.
- The standard brake line clearances are shown in the table below.

Unit: mm

Tube dia	Clamp intervals	
	Straight tube	Curved tube
4.75, 4.76	550	400
6.35	550	400
8	550	400
10	750	550
12	750	750
15	750	750

- 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 away from bolts and rivets.
- Make sure the brake fluid lines can be bled easily.
- Never clamp or tape electrical wires to the brake lines, as this can cause corrosion of the line.
  Maintain the clearances described in Section 4 "Clearance for the basic vehicle and bodies" ▷ 4.4.
- The clearance between the brake lines and exhaust system components should conform to the specifications in Section 4 "Clearance for the basic vehicle and bodies" ▷ 4.4.
- Position the connection nut in a location where it can be completely tightened without difficulty.
- Tighten the flare nuts to torque specified in ▷ 6.13.2. 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.
- 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.
- Never install brake lines near the drive shaft or other moving parts.
- Never change the installation location of the brake hoses.
- When replacing the brake lines, do not use the fluid which was drained.
  Drain the fluid completely and replace with new fluid.
- Install the brake lines so that they are protected from damages caused by flying objects thrown up by the tires.
- When it is necessary to protect brake lines against possible damage as described above, install a protective panel as shown below.
  (a) Fabricate a protective panel which will not be deformed by flying objects and come in contact with the brake lines.
  (b) Position and shape the protective panel properly (for drain holes, etc.) so water will drain freely.

Example

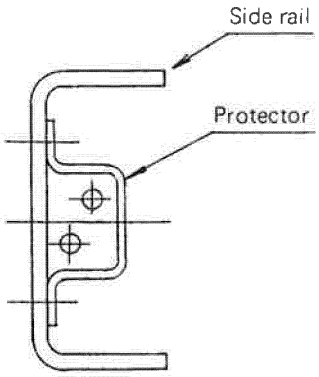


Fig. 6

6.14 Exhaust system

The modification of the exhaust system is prohibited because it has an adverse effect on the noise regulation, fire prevention, emission control system and engine.

<Vehicles with SCR and DPF systems>

6.14.1 Exhaust gas purification devices (BlueTec® system) and sensors

- Exhaust gas purification devices (BlueTec® system) may be damaged by heavy impact against their body or fall. When mounting, handle them with sufficient care.
- To prevent the exhaust gas purification devices (BlueTec® system) and engine proper from being adversely affected, do not relocate the exhaust gas purification devices (BlueTec® system), exhaust temperature senor, differential pressure sensor, lambda sensor and NOx sensor.
  If temporary removal of these parts becomes inevitable during mounting, be sure to reinstall these parts in the original places. Connect the pressure sensor hose properly, not in reverse, too loose nor too tense. Also, securely clip hose joints and make sure of gas-tightness.
- Exhaust gas purification devices and sensors are periodically removed for maintenance. Install them so that removal and reinstallation work can be carried out without any problems.

6.14.2 BlueTec® system

BlueTec® exhaust gas aftertreatment

BlueTec® exhaust gas aftertreatment removes NOx in the exhaust gas.
Do not modify and transfer the following parts because the performance of the system is deteriorated.

- SCR muffler
- Urea tank unit
- Dosing module
- Urea hose

Property damage

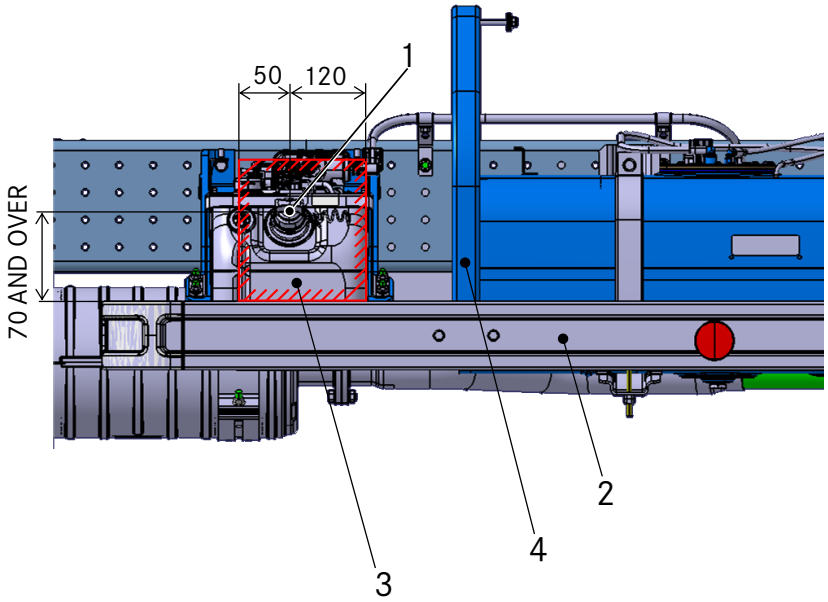
Do not take out the power supply for other electric components from the existing fuse.

Especially the function of BlueTec® exhaust gas after treatment can not work when the fuse of system is blowout.

BlueTec® exhaust gas after treatment requires a lot of electric power to work the heating device for freeze proofing in winter or cold region.

Installing a side guard and other parts around the urea tank

- Care is required when installing a side guard around the urea tank. Do not let the side guard and its mounting stay hide the filler cap of the tank and interfere with refilling the tank with AdBlue®. Be sure to open up sufficient space around the cap to allow a filler gun of AdBlue® to be inserted; typical dimensions of filler guns are shown in the figures below.
- Allow a clearance of at least 25 mm between the side guard, mud guard, etc. installed around the urea tank and the following parts of the urea tank: front end, rear end, and outer side.
- Avoid directly attaching parts to any of the urea tank brackets.
- Maintain sufficient free space to insert AdBlue® filler nozzle. (shaded area)



1 Cap
2 Side guard
3 Urea tank
4 Side guard mounting stay

AdBlue® filler gun - Examples

Filler gun for dispensers

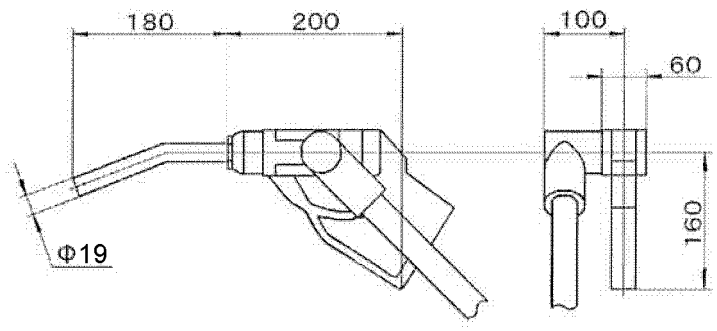
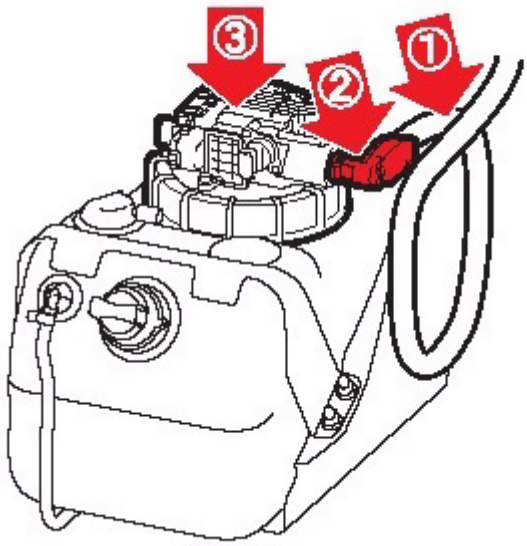


Fig. 2

6.14 Exhaust system

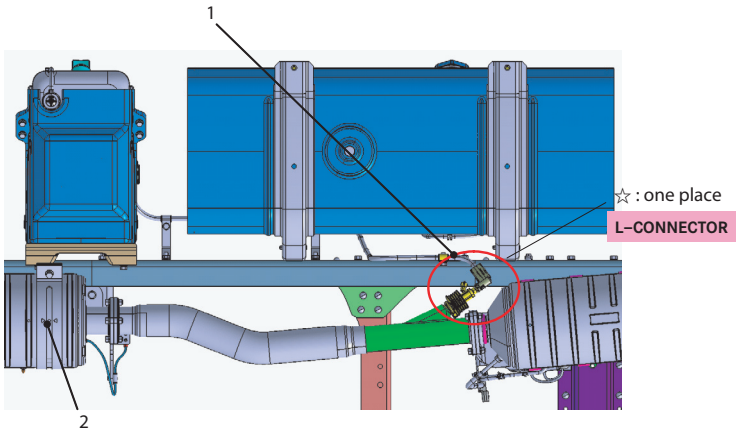
Urea tank and connection piping

- The urea tank with a urea pump module inside, the dosing module, and their connection piping are all installed conforming to the relevant exhaust gas control requirements. It is prohibited to relocate these components and change their piping when mounting the body or equipment.
- If an excessive force is applied to the urea tank and/or hose ①, the hose connector ② or the hose ① may break.
  (a) Do not pull the hose ① when servicing.
  (b) Do not step on the area around the hose connector ② or top of the urea tank ③. Do not apply heavy impact and do not scrub hard with a car wash brush.
- Do not use a broken hose connector or hose as it may cause leakage of urea water.

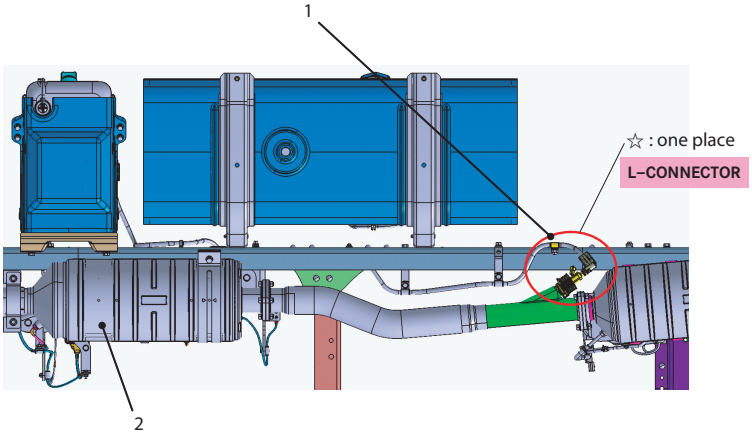


<EuroV Type>

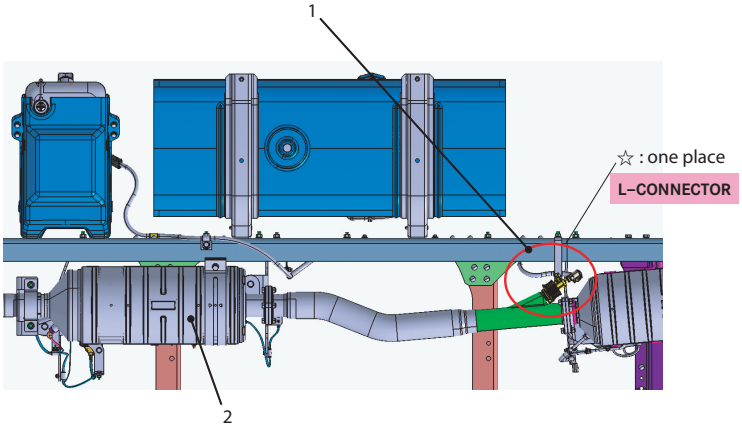
Wheel base: E



Wheel base: G



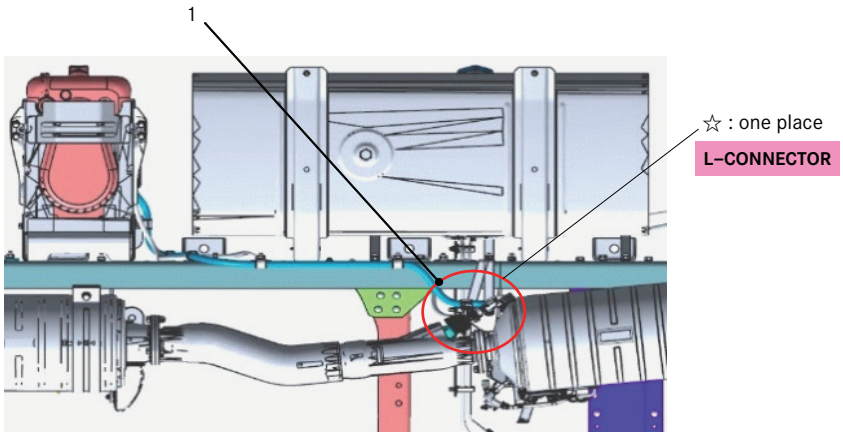
Wheel base: H, K



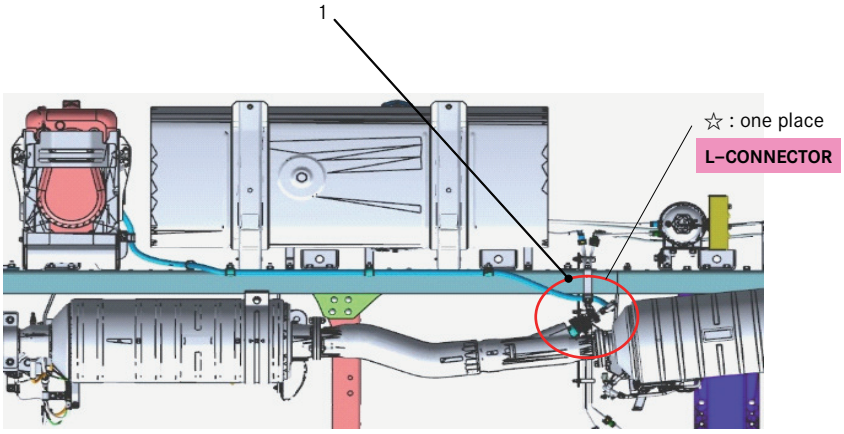
1 Dosing module
2 SCR muffler with internal catalyzer

<Euro VI Type>

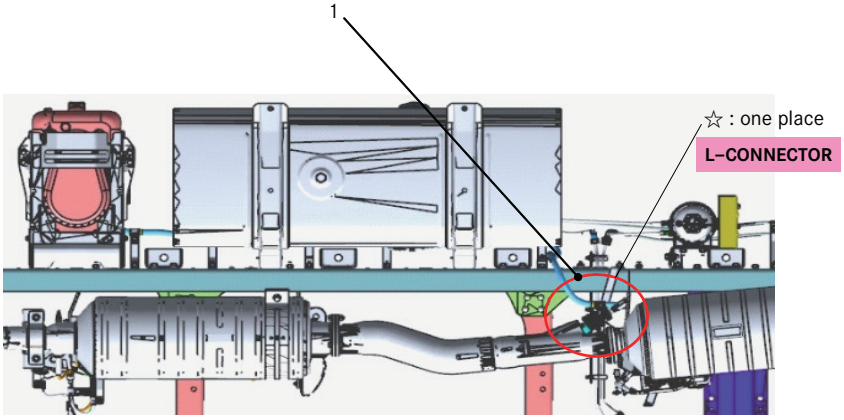
Wheel base: E



Wheel base: G

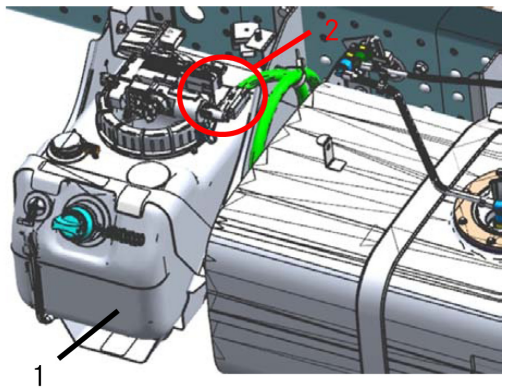


Wheel base: H, K



1 Dosing module

6.14 Exhaust system



1 Urea tank
2 L-connector

There are urea hose connecting ports near the L-connector. After any operation including mounting the body or equipment near these areas, visually check that the clamps of the coupling connector is fully closed regardless of whether you touch the piping or not.

Property damage

Applying undue force to hoses may damage their connections. Do not pull on hoses or step on their connections.

Precautions for electric welding

If electric welding is performed while the electric wiring for the pump module of the BlueTec® system is still connected, the internal electric circuits on the module could be damaged. Be sure to disconnect the module's electric wiring connector as follows before starting electric welding:

- Turn the starter switch to "OFF".
- Leave the starter switch in the "OFF" position for at least 1 minute. (This is necessary for after-run processing.)
- Disconnect the wiring connector on the pump module side.
- Be sure to ground the welder close to the welding area.

When reconnecting the connector after completing the electric welding, confirm that the starter switch is in the "OFF" position.

Property damage

Do not divide any power supply from an existing fuse.

Especially the BlueTec® system will not work if its fuse has blown. In winter and cold areas, the system consumes more electric power for its heater to prevent freezing. Never branch power for another electric device from the fuse.

<Vehicles with DPF system>

6.14.3 Clearance between exhaust system parts and other parts

- The exhaust pipe and exhaust gas purification devices (DPF, Rear Oxidation catalyst) become so hot that if they are too close to or in-terfere with other chassis parts, a serious accident like fire or damage by melting could occur. Malfunction is also a possible consequence. Secure sufficient clearance in accordance with the standards ▷ 4.4. If this is impracticable, provide a shield plate against heat to ensure safety.
- Do not install the tail pipe under fuel pipe, fuel hose joint or fuel filter drain tube.
  Wooden and rubber body parts should be more than 100 mm apart from the diesel particulate filter (DPF) integrated muffler and exhaust pipe. If this is impracticable, provide a shielding plate against heat to ensure safety.

Risk of accident and injury

The tail pipe (including Rear Oxidation catalyst) of a DPF-equipped vehicle can become considerably hotter than that of a conventional vehicle during automatic regeneration. Provide sufficient clearance between the tail pipe and other parts.

6.14.4 Exhaust gas purification devices (DPF, Rear Oxidation catalyst) and sensors

- The muffler integrated with diesel particulate filter (DPF) may be damaged by heavy impact against its body or fall. When mounting, handle it with sufficient care.
- To prevent the exhaust gas purification devices (DPF, Rear Oxidation catalyst) and engine proper from being adversely affected, do not relocate the exhaust gas purification devices (DPF, Rear Oxidation catalyst), exhaust temperature sensor or pressure sensor.
  If temporary removal of these parts becomes inevitable during mounting, be sure to reinstall these parts in the original places. Connect the pressure sensor hose properly, not in reverse, too loose nor too tense. Also, securely clip hose joints.
- The DPF-integrated muffler is periodically removed for maintenance. Install it so that removal and reinstallation work can be carried out without any problems.

6.15 Fuel system

6.15.1 Fuel tank

Do not connect the chassis-mounted fuel tank and the mounting bracketsto the body-building part, because this may adversely affect the mounting strength of the fuel tank.

Precautions for relocating the fuel tank

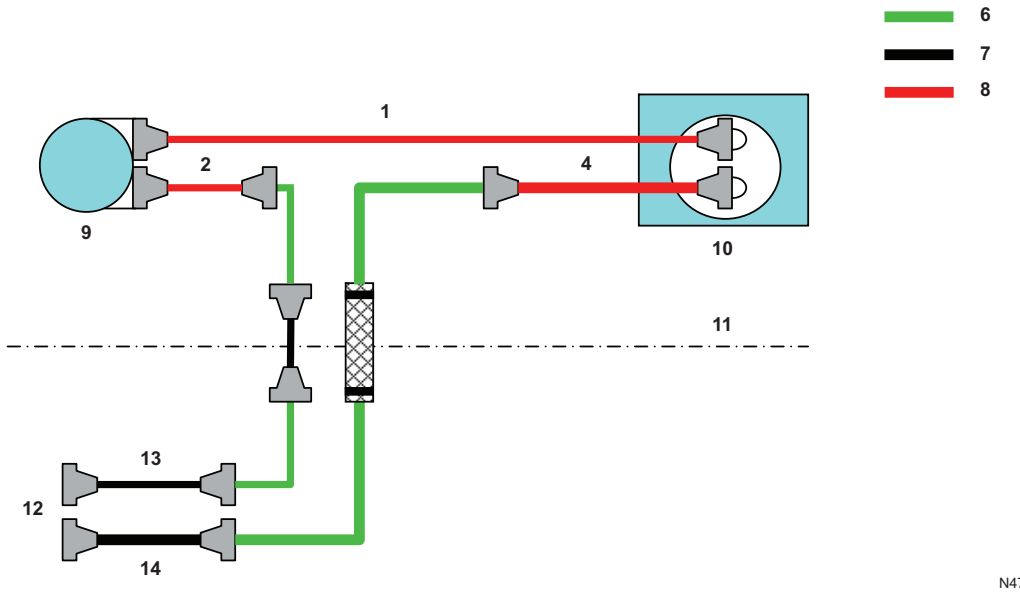
When changing the fuel pipes, use the specified steel pipes, nylon tubes and joints indicated below. If you use poor quality parts, a fire may occur, so be sure to purchase genuine parts from your local MITSUBISHI FUSO parts dealer.

Nylon tube

Unit: mm

Nominal diameter	Part number	Length	Applicable location
8	MK629953	1,000	Fuel tank – Fuel filter ①
	MK629955	1,500	Fuel tank – Fuel filter ①
	MK629957	2,000	Fuel tank – Fuel filter ①
	MK629959	3,000	Fuel tank – Fuel filter ①
	MK629961	1,000	Fuel filter – Main pipe ②
	MK629963	1,500	Fuel filter – Main pipe ②
	MK629965	2,000	Fuel filter – Main pipe ②
	MK629967	3,000	Fuel filter – Main pipe ②
	MK620244	2,000	Fuel filter – Joint ③
	MK620246	3,500	Fuel filter – Joint ③
10	MK629969	1,000	Return pipe – Fuel tank ④
	MK629971	1,500	Return pipe – Fuel tank ④
	MK629973	2,000	Return pipe – Fuel tank ④
	MK629975	3,000	Return pipe – Fuel tank ④
	MK620248	2,000	Joint - Fuel tank ⑤
	MK620250	3,500	Joint - Fuel tank ⑤

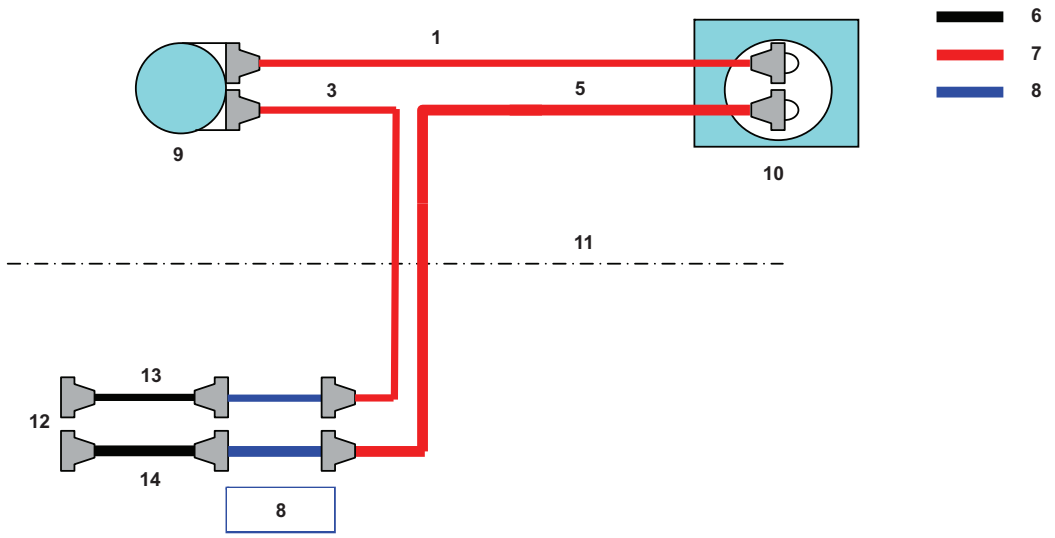
Changing the fuel pipe layout - Example 1



N47.25-2018-00

1 Fuel tank - fuel filter
2 Fuel filter - main pipe
4 Return pipe - fuel tank
6 Steel pipe
7 Existing nylon tube
8 Nylon tube
9 Fuel filter
10 Fuel tank
11 Center of chassis
12 Engine side
13 Feed line
14 Return line

Changing the fuel pipe layout - Example 2



N47.25-2019-00

1 Fuel tank - fuel filter
3 Fuel filter - connection
5 Connection - fuel tank
6 Existing nylon tube
7 Nylon tube
8 Joint
9 Fuel filter
10 Fuel tank
11 Center of chassis
12 Engine side
13 Feed line
14 Return line

Joint

When changing the fuel pipes as shown in Example 2, remove the steel pipe on the left side of the vehicle, and use the specified joint shown below.

Note that the applicable part number differs according to the width of the frame assembly.

(※ 1: Biodiesel B10 fuel is applicable)

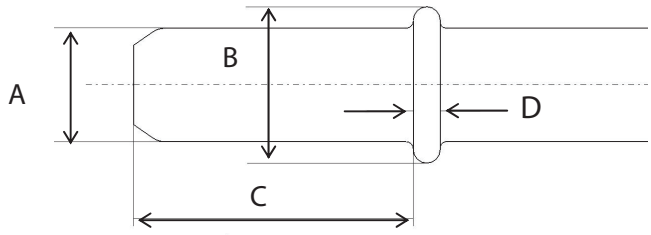
Frame assembly width (mm)	Nominal diameter	Part number	Applicable location
750	8	MK620252 ML209664 (※ 1)	Feed side
750	10	MK620253 ML209665 (※ 1)	Return side
850	8	MK620254 ML209666 (※ 1)	Feed side
850	10	MK620255 ML209667 (※ 1)	Return side

Steel pipes

Use steel pipes that have been rustproofed on both the inside and outside surfaces, and ensure that the shape of the ends of the pipes conforms to the figure below.

Rustproofing
- Inside surface : Copper plating (Plating thickness: 3 μ or more)
- Inside surface (biodiesel B10 fuel applicable) : Nickel plating (Plating thickness: 3 μ or more)
- Outside surface : Zinc plating (Plating thickness: 13 μ or more)

SAE J2044 standard type



Unit: mm

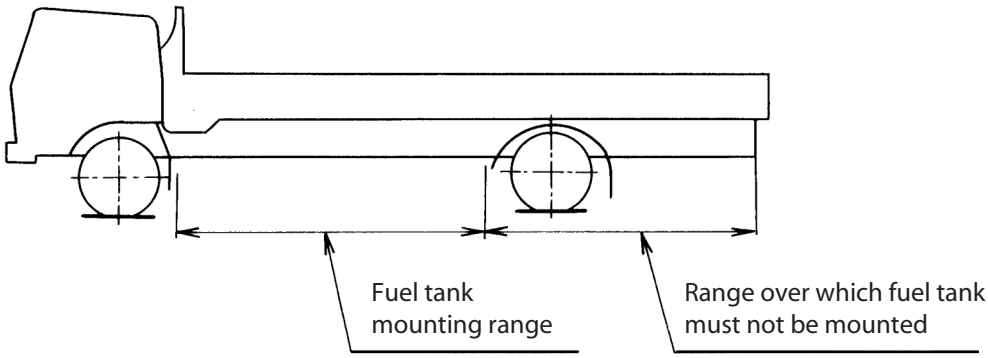
Nominal diameter D	A	B	C	D	
8	7.89 ± 0.06	10.98 ± 0.15	19.52 ± 0.25	1.6 ± 0.33	* 8 mm (5/16″)
10	9.49 ± 0.06	12.94 ± 0.21	19.52 ± 0.25	1.6 ± 0.33	* 9.5 mm (3/8″)

* For details of the shape, refer to SAE J2044.

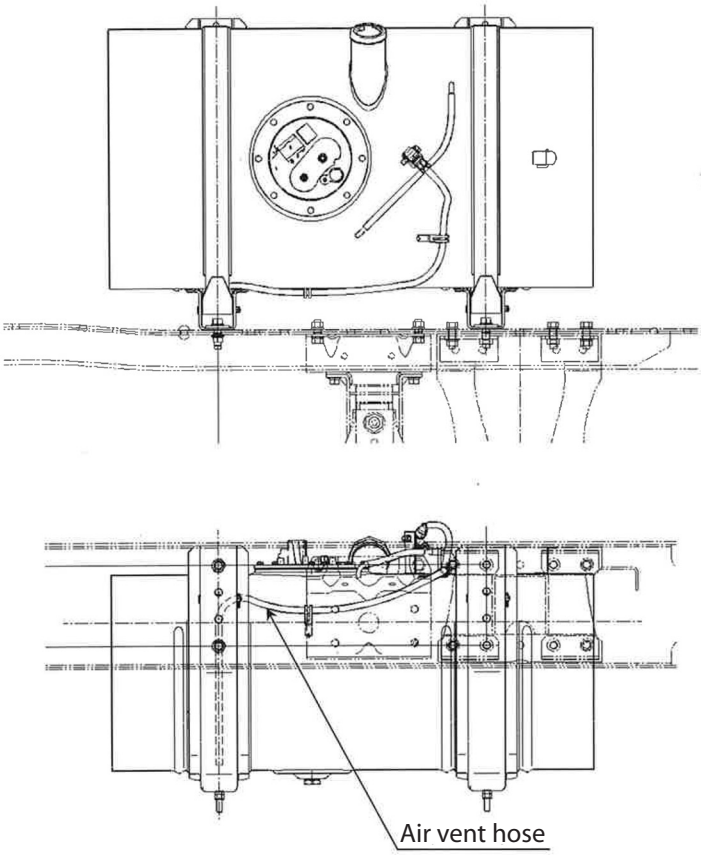
- Do not connect fuel hoses directly to each other. When you wish to extend the length of the fuel hose, connect it to the extension fuel hose via a nylon tube.
- Use steel pipes inside the engine compartment.
- Do not change the clips or the positions of clamps on parts of the engine and the frame which move relative to each other.
- Run fuel hoses and nylon tubes in such a way that they do not touch each other or touch metal pipes, electric wires etc., and then clamp them. If a fuel hose or a nylon tube is in contact with another tube or pipe, for example, it will wear and eventually become damaged, resulting in fuel spurting out or a fire occurring.
- Take care that the side guard and the fuel tank parts do not interfere with each other. Also, take steps to ensure that lubrication work is not impeded.
- Clamp the fuel hose at intervals of between 400 and 500 mm to ensure that its buckling does not occur. Use a sheet metal clip with rubber (MH020418), for example, to clamp the nylon tube. (The recommended bending radius is 80 mm or more for D = 8, and 120 mm or more for D = 10.)
- Maintain the steel pipe at least 15 mm from the corners of other parts, at least 25 mm from parts which move relative to each other, and fix it securely with clamps.
- In order to connect the feed side pipe and the return side pipe to the fuel tank, use nylon tubes and steel pipes whose end shape is stipulated in SAE J2044.
- If you use parts other than the above, fuel leakage is likely to occur, so be sure to use nylon tubes and prescribed steel pipes.
- Never use a rubber hose for the feed side piping.

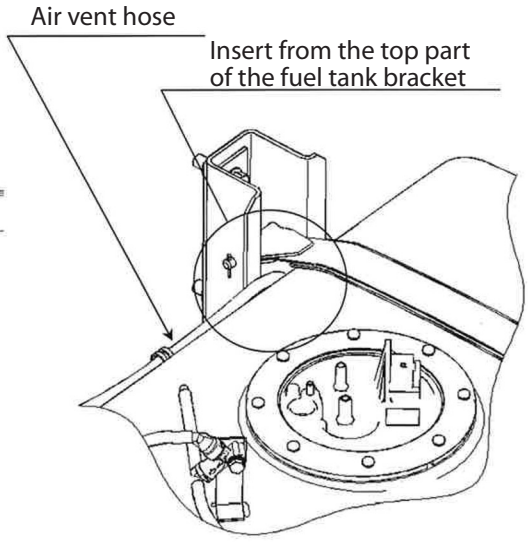
Relocating the fuel tank

- When you wish to relocate the fuel tank, follow the procedure of "Precautions for relocating the fuel tank" ▷ 6.15.1.



- After removing the fuel tank, firmly insert the air vent hose of the fuel tank into the bracket from the top, with the end face downward. When doing this, take care not to crush the air vent hose or allow it to become clogged.

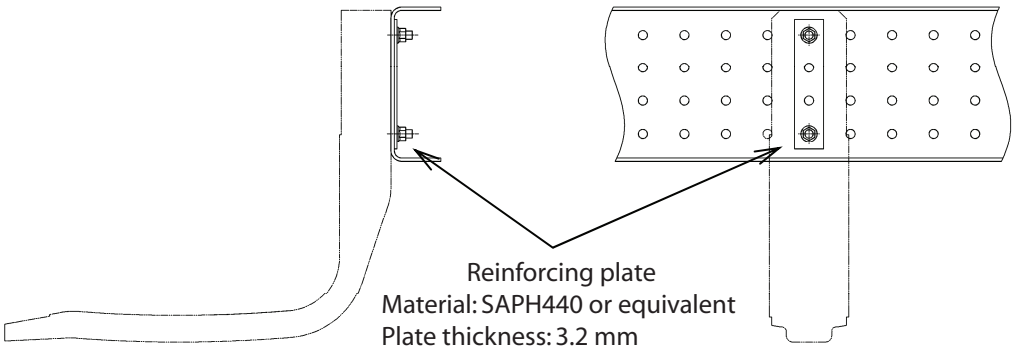




Re-installing the fuel tank

- When re-installing the fuel tank, take adequate account of vibration, the mounting position, and mounting conditions, and ensure that there is no looseness or other problem. When using new brackets, ensure that they have adequate strength to support the fuel tank.

<Fuel tank fixing points – Reinforcement example>



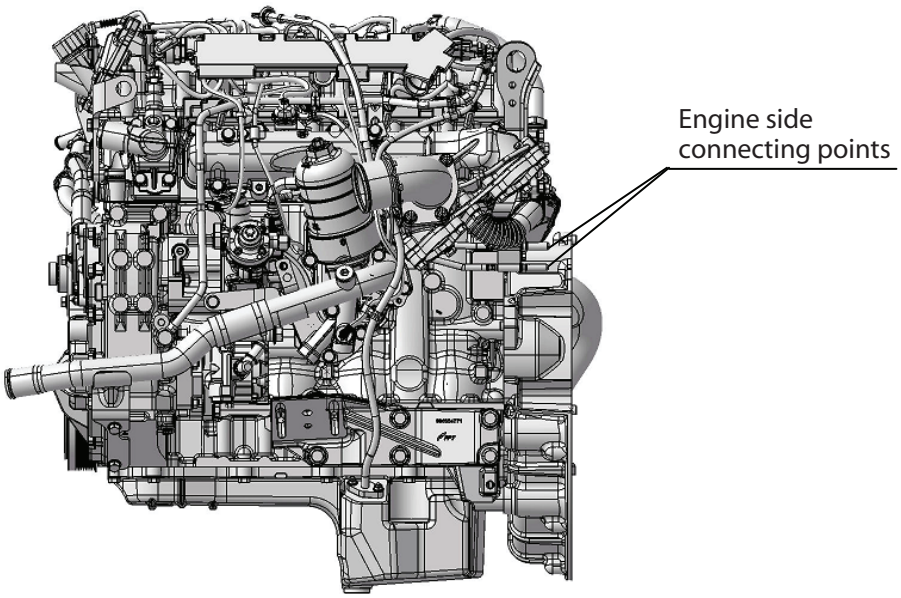
- To connect the fuel tank to the frame, be sure to use flange nuts and flange bolts of the strength classification shown below, and tighten the bolts to the specified torque.

	Size	Strength classification	Tightening torque
Flange bolts	M10	10T or more	90 – 110 N·m {9.2 – 11.2 kgf·m}
Flange nuts	M10	6T or more	

6.15.2 Fuel filter

Relocating the fuel filter

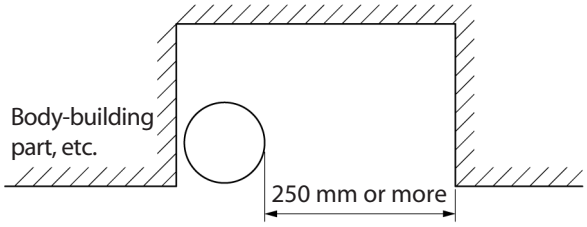
- Relocation position
  - Move the fuel filter to a point within the wheel bases. (It is also possible to mount the fuel tank and the fuel filter separately on the left and right sides of the vehicle.)
  - When relocating the fuel filter to a point near the exhaust pipe, maintain it at a distance of at least 150 mm from the heat source. If it is difficult to secure this distance, be sure to install a heat shield. Do not relocate the fuel filter to a point that is almost directly above the exhaust pipe.
  - Ensure that the water drainage outlet of the fuel filter does not protrude below the bottom surface of the fuel tank.
  - Fix the fuel filter independently to the frame. (This also applies to the case where the fuel filter mounted on the fuel tank brackets is to be relocated.)
- The size of each relocating pipe must be ϕ8 on the main side, and ϕ10 on the return side. For details, refer to "6.15.1 Fuel Tank" ▷ 6.15.1.
- Ensure that the length of each pipe between the engine side connecting point (see figure below) and the fuel tank is within 8.5 m.



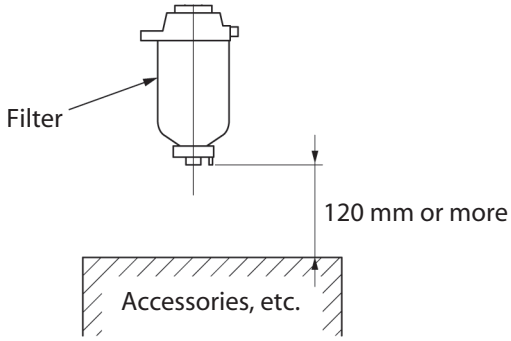
- Never connect fuel hoses directly to each other.
- Take care that dirt or other foreign matter does not enter the removed fuel pipe. (Particularly, be very careful of the part of the fuel pipe between the fuel filter and the engine.) Before installing a new pipe and fuel hose, confirm that there is no dirt or other foreign matter inside.
  If dirt or other foreign matter gets into the fuel filter, the parts of the fuel injection system are liable to break.
- Be careful that the fuel hose and nylon tube do not buckle and impede the supply of fuel.
  Fuel hose: Secure a bending radius of at least 50 mm inside the hose.
  Nylon tube: Recommended bending radius is at least 80 mm for D = 8, or 120 mm for D = 10.
- Secure the clearance indicated below between the fuel hose and the peripheral parts.
  Electrical wires: 20 mm or more
  When there is relative motion: 25 mm or more
  When there is no relative motion: 15 mm or more
- Securely fix the pipes and wires in the vicinity of the fuel filter with clips to prevent them from moving. Install the clips at intervals of no more than 300 mm.
- If there is a possibility of the fuel filter becoming damaged due to flying stones or fallen objects, for example, install a protective cover, or the like.

- Secure a clearance around the fuel filter to enable work such as draining off the water in the fuel filter, bleeding off air or replacing the element. A clearance value is shown below for reference.

  <Upward view>
  - Secure a space of at least 250 mm in at least one direction in the vicinity of the filter (to enable the filter wrench to be applied).



  <Side view>
  Secure the following space.
  - The space at the bottom end of the filter must be at least 120 mm (to enable the filter wrench to be applied).



- Do not modify the fuel filter or the mounting bracket.
- When newly fabricating a fuel filter bracket, ensure that it has adequate strength in consideration of body vibration.
- When refurbishing the electrical wiring going to the fuel filter, refer to "8.2 Electric wiring" ▷ 8.2.
- If there is anything concerning the relocation work that you are not sure of, please consult with the department in charge of body-building and modification.
  "2.2 Technical advice and contact persons" ▷ 2.2.

6.16 Handling of HEV system

Risk of accident

For HEV system, never modify or relocate high-voltage equipment, as this can cause electric shock or failure, and may be illegal. High-voltage of 270 V may be generated in the high-voltage circuit consisting of high-voltage equipment (motor generator, motor electronic control unit and high-voltage battery box) and high-voltage cable (orange color). Due care must be exercised. Also, the national regulations and laws in which the vehicle is to be used must be strictly observed.

Never use the high-voltage battery for any other application.

You cannot carry out body building for the purpose of transporting dangerous items.

Property damage

Do not wash the high-voltage battery using high-pressure washing. This may result in water getting inside the high-voltage battery, causing it to become damaged.

Do not drive the vehicle on a road that is submerged with water to a depth of 30 cm or more. This may result in water getting inside the high-voltage battery, causing it to become damaged.

Characteristics of HEV system
The system is equipped with a high-voltage battery (270 V) exclusive for the HEV system apart from a 12 V battery.
High-voltage is interrupted when the starter switch is turned OFF.
High-voltage is generated in the high-voltage circuit when the starter switch is turned ON.
High-voltage may be generated in the high-voltage circuit regardless of the vehicle condition when the HEV system is abnormal (illumination of the HEV warning lamp).

Additional information

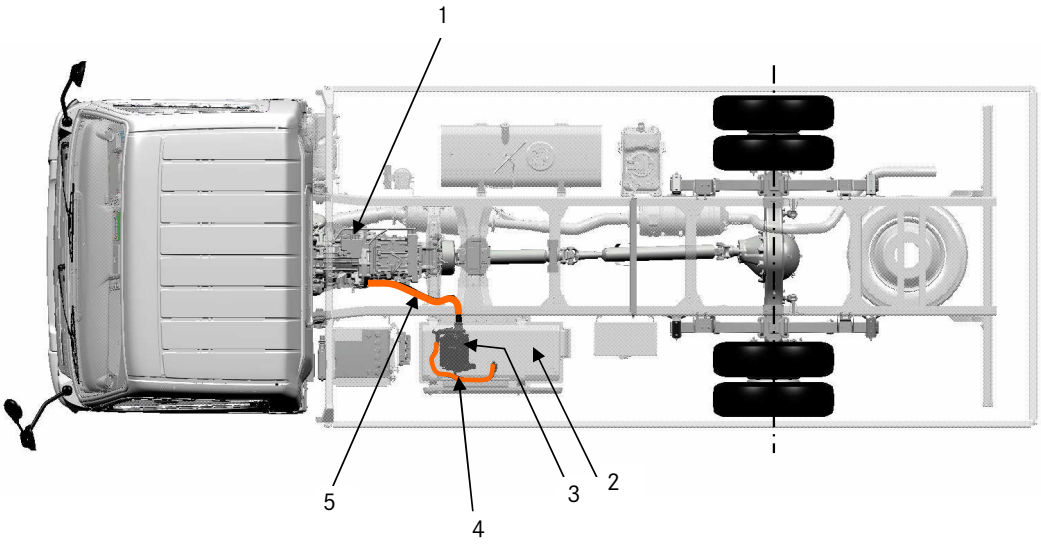
An ISS (Idling Start & Stop system) is standard fitment.

For this reason, there is a possibility of a chiller or other unit mounted on the vehicle becoming adversely affected while the ISS is operating. In such a case, it is recommended that you turn OFF the ISS switch.

6.16.1 General precautions

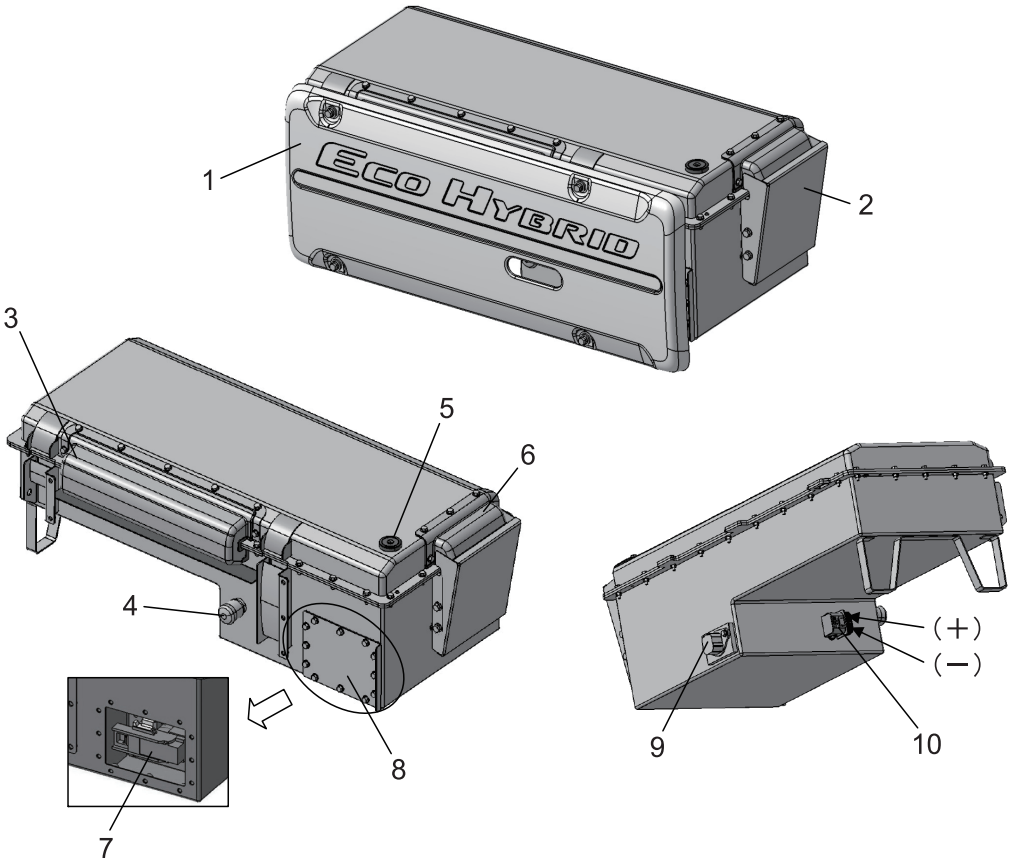
⚠ Risk of accident

A hybrid vehicle has high-voltage (approx. 270 V). Be careful that mishandling high-voltage equipment may lead to an electric shock, leakage and breakage.



1 *Motor generator (inside clutch housing)*
2 *High-voltage battery box*
3 *Motor electronic control unit (with built-in DC/DC converter)*
4 *High-voltage cable (Direct current cable, orange color)*
5 *High-voltage cable (three phase alternating current area, orange color)*

- Detail drawing of high-voltage battery box



1 *Side cover*
2 *Rear cover*
3 *Intake duct and air filter*
4 *High-voltage shutoff switch*
5 *Crash sensor resetting hole*
6 *Exhaust duct and air filter*
7 *Safety plug*
8 *Safety plug cover*
9 *Low-voltage connector*
10 *High-voltage connector*

(b) An operator who removes and installs high-voltage equipment must be careful of an electric shock. In addition, qualifications may be required depending on countries where the vehicle is used. Observe the laws and regulations of the applicable country when performing the work.

(c) The pieces of the high-voltage equipment should not be disassembled.
(excluding high-voltage cable joint, and safety plug and air filter of the high-voltage battery box)
Never disassemble the high-voltage equipment, because doing so may cause the risk of an electric shock and failure.
Besides, never modify sensors, harnesses and connectors.

(d) Even if it is simple work such as installing the radio, the high-voltage equipment might be damaged. Be sure to implement the following items.
- Remove the starter key from the starter switch.
- Remove the negative (-) terminal of the 12 V battery cable and put a cover on the terminal.
- Check that the hybrid system is normally activated ("READY indicator" illuminates on the instrument panel when the key is turned ON.) before and after body mounting work.

(e) Do not operate the high-voltage shutoff switch other than in an emergency. Failure to heed this warning may cause the high-voltage battery box to break down.

(f) Before carrying out a vehicle wash, including a high-pressure wash, stop the engine and wait for at least 20 seconds.
Also, do not directly discharge water or steam in the vicinity of the air intake or exhaust duct of the high-voltage battery box.

6.16.2 Removal procedure of high-voltage equipment and precautions

⚠ Risk of accident

- Care must be exercised when carrying out work related to a high-voltage circuit. Ensure that the worker observes the laws and regulations of his country.
- The high-voltage devices contain parts which generate magnetic force, so do not place articles of value in your pocket or any other place where it is liable to drop and cause a short circuit. Also, a magnetic card or watch, for example, is liable to cause failure due to magnetic force, so do not wear such an item when carrying out work.
- This work can be carried out by a person who wears an electronic medical appliance such as a pacemaker.
- If you apply a large impact to the high-voltage battery box, the internal crash sensor will operate, and system startup will be interrupted.
- Do not touch the high-voltage shutoff switch other than in an emergency.

List of insulation protectors used for HEV system removal

Operation	Work procedures	Insulation protector, insulated tool
Safety plug removal	Remove battery cover	Not required
	Remove safety plug cover	
	Remove safety plug	Insulated gloves
Removal of high-voltage cable assembly	Loosen bolts that fasten the high-voltage cable assembly connector	Insulated gloves
	Disconnect high-voltage cable assembly connector	
Removal of high-voltage battery box	Untie high-voltage battery strap	Not required
	Relocate cooling system supply (water filling) pipe (not necessary to remove) to remove high-voltage battery box	
	Disconnect vehicle harness connector	
	Loosen bolts that fasten high-voltage cable assembly connector	Insulated gloves
	Disconnect high-voltage cable assembly connector	
	Place high-voltage battery box on the floor	Not required

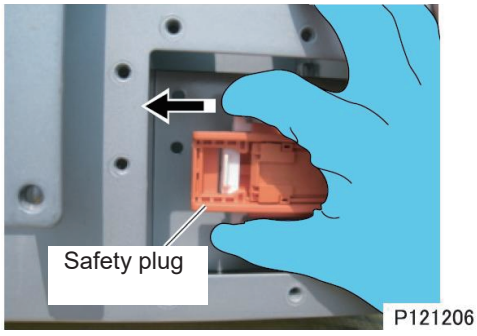
(a) After a lapse of approx. one minute from the time when the starter switch is turned "OFF", turn the starter switch "ON" once and check that no hybrid related failure occurs. (Illumination of "READY lamp" in the instrument panel)
When "READY lamp" does not illuminate in this condition, high-voltage can remain supplied to the direct current area of the high-voltage cable even if the starter switch is turned to "LOCK", due to a failure of the high-voltage equipment. It is very dangerous to remove the equipment in this condition. Do not perform subsequent work, and consult the dealer.

(b) Turn the starter switch to "LOCK."

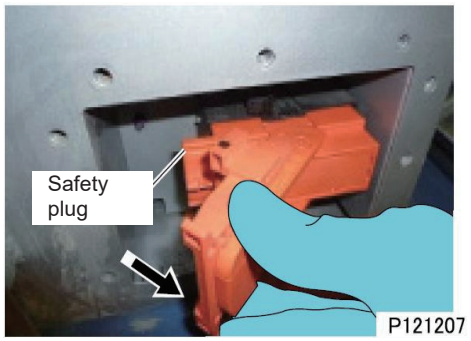
(c) Removing and re-installing the safety plug

- By way of preparation for removing the safety plug, be sure to wear electrically insulated gloves, and also insulate the tools to be used in order to prevent a short circuit.
  - Before removing the safety plug, remove the side cover (see detail drawing of high-voltage battery box) and remove the safety plug cover and release the lever lock.

Release the lever lock

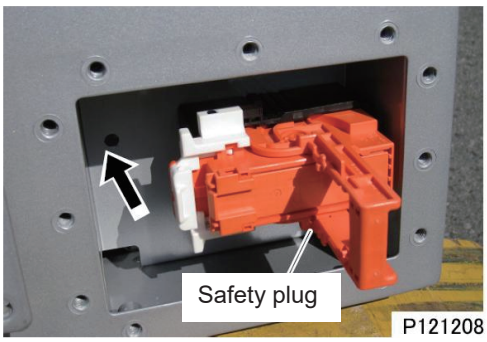


Remove the safety plug

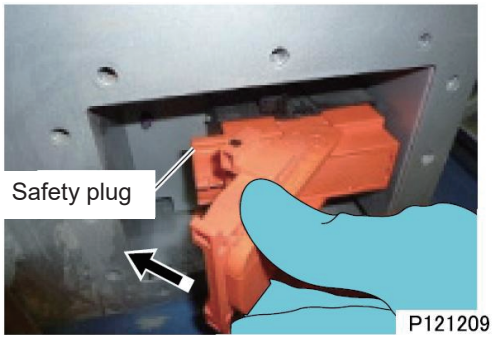


- Pull up to the safety plug lever toward you, and extract the safety plug. If ingress of foreign matter or water occurs, a breakdown is liable to occur, so be sure to install the safety plug cover before carrying out work.
  Keep the safety plug in a separate place to ensure that no other worker inadvertently installs it.

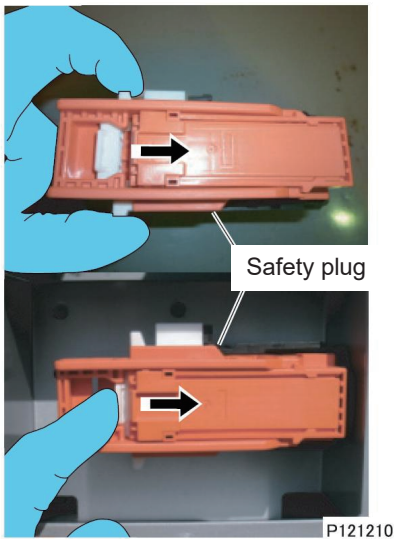
- Before installing the safety plug, ensure that the starter switch is OFF, and all high-voltage devices, high-voltage cables and 12 V system wires are correctly connected. Also, confirm that no other worker is carrying out work on a high-voltage device.
  - Install the safety plug on the terminal side of the high-voltage battery module.



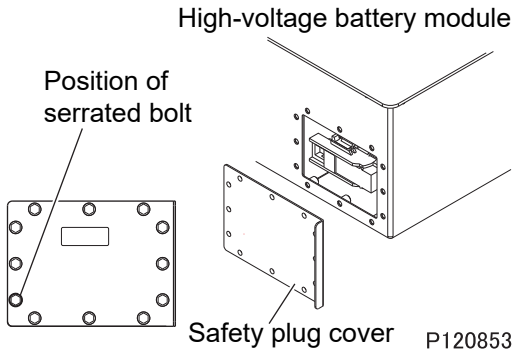
  - Push in the lever of the safety plug until you hear a sound, and confirm that you hear a locking noise.



- If the safety plug is inadequately locked, the safety plug cover will not close. Also, when you turn ON the starter switch, the FUSO diagnostics code is generated.



- Install the safety plug cover on the high-voltage battery module. Use a tightening torque of 10 to 14 N·m {1.0 to 1.4 kgf·m}.
- After tightening the safety plug cover bolts, make match marks on the bolts and the safety plug cover.
- One of the mounting bolts of the safety plug cover is serrated (silver). Be sure install this bolt on the unpainted part of the safety plug cover.

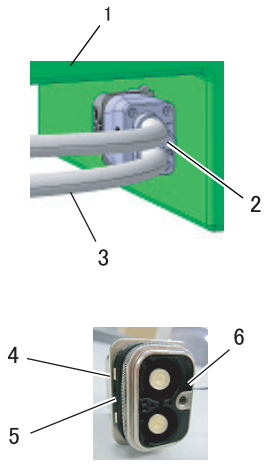


(d) Pull out the high-voltage cable, 12 V system wires and ground cable. Then, removal of the high-voltage equipment is possible.
When installing the high-voltage cable assembly, tighten the bolts clamping the cable assembly connector to 5 - 6 N·m {0.5 - 0.6 kgf·m}.

⚠ Risk of accident

- Handle the EMC spring and packing carefully as they can be easily damaged if, for example, an adhesive tape is stuck directly on them or they are hit against or get caught by something.
- Install the high-voltage cable assembly to the high-voltage battery box with no tilt at the connector to avoid breakage of the EMC spring and packing.
- If the EMC spring is broken or comes off the connector, replace the high-voltage battery box.
- Incompletely tightened bolt may result in poor water tightness of the connector. This state also may cause a diagnosis code to be set.

D

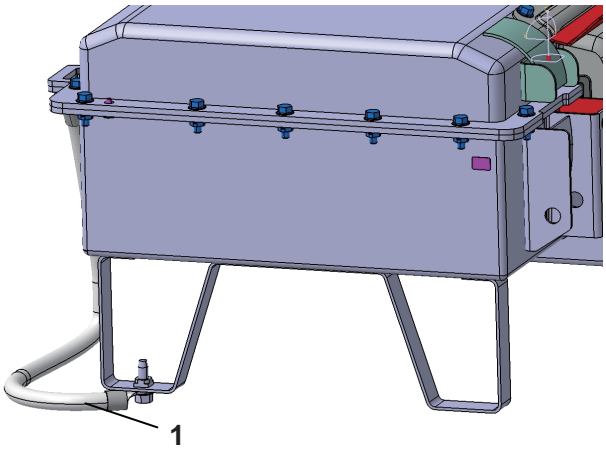


P121201

1 High-voltage battery box
2 Bolt
3 High-voltage cable assembly
4 Packing
5 EMC spring
6 High-voltage battery box side connector

When installing the ground cable, tighten the cable connectors to 19 - 28 N·m {1.9 - 2.8 kgf·m}.

D

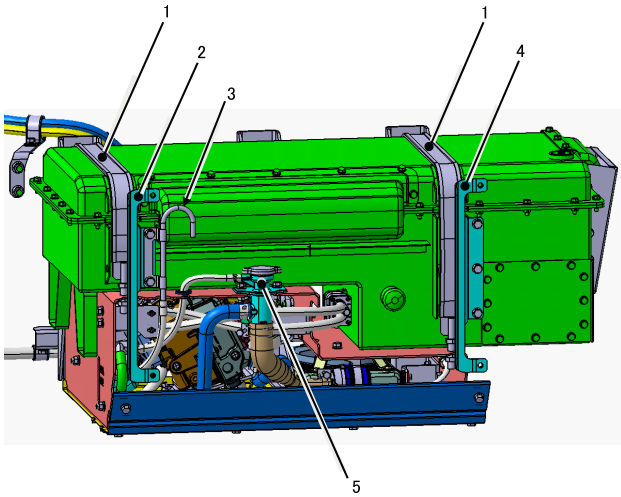


1 Ground cable

(e) Removing and re-installing the high-voltage battery box

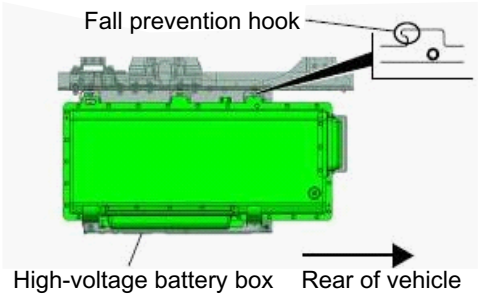
- Removing the high-voltage battery box

  Before relocating or lowering the high-voltage battery box, take off the side cover brackets and battery straps.
  Remove bolts from the radiator supply pipe and breather pipe. Then move the high-voltage battery box into the positions from which it can be readily removed.

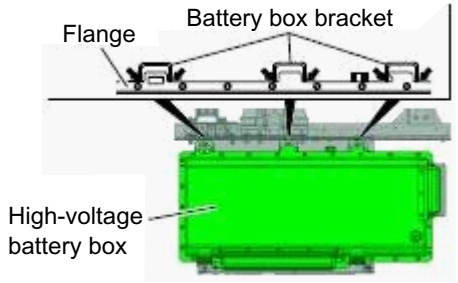


1 Strap battery
2 BRKT, battery cover Fr
3 Pipe assy breather
4 BRKT, battery cover Rr
5 Pipe assy radiator supply

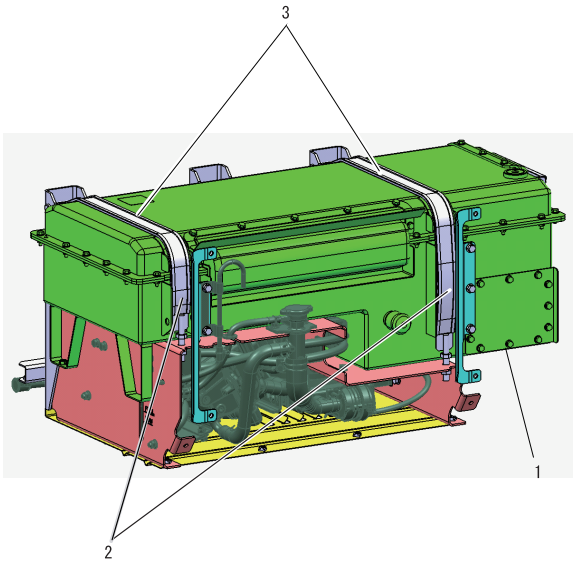
High-voltage battery box has a hook to prevent it from falling.
Move the high-voltage battery box back to the rear of the vehicle. Then draw it out toward you.

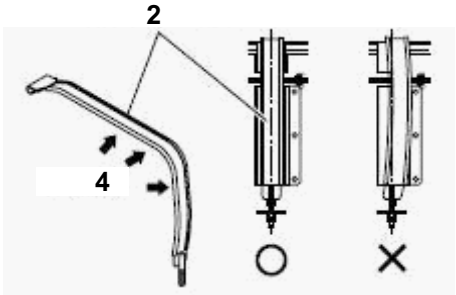


- Re-installing the high-voltage battery box
  - Put the high-voltage battery box on the vehicle.
  - Push the high-voltage battery box in until its flange hits the battery box bracket.



  - To locate the battery straps in the correct positions and fasten them correctly, apply a proper quantity of soapy water to the high-voltage battery box where the battery straps contact.
  - Center the battery straps on the battery box guides.
  - Tighten the battery strap nuts to the specified torque of 12 - 18 N·m {1.2 - 1.8 kgf·m}.





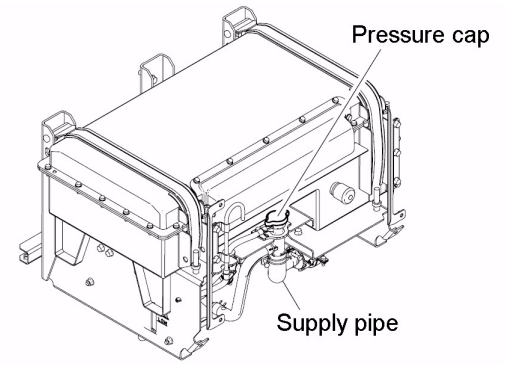
1 High-voltage battery box
2 Battery strap
3 Battery strap contact
4 Soapy water

(f) Be careful not to apply a large impact to the high-voltage battery box.
This may cause the crash sensor inside the high-voltage to operate, preventing the vehicle from starting.

(g) Install in the reverse order of removal.
Finally, turn the starter switch "ON" and check that "READY lamp" illuminates.
When the motor electronic control unit is removed, it is necessary to replenish coolant and bleed air after installation of the equipment.
To bleed air, put the starter switch in the ON position, and operate the water pump.

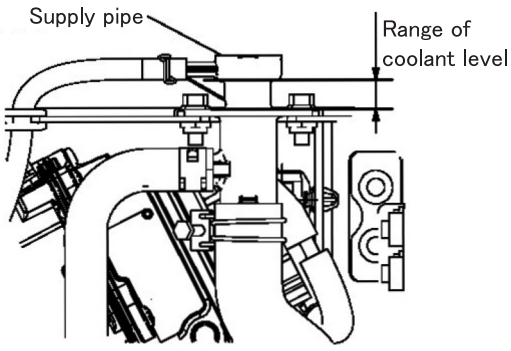
(h) Filling and air bleeding

- After draining coolant (tap water if the cooling system is washed), connect water hoses to the radiator drain cock, motor electronic control unit and radiator.
- Pour new coolant through the pressure cap fitting port of the supply pipe up to the brim.
- Operate the water pump by turning the starter switch to ON to circulate coolant and bleed air out of the cooling system. The water pump will be automatically stopped by its protective function if air is trapped in it. If this happens, turn the starter switch to OFF, then back to ON.



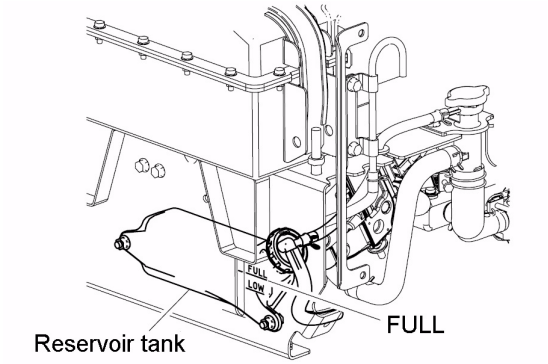
- Keep the coolant level at the brim of the pressure cap fitting port by adding coolant as its level drops.
- Continue the air bleeding operation until the coolant surface at the pressure cap fitting port stabilizes at a level within the indicated range (roughly 10 minutes or so).

<Vehicle without reservoir tank>



<Vehicle with reservoir tank>

- After completing the air bleeding operation, remove the cap of the reservoir tank and add coolant into the tank up to the FULL line.



6.16.3 Precautions during electric welding

(a) Remove the starter key from the starter switch.

(b) Remove the negative (-) terminal of the 12 V battery cable and put a cover on the terminal.

(c) Remove the safety plug of the high-voltage battery box.
Do not leave the safety plug cover open. Be sure to install it otherwise water or foreign matter may enter the high-voltage battery box and cause the battery to break down.

(d) Establish a ground for the welding machine as near the weld as possible.

6.16.4 Clearance between mounted object and high-voltage equipment

(a) In order to maintain an adequate supply of water to the high-voltage cooling radiator, provide a clearance to enable the side cover to be removed. If clearance cannot be secured, give consideration to the position of a mounted object above the cap to maintain an adequate supply of water to the radiator.

(b) Check to see if the clearance between the top of the high-voltage battery box and the mounted equipment will be sufficient. If necessary, provide the enough clearance to ensure that the intake duct of the high-voltage battery box can be easily removed or installed, and also if the high-voltage battery box can be easily removed or installed.

6.16.5 Precautions of high-voltage battery box

(a) In the high-voltage battery box, the inside is cooled by air with a cooling fan by introducing outside air from the side of the high-voltage battery.
Take steps to prevent the exhaust duct at the rear from being blocked off by the mounted equipment.
Also give consideration so that the rise in the temperature of the battery box itself is kept to a minimum.

(b) An air filter is installed at the outside air inlet of the high-voltage battery, and periodic cleaning is required for the air filter.
Take steps to ensure that the side cover can be removed in order to clean the intake air filter.
If the mounted equipment is necessarily located there, give consideration so that the mounted equipment can be removed for air filter cleaning.

(c) Be sure to install the side cover and the rear cover. Do not modify them.
Failure to heed this instruction will cause the waterproof performance of the high-voltage battery box to be impaired, resulting in possible breakdown of the battery.

(d) The high-voltage shutoff switch is intended to be operated by a member of a rescue squad from outside the vehicle in the event of an emergency.
Take steps to ensure that the switch is not hidden by the mounted equipment.
Do not operate the high-voltage shutoff switch other than in the event of an emergency. Failure to heed this warning may result in a breakdown.

(e) Take care not to apply an impact to the high-voltage battery box. This may cause the crash sensor inside the high-voltage to operate, preventing the hybrid system from activating.

(f) NEVER use the high-voltage battery for any other application.

(g) Do not drive through water that is more than 30 cm deep. Water may enter the vehicle, resulting in possible damage.

(h) Before carrying out a vehicle wash, including a high-pressure wash, stop the engine and wait for at least 20 seconds.

6.16.6 Installing the side guard

(a) When installing the side guard in the vicinity of the high-voltage battery box, take care that it does not interfere with the replenishment of water in the inverter cooling water tank, the inspection of the filling port and the high-voltage battery box side cover, or the operation of the high-voltage shutoff switch.

(b) Ensure that the side guard and mounting stay do not hide the access hole for the high-voltage shutoff switch in the side cover or the caution labels.

6.16.7 Precautions during painting

(a) High-voltage cables and connectors are in exclusive orange color so that they can be identified as high-voltage. When reapplying painting, be careful not to paint these cables so that they can be surely distinguished.

(b) The high-voltage battery box is painted in color so that the rise in the battery temperature is kept to a minimum. Do not repaint the battery box.

6.16.8 Attaching caution label for high-voltage shutoff switch

Additional information

For attaching of the caution label, see ▷ 10.14.2.

6.16.9 Installing custom-built truck body

When adding a wire or pipe for installing custom-built body, do not clamp it together with a high-voltage cable.

6.17 Others

6.17.1 SRS air bag

⚠ Risk of injuary

Observe the following precautions when carrying out body/modification work on vehicles equipped with SRS airbags and seat belts with emergency tensioning retractors.

Otherwise, the airbag may not operate properly or it may be triggered unexpectedly during the work. (SRS: Abbreviation for Supplemental Restraint System, a restraint system which supplements the seat belts)

- Precautions for body building and modifications
  (a) Modification of a front portion of the vehicle or mounting of a built body on the front surface of the cab may result in the SRS air bag not working properly. If such a modification is made or body building is performed, explain the precaution to the purchaser of the vehicle and alter the SRS air bag so as to make it inactive. For queries about the alteration procedure to make the air bag inactive and any special types of body building other than those given below, contact the responsible section. ▷ 2.2
    - Modification of the front bumper, frame or cab at the front portion of the vehicle
    - Mounting of a grille guard or winch
    - Mounting of a snowplow
    - Body building of a front-stowing, and not hook-stowing, cab back crane (type of crane traveling with a hook suspended at the front of the cab)

  (b) Never disassemble or modify the steering wheel (including the pad), airbag modules (driver's seat and front passenger seat), airbag ECU, sub-G sensor, ELR of the seatbelts fitted with pretensioners (driver's seat and front passenger seat) or the airbag harnesses.
  (c) Do not install electrical parts or equipment related to body-building at a location that is on and higher than the steering wheel.
  (d) The airbag ECU is installed on a bracket alongside the brake pedal on the cabin floor (in the case where a front passenger seat airbag is provided, a sub-sensor is also installed on the floor at the rear of the washer tank on the front passenger seat side), so do not modify or reinforce the airbag ECU mounting bracket. Also, do not apply a strong impact to the bracket by kicking or striking it, for example.

- Precautions during electric welding
  (a) Turn OFF the starter switch and disconnect the negative battery cable. Then, leave the vehicle to stand for 1 minute or more.
  This step is performed to let electricity stored in the backup capacitor disposed inside the ECU of the SRS air bag discharged.
  Wrap tape around the negative battery cable terminal for proper insulation. (Be sure to perform this step particularly for work related to electrical systems and cab.)
  (b) Make a ground connection of the welding machine near the welding portion.
  (c) After the welding operation, restore the battery cable to the original position and turn ON the starter switch. At this time, make sure that  does not appear on the meter claster.
  If the multi-display shows  , never fail to contact the MITSUBISHI FUSO authorized Distributer. ▷ 2.2

If you carry out welding work in the vicinity of the airbag, you are likely to cause this restraint system to become defective. Never carry out welding in the vicinity of the airbag.

If you ignore this warning, the airbag is likely to deploy or fail to function correctly.

- Precautions during body building work
  (a) The SRS air bag system parts are mounted around the steering wheel and seat belt retractor. Do not tap the areas around the SRS air bag system parts or otherwise apply impact to them.
  (b) Do not remove any SRS air bag system parts.

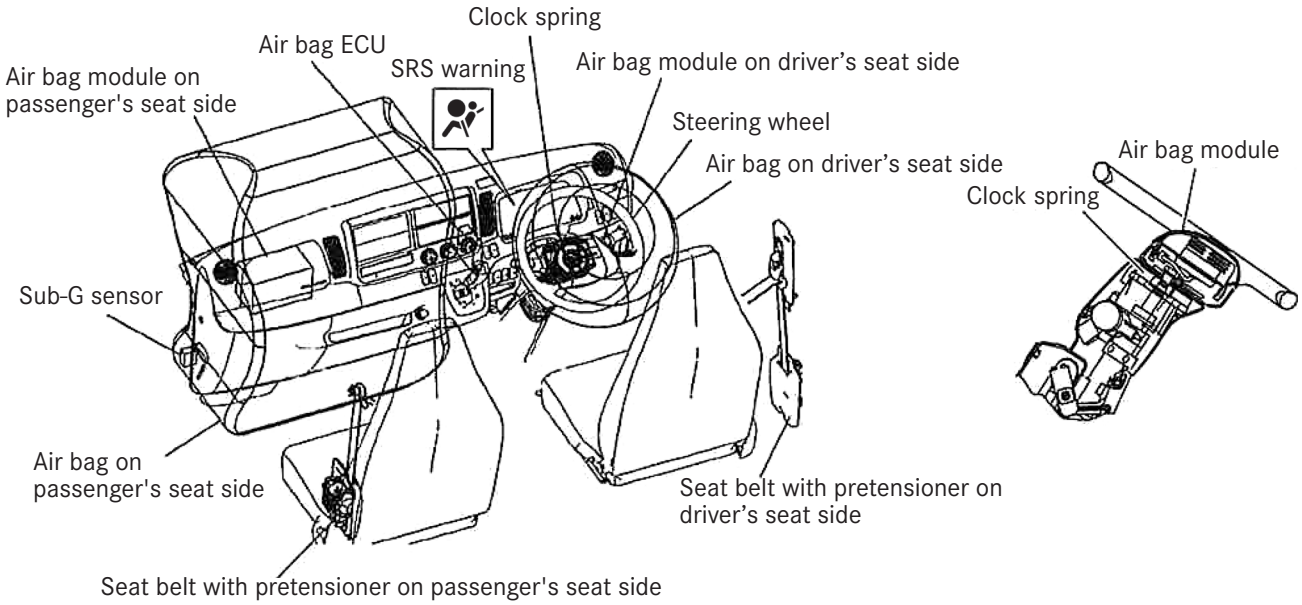
(c) Do not modify harnesses and connectors of the SRS air bag system. Do not fix other harnesses to the air bag or pretensioner harness.
(d) Do not check the SRS air bag circuit using a multimeter or similar device.
(e) When performing work involving heating to the cab (e.g. painting), if the temperature becomes 93°C or higher, remove the air bag ECU, sub-G sensor, air bag module, clock spring, and the ELR of the seat belt with pretensioner in advance.
If these parts are to be removed, contact the responsible section in advance ▷ 2.2.
(f) If the air bag module is removed, place it with the horn pad upper surface facing up on a flat site. Do not place any other object on the air bag module.
(g) Use utmost care when handling the air bag module, air bag ECU and sub-G sensor. Do not drop it or subject it to water or oil.
Never apply impact to the air bag ECU and sub-G sensor, in particular.
Should it be dropped, replace it with a new one even if it looks all right on the outside.
(h) Do not modify the electrical circuit of the SRS air bag.
Never use a general-purpose multimeter.
(i) Never source power from the SRS air bag fuse.
(j) Do not turn the clock spring three turns or more from the neutral position (straight-ahead position), as a damaged internal harness could result.
(k) Whenever removing the steering wheel or steering shaft joint, be sure to place the front tires in the straight-ahead position, remove the starter key, and lock the steering wheel.
(l) During reinstallation of the steering wheel, make sure that the front tires are placed in the straight-ahead position and the clock spring in the neutral position.
To bring the clock spring into its neutral position, follow these steps: turn the clock spring fully clockwise; turn it counterclockwise the number of turns specified on the label; and turn it until the alignment marks are aligned with each other.
(m) After the work has been completed, use the SRS air bag warning to check that the system functions properly.
Turn ON the starter switch and then check that the SRS air bag warning  does not appear on the meter cluster.
If the SRS air bag warning  appears, consult the MITSUBISHI FUSO authorized Distributer ▷ 2.2.

L

O

6.17 Others

- Miscellaneous
  (a) Be sure to consult the MITSUBISHI FUSO authorized Distributer whenever performing any work other than those noted above, replacing or disposing of the SRS air bag, or discarding a vehicle equipped with the SRS air bag. ▷ 2.2



6.17.2 DUONIC®

Cautions for vehicles with DUONIC® (Automated Manual Transmission)

When removing the DUONIC® components and associated parts (piping and wiring included) or performing other works for body mounting, pay particular attention to the following.

Oil cooler piping

- When reinstalling removed oil cooler piping, etc., make sure that the pipe and the DUONIC® system components do not contain any foreign matter. The presence of dirt or the like may cause the system, etc. to malfunction.
- After reinstalling, be sure to adjust the automatic transmission fluid level and initialize the DUONIC® system.

Clearance

- Make sure that the piping and harness are at least 25 mm apart from other parts. If this is impractical with parts installed on the same plane, clamp them at proper point(s) to hold them securely.

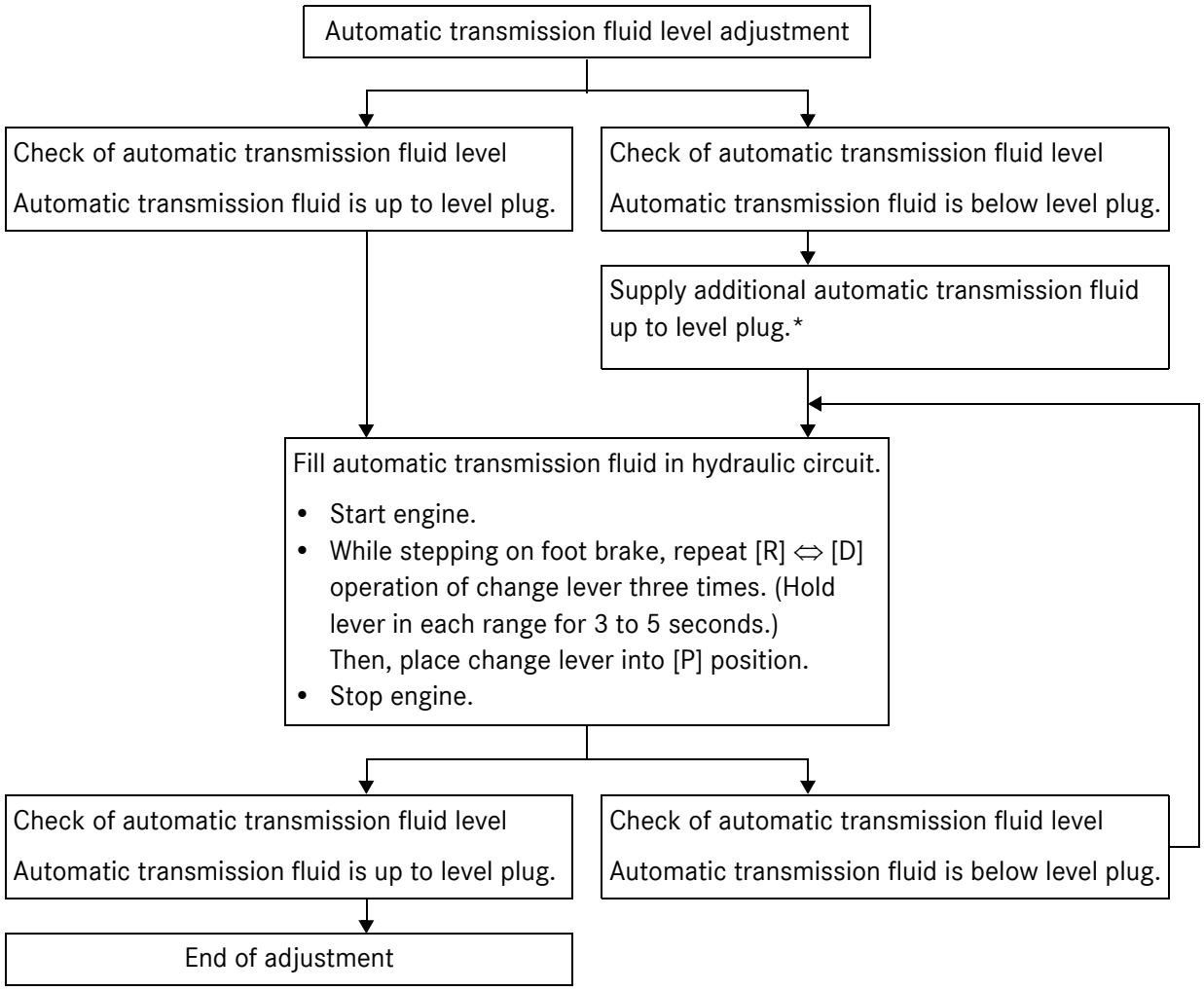
Automatic transmission fluid level adjustment

After reinstalling removed oil cooler piping, adjust the automatic transmission fluid level as follows.

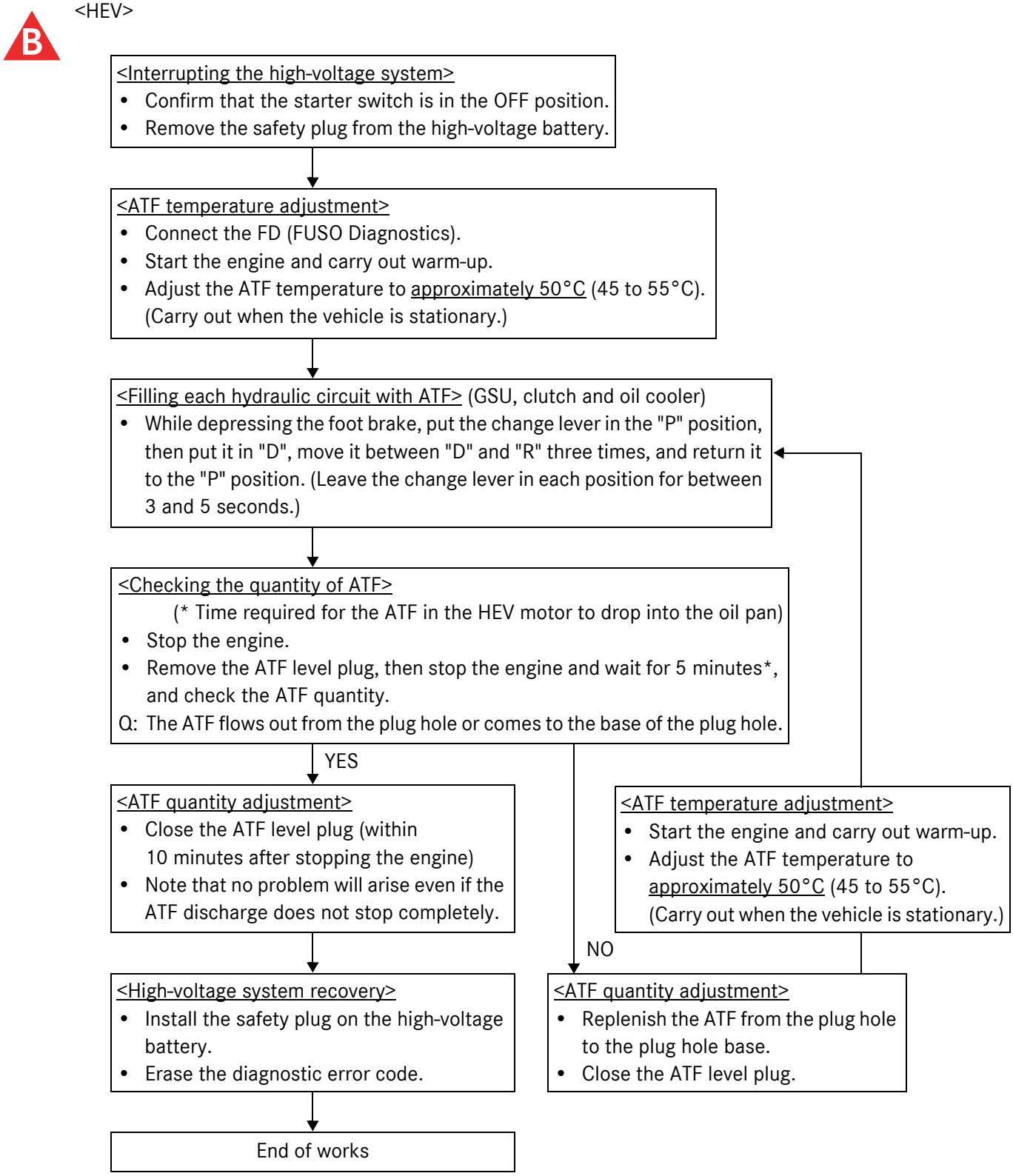
Automatic transmission fluid level adjustment procedure

Perform the adjustment in the following sequence. The position of the automatic transmission fluid level plug is the normal fluid level. If the automatic transmission fluid is up to the normal level after the hydraulic circuit is filled up, the adjustment has been properly made.

<FE, FG>


Automatic transmission fluid level adjustment
Check of automatic transmission fluid level
Automatic transmission fluid is up to level plug.
Check of automatic transmission fluid level
Automatic transmission fluid is below level plug.
Supply additional automatic transmission fluid up to level plug.*
Fill automatic transmission fluid in hydraulic circuit.
• Start engine.
• While stepping on foot brake, repeat [R] ⇔ [D] operation of change lever three times. (Hold lever in each range for 3 to 5 seconds.) Then, place change lever into [P] position.
• Stop engine.
Check of automatic transmission fluid level
Automatic transmission fluid is up to level plug.
Check of automatic transmission fluid level
Automatic transmission fluid is below level plug.
End of adjustment

<HEV>


<Interrupting the high-voltage system>
• Confirm that the starter switch is in the OFF position.
• Remove the safety plug from the high-voltage battery.
<ATF temperature adjustment>
• Connect the FD (FUSO Diagnostics).
• Start the engine and carry out warm-up.
• Adjust the ATF temperature to approximately 50°C (45 to 55°C). (Carry out when the vehicle is stationary.)
<Filling each hydraulic circuit with ATF> (GSU, clutch and oil cooler)
• While depressing the foot brake, put the change lever in the "P" position, then put it in "D", move it between "D" and "R" three times, and return it to the "P" position. (Leave the change lever in each position for between 3 and 5 seconds.)
<Checking the quantity of ATF>
(* Time required for the ATF in the HEV motor to drop into the oil pan)
• Stop the engine.
• Remove the ATF level plug, then stop the engine and wait for 5 minutes*, and check the ATF quantity.
Q: The ATF flows out from the plug hole or comes to the base of the plug hole.
YES
NO
<ATF quantity adjustment>
• Close the ATF level plug (within 10 minutes after stopping the engine)
• Note that no problem will arise even if the ATF discharge does not stop completely.
<ATF temperature adjustment>
• Start the engine and carry out warm-up.
• Adjust the ATF temperature to approximately 50°C (45 to 55°C). (Carry out when the vehicle is stationary.)
<High-voltage system recovery>
• Install the safety plug on the high-voltage battery.
• Erase the diagnostic error code.
<ATF quantity adjustment>
• Replenish the ATF from the plug hole to the plug hole base.
• Close the ATF level plug.
End of works

B

Fig. 1 Left view of transmission (FE, FG)

Fig. 2 Left view of transmission (HEV)

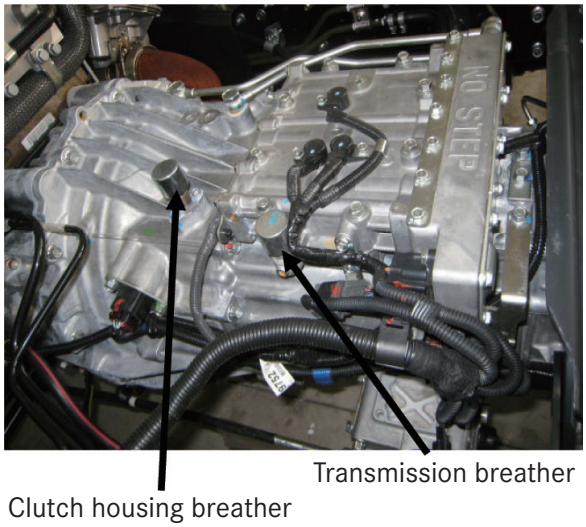


Fig. 3 Top view of transmission (FE, FG)

Initialization of DUONIC® System

- In the initialization of the DUONIC® system, the following initial settings are memorized by the DUONIC® electronic control unit: gear shift unit's gear position, clutch fill time, learned clutch torque value, and G sensor signal voltage on flat road. All of these settings are initialized with a single initialization operation, which must be performed every time the vehicle is serviced.
- Initialization of the DUONIC® system may help improve degradation of roll-off, creep or gear shift quality if that is experienced.
- The vehicle must be warmed up before performing initialization. With a cold engine or transmission, initialization may not be successfully completed when attempted.
- If any of the following service is performed, initialization must be performed following the procedure described.

Service	Initialization procedure
Inspection of automatic transmission fluid level and replacement of fluid	After inspection of automatic transmission fluid level and replacement of fluid, start the engine and cycle the shift lever to D and R several times to sufficiently circulate automatic transmission fluid before performing initialization. After initialization, test drive the vehicle.
Replacement of gear oil	After replacement of gear oil, perform initialization followed by test drive.
Work on engine or transmission	After any service on the engine or transmission, the DUONIC® system must be initialized as follows to prevent any possible degradation of driving quality due to possible change in the engine or transmission characteristics.

- While the engine or transmission is cold, initialization may be left uncompleted or learning values may be set inappropriate. To avoid such case, perform initialization after finishing transmission oil temperature adjustment by the procedure below.

Preparation before initialization of DUONIC® system

- Measure the oil temperature in the transmission using the FUSO Diagnostics.
- Adjust the transmission oil temperature to approximately 50°C by the method recommended below.
  - Repeat initialization several times. (With each time of initialization, the temperature rises by 10 to 12°C.)
  - Actually drive the vehicle to increase the transmission oil temperature up to the required level.
- When initialization is performed to eliminate feeling-related symptom, record initial setting reference values shown below. Comparison pre- and post-initialization values with these referent values can lead to the identification of the causes of symptoms.
- If feeling is not improved despite initialization of the DUONIC® system, check automatic transmission fluid level and repeat the initialization of DUONIC® system. Chances are that feeling will be improved this way.
- If driving quality or feeling is not improved despite initialization of the DUONIC® system, check automatic transmission fluid level, then repeat the initialization of the DUONIC® system. It can sometimes improve the feeling.

Property damage

DUONIC® system may make driving feeling bad if automatic transmission fluid level is not right.

Additional information

Every vehicle is different from each other. Thus, all vehicles do not necessarily show actual values within the reference values shown below.

B

Initial setting reference values

No.	Actual values	Description	FE and FG	HEV
1	Temperatures	Temperature of Transmission Oil	45 to 55°C	45 to 55°C
2	Transmission	Position of cylinder 1 front	87.2 to 88.3%	87.2 to 88.3%
3	Transmission	Position of cylinder 1 rear	11.6 to 12.7%	11.6 to 12.7%
4	Transmission	Position of cylinder 2 front	11.3 to 12.8%	11.3 to 12.8%
5	Transmission	Position of cylinder 2 rear	87.0 to 88.7%	87.0 to 88.7%
6	Transmission	Position of cylinder 3 front	10.7 to 12.6%	10.7 to 12.6%
7	Transmission	Position of cylinder 3 rear	87.8 to 89.8%	87.8 to 89.8%
8	Clutch	Time for Filling Learning Value Inner Clutch	0.15 to 0.27 sec	0.300 to 0.420 sec
9	Clutch	Time for Filling Learning Value Outer Clutch	0.08 to 0.22 sec	0.240 to 0.360 sec
10	Clutch	Inner Clutch Current at 25 kgfm Clutch Torque	570 to 663 mA	564 to 631 mA
11	Clutch	Inner Clutch Current at 5 kgfm Clutch Torque	341 to 412 mA	328 to 386 mA
12	Clutch	Outer Clutch Current at 25 kgfm Clutch Torque	552 to 659 mA	555 to 642 mA
13	Clutch	Outer Clutch Current at 5 kgfm Clutch Torque	369 to 435 mA	347 to 423 mA
14	Clutch	Inner Clutch Current at Kiss Point	301 to 376 mA	294 to 346 mA
15	Clutch	Outer Clutch Current at Kiss Point	296 to 366 mA	283 to 345 mA

B

Initialization standby mode

- Prior to starting initialization, the vehicle must be placed in the initialization standby mode.

Ensure that the vehicle meets all of the following conditions.

- Software installation and coding have been completed on the engine and DUONIC® electronic control units.
- Transmission oil temperature has been adjusted to approximately 50°C (45 to 55°C).
- Automatic transmission fluid level has been checked.
- The engine is stopped.
- The vehicle is stationary (with the brakes released) on a flat road and unloaded.
- The tire pressure has been set to specification.
- The cab tilt is locked.
- The starter key is in the ON position.
- The accelerator pedal is in the ON (50% or above) position.
- The foot brake is applied.
- The systems that are powered by the engine such as the air conditioner, the compressor for the freezer and the exhaust brake are stopped.
- The change lever is moved to D for one second and then set to A/M.
- The parking brake is applied for one second, then released for one second and then applied (pulled rather hard) again.

↓

"1" flashes on the gear shift indicator, which means that the vehicle is now in the initialization standby mode.

Initialization (Initialization)

↓

The vehicle goes back to the normal mode if the parking brake is released or the starter key is turned to the OFF position.

Initialization

Operator action	Vehicle action

With the vehicle in the initialization standby mode, set the accelerator pedal to OFF and the change lever to P before starting the engine.	• The progress of initialization process is indicated on the gear shift indicator as a flashing "2", "3", "4", "5" and "N".
	• Initialization progress indicated on the gear shift indicator is as follows:
	  • "2": The gear shift unit's gear position is being detected.
	  • "3": Clutch is being warmed up. G sensor voltage value is being corrected.
	  • "4": Clutch fill time is being learned.
	  • "5": Clutch torque is being learned.
	  • "N": Initialization is completed.

-	• Gearshift indicator "R" flashes on and off. → Initialization unsatisfactory. → Return to normal mode with parking brake off or key off, then repeat initialization. • If gearshift indicator changes flashing from "2" to "R", gear shifting by gearshift unit may be difficult, in which case the vehicle is moved once, then initialization is performed. Chances are that problem will be solved this way. • If gearshift indicator changes flashing from "3" to "R", G sensor may be installed out of place or G sensor signal may be abnormal. • If gearshift indicator changes flashing from "4" to "R", clutch may be out of order. • If gearshift indicator changes flashing from "5" to "R", engine may not be warm enough or clutch may be out of order. • If initialization ends in failure again, check clutch and transmission.

Initial setting reference values

No.	Description	Value	Remarks
1	Intermediate of Position of cylinder 1 front and rear	49.4 to 50.5%	(Position of cylinder 1 front + Position of cylinder 1 rear)/2
2	Intermediate of Position of cylinder 2 front and rear	49.2 to 50.8%	(Position of cylinder 2 front + Position of cylinder 2 rear)/2
3	Intermediate of Position of cylinder 3 front and rear	49.3 to 51.2%	(Position of cylinder 3 front + Position of cylinder 3 rear)/2

- After initialization is completed, check the above values (not indicated in the FUSO Diagnostics). If any post-initialization values largely deviate from above values (3% or more), repeat the initialization.
- If pre- and post-re-initialization values are the same, nothing is abnormal.
- Test run after initialization is completed and check that there is no feeling problem during driving and at speed change. If there is a shock or an abnormal sound at speed change, perform initialization of the DUONIC® system again.

⚠ Risk of accident

For safety, keep the foot brake applied after the engine is started.

B

Resetting the initialization

- The DUONIC® system offers the possibility to reset the initialization values of gear shift unit's gear position, clutch fill time, learned clutch torque, and G sensor voltage on flat road so that these values are defaulted to those before the initialization. (This feature is designed to be used such as when driving quality has deteriorated after initialization.)

Operator action	Vehicle action
With the vehicle in the initialization standby mode, set the change lever to "-".	"6" flashes on the gear shift indicator, meaning that the reset process has been completed.

Cautions during body equipment work on DUONIC® vehicle

The DUONIC® of the vehicle is a computerized and electronically controlled system; mishandling could cause system errors and in the worst case, breakdown of the computer itself. Therefore, body equipment work on the vehicle should be carried out while following the precautions given below.

General handling precautions

- Be sure not to change the tire size, final ratio, and speedometer gear ratio of a DUONIC® vehicle.
- Be sure not to alter DUONIC®-associated devices, sensors, harnesses and connectors in any way.
- Before disconnecting DUONIC®-associated connectors, set the starter switch of the vehicle to OFF. Before turning the starter switch ON, reconnect the disconnected connectors.
  If DUONIC®-associated device connectors are disconnected while power is supplied to the TCU, a warning lamp will light or the system may lose functionality.
- Before painting the transmission body, mask electric parts, harnesses, connectors, breathers, oil cooler pipe joints and other parts which should be covered.
  Furthermore, mask wrong fluid/oil supply preventive labels (ATF ONLY, GEAR OIL ONLY) attached near to appropriate fluid/oil plugs so that they are not covered with paint.
- After completing the body equipment work on the vehicle, make sure that the vehicle runs without any problem.

Power take-off for DUONIC® (Automated Manual Transmission)-equipped vehicle

The following procedures apply to the manufacturer-designated power take-off only.

The vehicle cannot be run while the power take-off is in operation.

Vacuum-type power take-off operation procedure

- With the engine running, place the shift lever into the P position (or N position).
- Set the power take-off main switch in the cab to ON.
- The indicator lamp PTO READY lights to indicate that the power take-off is in preparation.
- With the indicator lamp PTO on, the power take-off can be used.
- To clear this status, set the power take-off main switch in the cab to OFF. The indicator lamp PTO goes off and the indicator lamp PTO READY goes on. The power take-off is being released.
  The indicator lamp PTO READY goes off to indicate that the power take-off has been released.

Cable type power take-off operation procedure

- With the engine running, place the shift lever to the P position (or N position).
- Set the power take-off main switch in the cab to ON.
- The indicator lamp PTO READY lights.
- Connect the power take-off by means of the power take-off lever or damp lever.
- The indicator PTO goes on to indicate that the power take-off is operational.
- To release the power take-off, set the power take-off main switch in the cab to OFF. The indicator lamp PTO goes off and the indicator lamp PTO READY goes on to indicate that the power take-off is ready to be released.
  Release the power take-off by means of the power take-off lever or damp lever. The indicator lamp PTO READY goes off to indicate that the power take-off has been released.

Additional information

- The indicator lamp PTO READY may not show depending on the sequence, operating speed or device response speed, but it is normal.
- When the shift lever is in other than P or N position, the power take-off will not be connected if the power take-off switch is turned ON.
- On diesel-powered vehicle, if the shift lever is moved to other than P or N position or if the power take-off switch is turned ON again while operating the power take-off, a buzzer will sound, and the warning indication of PTO appears on the meter.
  On hybrid vehicle, if the shift lever is moved to other than P or N position, the power take-off is disengaged and PTO READY illuminates on the meter, and a buzzer will sound at 1-second intervals. If the shift lever is then returned to P or N position, a buzzer will sound for 1-second, the power take-off will be engaged and will restart the operation.
- On diesel-powered vehicle, a warning appears if the main switch of the power take-off is turned ON during driving.
  On hybrid vehicle, however, it appears only with the additional condition that the shift lever is other than P or N position or the shift lever is in N position and the vehicle speed is 15 km/h or higher.

6.17.3 Addition of a compressor and other accessories

Mounting procedure

- Ensure that electrical harnesses and hoses accompanying the installation of the various parts of the exhaust system and the accessories are separated from each other by at least 200 mm. If this separation cannot be realized, install heat insulation tubes or heat insulation plates to create a structure that prevents the harnesses from being affected by heat.

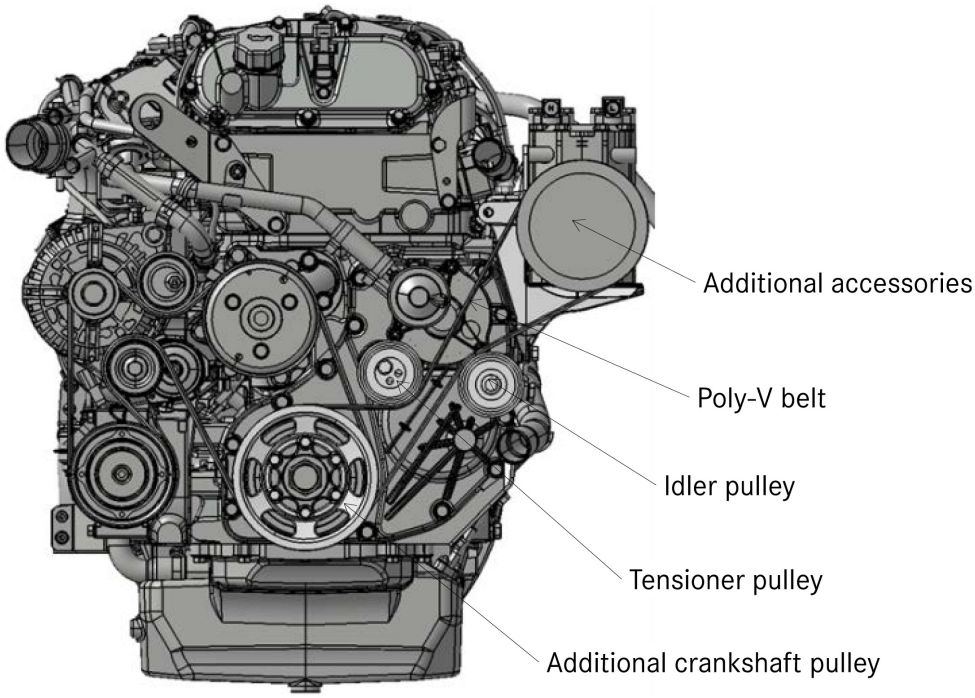
Conditions for installing the accessories

Refer to the following concerning the conditions for mounting the accessories on the brackets.

1 Weight of accessories: 14.2 kg max
2 Allowable accessory drive torque: 36 N·m max
3 Additional accessories must be driven by poly-V belt with idler and tensioner. (Refer to below figure)

Procedure drawings for installing accessary brackets and relavant parts

When installing the end bolts of the tension pulley and the idler pulley, be sure to use a box spanner or a socket wrench.



Example for additional accessories

6.17.4 Advanced emergency braking system (AEBS)

Advanced emergency braking system automatically applies the brakes to either prevent a collision, or reduce the speed at which impact occurs and thereby reduce the damage caused by a collision when a collision with the vehicle ahead cannot be avoided.

Preparation

Before doing any electrical welding work related to body mounting work, turn off the starter switch and disconnect the battery cable from the negative terminal.
Put the ground for the welder close to the position you are welding.

When painting work

- Mask the radar unit and radar cover so no paint gets on them.
- Remove the radar unit from the vehicle before forced drying the area around the radar unit.

If you remove the radar unit

After you have removed the radar unit from the vehicle, have the radar adjusted at MITSUBISHI FUSO TRUCK&BUS CORPORATION.

If you drop the radar unit

The radar unit is a precision component. You must replace it if it is subjected to physical shock, such as being dropped.

Built body components

Do not install built body components in front of the radar. Doing so could cause false alarms or malfunctions.
Do not install a license plate frame (number plate frame).

7.1 General

Risk of accident and injury

Do not modify any bolted connections that are relevant to safety, e.g. that are required for wheel alignment, steering or braking functions.

When unfastening bolted connections make sure that, when work is complete, the connection again corresponds with the original condition.

Welding work on the chassis/body may only be carried out by trained personnel.

The body, attached or installed equipment and any modifications must comply with the applicable laws and directives as well as workplace safety or accident prevention regulations, safety rules and accident insurer requirements.

Risk of fire

With all bodies make sure that neither flammable objects nor flammable liquids can come into contact with hot assemblies (including through leakages in the hydraulic system) such as the engine, transmission, exhaust system, turbocharger, etc.

Appropriate caps, seals and covers must be installed on the body in order to avoid the risk of fire.

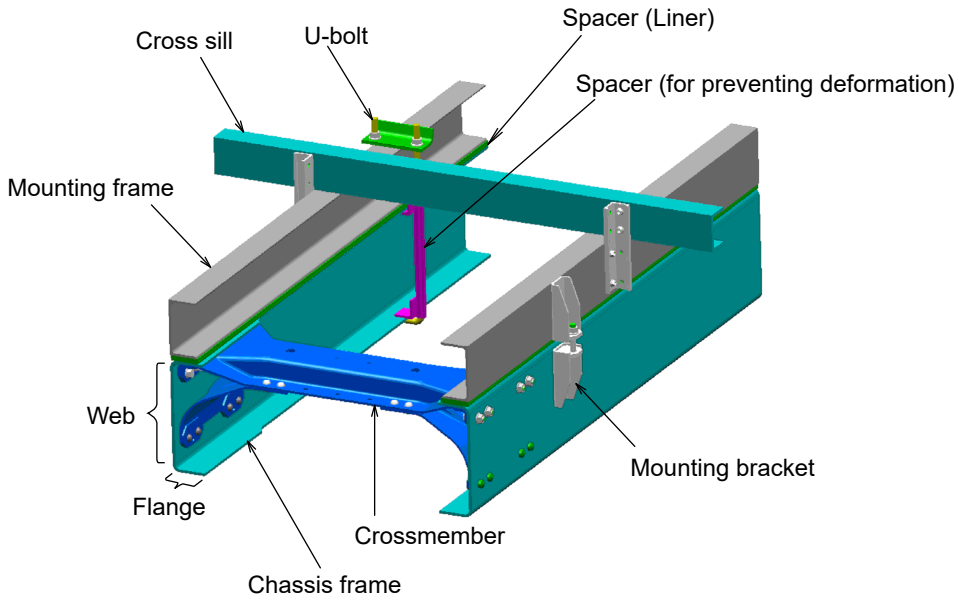
Property damage

Bodies on which the transmission can be expected to be exposed to high levels of water, e.g. cleaning water (flushing, overflowing or similar), require an effective cover over the transmission (transmission guard) which will prevent abrupt cooling as well as water ingestion via the transmission breather.

Additional information

Further information on bolted and welded connections can be found in Section 3 "Planning of bodies" ▷ 3.6 and Section 5 "Damage prevention" ▷ 5.1.

7.1.1 Body mounting methods



Correct calculation of load on the chassis frame

- If a mounting frame is used, the stress calculation of the chassis frame must be conducted for beams combined with the body to be mounted.
- The mounting frame must be fastened to the chassis frame so firmly that the rear body weight may be borne evenly by the combined chassis frame and mounting frame.

Additional information

- For the strength calculation of the chassis frame and mounting frame, refer to "10.4 Weight distribution table" ▷ 10.4.1 and "10.6.2 Frame section modulus" ▷ 10.6.2.
- The frame stress should be less than the values shown in the table below.

Table of frame stresses (when loaded to rating)

Material / Condition	High tensile steel plate with tensile strength	
	SAPH440 (S355MC) 440 MPa {45 kgf/mm^2}	HTP540 (S500MC) 540 MPa {55 kgf/mm^2}
Vehicles mainly driven on paved roads	74 MPa {7.5 kgf/mm^2} or less	88 MPa {9.0 kgf/mm^2} or less
Vehicles mainly driven on rough roads	54 MPa {5.5 kgf/mm^2} or less	64 MPa {6.5 kgf/mm^2} or less

7.1.2 Mounting frame

All bodies require a mounting frame or a substructure that assumes the function of a mounting frame to ensure a reliable connection between the chassis and the body.

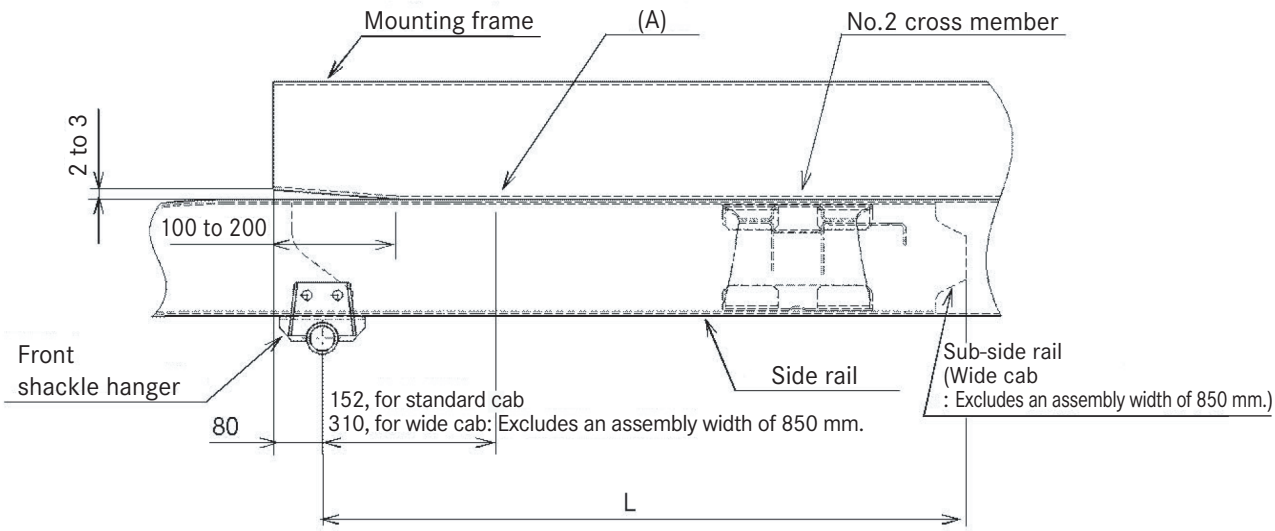
Property damage

If more than one body is mounted on the same chassis (e.g. platform and loading tailgate), the larger of the specified moments of resistance must be taken to determine the mounting frame.

7.2 Fastening mounting frame to chassis frame

7.2.1 Cargo trucks

- Be sure to install a mounting frame to ensure that a concentrated load is not applied to the chassis frame.



B

Unit: mm

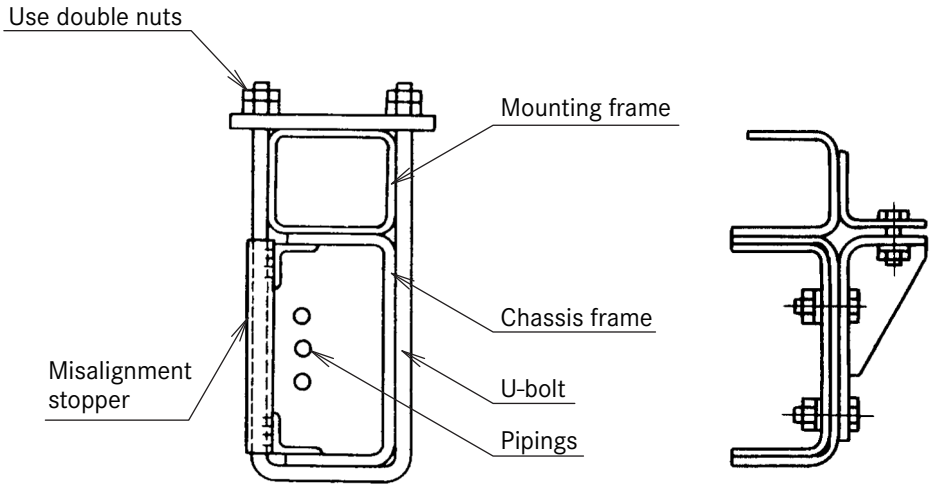
Vehicle mode	L
Standard cab	1050
Wide cab (FE, FG)	1100
Wide cab (HEV)	1250

Note: (A) indicates the part of the frame assembly that has been enlarged (standard cab: 700 mm assembly width; wide cab: 750 mm assembly width).

7.2 Fastening mounting frame to chassis frame

Cargo

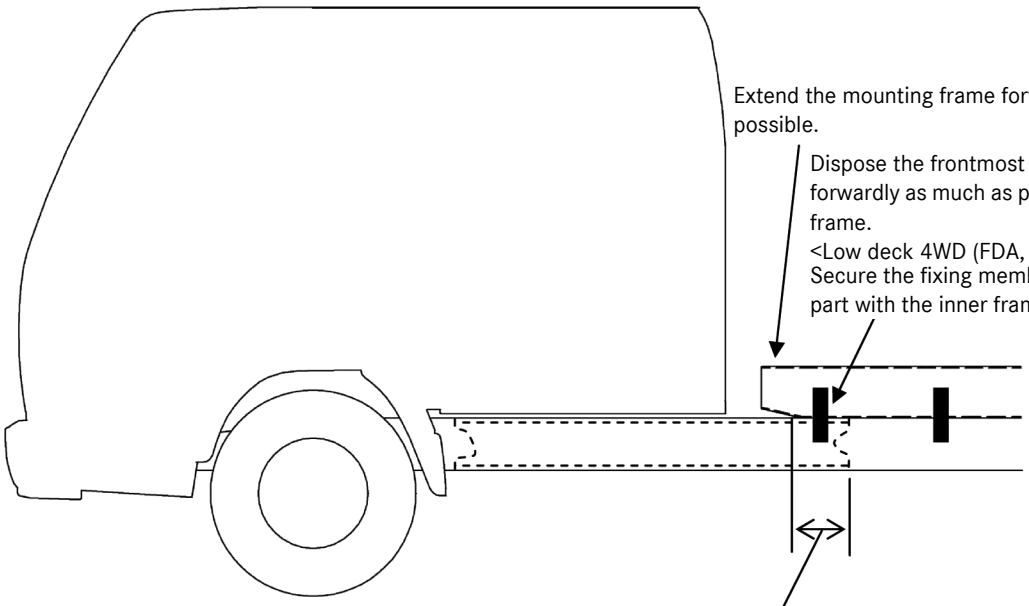
- Carry out the following in order to prevent stress concentrating at the front end of the mounting frame. Make the length of the tapered part of the bottom end of the mounting frame between 100 and 200 mm, and end the taper at a point that is not past (A). If a taper cannot be secured, form the end to a radius of at least 10, and extend the end part to the front (vicinity of the shackle).
- To connect the mounting frame to the chassis frame, either use U-bolts, or in the case of a heavy body building part fix the mounting frame with opposing brackets and ensure that the load imposed by the body building part plus the freight is borne by both the mounting frame and the chassis frame.
  Ensure that the front end connecting part is frontward of the No.2 cross member (transmission suspension part). A large number of holes and wires pass through this area, so take care not to damage them when installing the U-bolts.



7.2 Fastening mounting frame to chassis frame

Cargo

<Crew cab>



<Low deck 4WD (FDA, FGA model)>

The contact surface between the mounting frame and the side rail should overlap 100 mm or more with the inner frame.

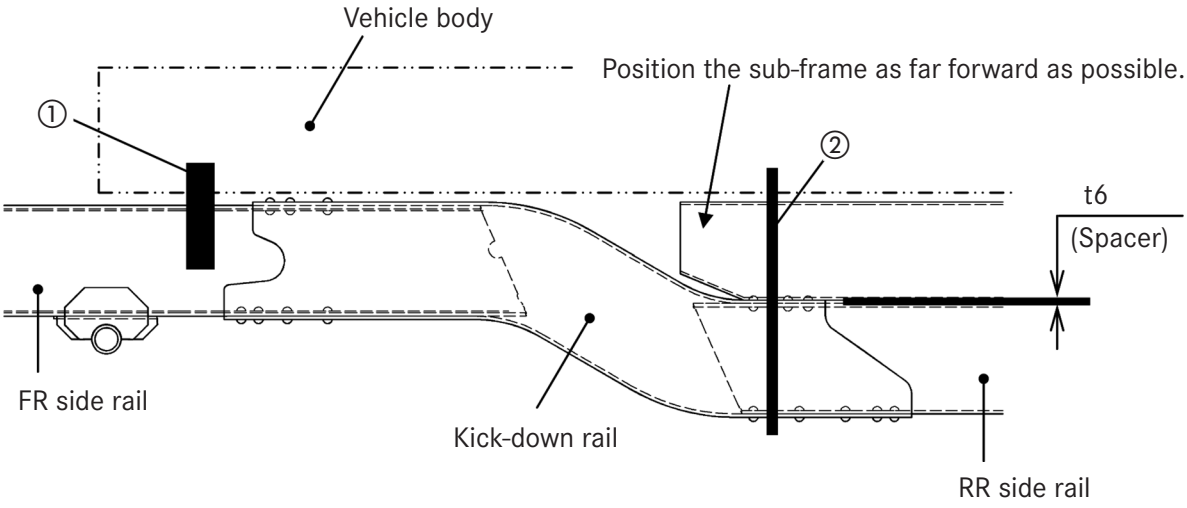
7.2 Fastening mounting frame to chassis frame

Cargo

<4WD(FGB Moel)>

B

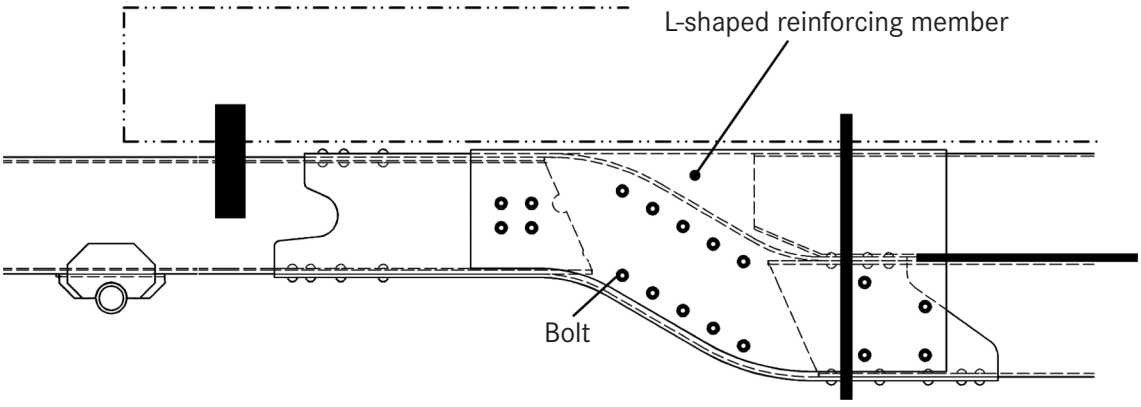
- When building a vehicle body to the frame of a 4WD vehicle (FGB model), follow the instructions below.
  (a) In the case of an ordinary vehicle body:
  Join the front end to the FR side rail (①). For securing the vehicle body to the RR side rail, join the vehicle body to the section where the RR side rail and kick-down rail overlap (②).



(b) In the case of a vehicle body that applies concentrated load or excessive force to the frame, or if an excessive twisting force may be applied to the frame on rough roads or muddy ground, add an L-shaped reinforcing member as shown in the figure below.
Use M10 bolts (8T) and nuts (6T) with a tightening torque of 60 to 80 N·m {6 to 8 kgf·m} to secure the vehicle body to the frame. Note that it is necessary to tighten together with the existing fuel tank, fuel filter and ATS module, so observe the following points:

① Specifications of bolt strength and tightening torque:
- For fuel tank and ATS module: 10T, 90 to 110 N·m {9 to 11 kgf·m}
- For fuel filter (No. 2 cross member): 8T, 60 to 80 N·m {6 to 8 kgf·m}

② On a vehicle equipped with the ATS module, there will be a difference in height of the vehicle body between the sections before and after the module due to the reinforcing member. Adjust the brackets to compensate for this height difference.



7.2 Fastening mounting frame to chassis frame

Cargo

(1) Position of mounting frame

- Install the mounting frame as shown in Fig. 1 to gradually reduce the stress concentrations in the front end. The front end of the mounting frame should be installed as close to the rear of the cab as possible. Extend the mounting frame as far toward the cab as possible when the rear body is installed far from the cab.

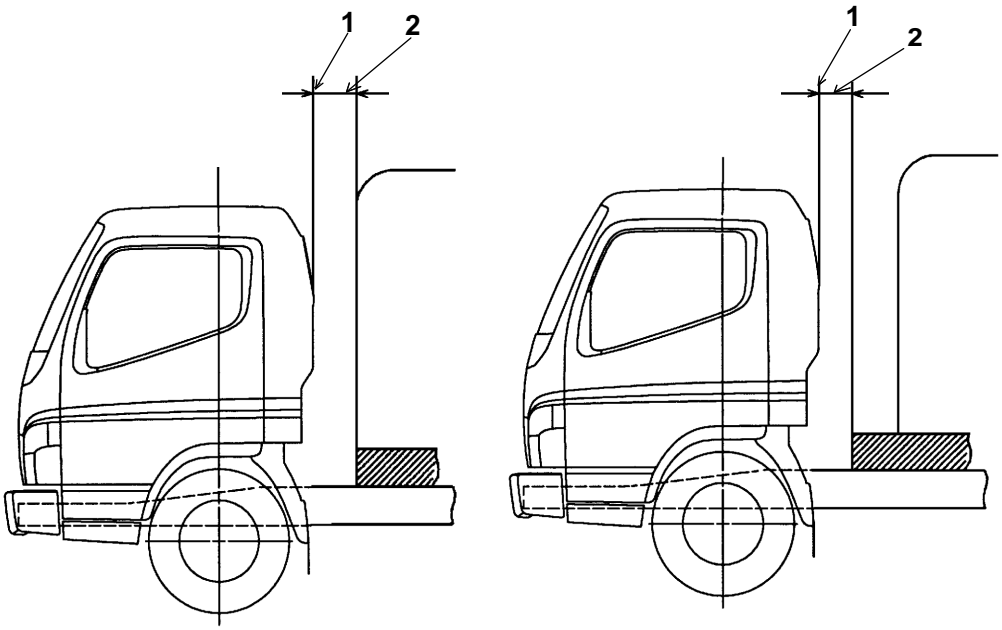


Fig. 1

1 CAB BACK
2 Extend the front end of the mounting frame as far forward as possible; less than 300 mm

7.2 Fastening mounting frame to chassis frame

Cargo

- Examples of front-end shape of mounting frames
  (a) Install the mounting frame having the shape as shown in Fig. 2 to gradually reduce the stress concentrations in the front end.

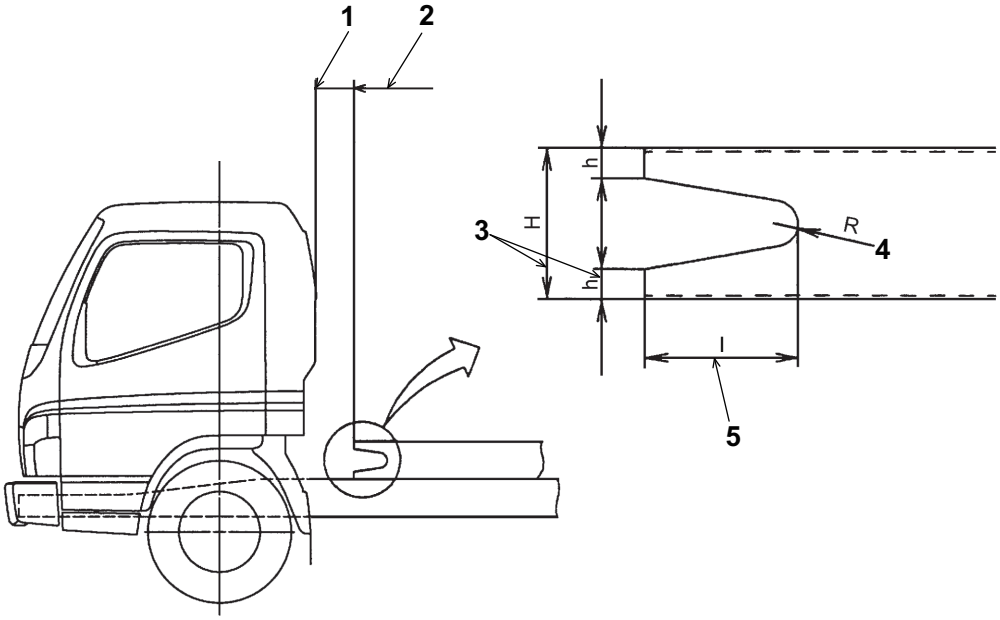


Fig. 2

1 CAB BACK
2 Extend the front end of the mounting frame as far forward as possible; less than 115 mm
3 "h" should be between a fourth and a fifth of "H"
4 DRILLING
5 "l" must not be less than 2/3H(two thirds of "H")

(b) The shape of the mounting frame front end as shown in Fig. 2 is highly desirable. However, if there is enough room behind the cab, the shape as shown in Fig. 3 is also acceptable.

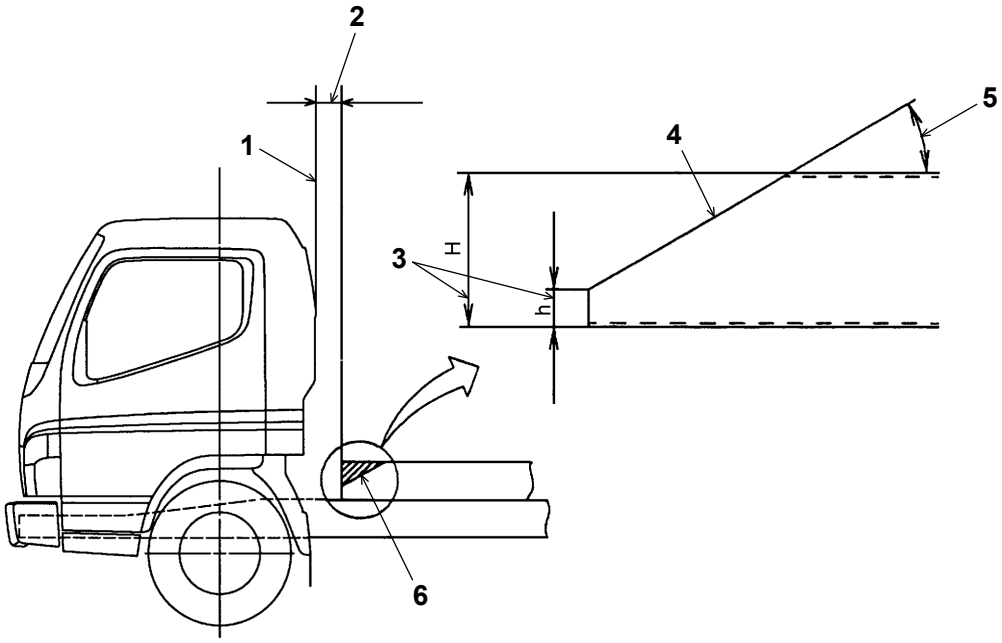


Fig. 3

1 CAB BACK
2 Less than 300 mm
3 "h" should be between a fourth and a fifth of "H"
4 Left open
5 Less than 30°
6 Cut off Obliquely

(c) If it is difficult to shape the front end of the mounting frame as described in Fig. 2 and Fig. 3, cut it to the shape as shown in Fig. 4 before installation.

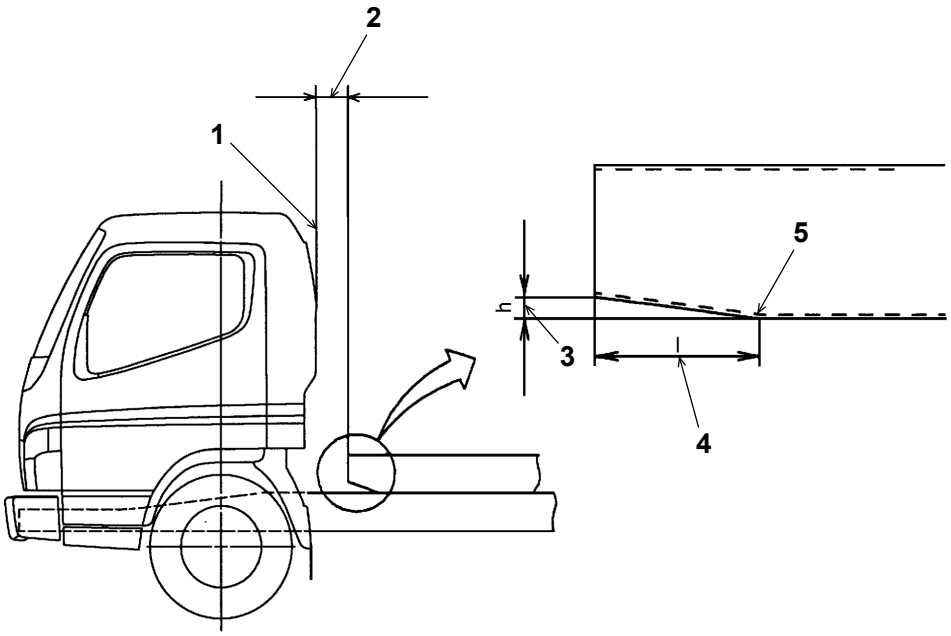


Fig. 4

1 CAB BACK
2 Less than 300 mm
3 "h" should be 2 to 3 mm
4 "l" should be 50 to 70 mm
5 This corner should be ground smoothly

7.2 Fastening mounting frame to chassis frame

Cargo

- If the chassis frame changes its width behind the cab back as shown in Fig. 7 and the mounting frame should extend forward beyond the width-changed portion, the mounting frame must also change its width along the chassis frame. The portion of the mounting frame where the width changed must have the internal surface reinforced with stiffeners as shown in the figure.

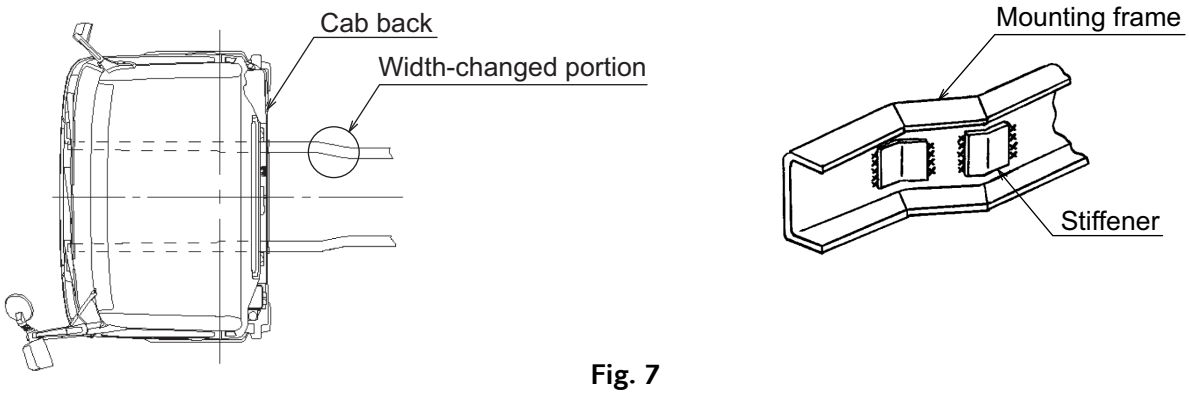
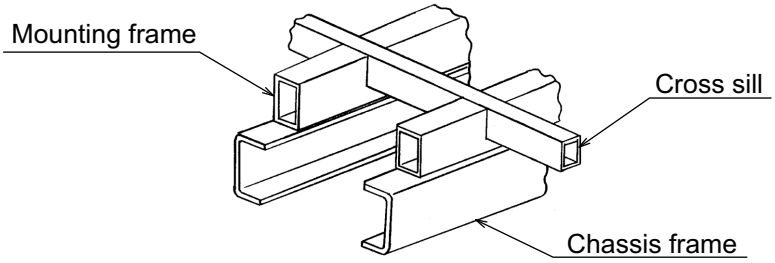


Fig. 7

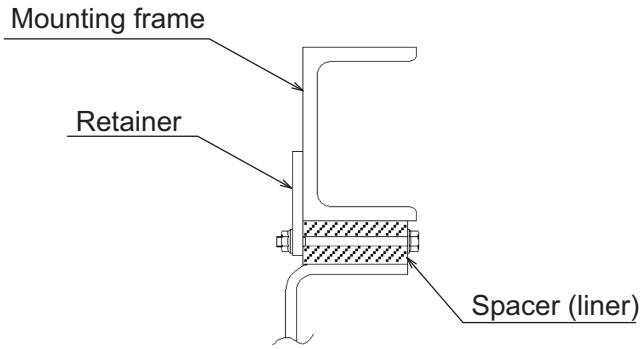
Other notes

- If, for the sake of a low deck design, the mounting frame and the cross sill must be arranged on the same plane, pass the cross sill member through the mounting frame.



(2) Spacer (Liner)

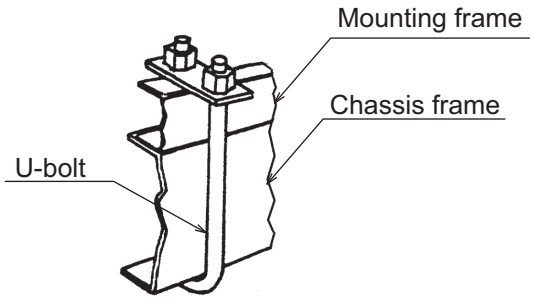
- Placing a spacer (liner) between the chassis frame and the mounting frame is not recommended because the combining force between both frames may be lowered.
- In an unavoidable case, hold the spacer (liner) in position with an additional retainer.



Installation of out-of-position preventive retainer

(3) Frame fasteners and their features

- U-bolt
  The U-bolt is a fastener widely used for combining two or more members. This offers a considerable fastening force and is effective for preventing lateral movement of members. However, it is not so effective for suppressing the longitudinal movement. Therefore, it is required that a retainer be used together for that purpose.



7.2 Fastening mounting frame to chassis frame

Cargo

- **Mounting Bracket**

When U-bolts cannot be used with a particular body, use mounting brackets in those positions to attach it to the mounting frame. Use the following bracket locations and installation procedures.

- Attach the mounting brackets to the chassis frame with bolts whenever possible. Be especially careful not to damage any pipes, hoses, and wiring harnesses attached to or around the frame.
- Do not attach brackets close to the ends of crossmembers, gussets or stiffeners. Brackets should be installed at least 200 mm away from the end of these parts.

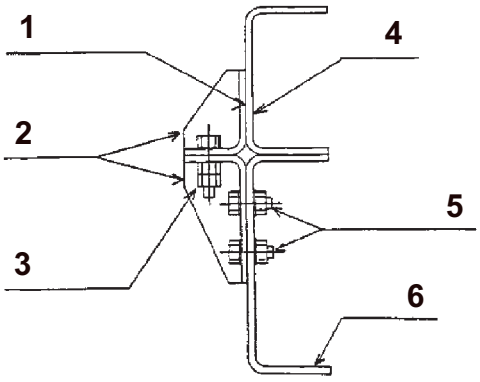


Fig. 8

1 Attached by welding
2 Mounting bracket
3 Use double nuts
4 Mounting frame
5 Tighten the bolts and nuts in more than two locations.
6 Chassis frame

- As a maker option, the genuine rear body brackets are available as shown below.

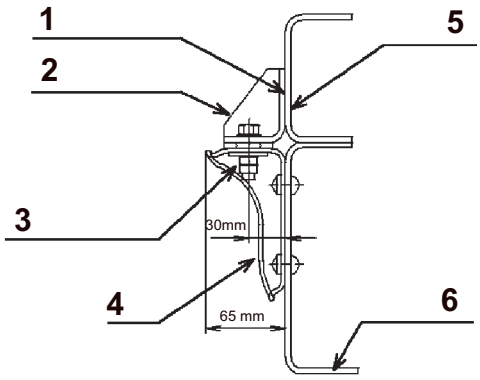


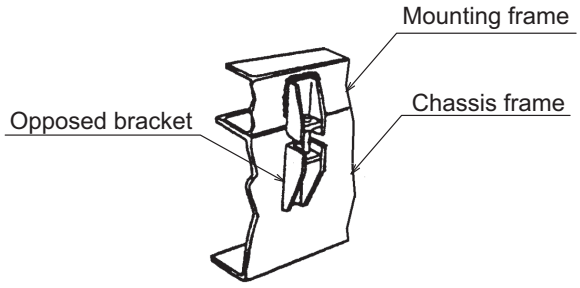
Fig. 9

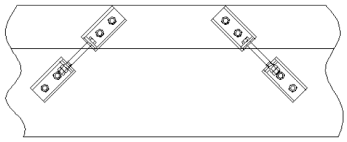
1 Attached by welding
2 Mounting bracket
3 Use double nuts With washer (more than Ø 32 mm)
4 Genuine mounting bracket
5 Mounting frame
6 Chassis frame

7.2 Fastening mounting frame to chassis frame

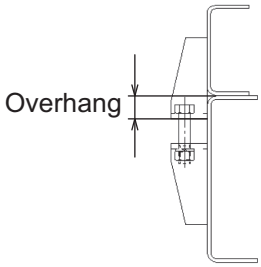
Cargo

- Opposed bracket
  This is a fastener composed of two brackets opposed to each other (one on chassis frame, one on mounting frame) and one bolt connecting these brackets. This offers a larger fastening force in a vertical direction as compared to a U-bolt. However, it is inferior in the longitudinal and lateral holding forces. To increase the longitudinal holding force of this fastener, arrange two pairs of brackets diagonally as shown below. To increase the lateral holding force, overhang the bracket on the mounting frame side toward the chassis frame side.



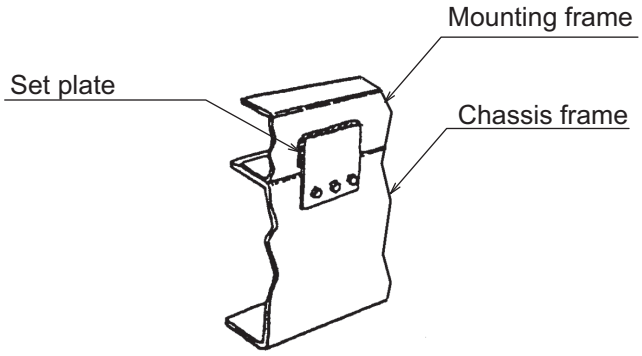


For increasing longitudinal holding force



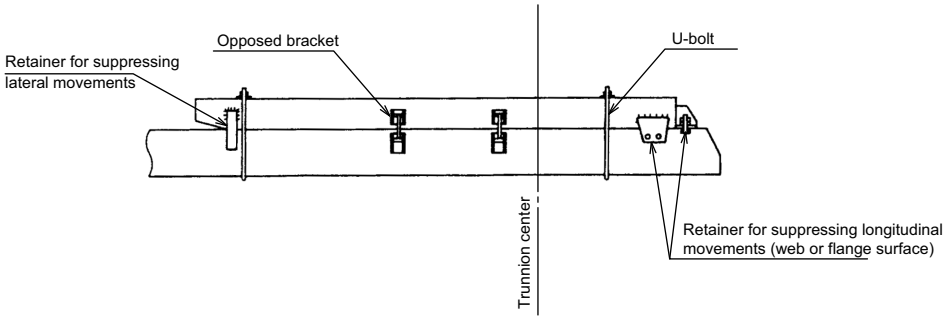
For increasing lateral holding force

- Mounting flange
  This is a retainer composed of a set plate fastening the chassis frame and mounting frame to each other. This offers a strong holding force in the longitudinal direction but is inferior to a U-bolt or opposed bracket in vertical and lateral holding forces.



Precautions for fastening frames

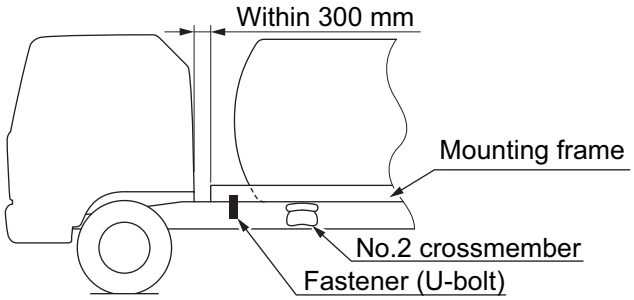
- When fastening the mounting frame to the chassis frame using U-bolts and opposed brackets, use retainers for preventing longitudinal and lateral movements together.



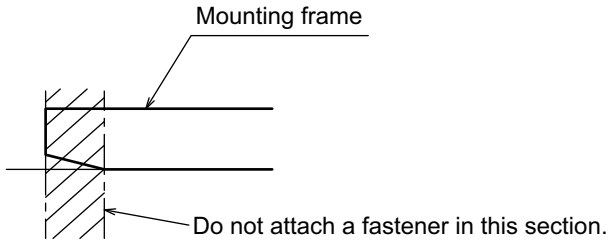
7.2 Fastening mounting frame to chassis frame

Cargo

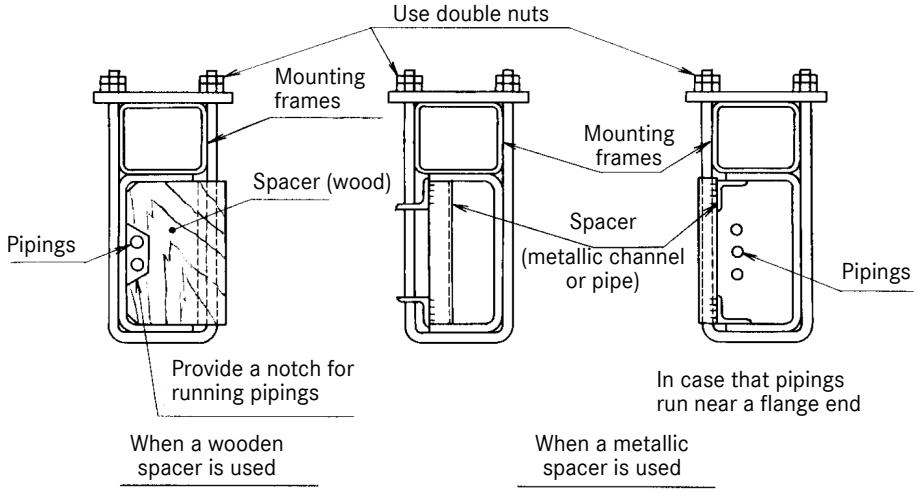
- Even if the distance between the cab back and body front end is larger, extend the mounting frame to near the cab back and secure it at a position before a No.2 crossmember with a fastener.



- When fastening with a U-bolt, ensure that ample spaces are left for running pipes, hoses, wires and harnesses.
- Do not attach any fastener in the mounting frame front end section where the sectional shape is different from the remaining part.



- When the mounting frame and chassis frame are combined with a U-bolt, insert a spacer in the chassis frame at the combined position to prevent the side rail flanges from deforming. When attaching the U-bolt near a hot component such as a muffler, use a metallic spacer, not a wooden spacer which can catch fire. Avoid welding a metallic spacer to the chassis frame to hold it in position.

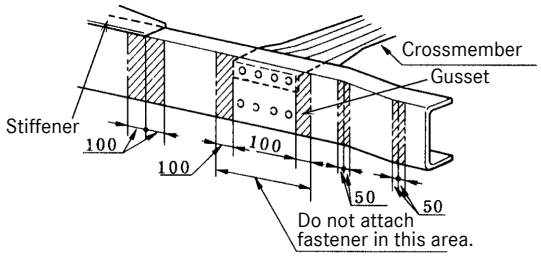


- Attaching opposed brackets to a chassis frame should be done with bolts. For the procedure, refer to "6. Modifications to the basic vehicle" ▷ 6.1.

7.2 Fastening mounting frame to chassis frame

Cargo

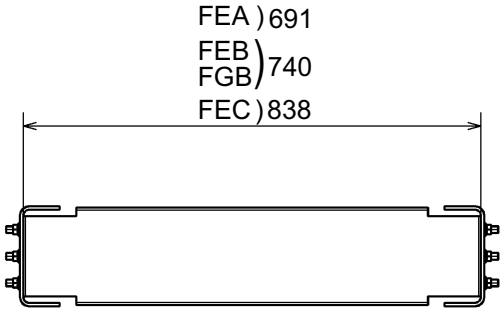
- Do not use U-bolts or opposed brackets for crossmember, stiffener and gusset attaching sections or near the curved section of the chassis frame because these sections are likely to be subjected to stress concentration.



B

(4) Rear end of chassis frame

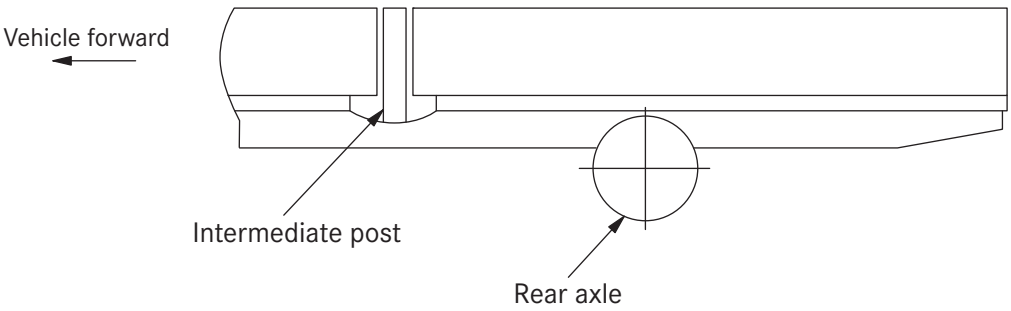
As a result of Product Tolerance for vehicles without RUP, the width dimension of the assembly at the Rear End of the Chassis Frame, may sometimes differ greatly from the dimension indicated in "10.5 Chassis cab drawings". Refer to ▷ 10.5.
If this constitutes an obstacle to body building, devise countermeasures to facilitate body building, such as the installation of a cross member at the rear end of the chassis frame.
An example of a cross member is shown in the figure below.



View seen from the rear of the vehicle

(5) Intermediate post

- On chassis mounted with a 5-way openable rear body, heavy object container or low rigidity body, install an intermediate post at a position just before the rear front axle to prevent the body from drooping rearward or to facilitate sideway swinging of a gate to open or close it during loading.



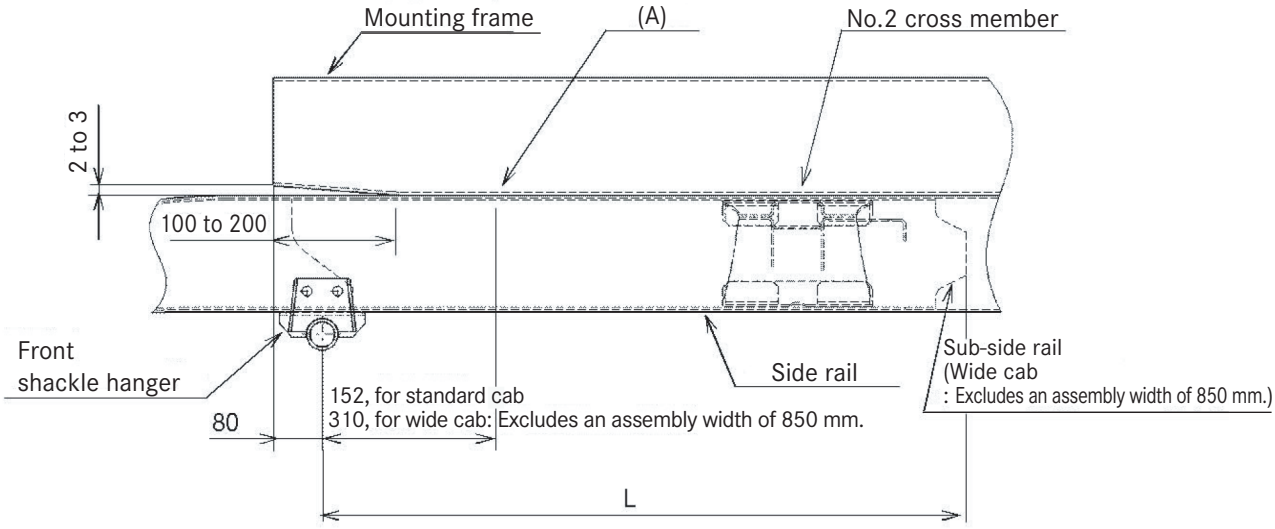
- When installing an intermediate post on a truck with a long wheelbase, taking the chassis frame deflection during loading into consideration, provide an ample space between the post and the side gate so that trouble-free side gate opening/closing operations may be assured.

7.2 Fastening mounting frame to chassis frame

Tank truck

7.2.2 Tank truck, Powder carrying vehicle

- Be sure to install a mounting frame to ensure that a concentrated load is not applied to the chassis frame.



B

Unit: mm

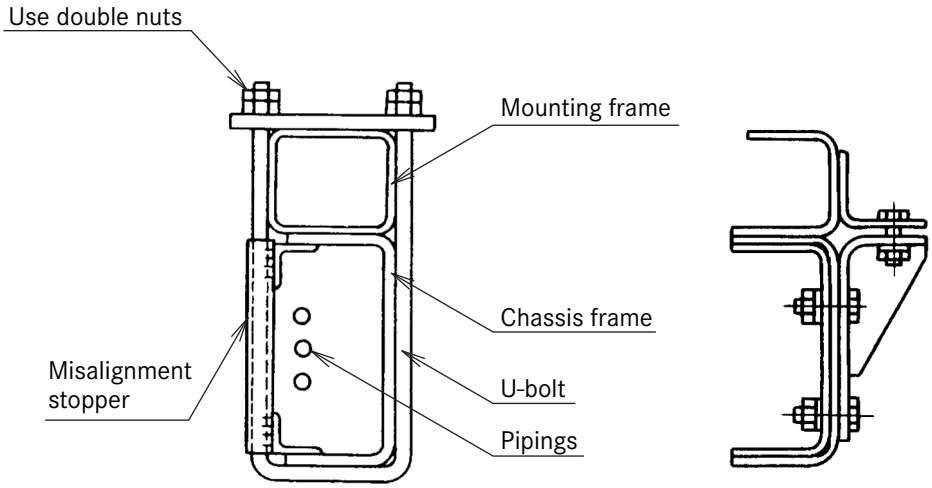
Vehicle mode	L
Standard cab	1050
Wide cab (FE, FG)	1100
Wide cab (HEV)	1250

Note: (A) indicates the part of the frame assembly that has been enlarged (standard cab: 700 mm assembly width; wide cab: 750 mm assembly width).

7.2 Fastening mounting frame to chassis frame

Tank truck

- Carry out the following in order to prevent stress concentrating at the front end of the mounting frame. Make the length of the tapered part of the bottom end of the mounting frame between 100 and 200 mm, and end the taper at a point that is not past (A). If a taper cannot be secured, form the end to a radius of at least 10, and extend the end part to the front (vicinity of the shackle).
- To connect the mounting frame to the chassis frame, either use U-bolts, or in the case of a heavy body building part fix the mounting frame with opposing brackets and ensure that the load imposed by the body building part plus the freight is borne by both the mounting frame and the chassis frame.
  Ensure that the front end connecting part is frontward of the No.2 cross member (transmission suspension part). A large number of holes and wires pass through this area, so take care not to damage them when installing the U-bolts.



7.2 Fastening mounting frame to chassis frame

Tank truck

(1) Position of mounting frame

- Install the mounting frame as shown in Fig. 1 to gradually reduce the stress concentrations in the front end. The front end of the mounting frame should be installed as close to the rear of the cab as possible. Extend the mounting frame as far toward the cab as possible when the rear body is installed far from the cab.

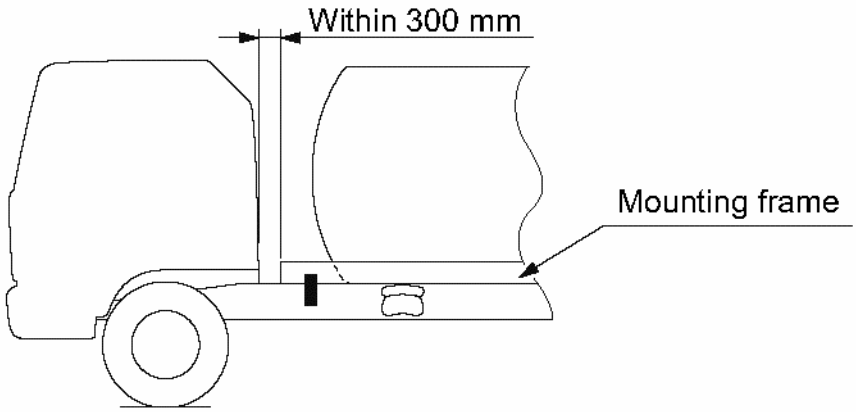


Fig. 1

1 CAB BACK
2 Extend the front end of the mounting frame as far forward as possible; less than 300 mm

- Examples of front-end shape of mounting frames
  (a) Install the mounting frame having the shape as shown in Fig. 2 to gradually reduce the stress concentrations in the front end.

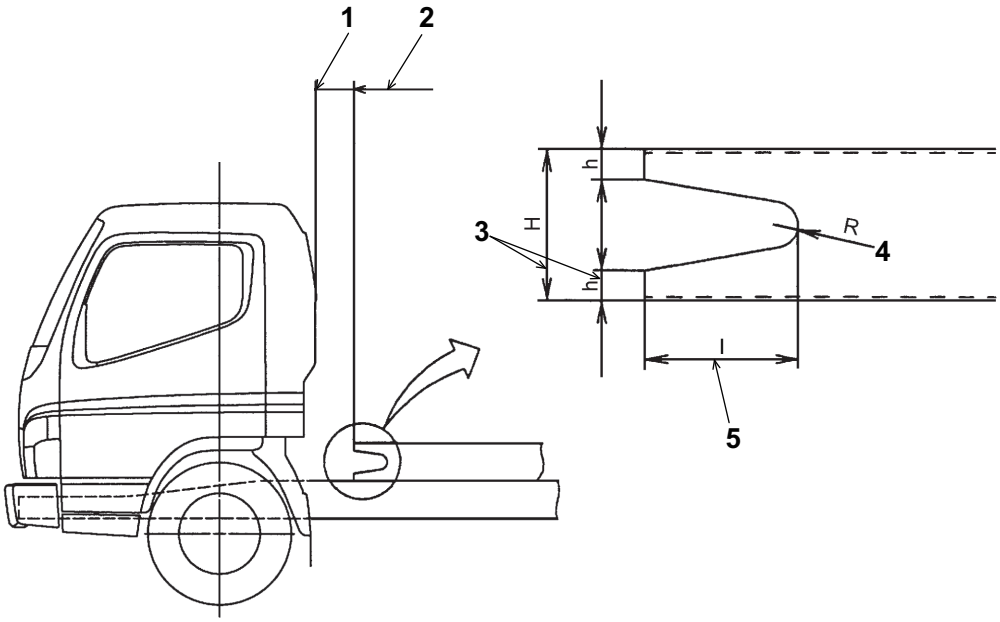


Fig. 2

1 CAB BACK
2 Extend the front end of the mounting frame as far forward as possible; less than 115 mm
3 "h" should be between a fourth and a fifth of "H"
4 DRILLING
5 "l" must not be less than 2/3H(two thirds of "H")

7.2 Fastening mounting frame to chassis frame

Tank truck

(b) The shape of the mounting frame front end as shown in Fig. 2 is highly desirable. However, if there is enough room behind the cab, the shape as shown in Fig. 3 is also acceptable.

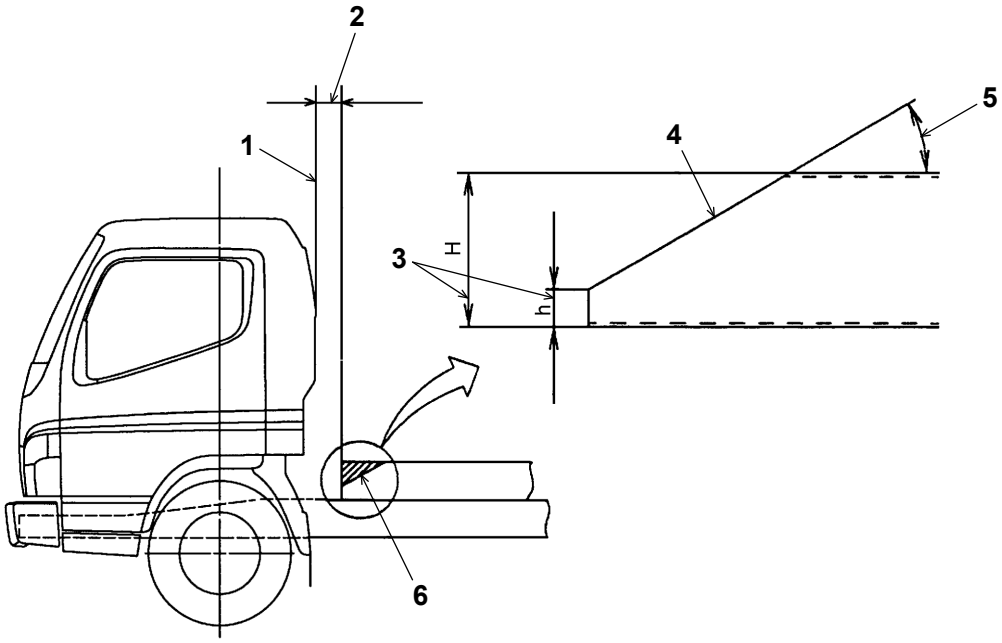


Fig. 3

1 CAB BACK
2 Less than 300 mm
3 "h" should be between a fourth and a fifth of "H"
4 Left open
5 Less than 30°
6 Cut off Obliquely

7.2 Fastening mounting frame to chassis frame

Tank truck

(c) If it is difficult to shape the front end of the mounting frame as described in Fig. 2 and Fig. 3, cut it to the shape as shown in Fig. 4 before installation.

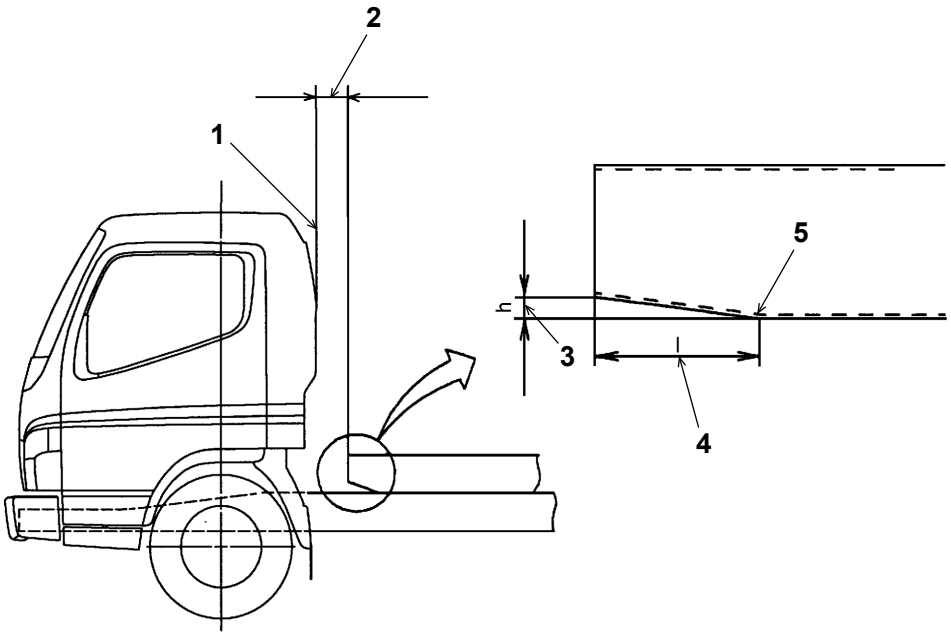


Fig. 4

1 CAB BACK
2 Less than 300 mm
3 "h" should be 2 to 3 mm
4 "l" should be 50 to 70 mm
5 This corner should be ground smoothly

7.2 Fastening mounting frame to chassis frame

Tank truck

- If the chassis frame changes its width behind the cab back as shown in Fig. 7 and the mounting frame should extend forward beyond the width-changed portion, the mounting frame must also change its width along the chassis frame. The portion of the mounting frame where the width changed must have the internal surface reinforced with stiffeners as shown in the figure.

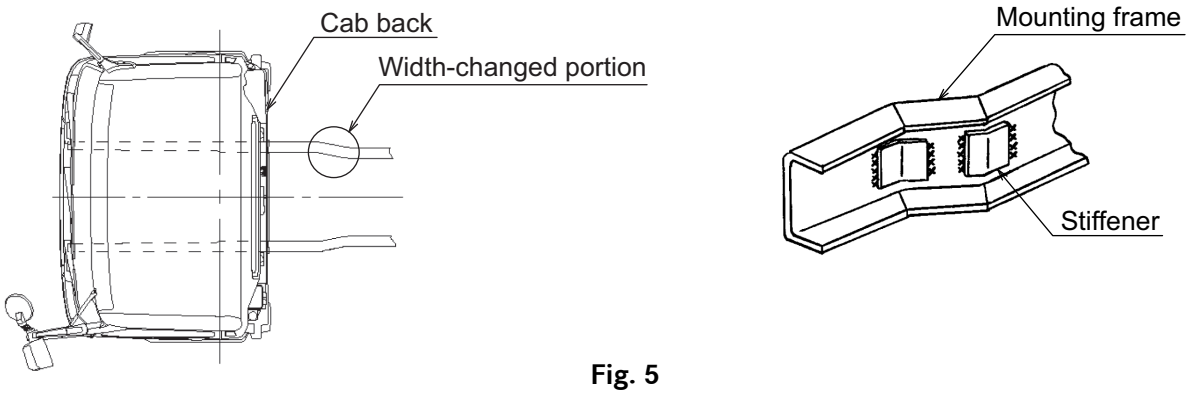
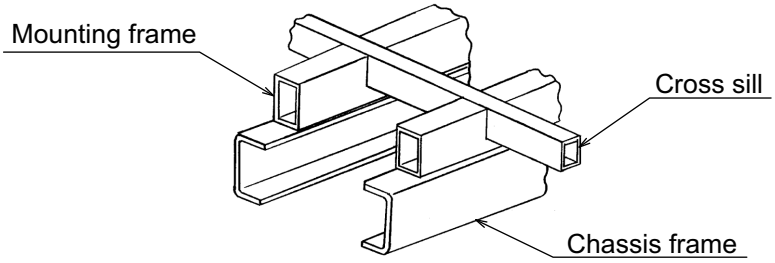


Fig. 5

Other notes

- If, for the sake of a low deck design, the mounting frame and the cross sill must be arranged on the same plane, pass the cross sill member through the mounting frame.



7.2 Fastening mounting frame to chassis frame

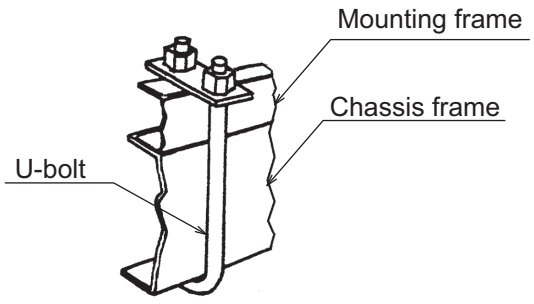
Tank truck

(2) Spacer (liner)

The spacer (liner) reduces the fastening force between the chassis frame and the mounting frame.

(3) Frame fasteners and their features

- U-bolt
  The U-bolt is a fastener widely used for combining two or more members. This offers a considerable fastening force and is effective for preventing lateral movement of members. However, it is not so effective for suppressing the longitudinal movement. Therefore, it is required that a retainer be used together for that purpose.



7.2 Fastening mounting frame to chassis frame

Tank truck

- **Mounting Bracket**

When U-bolts cannot be used with a particular body, use mounting brackets in those positions to attach it to the mounting frame. Use the following bracket locations and installation procedures.

- Attach the mounting brackets to the chassis frame with bolts whenever possible. Be especially careful not to damage any pipes, hoses, and wiring harnesses attached to or around the frame.
- Do not attach brackets close to the ends of crossmembers, gussets or stiffeners. Brackets should be installed at least 200 mm away from the end of these parts.

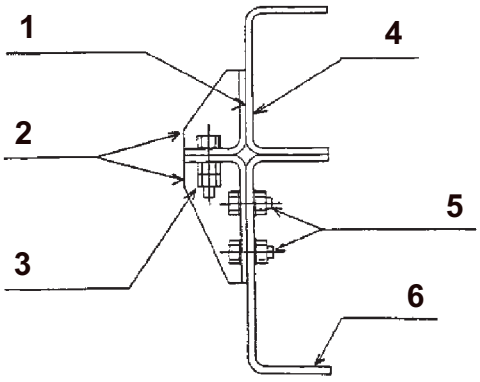


Fig. 6

1 Attached by welding
2 Mounting bracket
3 Use double nuts
4 Mounting frame
5 Tighten the bolts and nuts in more than two locations.
6 Chassis frame

- As a maker option, the genuine rear body brackets are available as shown below.

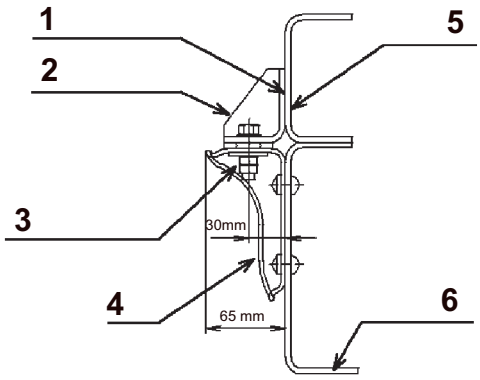


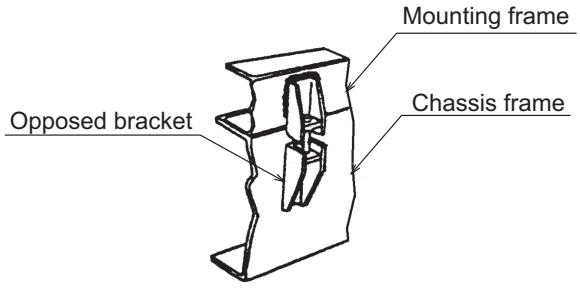
Fig. 7

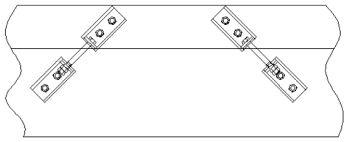
1 Attached by welding
2 Mounting bracket
3 Use double nuts With washer (more than Ø 32 mm)
4 Genuine mounting bracket
5 Mounting frame
6 Chassis frame

7.2 Fastening mounting frame to chassis frame

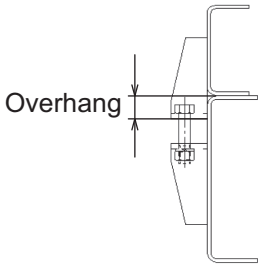
Tank truck

- Opposed bracket
  This is a fastener composed of two brackets opposed to each other (one on chassis frame, one on mounting frame) and one bolt connecting these brackets. This offers a larger fastening force in a vertical direction as compared to a U-bolt. However, it is inferior in the longitudinal and lateral holding forces. To increase the longitudinal holding force of this fastener, arrange two pairs of brackets diagonally as shown below. To increase the lateral holding force, overhang the bracket on the mounting frame side toward the chassis frame side.



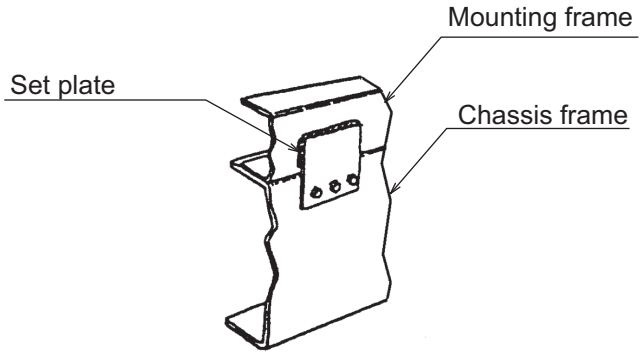


For increasing longitudinal holding force



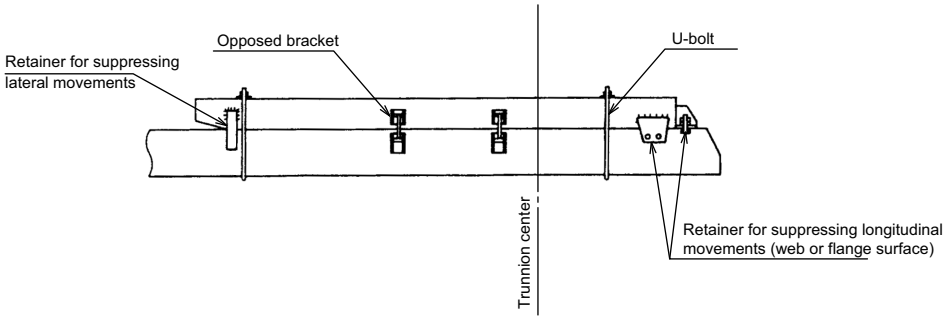
For increasing lateral holding force

- Mounting flange
  This is a retainer composed of a set plate fastening the chassis frame and mounting frame to each other. This offers a strong holding force in the longitudinal direction but is inferior to a U-bolt or opposed bracket in vertical and lateral holding forces.



Precautions for fastening frames

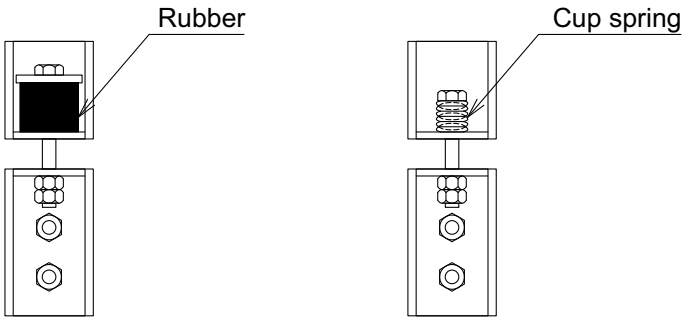
- When fastening the mounting frame to the chassis frame using U-bolts and opposed brackets, use retainers for preventing longitudinal and lateral movements together.



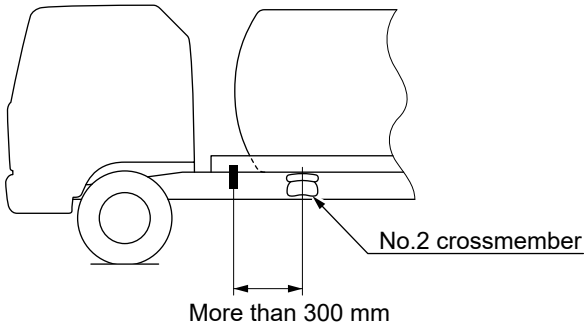
7.2 Fastening mounting frame to chassis frame

Tank truck

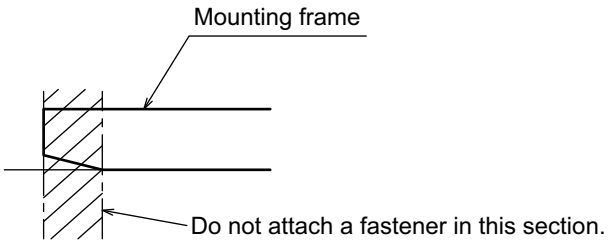
- For fastening at the forefront, use a flexible joint such as shown in the figure below to absorb the relative displacement between the mounting frame and chassis frame.



- Locate the forefront fastener at least 300 mm ahead from the No.2 crossmember to reduce the load input on the chassis frame.



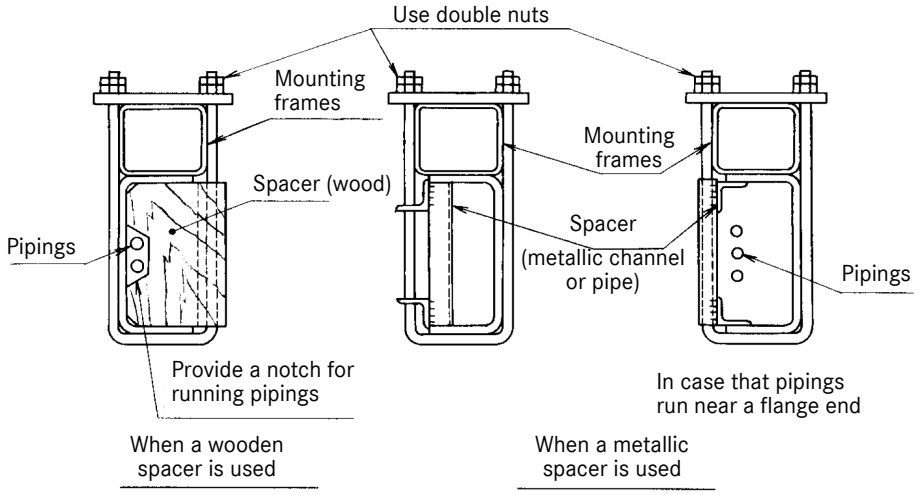
- When fastening with a U-bolt, ensure that ample spaces are left for running pipes, hoses, wires and harnesses.
- Do not attach any fastener in the mounting frame front end section where the sectional shape is different from the remaining part.



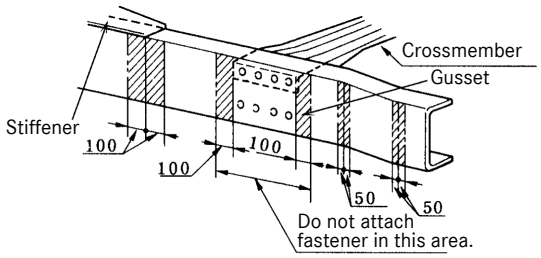
7.2 Fastening mounting frame to chassis frame

Tank truck

- When the mounting frame and chassis frame are combined with a U-bolt, insert a spacer in the chassis frame at the combined position to prevent the side rail flanges from deforming. When attaching the U-bolt near a hot component such as a muffler, use a metallic spacer, not a wooden spacer which can catch fire. Avoid welding a metallic spacer to the chassis frame to hold it in position.

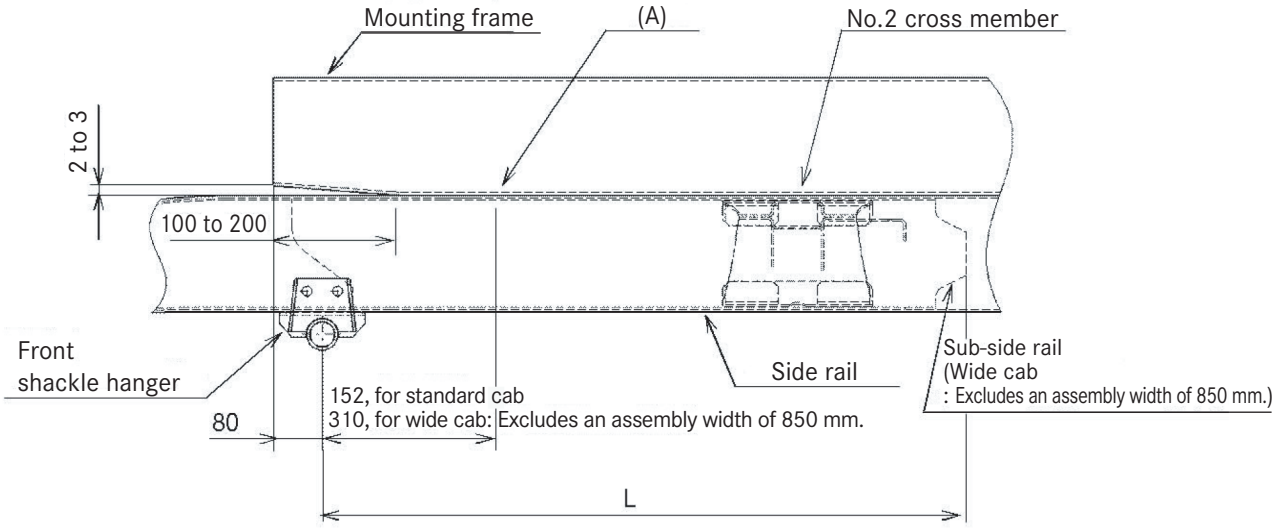


- Attaching opposed brackets to a chassis frame should be done with bolts. For the procedure, refer to "6. Modifications to the basic vehicle" ▷ 6.1.
- Do not use U-bolts or opposed brackets for crossmember, stiffener and gusset attaching sections or near the curved section of the chassis frame because these sections are likely to be subjected to stress concentration.



7.2.3 Loading crane

- Be sure to install a mounting frame to ensure that a concentrated load is not applied to the chassis frame.



B

Unit: mm

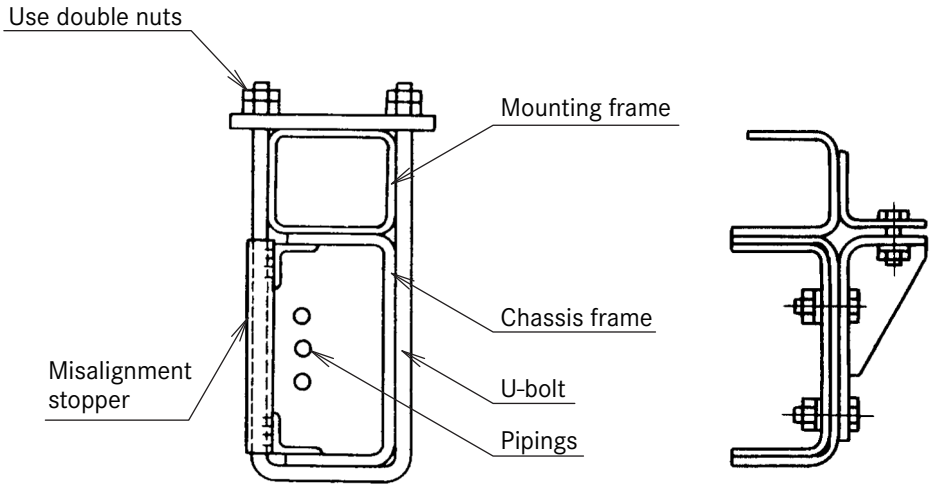
Vehicle mode	L
Standard cab	1050
Wide cab (FE, FG)	1100
Wide cab (HEV)	1250

Note: (A) indicates the part of the frame assembly that has been enlarged (standard cab: 700 mm assembly width; wide cab: 750 mm assembly width).

7.2 Fastening mounting frame to chassis frame

Loading crane

- Carry out the following in order to prevent stress concentrating at the front end of the mounting frame. Make the length of the tapered part of the bottom end of the mounting frame between 100 and 200 mm, and end the taper at a point that is not past (A). If a taper cannot be secured, form the end to a radius of at least 10, and extend the end part to the front (vicinity of the shackle).
- To connect the mounting frame to the chassis frame, either use U-bolts, or in the case of a heavy body building part fix the mounting frame with opposing brackets and ensure that the load imposed by the body building part plus the freight is borne by both the mounting frame and the chassis frame.
  Ensure that the front end connecting part is frontward of the No.2 cross member (transmission suspension part). A large number of holes and wires pass through this area, so take care not to damage them when installing the U-bolts.



7.2 Fastening mounting frame to chassis frame

Loading crane

(1) Position of mounting frame

- Be sure to use a mounting frame of box construction for ensuring higher rigidity.
- For reducing cab vibrations and protecting a chassis frame, mount the crane at a position as close to the cab back as possible.

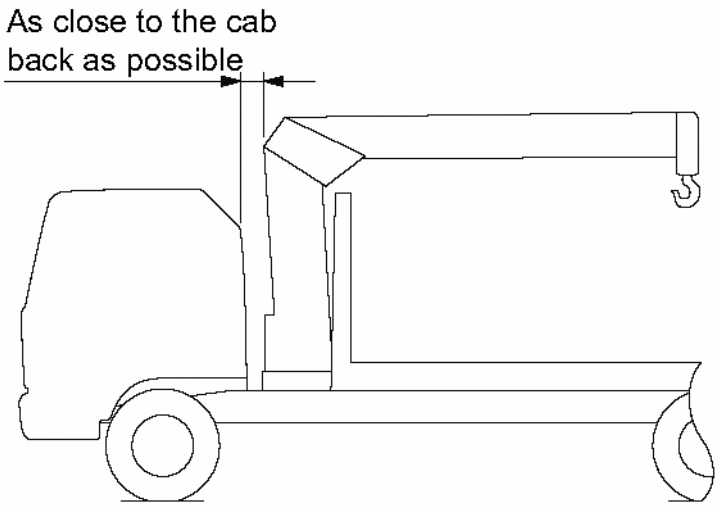


Fig. 1

- Examples of front-end shape of mounting frames
  (a) Install the mounting frame having the shape as shown in Fig. 2 to gradually reduce the stress concentrations in the front end.

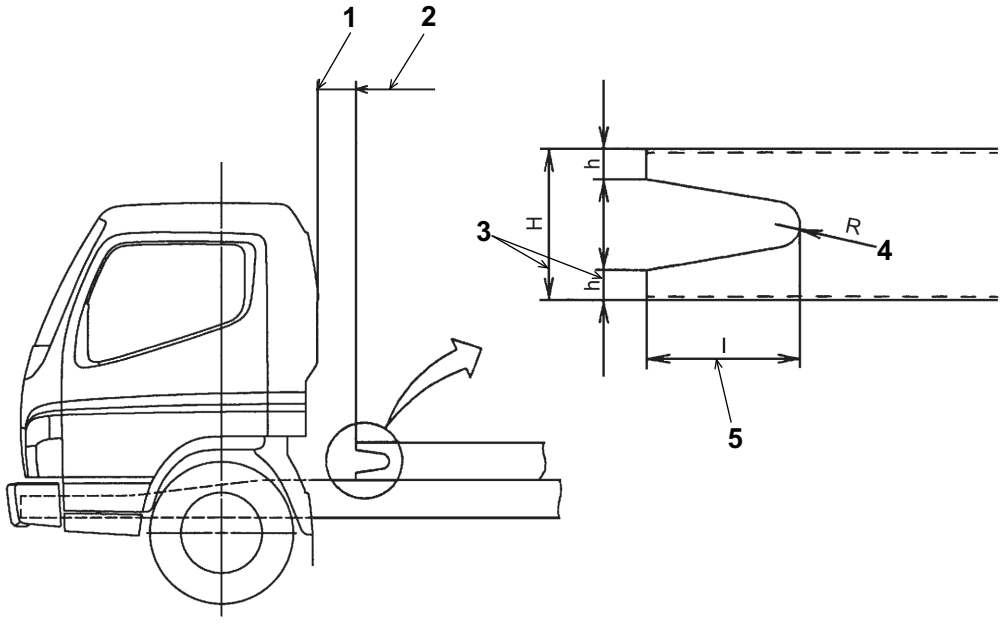


Fig. 2

1 CAB BACK
2 Extend the front end of the mounting frame as far forward as possible; less than 115 mm
3 "h" should be between a fourth and a fifth of "H"
4 DRILLING
5 "l" must not be less than 2/3H(two thirds of "H")

7.2 Fastening mounting frame to chassis frame

Loading crane

(b) The shape of the mounting frame front end as shown in Fig. 2 is highly desirable. However, if there is enough room behind the cab, the shape as shown in Fig. 3 is also acceptable.

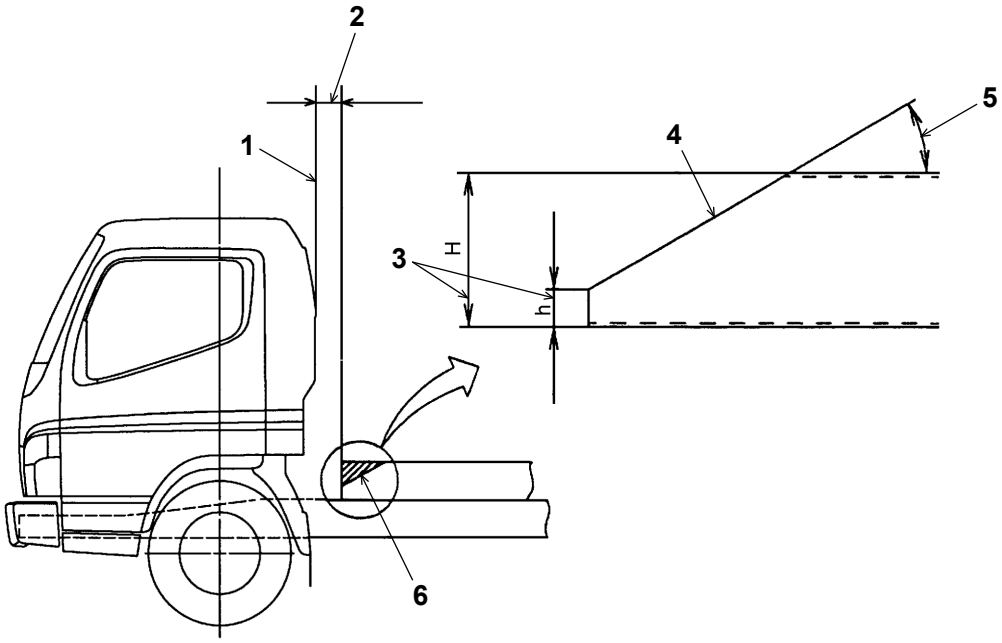


Fig. 3

1 CAB BACK
2 Less than 300 mm
3 "h" should be between a fourth and a fifth of "H"
4 Left open
5 Less than 30°
6 Cut off Obliquely

(c) If it is difficult to shape the front end of the mounting frame as described in Fig. 2 and Fig. 3, cut it to the shape as shown in Fig. 4 before installation.

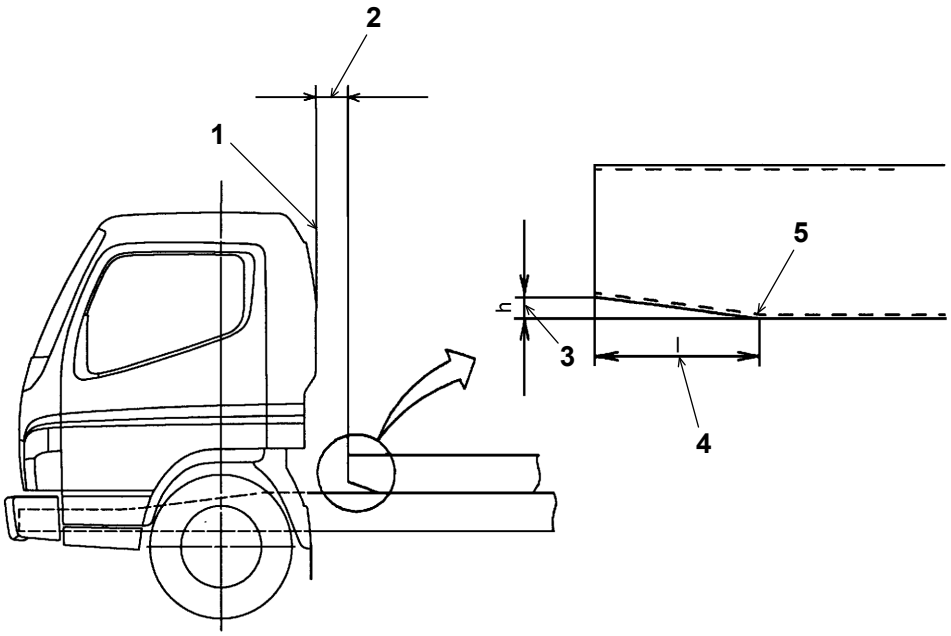


Fig. 4

1 CAB BACK
2 Less than 300 mm
3 "h" should be 2 to 3 mm
4 "l" should be 50 to 70 mm
5 This corner should be ground smoothly

7.2 Fastening mounting frame to chassis frame

Loading crane

- If the chassis frame changes its width behind the cab back as shown in Fig. 7 and the mounting frame should extend forward beyond the width-changed portion, the mounting frame must also change its width along the chassis frame. The portion of the mounting frame where the width changed must have the internal surface reinforced with stiffeners as shown in the figure.

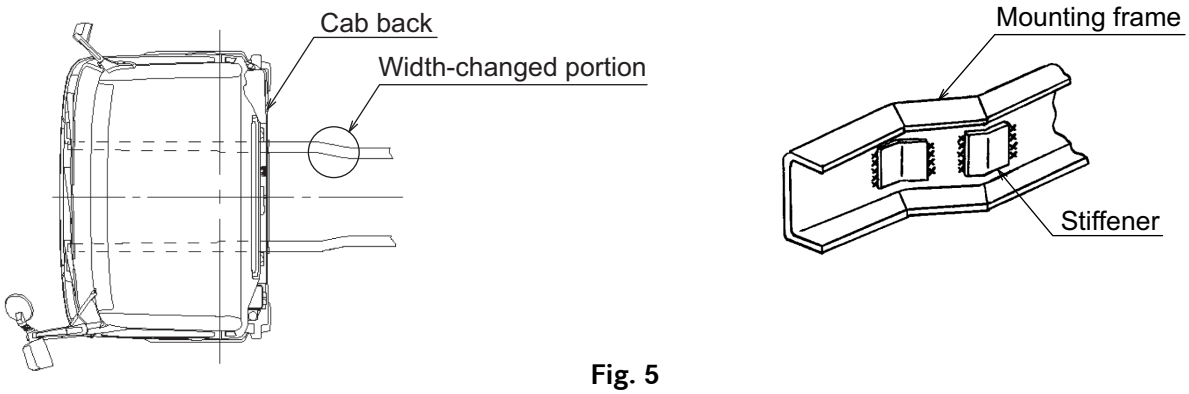
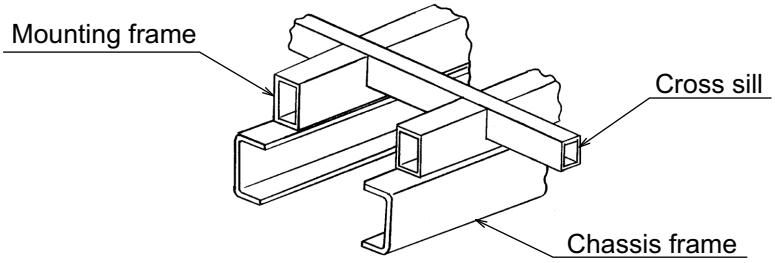


Fig. 5

Other notes

- If, for the sake of a low deck design, the mounting frame and the cross sill must be arranged on the same plane, pass the cross sill member through the mounting frame.



(2) Spacer (liner)

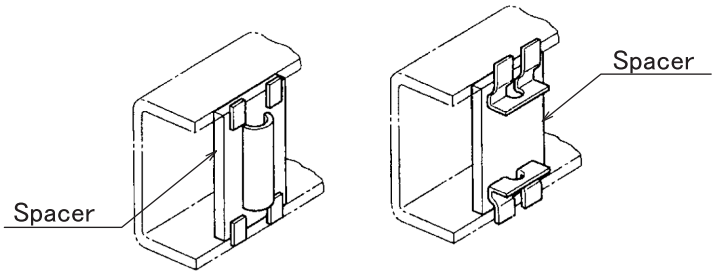
The spacer (liner) reduces the fastening force between the chassis frame and the mounting frame.

7.2 Fastening mounting frame to chassis frame

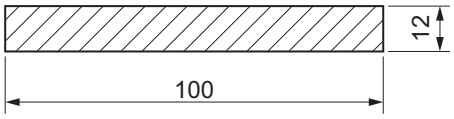
Loading crane

(3) Frame reinforcement

- In order to prevent the chassis frame flanges from deforming, provide the chassis frame with spacers for supporting the flanges. Avoid welding a metallic spacer to the chassis frame to hold it in position.



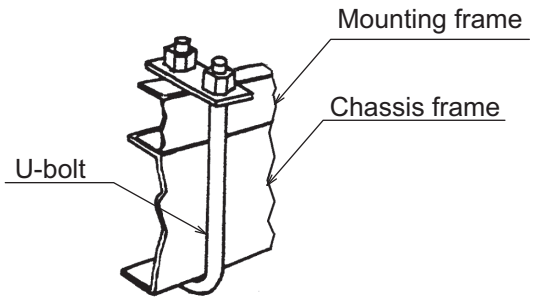
- Spacers for preventing deformation of the chassis frame must be fabricated from a steel plate having a sectional area of minimum 1200 mm^2.



- The frame section near the crane mounting position can be locally subjected to stress concentration during crane operation. Do not forget to reinforce this section with stiffeners. For the frame reinforcement procedure, refer to "6.5 Reinforcement" ▷ 6.5.

(4) Frame fasteners and their features

- U-bolt
  The U-bolt is a fastener widely used for combining two or more members. This offers a considerable fastening force and is effective for preventing lateral movement of members. However, it is not so effective for suppressing the longitudinal movement. Therefore, it is required that a retainer be used together for that purpose.



7.2 Fastening mounting frame to chassis frame

Loading crane

- **Mounting Bracket**

When U-bolts cannot be used with a particular body, use mounting brackets in those positions to attach it to the mounting frame. Use the following bracket locations and installation procedures.

- Attach the mounting brackets to the chassis frame with bolts whenever possible. Be especially careful not to damage any pipes, hoses, and wiring harnesses attached to or around the frame.
- Do not attach brackets close to the ends of crossmembers, gussets or stiffeners. Brackets should be installed at least 200 mm away from the end of these parts.

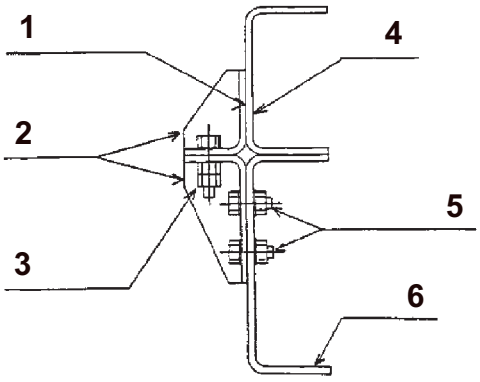


Fig. 6

1 Attached by welding
2 Mounting bracket
3 Use double nuts
4 Mounting frame
5 Tighten the bolts and nuts in more than two locations.
6 Chassis frame

- As a maker option, the genuine rear body brackets are available as shown below.

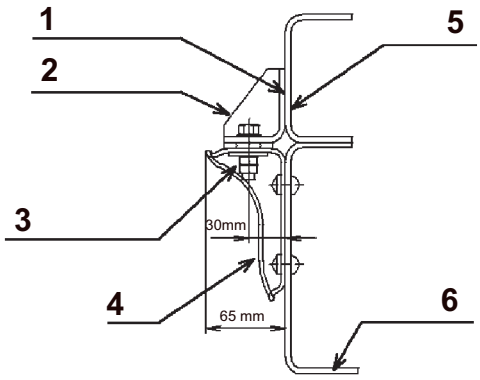


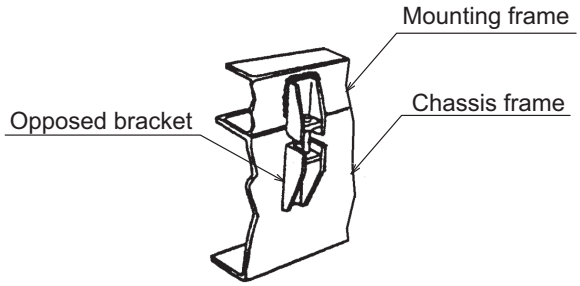
Fig. 7

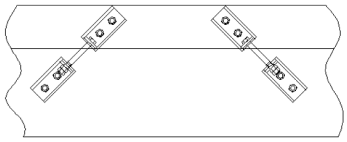
1 Attached by welding
2 Mounting bracket
3 Use double nuts With washer (more than Ø 32 mm)
4 Genuine mounting bracket
5 Mounting frame
6 Chassis frame

7.2 Fastening mounting frame to chassis frame

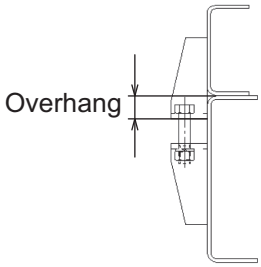
Loading crane

- Opposed bracket
  This is a fastener composed of two brackets opposed to each other (one on chassis frame, one on mounting frame) and one bolt connecting these brackets. This offers a larger fastening force in a vertical direction as compared to a U-bolt. However, it is inferior in the longitudinal and lateral holding forces. To increase the longitudinal holding force of this fastener, arrange two pairs of brackets diagonally as shown below. To increase the lateral holding force, overhang the bracket on the mounting frame side toward the chassis frame side.



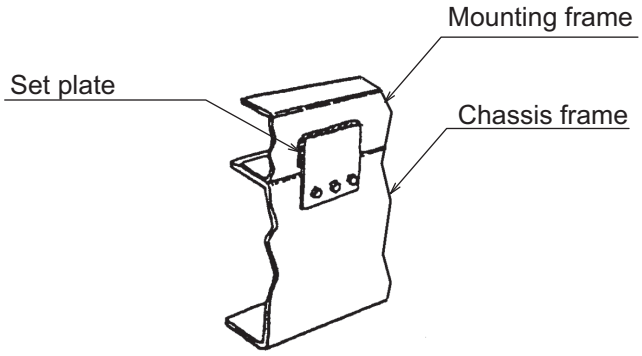


For increasing longitudinal holding force



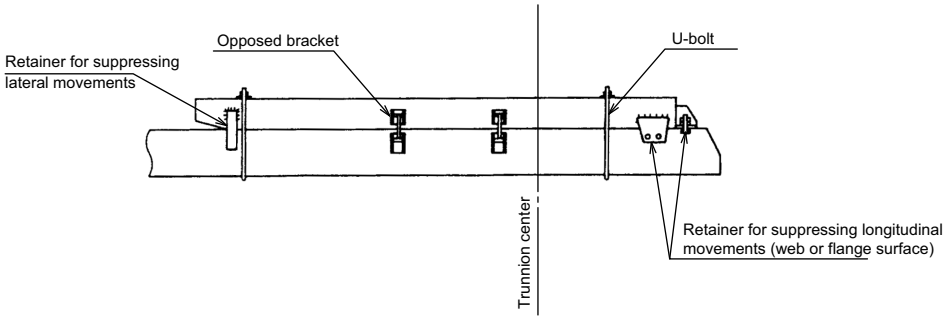
For increasing lateral holding force

- Mounting flange
  This is a retainer composed of a set plate fastening the chassis frame and mounting frame to each other. This offers a strong holding force in the longitudinal direction but is inferior to a U-bolt or opposed bracket in vertical and lateral holding forces.



Precautions for fastening frames

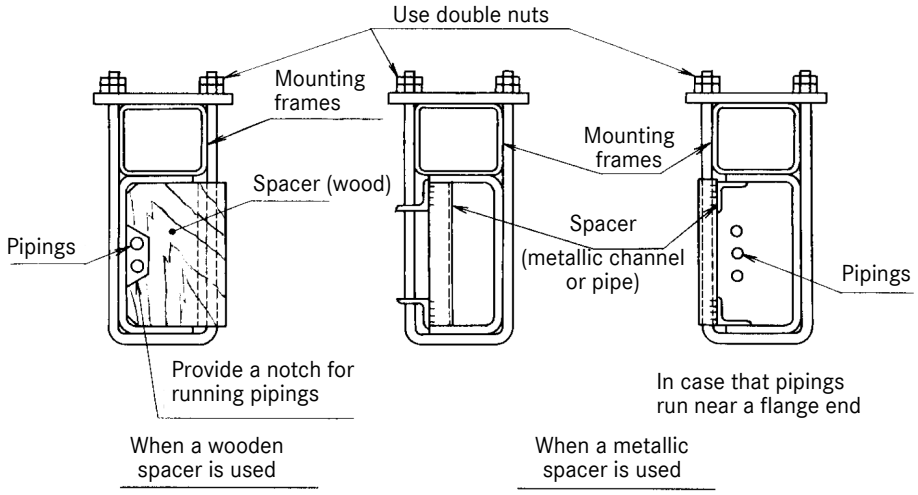
- When fastening the mounting frame to the chassis frame using U-bolts and opposed brackets, use retainers for preventing longitudinal and lateral movements together.



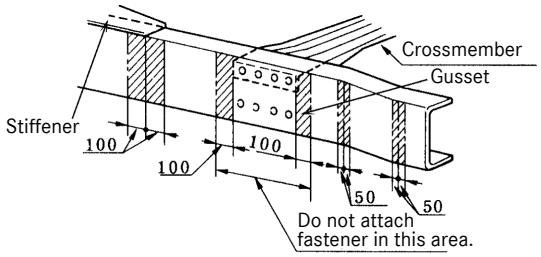
7.2 Fastening mounting frame to chassis frame

Loading crane

- When the mounting frame and chassis frame are combined with a U-bolt, insert a spacer in the chassis frame at the combined position to prevent the side rail flanges from deforming. When attaching the U-bolt near a hot component such as a muffler, use a metallic spacer, not a wooden spacer which can catch fire. Avoid welding a metallic spacer to the chassis frame to hold it in position.



- Attaching opposed brackets to a chassis frame should be done with bolts. For the procedure, refer to "6. Modifications to the basic vehicle" ▷ 6.1.
- Do not use U-bolts or opposed brackets for crossmember, stiffener and gusset attaching sections or near the curved section of the chassis frame because these sections are likely to be subjected to stress concentration.



7.3 Others

7.3.1 Fuel tank

⚠ Risk of fire

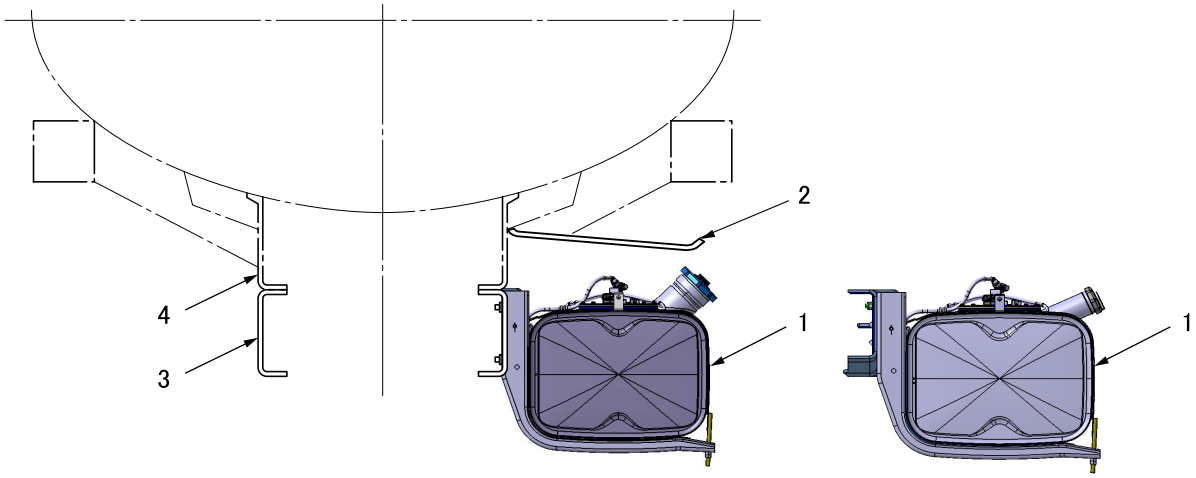
Firmly attach the airvent hose to the Fuel Tank Bracket if it comes away when relocating the fuel tank. ▷ 6.15.1

Attaching the splash guard protective cover

To protect the fuel hoses, a protection cover must be attached over the fuel hoses for the vehicle which has a large space between the tank and the body. (e.g. concrete mixer, tankbody)

Fig. 1 shows an example of a cover installed on a vehicle equipped as a lorry.

Fig. 1



<Euro III, IV> <Euro V, Euro VI>

1 Fuel tank
2 Cover bracket
3 Chassis frame
4 Mounting frame

Instructions for relocating the tank, adding on the auxiliary tank, and increasing its capacity

- A letter of no objection is required from the department responsible when relocating the tank, adding on the auxiliary tank, or increasing its capacity and following must be considered.
- Use MITSUBISHI FUSO authorized fuel hose when replace it.
- Keep the distance from the filler end and the end of air vent hose to;
  - Over 300 mm to exhaust exit
  - Over 200 mm to exposed electric terminal
- Don't connect the fuel piping over the exhaust pipes. Set the connection point where the fuel will not splash on the exhaust system even if it will leak.
- Install the tank securely to be free from loosen or other defect with consideration the effect of vibration, layout, and others. New bracket must be designed to have sufficient strength.
- Use legally conformed auxiliary tank for your local regulations.
- Don't open the plug for auxiliary tank except the mounting process of the auxiliary tank.
- Don't modify the MITSUBISHI FUSO genuine tank.
- Use following flange bolt and nut for mounting the tank, and tighten them with following torque. Some of the bolts that fix the tank on the frame are tightened with frame component such as C/MBR. These bolts and nuts must be tightened securely again with new bolts and nuts if you remove them through the relocating process.

	Size	Strength Grade	Tightening torque
BOLT, FLANGE	M10	10T or more	90 – 110 N·m
NUT, FLANGE	M10	6T	

8.1 Electrical system

Risk of fire

Work carried out incorrectly on the electrical system may impair its function. This may lead to the failure of components or parts relevant to safety.

Work on live electrical lines carries a risk of short circuit.

Before starting work on the electrical system, disconnect the on-board electrical system from the power source, e.g. battery.

All accident prevention regulations must be complied with when working on the vehicle.

Comply with all national regulations and laws.

Additional information

Observe the notes on operating safety and vehicle safety in Section 1 "Introduction" ▷ 1.3 and ▷ 1.4.

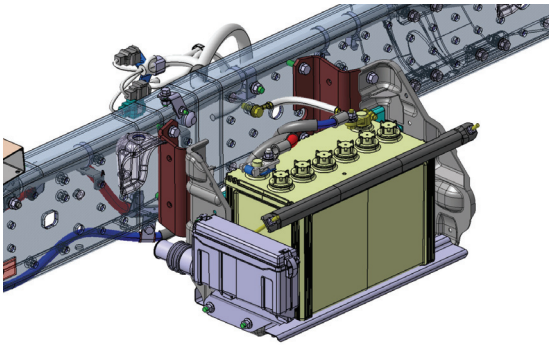
8.1.1 Specification Check Prior to Building the Body

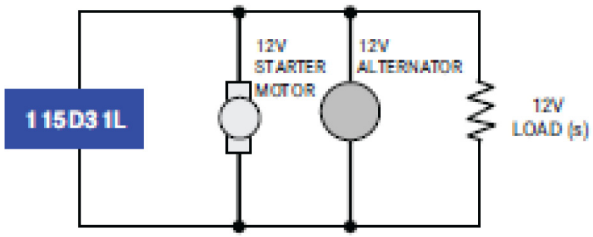
Power supply voltage

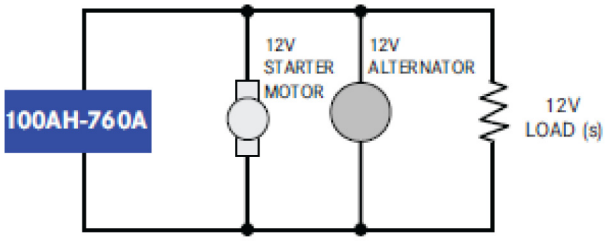
The configuration of the power supply voltage differs according to the particular vehicle.
Check the specifications of the battery mounted on the vehicle. When installing parts related to the power supply voltage, be sure to observe the following precautions.

(1) Configuration of the vehicle power supply

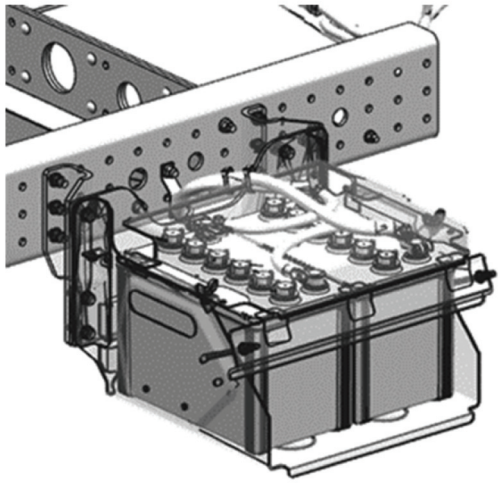
(a) When there is one battery
(115D31L/100AH-760A)
The vehicle uses 12 V power supply system.
You cannot install 24 V electrical components for building body.

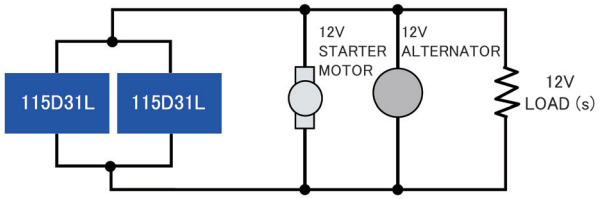


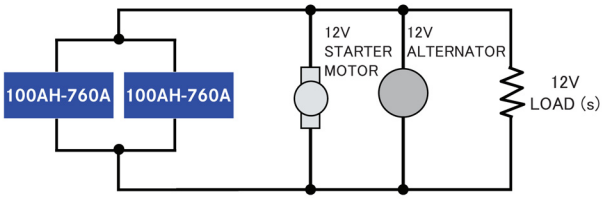


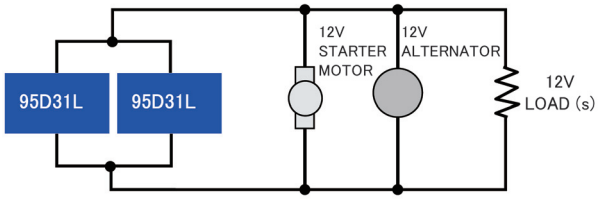


(b) When there are two batteries
(115D31LX2/100AH-760AX2/95D31LX2)
The vehicle uses 12 V power supply system.
You cannot install 24 V electrical components for building body.

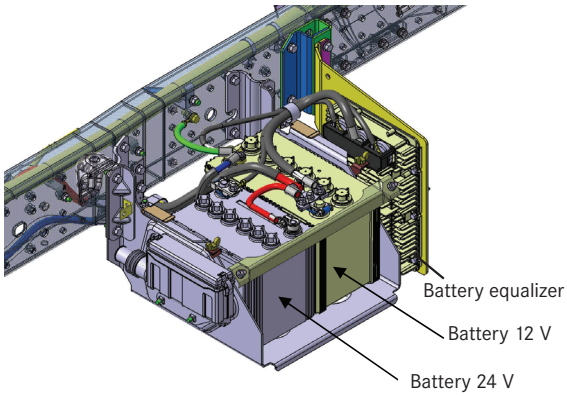


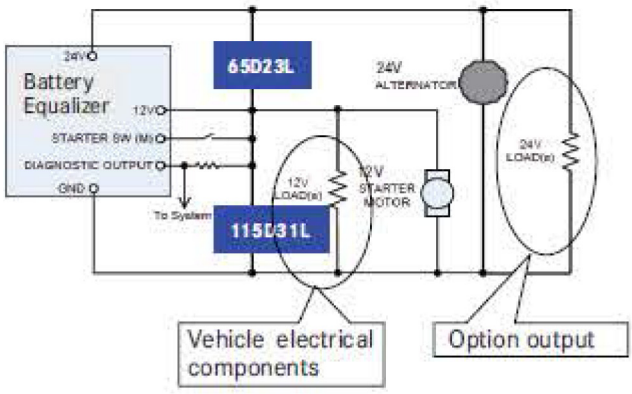


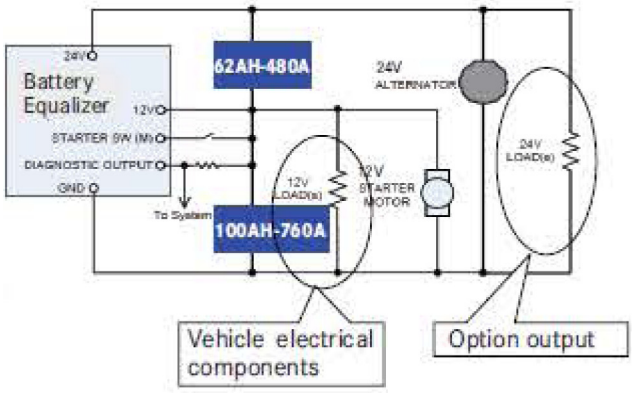




(c) When there are two batteries (115D31L65D23L/100AH-760A/62AH-480A)
In this case 12 V and 24 V power supply systems coexist in the one vehicle, so be very careful.
All of the existing electrical components use 12 V system, but the take-off power supply for the option connectors uses 24 V system.
Refer to ▷ 8.4.1 and ▷ 8.4.2.
You cannot use 12 V electrical components for building body.







Note: Some vehicles optionally use two 115D31L batteries without equalizer.

(2) Precautions concerning a 12 V/24 V mixed power supply voltage vehicle

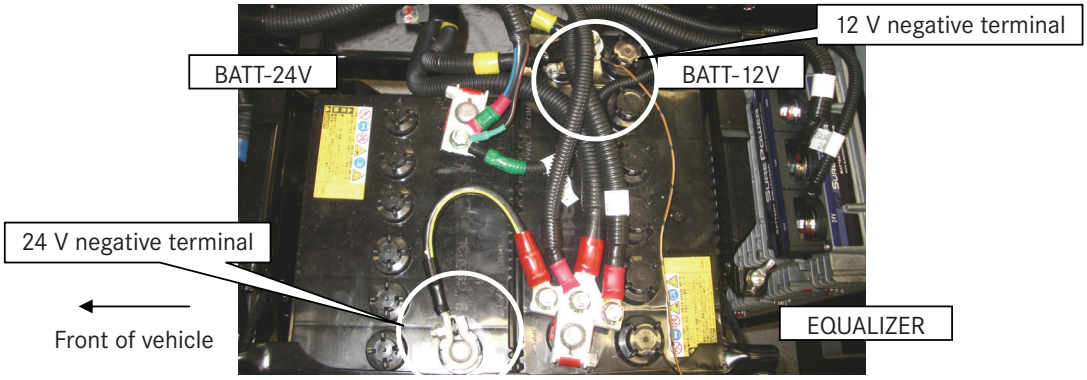
An error in the connected power supply or a wiring error such as a battery connected in the reverse polarity will have an adverse effect on the vehicle electrical components, and may lead to a vehicle fire. For this reason, be very careful of the following points.

<Before building the body>

- Turn OFF the starter switch, and pull out the starter key. Also, disconnect all testers and external communication devices.
- After carrying out the above work, close the doors and wait for at least 30 seconds before carrying out body-building work.

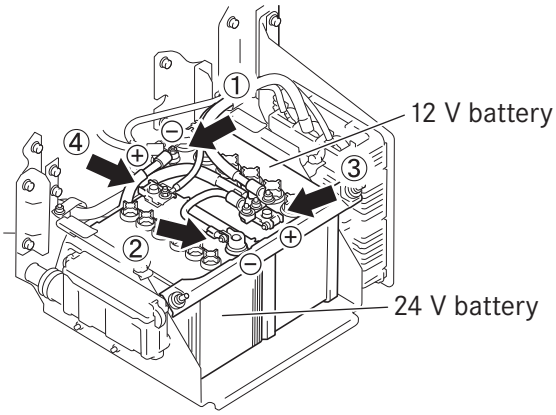
<When building the body>

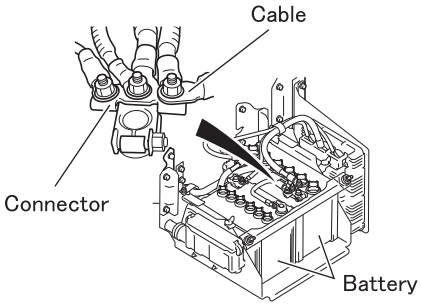
- Disconnect the battery cables from the negative terminals of both 12 V and 24 V batteries.



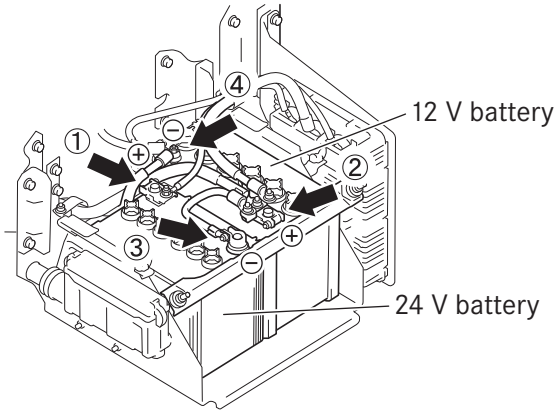
- Even after you have disconnected the cable from the negative terminal of the 12 V battery, be careful not to accidentally short-circuit the negative terminal of the 24 V battery to the frame or the battery box with a spanner or other similar tools.
- When taking off power, use the body-building connector (24 V). It is forbidden to directly take off power from both batteries as a general rule. If this is unavoidable, check ▷ 8.4.1 and ▷ 8.4.2.
- It is forbidden to cut, strip or splice wires or modify connectors or fuses in the existing harness instead of using the connectors intended for building the body. Refer to ▷ 8.4.1 and ▷ 8.4.2 before carrying out power take-off work.

- Procedure for disconnecting the harness cables
  ① Disconnect the cable from the negative terminal of the 12 V battery.
  ② Disconnect the cable from the negative terminal of the 24 V battery.
  ③ Disconnect the cable from the positive terminal of the 12 V battery.
  ④ Disconnect the cable from the positive terminal of the 24 V battery.





- Procedure for connecting the harness cables
  ① Connect the cable to the positive terminal of the 24 V battery.
  ② Connect the cable to the positive terminal of the 12 V battery.
  ③ Connect the cable to the negative terminal of the 24 V battery.
  ④ Connect the cable to the negative terminal of the 12 V battery.



(3) Relocating the batteries and battery equalizer

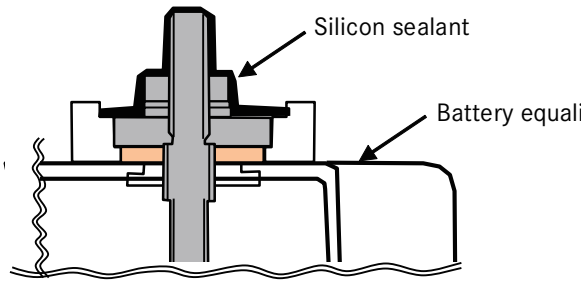
- Be sure to relocate the batteries and the battery equalizer as a set.

(4) Precautions concerning the battery equalizer

- Do not disconnect the cables from the 12 V and 24 V terminals of the battery equalizer unless it is absolutely necessary. If the cables must be disconnected from the terminals for some reason, note the following precautions.
- After disconnecting the battery cables, wait for 10 minutes, and then disconnect the battery equalizer cables.
- When reinstalling the battery equalizer, ensure that the terminal side is uppermost, and also that the height of the terminals of the battery equalizer is the same as the height of the battery terminals.
- When connecting the cables to the battery equalizer terminals, apply silicone sealant as described below to ensure that the terminals are fully waterproofed with sealant. If the sealing is inadequate, the terminals will corrode, which may lead to an electric fire, fusing of terminals, or other serious accident and damage.
- How to apply silicone sealant
  ① Place the battery equalizer in a horizontal position with the terminals facing upwards.
  ② Connect the 12 V, 24 V, and negative battery cables to the battery equalizer after disconnecting the cables from the 12 V, 24 V and negative terminals of the battery.

③ Apply silicone sealant to the illustrated areas of the 12 V and 24 V terminals on the battery equalizer and battery so that the metal parts are completely covered. Remove any air bubbles in the sealant, since they will adversely affect the waterproofing effect.

④ After completing the application, leave it in the horizontal position to dry (approx. 8 hours at 10°C and 50% humidity).



Name	Part No.	Remarks
SEALANT	MS996198	Bond type

8.1.2 Signal detection and actuation module-related parts

Cautions on Signal detection and Actuation Module (SAM) (relay and fuse-integrated control unit for body equipment)

The signal detection and actuation module is an integrated unit with the control and power distribution functions for electric parts of the cab and body equipment.

(a) Before disconnecting the connected cables of the signal detection and actuation module control unit, set the starter switch of the vehicle to OFF.

(b) Before performing welding to the chassis and body, be sure to disconnect the signal detection and actuation module control unit cables and connectors. Use exteme care of spattering (sparks, etc.) thrown on the harnesses during the welding work.
Ground the welder near the weld.

(c) When cleaning inside the cab, take utmost care not to splash the signal detection and actuation module control unit (including relays, fuses and connectors) with water.

(d) When removing the signal detection and actuation module control unit from the vehicle, set the starter switch of the vehicle to OFF, then disconnect the harness from the battery terminals and remove the connectors/nuts in the following order. (To reinstall, reverse the sequence of removal.)

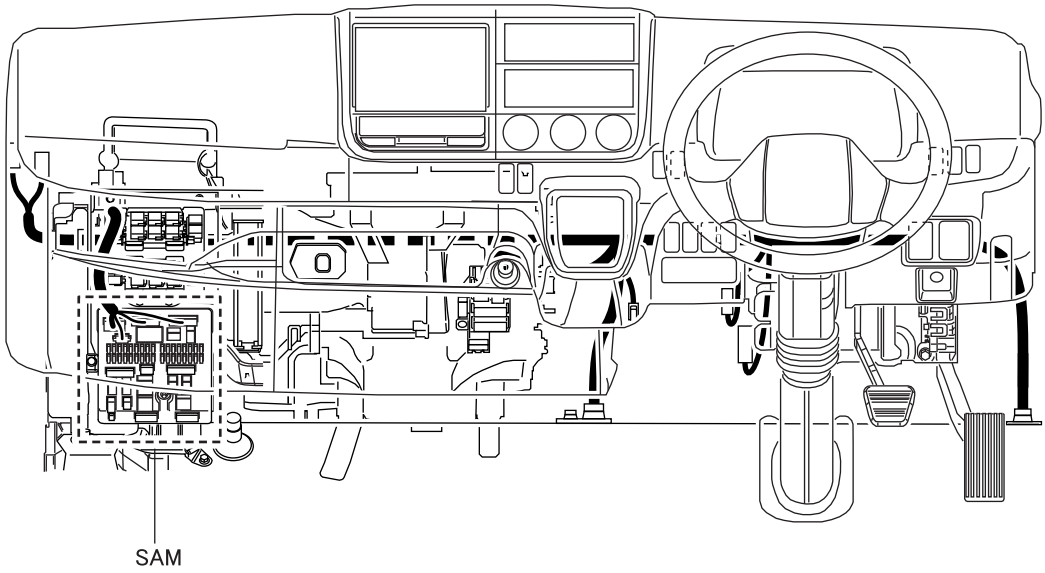
- Disconnect the power line (connector No. 9C, nut No. 10C) first.
- Disconnect the control unit connectors.
- Disconnect the ground line (connector No. 8C) last.
- Bracket nuts (back of signal detection and actuation module, M6 x 4)]

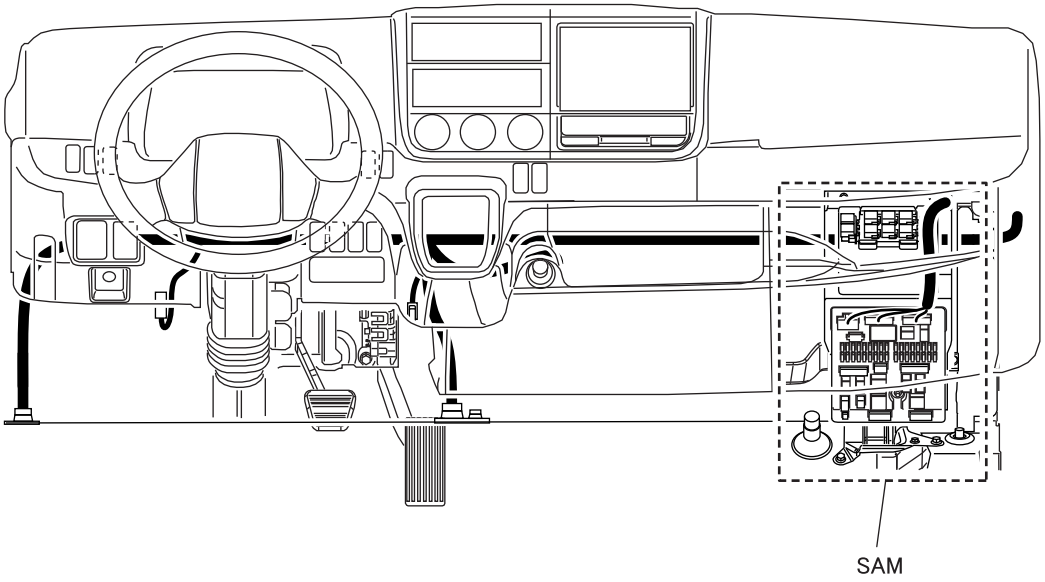
When installing the signal detection and actuation module control unit to the vehicle, tighten its nuts to the torques specified below.

Unit: N·m

Nut type	Torque	Use
M6	4 to 6 (nominal value: 5.45)	To mount the control unit to be bracket
M8	10 to 15 (nominal value: 12.7)	To mount the power line 10C

(e) Relays and fuses should be carefully installed or removed in/from the signal detection and actuation module control unit one by one.





Cautions to be taken when handling signal detection and actuation module related parts

To protect the functions of the signal detection and actuation module, DO NOT:

(a) Alter electrical routing by extending or cutting a power cable or connector to/from other parts than the connector used for body equipment or other similar methods.
(b) Alter the signal detection and actuation module control unit in any way.
(c) Remove or paint the cover of the signal detection and actuation module control unit.

Output terminals for additional wiring

The signal detection and actuation module control unit has circuit output terminals for additional wiring as listed below. Connect power or signal cables to the connectors used for body equipment to add the wiring as required.

Circuit name	Allowable current
Power supply (Batt)	7 A
Power supply (ACC)	7 A
Power supply (key-on)	7 A
ILL power supply*	2.5 A (chassis harness side) 2.5 A (body harness side)
Neutral signal*	0.2 A
Power take-off signal*	0.2 A
Parking brake signal*	0.2 A
Back alarm signal*	0.2 A

(a) Cautions when using output terminals for additional wiring

- Allowable current values are specified for the output terminals. Make sure that the rated current for any additional electric part to be used is lower than the specified allowable current.
- When any diagnostic function of the output terminals marked* is used, it is necessary to change data for the signal detection and actuation module. For details, ask the contact person ▷ 2.2.
- When a signal output terminal is used to operate any body equipment-side apparatus, use it as the activating side for operation relay. The relay used must be the noise-absorbing element-incorporated type.
- The output voltage differs according to the vehicle. Refer to "Power supply voltage" ▷ 8.1.1.
- For necessary output lead-out connectors, see "8.4.3 Mounting location of optional terminal" ▷ 8.4.3.
- When trailer is connected with coupling device, it is necessary to change data for the signal detection and actuation module to activate diagnosis function for the lamps. For details, ask the contact person ▷ 2.2.

(b) Precautions for body building and modifying electrical parts

SAM control unit will detect an error if an electrical part is added or replaced improperly. A warning lamp then goes on and remains on or the power is shut down, resulting in vehicle failure.

- If an electrical part is to be added or a lamp is to be replaced with an LED lamp, the current value of the electrical part should be ensured to fall within a specified range. This is, however, does not guarantee that the electrical part to be mounted will be fully operational when its current value falls within the specified range.
- For the specified current value, consult a MITSUBISHI FUSO authorized Distributer or your contact person ▷ 2.2.
- Body building or modification of any of the following electrical parts requires that the SAM control unit parameters be changed. Consult a MITSUBISHI FUSO Service Center. Some parts to be mounted may not be fully operational depending on their specifications or the vehicle specifications.
  Major body building and modification examples:
  - Mounting a transmission Power take-off
  - Mounting a dump control lever [Power take-off ON/OFF]
  - Mounting a centralized door lock and keyless entry system <Vehicle with keyless entry system>
  - Mounting a heated mirror
  - Mounting fog lamps
  - Mounting the step lamp
  - Modifying the rear combination lamp [incorporating LED]
  - Adding a turn signal
  - Modifying the license plate lamp

8.1.3 Starter switch

- The starter switch uses weak current contacts. Do not add any wiring to the line connected to the starter switch.
- In case the use of a power source linked to the starter switch is unavoidable, be sure to connect to the appropriate output terminal for additional wiring provided on the signal detection and actuation module control unit via the connector for body equipment.
  Regarding the output terminals for additional wiring provided on the signal detection and actuation module control unit, see "8.1.2 Signal detection and actuation module-related parts" ▷ 8.1.2.

8.2 Electric wiring

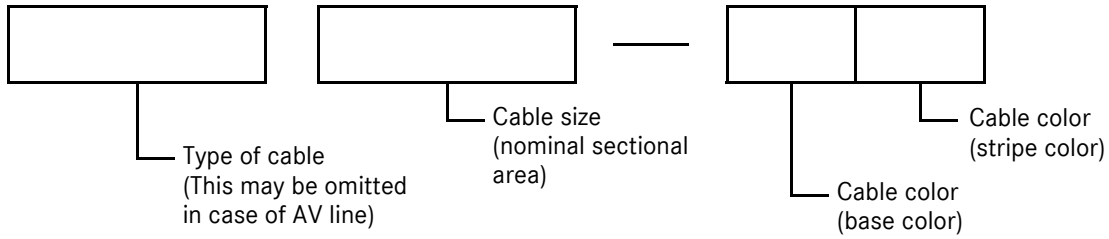
8.2.1 General precautions

The vehicle is delivered after electric wiring and fuses on the chassis side are checked with respect to load capacity, frequency of use, etc. to make sure of fire prevention and running safety. Do not alter the wiring unless it is absolutely necessary. Should it become unavoidable to extend or modify the wiring, be sure to follow the instructions given in "8.2 Electric Wiring".

8.2.2 Cable Identification

Cable size and cable color

Coding system



Alphabetical symbols of cable colors

Symbol	Color	Symbol	Color
W	WHITE	L	BLUE
B	BLACK	Br	BROWN
R	RED	Lg	LIGHT GREEN
Y	YELLOW	O	ORANGE
G	GREEN		

Typical examples of cable identification codes

- 0.85 – GW
  - Stripe color: White
  - Base color: Green
  - Cable size: 0.85 mm^2
- AVX1.25 – L
  - Base color: Blue (no stripe color)
  - Cable size: 1.25 mm^2
  - Type of cable: AVX line

Select types of cables

Related standards
(JIS C 3406: Low voltage cables for automotive use)
(JASO D 608: Heat-resistive low voltage cables for automotive use)
(JASO D 609: Current capacity of low voltage cables for automotive use)

Type of cable

Select necessary types of cables from the list below.

Type of cable	Location of use
AV line Vinyl-insulated low voltage cable for automotive use	Used for ordinary wiring
AVX line Cross-linked vinyl heat-resistive low voltage cable for automotive use	Used for wiring in areas where ambient temperature is high, such as around engine
AEX line Cross-linked polyethylene heat-resistive low voltage cable for automotive use	

Cable size

Select necessary cable sizes from the list below.

Nominal sectional area	Number of strands /Strand diameter (mm)	Allowable current (A)		
		AV line	AVX line	AEX line
0.5f	20/0.18	8	7	7
0.5	7/0.32	9	8	8
0.75f	30/0.18	10	9	9
0.85	11/0.32	11	10	10
1.25f	50/0.18	14	13	13
1.25	16/0.32	14	14	13
2	26/0.32	20	18	18
3	41/0.32	27	25	25
5	65/0.32	36	34	33
8	50/0.45	47	44	43

"f" suffixed to nominal sectional area stands for "flexible."

Use flexible cables in vibrating and crooked areas, such as at the cab to chassis, engine, transmission and dump hinge.

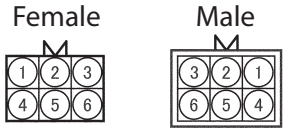
8.2.3 Connector code

Connector pin numbers

Numbering of terminals

Female terminals: Numbering started from upper left

Male terminal: Numbering started from upper right



8.2.4 Existing wiring and custom-built truck body on chassis side

- Make sure that wiring is not caught in by custom-built truck body.
- Make sure that wiring clear of sharp edges.
- When handling, do not pull wiring with excessive force.
- Remove harness connector by the connector body. Do not pull the harness.
- Make sure that wiring has a sufficient distance from heating parts.
- After installing custom-built truck body, make sure that associated wiring and parts can be inspected and serviced without hindrance.
- When a buzzer is provided for custom-built truck body, avoid shared use of chassis-side buzzer or use of a buzzer that is the same in tone as the chassis-side one.

8.2.5 Change and extension of wiring

Cables to be used

Use cables conforming to JIS C 3406 (low voltage cables for automotive use), JASO D 608 (heat-resistive low voltage cables for automotive use) or equivalent. As to vinyl tape, use products conforming to JIS C 2336 (vinyl adhesive tapes for electric insulation) or equivalent. See "Type of cable" in "8.2.2 Cable Identification" ▷ 8.2.2.

A

- When selecting a cable size, make sure that its allowable current conforms to the system rating. Especially in a system where a motor, etc. is used as a load, allow for the current in case the motor locks (restricted). See "Cable size" in "8.2.2 Cable Identification" ▷ 8.2.2.

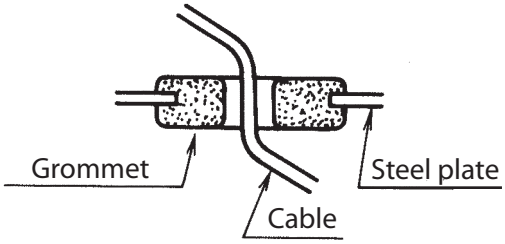
Wiring procedure

- When custom-built truck body-side wiring is extended, do not relocate existing cables and wires installed at the time of delivery from the manufacturer. If relocation is unavoidable, make sure that there is sufficient space from neighbouring parts and there is no interference with them.
- For wiring, install cables along rear body members, frame, etc. Do not stretch them in the air.
- Install cables clear of chassis and custom-built truck body rotary parts, vibrating parts and sharp edged parts. Firmly clamp cables.
  Secure the following clearances.

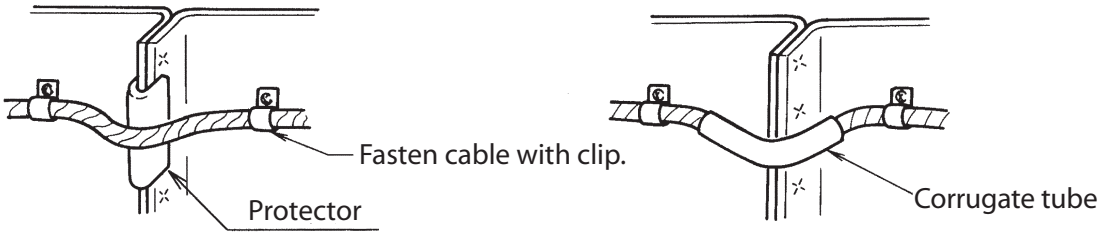
Unit: mm

Location	Minimum clearance
Between moving part and wiring	10
Between sharp edge and wiring	10

- Be sure to use a grommet in every cable through hole in the steel plate to prevent the cable from being damaged in the sheathing and short-circuited.



- Use additional clips as required where the cable may contact the edges of metal parts to prevent damage to sheathing due to vibration-induced contact. Alternatively, cover the metal edges with a protector or wrap corrugate tube around the part of the cable that contacts the metal edges.



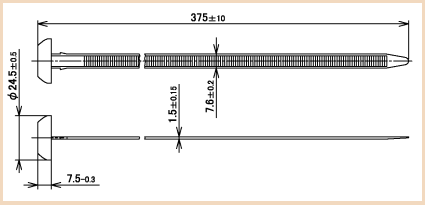
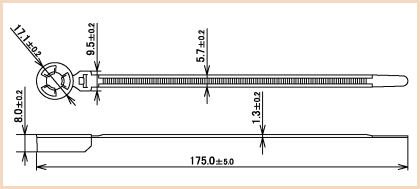
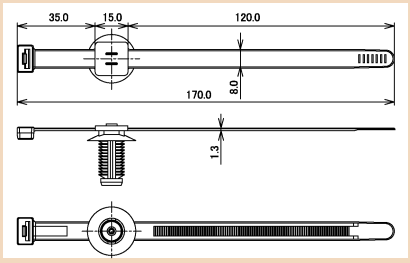
- If a harness exists nearby, tape the cable along to the harness. It is positively prohibitive to lay cables along the brake piping (including brake hose and brake pipe), fuel piping (including all metal and rubber hoses) and grease piping. Maintain clearances between cable and existing harness.

Unit: mm

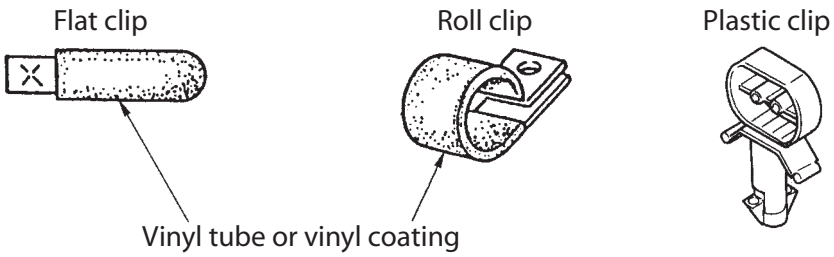
Wiring method	Minimum clearance
Parallel	10
Crossover	20

- For clearance between cable and exhaust system part, see "4.4 Clearance for the basic vehicle and bodies" ▷ 4.4.
- Install harnesses or battery cables where they will not be covered with accumulated dirt, snow, etc., iced nor damaged by flying stones. In an unavoidable case, provide a metal shield to protect the harness or cable.
- Do not connect cables with sheathing broken and wires drawn out.
- When equipment is wired, water may run down the cable into the equipment. Seal the through hole firmly with a grommet or the like and install the cable with its terminal upward.
- Route cables through places where they are not splashed with water or covered with dust.
- Do not install cables onto the top and outer sides of the frame. They may be damaged by feet put on the frame or stones flying to the frame during running.
- Install cables in the engine compartment apart enough from heat sources and along existing harness. Bind cables extensively with heat-resistive vinyl tape or fasten with metal sheet clamps (rubber- or vinyl-coated). Do not use non-heat-resistive vinyl tape because it is degraded to separate by heat.
- Install cables to engine- and transmission-mounted parts routing along existing harnesses so that their relative movements can be absorbed. Also, give cables a proper amount of slack so that they do not contact with other parts.
- When the routing of battery cables is changed for relocation of battery or other reason, do not extend or shorten battery cables and/or charging circuits of alternator, etc. Especially, do not change clamping method, clamping position, slack, etc. in areas of relative movement between starter and frame.
- When battery is relocated, locate it at least 200 mm apart from the exhaust system (muffler with emission gas purifier and tail pipe). If less than 200 mm apart, provide a heat insulator.
- When cables are shortened, do not cut them short but bind excess length of cable to existing harness or the like bundled with vinyl type.
- Hold MWP water-proof connectors for rear combination lamp, license lamp, side turn lamp, etc. in place by fastening the connector body with hook type plastic clips (MH056347 to MH056350) or band clips.

- When cable bands are cut off for convenience of work, obtain necessary parts in accordance with the list below and restore the cable bands to their original state.

Part name	Part No.	Geometry	Remarks
BAND, CLIP	MK665242		Fixing tie: Hellermann Tyton, BHT375M or equivalent
BAND, CLIP	MK665243		Stud bolt tie: Hellermann Tyton, T50SOSSBD-M10-HSW or equivalent
BAND, CLIP	MK665244		Fir tree mounting tie: Hellermann Tyton, CM170-FT11J or equivalent

- For clipping, use coating tape, protective rubber or plastic clip. Limit sticking and clasping clips to auxiliary use.



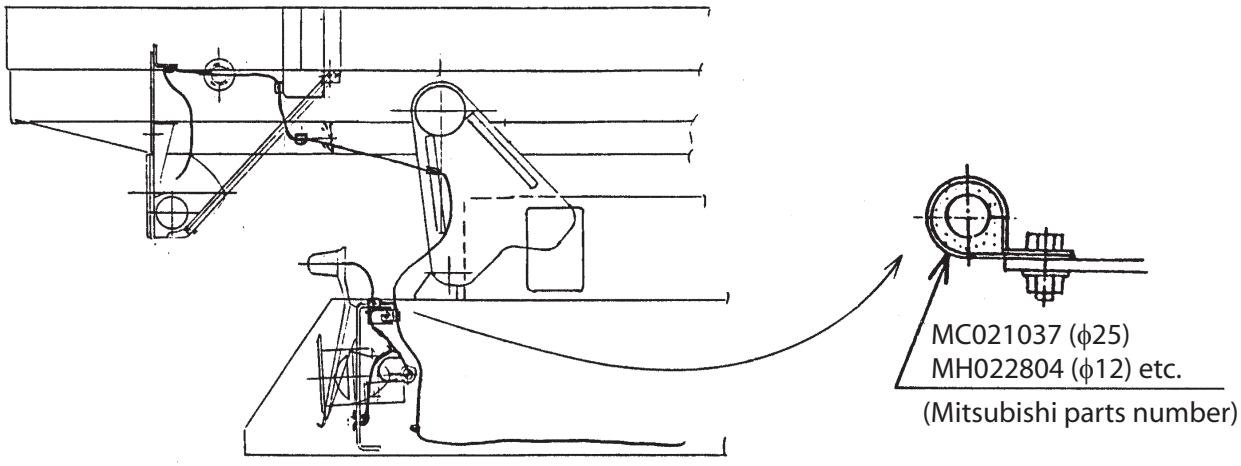
Given below are the standard limits of spacing for cable clamps.

Unit: mm

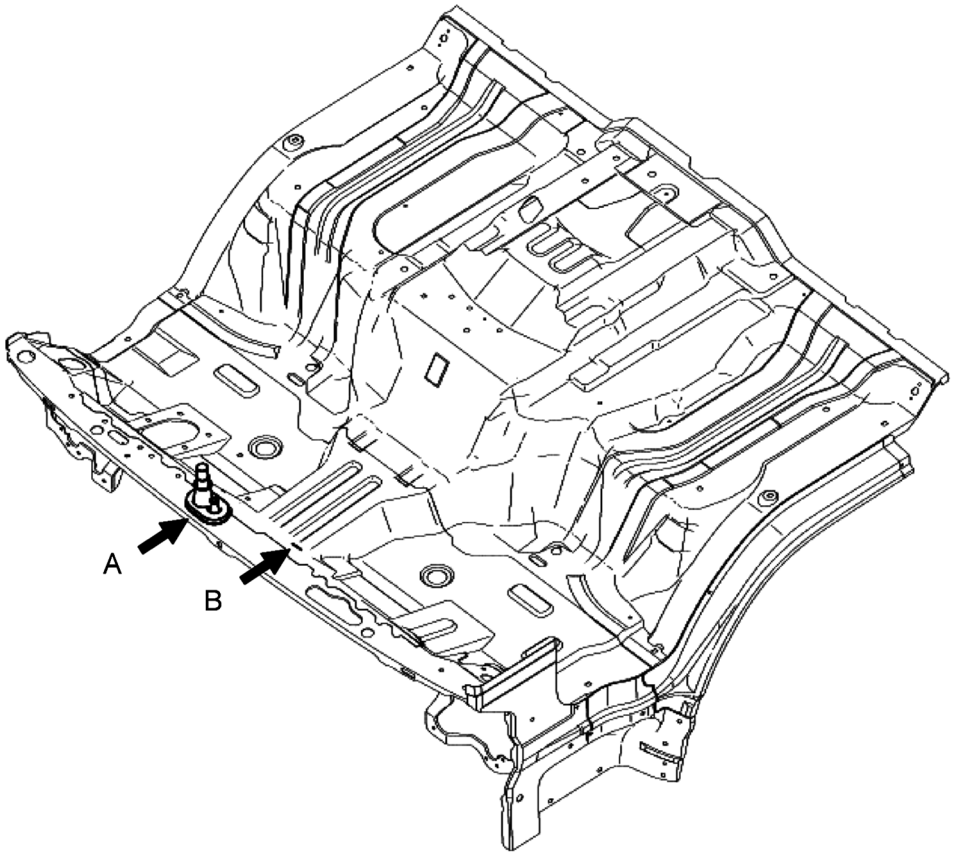
Harness diameter	Limit of spacing
Up to 5	Up to 300
5 to 10	400
10 to 20	500

8.2 Electric wiring

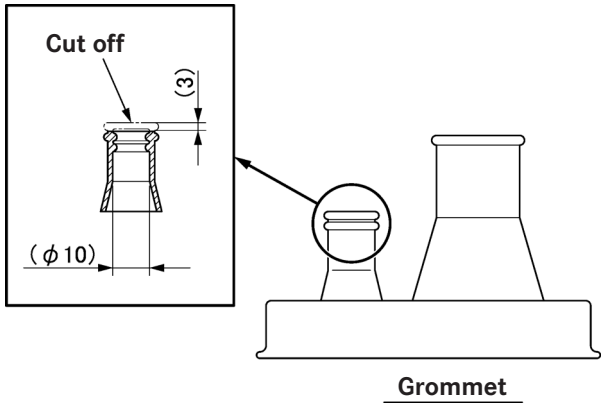
For cables to rotary portions of dump hinge and other custom-built truck body parts and vibrating bodies of engine, transmission, etc., use solid rubber clips.



- When passing electrical wiring through the cab floor, use the grommets in the area A and B shown below.



Let harness pass through the grommet cut as shown below and then tape them.



Procedure for wire connection

- In the case of wire connection using plug and plug receptacle, use the plug receptacle on the power supply side, so that if the plug and plug receptacle should be separated, the disconnected wire is not short-circuited even if it touches the vehicle body.
- When cable is extended, the extension cable should be identical in sectional area and hue. Connect the cable ends firmly by soldering or using crimp type terminal and provide the joint with solid insulating covering. Be sure not to connect cables by twisting together. When soldering, do not use hydrochloric acid.
  Especially, when wires of chassis harnesses (all harnesses outside of the cab) are extended, properly protect joints against water and insulate them.

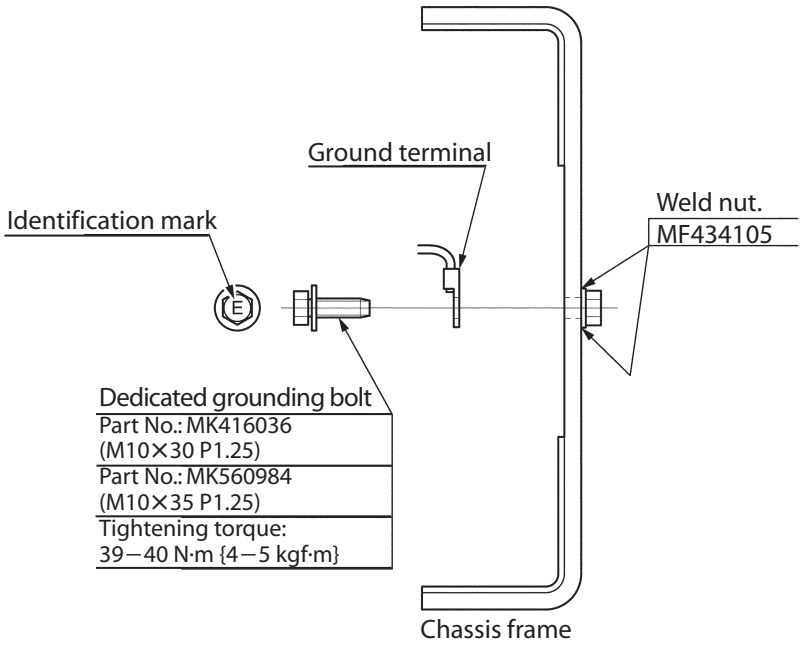
8.2.6 Grounding

Ground extended power cable to the circuit connecting to the minus (–) terminal of battery. In the case of grounding to the frame, establish the grounding point on unmasked or uncoated surface.

Use eyelet terminal for grounding.

Dedicated bolt for grounding is used for tightening ground terminal. In the case where dedicated grounding bolt is removed during custom-built truck body installation, do the following.

- If grounding point is not relocated
  Reinstall the removed dedicated grounding bolt by tightening to the specified torque.
- If grounding point is relocated
  Use designated dedicated grounding bolt shown below. Spot weld nut to the frame and tighten bolt to the specified torque. Provide the weld with touch-up coating.



When wiring from the custom-built truck body side is grounded to the frame, do the same as described in [If grounding point is relocated] above.

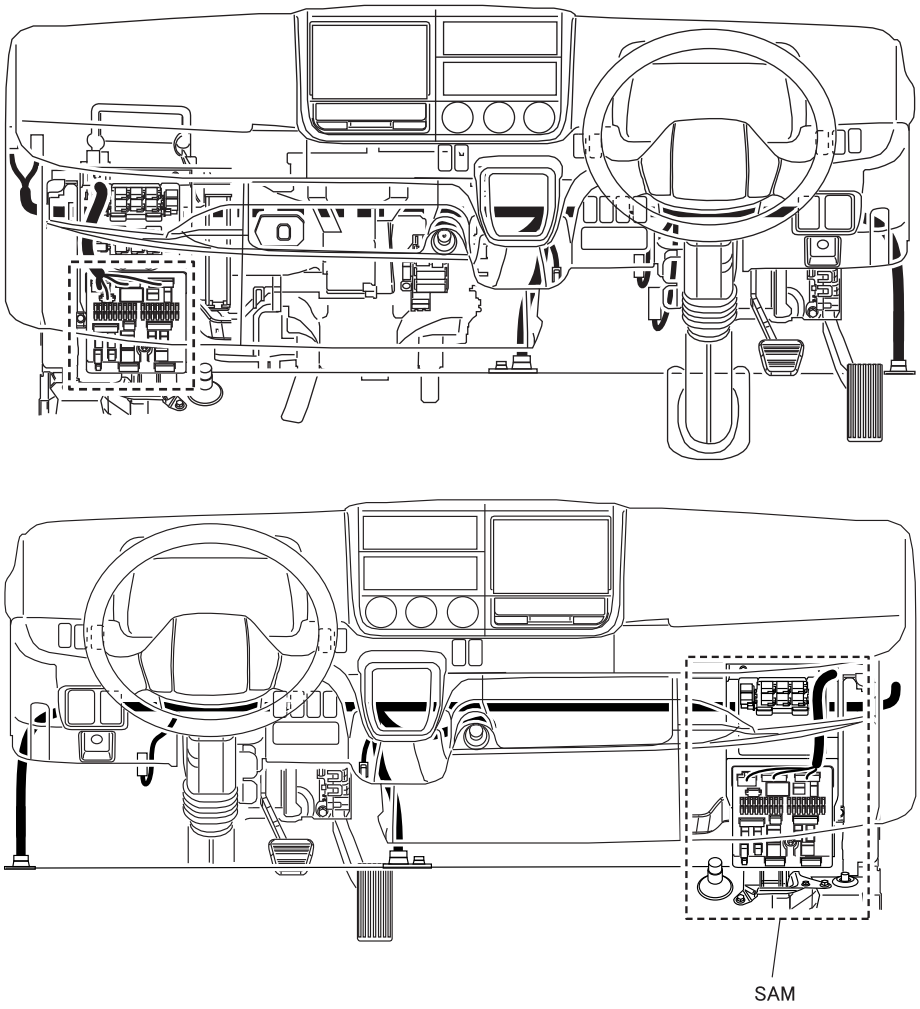
8.2.7 Fuse

(a) Do not route power wiring from any fuse for unintended use. The existing fuse on the chassis side is of the optimum capacity for the service load, frequency of use, etc. When installing an additional electrical device associated with body equipment, do not connect parts or harnesses which may provide an error signal to the chassis power line or ground line.
Be sure to lead out power for body equipment-related apparatus and lamps via designated appropriate connectors. For further details, see "8.4.3 Mounting location of optional terminal" ▷ 8.4.3.
Fuses in the cab are provided on the signal detection and actuation module control unit. When removing and reinstalling them, do so securely one by one. For other precautions on the signal detection and actuation module, see "8.1.2 Signal detection and actuation module-related parts" (▷ 8.1.2).

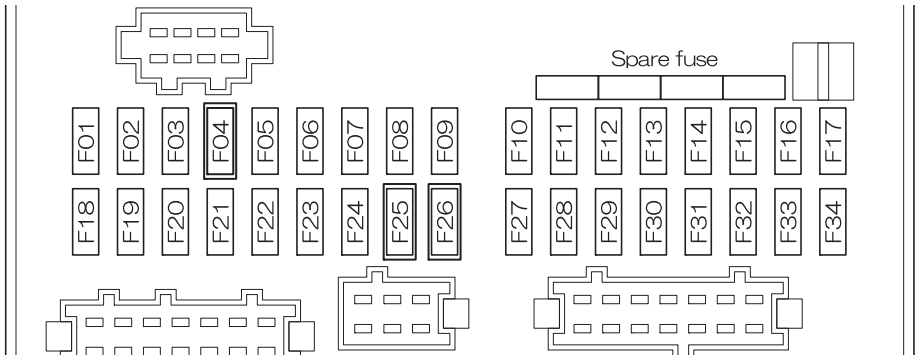
(b) Mid-point extension of existing wiring or the use of a larger capacity fuse could cause an excessive current to flow in the power fuse box, resulting in a fire.
The power supply voltage may differ depending upon the fuse. Verify the power supply voltage by referring to "Power supply voltage" ▷ 8.1.1.

(c) Arrangement of power fuses, relay in the instrument panel, sensors and ECU

- Fuse layout drawing



〈Inside of SAM〉



: 12 V power supply fuse

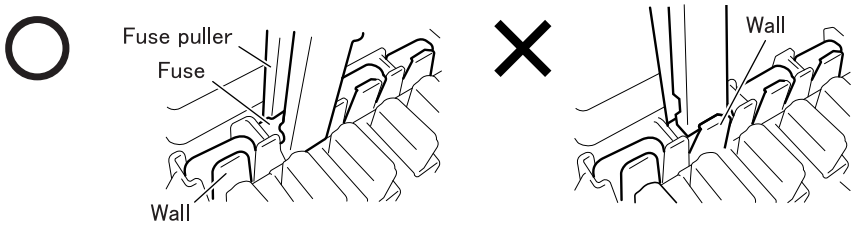
: When the vehicle uses two batteries, a 24 V power supply fuse is installed.
When the vehicle uses one battery, a 12 V power supply fuse is installed.

Fuse No.	Major load	Capacity
F01	Starter	10 A
F02	4WD M/V	10 A
F03	Air bag	10 A
F04*	Optional power (IGN)	10 A
F05	Power window (driver's seat side)	30 A
F06	Hillstart ECU	10 A
F07	Power window (passenger's seat side)	30 A
F08	-	-
F09	Meter, diaphragm tachometer, diagnosis connecter	10 A
F10	ISS	30 A
F11	Blower fan	30 A
F12	Audio, interior lamp	15 A
F13	Starter switch, ISS ECU	10 A
F14	Horn	10 A
F15	Audio	10 A
F16	Power mirror, power socket (cigarette lighter)	20 A
F17	Fuel heater	20 A
F18	ABS ECU	10 A
F19	Engine ECU	15 A
F20	ISS, 4WD M/V, Hillstart ECU	10 A
F21	Battery control unit, motor control unit	10 A
F22	Meters, air conditioner control	15 A
F23	-	-
F24	DUONIC® ECU, 4WD ECU	10 A
F25*	Optional power supply (ACC)	10 A
F26*	Optional power supply (B+)	10 A
F27	-	-
F28	Engine ECU	15 A
F29	BlueTec® system	20 A
F30	BlueTec® system	20 A
F31	Engine ECU	20 A
F32	Air conditioner	10 A
F33	-	-
F34	Fuel pump	15 A

*: The power supply voltage differs depending upon the vehicle power supply specifications. Refer to "Power supply voltage" ▷ 8.1.1.

- Removal of spare fuse
  To remove the spare fuse, insert a fuse puller from outside the wall holding the spare fuse.

  Do not insert the puller from inside the wall, as doing so could damage the apparatus and cause erroneous operation or a fire.



8.3 Handling of electric/electronic equipment

8.3.1 Available types of electronic control systems (typical examples)

Some systems may not be fitted depending on the specifications of the vehicle.

- Engine electronic control unit
- Transmission electronic control unit (TCU)
- Anti-lock brake system (ABS)
- Automated Manual Transmission
- Idling stop & start system (ISS)
- SRS air bag
- Signal detection and Actuation Module (SAM)
- Emergency locking retractor (ELR)
- Keyless entry
- Immobilizer

8.3.2 Handling of electronic parts

In the electronic control systems-equipped vehicle, multi-way connectors suited for weak current of such electronic parts and circuits as sensors, control units and actuators are used. When handling these connectors, use particular care in the following respects.

- Do not disjoin and rejoin connectors unless necessary. Connector pins could be deformed or damaged, resulting in poor contact.
- Disjoin connectors holding their housings. Pulling by cable or by force may deform connector pins.
- When disjoining connectors, do not let water, oil or dust adhere to their pin, or poor contact or unsteady continuity could result.
- Join connectors firmly after completion of work. When a harness is removed for servicing, restore it firmly to the original place after work.
- Use of electronic equipment, such as relays, solenoid valves and motors, for installation on the vehicle body is limited to those incorporating diode or varister noise absorbing elements.

8.3.3 Handling of battery

To prevent damage or fire of battery-related parts, observe the following precautions when handling the battery.

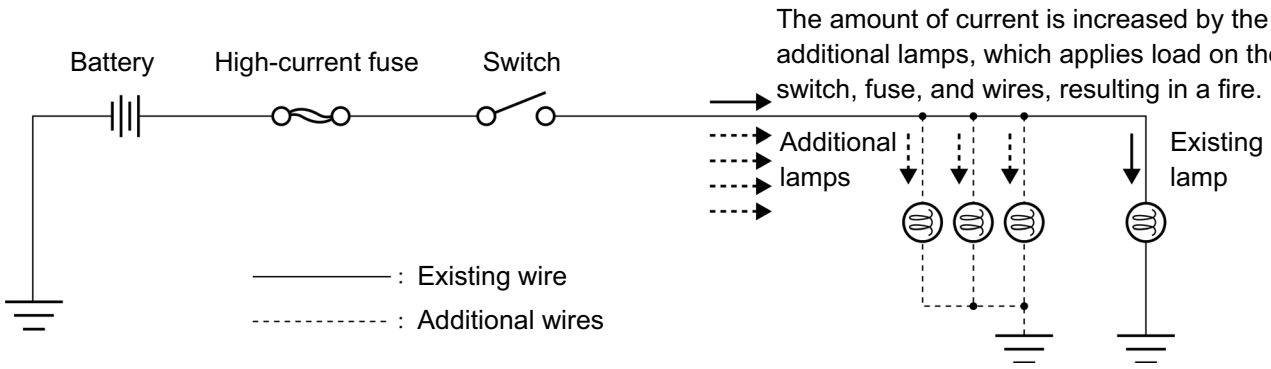
- Do not loosen or disconnect the battery cable while the engine is running.
- Be sure to connect the battery when starting the engine through towing.
- When performing a quick charge of the battery, be sure first to disconnect the battery cables from (+) and (–) terminals.
- Protect the cable to be routed near the exhaust system with a heat-resistant outer jacket.
- Route cables so that none rub together.

8.4 Power supply

8.4.1 Taking power from the existing wiring

(a) Source the power for the lamps and devices of the built body from the specified connector.
If an electrical device related to the built body is to be added, do not install a part or route a harness that can give a false signal to the power line and ground line of the electrical devices on the vehicle side.
Adding a wire to a midway point of the existing wire or increasing capacity by changing the fuse causes an excessive current to flow through the power supply and fuse box, leading to a fire.
Never change or add electrical wires except for those contained in this manual.
Increase the number of lamps according to the table given below (load, power source, etc.).

(b) Typical faulty wiring



8.4.2 Taking power via the onboard battery terminal

Take power by way of the onboard battery terminal only when doing that is absolutely necessary to achieve body building. If it is done unavoidably, observe the following precautions.

(a) Add a fuse of a correct type to any additional wire to thereby protect the circuit.

(b) Use a wire of 5.0 mm^2 or more for the additional wire ("between battery terminal and fuse" of the next figure (▷ 8.4.2). Set the wire as short as possible and make sure that its jacket is not damaged to result in a short.

(c) For the combination of the capacity of the additional fuse and the wire size between the fuse and the additional load, study those marked with ○ in "List of recommended combinations of fuse capacity and wire size" (▷ 8.4.2).

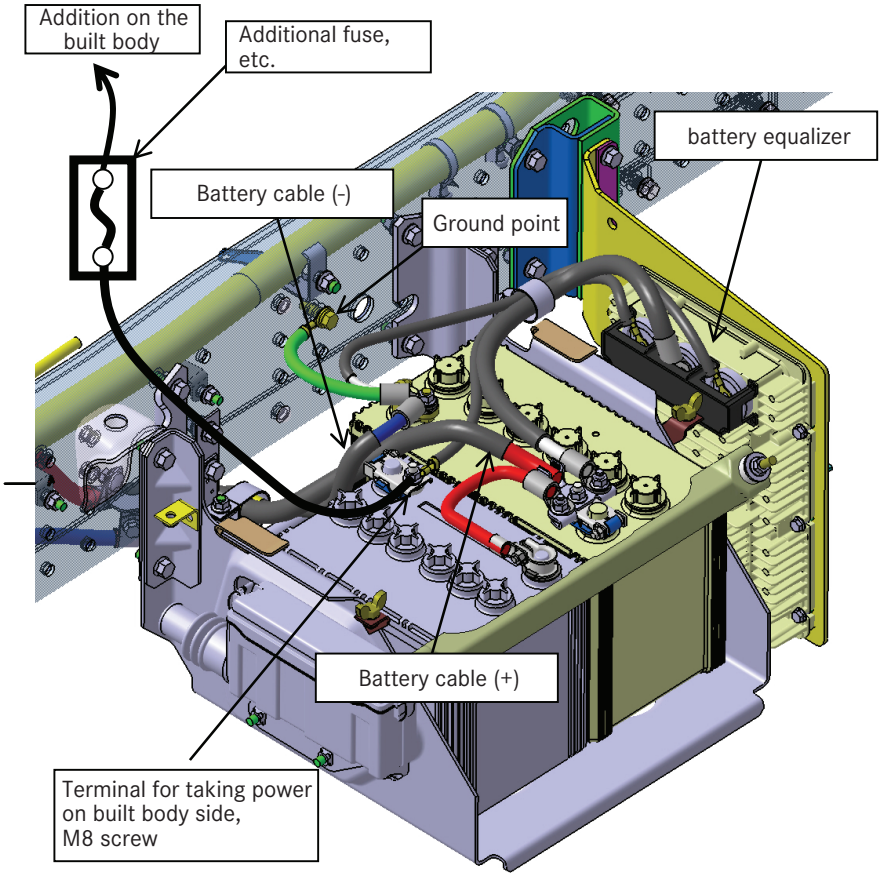
(d) Install the additional fuse in a waterproof cover (e.g. electric cover) or take an equivalent waterproofing measure for the additional fuse. Do not add wires or fuses to the existing high-current fuse box.

(e) Use of a directly connected power supply causes the onboard battery to tend to run down quickly. Make sure that the customer understands and observes the following handling precautions:

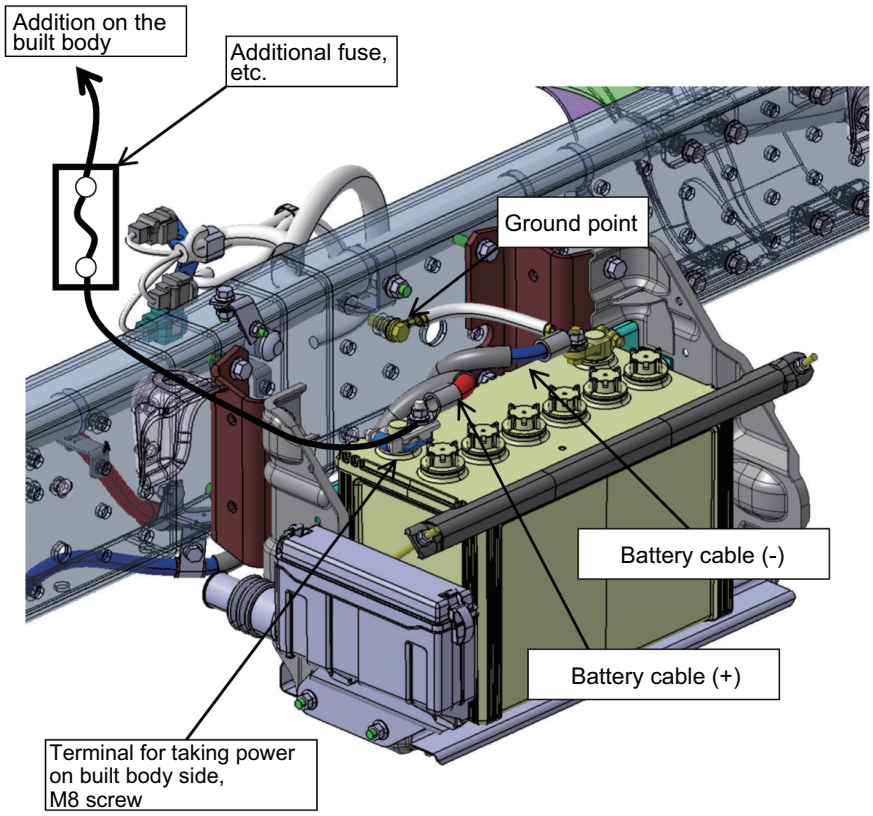
- It is prohibited to use the onboard battery for a long time with the engine stationary.
  Do not use the onboard battery as a service power supply (for the clock, memory, etc.).

Between battery terminal and fuse

24 V (vehicles with 24 V power supply system)



12 V (vehicles with 12 V power supply system)



(f) Use a round flat terminal for the power supply terminal and jointly fasten it by using the fixing nut for attaching the battery cable terminal.
Only one power supply terminal may be used.
Two or more additional terminals can be loosened, resulting in heat being generated or a short.

List of recommended combinations of fuse capacity and wire size

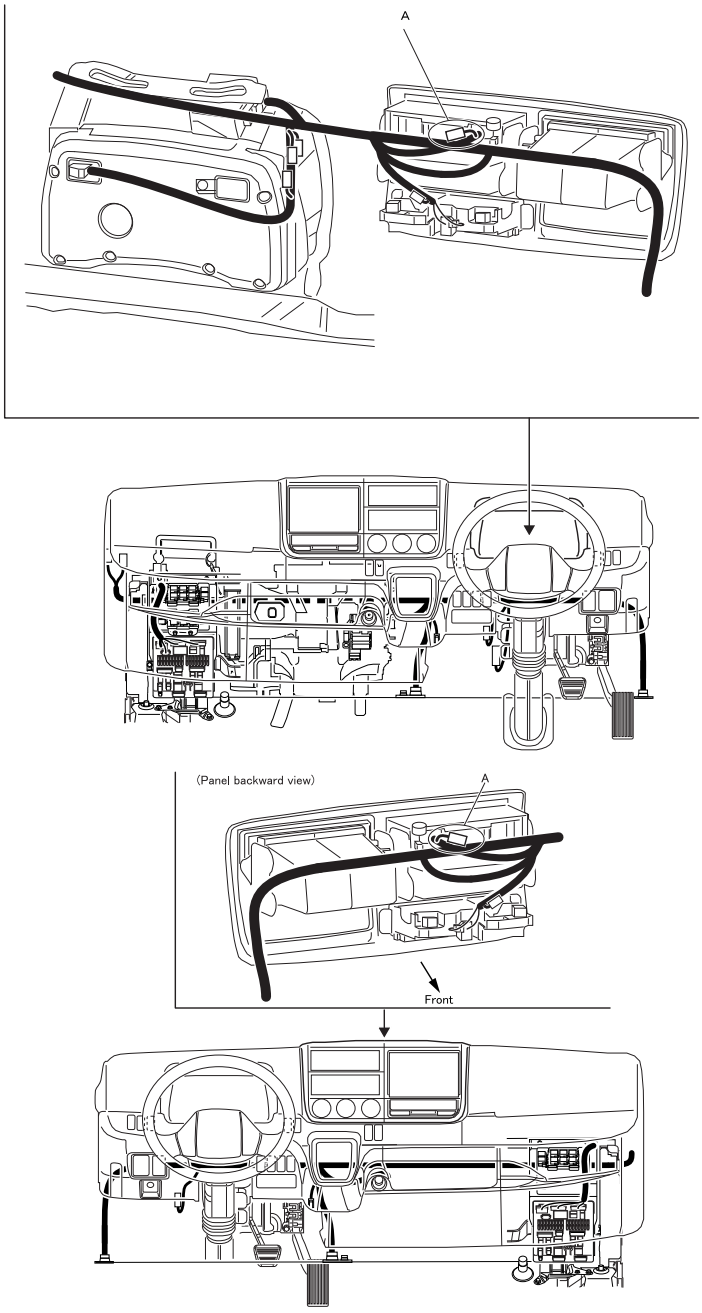
○ : Usable × : Not usable

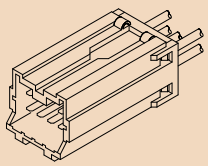
Fuse		Wire size (mm^2) [upper] and wire permissible current (A) [lower]							
Type	Specifications	0.3	0.5	0.85	1.25	2.0	3.0	5.0	(mm^2)
		11	14	18	23	31	42	57	(A)
Blade and glass tube	5 A	○	○	○	○	○	○	○	
	7.5 A	○	○	○	○	○	○	○	
	10 A	×	○	○	○	○	○	○	
	15 A	×	×	○	○	○	○	○	

Note: Keep the continuous permissible current within 70 % of the fuse specifications value.
(E.g.) If the fuse used is 10 A:
$10 \times 0.7 = 7$ (A)
→ A load of up to 7 A can be used.

8.4.3 Mounting location of optional terminal

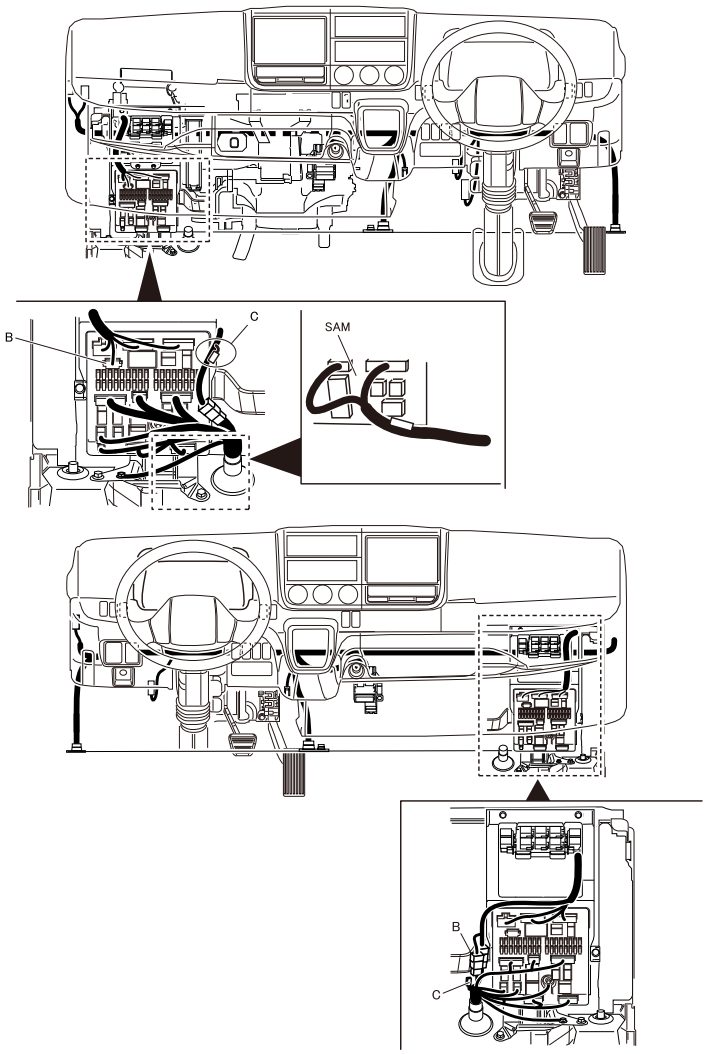
- Inside Cab



No.	Part Name	Connector No.	Circuit Description				Mating Connector
			No.	Circuit	Line color	Load	
A	OPTION CONNECTOR (Tachograph navigation)	MH056874 1 2 3 4 5 6	01 02 03 04 05 06	MAIN (12V) SPEEDSIG(25P) SPEEDSIG(8P)	Y-G Lg O-L	- - -	MH056807 

-: The connector marked with - is used for signal cabling only, not used to connect the loads.

AB



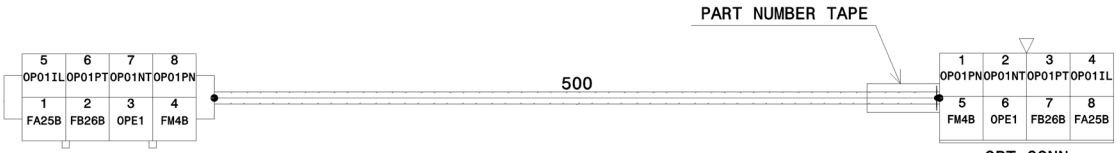
No.	Part Name	Connector No.	Circuit Description				Mating Connector
			No.	Circuit	Line color	Load	
B	OPTION CONNECTOR (Only When sub harness (MK649751) is arranged)	MH052847 1 2 3 4 5 6 7 8	01	PARKING ON (24 V/12 V)	Br	*1	MH052805
			02	NEUTRAL (24 V/12 V)	R-G	*1	
			03	PTO (24 V/12 V)	Lg-R	*1	
			04	ILL (24 V/12 V)	O-B	*1	
			05	MAIN (24 V/12 V)	L-R	*1	
			06	GND	B	10A	
			07	BATT (24 V/12 V)	G-R	*1	
			08	ACC (24 V/12 V)	W-R	*1	
C	OPTION CONNECTOR	MH056867 1 2	01	IDLE UP (SWtoGND)	R-B	-	MH056800
			02				

-: The connector marked with - is used for signal cabling only, not used to connect the loads.

*1: Loads to be connected to the connector marked with *1 should be arranged so that the total value of the connector output in each of the cab and chassis side shall not exceed the permissible current.

AB

Sub-harness(MK649751) details



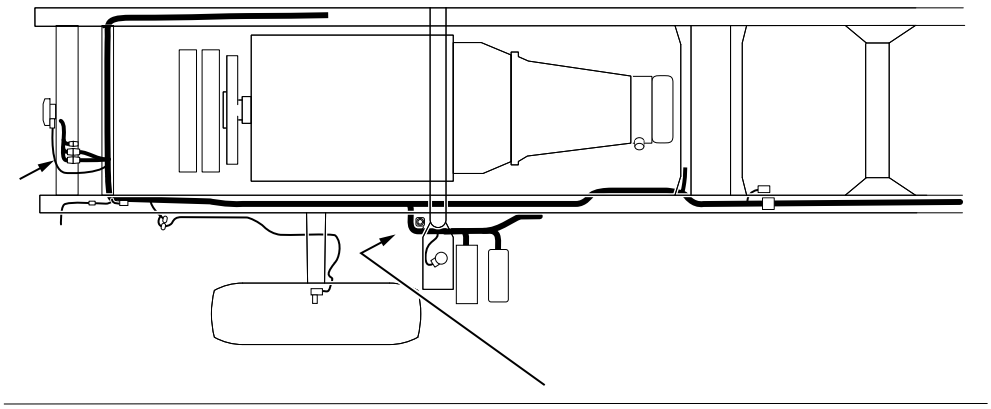
SAM 4X
1 04 00 56142 3
KOSTAL

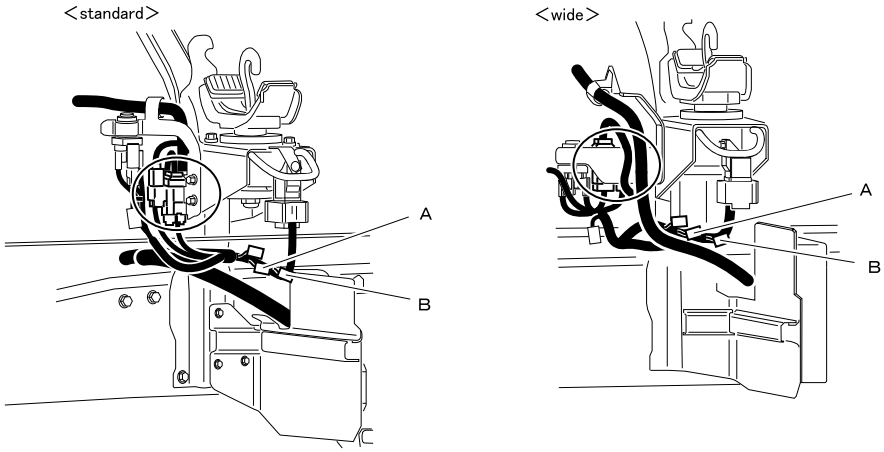
Cav	No	Wire	M/C	Spec	Col	To	Cav
1	FA25B	CAVS		0.5	W/R	OPT CONN	8
2	FB26B	CAVS		0.5	G/R	OPT CONN	7
3	OPE1	CAVS		0.85	B	OPT CONN	6
4	FM4B	CAVS		0.5	L/R	OPT CONN	5
5	OP01IL	CAVS		0.5	O/B	OPT CONN	4
6	OP01PT	CAVS		0.5	Lg/R	OPT CONN	3
7	OP01NT	CAVS		0.5	R/G	OPT CONN	2
8	OP01PN	CAVS		0.5	Br	OPT CONN	1

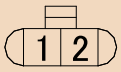
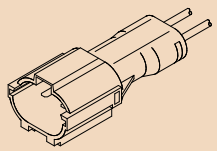
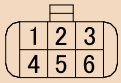
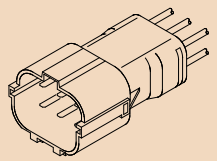
OPT CONN
MH052847
MITSUBISHI

Cav	No	Wire	M/C	Spec	Col	To	Cav
1	OP01PN	CAVS		0.5	Br	SAM 4X	8
2	OP01NT	CAVS		0.5	R/G	SAM 4X	7
3	OP01PT	CAVS		0.5	Lg/R	SAM 4X	6
4	OP01IL	CAVS		0.5	O/B	SAM 4X	5
5	FM4B	CAVS		0.5	L/R	SAM 4X	4
6	OPE1	CAVS		0.85	B	SAM 4X	3
7	FB26B	CAVS		0.5	G/R	SAM 4X	2
8	FA25B	CAVS		0.5	W/R	SAM 4X	1

- Outside Cab





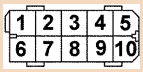
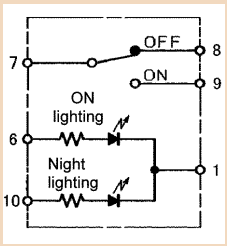
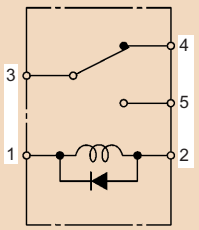
No.	Part Name	Connector No.	Circuit Description				Mating Connector
			No.	Circuit	Line color	Load	
A	OPTION CONNECTOR (side turn)	MH056451 	01 02	TURN LH (12 V) TURN RH (12 V)	Gr-L Gr-R	*1 *1	MH056401 
B	OPTION CONNECTOR (chassis)	MH056457 	01 02 03 04 05 06	BATT (24 V/12 V) ACC (24 V/12 V) MAIN (24 V/12 V) IDLE UP (SW to GND) ILL (24 V/12 V) GND	G-R W-R L-R R-B O-B B	*2 *2 *2 - - -	MH050090 

-: The connector marked with - is used for signal cabling only, not used to connect the loads.

*1: In a vehicle with a connector marked with *1, one lamp as shown in the following can be additionally mounted for one side of the vehicle at manufacturer's option: voltage:12 V, lamp type: 21 W.

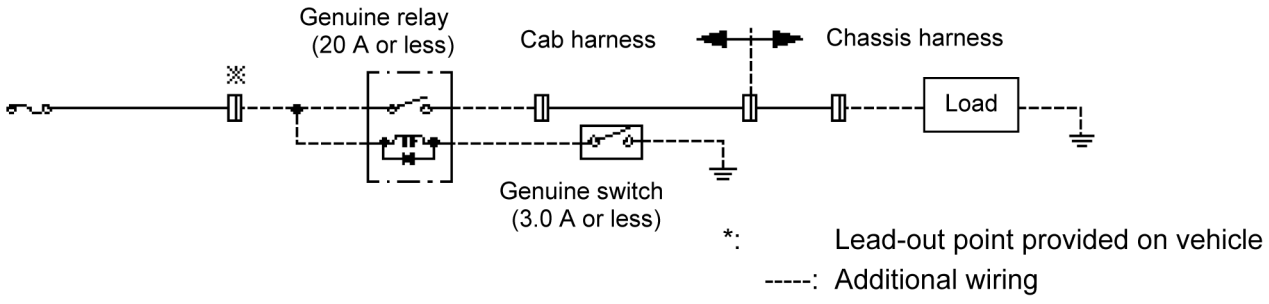
*2: Loads to be connected to the connector marked with *2 should be arranged so that the total value of the connector output in each of the cab and chassis side shall not exceed the permissible current.

8.4.4 Installation of switches and relays for equipment

Part Name	Mitsubishi Part No.	Allowable Current	Connector (Harness side)	Circuit
Rocker switch	MK645424	3.0 A or less	 MCP2.8 type connector Housing: A0145450026 Terminal: A0145451126KZ (wire diameter: 0.3 mm^2) A0135457626KZ (wire diameter: 0.5 to 0.85 mm^2)	
Relay	MK420479 24 V type	Between ⑤ & ④ (normally open side): 10 A max Between ⑤ & ② (normally closed side): 5 A max	 Connector type EQ5A (MH059820)	 1: Power supply side 2: Ground side
	MK420480 12 V type	Between ⑤ & ④ (normally open side): 20 A max Between ⑤ & ② (normally closed side): 10 A maxs		

Notes:

1. If the total load current to the equipment connected to the switch for equipment exceeds 3.0 A, a relay must be added to prevent the flow of any load current exceeding 3.0 A through the switch.
   Night lighting and ON lighting are available for the switch for equipment. Use them as required.
2. For the vehicle voltage, refer to "Power supply voltage" ▷ 8.1.1.
   There are two relays: One intended exclusively for 24 V and the other exclusively for 12 V.
   The allowable current for the output line for equipment is specified separately from that for the relay above.
   Select the connected load that will not exceed either allowable current.
3. Typical example of use



8.5 Charging/discharging balance

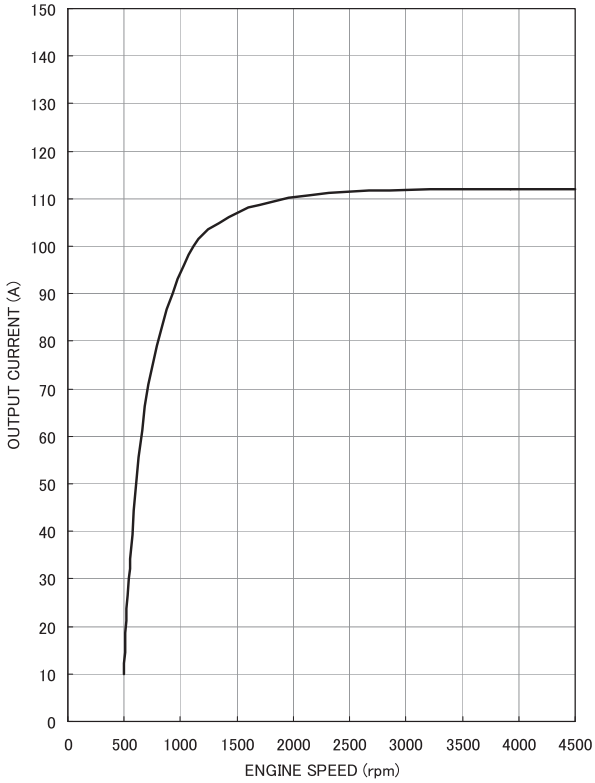
The charging/discharging balance may become worse in the following operating conditions. For this reason, reduce the electrical load during work referring to the Engine Alternator Performance Curves.

- When there is a lot of night work
- When working for a long time with the engine idling
- When many large load electrical auxiliary equipments are connected

In particular, when mainly idling the engine during night work, make sure that the electrical load is lower than the output current of the alternator.

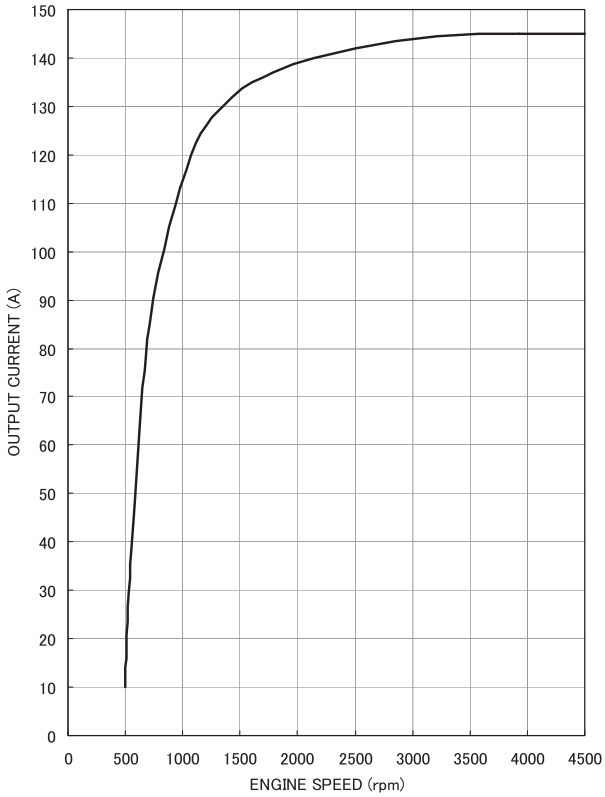
- Engine Alternator Performance Curves

Alternator 12V-110A

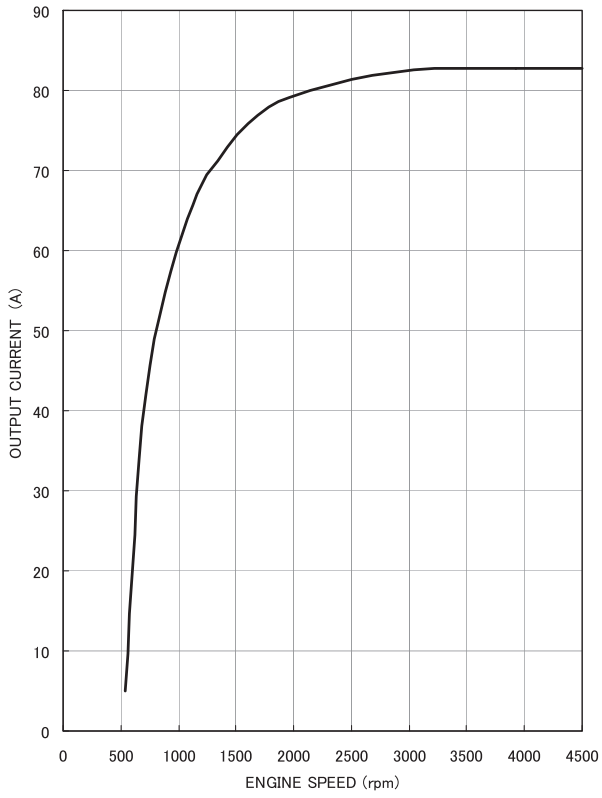


8.5 Charging/discharging balance

Alternator 12V-140A

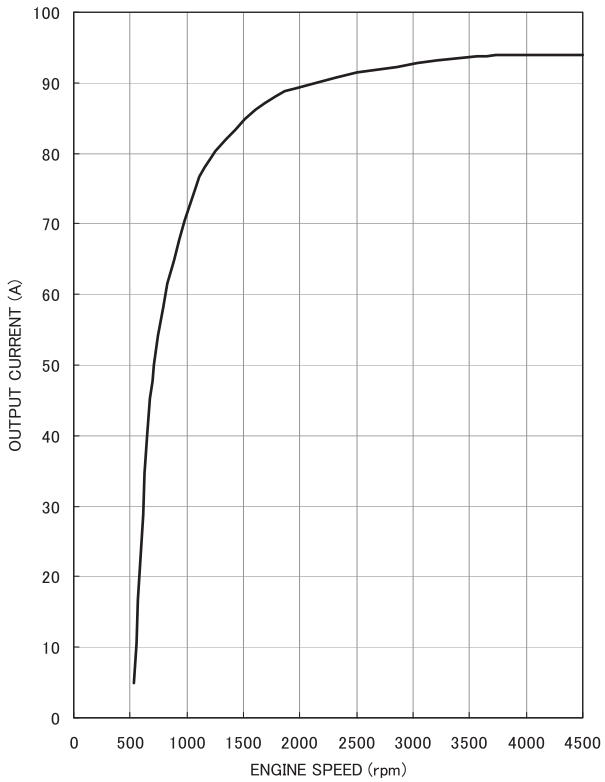


Alternator 24V-80A



B

Alternator 24V-90A (option)

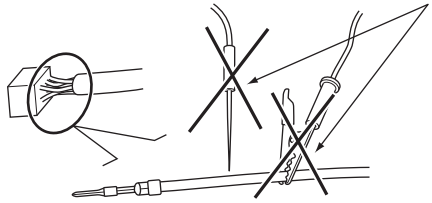


8.6 Electric circuit continuity check

Needling check is prohibitive.

Damage to cable insulation by test bar or electric circuit check lamp needle can result in premature corrosion of chassis harness.

Sticking of test bar or electric circuit check lamp needle into cable insulation is prohibitive.

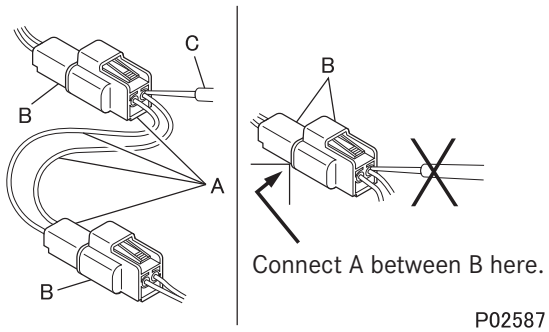


8.6.1 Check procedures

Continuity check with mating connectors joined (with continuity established in circuit)

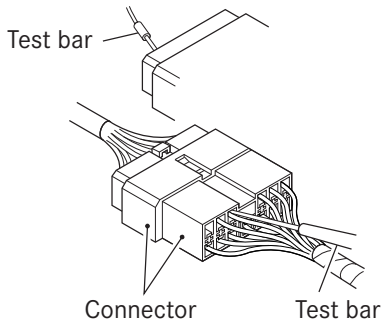
Waterproof connector

- Connect check harness A between joined circuit connectors B.
- Perform the check with the test bar applied to the check harness A connector
- Do not put in the test bar from connector B-side harness. The connector would lose waterproofing performance to result in harness corrosion.



Non-waterproof connector

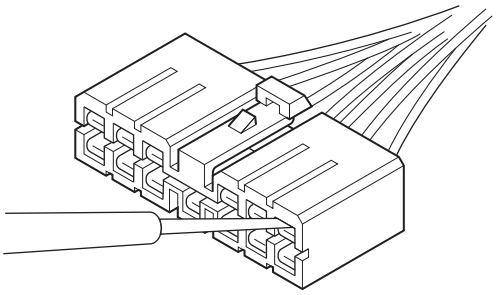
- Insert the test bar from the harness side.
- If joined connectors are so small that test bar cannot be inserted, such as control unit connectors, do not push in the test bar by force but use a superfine pointed test bar.



Continuity check with connectors disjoined

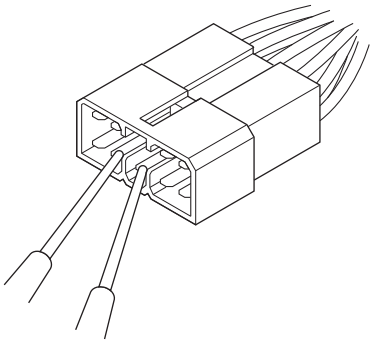
Check with female connector pins

- Perform the check with the test bar inserted in the pins.
- Forced bar insertion could result in poor contact.



Check with male connector pins

- Perform the check applying the test bar directly to connector pins.
- Take care that the test bar does not short-circuit between connector pins. In the case of electronic control units, short-circuiting could break down their internal circuit.

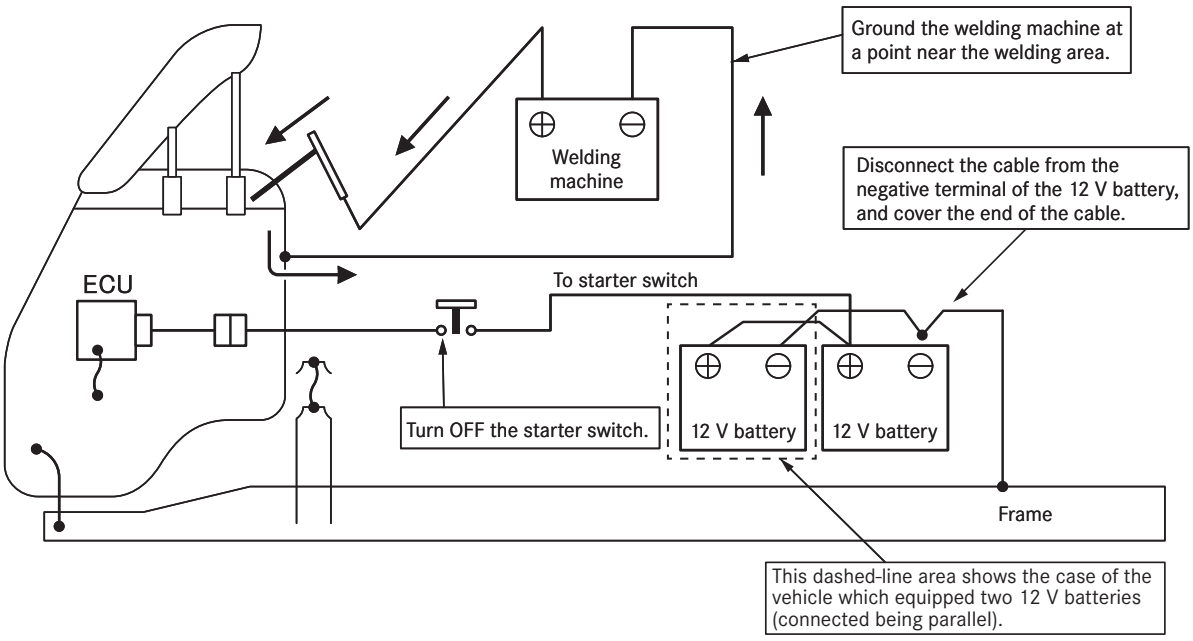


8.7 Precautions for electric welding

When a worker carries out arc welding, the electrical harness of the vehicle and also the electronic devices sometimes become damaged. To prevent this, observe the following precautions.

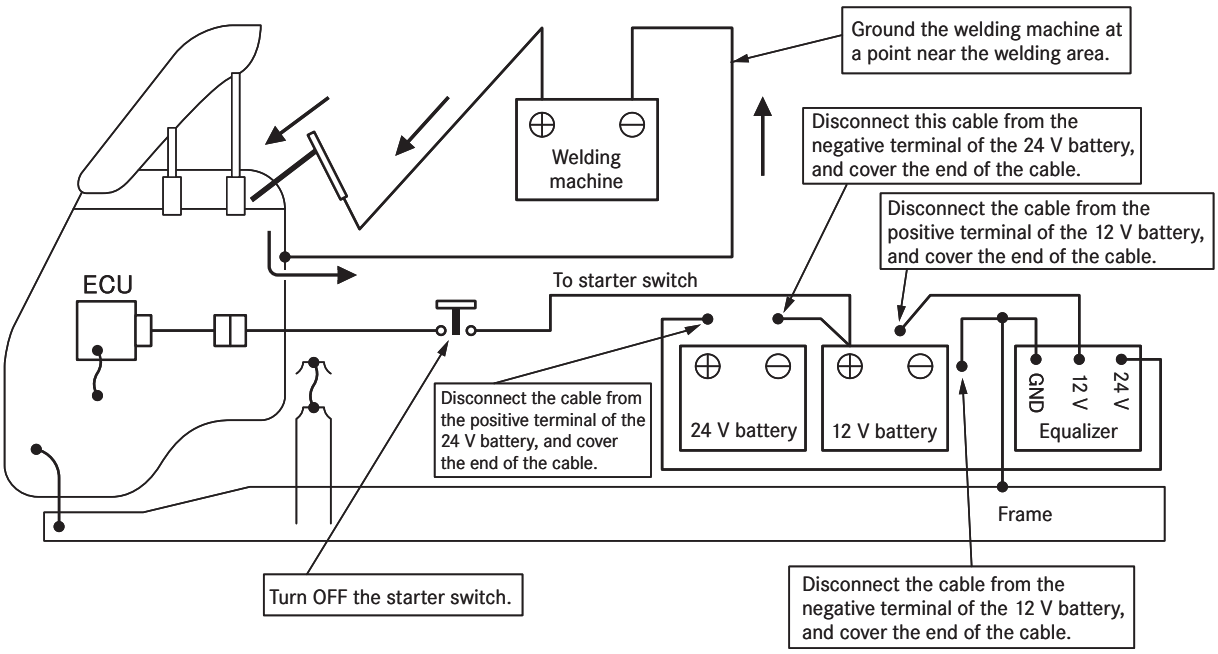
- Preparations for arc welding
  On the vehicle are mounted electronic devices and an electronic control unit (ECU) which are connected directly to the battery. If you carry out arc welding with these devices connected, current from the welding machine may flow in the reverse direction through the ground circuit and damage the devices.
  If you do not observe the precautions for welding, welding current will flow through the following circuit: ▷ 8.7
  Before carrying out welding, carry out the following work.
  (a) Turn OFF the starter switch
  (b) Disconnect the battery cables from negative terminals of the batteries, and cover the ends of the cables.
  Disconnect the harness connectors connected to the 12 V and 24 V terminals of the battery equalizer from the positive terminals of the batteries, and cover the ends of the cables.
  (c) Wait for at least one minute. (because SRS airbags are installed)
  (d) Be sure to ground the welding machine at a point near the welding area.
    - When welding to the cabin
      Ground the cabin using a nearby plated bolt or a metallic part of the cabin.
      When grounding the cabin itself, remove the paint from the grounding point.
    - When welding to the frame
      Ground the frame using a nearby plated bolt or the frame.
      When grounding the frame itself, remove the paint from the grounding point.
      Do not obtain a ground using a chassis spring because this may result in damage to the spring.

G (Vehicles with 12 V power supply system)



8.7 Precautions for electric welding

(Vehicles with 24 V power supply system)



- Other precautions
  (a) Before carrying out welding, place a cover over electronic devices, rubber hoses, wire harnesses, pipes, tubes, chassis spring, tires and other items in the vicinity of the welding area in order to protect them from sparks (spatter) generated during welding.
  Please note that you cannot protect the ECU from damage caused by a short circuit if you accidentally touch the ECU case with the welding rod.
  (b) Carry out welding under appropriate conditions, take steps to minimize the effect of heat on the vicinity, and also strive to secure high welding quality.
- Checks to be performed after the end of welding work
  (a) Reconnect the battery cables that you disconnected from the positive and negative terminals, so as to restore the power.
  If you removed the paint from the frame or the cabin, apply rustproofing paint of the same color.
  (b) Confirm that the starter switch is OFF.
  (c) If you wait for at least 30 seconds before reconnecting the battery cables that you disconnected from the positive and negative terminals in step (a), the needle of each meter in the meter cluster will move. Note, however, that this is due to the operation the self-diagnostic function, and is not indicative of a fault.
  (d) After restoring the power, check the electronic devices to see if they function correctly.
  For the checking method, consult with your local MITSUBISHI FUSO dealer.
  (e) For the precautions to observe concerning the SRS airbag when carrying out welding work, refer to ▷ 6.17.1.
  (f) For the precautions to observe concerning the BlueTec® exhaust gas aftertreatment when carrying out welding work, refer to ▷ 6.14.

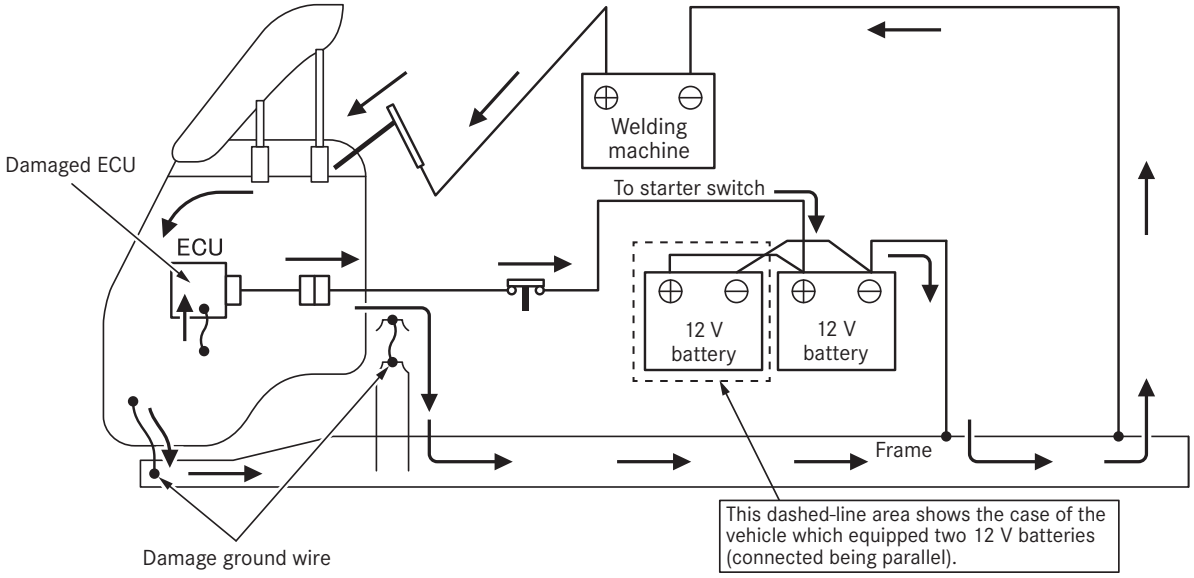
8.7 Precautions for electric welding

- If you do not observe the precautions for welding, welding current will flow through the following circuit:

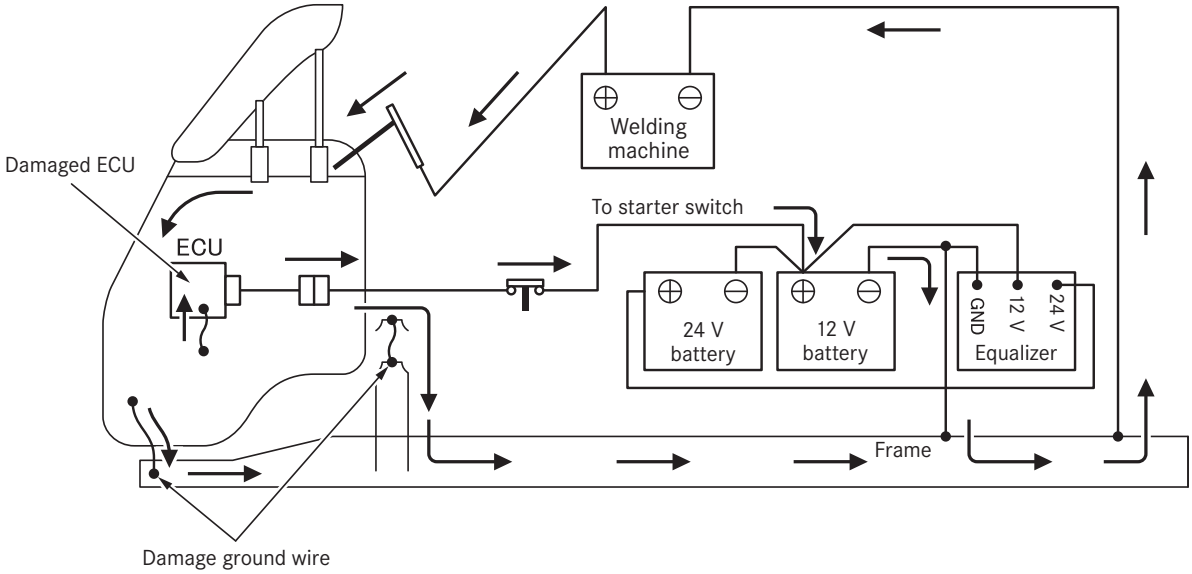
Welding rod→Cabin meta→ECU→ECU wiring→Battery→Battery ground→Welding machine ground
Ground wire

As a result, other wiring including the ECU and the ground wire will be damaged.

(Vehicles with 12 V power supply system)



(Vehicles with 24 V power supply system)



8.8 Lighting

8.8.1 Installation of Additional lamps and equipment

- Turn signal lamps
  One lamp (*1) may be added on one side (*1: voltage 12 V, lamp specifications 21 W).
  The addition of the lamp may result in the open circuit detection function being inoperative. Use the specified additional lamp.
  After modification, be sure to perform the functional check.
  When you install additional turn lamp, ask the nearest MITSUBISHI FUSO authorized Distributer to change the parameters of the SAM control unit. Failure to change the parameters will result in the turn signal not operating properly.

- Installing rear lamps
  (1) The vehicle is shipped with the rear combination lamp, backup lamp, and license plate lamp temporarily mounted on the chassis. Use those parts.
  (2) Be sure to install the lamps on each side of the vehicle symmetrically. Fix lamp wires aesthetically nicely along the rear surfaces of the frame, cross member, and rear body by using adequate clamps.

- Rear combination lamp
  (1) Installation
  On the chassis with a cab, the rear combination lamp has been temporarily mounted upside down and the water drain hole in the lamp has been taped. Be sure to peel off the tape after the lamp is installed in the correct position.
  Do not array the lamp vertically.
  (2) Harness extension
  The extension harness for the rear combination lamp is available now. please use it.

Unit: mm

Application	Length	Part No.
Extension harness for rear combination lamp	400	MC115366
	900	MC115367

- License plate holder
  (1) For the license plate lamp, use the lamp provided with the chassis as far as possible.
  (2) The law stipulates that the license plate bracket must be of a construction such that it cannot be easily removed from the rear body. For this reason, install the bracket with rivets, or bolt the bracket by tightening the nuts and then be sure to either crimp the threaded part of each bolt or weld the nut to the bolt.
  (3) When installing the license plate brackets to the wooden part of the rear body, use bolts that are of sufficient length to pass completely through the wood, and after tightening the nuts be sure to crimp the threaded part of each bolt.
  (4) Select the mounting position of the license plate in such a way that the license plate is not in the shadow of the rear bumper or any of the lamps.

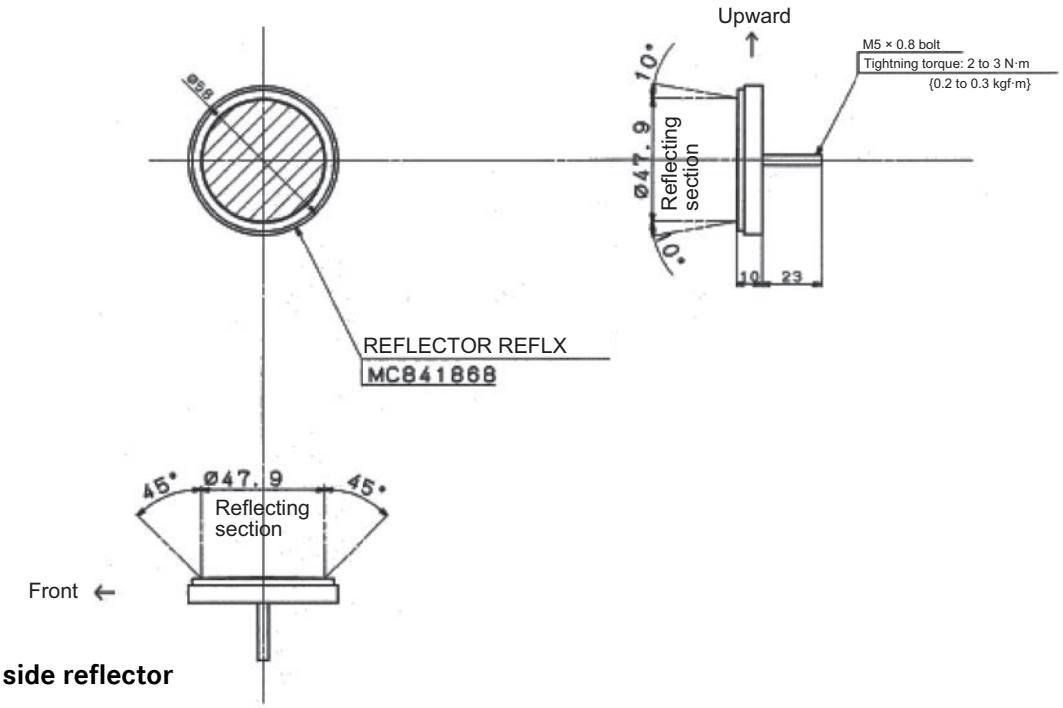
- Installation of side reflectors
  Remove side reflectors from the frame during body building for later use. For additional requirements, use MITSUBISHI FUSO genuine parts.
  The front side reflector, removed from the frame, can no longer be reused. Use a new part if replacement is necessary for a damage one.

8.8.2 Side reflector

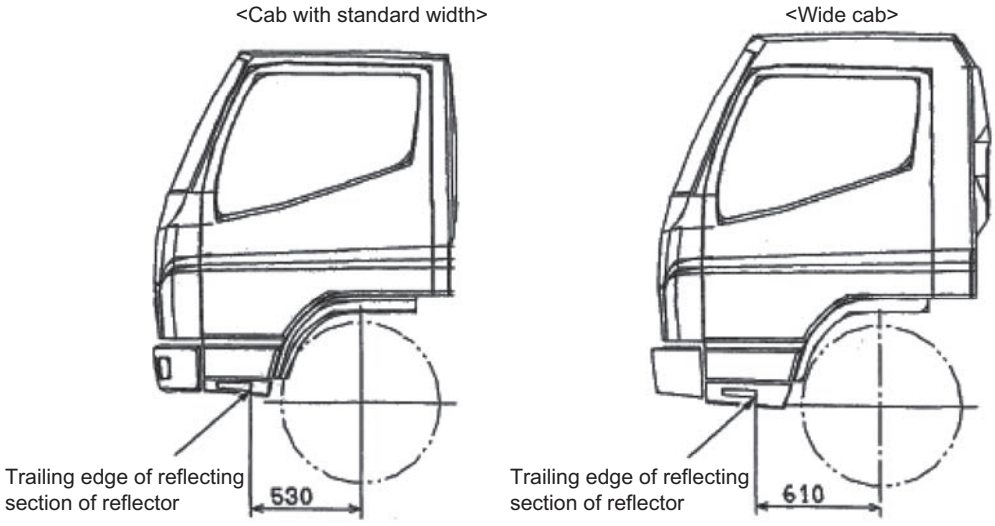
The side reflectors must be removed before starting the body mounting work.

If any additional side reflectors are to be installed, be sure to use MITSUBISHI FUSO genuine reflectors.

Side reflector



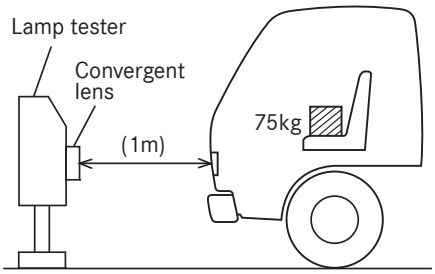
Front side reflector

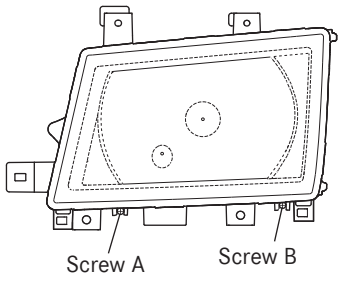


8.8.3 Headlamp aiming

Preparation before Adjustment

- Park the vehicle on a level place.
- Be sure to put tire chocks securely in place.
- Unload the vehicle and make sure no one is in it.
- Inflate the tires to the specified pressure.
- Seat one person of an equivalent mass (75 kg) in the vehicle.
- Start the engine and check that the battery is being charged.
- Place convergent lamp tester and the vehicle facing each other as shown in the drawing.
- Align the center of headlamp bulb and the center of convergent lens of convergent lamp tester. (The drawing shows the left-hand headlamp.)
- When adjusting one headlamp, mask the other to avoid light leakage.



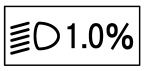


Adjustment

- Do not mask a lit headlamp for more than 2 minutes or the heat generated might cause a fire.

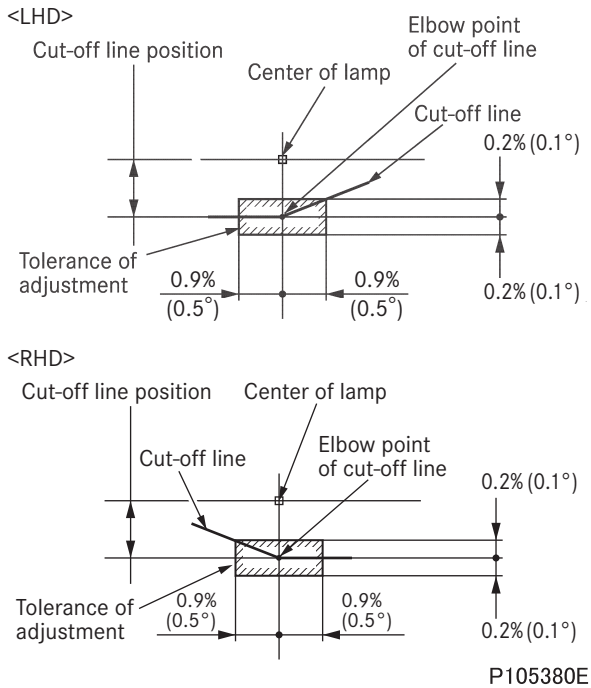
Headlamp

- Adjust the right- and left-hand headlamps to the specified optical axes using the 2 aiming adjustment screws.
- Adjust the dipped (low) beam optical axis angle to the value on the initial optical axis label attached to the rear side of the passenger seat side door opening.
  Ex. Initial optical axis label [when 1.0%]



Adjustment of dipped beam

- Turn on dipped beam.
- Make adjustment by the following procedure so that the elbow point of dipped beam cut-off line is in the illustrated position.
- Vertical adjustment: Adjust by turning screws A and B in this order by the same amount.
- Horizontal adjustment: Turn screw B.
- Adjust the optical axes of the dipped beams so that the cut-off line position can conform to the standard value.



P105380E

Model	Initial optical axis label	Optical axis adjustment angle
Except FG High Floor	1.0%	1.0% (0.57°)
FG High Floor	1.5%	1.5% (0.86°)

Vertical adjustment: Turn screws A and B in that sequence by equal amounts at a time.

Horizontal adjustment: Perform adjustment by turning screw B.

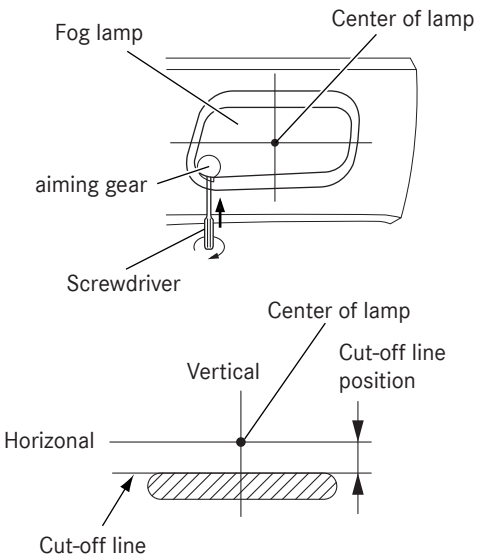
	Optical axis adjustment direction							
	Right headlamp				Left headlamp			
	Up	Down	Left	Right	Up	Down	Left	Right
Screw A	Counter-clockwise	Clockwise			Counter-clockwise	Clockwise		
Screw B	Counter-clockwise	Clockwise	Counter-clockwise	Clockwise	Counter-clockwise	Clockwise	Clockwise	Counter-clockwise

8.8.4 Fog lamp

After carrying out body-building, perform re-adjustment of aiming.

Using the aiming adjustment gear, adjust the left and right fog lamps to the correct optical axis.

Adjust the angle of the optical axis of the fog lamp so that the light-dark boundary line is in the location shown in the figure below.



Location of light-dark boundary line	Adjustment value
	1.5%(0.86°) or less

	Optical axis adjustment direction	
	Up	Down
Driver rotation direction	Clockwise	Counter-clockwise

8.9 Mobile communications systems

The ADR/GGVS regulations (Hazardous Materials Road Transport Regulations and European Agreement concerning the International Carriage of Dangerous Goods by Road) and the manufacturer's information and installation specification must be observed.

If mobile communication systems (e.g. telephone, CB radio) are retrofitted, the following requirements must be fulfilled in order to avoid malfunctions developing on the vehicle at a later stage.

Equipment

- The equipment must have official approval and correspond to DIN 50498.
- The equipment must be permanently installed.
- Operation of portable or mobile equipment inside the cab is only permitted if this equipment is connected to a permanently installed external aerial.
- The transmitter must be installed separately from all other vehicle electronics.
- Protect equipment from moisture.
- Observe the permissible operating temperature.
- Protect the equipment against severe mechanical vibrations.

Aerial (for two-way radio sets)

- The aerial must be officially licensed.

Connection and wiring

- The connection should be made directly to teriminal inside cab ▷ 8.4.3.
- Disconnect the unit from the electrical system before jump-starting.
- Cables should be wired via the shortest possible route (not looped) and twisted.
- Ensure that the system has a good ground connection to the body (aerial and equipment).
- The aerial and connecting cables between the transmitter, receiver and control panel must be routed separately from the vehicle wiring harness in the vicinity of the body ground.
- Make sure that the aerial cable is not kinked or crushed.

Additional information

The notes on operating safety and vehicle safety in Section 1 "Introduction" ▷ 1.3 and ▷ 1.4 must be complied with.

9.1 Axle load calculation

An axle load calculation is required to optimize the overall vehicle (vehicle and body). It is only possible to match the body to the truck if the vehicle is weighed before any work on the body is carried out. The weights measured by weighing form the basis of the axle load calculation.

The moment theorem is used to distribute the weight of the equipment on the front and rear axles. All distances relate to the center front axle (theoretical center). Mark the weight with mathematically correct signs and enter them in the table. The result will assist you in choosing the optimum positioning of the body.

It has proved useful to make the following calculations:

Weight

+ (plus) is everything when the vehicle is laden
– (minus) is everything that the vehicle can unload (weights)

Axle distance

+ (plus) is everything behind the center of the front axle
– (minus) is everything in front of the center of the front axle

Calculate the weight distribution on the front and rear axle using the formula:

$$\triangle G_{HA} = \frac{G_{component} \cdot a}{R} \text{ [kg]}$$

$\triangle G_{HA}$	=	Change in weight on rear axle in [kg]
$G_{component}$	=	Component weight in [kg]
a	=	Axle distance to theoretical center of front axle in [mm]
R	=	Theoretical wheelbase [mm]

$$\triangle G_{VA} = G_{component} - G_{HA} \text{ [kg]}$$

$\triangle G_{VA}$	=	Change in weight on front axle in [kg]
$G_{component}$	=	Component weight in [kg]
$\triangle G_{HA}$	=	Change in weight on rear axle in [kg]

Index

V

W

Revision record <Common section (Chapter 1-9)>

AE	11. November. 2022	Additional specifications included
AD	15. September. 2022	Additional specifications included
AC	13. April. 2022	Additional specifications included
AB	14. January. 2022	Correction
AA	30. August. 2021	Additional specifications included
Z	07. June. 2021	Additional specifications included
Y	30. April. 2021	Additional specifications included
X	30. September. 2020	Additional specifications included
W	17. July. 2020	Additional specifications included
V	13. March. 2020	Additional specifications included
U	31. January. 2020	Additional specifications included
T	18. December. 2019	Additional specifications included
S	30. September	Additional specifications included
R	29. March. 2019	Additional specifications included
Q	29. June. 2018	Additional specifications included
P	08. March. 2018	Correction
O	31. October. 2017	Additional specifications included
N	30. June. 2017	Additional specifications included
M	04. September. 2015	Additional specifications included
L	29. MAY. 2015	Additional specifications included
K	06. March. 2015	Additional specifications included
J	26. December. 2014	Additional specifications included
I	07. November. 2014	Other models added
H	29. August. 2014	Additional specifications included
G	18. June. 2014	Other models added
F	28. January. 2014	Added notices for wiring
–	29. November. 2013	–
E	31. October. 2013	Other models added
D	20. September. 2013	Other models added
–	31. July. 2013	–
C	28. September. 2012	Additional specifications included
B	28. June. 2012	Other models added
A	25. January. 2012	Added notices for wiring
–	24. October. 2011	Newly issued
Rev. code	Date issued	Remarks

NOTE:

1, Chapter 1-9 is Common Section for all markets and to be revised without any special notification. Therefore, please note that this version is not necessarily the latest one.

2, Chapter 10 is for specific market(s). MFTBC will distribute the latest version whenever it will be revised.

BlueTec®：The trademark of Daimler AG.
AdBlue®：The trademark of the German Association of the Automobile Industry (VDA).
DUONIC®：The trademark of Daimler AG.

Body/equipment mounting directives <Common section>

CANTER

MITSUBISHI FUSO TRUCK & BUS CORPORATION

November. 2022 TL201

Body/equipment mounting directives
Technical data section
Australia

MITSUBISHI FUSO TRUCK & BUS CORPORATION
January. 2023 TL2FA

10 Technical data

10.1 Model line-up

Model	Type	Drive system	Crew	Engine			G.V.W. (kg)	G.C.W. (kg)	Tire
				Model	Output (kw)	Torque (Nm)			
FEA21CR2SFBB	Forward control tilt cab	4×2	3	4P10	96	300	3510	7000	185/85R16
FEB21CR4SFBC					110	370	4500	8000	
FEB21ER4SFBC									
FEB51ER4SFBC							6000	9500	205/85R16
FEB51GR4SFBC									
FEB71GR4SFBC							7500	11000	215/75R17.5
FEB71GR4WFBC	Forward control fixed cab		7						
FEB91GR4WFBD					129	430	8200	11700	
FEC71ER4SFBC	Forward control tilt cab		3		110	370	7500	11000	
FEC91GR4SFBD					129	430	8200	11700	
FEC91HR4SFBD									
FEC91KR4SFBD									
FECX1GR4SFBD							8550	12050	
FECX1GR4WFBD	Forward control fixed cab		7						
FECX1HR4SFBD	Forward control tilt cab		3						
FECX1KR4SFBD									
FEA21CR1SFBB					96	300	3510	7000	185/85R16
FEA21CR3SFBC					110	370	4500	8000	
FEA21ER3SFBC									
FEA21ER3SFBL									
FEA21ER3WFBC	Forward control fixed cab		6						195/85R15
FEB21CR3SFBC	Forward control tilt cab		3						185/85R16
FEB21CR3SFBG									
FEB21ER3SFBC									
FEB21ER3SFBG									
FEB51ER3SFBC							6000	9500	205/85R16
FEB51GR3SFBC									
FEB71ER3WFBC	Forward control fixed cab		7				7500	11000	215/75R17.5
FEB71GR3SFBC	Forward control tilt cab		3						
FEB71GR3WFBC	Forward control fixed cab		7						
FEB91ER3WFBD					129	430	8200	11700	
FEB91GR3WFBD									
FEC71ER3SFBC	Forward control tilt cab		3		110	370	7500	11000	
FEC91GR3SFBD					129	430	8200	11700	
FEC91HR3SFBD									
FEC91KR3SFBD									
FECX1GR3SFBD							8550	12050	
FECX1GR3WFBD	Forward control fixed cab		7						
FECX1HR3SFBD	Forward control tilt cab		3						
FECX1KR3SFBD									
FGB71CR6SFBC		4×4			110	370	6500	10000	
FGB71ER6SFBC									
FGB71ER4WFBC	Forward control fixed cab		7						
FGB71ER6WFBC									

10.2 Specifications

10.2.1 Specifications

(1) FE

Model		FEA21CR1SFBB	FEA21CR2SFBB	FEA21CR3SFBC
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		2800	2800	2800
Tread (mm)	Front	1390	1390	1390
	Rear	1435	1435	1435
Curb weight (kg) *		1950	1935	1950
	Front*	1380	1365	1380
	Rear*	570	570	570
Max. G.V.W. (kg)		3510	3510	4500
Max. G.C.W. (kg)		7000	7000	8000
Model		4P10-7AT2	4P10-7AT2	4P10-7AT4
Max. Output (EEC)		96 kW / 3500 rpm	96 kW / 3500 rpm	110 kW / 3500 rpm
Max. Torque (EEC)		300 Nm / 1300 rpm	300 Nm / 1300 rpm	370 Nm / 1320 rpm
Clutch		-	C3W28	-
Transmission		M038S6	M038S5	M038S6
	Gear ratio	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397
Propeller shaft		P3	P3	P3
Transfer		-	-	-
Rear axle		R030T	R030T	R030T
Final reduction gear		D3H	D3H	D3H
	Ratio	STD: 4.444 OPT: 4.875	STD: 4.444 OPT: 4.875	STD: 4.444 OPT: 4.875
Front axle		F200T	F200T	F200T
Tires		185/85R16	185/85R16	185/85R16
Wheels		16x5 1/2K-115-8t-5studs	16x5 1/2K-115-8t-5studs	16x5 1/2K-115-8t-5studs
Steering angle (in/out)		43° / 37°	43° / 37°	43° / 37°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Double wishbone independent suspension with shock absorbers (Coil spring)	Double wishbone independent suspension with shock absorbers (Coil spring)	Double wishbone independent suspension with shock absorbers (Coil spring)
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers
P.T.O		-	-	-
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF	DPF	DPF
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Standard, Single	Standard, Single	Standard, Single
Crew		3	3	3

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver

** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FEA21ER3SFBC FEA21ER3SFBL (*)	FEA21ER3WFBC	FEB21CR3SFBC
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		3400	3400	2800
Tread (mm)	Front	1390	1390	1655
	Rear	1435	1435	1495
Curb weight (kg) *		1980 *(1975)	2180	2065
	Front*	1400	1515	1480
	Rear*	580 *(575)	665	585
Max. G.V.W. (kg)		4500	4500	4500
Max. G.C.W. (kg)		8000	8000	8000
Model		4P10-7AT4	4P10-7AT4	4P10-7AT4
Max. Output (EEC)		110 kW / 3500 rpm	110 kW / 3500 rpm	110 kW / 3500 rpm
Max. Torque (EEC)		370 Nm / 1320 rpm	370 Nm / 1320 rpm	370 Nm / 1320 rpm
Clutch		-	-	-
Transmission		M038S6	M038S6	M038S6
	Gear ratio	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397
Propeller shaft		P3	P3	P3
Transfer		-	-	-
Rear axle		R030T	R030T	R030T
Final reduction gear		D3H	D3H	D3H
	Ratio	STD: 4.444 OPT: 4.875	STD: 4.444 OPT: 4.875	STD: 4.444 OPT: 4.875
Front axle		F200T	F200T	F200T
Tires		185/85R16	195/85R16	185/85R16
Wheels		16x5 1/2K-115-8t-5studs	15x5.00-115-8t-5studs	16x5 1/2K-115-8t-5studs
Steering angle (in/out)		43° / 37°	43° / 37°	48° / 41°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Double wishbone independent suspension with shock absorbers (Coil spring)	Double wishbone independent suspension with shock absorbers (Coil spring)	Double wishbone independent suspension with shock absorbers (Coil spring)
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
P.T.O		-	-	-
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF	DPF	DPF
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	115D31Lx1	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Standard, Single	Standard, Crew	Wide, Single
Crew		3	6 (3+3)	3

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FEB21CR3SFBG	FEB21CR4SFBC	FEB21ER3SFBC
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		2800	2800	3400
Tread (mm)	Front	1655	1655	1655
	Rear	1495	1495	1495
Curb weight (kg) *		2065	2045	2090
	Front*	1480	1470	1490
	Rear*	585	575	600
Max. G.V.W. (kg)		4500	4500	4500
Max. G.C.W. (kg)		8000	8000	8000
Model		4P10-7AT4	4P10-7AT4	4P10-7AT4
Max. Output (EEC)		110 kW / 3500 rpm	110 kW / 3500 rpm	110 kW / 3500 rpm
Max. Torque (EEC)		370 Nm / 1320 rpm	370 Nm / 1320 rpm	370 Nm / 1320 rpm
Clutch		-	C4W30	-
Transmission		M038S6	M038S5	M038S6
	Gear ratio	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397
Propeller shaft		P3	P3	P3
Transfer		-	-	-
Rear axle		R030T	R030T	R030T
Final reduction gear		D3H	D3H	D3H
	Ratio	STD: 4.444 OPT: 4.875	STD: 4.444 OPT: 4.875	STD: 4.444 OPT: 4.875
Front axle		F200T	F200T	F200T
Tires		185/85R16	185/85R16	185/85R16
Wheels		16x5 1/2K-115-8t-5studs	16x5 1/2K-115-8t-5studs	16x5 1/2K-115-8t-5studs
Steering angle (in/out)		48° / 41°	48° / 41°	48° / 41°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Double wishbone independent suspension with shock absorbers (Coil spring)	Double wishbone independent suspension with shock absorbers (Coil spring)	Double wishbone independent suspension with shock absorbers (Coil spring)
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
P.T.O		-	-	-
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF	DPF	DPF
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 140 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Wide, Single	Wide, Single	Wide, Single
Crew		3	3	3

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FEB21ER3SFBG	FEB21ER4SFBC	FEB51ER3SFBC
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		3400	3400	3400
Tread (mm)	Front	1655	1655	1670
	Rear	1495	1495	1495
Curb weight (kg) *		2090	2070	2270
	Front*	1490	1475	1565
	Rear*	600	595	705
Max. G.V.W. (kg)		4500	4500	STD: 6000 OPT: 4500
Max. G.C.W. (kg)		8000	8000	STD: 9500 OPT: 8000
Model		4P10-7AT4	4P10-7AT4	4P10-7AT4
Max. Output (EEC)		110 kW / 3500 rpm	110 kW / 3500 rpm	110 kW / 3500 rpm
Max. Torque (EEC)		370 Nm / 1320 rpm	370 Nm / 1320 rpm	370 Nm / 1320 rpm
Clutch		-	C4W30	-
Transmission		M038S6	M038S5	M038S6
	Gear ratio	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397
Propeller shaft		P3	P3	P3
Transfer		-	-	-
Rear axle		R030T	R030T	R033T
Final reduction gear		D3H	D3H	D033H
	Ratio	STD: 4.444 OPT: 4.875	STD: 4.444 OPT: 4.875	STD: 4.875 OPT: 5.285
Front axle		F200T	F200T	F200T
Tires		185/85R16	185/85R16	205/85R16
Wheels		16x5 1/2K-115-8t-5studs	16x5 1/2K-115-8t-5studs	16x5 1/2K-115-8t-5studs
Steering angle (in/out)		48° / 41°	48° / 41°	49° / 36°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Double wishbone independent suspension with shock absorbers (Coil spring)	Double wishbone independent suspension with shock absorbers (Coil spring)	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
P.T.O		-	-	-
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF	DPF	DPF
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 140 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Wide, Single	Wide, Single	Wide, Single
Crew		3	3	3

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FEB51ER4SFBC	FEB51GR3SFBC	FEB51GR4SFBC
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		3400	3850	3850
Tread (mm)	Front	1670	1670	1670
	Rear	1495	1495	1495
Curb weight (kg) *		2245	2290	2265
	Front*	1550	1565	1550
	Rear*	695	725	715
Max. G.V.W. (kg)		STD: 6000 OPT: 4500	STD: 6000 OPT: 4500	STD: 6000 OPT: 4500
Max. G.C.W. (kg)		STD: 9500 OPT: 8000	STD: 9500 OPT: 8000	STD: 9500 OPT: 8000
Model		4P10-7AT4	4P10-7AT4	4P10-7AT4
Max. Output (EEC)		110 kW / 3500 rpm	110 kW / 3500 rpm	110 kW / 3500 rpm
Max. Torque (EEC)		370 Nm / 1320 rpm	370 Nm / 1320 rpm	370 Nm / 1320 rpm
Clutch		C4W30	-	C4W30
Transmission		M038S5	M038S6	M038S5
	Gear ratio	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494
Propeller shaft		P3	P3	P3
Transfer		-	-	-
Rear axle		R030T	R033T	R030T
Final reduction gear		D3H	D033H	D3H
	Ratio	STD: 4.875 OPT: 5.285	STD: 4.875 OPT: 5.285	STD: 4.875 OPT: 5.285
Front axle		F200T	F200T	F200T
Tires		205/85R16	205/85R16	205/85R16
Wheels		16x5 1/2K-115-8t-5studs	16x5 1/2K-115-8t-5studs	16x5 1/2K-115-8t-5studs
Steering angle (in/out)		49° / 36°	49° / 36°	49° / 36°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
P.T.O		-	-	-
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF	DPF	DPF
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Wide, Single	Wide, Single	Wide, Single
Crew		3	3	3

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FEB71ER3WFBC	FEB71GR3SFBC	FEB71GR3WFBC
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		3400	3850	3850
Tread (mm)	Front	1675	1675	1675
	Rear	1560	1560	1560
Curb weight (kg) *		2650	2445	2675
	Front*	1750	1610	1775
	Rear*	900	835	900
Max. G.V.W. (kg)		STD: 7500 OPT: 4500	STD: 7500 OPT: 4500	STD: 7500 OPT: 4500
Max. G.C.W. (kg)		STD: 11000 OPT: 8000	STD: 11000 OPT: 8000	STD: 11000 OPT: 8000
Model		4P10-7AT4	4P10-7AT4	4P10-7AT4
Max. Output (EEC)		110 kW / 3500 rpm	110 kW / 3500 rpm	110 kW / 3500 rpm
Max. Torque (EEC)		370 Nm / 1320 rpm	370 Nm / 1320 rpm	370 Nm / 1320 rpm
Clutch		-	-	–
Transmission		M038S6	M038S6	M038S6
	Gear ratio	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397
Propeller shaft		P3	P3	P3
Transfer		-	-	–
Rear axle		R035T	R035T	R035T
Final reduction gear		D035H	D035H	D035H
	Ratio	5.714	5.714	5.714
Front axle		F350T	F350T	F350T
Tires		215/75R17.5	215/75R17.5	215/75R17.5 (3200/6200)
Wheels		17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs	17.5x6.00-127-9t, 6studs
Steering angle (in/out)		45° / 34°	45° / 34°	45° / 34°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers
P.T.O		-	-	–
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF	DPF	DPF
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Wide, Crew	Wide, Crew	Wide, Crew
Crew		7 (3+4)	3	7 (3+4)

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FEB71GR4SFBC	FEB71GR4WFBC	FEB91ER3WFBD
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		3850	3850	3400
Tread (mm)	Front	1675	1675	1675
	Rear	1560	1560	1560
Curb weight (kg) *		2425	2645	2700
	Front*	1595	1750	1760
	Rear*	830	895	940
Max. G.V.W. (kg)		STD: 7500 OPT: 4500	STD: 7500 OPT: 4500	STD: 8200 OPT: 4500
Max. G.C.W. (kg)		STD: 11000 OPT: 8000	STD: 11000 OPT: 8000	STD: 11700 OPT: 8000
Model		4P10-7AT4	4P10-7AT4	4P10-7AT6
Max. Output (EEC)		110 kW / 3500 rpm	110 kW / 3500 rpm	129 kW / 3500 rpm
Max. Torque (EEC)		370 Nm / 1320 rpm	370 Nm / 1320 rpm	430 Nm / 1600 rpm
Clutch		C4W30	C4W30	-
Transmission		M038S5	M038S5	M038S6
	Gear ratio	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.494 -3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397
Propeller shaft		P3	P3	P3
Transfer		-	–	-
Rear axle		R035T	R035T	R035T
Final reduction gear		D035H	D035H	D035H
	Ratio	5.285	5.285	6.166
Front axle		F350T	F350T	F350T
Tires		215/75R17.5	215/75R17.5 (3200/6200)	215/75R17.5
Wheels		17.5x6.00-127-9t-6studs	17.5x6.00-127-9t, 6studs	17.5x6.00-127-9t-6studs
Steering angle (in/out)		45° / 34°	45° / 34°	45° / 34°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
P.T.O		-	–	-
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF	DPF	DPF+SCR
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD:115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Wide, Single	Wide, Crew	Wide, Crew
Crew		3	7 (3+4)	7 (3+4)

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FEB91GR3WFBD	FEB91GR4WFBD	FEC71ER3SFBC
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		3850	3850	3400
Tread (mm)	Front	1675	1675	1675
	Rear	1560	1560	1670
Curb weight (kg) *		2715	2705	2430
	Front*	1780	1770	1595
	Rear*	935	935	835
Max. G.V.W. (kg)		STD: 8200 OPT: 4500	STD: 8200 OPT: 4500	STD: 7500 OPT: 4500
Max. G.C.W. (kg)		STD: 11700 OPT: 8000	STD: 11700 OPT: 8000	STD: 11000 OPT: 8000
Model		4P10-7AT6	4P10-7AT6	4P10-7AT4
Max. Output (EEC)		129 kW / 3500 rpm	129 kW / 3500 rpm	110 kW / 3500 rpm
Max. Torque (EEC)		430 Nm / 1600 rpm	430 Nm / 1600 rpm	370 Nm / 1320 rpm
Clutch		-	C4W30	-
Transmission		M038S6	M038S5	M038S6
	Gear ratio	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397
Propeller shaft		P3	P3	P3
Transfer		-	-	-
Rear axle		R035T	R035T	R035T
Final reduction gear		D035H	D035H	D035H
	Ratio	6.166	5.285	5.714
Front axle		F350T	F350T	F350T
Tires		215/75R17.5	215/75R17.5	215/75R17.5
Wheels		17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs
Steering angle (in/out)		45° / 34°	45° / 34°	45° / 34°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
P.T.O		-	-	-
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF+SCR	DPF+SCR	DPF
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Wide, Crew	Wide, Crew	Wide, Single
Crew		7 (3+4)	7 (3+4)	3

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FEC71ER4SFBC	FEC91GR3SFBD	FEC91GR4SFBD
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		2800	3850	3850
Tread (mm)	Front	1675	1675	1675
	Rear	1670	1670	1670
Curb weight (kg) *		2410	2495	2480
	Front*	1580	1600	1585
	Rear*	830	895	895
Max. G.V.W. (kg)		STD: 7500 OPT: 4500	8200	8200
Max. G.C.W. (kg)		STD: 11000 OPT: 8000	11700	11700
Model		4P10-7AT4	4P10-7AT6	4P10-7AT6
Max. Output (EEC)		110 kW / 3500 rpm	129 kW / 3500 rpm	129 kW / 3500 rpm
Max. Torque (EEC)		370 Nm / 1320 rpm	430 Nm / 1600 rpm	430 Nm / 1600 rpm
Clutch		C4W30	-	C4W30
Transmission		M038S5	M038S6	M038S5
	Gear ratio	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494
Propeller shaft		P3	P3	P3
Transfer		-	-	-
Rear axle		R035T	R035T	R035T
Final reduction gear		D035H	D035H	D035H
	Ratio	5.285	6.166	5.285
Front axle		F350T	F350T	F350T
Tires		215/75R17.5	215/75R17.5	215/75R17.5
Wheels		17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs
Steering angle (in/out)		45° / 34°	45° / 34°	45° / 34°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
P.T.O		-	-	-
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF	DPF+SCR	DPF+SCR
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Wide, Single	Wide, Single	Wide, Single
Crew		3	3	3

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FEC91HR3SFBD	FEC91HR4SFBD	FEC91KR3SFBD
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		4300	4300	4750
Tread (mm)	Front	1675	1675	1675
	Rear	1670	1670	1670
Curb weight (kg) *		2530	2515	2550
	Front*	1635	1620	1650
	Rear*	895	895	900
Max. G.V.W. (kg)		8200	8200	8200
Max. G.C.W. (kg)		11700	11700	11700
Model		4P10-7AT6	4P10-7AT6	4P10-7AT6
Max. Output (EEC)		129 kW / 3500 rpm	129 kW / 3500 rpm	129 kW / 3500 rpm
Max. Torque (EEC)		430 Nm / 1600 rpm	430 Nm / 1600 rpm	430 Nm / 1600 rpm
Clutch		-	C4W30	-
Transmission		M038S6	M038S5	M038S6
	Gear ratio	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397
Propeller shaft		P3	P3	P3
Transfer		-	-	-
Rear axle		R035T	R035T	R035T
Final reduction gear		D035H	D035H	D035H
	Ratio	6.166	5.285	6.166
Front axle		F350T	F350T	F350T
Tires		215/75R17.5	215/75R17.5	215/75R17.5
Wheels		17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs
Steering angle (in/out)		45° / 34°	45° / 34°	45° / 34°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
P.T.O		-	-	-
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF+SCR	DPF+SCR	DPF+SCR
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Wide, Single	Wide, Single	Wide, Single
Crew		3	3	3

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FEC91KR4SFBD	FECX1GR3SFBD	FECX1GR3WFBD
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		4750	3850	3850
Tread (mm)	Front	1675	1675	1675
	Rear	1670	1670	1670
Curb weight (kg) *		2535	2470	2695
	Front*	1640	1580	1735
	Rear*	895	890	960
Max. G.V.W. (kg)		8200	8550	8550
Max. G.C.W. (kg)		11700	12050	12050
Model		4P10-7AT6	4P10-7AT6	4P10-7AT6
Max. Output (EEC)		129 kW / 3500 rpm	129 kW / 3500 rpm	129 kW / 3500 rpm
Max. Torque (EEC)		430 Nm / 1600 rpm	430 Nm / 1600 rpm	430 Nm / 1600 rpm
Clutch		C4W30	–	–
Transmission		M038S5	M038S6	M038S6
	Gear ratio	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397
Propeller shaft		P3	P3	P3
Transfer		-	–	–
Rear axle		R035T	R035T	R035T
Final reduction gear		D035H	D035H	D035H
	Ratio	5.285	6.166	6.166
Front axle		F350T	F350T	F350T
Tires		215/75R17.5	215/75R17.5	215/75R17.5
Wheels		17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs
Steering angle (in/out)		45° / 34°	45° / 34°	45° / 34°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers
P.T.O		-	–	–
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF+SCR	DPF+SCR	DPF+SCR
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Wide, Single	Wide, Single	Wide, Crew
Crew		3	3	7 (3+4)

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FECX1GR4SFBD	FECX1GR4WFBD	FECX1HR3SFBD
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		3850	3850	4300
Tread (mm)	Front	1675	1675	1675
	Rear	1670	1670	1670
Curb weight (kg) *		2455	2685	2505
	Front*	1565	1725	1615
	Rear*	890	960	890
Max. G.V.W. (kg)		8550	8550	8550
Max. G.C.W. (kg)		12050	12050	12050
Model		4P10-7AT6	4P10-7AT6	4P10-7AT6
Max. Output (EEC)		129 kW / 3500 rpm	129 kW / 3500 rpm	129 kW / 3500 rpm
Max. Torque (EEC)		430 Nm / 1600 rpm	430 Nm / 1600 rpm	430 Nm / 1600 rpm
Clutch		C4W30	C4W30	–
Transmission		M038S5	M038S5	M038S6
	Gear ratio	5.494 -3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.494 -3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397
Propeller shaft		P3	P3	P3
Transfer		–	–	–
Rear axle		R035T	R035T	R035T
Final reduction gear		D035H	D035H	D035H
	Ratio	5.285	5.285	6.166
Front axle		F350T	F350T	F350T
Tires		215/75R17.5	215/75R17.5	215/75R17.5
Wheels		17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs
Steering angle (in/out)		45° / 34°	45° / 34°	45° / 34°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers
P.T.O		–	–	–
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF+SCR	DPF+SCR	DPF+SCR
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Wide, Single	Wide, Crew	Wide, Single
Crew		3	7 (3+4)	3

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FECX1HR4SFBD	FECX1KR3SFBD	FECX1KR4SFBD
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		4300	4750	4750
Tread (mm)	Front	1675	1675	1675
	Rear	1670	1670	1670
Curb weight (kg) *		2495	2525	2510
	Front*	1605	1630	1620
	Rear*	890	895	890
Max. G.V.W. (kg)		8550	8550	8550
Max. G.C.W. (kg)		12050	12050	12050
Model		4P10-7AT6	4P10-7AT6	4P10-7AT6
Max. Output (EEC)		129 kW / 3500 rpm	129 kW / 3500 rpm	129 kW / 3500 rpm
Max. Torque (EEC)		430 Nm / 1600 rpm	430 Nm / 1600 rpm	430 Nm / 1600 rpm
Clutch		C4W30	–	C4W30
Transmission		M038S5	M038S6	M038S5
	Gear ratio	5.494 -3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.397 - 3.788 - 2.310 - 1.474 - 1.000 - 0.701 Rev. 5.397	5.494 -3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494
Propeller shaft		P3	P3	P3
Transfer		–	–	–
Rear axle		R035T	R035T	R035T
Final reduction gear		D035H	D035H	D035H
	Ratio	5.285	6.166	5.285
Front axle		F350T	F350T	F350T
Tires		215/75R17.5	215/75R17.5	215/75R17.5
Wheels		17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs
Steering angle (in/out)		45° / 34°	45° / 34°	45° / 34°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer	Semi-elliptic laminated leaf spring with shock absobers and stabilizer
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers
P.T.O		–	–	–
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF+SCR	DPF+SCR	DPF+SCR
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2	STD: 115D31Lx1 OPT: 115D31Lx2
Cab		Wide, Single	Wide, Single	Wide, Single
Crew		3	3	3

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

(2) FG

Model		FGB71CR6SFBC	FGB71ER4WFBC	FGB71ER6SFBC
Emission		EuroV	EuroV	EuroV
Wheelbase (mm)		2815	3415	3415
Tread (mm)	Front	1665	1665	1665
	Rear	1560	1560	1560
Curb weight (kg) *		2635	2850	2670
	Front*	1765	1910	1780
	Rear*	870	940	890
Max. G.V.W. (kg)		STD: 6500 OPT: 4500	STD: 6500 OPT: 4500	STD: 6500 OPT: 4500
Max. G.C.W. (kg)		STD: 10000 OPT: 8000	STD: 10000 OPT: 8000	STD: 10000 OPT: 8000
Model		4P10-7AT4	4P10-7AT4	4P10-7AT4
Max. Output (EEC)		110 kW / 3500 rpm	110 kW / 3500 rpm	110 kW / 3500 rpm
Max. Torque (EEC)		370 Nm / 1320 rpm	370 Nm / 1320 rpm	370 Nm / 1320 rpm
Clutch		C4W30	C4W30	C4W30
Transmission		M038S5	M038S5	M038S5
	Gear ratio	5.494 -3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.494 - 3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494	5.494 -3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494
Propeller shaft		P3	P3	P3
Transfer		Transmission with transfer (Part time with Hi-Low mode)	Transmission with transfer (Part time)	Transmission with transfer (Part time with Hi-Low mode)
Rear axle		R035T	R035T	R035T
Final reduction gear		D035H	D035H	D035H
	Ratio	5.285	5.285	5.285
Front axle		F200TW	F200TW	F200TW
Tires		215/75R17.5 BS 716z	215/75R17.5 BS 716z	215/75R17.5 BS 716z
Wheels		17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs	17.5x6.00-127-9t-6studs
Steering angle (in/out)		35° / 34°	35° / 34°	35° / 34°
SRS air bag		STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side	STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system	hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case	Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers	Semi-elliptic laminated leaf spring with shock absobers
P.T.O		-	-	-
Fuel system	Injection pump	Unit pump	Unit pump	Unit pump
	Governor	Electronic control governor	Electronic control governor	Electronic control governor
Fuel tank		100 L	100 L	100 L
Exhaust system		DPF	DPF	DPF
Electrical	Voltage	-	-	-
	Alternator	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp	A.C. 12 Volt, 110 Amp
	Batteries	STD:115D31Lx1 OPT:115D31Lx2	STD:115D31Lx1 OPT:115D31Lx2	STD:115D31Lx1 OPT:115D31Lx2
Cab		Wide, Single	Wide, Crew	Wide, Single
Crew		3	7 (3+4)	3

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

10.2 Specifications

Model		FGB71ER6WFBC
Emission		EuroV
Wheelbase (mm)		3415
Tread (mm)	Front	1665
	Rear	1560
Curb weight (kg) *		2900
	Front*	1940
	Rear*	960
Max. G.V.W. (kg)		STD: 6500 OPT: 4500
Max. G.C.W. (kg)		STD: 10000 OPT: 8000
Model		4P10-7AT4
Max. Output (EEC)		110 kW / 3500 rpm
Max. Torque (EEC)		370 Nm / 1320 rpm
Clutch		C4W30
Transmission		M038S5
	Gear ratio	5.494 -3.193 - 1.689 - 1.000 - 0.723 Rev. 5.494
Propeller shaft		P3
Transfer		Transmission with transfer (Part time with Hi-Low mode)
Rear axle		R035T
Final reduction gear		D035H
	Ratio	5.285
Front axle		F200TW
Tires		215/75R17.5 BS 716z
Wheels		17.5x6.00-127-9t-6studs
Steering angle (in/out)		35° / 34°
SRS air bag		STD: Driver side OPT: Assist side
Service brake		hydraulic vacuum assisted 2 circuit split system
Parking brake		Mechanical, internal expanding type mounted on the rear end of the transmission case
Front suspension		Semi-elliptic laminated leaf spring with shock absobers
Rear suspension		Semi-elliptic laminated leaf spring with shock absobers
P.T.O		-
Fuel system	Injection pump	Unit pump
	Governor	Electronic control governor
Fuel tank		100 L
Exhaust system		DPF
Electrical	Voltage	-
	Alternator	A.C. 12 Volt, 110 Amp
	Batteries	STD:115D31Lx1 OPT:115D31Lx2
Cab		Wide, Crew
Crew		7 (3+4)

* Including coolant, oils, 90% fuel, spare wheel, tools and 75 kg driver
** Calculated maximum value. Should be checked based on installed body and application.

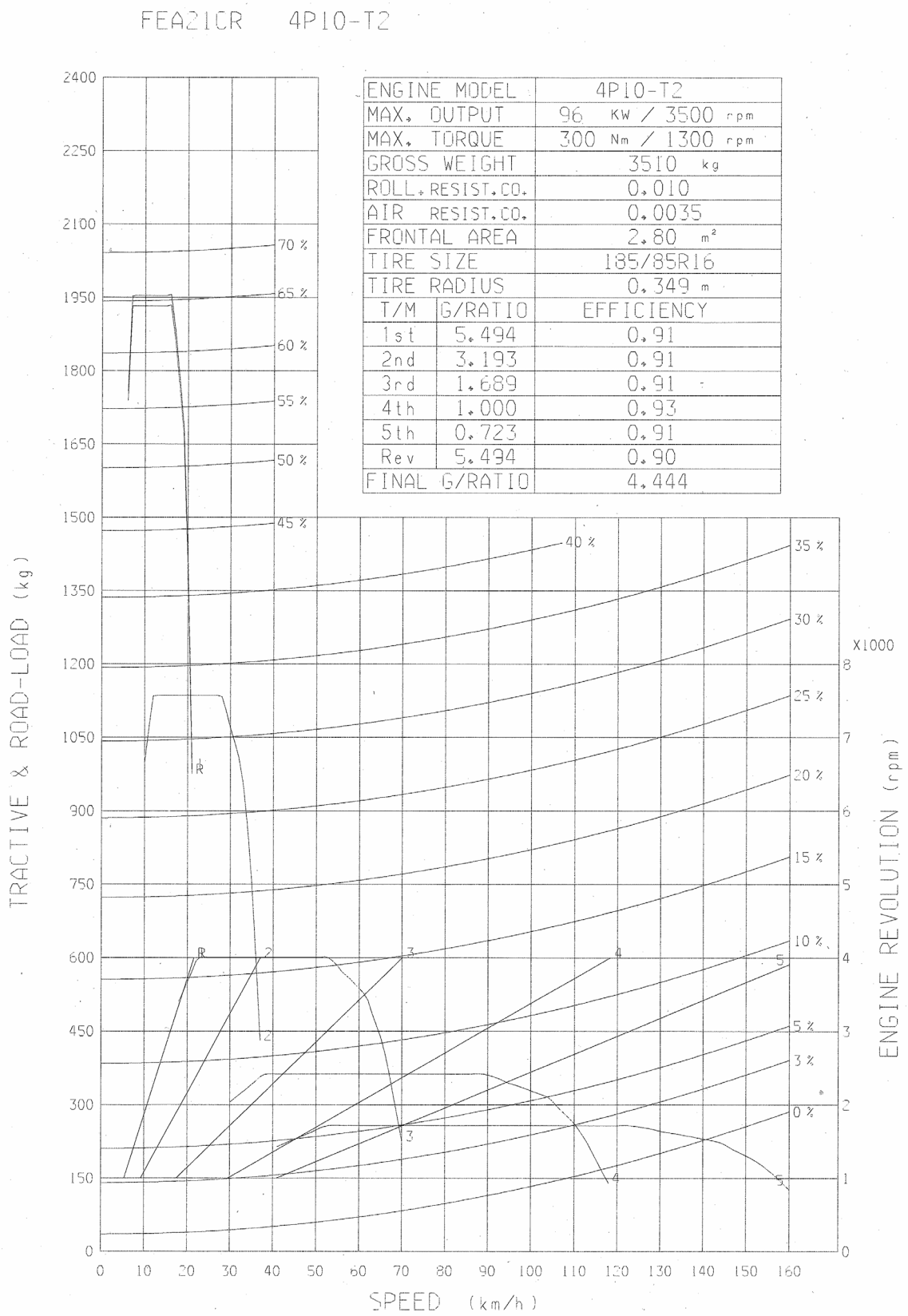
10.2.2 Axle and tire load carrying capacity

Max. GVW (kg)	Vehicle Model	Max. Output (kw)	Tire Size				Axle Capacity (kg)	
			195/85R15	185/85R16	205/85R16	215/75R17.5	Front	Rear
3510	FEA21CR1SFBB	96		X			2180	3800
	FEA21CR2SFBB			X				
4500	FEA21CR3SFBC	110		X				
	FEA21ER3SFBC			X				
	FEA21ER3SFBL			X				
	FEA21ER3WFBC		X				2300	
	FEB21CR3SFBC			X			2180	
	FEB21CR3SFBG			X				
	FEB21CR4SFBC			X				
	FEB21ER3SFBC			X				
	FEB21ER3SFBG			X				
	FEB21ER4SFBC			X				
6000	FEB51ER3SFBC				X		2570	4500
	FEB51ER4SFBC				X			
	FEB51GR3SFBC				X			
	FEB51GR4SFBC				X			
6500	FGB71CR6SFBC					X	2800	5760
	FGB71ER4WFBC					X		
	FGB71ER6SFBC					X		
	FGB71ER6WFBC					X		
7500	FEB71ER3WFBC					X	3100	6000
	FEB71GR3SFBC					X		
	FEB71GR3WFBC					X		
	FEB71GR4SFBC					X		
	FEB71GR4WFBC					X		
	FEC71ER3SFBC					X		
	FEC71ER4SFBC					X		
8200	FEB91ER3WFBD	129				X		
	FEB91GR3WFBD					X		
	FEB91GR4WFBD					X		
	FEC91GR3SFBD					X		
	FEC91GR4SFBD					X		
	FEC91HR3SFBD					X		
	FEC91HR4SFBD					X		
	FEC91KR3SFBD					X		
	FEC91KR4SFBD					X		
8550	FECX1GR3SFBD					X		
	FECX1GR3WFBD					X		
	FECX1GR4SFBD					X		
	FECX1GR4WFBD					X		
	FECX1HR3SFBD					X		
	FECX1HR4SFBD					X		
	FECX1KR3SFBD					X		
	FECX1KR4SFBD					X		
Tire Capacity (kg)*1		Front	1150X2=2300	1090X2=2180	1285X2=2570	1600X2=3200 1700X2=3400		
		Rear	1090X4=4360	1030X4=4120	1215X4=4860	1550X4=6200 1600X4=6400		

*1 At Maximum information pressure (kPa, cold: Fr/Re)
185/85R16 ... 600/600
195/85R15 113/111 ... 600/600
205/85R16 117/115 ... 600/600
215/75R17.5 124/123 ... 675/675
215/75R17.5 126/124 ... 700/700

10.3 Performance curve

10.3.1 Vehicle performance curve

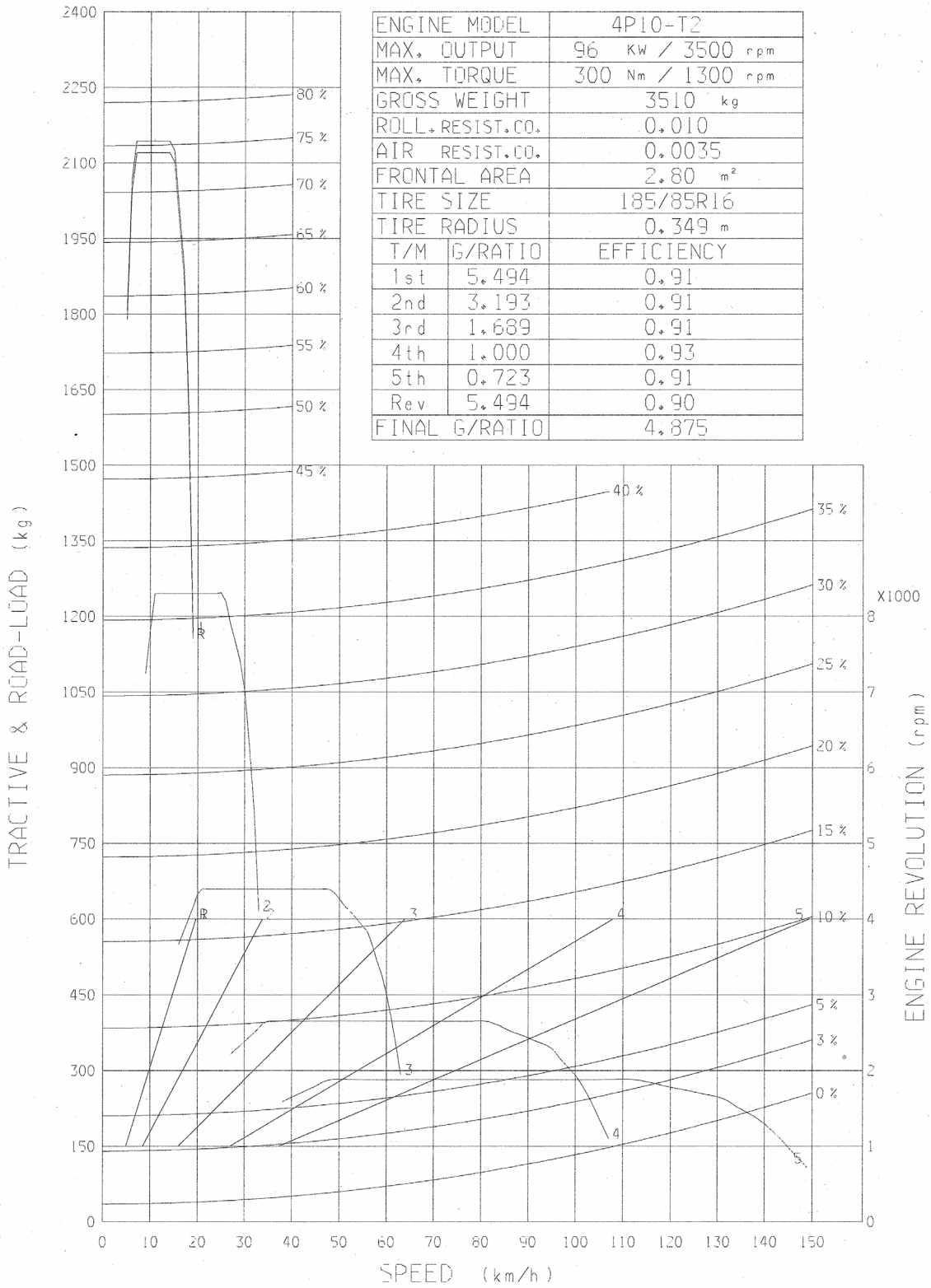


D

FEA21ER 4P10-T2

ENGINE MODEL	4P10-T2
MAX. OUTPUT	96 KW / 3500 rpm
MAX. TORQUE	300 Nm / 1300 rpm
GROSS WEIGHT	3510 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	2.80 m²
TIRE SIZE	185/85R16
TIRE RADIUS	0.349 m

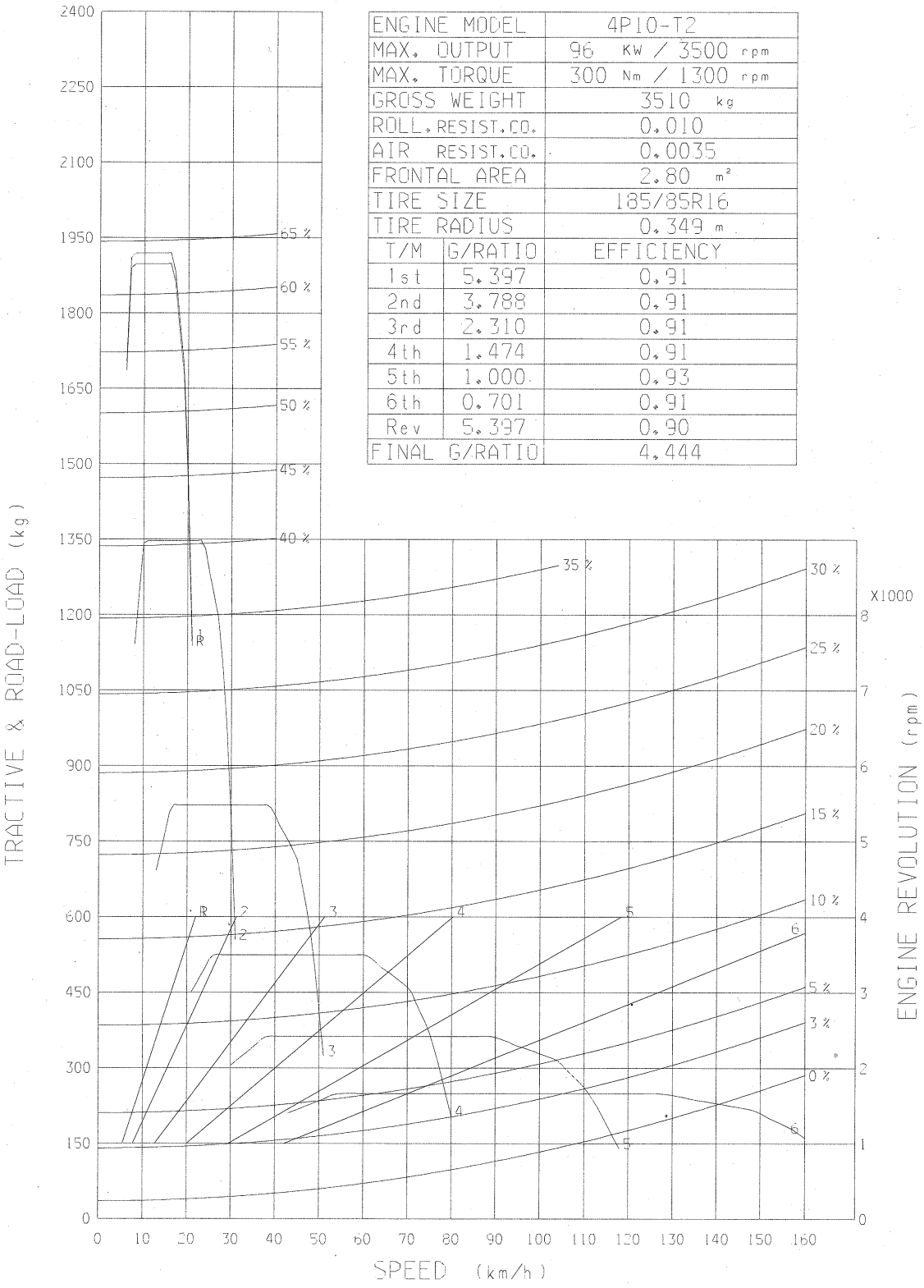
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
FINAL G/RATIO		4.875



10.3 Performance curve

FEA21CR 4P10-T2

ENGINE MODEL		4P10-T2
MAX. OUTPUT		96 KW / 3500 rpm
MAX. TORQUE		300 Nm / 1300 rpm
GROSS WEIGHT		3510 kg
ROLL. RESIST. CO.		0.010
AIR RESIST. CO.		0.0035
FRONTAL AREA		2.80 m²
TIRE SIZE		185/85R16
TIRE RADIUS		0.349 m
T/M	G/RATIO	EFFICIENCY
1st	5.397	0.91
2nd	3.788	0.91
3rd	2.310	0.91
4th	1.474	0.91
5th	1.000	0.93
6th	0.701	0.91
Rev	5.397	0.90
FINAL G/RATIO		4.444

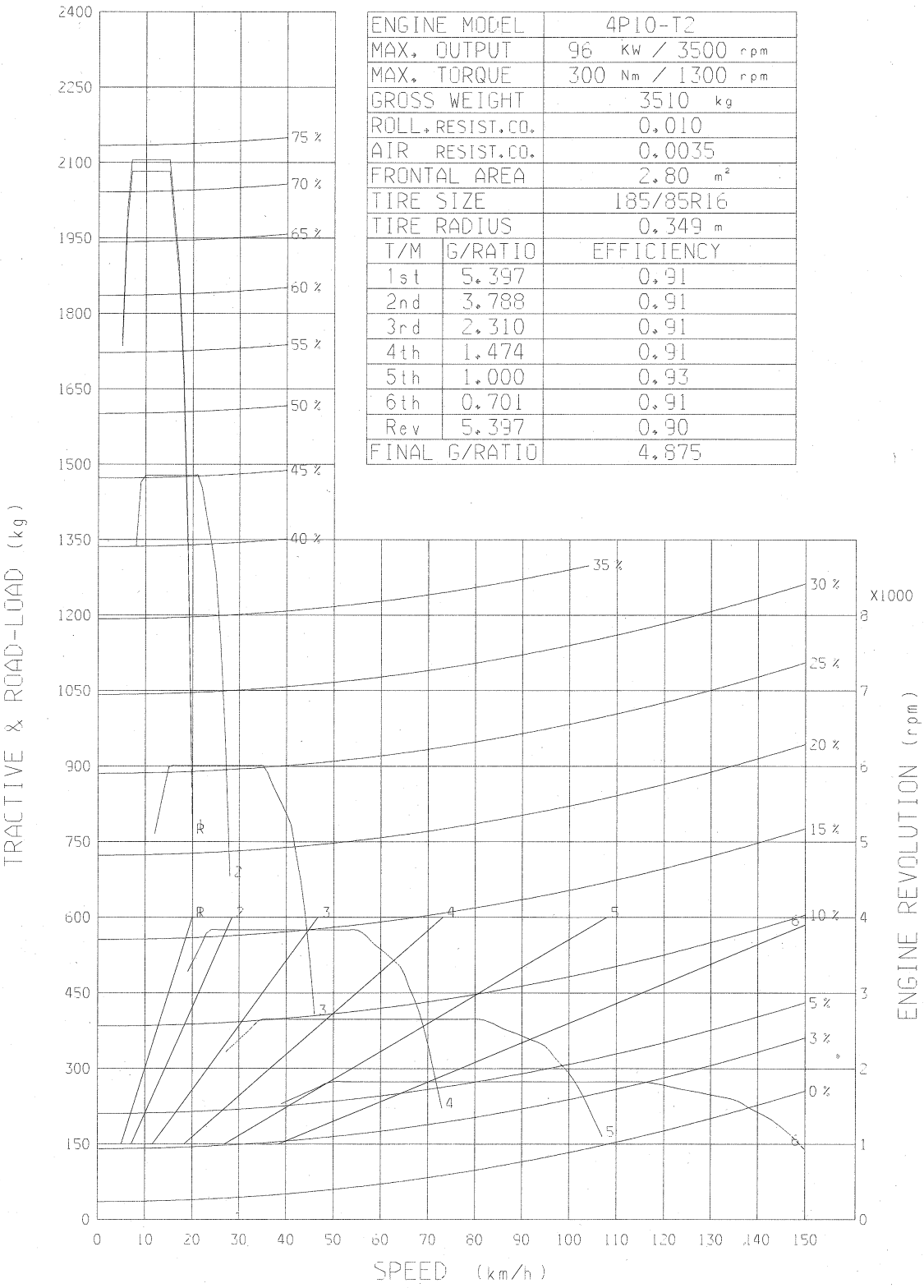


10.3 Performance curve

FE#21CR 4P10-T2

ENGINE MODEL	4P10-T2
MAX. OUTPUT	96 KW / 3500 rpm
MAX. TORQUE	300 Nm / 1300 rpm
GROSS WEIGHT	3510 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	2.80 m²
TIRE SIZE	185/85R16
TIRE RADIUS	0.349 m

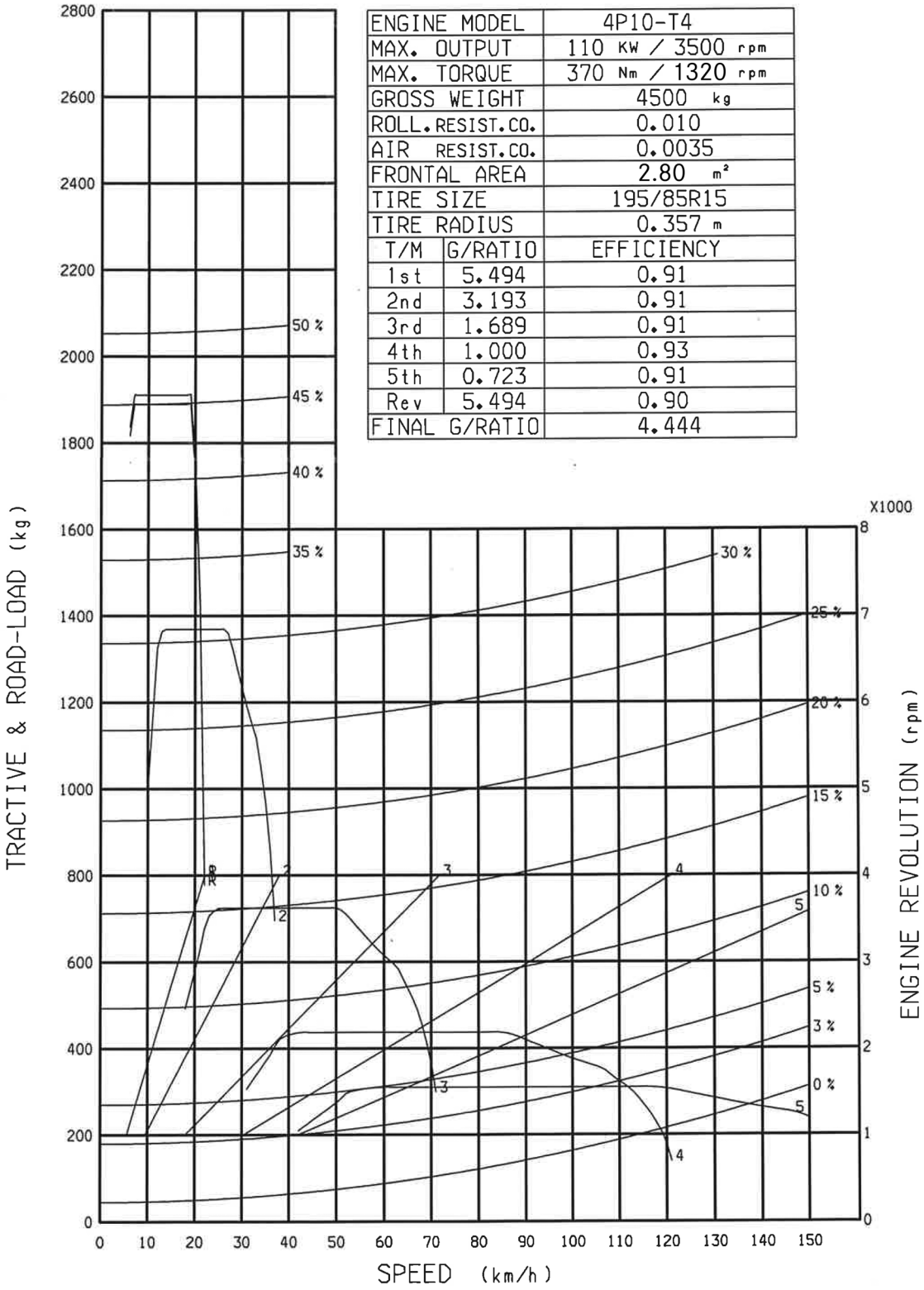
T/M	G/RATIO	EFFICIENCY
1st	5.397	0.91
2nd	3.788	0.91
3rd	2.310	0.91
4th	1.474	0.91
5th	1.000	0.93
6th	0.701	0.91
Rev	5.397	0.90
FINAL G/RATIO		4.875



D

FEA21ER3W 4P10-T4

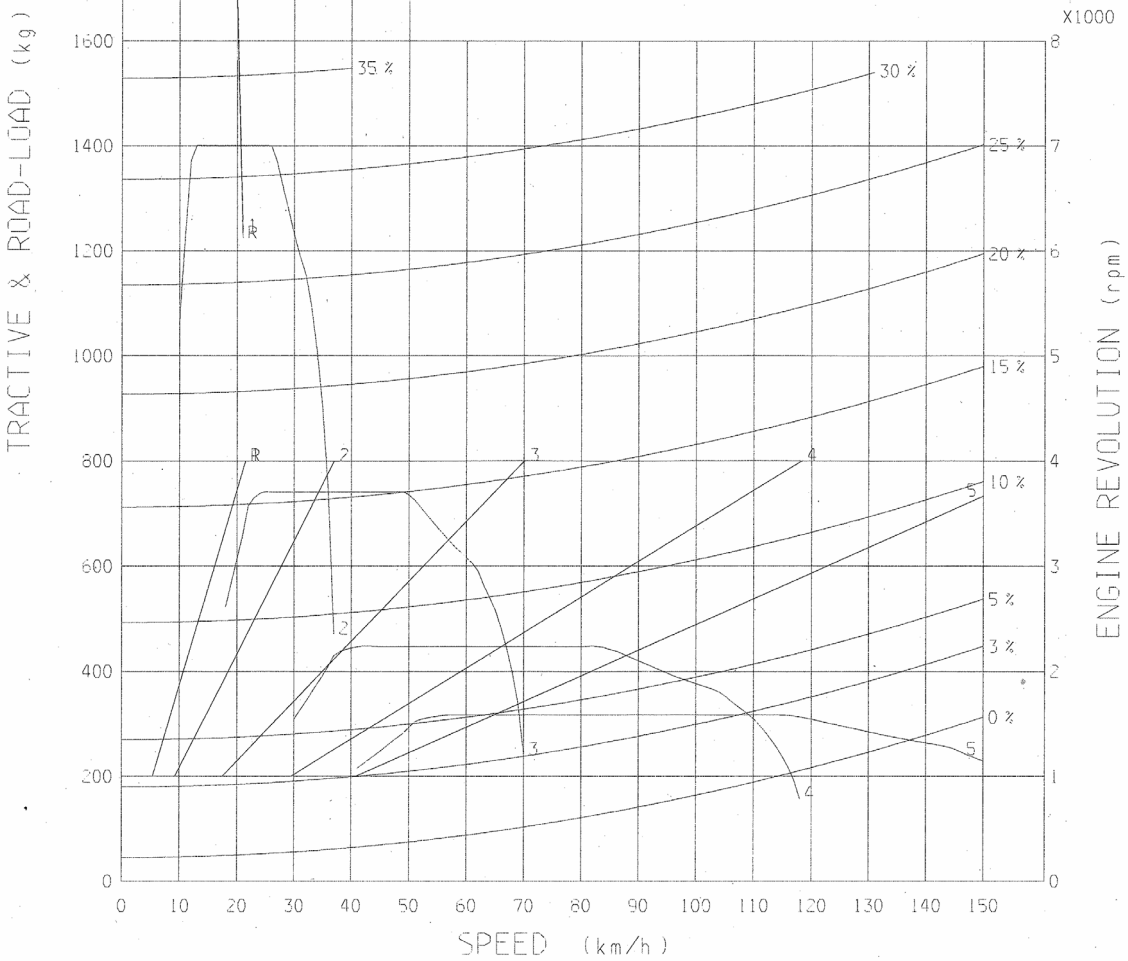
ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		4500 kg
ROLL. RESIST. CO.		0.010
AIR RESIST. CO.		0.0035
FRONTAL AREA		2.80 m²
TIRE SIZE		195/85R15
TIRE RADIUS		0.357 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
FINAL G/RATIO		4.444



10.3 Performance curve

FEB21CR 4P10-T4
FEB21ER

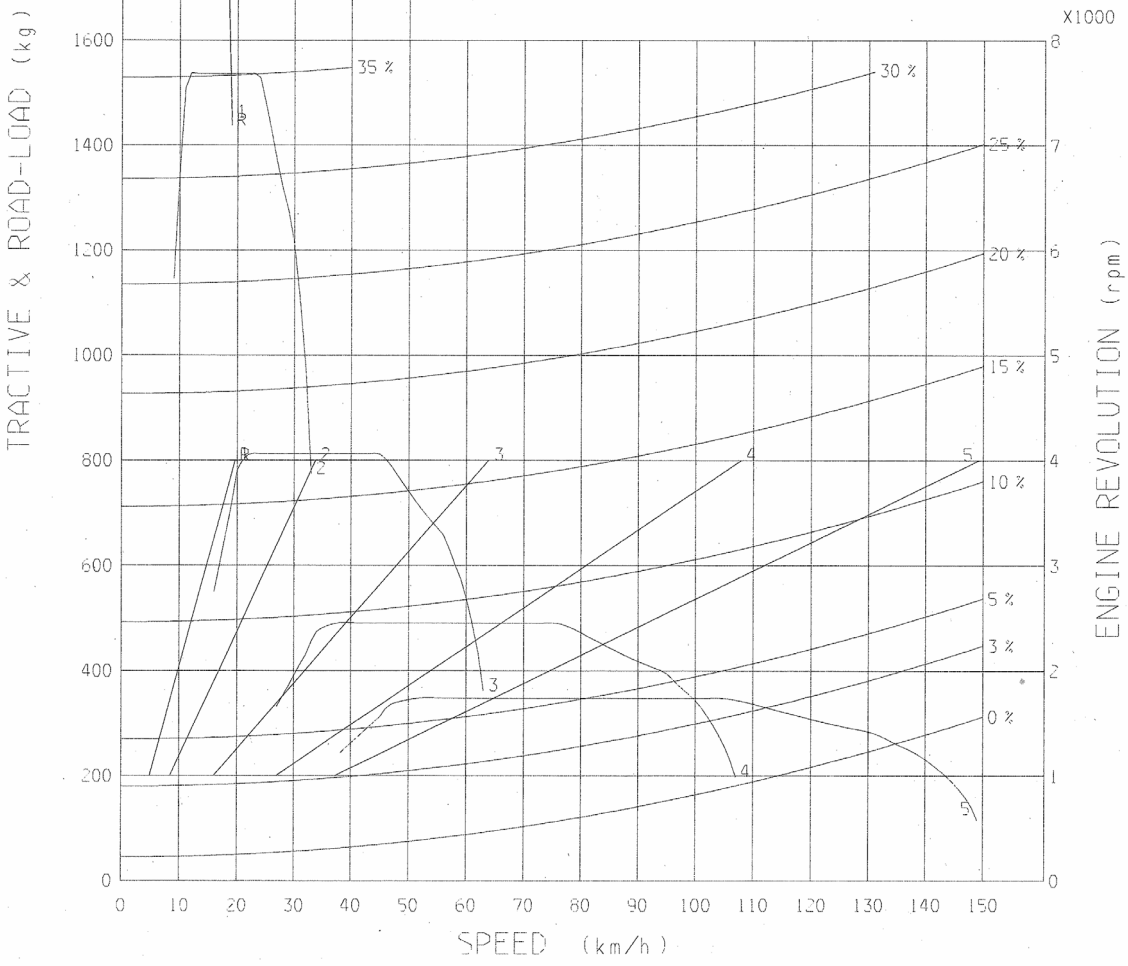
ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		4500 kg
ROLL. RESIST. CO.		0.010
AIR RESIST. CO.		0.0035
FRONTAL AREA		3.40 m²
TIRE SIZE		185/85R16
TIRE RADIUS		0.349 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
FINAL G/RATIO		4.444



10.3 Performance curve

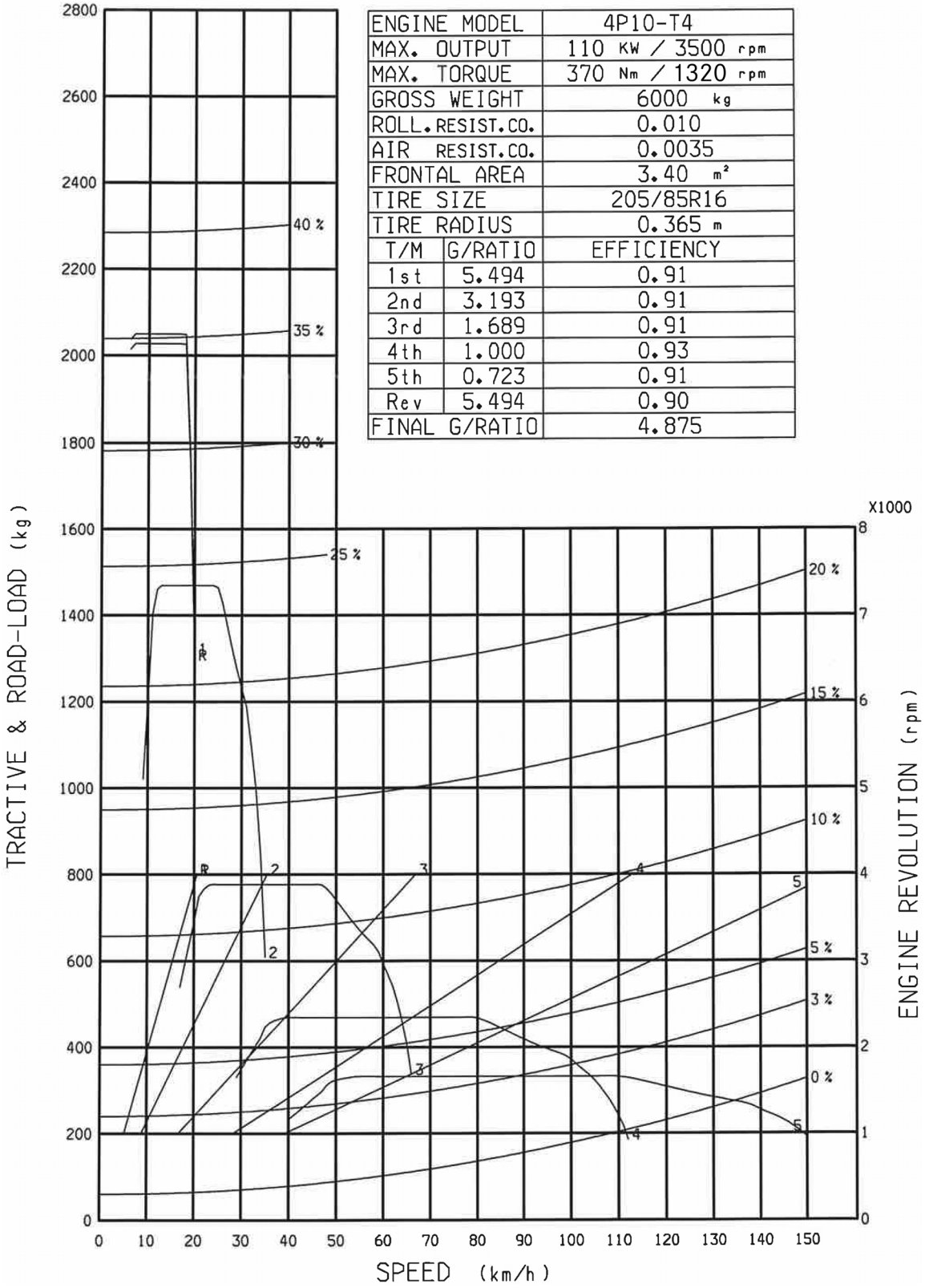
FEB21CR 4P10-T4
FEB21ER

ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		4500 kg
ROLL. RESIST. CO.		0.010
AIR RESIST. CO.		0.0035
FRONTAL AREA		3.40 m²
TIRE SIZE		185/85R16
TIRE RADIUS		0.349 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
FINAL G/RATIO		4.875



FEB51ER 4P10-T4
FEB51GR

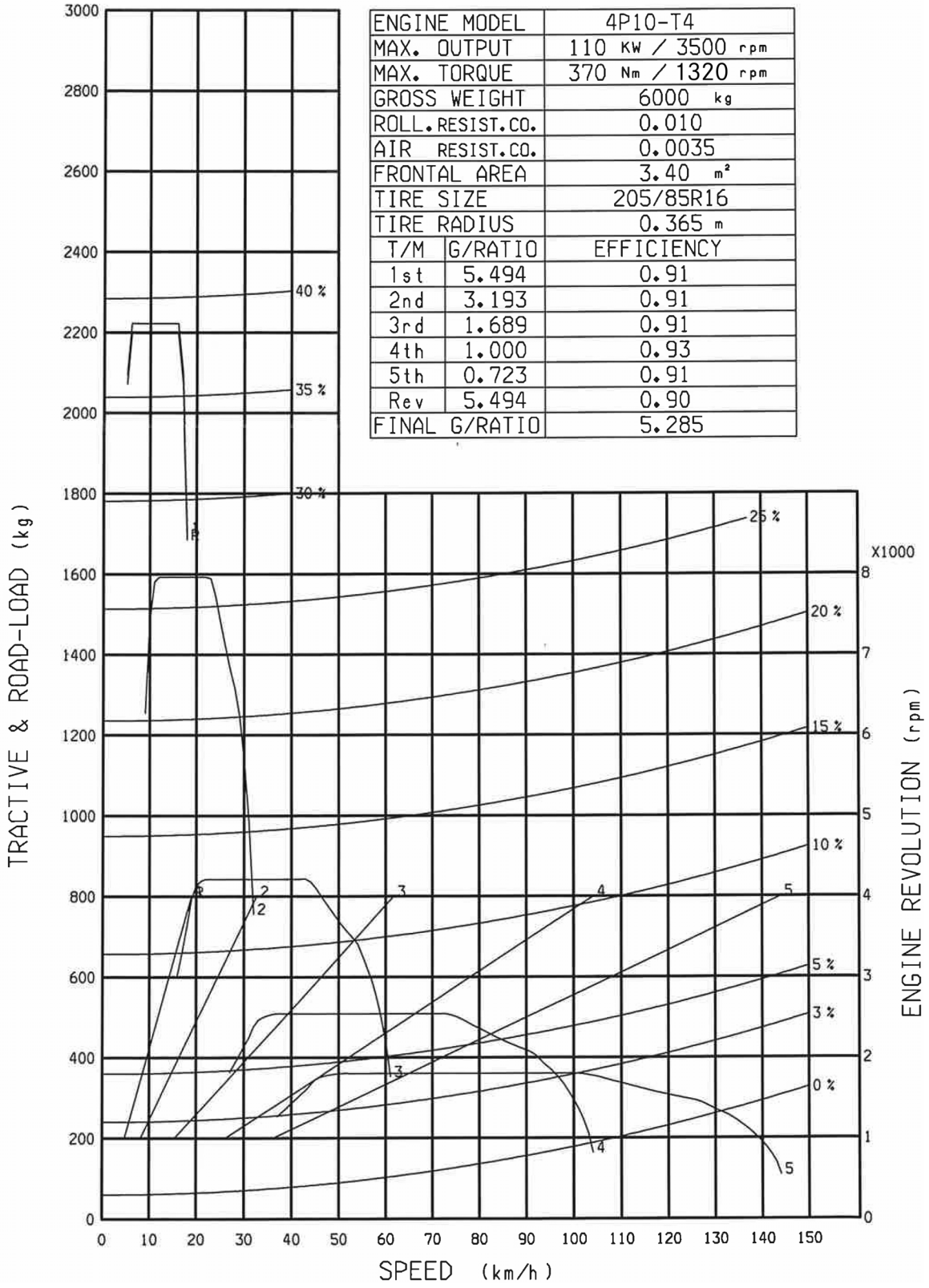
ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		6000 kg
ROLL. RESIST. CO.		0.010
AIR RESIST. CO.		0.0035
FRONTAL AREA		3.40 m²
TIRE SIZE		205/85R16
TIRE RADIUS		0.365 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
FINAL G/RATIO		4.875



10.3 Performance curve

FEB51ER 4P10-T4
FEB51GR

ENGINE MODEL	4P10-T4
MAX. OUTPUT	110 KW / 3500 rpm
MAX. TORQUE	370 Nm / 1320 rpm
GROSS WEIGHT	6000 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	3.40 m²
TIRE SIZE	205/85R16
TIRE RADIUS	0.365 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
FINAL G/RATIO		5.285

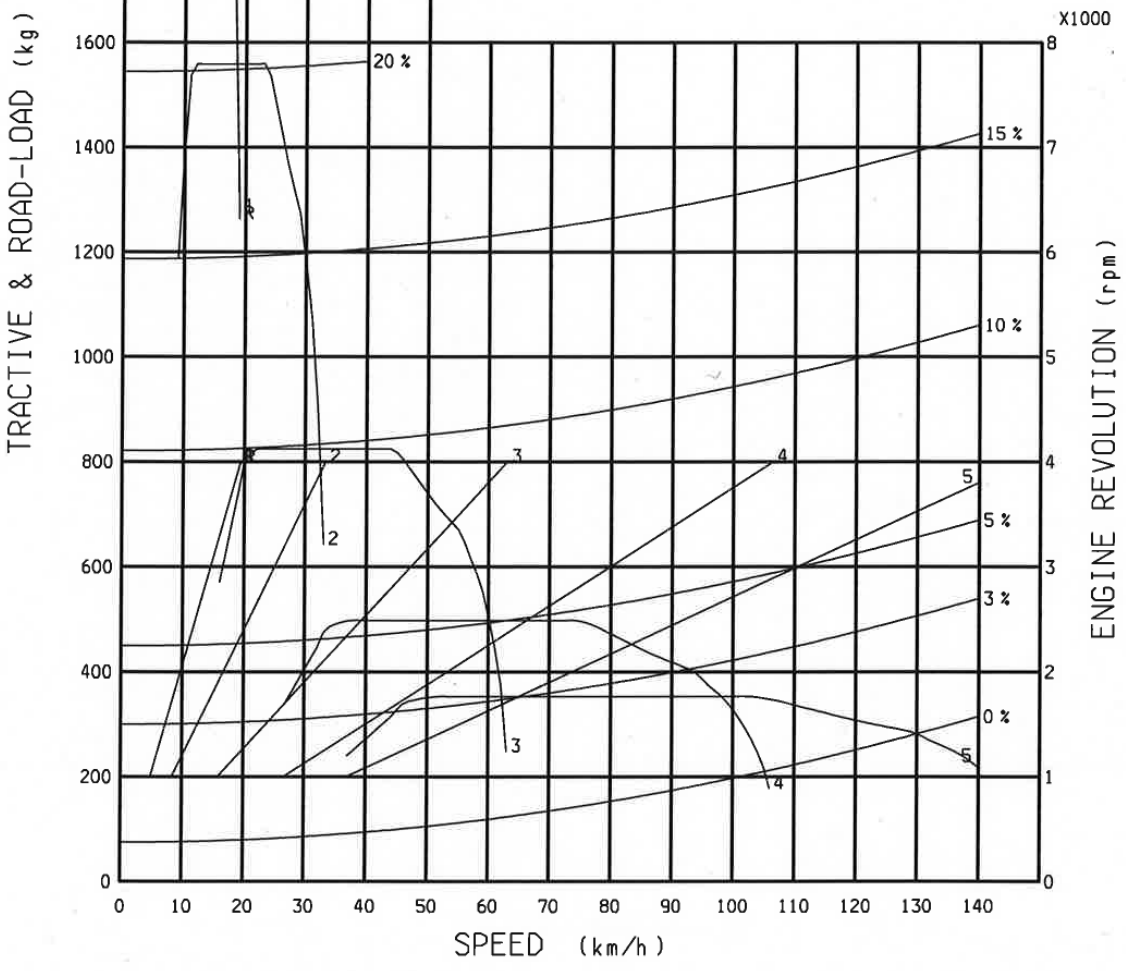


D

FEB71GR 4P10-T4

ENGINE MODEL	4P10-T4
MAX. OUTPUT	110 KW / 3500 rpm
MAX. TORQUE	370 Nm / 1320 rpm
GROSS WEIGHT	7500 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	3.50 m²
TIRE SIZE	215/75R17.5
TIRE RADIUS	0.373 m

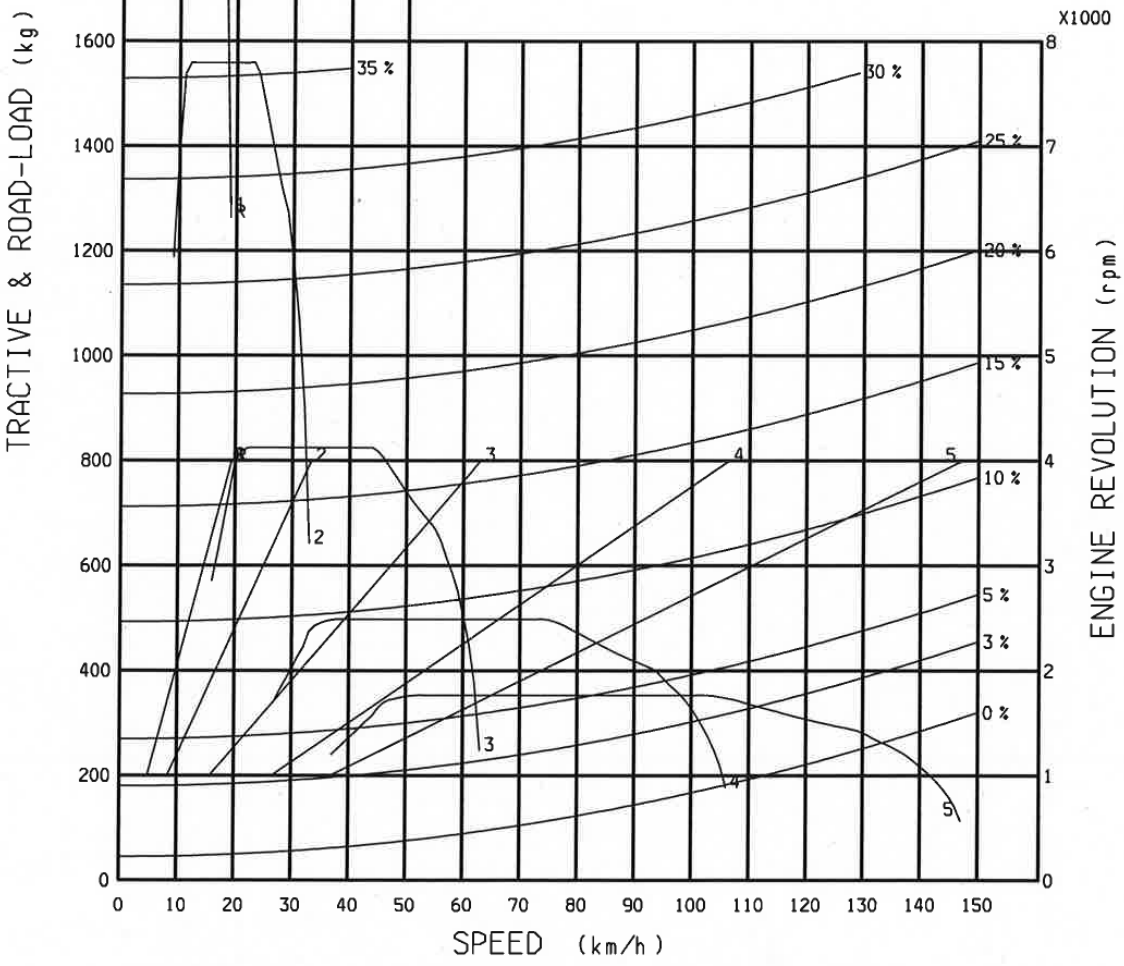
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
FINAL G/RATIO		5.285



D

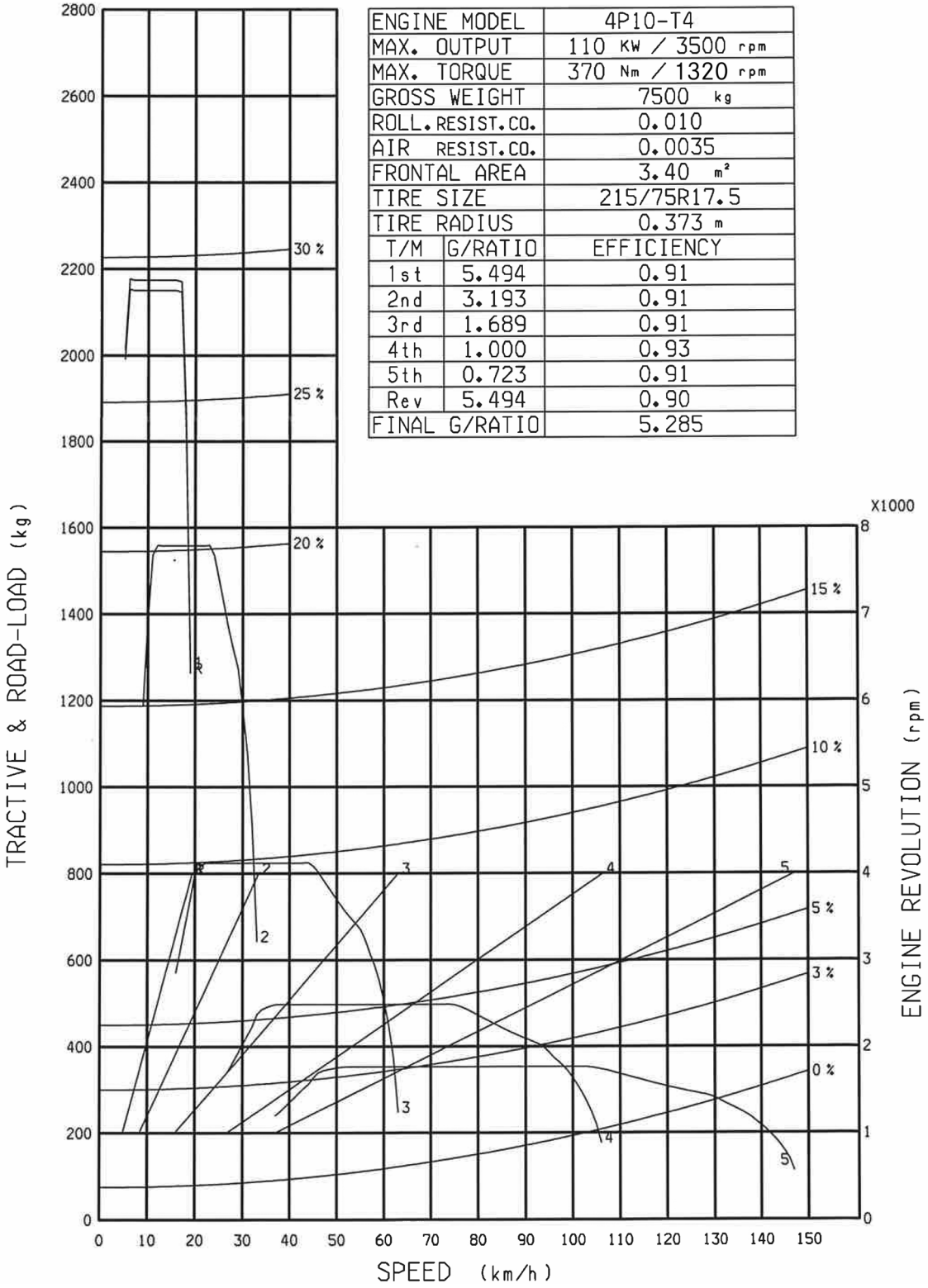
FEB71GR 4P10-T4

ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		4500 kg
ROLL. RESIST. CO.		0.010
AIR RESIST. CO.		0.0035
FRONTAL AREA		3.50 m²
TIRE SIZE		215/75R17.5
TIRE RADIUS		0.373 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
FINAL G/RATIO		5.285



FEC71ER 4P10-T4

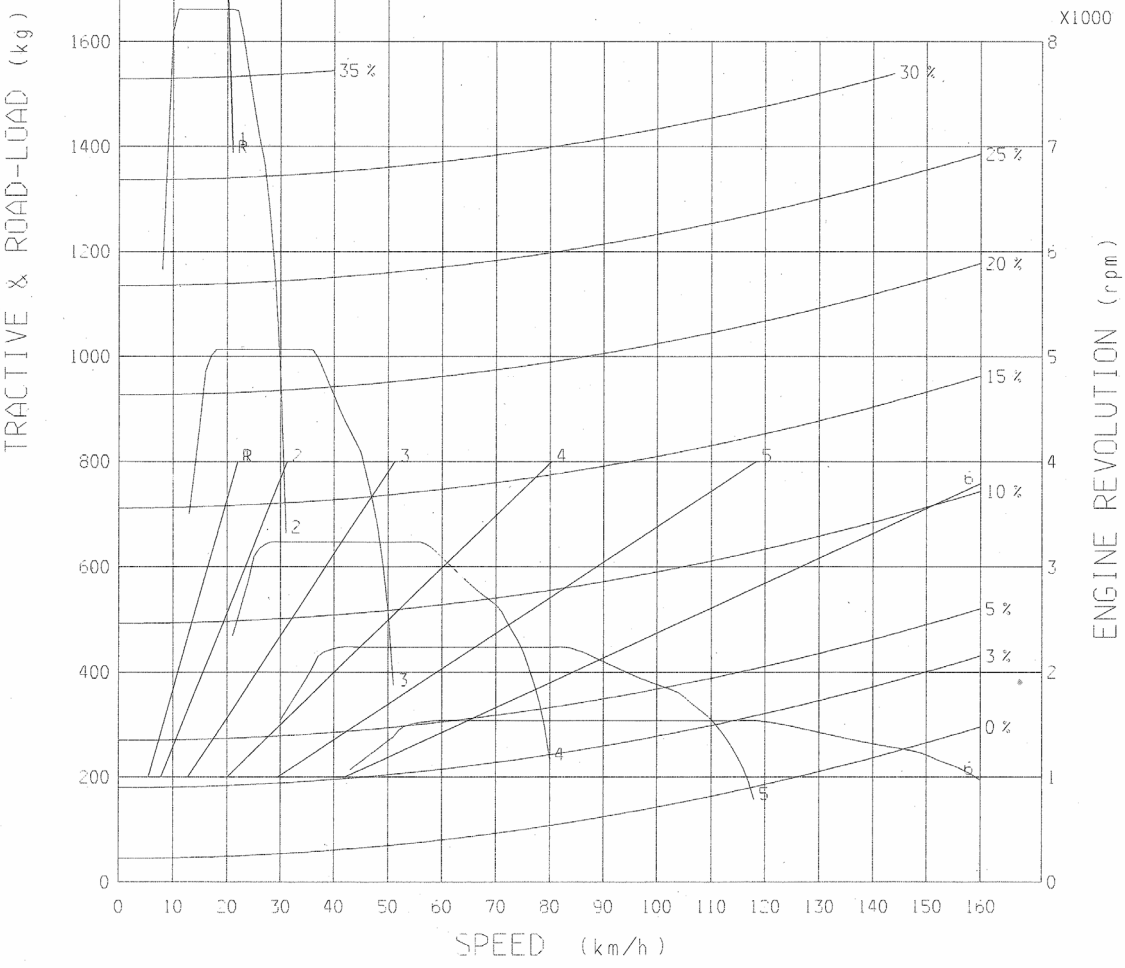
ENGINE MODEL	4P10-T4
MAX. OUTPUT	110 KW / 3500 rpm
MAX. TORQUE	370 Nm / 1320 rpm
GROSS WEIGHT	7500 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	3.40 m²
TIRE SIZE	215/75R17.5
TIRE RADIUS	0.373 m
T/M G/RATIO	EFFICIENCY
1st 5.494	0.91
2nd 3.193	0.91
3rd 1.689	0.91
4th 1.000	0.93
5th 0.723	0.91
Rev 5.494	0.90
FINAL G/RATIO	5.285



10.3 Performance curve

FEA21CR 4P10-T4
FEA21ER

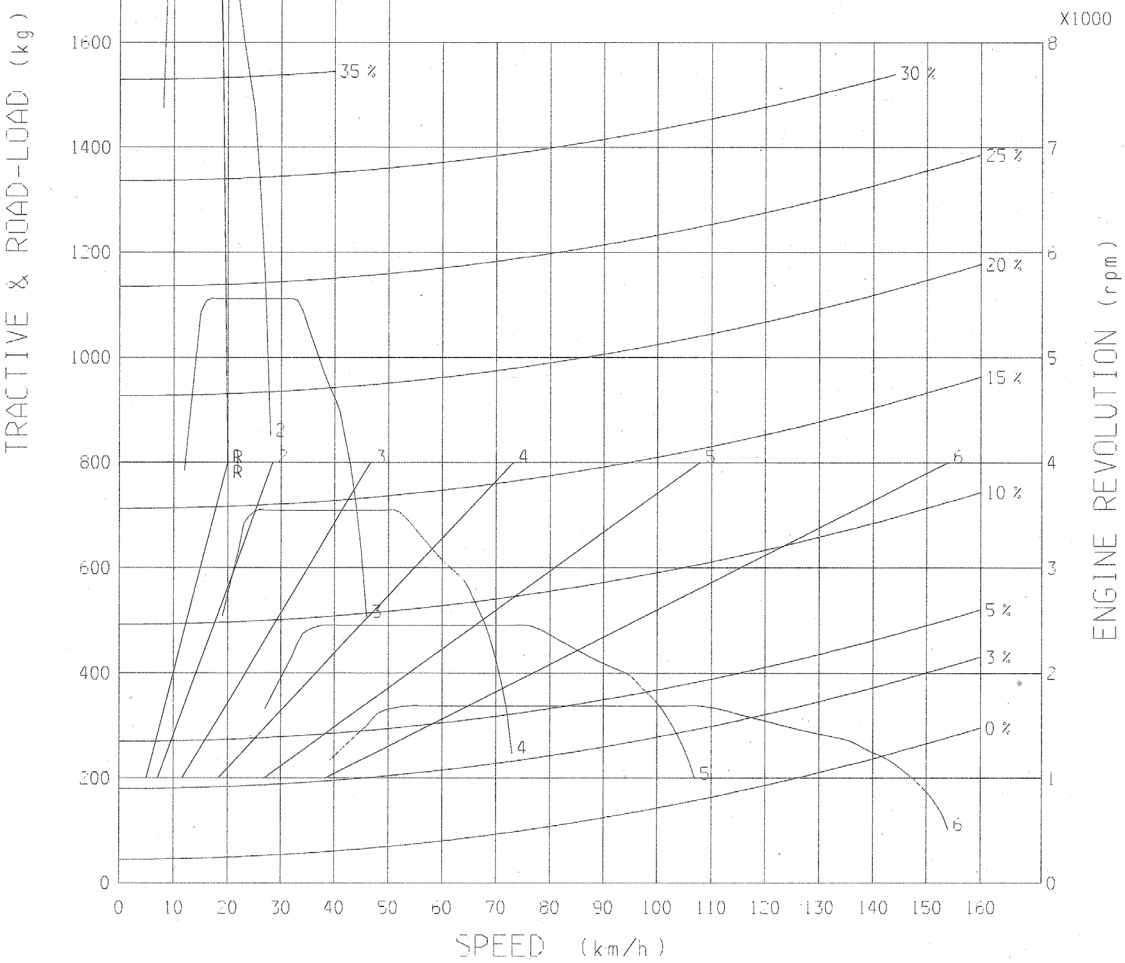
ENGINE MODEL	4P10-T4
MAX. OUTPUT	110 KW / 3500 rpm
MAX. TORQUE	370 Nm / 1320 rpm
GROSS WEIGHT	4500 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	2.80 m²
TIRE SIZE	185/85R16
TIRE RADIUS	0.349 m
T/M G/RATIO	EFFICIENCY
1st 5.397	0.91
2nd 3.788	0.91
3rd 2.310	0.91
4th 1.474	0.91
5th 1.000	0.93
6th 0.701	0.91
Rev 5.397	0.90
FINAL G/RATIO	4.444



10.3 Performance curve

FEA21CR 4P10-T4
FEA21ER

ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		4500 kg
ROLL. RESIST.CO.		0.010
AIR RESIST.CO.		0.0035
FRONTAL AREA		2.80 m²
TIRE SIZE		185/85R16
TIRE RADIUS		0.349 m
T/M	G/RATIO	EFFICIENCY
1st	5.397	0.91
2nd	3.788	0.91
3rd	2.310	0.91
4th	1.474	0.91
5th	1.000	0.93
6th	0.701	0.91
Rev	5.397	0.90
FINAL G/RATIO		4.875



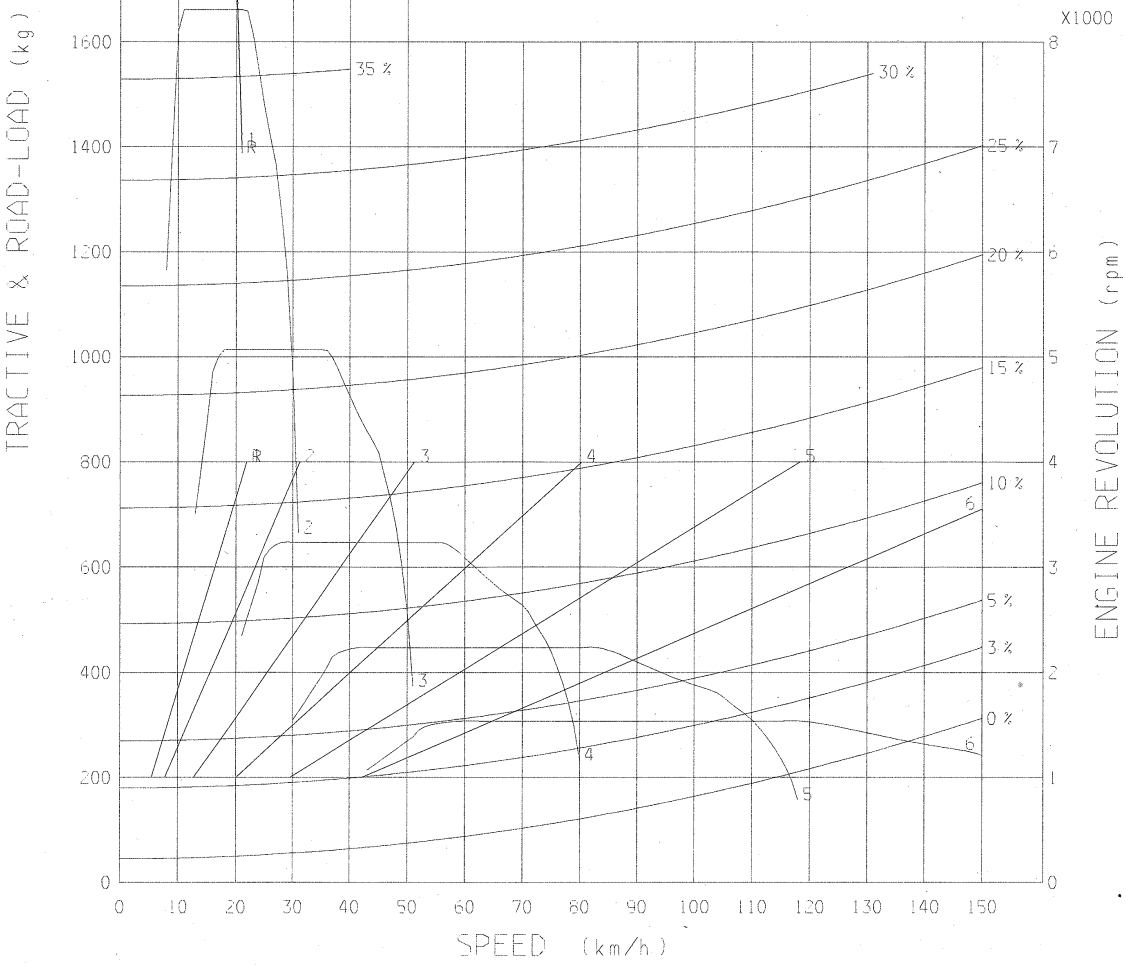
10.3 Performance curve

D

FE82ICR 4P10-T4

ENGINE MODEL	4P10-T4
MAX. OUTPUT	110 KW / 3500 rpm
MAX. TORQUE	370 Nm / 1320 rpm
GROSS WEIGHT	4500 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	3.40 m²
TIRE SIZE	185/85R16
TIRE RADIUS	0.349 m

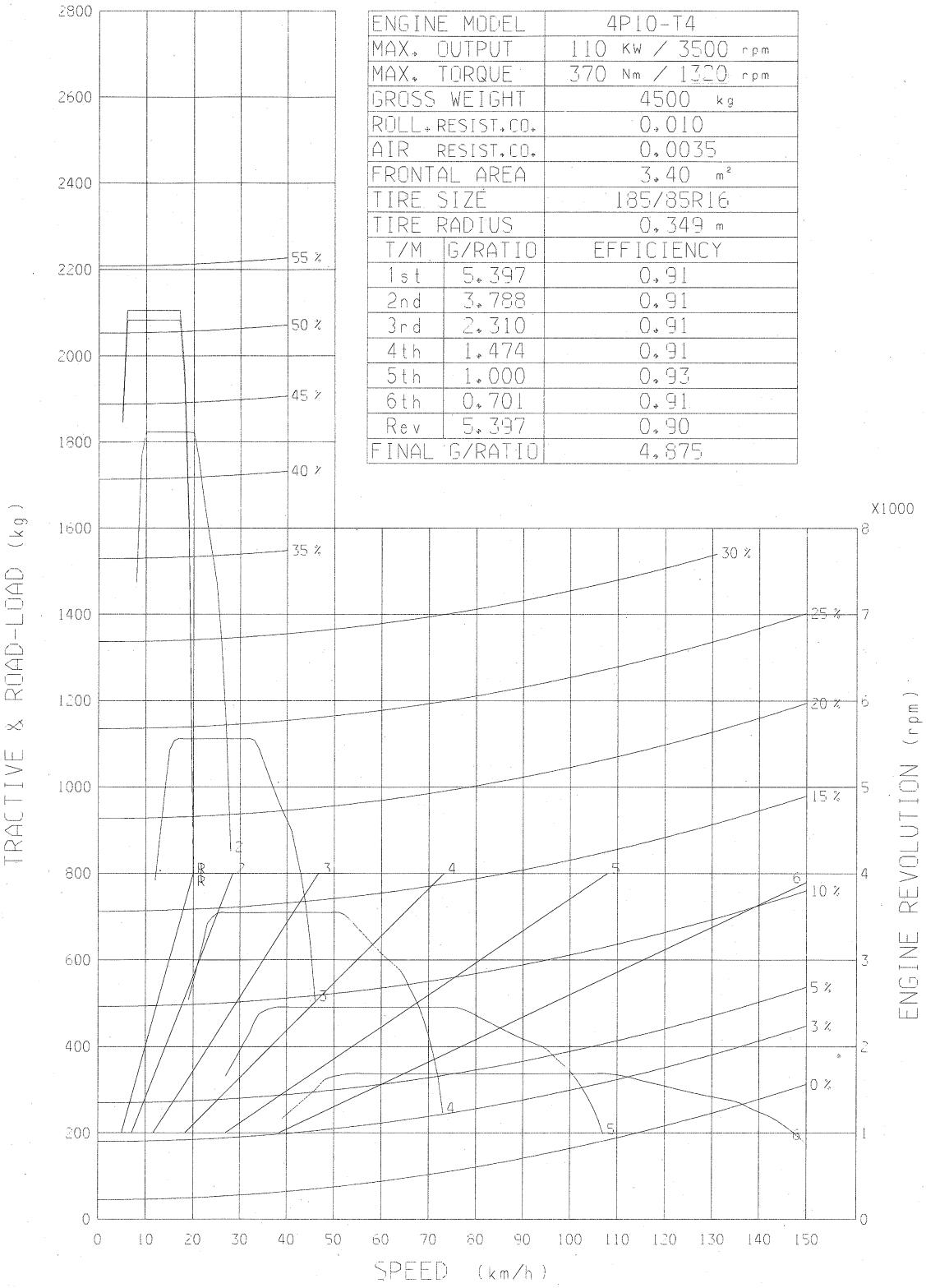
T/M	G/RATIO	EFFICIENCY
1st	5.397	0.91
2nd	3.788	0.91
3rd	2.310	0.91
4th	1.474	0.91
5th	1.000	0.93
6th	0.701	0.91
Rev	5.397	0.90
FINAL G/RATIO		4.444



D

FE821CR 4P10-T4

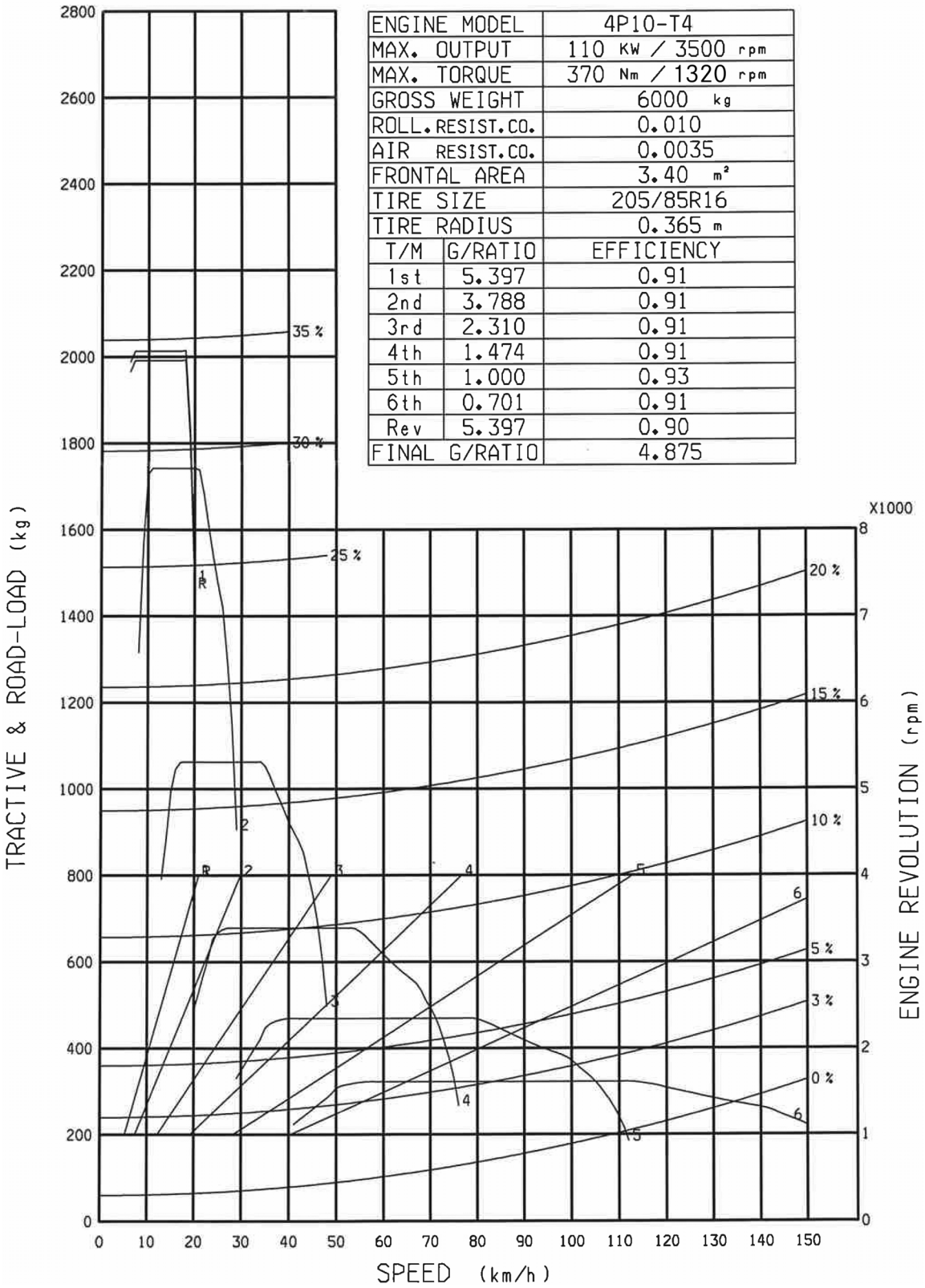
ENGINE MODEL	4P10-T4
MAX. OUTPUT	110 KW / 3500 rpm
MAX. TORQUE	370 Nm / 1320 rpm
GROSS WEIGHT	4500 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	3.40 m²
TIRE SIZE	185/85R16
TIRE RADIUS	0.349 m
T/M G/RATIO	EFFICIENCY
1st 5.397	0.91
2nd 3.788	0.91
3rd 2.310	0.91
4th 1.474	0.91
5th 1.000	0.93
6th 0.701	0.91
Rev 5.397	0.90
FINAL G/RATIO	4.875



10.3 Performance curve

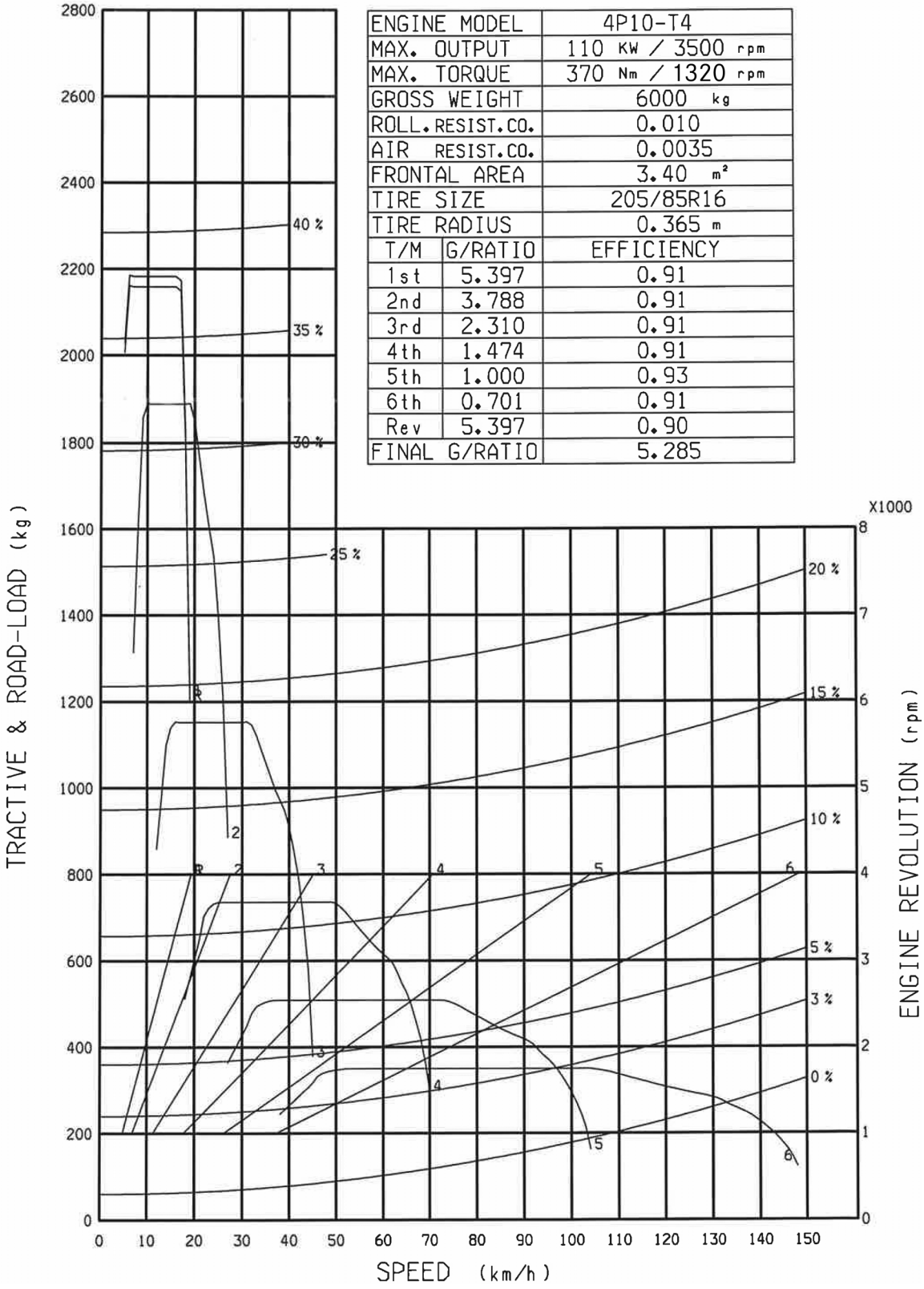
FEB51ER 4P10-T4
FEB51GR

ENGINE MODEL	4P10-T4
MAX. OUTPUT	110 KW / 3500 rpm
MAX. TORQUE	370 Nm / 1320 rpm
GROSS WEIGHT	6000 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	3.40 m²
TIRE SIZE	205/85R16
TIRE RADIUS	0.365 m
T/M G/RATIO	EFFICIENCY
1st 5.397	0.91
2nd 3.788	0.91
3rd 2.310	0.91
4th 1.474	0.91
5th 1.000	0.93
6th 0.701	0.91
Rev 5.397	0.90
FINAL G/RATIO	4.875



FEB51ER 4P10-T4
FEB51GR

ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		6000 kg
ROLL. RESIST. CO.		0.010
AIR RESIST. CO.		0.0035
FRONTAL AREA		3.40 m²
TIRE SIZE		205/85R16
TIRE RADIUS		0.365 m
T/M	G/RATIO	EFFICIENCY
1st	5.397	0.91
2nd	3.788	0.91
3rd	2.310	0.91
4th	1.474	0.91
5th	1.000	0.93
6th	0.701	0.91
Rev	5.397	0.90
FINAL G/RATIO		5.285

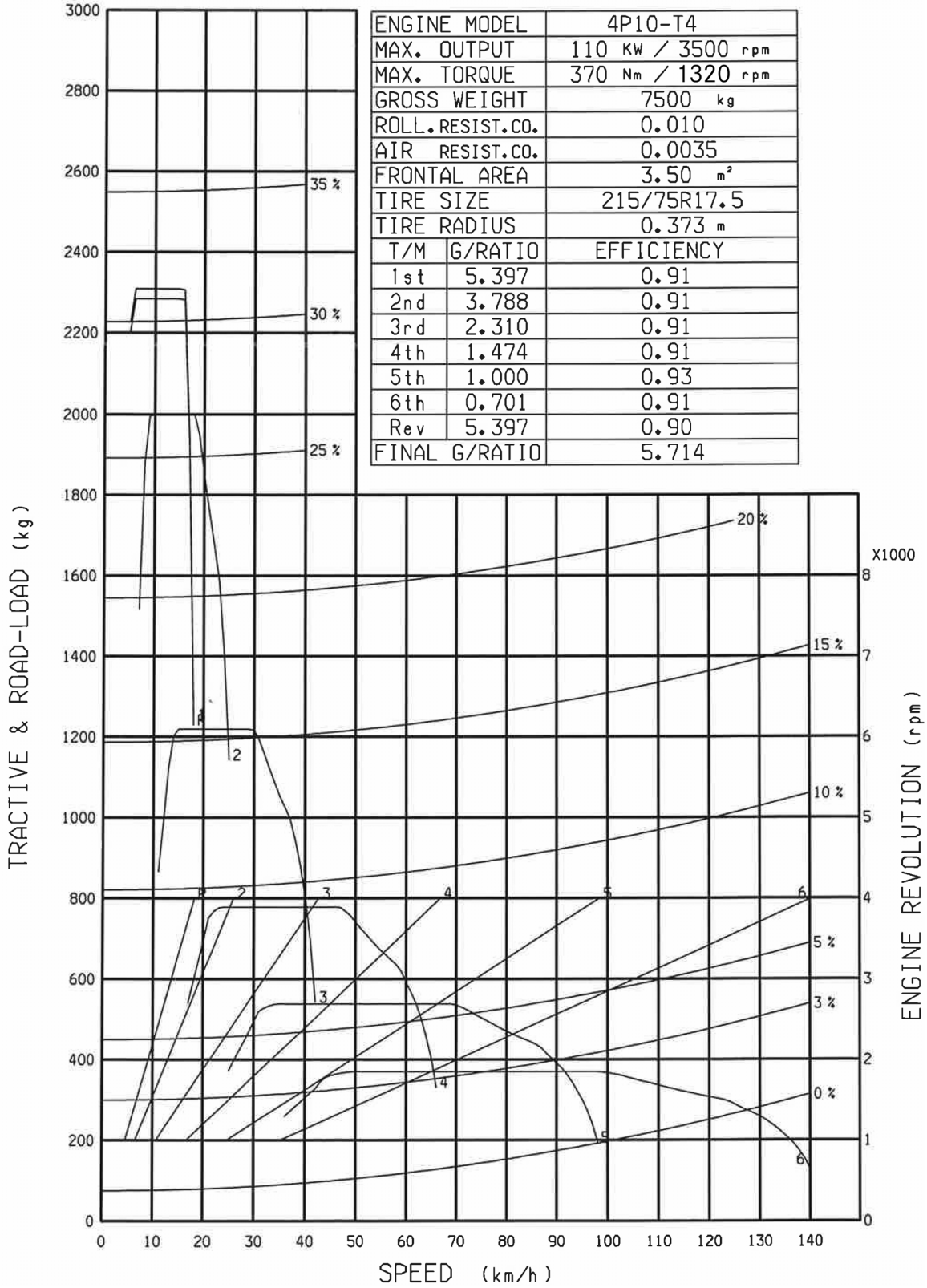


10.3 Performance curve

FEB71ER 4P10-T4
FEC71ER

ENGINE MODEL	4P10-T4
MAX. OUTPUT	110 KW / 3500 rpm
MAX. TORQUE	370 Nm / 1320 rpm
GROSS WEIGHT	7500 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	3.50 m²
TIRE SIZE	215/75R17.5
TIRE RADIUS	0.373 m

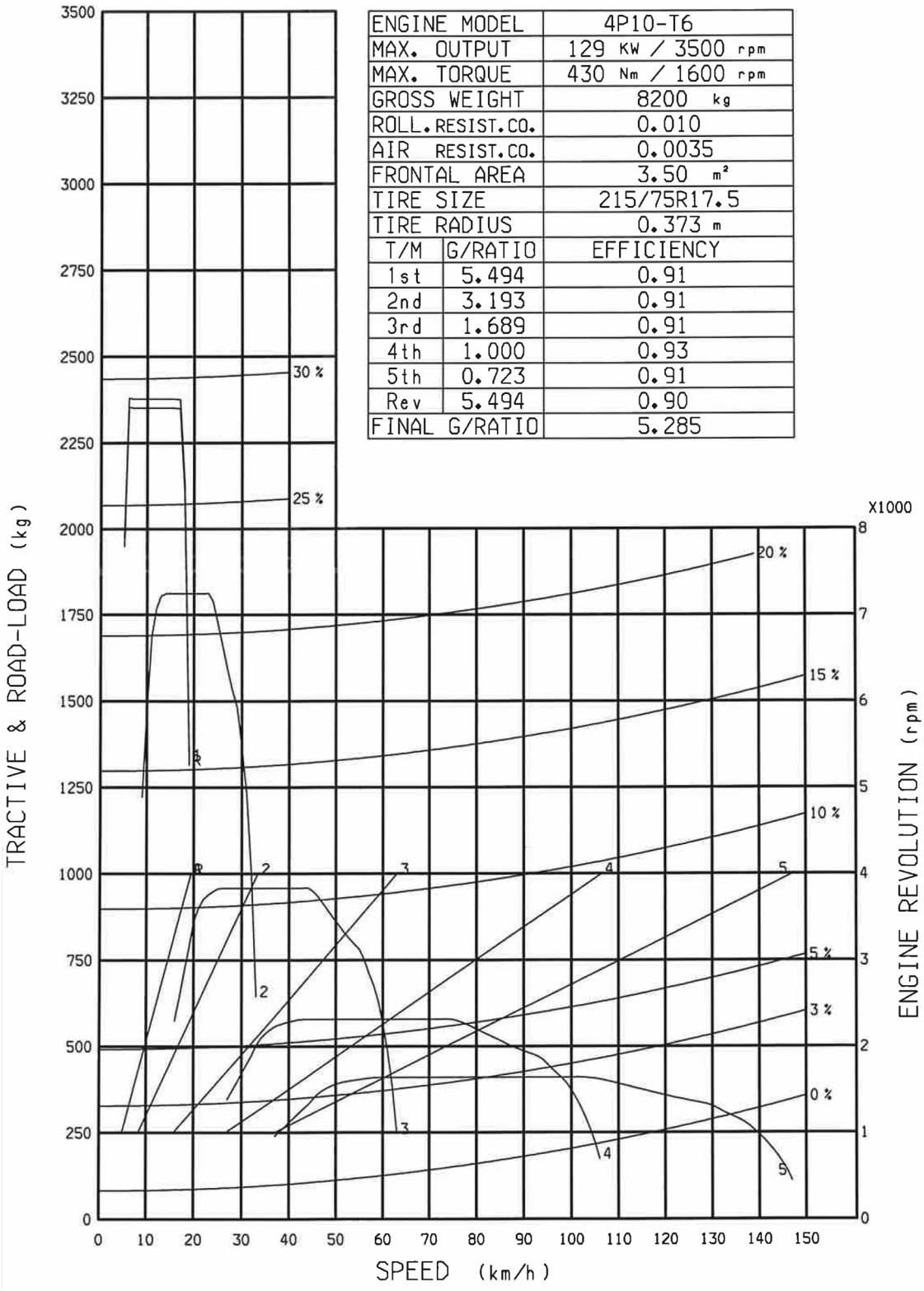
T/M	G/RATIO	EFFICIENCY
1st	5.397	0.91
2nd	3.788	0.91
3rd	2.310	0.91
4th	1.474	0.91
5th	1.000	0.93
6th	0.701	0.91
Rev	5.397	0.90
FINAL G/RATIO		5.714



10.3 Performance curve

FEB91ER 4P10-T6
FEB91GR
FEC91GR
FEC91HR
FEC91KR

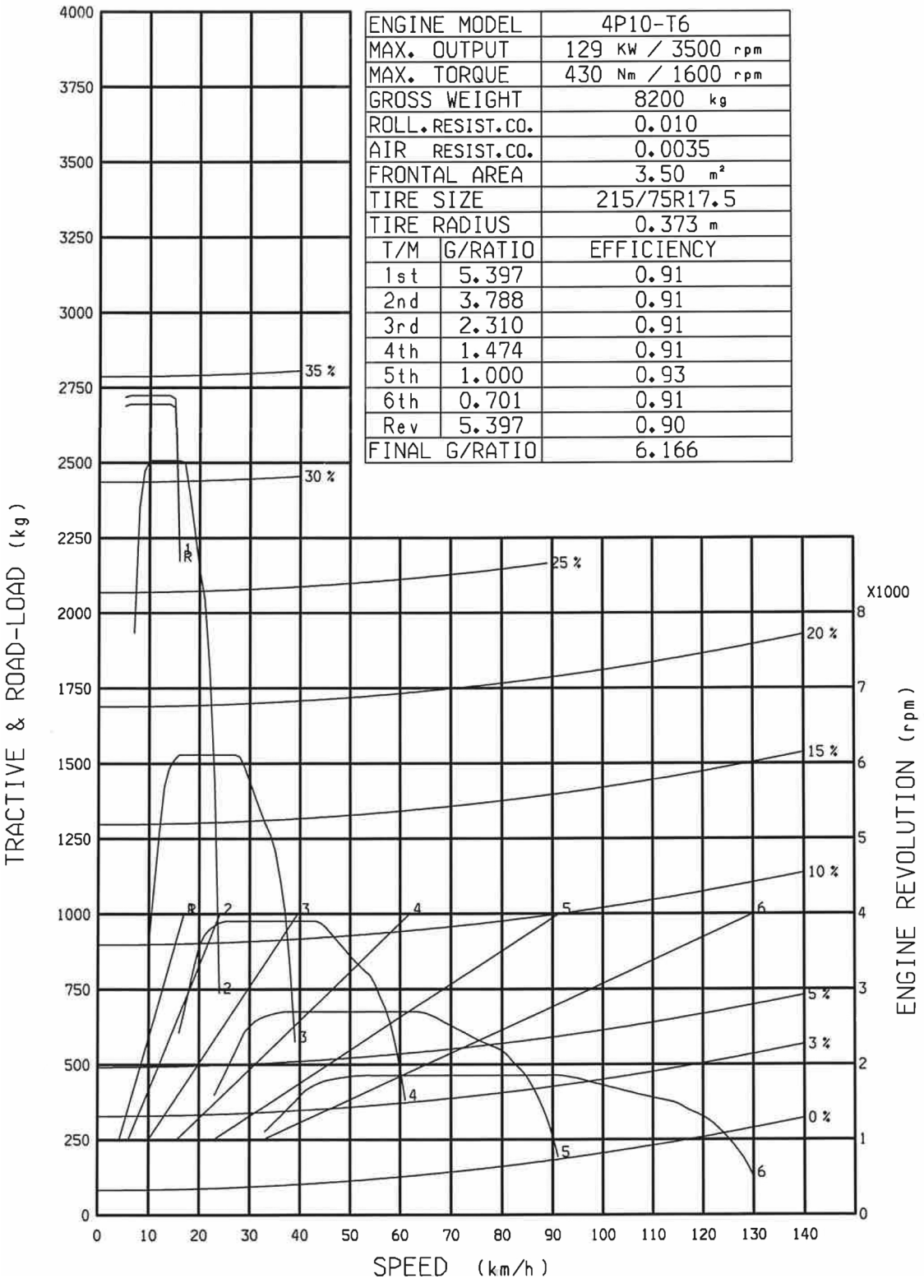
ENGINE MODEL		4P10-T6
MAX. OUTPUT		129 KW / 3500 rpm
MAX. TORQUE		430 Nm / 1600 rpm
GROSS WEIGHT		8200 kg
ROLL. RESIST. CO.		0.010
AIR RESIST. CO.		0.0035
FRONTAL AREA		3.50 m²
TIRE SIZE		215/75R17.5
TIRE RADIUS		0.373 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
FINAL G/RATIO		5.285



FEB91ER
FEB91GR
FEC91GR
FEC91HR
FEC91KR

4P10-T6

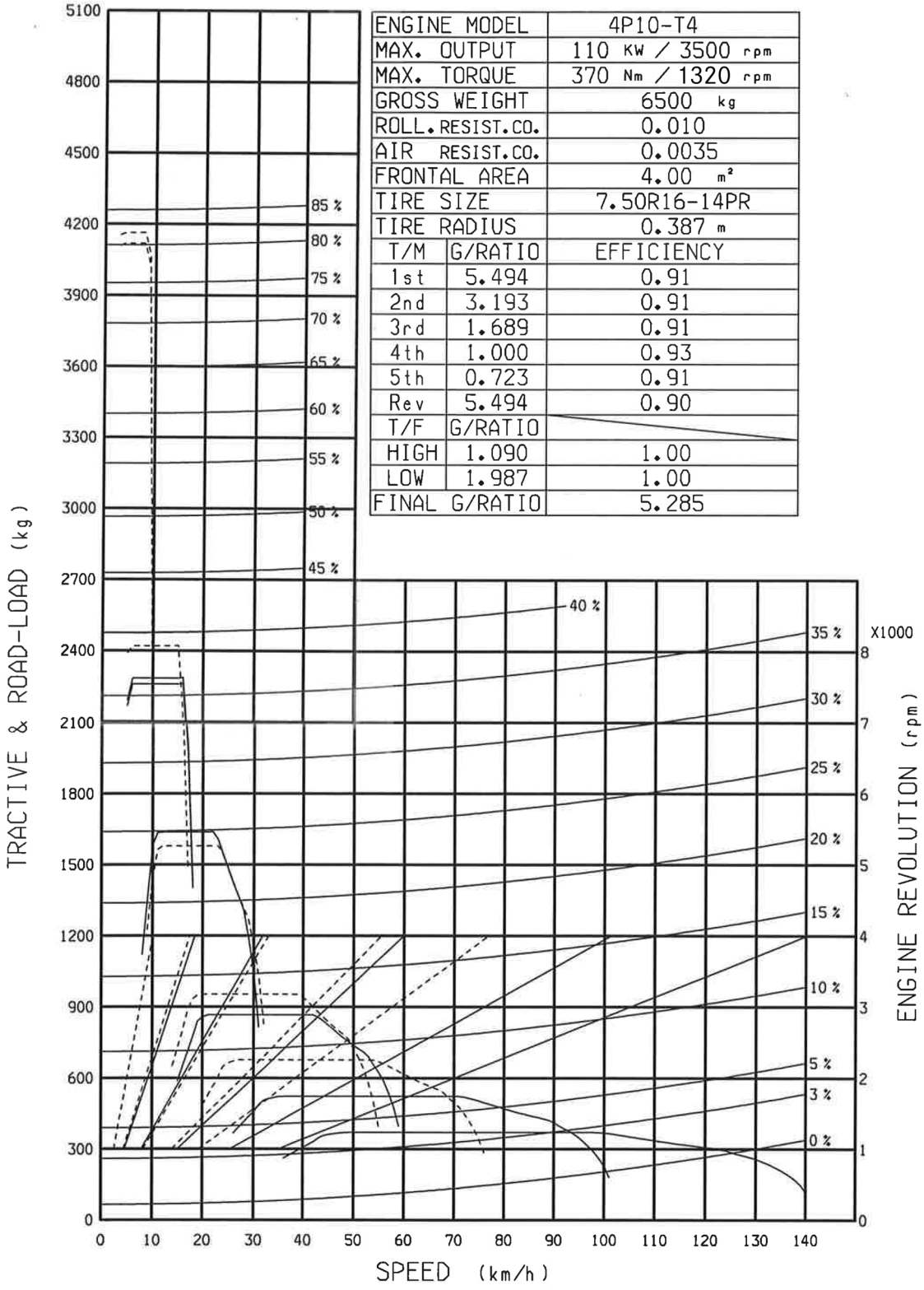
ENGINE MODEL		4P10-T6
MAX. OUTPUT		129 KW / 3500 rpm
MAX. TORQUE		430 Nm / 1600 rpm
GROSS WEIGHT		8200 kg
ROLL. RESIST. CO.		0.010
AIR RESIST. CO.		0.0035
FRONTAL AREA		3.50 m²
TIRE SIZE		215/75R17.5
TIRE RADIUS		0.373 m
T/M	G/RATIO	EFFICIENCY
1st	5.397	0.91
2nd	3.788	0.91
3rd	2.310	0.91
4th	1.474	0.91
5th	1.000	0.93
6th	0.701	0.91
Rev	5.397	0.90
FINAL G/RATIO		6.166



D

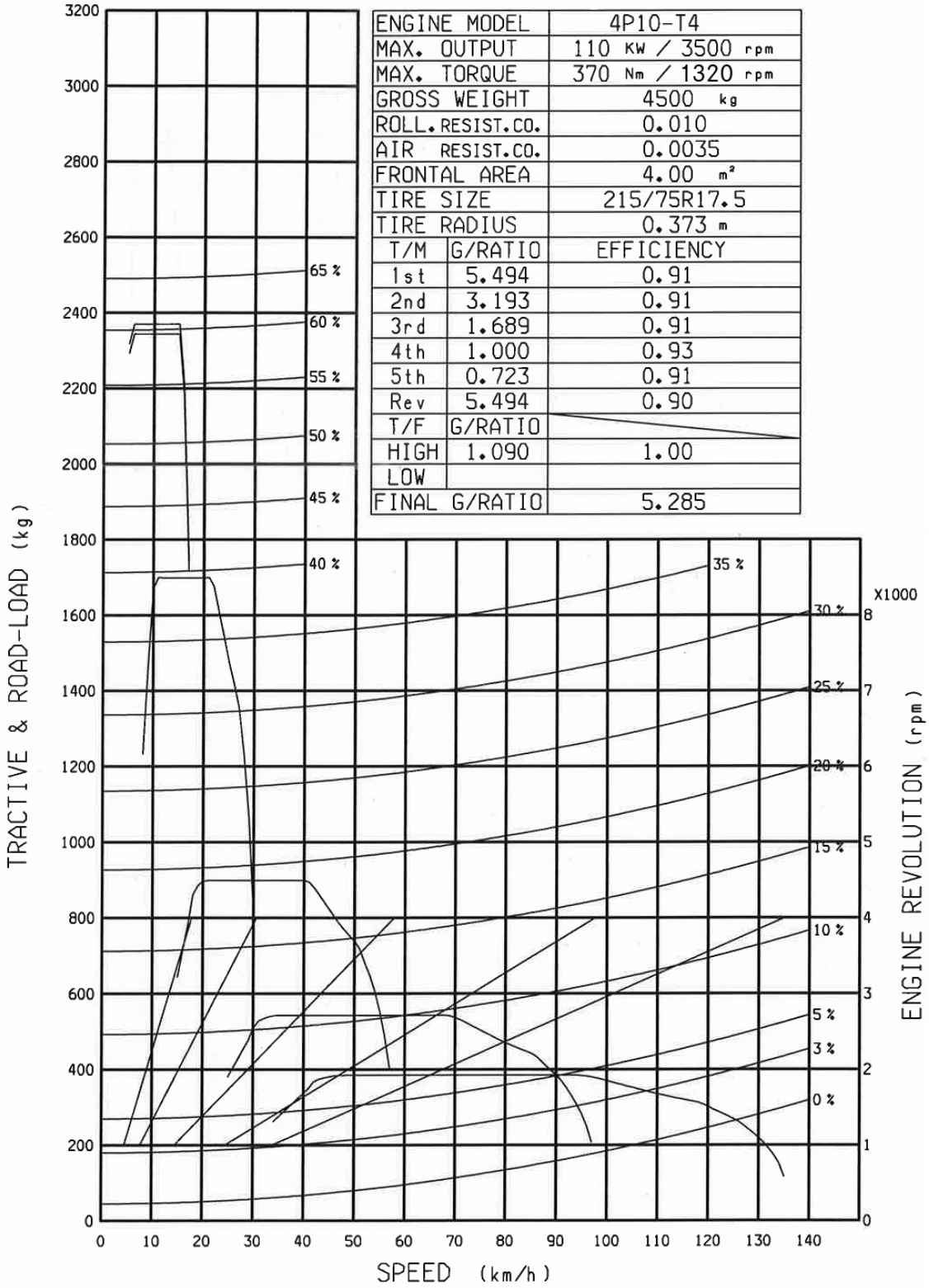
FGB71CR 4P10-T4

ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		6500 kg
ROLL. RESIST.CO.		0.010
AIR RESIST.CO.		0.0035
FRONTAL AREA		4.00 m²
TIRE SIZE		7.50R16-14PR
TIRE RADIUS		0.387 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
T/F	G/RATIO	
HIGH	1.090	1.00
LOW	1.987	1.00
FINAL G/RATIO		5.285



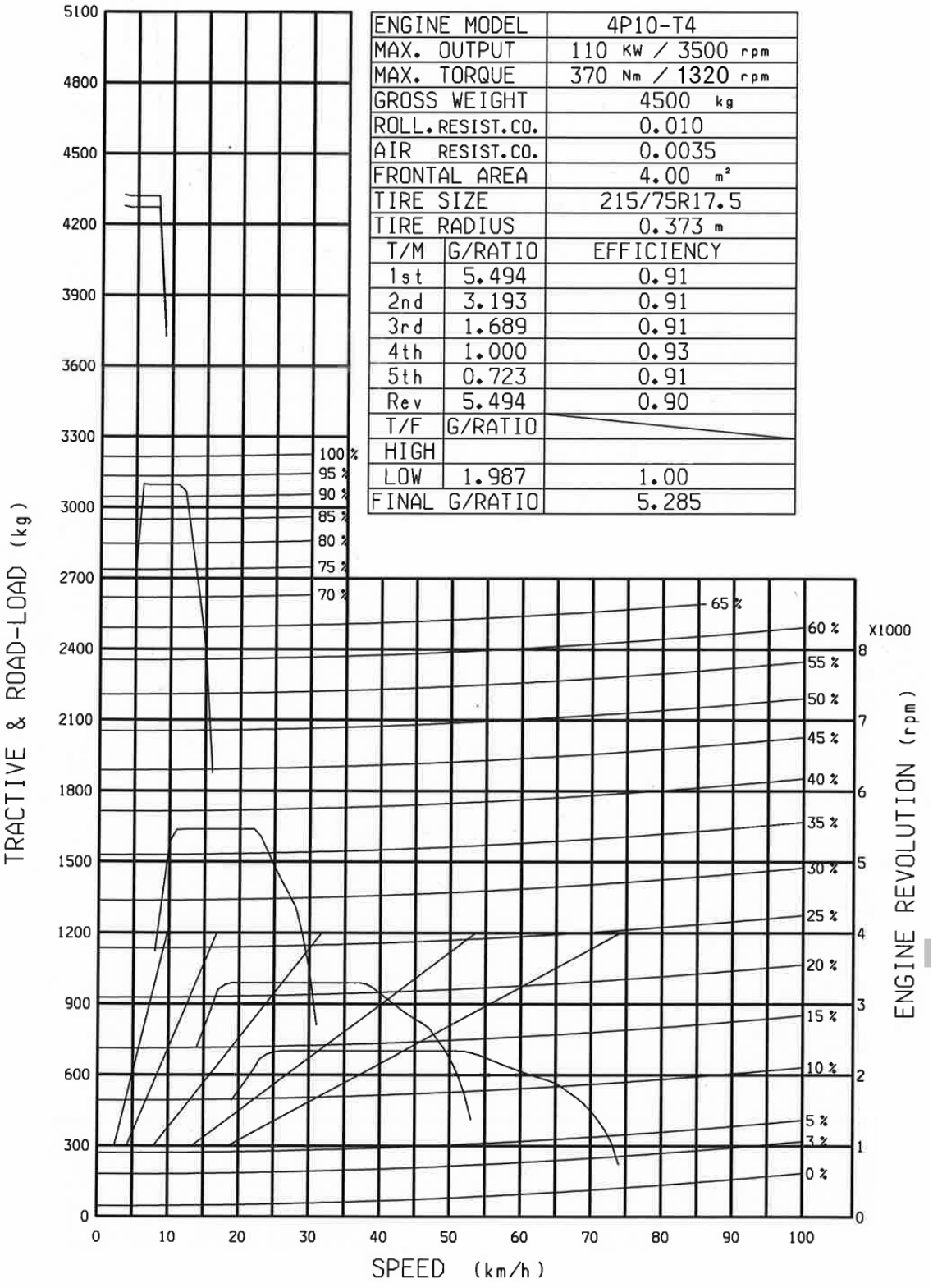
FGB71CR 4P10-T4
FGB71ER

ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		4500 kg
ROLL. RESIST.CO.		0.010
AIR RESIST.CO.		0.0035
FRONTAL AREA		4.00 m²
TIRE SIZE		215/75R17.5
TIRE RADIUS		0.373 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
T/F	G/RATIO	
HIGH	1.090	1.00
LOW		
FINAL G/RATIO		5.285



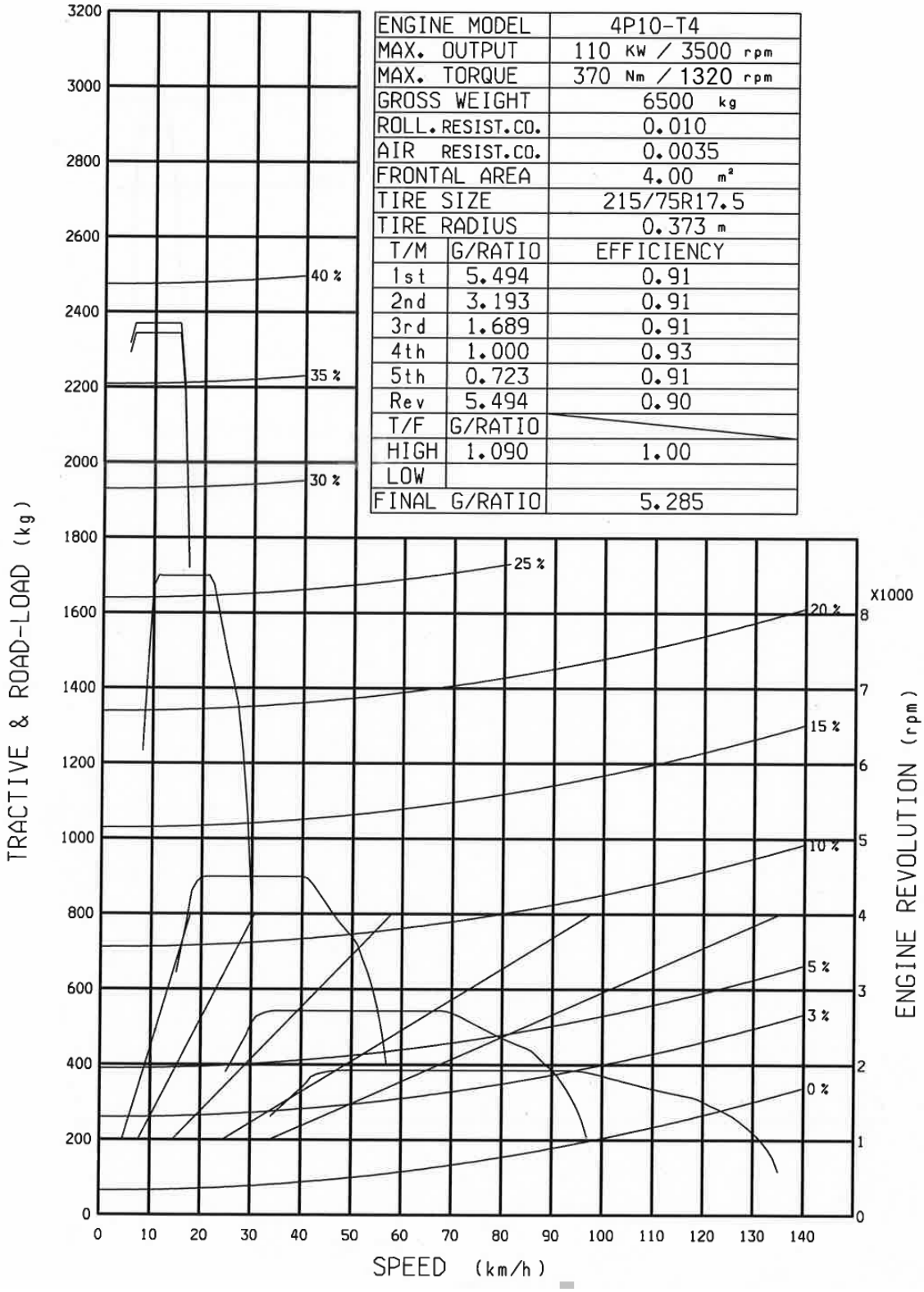
FGB71CR 4P10-T4
FGB71ER

ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		4500 kg
ROLL. RESIST. CO.		0.010
AIR RESIST. CO.		0.0035
FRONTAL AREA		4.00 m²
TIRE SIZE		215/75R17.5
TIRE RADIUS		0.373 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
T/F	G/RATIO	
HIGH		
LOW	1.987	1.00
FINAL G/RATIO		5.285



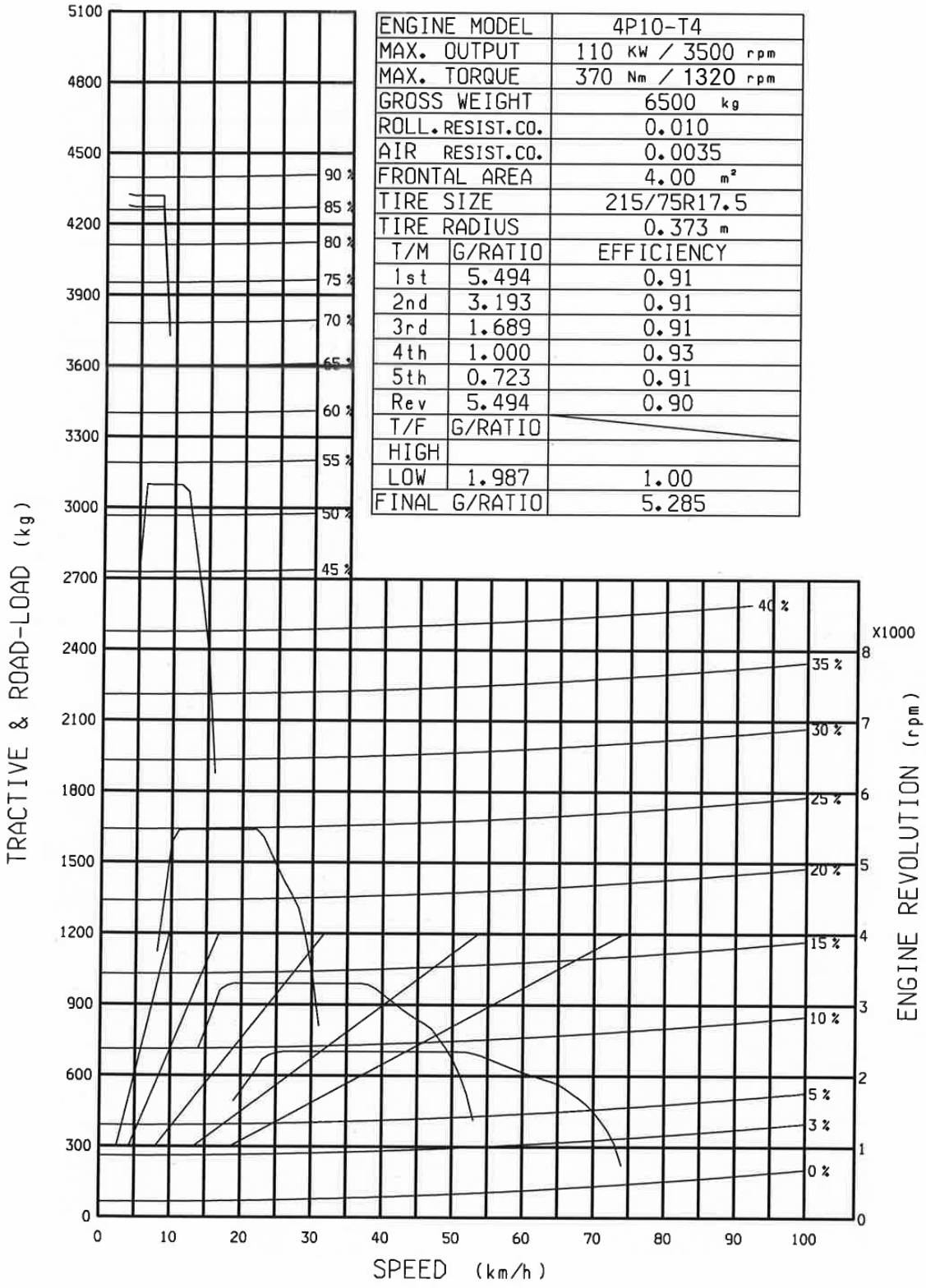
FGB71CR 4P10-T4
FGB71ER

ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		6500 kg
ROLL. RESIST.CO.		0.010
AIR RESIST.CO.		0.0035
FRONTAL AREA		4.00 m²
TIRE SIZE		215/75R17.5
TIRE RADIUS		0.373 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
T/F	G/RATIO	
HIGH	1.090	1.00
LOW		
FINAL G/RATIO		5.285



FGB71CR 4P10-T4
FGB71ER

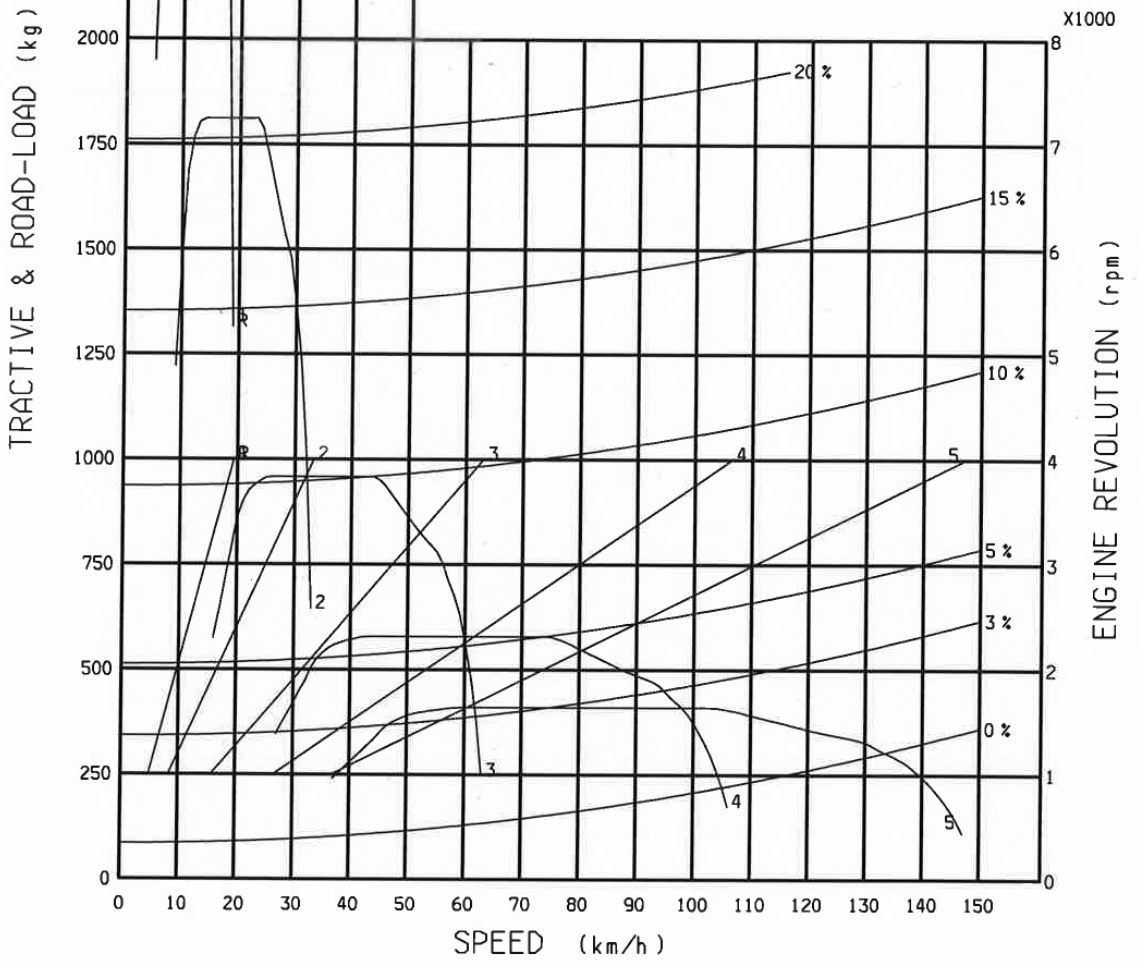
ENGINE MODEL		4P10-T4
MAX. OUTPUT		110 KW / 3500 rpm
MAX. TORQUE		370 Nm / 1320 rpm
GROSS WEIGHT		6500 kg
ROLL. RESIST. CO.		0.010
AIR RESIST. CO.		0.0035
FRONTAL AREA		4.00 m²
TIRE SIZE		215/75R17.5
TIRE RADIUS		0.373 m
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
T/F	G/RATIO	
HIGH		
LOW	1.987	1.00
FINAL G/RATIO		5.285



FECX1GR 4P10-T6
FECX1KR

ENGINE MODEL	4P10-T6
MAX. OUTPUT	129 KW / 3500 rpm
MAX. TORQUE	430 Nm / 1600 rpm
GROSS WEIGHT	8550 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	3.50 m²
TIRE SIZE	215/75R17.5
TIRE RADIUS	0.373 m

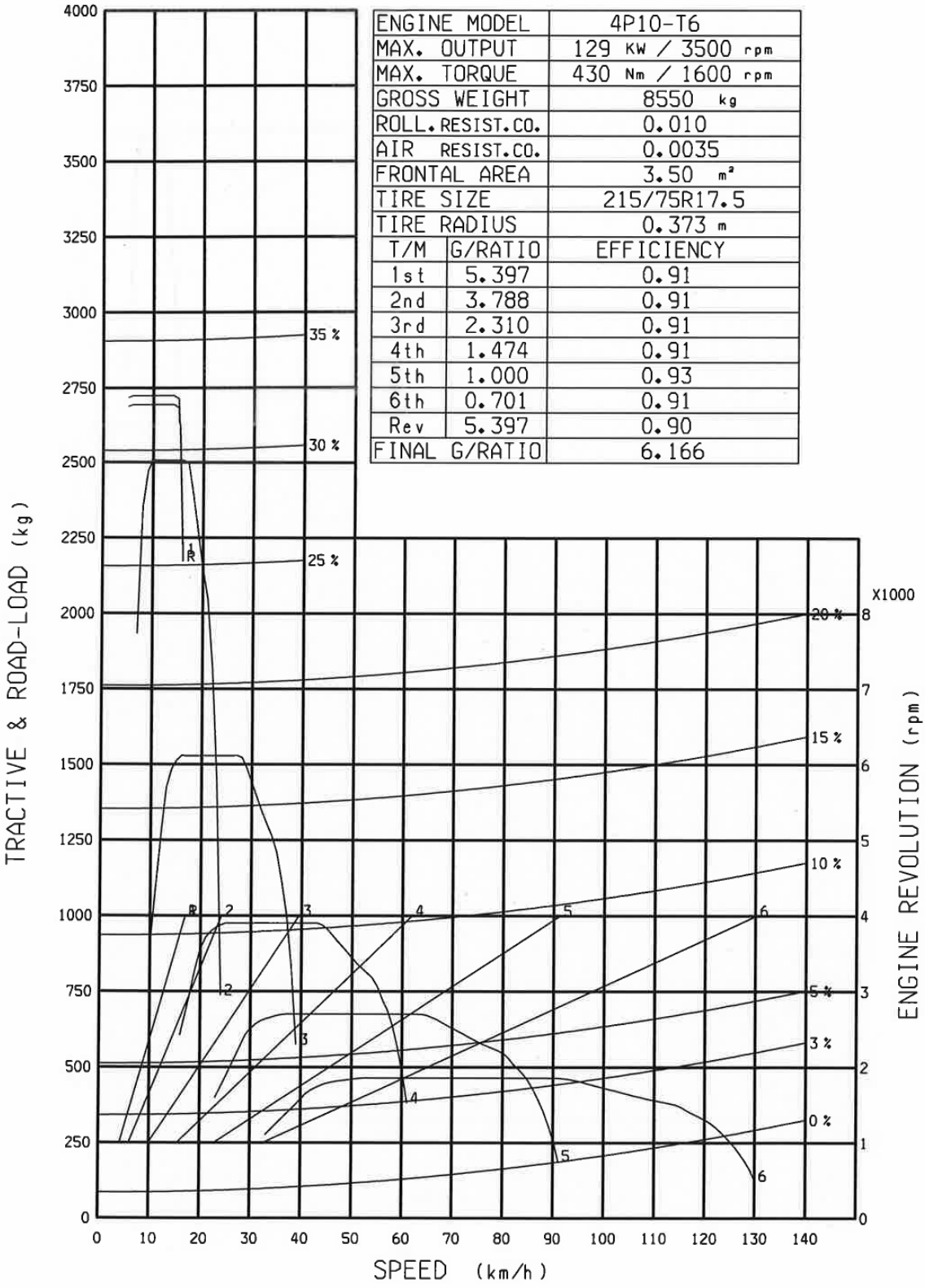
T/M	G/RATIO	EFFICIENCY
1st	5.494	0.91
2nd	3.193	0.91
3rd	1.689	0.91
4th	1.000	0.93
5th	0.723	0.91
Rev	5.494	0.90
FINAL G/RATIO		5.285



FECX1GR 4P10-T6
FECX1HR
FECX1KR

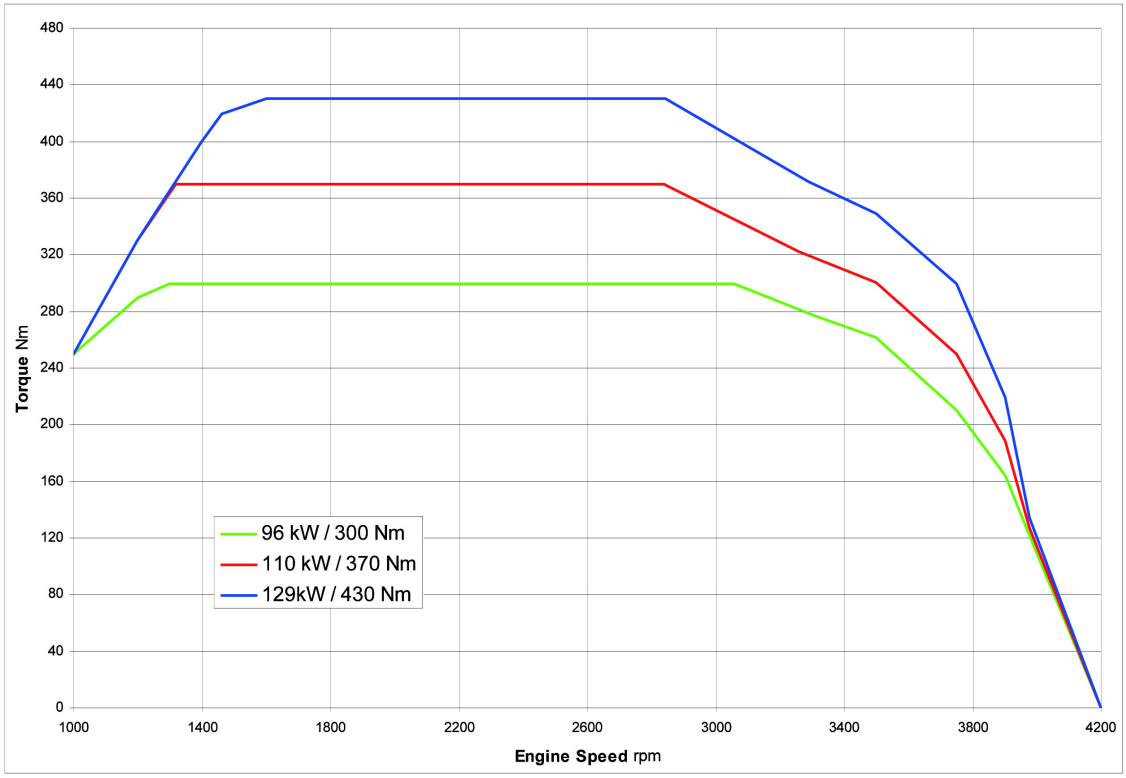
ENGINE MODEL	4P10-T6
MAX. OUTPUT	129 KW / 3500 rpm
MAX. TORQUE	430 Nm / 1600 rpm
GROSS WEIGHT	8550 kg
ROLL. RESIST. CO.	0.010
AIR RESIST. CO.	0.0035
FRONTAL AREA	3.50 m²
TIRE SIZE	215/75R17.5
TIRE RADIUS	0.373 m

T/M	G/RATIO	EFFICIENCY
1st	5.397	0.91
2nd	3.788	0.91
3rd	2.310	0.91
4th	1.474	0.91
5th	1.000	0.93
6th	0.701	0.91
Rev	5.397	0.90
FINAL G/RATIO		6.166

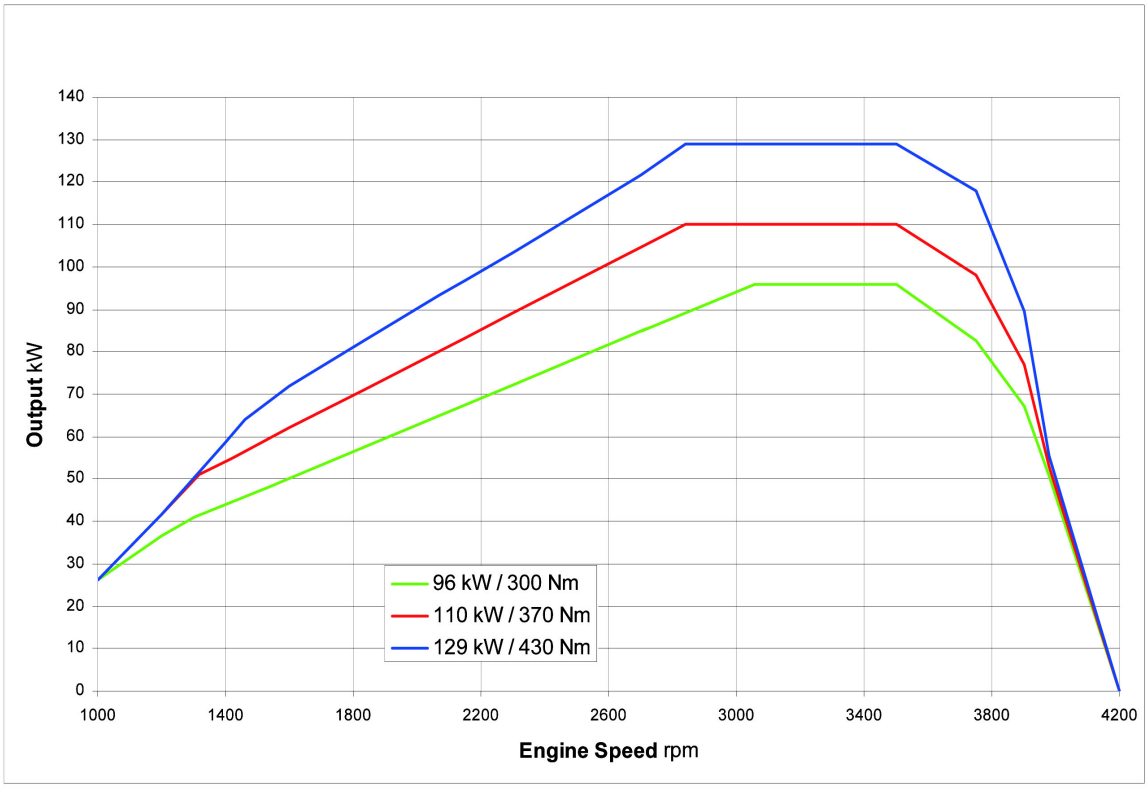


10.3.2 Engine performance curve

- Torque



- Output



10.3.3 Governor and torque characteristics

- 4P10 (96kW)

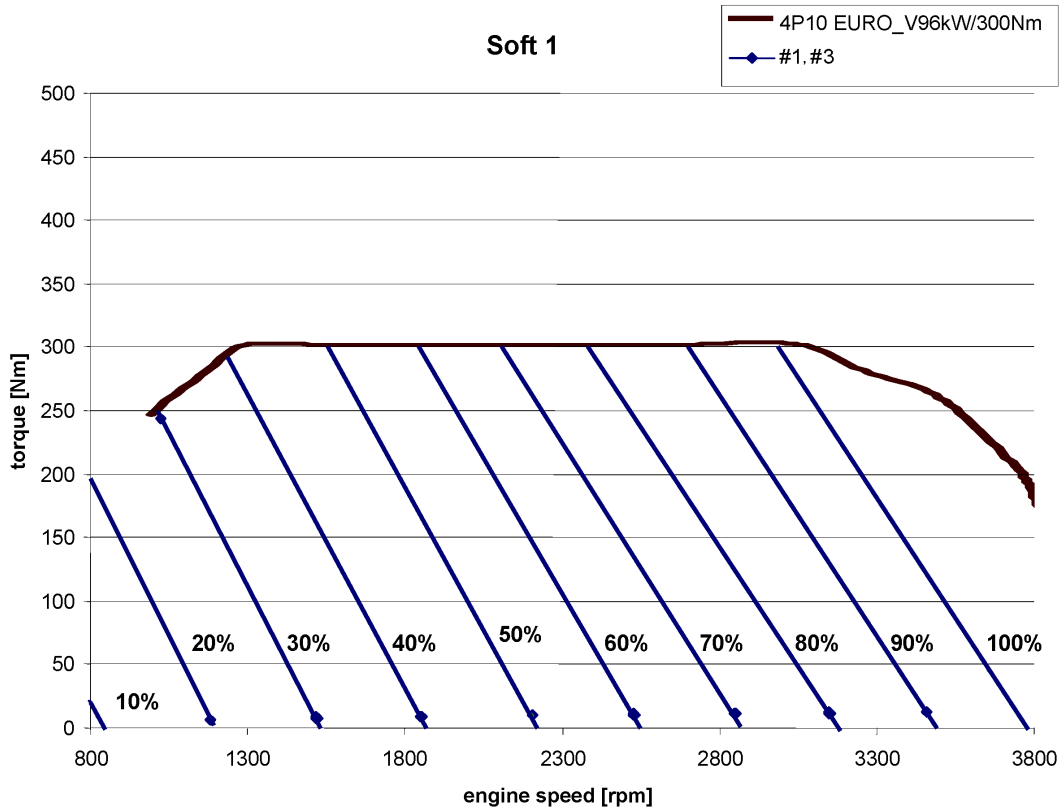


Fig.1

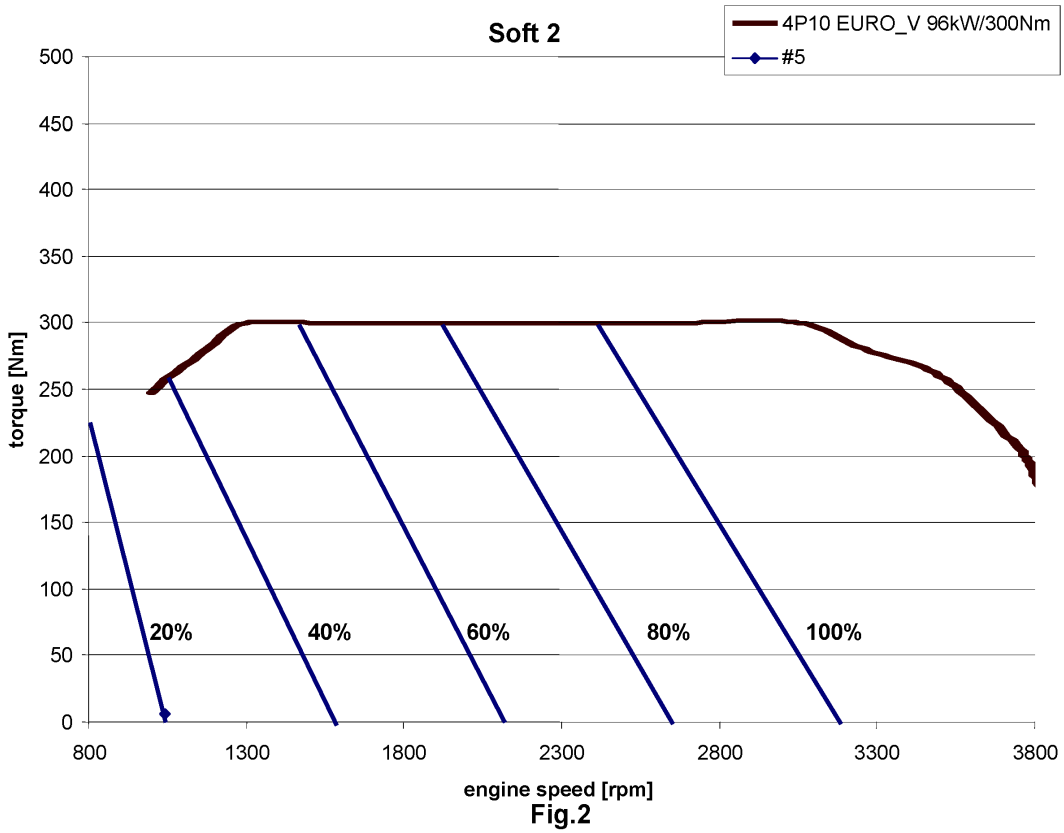


Fig.2

10.3 Performance curve

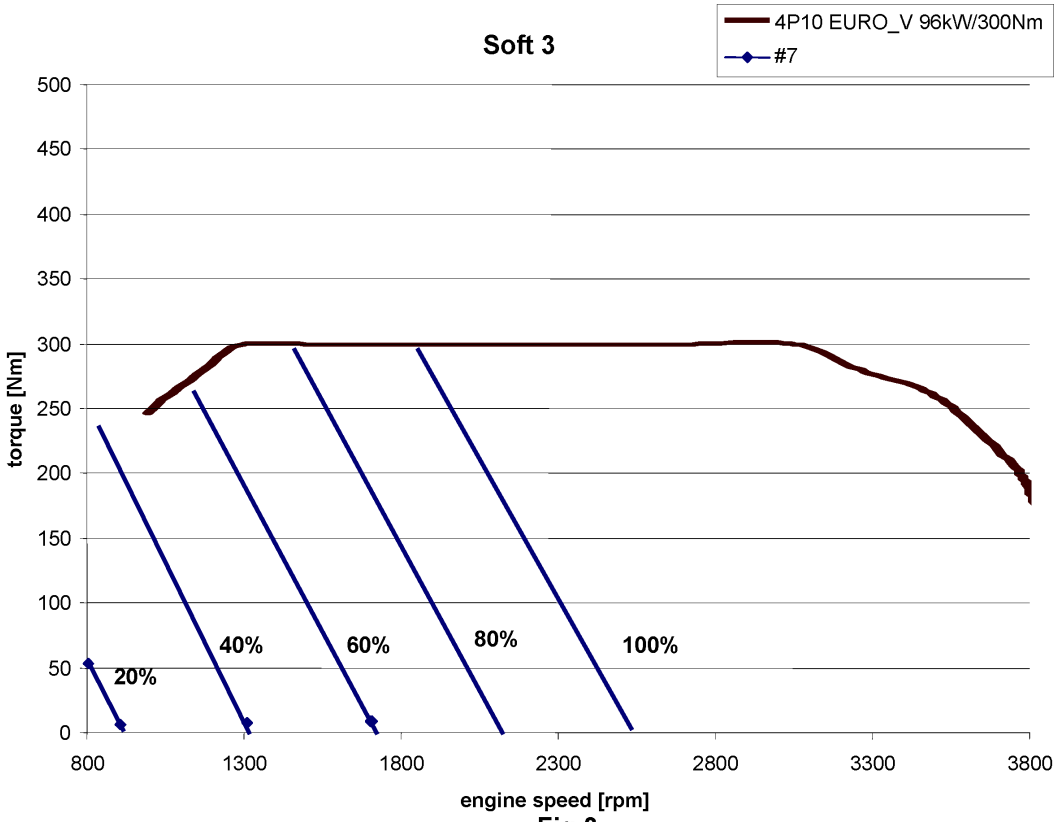


Fig.3

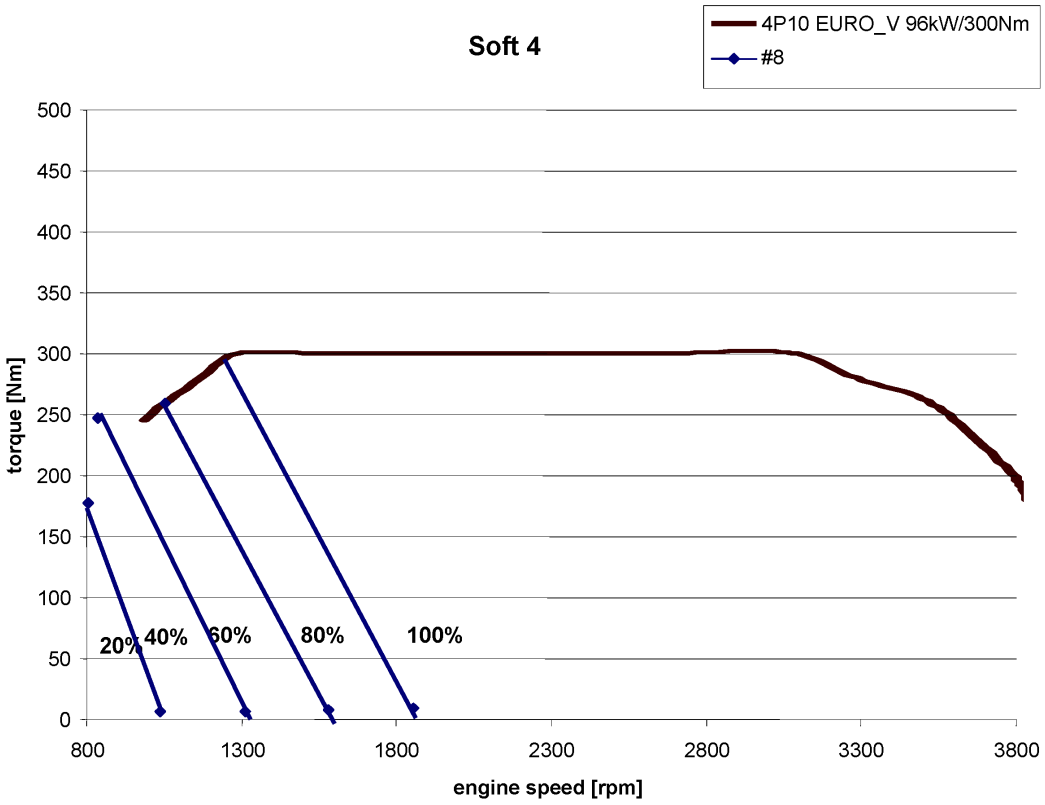


Fig.4

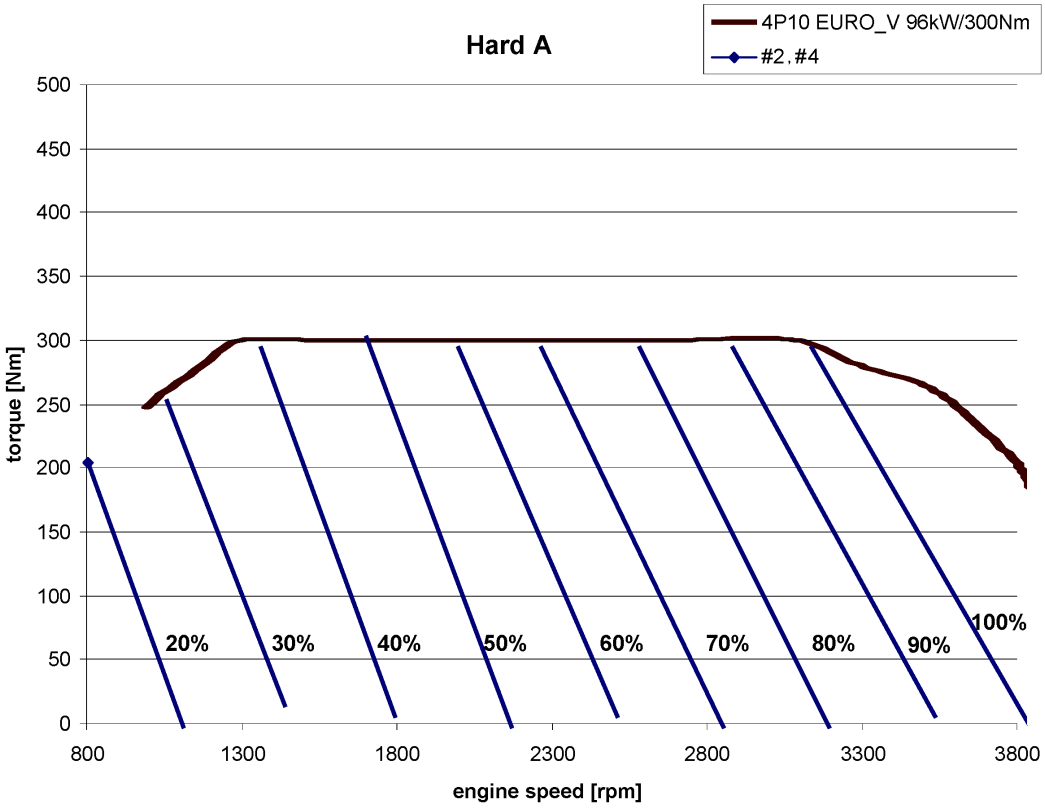

Hard A
4P10 EURO_V 96kW/300Nm
#2, #4
torque [Nm]
500
450
400
350
300
250
200
150
100
50
0
800
1300
1800
2300
2800
3300
3800
engine speed [rpm]
20%
30%
40%
50%
60%
70%
80%
90%
100%

Fig.5

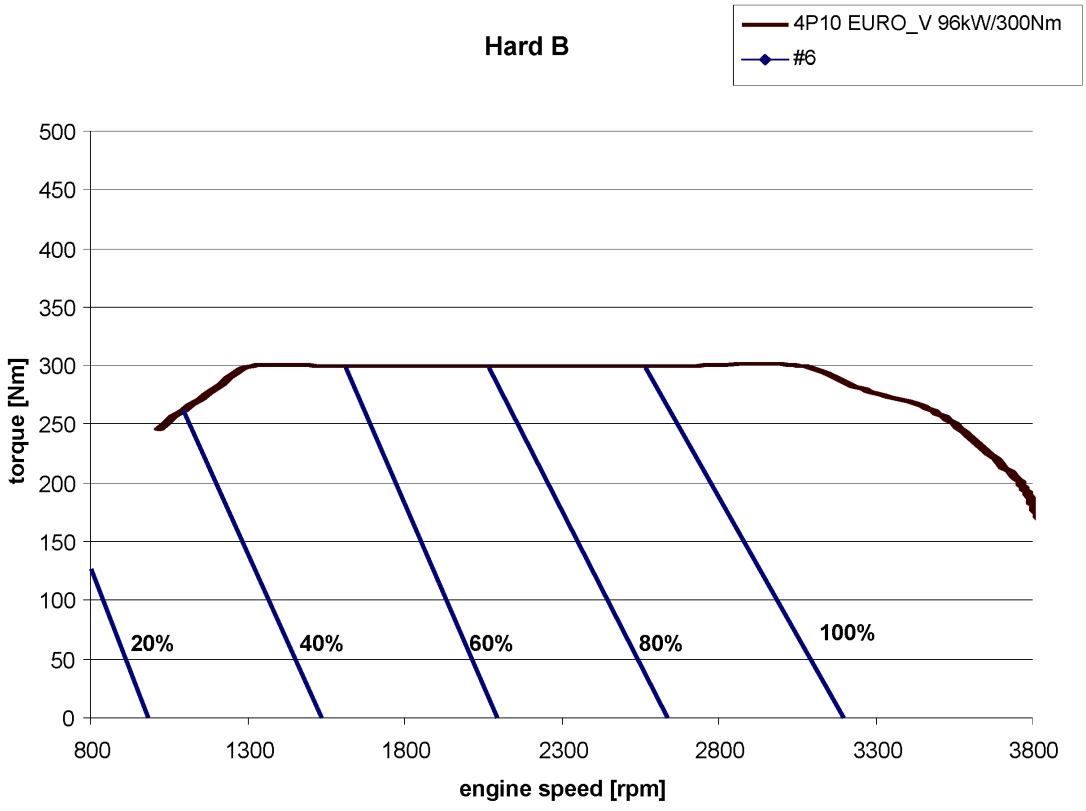

Hard B
4P10 EURO_V 96kW/300Nm
#6
torque [Nm]
500
450
400
350
300
250
200
150
100
50
0
800
1300
1800
2300
2800
3300
3800
engine speed [rpm]
20%
40%
60%
80%
100%

Fig.6

- 4P10 (110kW)

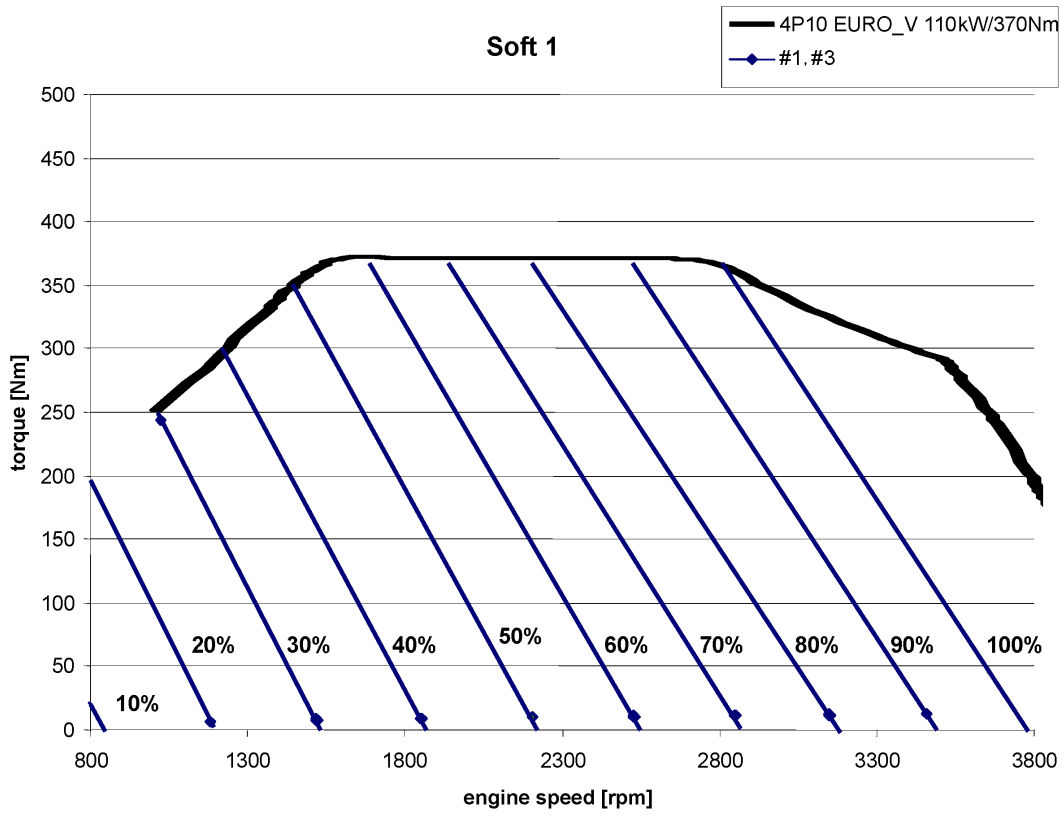


Fig.7

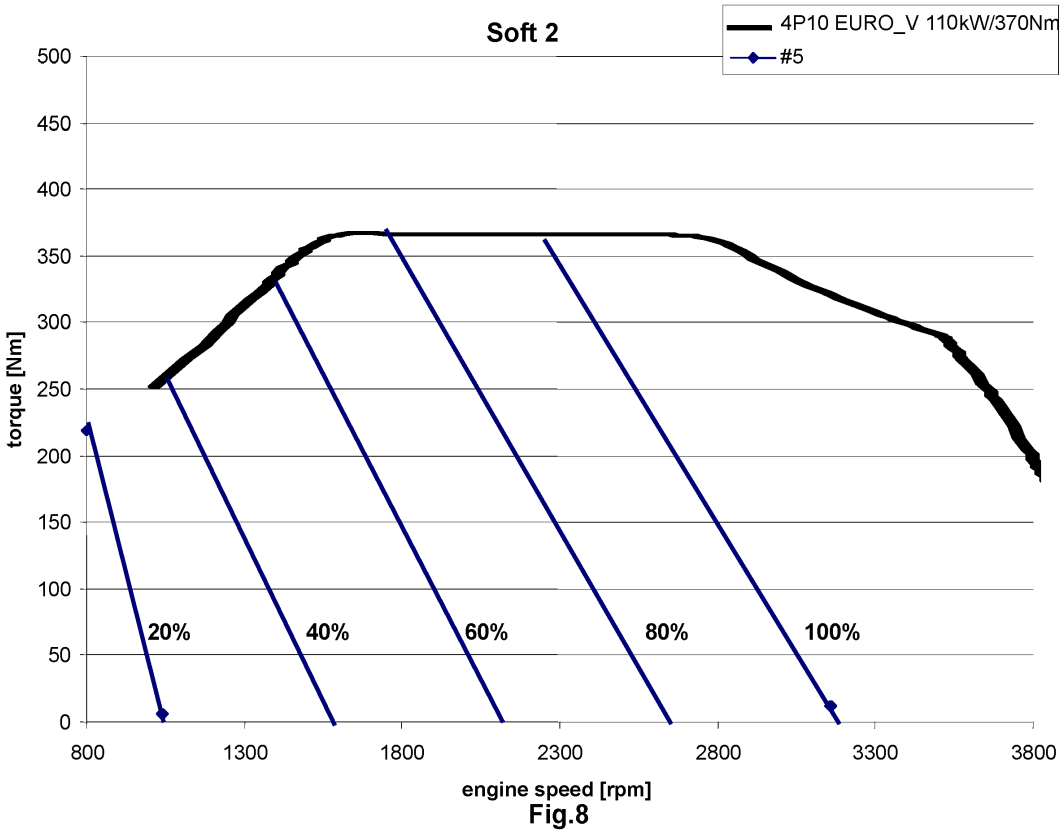


Fig.8

10.3 Performance curve

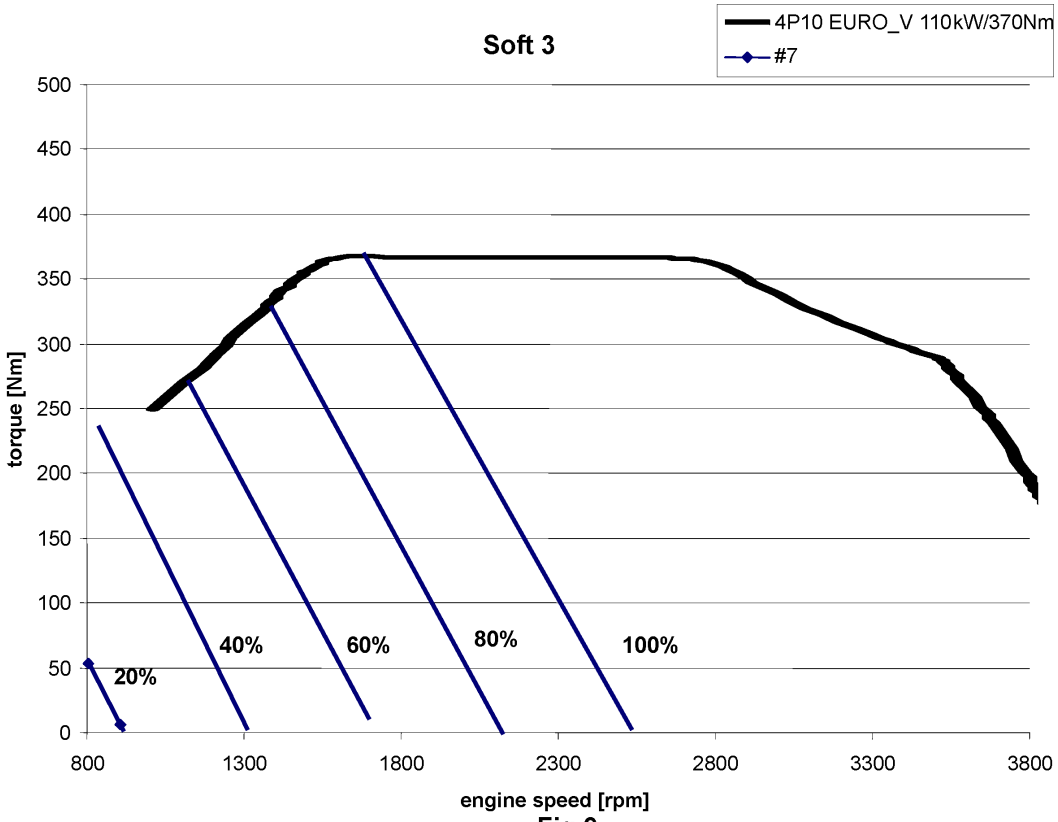


Fig.9

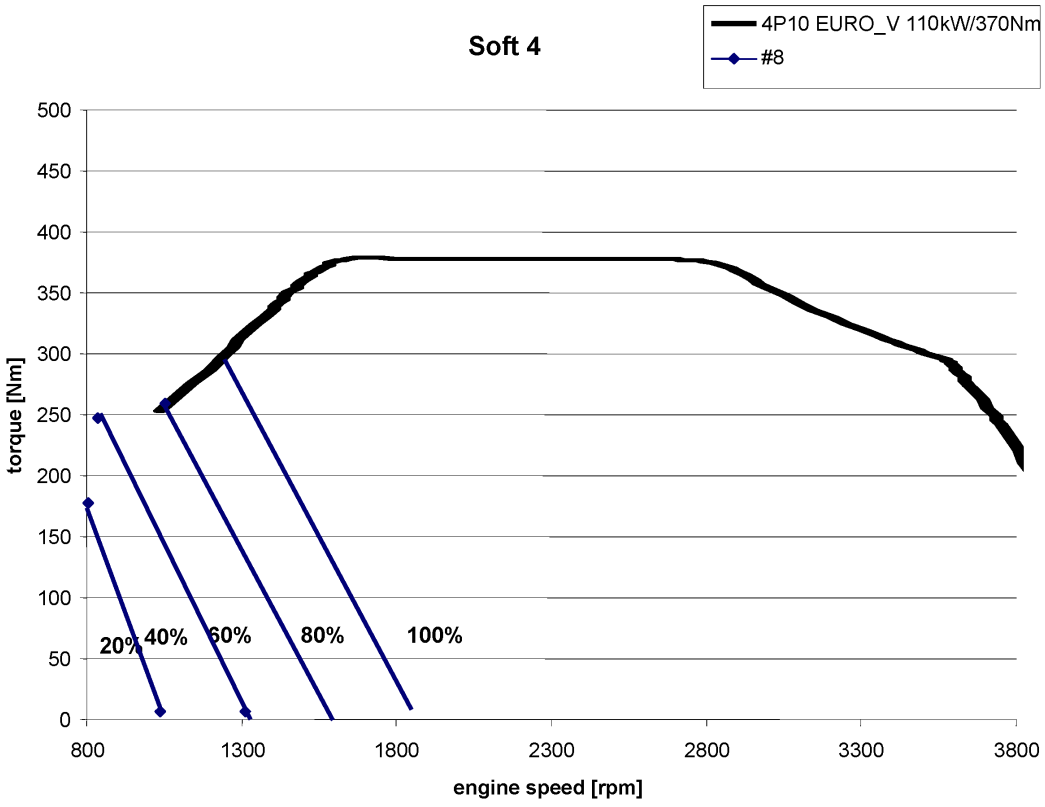


Fig.10

10.3 Performance curve

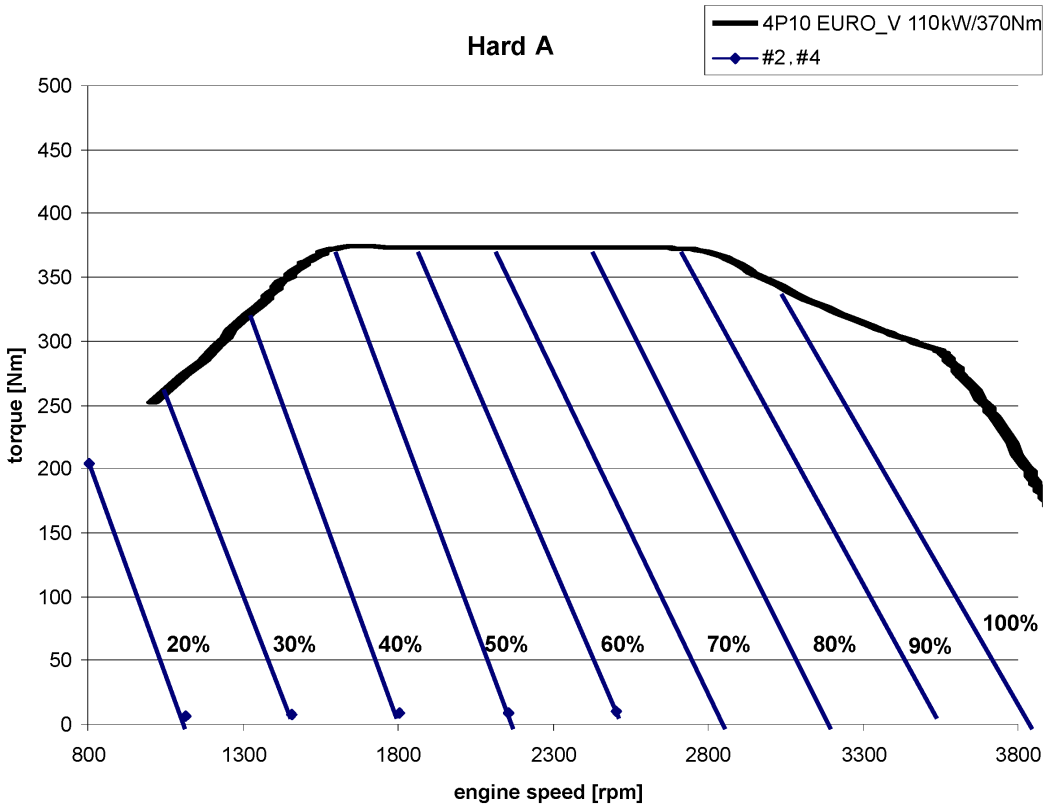


Fig.11

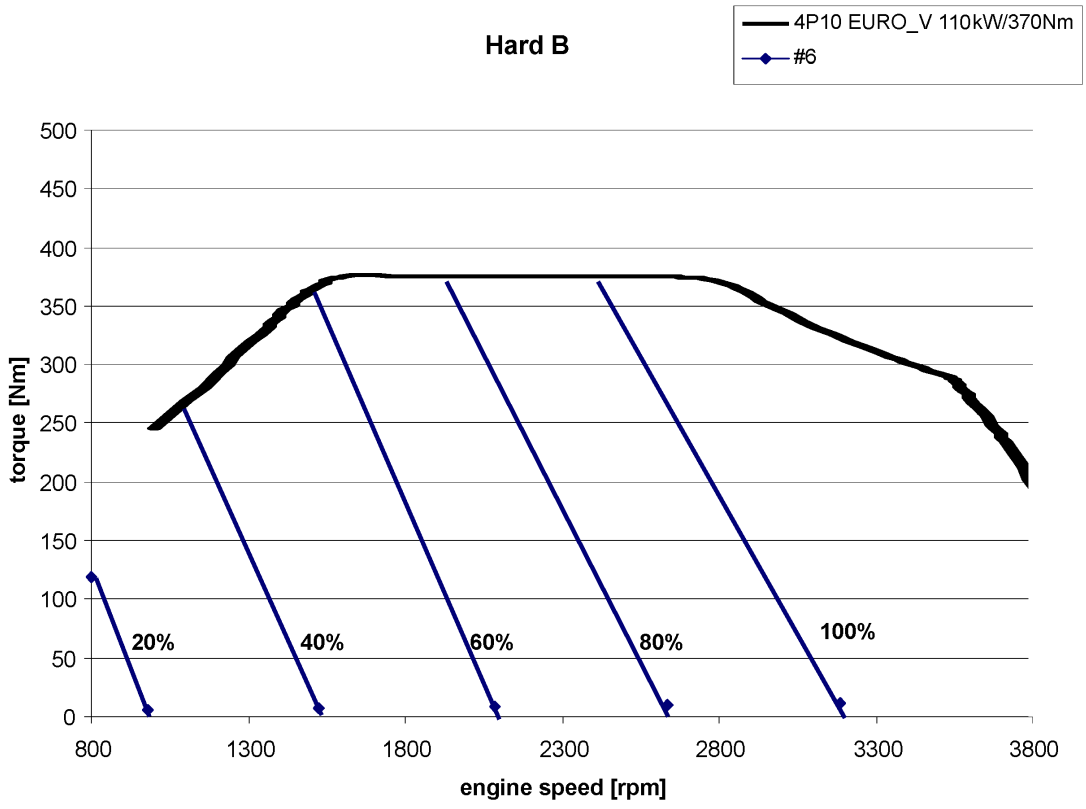


Fig.12

- 4P10 (129kW)

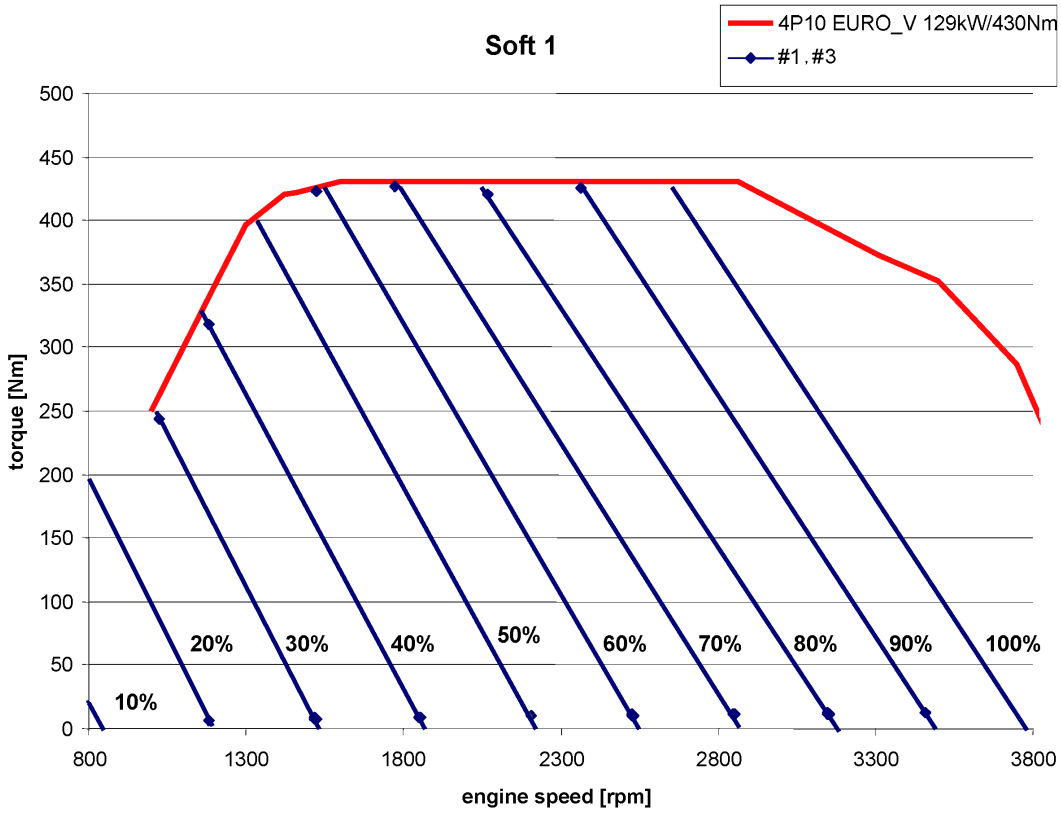


Fig. 13

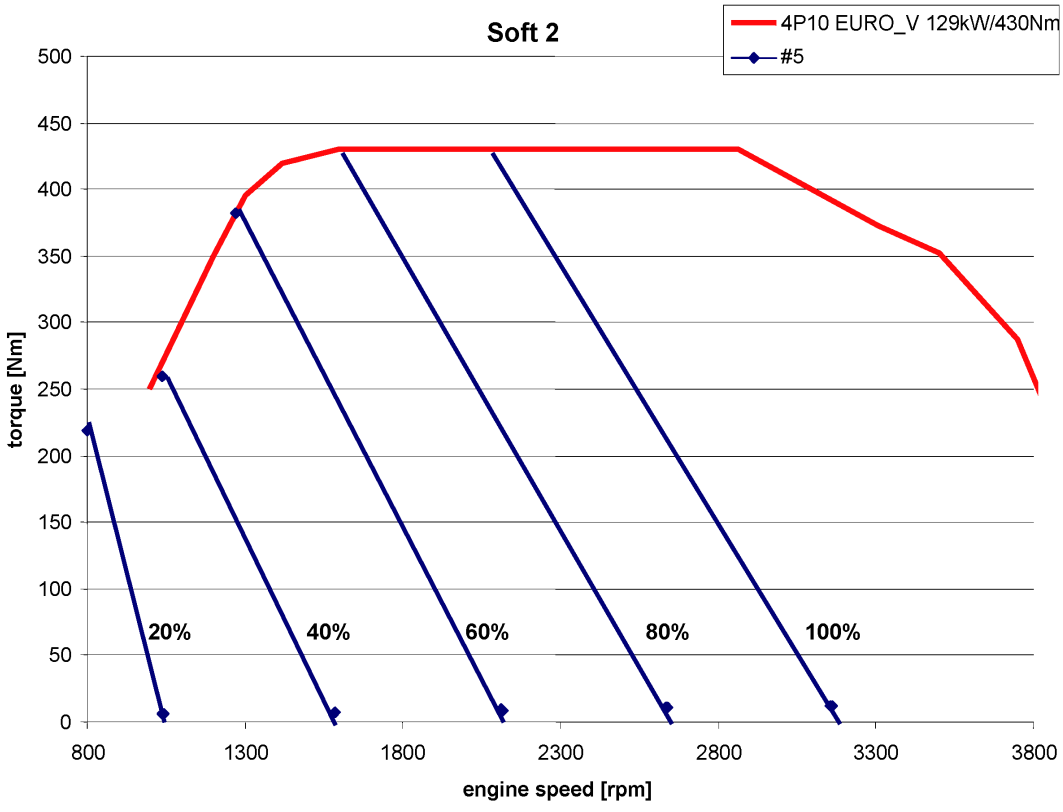


Fig. 14

10.3 Performance curve

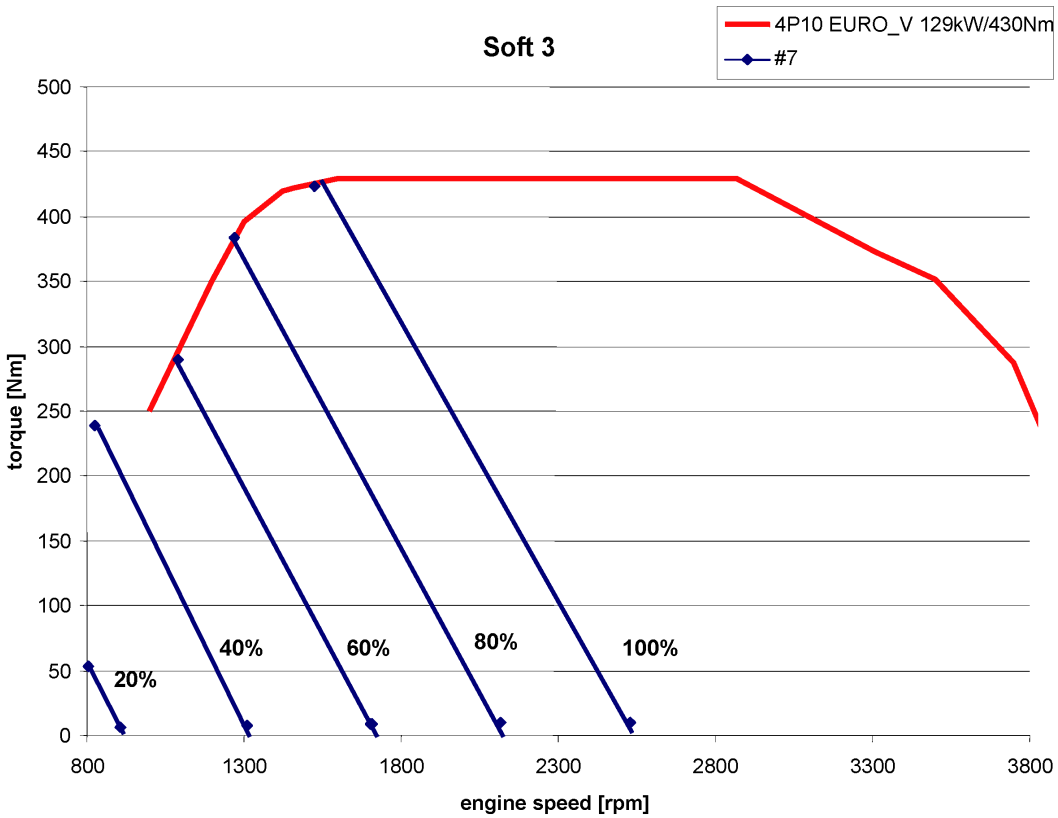


Fig. 15

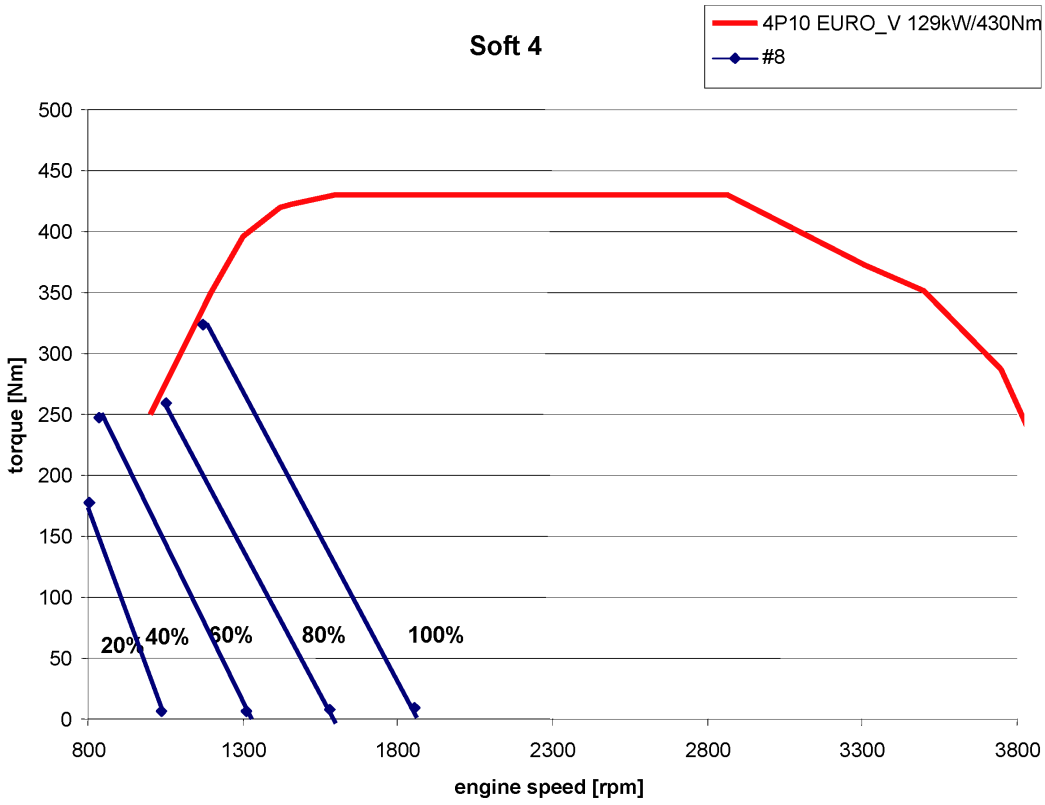


Fig. 16

10.3 Performance curve

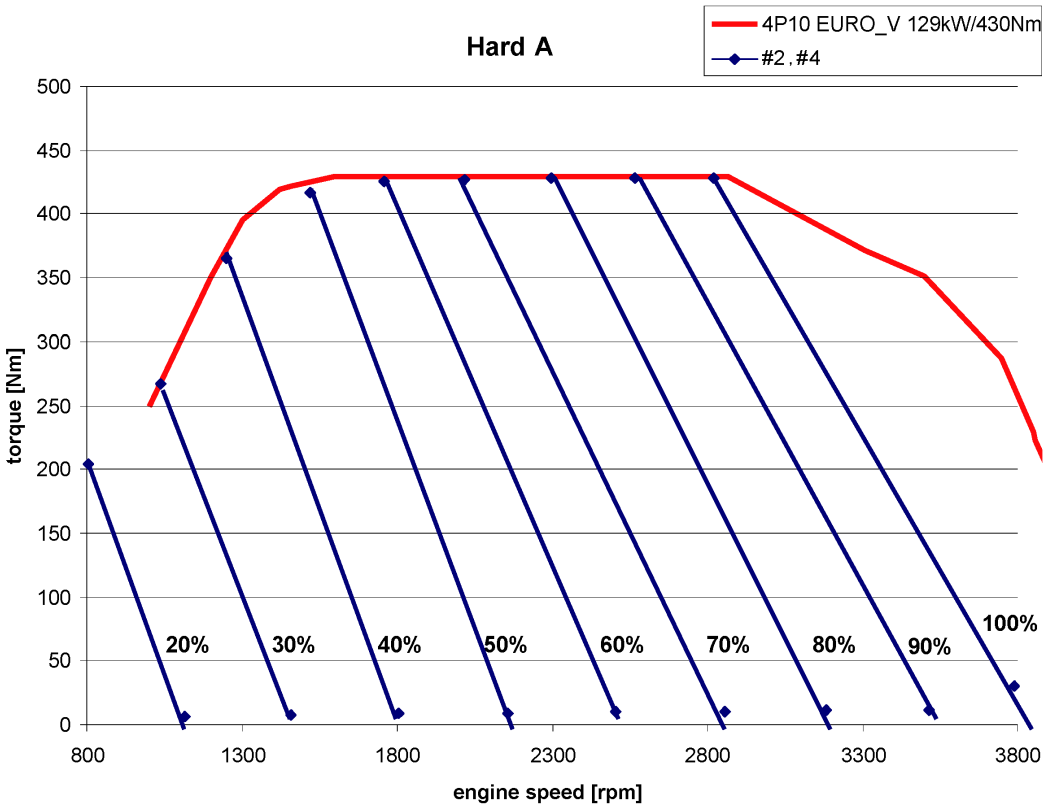


Fig. 17

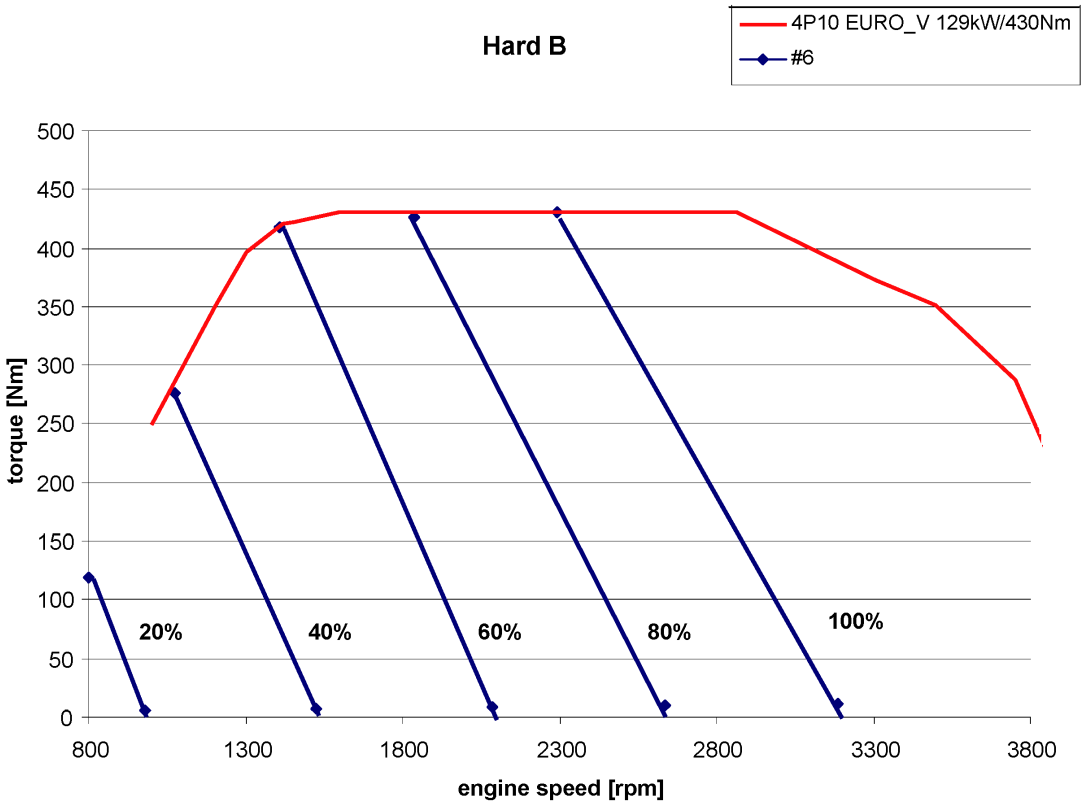


Fig. 18

10.4 Weight distribution table

10.4.1 Weight distribution table

Model: FEA21CR1SFBB (96 kW)

Wheelbase (m) : 2.800

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	7	-0.946	9.2	-2.3
Steering system	18	-0.714	22.1	-4.5
Engine control system	1	-0.900	0.7	-0.2
Brake, clutch control system	21	-0.900	27.8	-6.8
Air intake system	20	-0.515	23.7	-3.7
Parking brake system	5	0.826	3.7	1.5
Remote control system	9	0.793	6.2	2.5
Cab assembly, Front cab mounting	294	-0.250	320.4	-26.3
Cooling system	18	-0.315	19.5	-2.0
Engine, Transmission assembly	433	0.356	378.3	55.1
Rear cab mounting	41	-0.160	43.3	-2.3
Battery	28	0.889	19.1	8.9
Fuel system	112	1.375	57.0	55.0
Exhaust system	36	1.905	11.5	24.5
Propeller shaft assembly	12	1.839	3.9	7.6
Electric system	38	-0.700	47.1	-9.4
Frame and others	190	1.317	100.4	89.2
Engine and T/M cover	3	0.356	3.0	0.4
A/C unit	20	-0.690	24.3	-4.8
Electric others	10	1.450	4.8	5.2
ECU	4	-0.805	5.2	-1.2
SCR tank	0	1.283	0.0	0.0
IFS	85	0.024	84.3	0.7
Spare tire carrier	2	3.663	-0.6	2.6
Sprung weight	1405		1214.9 1215	189.7 190
Unsprung weight	547		171	377
Chassis Cab weight *2	1952 1950		1386 1385	567 565

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEA21CR2SFBB (96 kW)

Wheelbase (m) : 2.800

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	7	-0.946	9.2	-2.3
Steering system	18	-0.714	22.1	-4.5
Engine control system	1	-0.900	0.7	-0.2
Brake, clutch control system	24	-0.900	31.1	-7.6
Air intake system	20	-0.515	23.7	-3.7
Parking brake system	5	0.826	3.7	1.5
Remote control system	15	0.793	10.5	4.2
Cab assembly, Front cab mounting	294	-0.250	320.4	-26.3
Cooling system	15	-0.315	16.4	-1.7
Engine, Transmission assembly	398	0.356	347.2	50.6
Rear cab mounting	41	-0.160	43.3	-2.3
Battery	28	0.889	19.1	8.9
Fuel system	112	1.375	57.0	55.0
Exhaust system	37	1.905	11.8	25.2
Propeller shaft assembly	12	1.839	3.9	7.6
Electric system	38	-0.700	47.1	-9.4
Frame and others	194	1.317	102.7	91.1
Engine and T/M cover	9	0.356	8.1	1.2
A/C unit	20	-0.690	24.3	-4.8
Electric others	10	1.450	4.8	5.2
ECU	4	-0.805	5.2	-1.2
SCR tank	0	0.000	0.0	0.0
IFS	85	0.024	84.3	0.7
Spare tire carrier	2	3.663	-0.6	2.6
Sprung weight	1386		1196.0 1196	189.8 190
Unsprung weight	547		171	377
*2 Chassis Cab weight	1933 1935		1367 1365	567 570

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEA21CR3SFBC (110 kW)

Wheelbase (m) : 2.800

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	7	-0.946	9.2	-2.3
Steering system	18	-0.714	22.1	-4.5
Engine control system	1	-0.900	0.7	-0.2
Brake, clutch control system	21	-0.900	27.8	-6.8
Air intake system	20	-0.515	23.7	-3.7
Parking brake system	5	0.826	3.7	1.5
Remote control system	9	0.793	6.2	2.5
Cab assembly, Front cab mounting	294	-0.250	320.4	-26.3
Cooling system	18	-0.315	19.5	-2.0
Engine, Transmission assembly	433	0.356	378.3	55.1
Rear cab mounting	41	-0.160	43.3	-2.3
Battery	28	0.889	19.1	8.9
Fuel system	112	1.375	57.0	55.0
Exhaust system	36	1.905	11.5	24.5
Propeller shaft assembly	12	1.839	3.9	7.6
Electric system	38	-0.700	47.1	-9.4
Frame and others	190	1.317	100.4	89.2
Engine and T/M cover	3	0.356	3.0	0.4
A/C unit	20	-0.690	24.3	-4.8
Electric others	10	1.450	4.8	5.2
ECU	4	-0.805	5.2	-1.2
SCR tank	0	1.282	0.0	0.0
IFS	85	0.024	84.3	0.7
Spare tire carrier	2	3.663	-0.6	2.6
Sprung weight	1405		1214.9 1215	189.7 190
Unsprung weight	547		171	377
*2 Chassis Cab weight	1952 1950		1386 1385	567 565

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEA21ER3SFBC (110 kW)

Wheelbase (m) : 3.400

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	7	-0.946	8.8	-1.9
Steering system	18	-0.714	21.3	-3.7
Engine control system	1	-0.900	0.6	-0.1
Brake, clutch control system	21	-0.900	26.6	-5.6
Air intake system	20	-0.515	23.1	-3.0
Parking brake system	5	0.826	3.9	1.3
Remote control system	9	0.799	6.7	2.0
Cab assembly, Front cab mounting	294	-0.250	315.7	-21.6
Cooling system	18	-0.315	19.2	-1.6
Engine, Transmission assembly	433	0.356	388.0	45.4
Rear cab mounting	41	-0.161	42.9	-1.9
Battery	28	0.889	20.7	7.3
Fuel system	112	1.775	53.5	58.5
Exhaust system	31	1.380	18.4	12.6
Propeller shaft assembly	22	2.171	8.0	14.1
Electric system	38	-0.700	45.5	-7.8
Frame and others	214	1.639	110.7	103.1
Engine and T/M cover	3	0.356	3.1	0.4
A/C unit	20	-0.690	23.5	-4.0
Electric others	10	1.500	5.6	4.4
ECU	4	-0.805	5.0	-0.9
SCR tank	0	1.783	0.0	0.0
IFS	85	0.024	84.4	0.6
Spare tire carrier	2	4.363	-0.6	2.6
Sprung weight	1434		1234.6 1235	200.2 200
Unsprung weight	547		171	377
*2 Chassis Cab weight	1982 1980		1406 1405	577 575

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEA21ER3SFBL (110 kW)

Wheelbase (m) : 3.400

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	7	-0.946	8.8	-1.9
Steering system	18	-0.714	21.3	-3.7
Engine control system	0	-0.900	0.5	-0.1
Brake, clutch control system	21	-0.900	26.6	-5.6
Air intake system	20	-0.515	23.1	-3.0
Parking brake system	5	0.826	3.9	1.3
Remote control system	9	0.799	6.7	2.0
Cab assembly, Front cab mounting	290	-0.250	311.3	-21.3
Cooling system	18	-0.315	19.2	-1.6
Engine, Transmission assembly	433	0.356	387.7	45.3
Rear cab mounting	41	-0.161	42.9	-1.9
Battery	28	0.889	20.7	7.3
Fuel system	112	1.775	53.5	58.5
Exhaust system	31	1.380	18.4	12.6
Propeller shaft assembly	22	2.171	8.0	14.1
Electric system	38	-0.700	45.5	-7.8
Frame and others	214	1.639	110.7	103.0
Engine and T/M cover	3	0.356	3.1	0.4
A/C unit	20	-0.690	23.5	-4.0
Electric others	10	1.500	5.6	4.4
ECU	4	-0.805	5.0	-1.0
SCR tank	0	1.783	0.0	0.0
IFS	85	0.024	84.4	0.6
Spare tire carrier	2	4.363	-0.6	2.6
Sprung weight	1430		1229.8 1230	200.2 200
Unsprung weight	547		171	377
Chassis Cab weight *2	1977 1975		1401 1400	577 575

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEA21ER3WFBC (110 kW)

Wheelbase (m) : 3.400

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	7	-0.946	8.8	-1.9
Steering system	18	-0.714	21.3	-3.7
Engine control system	1	-0.900	0.6	-0.1
Brake, clutch control system	21	-0.900	26.6	-5.6
Air intake system	22	-0.515	25.9	-3.4
Parking brake system	5	0.826	3.9	1.3
Remote control system	9	0.799	6.7	2.0
Cab assembly, Front cab mounting	483	0.290	441.9	41.2
Cooling system	19	-0.315	20.6	-1.7
Engine, Transmission assembly	433	0.356	388.0	45.4
Rear cab mounting	37	0.300	33.7	3.3
Battery	28	0.889	20.7	7.3
Fuel system	112	2.125	42.0	70.0
Exhaust system	31	1.380	18.4	12.6
Propeller shaft assembly	22	2.162	8.1	14.0
Electric system	38	-0.700	45.5	-7.8
Frame and others	214	1.639	110.7	103.0
Engine and T/M cover	3	0.356	3.1	0.4
A/C unit	29	-0.200	30.4	-1.7
Electric others	10	1.500	5.6	4.4
ECU	4	-0.805	5.0	-1.0
SCR tank	0	2.125	0.0	0.0
IFS	85	0.024	84.4	0.6
Spare tire carrier	2	4.363	-0.6	2.6
Sprung weight	1632		1351.3 1351	281.2 281
Unsprung weight	547		171	377
*2 Chassis Cab weight	2180 2180		1522 1520	658 660

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB21CR3SFBC/FEB21CR3SFBG (110 kW)

Wheelbase (m) : 2.800

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	14.3	-3.8
Steering system	19	-0.719	24.3	-5.0
Engine control system	1	-1.000	0.7	-0.2
Brake, clutch control system	21	-1.000	28.5	-7.5
Air intake system	24	0.524	19.3	4.4
Parking brake system	5	0.826	3.7	1.5
Remote control system	9	0.793	6.2	2.5
Cab assembly, Front cab mounting	345	-0.300	382.3	-37.0
Cooling system	20	-0.315	22.0	-2.2
Engine, Transmission assembly	433	0.401	371.3	62.1
Rear cab mounting	44	-0.223	47.5	-3.5
Battery	28	0.889	19.1	8.9
Fuel system	112	1.275	61.0	51.0
Exhaust system	36	1.660	14.7	21.3
Propeller shaft assembly	12	1.882	3.8	7.7
Electric system	39	-0.800	49.8	-11.1
Frame and others	204	1.317	107.9	95.8
Engine and T/M cover	2	0.401	2.1	0.3
A/C unit	21	-0.780	26.2	-5.7
Electric others	10	1.600	4.3	5.7
ECU	4	-0.896	5.2	-1.3
SCR tank	0	1.975	0.0	0.0
IFS	95	0.005	94.4	0.2
Spare tire carrier	6	3.663	-1.8	7.8
Sprung weight	1499		1306.8 1307	191.9 192
Unsprung weight	564		175	389
*2 Chassis Cab weight	2063 2065		1482 1485	581 580

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB21CR4SFBC (110 kW)

Wheelbase (m) : 2.800

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	14.3	-3.8
Steering system	19	-0.719	24.3	-5.0
Engine control system	1	-1.000	0.7	-0.2
Brake, clutch control system	24	-1.000	31.9	-8.4
Air intake system	24	0.524	19.3	4.4
Parking brake system	5	0.826	3.7	1.5
Remote control system	15	0.793	10.8	4.2
Cab assembly, Front cab mounting	345	-0.300	382.3	-37.0
Cooling system	17	-0.315	18.7	-1.9
Engine, Transmission assembly	400	0.401	342.9	57.3
Rear cab mounting	44	-0.223	47.5	-3.5
Battery	28	0.889	19.1	8.9
Fuel system	112	1.275	61.0	51.0
Exhaust system	37	1.660	15.1	21.9
Propeller shaft assembly	12	1.882	3.8	7.7
Electric system	39	-0.800	49.8	-11.1
Frame and others	206	1.317	109.3	97.0
Engine and T/M cover	10	0.401	9.0	1.5
A/C unit	21	-0.780	26.2	-5.7
Electric others	10	1.600	4.3	5.7
ECU	4	-0.896	5.2	-1.3
SCR tank	0	1.975	0.0	0.0
IFS	95	0.005	94.4	0.2
Spare tire carrier	2	3.663	-0.6	2.6
Sprung weight	1479		1293.0 1293	186.0 186
Unsprung weight	564		175	389
*2 Chassis Cab weight	2043 2045		1468 1470	575 575

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB21ER3SFBC/FEB21ER3SFBG (110 kW)

Wheelbase (m) : 3.400

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.6	-3.1
Steering system	19	-0.719	23.4	-4.1
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	21	-1.000	27.2	-6.2
Air intake system	24	0.524	20.0	3.7
Parking brake system	5	0.826	3.9	1.3
Remote control system	9	0.471	7.5	1.2
Cab assembly, Front cab mounting	345	-0.300	375.8	-30.5
Cooling system	20	-0.315	21.6	-1.8
Engine, Transmission assembly	433	0.401	382.3	51.1
Rear cab mounting	44	-0.223	46.9	-2.9
Battery	28	0.889	20.7	7.3
Fuel system	112	1.825	51.9	60.1
Exhaust system	31	1.420	18.1	12.9
Propeller shaft assembly	22	2.190	7.9	14.2
Electric system	39	-0.800	47.8	-9.1
Frame and others	228	1.639	117.9	109.7
Engine and T/M cover	2	0.401	2.1	0.3
A/C unit	21	-0.780	25.2	-4.7
Electric others	10	1.700	5.0	5.0
ECU	4	-0.896	5.0	-1.0
SCR tank	0	2.575	0.0	0.0
IFS	95	0.005	94.5	0.1
Spare tire carrier	2	4.363	-0.6	2.6
Sprung weight	1524		1318.3 1318	206.0 206
Unsprung weight	564		175	389
*2 Chassis Cab weight	2088 2090		1493 1495	595 595

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB21ER4SFBC (110 kW)

Wheelbase (m) : 3.400

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.6	-3.1
Steering system	19	-0.719	23.4	-4.1
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	24	-1.000	30.4	-6.9
Air intake system	24	0.524	20.0	3.7
Parking brake system	5	0.826	3.9	1.3
Remote control system	15	0.471	12.9	2.1
Cab assembly, Front cab mounting	345	-0.300	375.8	-30.5
Cooling system	17	-0.315	18.4	-1.6
Engine, Transmission assembly	400	0.401	353.0	47.2
Rear cab mounting	44	-0.223	46.9	-2.9
Battery	28	0.889	20.7	7.3
Fuel system	112	1.825	51.9	60.1
Exhaust system	32	1.420	18.6	13.4
Propeller shaft assembly	22	2.190	7.9	14.2
Electric system	39	-0.800	47.8	-9.1
Frame and others	227	1.639	117.4	109.2
Engine and T/M cover	10	0.401	9.2	1.2
A/C unit	21	-0.780	25.2	-4.7
Electric others	10	1.700	5.0	5.0
ECU	4	-0.896	5.0	-1.0
SCR tank	0	2.575	0.0	0.0
IFS	95	0.005	94.5	0.1
Spare tire carrier	2	4.363	-0.6	2.6
Sprung weight	1505		1301.5 1302	203.4 203
Unsprung weight	564		175	389
*2 Chassis Cab weight	2069 2070		1477 1475	592 595

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB51ER3SFBC (110 kW)

Wheelbase (m) : 3.400

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.6	-3.1
Steering system	40	-0.719	49.0	-8.5
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	21	-1.000	27.2	-6.2
Air intake system	24	0.524	20.0	3.7
Parking brake system	5	0.826	3.9	1.3
Remote control system	9	0.471	7.5	1.2
Cab assembly, Front cab mounting	345	-0.300	375.8	-30.5
Cooling system	22	-0.315	23.5	-2.0
Engine, Transmission assembly	433	0.401	382.3	51.1
Rear cab mounting	44	-0.223	46.9	-2.9
Battery	28	0.889	20.7	7.3
Fuel system	112	1.825	51.9	60.1
Exhaust system	31	1.420	18.1	12.9
Propeller shaft assembly	22	2.190	7.9	14.2
Electric system	39	-0.800	47.8	-9.1
Frame and others	297	1.639	153.8	143.1
Engine and T/M cover	3	0.401	2.4	0.3
A/C unit	21	-0.780	25.2	-4.7
Electric others	10	1.700	5.0	5.0
ECU	4	-0.896	5.0	-1.0
SCR tank	0	2.575	0.0	0.0
IFS	0	0.005	0.0	0.0
Spare tire carrier	2	4.363	-0.6	2.6
Sprung weight	1522		1287.5 1288	234.7 235
Unsprung weight	749		282	466
Chassis Cab weight *2	2271 2270		1570 1570	701 700

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB51ER4SFBC (110 kW)

Wheelbase (m) : 3.400

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.6	-3.1
Steering system	40	-0.719	49.0	-8.5
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	24	-1.000	30.4	-6.9
Air intake system	24	0.524	20.0	3.7
Parking brake system	5	0.826	3.9	1.3
Remote control system	15	0.471	12.9	2.1
Cab assembly, Front cab mounting	345	-0.300	375.8	-30.5
Cooling system	19	-0.315	20.3	-1.7
Engine, Transmission assembly	400	0.401	353.0	47.2
Rear cab mounting	44	-0.223	46.9	-2.9
Battery	28	0.889	20.7	7.3
Fuel system	112	1.825	51.9	60.1
Exhaust system	32	1.420	18.6	13.4
Propeller shaft assembly	22	2.190	7.9	14.2
Electric system	39	-0.800	47.8	-9.1
Frame and others	297	1.639	153.8	143.1
Engine and T/M cover	12	0.401	10.5	1.4
A/C unit	21	-0.780	25.2	-4.7
Electric others	10	1.700	5.0	5.0
ECU	4	-0.896	5.0	-1.0
SCR tank	0	2.575	0.0	0.0
IFS	0	0.005	0.0	0.0
Spare tire carrier	2	4.363	-0.6	2.6
Sprung weight	1505		1272.2 1272	232.9 233
Unsprung weight	741		282	459
*2 Chassis Cab weight	2246 2245		1554 1555	692 690

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB51GR3SFBC (110 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.2	-2.8
Steering system	40	-0.719	48.0	-7.6
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	21	-1.000	26.5	-5.5
Air intake system	24	0.524	20.5	3.2
Parking brake system	5	0.826	4.1	1.1
Remote control system	9	0.435	7.7	1.0
Cab assembly, Front cab mounting	345	-0.300	372.2	-26.9
Cooling system	22	-0.315	23.3	-1.8
Engine, Transmission assembly	433	0.401	388.3	45.1
Rear cab mounting	44	-0.223	46.5	-2.5
Battery	28	0.889	21.5	6.5
Fuel system	112	2.325	44.4	67.6
Exhaust system	32	1.420	20.2	11.8
Propeller shaft assembly	23	2.416	8.5	14.3
Electric system	39	-0.800	46.7	-8.0
Frame and others	316	1.925	158.0	157.9
Engine and T/M cover	3	0.401	2.4	0.3
A/C unit	21	-0.780	24.7	-4.2
Electric others	10	1.920	5.0	5.0
ECU	4	-0.896	4.9	-0.9
SCR tank	0	3.025	0.0	0.0
IFS	0	0.005	0.0	0.0
Spare tire carrier	2	4.813	-0.5	2.5
Sprung weight	1543		1286.7 1287	256.0 256
Unsprung weight	749		282	466
*2 Chassis Cab weight	2292 2290		1569 1570	722 720

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB51GR4SFBC (110 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.2	-2.8
Steering system	40	-0.719	48.0	-7.6
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	24	-1.000	29.6	-6.1
Air intake system	24	0.524	20.5	3.2
Parking brake system	5	0.826	4.1	1.1
Remote control system	15	0.435	13.3	1.7
Cab assembly, Front cab mounting	345	-0.300	372.2	-26.9
Cooling system	19	-0.315	20.1	-1.5
Engine, Transmission assembly	400	0.401	358.5	41.7
Rear cab mounting	44	-0.223	46.5	-2.5
Battery	28	0.889	21.5	6.5
Fuel system	112	2.325	44.4	67.6
Exhaust system	32	1.420	20.2	11.8
Propeller shaft assembly	23	2.416	8.5	14.3
Electric system	39	-0.800	46.7	-8.0
Frame and others	316	1.925	158.0	157.9
Engine and T/M cover	12	0.401	10.7	1.2
A/C unit	21	-0.780	24.7	-4.2
Electric others	10	1.920	5.0	5.0
ECU	4	-0.896	4.9	-0.9
SCR tank	0	3.025	0.0	0.0
IFS	0	0.005	0.0	0.0
Spare tire carrier	2	4.813	-0.5	2.5
Sprung weight	1525		1270.7 1271	253.9 254
Unsprung weight	741		282	459
*2 Chassis Cab weight	2266 2265		1553 1555	713 710

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB71ER3WFBC (110 kW)

Wheelbase (m) : 3.400

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.6	-3.1
Steering system	40	-0.719	49.0	-8.5
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	21	-1.000	27.2	-6.2
Air intake system	25	0.524	21.1	3.9
Parking brake system	5	0.826	3.9	1.3
Remote control system	9	0.471	7.5	1.2
Cab assembly, Front cab mounting	564	0.240	524.5	39.8
Cooling system	23	-0.315	24.9	-2.1
Engine, Transmission assembly	433	0.401	382.3	51.1
Rear cab mounting	42	0.230	38.7	2.8
Battery	28	0.889	20.7	7.3
Fuel system	112	2.175	40.4	71.6
Exhaust system	31	1.420	18.1	12.9
Propeller shaft assembly	22	2.204	7.8	14.3
Electric system	39	-0.800	47.8	-9.1
Frame and others	304	1.639	157.5	146.6
Engine and T/M cover	3	0.401	2.4	0.3
A/C unit	30	-0.300	32.6	-2.6
Electric others	10	1.700	5.0	5.0
ECU	4	-0.896	5.0	-1.0
SCR tank	0	2.525	0.0	0.0
IFS	0	0.024	0.0	0.0
Spare tire carrier	2	4.363	-0.6	2.6
Sprung weight	1758		1430.0 1430	328.0 328
Unsprung weight	894		325	569
*2 Chassis Cab weight	2652 2650		1755 1755	897 895

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB71GR3SFBC (110 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.2	-2.8
Steering system	40	-0.719	48.0	-7.6
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	21	-1.000	26.5	-5.5
Air intake system	24	0.524	20.5	3.2
Parking brake system	5	0.826	4.1	1.1
Remote control system	9	0.435	7.7	1.0
Cab assembly, Front cab mounting	345	-0.300	372.2	-26.9
Cooling system	22	-0.315	23.3	-1.8
Engine, Transmission assembly	433	0.401	388.3	45.1
Rear cab mounting	44	-0.223	46.5	-2.5
Battery	28	0.889	21.5	6.5
Fuel system	112	2.325	44.4	67.6
Exhaust system	31	1.420	19.6	11.4
Propeller shaft assembly	23	2.416	8.5	14.3
Electric system	39	-0.800	46.7	-8.0
Frame and others	325	1.925	162.3	162.3
Engine and T/M cover	3	0.401	2.4	0.3
A/C unit	21	-0.780	24.7	-4.2
Electric others	10	1.920	5.0	5.0
ECU	4	-0.896	4.9	-0.9
SCR tank	0	3.025	0.0	0.0
IFS	0	0.005	0.0	0.0
Spare tire carrier	2	4.813	-0.5	2.5
Sprung weight	1551		1290.4 1290	260.0 260
Unsprung weight	894		325	569
*2 Chassis Cab weight	2445 2445		1615 1615	829 830

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB71GR3WFBC (110 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10.5	-1.012	13.2	-2.8
Steering system	40.5	-0.719	48.0	-7.6
Engine control system	0.4	-1.000	0.5	-0.1
Brake, clutch control system	21.0	-1.000	26.5	-5.5
Air intake system	25.0	0.716	20.3	4.6
Parking brake system	5.2	0.826	4.1	1.1
Remote control system	8.7	0.435	7.7	1.0
Cab assembly, Front cab mounting	564.3	0.240	529.1	35.2
Cooling system	21.5	-0.315	23.3	-1.8
Engine, Transmission assembly	419.4	0.401	375.7	43.7
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	41.5	0.230	39.0	2.5
Battery	28.0	0.889	21.5	6.5
Fuel system	114.0	2.325	45.2	68.8
Exhaust system	31.0	1.420	19.6	11.4
Propeller shaft assembly	22.8	2.416	8.5	14.3
Electric system	38.7	-0.800	46.7	-8.0
Frame and others	324.6	1.925	162.3	162.3
Engine and T/M cover	2.7	0.401	2.4	0.3
A/C unit	30.0	-0.300	32.3	-2.3
Electric others	10.0	1.920	5.0	5.0
ECU	4.0	-0.896	4.9	-0.9
SCR tank	0.0	3.025	0.0	0.0
Spare tire career	2.0	4.813	-0.5	2.5
Miscellaneous	13.0	0.415	11.6	1.4
Sprung weight	1779		1446.9 1447	331.6 332
Unsprung weight	894		325	569
Chassis Cab weight *2	2673 2675		1772 1775	901 900

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB71GR4SFBC (110 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.2	-2.8
Steering system	40	-0.719	48.0	-7.6
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	24	-1.000	29.6	-6.1
Air intake system	24	0.524	20.5	3.2
Parking brake system	5	0.826	4.1	1.1
Remote control system	15	0.435	13.3	1.7
Cab assembly, Front cab mounting	345	-0.300	372.2	-26.9
Cooling system	19	-0.315	20.1	-1.5
Engine, Transmission assembly	400	0.401	358.5	41.7
Rear cab mounting	44	-0.223	46.5	-2.5
Battery	28	0.889	21.5	6.5
Fuel system	112	2.325	44.4	67.6
Exhaust system	32	1.420	20.2	11.8
Propeller shaft assembly	23	2.416	8.5	14.3
Electric system	39	-0.800	46.7	-8.0
Frame and others	325	1.925	162.3	162.3
Engine and T/M cover	12	0.401	10.7	1.2
A/C unit	21	-0.780	24.7	-4.2
Electric others	10	1.920	5.0	5.0
ECU	4	-0.896	4.9	-0.9
SCR tank	0	3.025	0.0	0.0
IFS	0	0.005	0.0	0.0
Spare tire carrier	2	4.813	-0.5	2.5
Sprung weight	1533		1275.0 1275	258.3 258
Unsprung weight	894		325	569
Chassis Cab weight *2	2427 2425		1600 1600	827 825

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB71GR4WFBC (110 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10.5	-1.012	13.2	-2.8
Steering system	40.5	-0.719	48.0	-7.6
Engine control system	0.4	-1.000	0.5	-0.1
Brake, clutch control system	23.5	-1.000	29.6	-6.1
Air intake system	25.0	0.716	20.3	4.6
Parking brake system	5.2	0.826	4.1	1.1
Remote control system	15.0	0.435	13.3	1.7
Cab assembly, Front cab mounting	564.3	0.240	529.1	35.2
Cooling system	18.6	-0.315	20.1	-1.5
Engine, Transmission assembly	387.7	0.401	347.3	40.4
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	41.5	0.230	39.0	2.5
Battery	28.0	0.889	21.5	6.5
Fuel system	114.0	2.325	45.2	68.8
Exhaust system	32.0	1.420	20.2	11.8
Propeller shaft assembly	22.8	2.416	8.5	14.3
Electric system	38.7	-0.800	46.7	-8.0
Frame and others	324.6	1.925	162.3	162.3
Engine and T/M cover	11.9	0.401	10.7	1.2
A/C unit	30.0	-0.300	32.3	-2.3
Electric others	10.0	1.920	5.0	5.0
ECU	4.0	-0.896	4.9	-0.9
SCR tank	0.0	3.025	0.0	0.0
Spare tire career	2.0	4.813	-0.5	2.5
Sprung weight	1750		1421.3 1421	328.6 329
Unsprung weight	894		325	569
Chassis Cab weight *2	2644 2645		1746 1745	898 900

*1: From front axle center
*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB91ER3WFBD (129 kW)

Wheelbase (m) : 3.400

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.6	-3.1
Steering system	41	-0.719	49.1	-8.6
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	21	-1.000	27.2	-6.2
Air intake system	25	0.524	21.1	3.9
Parking brake system	5	0.826	3.9	1.3
Remote control system	9	0.471	7.5	1.2
Cab assembly, Front cab mounting	564	0.240	524.5	39.8
Cooling system	23	-0.315	24.9	-2.1
Engine, Transmission assembly	433	0.401	382.3	51.1
Rear cab mounting	42	0.230	38.7	2.8
Battery	28	0.889	20.7	7.3
Fuel system	112	2.175	40.4	71.6
Exhaust system	59	2.232	20.1	38.4
Propeller shaft assembly	22	2.204	7.8	14.3
Electric system	39	-0.800	47.8	-9.1
Frame and others	306	1.638	158.6	147.5
Engine and T/M cover	3	0.401	2.4	0.3
A/C unit	30	-0.300	32.6	-2.6
Electric others	10	1.700	5.0	5.0
ECU	4	-0.896	5.0	-1.0
SCR tank	18	2.525	4.6	13.4
IFS	0	0.024	0.0	0.0
Spare tire carrier	2	4.363	-0.6	2.6
Sprung weight	1805		1437.8 1438	367.7 368
Unsprung weight	895		325	570
*2 Chassis Cab weight	2700 2700		1763 1765	938 935

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB91GR3WFBD (129 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.2	-2.8
Steering system	41	-0.719	48.1	-7.6
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	21	-1.000	26.5	-5.5
Air intake system	25	0.524	21.6	3.4
Parking brake system	5	0.826	4.1	1.1
Remote control system	9	0.435	7.7	1.0
Cab assembly, Front cab mounting	564	0.240	529.1	35.2
Cooling system	23	-0.315	24.6	-1.9
Engine, Transmission assembly	433	0.401	388.3	45.1
Rear cab mounting	42	0.230	39.0	2.5
Battery	28	0.889	21.5	6.5
Fuel system	112	2.325	44.4	67.6
Exhaust system	54	2.107	24.2	29.3
Propeller shaft assembly	23	2.430	8.4	14.4
Electric system	39	-0.800	46.7	-8.0
Frame and others	325	1.925	162.6	162.5
Engine and T/M cover	3	0.401	2.4	0.3
A/C unit	30	-0.300	32.3	-2.3
Electric others	10	1.920	5.0	5.0
ECU	4	-0.896	4.9	-0.9
SCR tank	18	3.025	3.9	14.1
IFS	0	0.000	0.0	0.0
Spare tire carrier	2	4.813	-0.5	2.5
Sprung weight	1820		1458.6 1459	361.4 361
Unsprung weight	895		325	570
Chassis Cab weight *2	2715 2715		1784 1785	931 930

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEB91GR4WFBD (129 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.2	-2.8
Steering system	41	-0.719	48.1	-7.6
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	24	-1.000	29.6	-6.1
Air intake system	25	0.524	21.6	3.4
Parking brake system	5	0.826	4.1	1.1
Remote control system	15	0.435	13.3	1.7
Cab assembly, Front cab mounting	570	0.240	534.7	35.6
Cooling system	20	-0.315	21.4	-1.6
Engine, Transmission assembly	400	0.401	358.5	41.7
Rear cab mounting	42	0.230	39.0	2.5
Battery	28	0.889	21.5	6.5
Fuel system	112	2.325	44.4	67.6
Exhaust system	62	2.107	28.1	33.9
Propeller shaft assembly	23	2.430	8.4	14.4
Electric system	39	-0.800	46.7	-8.0
Frame and others	325	1.925	162.5	162.4
Engine and T/M cover	6	0.401	5.2	0.6
A/C unit	30	-0.300	32.3	-2.3
Electric others	10	1.920	5.0	5.0
ECU	4	-0.896	4.9	-0.9
SCR tank	18	3.025	3.9	14.1
IFS	0	0.000	0.0	0.0
Spare tire carrier	2	4.813	-0.5	2.5
Sprung weight	1810		1446.5 1447	363.6 364
Unsprung weight	895		325	570
*2 Chassis Cab weight	2705 2705		1772 1770	934 935

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEC71ER3SFBC (110 kW)

Wheelbase (m) : 3.400

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.6	-3.1
Steering system	41	-0.719	49.1	-8.6
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	21	-1.000	27.2	-6.2
Air intake system	24	0.524	20.0	3.7
Parking brake system	5	0.826	3.9	1.3
Remote control system	9	0.471	7.5	1.2
Cab assembly, Front cab mounting	345	-0.300	375.8	-30.5
Cooling system	22	-0.315	23.5	-2.0
Engine, Transmission assembly	433	0.401	382.3	51.1
Rear cab mounting	44	-0.223	46.9	-2.9
Battery	28	0.889	20.7	7.3
Fuel system	112	1.825	51.9	60.1
Exhaust system	32	1.420	18.6	13.4
Propeller shaft assembly	22	2.190	7.9	14.2
Electric system	39	-0.800	47.8	-9.1
Frame and others	306	1.860	138.5	167.3
Engine and T/M cover	3	0.401	2.4	0.3
A/C unit	21	-0.780	25.2	-4.7
Electric others	10	1.700	5.0	5.0
ECU	4	-0.896	5.1	-1.1
SCR tank	0	2.575	0.0	0.0
IFS	0	0.005	0.0	0.0
Spare tire carrier	2	4.363	-0.6	2.6
Sprung weight	1532		1272.9 1273	259.2 259
Unsprung weight	899		325	574
*2 Chassis Cab weight	2431 2430		1598 1600	833 830

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEC71ER4SFBC (110 kW)

Wheelbase (m) : 3.400

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.6	-3.1
Steering system	41	-0.719	49.1	-8.6
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	24	-1.000	30.4	-6.9
Air intake system	24	0.524	20.0	3.7
Parking brake system	5	0.826	3.9	1.3
Remote control system	15	0.471	12.9	2.1
Cab assembly, Front cab mounting	345	-0.300	375.8	-30.5
Cooling system	19	-0.315	20.3	-1.7
Engine, Transmission assembly	400	0.401	353.0	47.2
Rear cab mounting	44	-0.223	46.9	-2.9
Battery	28	0.889	20.7	7.3
Fuel system	112	1.825	51.9	60.1
Exhaust system	33	1.420	19.2	13.8
Propeller shaft assembly	22	2.190	7.9	14.2
Electric system	39	-0.800	47.8	-9.1
Frame and others	304	1.860	137.6	166.2
Engine and T/M cover	10	0.401	9.2	1.2
A/C unit	21	-0.780	25.2	-4.7
Electric others	10	1.700	5.0	5.0
ECU	4	-0.896	5.1	-1.1
SCR tank	0	2.575	0.0	0.0
IFS	0	0.005	0.0	0.0
Spare tire carrier	2	4.363	-0.6	2.6
Sprung weight	1511		1255.5 1256	256.0 256
Unsprung weight	899		325	574
Chassis Cab weight *2	2410 2410		1581 1580	830 830

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEC91GR3SFBD (129 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.2	-2.8
Steering system	41	-0.719	48.1	-7.6
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	21	-1.000	26.5	-5.5
Air intake system	24	0.524	20.5	3.2
Parking brake system	5	0.826	4.1	1.1
Remote control system	9	0.435	7.7	1.0
Cab assembly, Front cab mounting	345	-0.300	372.2	-26.9
Cooling system	22	-0.315	23.3	-1.8
Engine, Transmission assembly	433	0.401	388.3	45.1
Rear cab mounting	44	-0.223	46.5	-2.5
Battery	28	0.889	21.5	6.5
Fuel system	112	2.325	44.4	67.6
Exhaust system	55	2.099	24.8	29.7
Propeller shaft assembly	23	2.416	8.5	14.3
Electric system	39	-0.800	46.7	-8.0
Frame and others	329	2.200	140.8	187.7
Engine and T/M cover	3	0.401	2.4	0.3
A/C unit	21	-0.780	24.7	-4.2
Electric others	10	1.920	5.0	5.0
ECU	4	-0.896	5.1	-1.0
SCR tank	18	3.025	3.9	14.1
IFS	0	0.005	0.0	0.0
Spare tire carrier	2	4.813	-0.5	2.5
Sprung weight	1596		1278.3 1278	317.7 318
Unsprung weight	899		325	574
*2 Chassis Cab weight	2495 2495		1603 1605	892 890

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEC91GR4SFBD (129 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	13.2	-2.8
Steering system	41	-0.719	48.1	-7.6
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	24	-1.000	29.6	-6.1
Air intake system	24	0.524	20.5	3.2
Parking brake system	5	0.826	4.1	1.1
Remote control system	15	0.435	13.3	1.7
Cab assembly, Front cab mounting	345	-0.300	372.2	-26.9
Cooling system	19	-0.315	20.1	-1.5
Engine, Transmission assembly	400	0.401	358.5	41.7
Rear cab mounting	44	-0.223	46.5	-2.5
Battery	28	0.889	21.5	6.5
Fuel system	112	2.325	44.4	67.6
Exhaust system	56	2.099	25.2	30.3
Propeller shaft assembly	23	2.416	8.5	14.3
Electric system	39	-0.800	46.7	-8.0
Frame and others	328	2.200	140.4	187.1
Engine and T/M cover	15	0.401	13.5	1.6
A/C unit	21	-0.780	24.7	-4.2
Electric others	10	1.920	5.0	5.0
ECU	4	-0.896	5.1	-1.0
SCR tank	18	3.025	3.9	14.1
IFS	0	0.005	0.0	0.0
Spare tire carrier	2	4.813	-0.5	2.5
Sprung weight	1581		1265.1 1265	316.0 316
Unsprung weight	899		325	574
Chassis Cab weight *2	2480 2480		1590 1590	890 890

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEC91HR3SFBD (129 kW)

Wheelbase (m) : 4.300

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	12.9	-2.5
Steering system	41	-0.719	47.3	-6.8
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	21	-1.000	25.9	-4.9
Air intake system	24	0.524	20.8	2.9
Parking brake system	5	0.826	4.2	1.0
Remote control system	9	0.276	8.1	0.6
Cab assembly, Front cab mounting	345	-0.300	369.4	-24.1
Cooling system	22	-0.315	23.1	-1.6
Engine, Transmission assembly	433	0.401	393.0	40.4
Rear cab mounting	44	-0.223	46.3	-2.3
Battery	28	0.889	22.2	5.8
Fuel system	112	2.325	51.4	60.6
Exhaust system	55	2.037	28.7	25.8
Propeller shaft assembly	35	2.653	13.3	21.3
Electric system	39	-0.800	45.9	-7.2
Frame and others	352	2.361	158.7	193.3
Engine and T/M cover	3	0.401	2.5	0.3
A/C unit	21	-0.780	24.2	-3.7
Electric others	10	2.020	5.3	4.7
ECU	4	-0.896	5.0	-0.9
SCR tank	18	3.075	5.1	12.9
IFS	0	0.005	0.0	0.0
Spare tire carrier	2	5.363	-0.5	2.5
Sprung weight	1632		1313.4 1313	318.0 318
Unsprung weight	899		325	574
Chassis Cab weight *2	2531 2530		1638 1640	892 890

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEC91HR4SFBD (129 kW)

Wheelbase (m) : 4.300

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	12.9	-2.5
Steering system	41	-0.719	47.3	-6.8
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	24	-1.000	29.0	-5.5
Air intake system	24	0.524	20.8	2.9
Parking brake system	5	0.826	4.2	1.0
Remote control system	15	0.276	14.0	1.0
Cab assembly, Front cab mounting	345	-0.300	369.4	-24.1
Cooling system	19	-0.315	19.9	-1.4
Engine, Transmission assembly	400	0.401	362.9	37.3
Rear cab mounting	44	-0.223	46.3	-2.3
Battery	28	0.889	22.2	5.8
Fuel system	112	2.325	51.4	60.6
Exhaust system	56	2.037	29.2	26.3
Propeller shaft assembly	35	2.653	13.3	21.3
Electric system	39	-0.800	45.9	-7.2
Frame and others	352	2.361	158.6	193.2
Engine and T/M cover	15	0.401	13.7	1.4
A/C unit	21	-0.780	24.2	-3.7
Electric others	10	2.020	5.3	4.7
ECU	4	-0.896	5.0	-0.9
SCR tank	18	3.075	5.1	12.9
IFS	0	0.000	0.0	0.0
Spare tire carrier	2	5.363	-0.5	2.5
Sprung weight	1617		1300.7 1301	316.4 316
Unsprung weight	899		325	574
Chassis Cab weight *2	2516 2515		1626 1625	890 890

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEC91KR3SFBD (129 kW)

Wheelbase (m) : 4.750

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	12.7	-2.2
Steering system	41	-0.719	46.6	-6.1
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	21	-1.000	25.4	-4.4
Air intake system	24	0.524	21.1	2.6
Parking brake system	5	0.826	4.3	0.9
Remote control system	9	0.259	8.2	0.5
Cab assembly, Front cab mounting	345	-0.300	367.1	-21.8
Cooling system	22	-0.315	22.9	-1.4
Engine, Transmission assembly	433	0.401	396.8	36.6
Rear cab mounting	44	-0.223	46.1	-2.1
Battery	28	0.889	22.8	5.2
Fuel system	112	2.325	57.2	54.8
Exhaust system	55	2.037	31.1	23.4
Propeller shaft assembly	37	2.877	14.7	22.6
Electric system	39	-0.800	45.2	-6.5
Frame and others	368	2.630	164.4	203.9
Engine and T/M cover	3	0.401	2.5	0.2
A/C unit	21	-0.780	23.9	-3.4
Electric others	10	2.110	5.6	4.4
ECU	4	-0.896	4.9	-0.8
SCR tank	18	3.075	6.3	11.7
IFS	0	0.000	0.0	0.0
Spare tire carrier	2	5.813	-0.4	2.4
Sprung weight	1650		1330.0 1330	320.4 320
Unsprung weight	899		325	574
*2 Chassis Cab weight	2549 2550		1655 1655	894 895

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FEC91KR4SFBD (129 kW)

Wheelbase (m) : 4.750

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10	-1.012	12.7	-2.2
Steering system	41	-0.719	46.6	-6.1
Engine control system	1	-1.000	0.6	-0.1
Brake, clutch control system	24	-1.000	28.4	-4.9
Air intake system	24	0.524	21.1	2.6
Parking brake system	5	0.826	4.3	0.9
Remote control system	15	0.259	14.2	0.8
Cab assembly, Front cab mounting	345	-0.300	367.1	-21.8
Cooling system	19	-0.315	19.8	-1.2
Engine, Transmission assembly	400	0.401	366.4	33.8
Rear cab mounting	44	-0.223	46.1	-2.1
Battery	28	0.889	22.8	5.2
Fuel system	112	2.325	57.2	54.8
Exhaust system	56	2.037	31.7	23.8
Propeller shaft assembly	37	2.877	14.7	22.6
Electric system	39	-0.800	45.2	-6.5
Frame and others	368	2.630	164.3	203.7
Engine and T/M cover	15	0.401	13.8	1.3
A/C unit	21	-0.780	23.9	-3.4
Electric others	10	2.110	5.6	4.4
ECU	4	-0.896	4.9	-0.8
SCR tank	18	3.075	6.3	11.7
IFS	0	0.000	0.0	0.0
Spare tire carrier	2	5.813	-0.4	2.4
Sprung weight	1636		1317.3 1317	318.9 319
Unsprung weight	899		325	574
*2 Chassis Cab weight	2535 2535		1642 1640	893 895

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FECX1GR3SFBD (129 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10.5	-1.012	13.2	-2.8
Steering system	40.5	-0.719	48.1	-7.6
Engine control system	0.4	-1.000	0.5	-0.1
Brake, clutch control system	21.0	-1.000	26.5	-5.5
Air intake system	23.7	0.524	20.5	3.2
Parking brake system	5.2	0.826	4.1	1.1
Remote control system	8.7	0.435	7.7	1.0
Cab assembly, Front cab mounting	345.3	-0.300	372.2	-26.9
Cooling system	21.5	-0.315	23.3	-1.8
Engine, Transmission assembly	419.4	0.401	375.7	43.7
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	44.0	-0.223	46.5	-2.5
Battery	28.0	0.889	21.5	6.5
Fuel system	114.0	2.325	45.2	68.8
Exhaust system	54.5	2.099	24.8	29.7
Propeller shaft assembly	22.8	2.416	8.5	14.3
Electric system	38.7	-0.800	46.7	-8.0
Frame and others	327.5	2.200	140.4	187.1
Engine and T/M cover	2.7	0.401	2.4	0.3
A/C unit	20.5	-0.780	24.7	-4.2
Electric others	10.0	1.920	5.0	5.0
ECU	4.2	-0.896	5.1	-1.0
SCR tank	17.7	3.025	3.8	13.9
Spare tire career	2.0	4.813	-0.5	2.5
Sprung weight	1583		1265.9 1266	316.7 317
Unsprung weight	886		312	574
Chassis Cab weight *2	2469 2470		1578 1580	891 890

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FECX1GR3WFBD (129 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10.5	-1.012	13.2	-2.8
Steering system	40.5	-0.719	48.1	-7.6
Engine control system	0.4	-1.000	0.5	-0.1
Brake, clutch control system	21.0	-1.000	26.5	-5.5
Air intake system	25.0	0.716	20.3	4.6
Parking brake system	5.2	0.826	4.1	1.1
Remote control system	8.7	0.435	7.7	1.0
Cab assembly, Front cab mounting	564.3	0.240	529.1	35.2
Cooling system	21.5	-0.315	23.3	-1.8
Engine, Transmission assembly	419.4	0.401	375.7	43.7
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	41.5	0.230	39.0	2.5
Battery	28.0	0.889	21.5	6.5
Fuel system	114.0	2.325	45.2	68.8
Exhaust system	54.5	2.099	24.8	29.7
Propeller shaft assembly	22.8	2.416	8.5	14.3
Electric system	38.7	-0.800	46.7	-8.0
Frame and others	327.5	2.200	140.4	187.1
Engine and T/M cover	2.7	0.401	2.4	0.3
A/C unit	30.0	-0.300	32.3	-2.3
Electric others	10.0	1.920	5.0	5.0
ECU	4.2	-0.896	5.1	-1.0
SCR tank	17.7	3.025	3.8	13.9
Spare tire career	2.0	4.813	-0.5	2.5
Sprung weight	1810		1422.7 1423	387.1 387
Unsprung weight	886		312	574
Chassis Cab weight *2	2696 2695		1735 1735	961 960

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FECX1GR4SFBD (129 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10.5	-1.012	13.2	-2.8
Steering system	40.5	-0.719	48.1	-7.6
Engine control system	0.4	-1.000	0.5	-0.1
Brake, clutch control system	23.5	-1.000	29.6	-6.1
Air intake system	23.7	0.524	20.5	3.2
Parking brake system	5.2	0.826	4.1	1.1
Remote control system	15.0	0.435	13.3	1.7
Cab assembly, Front cab mounting	345.3	-0.300	372.2	-26.9
Cooling system	18.6	-0.315	20.1	-1.5
Engine, Transmission assembly	387.7	0.401	347.3	40.4
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	44.0	-0.223	46.5	-2.5
Battery	28.0	0.889	21.5	6.5
Fuel system	114.0	2.325	45.2	68.8
Exhaust system	55.5	2.099	25.2	30.3
Propeller shaft assembly	22.8	2.416	8.5	14.3
Electric system	38.7	-0.800	46.7	-8.0
Frame and others	327.5	2.200	140.4	187.1
Engine and T/M cover	15.1	0.401	13.5	1.6
A/C unit	20.5	-0.780	24.7	-4.2
Electric others	10.0	1.920	5.0	5.0
ECU	4.2	-0.896	5.1	-1.0
SCR tank	17.7	3.025	3.8	13.9
Spare tire career	2.0	4.813	-0.5	2.5
Sprung weight	1570		1254.5 1255	315.7 316
Unsprung weight	886		312	574
Chassis Cab weight *2	2456 2455		1567 1565	890 890

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FECX1GR4WFBD (129 kW)

Wheelbase (m) : 3.850

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10.5	-1.012	13.2	-2.8
Steering system	40.5	-0.719	48.1	-7.6
Engine control system	0.4	-1.000	0.5	-0.1
Brake, clutch control system	23.5	-1.000	29.6	-6.1
Air intake system	25.0	0.716	20.3	4.6
Parking brake system	5.2	0.826	4.1	1.1
Remote control system	15.0	0.435	13.3	1.7
Cab assembly, Front cab mounting	564.3	0.240	529.1	35.2
Cooling system	18.6	-0.315	20.1	-1.5
Engine, Transmission assembly	387.7	0.401	347.3	40.4
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	41.5	0.230	39.0	2.5
Battery	28.0	0.889	21.5	6.5
Fuel system	114.0	2.325	45.2	68.8
Exhaust system	55.5	2.099	25.2	30.3
Propeller shaft assembly	22.8	2.416	8.5	14.3
Electric system	38.7	-0.800	46.7	-8.0
Frame and others	327.5	2.200	140.4	187.1
Engine and T/M cover	15.1	0.401	13.5	1.6
A/C unit	30.0	-0.300	32.3	-2.3
Electric others	10.0	1.920	5.0	5.0
ECU	4.2	-0.896	5.1	-1.0
SCR tank	17.7	3.025	3.8	13.9
Spare tire career	2.0	4.813	-0.5	2.5
Sprung weight	1798		1411.3 1411	386.1 386
Unsprung weight	886		312	574
Chassis Cab weight *2	2684 2685		1723 1725	960 960

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FECX1HR3SFBD (129 kW)

Wheelbase (m) : 4.300

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10.5	-1.012	12.9	-2.5
Steering system	40.5	-0.719	47.3	-6.8
Engine control system	0.4	-1.000	0.5	-0.1
Brake, clutch control system	21.0	-1.000	25.9	-4.9
Air intake system	23.7	0.524	20.8	2.9
Parking brake system	5.2	0.826	4.2	1.0
Remote control system	8.7	0.276	8.1	0.6
Cab assembly, Front cab mounting	345.3	-0.300	369.4	-24.1
Cooling system	21.5	-0.315	23.1	-1.6
Engine, Transmission assembly	419.4	0.401	380.3	39.1
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	44.0	-0.223	46.3	-2.3
Battery	28.0	0.889	22.2	5.8
Fuel system	114.0	2.325	52.4	61.6
Exhaust system	54.5	2.037	28.7	25.8
Propeller shaft assembly	34.6	2.653	13.3	21.3
Electric system	38.7	-0.800	45.9	-7.2
Frame and others	352.1	2.361	158.7	193.3
Engine and T/M cover	2.7	0.401	2.5	0.3
A/C unit	20.5	-0.780	24.2	-3.7
Electric others	10.0	2.020	5.3	4.7
ECU	4.2	-0.896	5.0	-0.9
SCR tank	17.7	3.075	5.0	12.7
Spare tire career	2.0	5.363	-0.5	2.5
Sprung weight	1619		1301.5 1302	317.5 317
Unsprung weight	886		312	574
Chassis Cab weight *2	2505 2505		1614 1615	891 890

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FECX1HR4SFBD (129 kW)

Wheelbase (m) : 4.300

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10.5	-1.012	12.9	-2.5
Steering system	40.5	-0.719	47.3	-6.8
Engine control system	0.4	-1.000	0.5	-0.1
Brake, clutch control system	23.5	-1.000	29.0	-5.5
Air intake system	23.7	0.524	20.8	2.9
Parking brake system	5.2	0.826	4.2	1.0
Remote control system	15.0	0.276	14.0	1.0
Cab assembly, Front cab mounting	345.3	-0.300	369.4	-24.1
Cooling system	18.6	-0.315	19.9	-1.4
Engine, Transmission assembly	387.7	0.401	351.5	36.2
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	44.0	-0.223	46.3	-2.3
Battery	28.0	0.889	22.2	5.8
Fuel system	114.0	2.325	52.4	61.6
Exhaust system	55.5	2.037	29.2	26.3
Propeller shaft assembly	34.6	2.653	13.3	21.3
Electric system	38.7	-0.800	45.9	-7.2
Frame and others	351.8	2.361	158.6	193.2
Engine and T/M cover	15.1	0.401	13.7	1.4
A/C unit	20.5	-0.780	24.2	-3.7
Electric others	10.0	2.020	5.3	4.7
ECU	4.2	-0.896	5.0	-0.9
SCR tank	17.7	3.075	5.0	12.7
Spare tire career	2.0	5.363	-0.5	2.5
Sprung weight	1606		1290.1 1290	316.1 316
Unsprung weight	886		312	574
Chassis Cab weight *2	2493 2495		1602 1605	890 890

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FECX1KR3SFBD (129 kW)

Wheelbase (m) : 4.750

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10.5	-1.012	12.7	-2.2
Steering system	40.5	-0.719	46.6	-6.1
Engine control system	0.4	-1.000	0.5	-0.1
Brake, clutch control system	21.0	-1.000	25.4	-4.4
Air intake system	23.7	0.524	21.1	2.6
Parking brake system	5.2	0.826	4.3	0.9
Remote control system	8.7	0.259	8.2	0.5
Cab assembly, Front cab mounting	345.3	-0.300	367.1	-21.8
Cooling system	21.5	-0.315	22.9	-1.4
Engine, Transmission assembly	419.4	0.401	384.0	35.4
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	44.0	-0.223	46.1	-2.1
Battery	28.0	0.889	22.8	5.2
Fuel system	114.0	2.325	58.2	55.8
Exhaust system	54.5	2.037	31.1	23.4
Propeller shaft assembly	37.3	2.877	14.7	22.6
Electric system	38.7	-0.800	45.2	-6.5
Frame and others	368.3	2.630	164.4	203.9
Engine and T/M cover	2.7	0.401	2.5	0.2
A/C unit	20.5	-0.780	23.9	-3.4
Electric others	10.0	2.110	5.6	4.4
ECU	4.2	-0.896	4.9	-0.8
SCR tank	17.7	3.075	6.2	11.5
Spare tire career	2.0	5.813	-0.4	2.4
Sprung weight	1638		1318.0 1318	320.0 320
Unsprung weight	886		312	574
Chassis Cab weight *2	2524 2525		1630 1630	894 895

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FECX1KR4SFBD (129 kW)

Wheelbase (m) : 4.750

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	10.5	-1.012	12.7	-2.2
Steering system	40.5	-0.719	46.6	-6.1
Engine control system	0.4	-1.000	0.5	-0.1
Brake, clutch control system	23.5	-1.000	28.4	-4.9
Air intake system	23.7	0.524	21.1	2.6
Parking brake system	5.2	0.826	4.3	0.9
Remote control system	15.0	0.259	14.2	0.8
Cab assembly, Front cab mounting	345.3	-0.300	367.1	-21.8
Cooling system	18.6	-0.315	19.8	-1.2
Engine, Transmission assembly	387.7	0.401	355.0	32.7
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	44.0	-0.223	46.1	-2.1
Battery	28.0	0.889	22.8	5.2
Fuel system	114.0	2.325	58.2	55.8
Exhaust system	55.5	2.037	31.7	23.8
Propeller shaft assembly	37.3	2.877	14.7	22.6
Electric system	38.7	-0.800	45.2	-6.5
Frame and others	368.0	2.630	164.3	203.7
Engine and T/M cover	15.1	0.401	13.8	1.3
A/C unit	20.5	-0.780	23.9	-3.4
Electric others	10.0	2.110	5.6	4.4
ECU	4.2	-0.896	4.9	-0.8
SCR tank	17.7	3.075	6.2	11.5
Spare tire career	2.0	5.813	-0.4	2.4
Sprung weight	1625		1306.7 1307	318.6 319
Unsprung weight	886		312	574
Chassis Cab weight *2	2511 2510		1619 1620	893 890

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FGB71CR6SFBC (110 kW)

Wheelbase (m) : 2.815

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	11.0	-0.997	14.9	-3.9
Steering system	40.5	-0.704	50.6	-10.1
Engine control system	0.4	-1.000	0.6	-0.2
Brake, clutch control system	23.5	-0.985	31.7	-8.2
Air intake system	24.0	-0.509	28.3	-4.3
Parking brake system	6.2	0.100	6.0	0.2
Remote control system	15.0	0.211	13.9	1.1
Cab assembly, Front cab mounting	345.3	-0.285	380.3	-35.0
Cooling system	35.0	-0.305	38.8	-3.8
Engine, Transmission assembly	482.4	0.530	391.6	90.8
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	44.0	-0.208	47.3	-3.3
Battery	28.0	0.904	19.0	9.0
Fuel system	114.0	1.745	43.3	70.7
Exhaust system	59.0	1.278	32.2	26.8
Propeller shaft assembly	22.0	1.955	6.7	15.3
Electric system	38.7	-0.338	43.3	-4.6
Frame and others	312.2	1.415	155.3	156.9
Engine and T/M cover	2.4	0.401	2.1	0.3
A/C unit	27.0	-0.765	34.3	-7.3
Electric others	10.0	1.470	4.8	5.2
ECU	4.0	-0.896	5.3	-1.3
SCR tank	0.0	0.000	0.0	0.0
Spare tire career	2.0	3.678	-0.6	2.6
Sprung weight	1647		1349.7 1350	296.9 297
Unsprung weight	989		415	574
Chassis Cab weight *2	2636 2635		1765 1765	871 870

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FGB71ER4WFBC (110 kW)

Wheelbase (m) : 3.415

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	11	-0.997	14.2	-3.2
Steering system	40	-0.704	48.8	-8.3
Engine control system	0	-1.000	0.6	-0.1
Brake, clutch control system	24	-0.985	30.3	-6.8
Air intake system	24	-0.509	27.6	-3.6
Parking brake system	6	0.100	6.0	0.2
Remote control system	15	0.211	14.1	0.9
Cab assembly, Front cab mounting	565	0.255	523.1	42.2
Cooling system	33	-0.305	35.9	-2.9
Engine, Transmission assembly	456	0.530	384.8	70.7
Rear cab mounting	42	0.245	39.0	3.0
Battery	28	0.904	20.6	7.4
Fuel system	114	1.895	50.7	63.3
Exhaust system	58	1.319	35.6	22.4
Propeller shaft assembly	32	2.275	10.7	21.3
Electric system	39	-0.794	47.7	-9.0
Frame and others	336	1.882	151.0	185.4
Engine and T/M cover	7	0.401	6.5	0.9
A/C unit	36	-0.765	44.1	-8.1
Electric others	10	1.715	5.0	5.0
ECU	4	-0.896	5.0	-1.0
Spare tire career	2	4.258	-0.5	2.5
Sprung weight	1883		1500.8 1501	382.2 382
Unsprung weight	989		415	574
Chassis Cab weight *2	2872 2870		1916 1915	956 955

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FGB71ER6SFBC (110 kW)

Wheelbase (m) : 3.415

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	11.0	-0.997	14.2	-3.2
Steering system	40.5	-0.704	48.8	-8.3
Engine control system	0.4	-1.000	0.6	-0.1
Brake, clutch control system	23.5	-0.985	30.3	-6.8
Air intake system	24.0	-0.509	27.6	-3.6
Parking brake system	6.2	0.100	6.0	0.2
Remote control system	15.0	0.211	14.1	0.9
Cab assembly, Front cab mounting	345.3	-0.285	374.1	-28.8
Cooling system	35.0	-0.305	38.1	-3.1
Engine, Transmission assembly	482.4	0.530	407.5	74.9
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	44.0	-0.208	46.7	-2.7
Battery	28.0	0.904	20.6	7.4
Fuel system	114.0	1.895	50.7	63.3
Exhaust system	59.0	1.278	36.9	22.1
Propeller shaft assembly	32.0	2.275	10.7	21.3
Electric system	38.7	-0.338	42.5	-3.8
Frame and others	336.4	1.882	151.0	185.4
Engine and T/M cover	2.4	0.401	2.2	0.3
A/C unit	27.0	-0.765	33.0	-6.0
Electric others	10.0	1.715	5.0	5.0
ECU	4.0	-0.896	5.0	-1.0
SCR tank	0.0	0.000	0.0	0.0
Spare tire career	2.0	4.258	-0.5	2.5
Sprung weight	1681		1365.1 1365	315.9 316
Unsprung weight	989		415	574
Chassis Cab weight *2	2670 2670		1780 1780	890 890

*1: From front axle center
*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4 Weight distribution table

Model: FGB71ER6WFBC (110 kW)

Wheelbase (m) : 3.415

Parts name	Weight (Kg)	Distance *1 to center of gravity (m)	Front axle load (Kg)	Rear axle load (Kg)
Front bumper	11.0	-0.997	14.2	-3.2
Steering system	40.5	-0.704	48.8	-8.3
Engine control system	0.4	-1.000	0.6	-0.1
Brake, clutch control system	23.5	-0.985	30.3	-6.8
Air intake system	24.0	-0.509	27.6	-3.6
Parking brake system	6.2	0.100	6.0	0.2
Remote control system	15.0	0.211	14.1	0.9
Cab assembly, Front cab mounting	565.3	0.255	523.1	42.2
Cooling system	33.0	-0.305	35.9	-2.9
Engine, Transmission assembly	482.4	0.530	407.5	74.9
HEV system	0.0	0.000	0.0	0.0
Rear cab mounting	42.0	0.245	39.0	3.0
Battery	28.0	0.904	20.6	7.4
Fuel system	114.0	1.895	50.7	63.3
Exhaust system	58.0	1.319	35.6	22.4
Propeller shaft assembly	32.0	2.275	10.7	21.3
Electric system	38.7	-0.794	47.7	-9.0
Frame and others	336.4	1.882	151.0	185.4
Engine and T/M cover	7.4	0.401	6.5	0.9
A/C unit	36.0	-0.765	44.1	-8.1
Electric others	10.0	1.715	5.0	5.0
ECU	4.0	-0.896	5.0	-1.0
SCR tank	0.0	0.000	0.0	0.0
Spare tire career	2.0	4.258	-0.5	2.5
Sprung weight	1910		1523.5 1524	386.4 386
Unsprung weight	989		415	574
Chassis Cab weight *2	2899 2900		1939 1940	960 960

*1: From front axle center

*2: Chassis cab weight: Include oil, fuel and coolant but exclude tire & disk, tools and persons.

10.4.2 Option equipment

Group	Option	Mass Variation [kg]	Mass Center Position (distance from Fr. Axle center) [m]*1						Remark
			Standard Cab		Wide Cab				
			2WD Single	2WD Double	2WD Single	2WD Double	4WD Single	4WD Double	
Chassis	Heavy duty battery (115D31LX2) 12V tandem	+30 kg	0.889	-	0.889	0.889	0.904	0.904	
	Dual A/C	+33 kg	-	-0.250	-	-0.300	-	-	

Note. - *1 Distance from Fr. Axle Center ; +: backward, -: forward

10.5 Chassis cab drawings

10.5.1 Chassis cab drawings

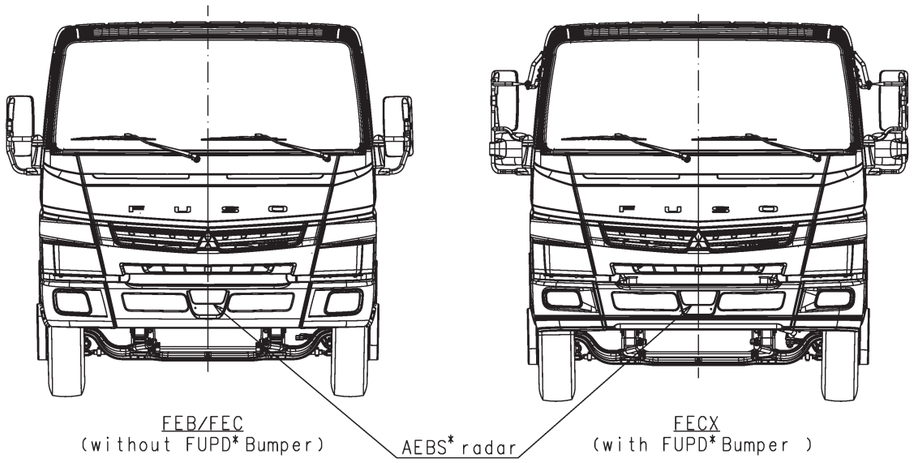
Please refer to the following and replace the model in the drawing with the 19MY model.

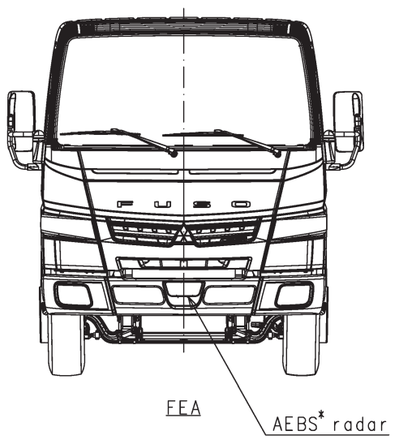
BB⇐AB, BC⇐AC, BD⇐AD, BG⇐AG, BL⇐AL

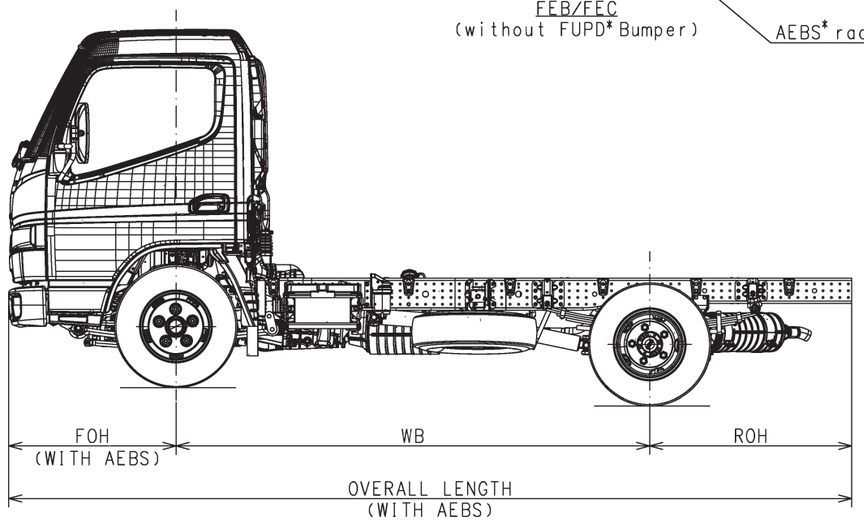
Example: FEA21CR2SF**BB**⇐FEA21CR2SF**AB**

Model	Transmission	Page
Common for FEA, FEB , FEC models with AEBS		102
FEA21CR2SFBB	MT	103
FEB21CR4SFBC		104
FEB21ER4SFBC		105
FEC71ER4SFBC		106
FEB91GR4WFBD		107
FEC91KR4SFBD		108
FEB51ER4SFBC		109
FEB51GR4SFBC		110
FEB71GR4SFBC		111
FEB71GR4WFBC		112
FEC91GR4SFBD		113
FEC91HR4SFBD		114
FECX1GR4SFBD		115
FECX1GR4WFBD		116
FECX1HR4SFBD		117
FECX1KR4SFBD		118
FEA21CR1SFBB	AMT	119
FEA21CR3SFBC		
FEA21ER3SFBC		120
FEA21ER3SFBL		121
FEA21ER3WFBC		122
FEB21CR3SFBC_G		123
FEB21ER3SFBC_G		124
FEB71ER3WFBC		125
FEC71ER3SFBC		126
FEB91ER3WFBD		127
FEB91GR3WFBD		128
FEC91KR3SFBD		129
FEB51ER3SFBC		130
FEB51GR3SFBC		131
FEB71GR3SFBC		132
FEB71GR3WFBC		133
FEC91GR3SFBD		134
FEC91HR3SFBD		135
FECX1GR3SFBD		136

10.5 Chassis cab drawings





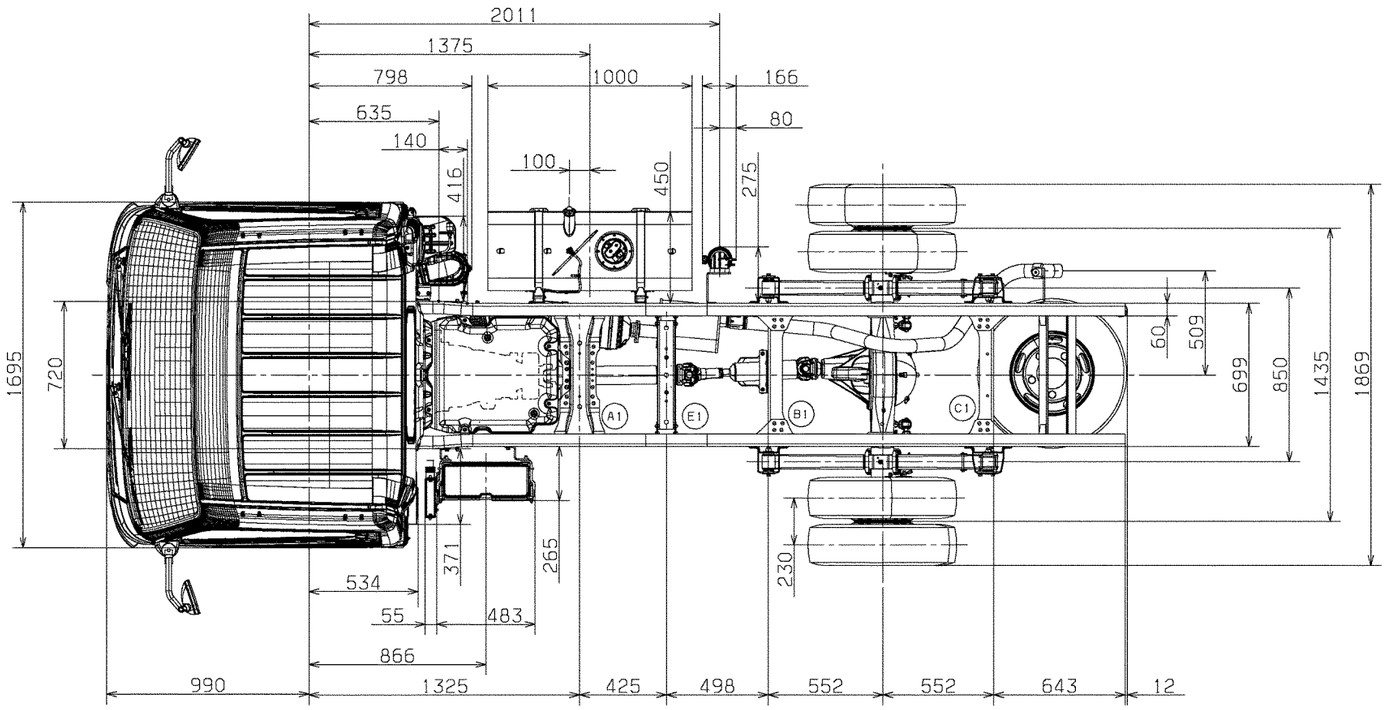


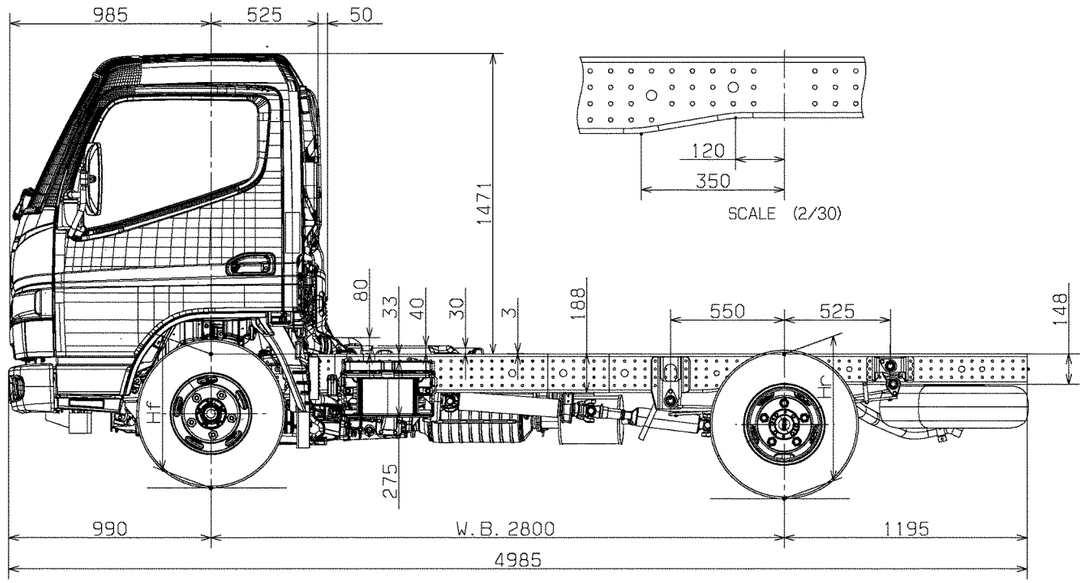
WITH AEBS	
FOH	+5mm
OVERALL LENGTH	

AEBS*: Advanced Emergency Braking System
FUPD*: Front Underrun Protection Device

Note : +5mm compared to without AEBS

10.5 Chassis cab drawings

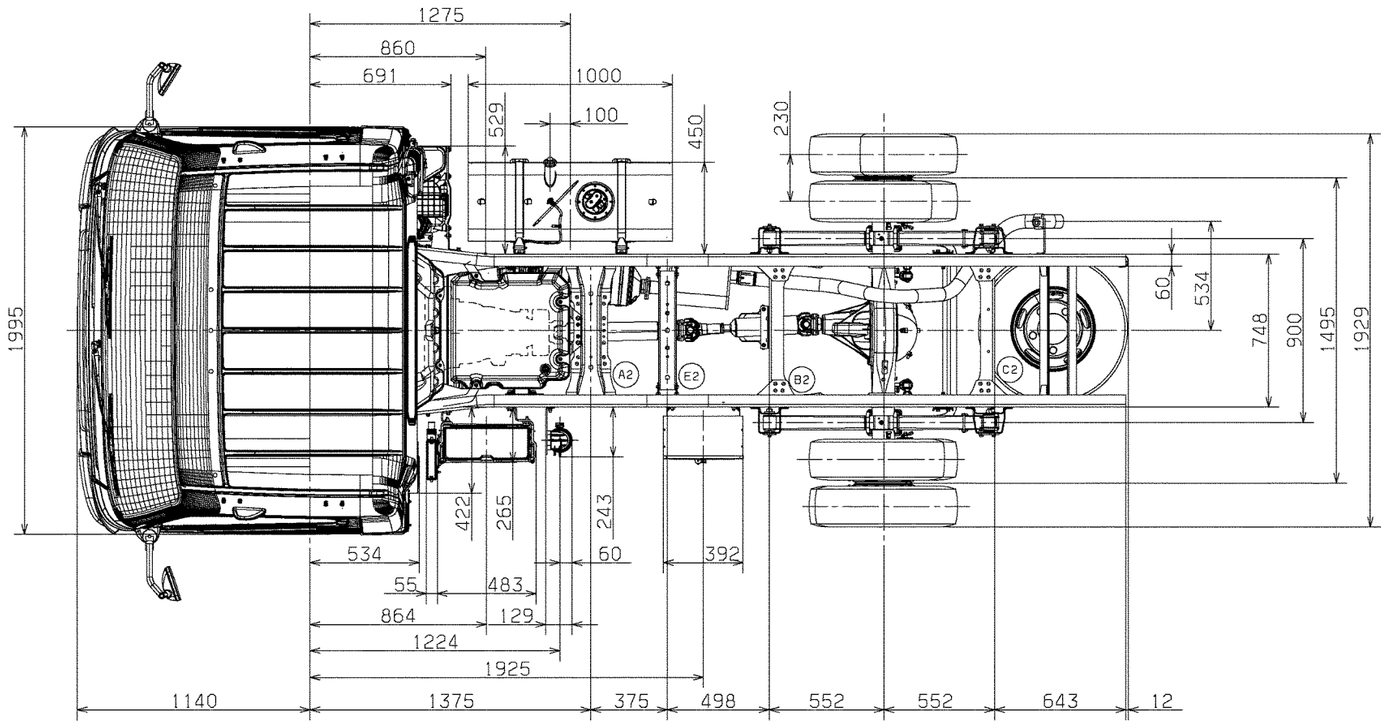


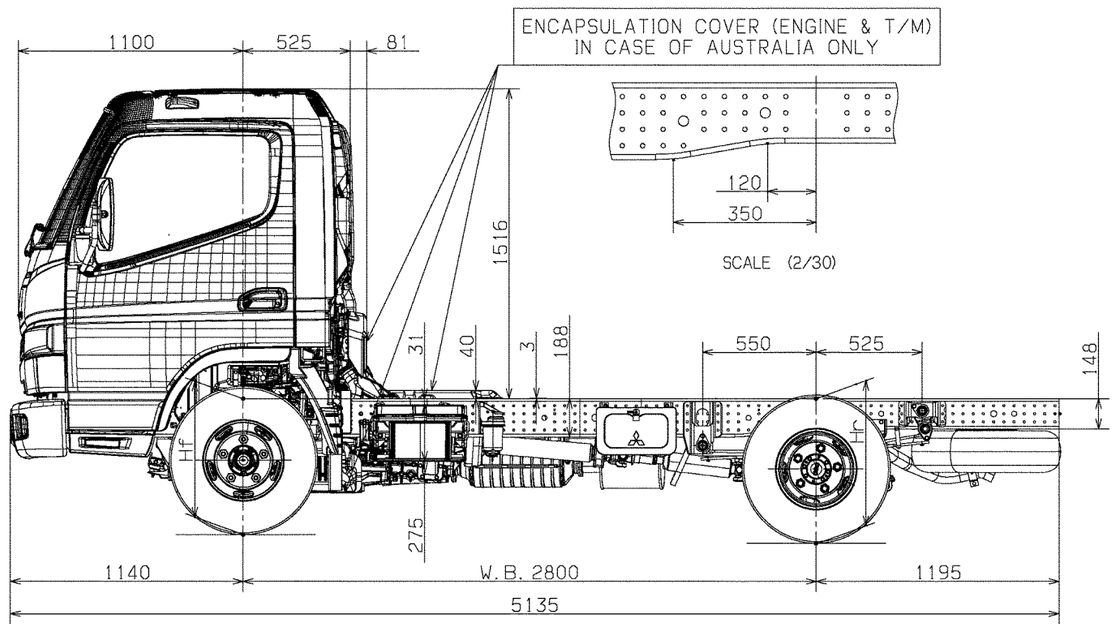


CHASSIS CAB
DRAWINGS

FEA21CR2SFAB
UNIT :mm SCALE :1/30

10.5 Chassis cab drawings

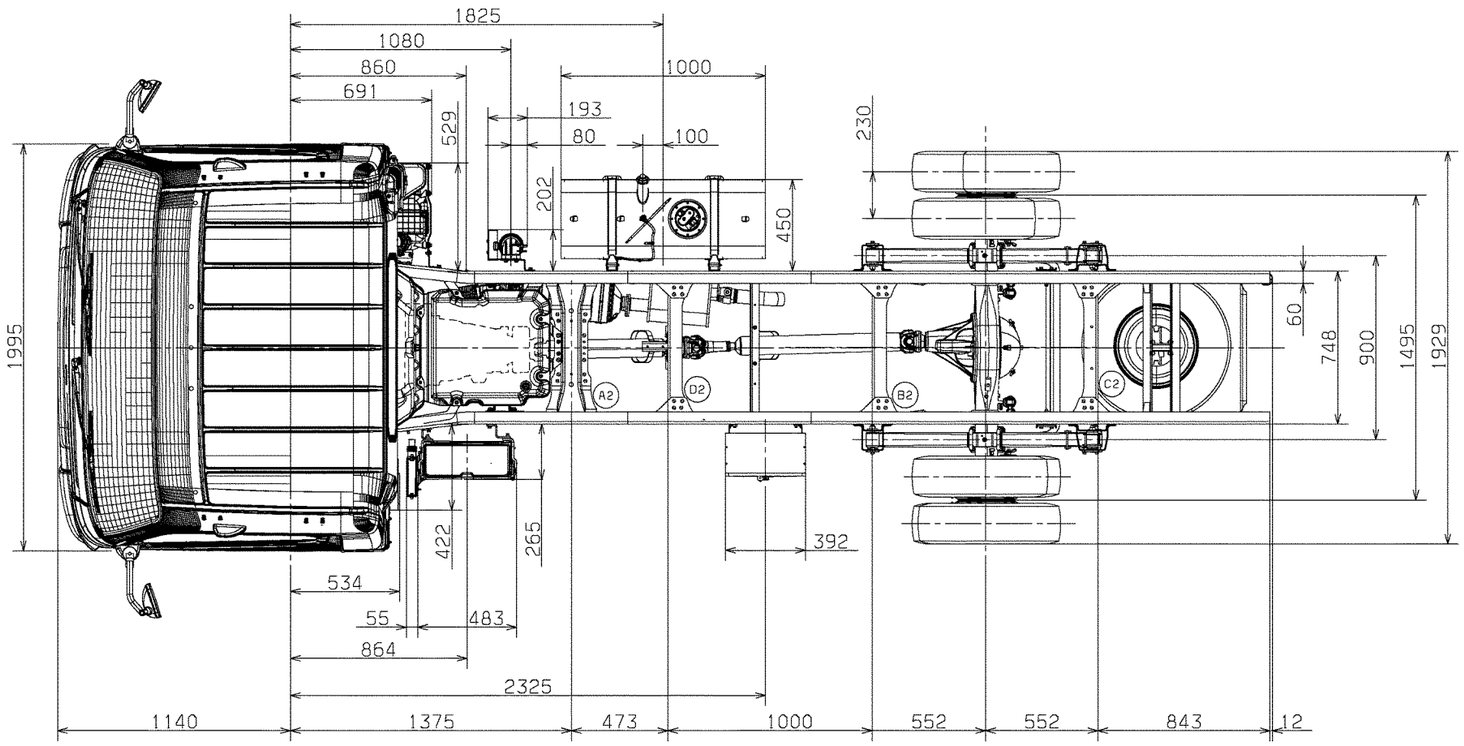


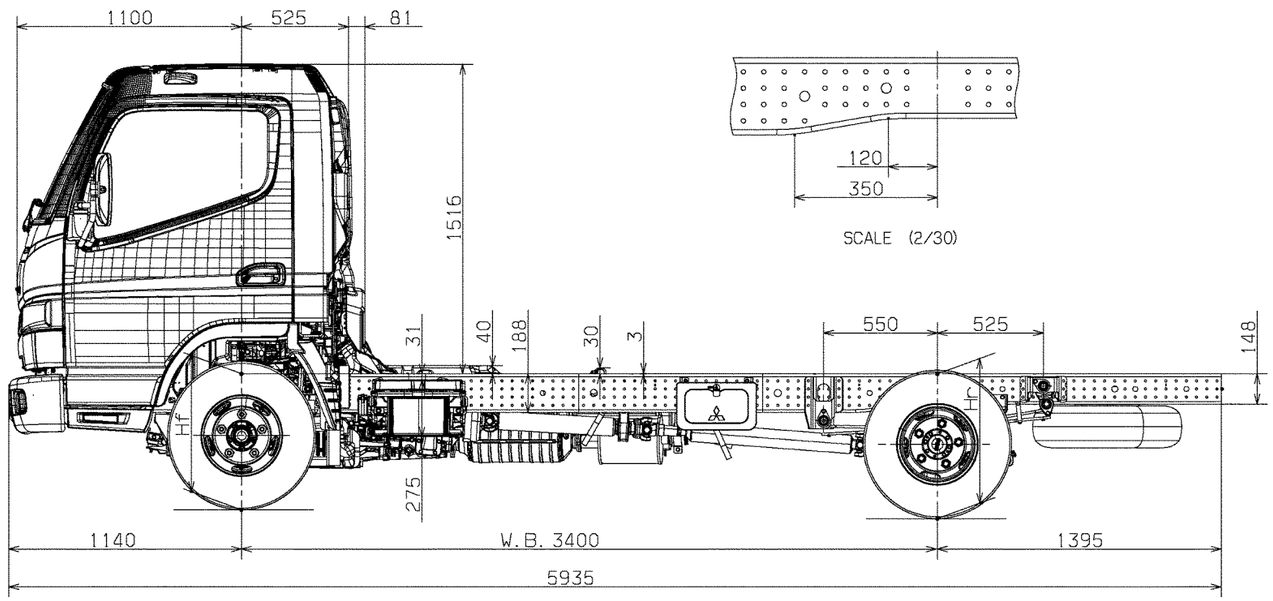


CHASSIS CAB
DRAWINGS

FEB21CR4SFAC
UNIT :mm SCALE :1/30

10.5 Chassis cab drawings

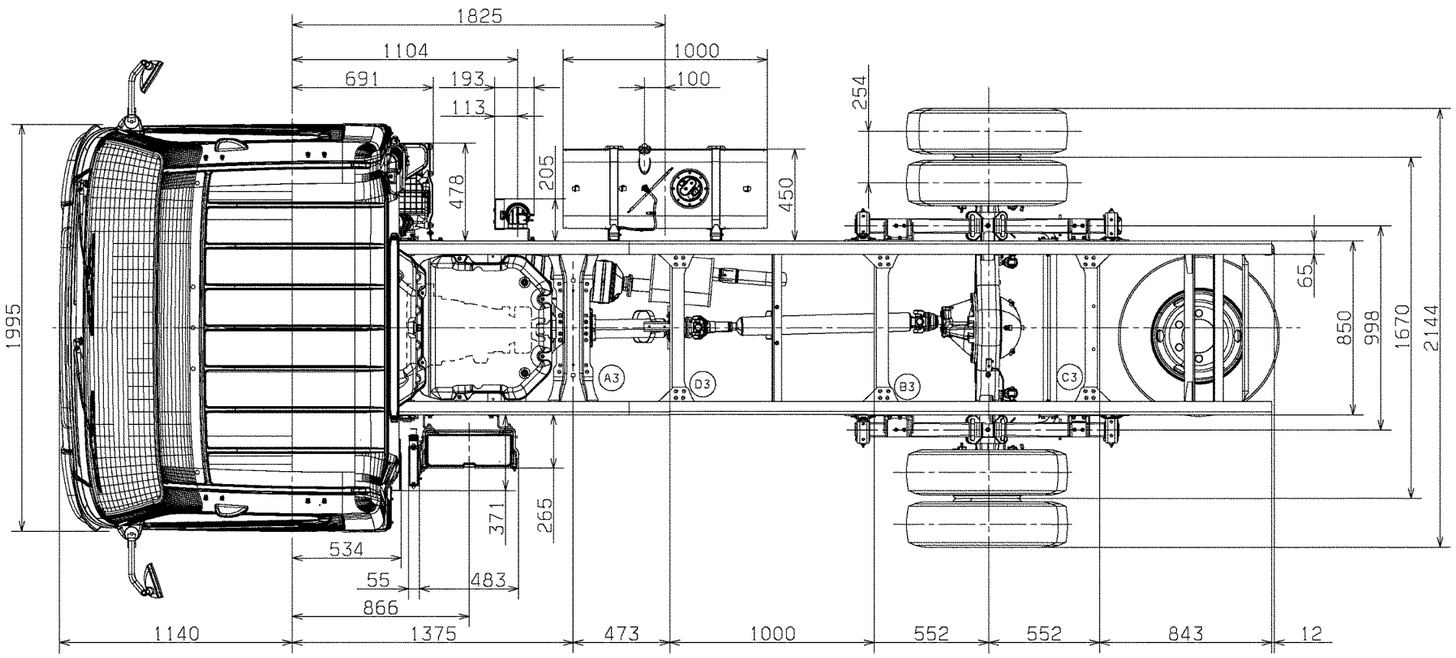


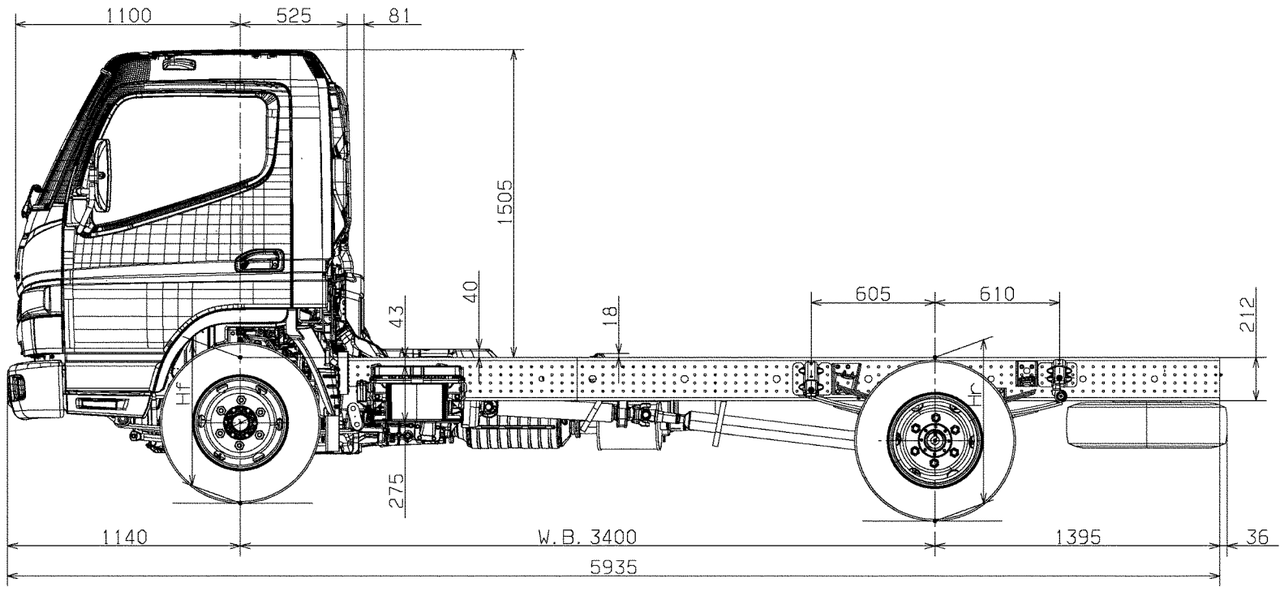


CHASSIS CAB
DRAWINGS

FEB21ER4SFAC
UNIT :mm SCALE :1/30

10.5 Chassis cab drawings

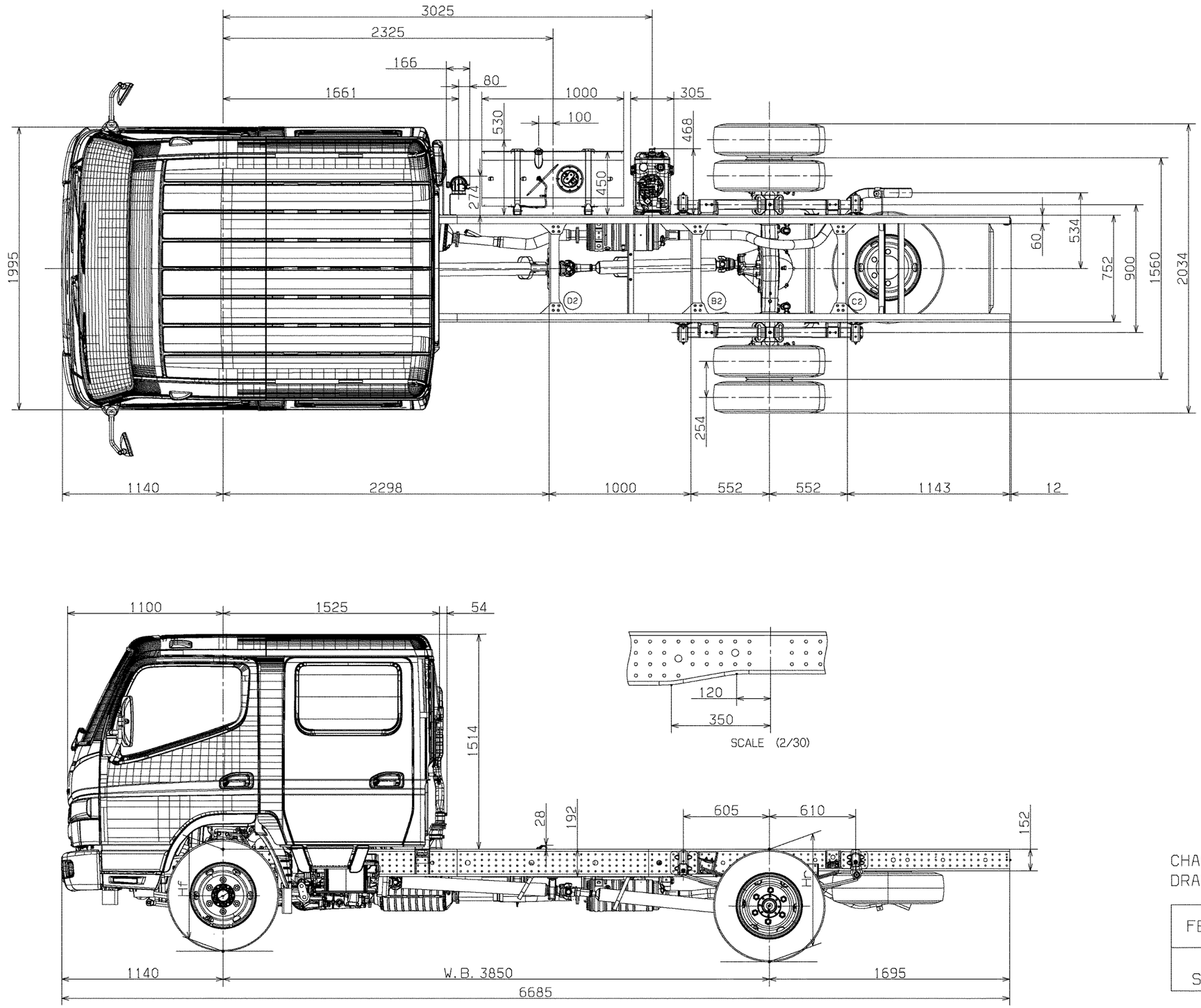




CHASSIS CAB
DRAWINGS

FEC71ER4SFAC
UNIT :mm SCALE :1/30

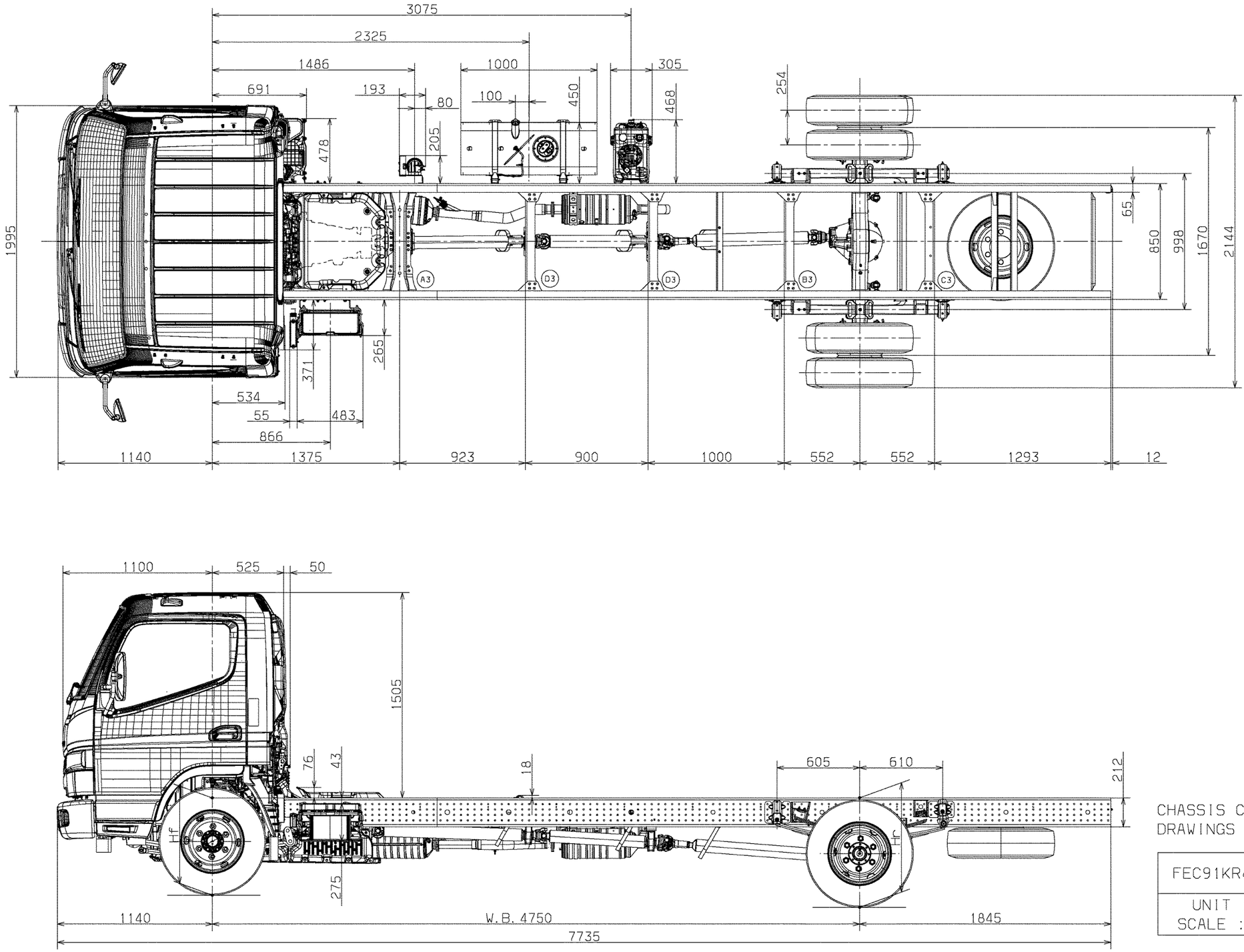
10.5 Chassis cab drawings



CHASSIS CAB
DRAWINGS

FEB91GR4WFAD
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

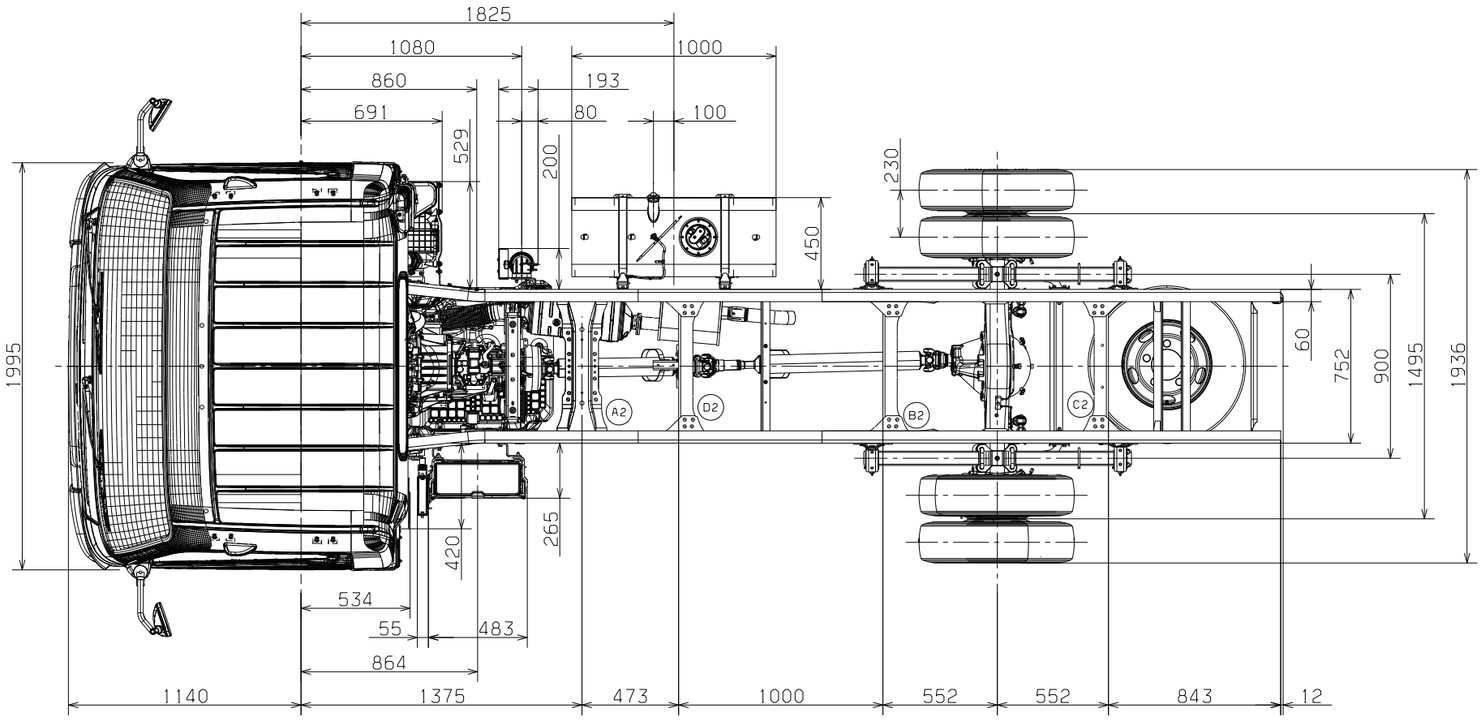


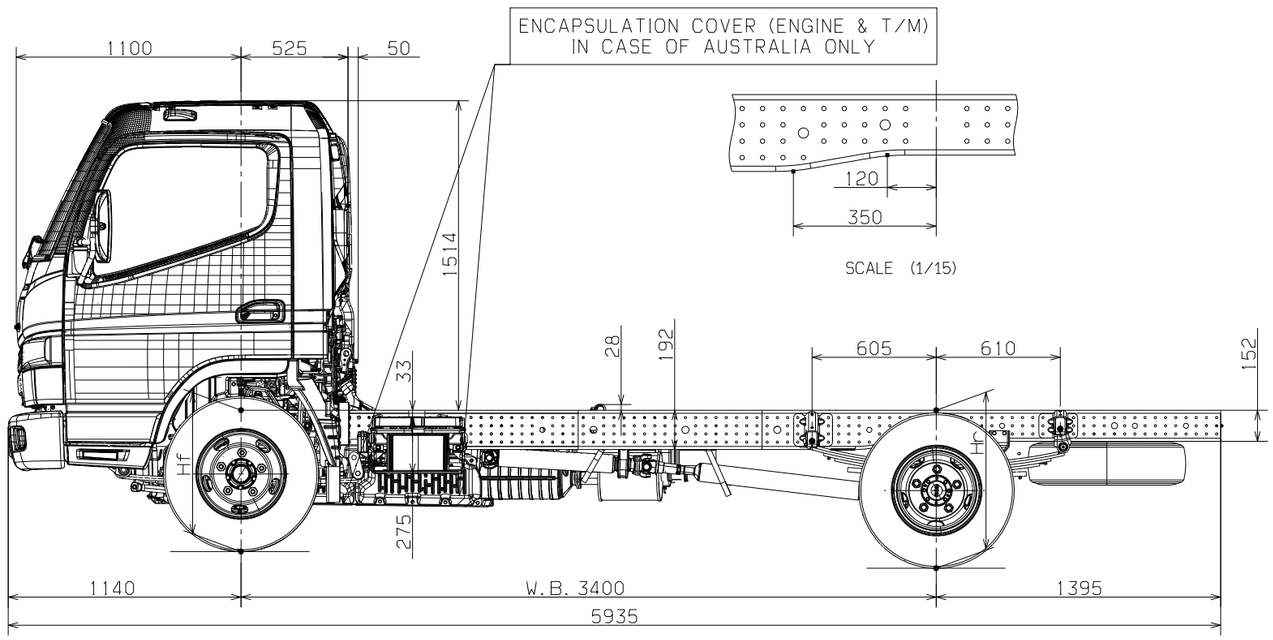
CHASSIS CAB
DRAWINGS

FEC91KR4SFAD
UNIT :mm SCALE :1/30

10.5 Chassis cab drawings

C

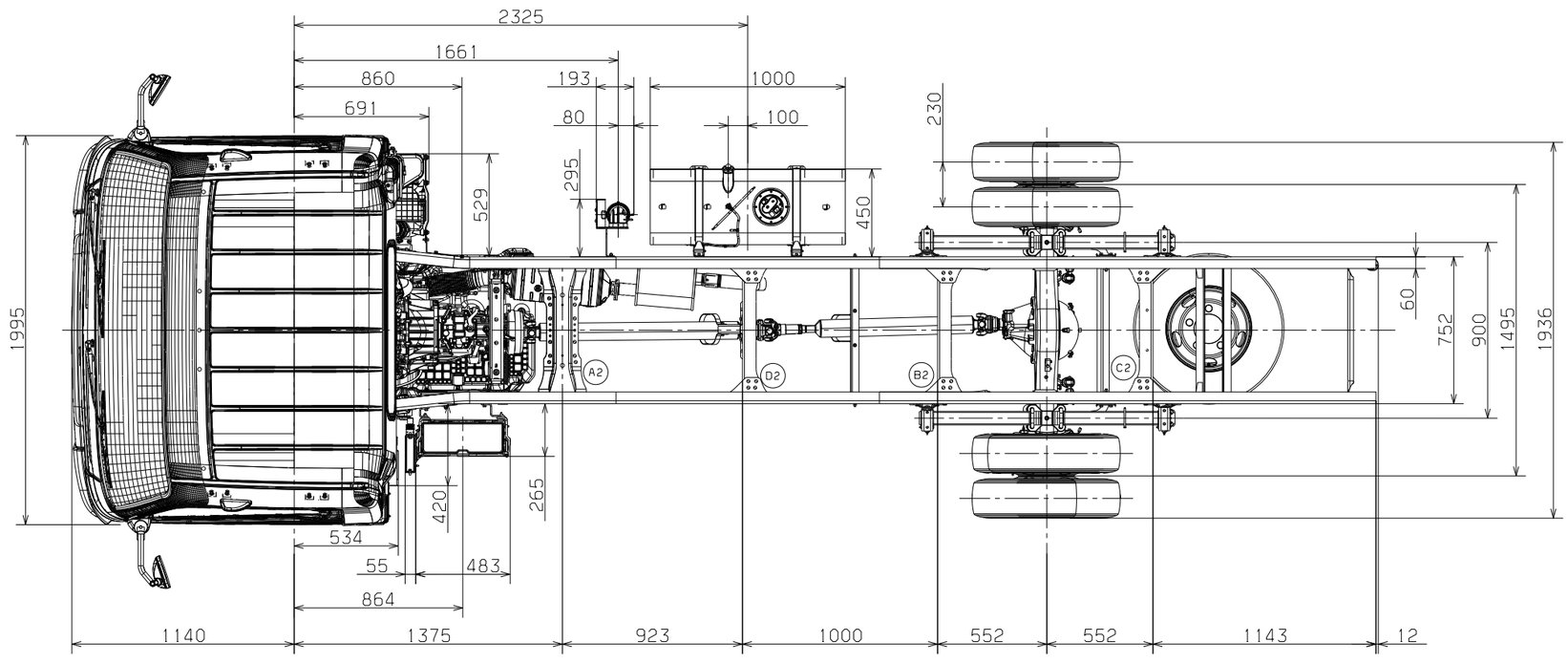


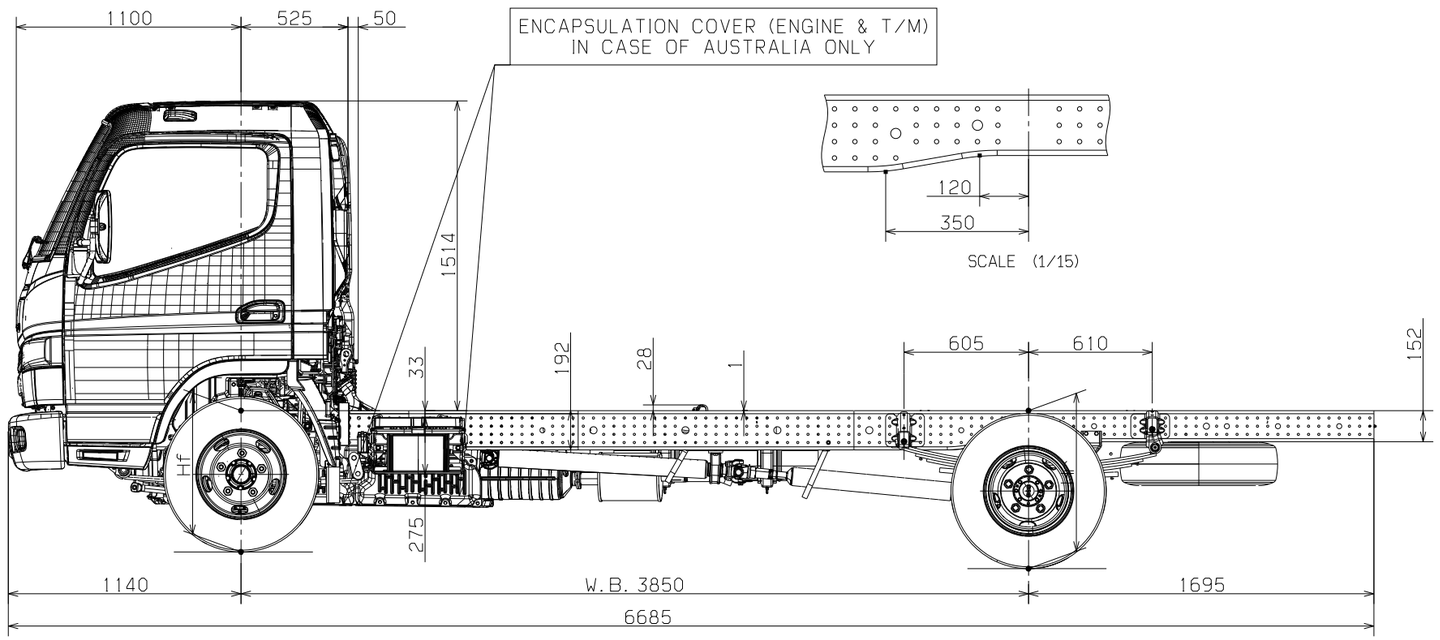


CHASSIS CAB
DRAWINGS

FEB51ER4SFAC
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings



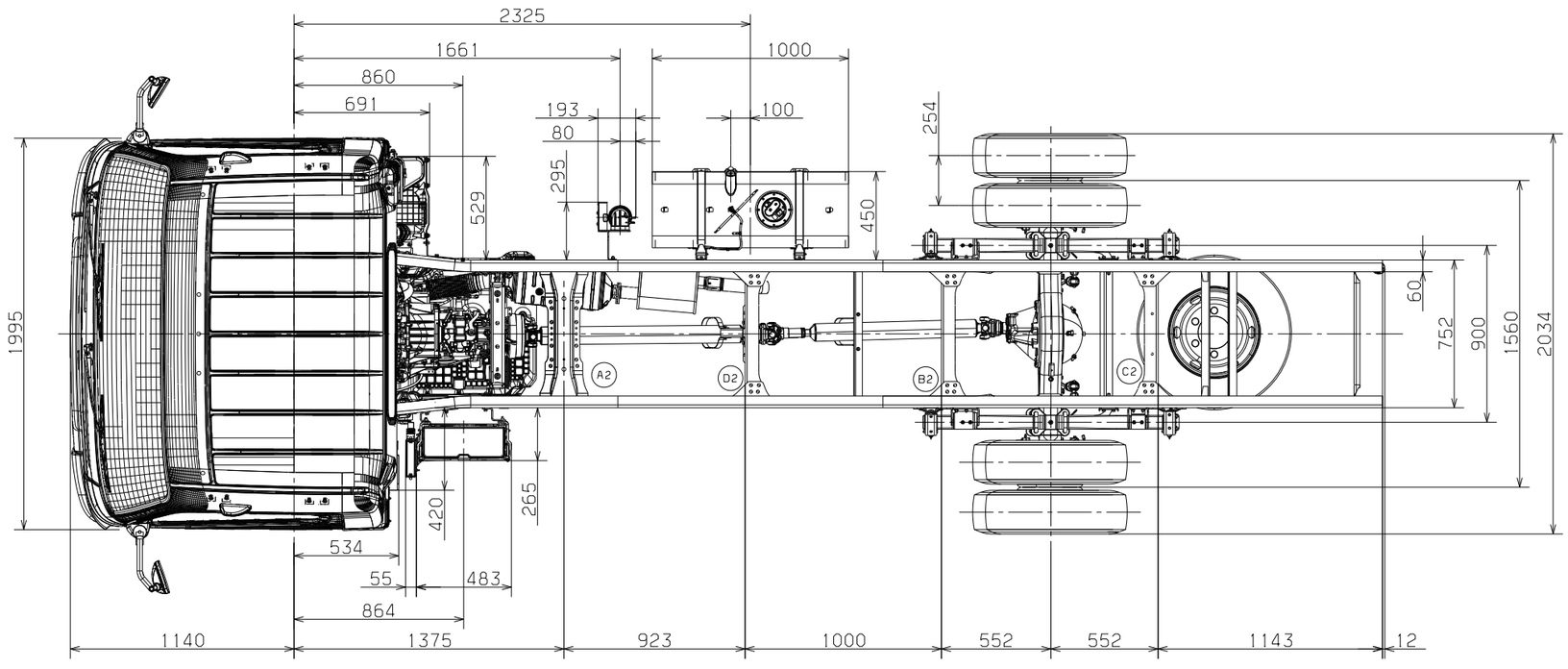


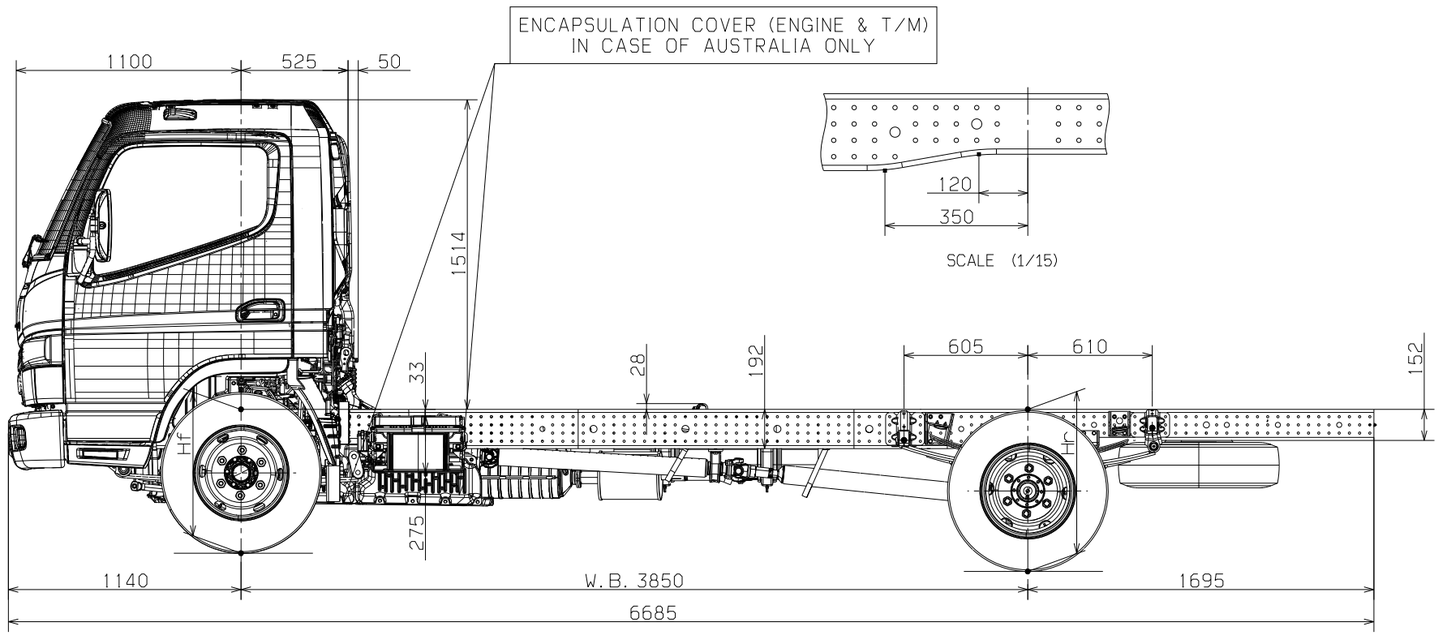
CHASSIS CAB
DRAWINGS

FEB51GR4SFAC
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

C



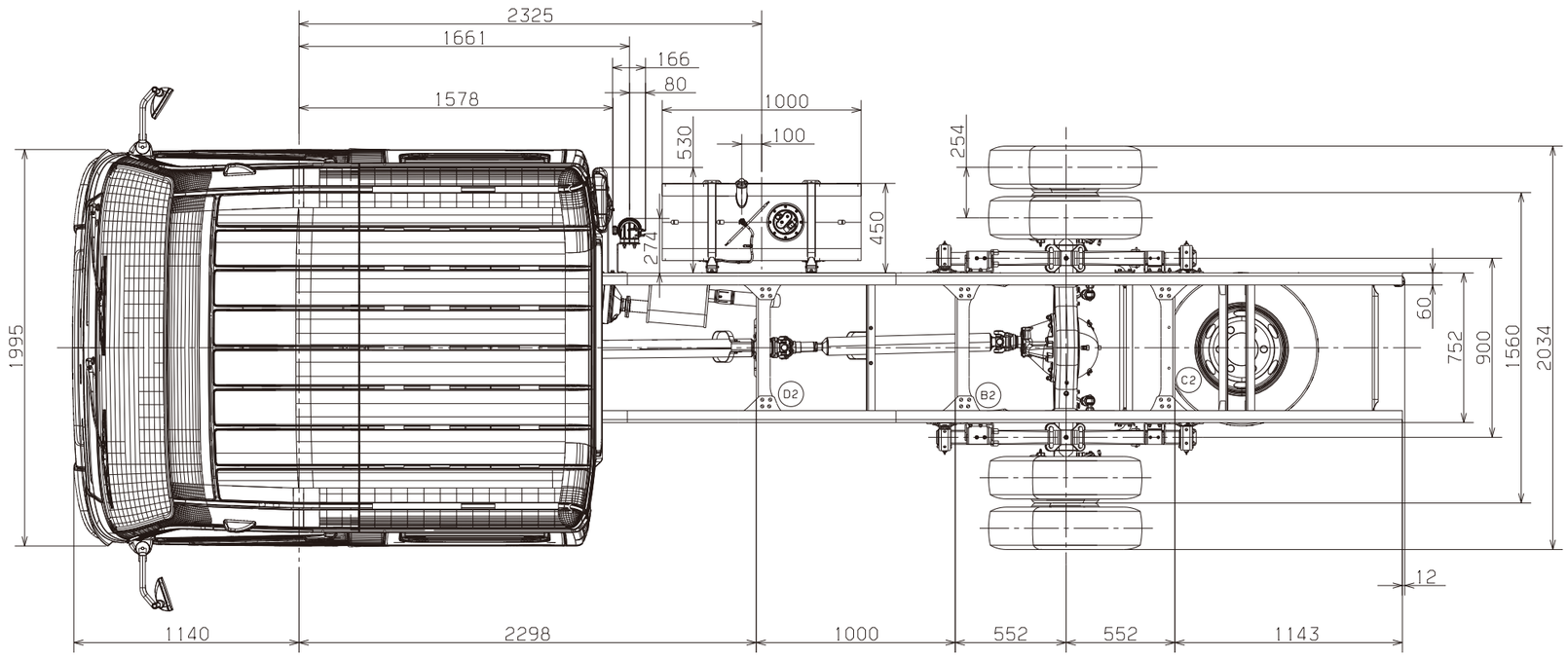


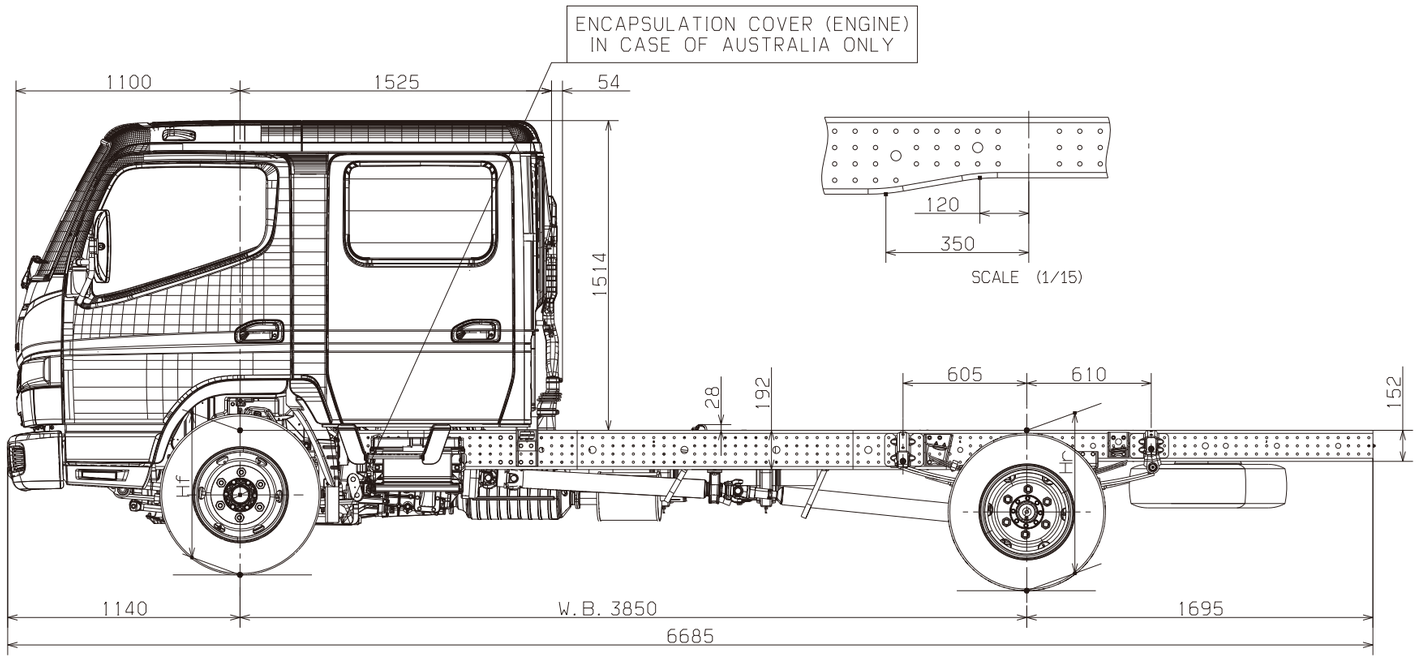
CHASSIS CAB
DRAWINGS

FEB71GR4SFAC
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

C

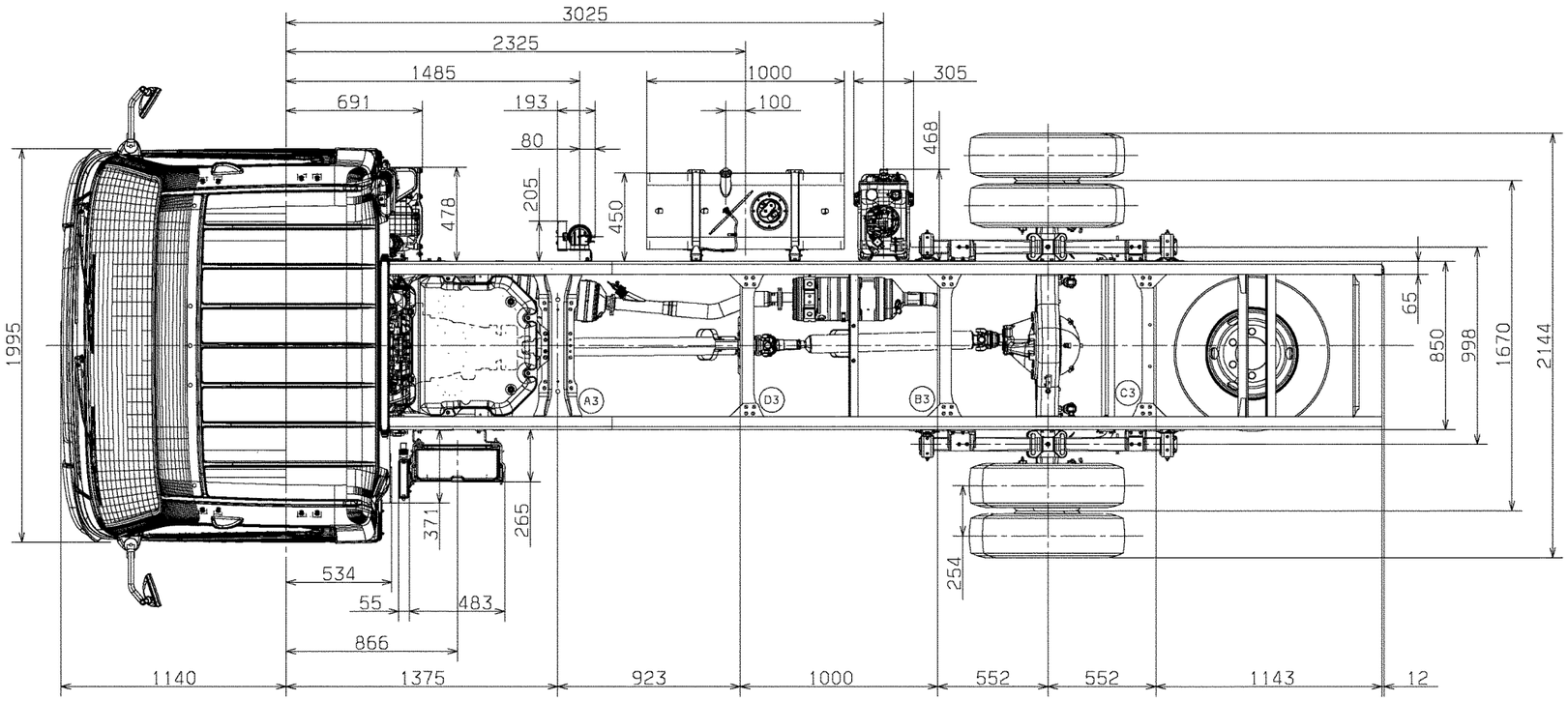


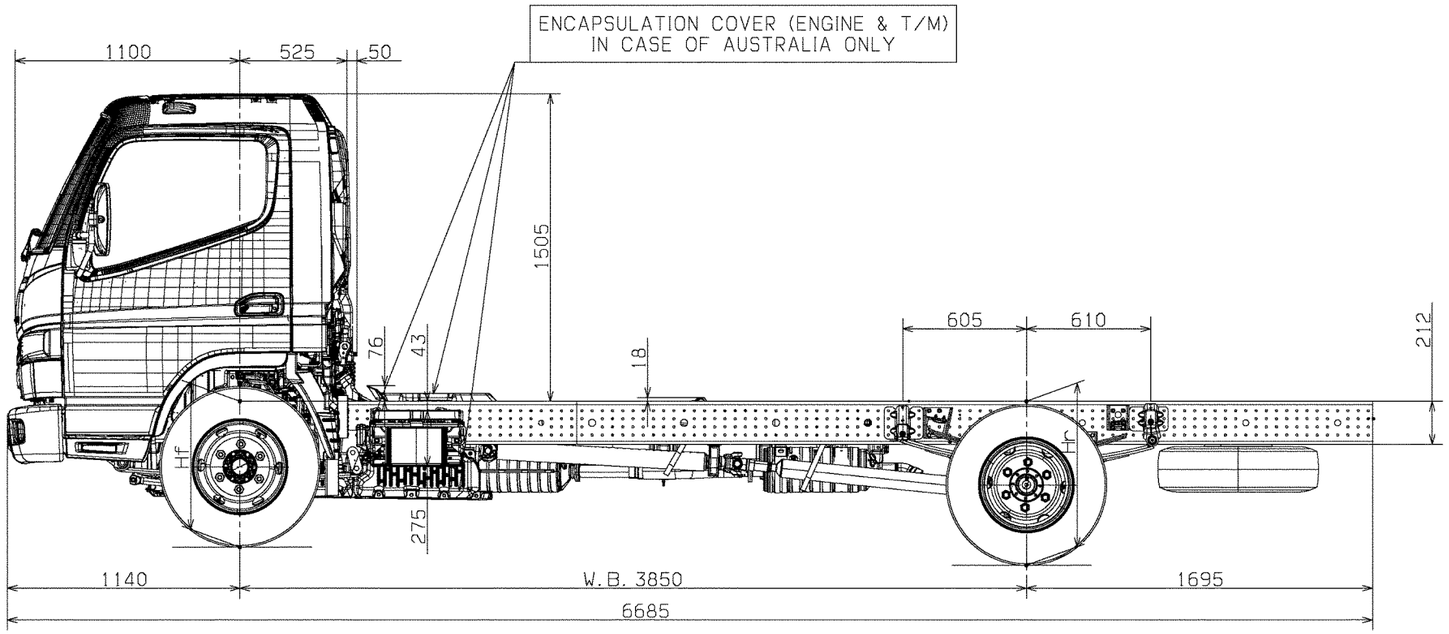


CHASSIS CAB
DRAWINGS

FEB71GR4WFAC
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

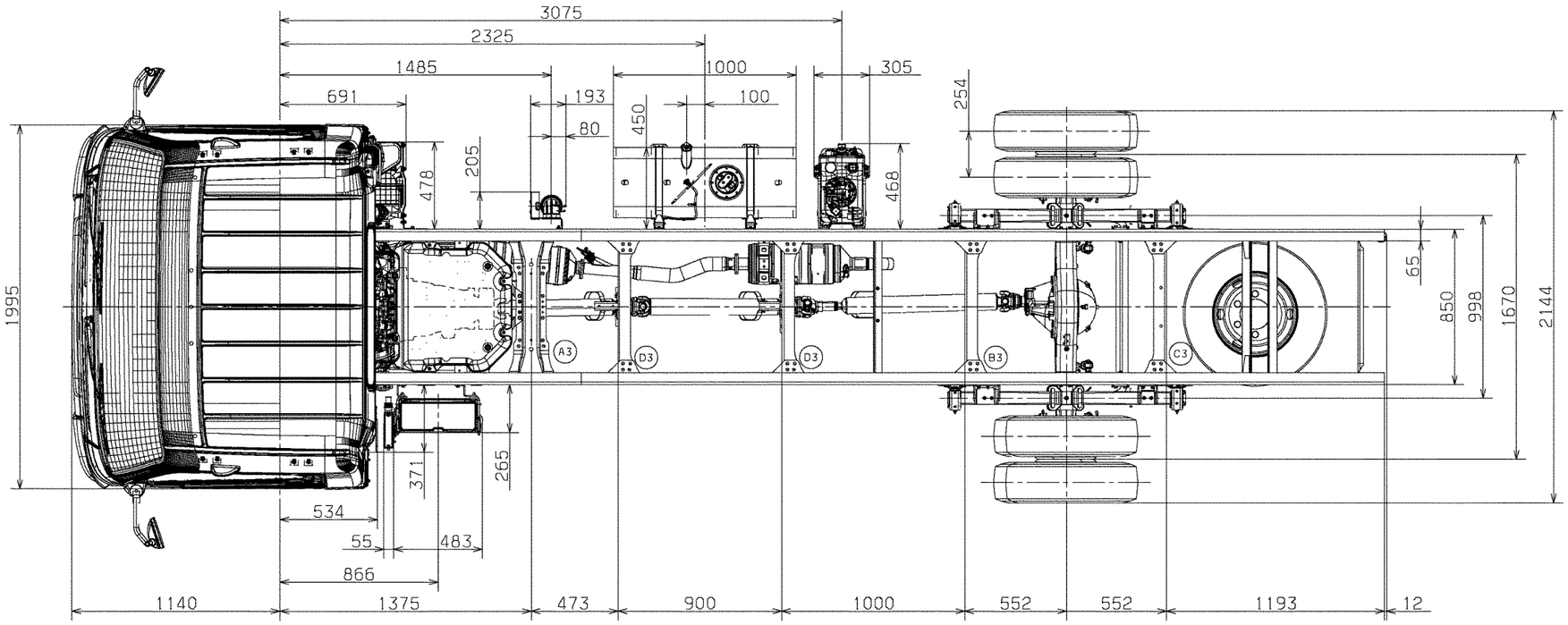


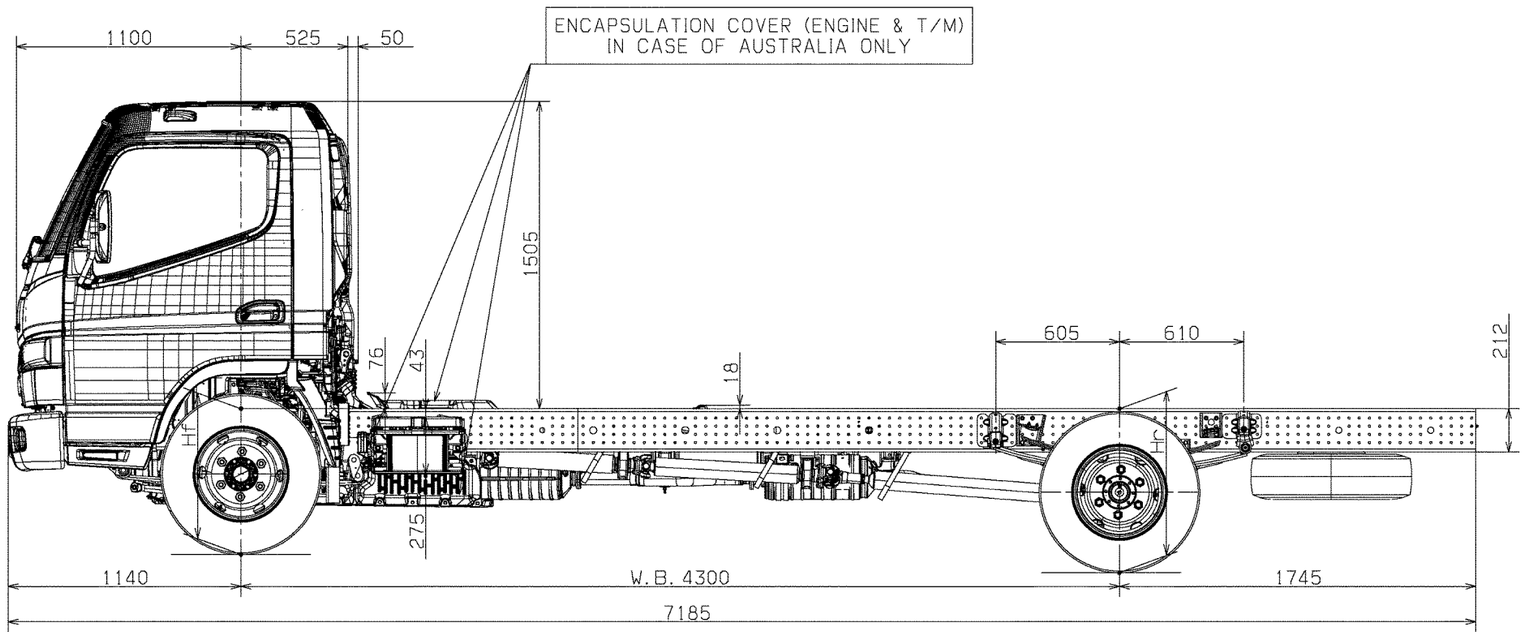


CHASSIS CAB
DRAWINGS

FEC91GR4SFAD
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings



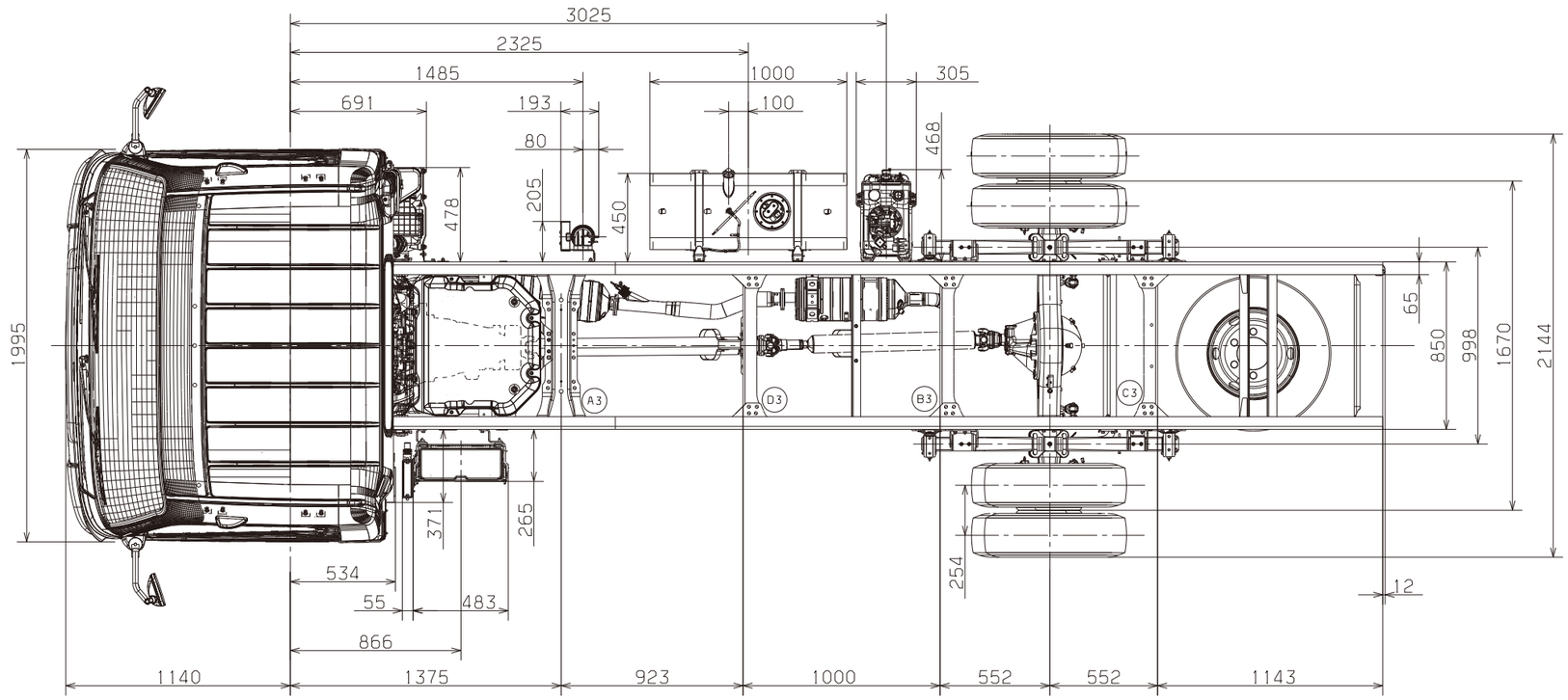


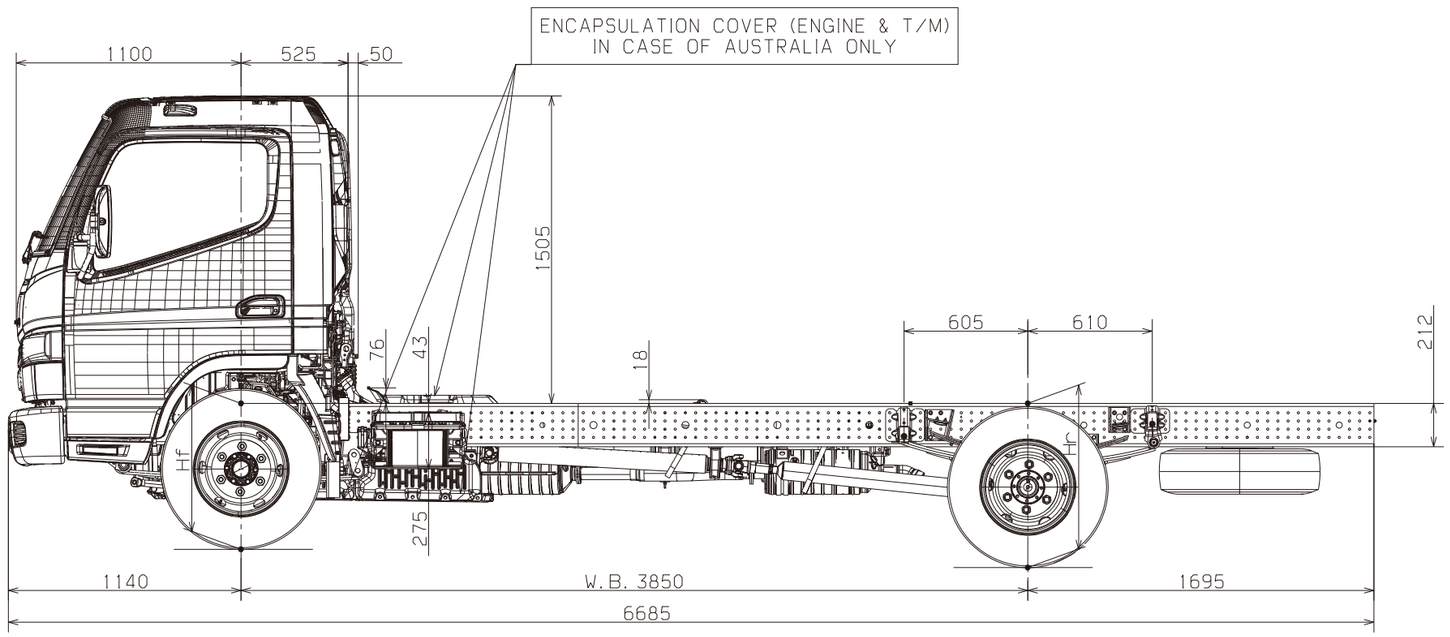
CHASSIS CAB
DRAWINGS

FEC91HR4SFAD
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

C



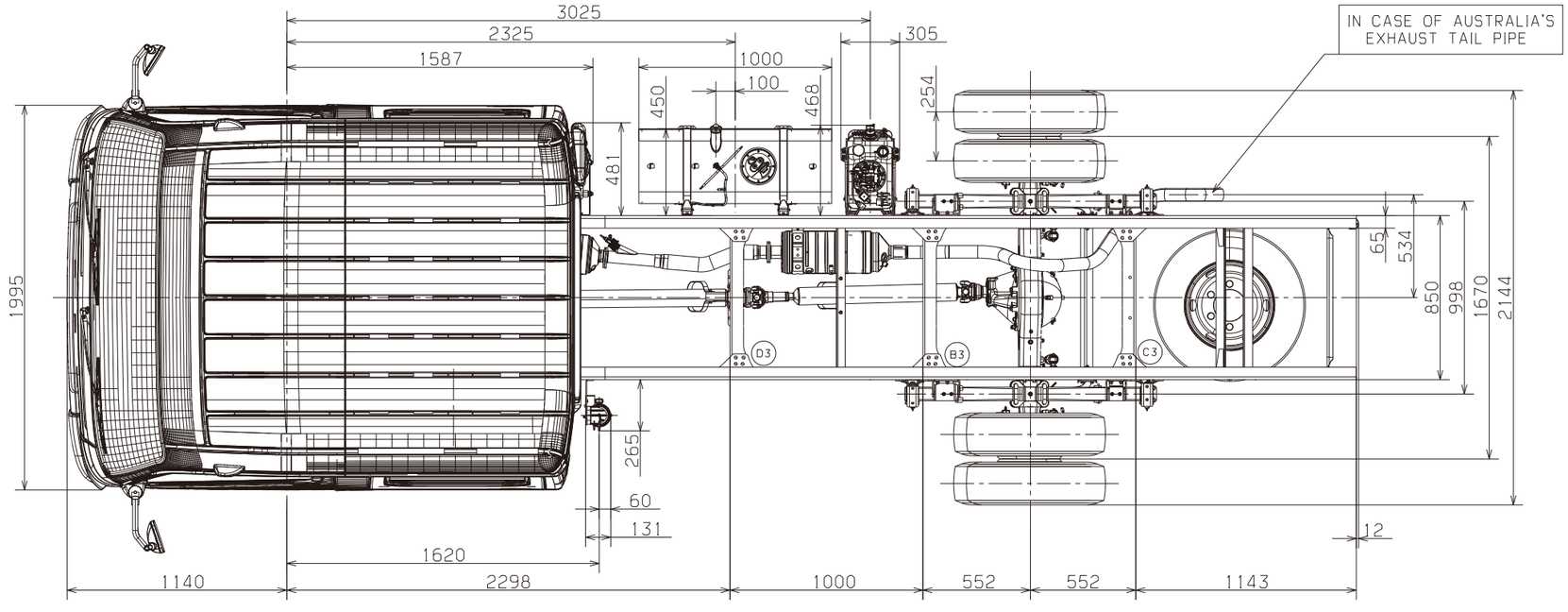


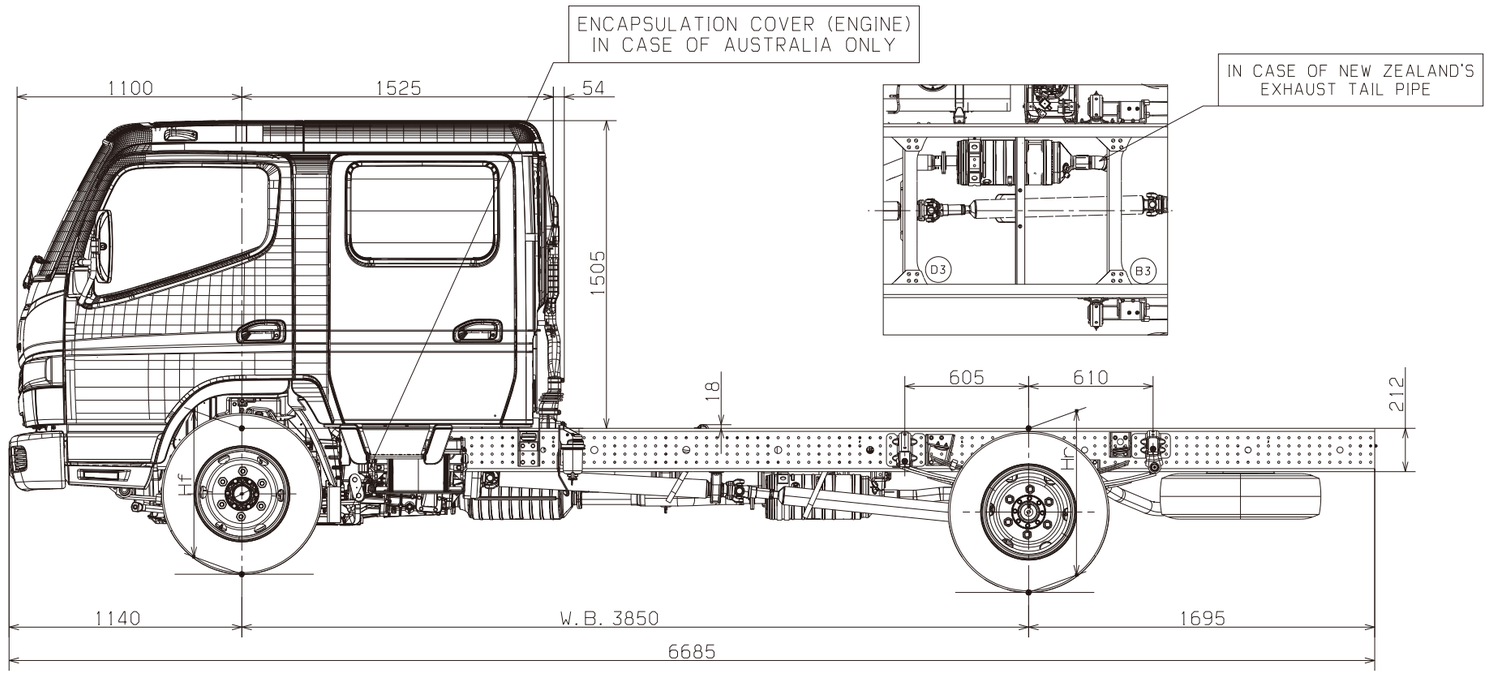
CHASSIS CAB
DRAWINGS

FECX1GR4SFAD
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

C



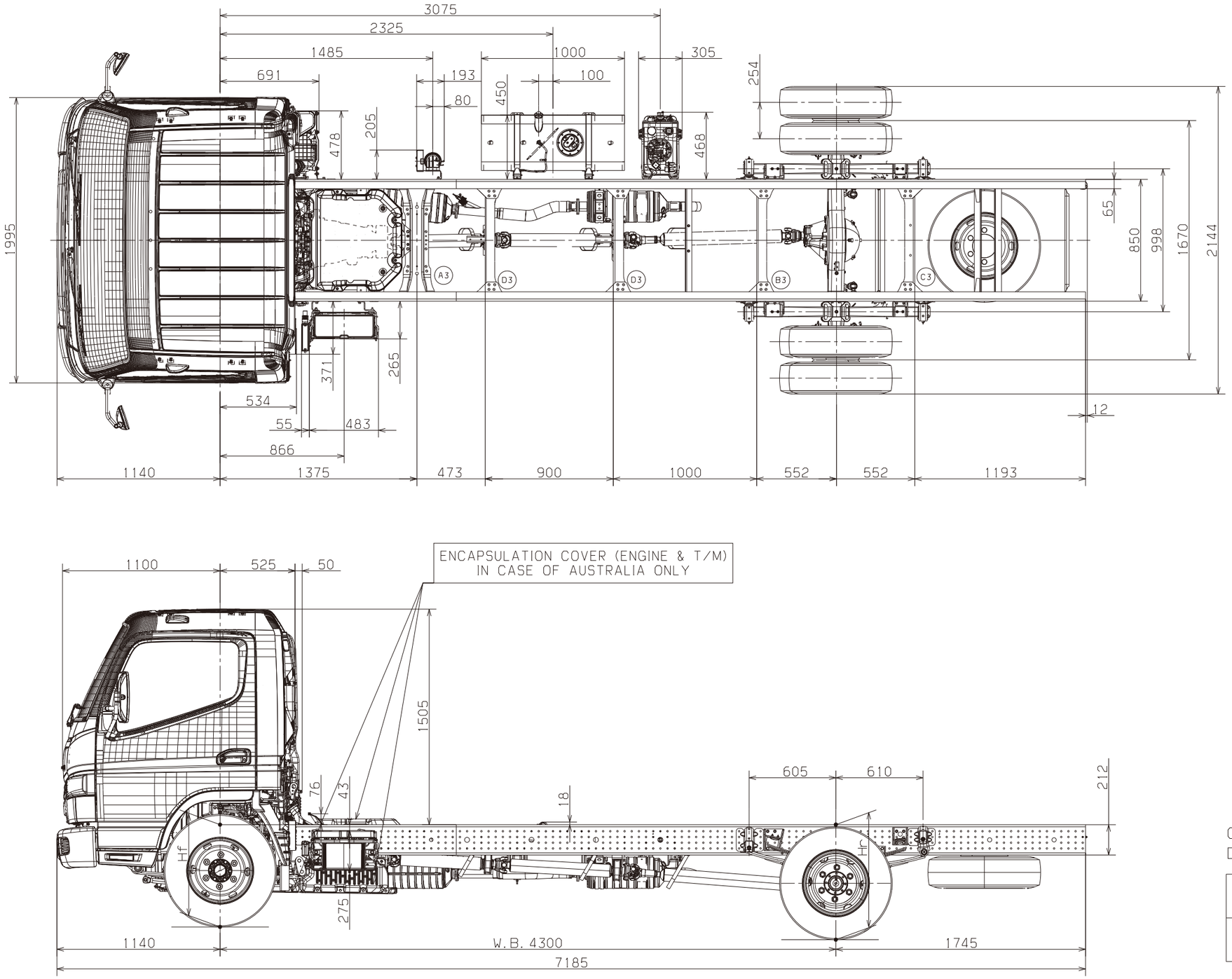


CHASSIS CAB
DRAWINGS

FECX1GR4WFAD
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

C

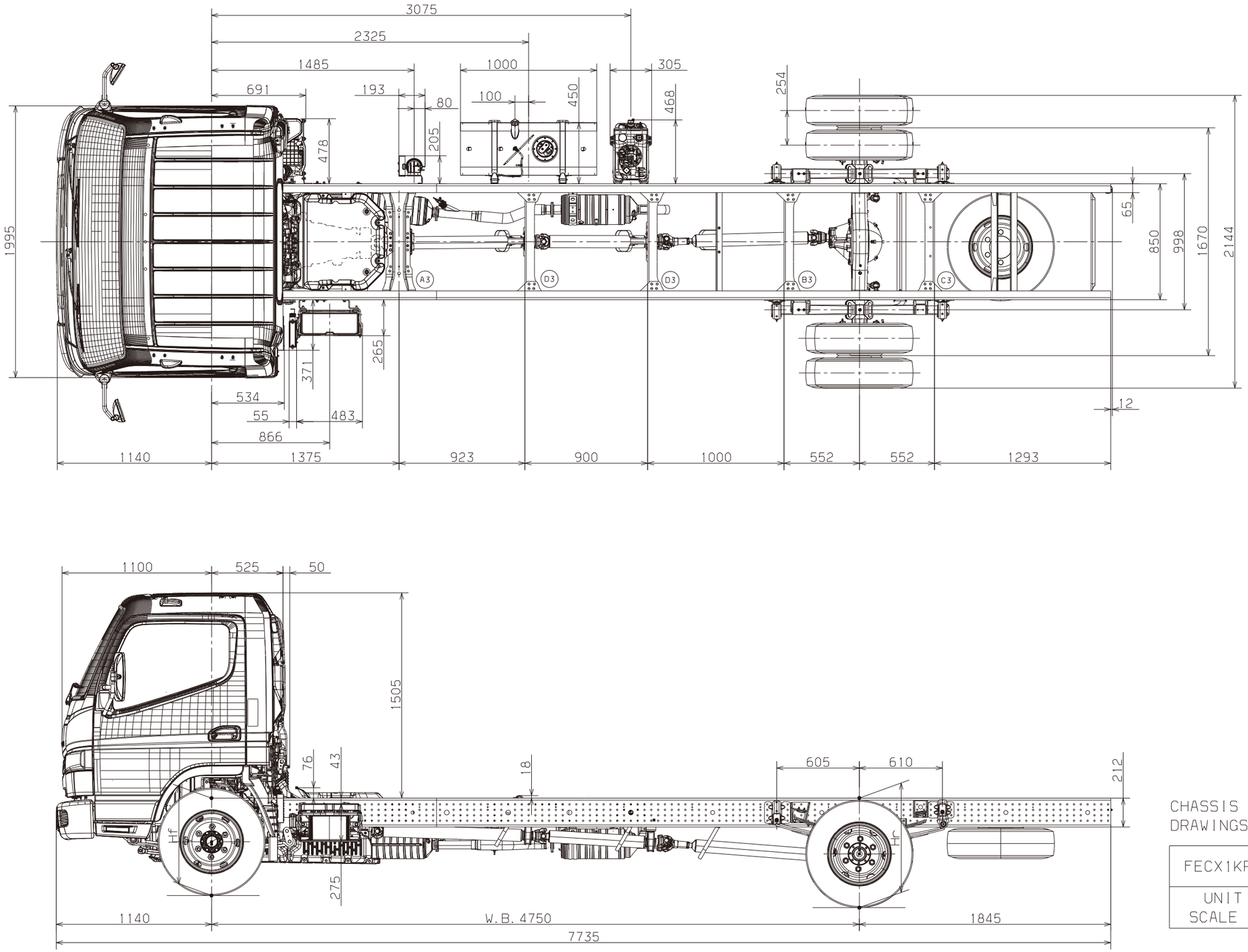


CHASSIS CAB
DRAWINGS

FECX1HR4SFAD
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

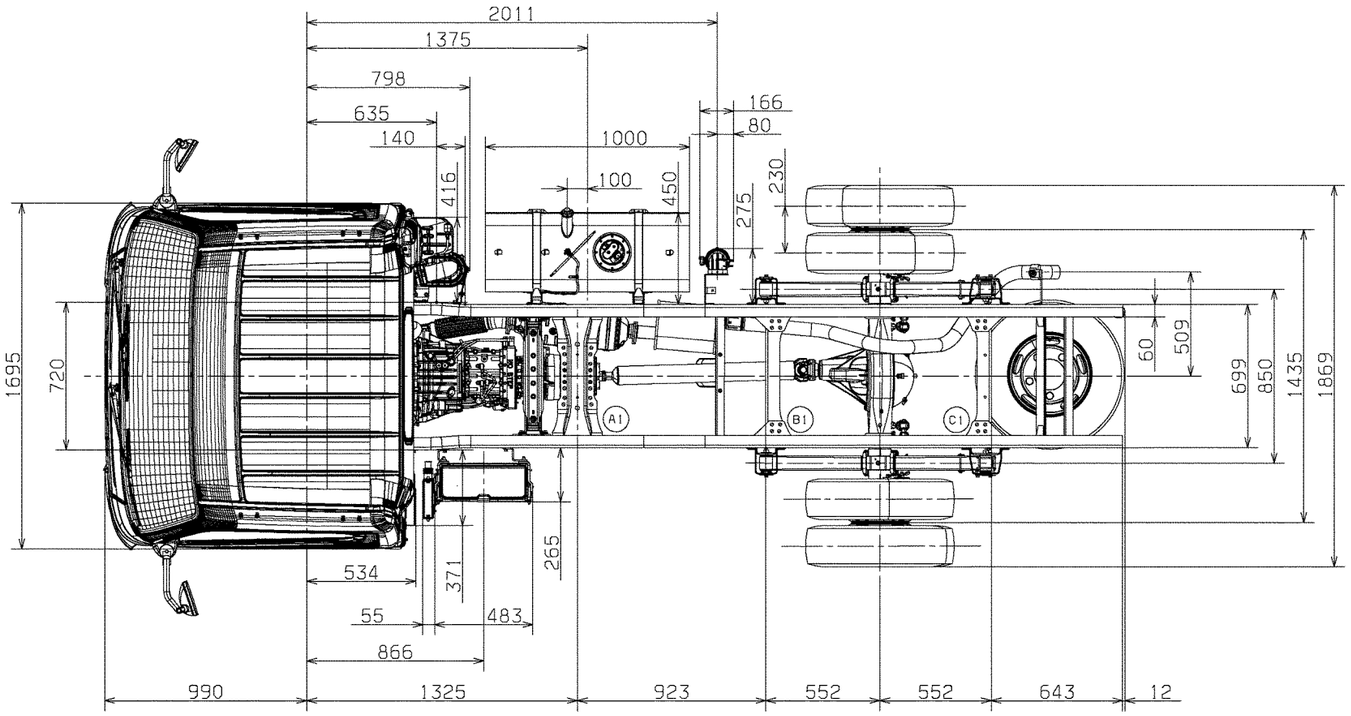
C

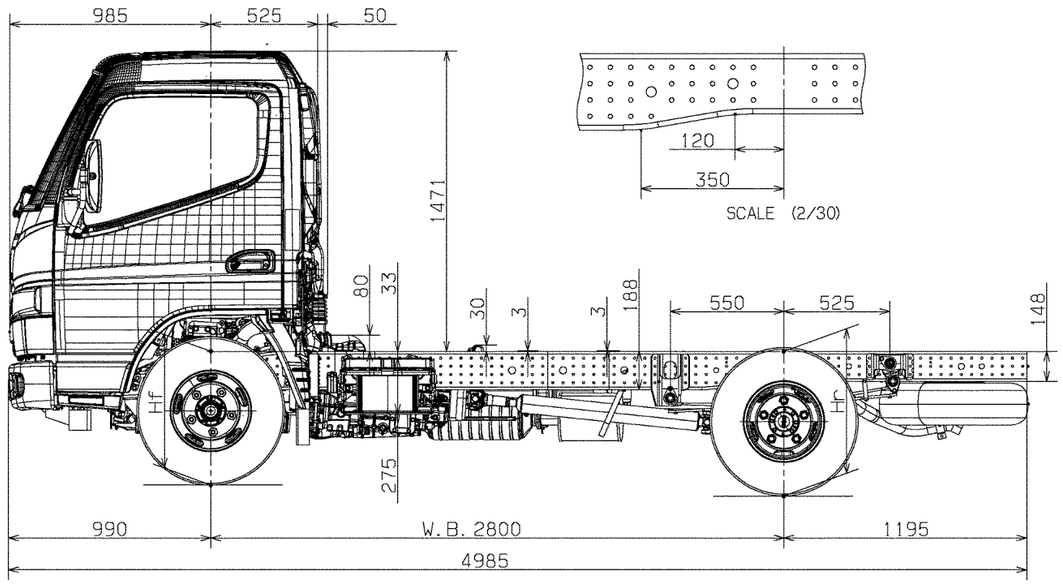


CHASSIS CAB
DRAWINGS

FECX1KR4SFAD
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

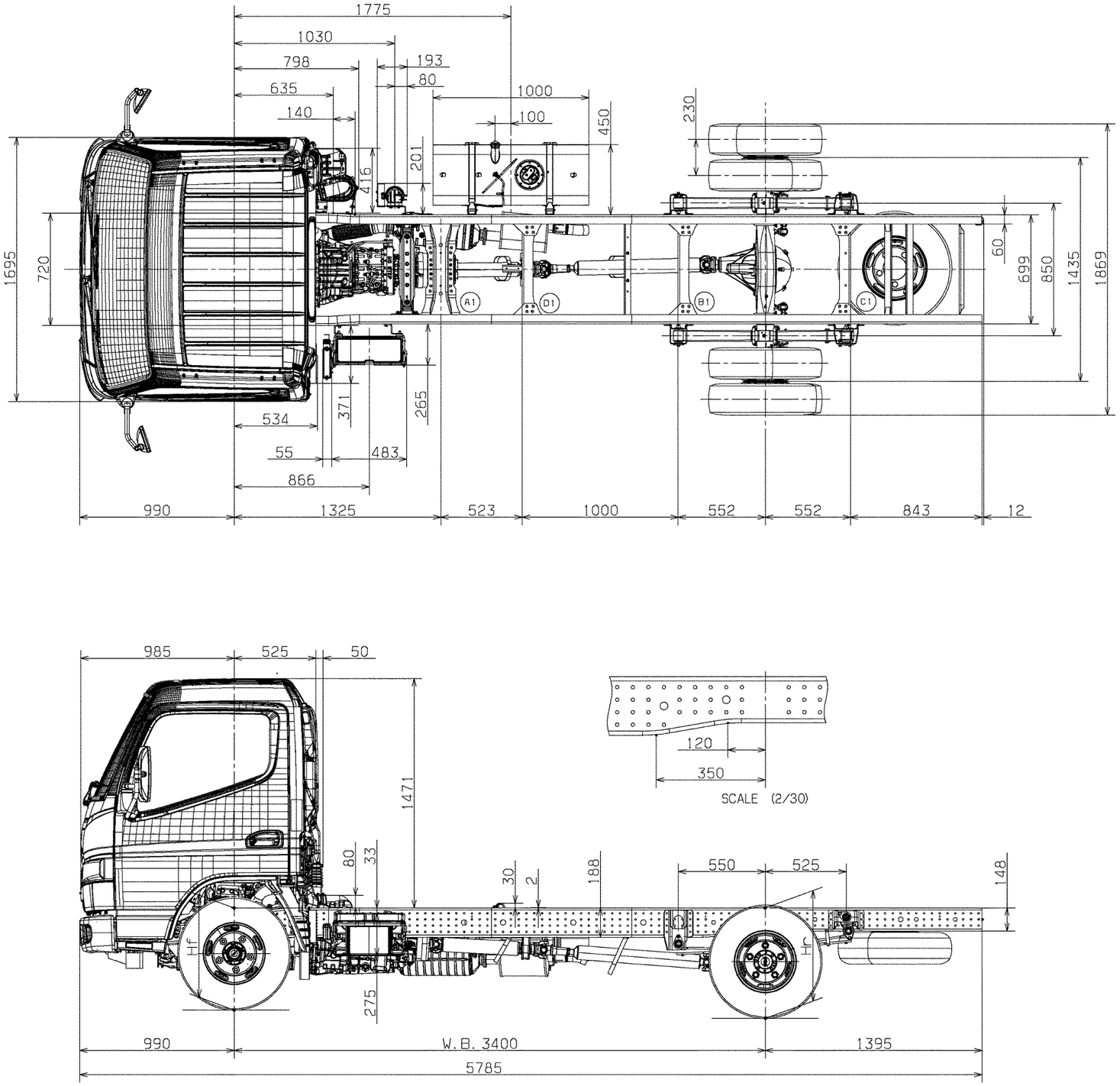




CHASSIS CAB
DRAWINGS

FEA21CR3SFAC FEA21CR1SFAB
UNIT :mm SCALE :1/30

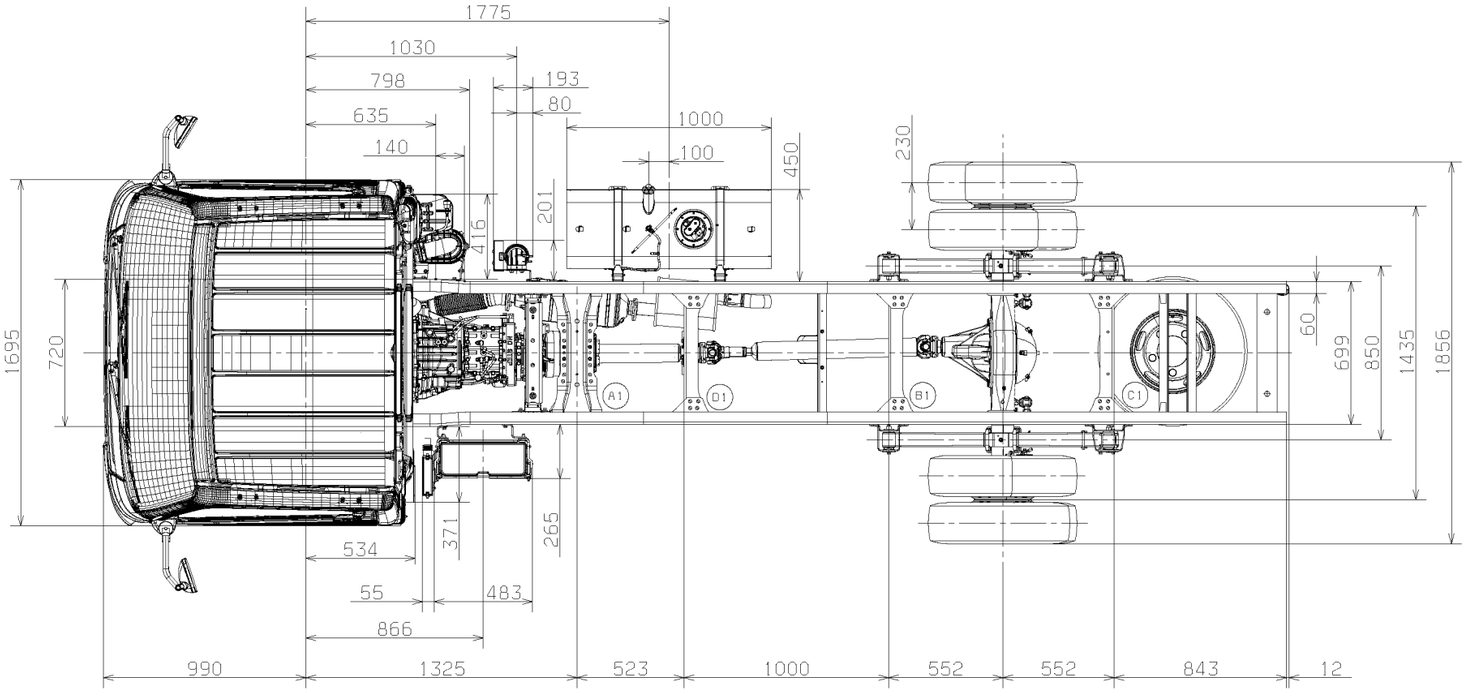
10.5 Chassis cab drawings

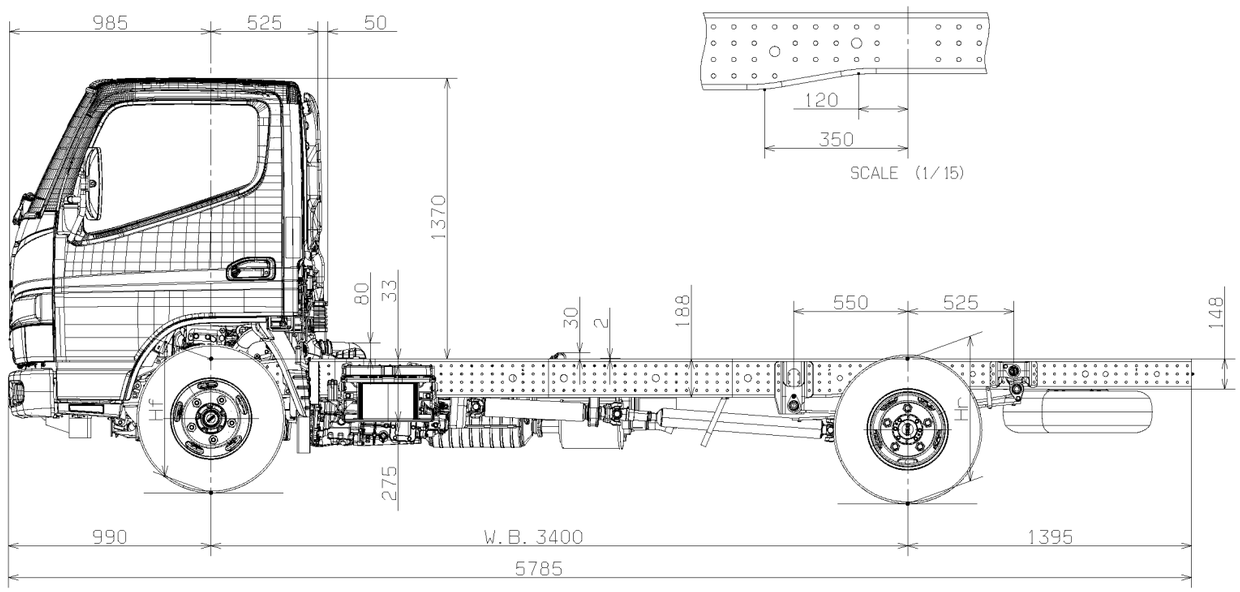


CHASSIS CAB
DRAWINGS

FEA21ER3SFAC
UNIT :mm SCALE :1/30

10.5 Chassis cab drawings



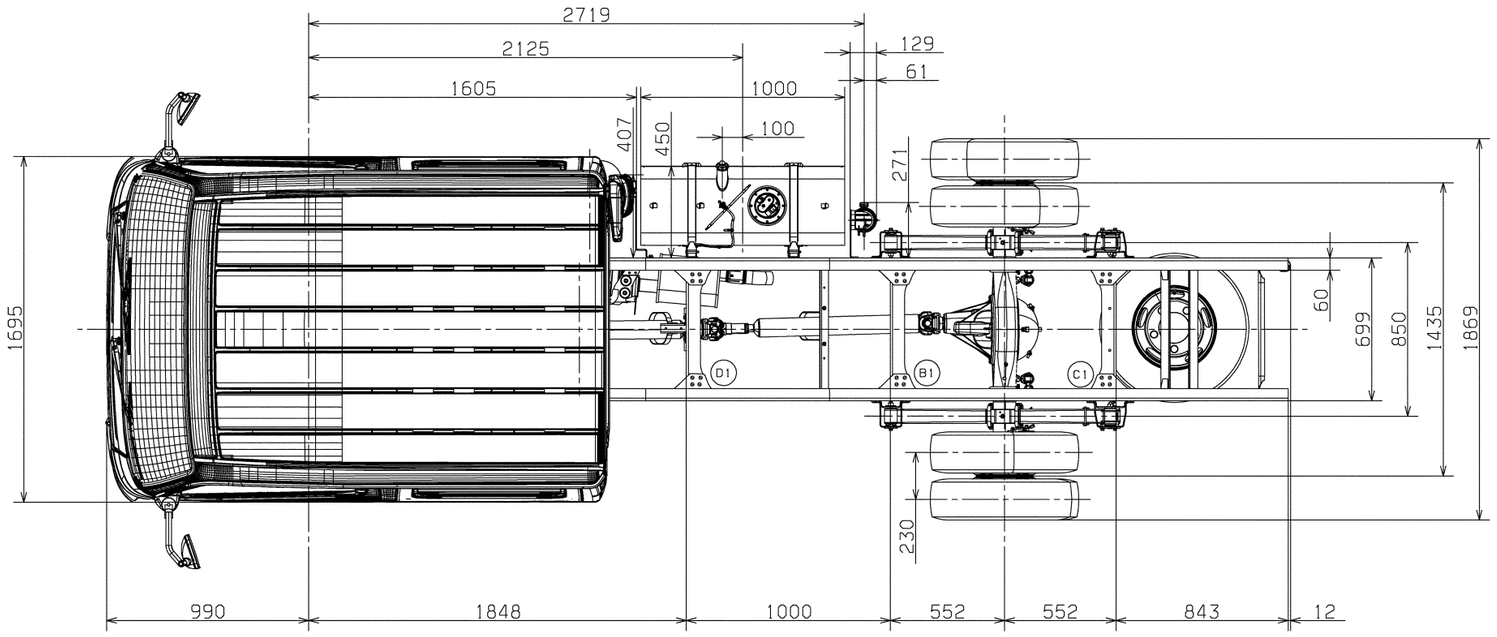


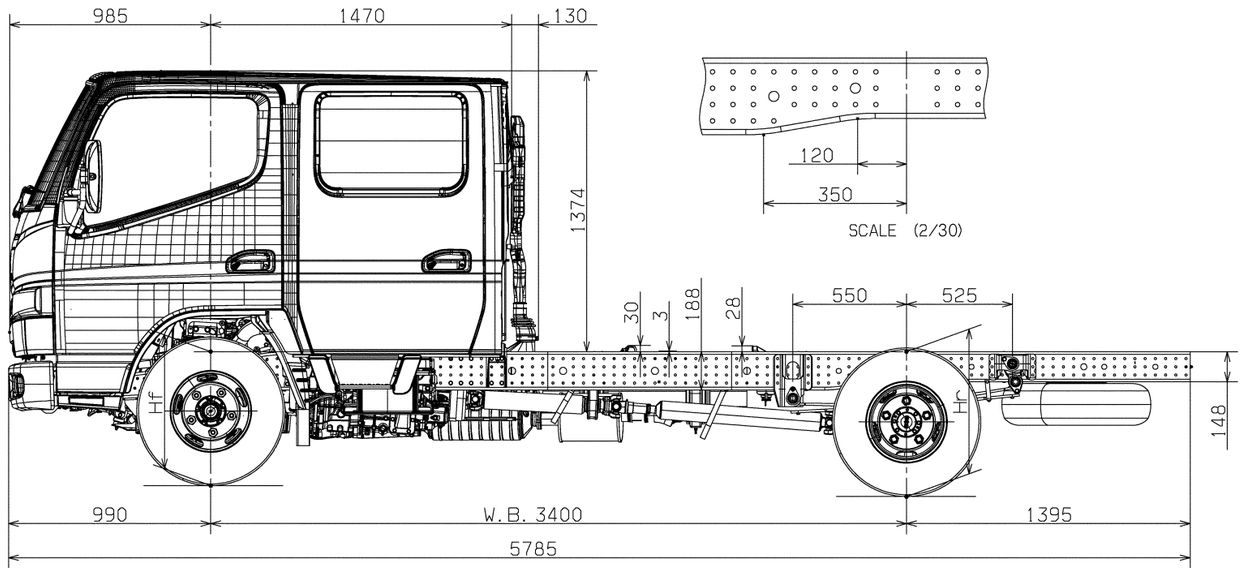
CHASSIS CAB
DRAWINGS

FEA21ER3SFAL
UNIT :mm SCALE :1/30

185/85R16.

10.5 Chassis cab drawings

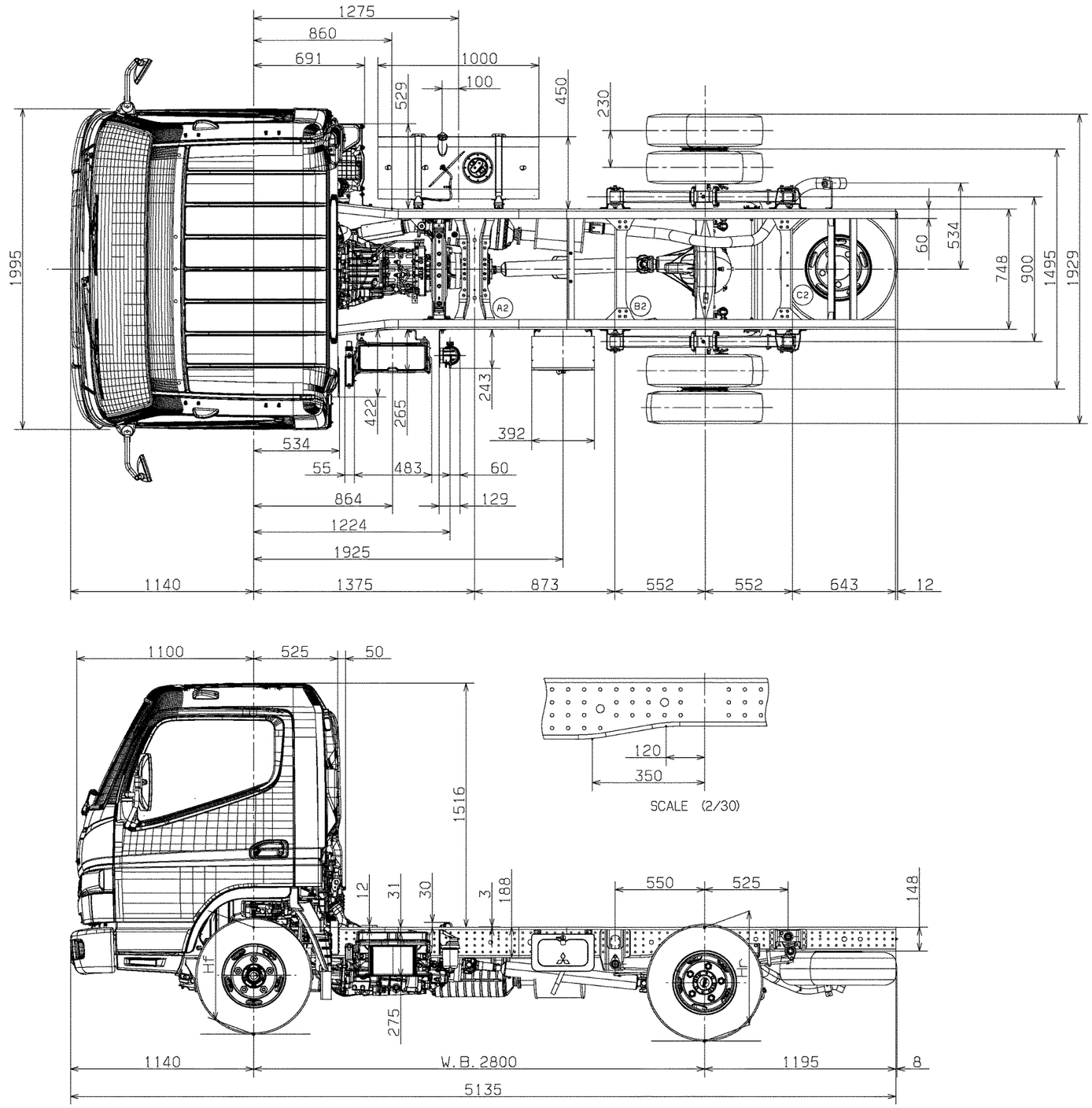




CHASSIS CAB
DRAWINGS

FEA21ER3WFAC
UNIT :mm SCALE :1/30

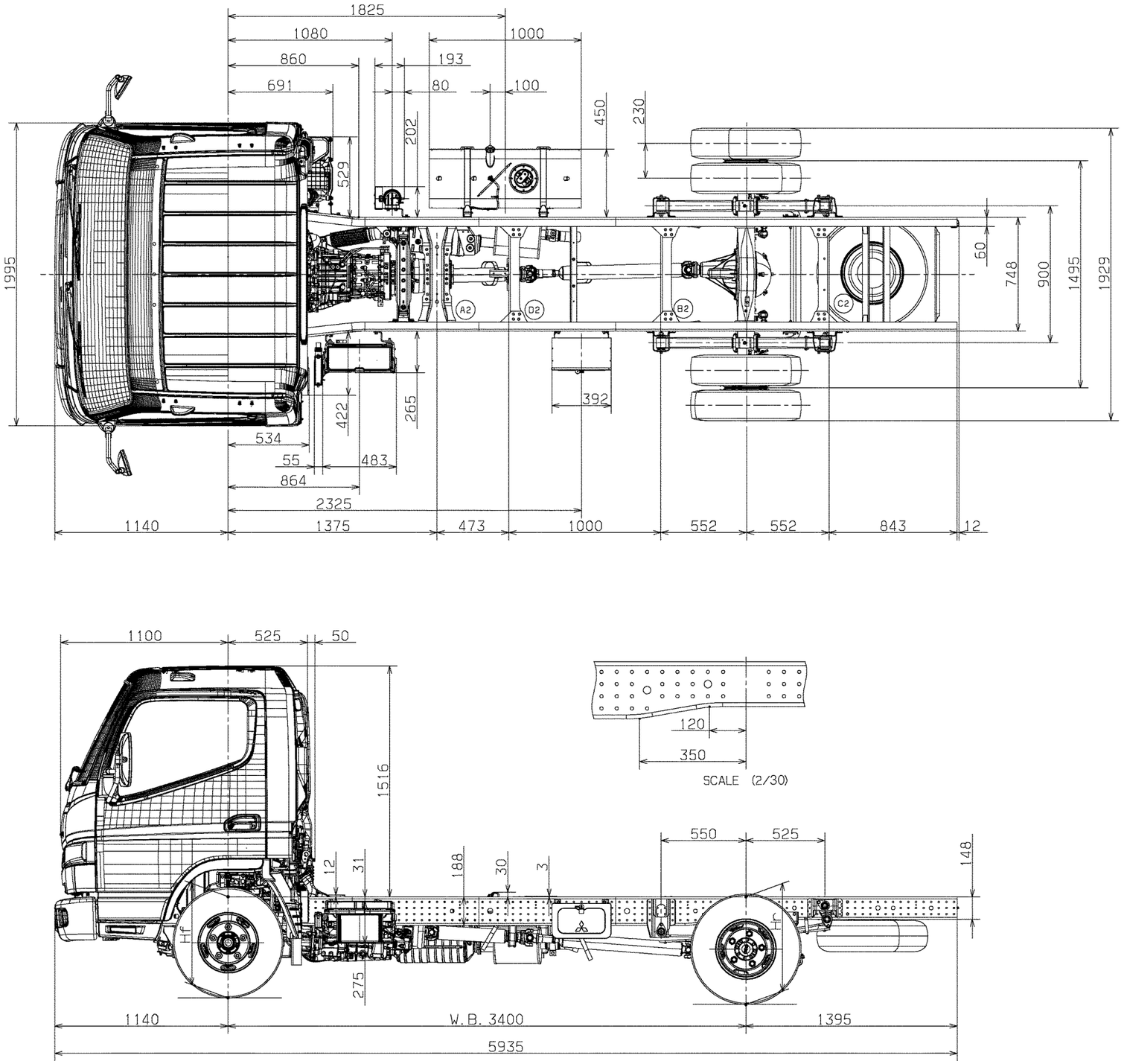
10.5 Chassis cab drawings



CHASSIS CAB
DRAWINGS

FEB21CR3SFAC
UNIT : mm SCALE : 1/30

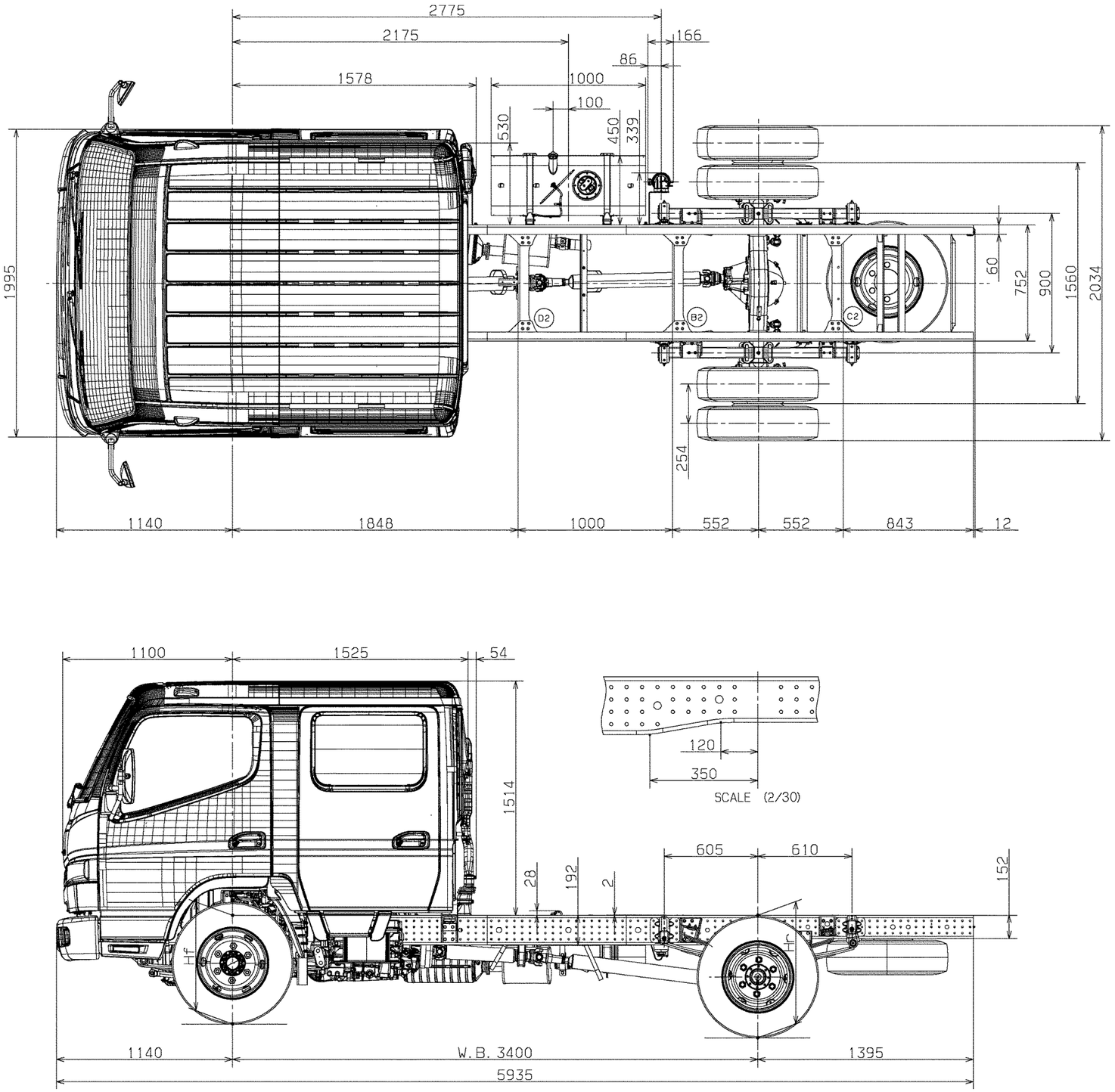
10.5 Chassis cab drawings



CHASSIS CAB
DRAWINGS

FEB21ER3SFAC
UNIT :mm SCALE :1/30

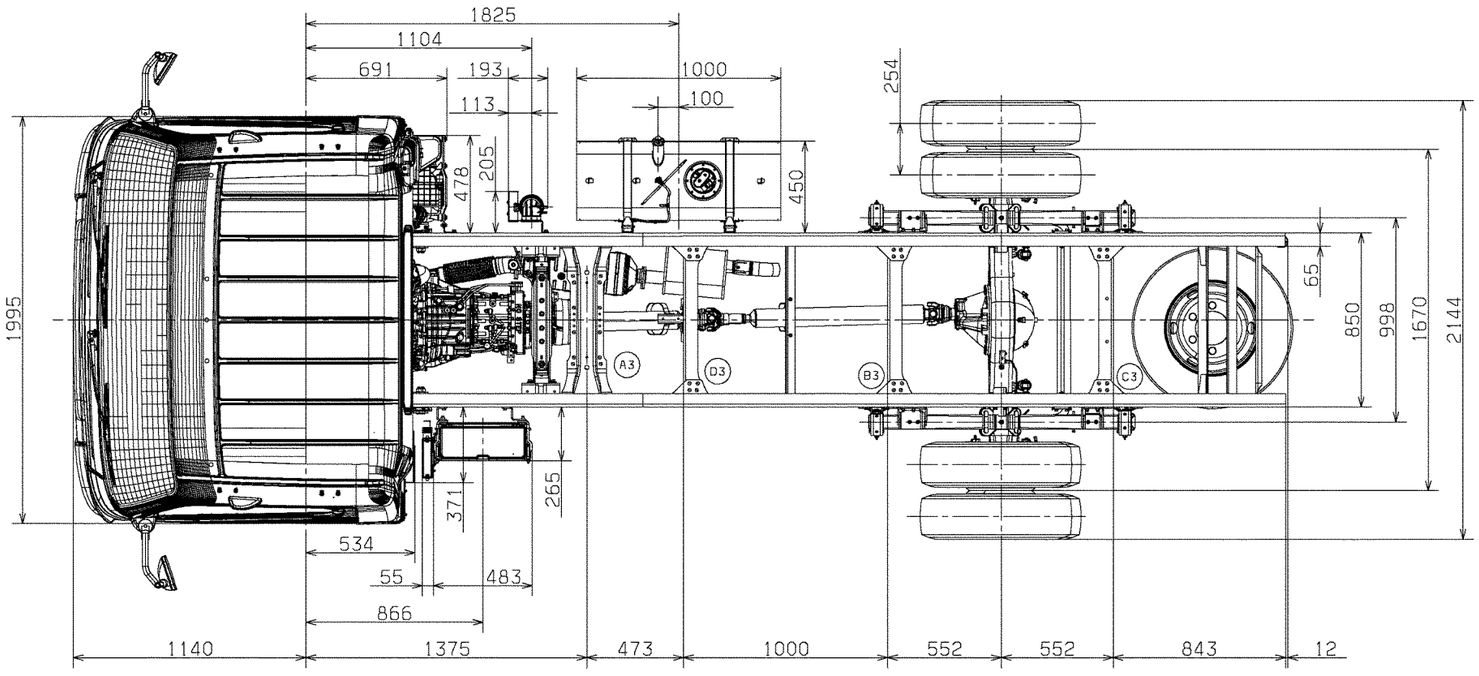
10.5 Chassis cab drawings

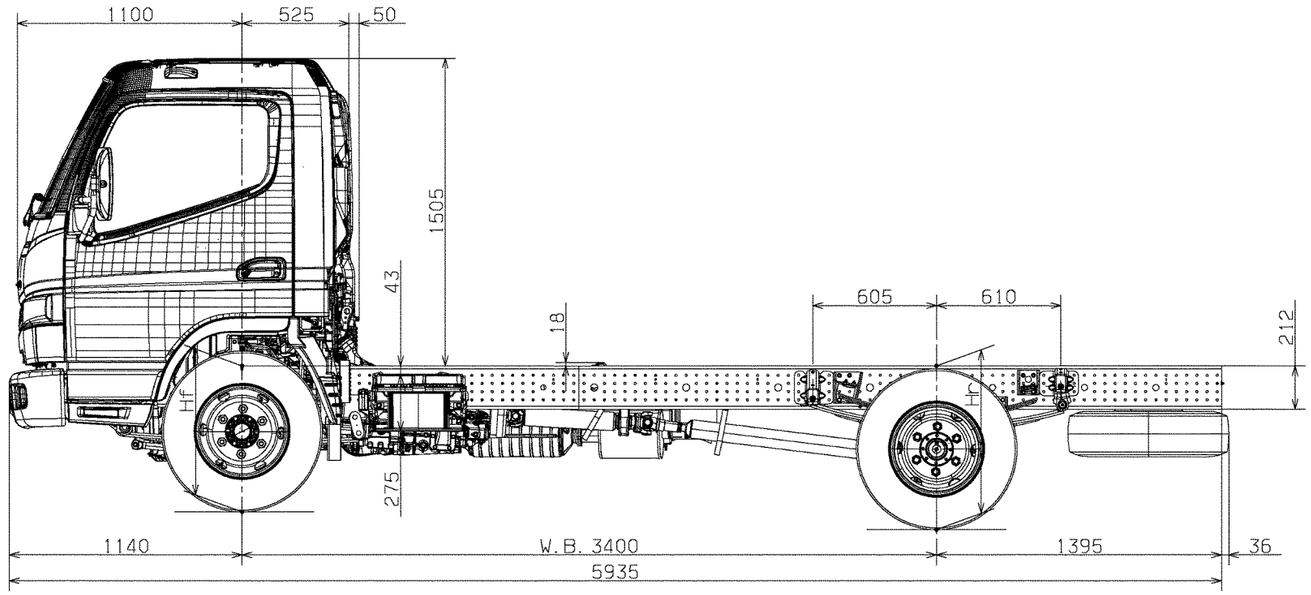


CHASSIS CAB
DRAWINGS

FEB71ER3WFAC
UNIT :mm SCALE :1/30

10.5 Chassis cab drawings

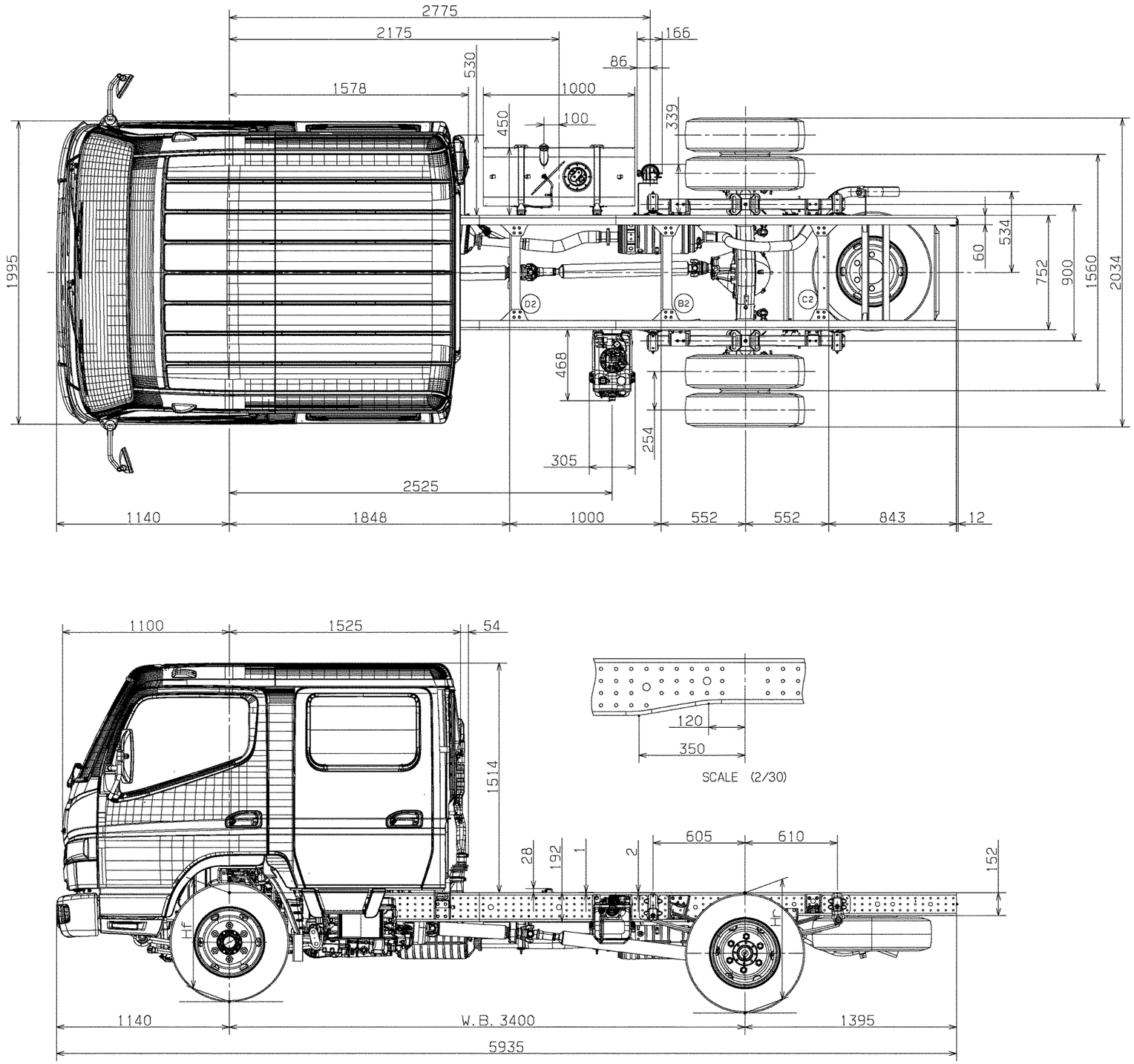




CHASSIS CAB
DRAWINGS

FEC71ER3SFAC
UNIT :mm SCALE :1/30

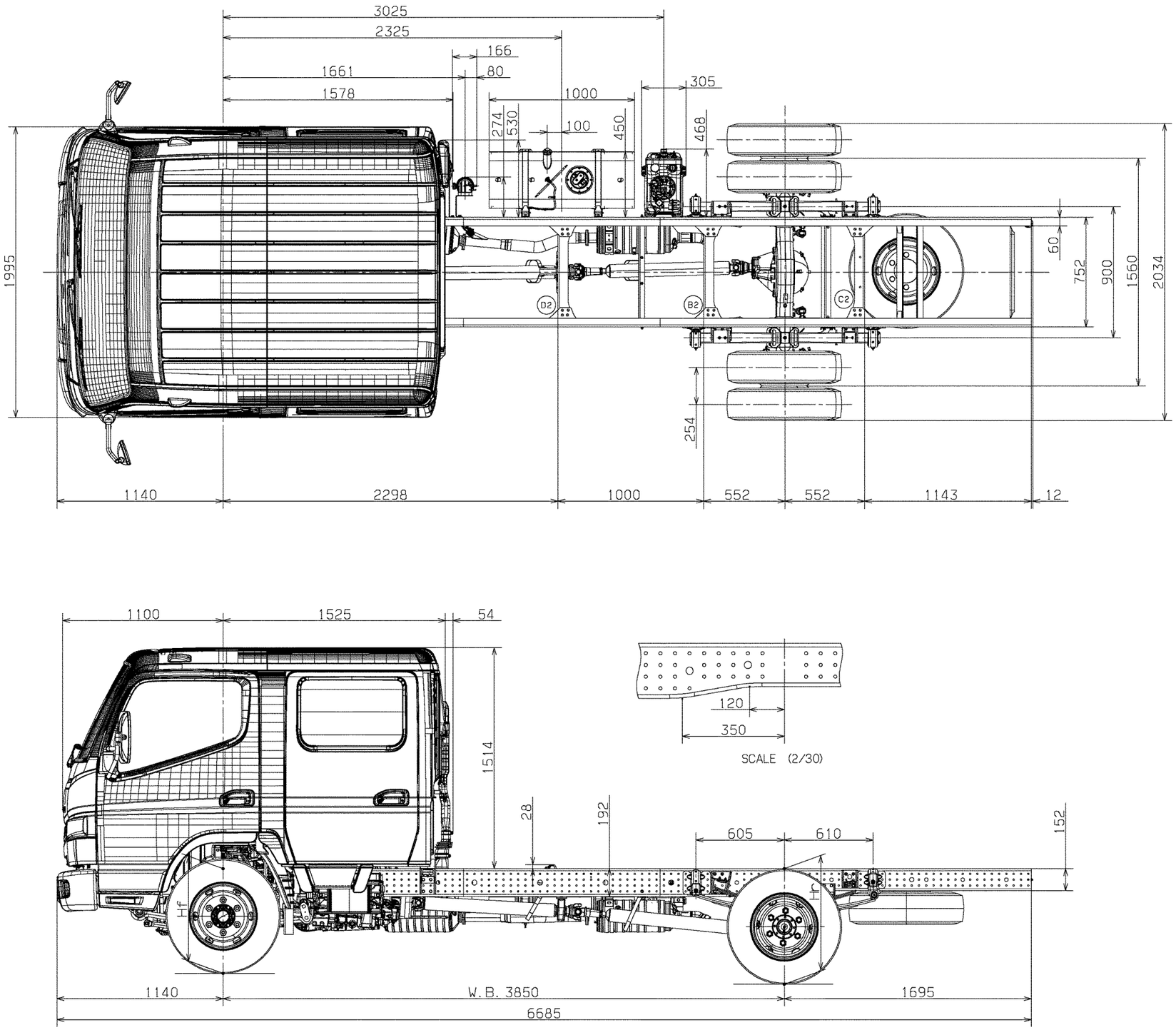
10.5 Chassis cab drawings



CHASSIS CAB
DRAWINGS

FEB91ER3WFAD
UNIT :mm SCALE :1/30

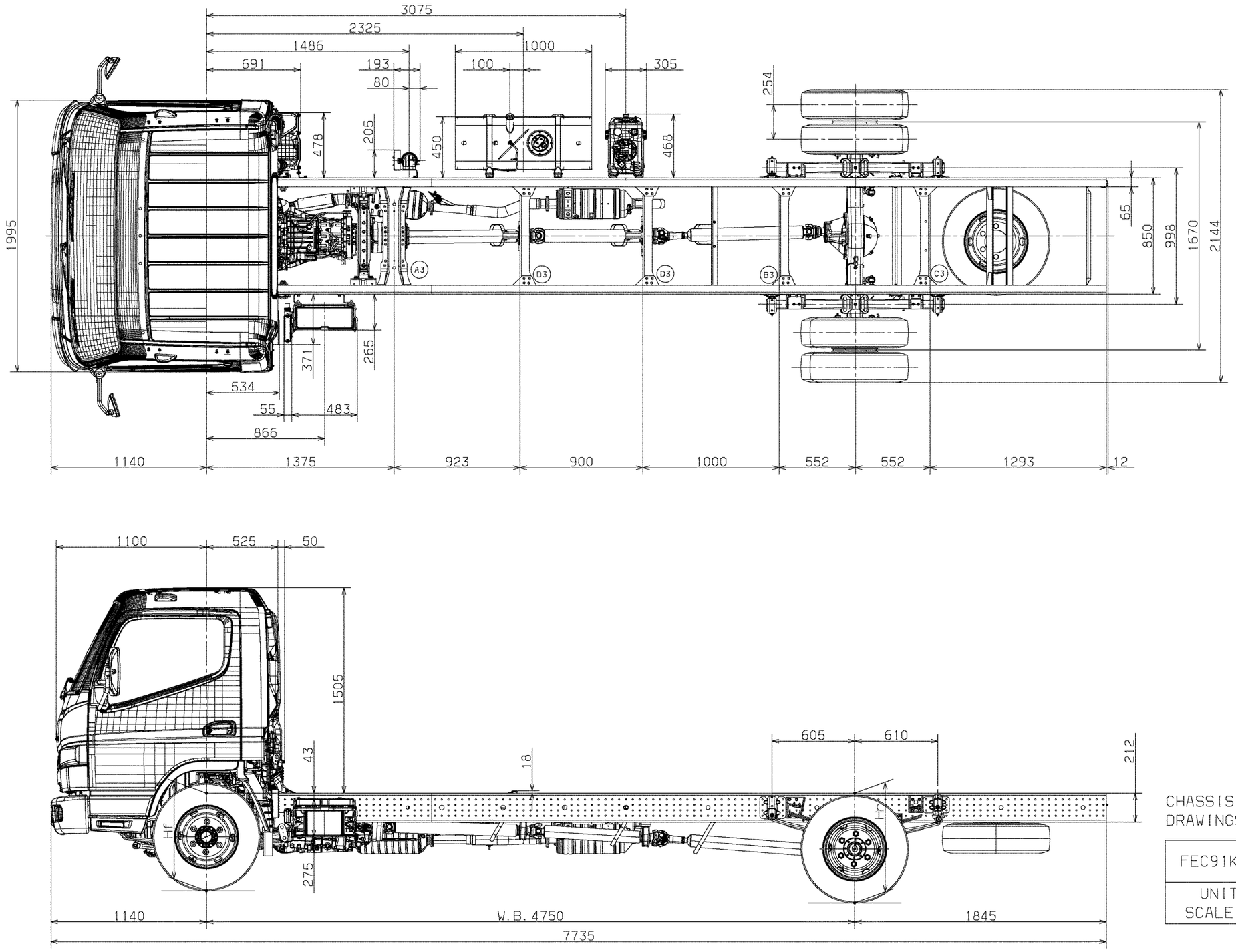
10.5 Chassis cab drawings



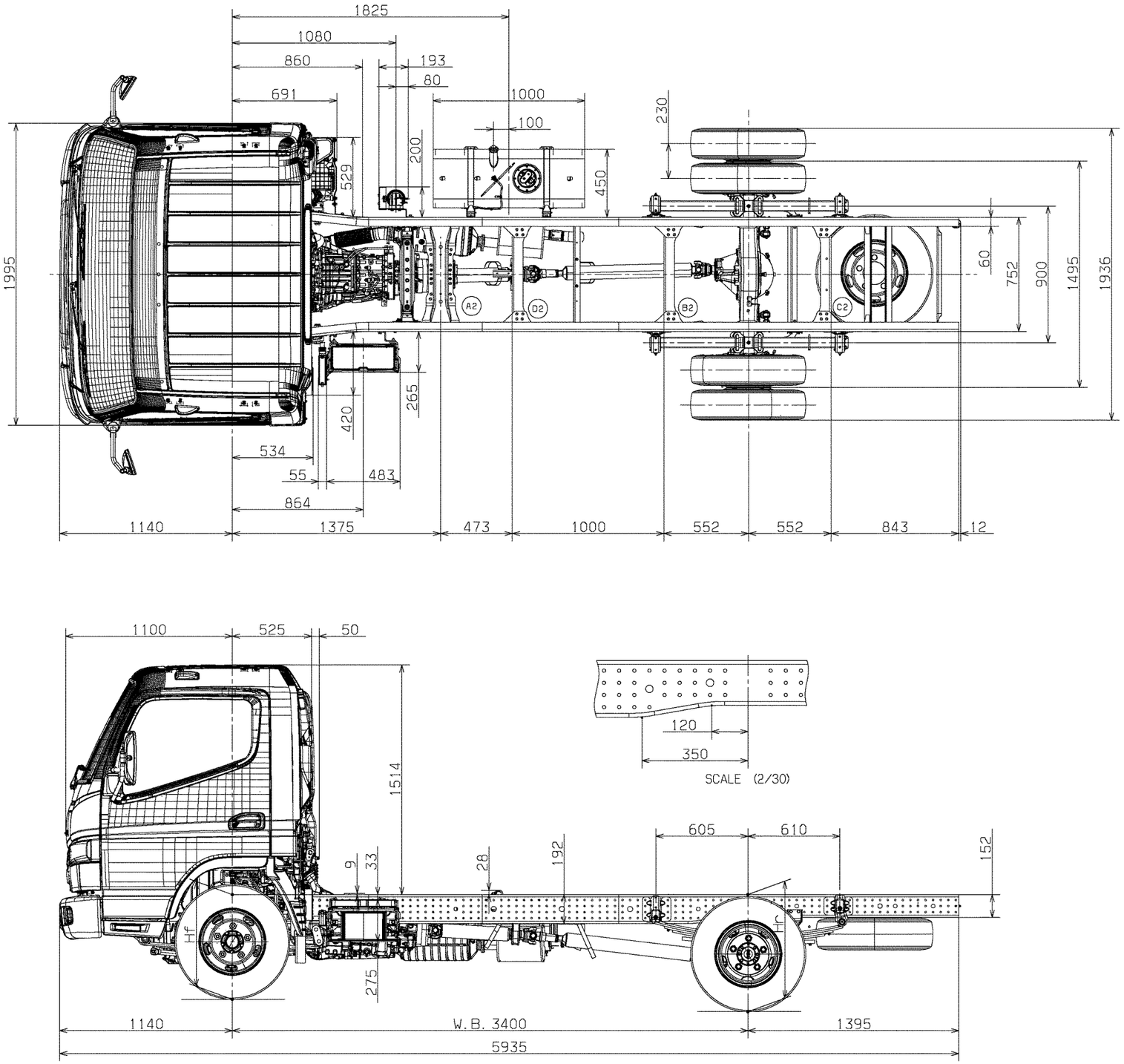
CHASSIS CAB
DRAWINGS

FEB91GR3WFAD
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings



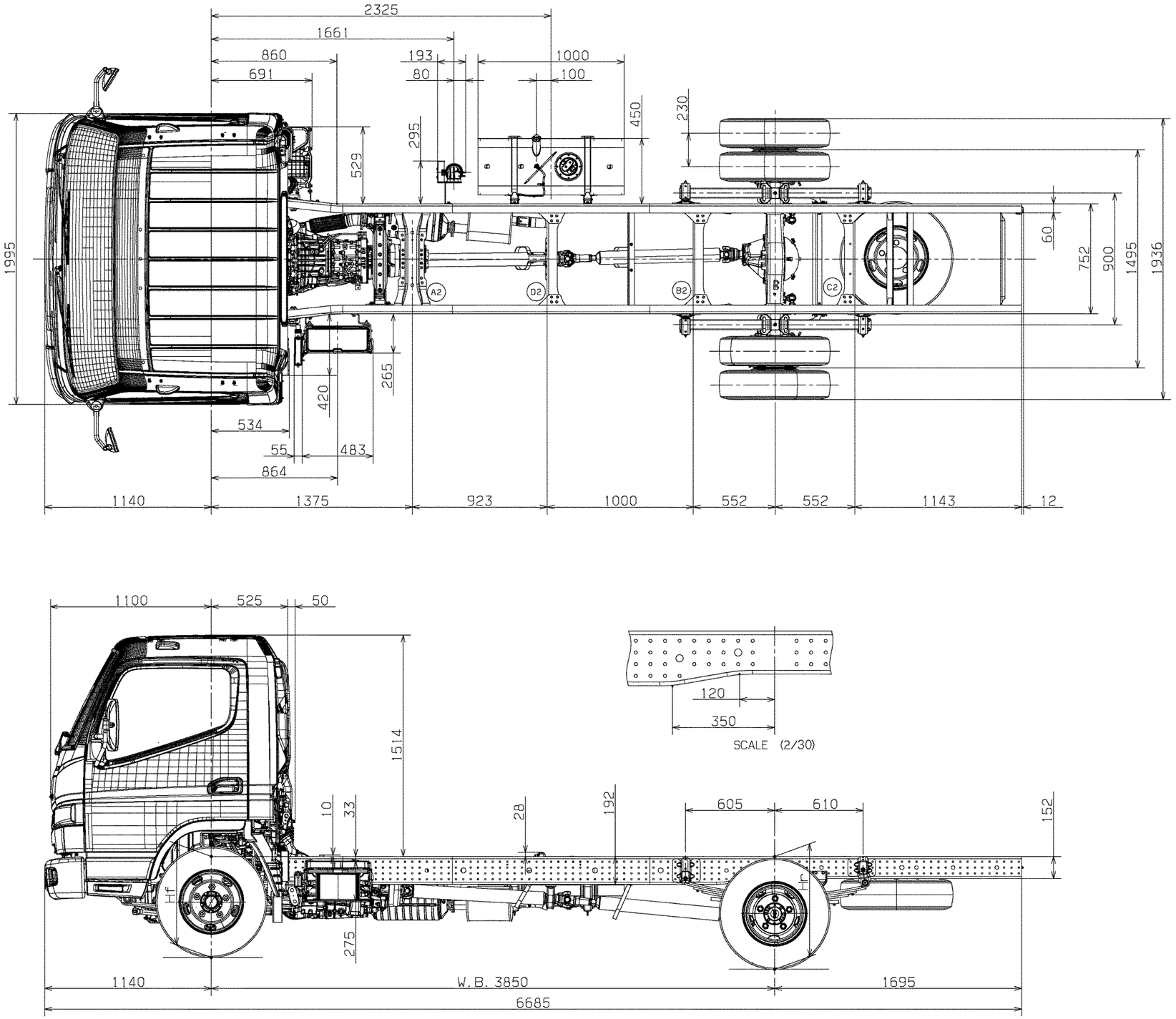
10.5 Chassis cab drawings



CHASSIS CAB
DRAWINGS

FEB51ER3SFAC
UNIT :mm SCALE :1/30

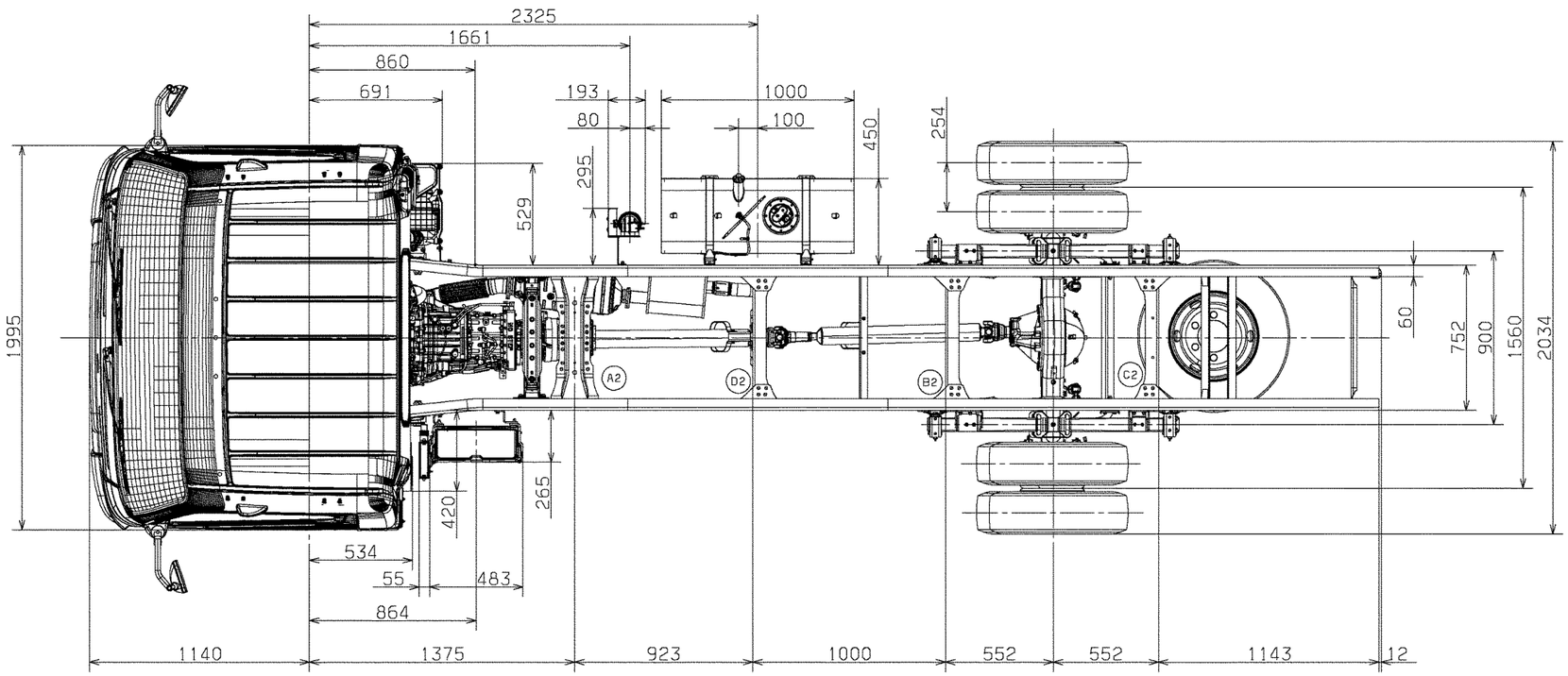
10.5 Chassis cab drawings

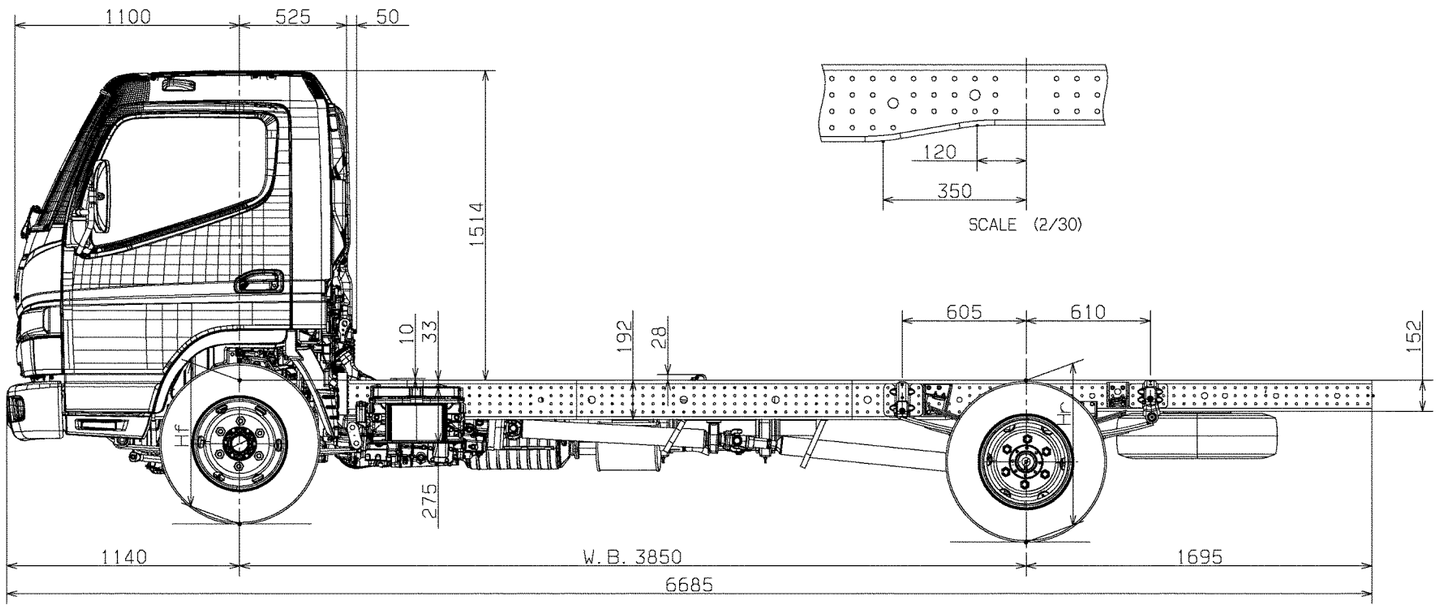


CHASSIS CAB
DRAWINGS

FEB51GR3SFAC
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings



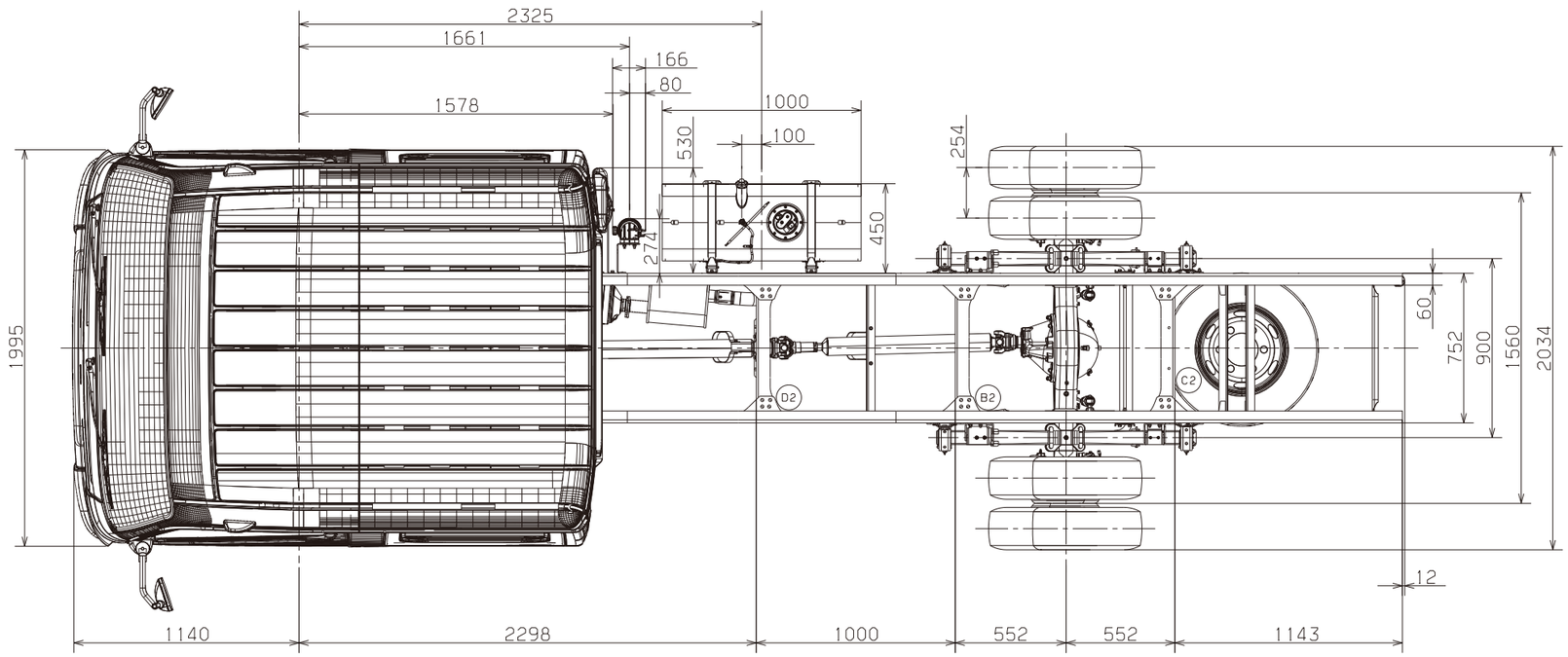


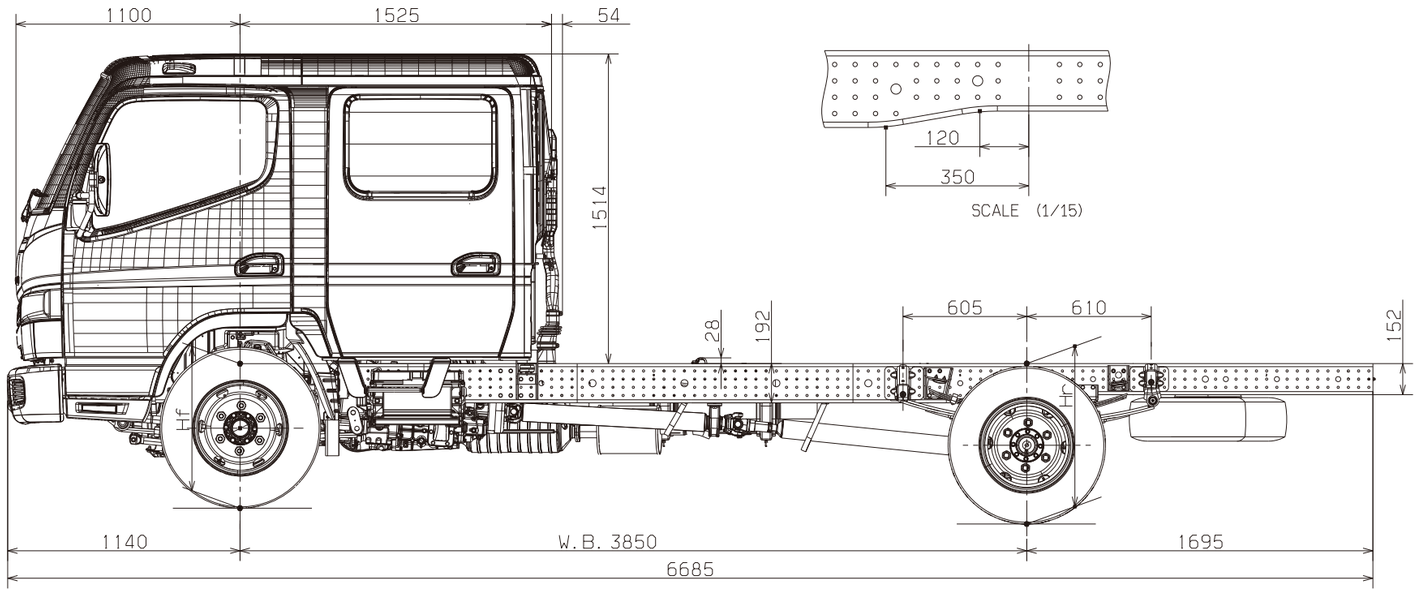
CHASSIS CAB
DRAWINGS

FEB71GR3SFAC
UNIT :mm SCALE :1/30

10.5 Chassis cab drawings

C

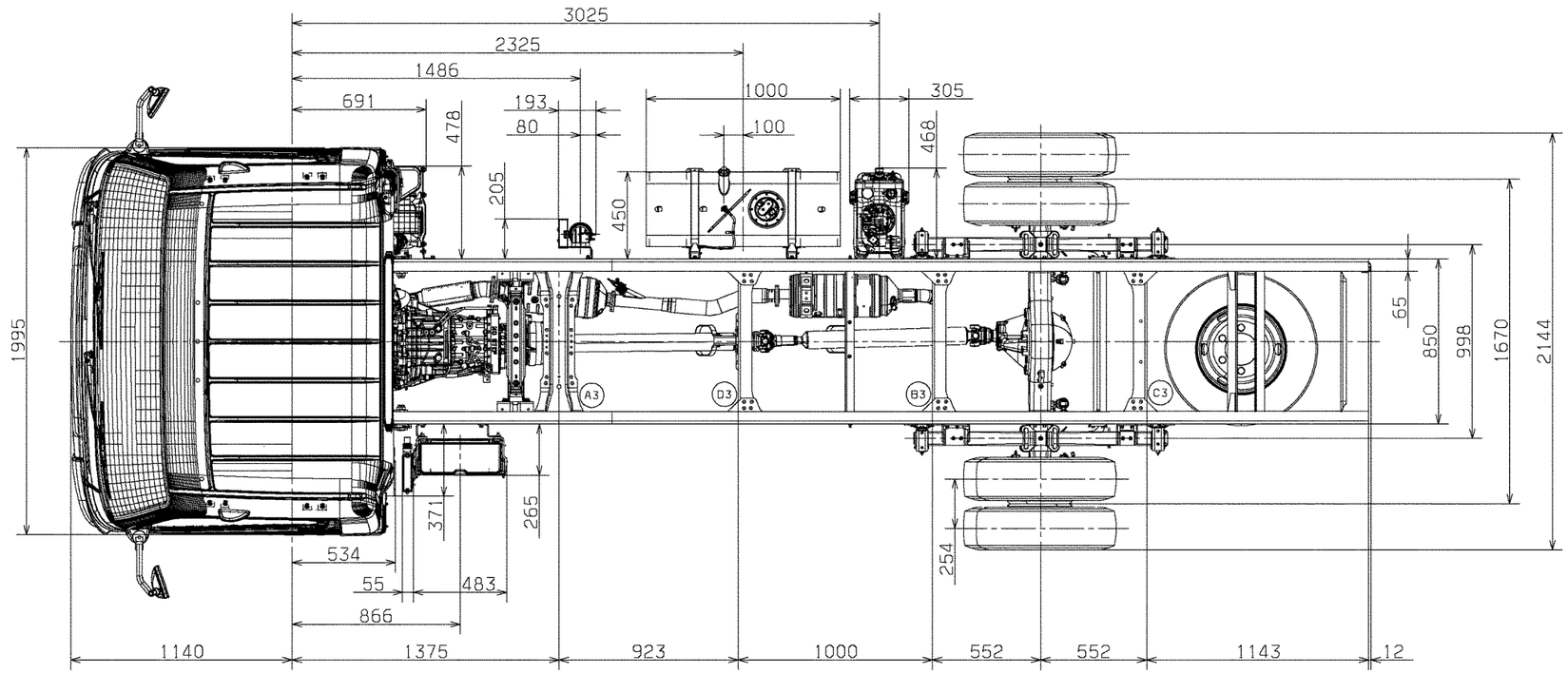


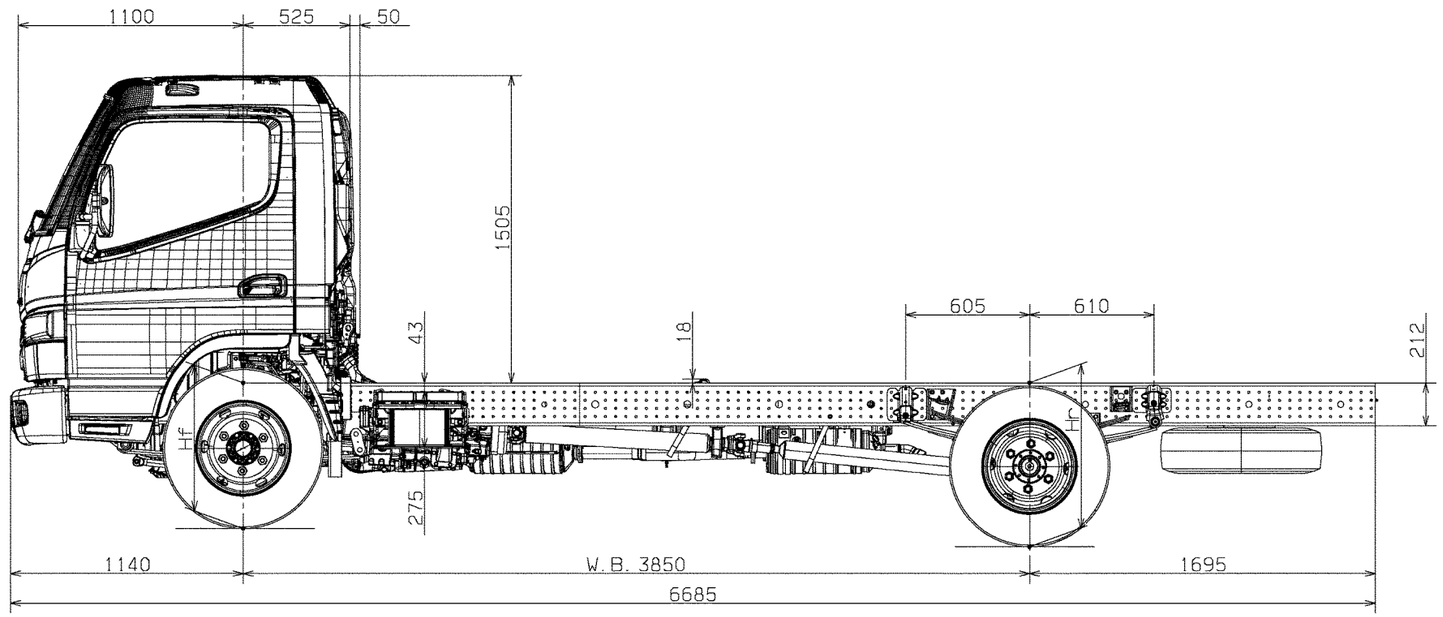


CHASSIS CAB
DRAWINGS

FEB71GR3WFAC
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

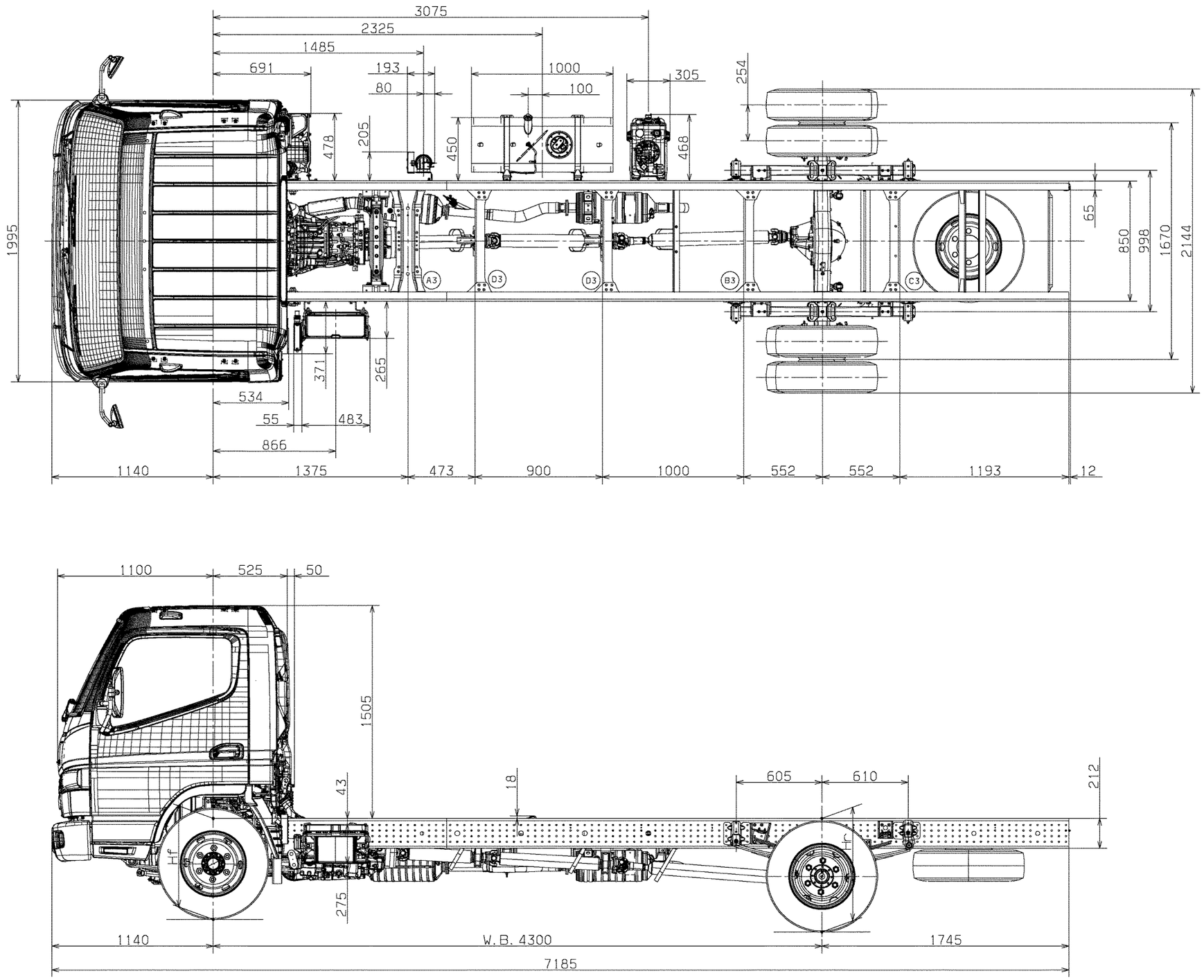




CHASSIS CAB
DRAWINGS

FEC91GR3SFAD
UNIT :mm SCALE :1/30

10.5 Chassis cab drawings

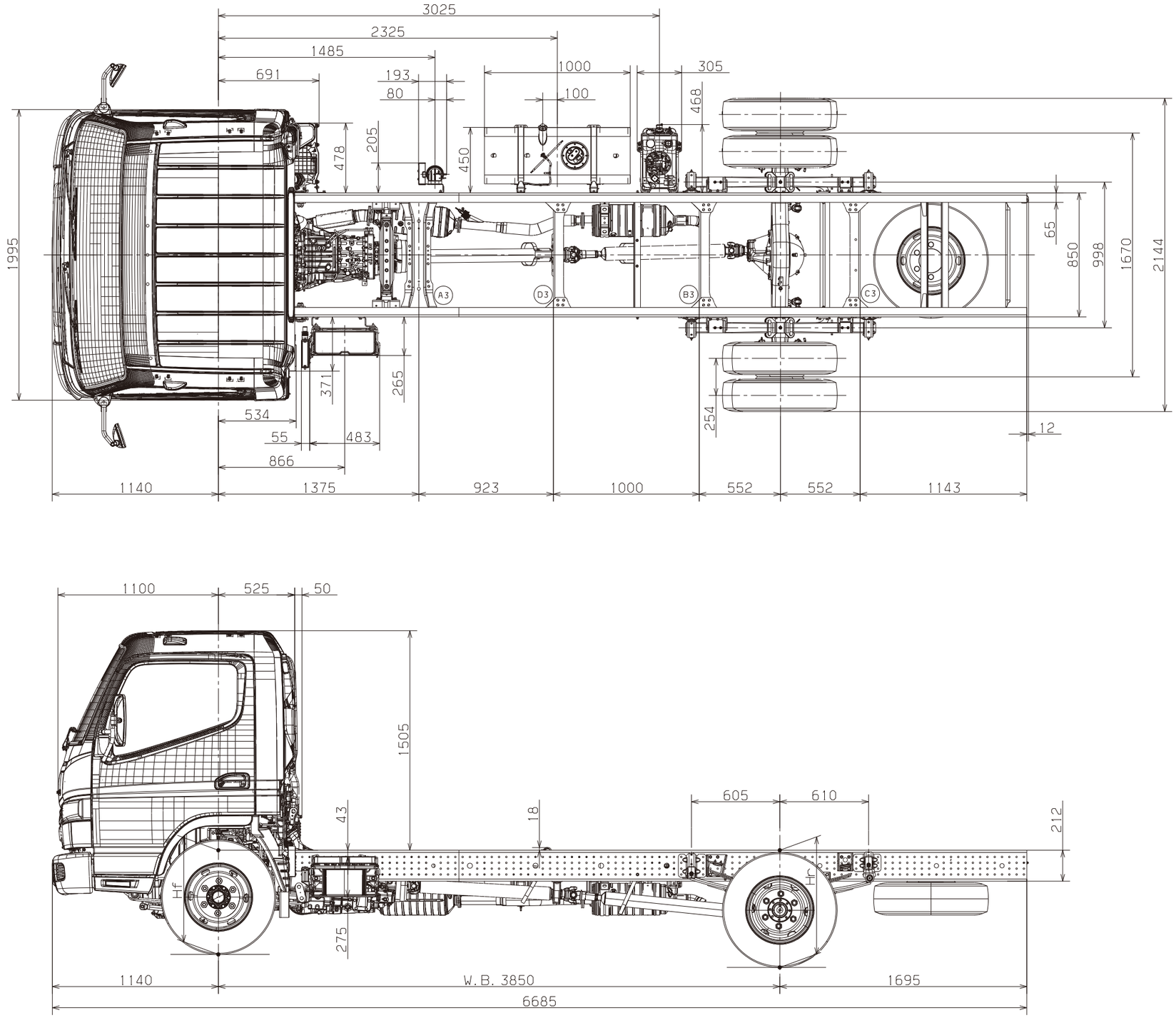


CHASSIS CAB
DRAWINGS

FEC91HR3SFAD
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

C

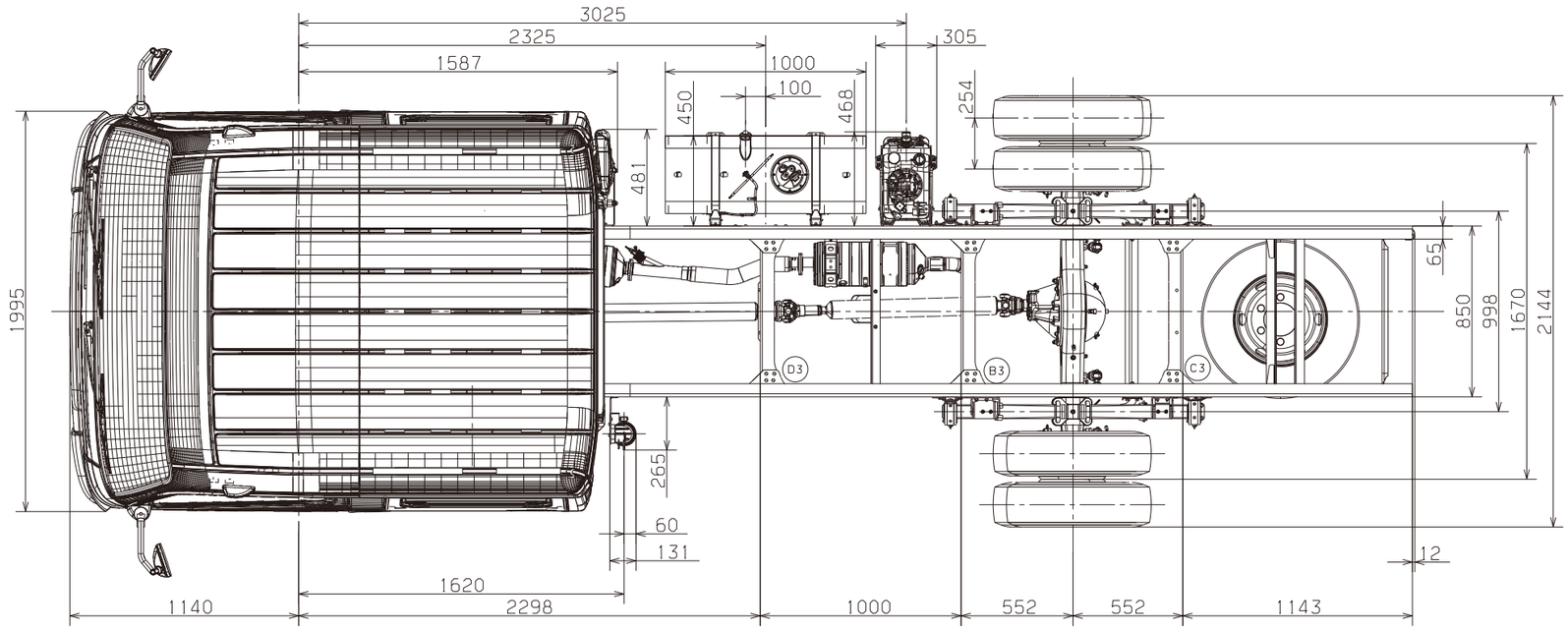


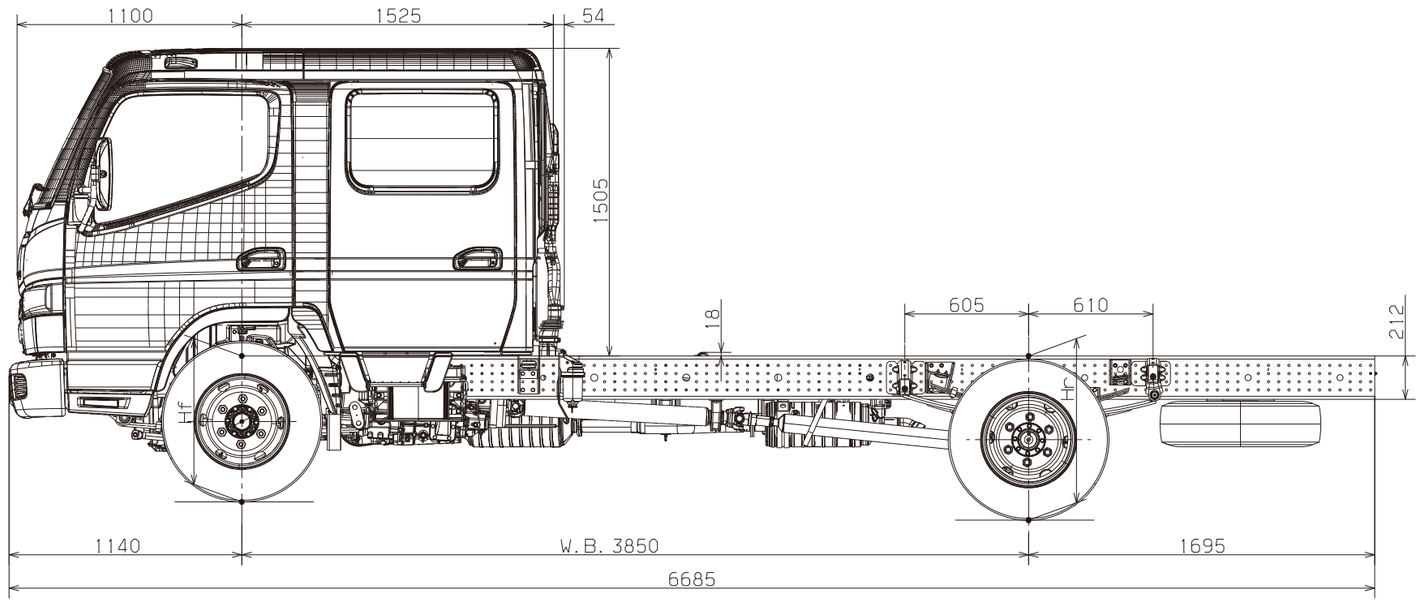
CHASSIS CAB
DRAWINGS

FECX1GR3SFAD
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

C



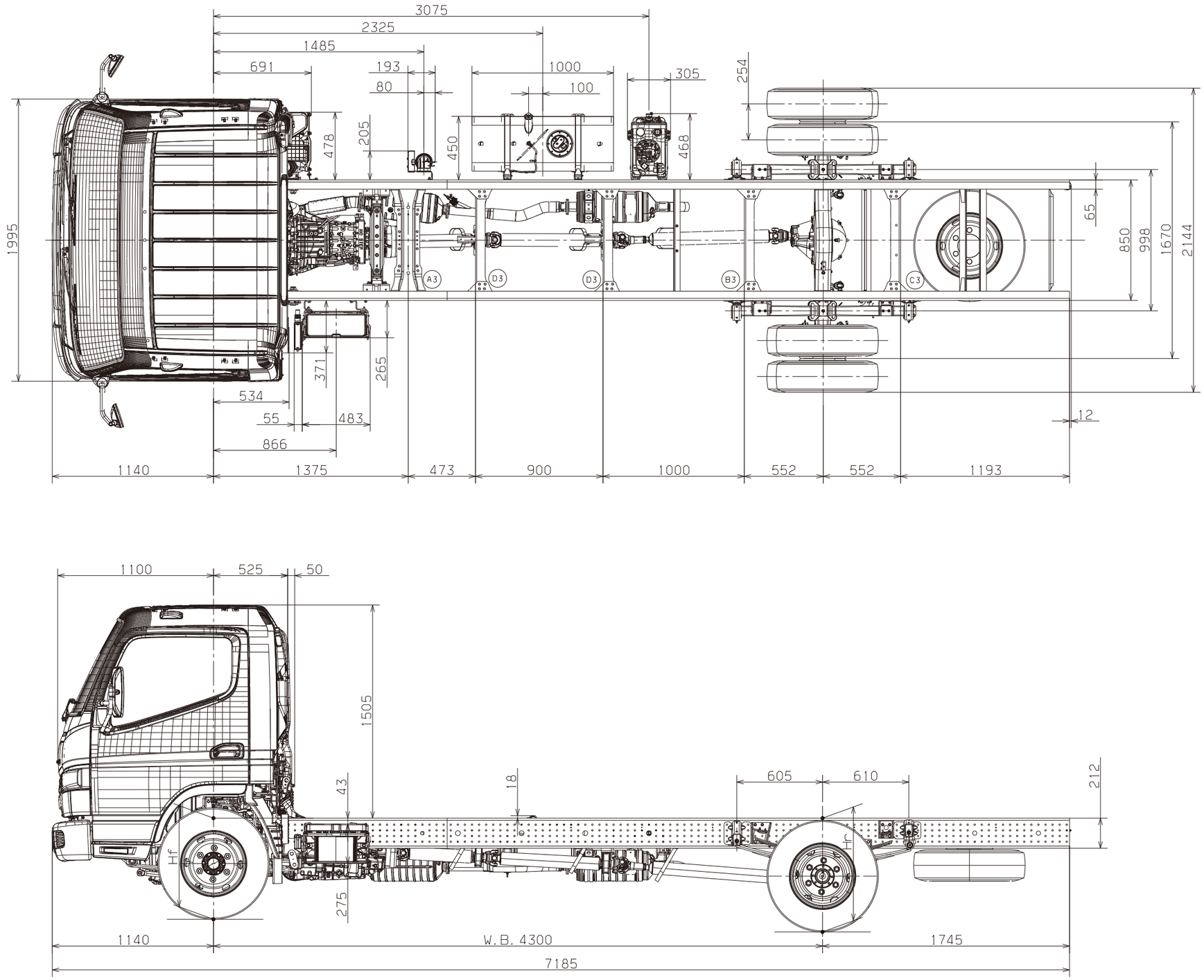


CHASSIS CAB
DRAWINGS

FECX1GR3WFAD
UNIT :mm SCALE :1/30

10.5 Chassis cab drawings

C

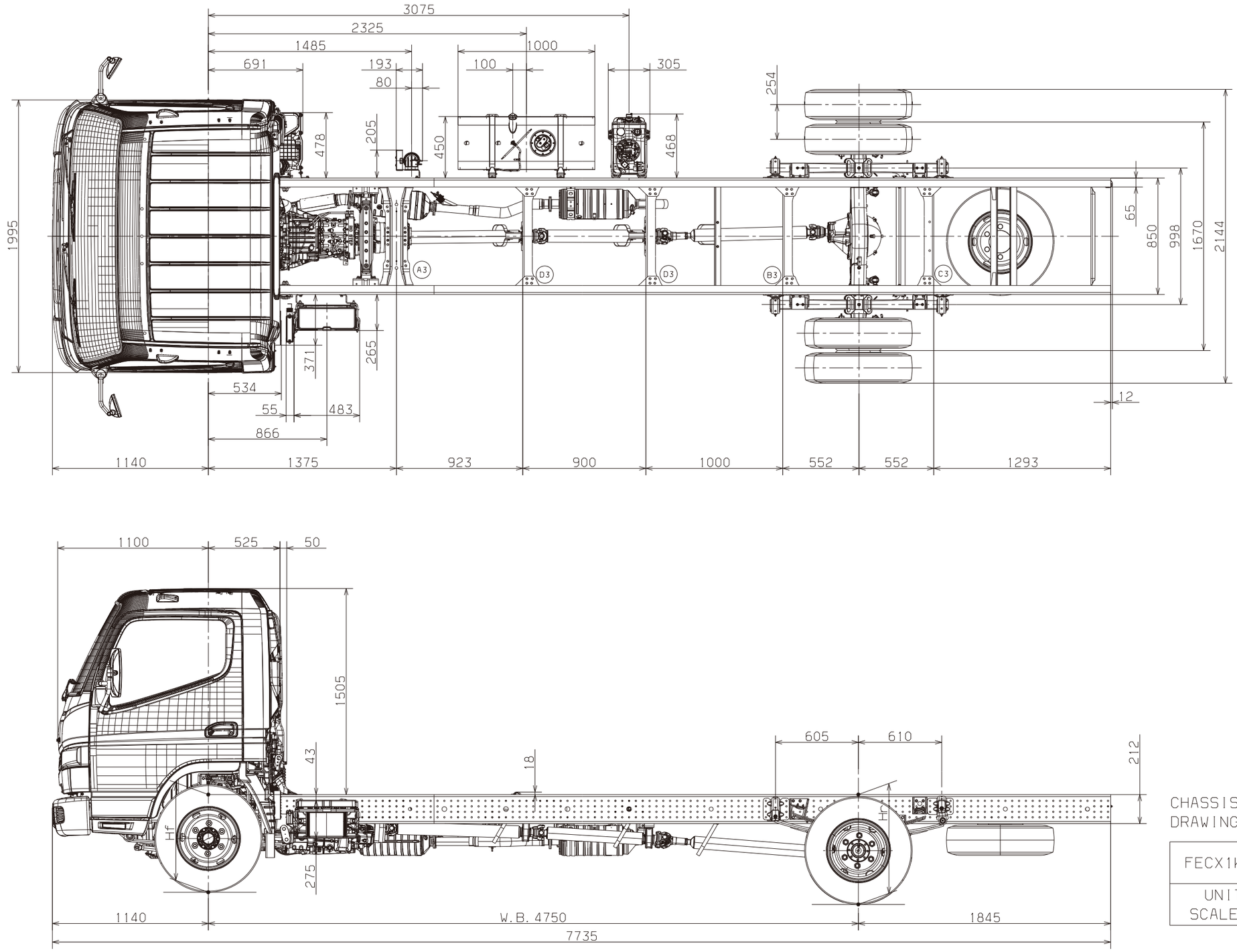


CHASSIS CAB
DRAWINGS

FECX1HR3SFAD
UNIT : mm SCALE : 1/30

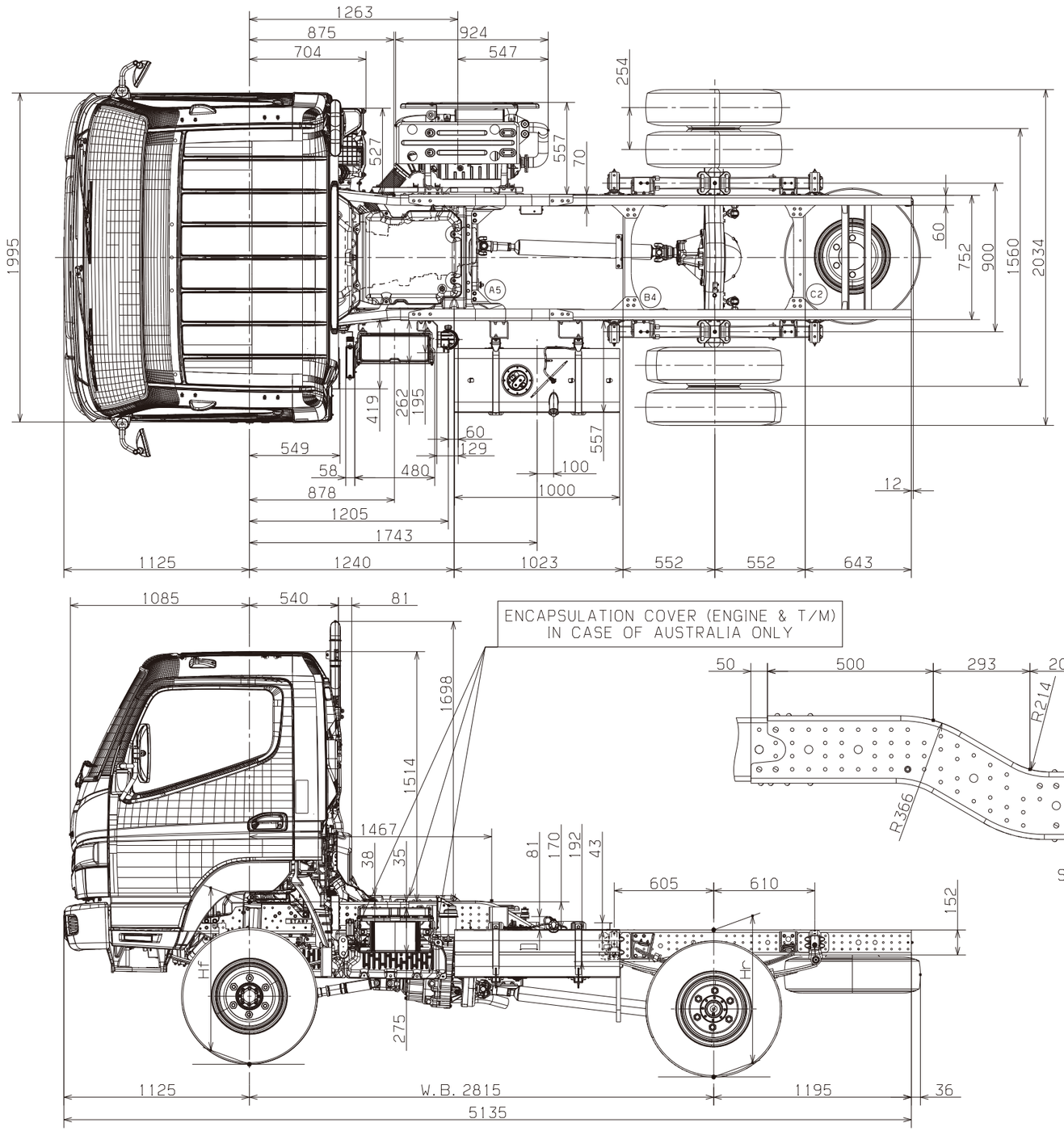
10.5 Chassis cab drawings

C



10.5 Chassis cab drawings

C

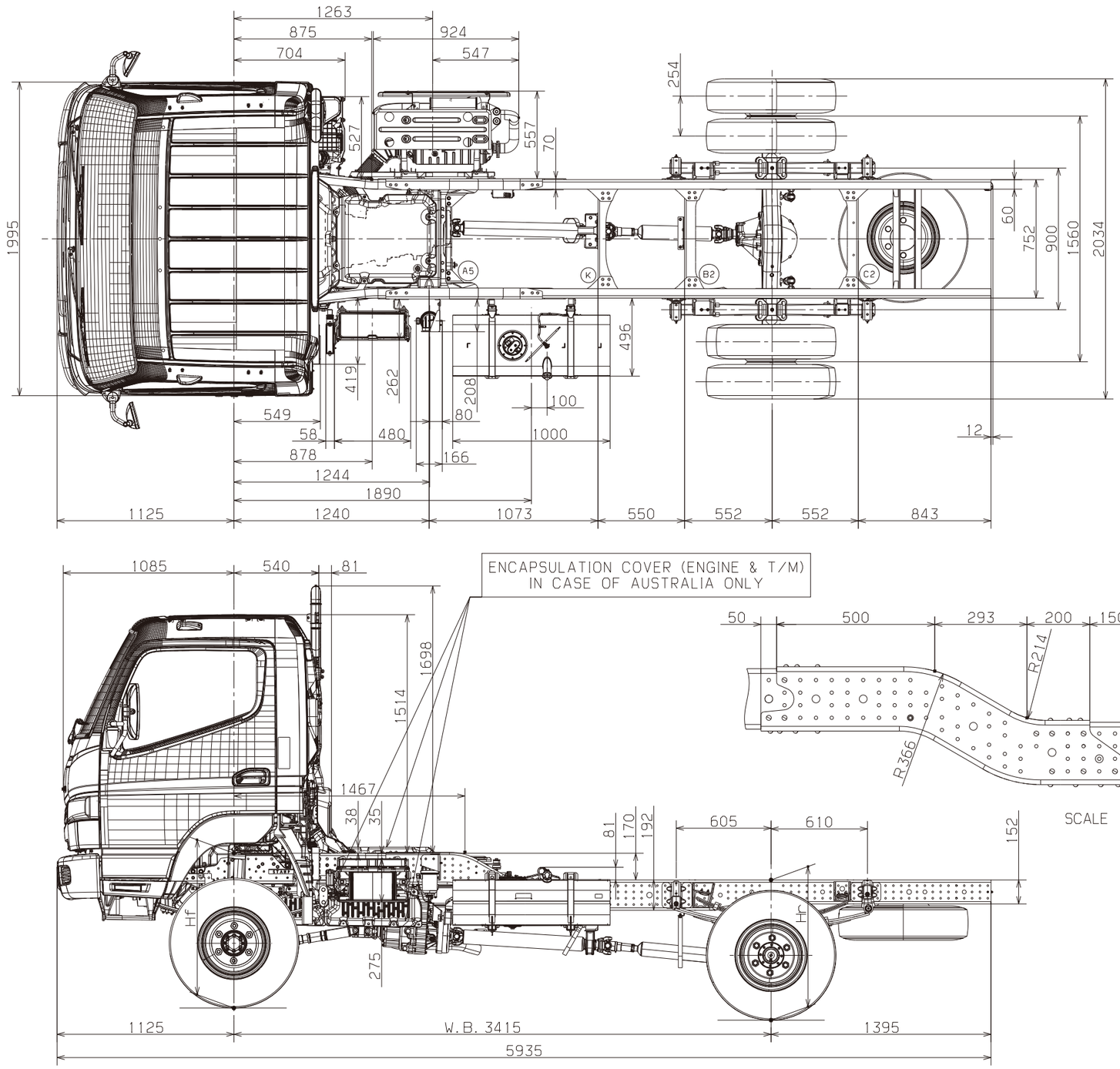


CHASSIS CAB
DRAWINGS

FGB71CR6SFAC
UNIT :mm SCALE :1/30

10.5 Chassis cab drawings

C

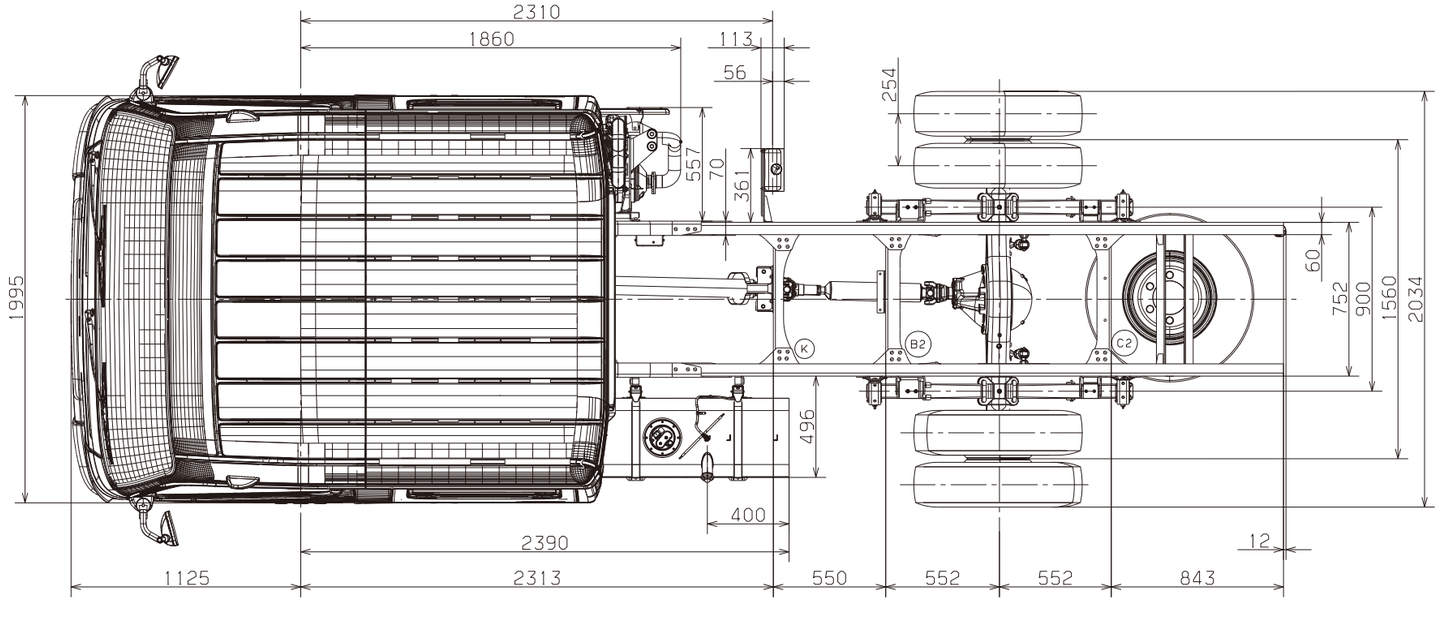


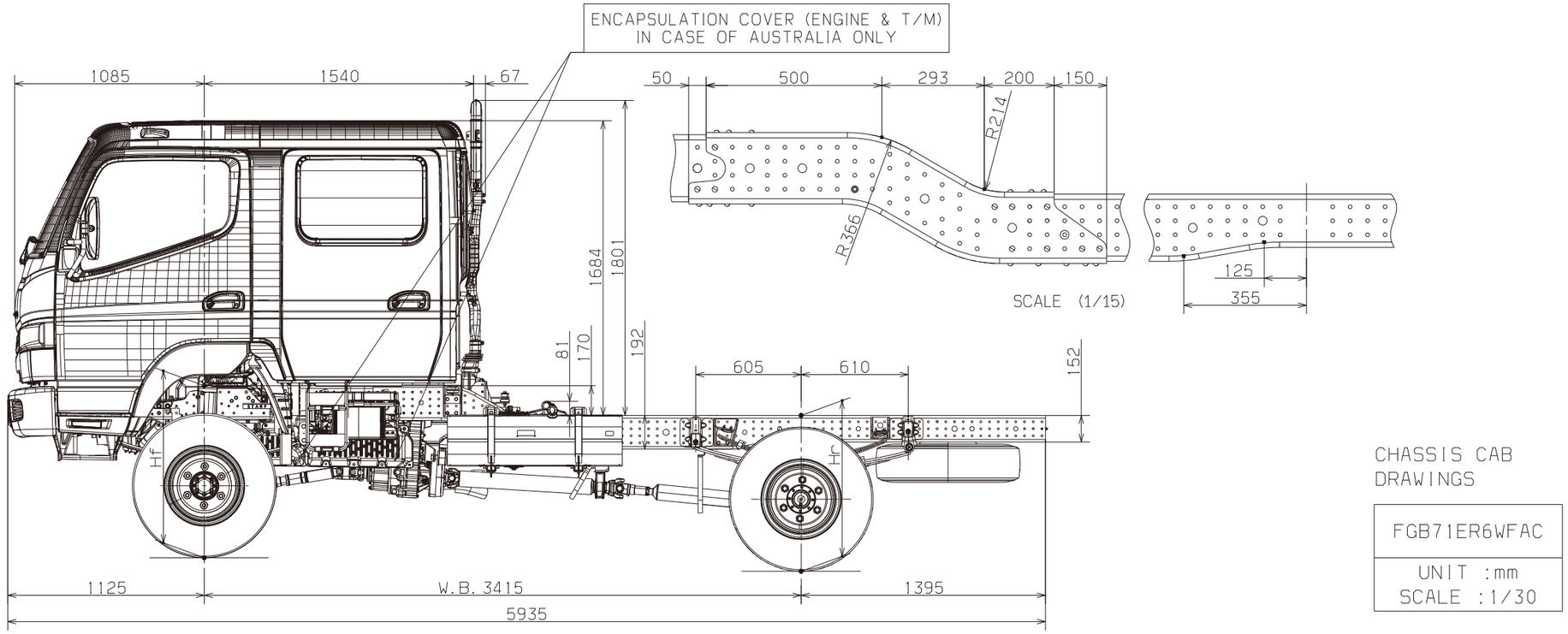
CHASSIS CAB
DRAWINGS

FGB71ER6SFAC
UNIT : mm SCALE : 1/30

10.5 Chassis cab drawings

C



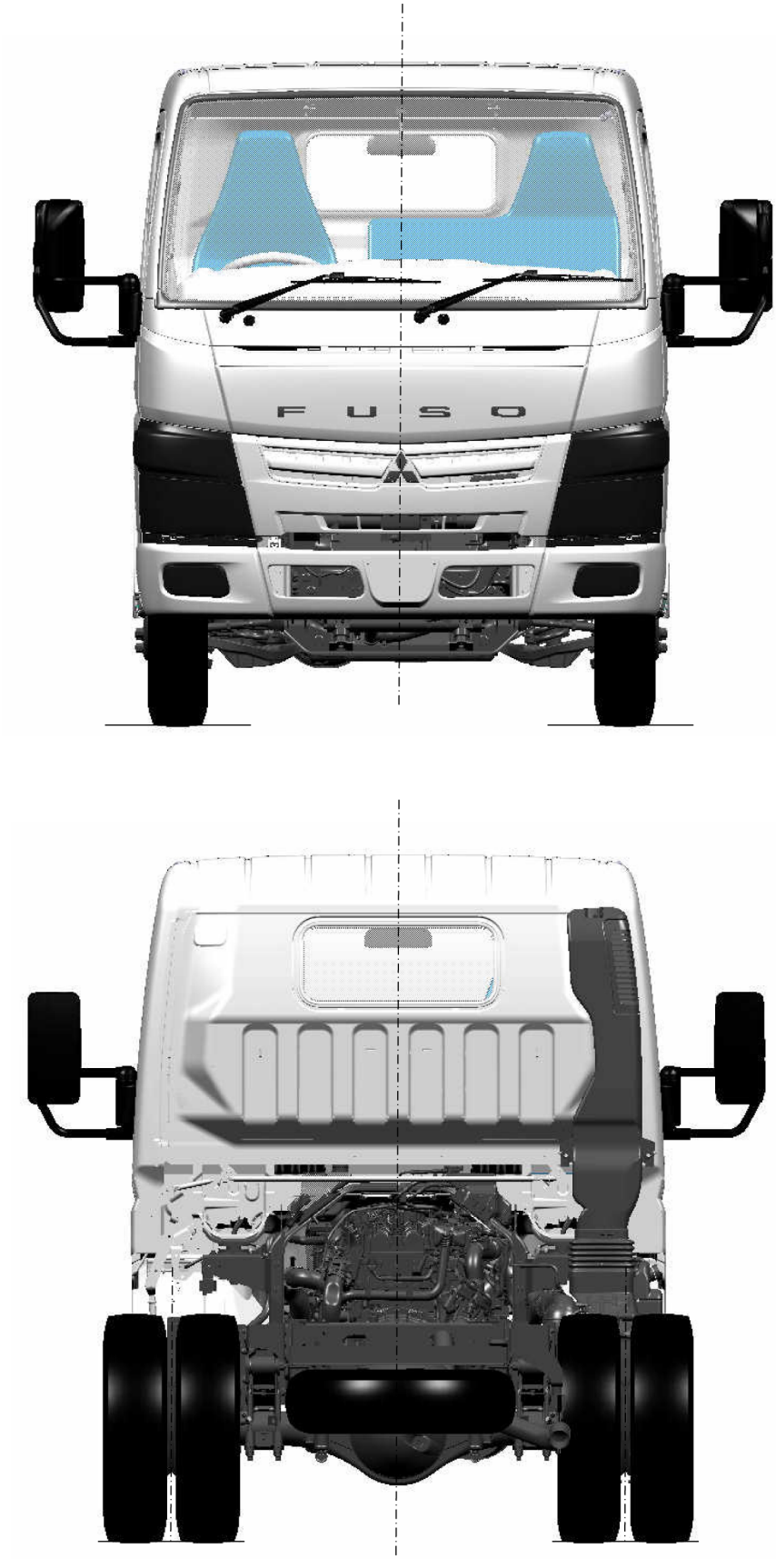


CHASSIS CAB
DRAWINGS

FGB71ER6WFAC
UNIT : mm SCALE : 1/30

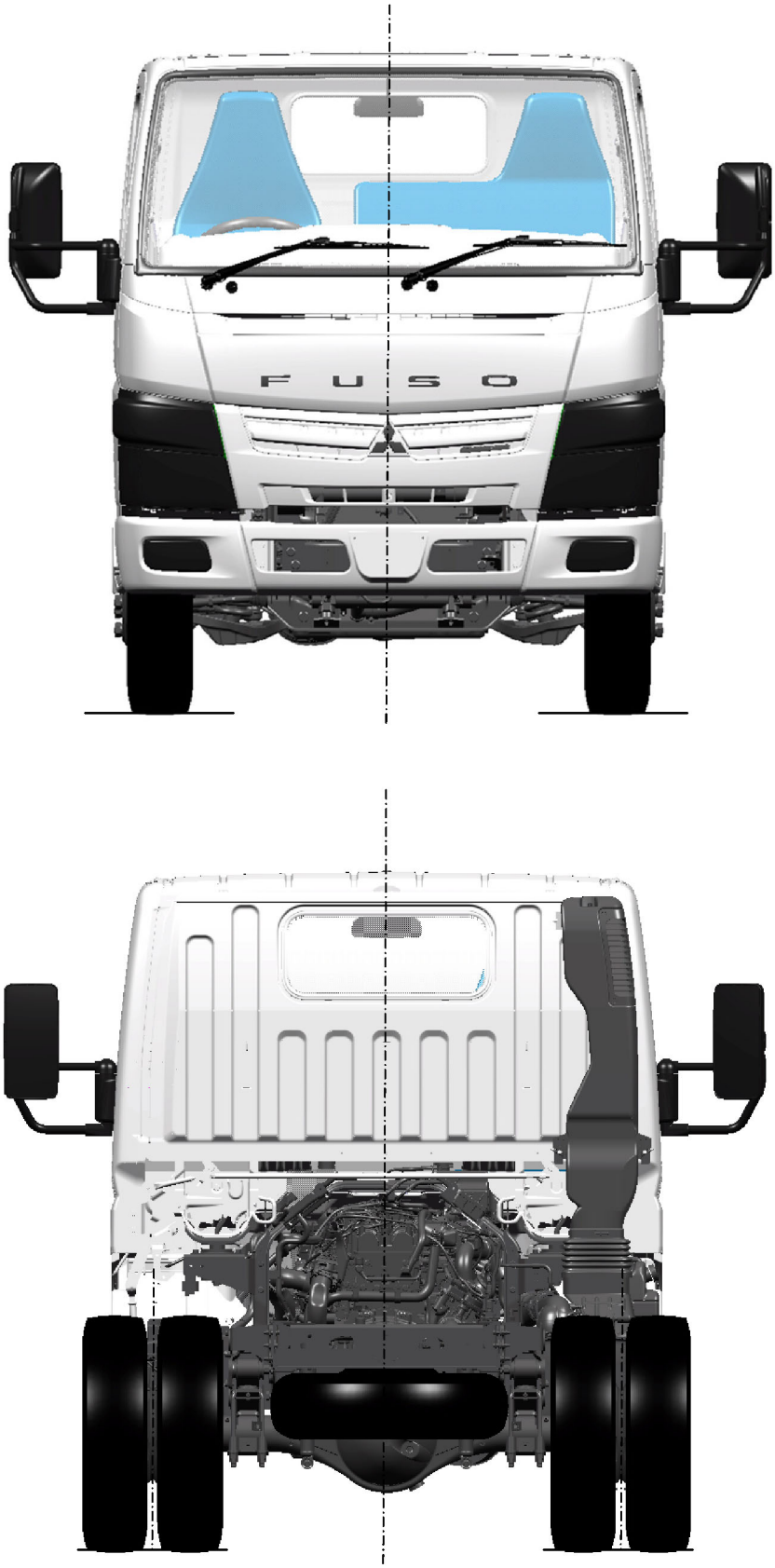
10.5.2 Cab drawings

10.5 Chassis cab drawings



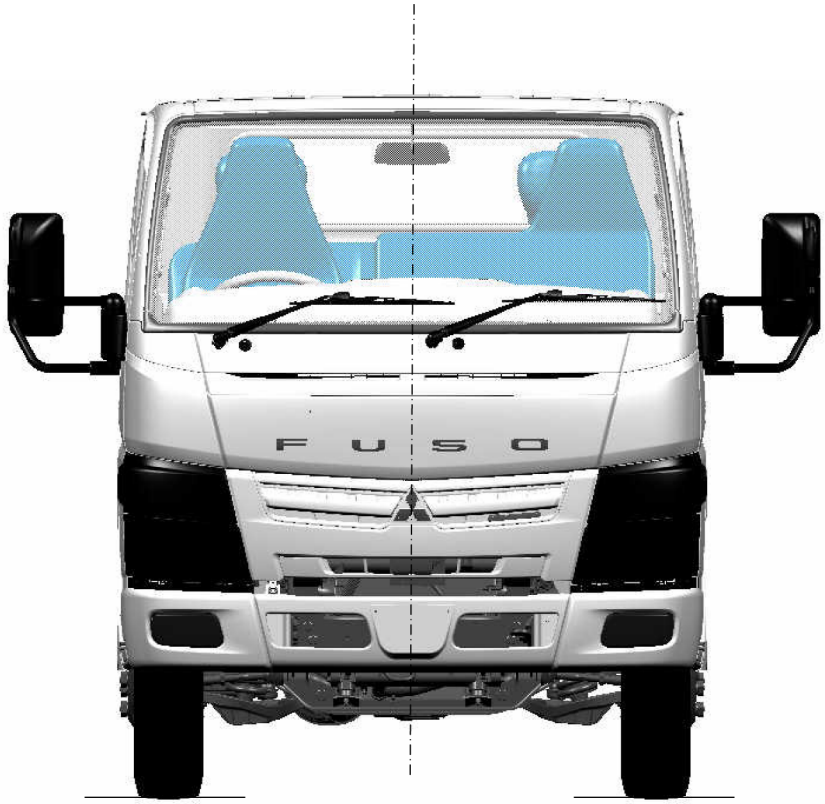
FEA21C SINGLE CAB AMT

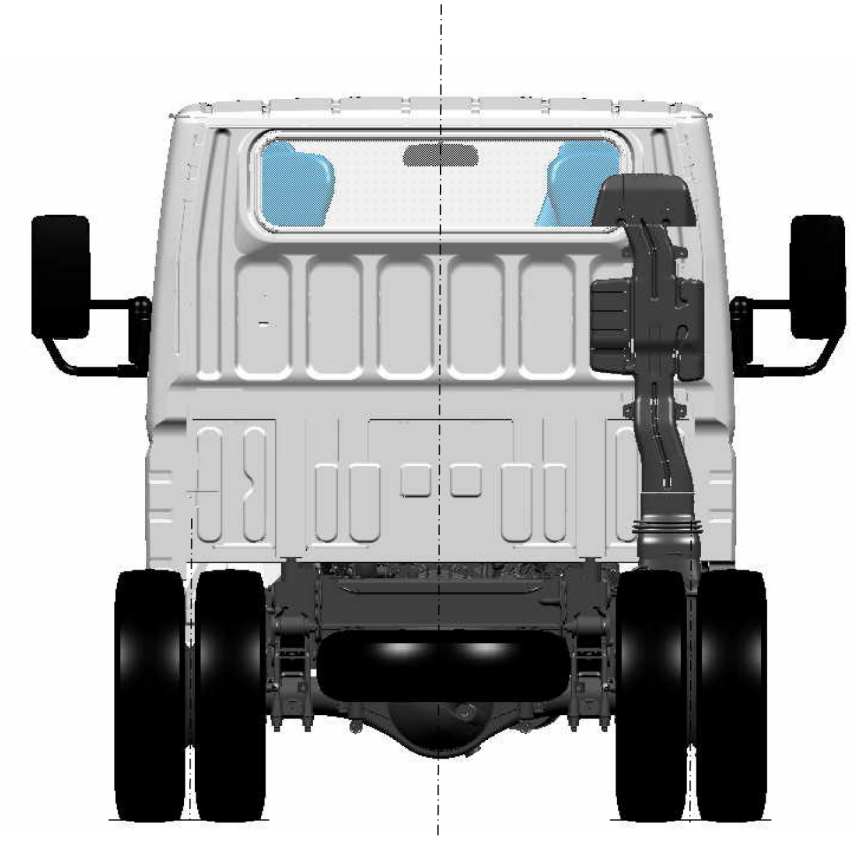
10.5 Chassis cab drawings



FEA21E SINGLE CAB AMT

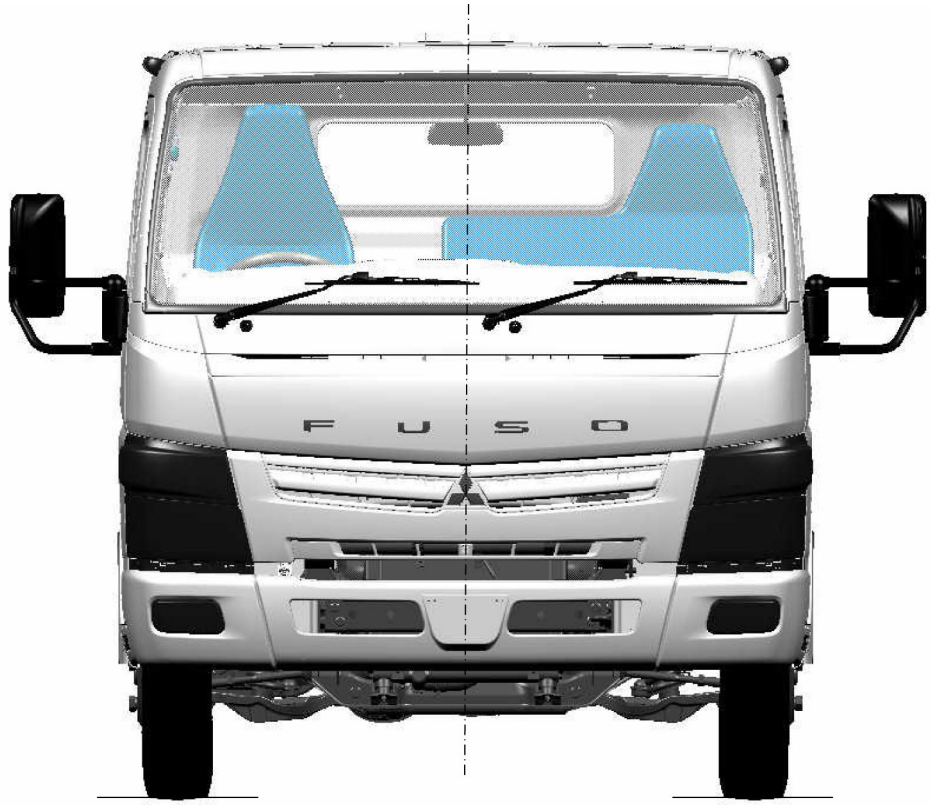
10.5 Chassis cab drawings

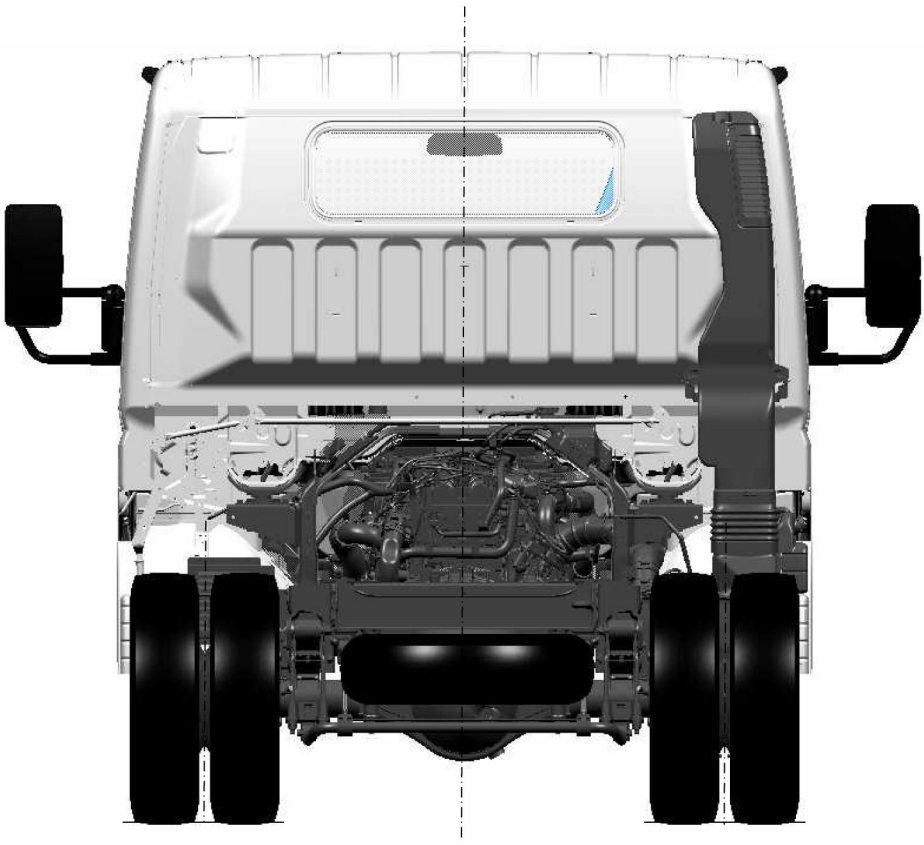




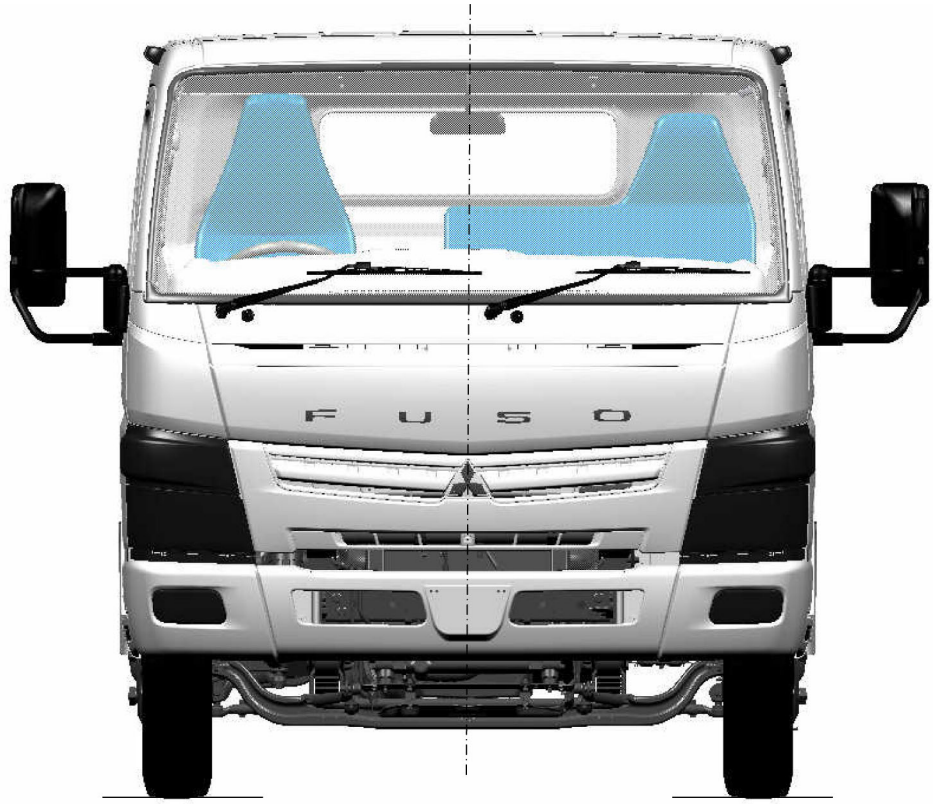
FEA21E CREW CAB AMT

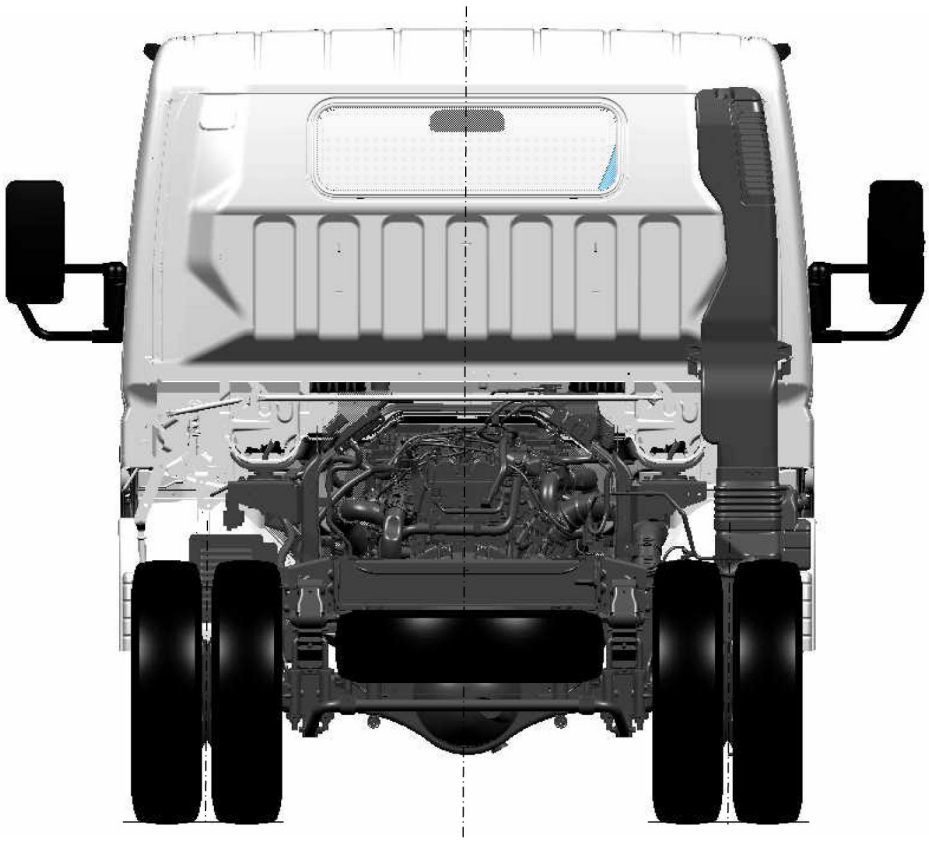
10.5 Chassis cab drawings





FEB21 SINGLE CAB AMT





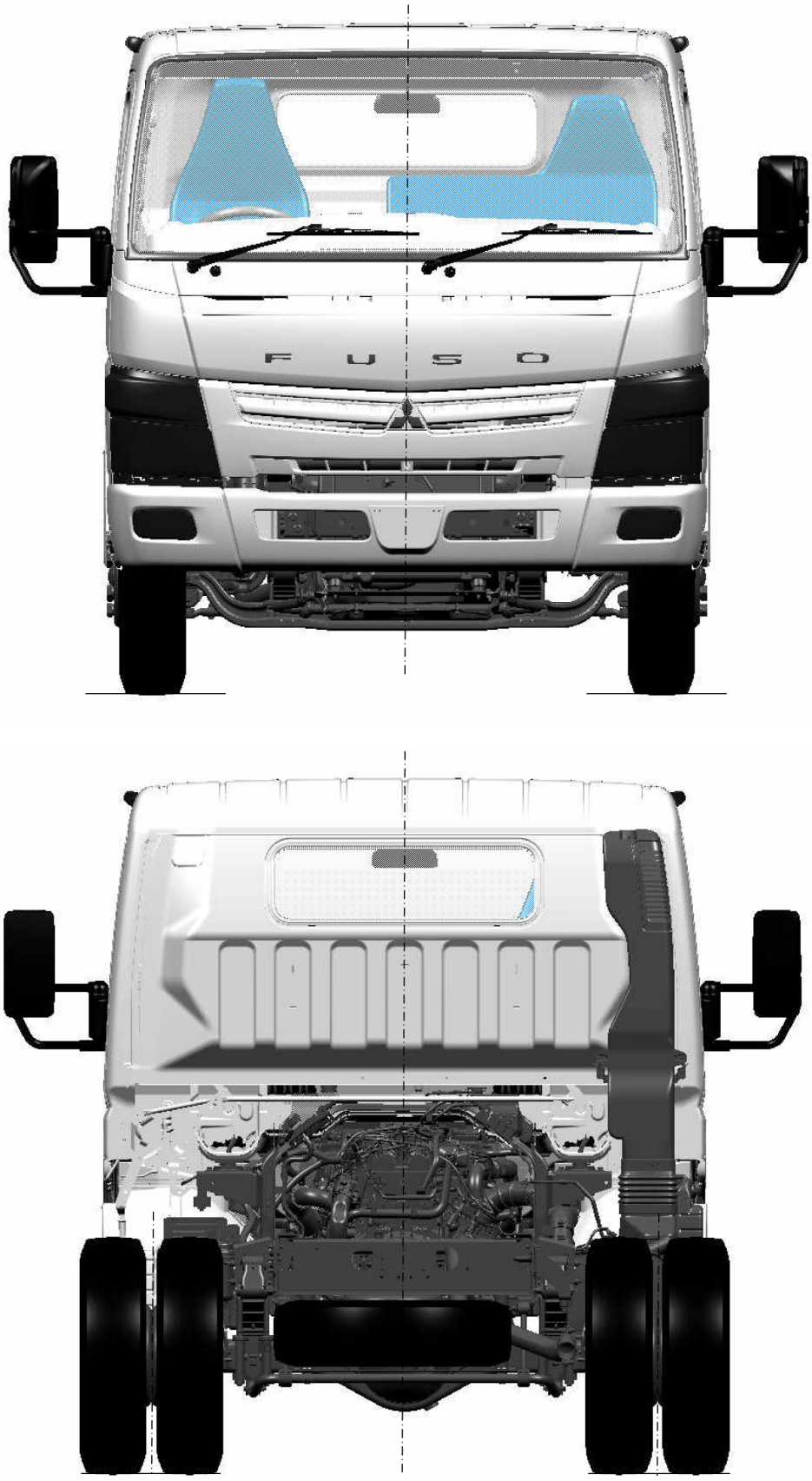
FEB51, FEB71 SINGLE CAB AMT/MT

FEB71 CREW CAB AMT/MT

10.5 Chassis cab drawings

FEB91 CREW CAB AMT

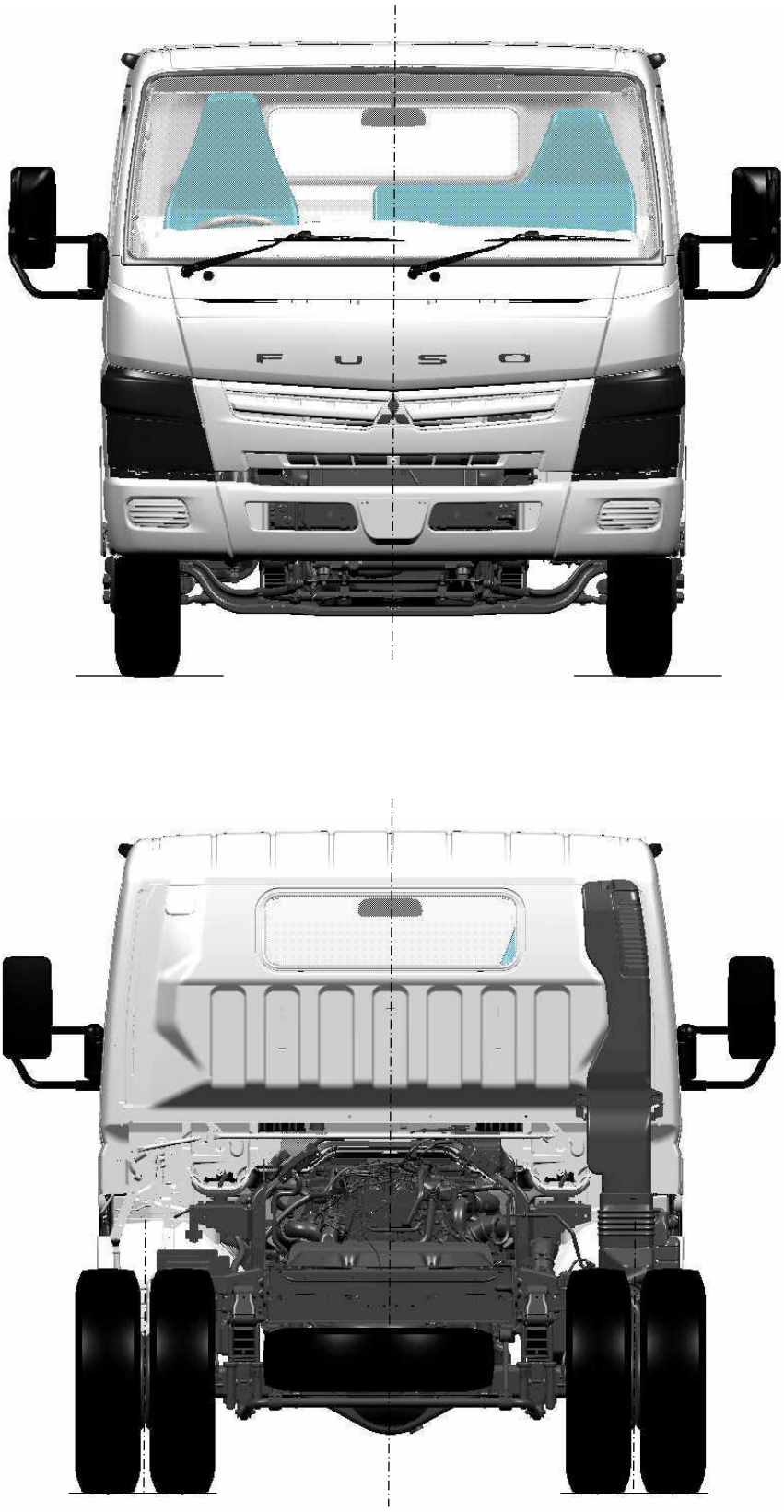
10.5 Chassis cab drawings



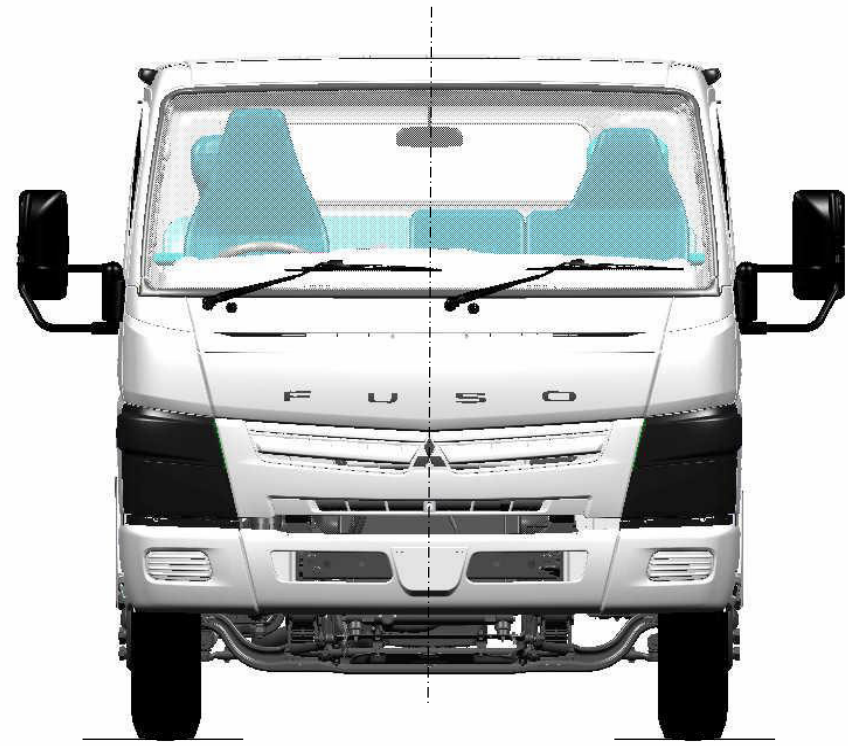
FEC71 SINGLE CAB AMT

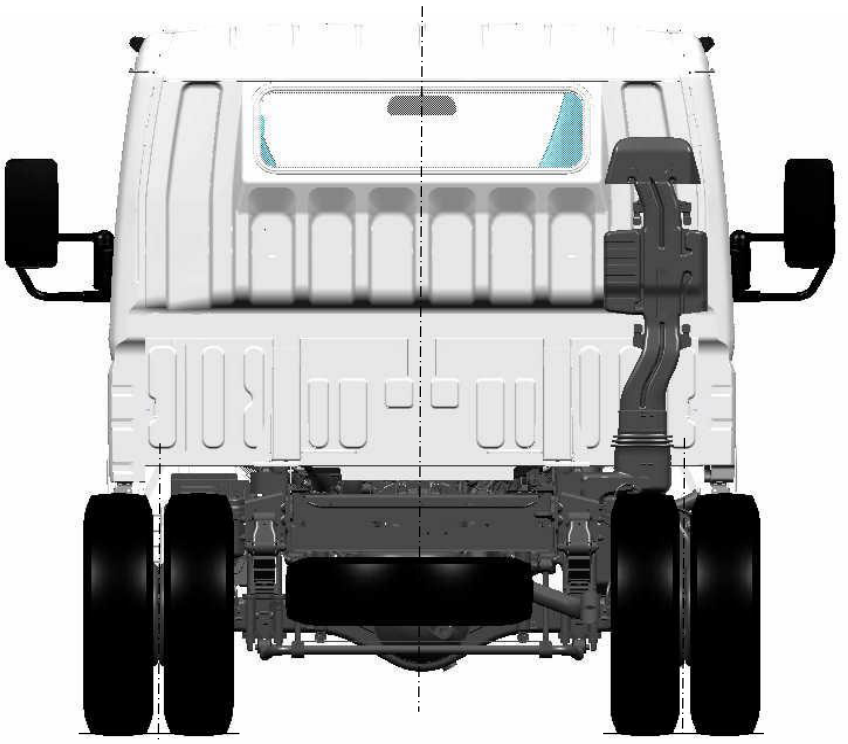
10.5 Chassis cab drawings

FEC91 SINGLE CAB AMT/MT



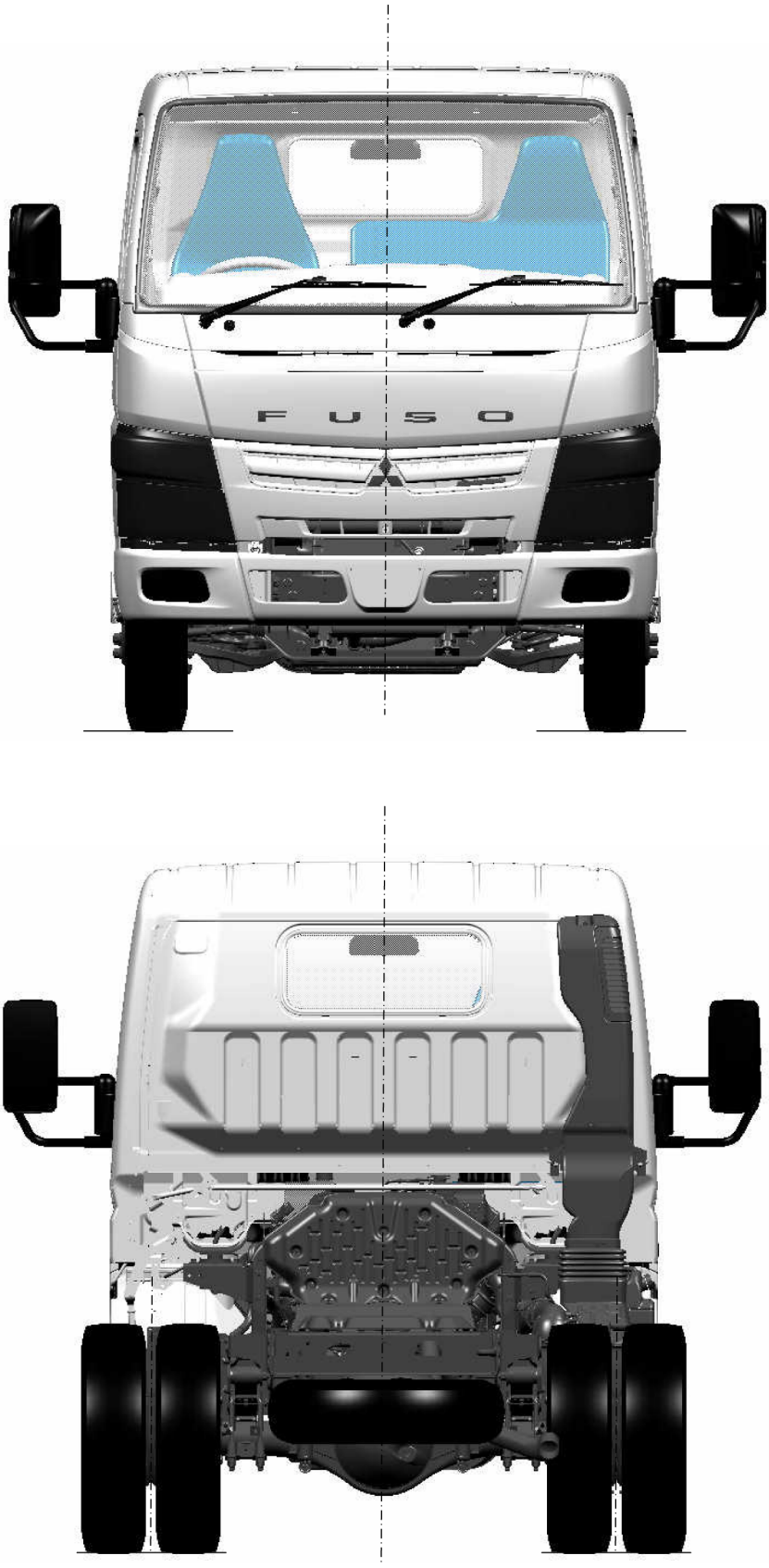
FECX1 SINGLE CAB AMT





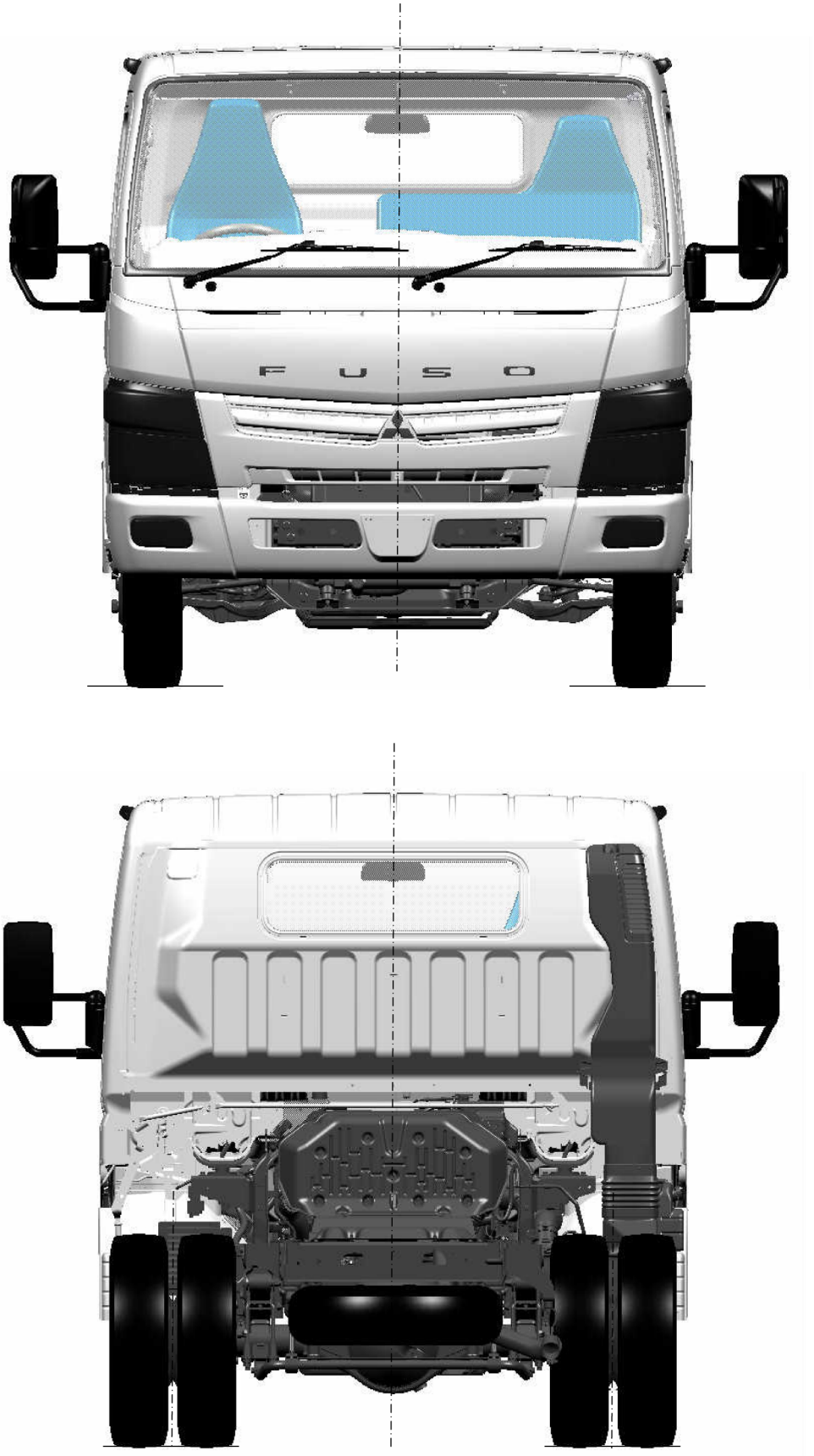
FECX1 CREW CAB AMT

10.5 Chassis cab drawings



FEA21 SINGLE CAB MT

10.5 Chassis cab drawings



FEB21 SINGLE CAB MT

10.5 Chassis cab drawings

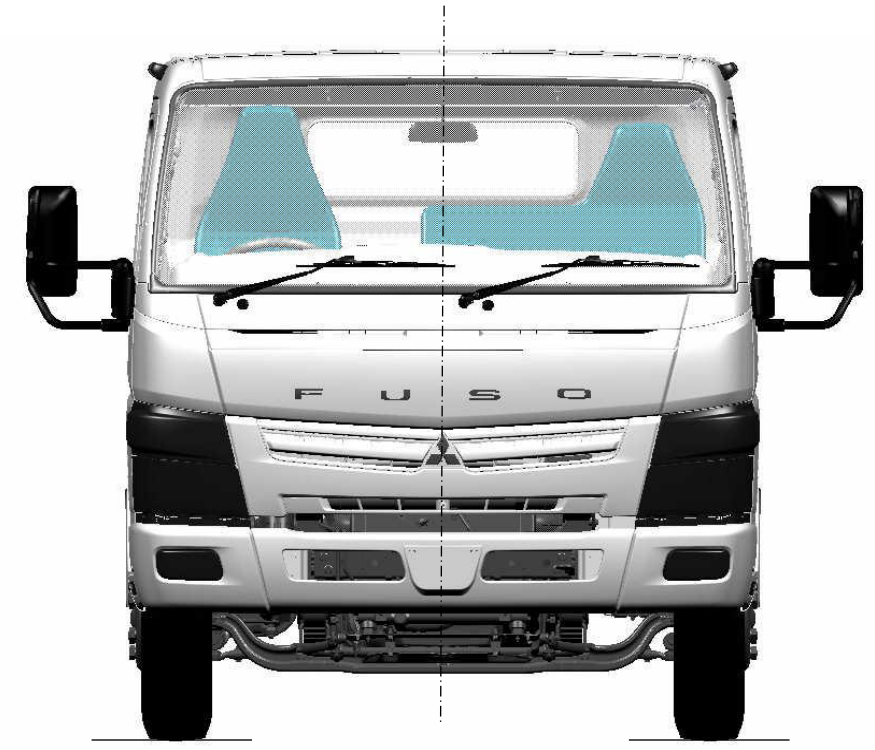
FEB21E SINGLE CAB MT

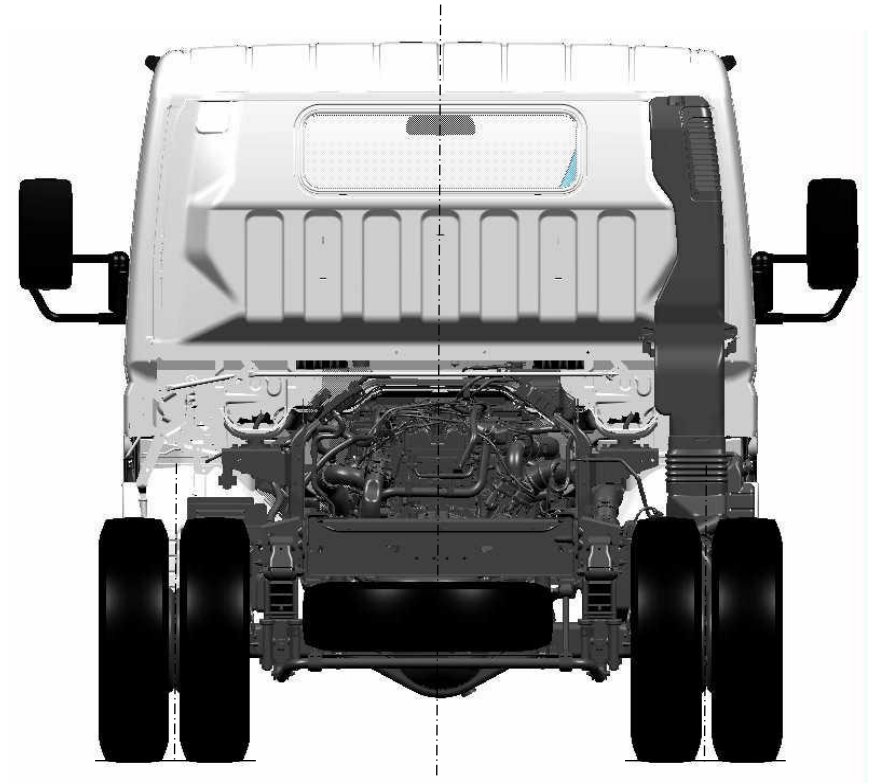
10.5 Chassis cab drawings

FEB91 CREW CAB MT

10.5 Chassis cab drawings

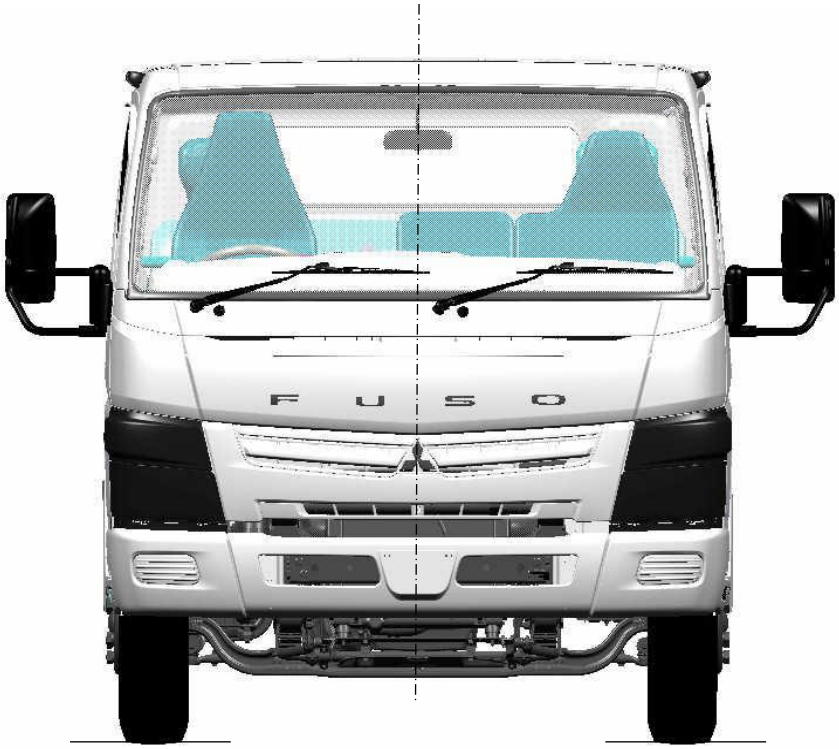
FEC71 SINGLE CAB MT

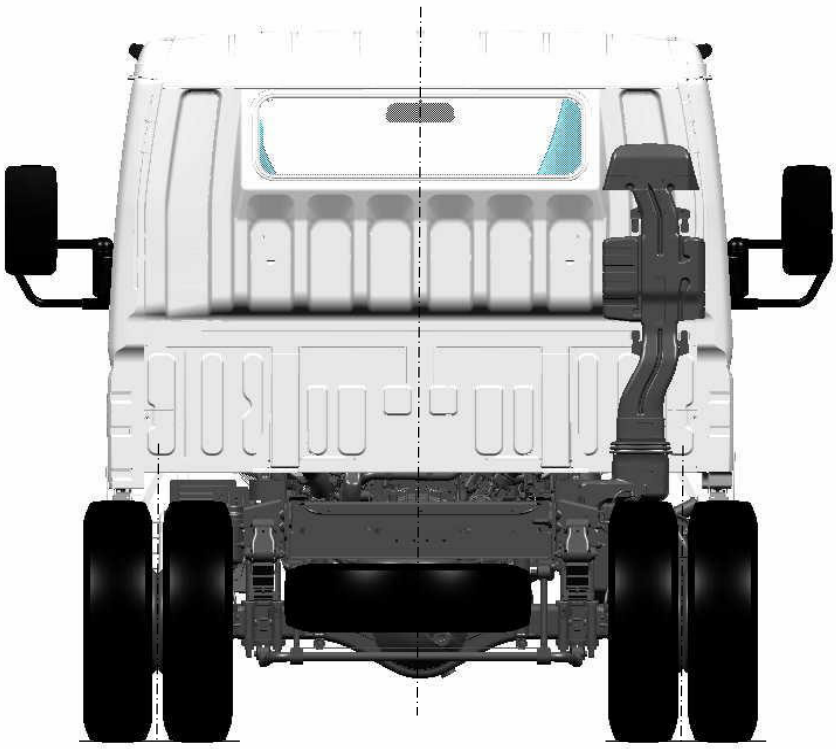




FECX1 SINGLE CAB MT

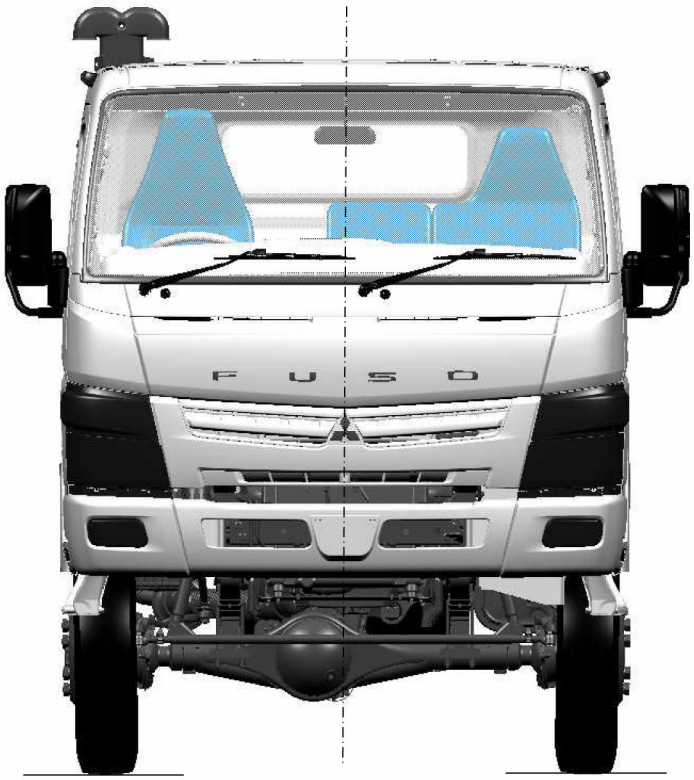
C

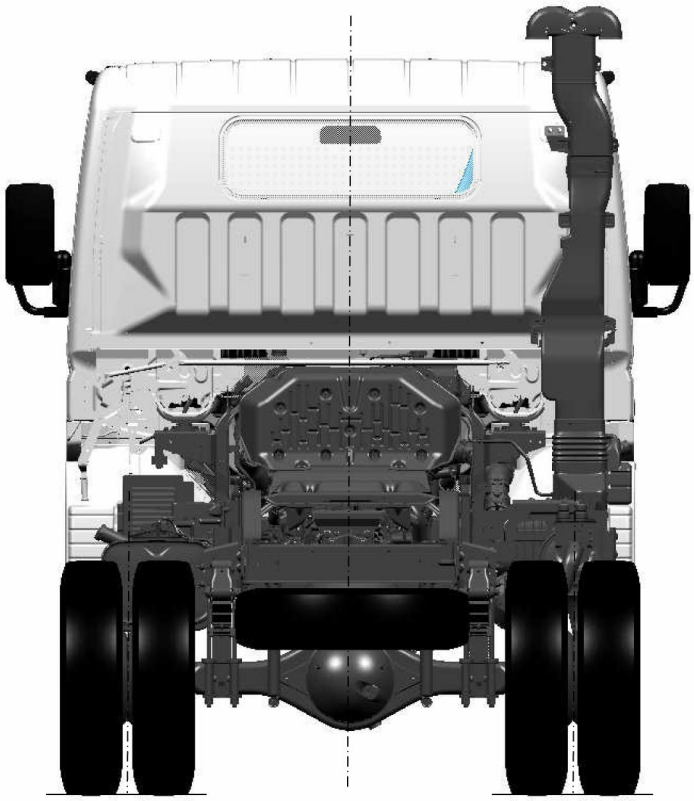




FECX1 CREW CAB MT

10.5 Chassis cab drawings





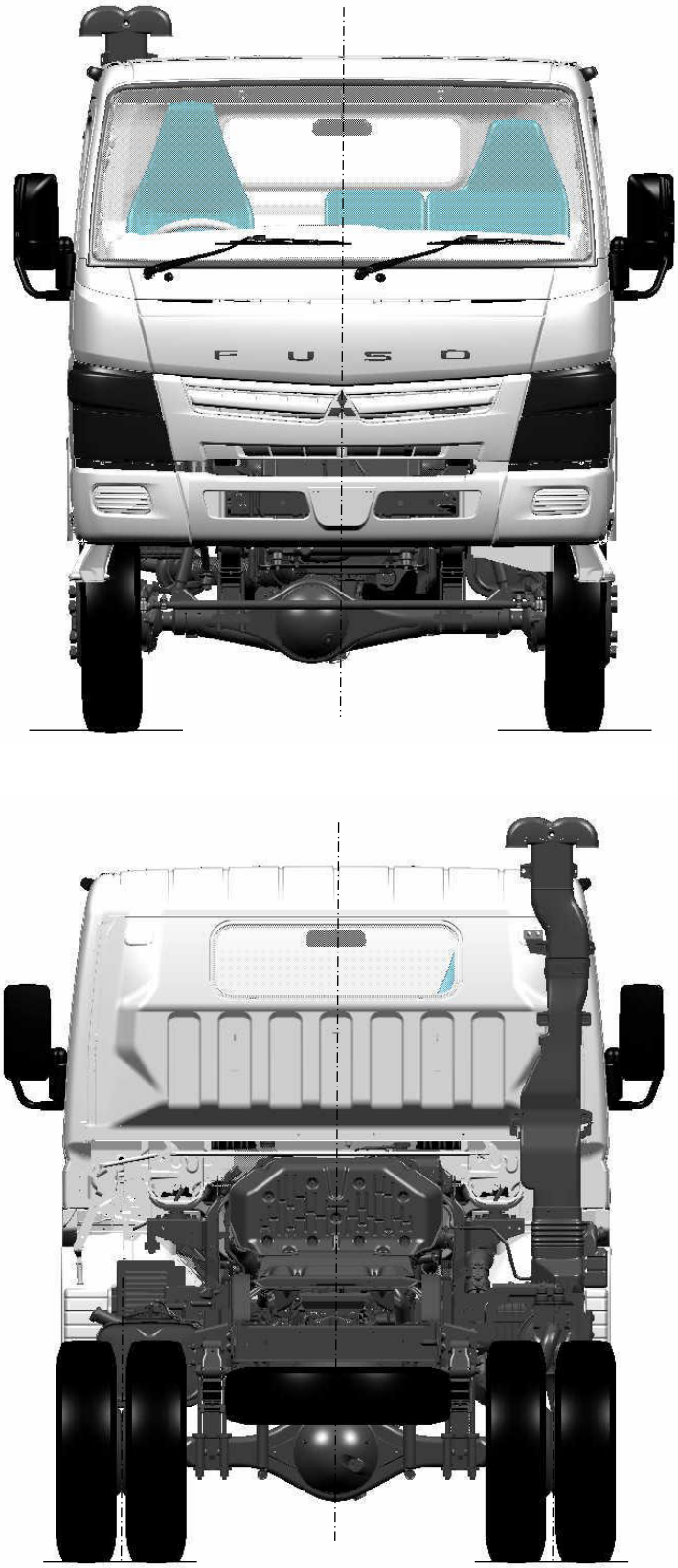
FGB71 SINGLE CAB MT

10.5 Chassis cab drawings

FGB71 CREW CAB MT

10.5 Chassis cab drawings

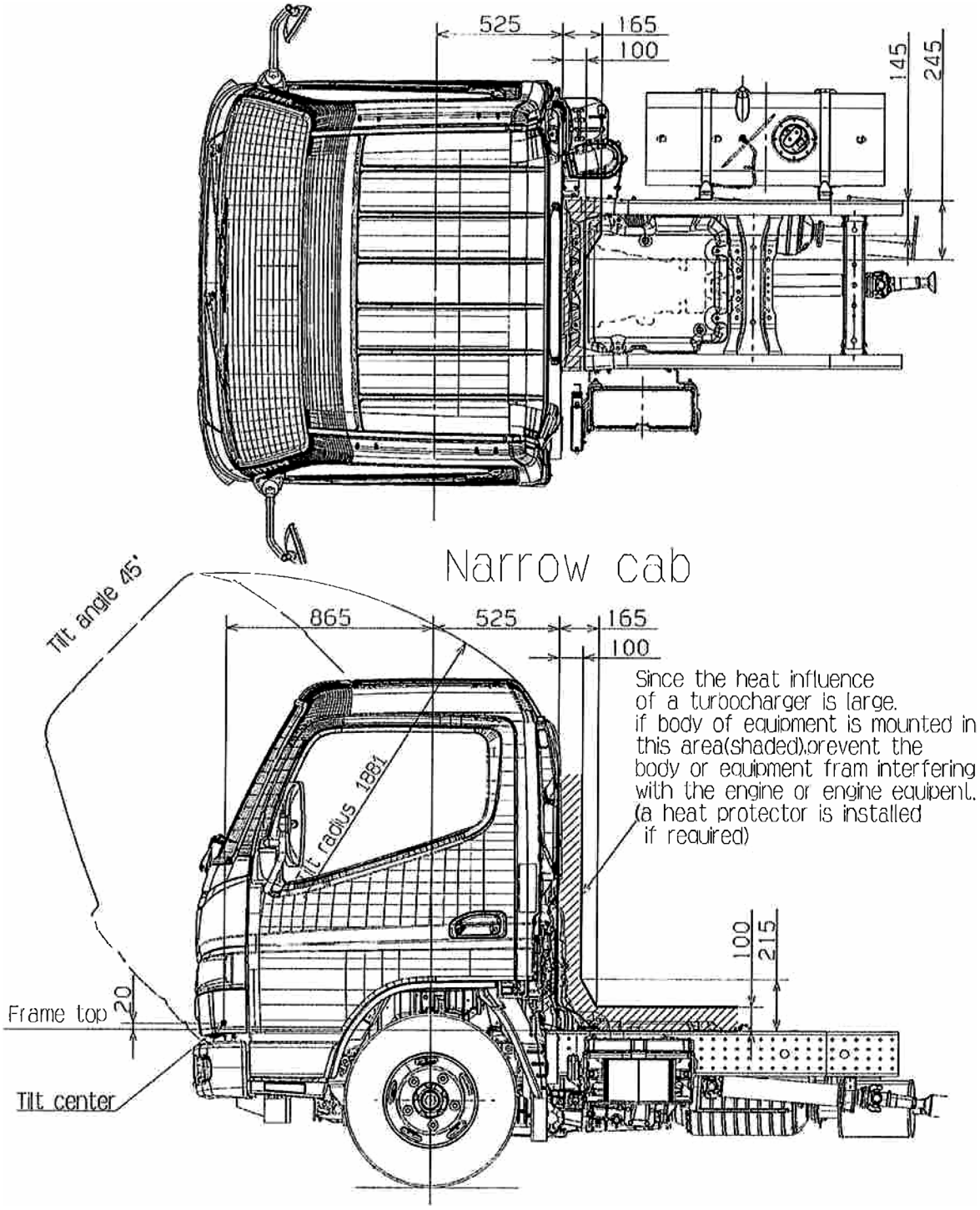
FGB71 CREW CAB MT (Hi-Lo)



FGB71 SINGLE CAB MT (Hi-Lo)

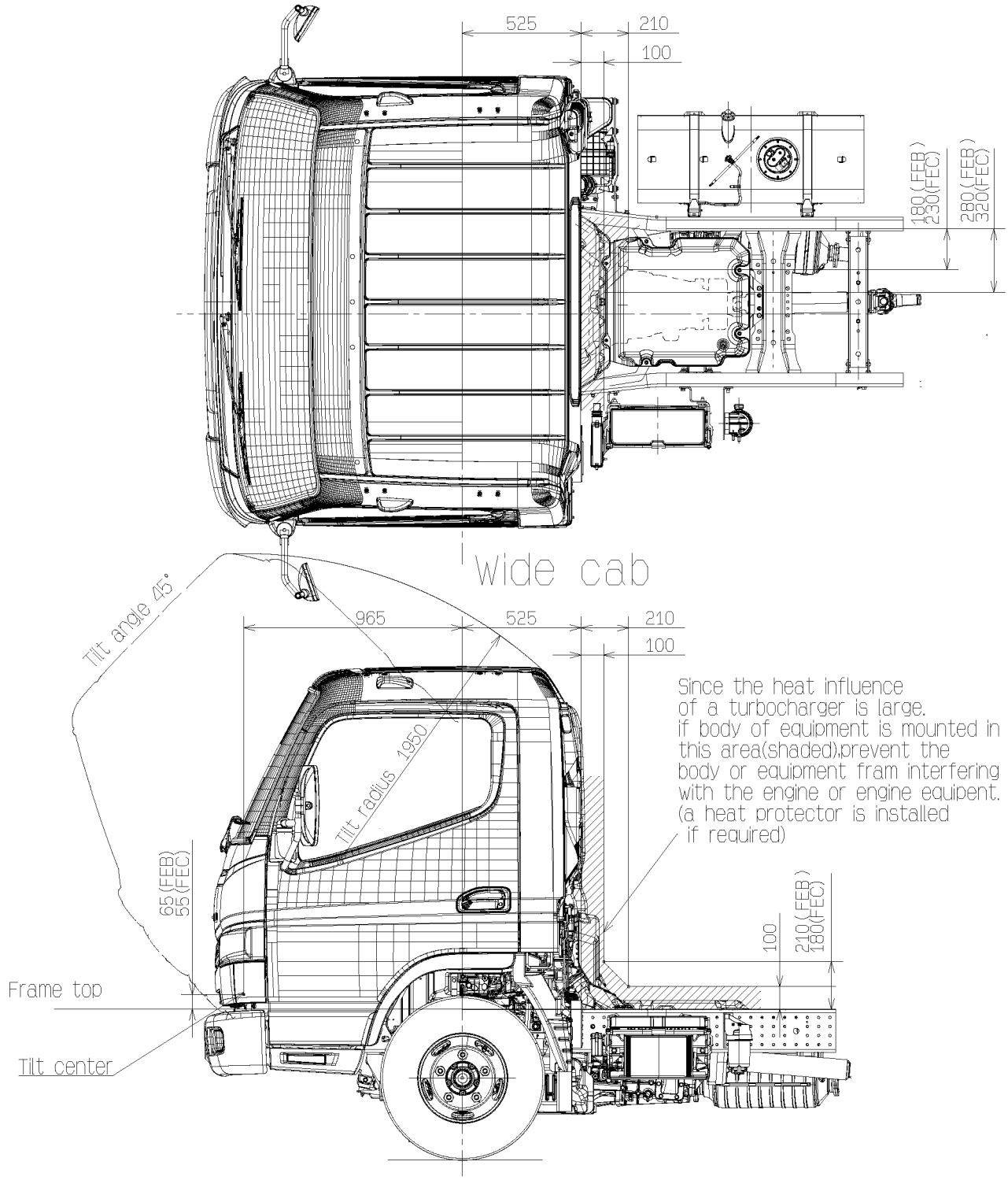
10.5.3 Cab side view

<FEA>



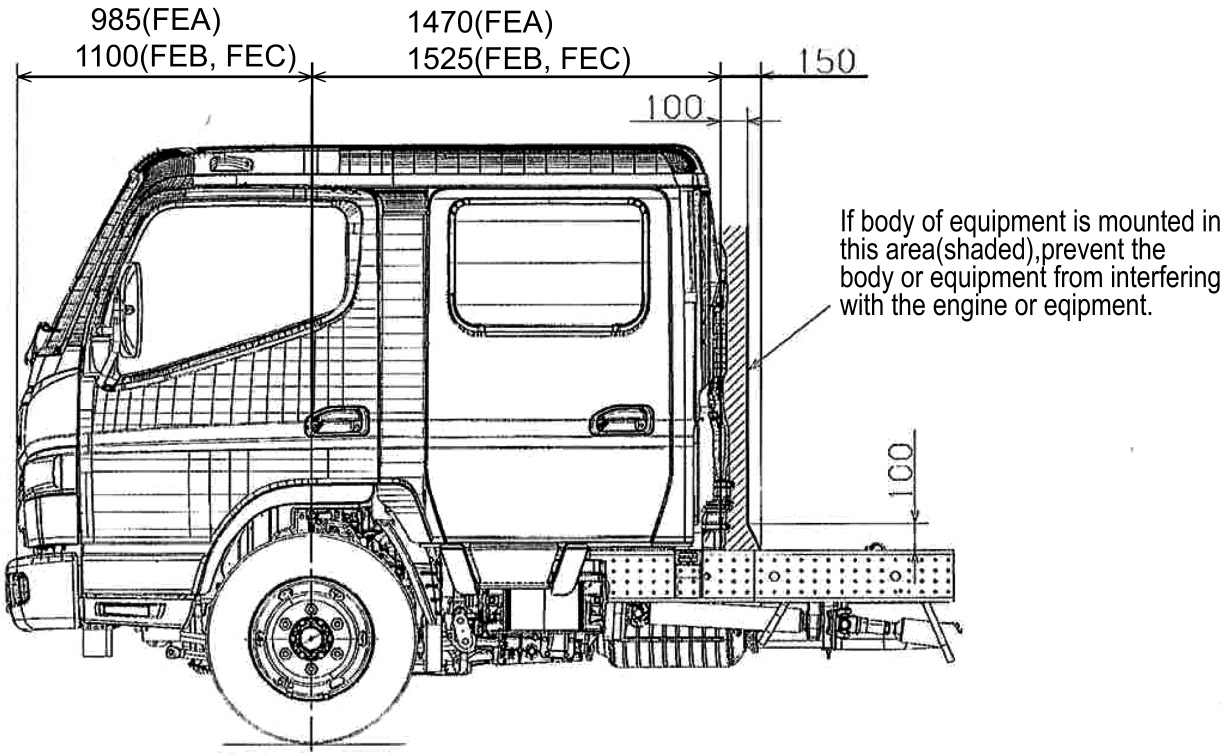
10.5 Chassis cab drawings

<FEB>
<FEC>



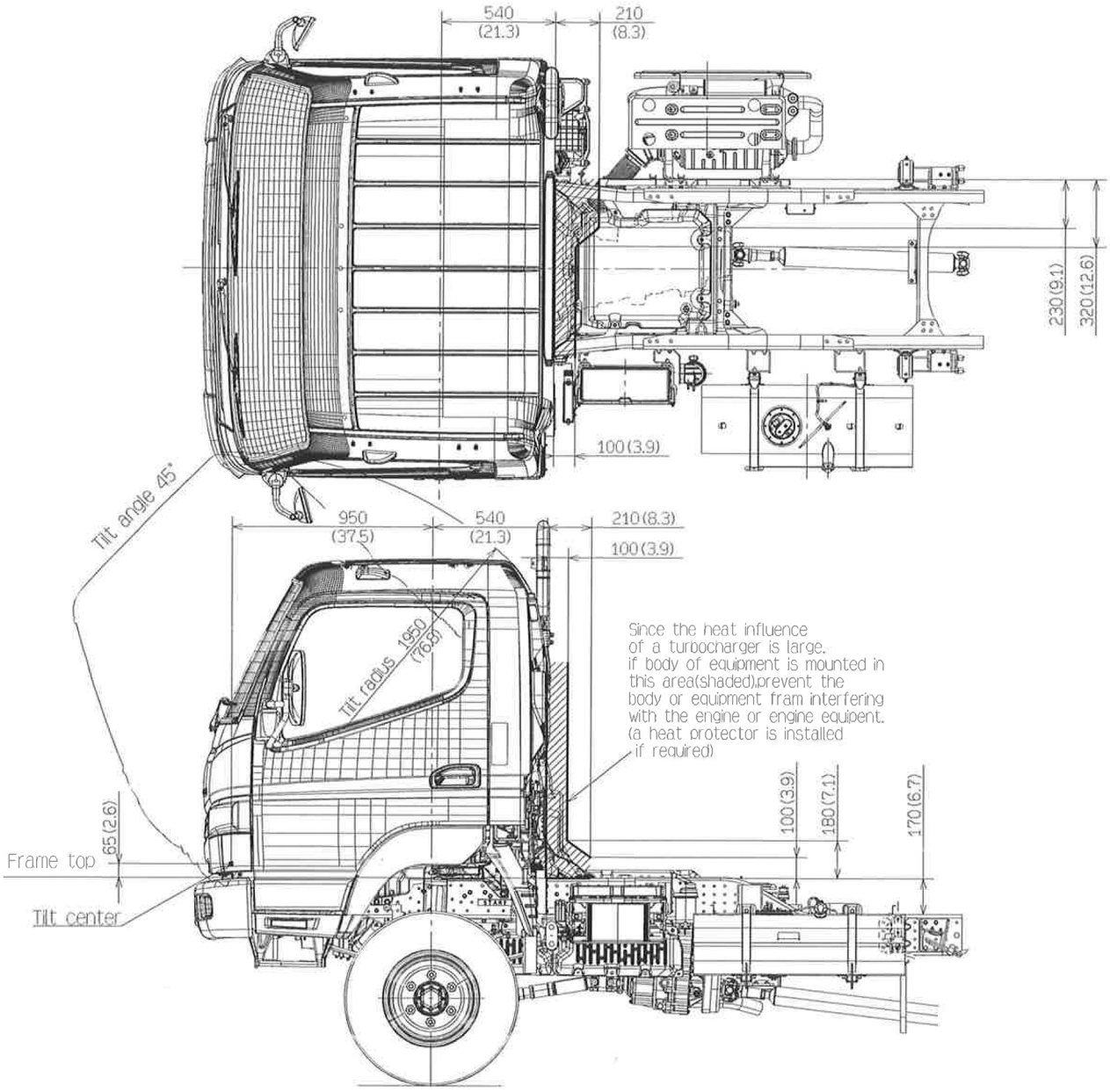
<FEA double cab>
<FEB double cab>
<FEC double cab>

Double cab

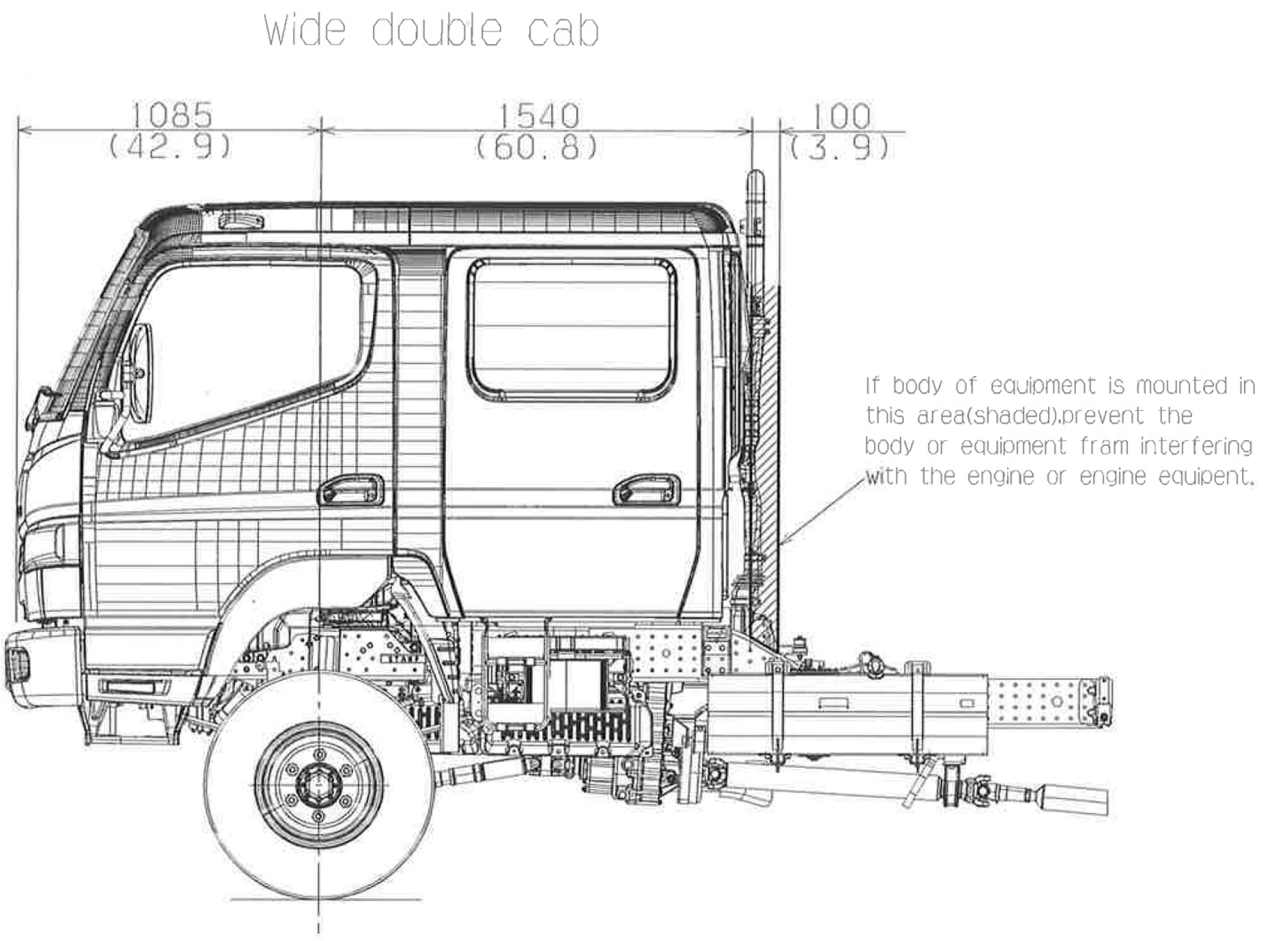


10.5 Chassis cab drawings

<FGB>



<FGB double cab>

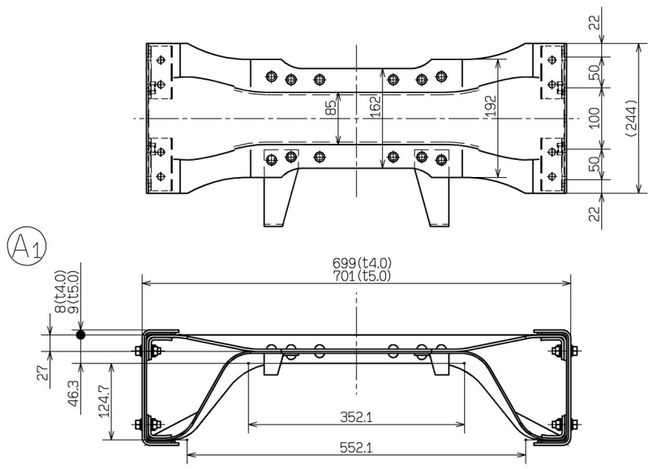


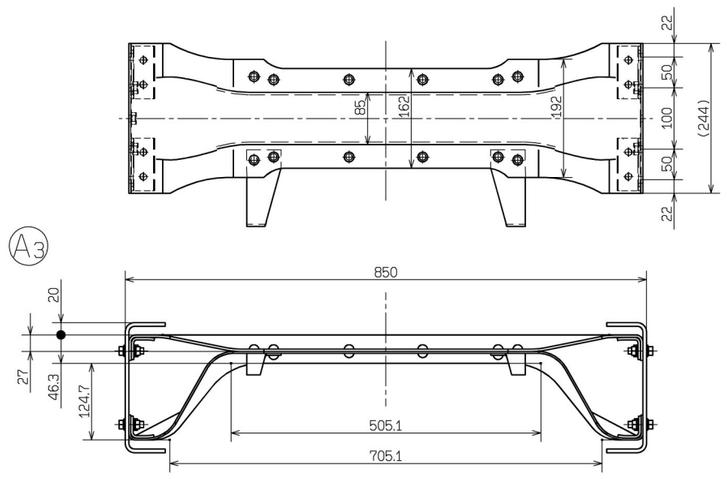
10.6 Frame structure

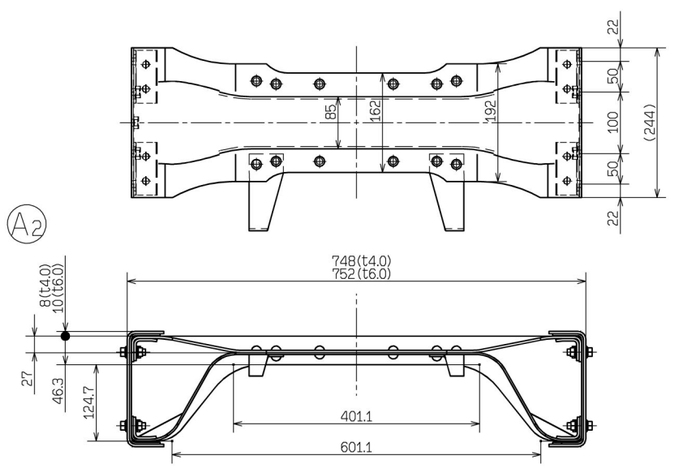
10.6.1 Details of crossmembers

Model	Section
FEA, FEB, FEC	A1, A2, A3
	B1, B2, B3
	C1, C2, C3
	D1, D2, D3
	E1, E2, E3
FGB	A5, C2, K
	B2, B4

10.6 Frame structure



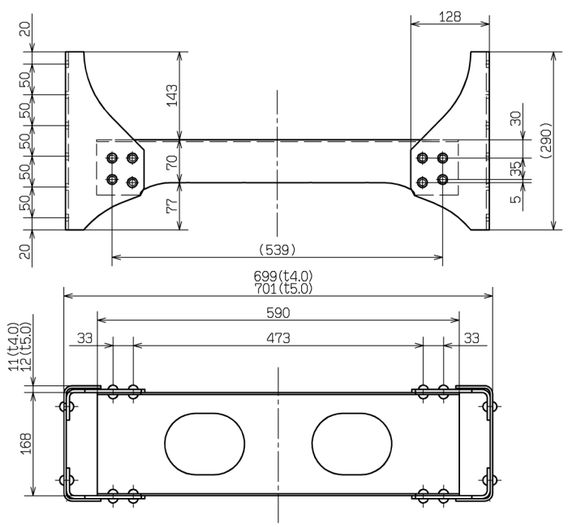




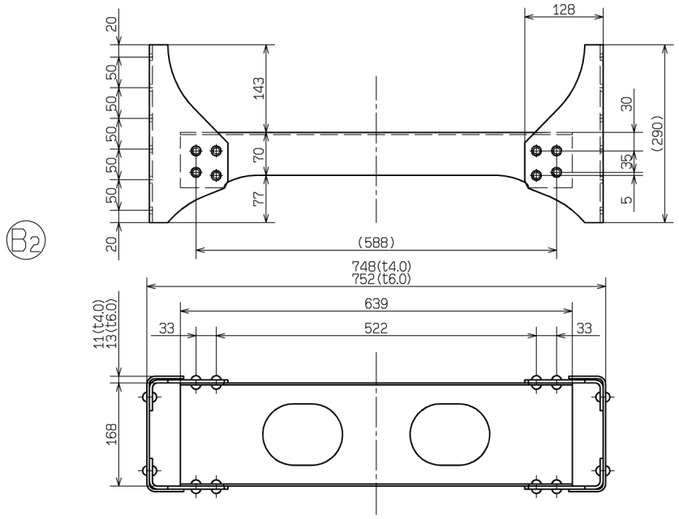
UNIT : mm

10.6 Frame structure

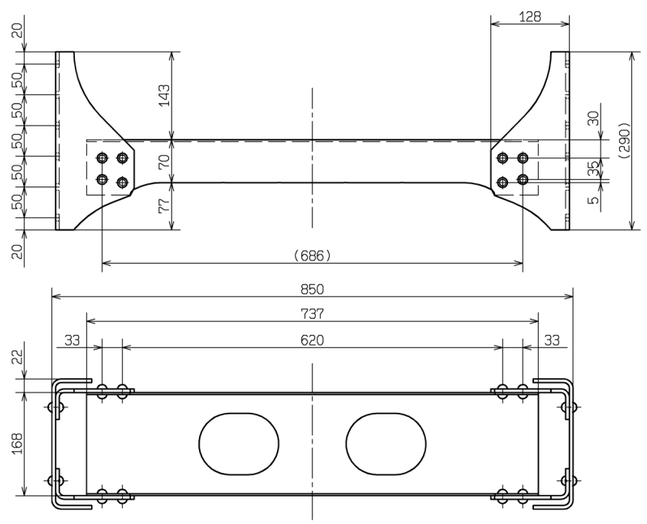
B1



B2



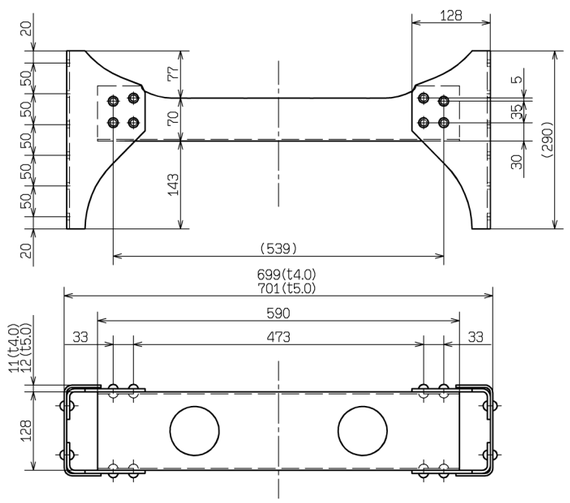
B3



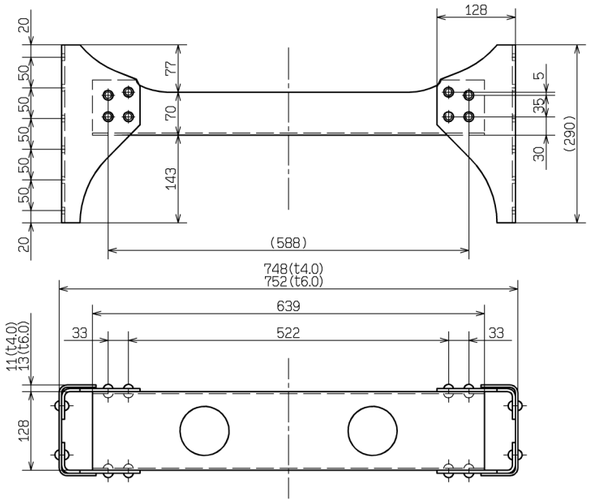
UNIT : mm

10.6 Frame structure

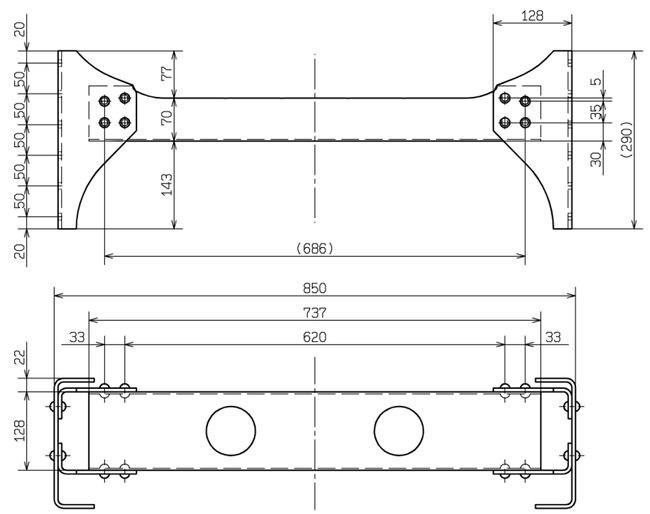
C1



C2



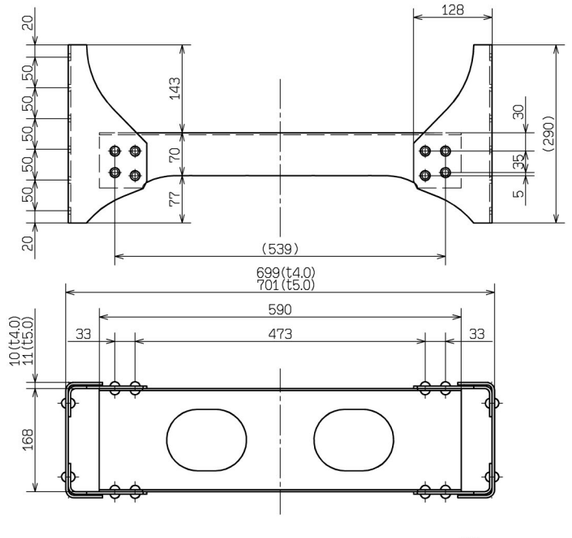
C3



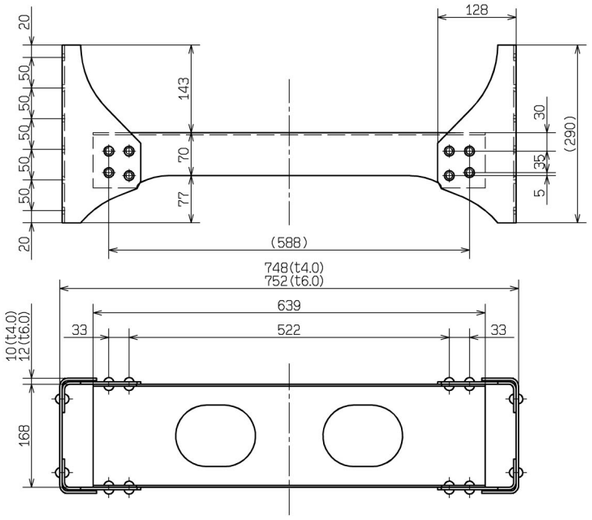
UNIT : mm

10.6 Frame structure

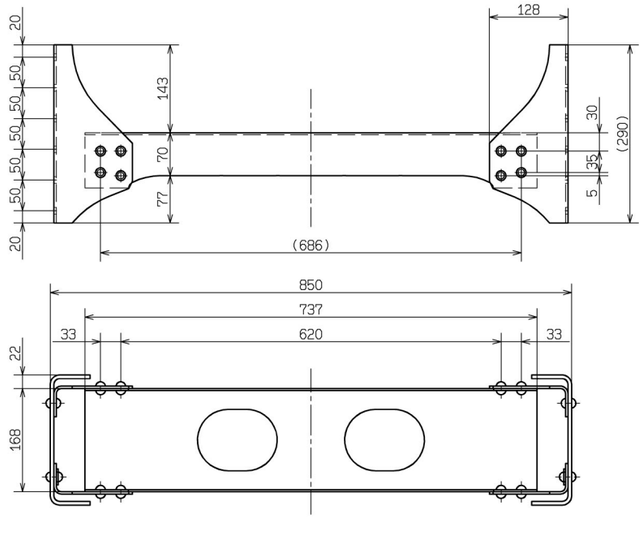
D1



D2

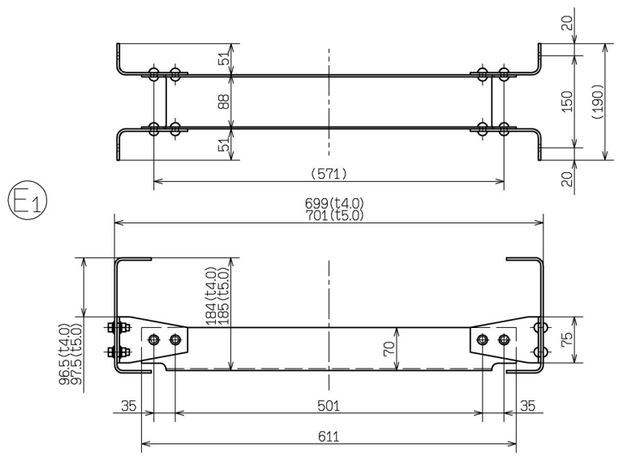


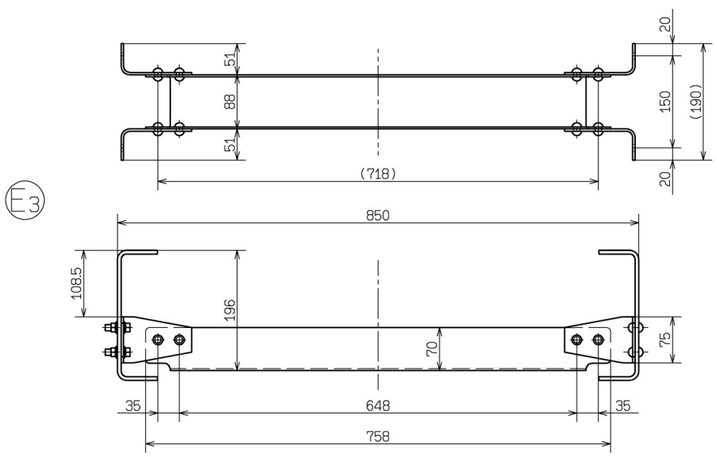
D3

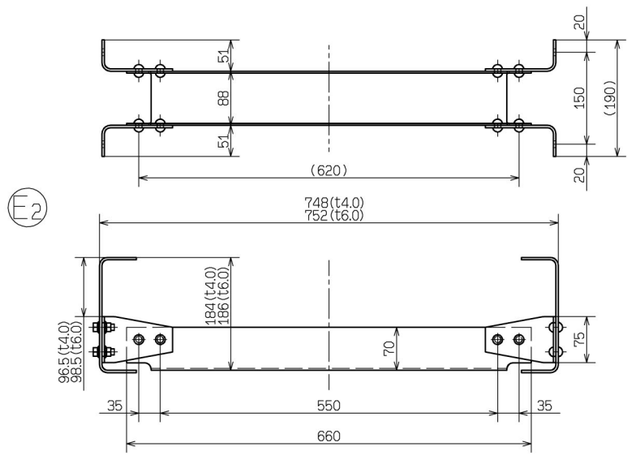


UNIT : mm

10.6 Frame structure

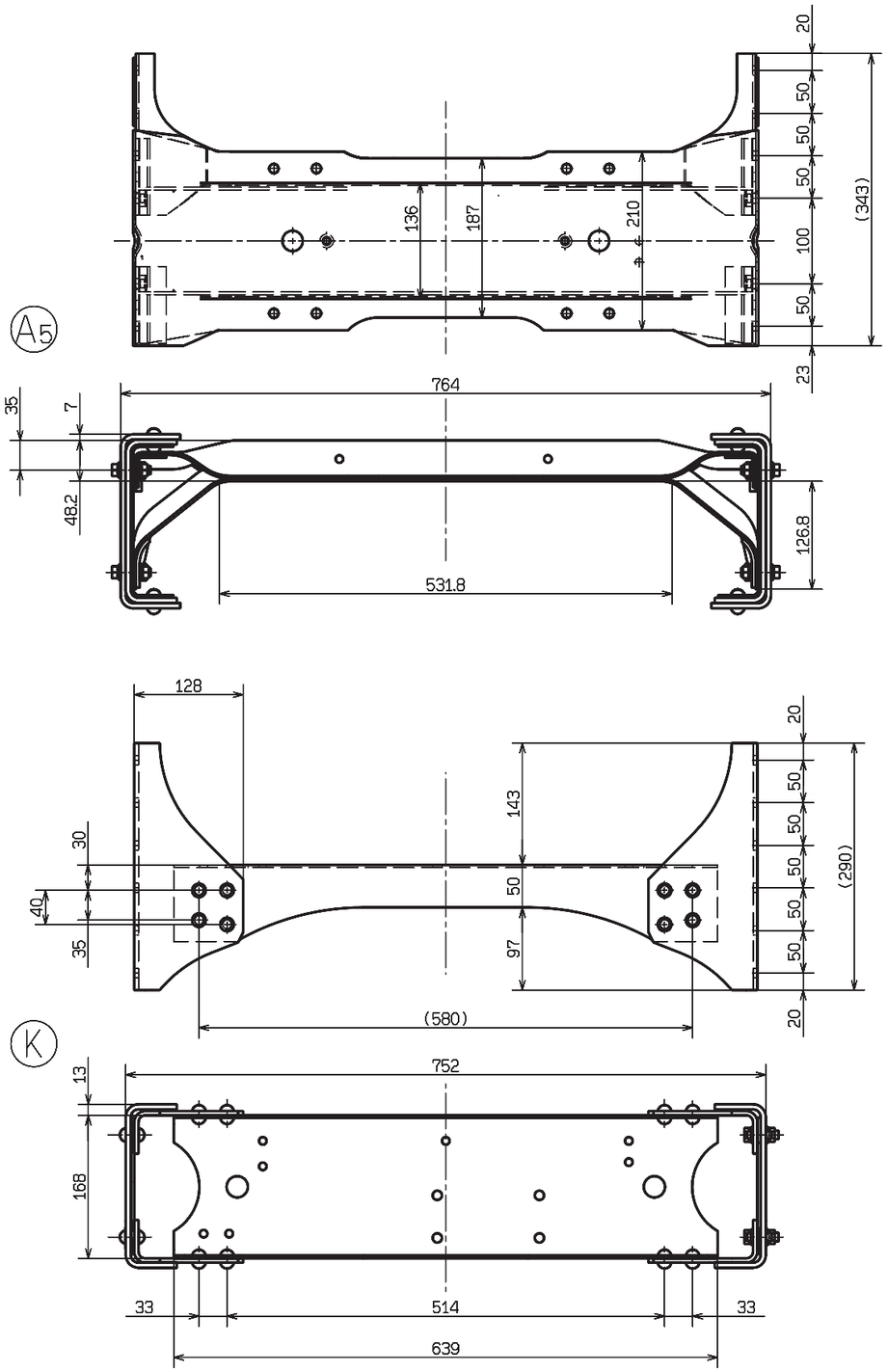






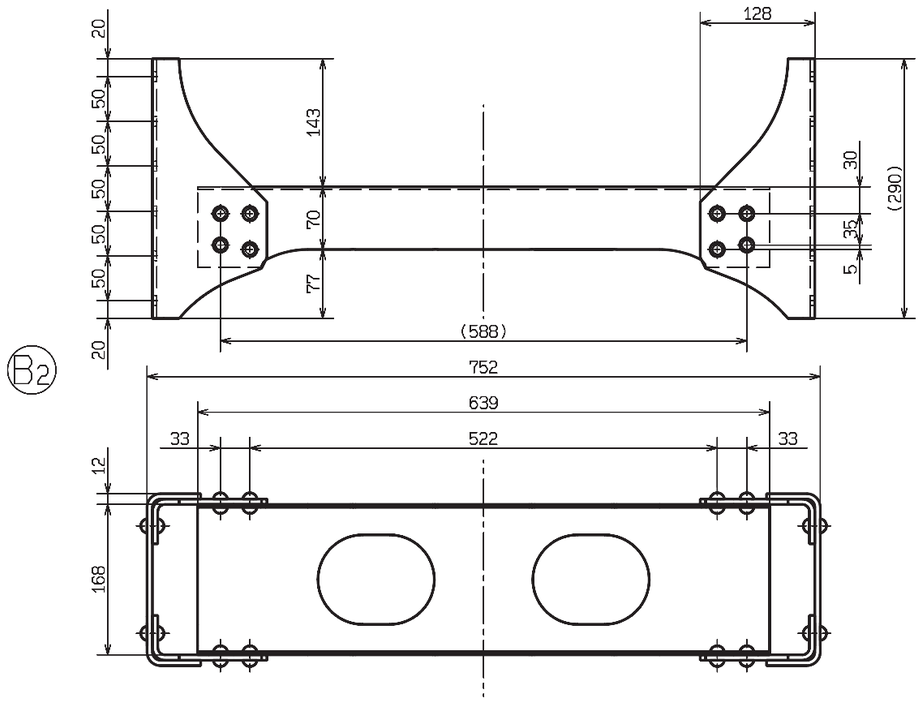
UNIT : mm

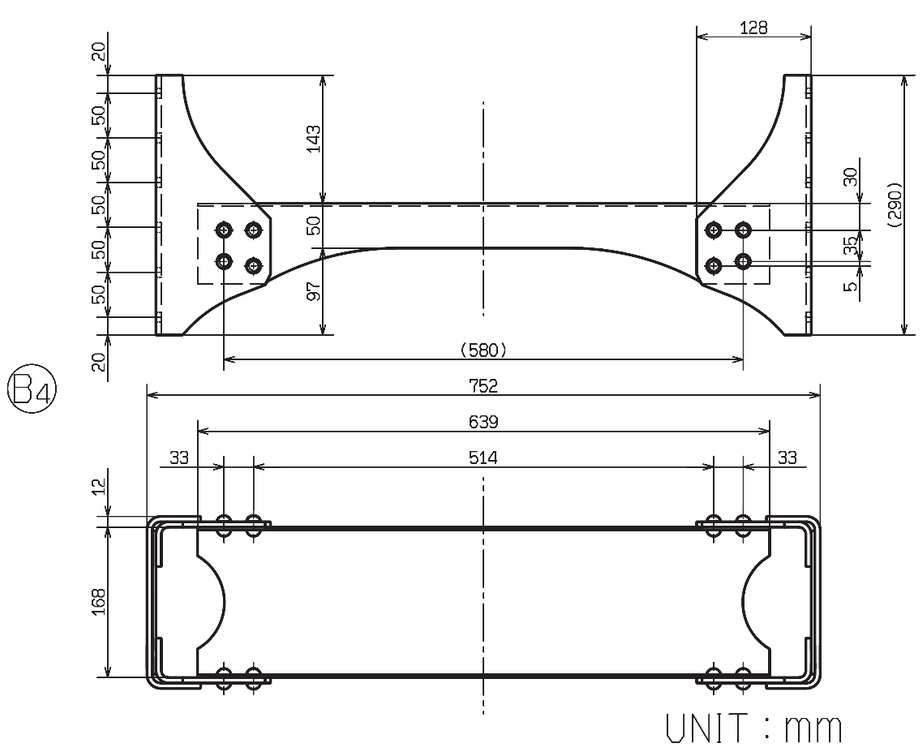
10.6 Frame structure



UNIT : mm

10.6 Frame structure

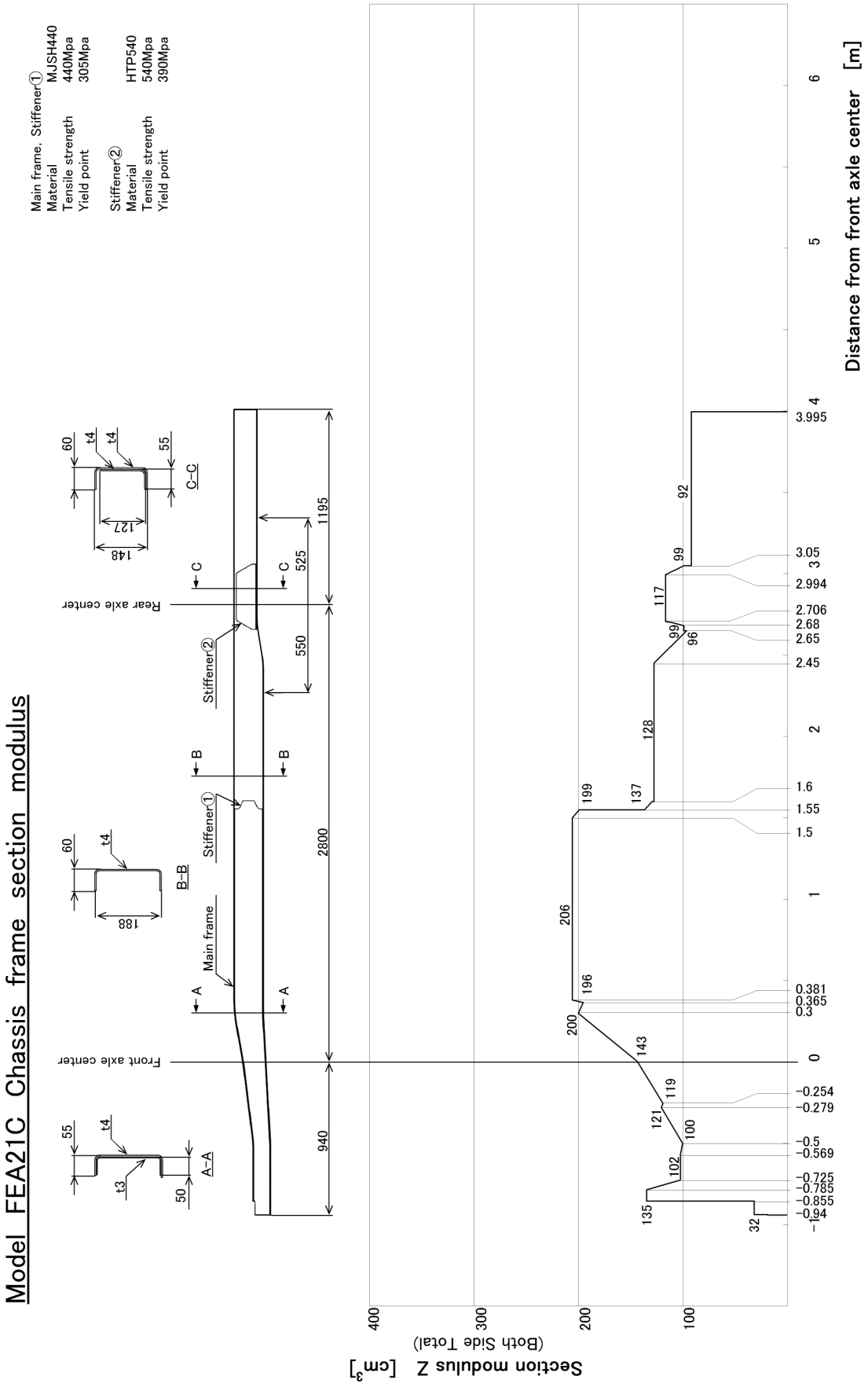


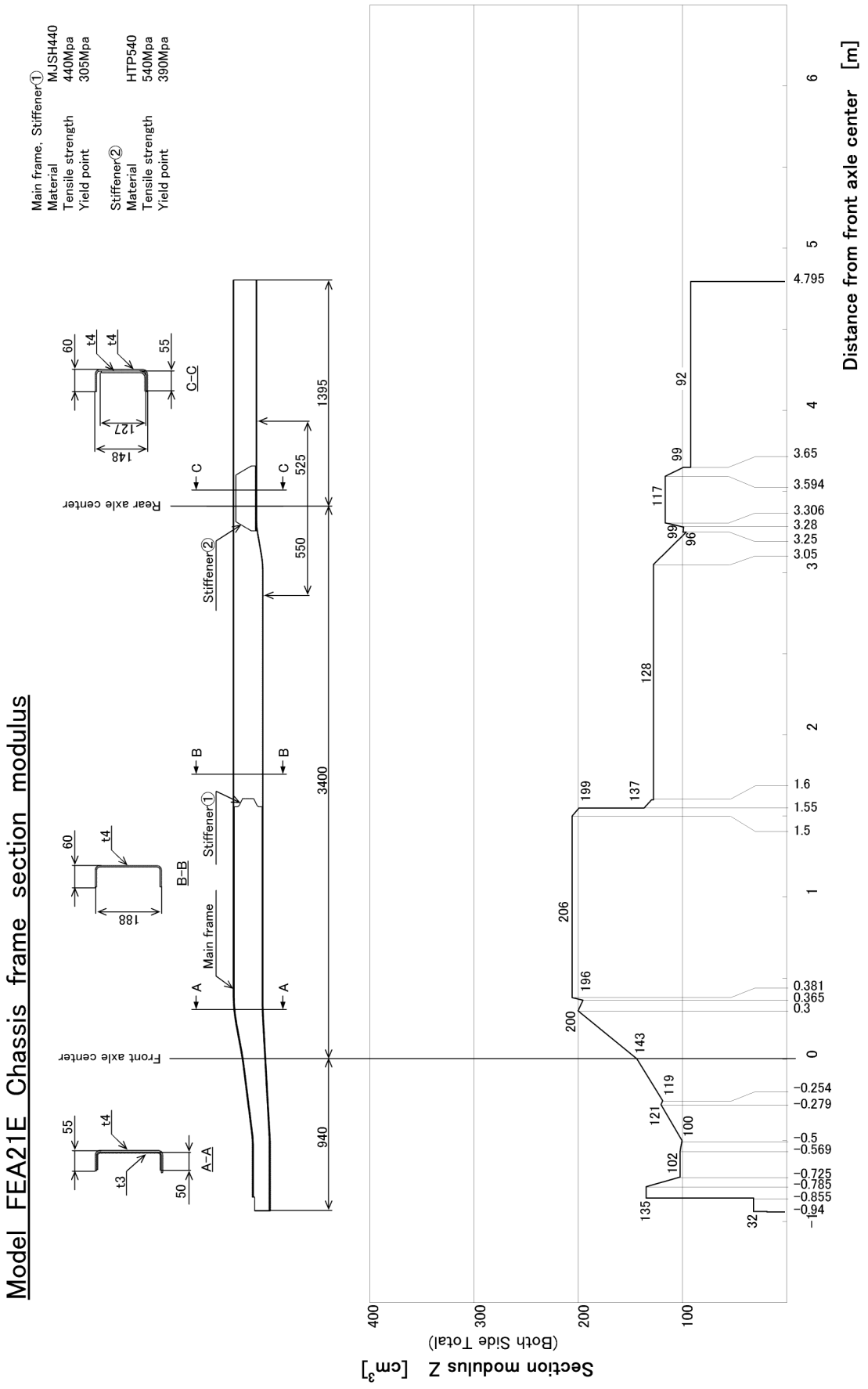


10.6.2 Frame section modulus

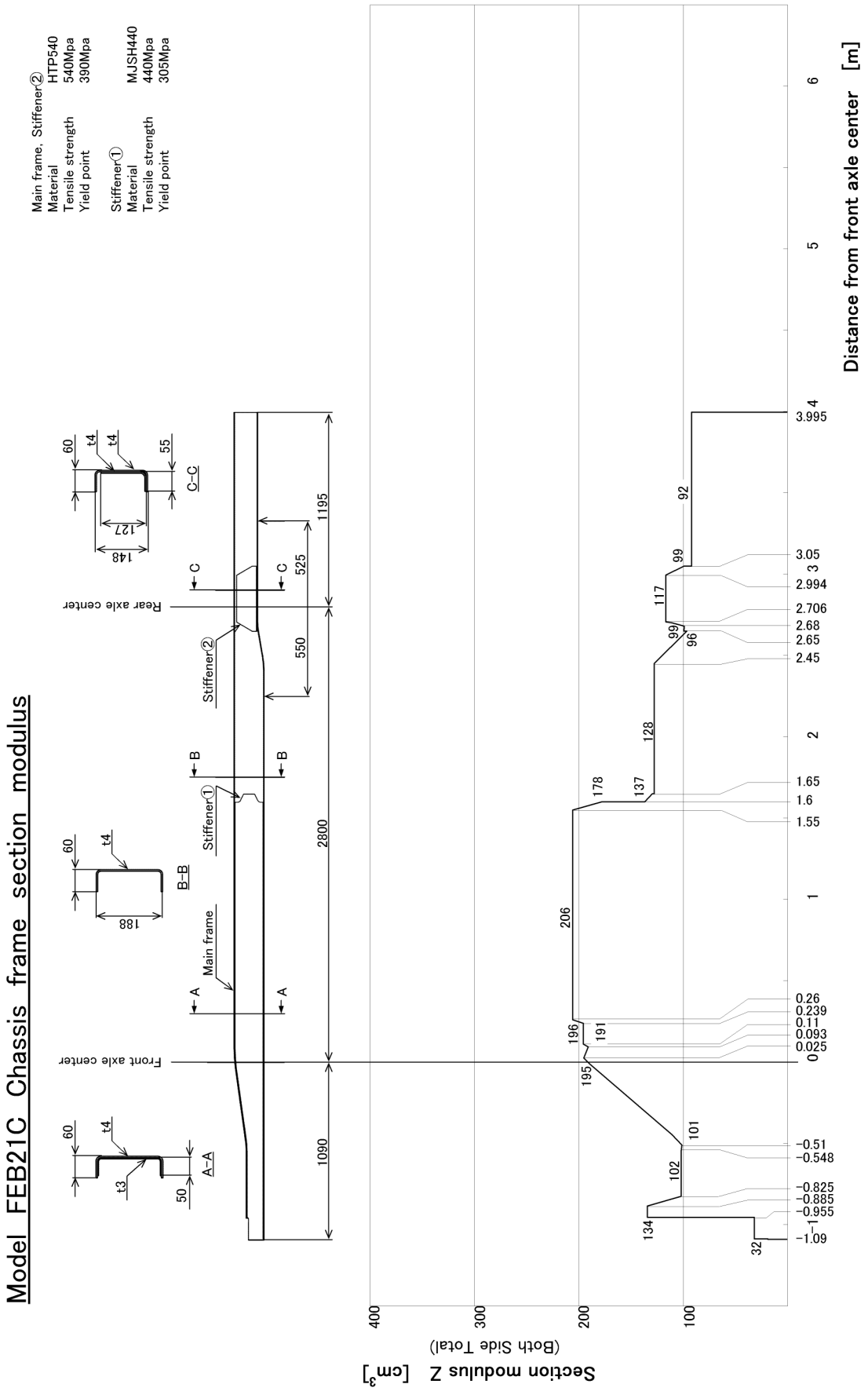
Model	Name of data to be referenced
FEA21CR1SFBB FEA21CR2SFBB FEA21CR3SFBC	180
FEA21ER3SFBC FEA21ER3WFBC FEA21ER3SFBL	181
FEB21CR3SFBC_G FEB21CR4SFBC	182
FEB21ER3SFBC_G FEB21ER4SFBC	183
FEB51ER3SFBC FEB51ER4SFBC FEB71ER3WFBC FEB91ER3WFBD	184
FEB51GR3SFBC FEB51GR4SFBC FEB71GR3SFBC FEB71GR3WFBC FEB71GR4SFBC FEB71GR4WFBC FEB91GR3WFBD FEB91GR4WFBD	185
FEC71ER3SFBC FEC71ER4SFBC	186
FEC91GR3SFBD FEC91GR4SFBD FECX1GR3SFBD FECX1GR3WFBD FECX1GR4SFBD FECX1GR4WFBD	187
FEC91HR3SFBD FEC91HR4SFBD FECX1HR3SFBD FECX1HR4SFBD	188

Model	Name of data to be referenced
FEC91KR3SFBD FEC91KR4SFBD FECX1KR3SFBD FECX1KR4SFBD	189
FGB71CR6SFBC	190
FGB71ER4WFBC FGB71ER6SFBC FGB71ER6WFBC	191

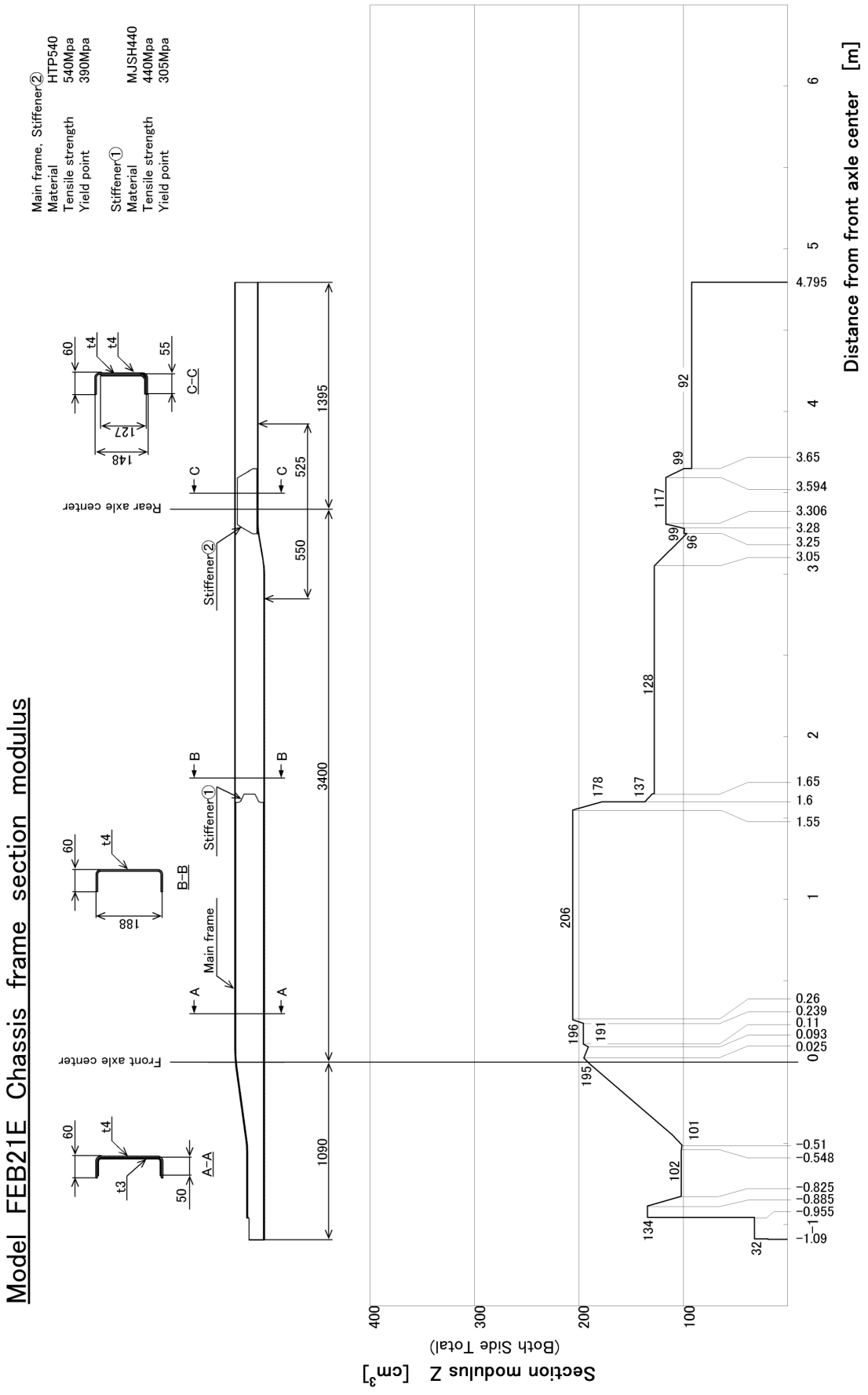

Model FEA21C Chassis frame section modulus
Main frame, Stiffener①
Material MJSH440
Tensile strength 440Mpa
Yield point 305Mpa
Stiffener②
Material HTP540
Tensile strength 540Mpa
Yield point 390Mpa
Front axle center
Rear axle center
Main frame
Stiffener①
Stiffener②
A–A
B–B
C–C
940
2800
550
525
1195
Section modulus Z [cm³]
(Both Side Total)
Distance from front axle center [m]

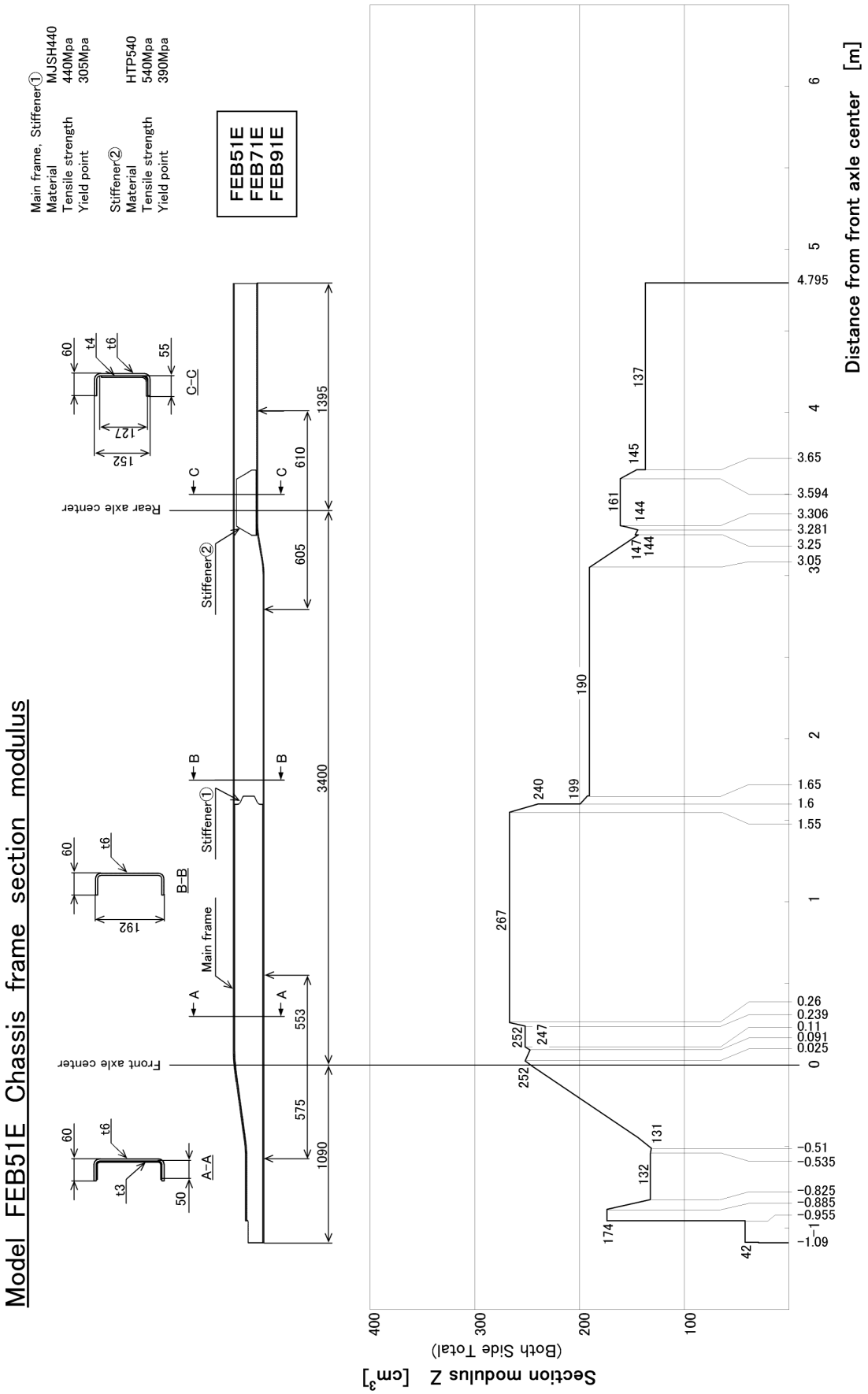

Model FEA21E Chassis frame section modulus
Main frame, Stiffener①
Material MJSH440
Tensile strength 440Mpa
Yield point 305Mpa
Stiffener②
Material HTP540
Tensile strength 540Mpa
Yield point 390Mpa
Rear axle center
Front axle center
Main frame
Stiffener①
Stiffener②
A–A
B–B
C–C
1395
525
550
3400
940
Section modulus Z [cm³]
(Both Side Total)
Distance from front axle center [m]

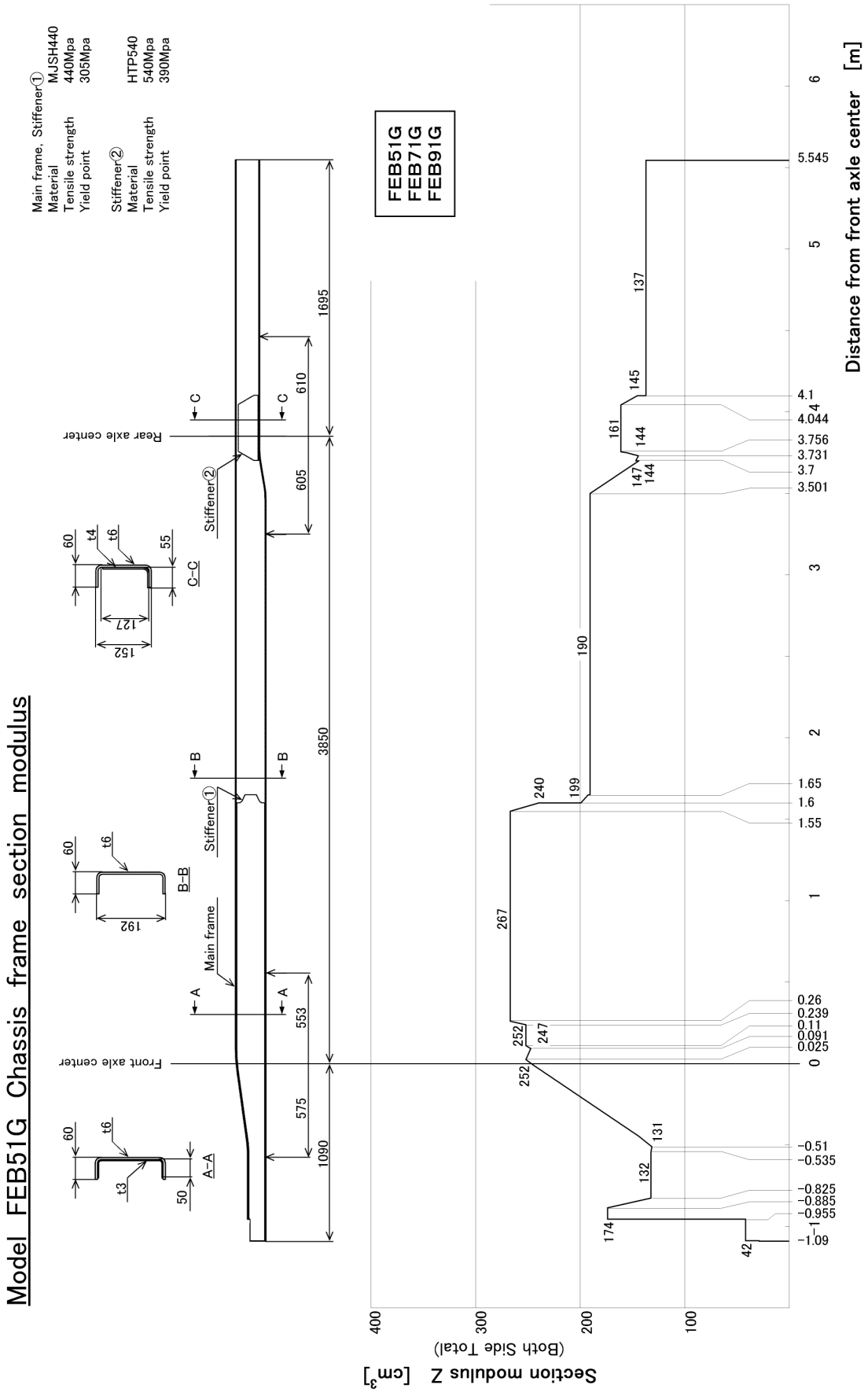
10.6 Frame structure

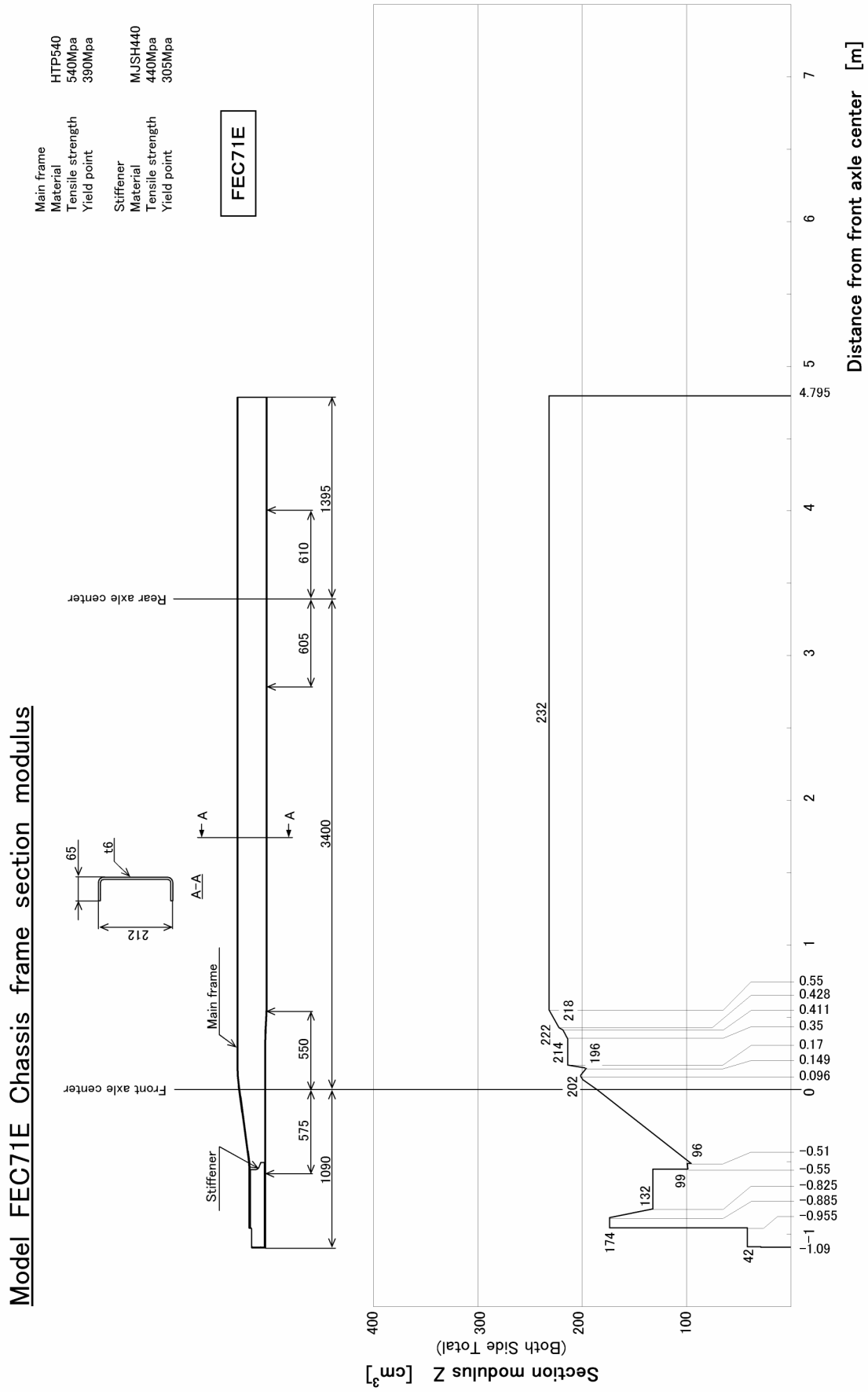


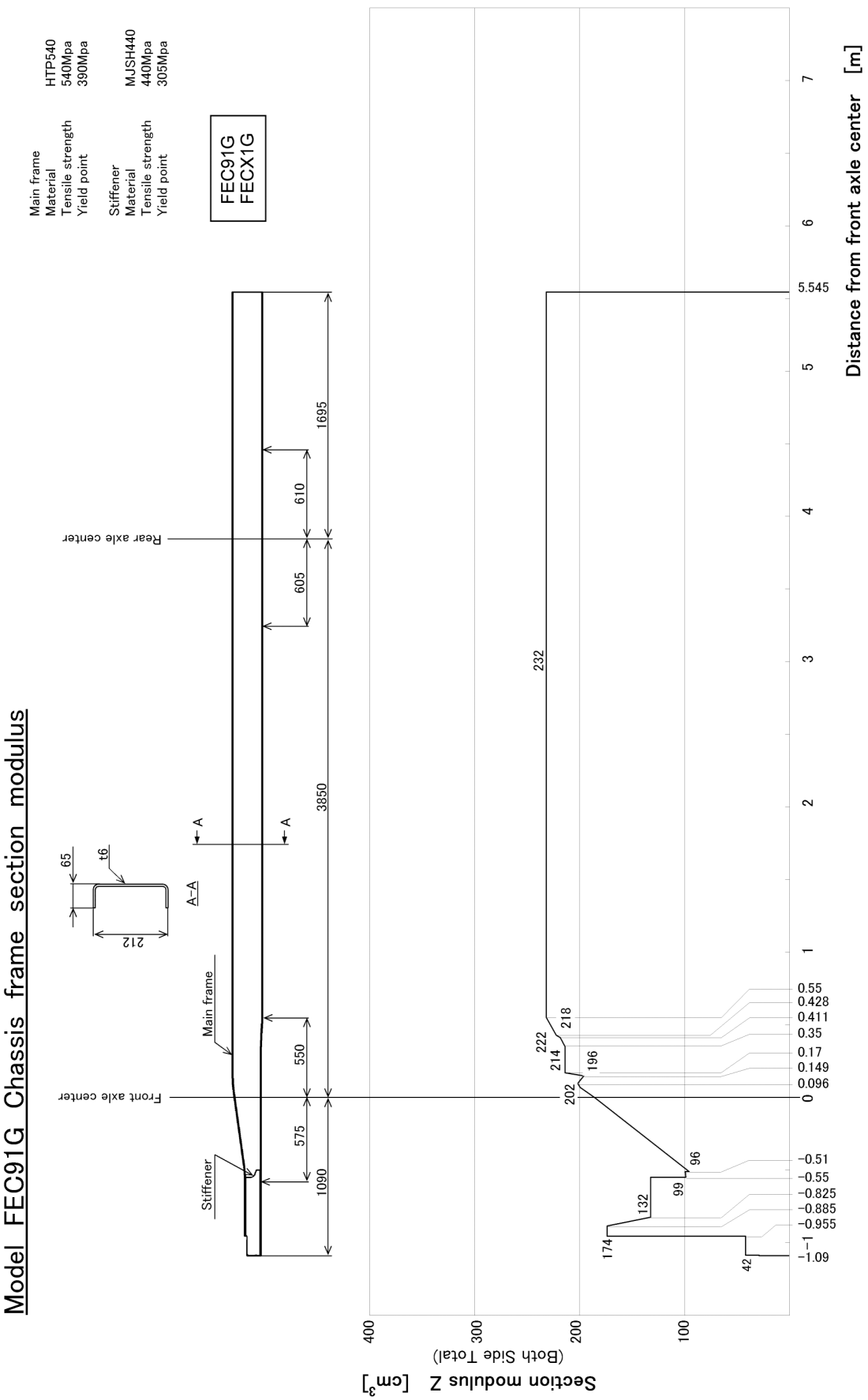
10.6 Frame structure

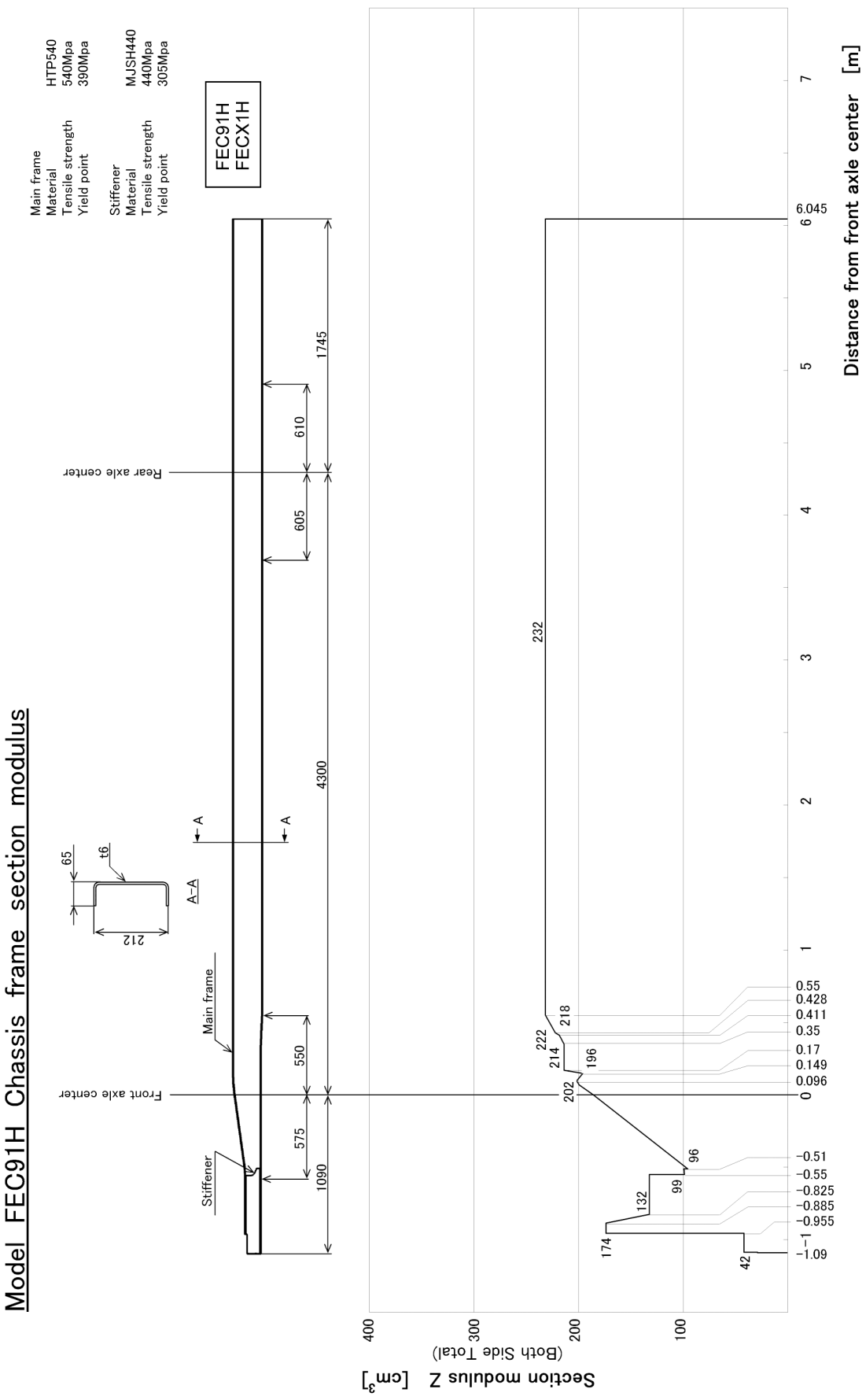


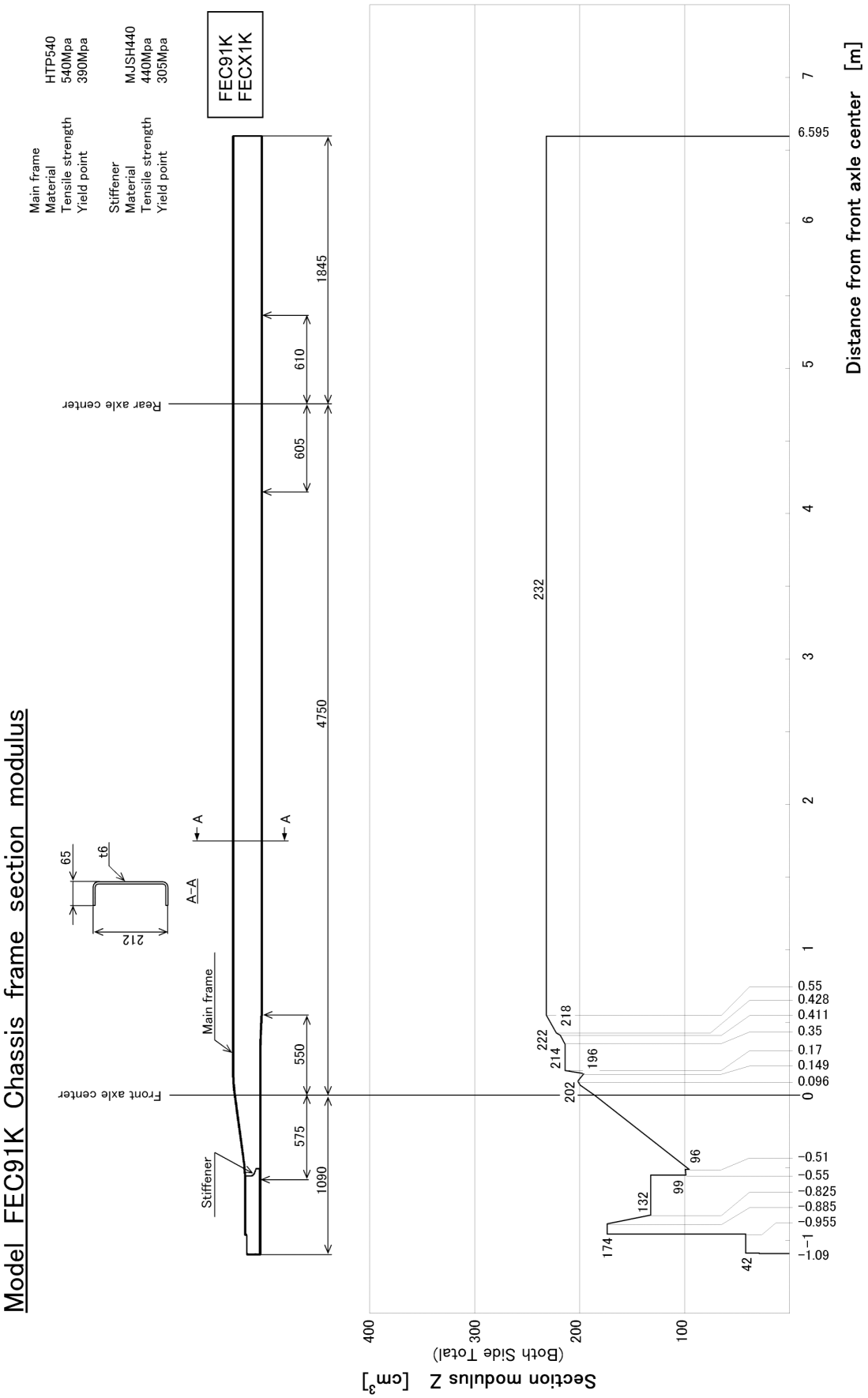

Model FEB51E Chassis frame section modulus
Main frame, Stiffener①
Material MJSH440
Tensile strength 440Mpa
Yield point 305Mpa
Stiffener②
Material HTP540
Tensile strength 540Mpa
Yield point 390Mpa
FEB51E
FEB71E
FEB91E
Front axle center
Rear axle center
Main frame
Stiffener①
Stiffener②
A–A
B–B
C–C
Section modulus Z [cm³]
(Both Side Total)
Distance from front axle center [m]


Model FEB51G Chassis frame section modulus
Main frame, Stiffener①
Material MJSH440
Tensile strength 440Mpa
Yield point 305Mpa
Stiffener②
Material HTP540
Tensile strength 540Mpa
Yield point 390Mpa
FEB51G
FEB71G
FEB91G
Rear axle center
Front axle center
Stiffener②
Stiffener①
Main frame
A–A
B–B
C–C
1695
610
605
3850
553
575
1090
60
t4
t6
55
127
152
192
t3
50
Distance from front axle center [m]
Section modulus Z [cm³]
(Both Side Total)
5.545
4.1
4.044
3.756
3.731
3.7
3.501
1.65
1.6
1.55
0.26
0.239
0.11
0.091
0.025
0
−0.51
−0.535
−0.825
−0.885
−0.955
−1.09
137
145
161
144
147
144
190
240
199
267
252
247
252
131
132
174
42
400
300
200
100
6
5
4
3
2
1
0
−1

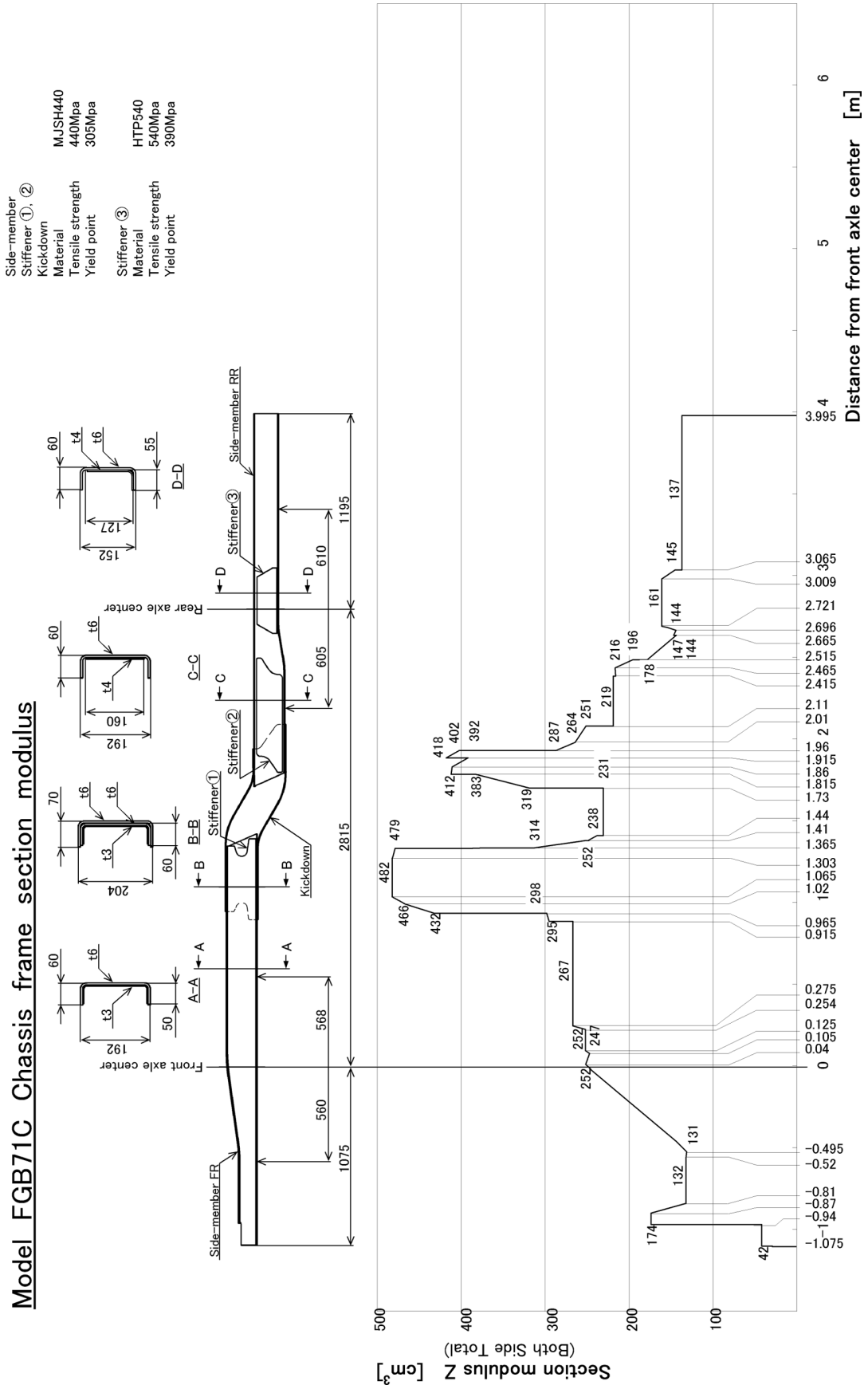

Model FEC71E Chassis frame section modulus
FEC71E
Main frame
Material HTP540
Tensile strength 540Mpa
Yield point 390Mpa
Stiffener
Material MJSH440
Tensile strength 440Mpa
Yield point 305Mpa
Rear axle center
Front axle center
Main frame
Stiffener
A–A
65
9t
212
1395
610
605
3400
550
575
1090
Distance from front axle center [m]
Section modulus Z [cm³]
(Both Side Total)
4.795
232
222
218
214
202
196
174
132
99
96
42
0.55
0.428
0.411
0.35
0.17
0.149
0.096
−0.51
−0.55
−0.825
−0.885
−0.955
−1.09


Model FEC91G Chassis frame section modulus
FEC91G
FECX1G
Main frame
Material HTP540
Tensile strength 540Mpa
Yield point 390Mpa
Stiffener
Material MJSH440
Tensile strength 440Mpa
Yield point 305Mpa
Rear axle center
Front axle center
Main frame
Stiffener
A–A
65
t6
212
1695
610
605
3850
550
575
1090
Section modulus Z [cm³]
(Both Side Total)
400
300
200
100
Distance from front axle center [m]
0
1
2
3
4
5
6
7
5.545
232
222
218
214
202
196
0.55
0.428
0.411
0.35
0.17
0.149
0.096
96
99
132
174
42
−0.51
−0.55
−0.825
−0.885
−0.955
−1
−1.09

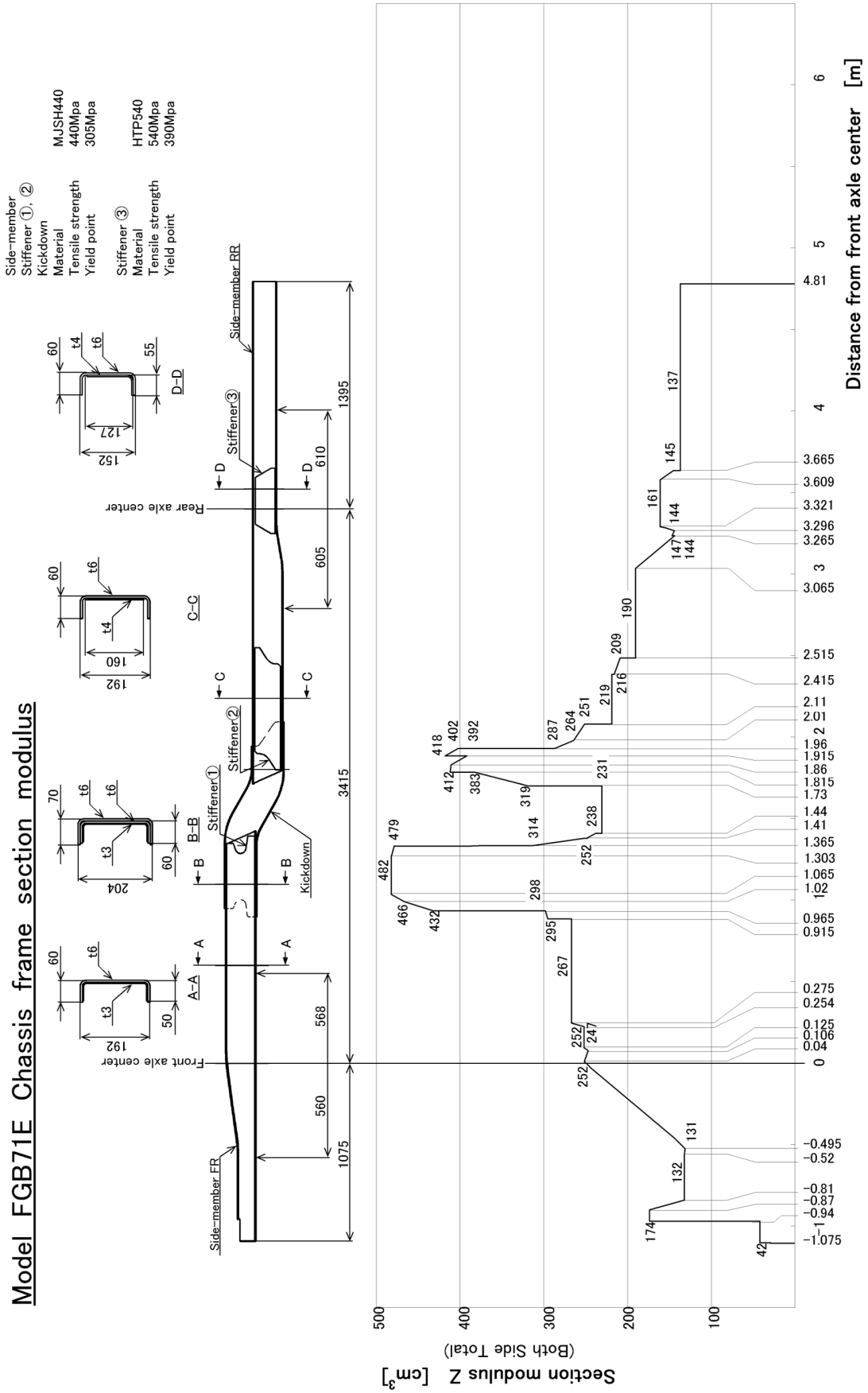

Model FEC91H Chassis frame section modulus
FEC91H
FECX1H
Main frame
Material HTP540
Tensile strength 540Mpa
Yield point 390Mpa
Stiffener
Material MJSH440
Tensile strength 440Mpa
Yield point 305Mpa
Rear axle center
Front axle center
Main frame
Stiffener
A–A
65
t6
212
1745
610
605
4300
550
575
1090
Section modulus Z [cm³]
(Both Side Total)
400
300
200
100
Distance from front axle center [m]
0
1
2
3
4
5
6
6.045
7
232
222
214
218
202
196
174
132
99
96
42
0.55
0.428
0.411
0.35
0.17
0.149
0.096
−0.51
−0.55
−0.825
−0.885
−0.955
−1
−1.09


Model FEC91K Chassis frame section modulus
FEC91K
FECX1K
Main frame
Material HTP540
Tensile strength 540Mpa
Yield point 390Mpa
Stiffener
Material MJSH440
Tensile strength 440Mpa
Yield point 305Mpa
Rear axle center
Front axle center
Main frame
Stiffener
A–A
65
t6
212
1845
610
605
4750
550
575
1090
Section modulus Z [cm³]
(Both Side Total)
400
300
200
100
232
222
214
218
202
196
174
132
99
96
42
0.55
0.428
0.411
0.35
0.17
0.149
0.096
−0.51
−0.55
−0.825
−0.885
−0.955
−1.09
6.595
Distance from front axle center [m]
0
1
2
3
4
5
6
7

10.6 Frame structure



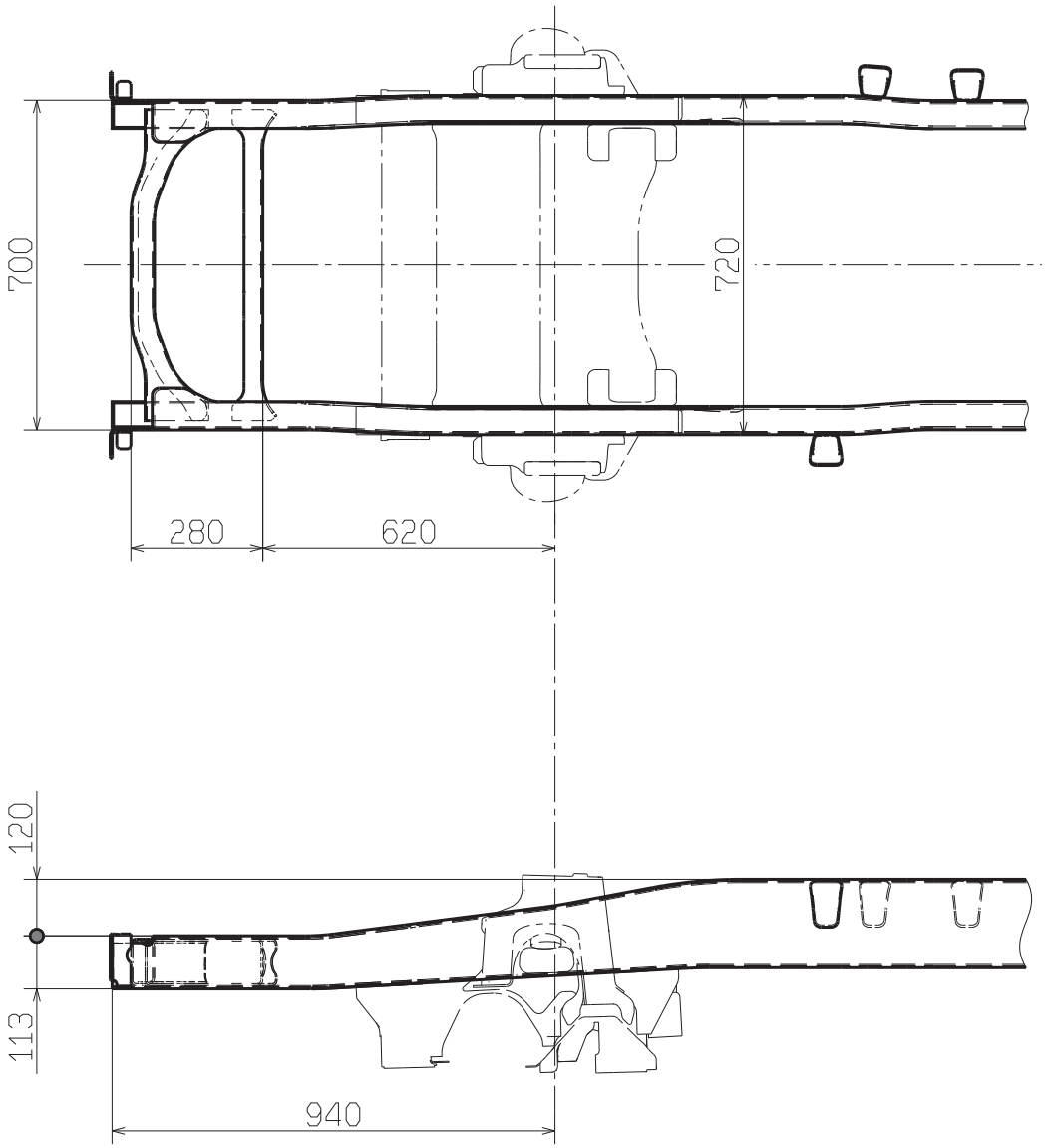
10.6 Frame structure



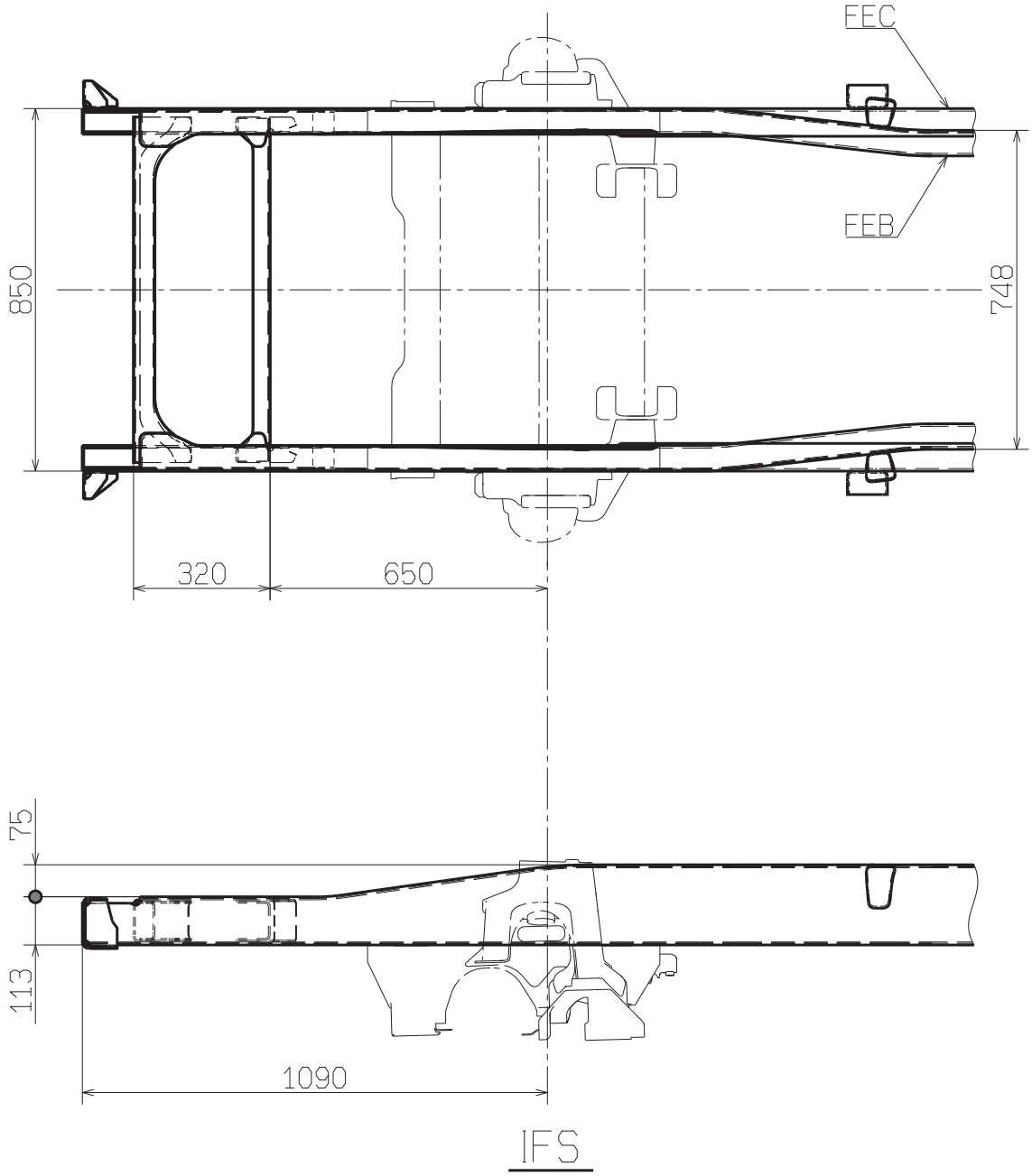
10.6.3 Frame front drawings

Front suspension type	Model	Frame width	Page
Independent	FEA2	700	193
	FEB2	750	194
Rigid	FEB5 FEB7 FEB9	750	195
	FEC7 FEC9 FECX	850	
	FGB7	750	

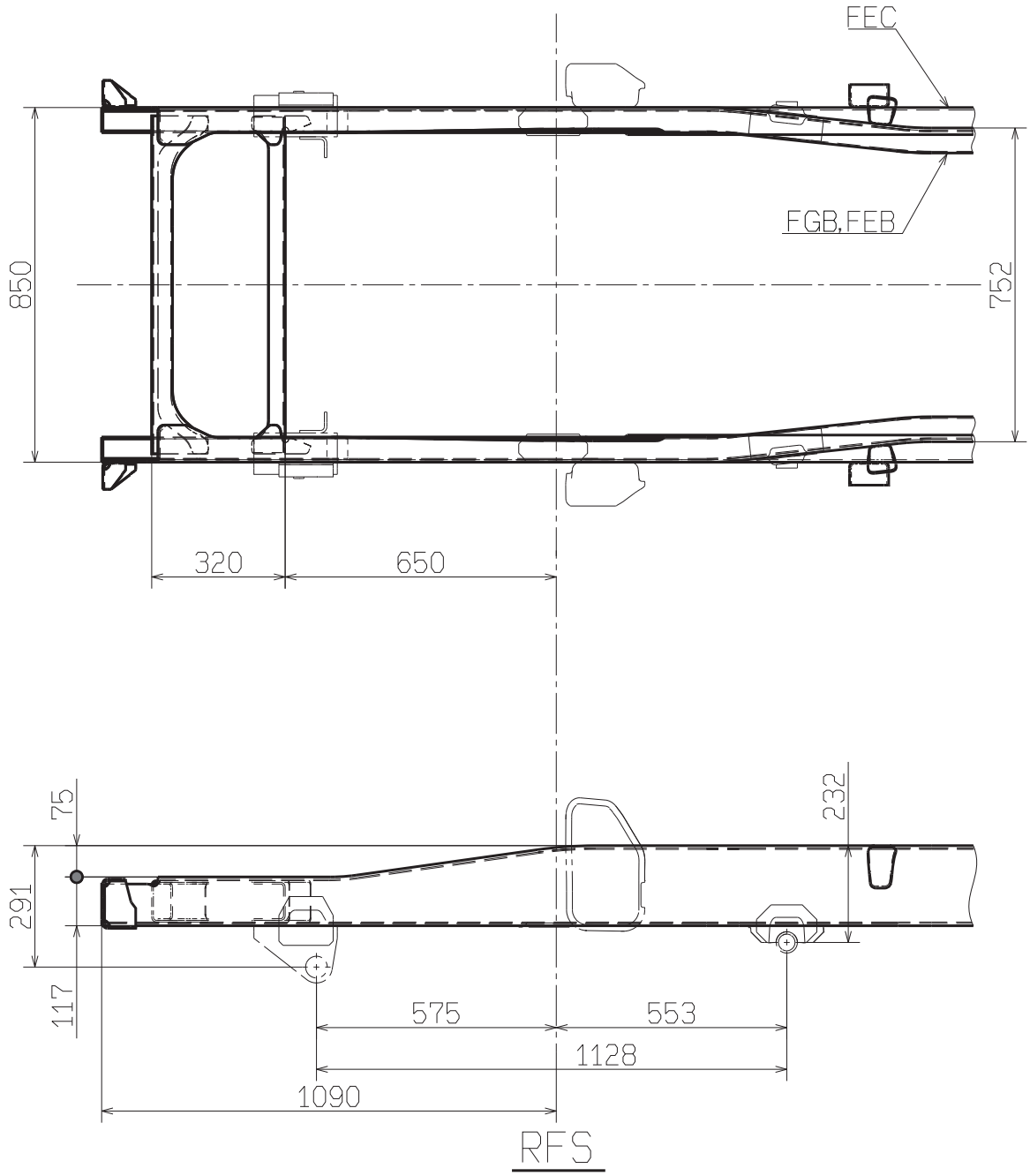
<FEA2>



<FEB2>



<FEB5, 7, 9>
<FEC7, 9, X>
<FGB7>



10.7 Spring characteristic

10.7.1 Distance from frame top surface to ground

MODEL	OBJECT ENGINE kW	CAB CHASSIS WEIGHT kg			UNDER-SPRING WEIGHT kg		DISTANCE FROM FRAME TOP SURFACE TO GROUND mm		CoG. HEIGHT mm
		Front Wf	Rear Wr	Total W	Front	Rear	Front ±10 Hf	Rear ±25 Hr	
FEA21CR2SFBB	96	1365	570	1935	171	377	638	723	540
FEA21CR1SFBB	96	1380	570	1950	171	377	638	723	540
FEA21CR3SFBC	110	1380	570	1950	171	377	638	733	575
FEA21ER3SFBC	110	1400	580	1980	171	377	637	732	575
FEA21ER3SFBL	110	1400	575	1975	171	377	637	732	575
FEA21ER3WFBC	110	1515	665	2180	171	377	630	729	625
FEB21CR4SFBC	110	1465	580	2045	175	389	651	733	615
FEB21ER4SFBC	110	1470	600	2070	175	389	651	722	615
FEB21CR3SFBC_G	110	1485	580	2065	175	389	650	732	615
FEB21ER3SFBC_G	110	1490	600	2090	175	389	650	732	615
FEB51ER4SFBC	110	1550	695	2245	282	459	674	783	615
FEB51GR4SFBC	110	1550	715	2265	282	459	674	782	615
FEB51ER3SFBC	110	1565	705	2270	282	466	673	783	615
FEB51GR3SFBC	110	1565	725	2290	282	466	673	782	615
FEB71GR4SFBC	110	1595	830	2425	325	569	681	797	615
FEB71ER3WFBC	110	1750	900	2650	325	569	676	795	615
FEB71GR3SFBC	110	1610	835	2445	325	569	681	797	615
FEB71GR3WFBC	110	1775	900	2675	325	569	675	795	615
FEB71GR4WFBC	110	1750	895	2645	325	569	676	795	615
FEC71ER4SFBC	110	1580	830	2410	325	574	704	807	605
FEC71ER3SFBC	110	1595	835	2430	325	574	703	807	605
FEB91GR4WFBD	129	1765	940	2705	325	570	685	794	615
FEB91ER3WFBD	129	1760	940	2700	325	570	685	794	615
FEB91GR3WFBD	129	1780	935	2715	325	570	685	794	615
FEC91KR4SFBD	129	1640	895	2535	325	574	702	805	605
FEC91GR4SFBD	129	1585	895	2480	325	574	704	805	605
FEC91HR4SFBD	129	1620	895	2515	325	574	702	805	605
FEC91KR3SFBD	129	1650	900	2550	325	574	701	805	605
FEC91GR3SFBD	129	1600	895	2495	325	574	703	805	605
FEC91HR3SFBD	129	1635	895	2530	325	574	702	805	605
FECX1GR4SFBD	129	1570	885	2455	325	574	724	805	605
FECX1GR4WFBD	129	1725	960	2685	312	574	718	803	605
FECX1GR3SFBD	129	1580	890	2470	325	574	723	805	605
FECX1GR3WFBD	129	1735	960	2695	312	574	718	803	605
FECX1HR4SFBD	129	1605	890	2495	325	574	723	805	605
FECX1HR3SFBD	129	1615	890	2505	325	574	722	805	605
FECX1KR4SFBD	129	1620	890	2510	325	574	722	805	605
FECX1KR3SFBD	129	1635	890	2525	325	574	722	805	605
FGB71ER4WFBC	110	1915	955	2870	415	574	974	870	815
FGB71CR6SFBC	110	1765	870	2635	415	574	979	873	740

10.7 Spring characteristic

MODEL	OBJECT ENGINE kW	CAB CHASSIS WEIGHT kg			UNDER-SPRING WEIGHT kg		DISTANCE FROM FRAME TOP SURFACE TO GROUND mm		CoG. HEIGHT mm
		Front Wf	Rear Wr	Total W	Front	Rear	Front ±10 Hf	Rear ±25 Hr	
FGB71ER6SFBC	110	1785	885	2670	415	574	978	872	740
FGB71ER6WFBC	110	1940	960	2900	415	574	973	870	815

Method of calculating Hf, Hr
hf : Distance from frame top to front wheel center (See Chapter 10.7.3.)
hr : Distance from frame top to rear wheel center (See Chapter 10.7.4.)
Rf, Rr : Tire radius (See Chapter 10.7.5.)

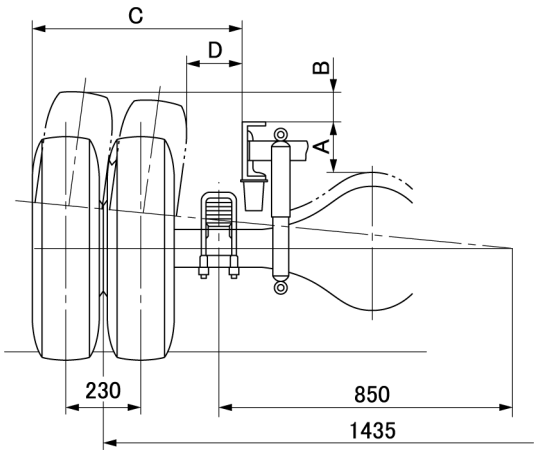
10.7.2 Differential and tire bound height

Model	Tire size	A mm	B mm	C mm	D mm
FEA21CR2SFBB	185/85R16	76	157	579	135
FEA21CR1SFBB	185/85R16	76	157	579	135
FEA21CR3SFBC	185/85R16	76	157	579	135
FEA21ER3SFBC	185/85R16	76	155	579	136
FEA21ER3SFBL	185/85R16	76	155	579	136
FEA21ER3WFBC	195/85R15	76	149	585	132
FEB21CR4SFBC	185/85R16	66	154	584	142
FEB21ER4SFBC	185/85R16	76	164	584	142
FEB21CR3SFBC_G	185/85R16	76	152	584	143
FEB21ER3SFBC_G	185/85R16	76	153	584	143
FEB51ER4SFBC	205/85R16	110	144	592	130
FEB51GR4SFBC	205/85R16	110	143	592	130
FEB51ER3SFBC	205/85R16	110	144	592	130
FEB51GR3SFBC	205/85R16	110	143	592	130
FEB71GR4SFBC	215/75R17.5	105	160	641	141
FEB71ER3WFBC	215/75R17.5	105	160	641	141
FEB71GR3SFBC	215/75R17.5	105	160	641	141
FEB71GR3WFBC	215/75R17.5	105	159	641	141
FEB71GR4WFBC	215/75R17.5	105	159	641	141
FEC71ER4SFBC	215/75R17.5	125	131	647	152
FEC71ER3SFBC	215/75R17.5	125	131	647	152
FEB91GR4WFBD	215/75R17.5	105	159	641	141
FEB91ER3WFBD	215/75R17.5	105	159	641	141
FEB91GR3WFBD	215/75R17.5	105	159	641	141
FEC91KR4SFBD	215/75R17.5	125	129	647	153
FEC91GR4SFBD	215/75R17.5	125	130	647	152
FEC91HR4SFBD	215/75R17.5	125	130	647	152
FEC91KR3SFBD	215/75R17.5	125	129	647	153
FEC91GR3SFBD	215/75R17.5	125	130	647	152
FEC91HR3SFBD	215/75R17.5	125	130	647	152
FECX1GR4SFBD	215/75R17.5	125	130	647	152
FECX1GR4WFBD	215/75R17.5	125	130	647	152
FECX1GR3SFBD	215/75R17.5	125	130	647	152
FECX1GR3WFBD	215/75R17.5	125	130	647	152
FECX1HR4SFBD	215/75R17.5	125	130	647	152
FECX1HR3SFBD	215/75R17.5	125	130	647	152
FECX1KR4SFBD	215/75R17.5	125	129	647	153

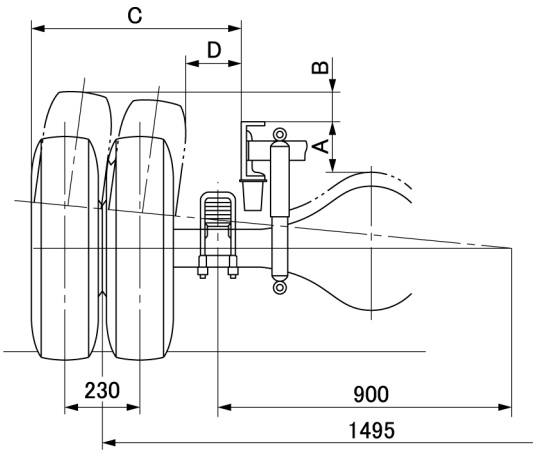
10.7 Spring characteristic

Model	Tire size	A mm	B mm	C mm	D mm
FECX1KR3SFBD	215/75R17.5	125	129	647	153
FGB71ER4WFBC	215/75R17.5	182	82	641	151
FGB71CR6SFBC	215/75R17.5	182	83	641	150
FGB71ER6SFBC	215/75R17.5	182	82	641	150
FGB71ER6WFBC	215/75R17.5	182	82	641	151

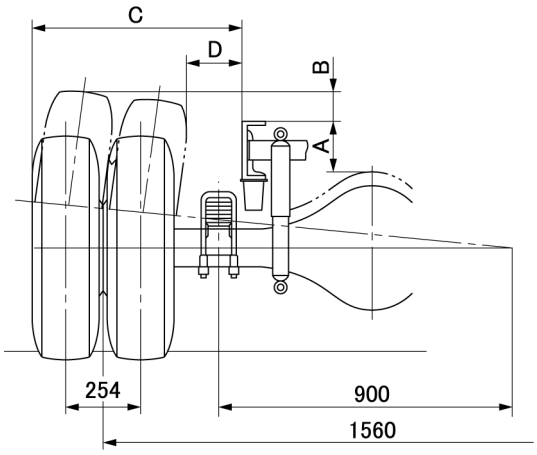
10.7 Spring characteristic



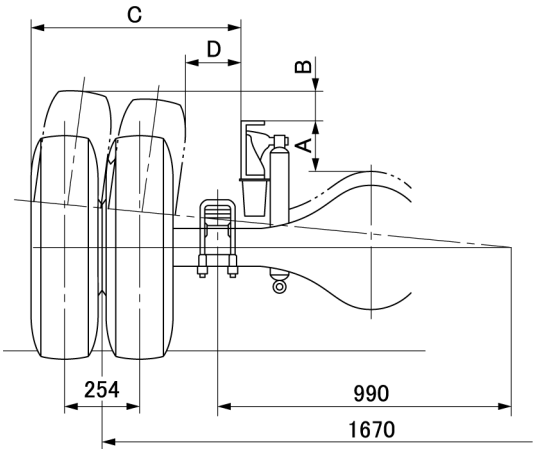
FEA2



FEB2
FEB5



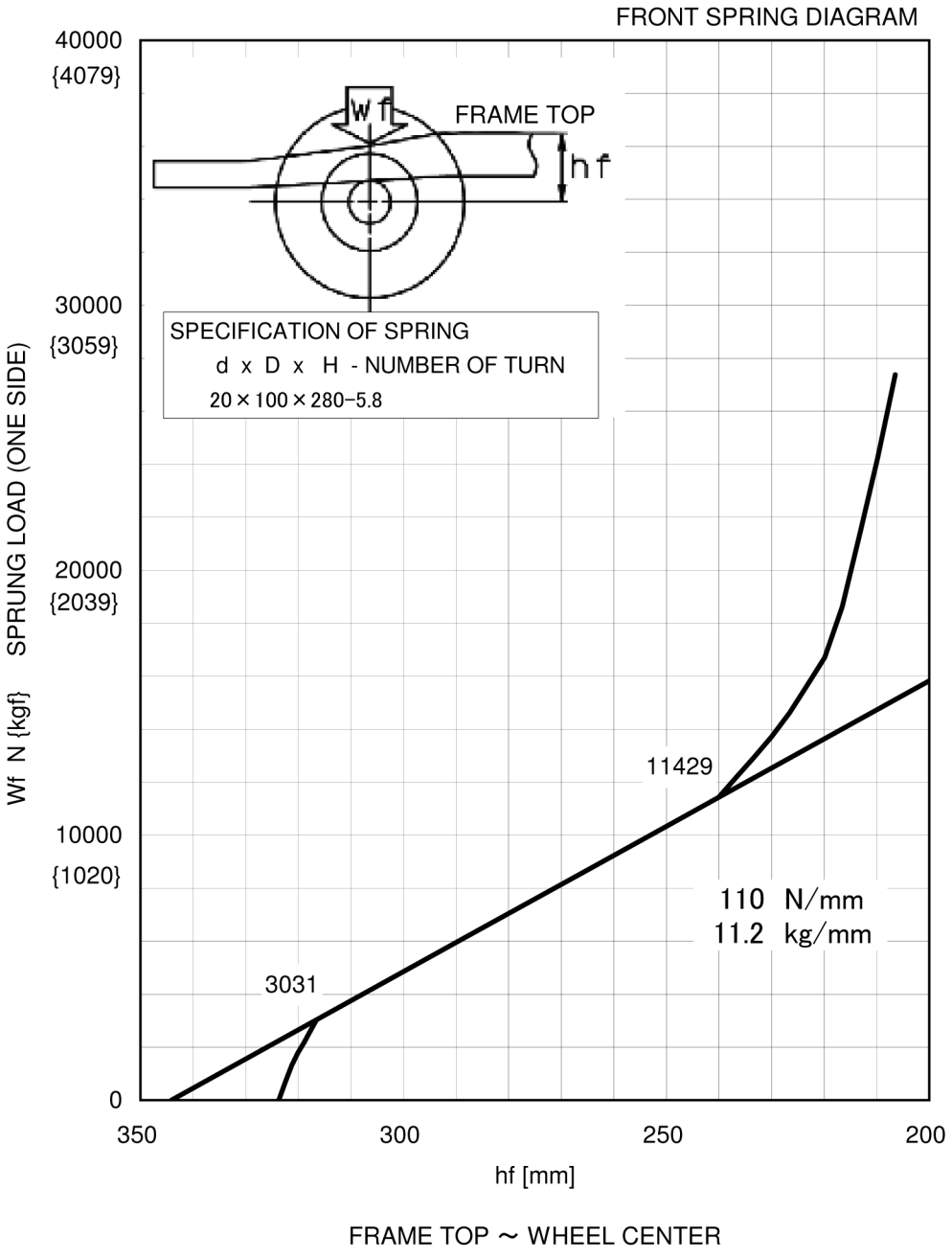
FEB7
FEB9
FGB7



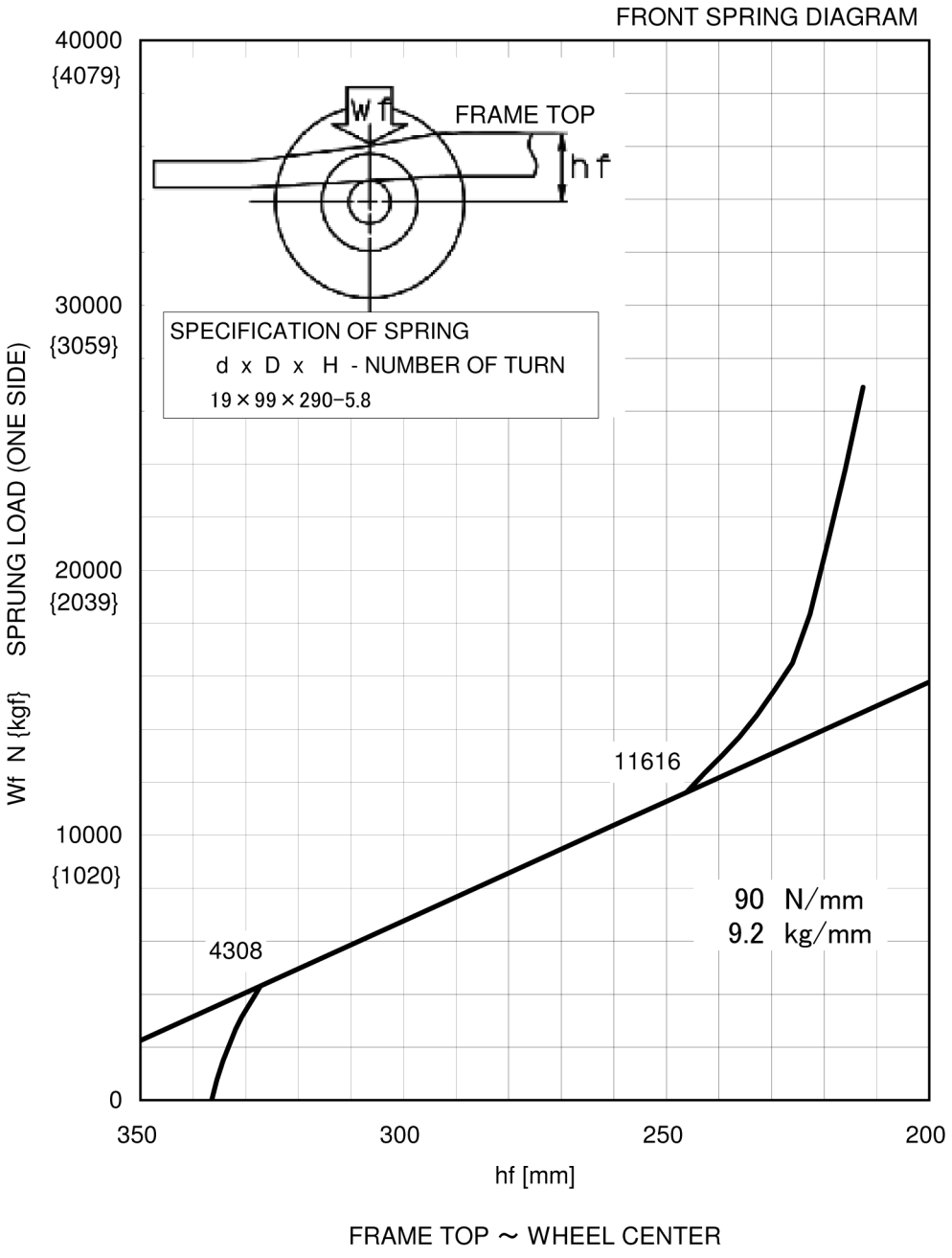
FEC7
FEC9
FECX

10.7.3 Front spring diagram

MODEL: FEA2

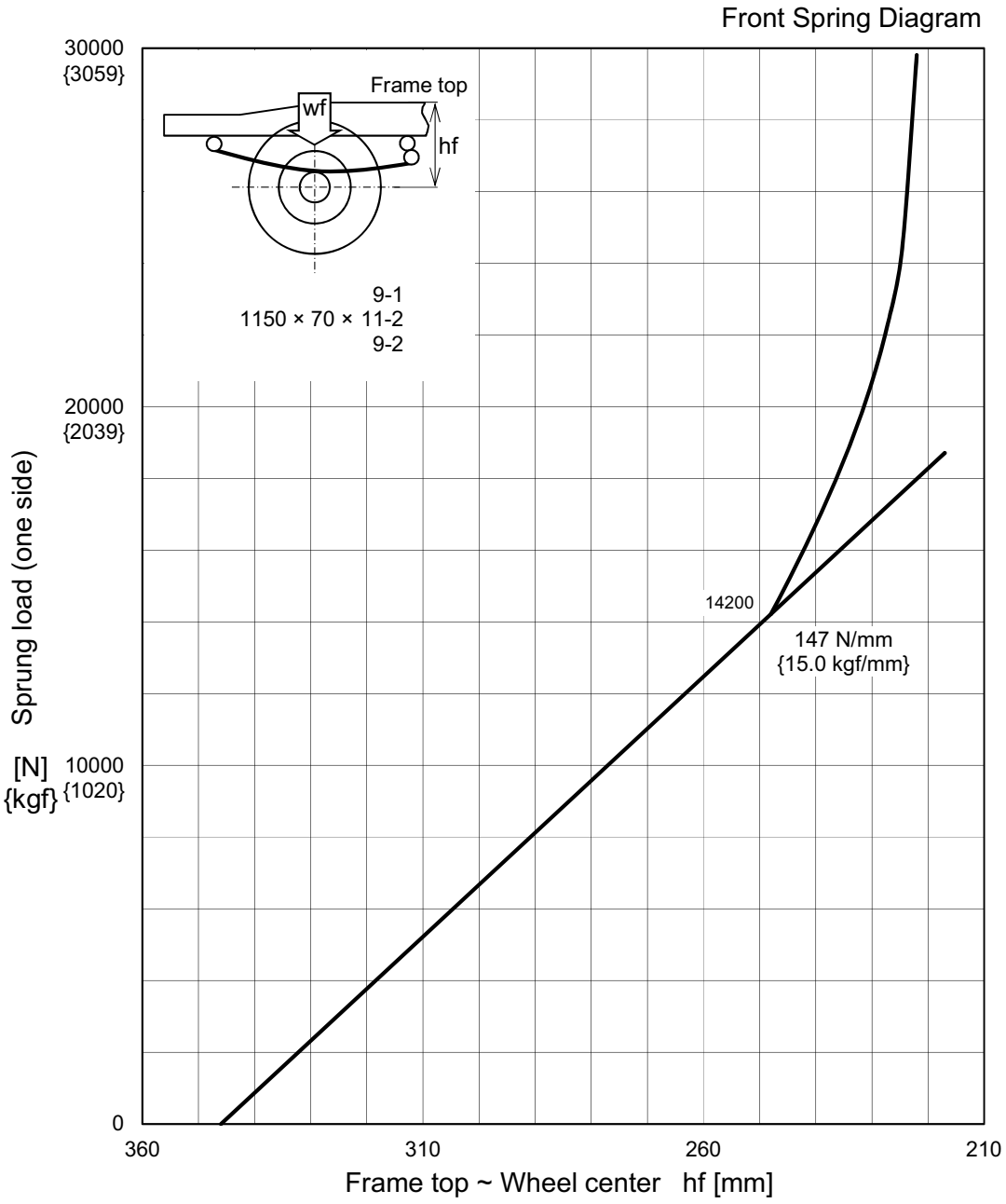


MODEL: FEB2

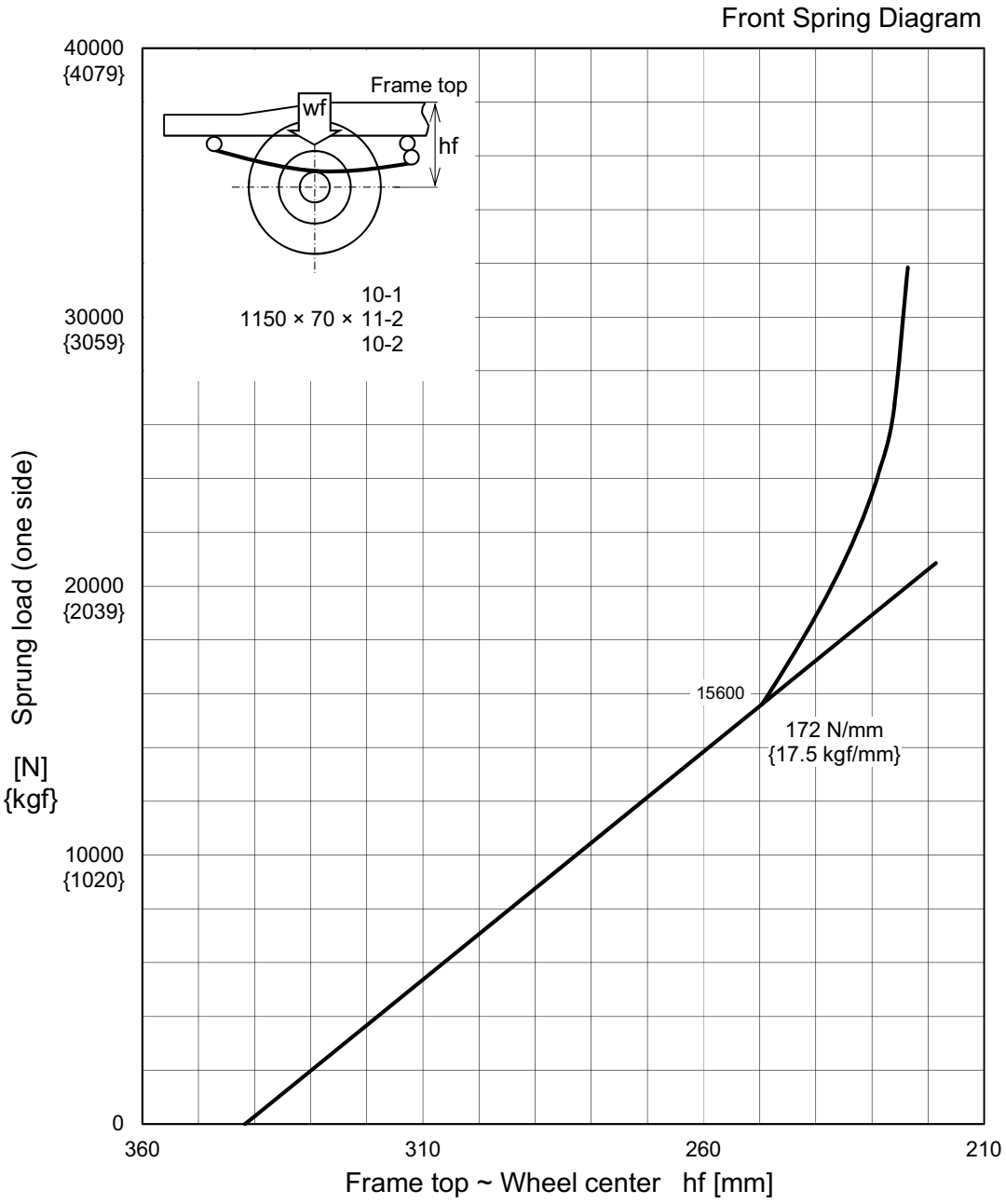


FRAME TOP ~ WHEEL CENTER

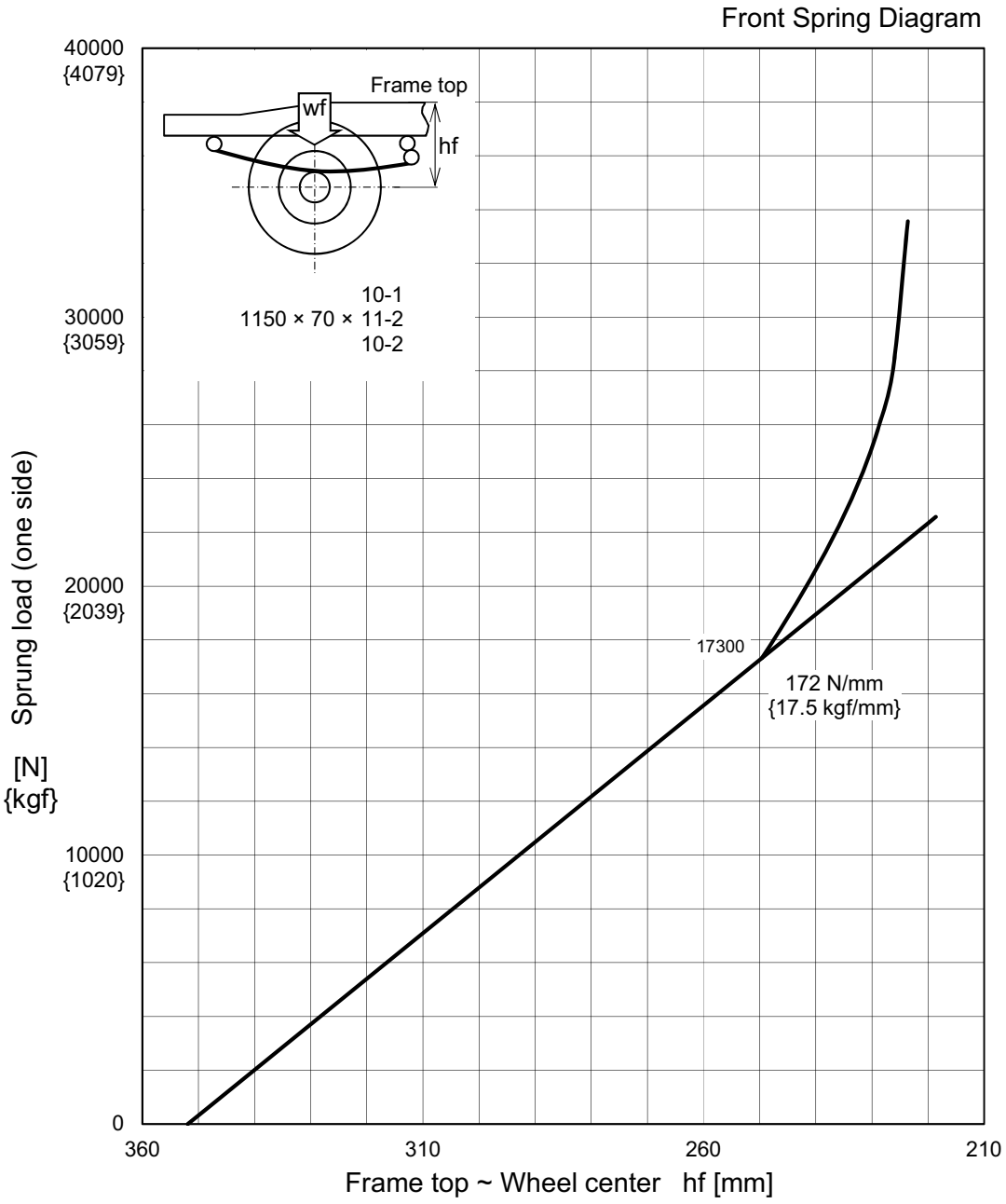
MODEL: FEB5


Front Spring Diagram
30000
{3059}
20000
{2039}
10000
{1020}
0
Sprung load (one side)
[N]
{kgf}
Frame top
wf
hf
9-1
1150 × 70 × 11-2
9-2
14200
147 N/mm
{15.0 kgf/mm}
360
310
260
210
Frame top ~ Wheel center hf [mm]

MODEL: FEB7

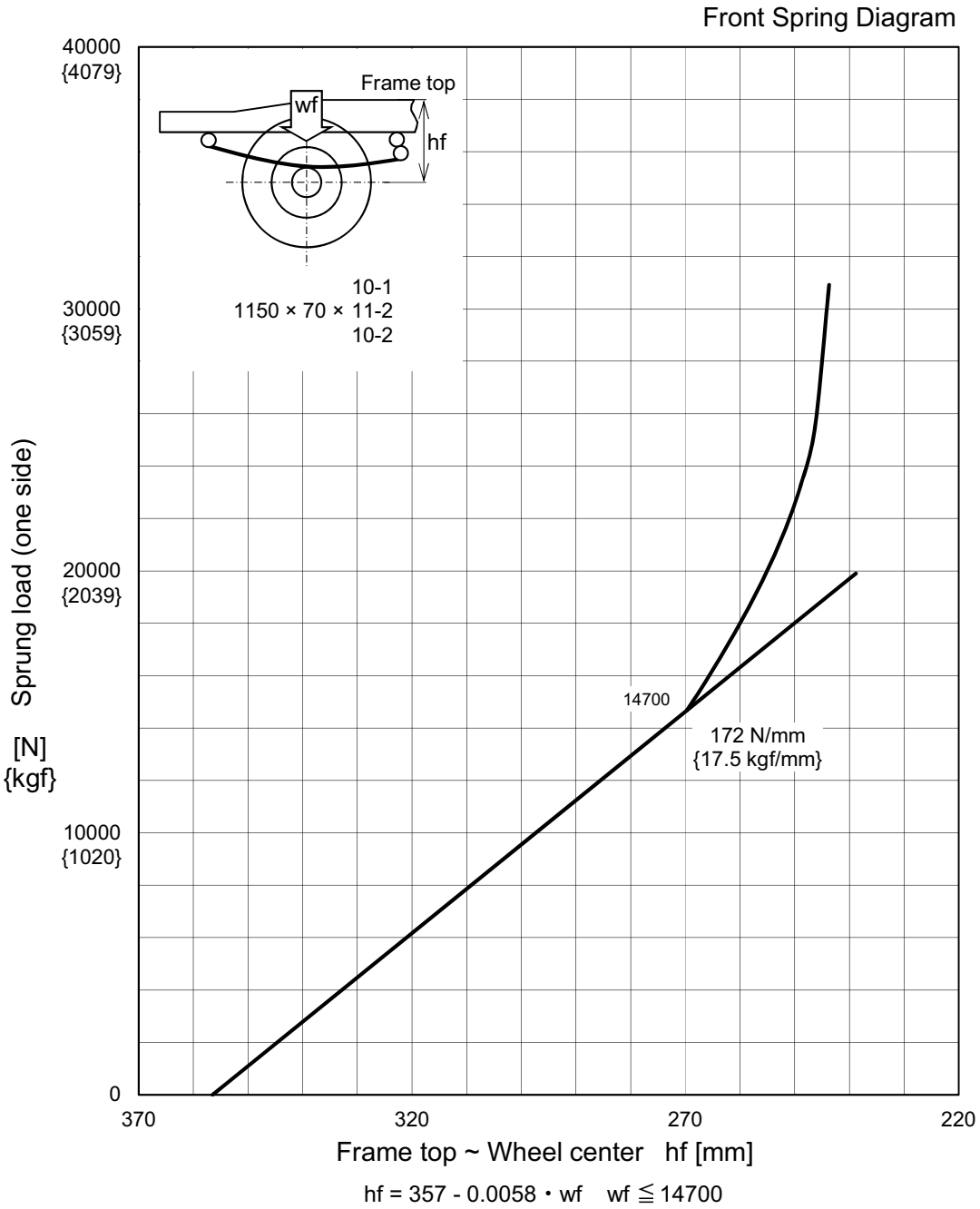

Front Spring Diagram
40000
{4079}
30000
{3059}
20000
{2039}
10000
{1020}
0
Sprung load (one side)
[N]
{kgf}
Frame top
wf
hf
10-1
1150 × 70 × 11-2
10-2
15600
172 N/mm
{17.5 kgf/mm}
360
310
260
210
Frame top ~ Wheel center hf [mm]

MODEL: FEB9

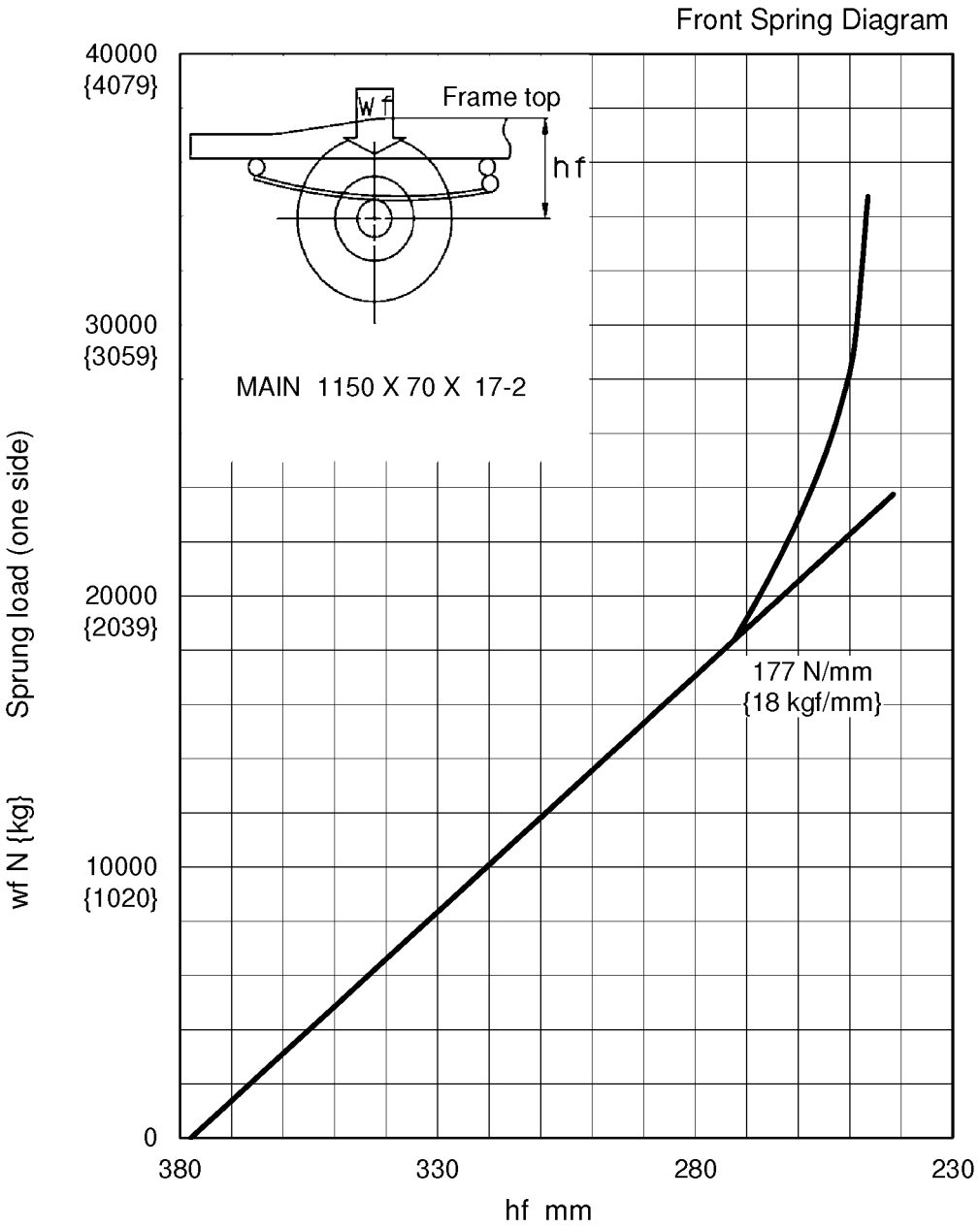

Front Spring Diagram
40000
{4079}
30000
{3059}
20000
{2039}
10000
{1020}
0
Sprung load (one side)
[N]
{kgf}
Frame top
wf
hf
10-1
1150 × 70 × 11-2
10-2
17300
172 N/mm
{17.5 kgf/mm}
360
310
260
210
Frame top ~ Wheel center hf [mm]

10.7 Spring characteristic

MODEL: FEC7 & FEC9

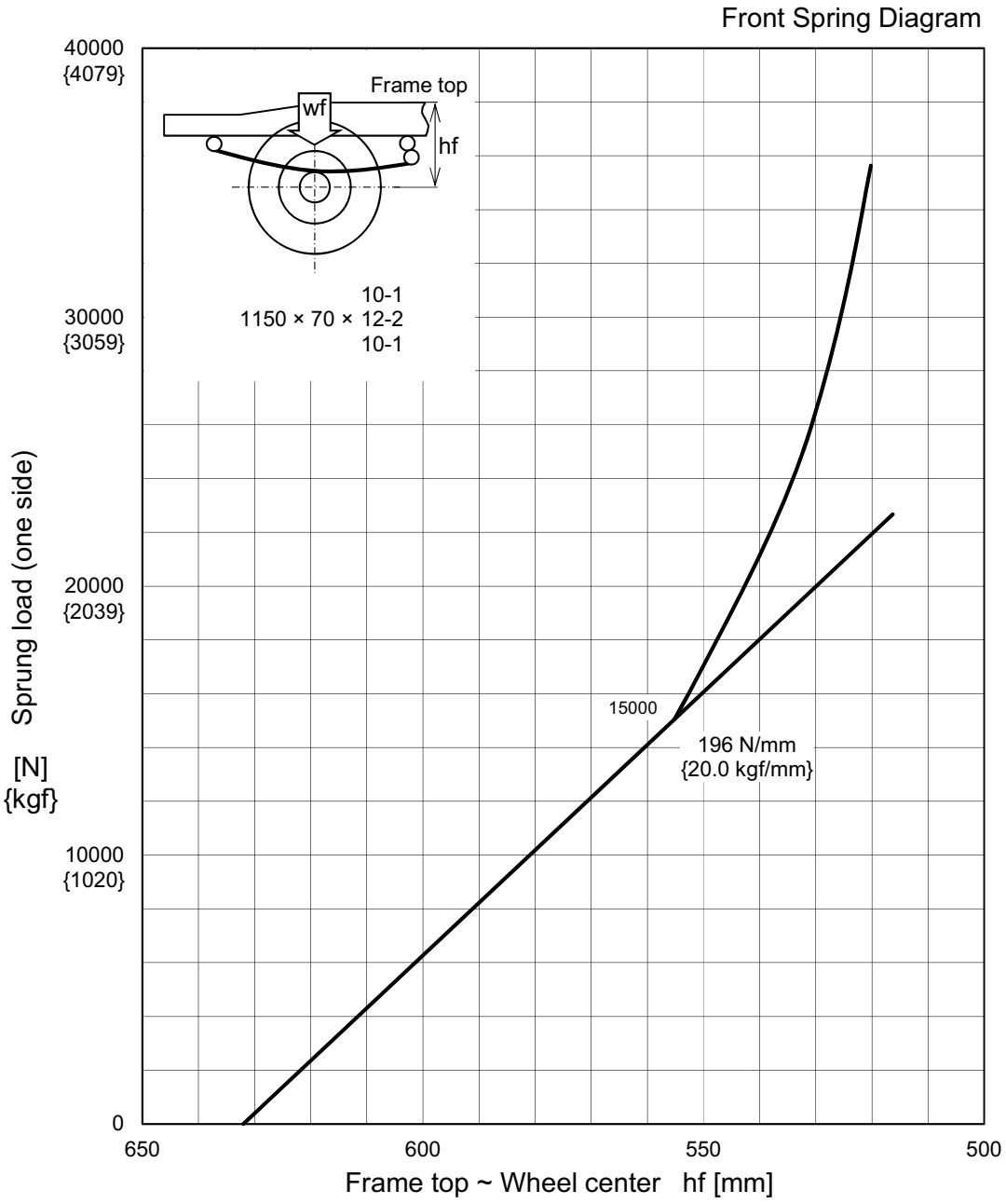


MODEL: FECX



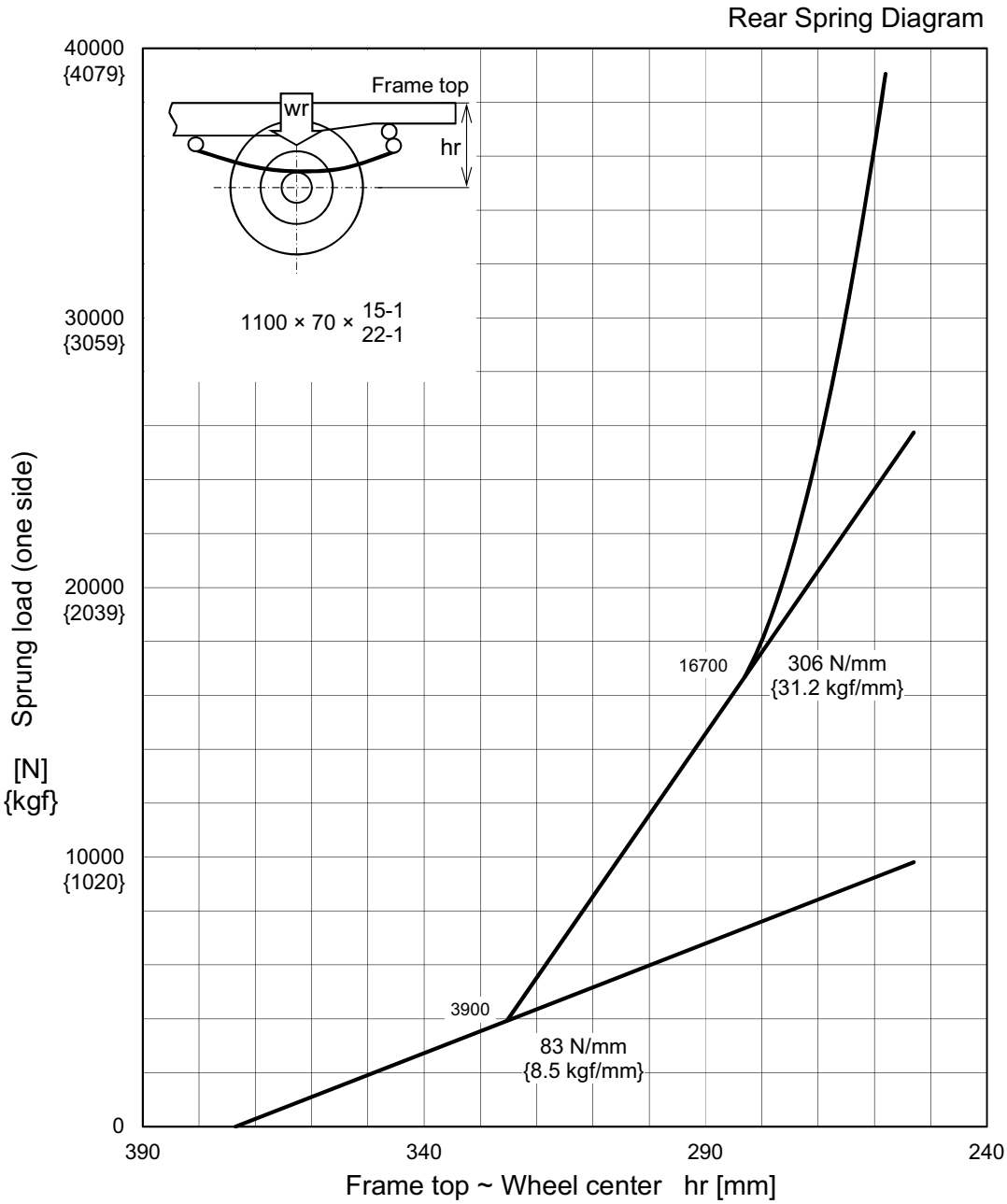
Frame top ~ Wheel center

MODEL: FGB7


Front Spring Diagram
40000
{4079}
30000
{3059}
20000
{2039}
10000
{1020}
0
Sprung load (one side)
[N]
{kgf}
Frame top
wf
hf
10-1
1150 × 70 × 12-2
10-1
15000
196 N/mm
{20.0 kgf/mm}
650
600
550
500
Frame top ~ Wheel center hf [mm]

10.7.4 Rear spring diagram

MODEL: FEA2**1,2
FEB2 (EXCEPT FEB2*C*4)

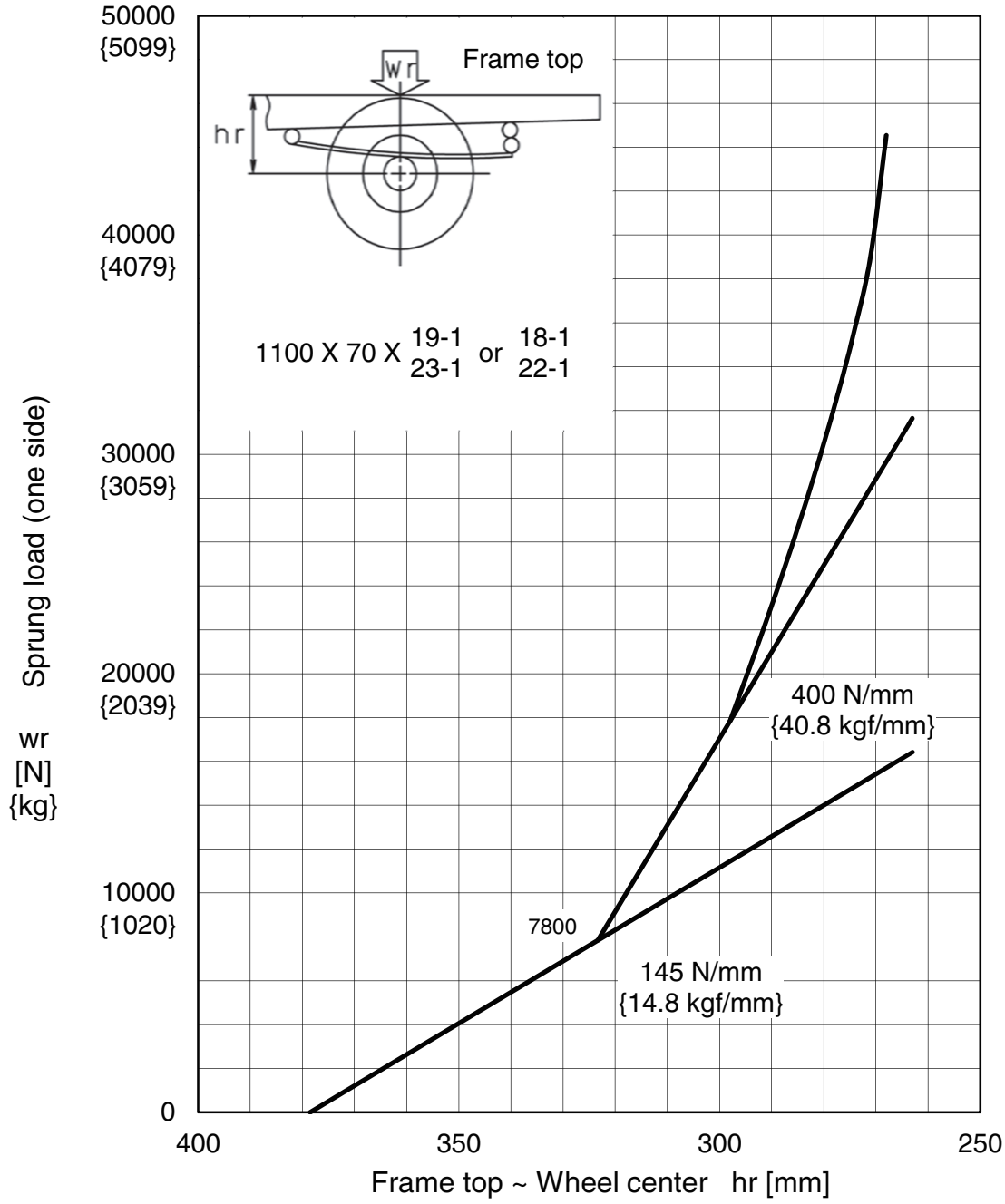


hr = 374 - 0.012 • wr wr ≦ 3900
hr = 338 - 0.0033 • wr 3900 ＜ wr ≦ 16700

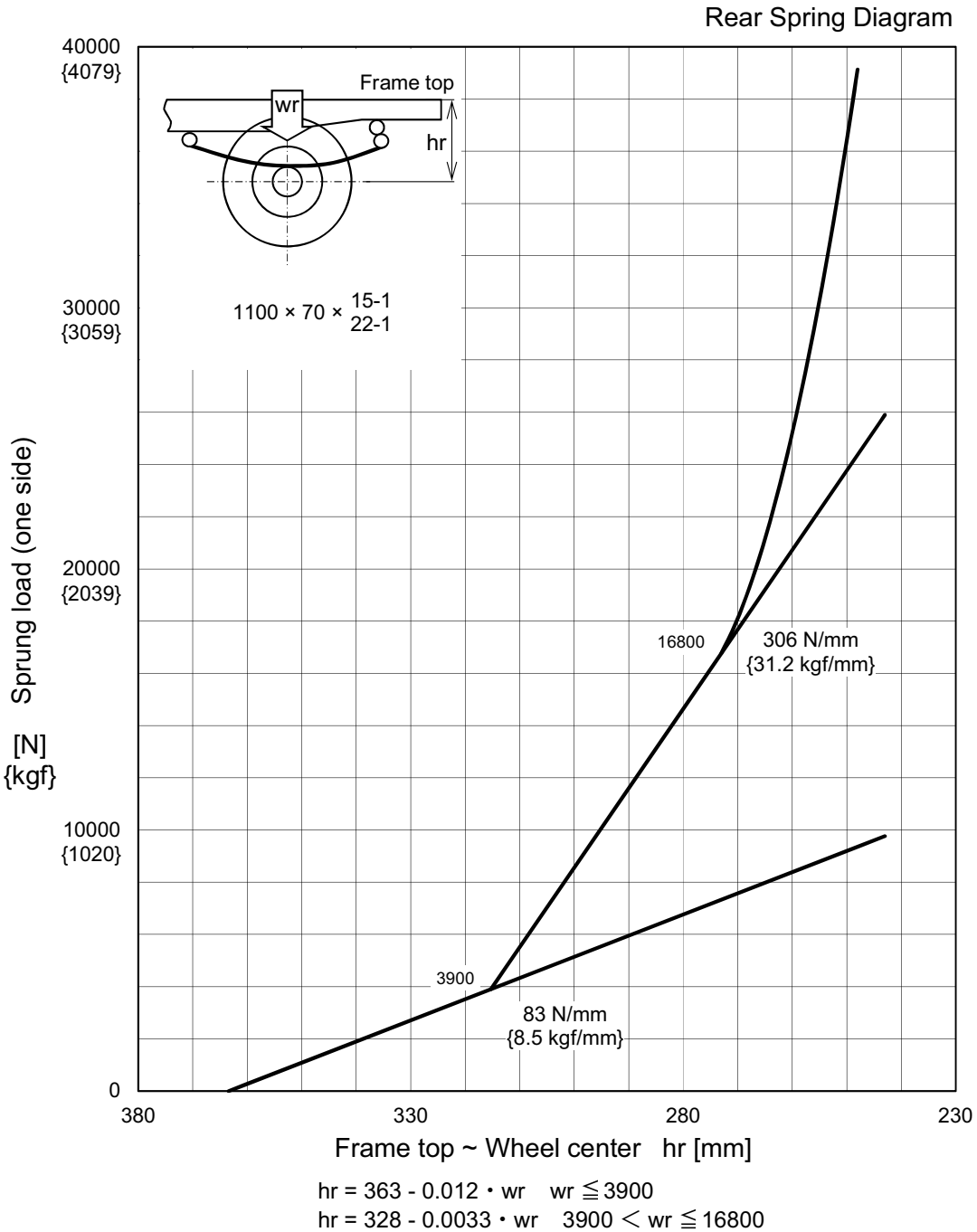
10.7 Spring characteristic

MODEL: FEA2**1,2 H/D
FEA2**3
FEB2 (EXCEPT FEB2*C*4)

Rear Spring Diagram



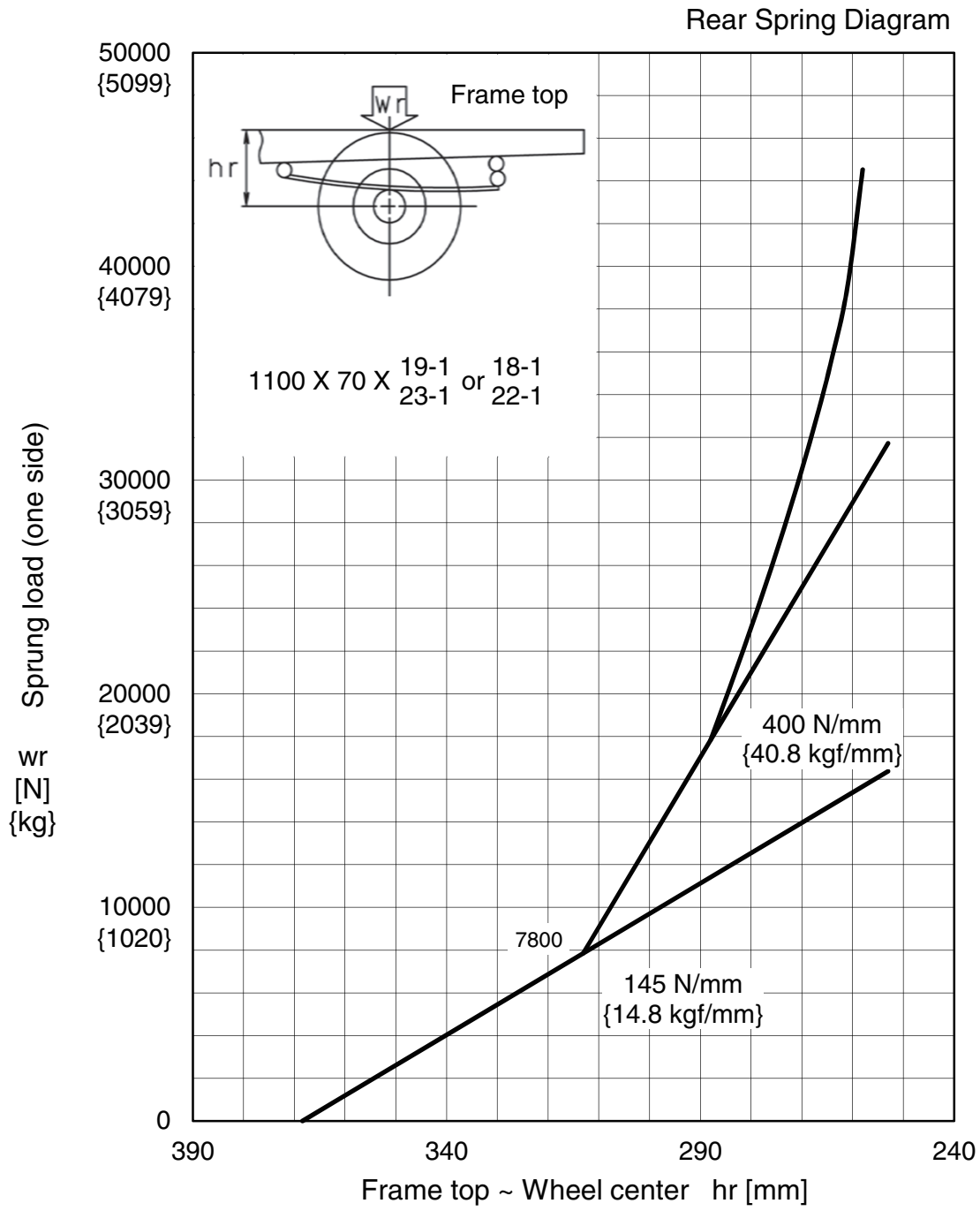
MODEL: FEB2*C*4 L/D



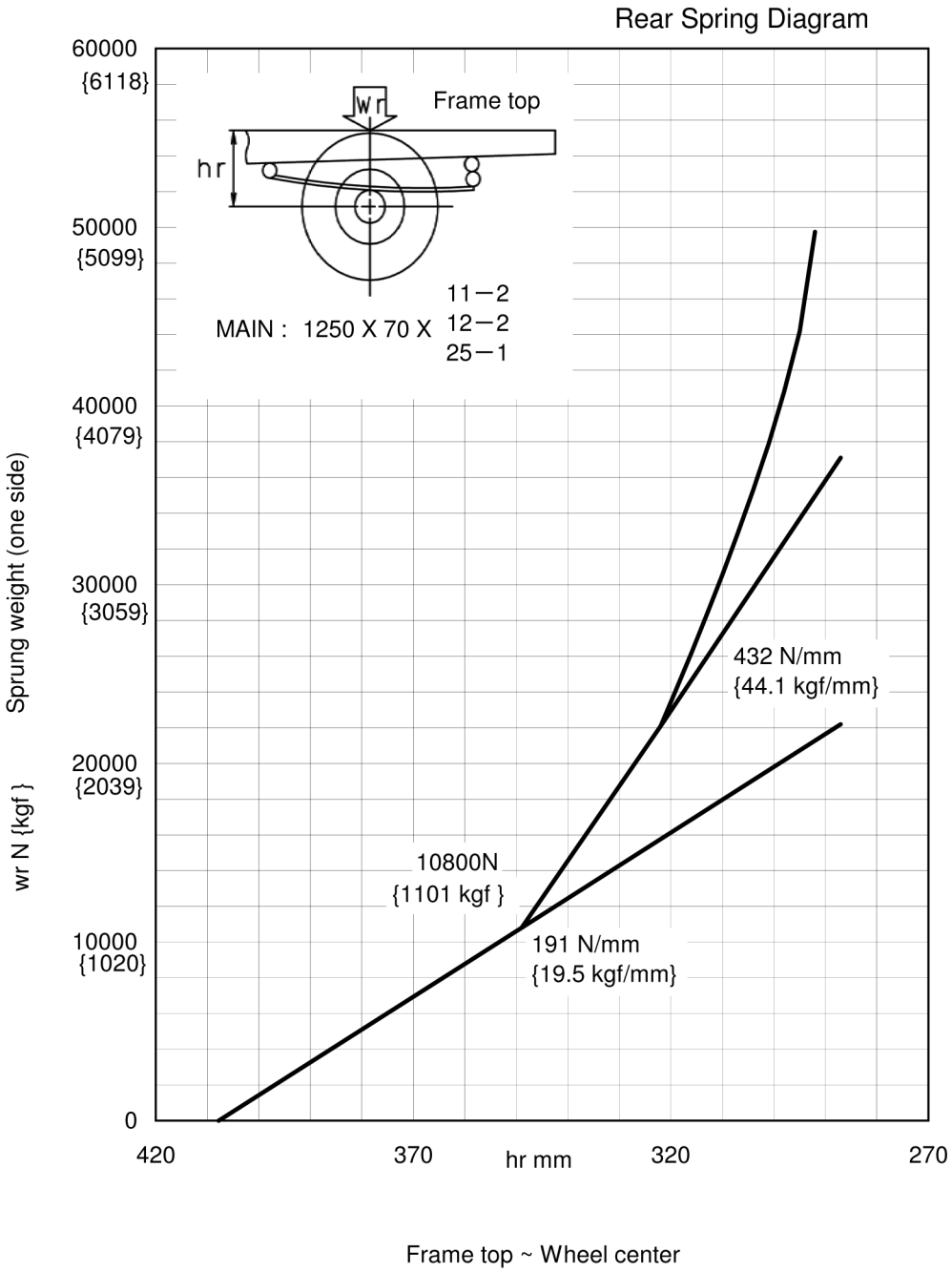
hr = 363 - 0.012 • wr wr ≦ 3900

hr = 328 - 0.0033 • wr 3900 ＜ wr ≦ 16800

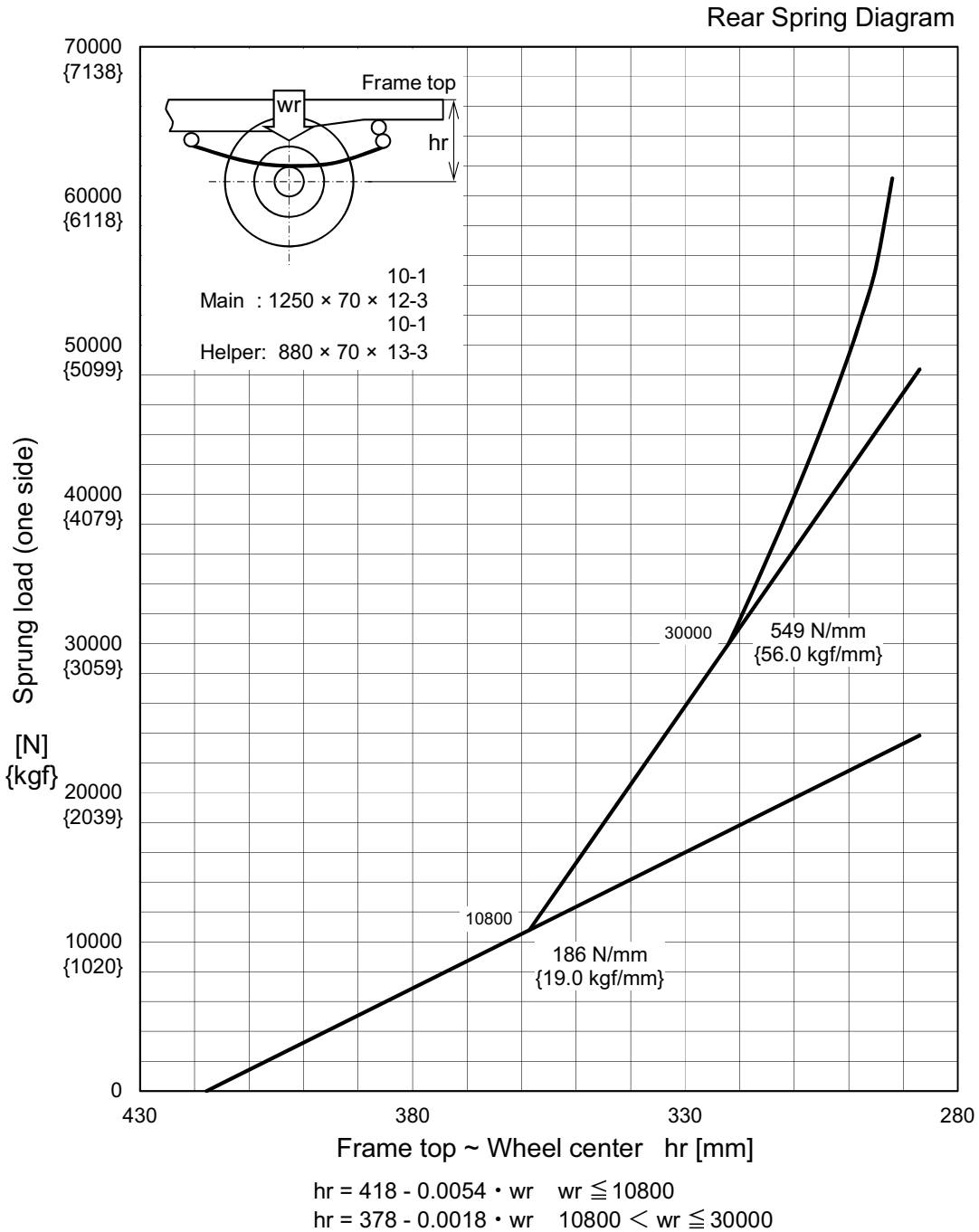
MODEL: FEB2*C*4



MODEL: FEB5

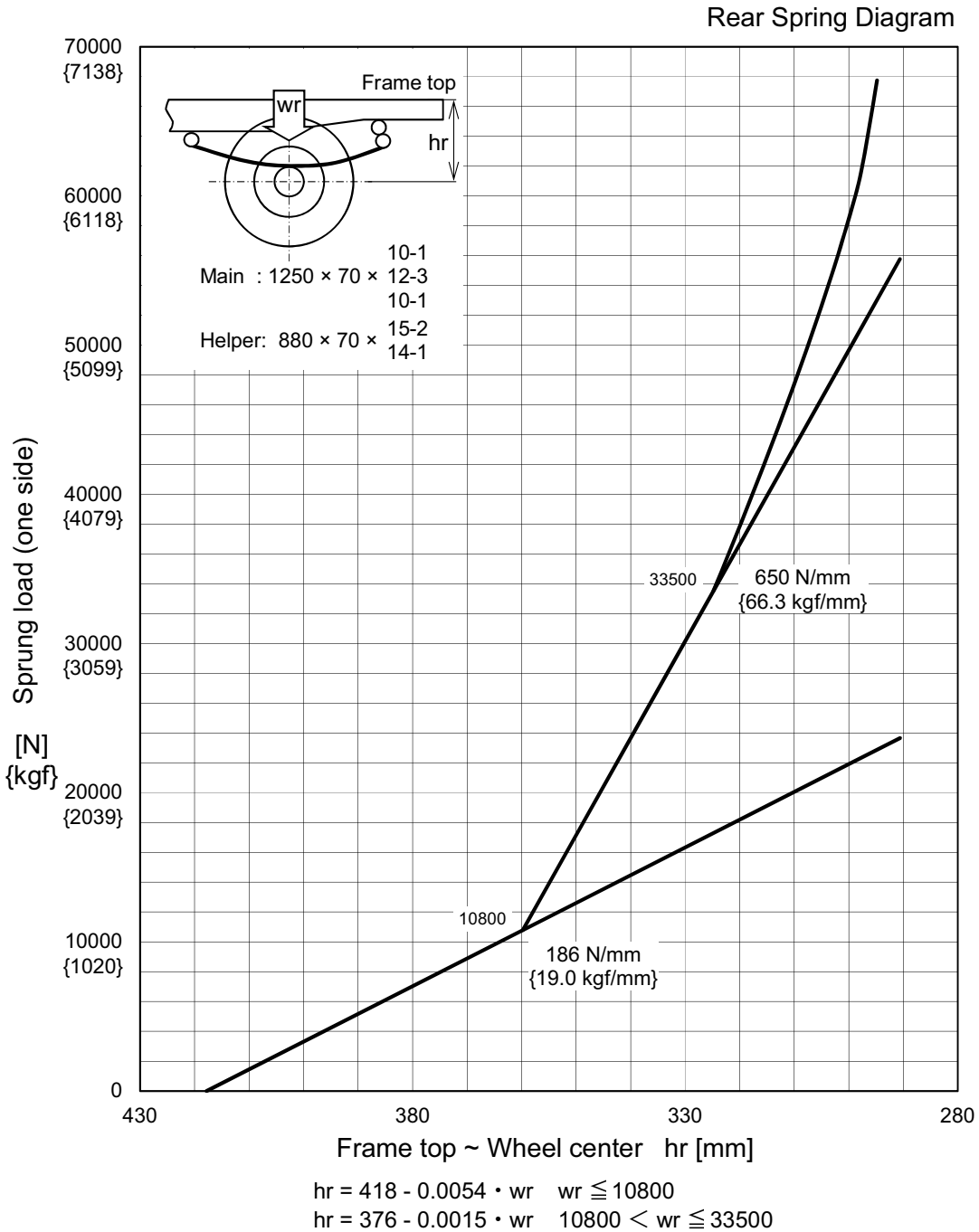

Rear Spring Diagram
60000
{6118}
50000
{5099}
40000
{4079}
30000
{3059}
20000
{2039}
10000
{1020}
0
Sprung weight (one side)
wr N {kgf }
wr
Frame top
hr
MAIN : 1250 X 70 X 11—2 12—2 25—1
432 N/mm
{44.1 kgf/mm}
10800N
{1101 kgf }
191 N/mm
{19.5 kgf/mm}
420
370
hr mm
320
270
Frame top ~ Wheel center

MODEL: FEB7

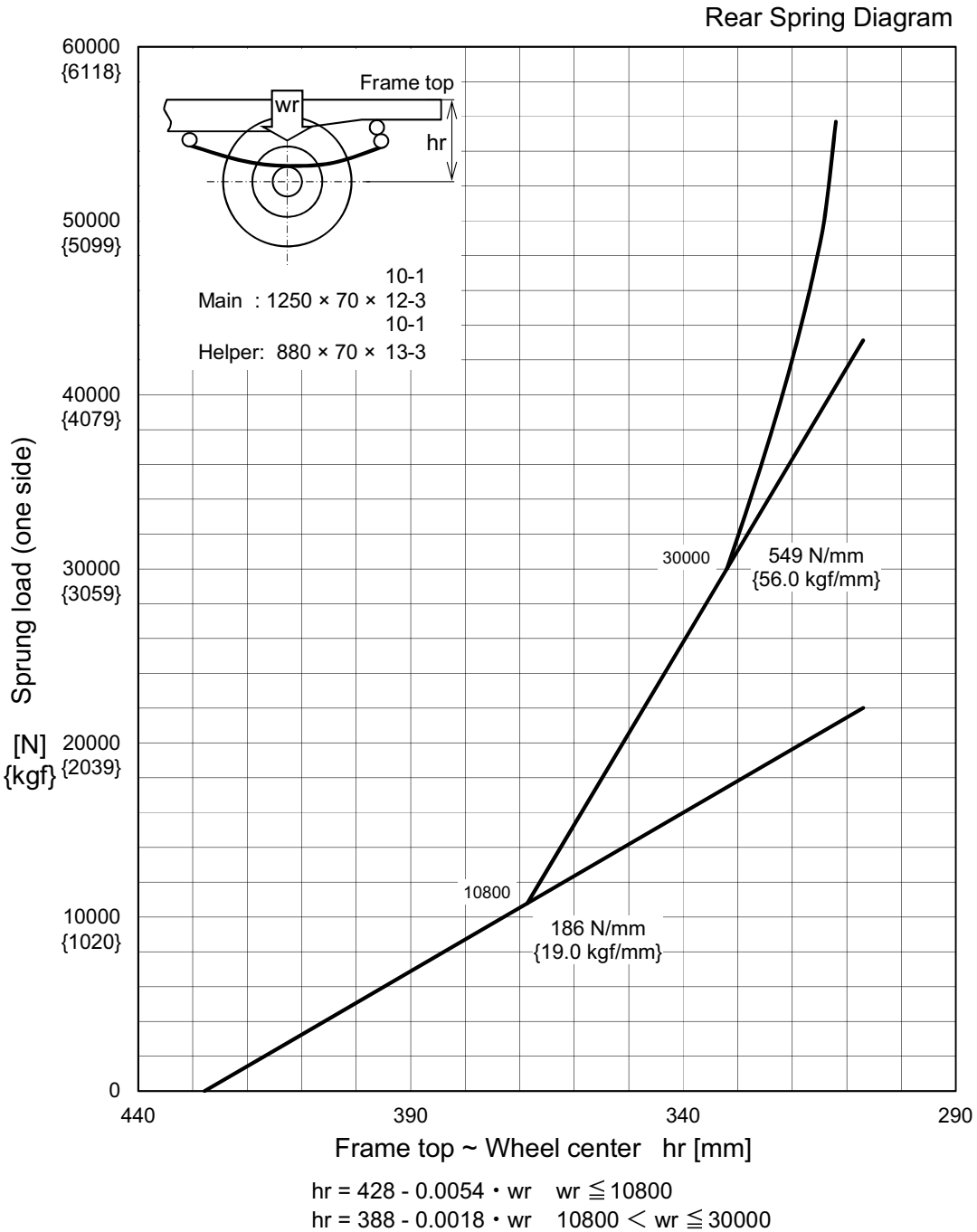


hr = 418 - 0.0054 • wr wr ≦ 10800
hr = 378 - 0.0018 • wr 10800 < wr ≦ 30000

MODEL: FEB9

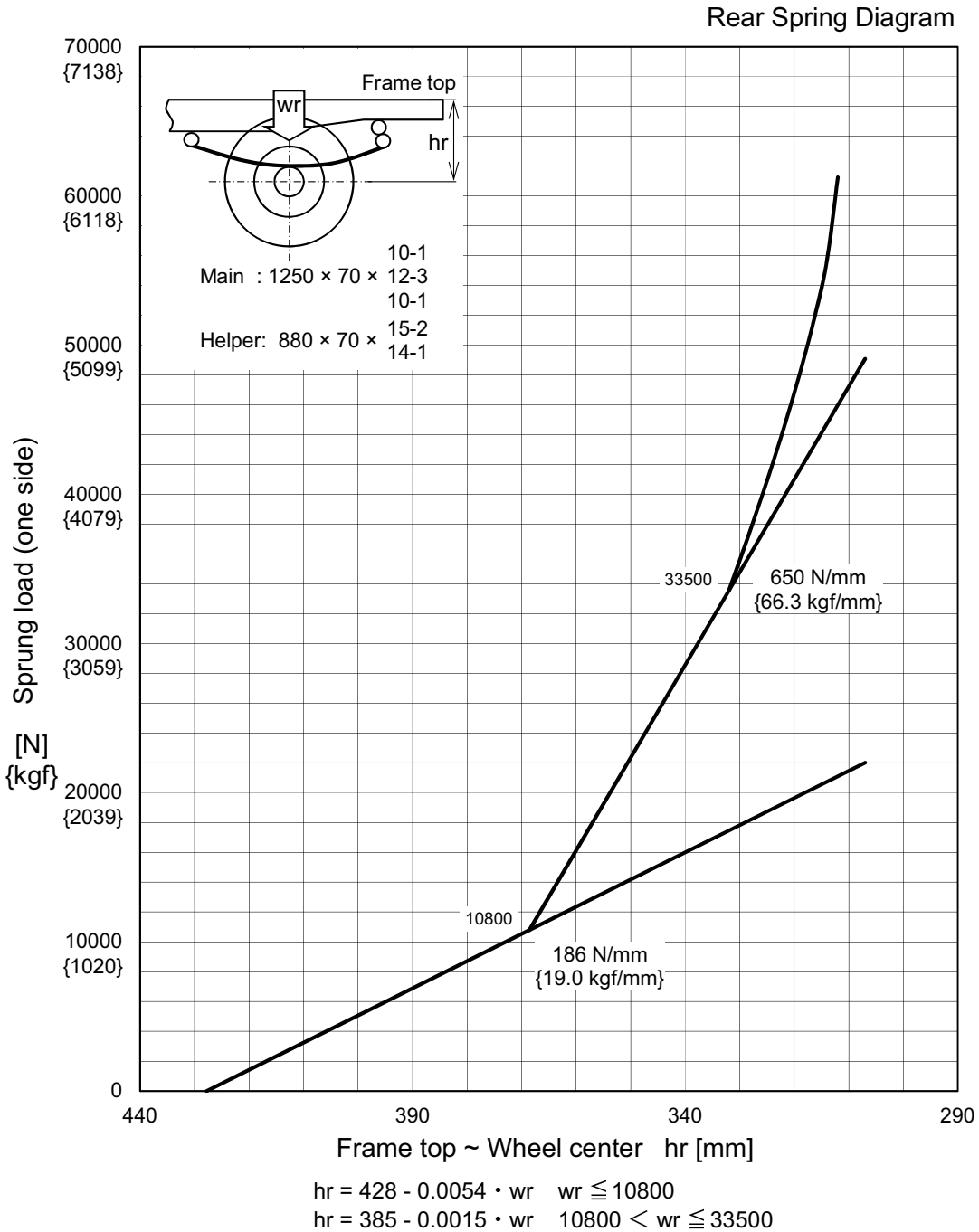

Rear Spring Diagram
70000
{7138}
60000
{6118}
50000
{5099}
40000
{4079}
30000
{3059}
20000
{2039}
10000
{1020}
0
Sprung load (one side)
[N]
{kgf}
Frame top
wr
hr
Main : 1250 × 70 × 10-1 12-3 10-1
Helper: 880 × 70 × 15-2 14-1
33500
650 N/mm
{66.3 kgf/mm}
10800
186 N/mm
{19.0 kgf/mm}
430
380
330
280
Frame top ~ Wheel center hr [mm]
hr = 418 - 0.0054 • wr wr ≦ 10800
hr = 376 - 0.0015 • wr 10800 < wr ≦ 33500

MODEL: FEC7



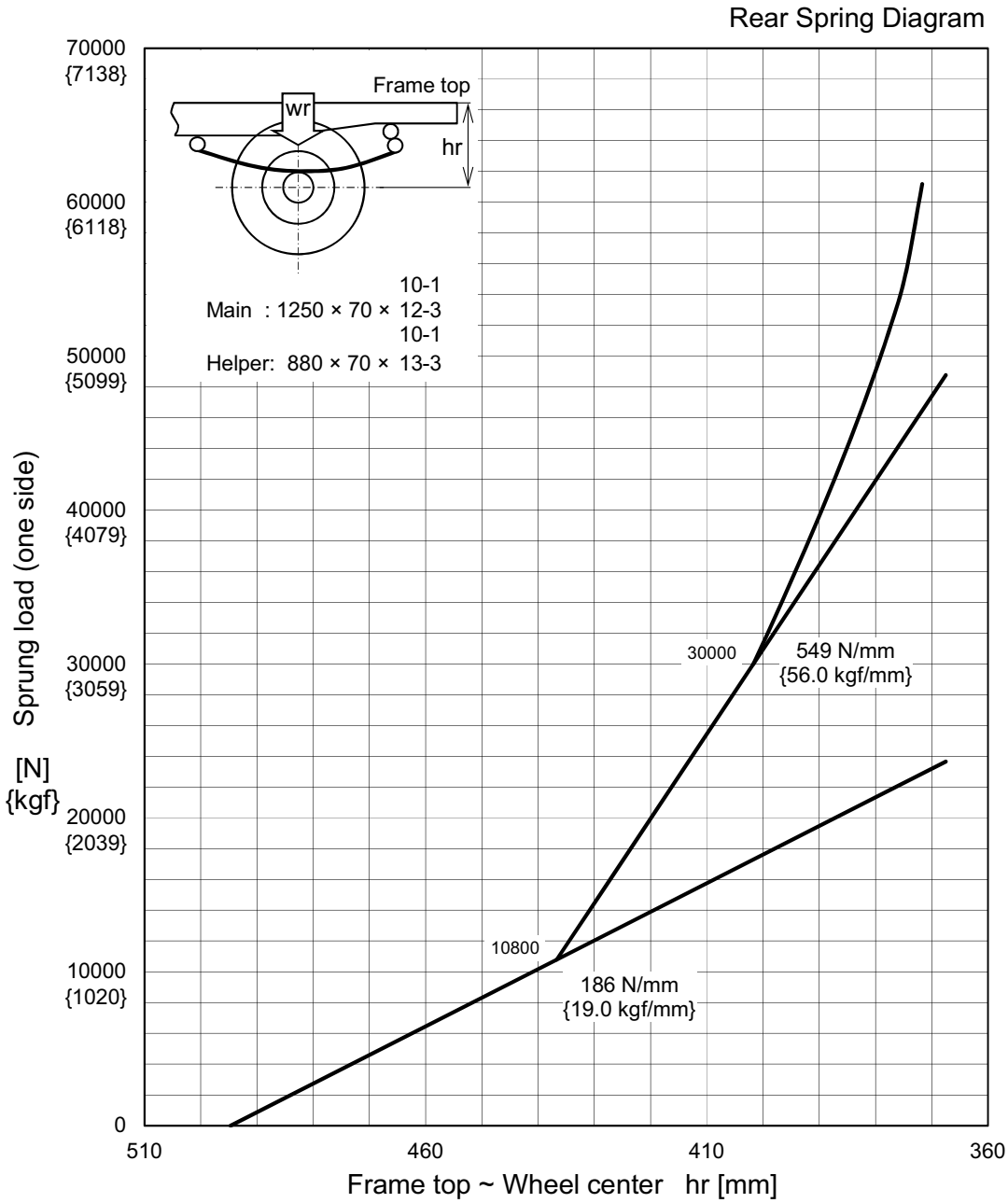
hr = 428 - 0.0054 • wr wr ≦ 10800
hr = 388 - 0.0018 • wr 10800 < wr ≦ 30000

MODEL: FEC9,FECX

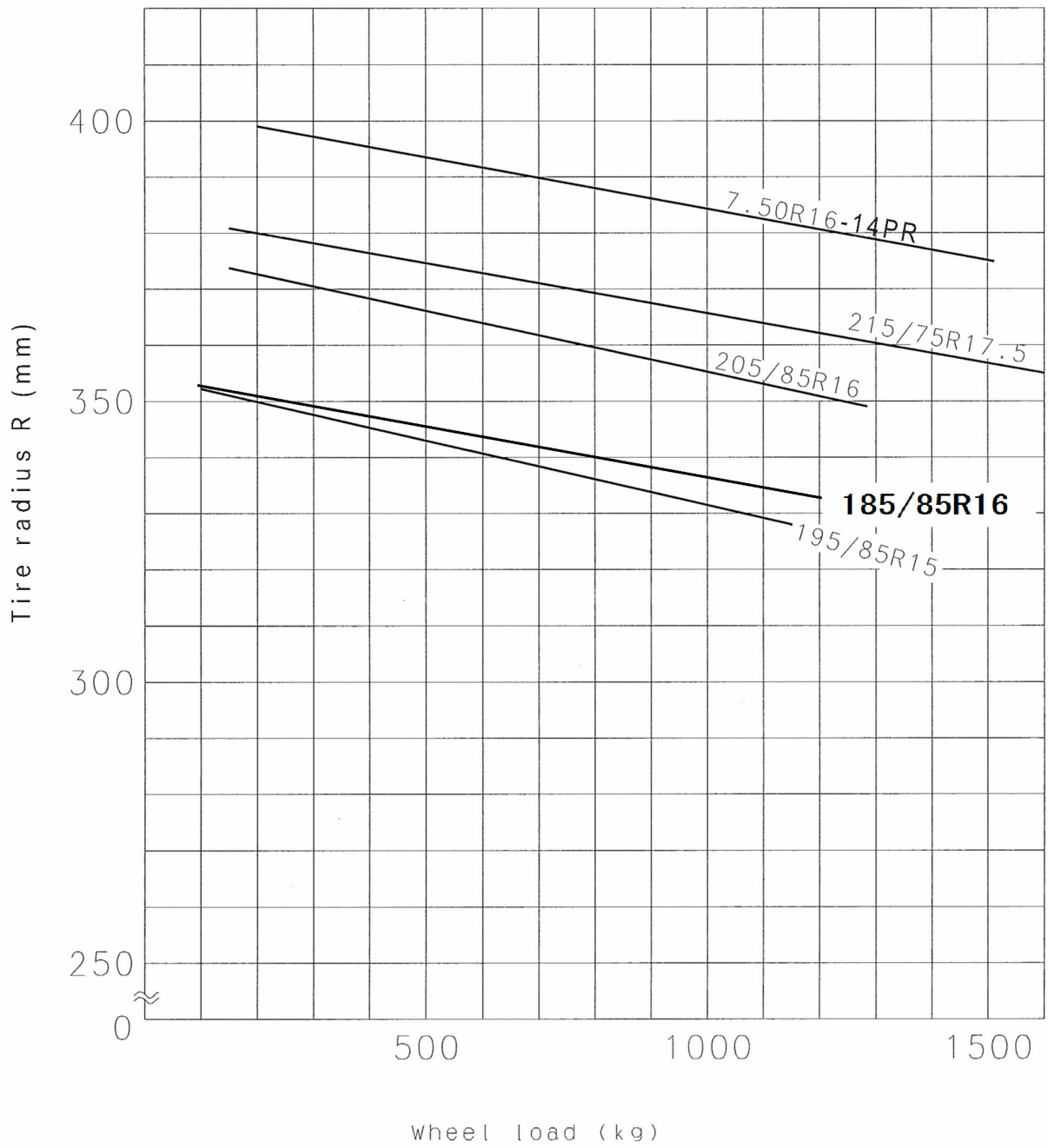


hr = 428 - 0.0054 • wr wr ≦ 10800
hr = 385 - 0.0015 • wr 10800 < wr ≦ 33500

MODEL: FGB7


Rear Spring Diagram
70000
{7138}
60000
{6118}
50000
{5099}
40000
{4079}
30000
{3059}
20000
{2039}
10000
{1020}
0
Sprung load (one side)
[N]
{kgf}
Frame top
wr
hr
10-1
Main : 1250 × 70 × 12-3
10-1
Helper: 880 × 70 × 13-3
30000
549 N/mm
{56.0 kgf/mm}
10800
186 N/mm
{19.0 kgf/mm}
510
460
410
360
Frame top ~ Wheel center hr [mm]

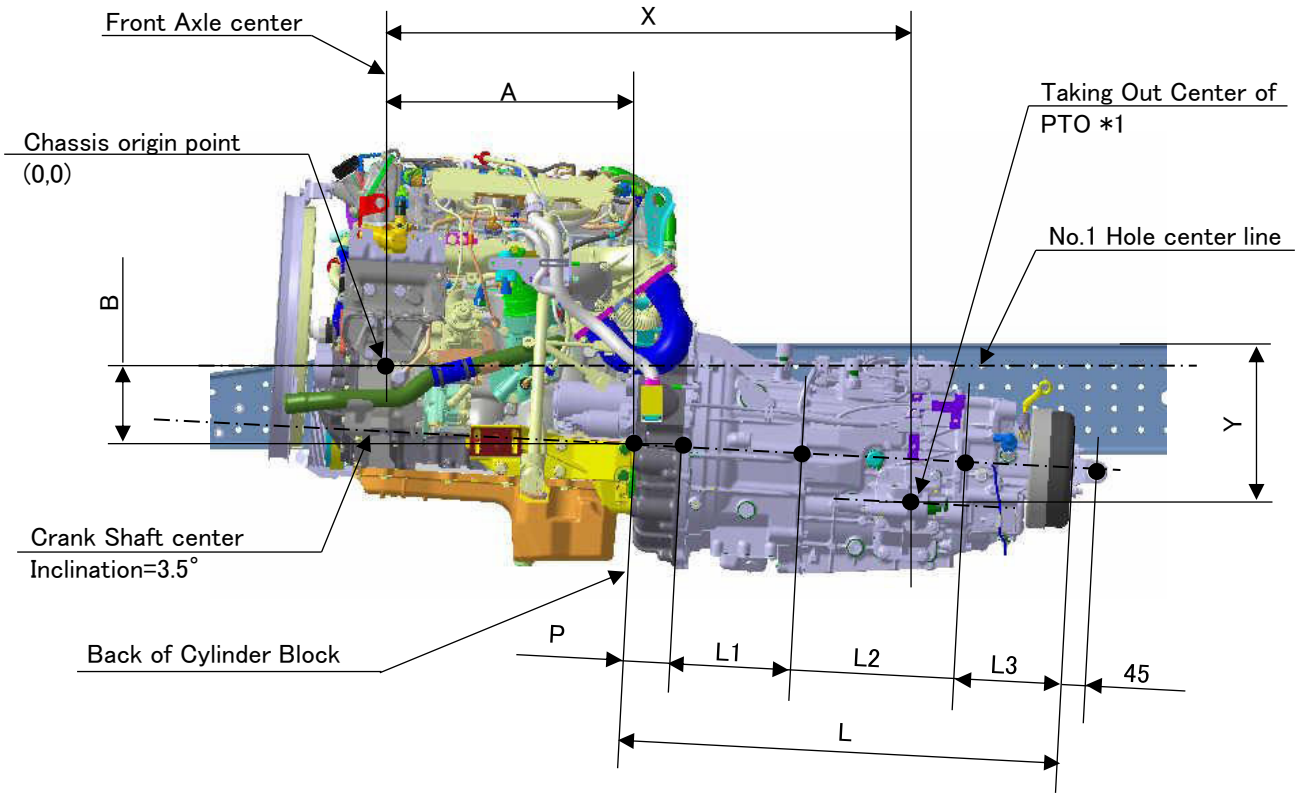
10.7.5 Tire radius calculating diagram



Single tire : Front-rear tire distributed load/2
Double tire : Rear-tire distributed load/4

10.8 Engine transmission assembly

<FEA21>
<FEB21, 51, 71, 91>
<FEC71, 91, X1>



- Back of Cylinder Block (Unit : mm)

Model	A	B	Offset of Engines center from Chassis center line
FEA	425	146	-5 (Left side)
FEB, FEC	470	146	-10 (Left side)

- Dimensions of Transmission (Unit : mm)

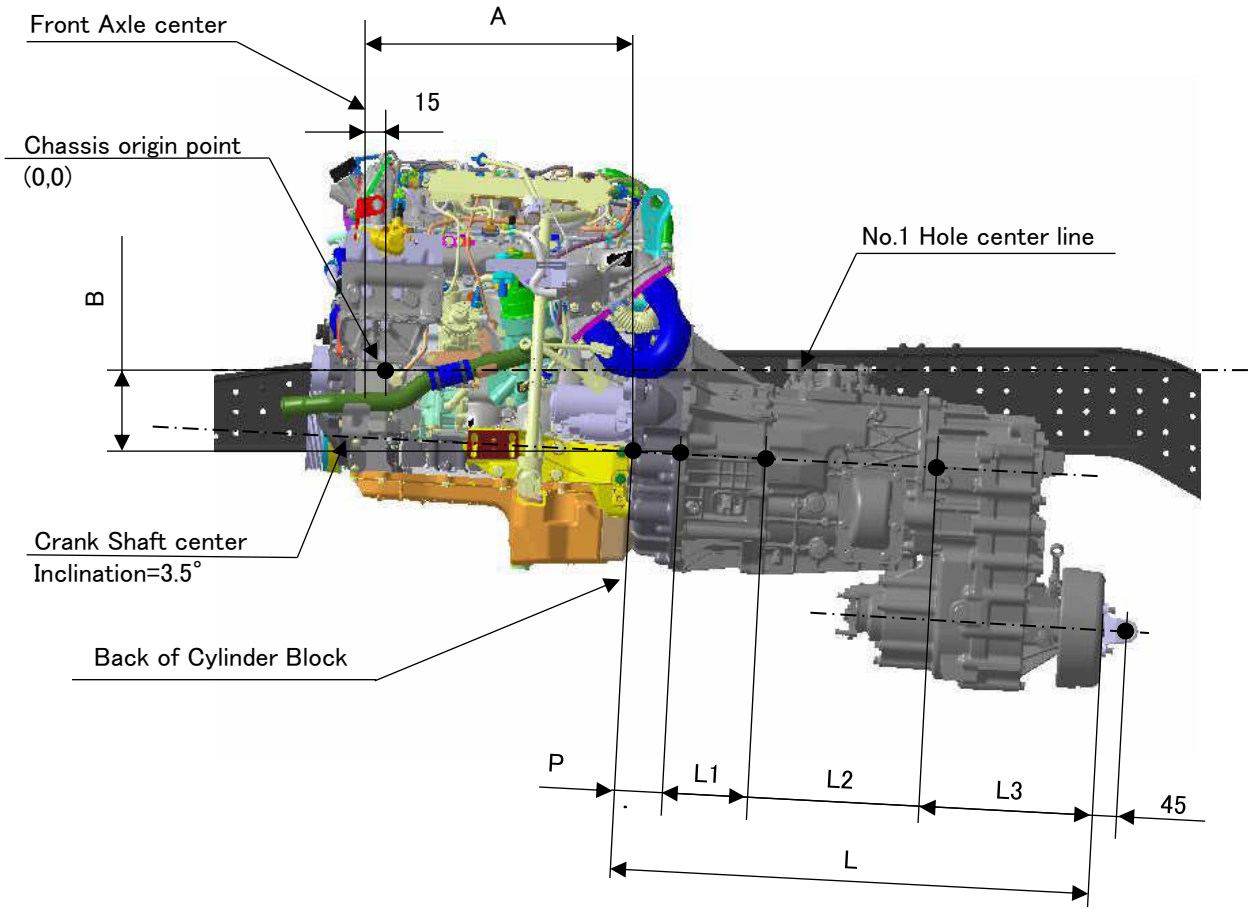
T/M	Clutch	P	L1	L2	L3	L
M038S6	-	90	215	317	204.5	826.5
M038S5	C3W28	1.5	236.5	317	146.5	701.5
M038S5	C4W30	90	148	317	146.5	701.5

- Taking out center of PTO *1 (Unit : mm)

Model	T/M	Frame thickness	147N·m [15kgf·m]	
			X	Y
FEA	M038S6	(5t)	940.6	292.5
	M038S5	(5t)	873.7	288.4
FEC	M038S6	(6t)	985.6	302.5
	M038S5	(6t)	918.7	298.4

10.8 Engine transmission assembly

<FGB71>



- Back of Cylinder Block

Unit : mm

Model	A	B	Offset of Engines center from Chassis center line
FGB	485	146	-10 (Left side)

- Dimensions of Transmission

(Unit : mm)

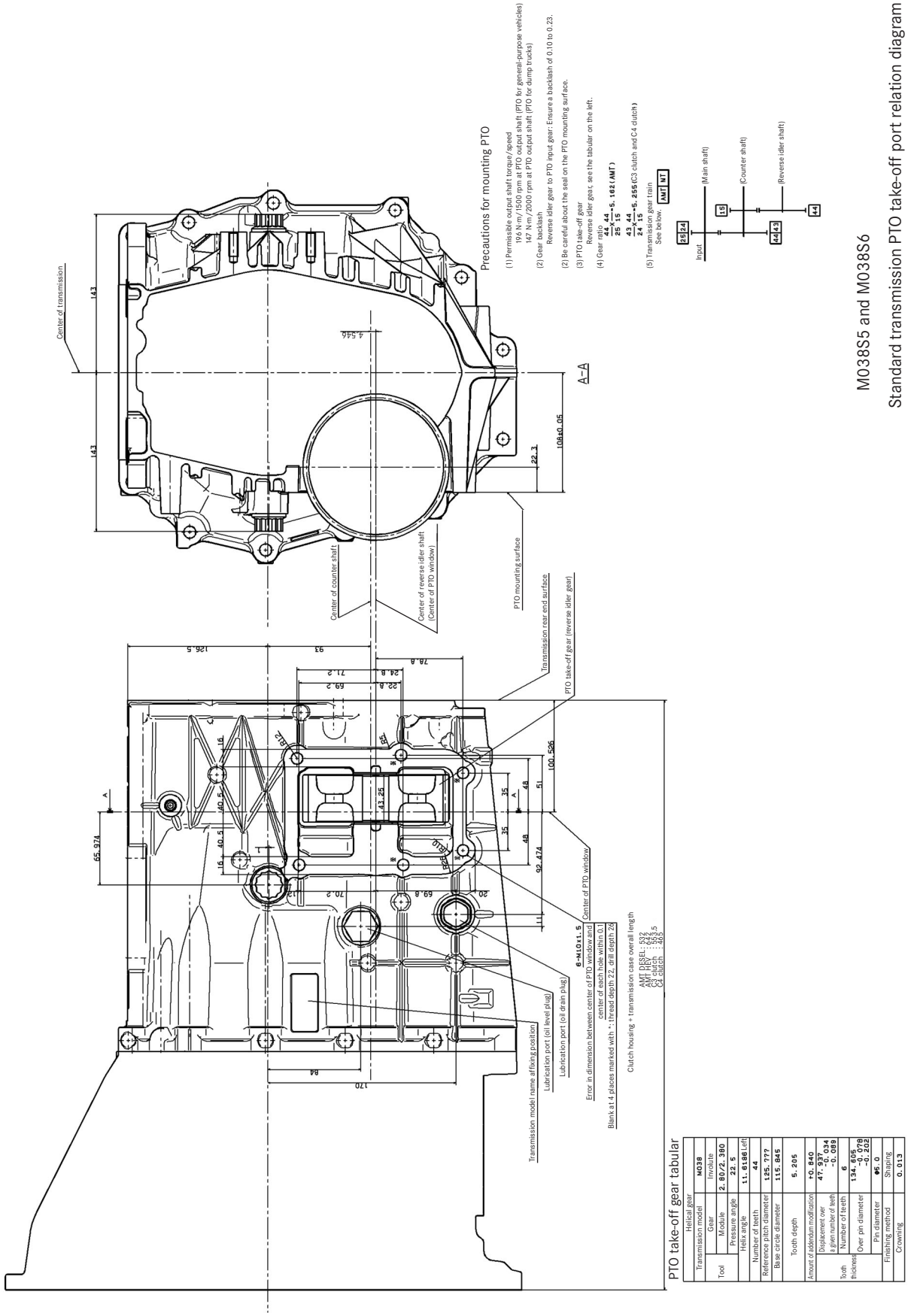
T/M	Clutch	P	L1	L2	L3	L
M038S5	C4W30	90	148	317	349.5	904.5

10.9 Power take-offs

10.9.1 Transmission power take-off layout

M038S5 and M038S6

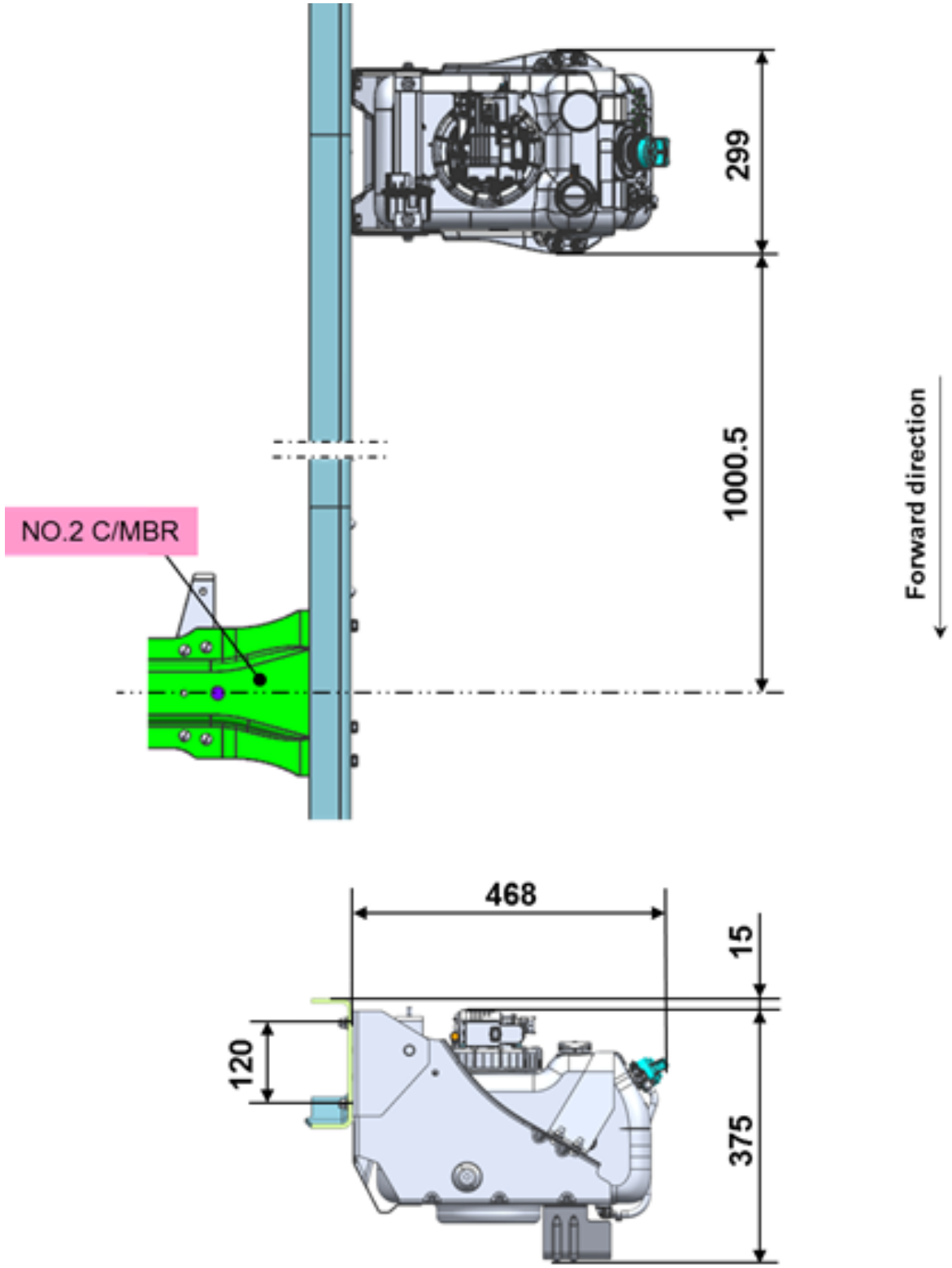
Standard transmission PTO take-off port relation diagram



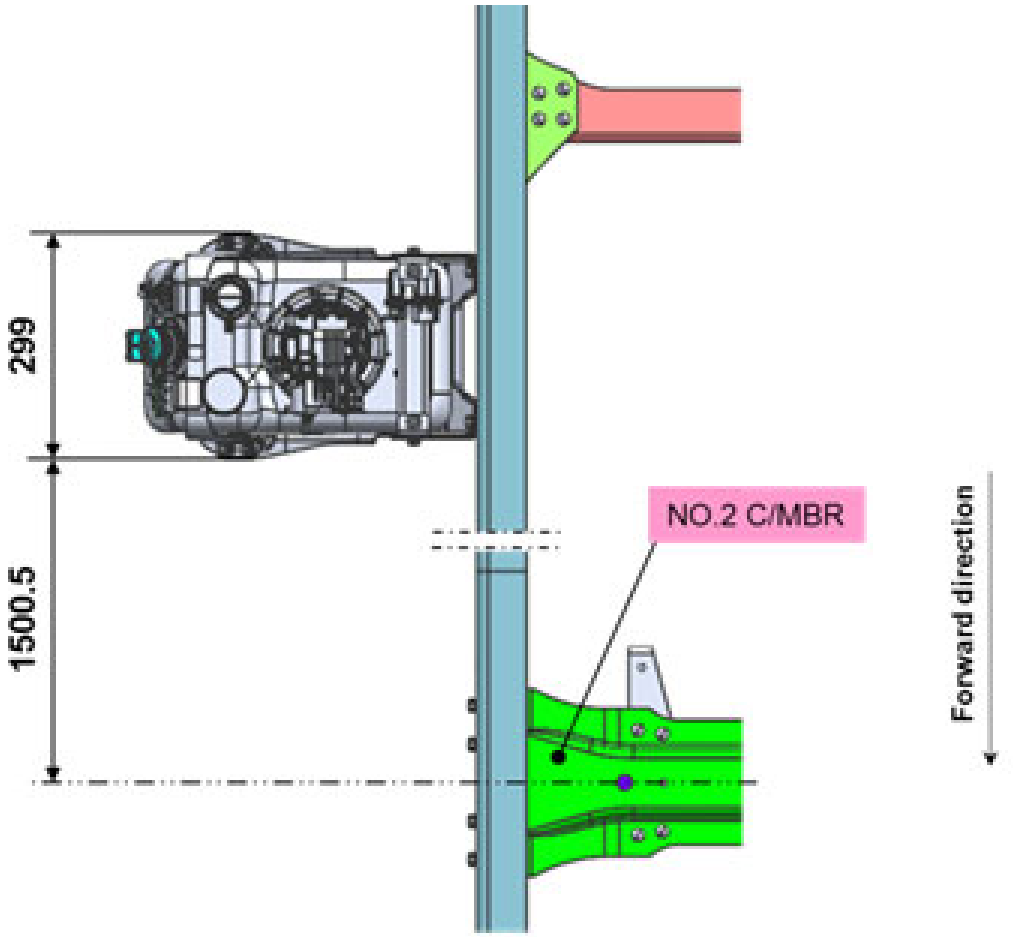
Helical gear		
Transmission model		M038
Tool	Gear	Involute
	Module	2.80/2.380
	Pressure angle	22.5
	Helix angle	11.6186 Left
Number of teeth		44
Reference pitch diameter		125.177
Base circle diameter		115.645
Tooth depth		5.205
Amount of addendum modification		+0.840
Tooth thickness	Displacement over a given number of teeth	47.52 -0.034 -0.089
	Number of teeth	6
	Over pin diameter	134.605 -0.078 -0.202
	Pin diameter	φ6.0
Finishing method		Shaping
Crowning		0.013

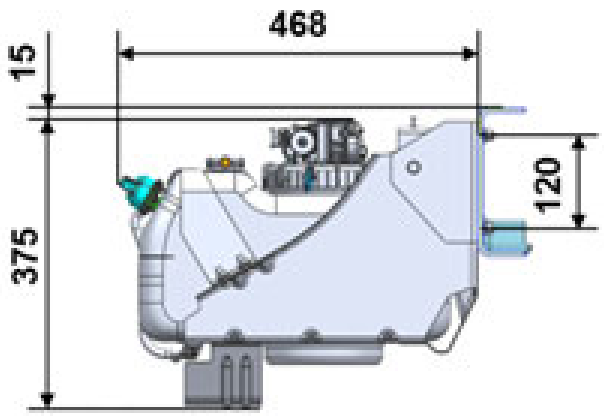
10.10 Exhaust system layout

FEB91E

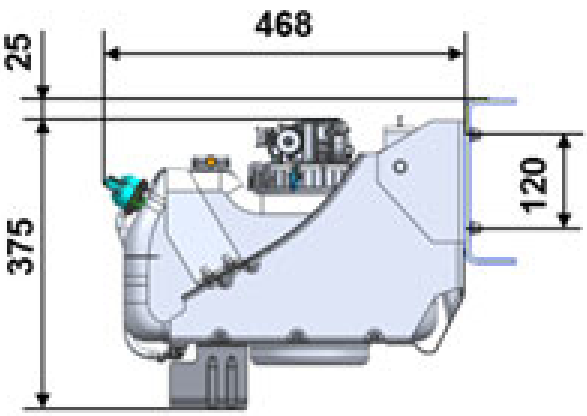


FEC91G SINGLE CAB
FEB91G CREW CAB
FECX1G



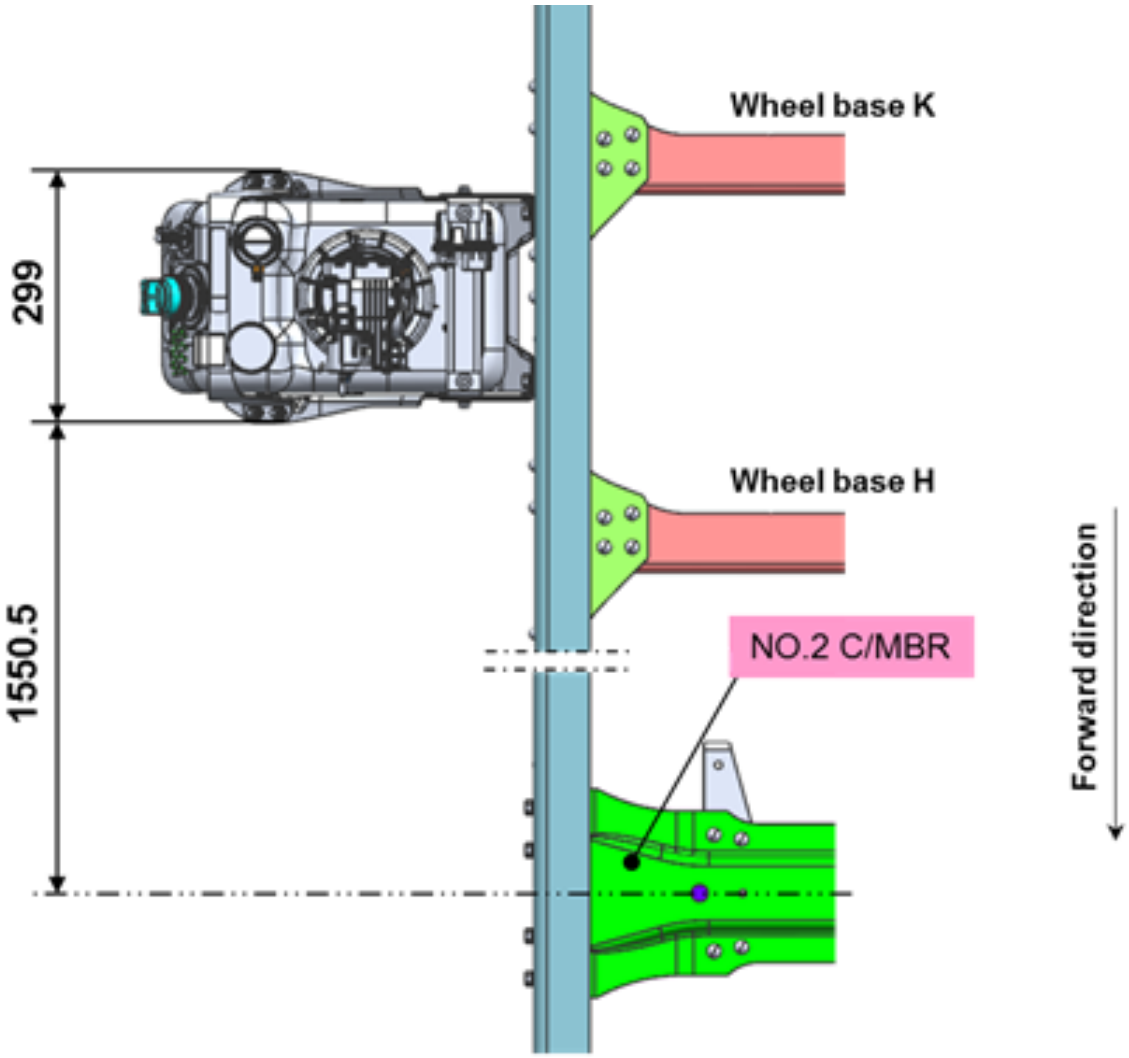


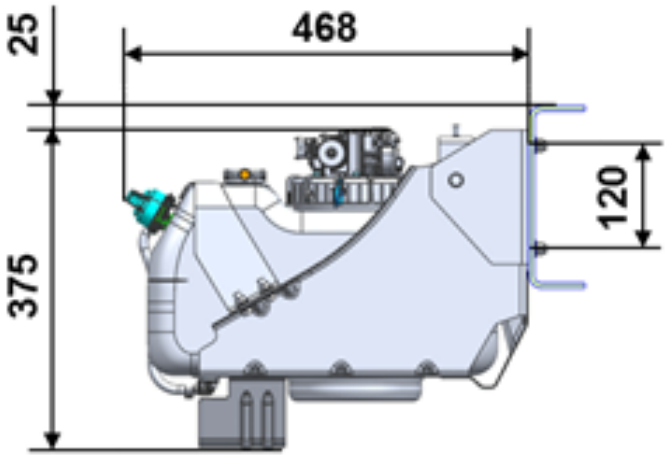
750 Frame Wheel base G Crew cab



850 Frame Wheel base G Single cab
Crew cab

FEC91K, H
FECX1K, H

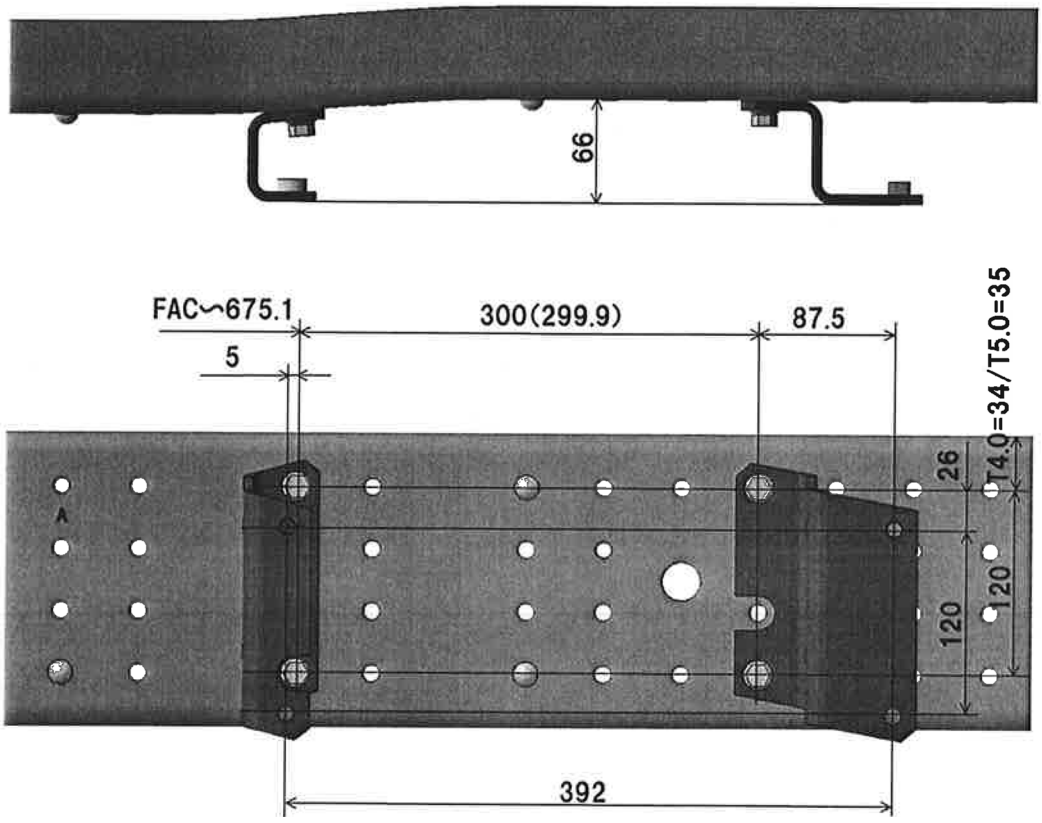




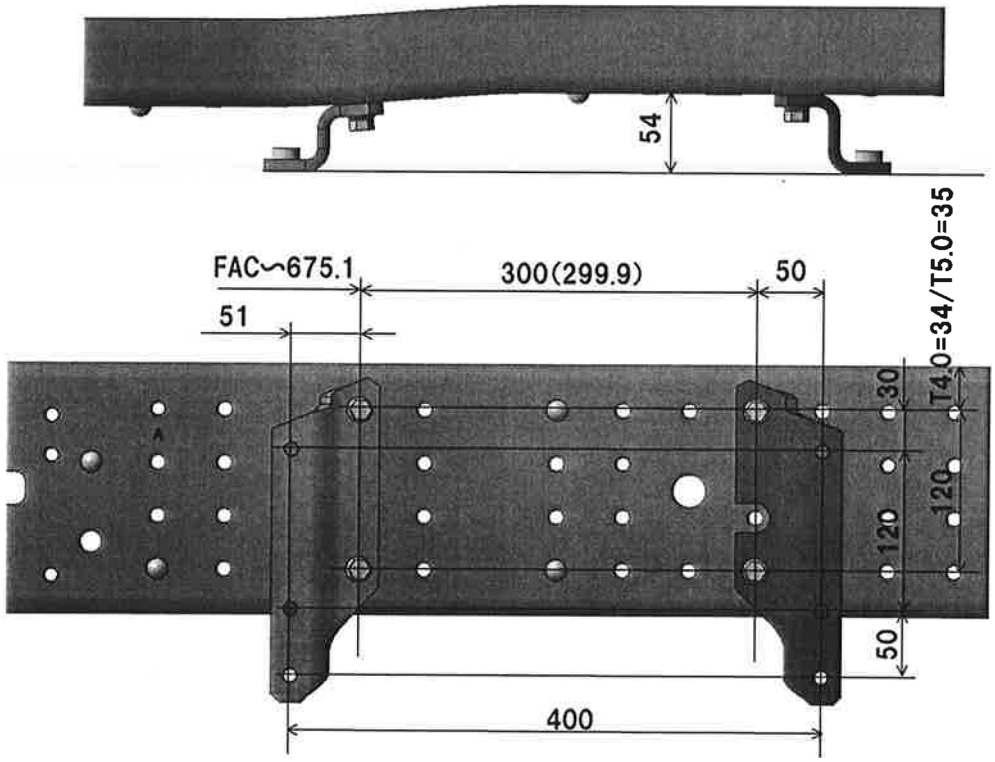
10.11 Battery mounting layout

10.11.1 Battery mounting layout

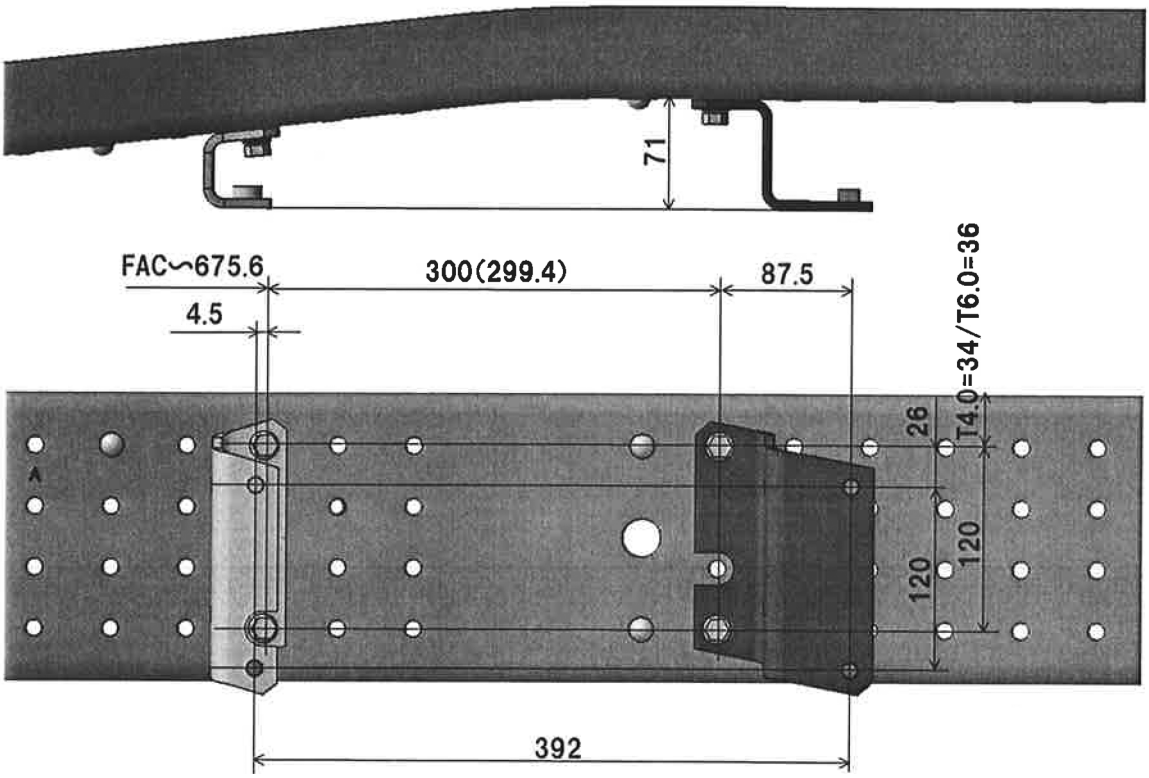
FEA



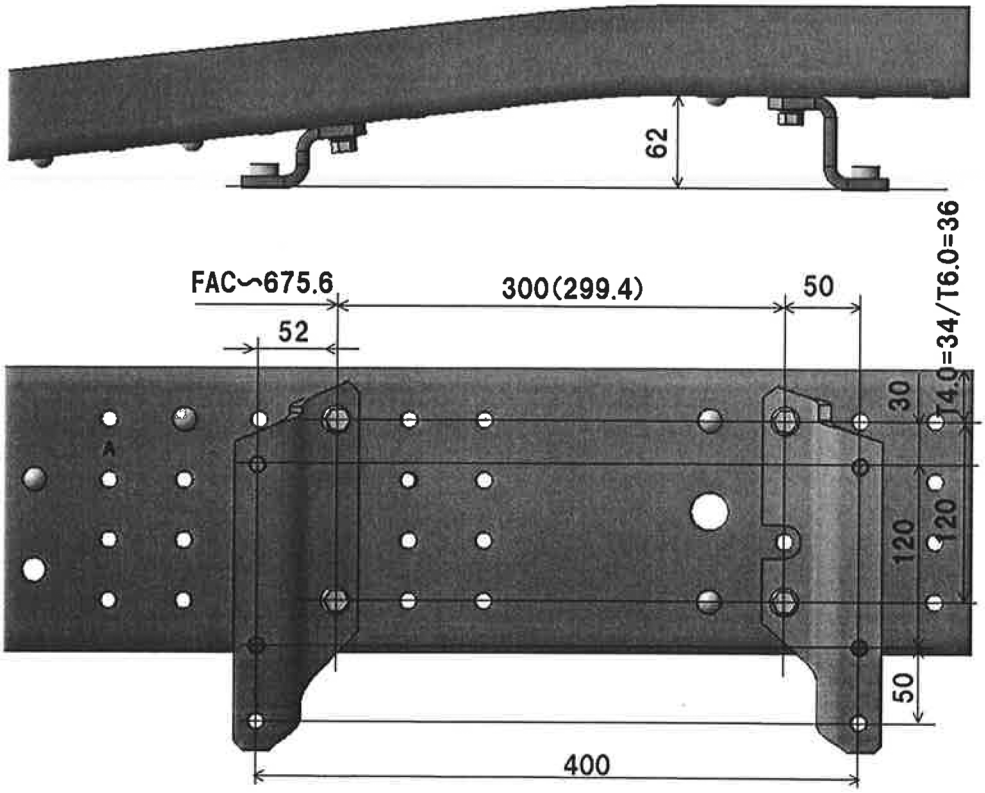
FEA(Alarge Capacity type)



FEB

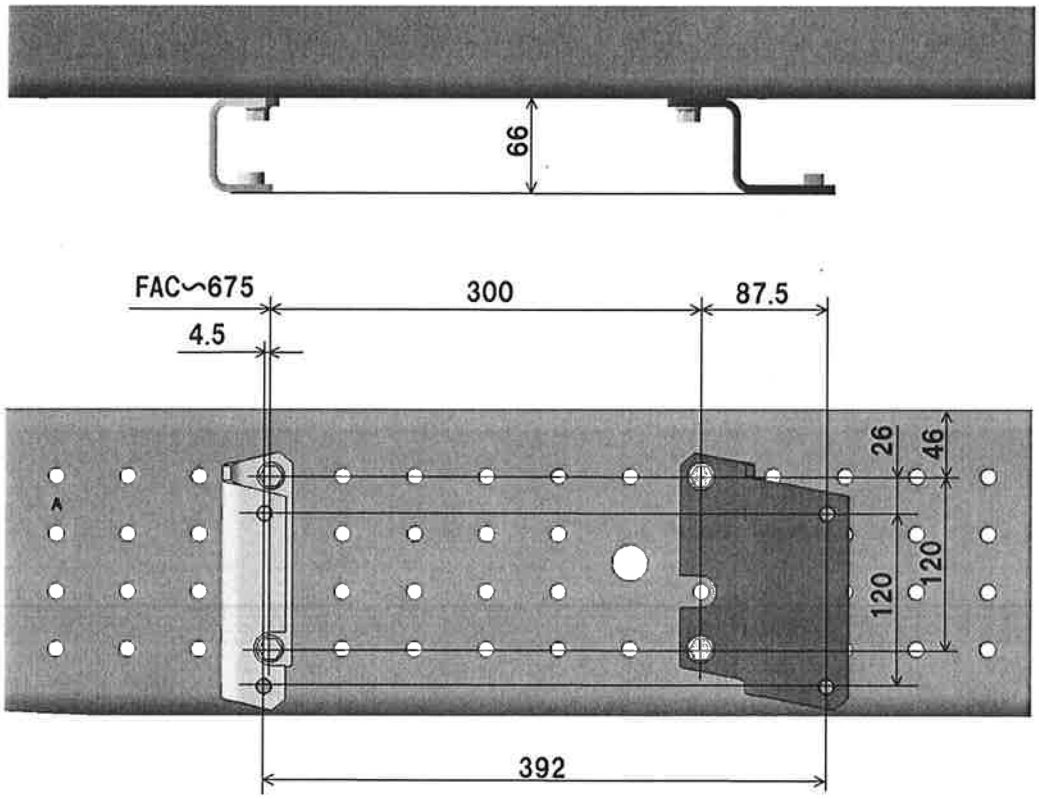


FEB (Alarge capacity type)

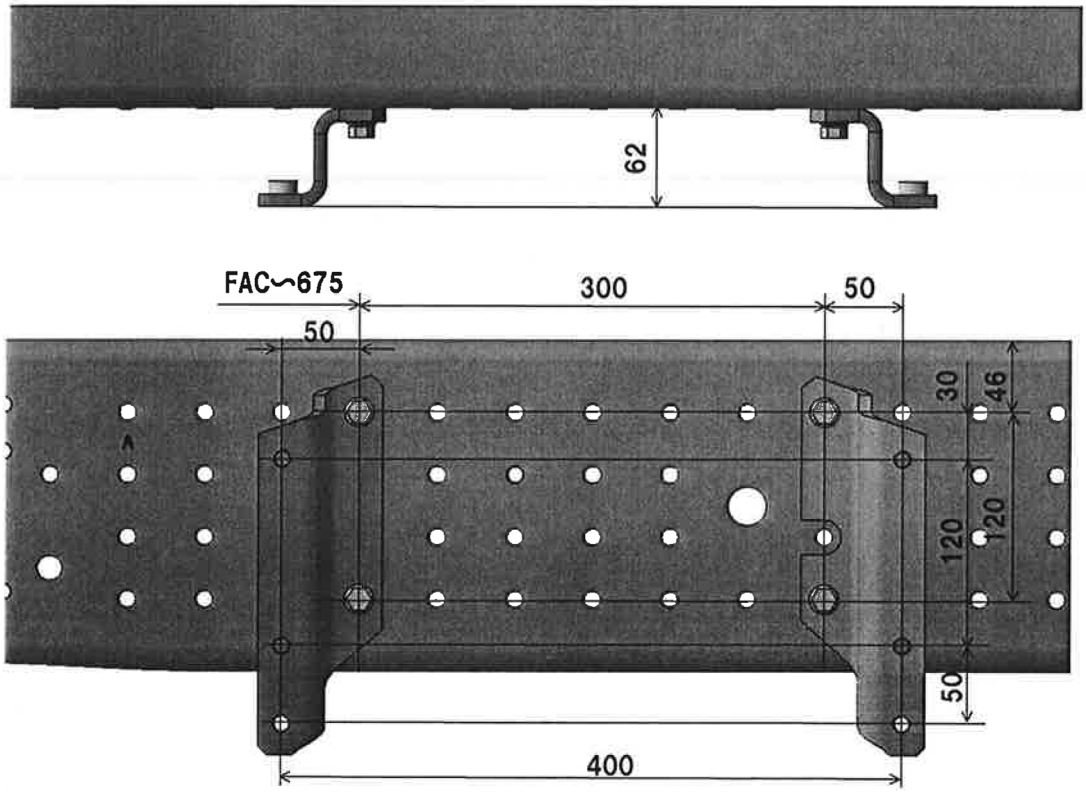


10.11 Battery mounting layout

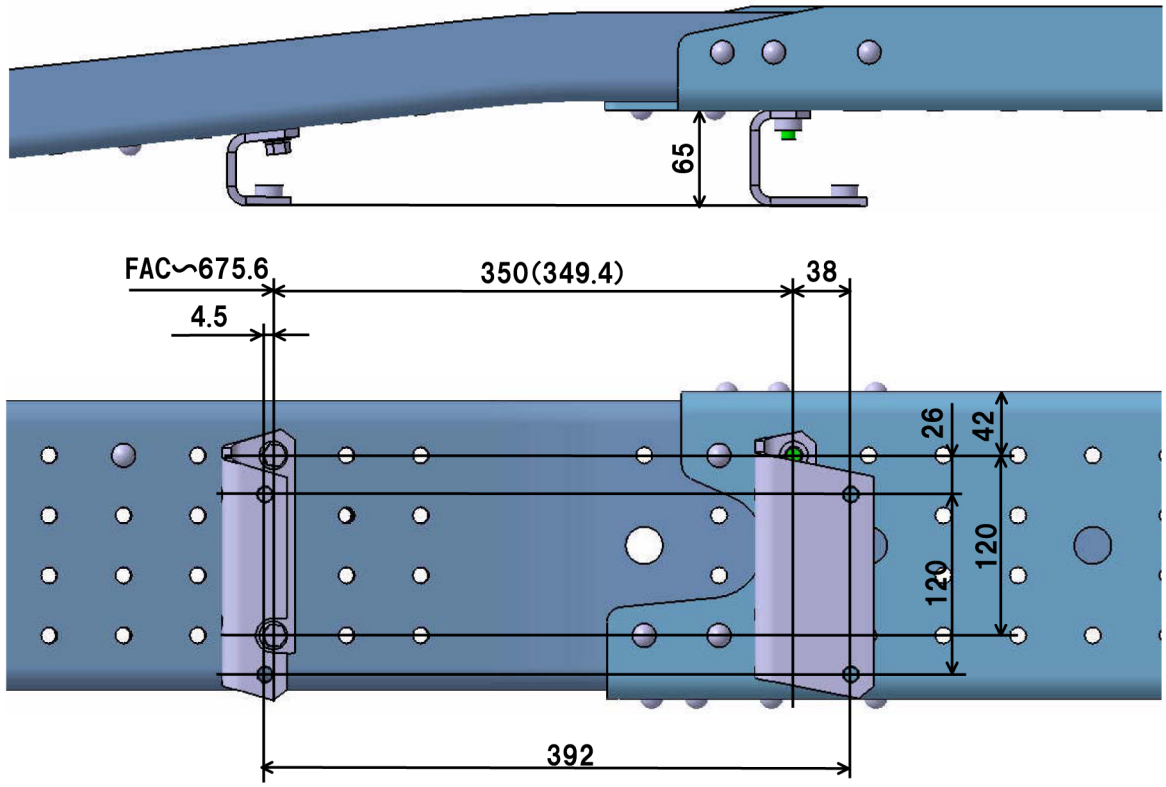
FEC



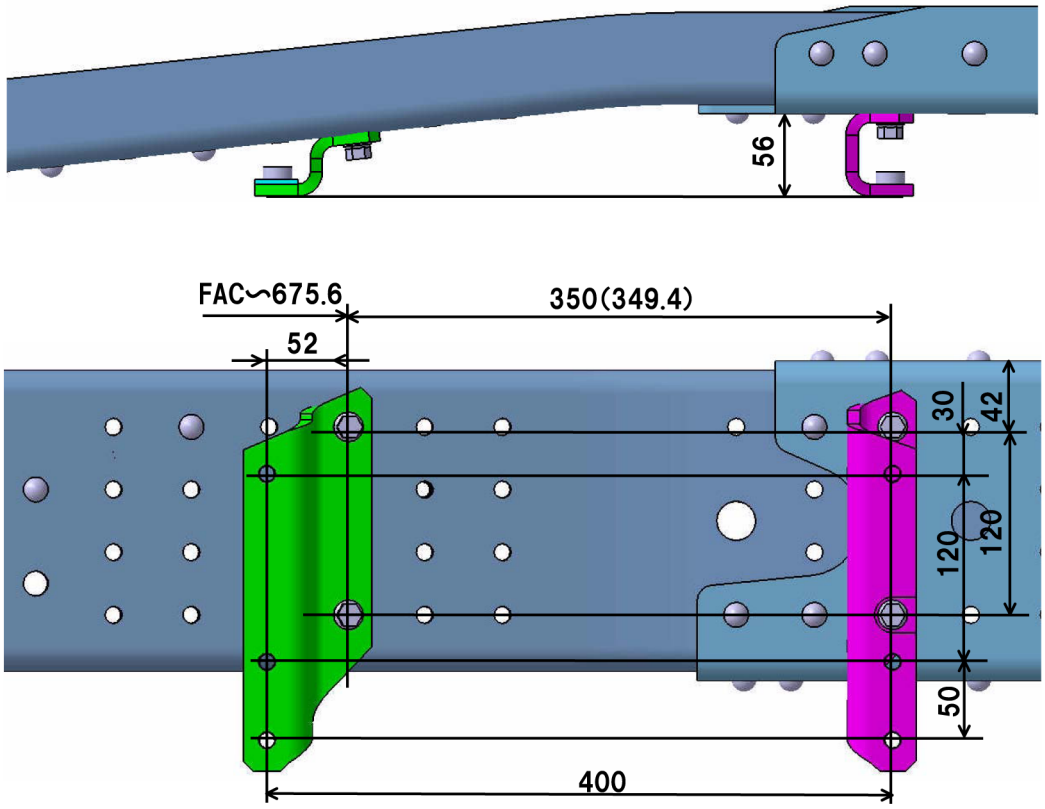
FEC (A Large Capacity type)



FGB



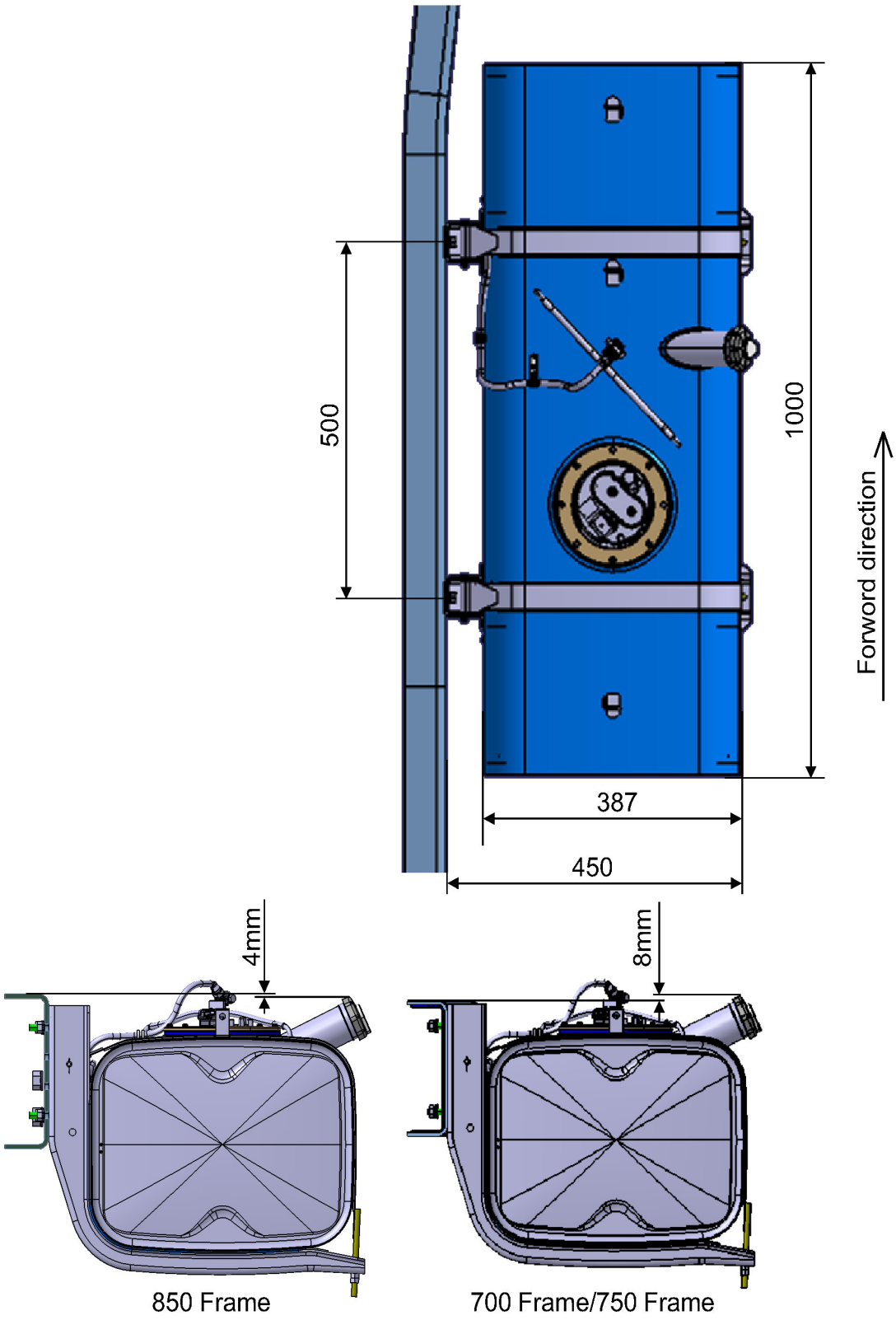
FGB (A Large Capacity type)



10.12 Fuel tank mounting layout

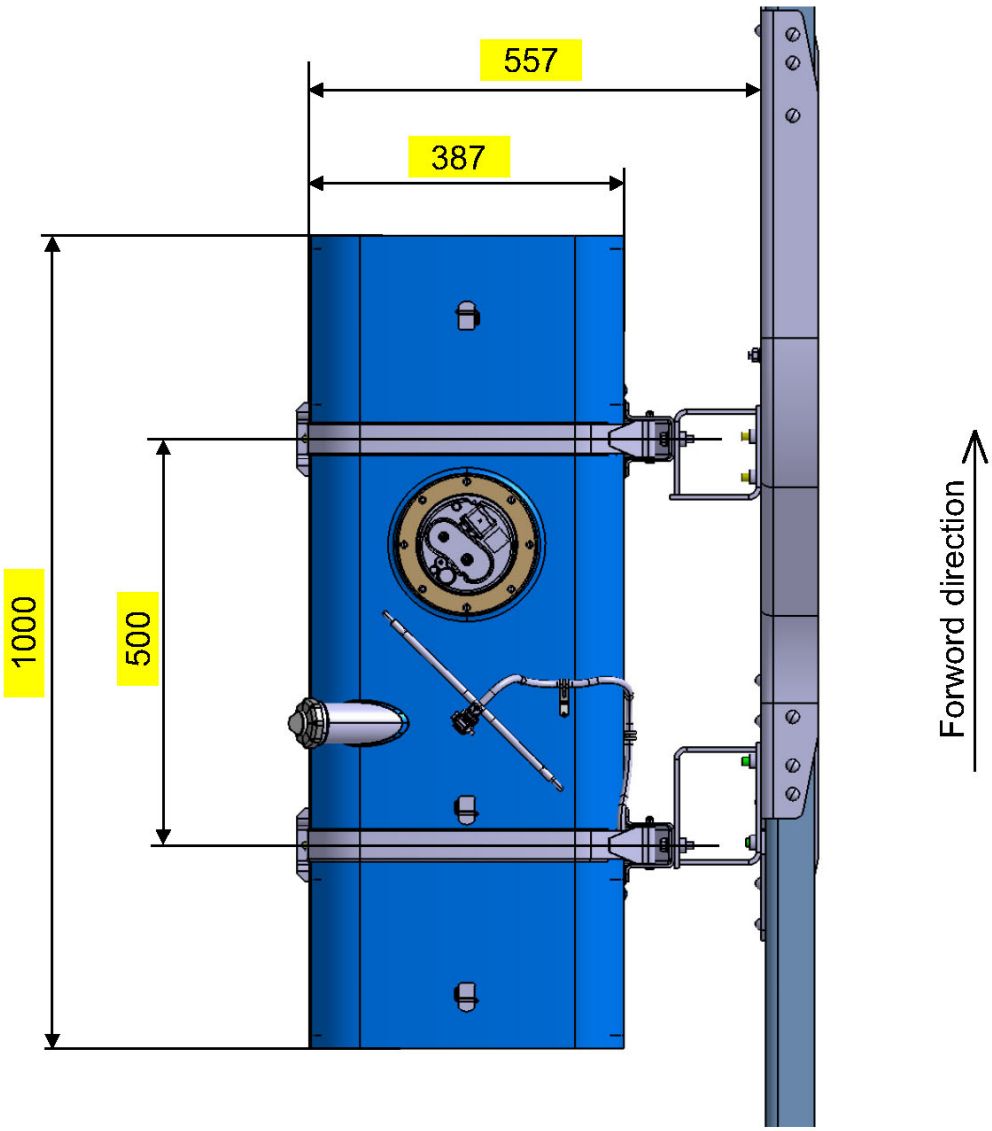
10.12.1 Fuel tank

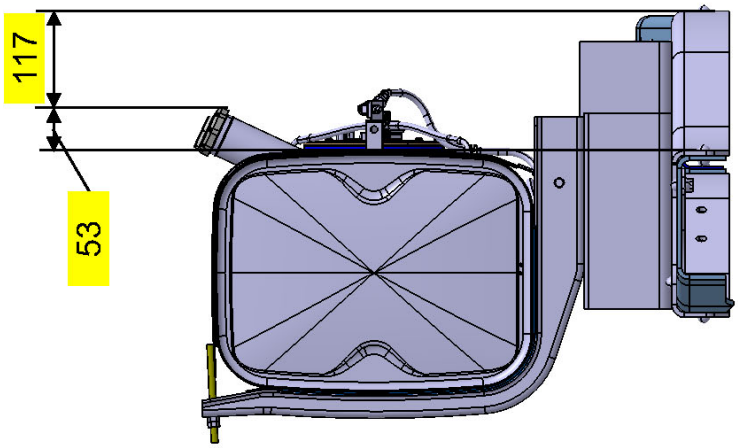
100-liter tank <FE>



10.12 Fuel tank mounting layout

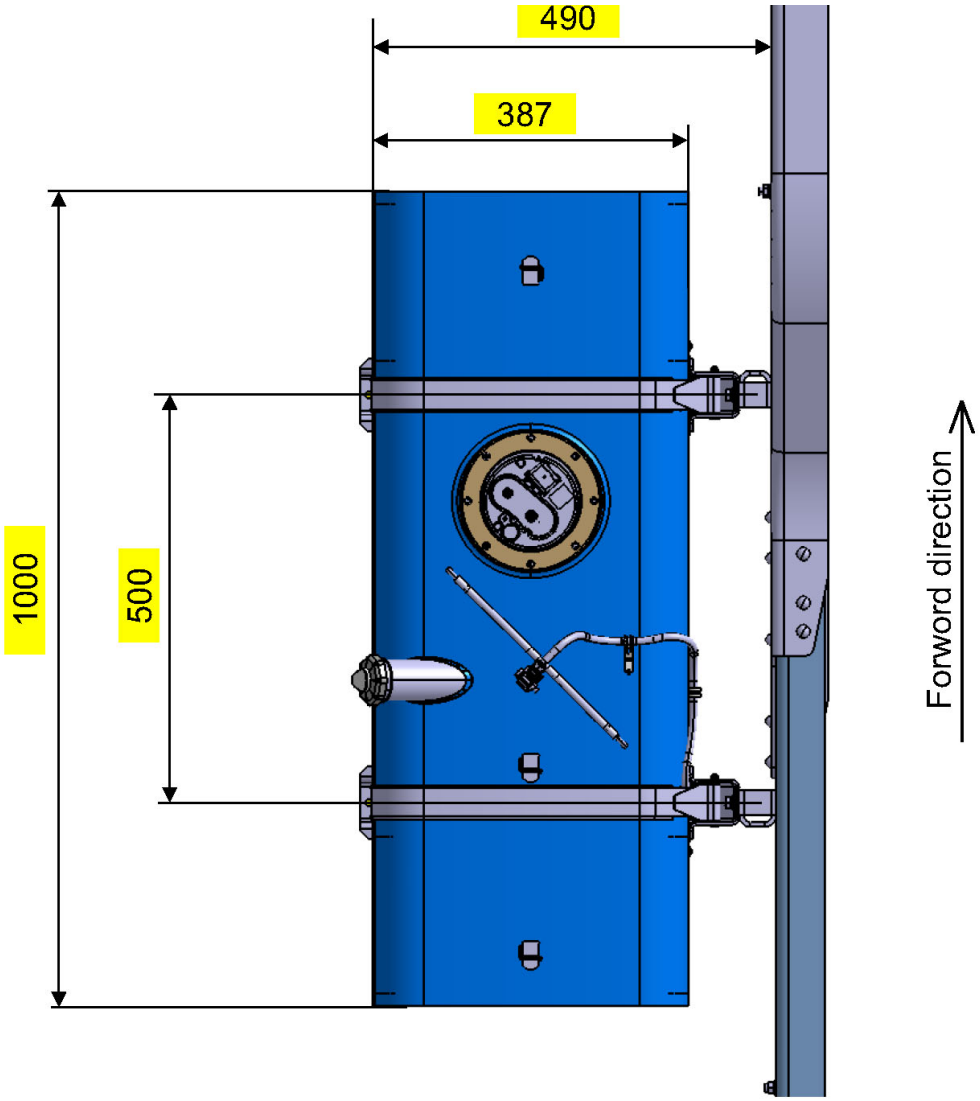
100-liter tank <FGB71C>

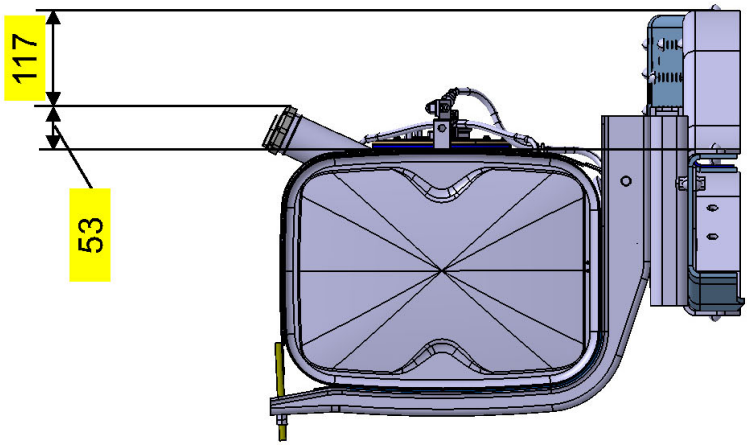




10.12 Fuel tank mounting layout

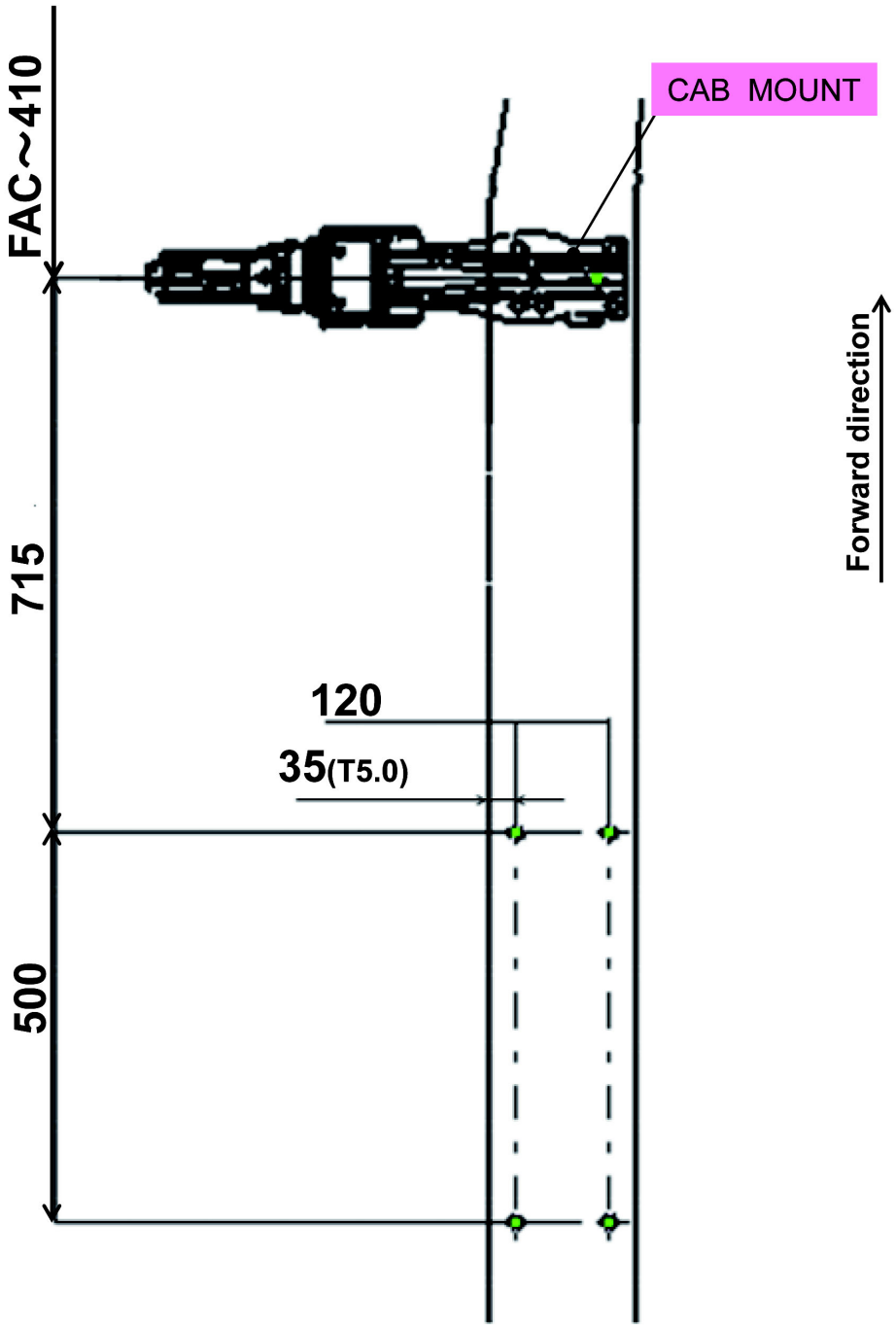
100-liter tank <FGB71E>





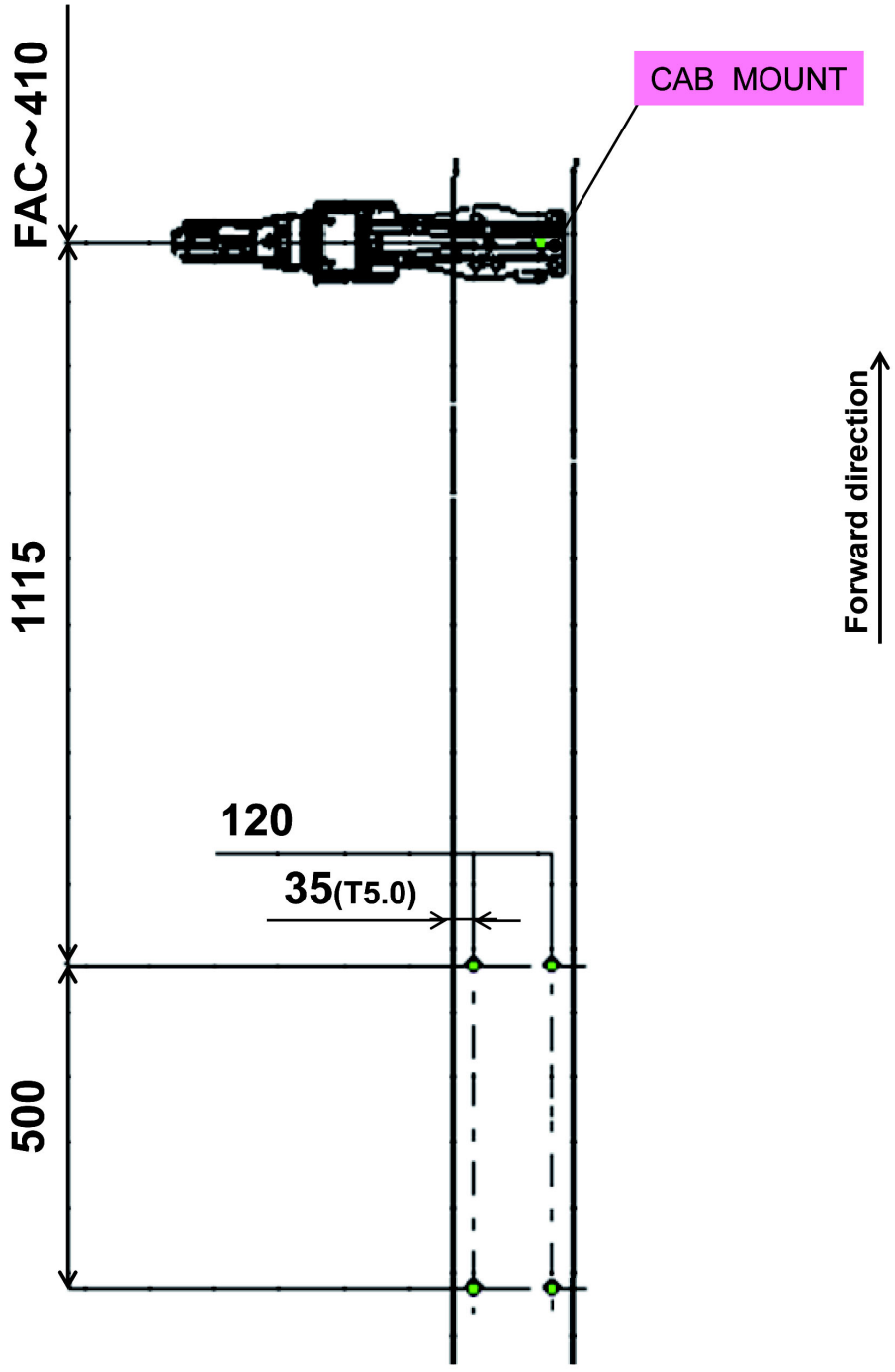
10.12.2 Fuel tank bracket

FEA21

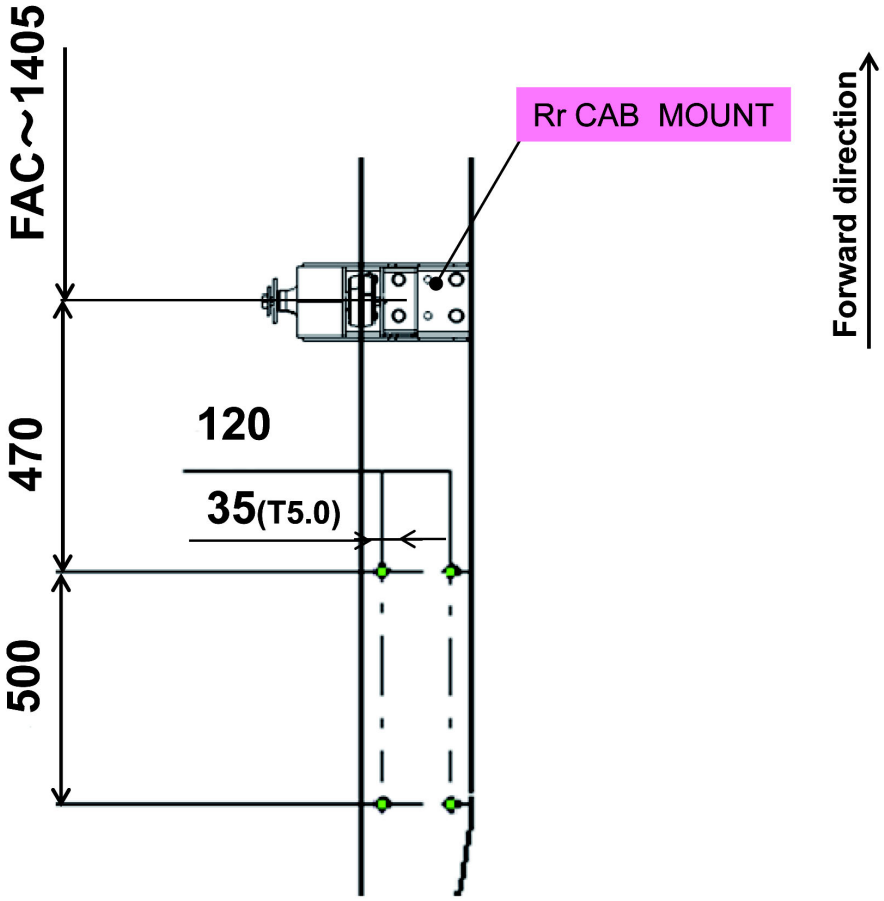


10.12 Fuel tank mounting layout

FEA21E SINGLE CAB

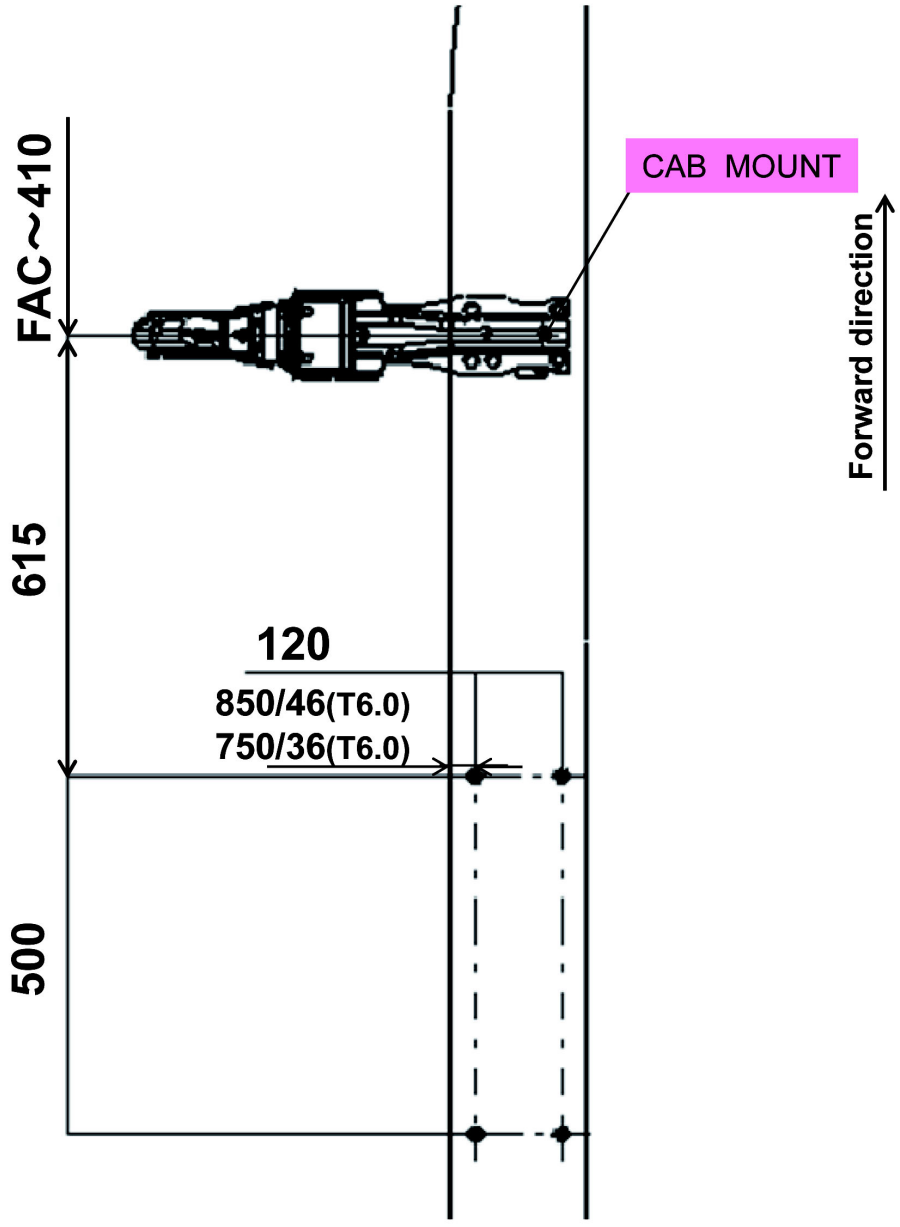


FEA21E CREW CAB



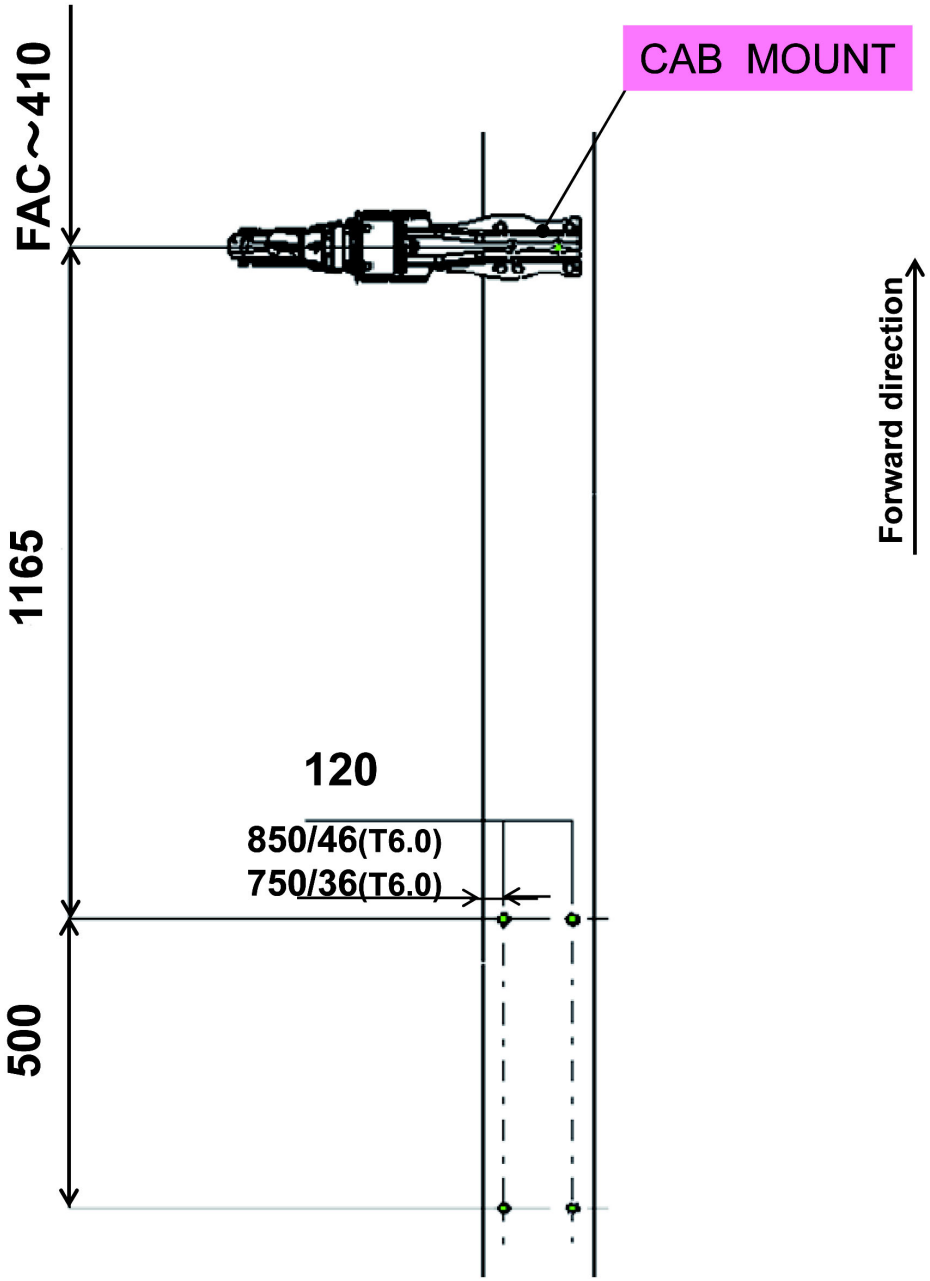
10.12 Fuel tank mounting layout

FEB21C, FEC71

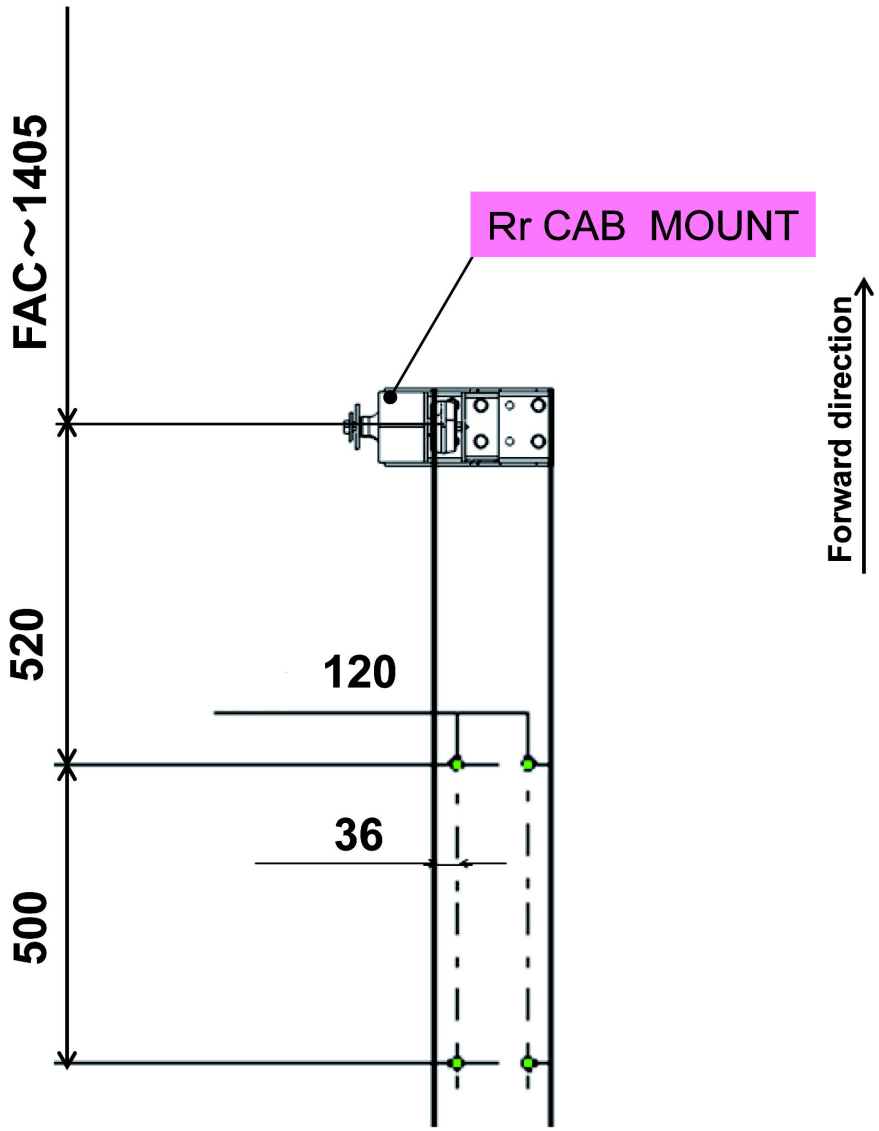


10.12 Fuel tank mounting layout

FEB21, 51E
FEC71

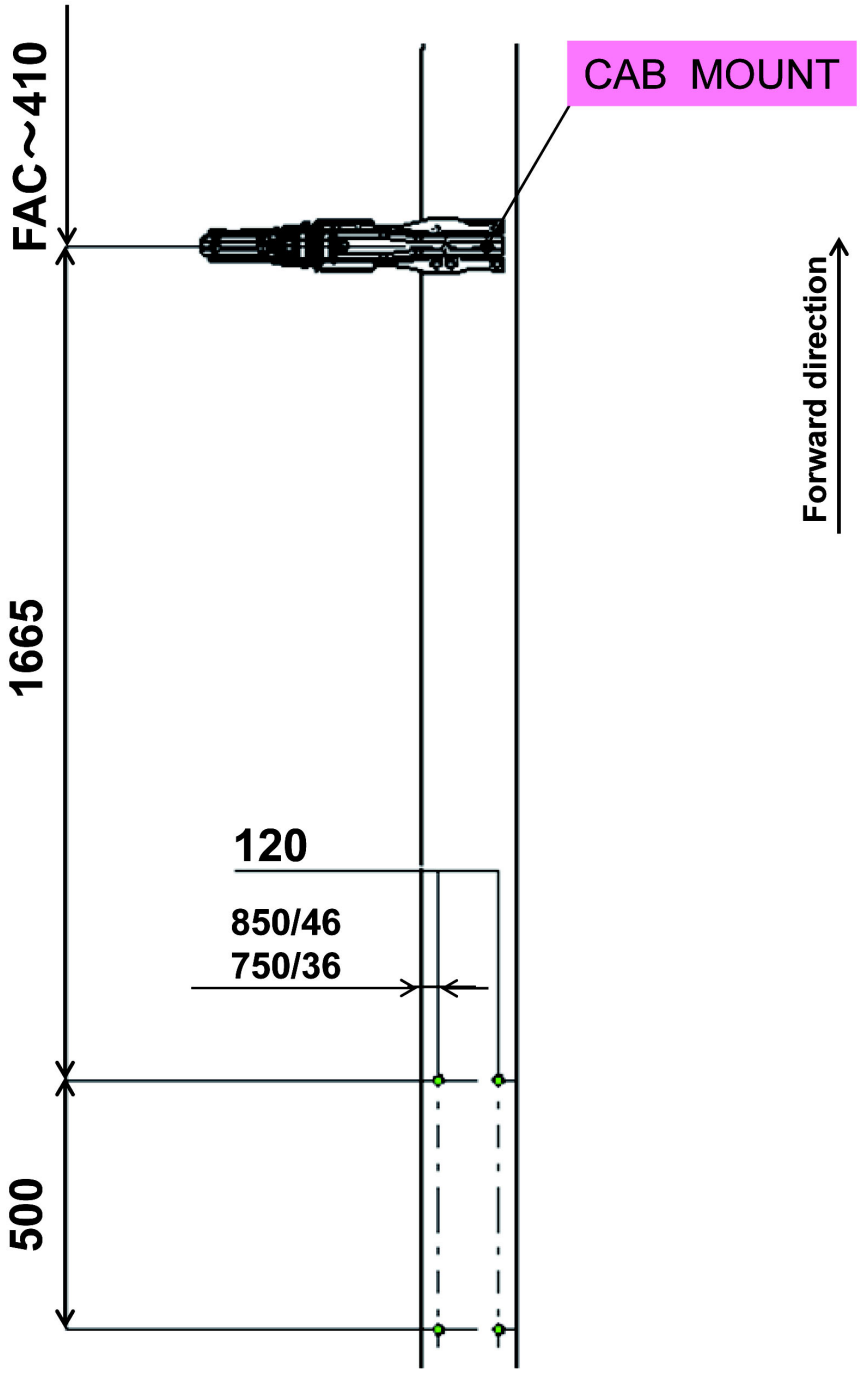


FEB71, 91E



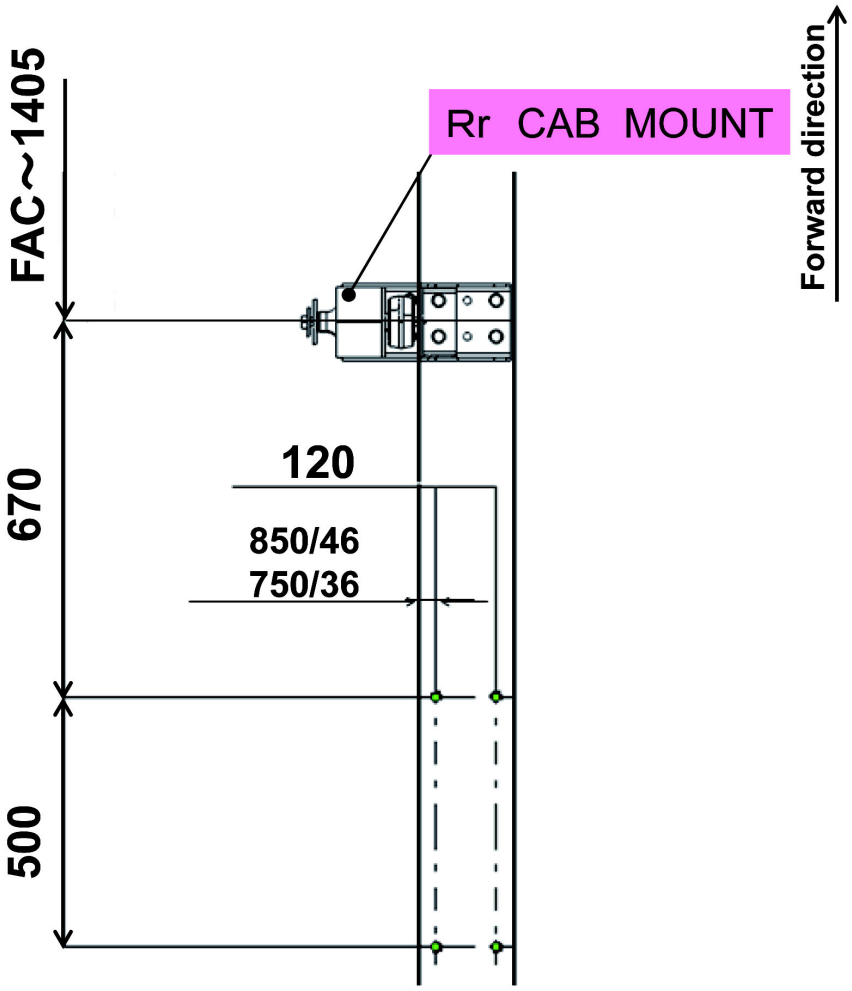
10.12 Fuel tank mounting layout

FEB51, 71G
FEC91G, K, H
FECX1G, K, H



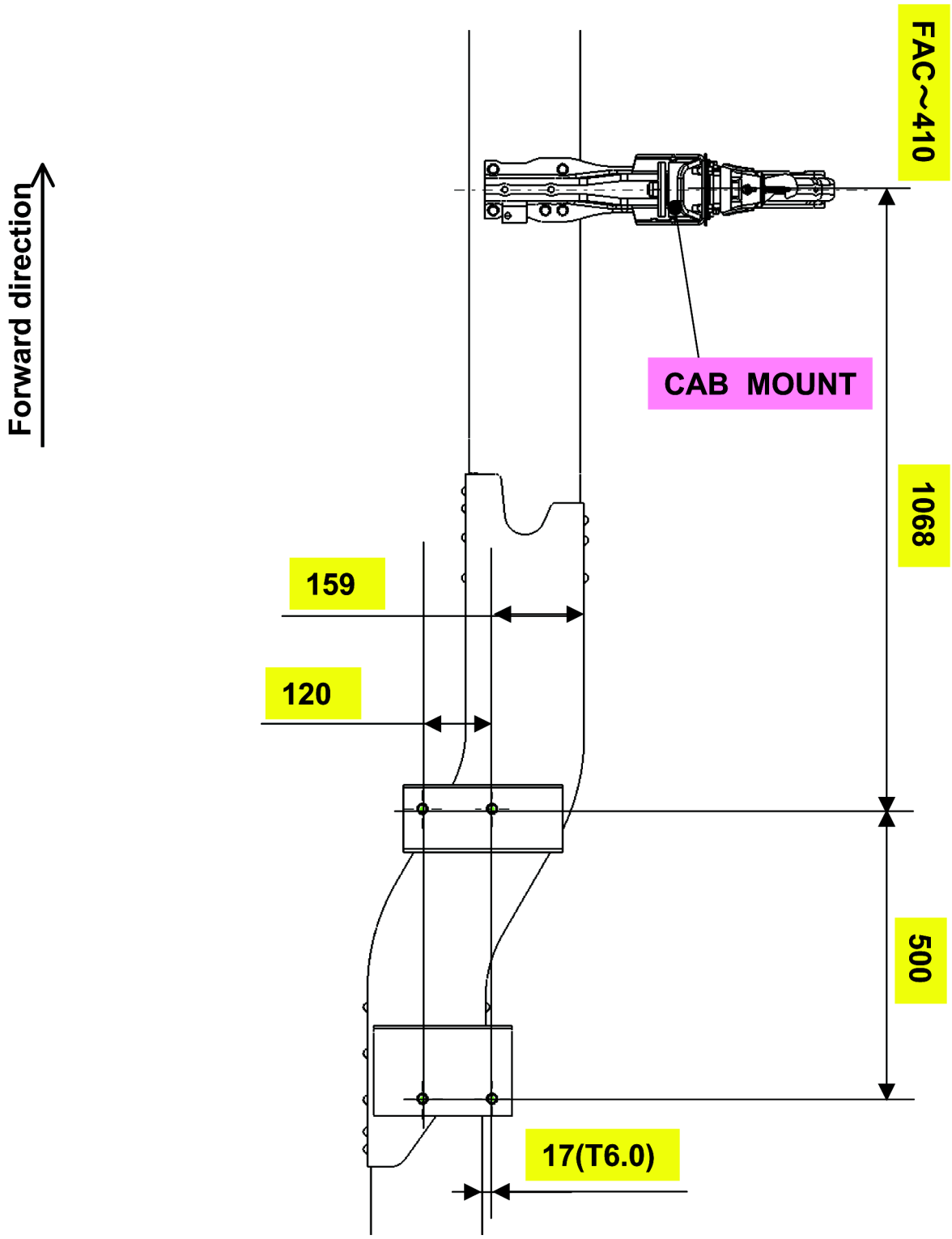
10.12 Fuel tank mounting layout

FEB91G



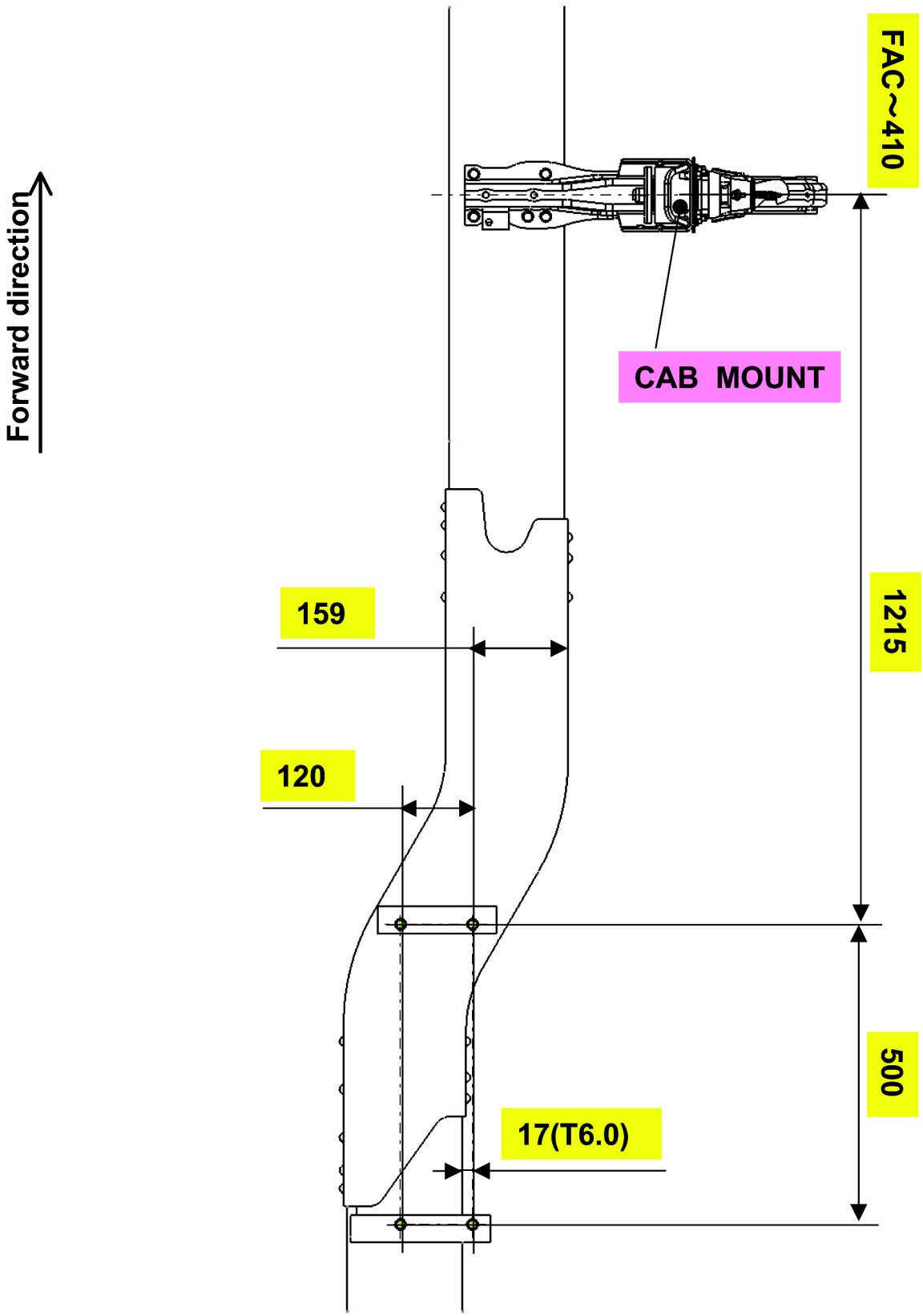
10.12 Fuel tank mounting layout

FGB71C



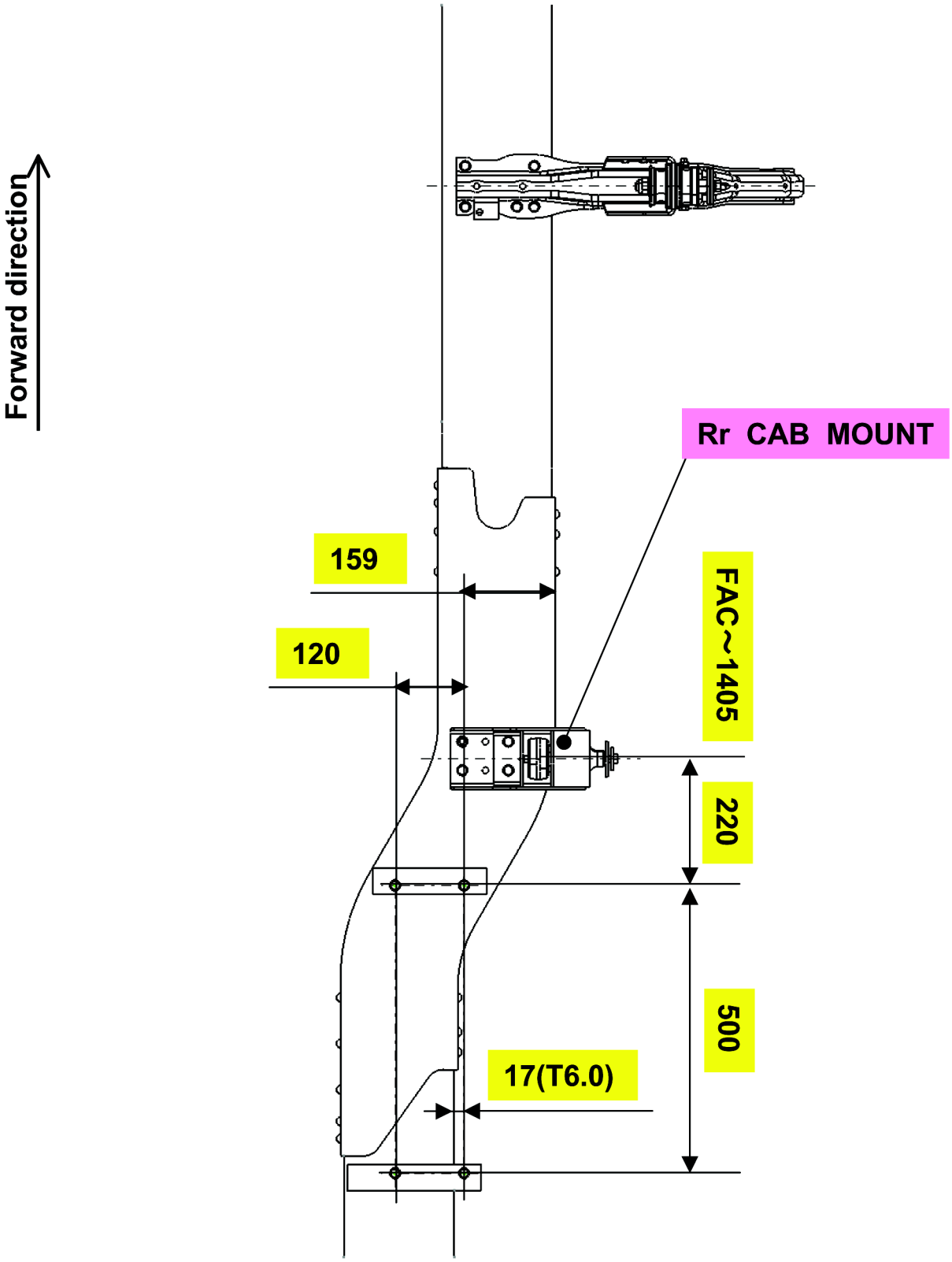
10.12 Fuel tank mounting layout

FGB71E SINGLE CAB



10.12 Fuel tank mounting layout

FGB71E CREW CAB



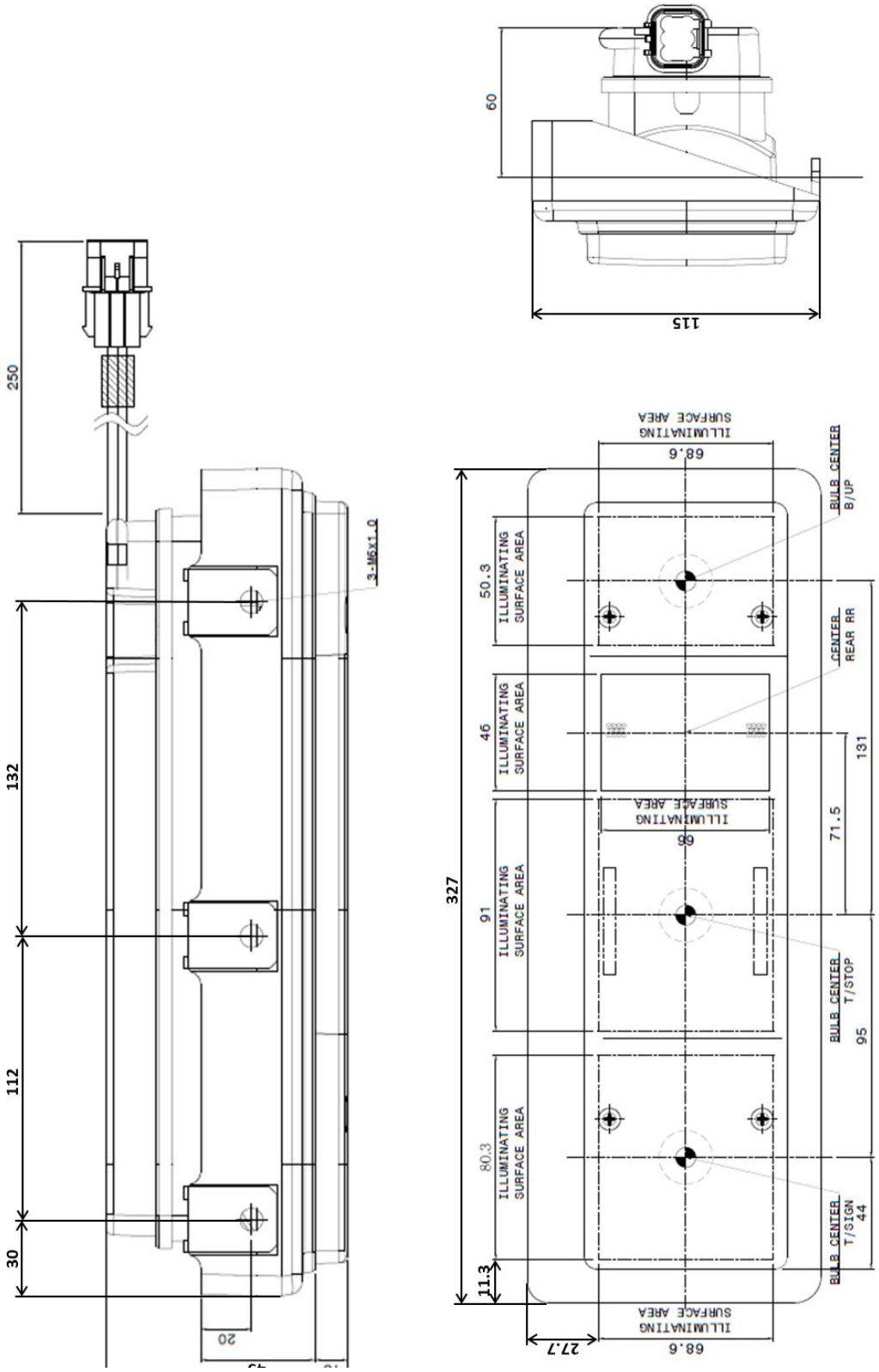
10.13 Electrical systems

See the electrical systems section.

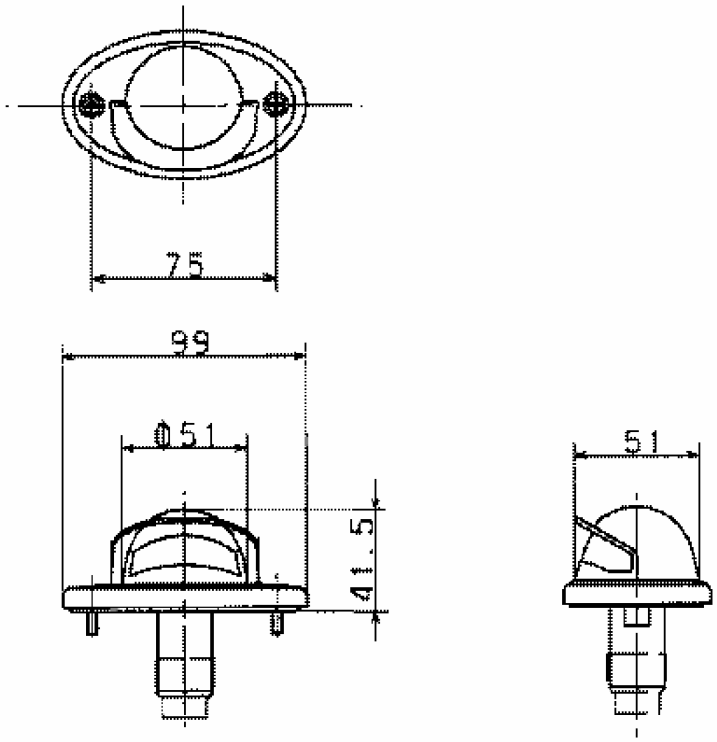
10.14 Other equipment

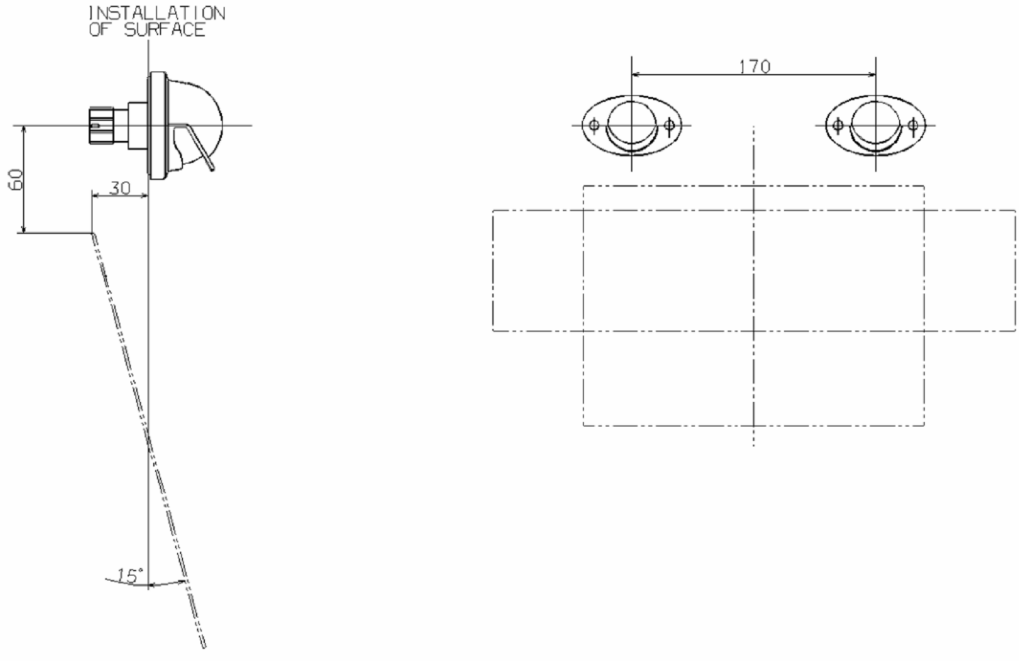
10.14.1 Installing rear lamps

(1) Rear combination lamp



(2) Rear registration plate lamp





10.14.2 Labels and markings

- When peeling off a label or emblem, order the part number from the responsible division and attach the label or emblem while referring to ▷ page 250.

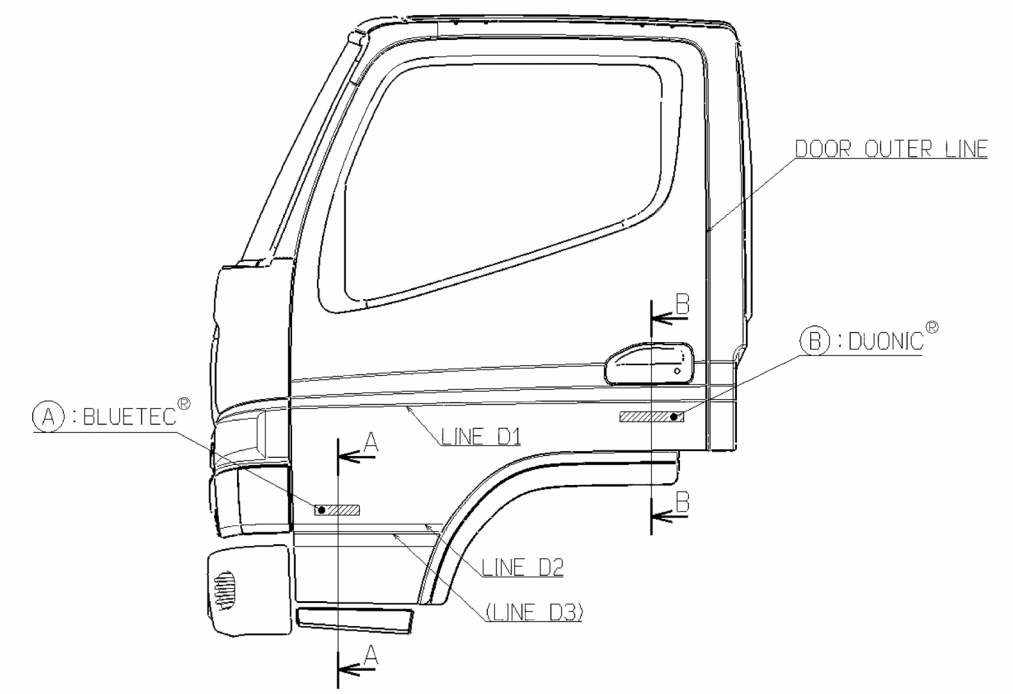
(1) List of the attaching locations of labels and emblems

Locations / Description	Front face of cab	RH and LH doors
FUSO	○	–
DUONIC®	–	○
BlueTec®	–	○

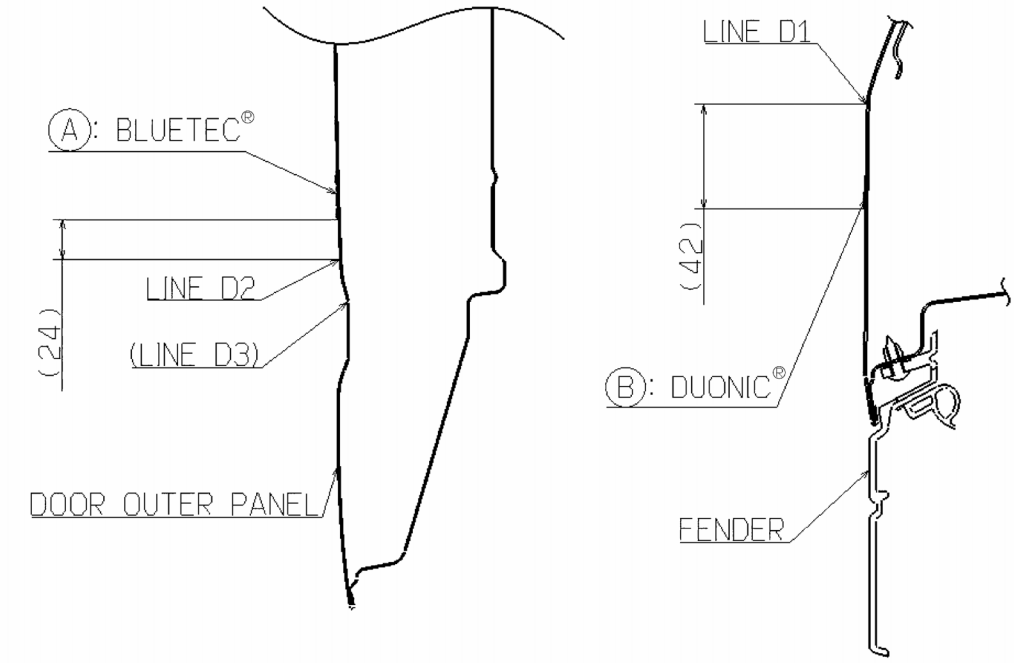
NOTE: Types of the label and emblem attaching on a vehicle differ depending on the vehicle types.

(2) Installation of marks

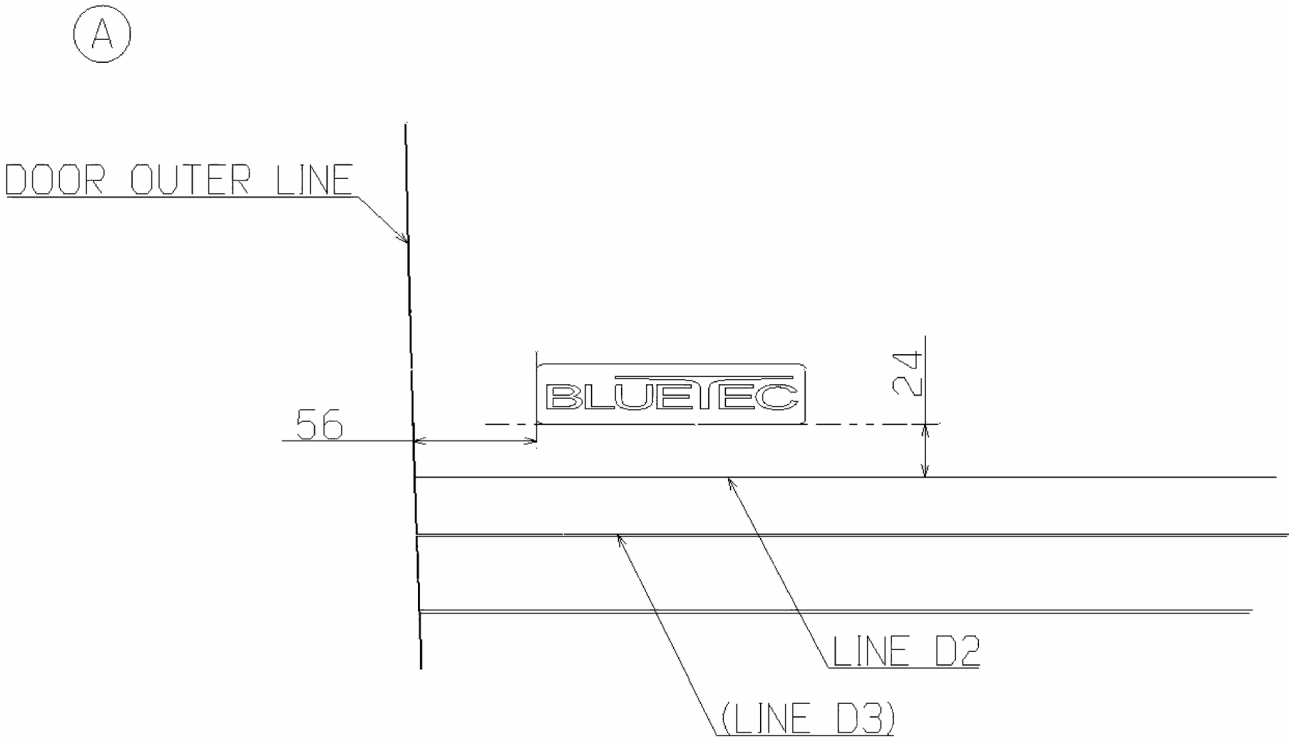
Clean the indicated areas where the BLUETEC® mark, DUONIC® mark are to be stuck, peel off the backing paper from each sticker, and affix it in position according to the illustration.



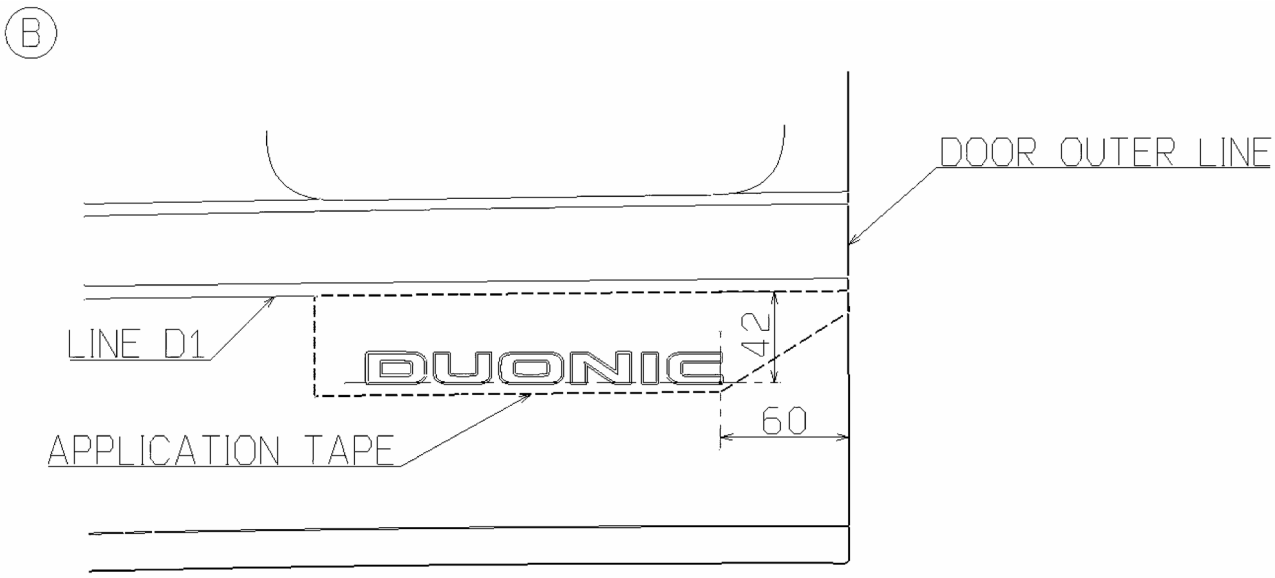
SIDE VIEW (LH)



A–A B–B

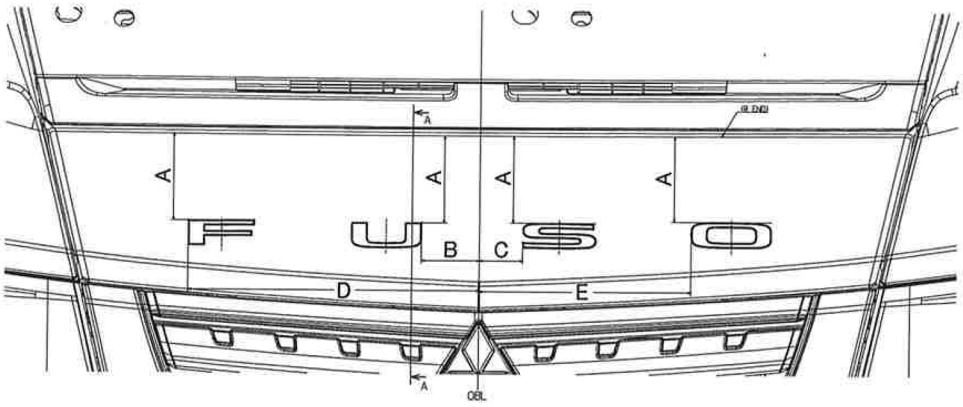


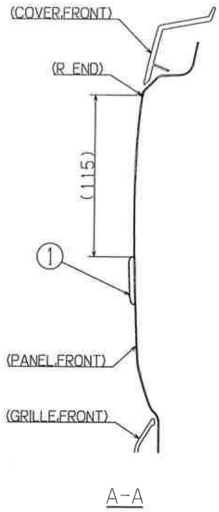
BLUETEC®
MK675502



DUONIC®
MK676977 (LH)
MK676978 (RH)

Attaching procedure of the labels and emblems





(Unit: mm)

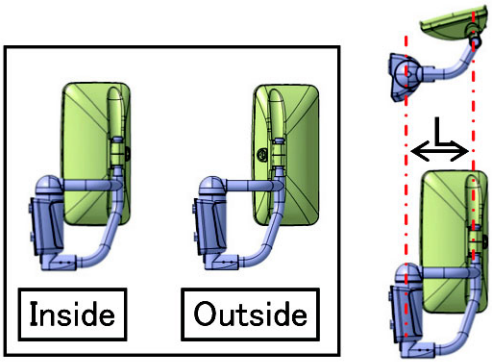
Cab width	A	B	C	D	E
Standard	115	78	60	390	285
Wide	115	103	85	465	360

10.14.3 Outside mirror

There is a limitation on rear body width for outside Mirror and Lamps.

Outside mirror

The vehicle is shipped from the factory with the outside mirrors installed in the "Inside set" position. Before delivery, relocate the mirrors in the necessary positions shown in Figure 1 and Table 1 depending on the rear body width.



STAY LENGTH	L(mm)
Short	170
Long	290

Fig. 1

Table 1: Mirror setting positions corresponding to stay length and rear body width

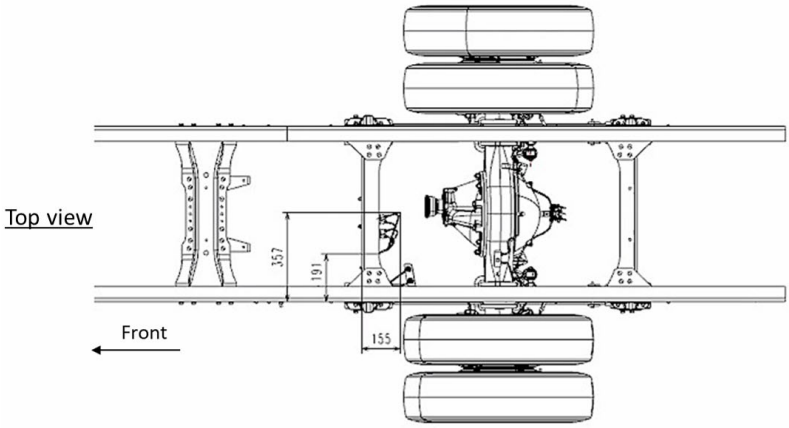
MODEL (CABIN WIDTH)	STAY LENGTH	MIRROR SET	REAR BODY WIDTH (mm)
F*A (Narrow)	Short	Outside Set	1900 to 2000
	Long	Inside Set	2000 to 2100
F*B F*C (Wide)	Short	Inside Set	to 2100
		Outside Set	2155
	Long	Inside Set	2300 to 2400

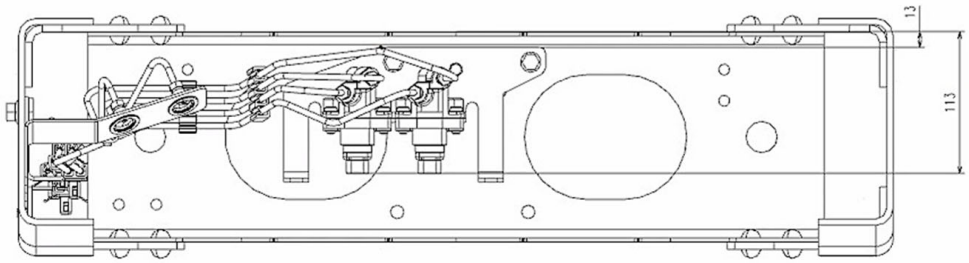
* Consult an authorised dealer if the rear body width is not within the ranges shown above.

10.14.4 AUS valve

<With Hill Holder>

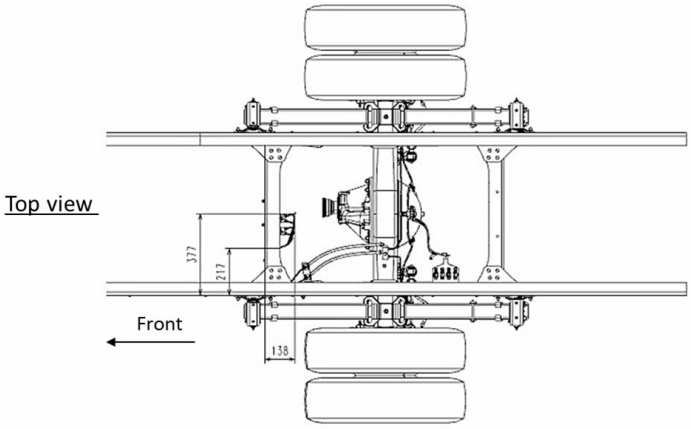
FEA

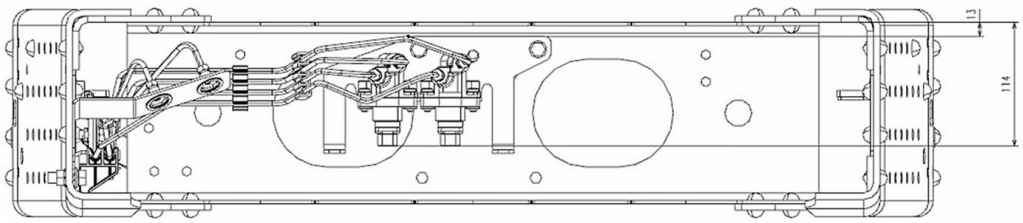




Rear view

FEB



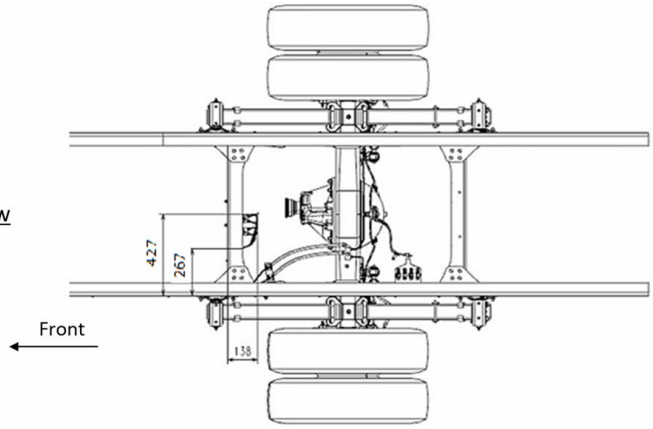


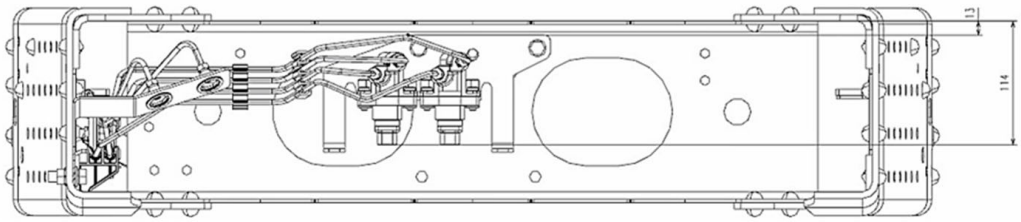
Rear view

10.14 Other equipment

FEC

Top view





Rear view

Index

Revision record <Technical data section>

Rev. code	Date issued	Remarks
F	20. January. 2023	Correction
E	28.February.2020	Safety equipment added
D	3. April. 2015	Other models added
C	20. September. 2013	Other models added
B	3. August. 2012	Other models added
A	25. January. 2012	Added notices for wiring
–	24. October. 2011	Newly issued

NOTE:

1, Chapter 1-9 is Common Section for all markets and to be revised without any special notification. Therefore, please note that this version is not necessarily the latest one.

2, Chapter 10 is for specific market(s). MFTBC will distribute the latest version whenever it will be revised.

BlueTec®: The trademark of Daimler AG.
AdBlue®: The trademark of the German Association of the Automobile Industry (VDA).
DUONIC®: The trademark of Daimler AG.

Body/equipment mounting directives <Technical data section>

CANTER

Australia

MITSUBISHI FUSO TRUCK & BUS CORPORATION

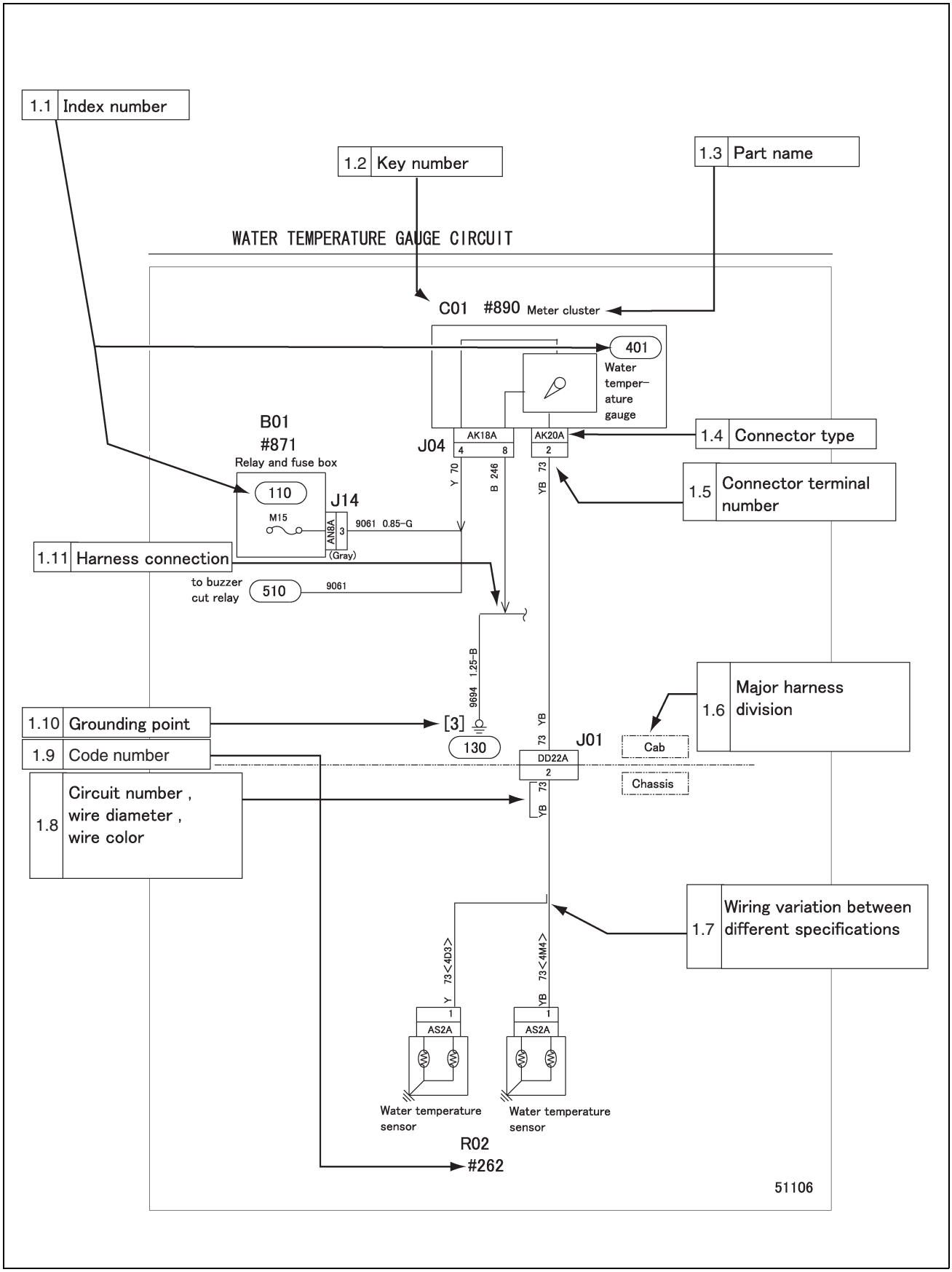
January. 2023 TL2FA

Body/equipment mounting directives
Electrical systems section
Australia

MITSUBISHI FUSO TRUCK & BUS CORPORATION
February. 2020 TL2FA

10.13 Electrical systems

HOW TO READ CIRCUITS



1.1 Index number: (100) - (999)

- Index numbers are used as reference numbers for electrical circuits. Each electrical circuit has been assigned its own index number.

1.2 Key number: A01 - Z99

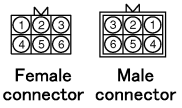
- Key numbers indicate parts installation locations. The installation location of an electrical equipment can be easily found using its key number shown in a circuit diagram.
  All of the electrical equipment installation locations are listed in Gr54-10. (Group Number Service Manual)

1.3 Part name

1.4 Connector type (type indication)

- A list of the connectors used is included in Gr54-10. (Group Number Service Manual)

1.5 Connector terminal number



Connector terminal numbering starts with the upper left corner for female connectors and with the upper right corner for male connectors.

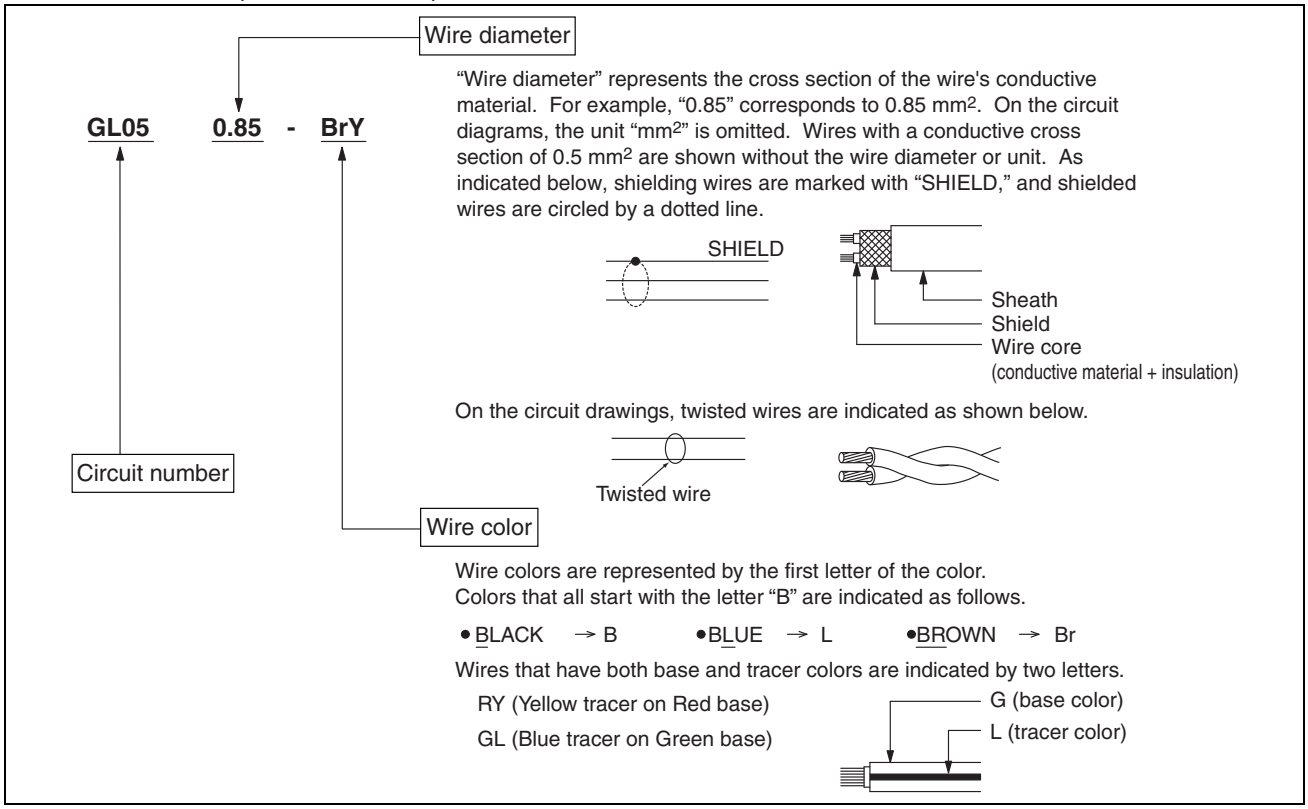
1.6 Major harness division

- Major harness divisions are shown

1.7 Wiring variations between different specifications

- Variations in wiring/circuit between different vehicle specifications are clearly indicated as shown.

1.8 Circuit number, wire diameter, wire color



1.9 Code number: #001 - #999

- Code numbers are reference numbers to find individual electrical equipment inspection procedures. The inspection procedure for an electrical equipment can be found using its code number shown in a circuit diagram.

1.10 Grounding point: [1] - [99]

- Locations where wires are grounded to the vehicle. All of the grounding points are listed in (130). (Index number Service Manual)

1.11 Harness connection

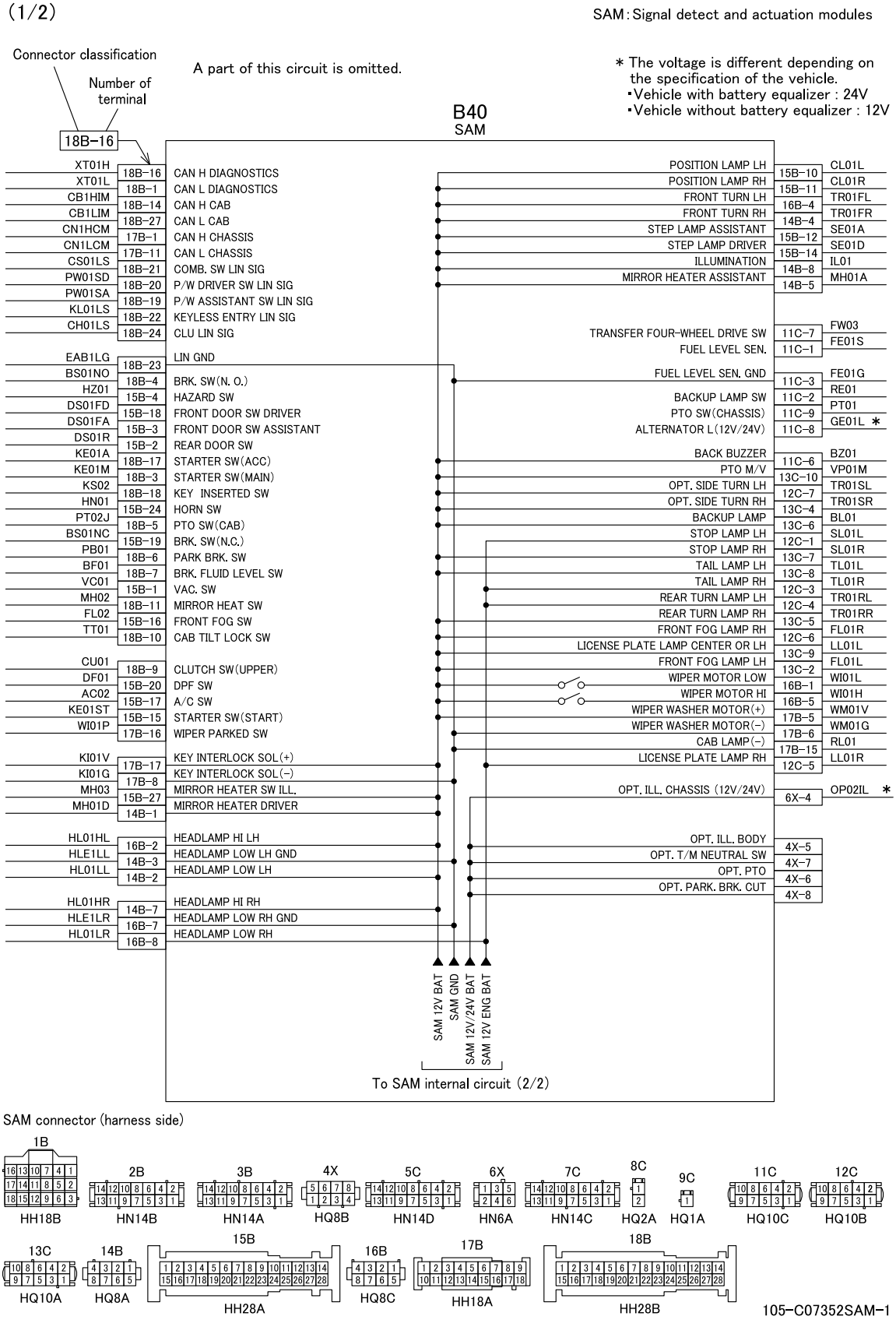
- The arrow in the wiring diagram indicates where harnesses are connected, and NOT the flow of electricity.

Wire color

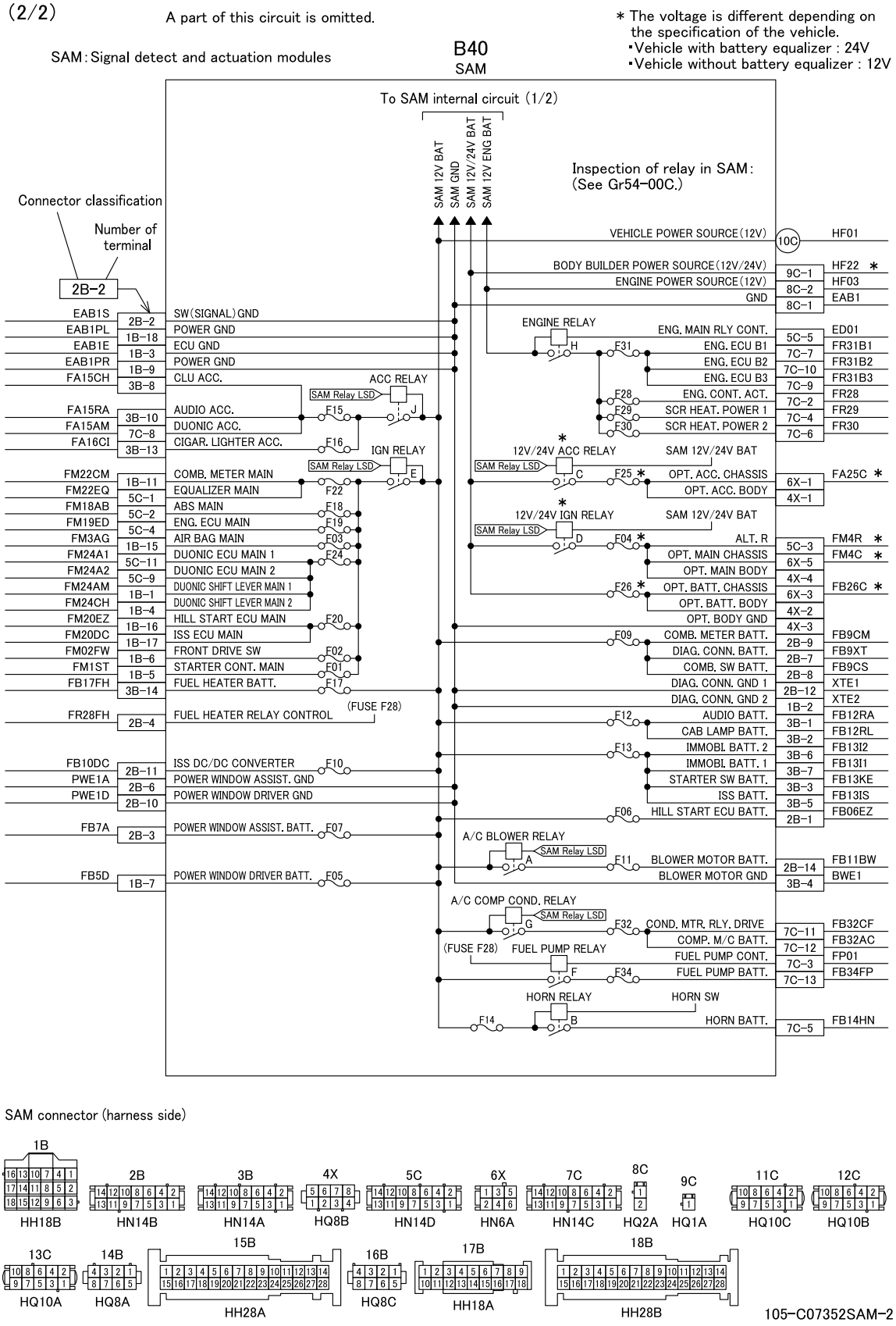
Wire color		Insulation color + tracer											
B	Black	BW	Black/ white	BY	Black/ yellow	BR	Black/red	BG	Black/ green	BL	Black/ blue		
Br	Brown	BrW	Brown/ white	BrB	Brown/ black	BrY	Brown/ yellow	BrR	Brown/ red	BrG	Brown/ green		
G	Green	GW	Green/ white	GR	Green/ red	GY	Green/ yellow	GB	Green/ black	GL	Green/ blue	GO	Green/ orange
Gr Gy	Gray	GrL GyL	Gray/ blue	GrR GyR	Gray/ red								
L	Blue	LW	Blue/ white	LR	Blue/red	LY	Blue/ yellow	LB	Blue/ black	LO	Blue/ orange	LG	Blue/ green
Lg	Light green	LgR	Light green/ red	LgY	Light green/ yellow	LgB	Light green/ black	LgW	Light green/ white				
O	Orange	OL	Orange/ blue	OB	Orange/ black	OG	Orange/ green						
P	Pink	PB	Pink/ black	PG	Pink/ green	PL	Pink/ blue	PW	Pink/ white				
Pu	Purple												
R	Red	RW	Red/ white	RB	Red/ black	RY	Red/ yellow	RG	Red/ green	RL	Red/blue	RO	Red/ orange
Sb	Sky blue												
V	Violet	VY	Violet/ yellow	VW	Violet/ white	VR	Violet/red	VG	Violet/ green				
W	White	WR	White/ red	WB	White/ black	WL	White/ blue	WG	White/ green	WO	White/ orange		
Y	Yellow	YR	Yellow/ red	YB	Yellow/ black	YG	Yellow/ green	YL	Yellow/ blue	YW	Yellow/ white	YO	Yellow/ orange
		YP	Yellow/ pink	YV	Yellow/ violet								

10.13.1 Electrical wiring diagram

SAM INTERNAL CIRCUIT (1)



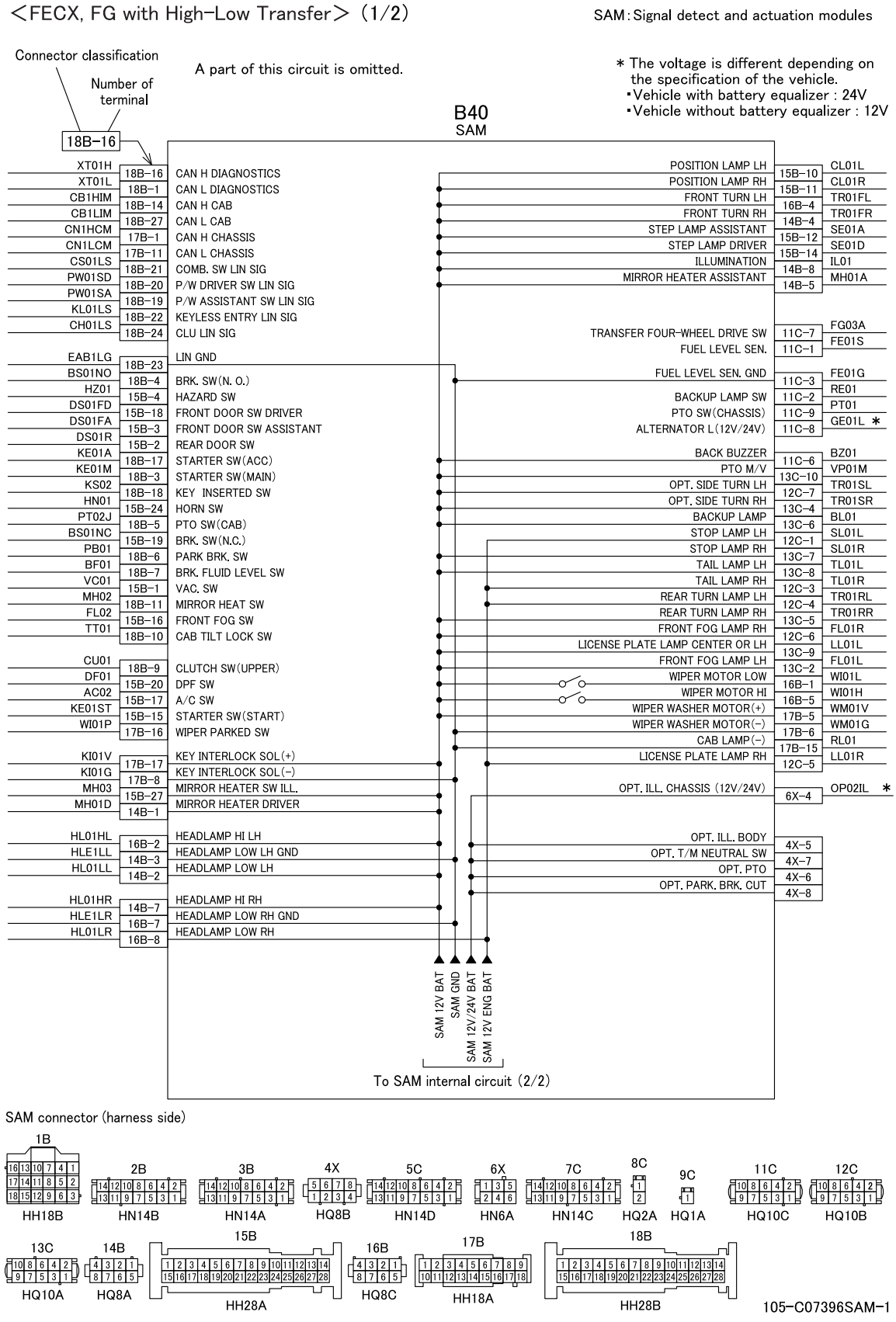
SAM INTERNAL CIRCUIT (2)



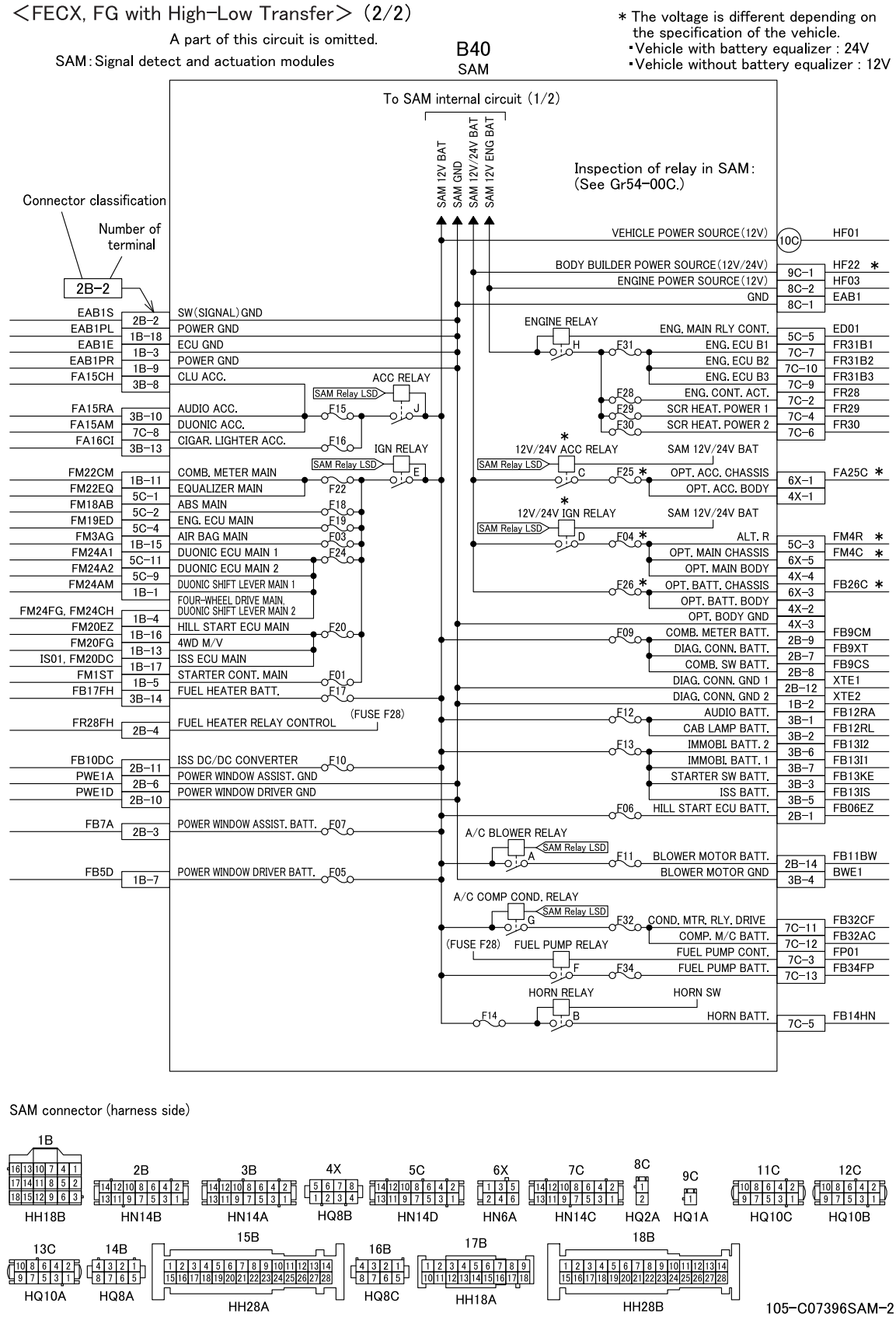
SAM connector (harness side)

105-C07352SAM-2

SAM INTERNAL CIRCUIT (3)



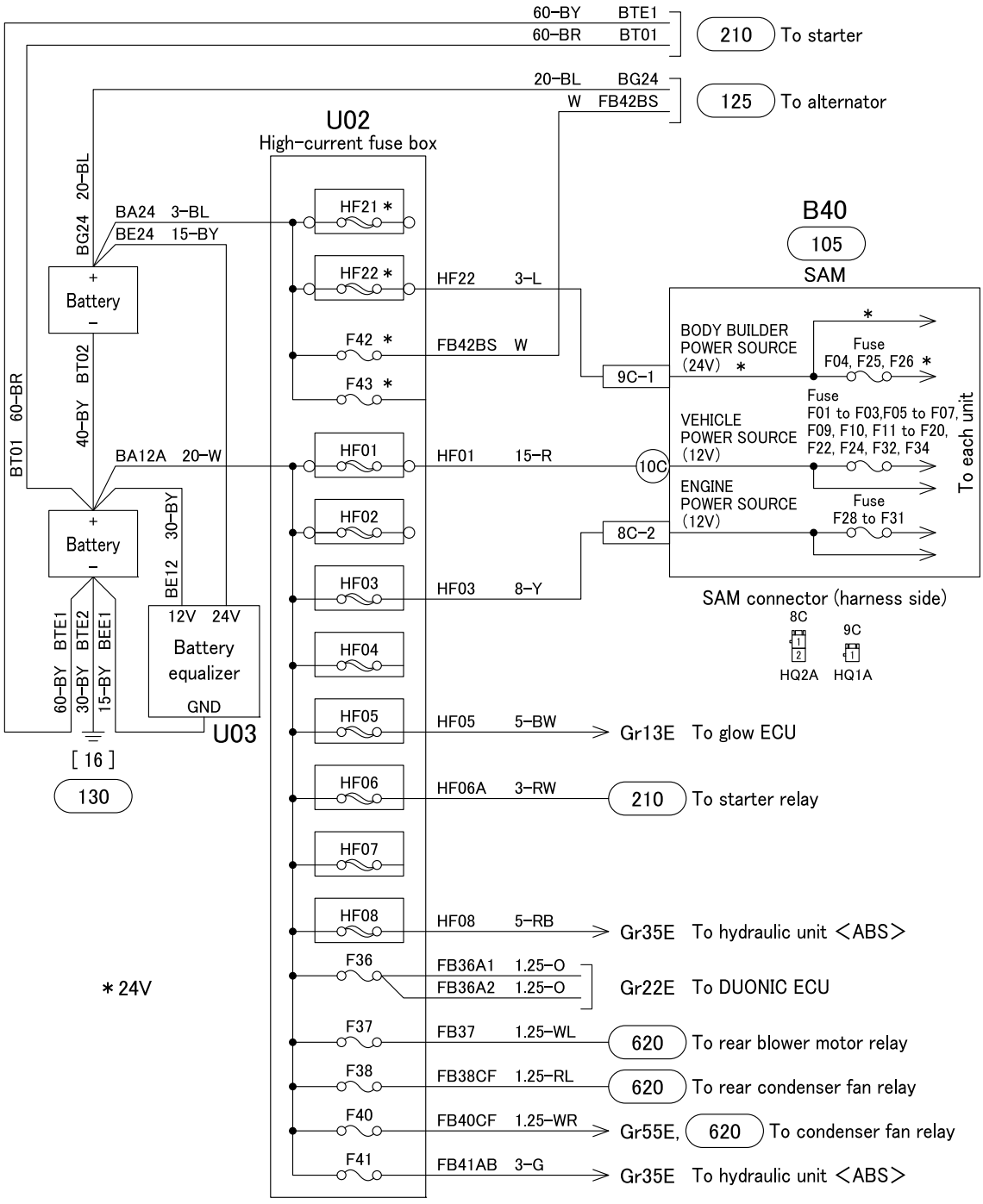
SAM INTERNAL CIRCUIT (4)



POWER CIRCUIT (1)

Battery → high-current fuse → SAM
＜Vehicle with battery equalizer＞

ECU : Electronic control unit
ABS : Anti-lock brake system

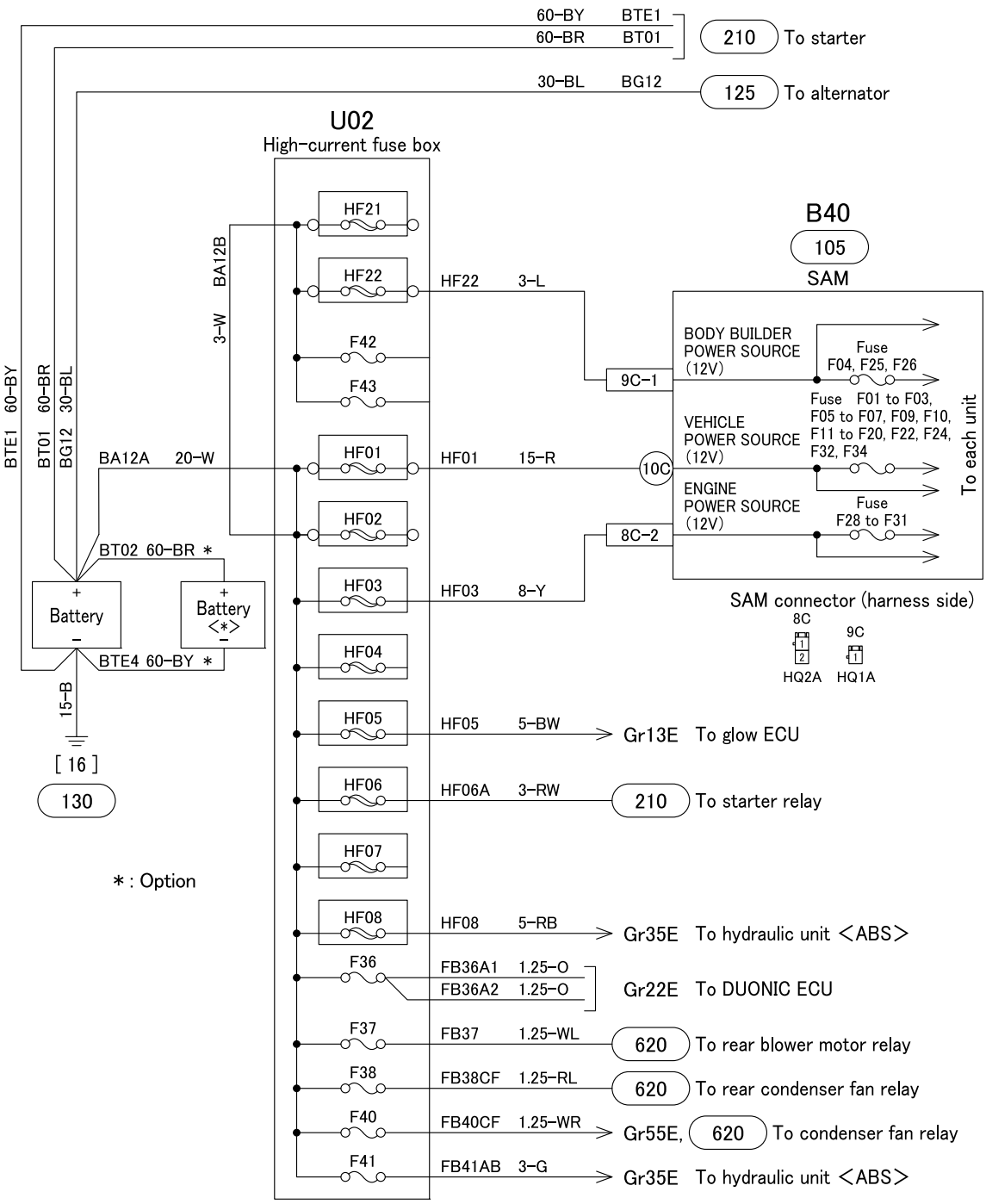


110-C07352ALL-1

POWER CIRCUIT (2)

Battery → high-current fuse → SAM
<Vehicle without battery equalizer>

ECU: Electronic control unit
ABS: Anti-lock brake system

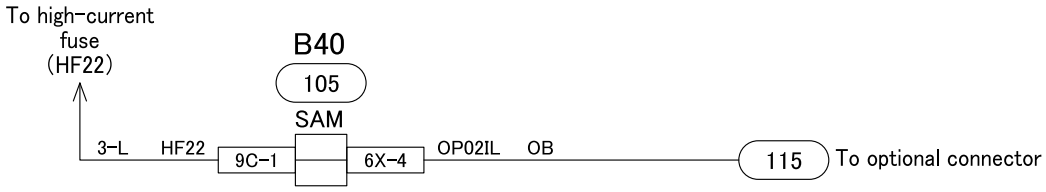


110-C07352ALL-2

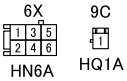
POWER CIRCUIT (3)

SAM
(12V/24V BAT)

The voltage is different depending on
the specification of the vehicle.
・Vehicle with battery equalizer : 24V
・Vehicle without battery equalizer : 12V



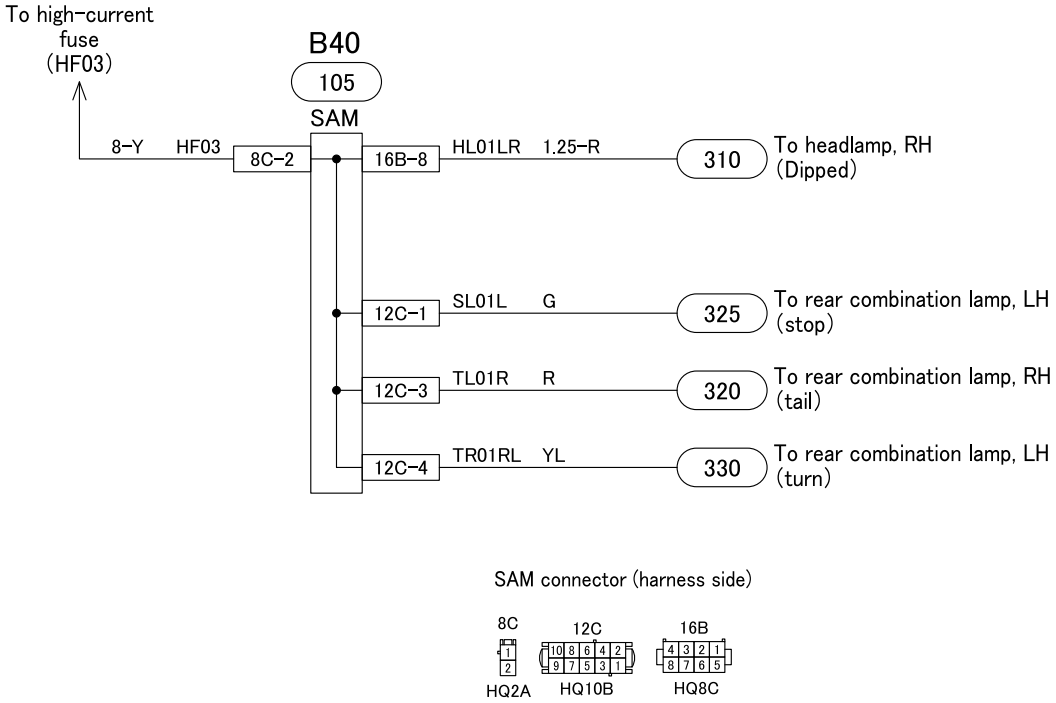
SAM connector (harness side)



110-C07352-2412

POWER CIRCUIT (4)

SAM
(12V ENG BAT)

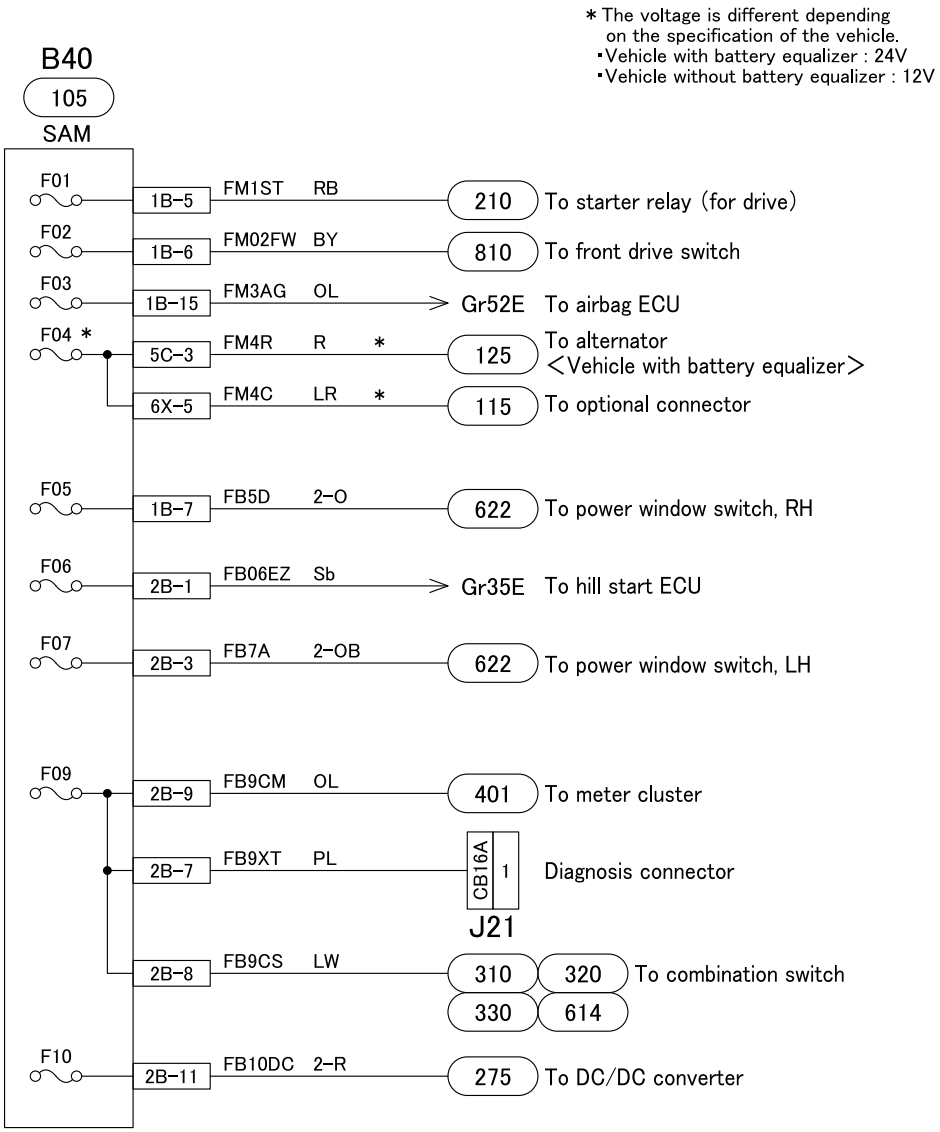


SAM connector (harness side)

110-C07352-12E

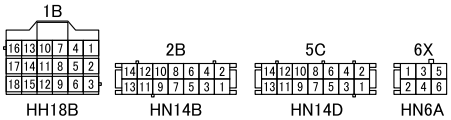
POWER CIRCUIT (5)

SAM
(Fuse F01 to F10)



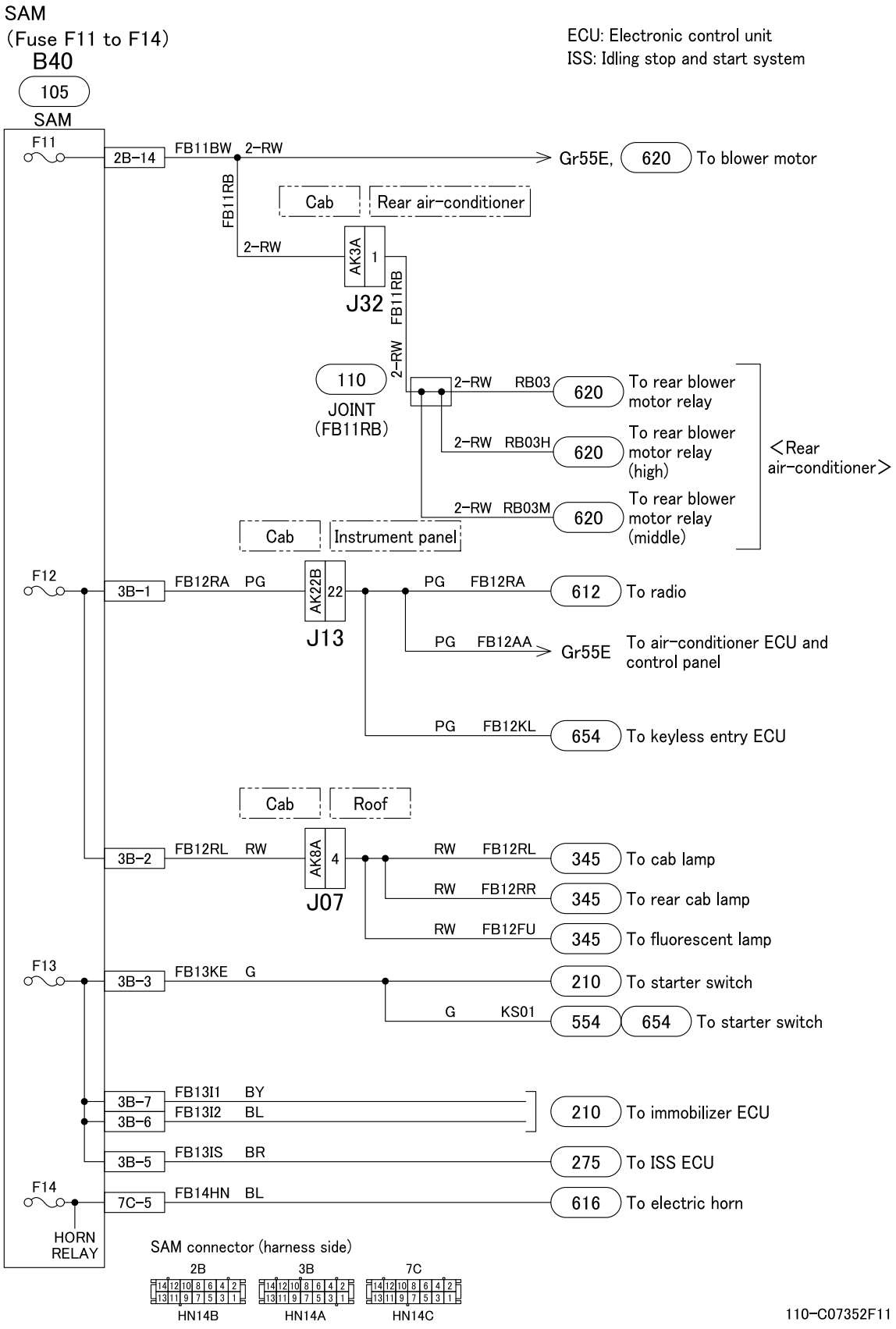
ECU: Electronic control unit

SAM connector (harness side)



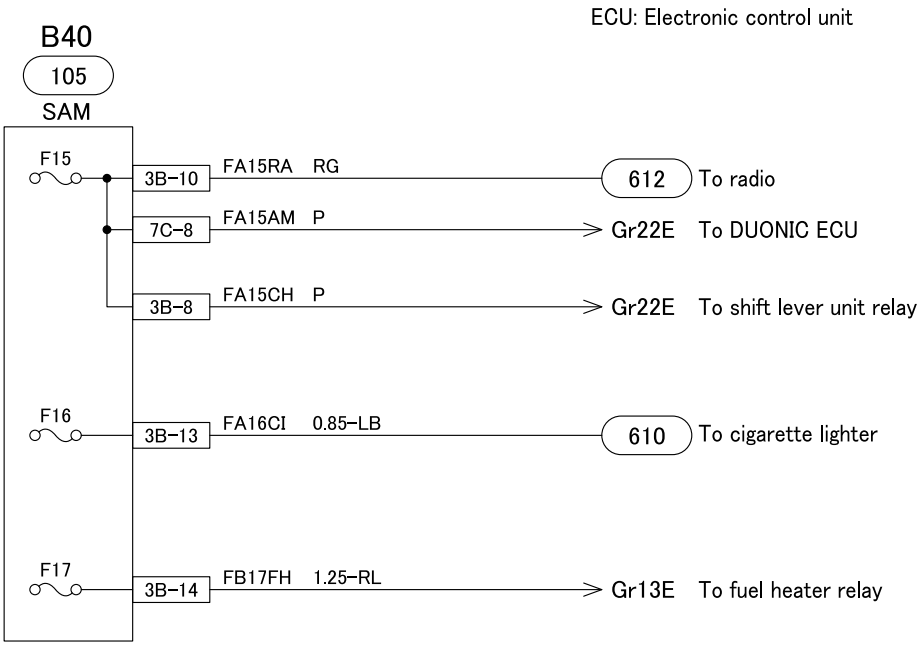
110-C07352F01

POWER CIRCUIT (6)

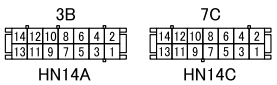


POWER CIRCUIT (7)

SAM
(Fuse F15 to F17)



SAM connector (harness side)

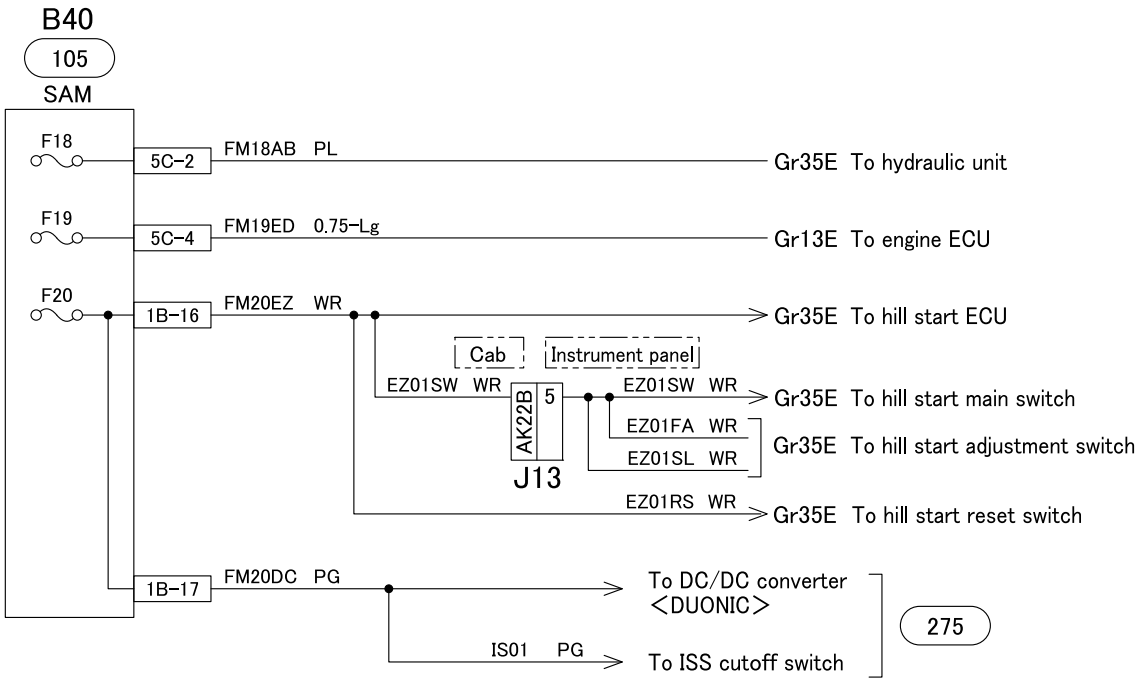


110-C07352F15

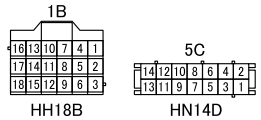
POWER CIRCUIT (8)

SAM
(Fuse F18 to F20)

ECU: Electronic control unit
ISS: Idling stop and start system



SAM connector (harness side)



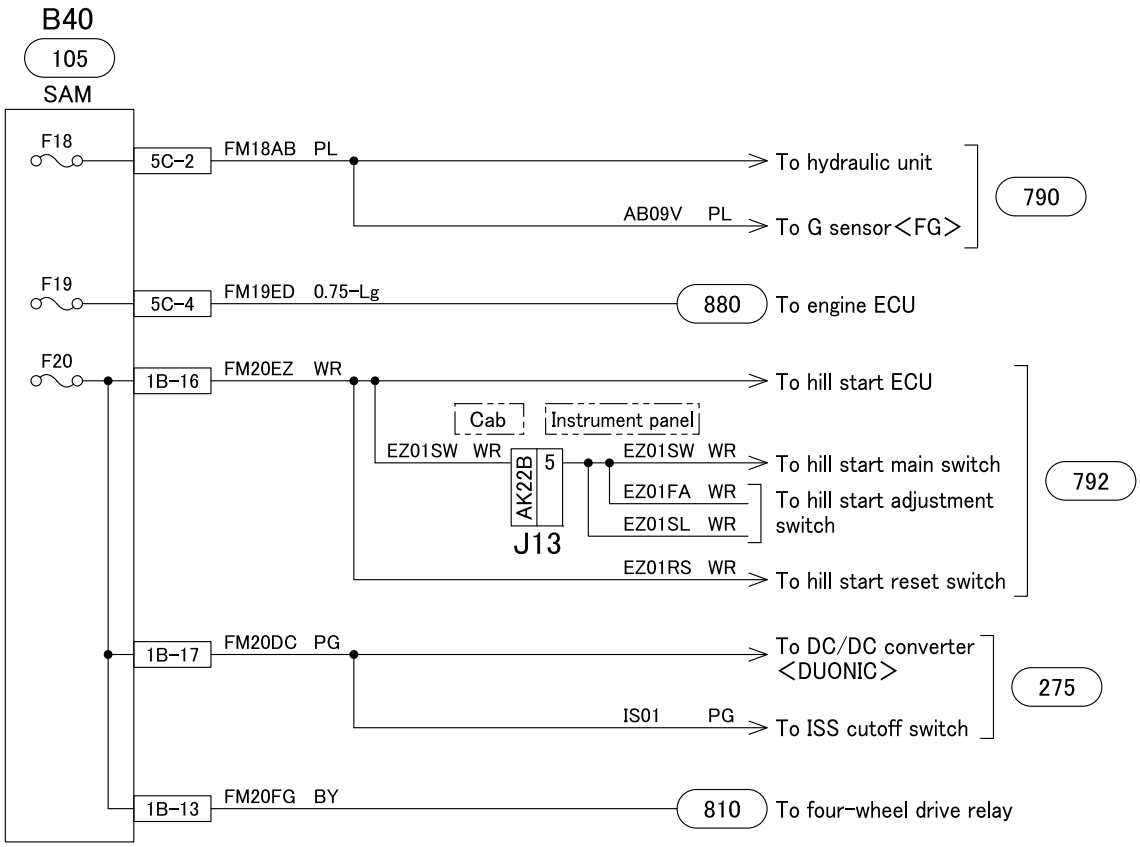
110-C07352F18

POWER CIRCUIT (9)

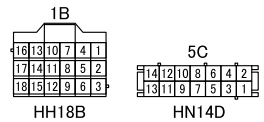
C

<FECX, FG with High-Low Transfer>
SAM
(Fuse F18 to F20)

ECU: Electronic control unit
ISS: Idling stop and start system



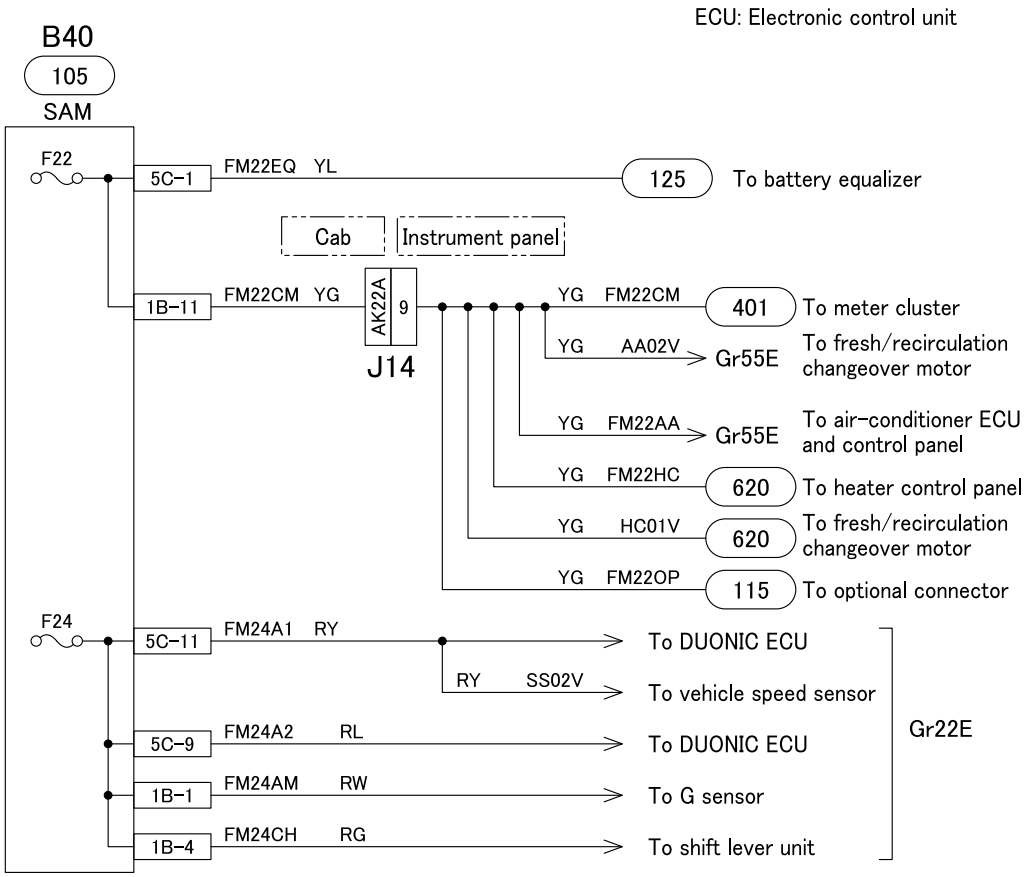
SAM connector (harness side)



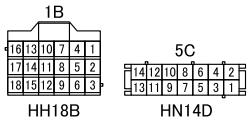
110-C07396F18

POWER CIRCUIT (10)

SAM
(Fuse F22 to F24)



SAM connector (harness side)

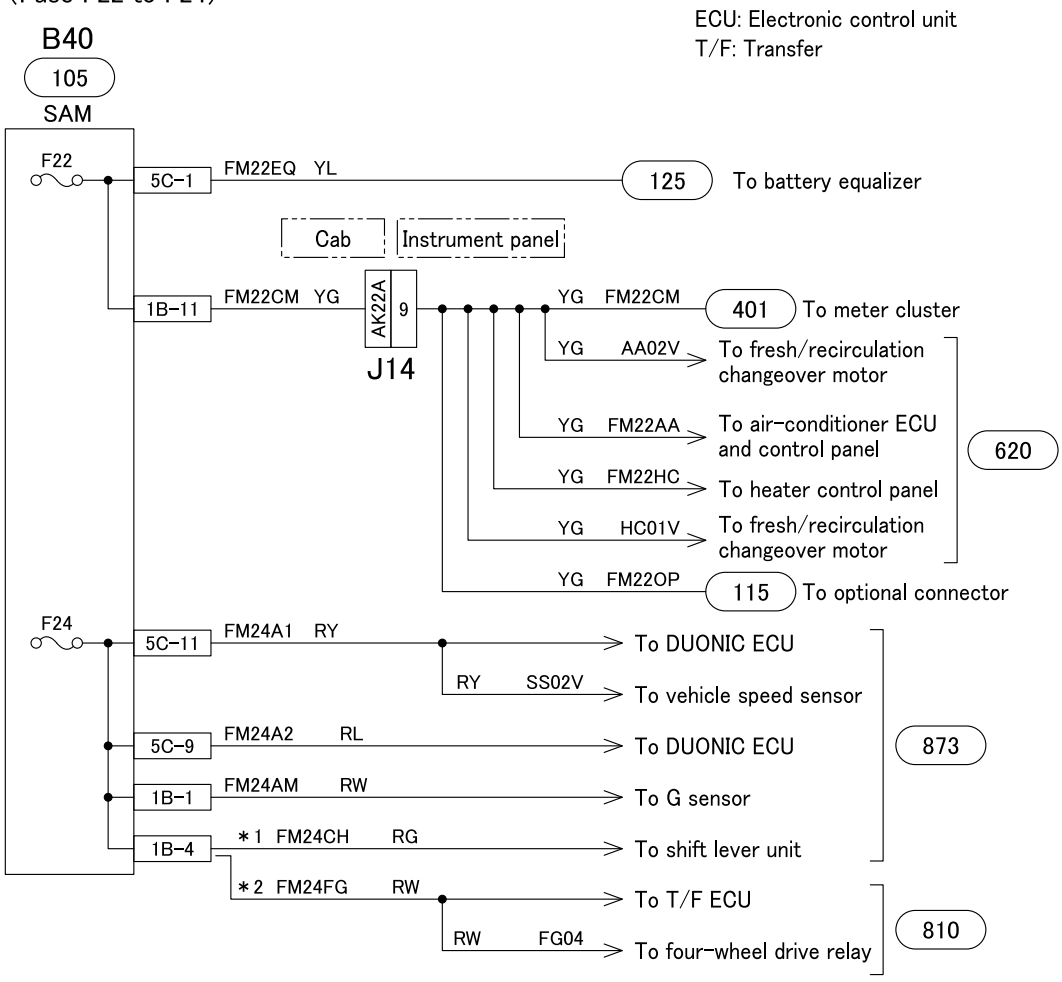


110-C07352F22

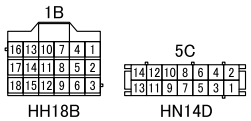
POWER CIRCUIT (11)

<FECX, FG with High-Low Transfer>
SAM
(Fuse F22 to F24)

ECU: Electronic control unit
T/F: Transfer



SAM connector (harness side)

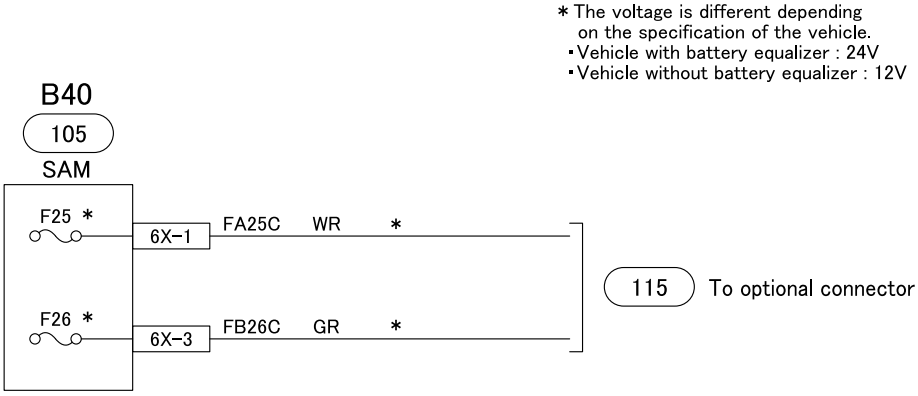


*1: DUONIC
*2: FG

110-C07396F22

POWER CIRCUIT (12)

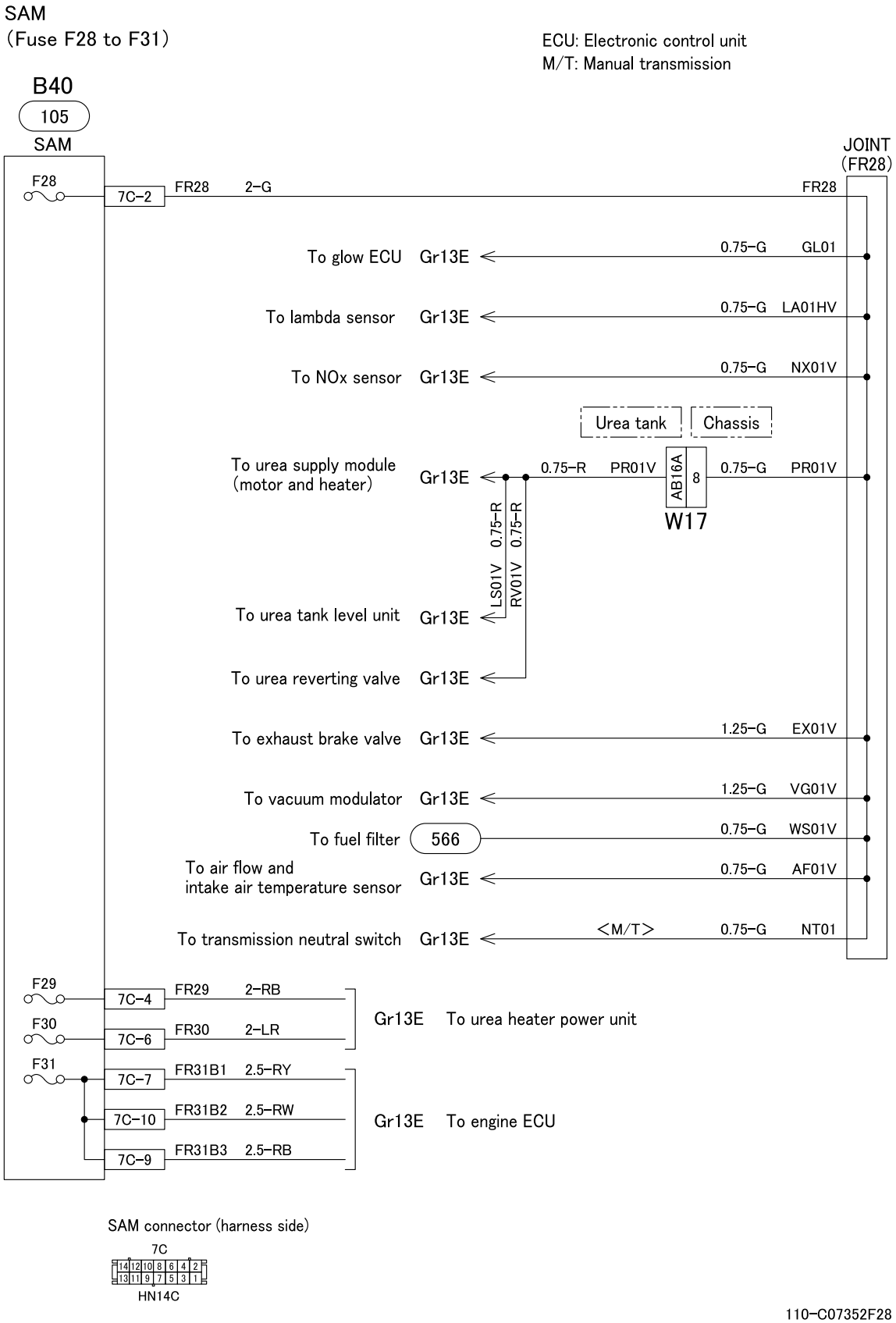
SAM
(Fuse F25 to F26)



SAM connector (harness side)

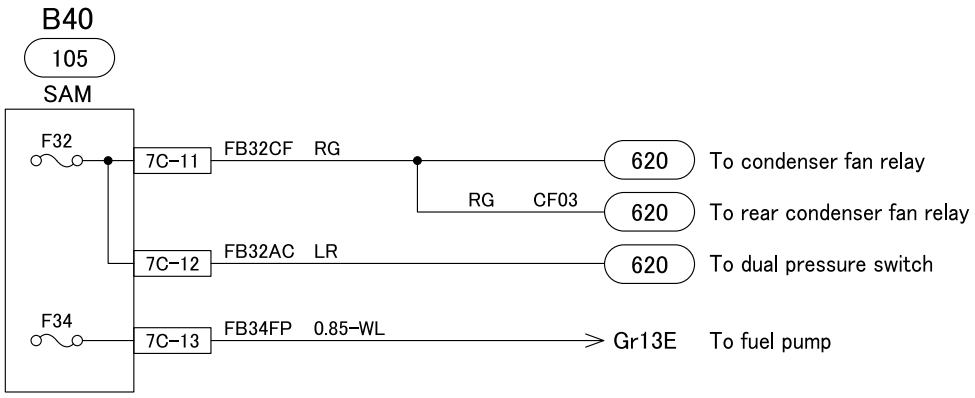
110-C07352F25

POWER CIRCUIT (13)

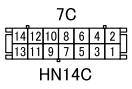


POWER CIRCUIT (14)

SAM
(Fuse F32 to F34)



SAM connector (harness side)

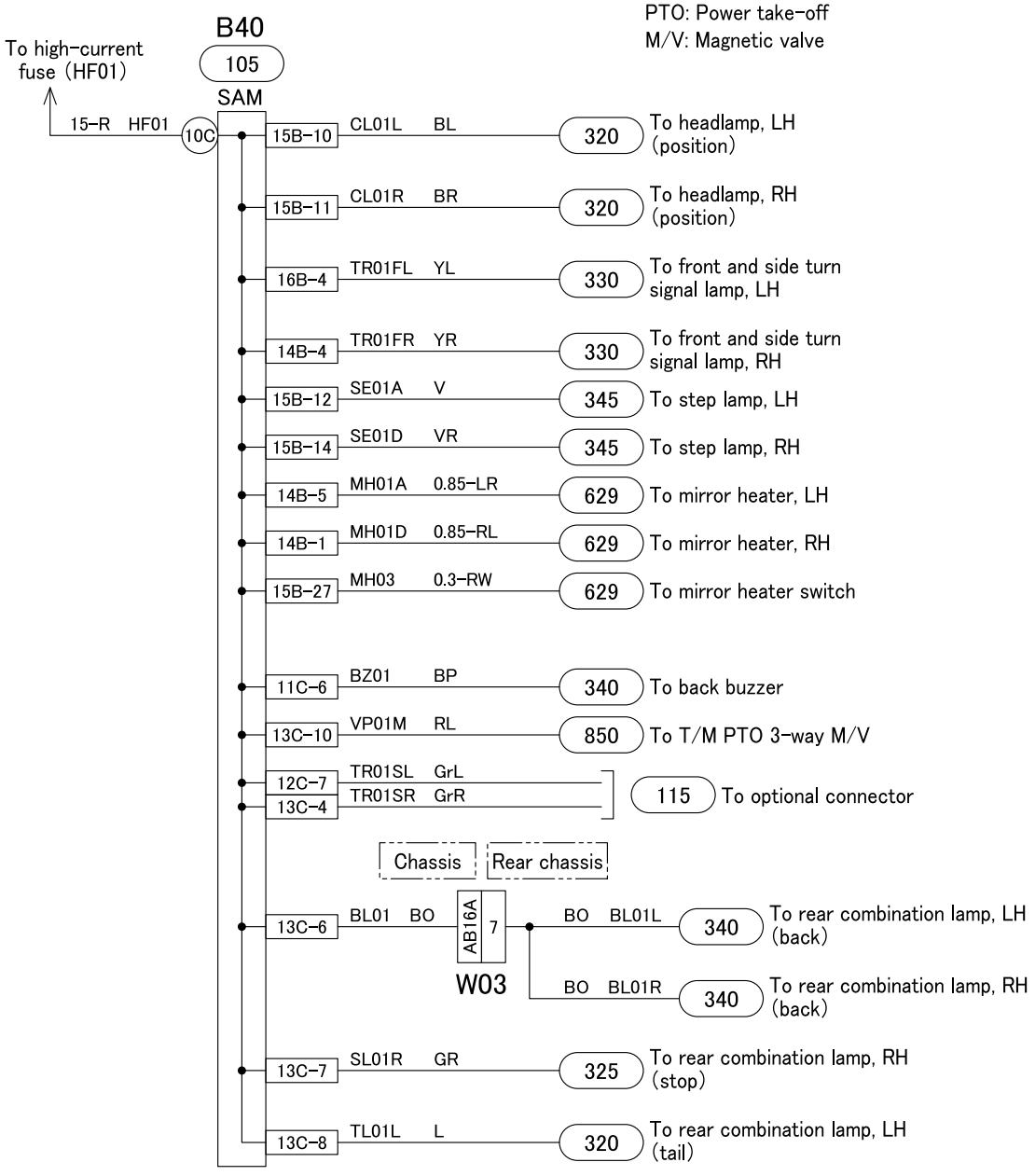


110-C07352F32

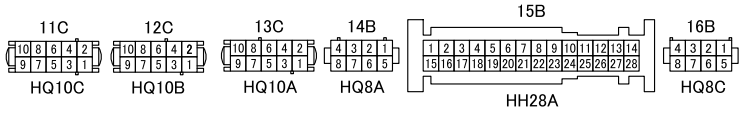
POWER CIRCUIT (15)

SAM
(12V BAT)1/4

T/M: Transmission
PTO: Power take-off
M/V: Magnetic valve



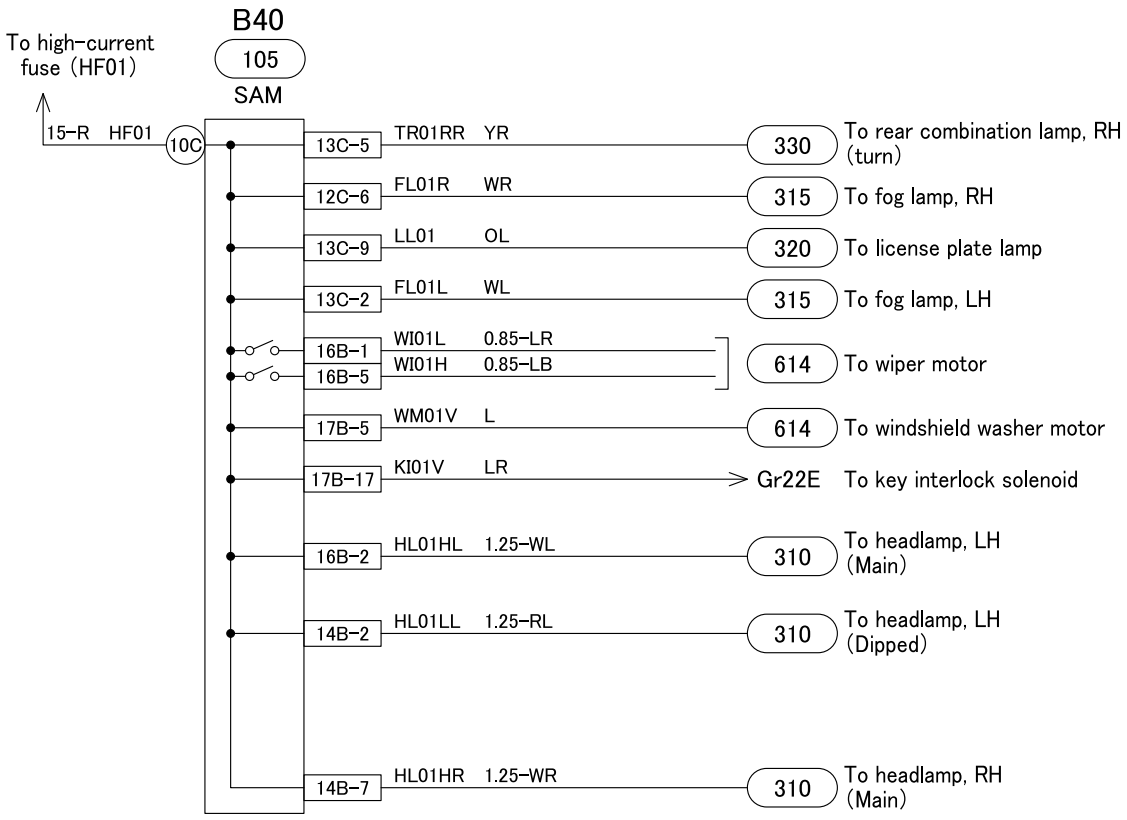
SAM connector (harness side)



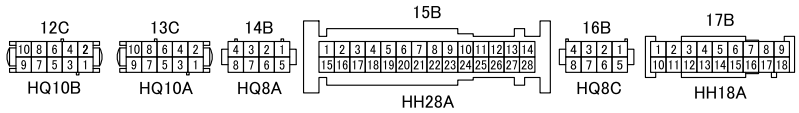
110-C07352-12-1

POWER CIRCUIT (16)

SAM
(12V BAT)2/4



SAM connector (harness side)

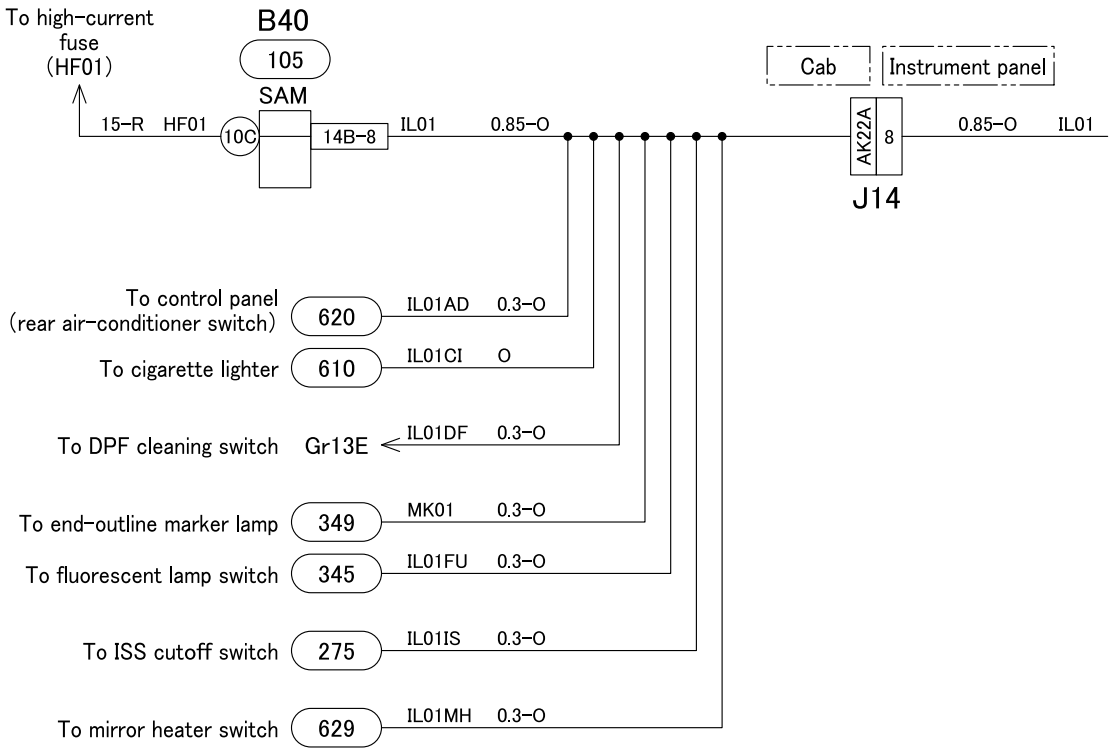


110-C07352-12-2

POWER CIRCUIT (17)

SAM
(12V BAT)3/4

DPF: Diesel particulate filter
ISS: Idling stop and start system



SAM connector (harness side)

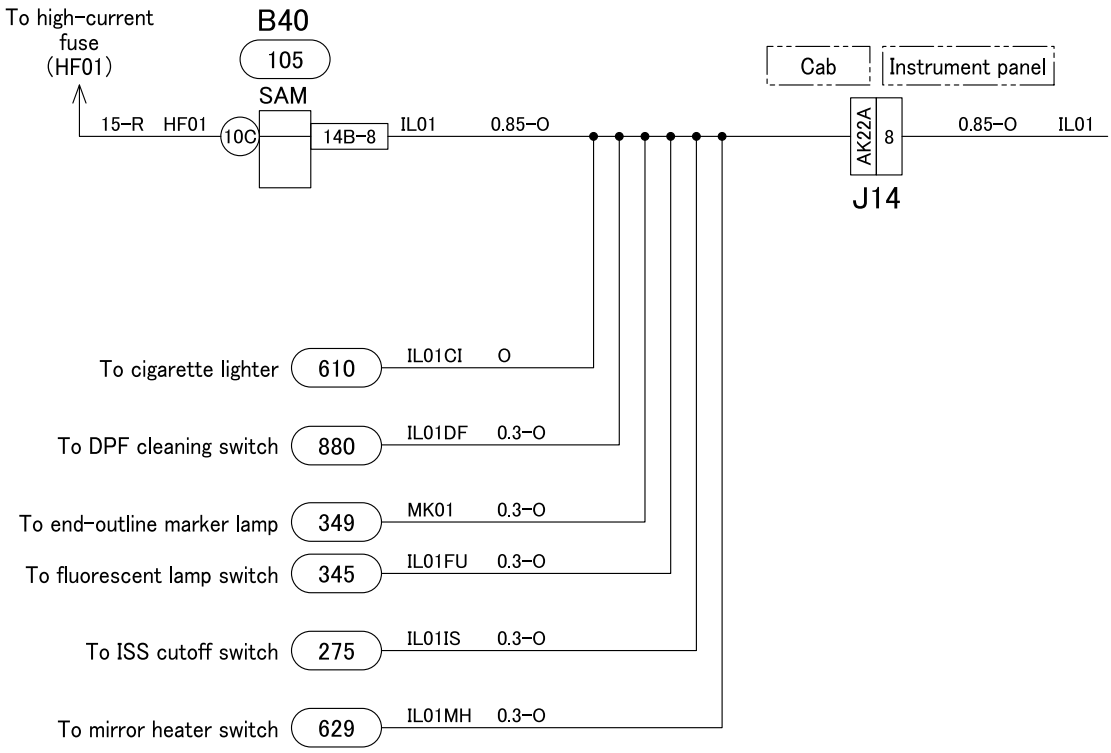
110-C07352-12-3

POWER CIRCUIT (18)

＜FECX, FG with High-Low Transfer＞

SAM
(12V BAT)3/4

DPF: Diesel particulate filter
ISS: Idling stop and start system



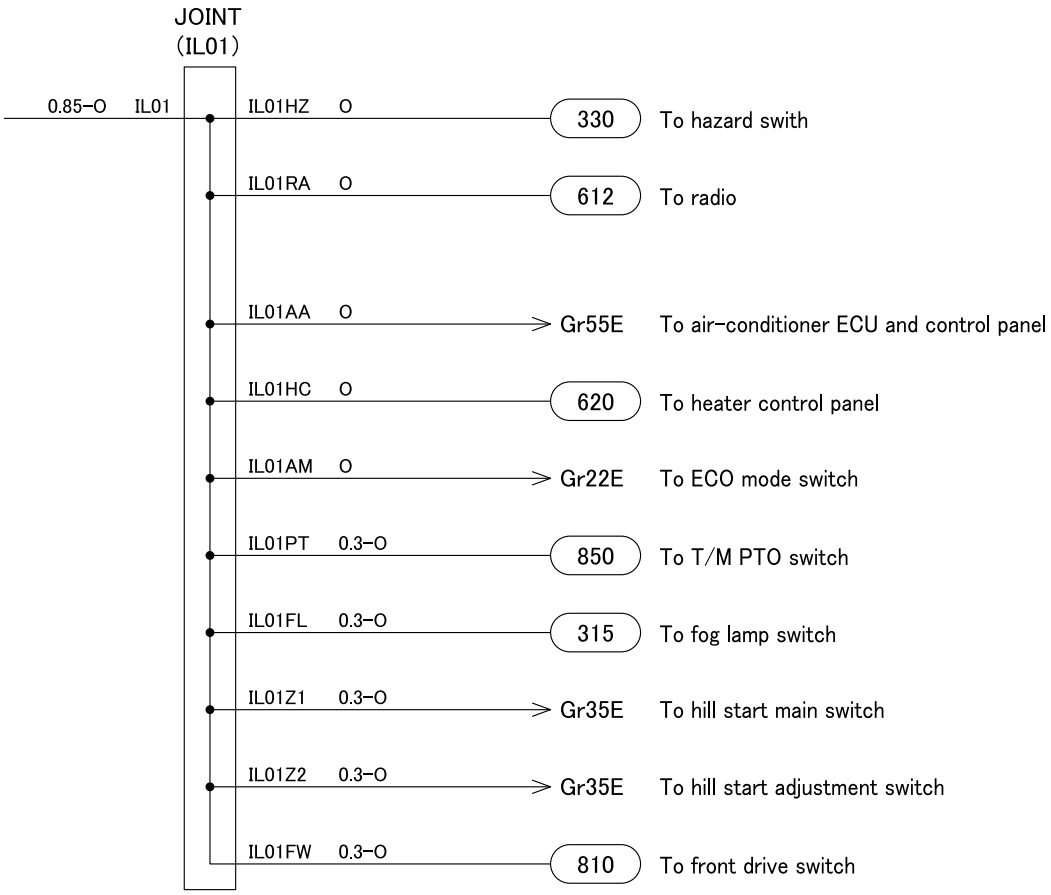
SAM connector (harness side)

110-C07396-12-3

POWER CIRCUIT (19)

SAM
(12V BAT)4/4

ECU: Electronic control unit
T/M: Transmission
PTO: Power take-off

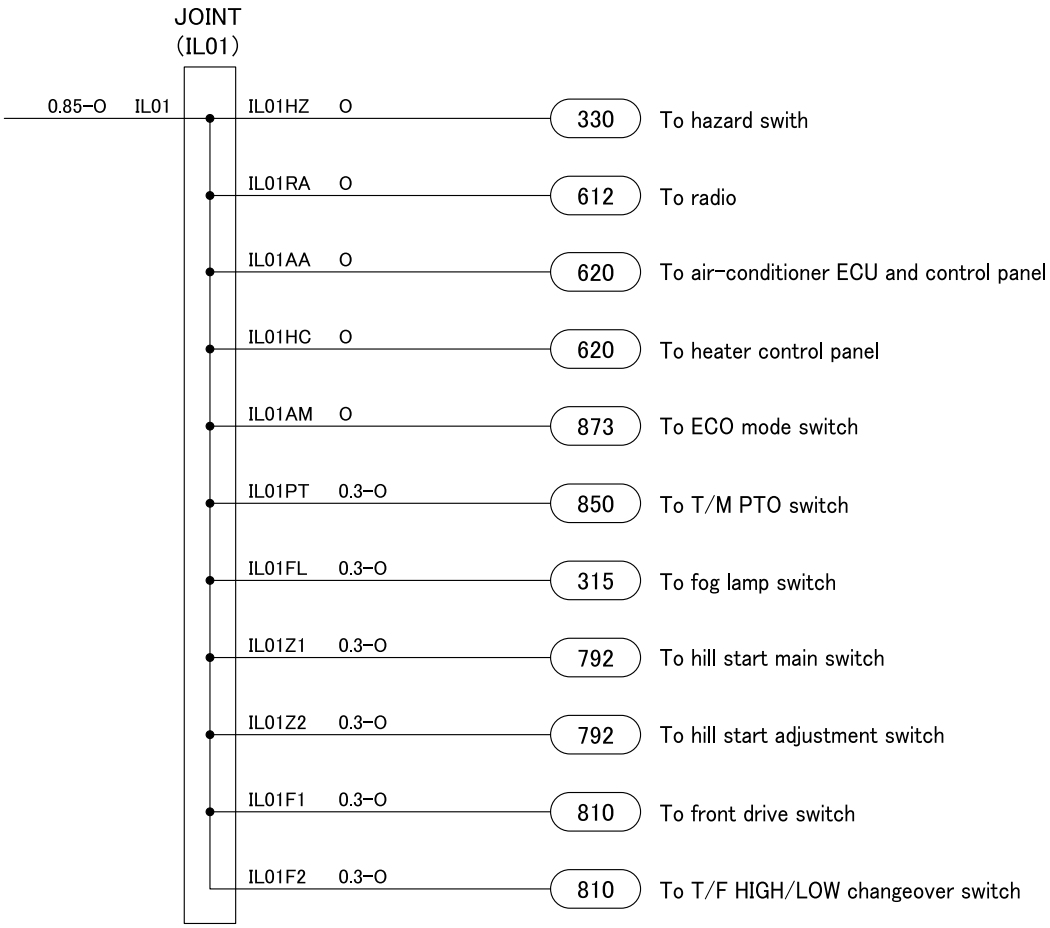


110-C07352-12-4

POWER CIRCUIT (20)

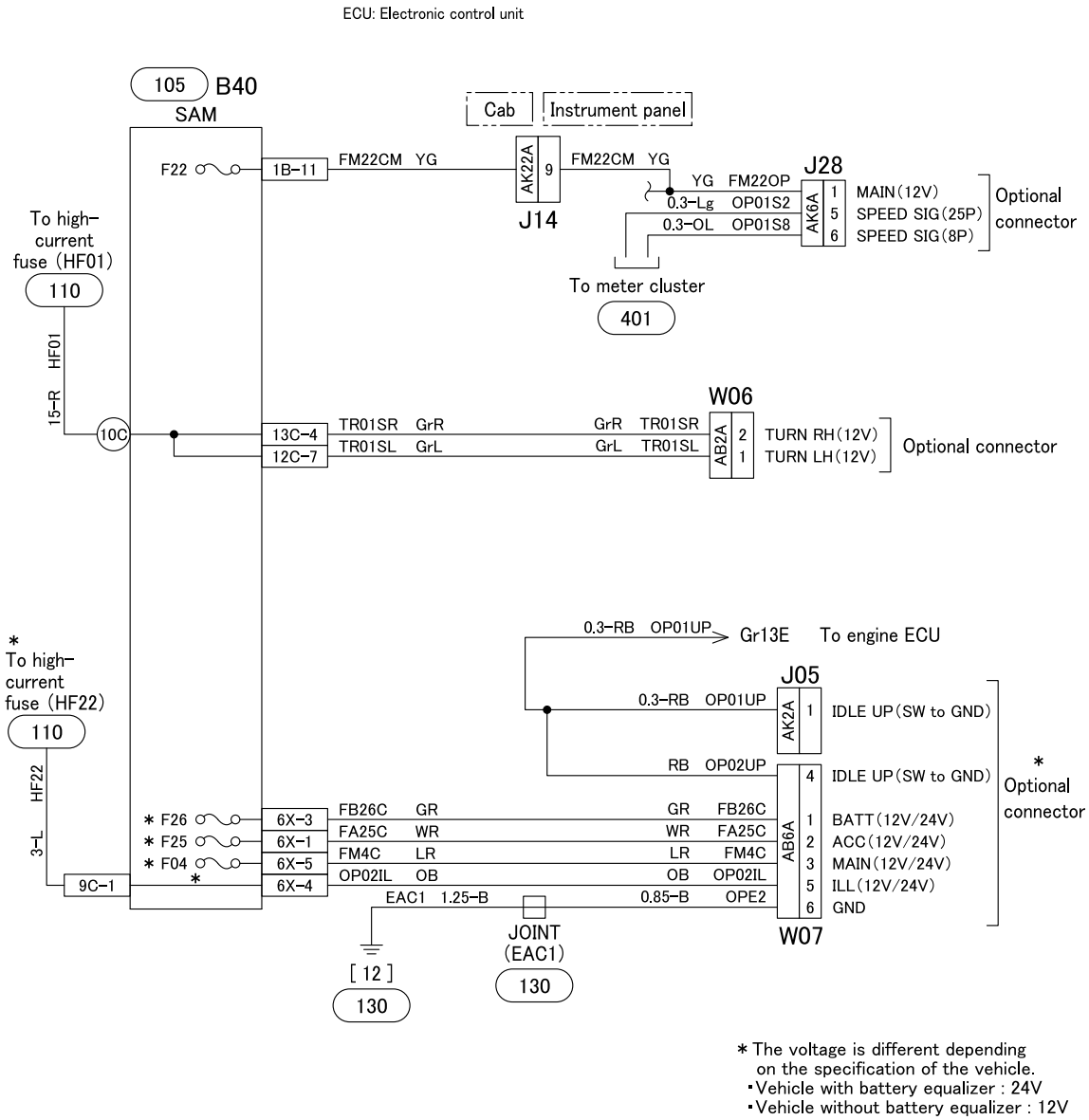
SAM ＜FECX, FG with High-Low Transfer＞
(12V BAT)4/4

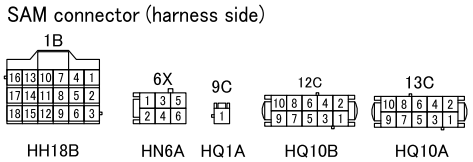
T/F: Transfer
ECU: Electronic control unit
T/M: Transmission
PTO: Power take-off



110-C07396-12-4

RESERVE POWER CIRCUIT

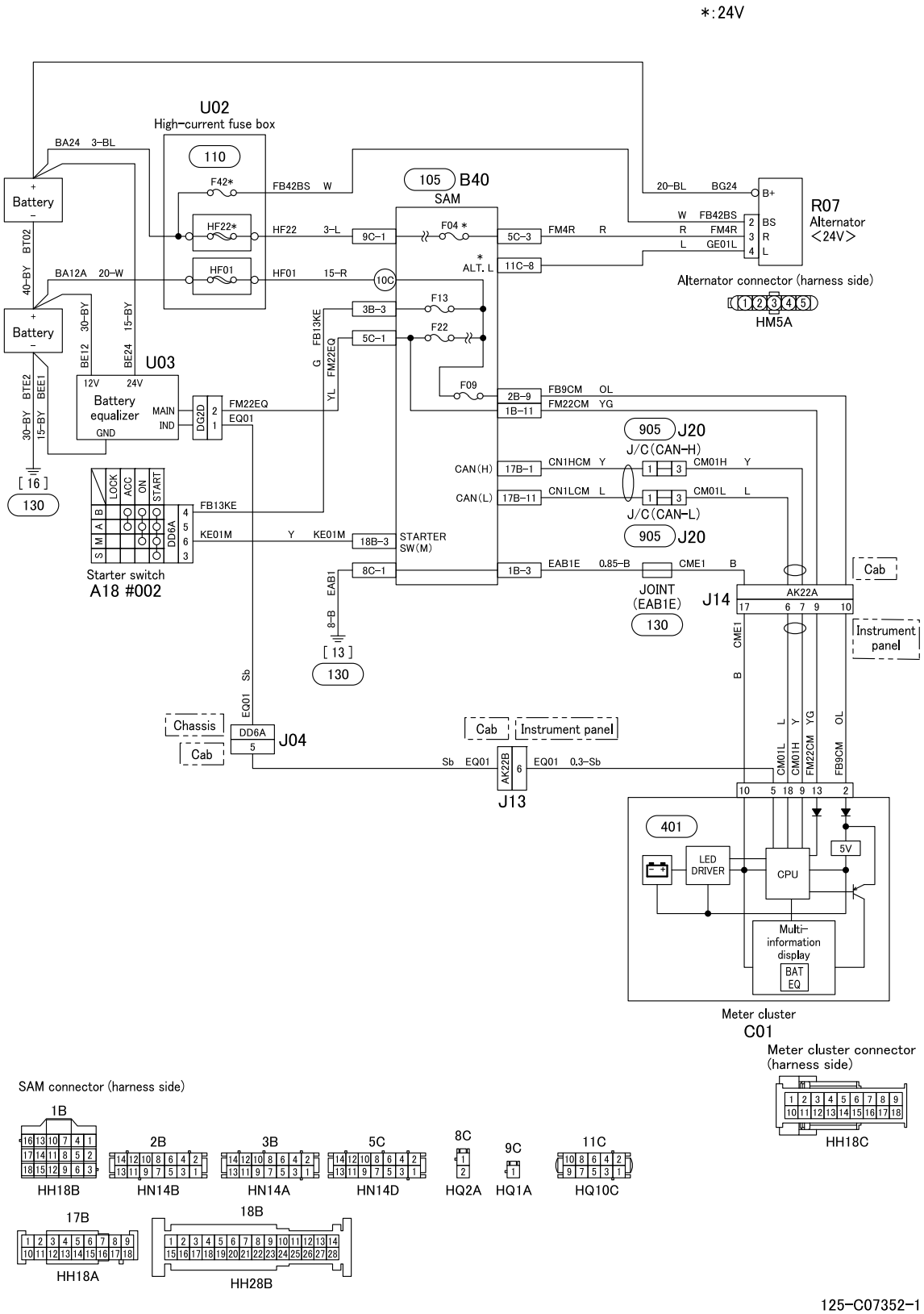




115-C07352

BATTERY CHARGING CIRCUIT (1)

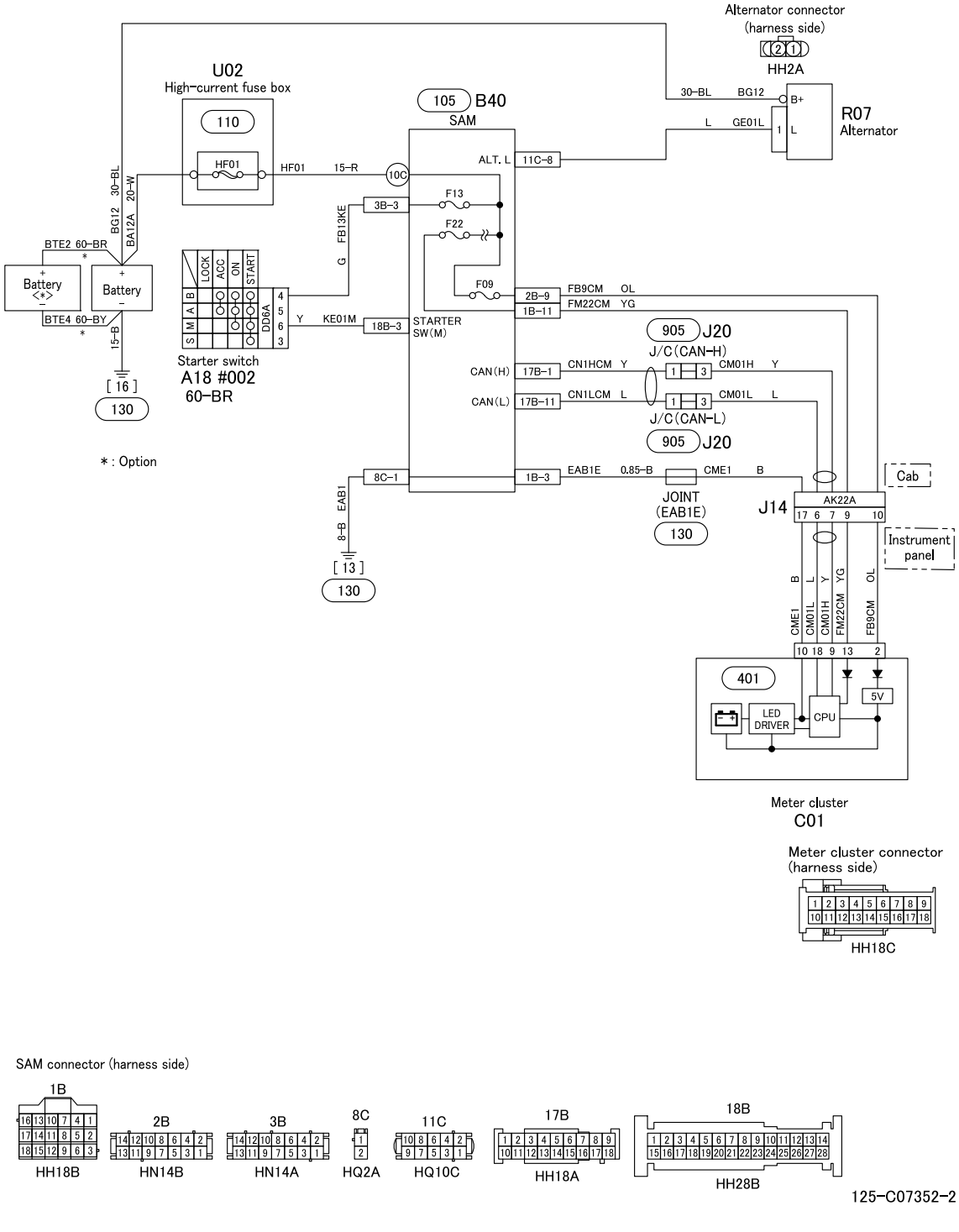
＜Vehicle with battery equalizer＞



125-C07352-1

BATTERY CHARGING CIRCUIT (2)

＜Vehicle without battery equalizer＞

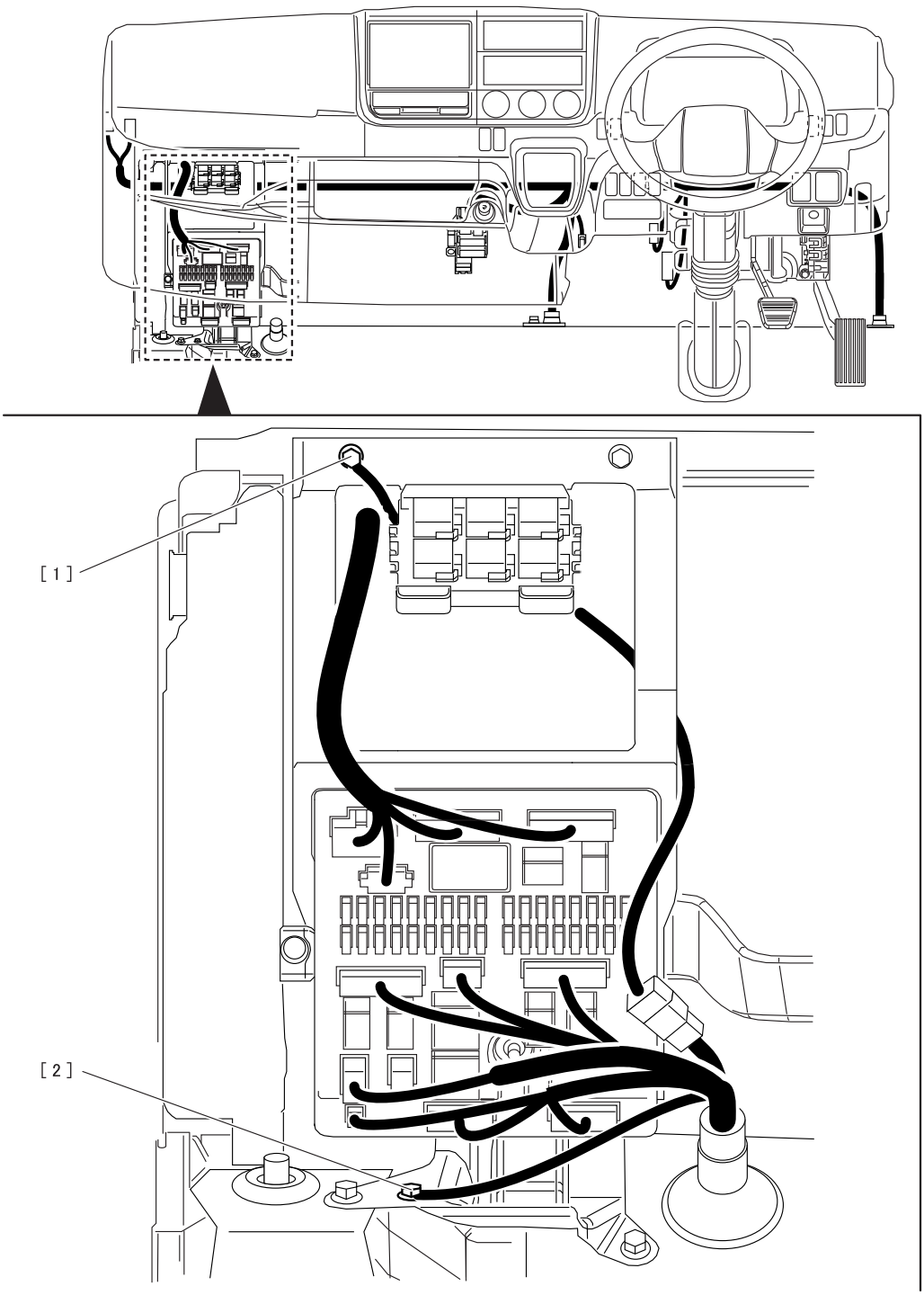


SAM connector (harness side)

125-C07352-2

GROUND (1)

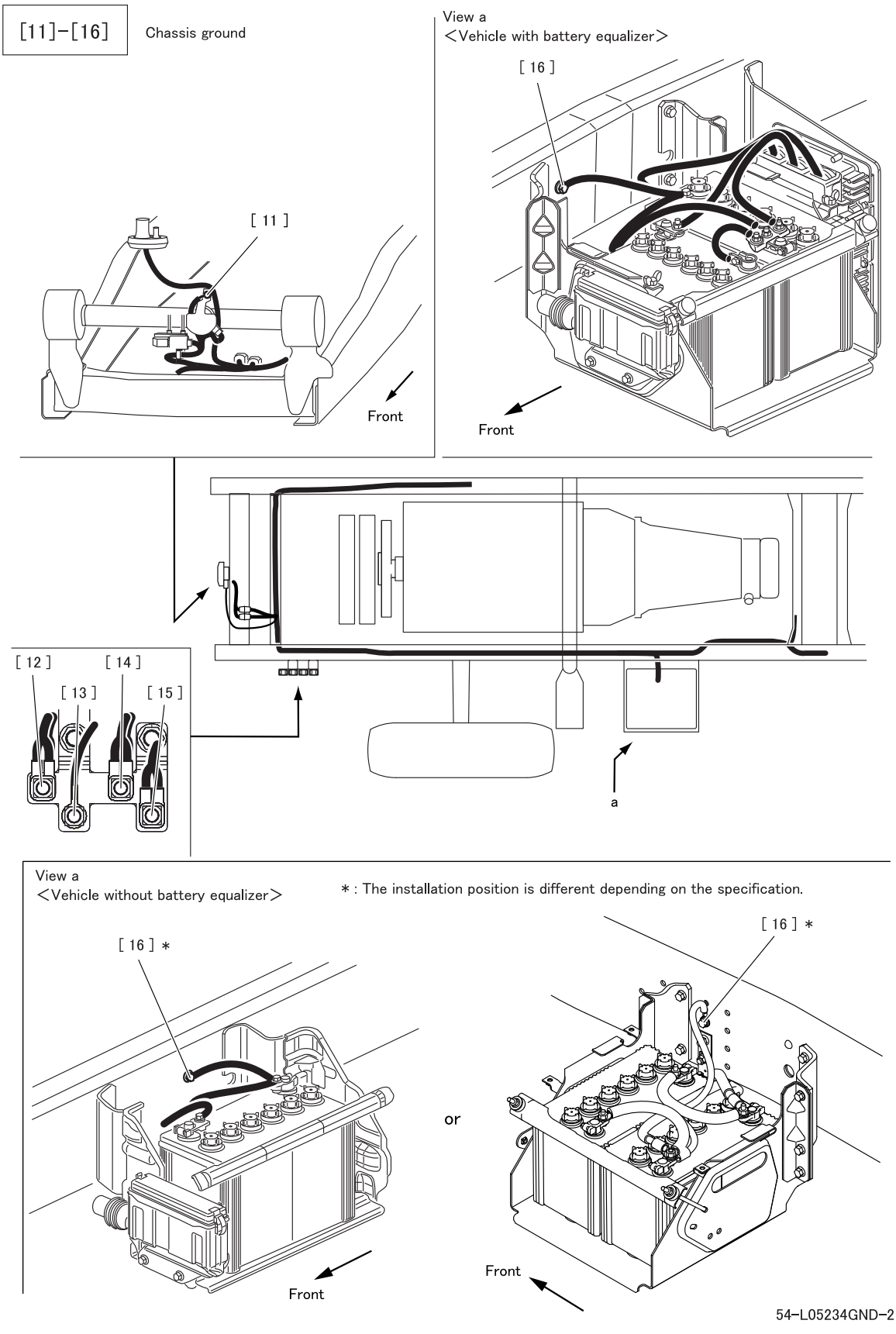
[1]–[2] Cab ground



Location	Circuit No.	Wire diameter – wire color	Destination	Remarks
[1]	EAB2	1.25–B	JOINT (EAB2)	
[2]	EAB3	1.25–B	Frame ground ([12])	

54–L05234GND–1

GROUND (2)


[11]–[16]
Chassis ground
[11]
Front
View a
<Vehicle with battery equalizer>
[16]
Front
[12]
[13]
[14]
[15]
a
View a
<Vehicle without battery equalizer>
* : The installation position is different depending on the specification.
[16] *
Front
or
[16] *
Front
54–L05234GND–2

GROUND (3)

Location	Circuit No.	Wire diameter – wire color	Destination	Remarks
[11]	HNE1	1.25–B	Frame ground ([12])	Horn
[12]	CFE1	1.25–B	Condenser fan motor	<FE>
	CFE3	1.25–B		<FE : Crew cab (rear air–conditioner)>
	EAB3	1.25–B	Cab ground ([2])	
	EAC1	1.25–B	JOINT (EAC1)	
	FHE1	1.25–B	Fuel filter	<FG>
	FHE1S	1.25–B		<FG>
	FLE1	B	Fog lamp	*1, *2
	HNE1	1.25–B	Horn ground	
	HSE1	2–B	Urea tank	BlueTec® exhaust gas aftertreatment
	HSE2	2–B		
[13]	EAB1	8–B	SAM	
[14]	ABE1	3–B	Hydraulic unit	ABS
	ABE2	3–B		
	AME1	1.25–B	DUONIC ECU	
	AME2	1.25–B		
	EDE1	2.5–B	Engine ECU	
	EDE2	2.5–B		
	EDE3	2.5–B		
	EXE1	1.25–B		
[15]	CFE1	1.25–B	Condenser fan motor	<FG>
	CFE3	1.25–B	Condenser fan motor	<FG : Crew cab (rear air–conditioner)>
	EAR1	1.25–B	JOINT (EAR1)	
	FHE1	1.25–B	Fuel filter	<FE>
	FHE1S	1.25–B		<FE>
[16]	—	15–B	Battery	Vehicle without battery equalzer : 12V
	BTE2	30–BY		Vehicle with battery equalzer : 24V

SAM : Signal detect and actuation modules
ABS : Anti–lock brake system
ECU : Electronic control unit

*1 : For Australia/New Zealand
*2 : For Hong Kong

54–L05234GND–3

GROUND (4)

C

＜FECX, FG with High-Low Transfer＞

Location	Circuit No.	Wire diameter – wire color	Destination	Remarks
[11]	HNE1	1.25-B	Frame ground ([12])	Horn
[12]	EAB3	1.25-B	Cab ground ([2])	
	EAC1	1.25-B	JOINT (EAC1)	
	FHE1	1.25-B	Fuel filter	
	FPE1	0.85-B	Fuel pump	
	FLE1	B	Fog lamp	*1
	HNE1	1.25-B	Horn ground	
	HSE1	2-B	JOINT (HSE1)	BlueTec® exhaust gas aftertreatment
	HSE2	2-B		
[13]	EAB1	8-B	SAM	
[14]	ABE1	3-B	Hydraulic unit	ABS
	ABE2	3-B		
	AME1	1.25-B	DUONIC ECU	
	AME2	1.25-B		
	EDE1	2.5-B	Engine ECU	
	EDE2	2.5-B		
	EDE3	2.5-B		
	EXE1	1.25-B	Exhaust brake valve	
[15]	CFE1	1.25-B	Condenser fan motor	
	EAR1	1.25-B	JOINT (EAR1)	
[16]	BTE3	30-BY	Battery	Vehicle without battery equalzer : 12V
	BTE2			Vehicle with battery equalzer : 24V

SAM : Signal detect and actuation modules
ABS : Anti-lock brake system
ECU : Electronic control unit

*1 : For Australia/New Zealand

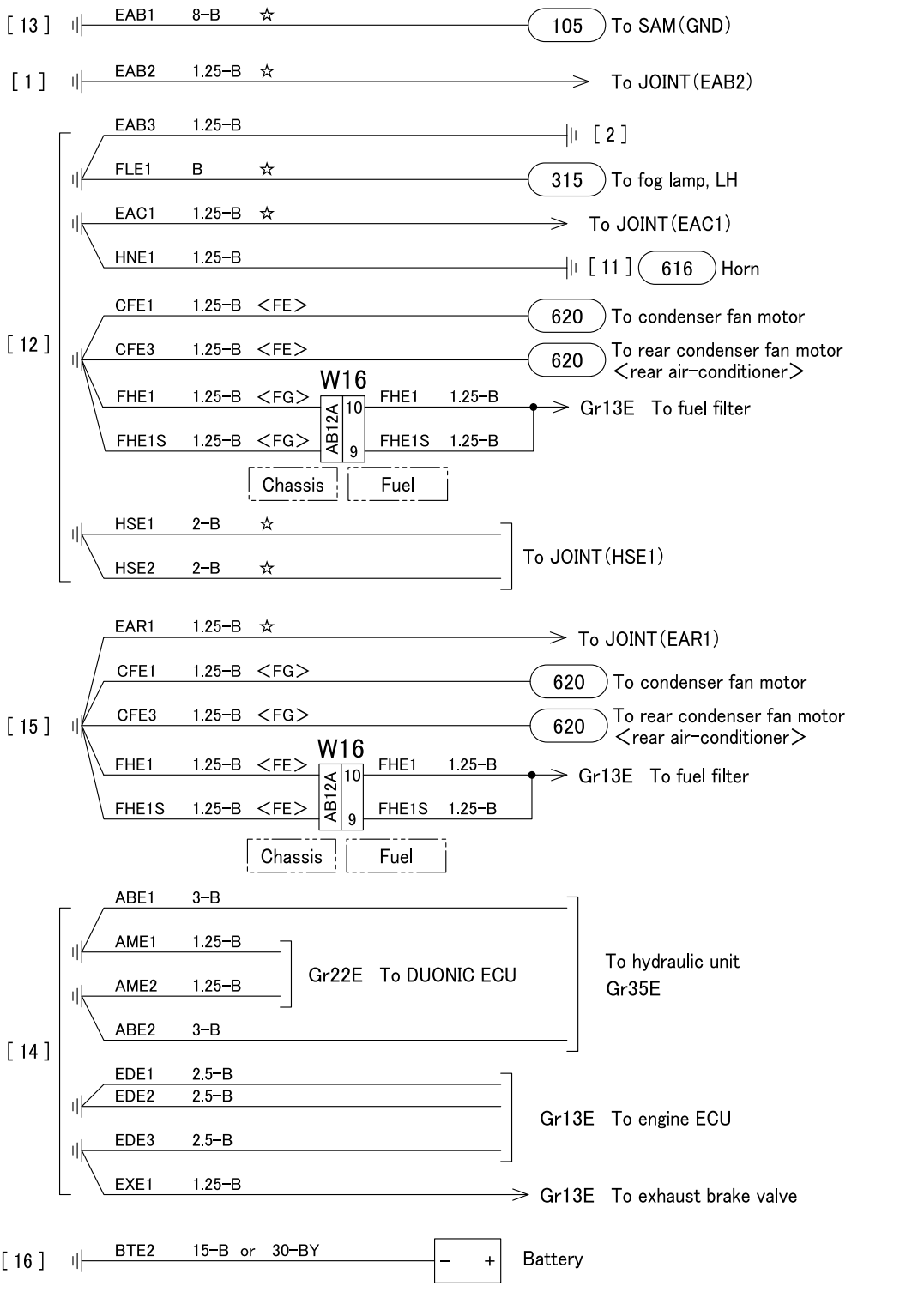
54-L05282GND-3

GROUND (5)

Entire ground

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

ECU: Electronic control unit



130-C07352ALL

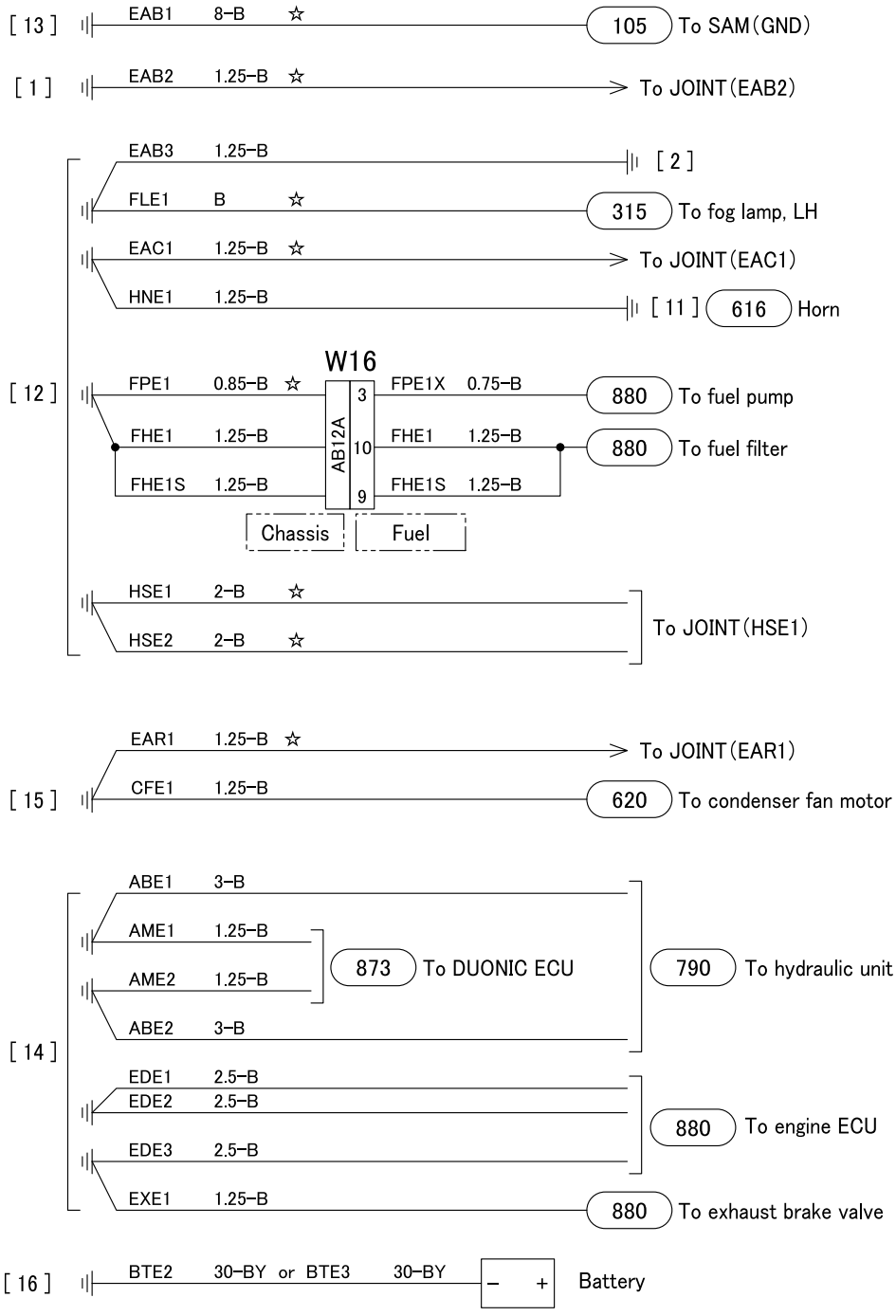
GROUND (6)

<FECX, FG with High-Low Transfer>

Entire ground

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

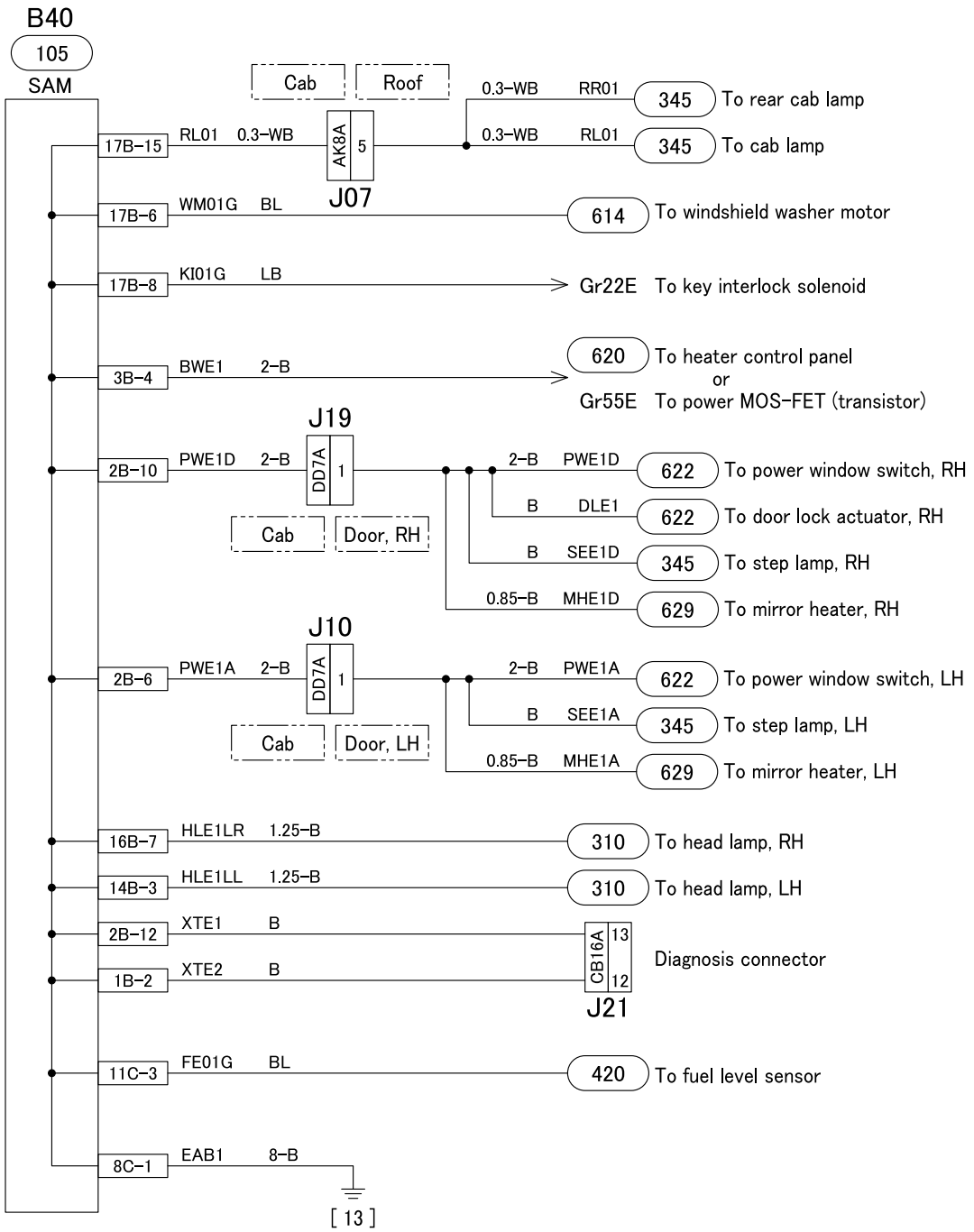
ECU: Electronic control unit



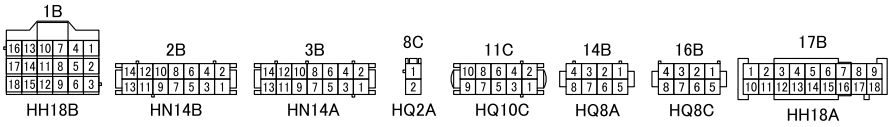
130-C07396ALL

GROUND (7)

Circuit No. EAB1 ground (1/6)



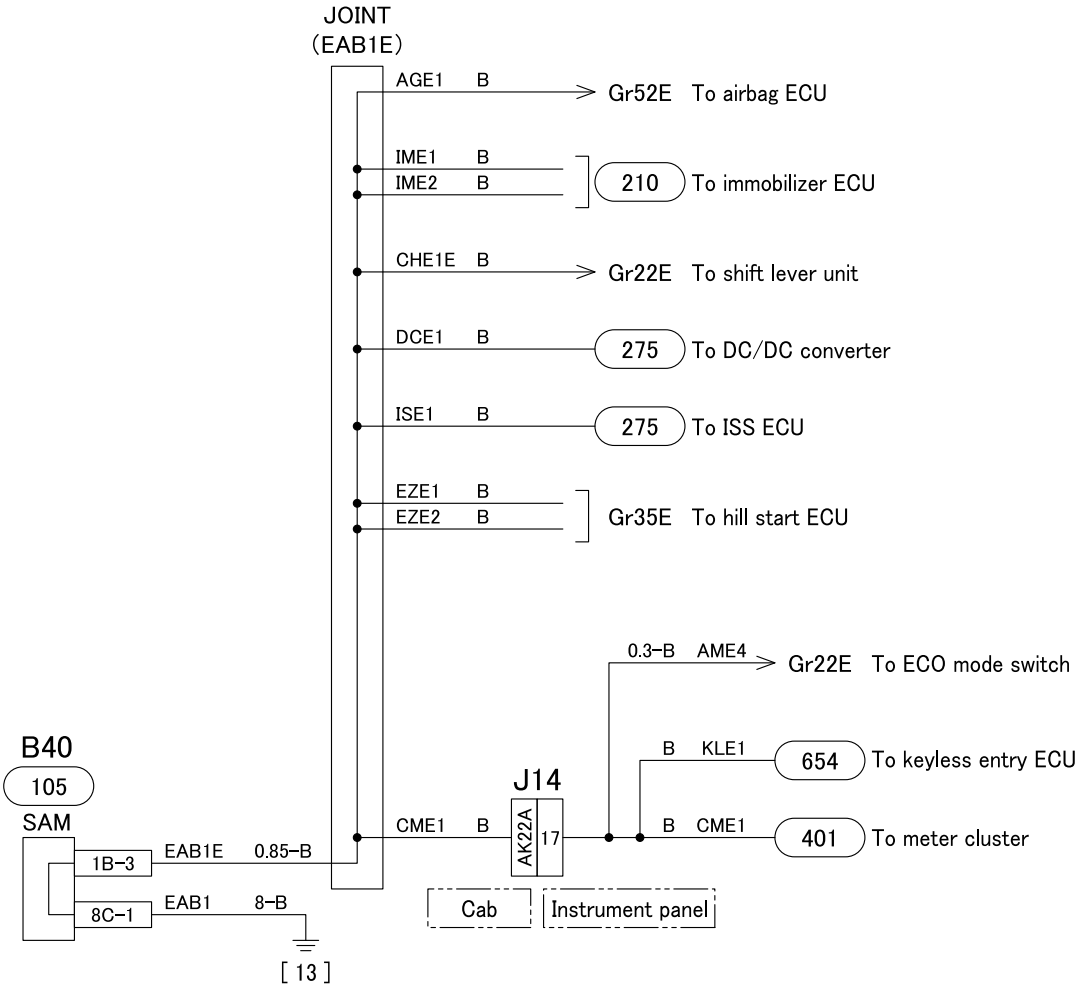
SAM connector (harness side)



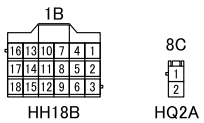
130-C07352EAB1-1

GROUND (8)

Circuit No. EAB1 ground (2/6)
＜JOINT(EAB1E)＞



SAM connector (harness side)

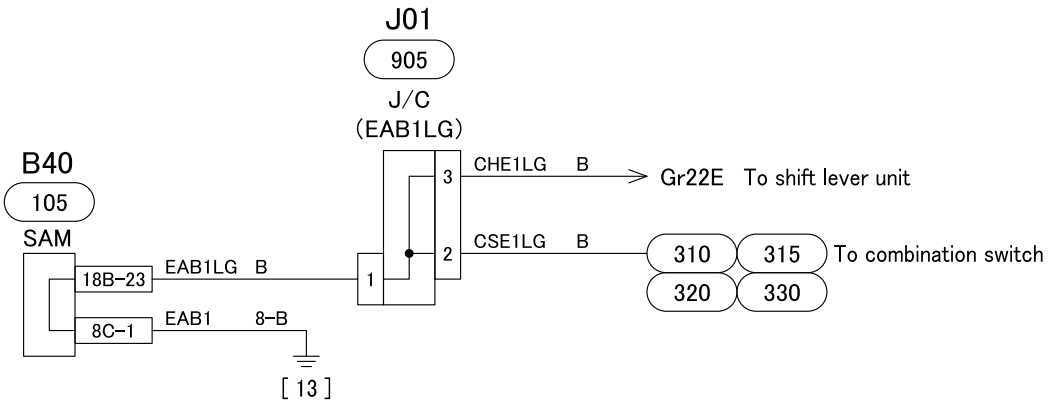


ECU: Electronic control unit
ISS: Idling stop and start system

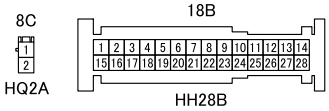
130-C07352EAB1-2

GROUND (9)

Circuit No. EAB1 ground (3/6)
＜J/C(EAB1LG)＞



SAM connector (harness side)

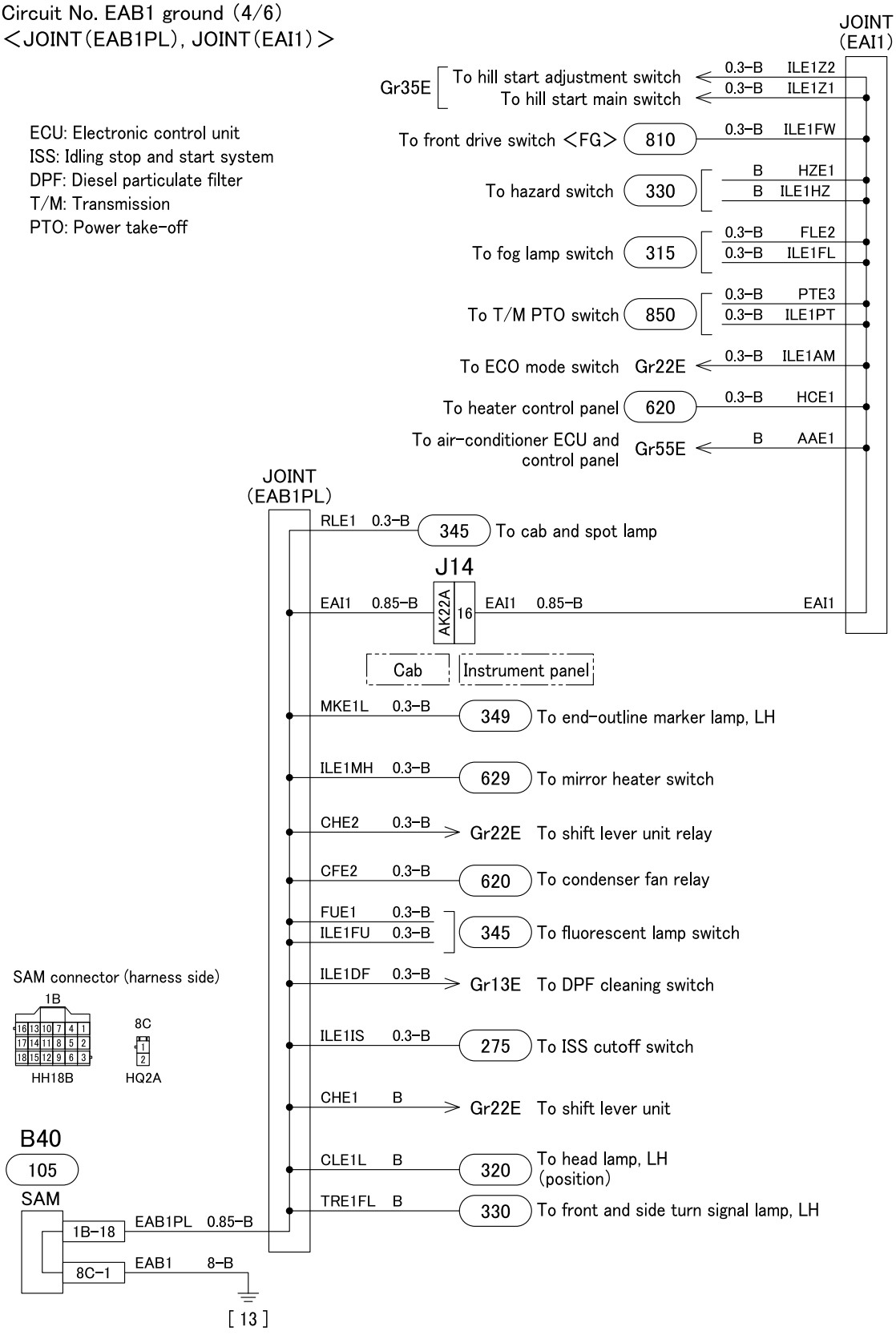


130-C07352EAB1-3

GROUND (10)

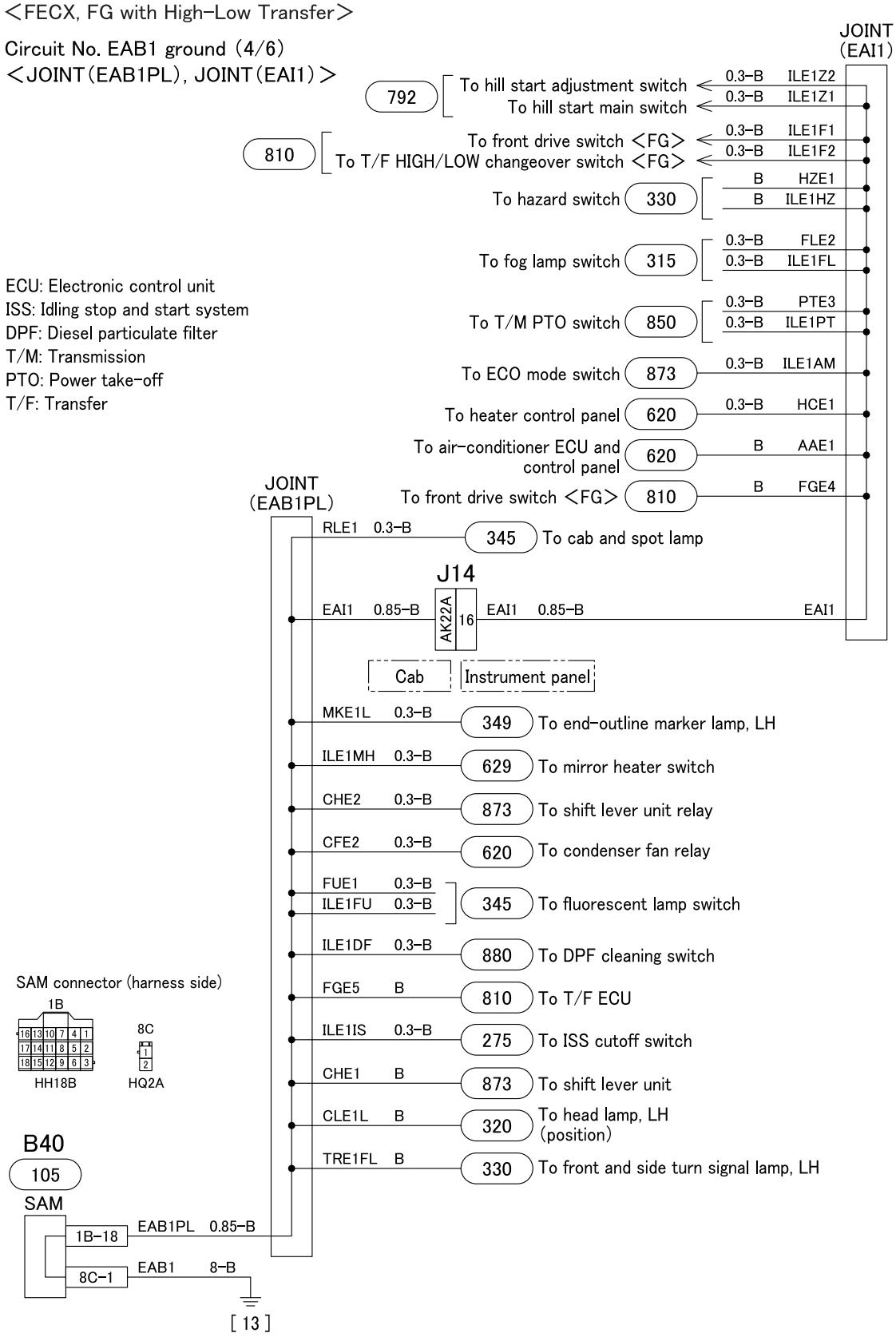
Circuit No. EAB1 ground (4/6)
<JOINT(EAB1PL), JOINT(EAI1)>

ECU: Electronic control unit
ISS: Idling stop and start system
DPF: Diesel particulate filter
T/M: Transmission
PTO: Power take-off



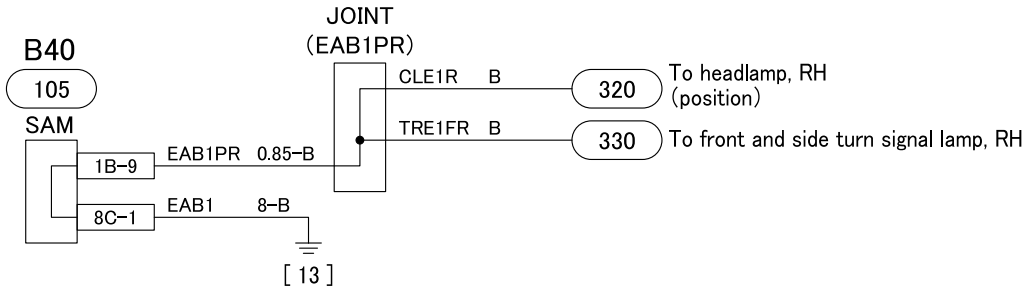
130-C07352EAB1-4

GROUND (11)

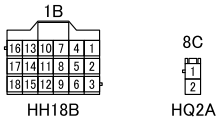

＜FECX, FG with High-Low Transfer＞
Circuit No. EAB1 ground (4/6)
＜JOINT(EAB1PL), JOINT(EAI1)＞
ECU: Electronic control unit
ISS: Idling stop and start system
DPF: Diesel particulate filter
T/M: Transmission
PTO: Power take-off
T/F: Transfer
JOINT (EAI1)
792
To hill start adjustment switch
To hill start main switch
0.3-B ILE1Z2
0.3-B ILE1Z1
810
To front drive switch ＜FG＞
To T/F HIGH/LOW changeover switch ＜FG＞
0.3-B ILE1F1
0.3-B ILE1F2
To hazard switch 330
B HZE1
B ILE1HZ
To fog lamp switch 315
0.3-B FLE2
0.3-B ILE1FL
To T/M PTO switch 850
0.3-B PTE3
0.3-B ILE1PT
To ECO mode switch 873
0.3-B ILE1AM
To heater control panel 620
0.3-B HCE1
To air-conditioner ECU and control panel 620
B AAE1
To front drive switch ＜FG＞ 810
B FGE4
JOINT (EAB1PL)
RLE1 0.3-B
345
To cab and spot lamp
J14
EAI1 0.85-B
AK22A
16
EAI1 0.85-B
EAI1
Cab
Instrument panel
MKE1L 0.3-B 349 To end-outline marker lamp, LH
ILE1MH 0.3-B 629 To mirror heater switch
CHE2 0.3-B 873 To shift lever unit relay
CFE2 0.3-B 620 To condenser fan relay
FUE1 0.3-B
ILE1FU 0.3-B
345 To fluorescent lamp switch
ILE1DF 0.3-B 880 To DPF cleaning switch
FGE5 B 810 To T/F ECU
ILE1IS 0.3-B 275 To ISS cutoff switch
CHE1 B 873 To shift lever unit
CLE1L B 320 To head lamp, LH (position)
TRE1FL B 330 To front and side turn signal lamp, LH
SAM connector (harness side)
1B
HH18B
8C
HQ2A
B40
105
SAM
1B-18 EAB1PL 0.85-B
8C-1 EAB1 8-B
[13]
130-C07396EAB1-4

GROUND (12)

Circuit No. EAB1 ground (5/6)
＜JOINT(EAB1PR)＞



SAM connector (harness side)

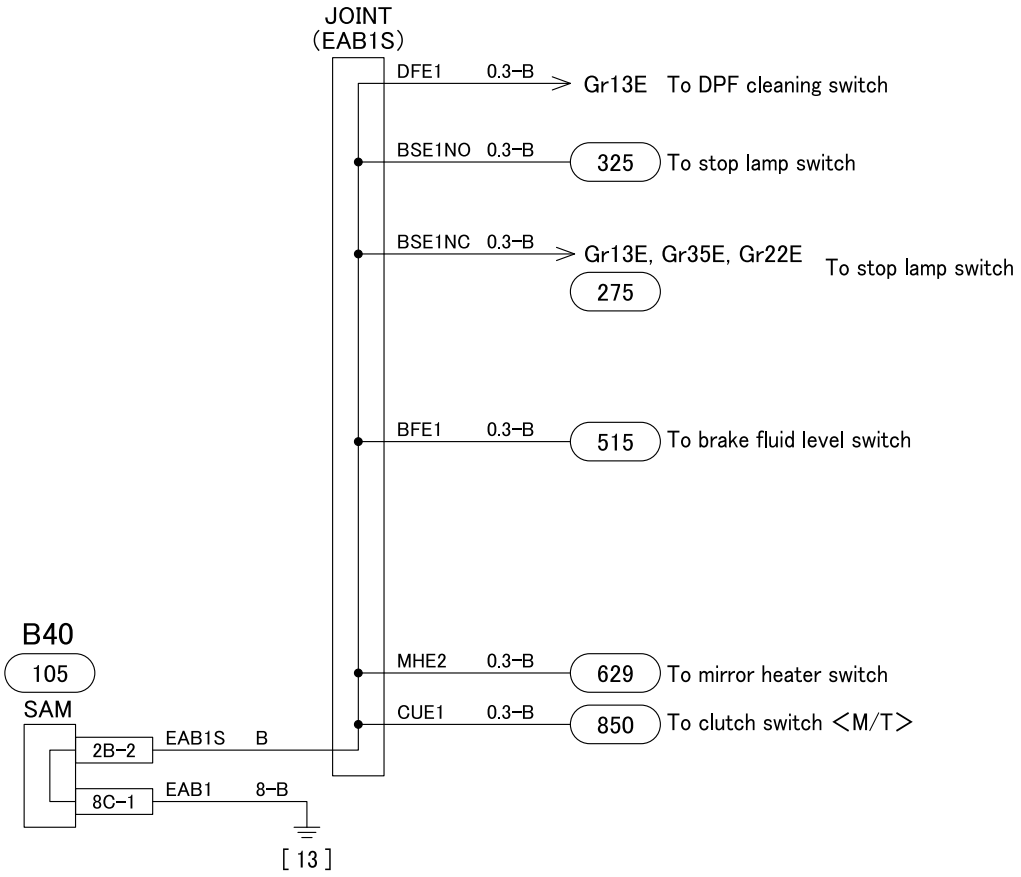


130-C07352EAB1-5

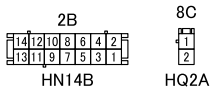
GROUND (13)

Circuit No. EAB1 ground (6/6)
＜JOINT(EAB1S)＞

M/T: Manual transmission
DPF: Diesel particulate filter



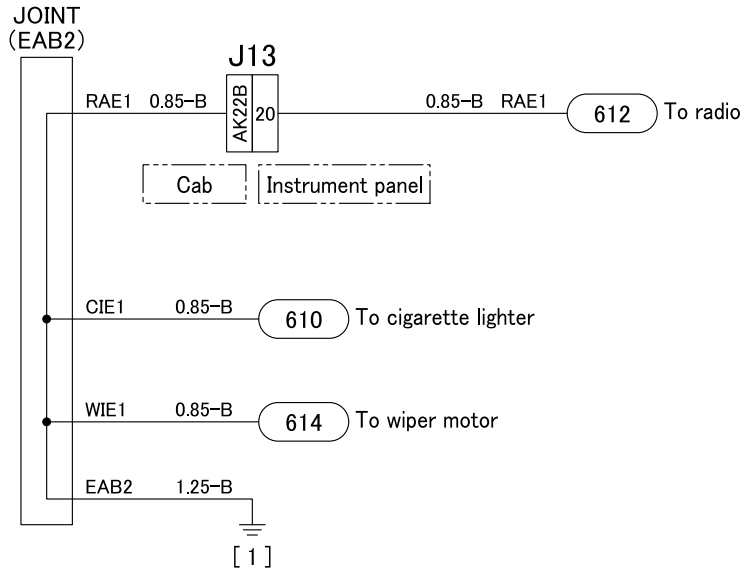
SAM connector (harness side)



130-C07352EAB1-6

GROUND (14)

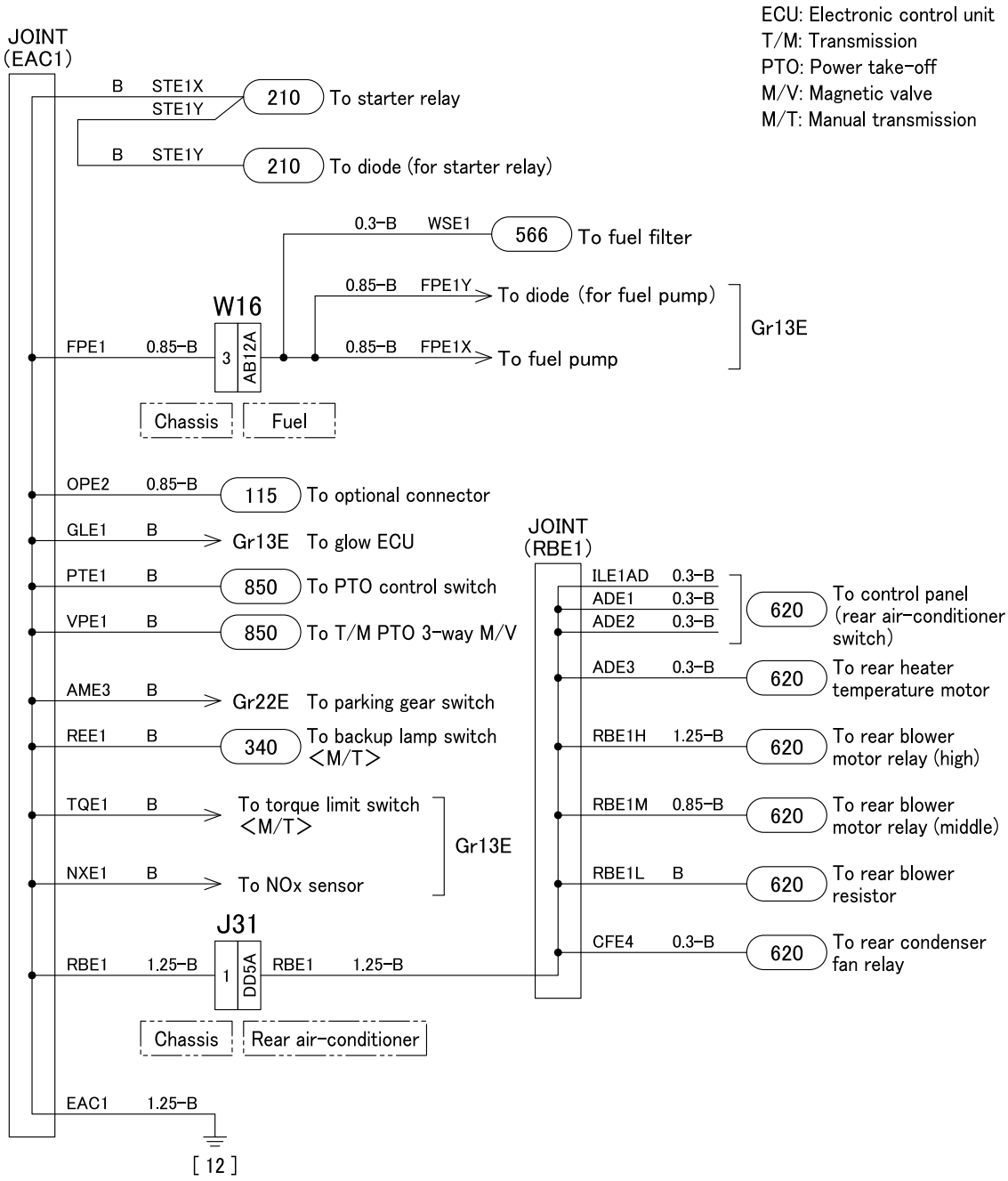
Circuit No. EAB2 ground



130-C07352EAB2

GROUND (15)

Circuit No. EAC1 ground



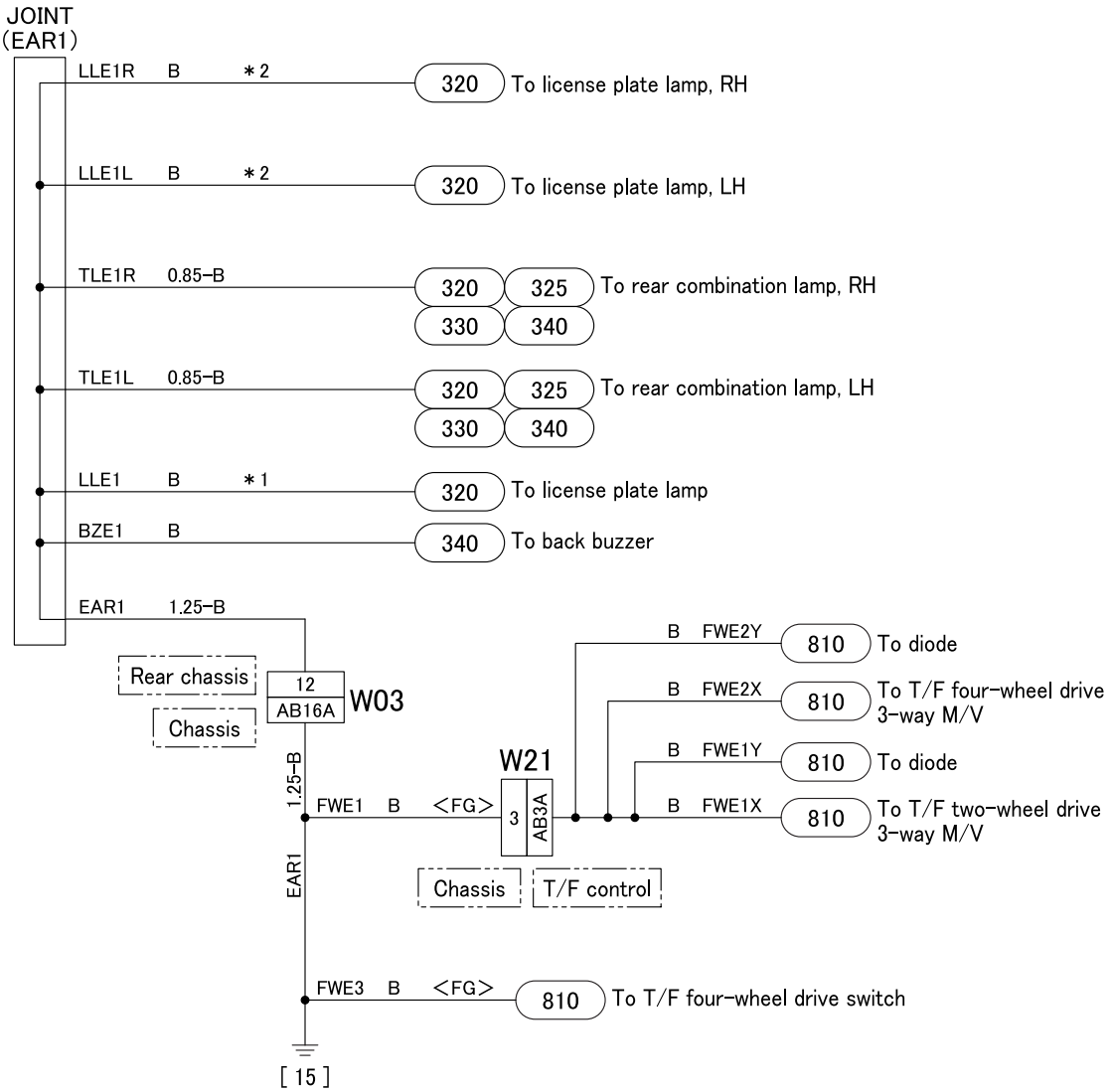
130-C07352EAC1

GROUND (16)

Circuit No. EAR1 ground

T/F: Transfer
M/V: Magnetic Valve

＊1 : For Singapore
＊2 : Except ＊1



130-C07352EAR1

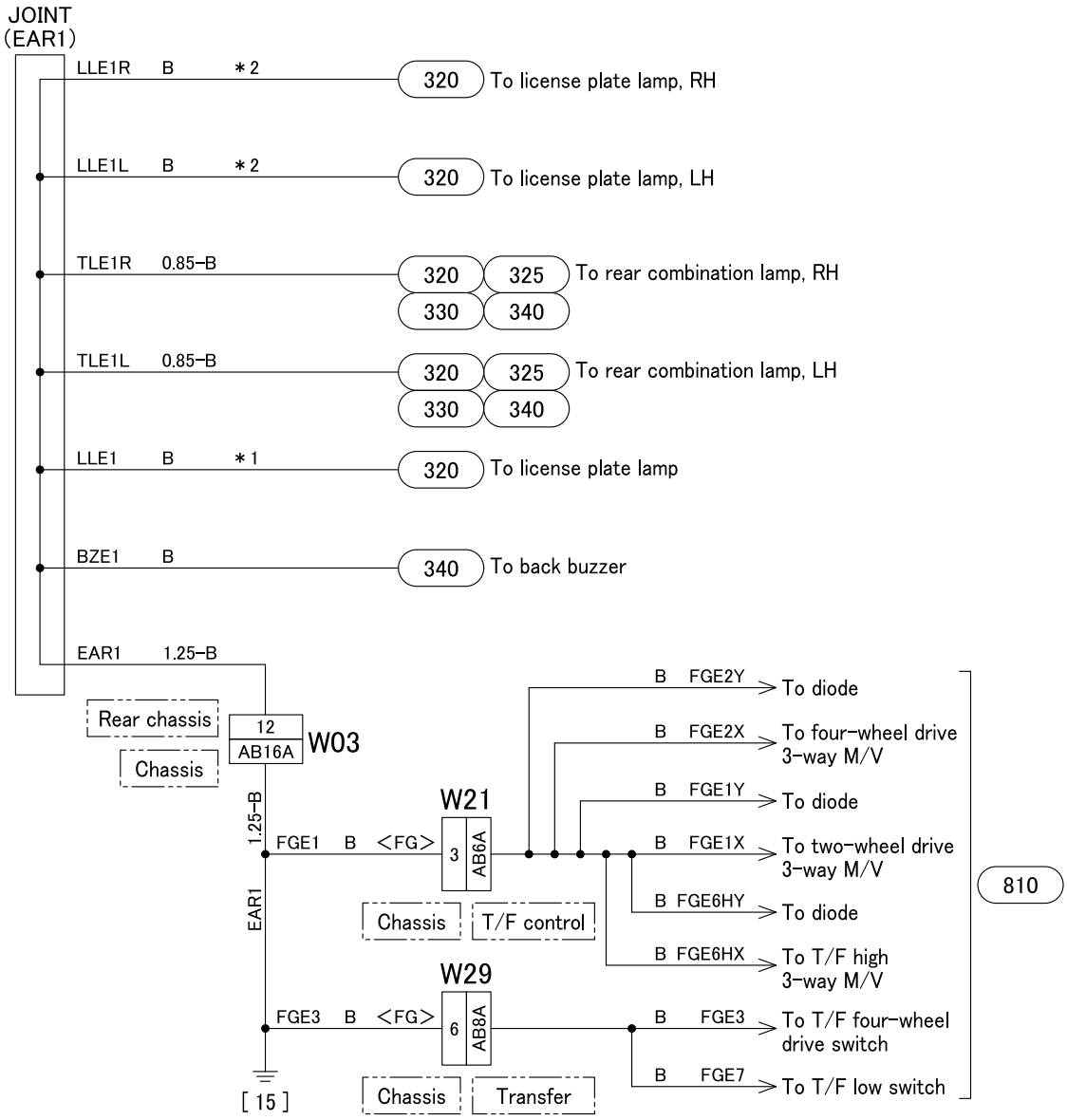
GROUND (17)

<FECX, FG with High-Low Transfer>

Circuit No. EAR1 ground

T/F: Transfer
M/V: Magnetic Valve

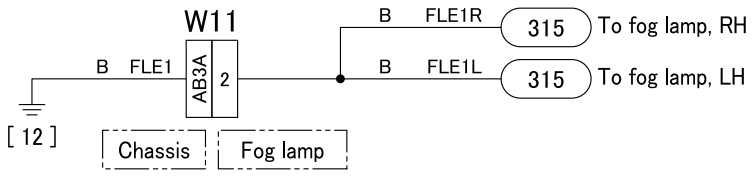
＊1 : For Singapore
＊2 : Except ＊1



130-C07396EAR1

GROUND (18)

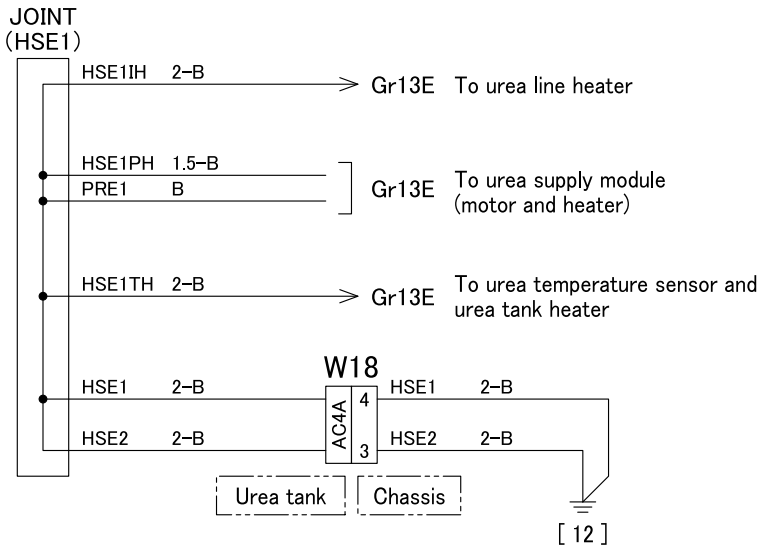
Circuit No. FLE1 ground



130–C07352FLE1

GROUND (19)

Circuit No. HSE1, HSE2 ground



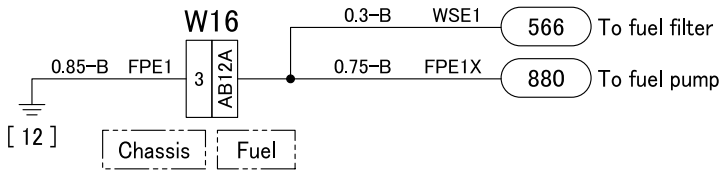
130-C07352HSE1

GROUND (20)

C

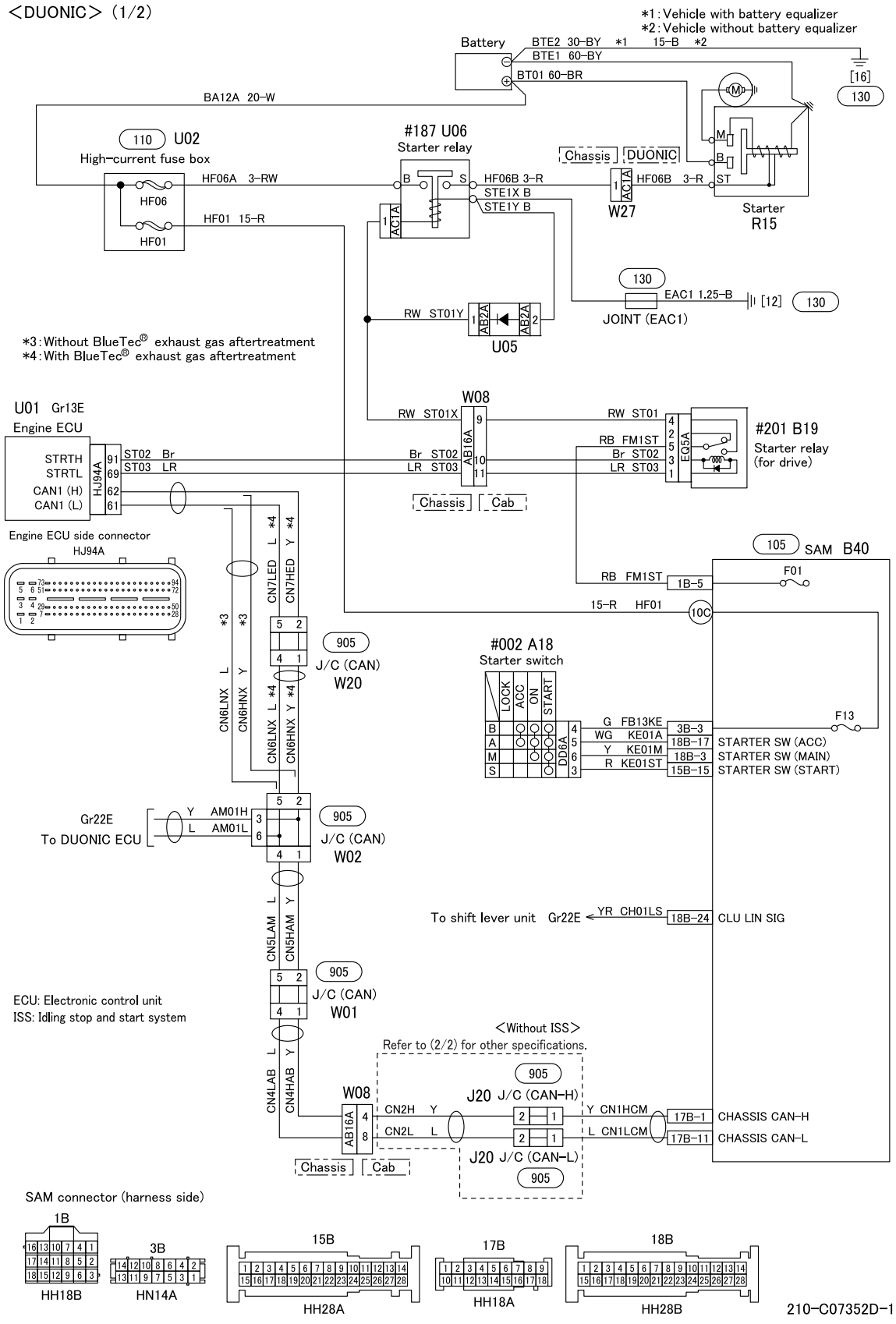
＜FECX, FG with High-Low Transfer＞

Circuit No. FPE1 ground



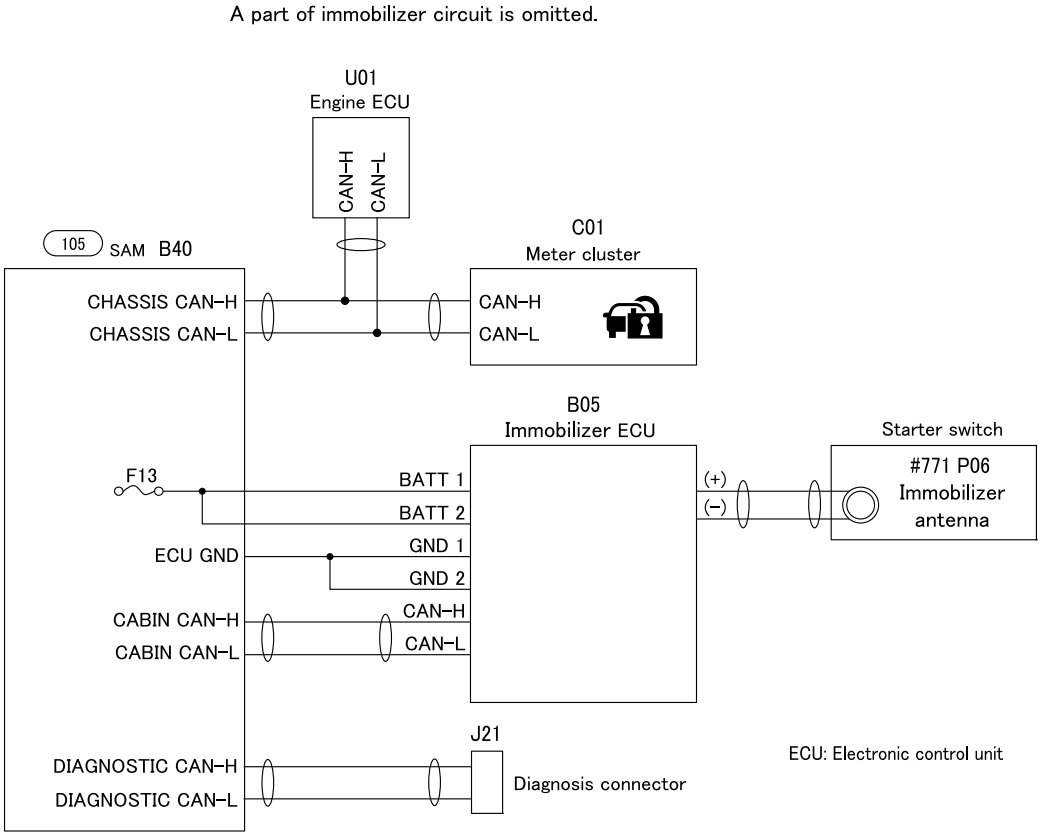
130-C07396FPE1

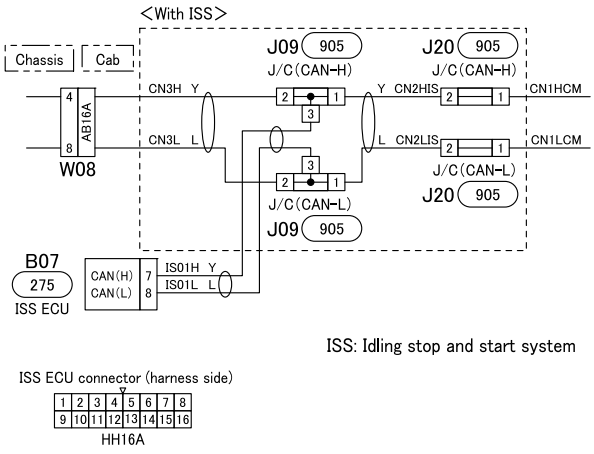
ENGINE STARTING CIRCUIT (1)



ENGINE STARTING CIRCUIT (2)

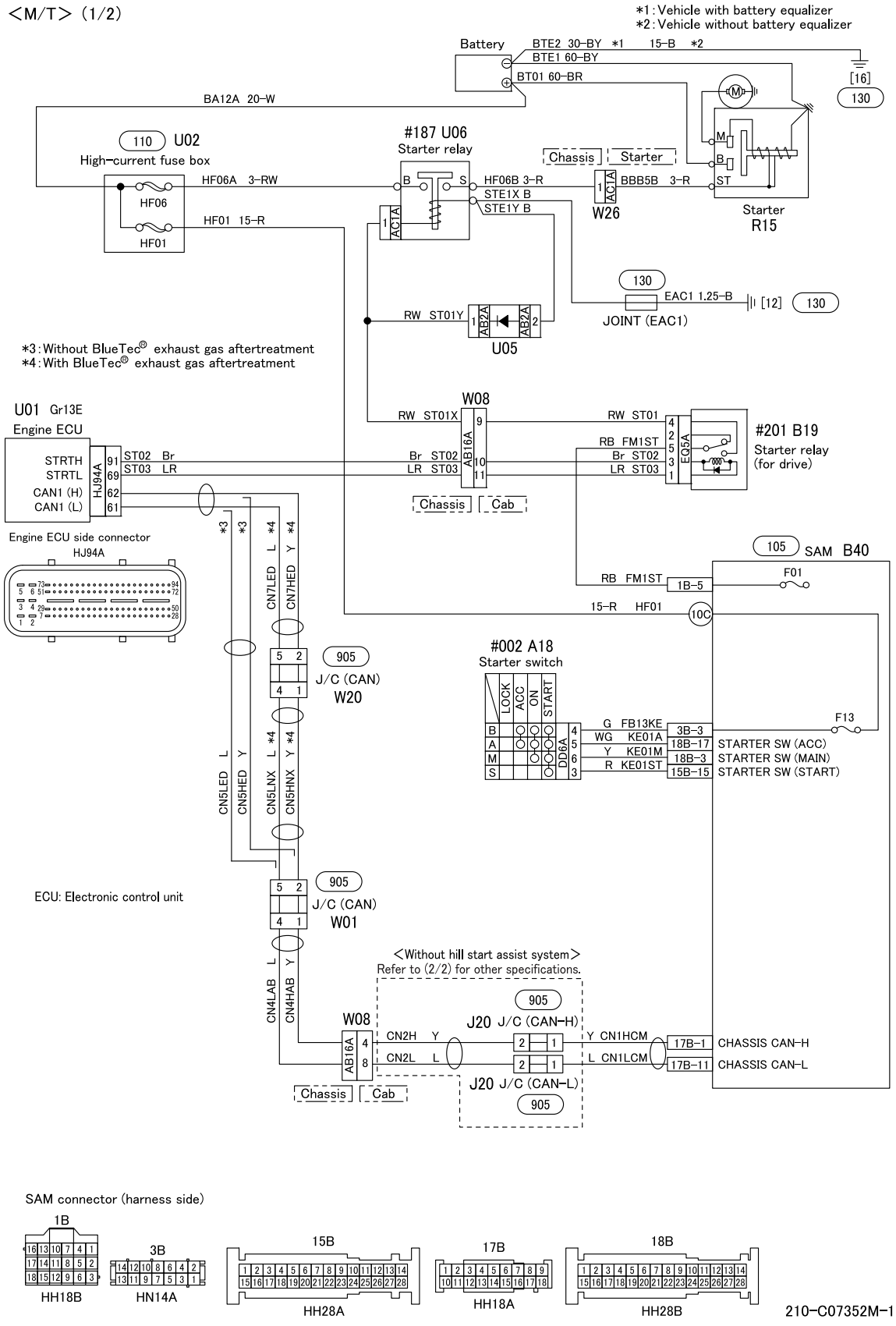
＜DUONIC＞（2/2）





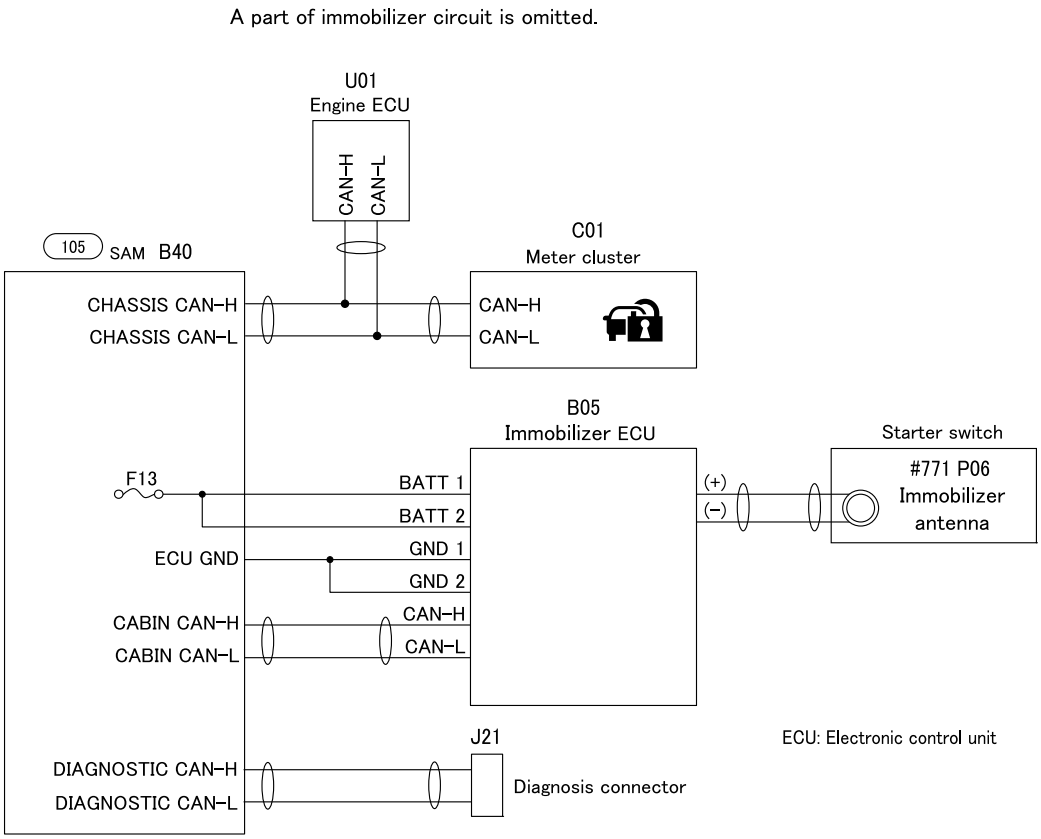
210−C07352D−2

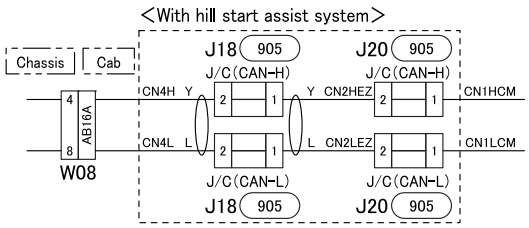
ENGINE STARTING CIRCUIT (3)



ENGINE STARTING CIRCUIT (4)

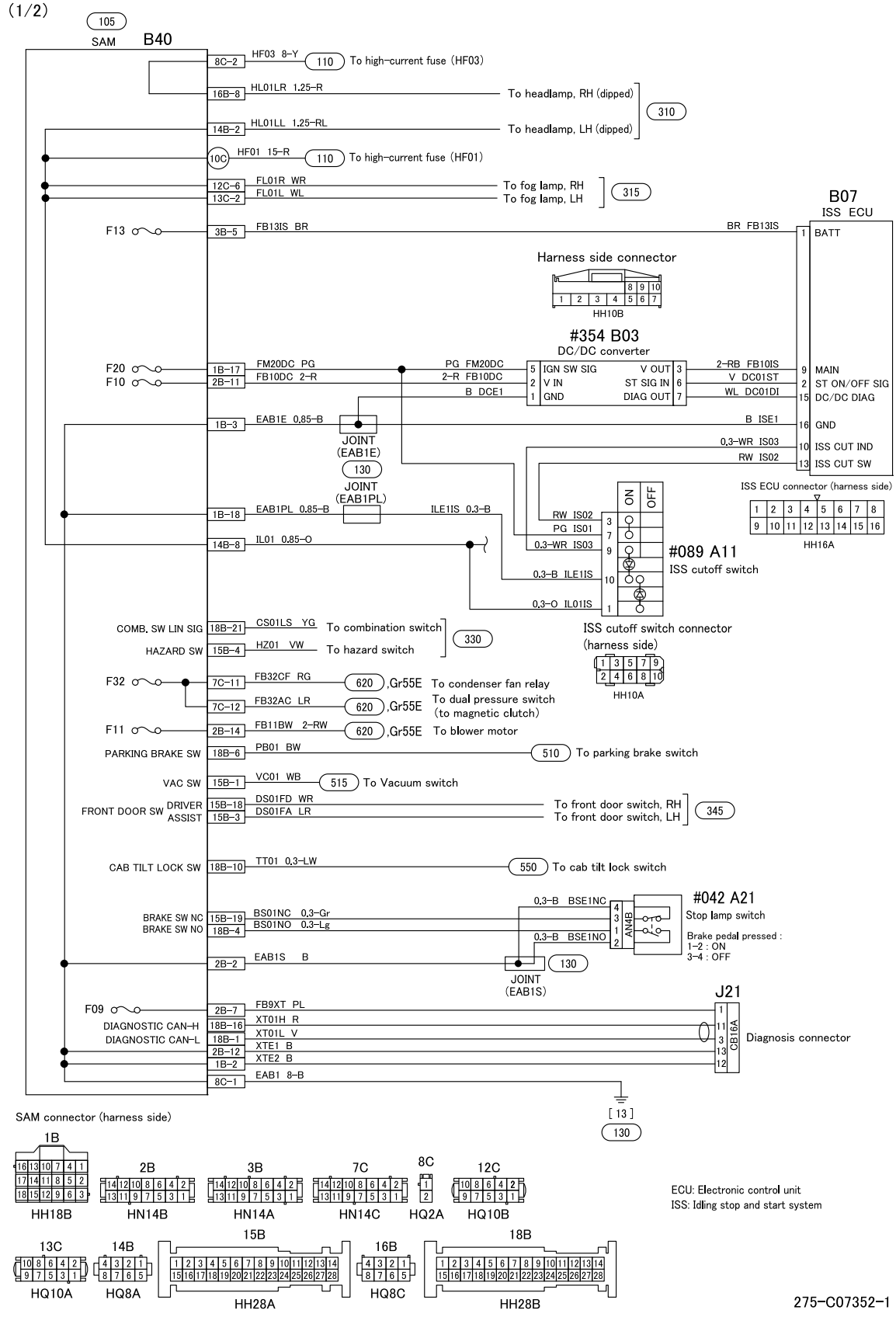
＜M/T＞ (2/2)



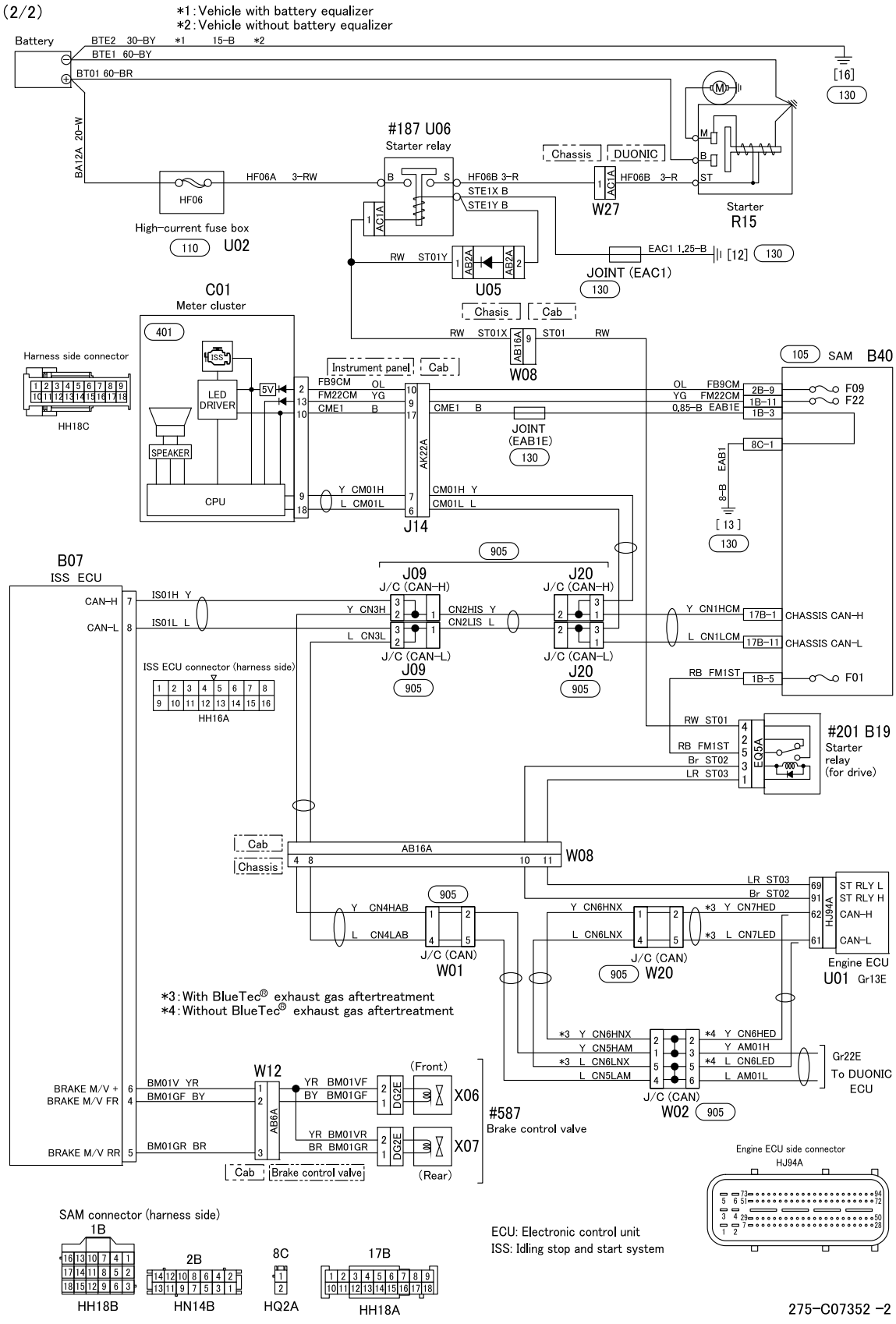


210-C07352M-2

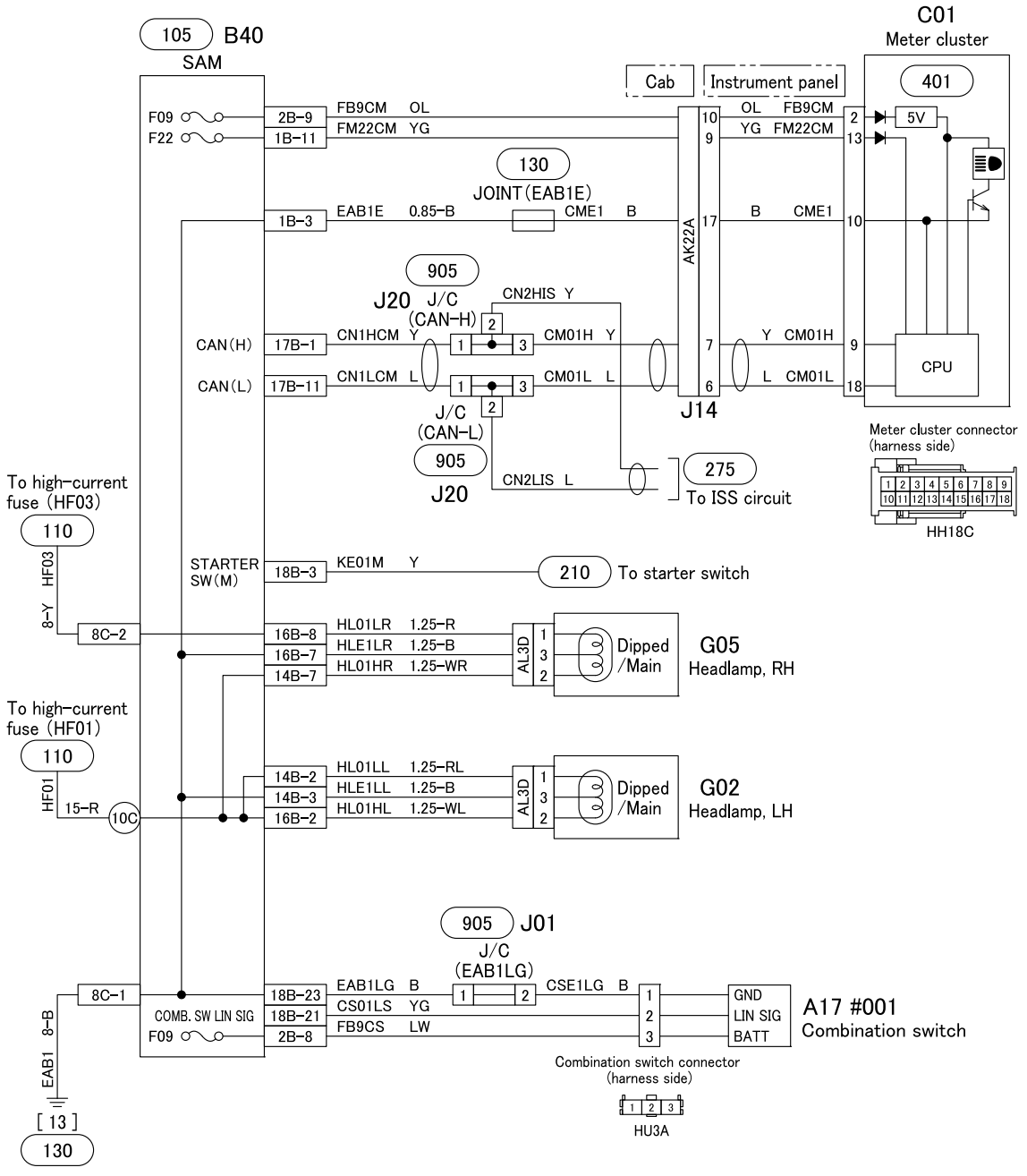
ISS (IDLING STOP AND START SYSTEM) CIRCUIT (1)

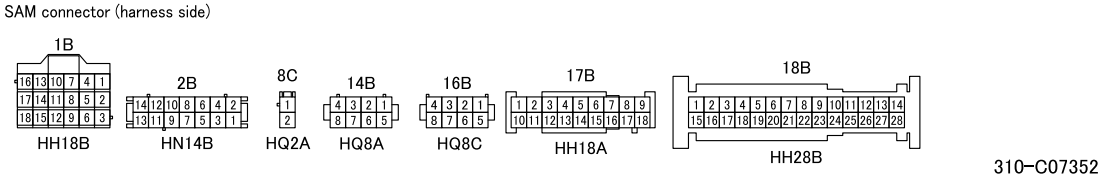


ISS (IDLING STOP AND START SYSTEM) CIRCUIT (2)



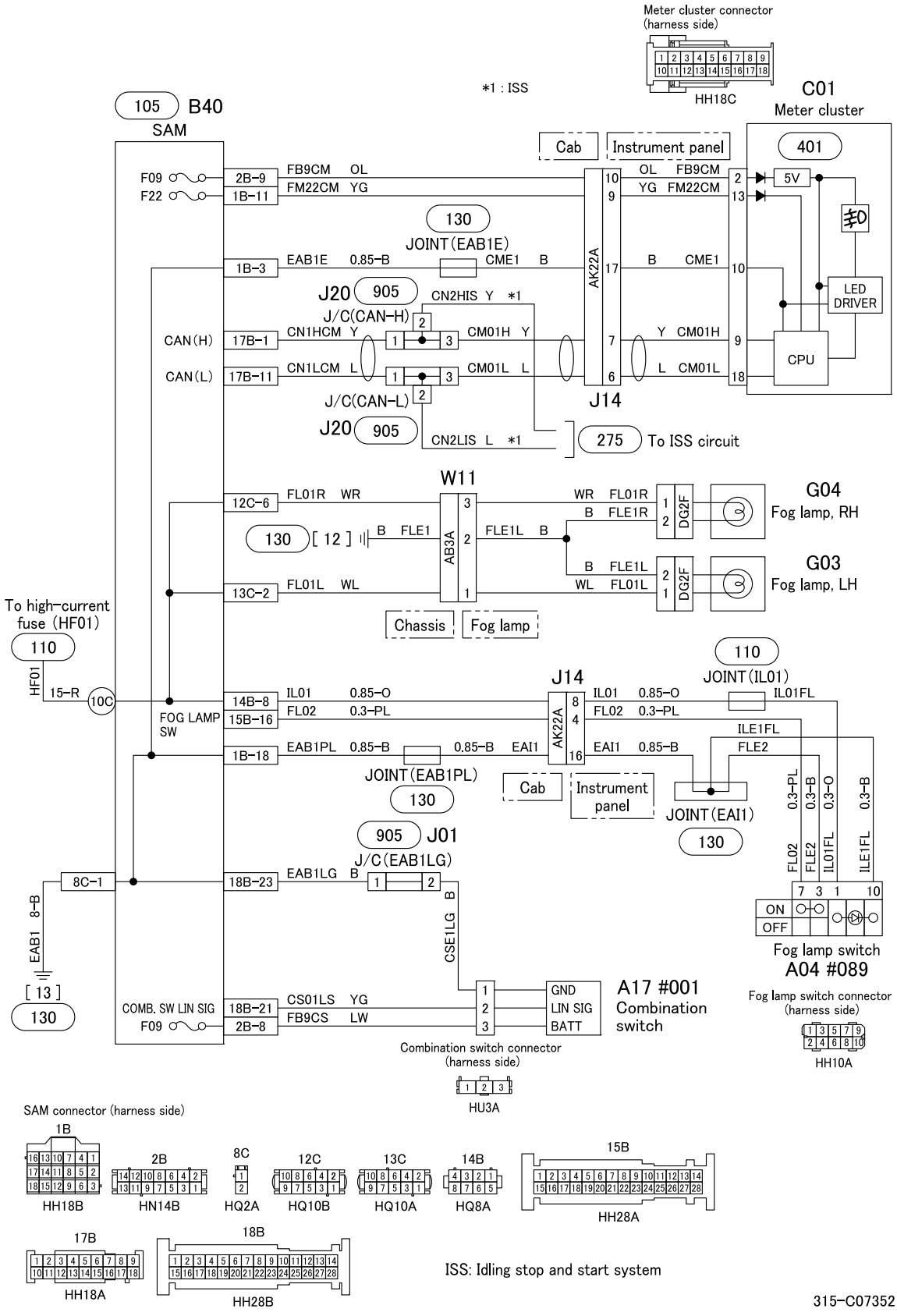
HEADLAMP CIRCUIT



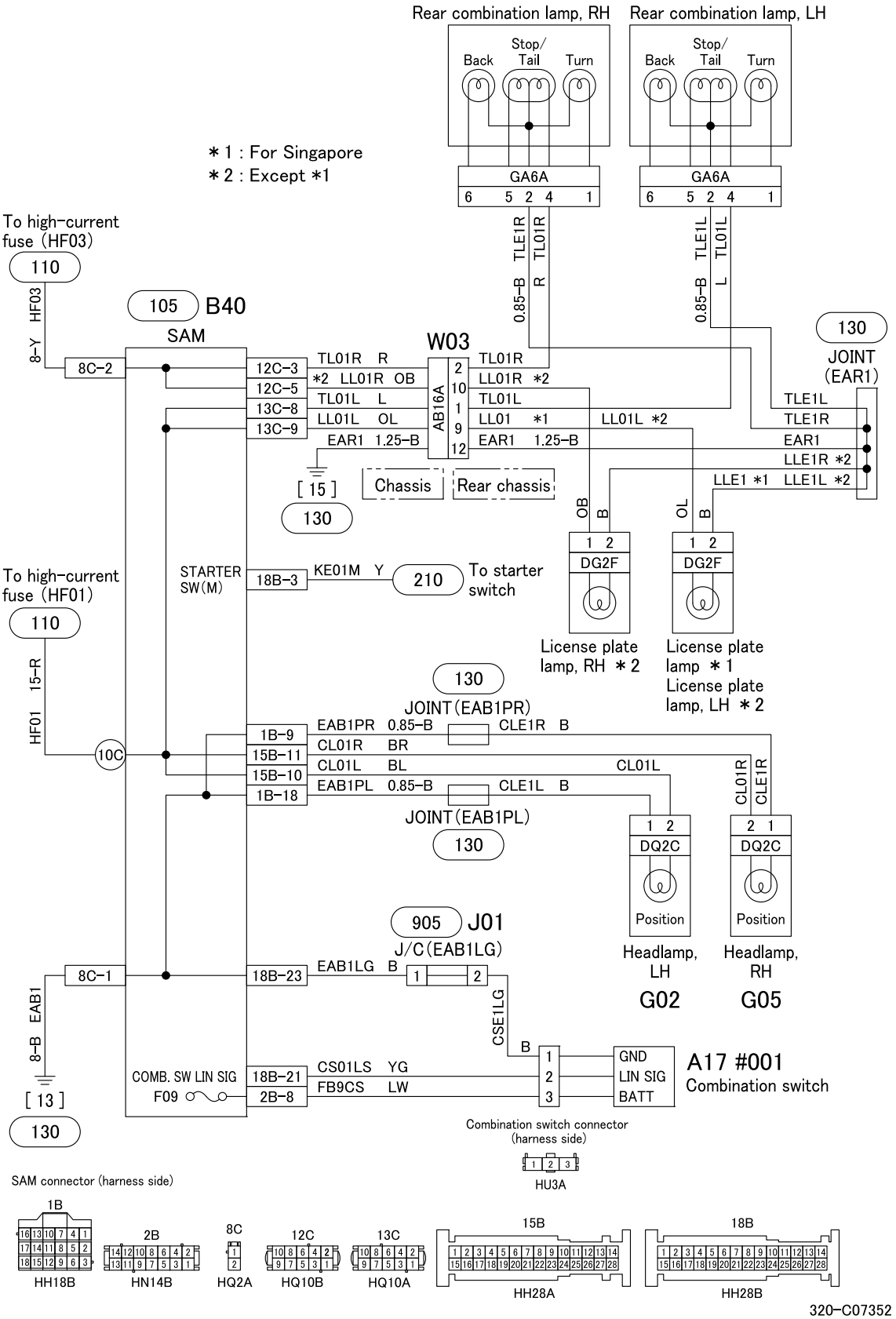


310-C07352

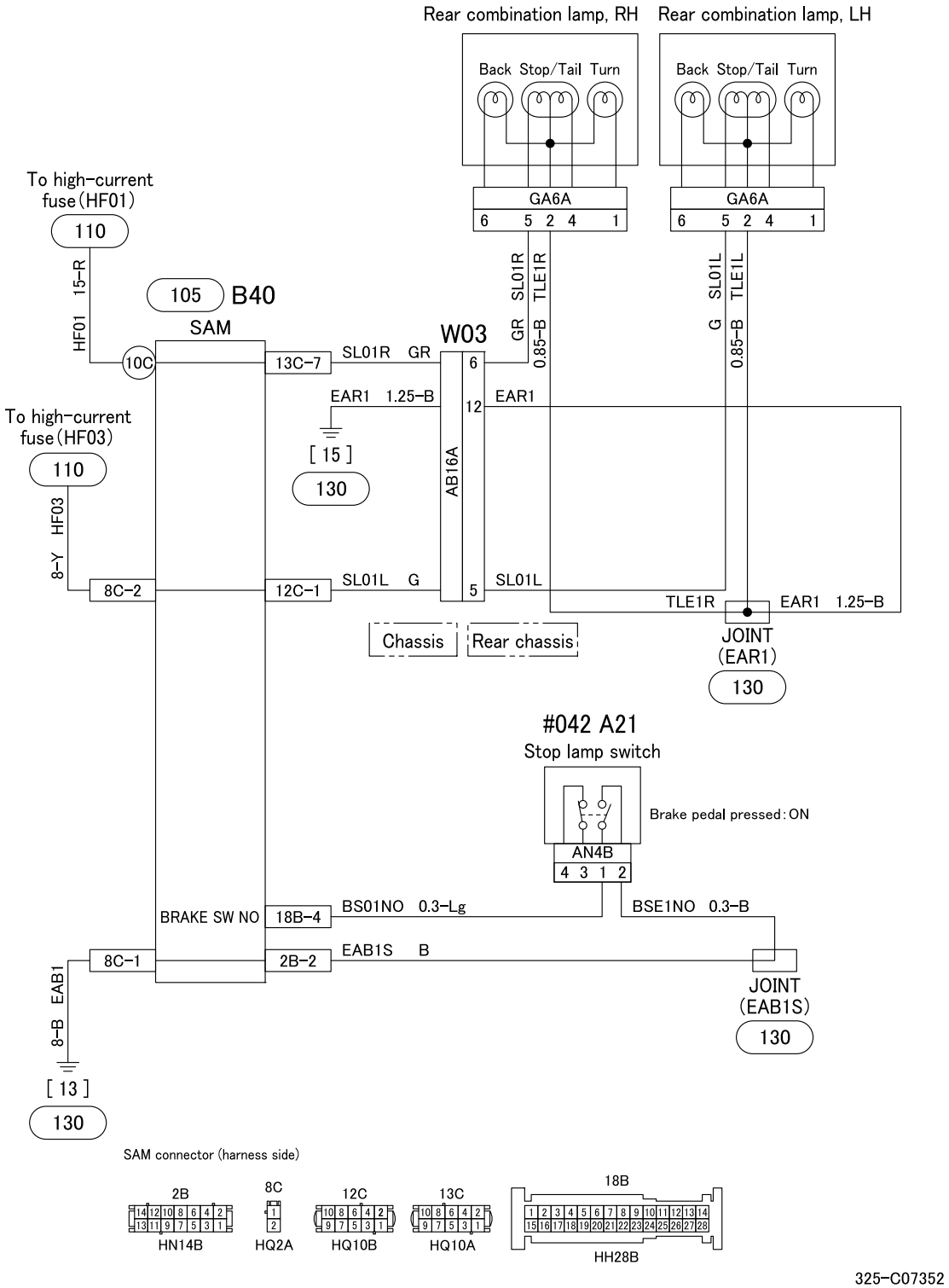
FOG LAMP CIRCUIT



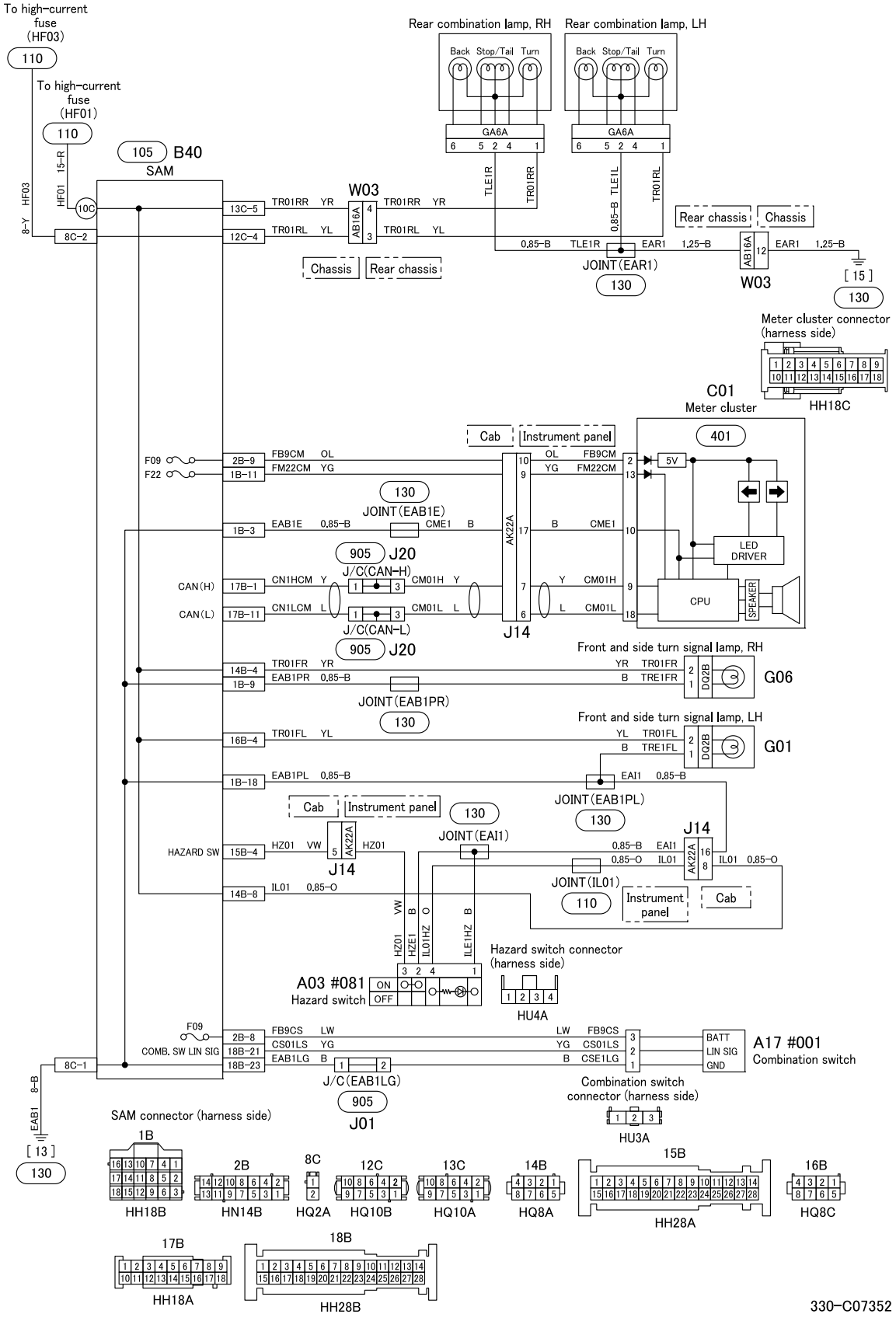
TAIL, POSITION AND LICENSE PLATE LAMPS CIRCUIT



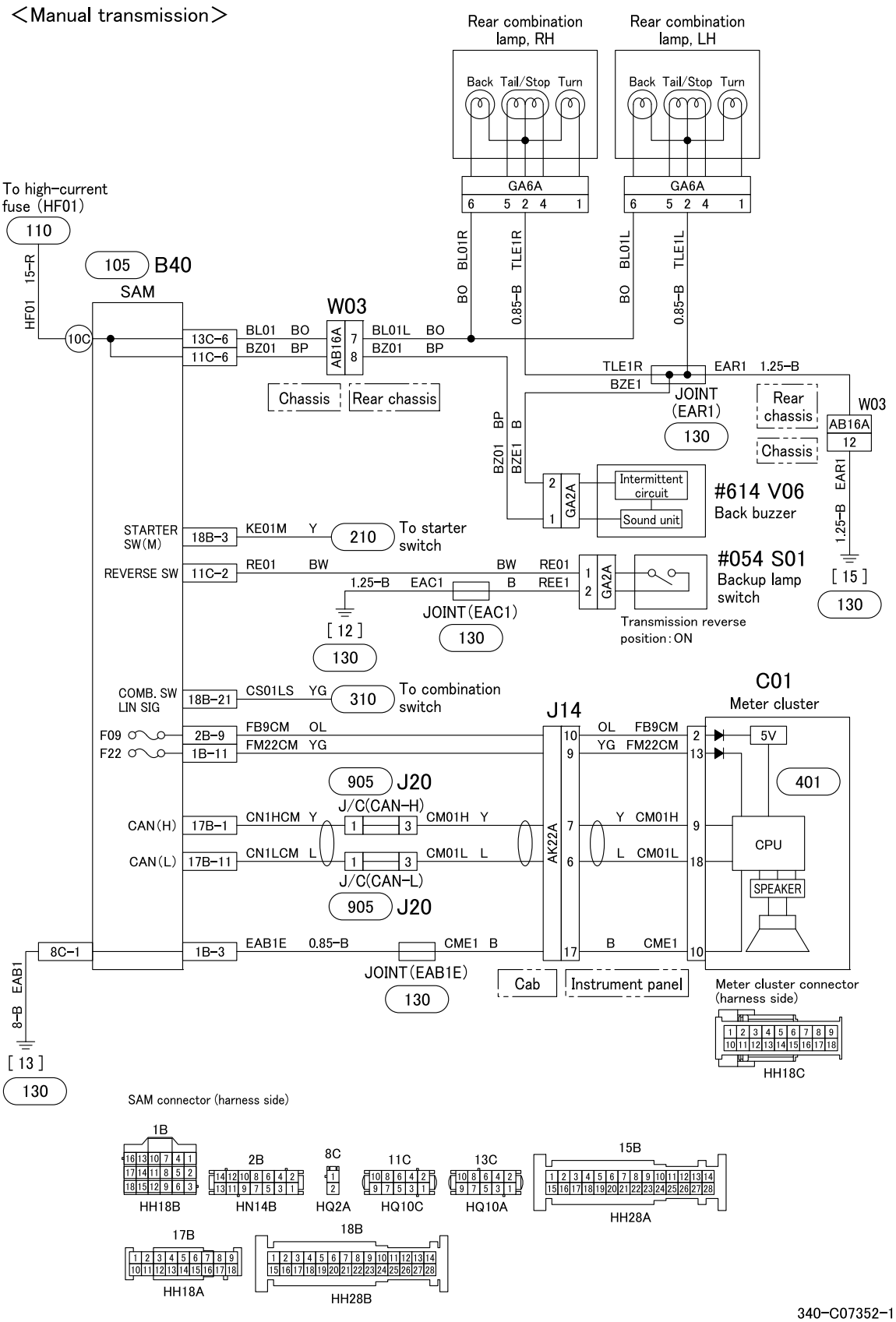
STOP LAMP CIRCUIT



TURN SIGNAL AND HAZARD LAMP CIRCUIT

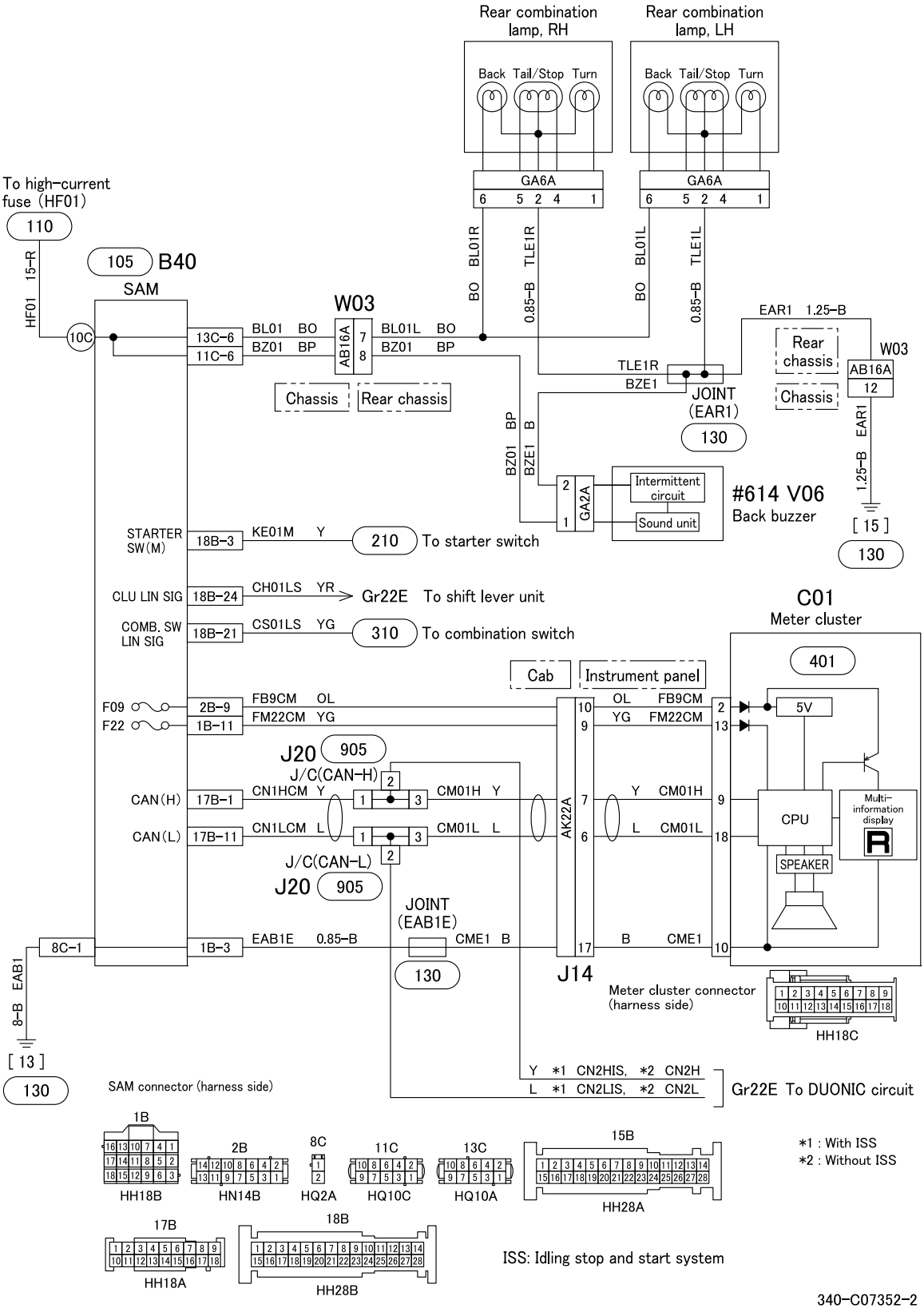


BACKUP LAMP CIRCUIT (1)

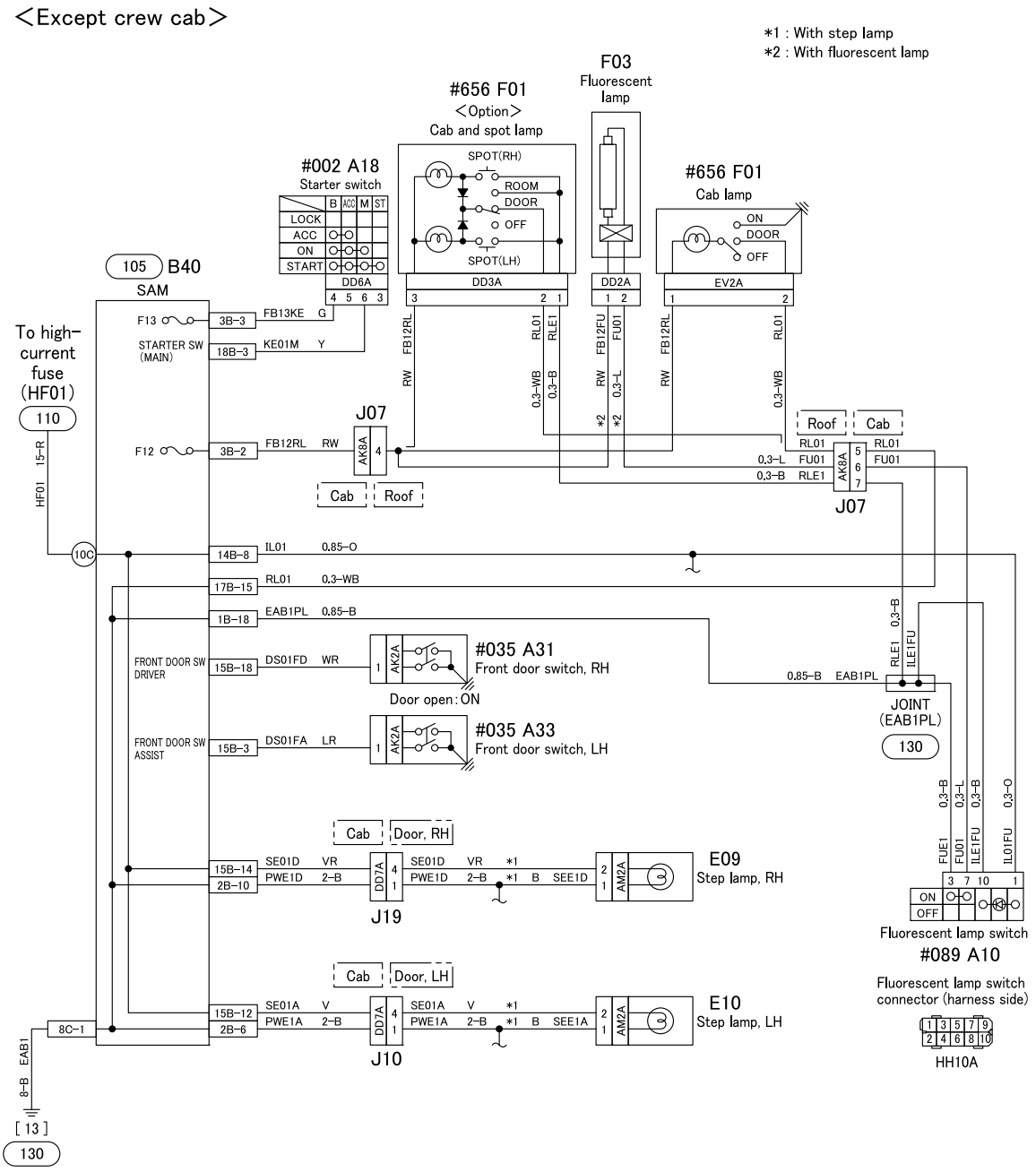


BACKUP LAMP CIRCUIT (2)

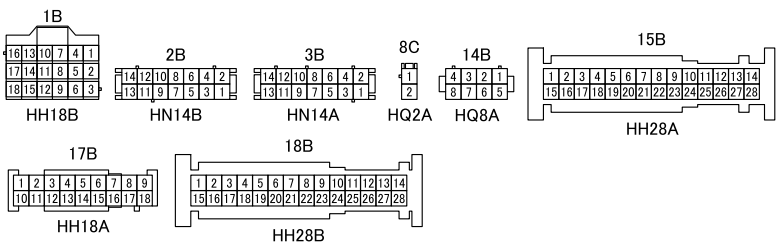
＜DUONIC＞



CAB LAMP CIRCUIT (1)



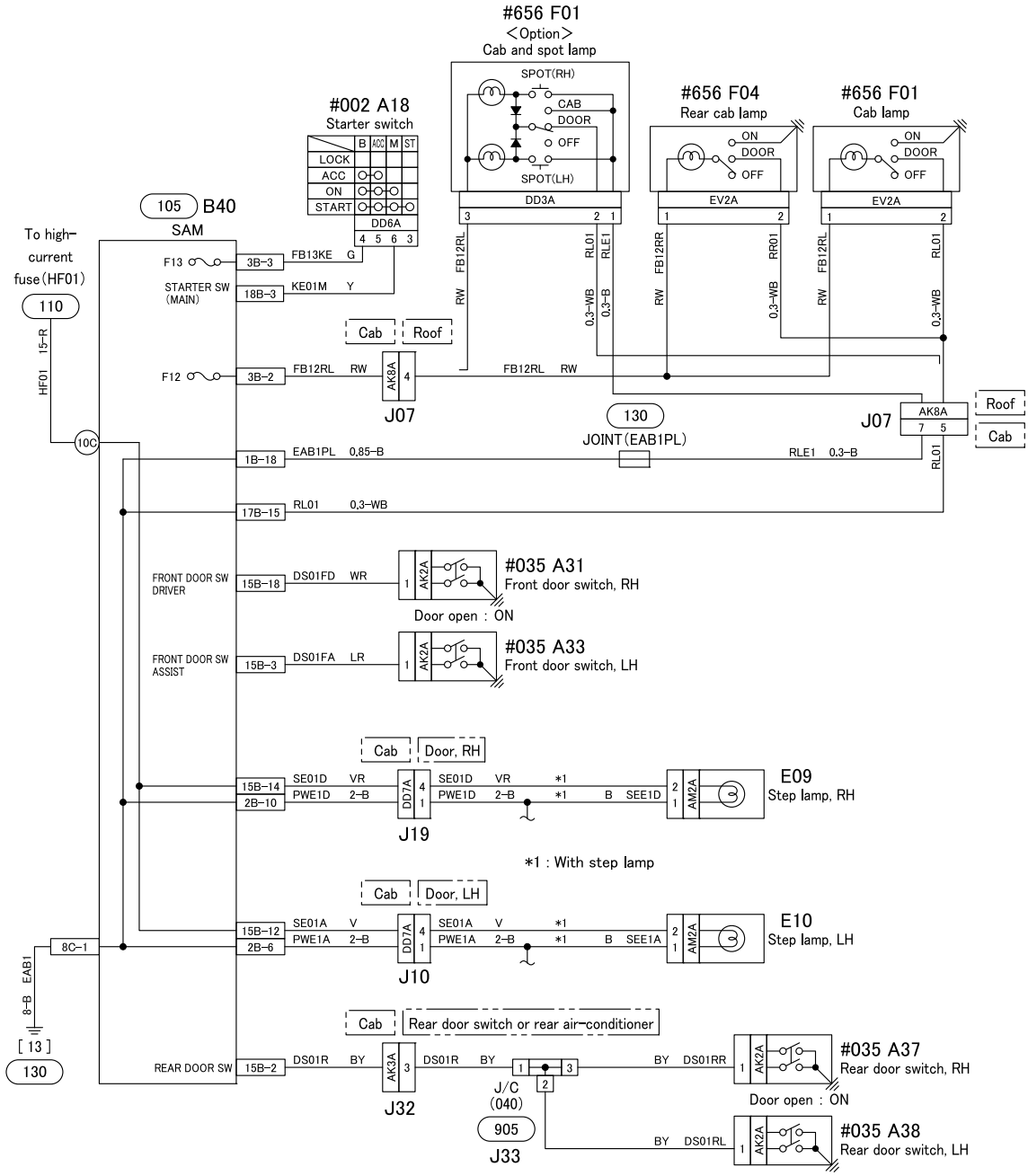
SAM connector (harness side)



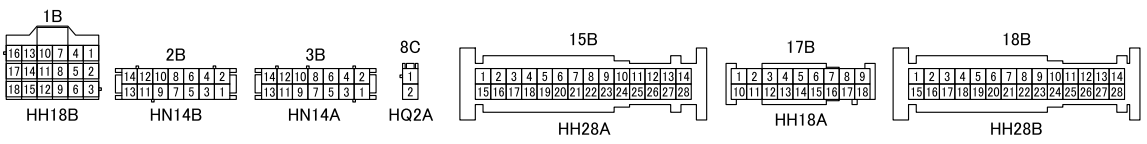
345-C07352-1

CAB LAMP CIRCUIT (2)

＜Crew cab＞

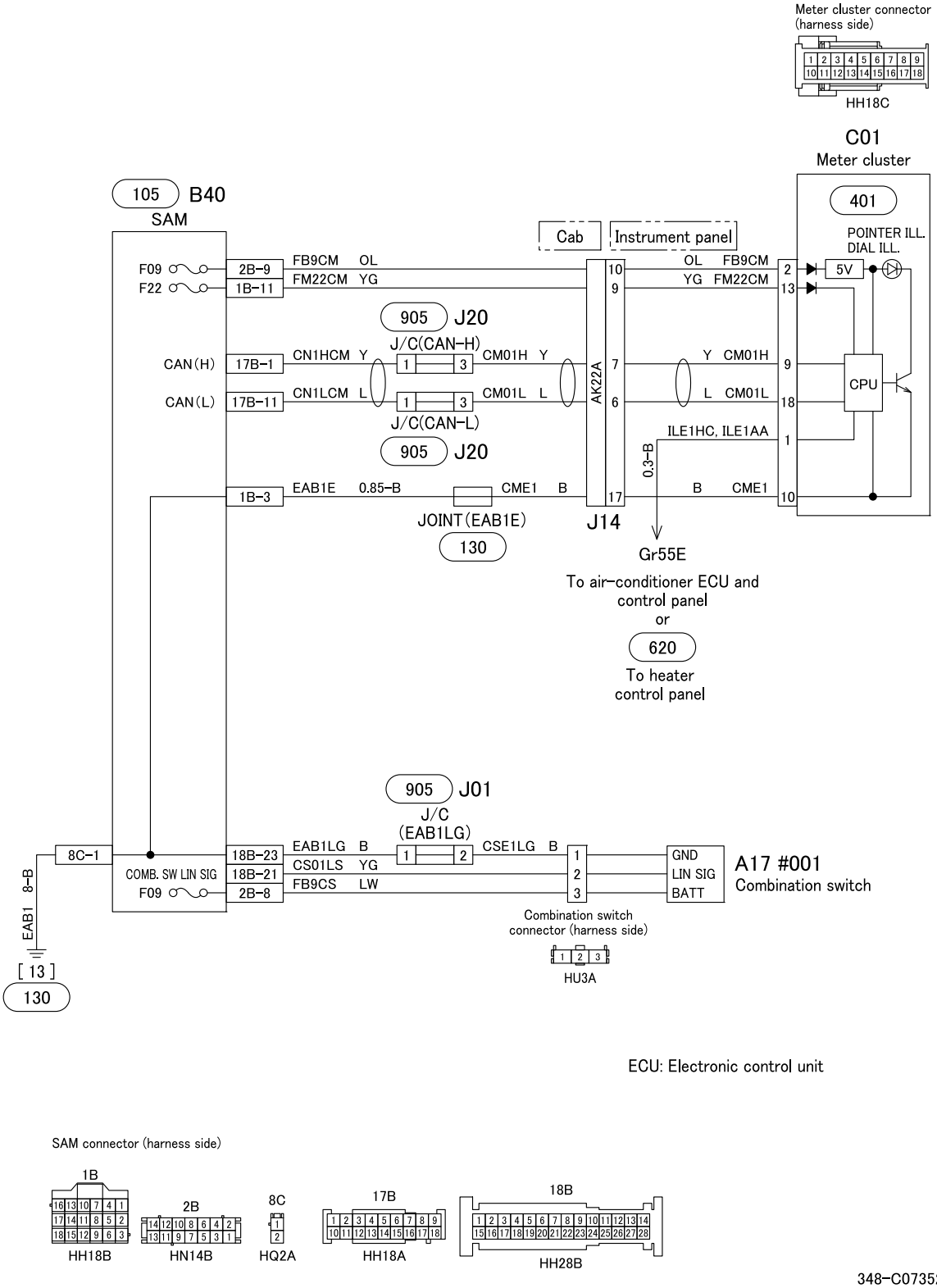


SAM connector (harness side)



345-C07352-2

ILLUMINATION LAMP CIRCUIT

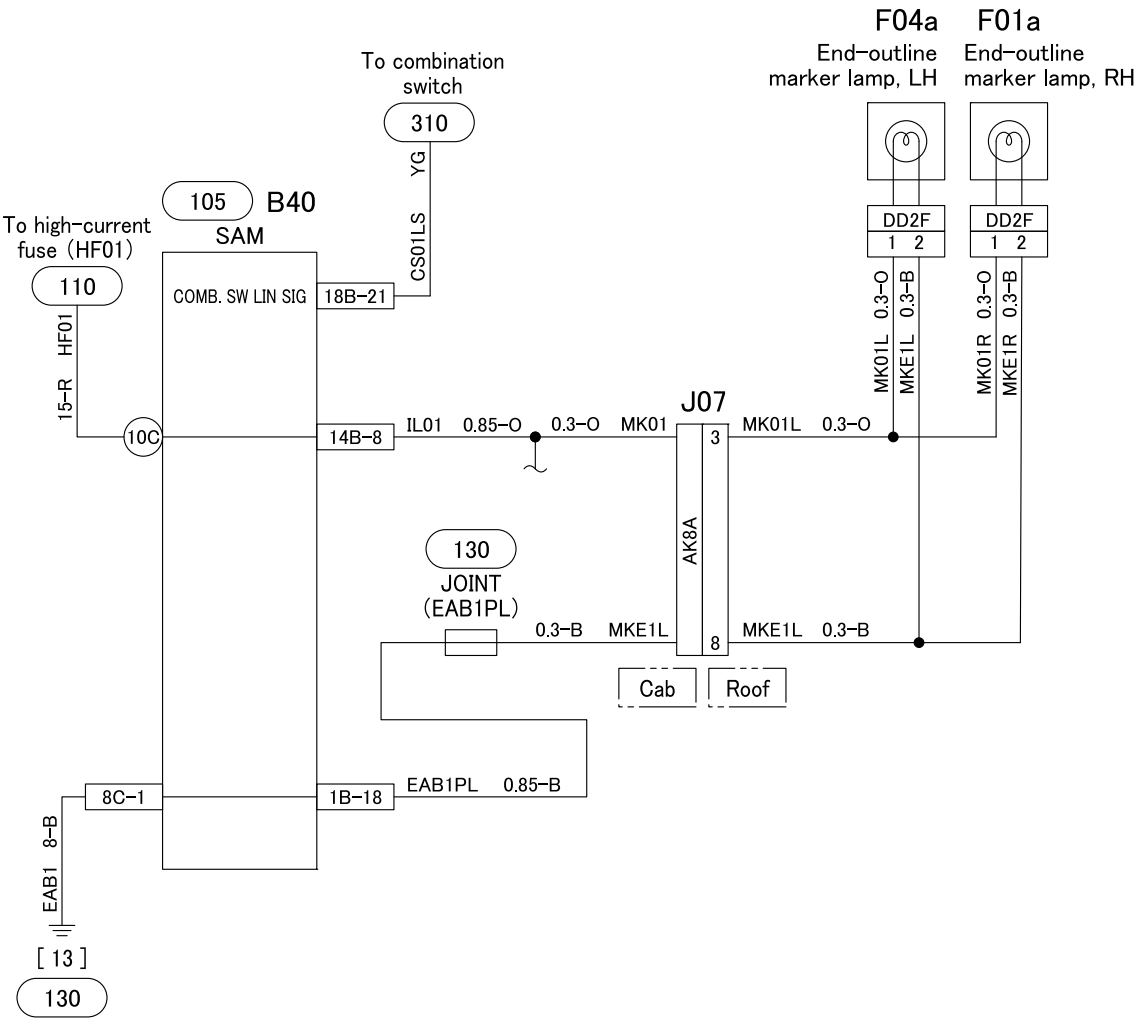


ECU: Electronic control unit

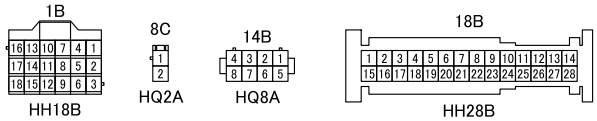
SAM connector (harness side)

348-C07352

END-OUTLINE MARKER LAMP CIRCUIT



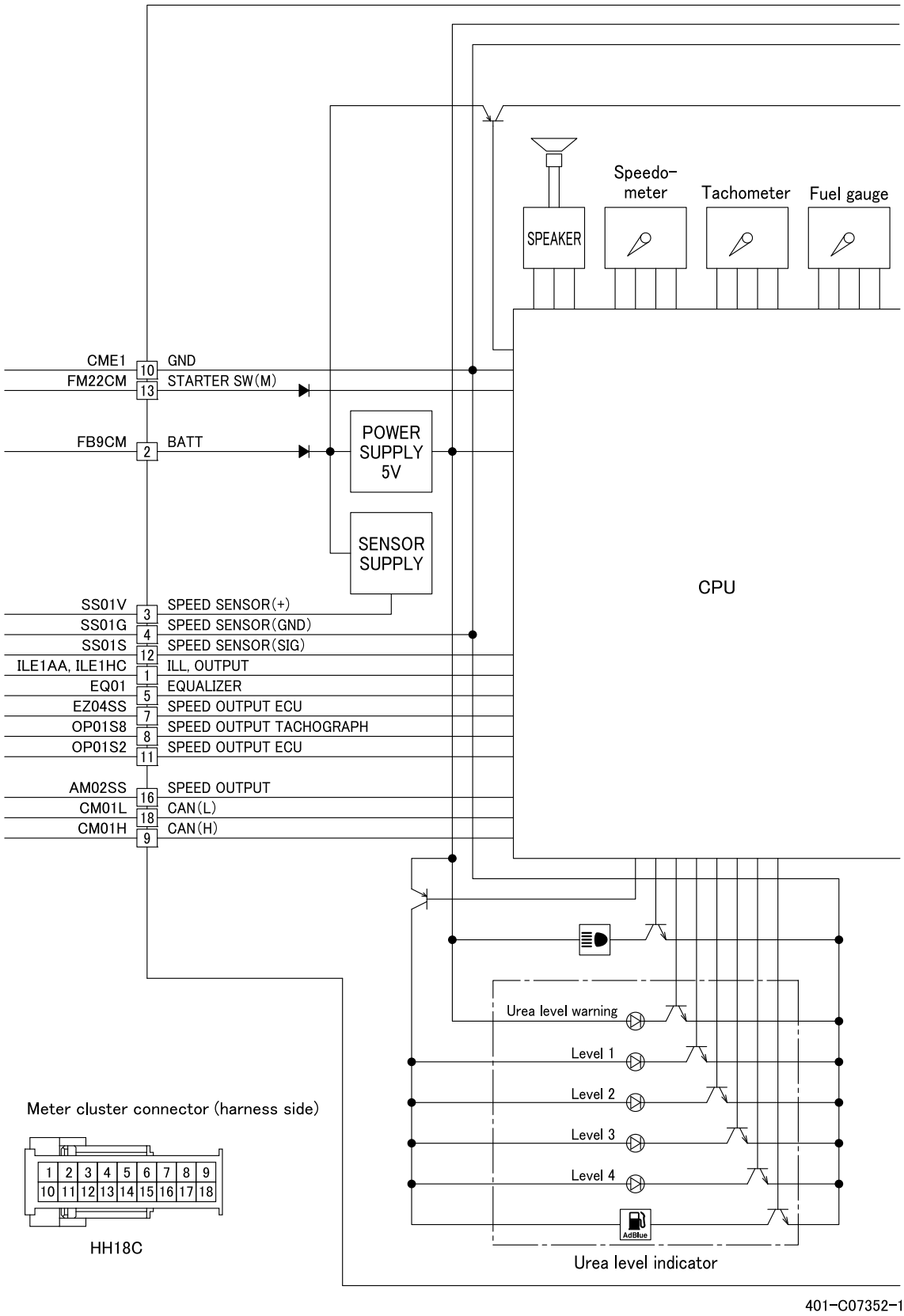
SAM connector (harness side)



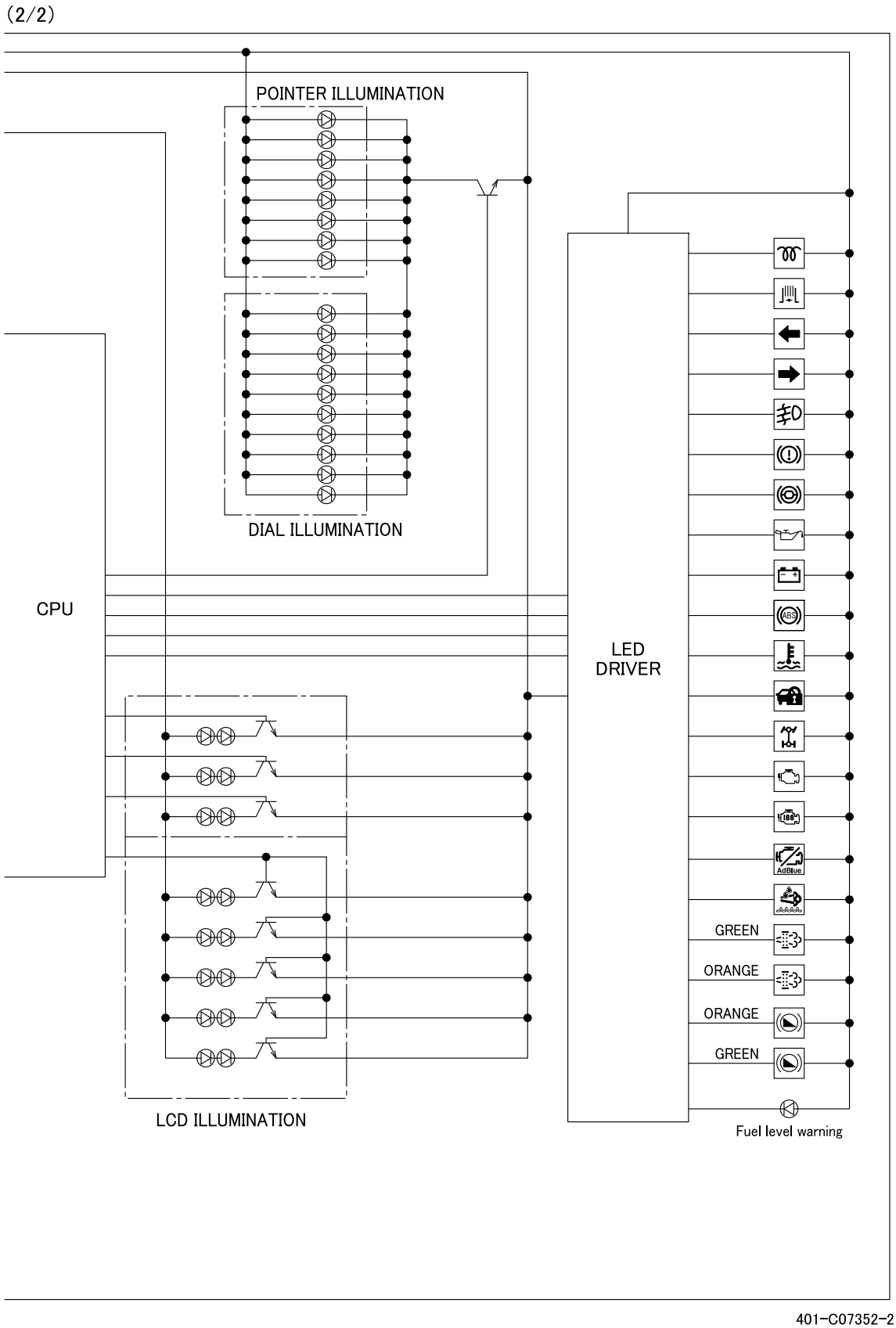
349-C07352

METER CLUSTER INTERNAL CIRCUIT (1)

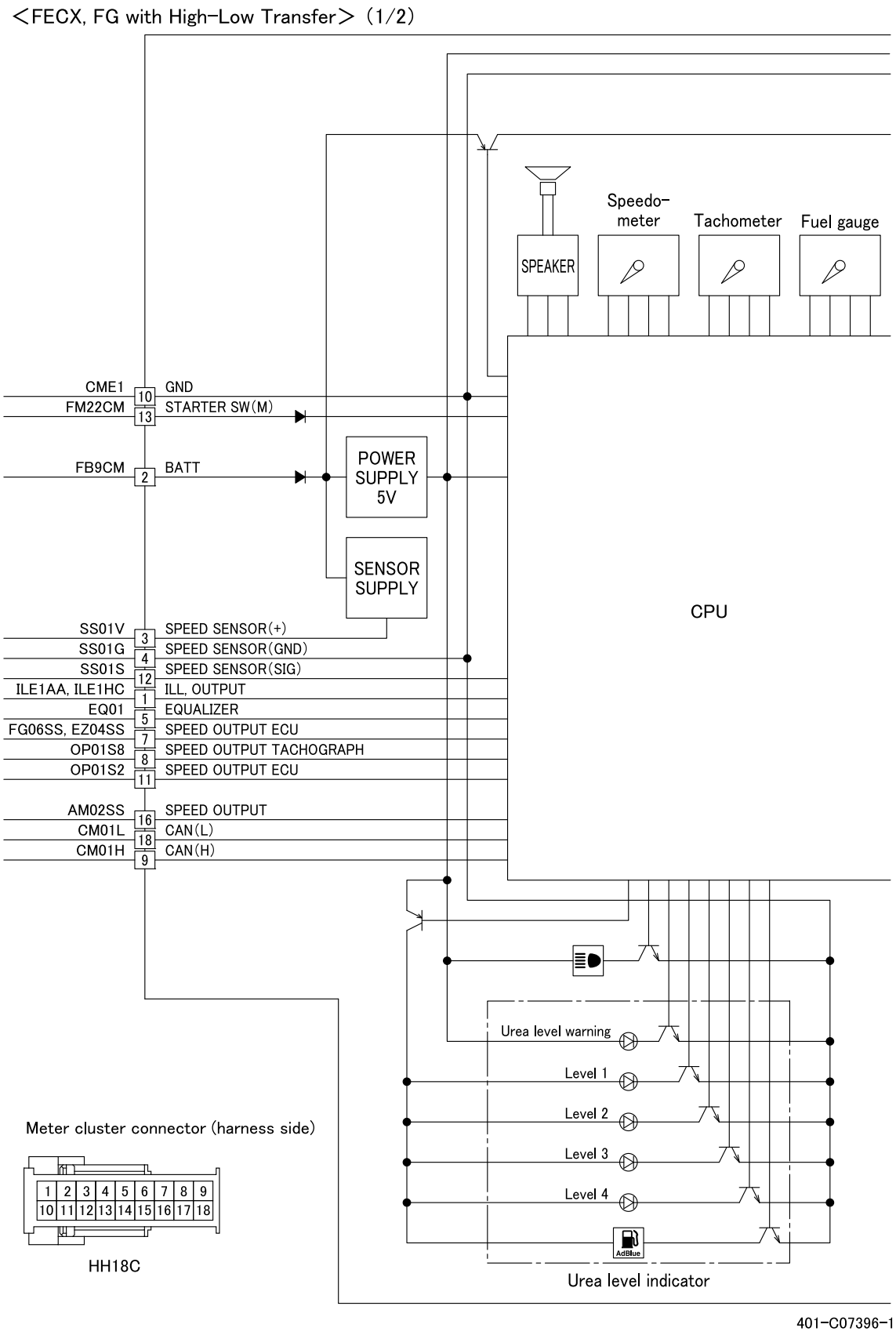
(1/2)



METER CLUSTER INTERNAL CIRCUIT (2)

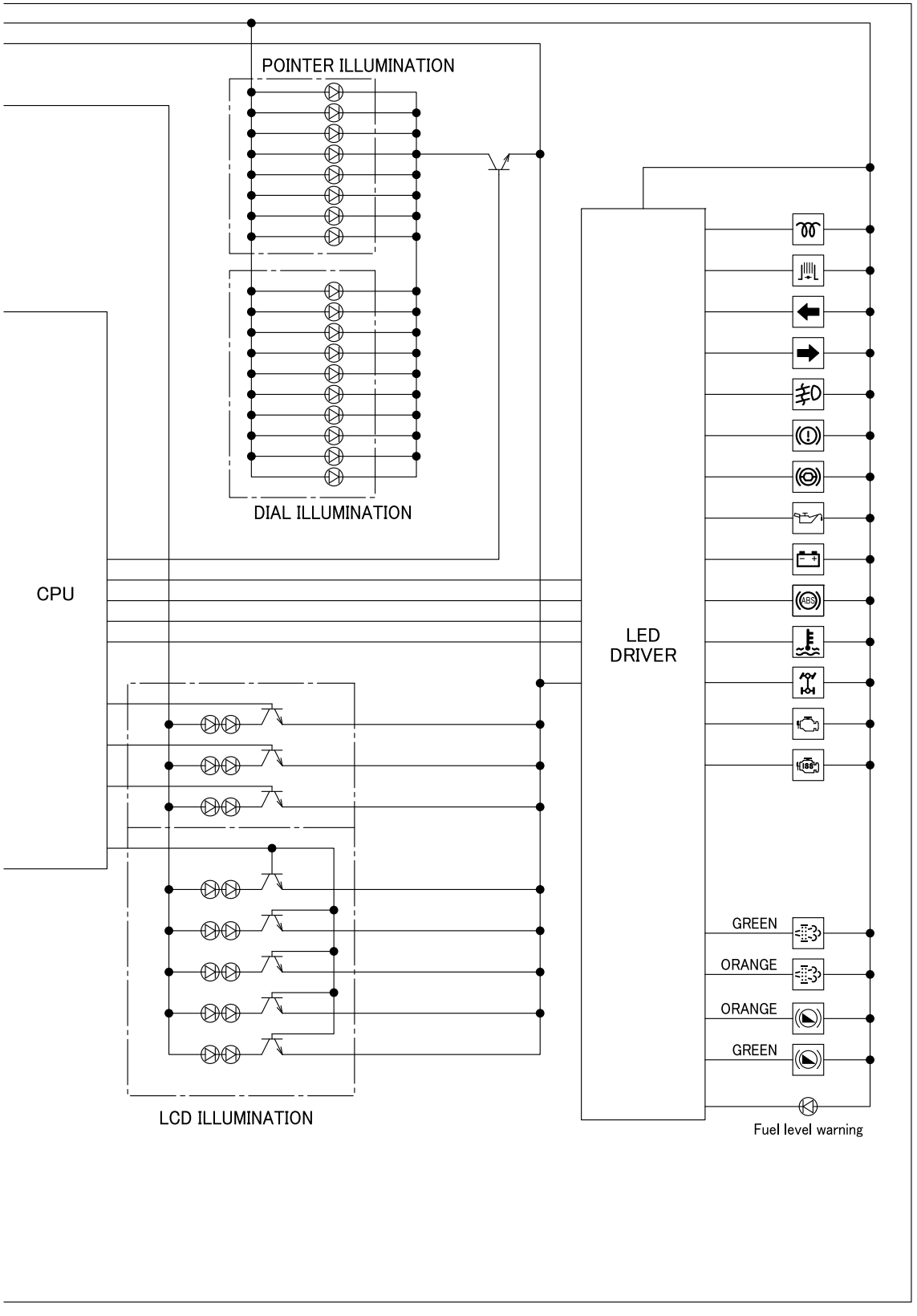


METER CLUSTER INTERNAL CIRCUIT (3)



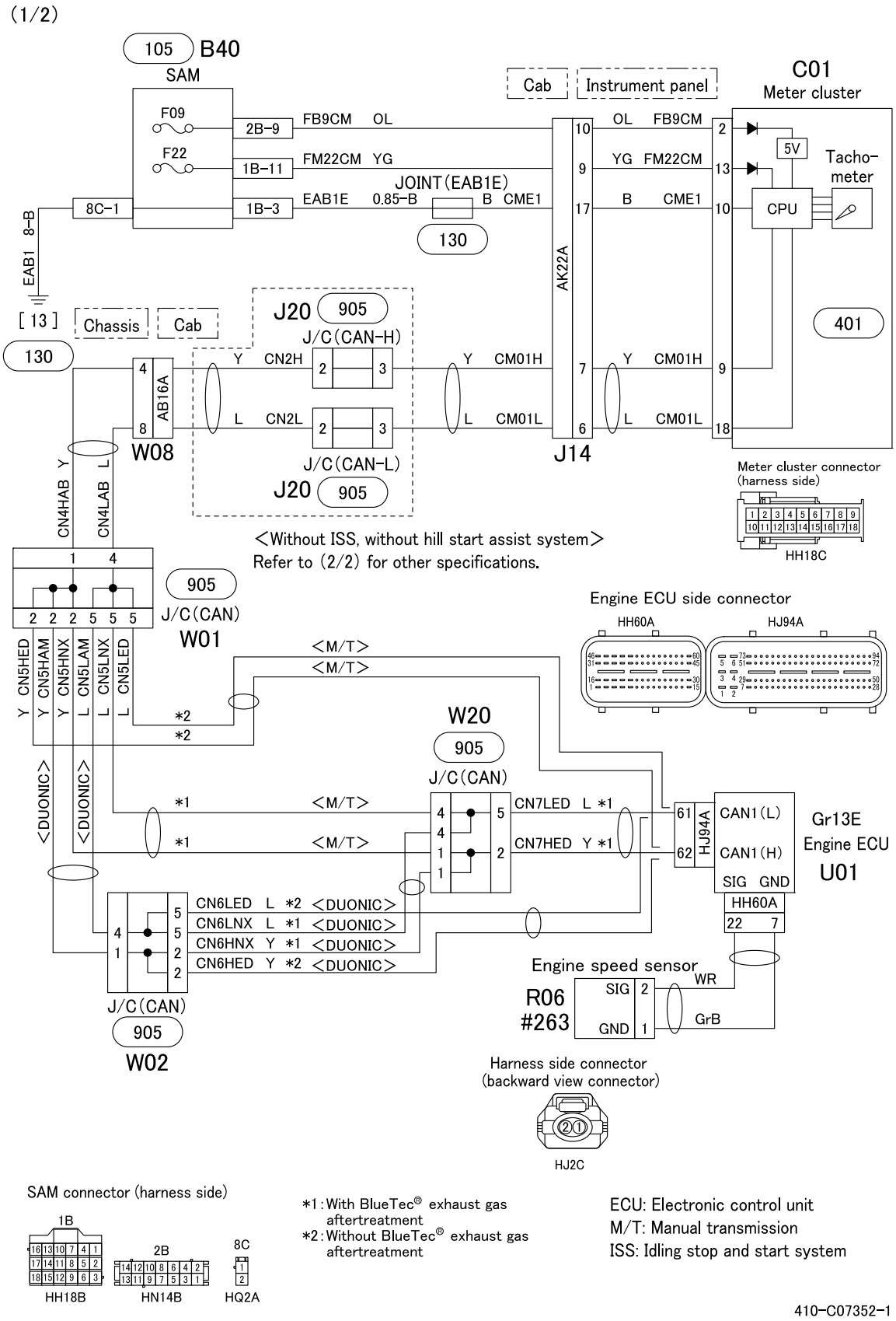
METER CLUSTER INTERNAL CIRCUIT (4)

＜FECX, FG with High-Low Transfer＞（2/2）



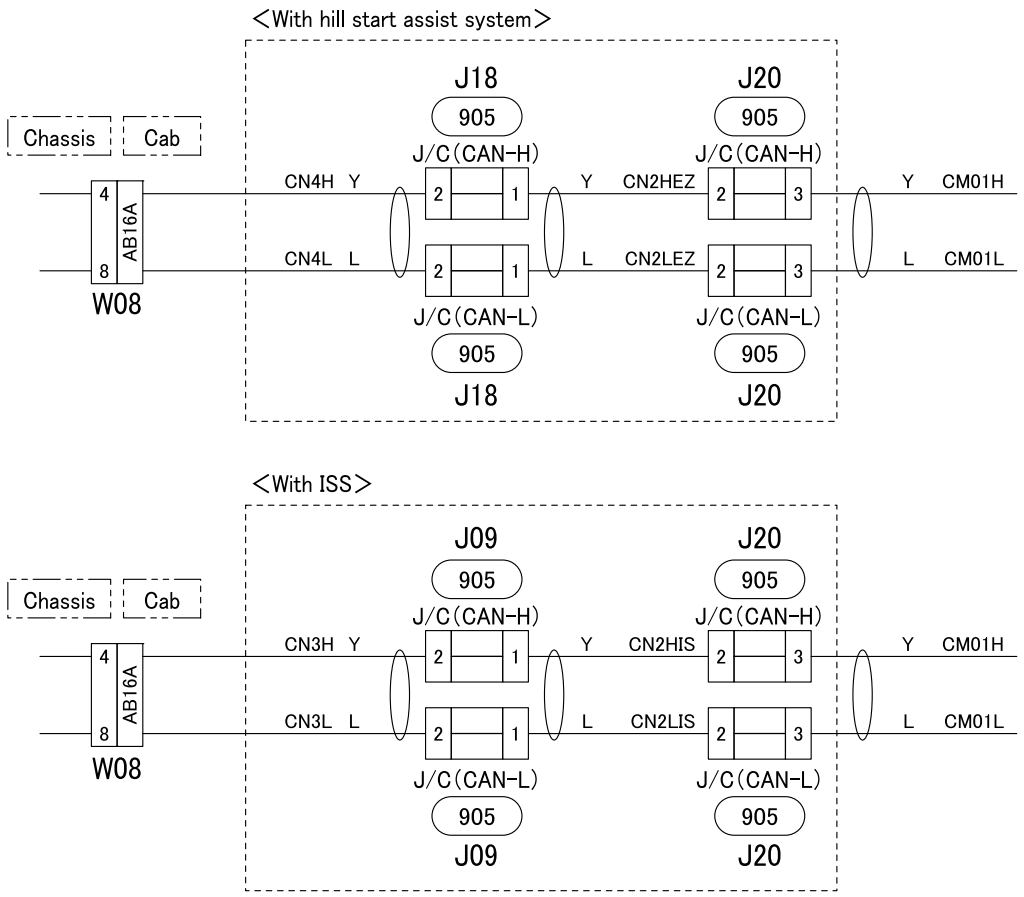
401-C07396-2

TACHOMETER CIRCUIT (1)



TACHOMETER CIRCUIT (2)

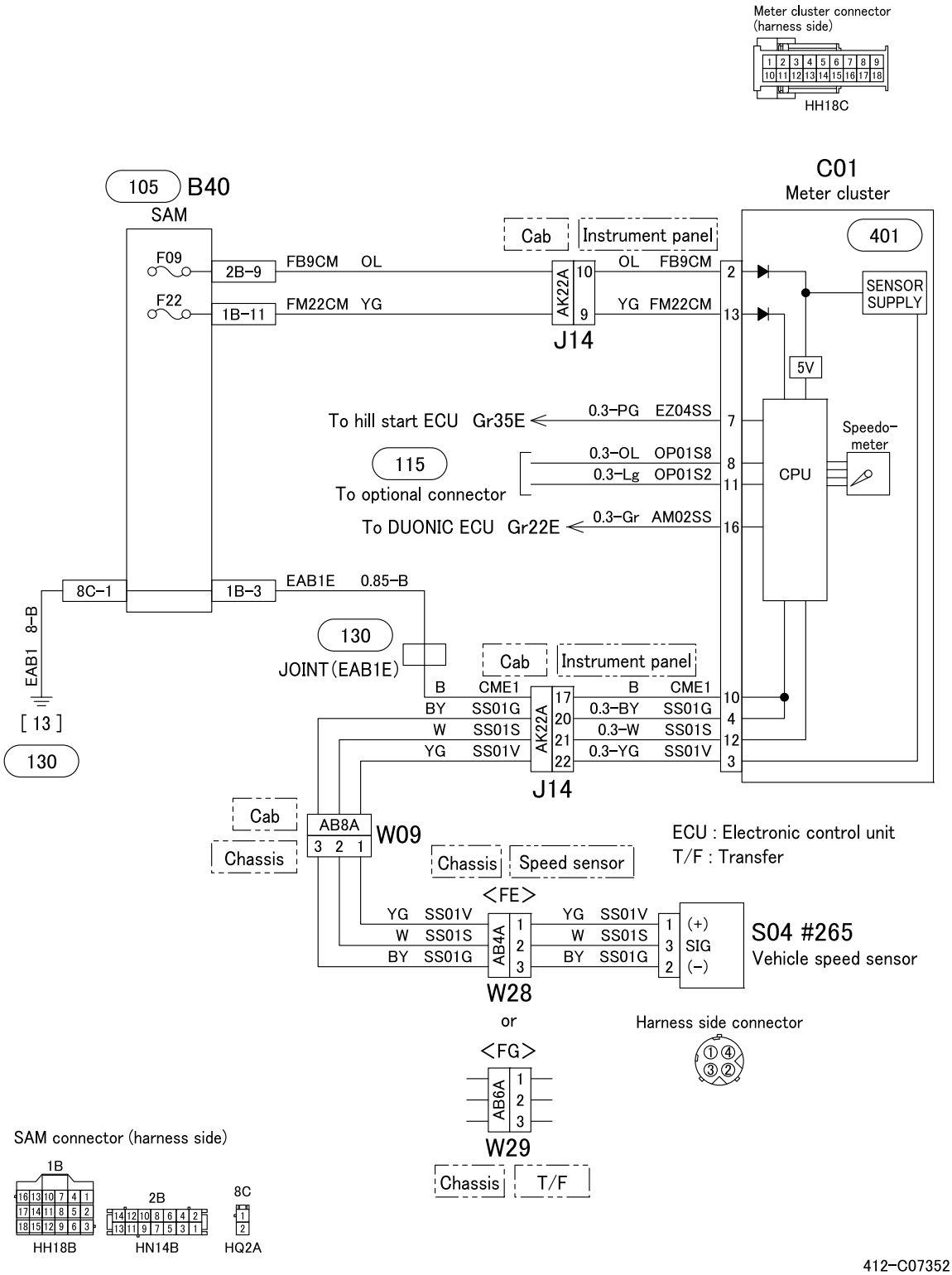
(2/2)



ISS: Idling stop and start system

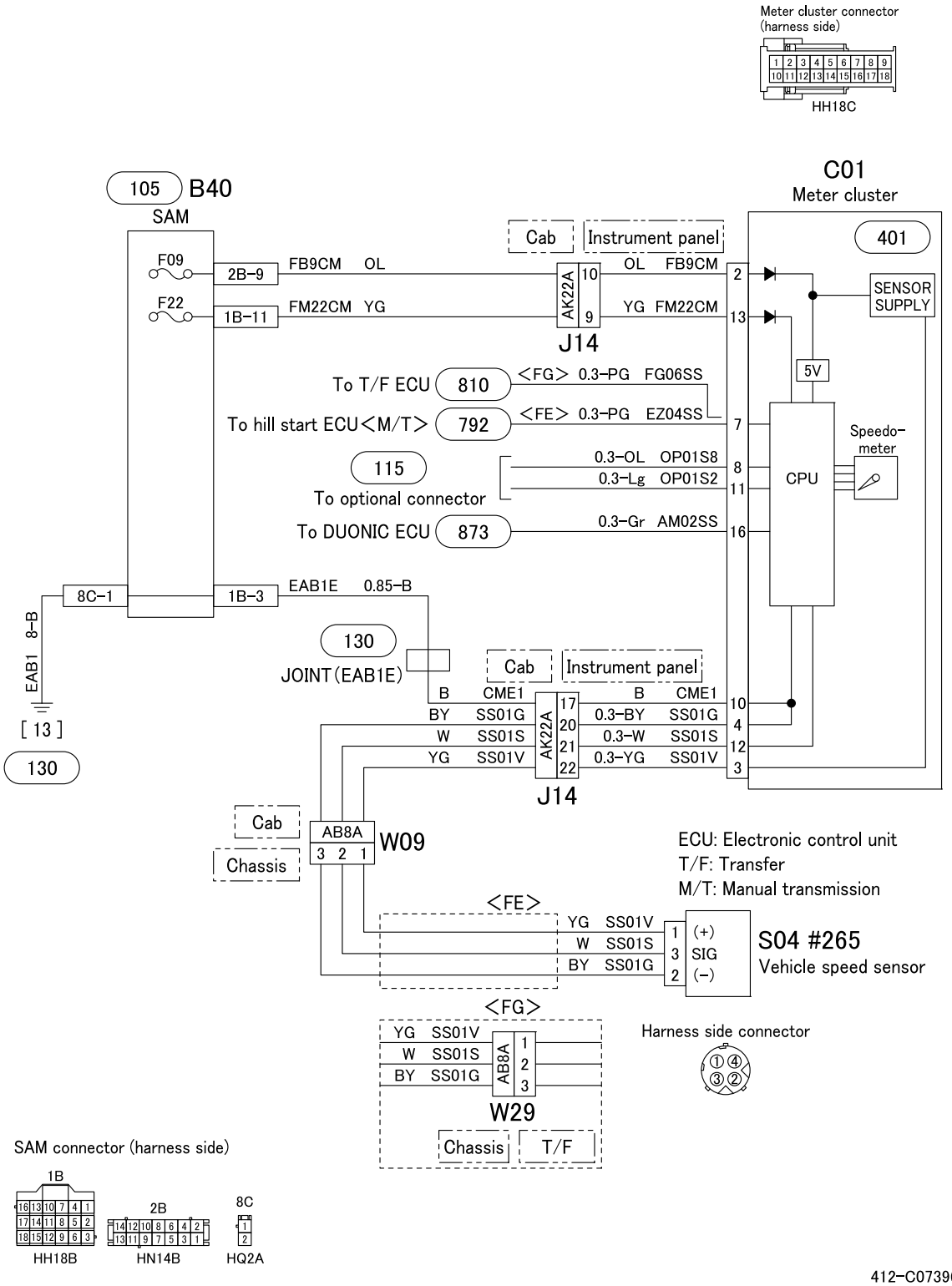
410-C07352-2

SPEEDOMETER CIRCUIT (1)

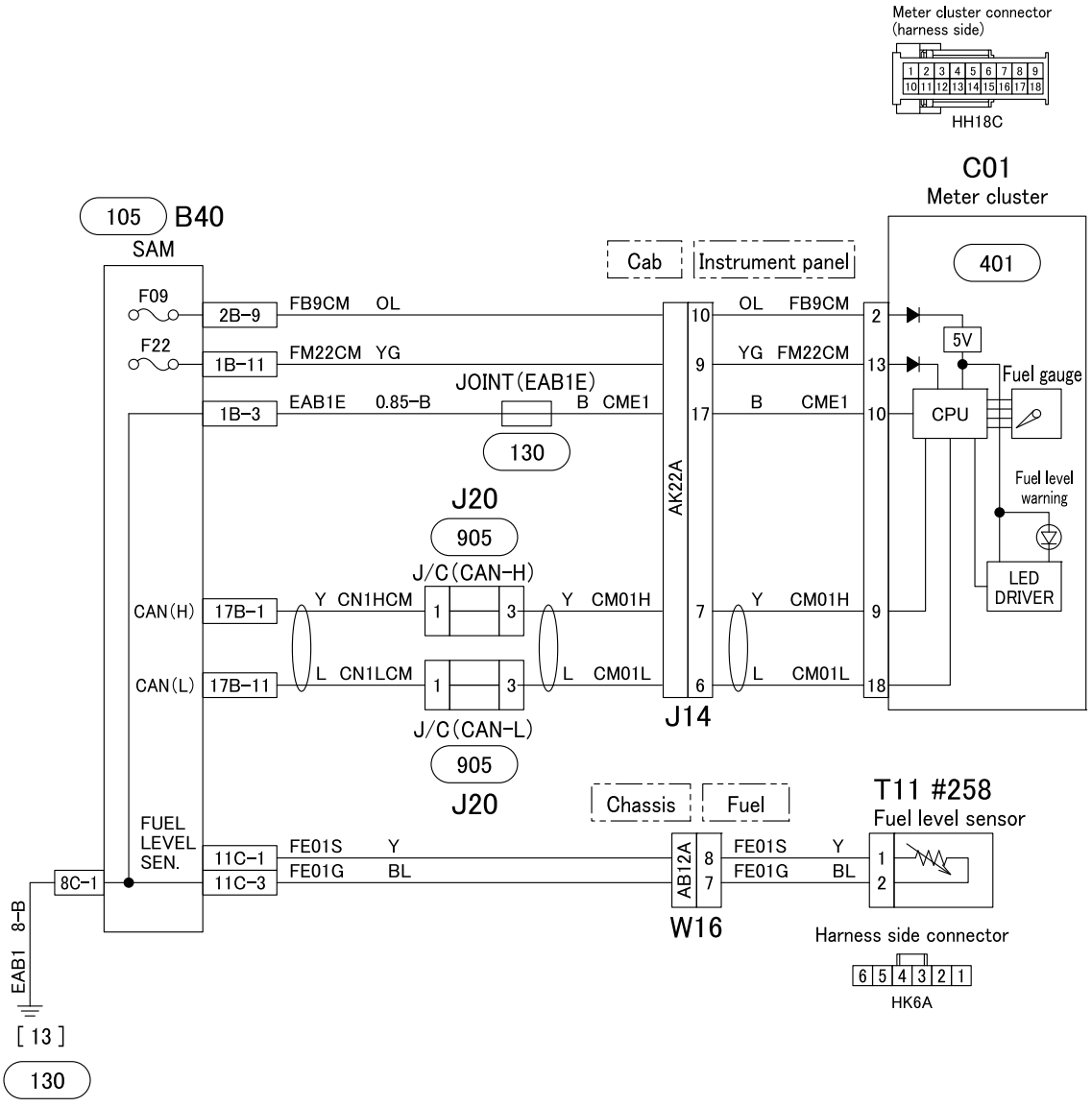


SPEEDOMETER CIRCUIT (2)

<FECX, FG with High-Low Transfer>

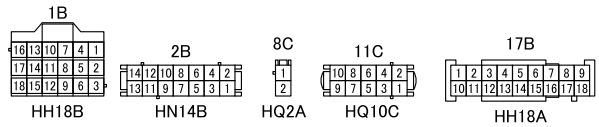


FUEL GAUGE CIRCUIT



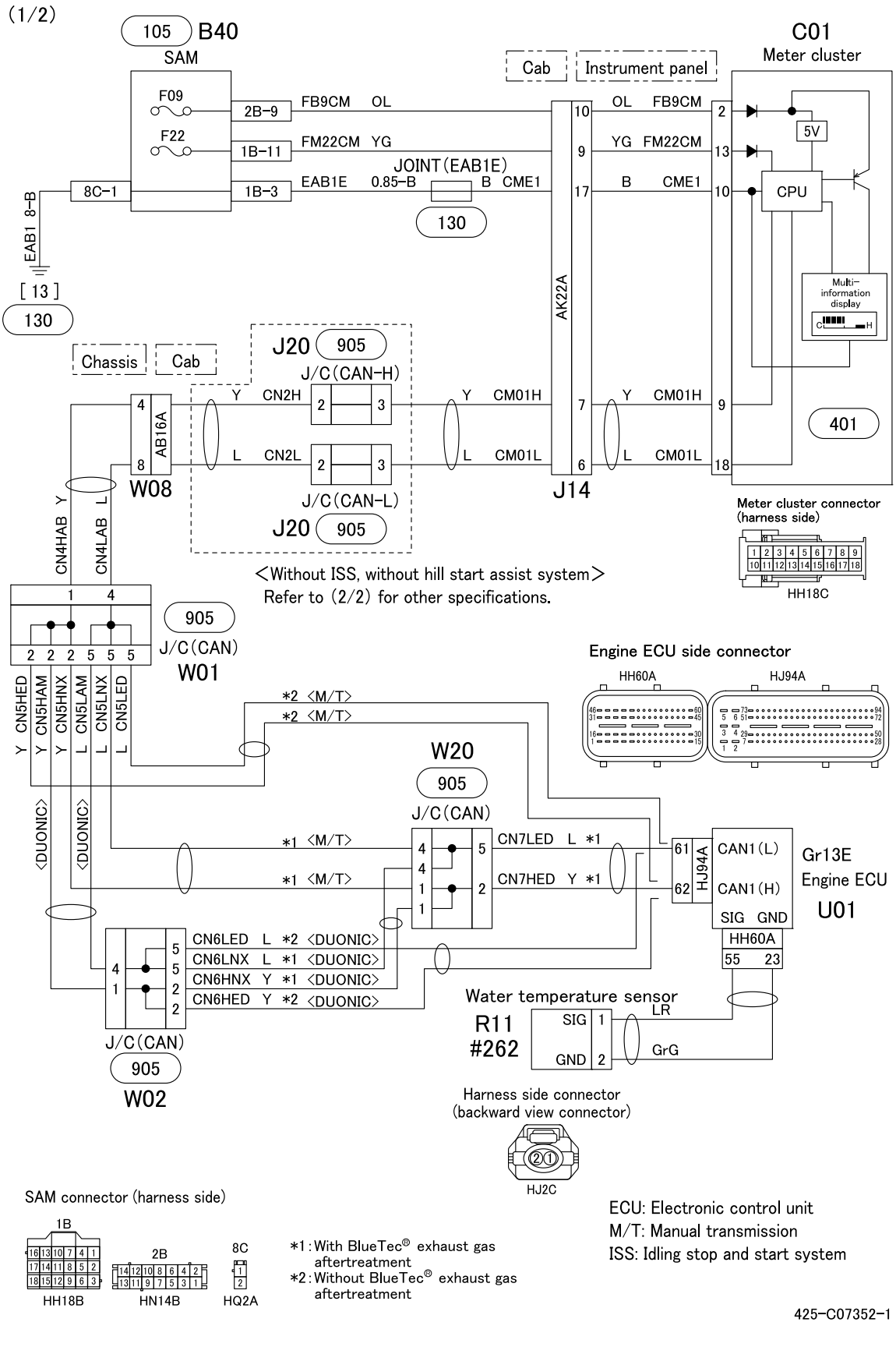
ECU: Electronic control unit

SAM connector (harness side)



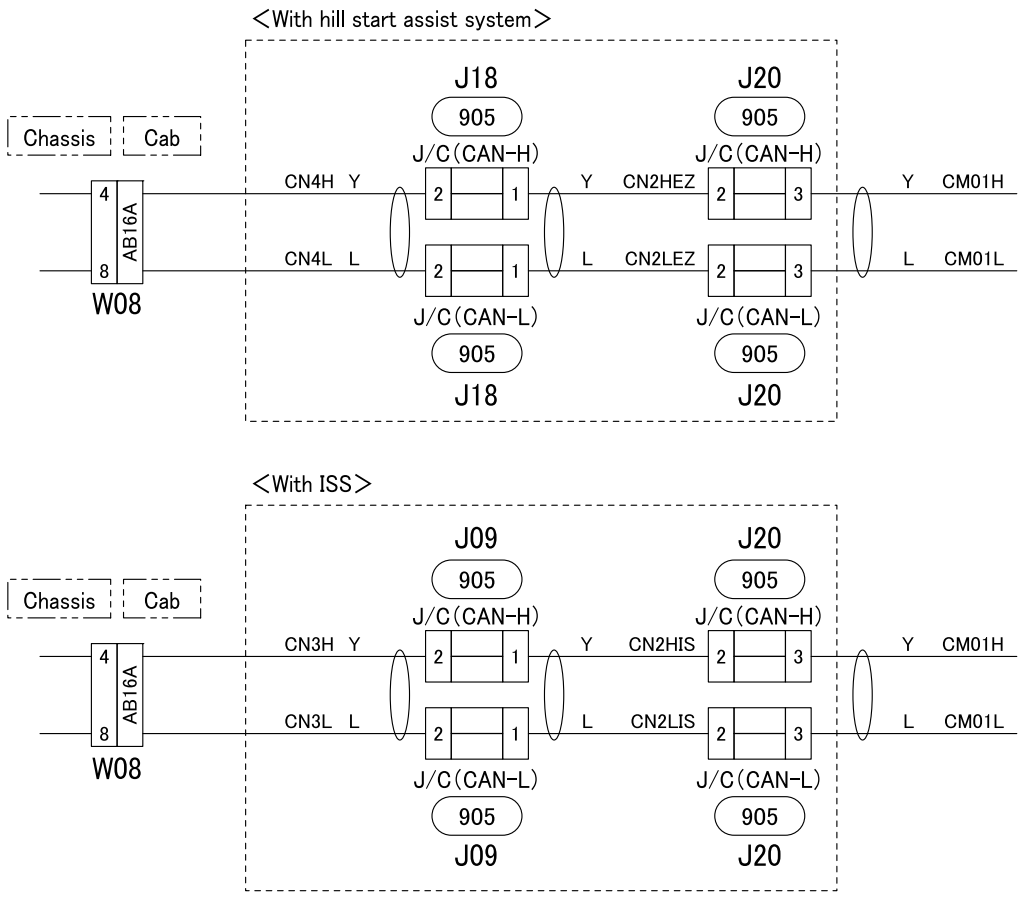
420-C07352

WATER TEMPERATURE GAUGE CIRCUIT (1)



WATER TEMPERATURE GAUGE CIRCUIT (2)

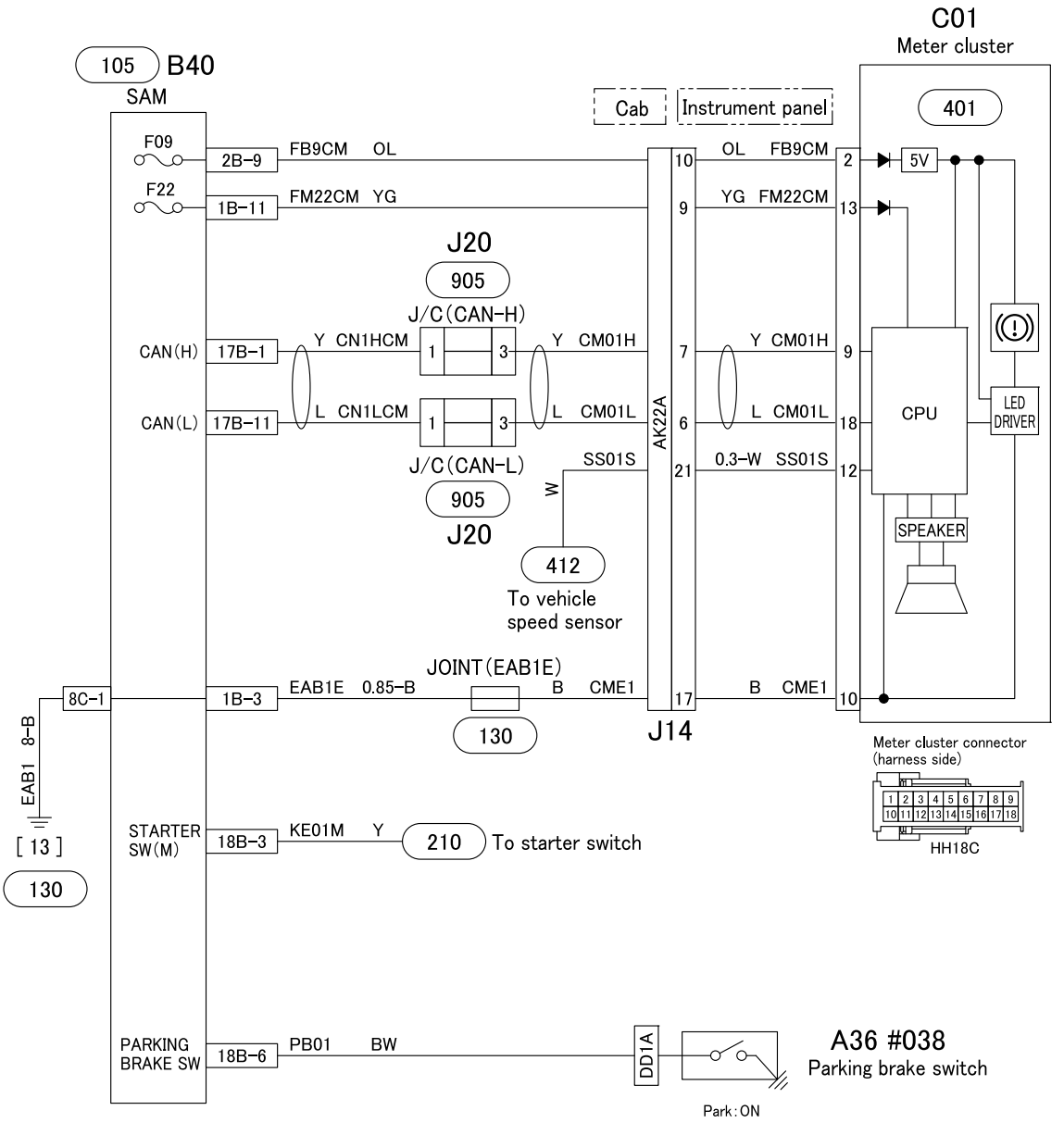
(2/2)



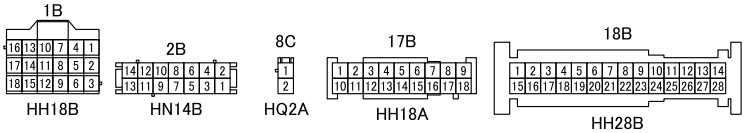
ISS: Idling stop and start system

425-C07352-2

PARKING BRAKE INDICATOR CIRCUIT

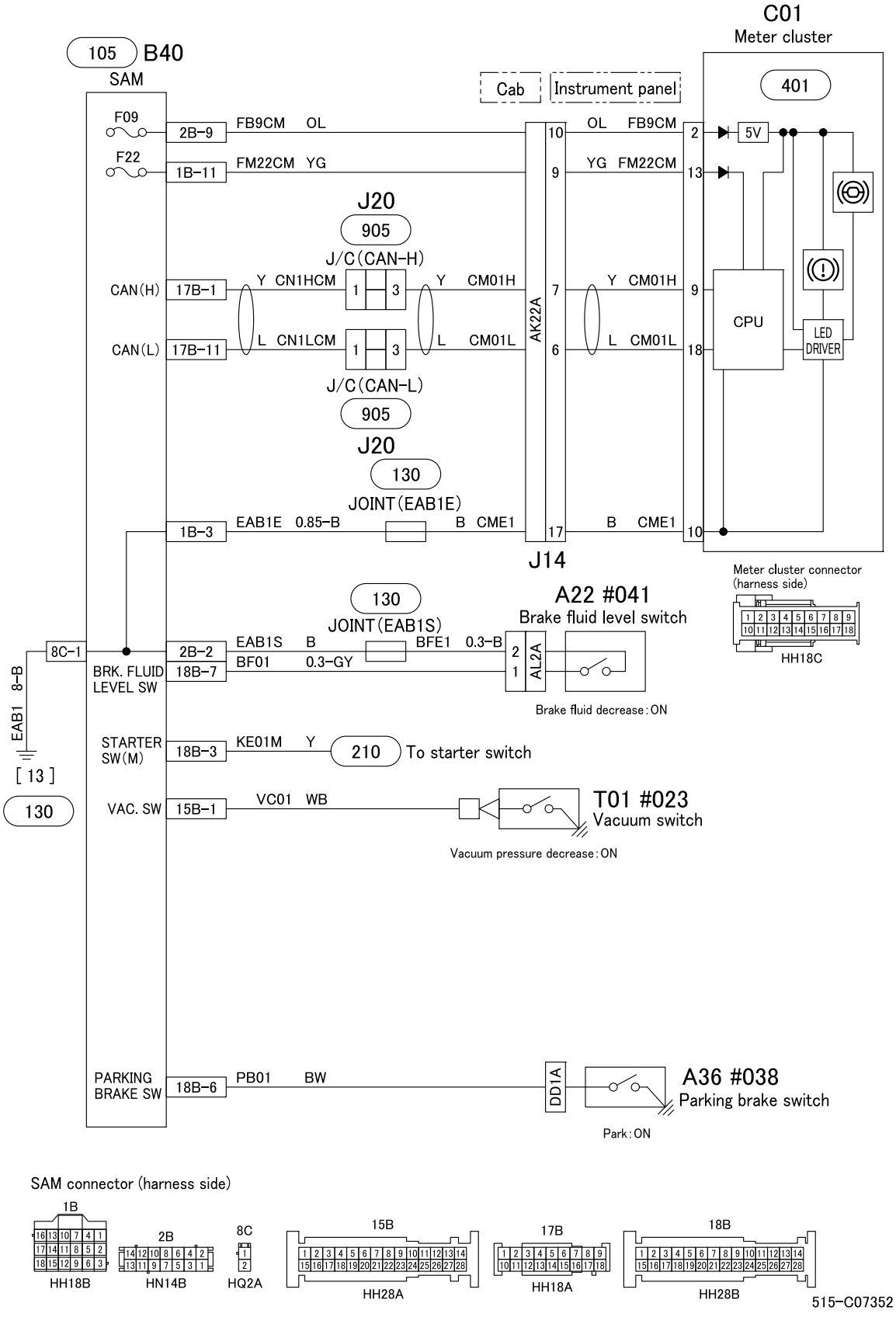


SAM connector (harness side)

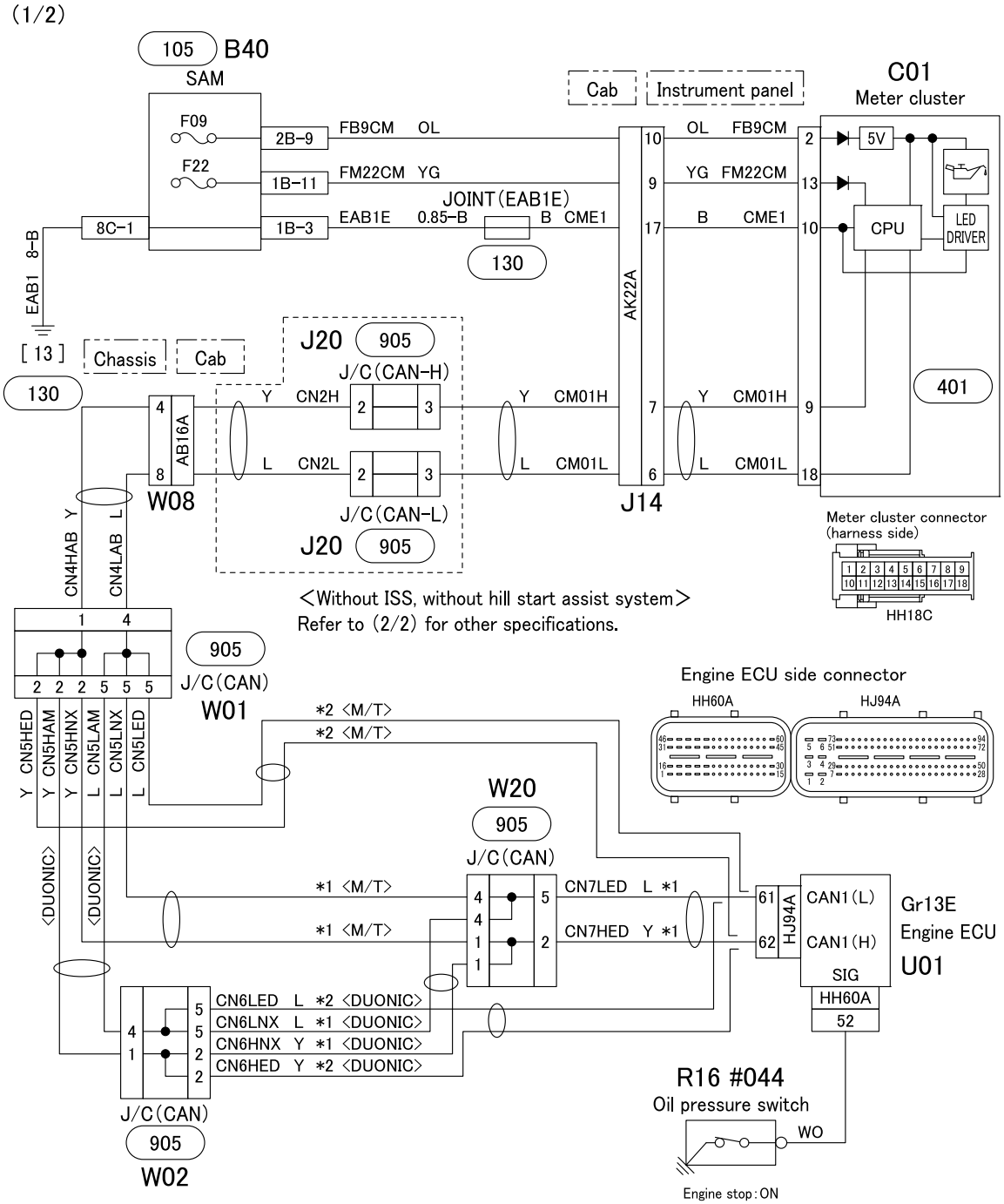


510-C07352

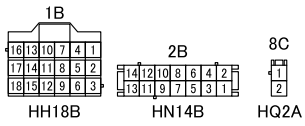
BRAKE WARNING CIRCUIT



ENGINE OIL PRESSURE WARNING CIRCUIT (1)



SAM connector (harness side)



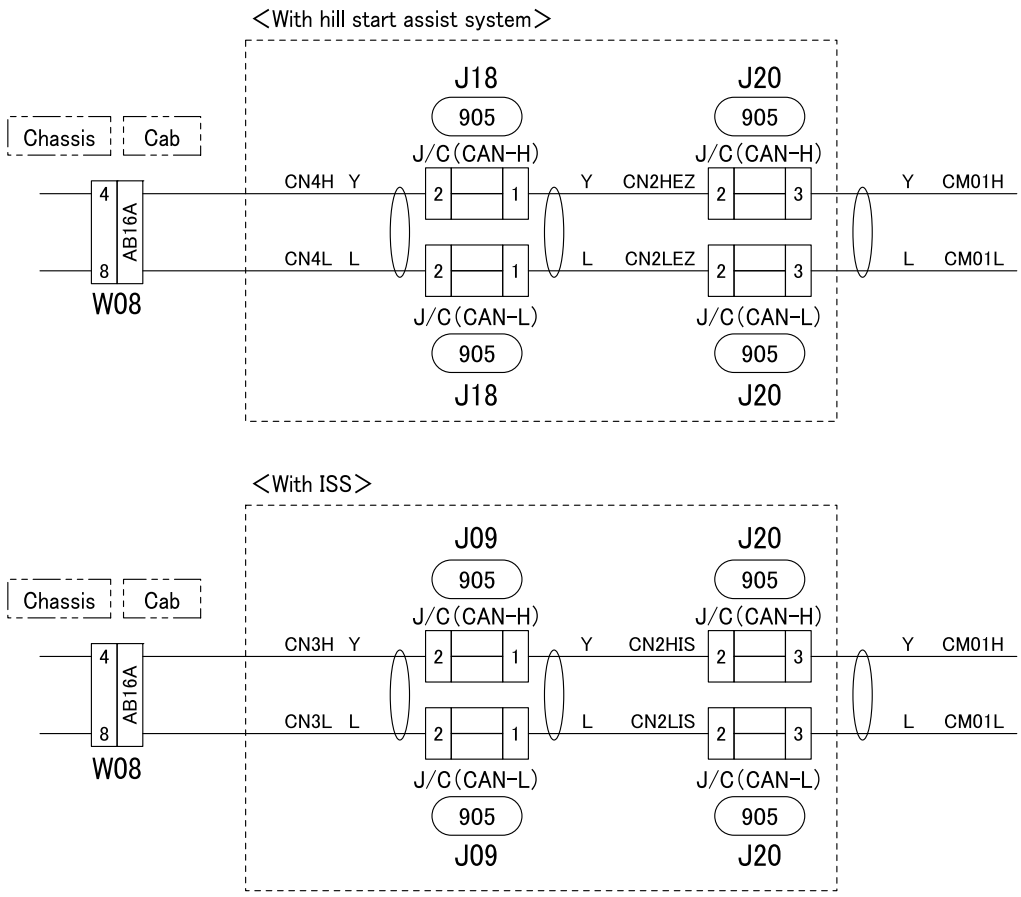
*1: With BlueTec® exhaust gas aftertreatment
*2: Without BlueTec® exhaust gas aftertreatment

ECU: Electronic control unit
M/T: Manual transmission
ISS: Idling stop and start system

536-C07352-1

ENGINE OIL PRESSURE WARNING CIRCUIT (2)

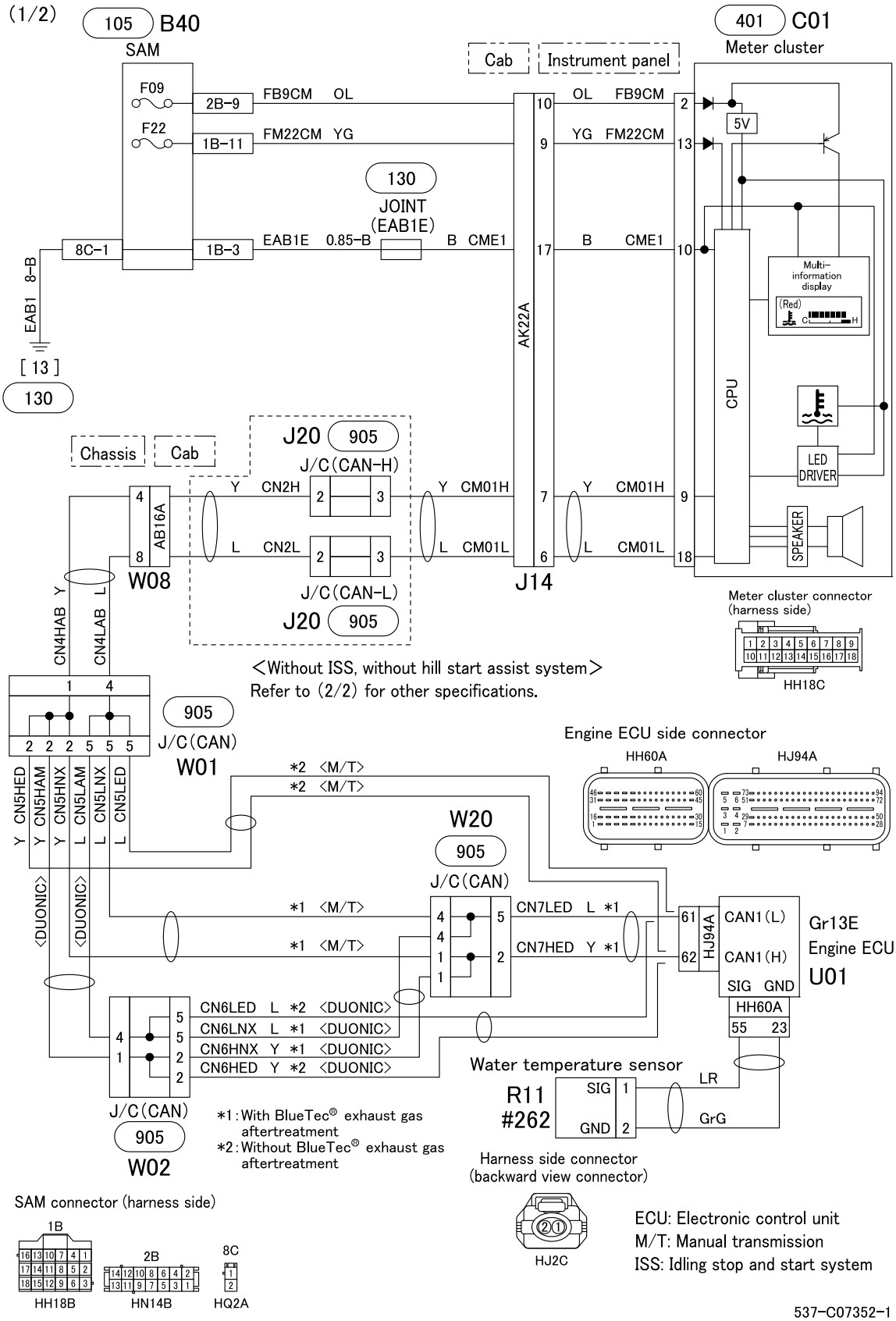
(2/2)



ISS: Idling stop and start system

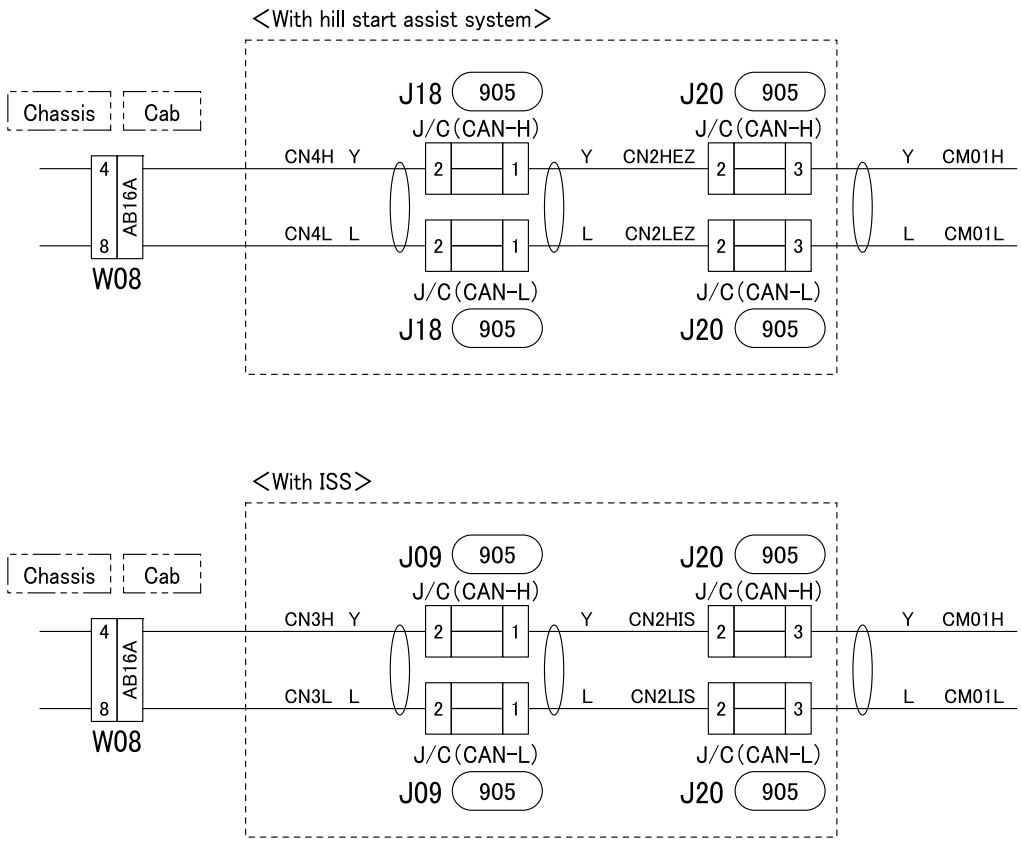
536-C07352-2

OVERHEATING WARNING CIRCUIT (1)



OVERHEATING WARNING CIRCUIT (2)

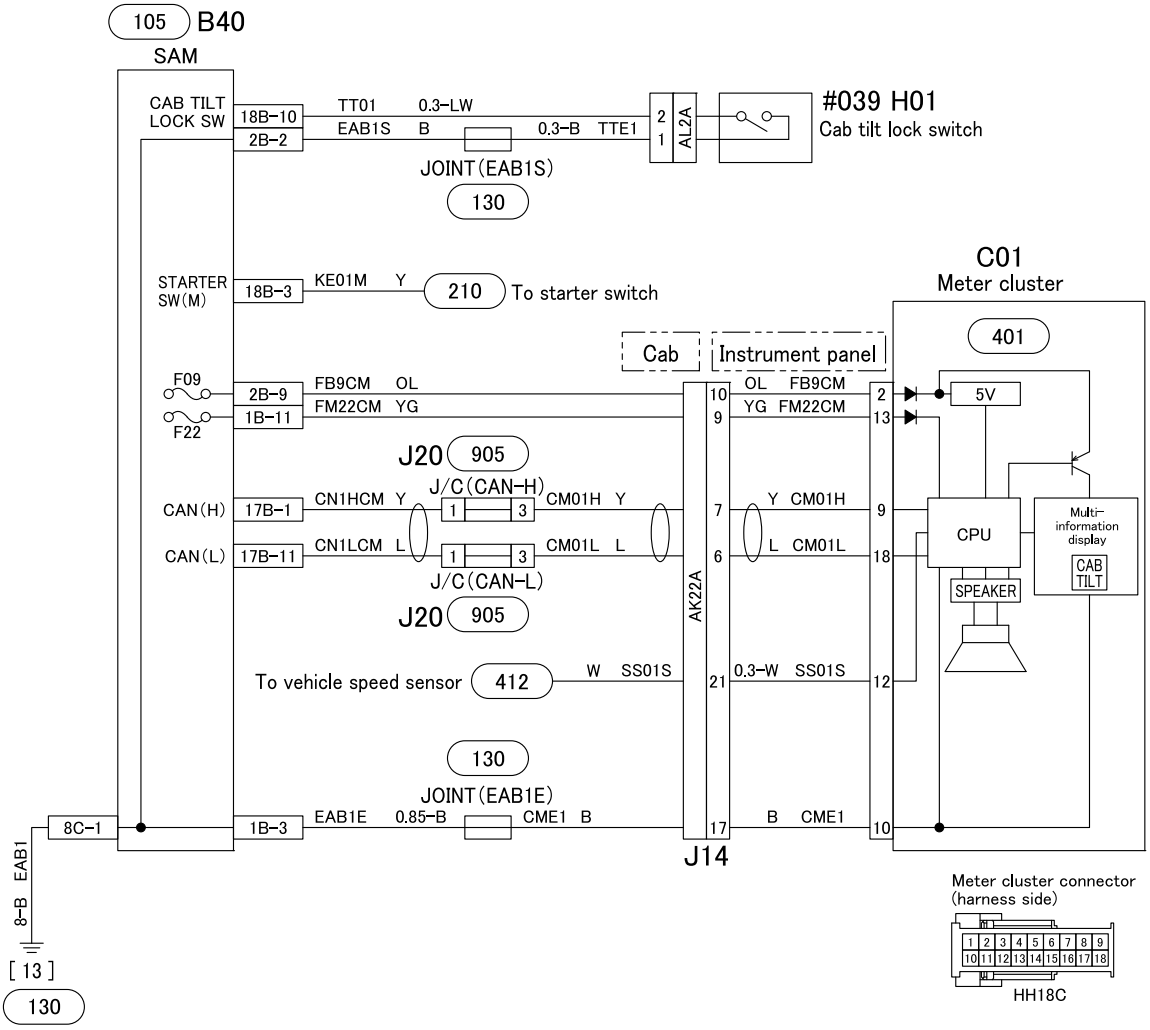
(2/2)



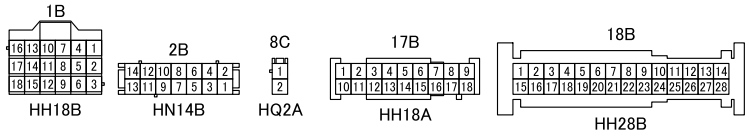
ISS: Idling stop and start system

537-C07352-2

CAB TILT WARNING CIRCUIT

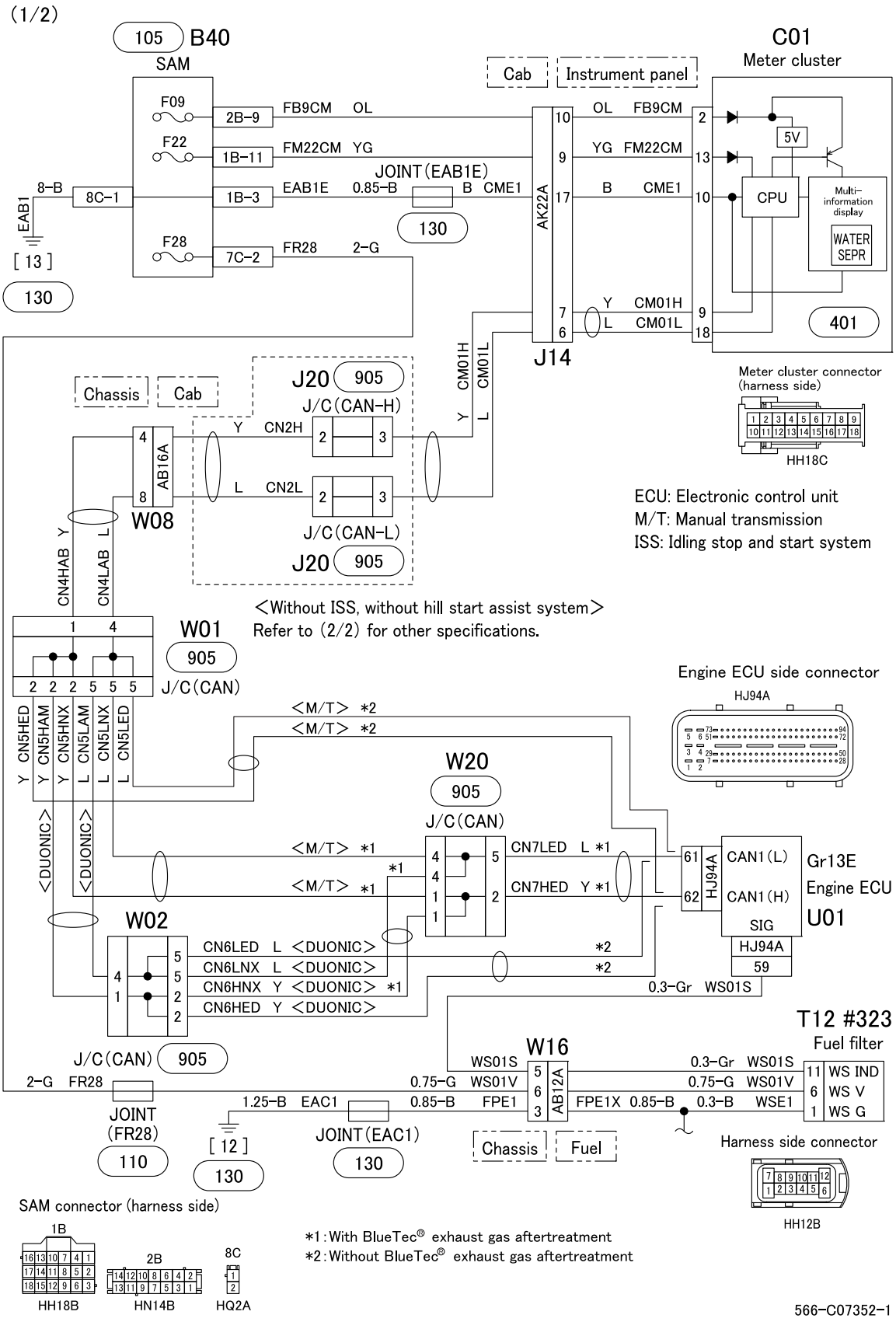


SAM connector (harness side)



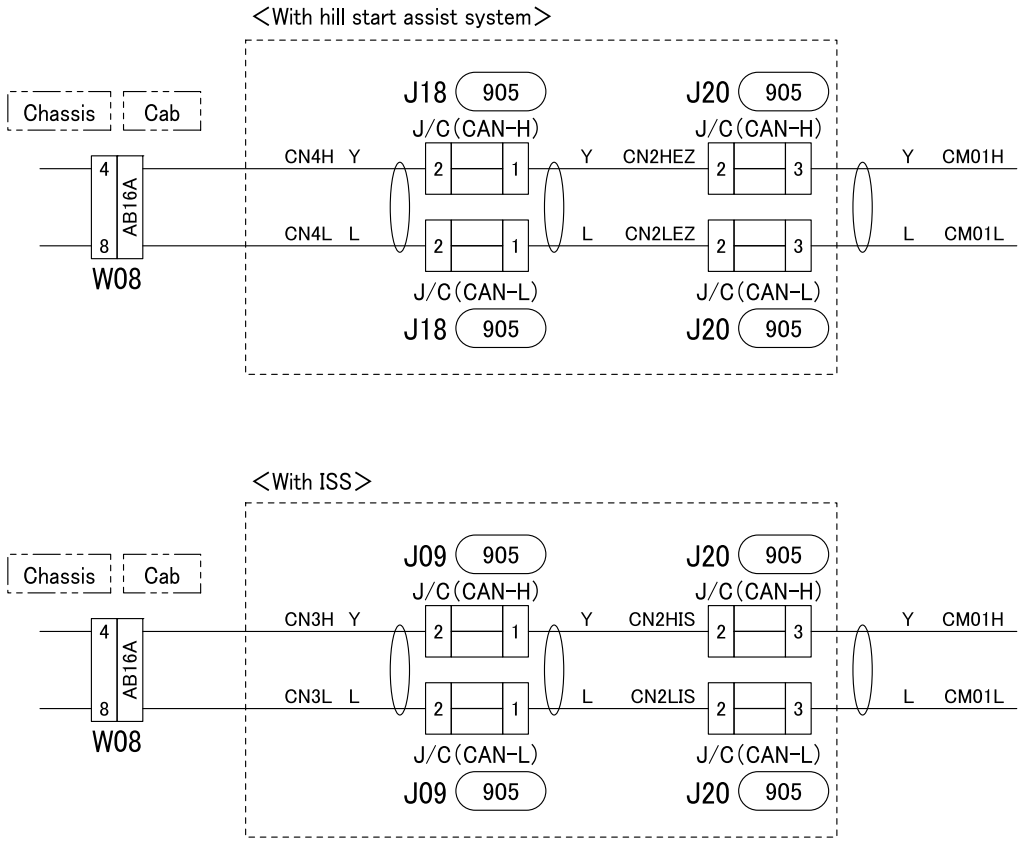
550-C07352

FUEL FILTER WARNING CIRCUIT (1)



FUEL FILTER WARNING CIRCUIT (2)

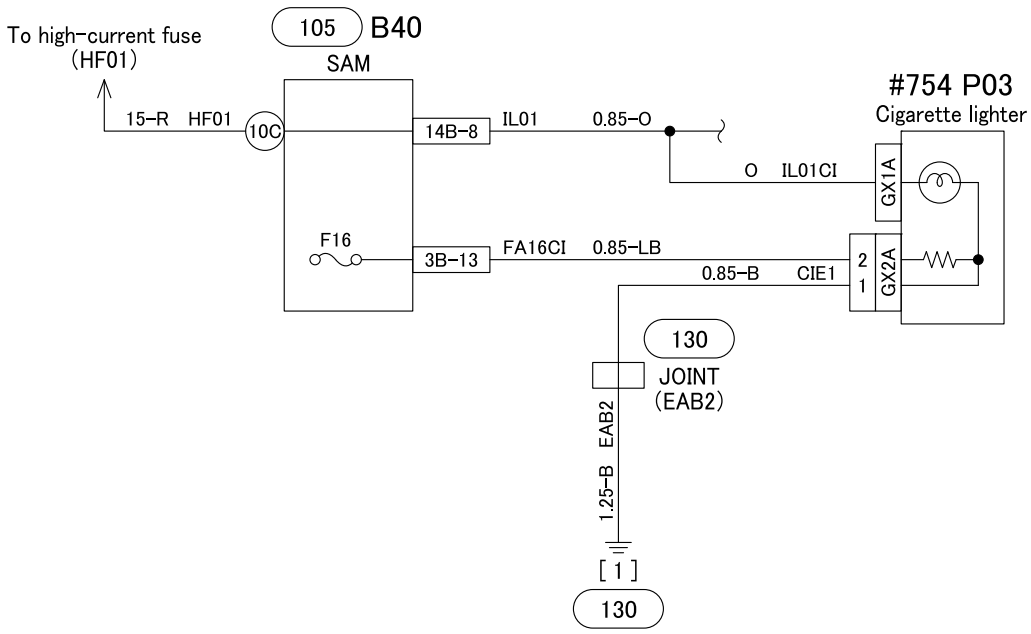
(2/2)



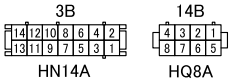
ISS: Idling stop and start system

566-C07352-2

CIGARETTE LIGHTER CIRCUIT

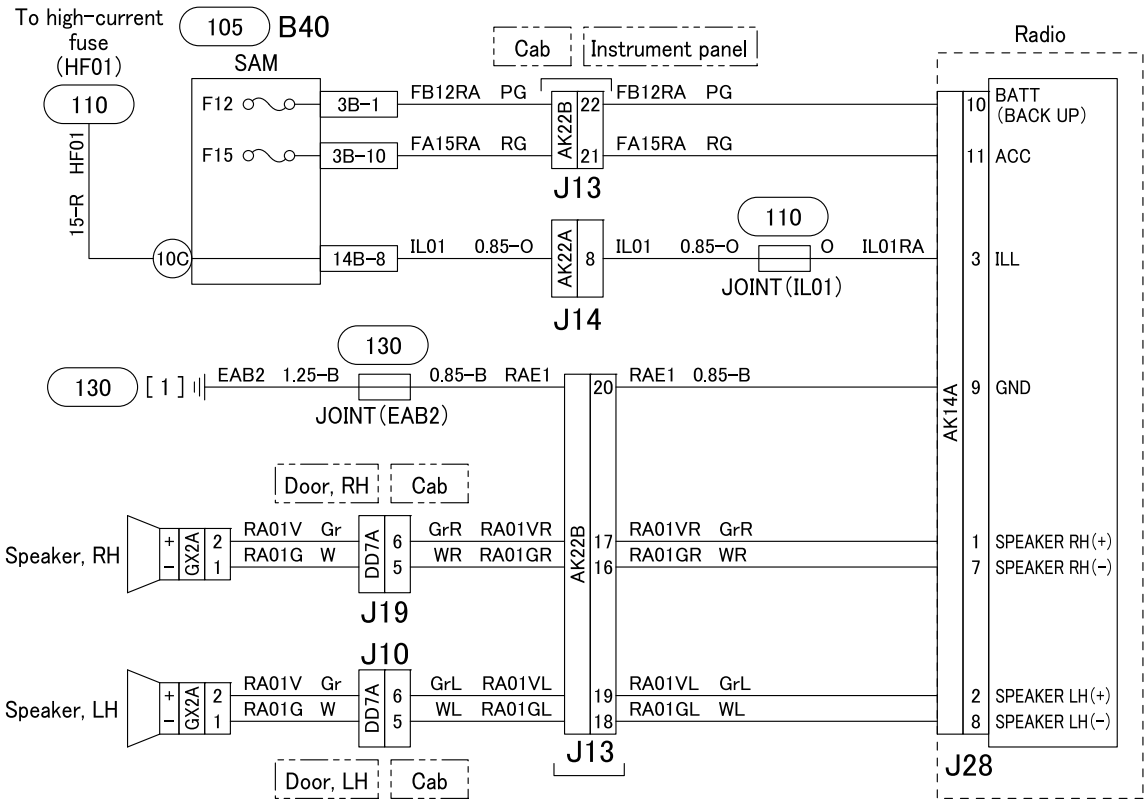


SAM connector (harness side)

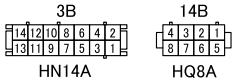


610-C07352

AUDIO CIRCUIT

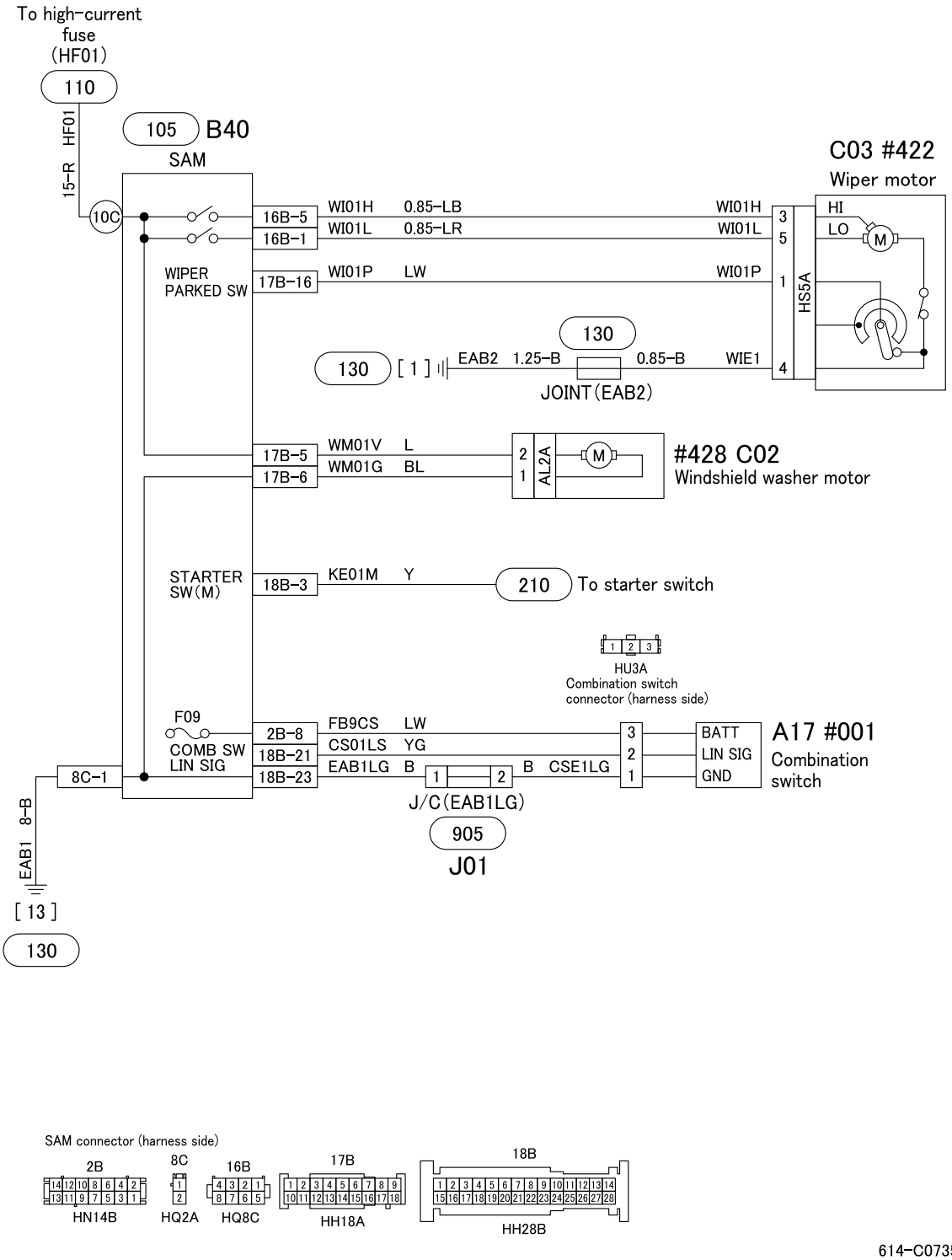


SAM connector (harness side)



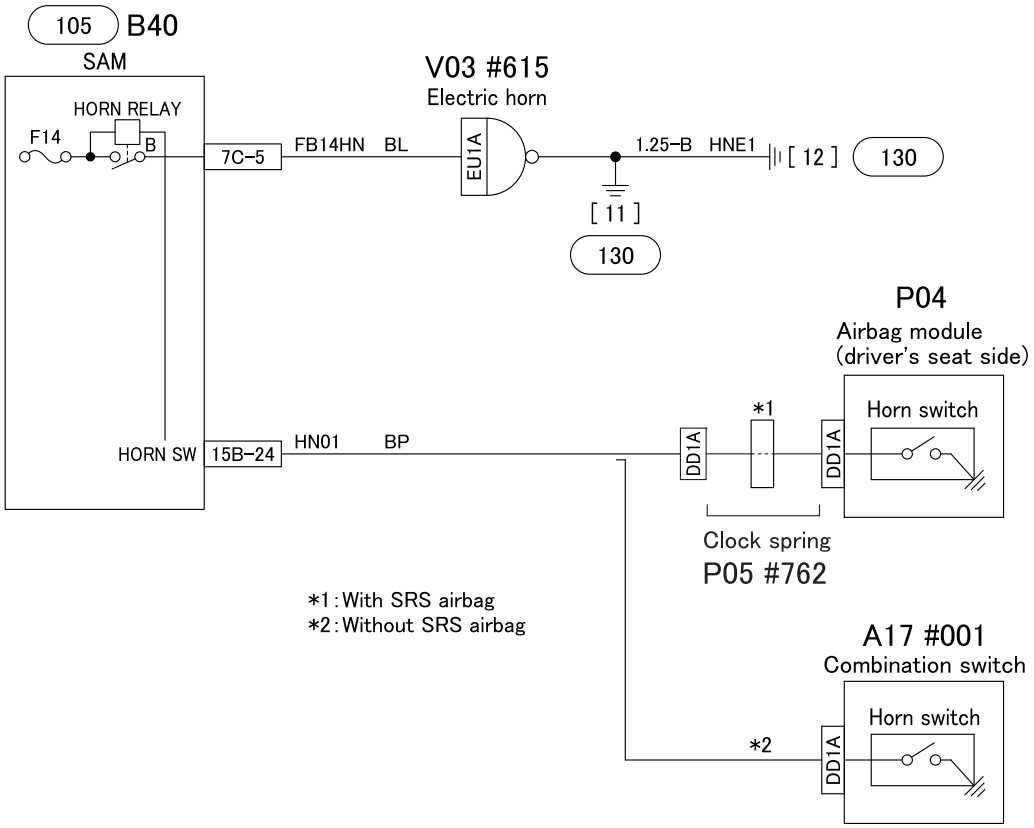
612-C07352

WIPER AND WASHER CIRCUIT



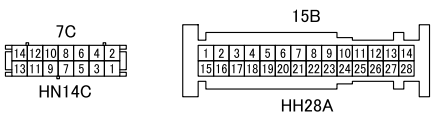
614-C07352

HORN CIRCUIT



SRS: Supplemental restraint system

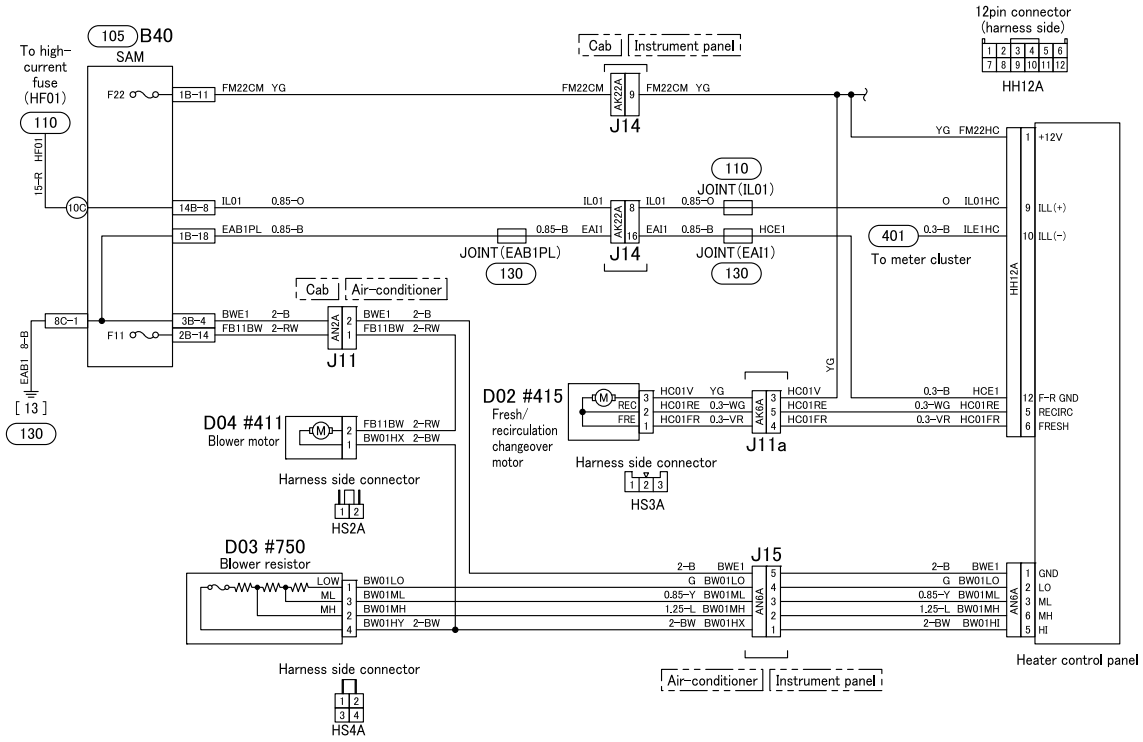
SAM connector (harness side)



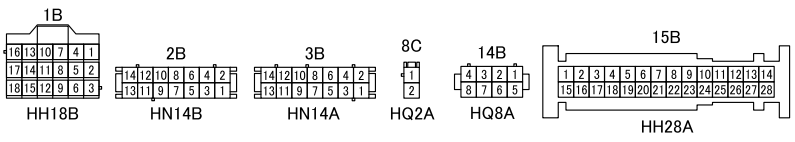
616-C07352

HEATER AND AIR-CONDITIONER CIRCUIT (1)

＜Heater＞



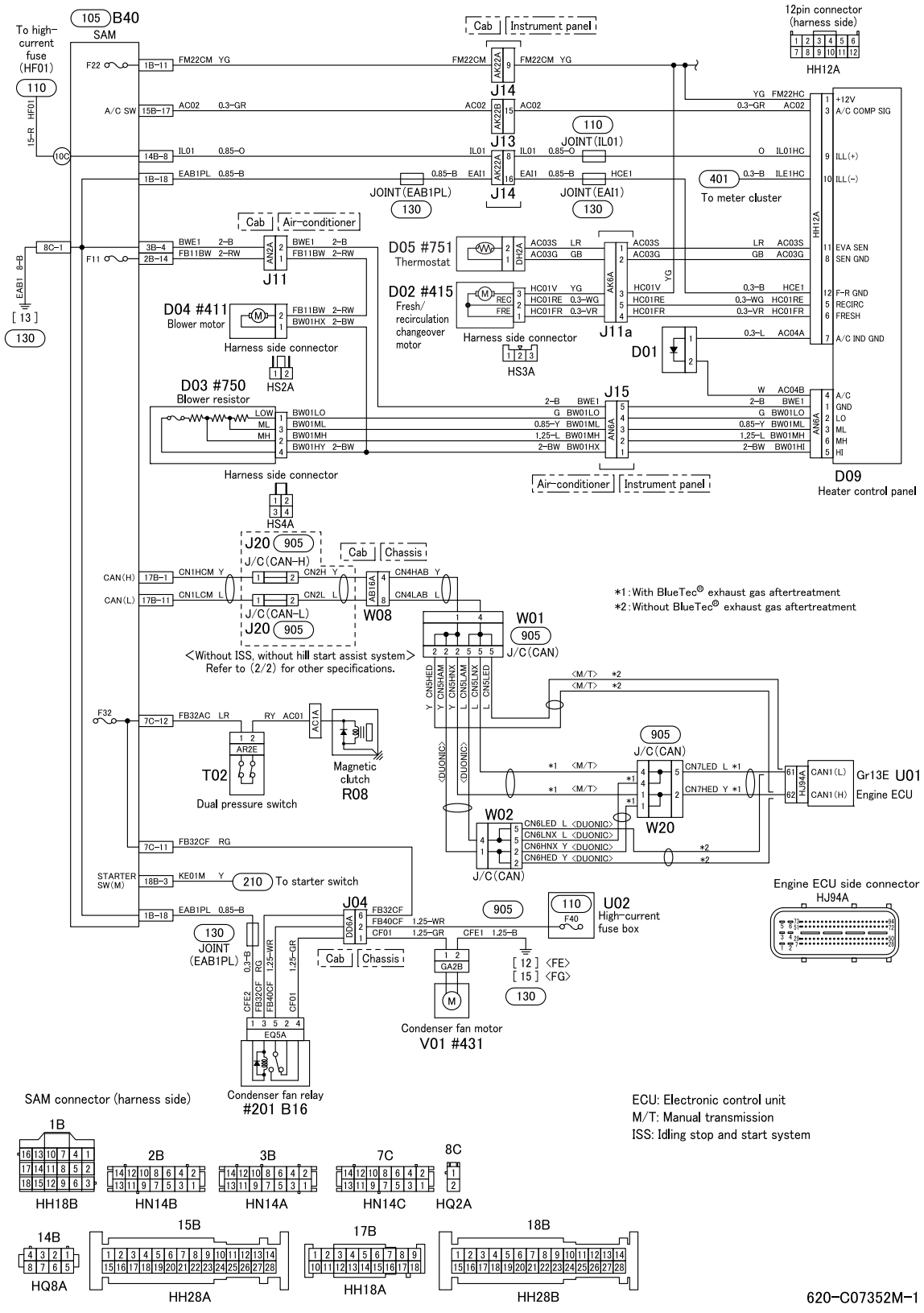
SAM connector (harness side)



620-C07352H

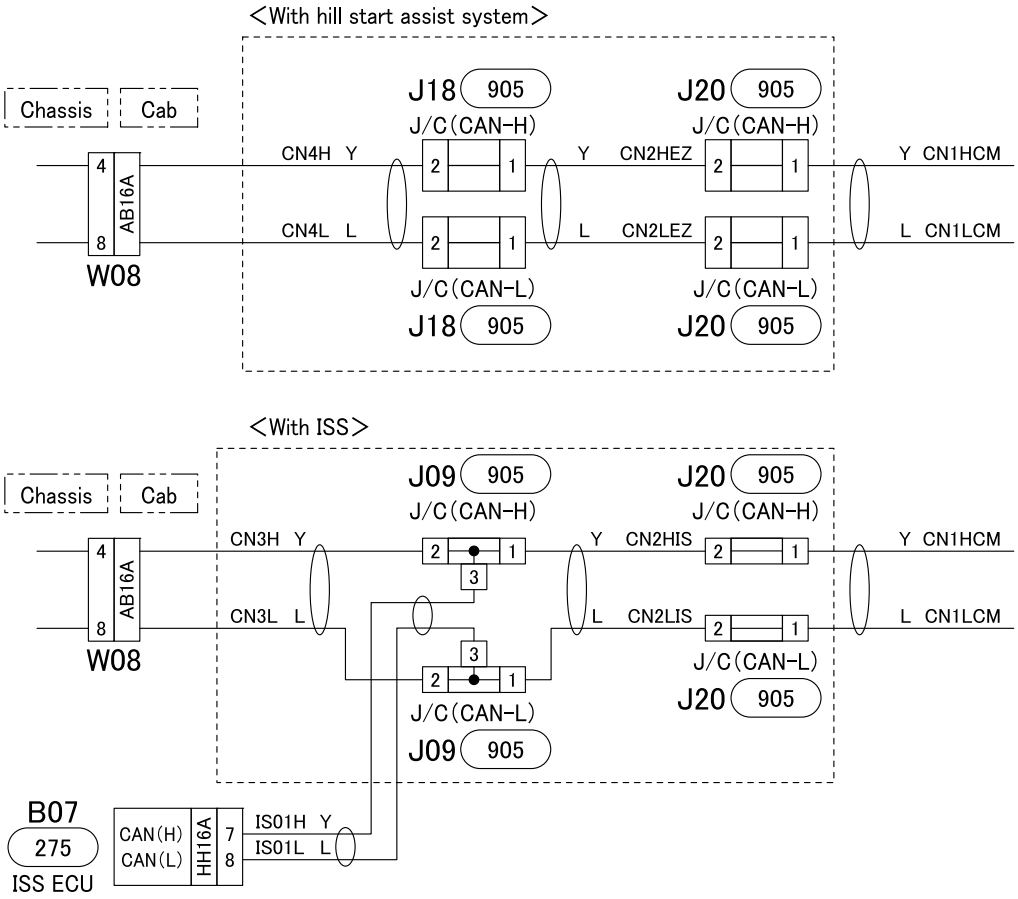
HEATER AND AIR-CONDITIONER CIRCUIT (2)

＜Manual air−conditioner＞(1/2)



HEATER AND AIR-CONDITIONER CIRCUIT (3)

＜Manual air-conditioner＞(2/2)



ISS ECU connector (harness side)

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

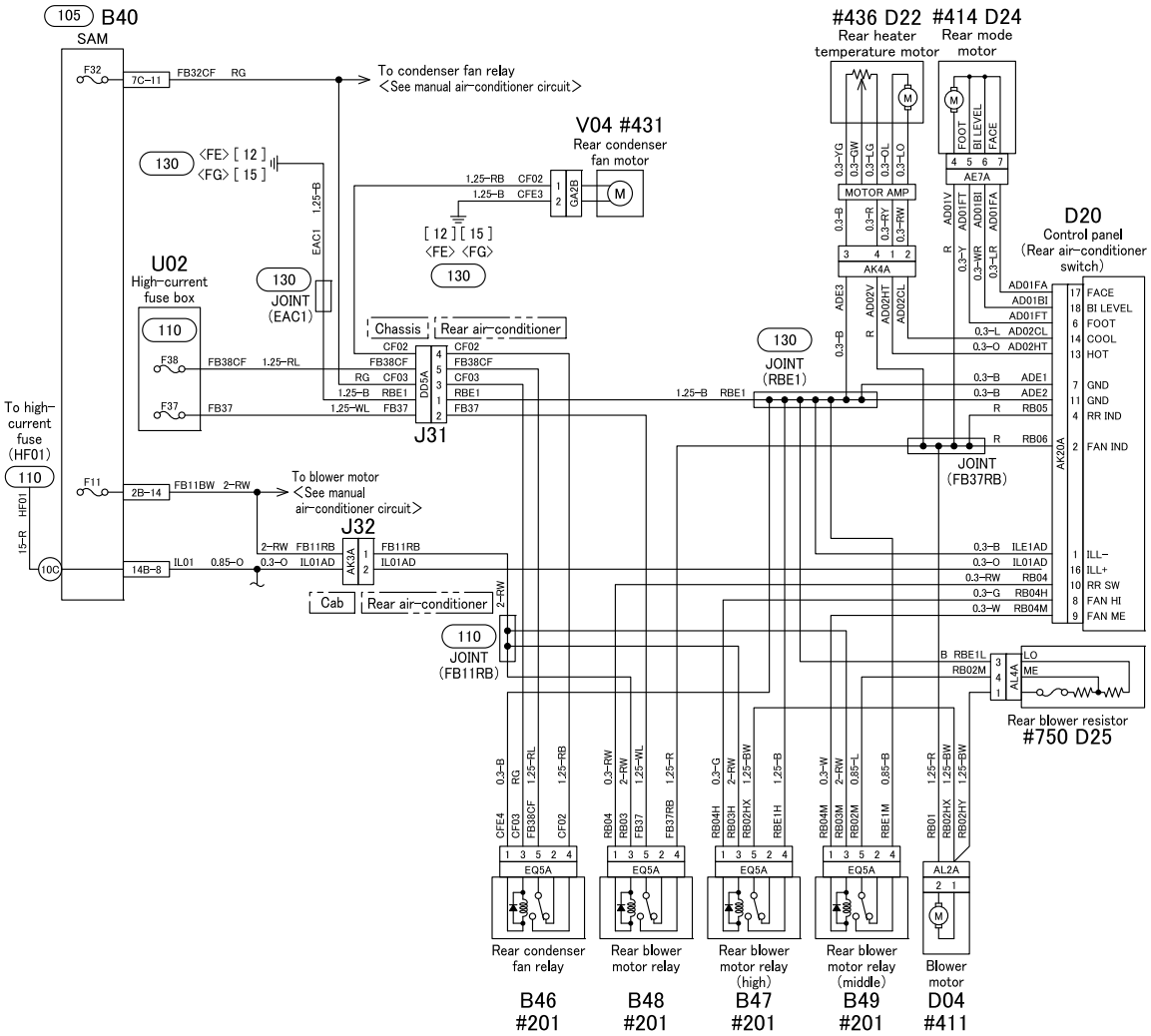
HH16A

ISS: Idling stop and start system

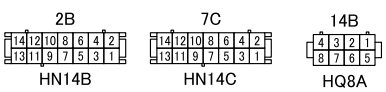
620-C07352M-2

HEATER AND AIR-CONDITIONER CIRCUIT (4)

＜Rear air-conditioner＞

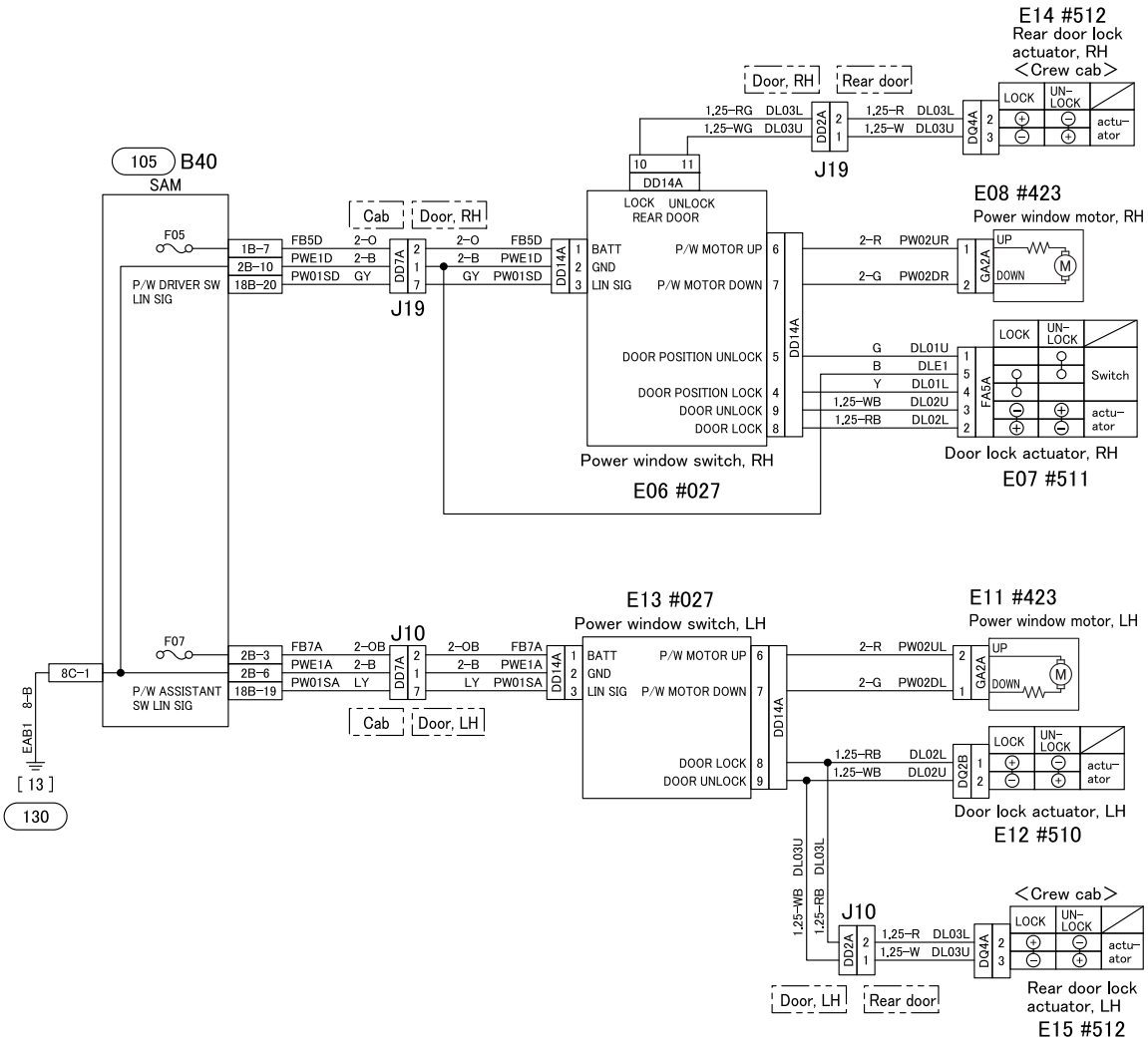


SAM connector (harness side)

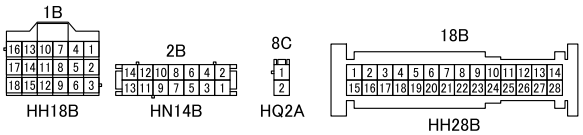


620-C07352R

POWER WINDOW AND CENTRAL DOOR LOCK CIRCUIT

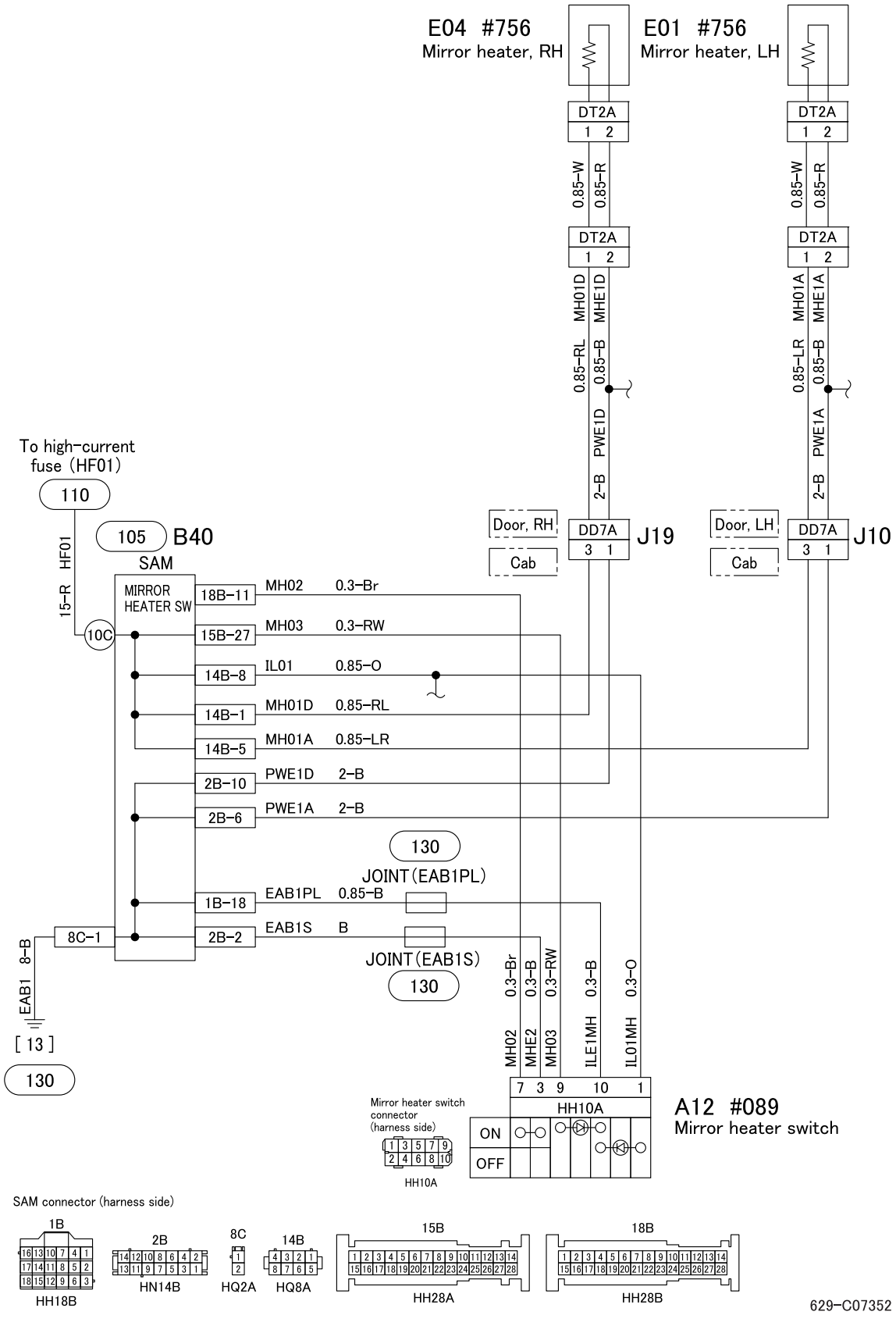


SAM connector (harness side)

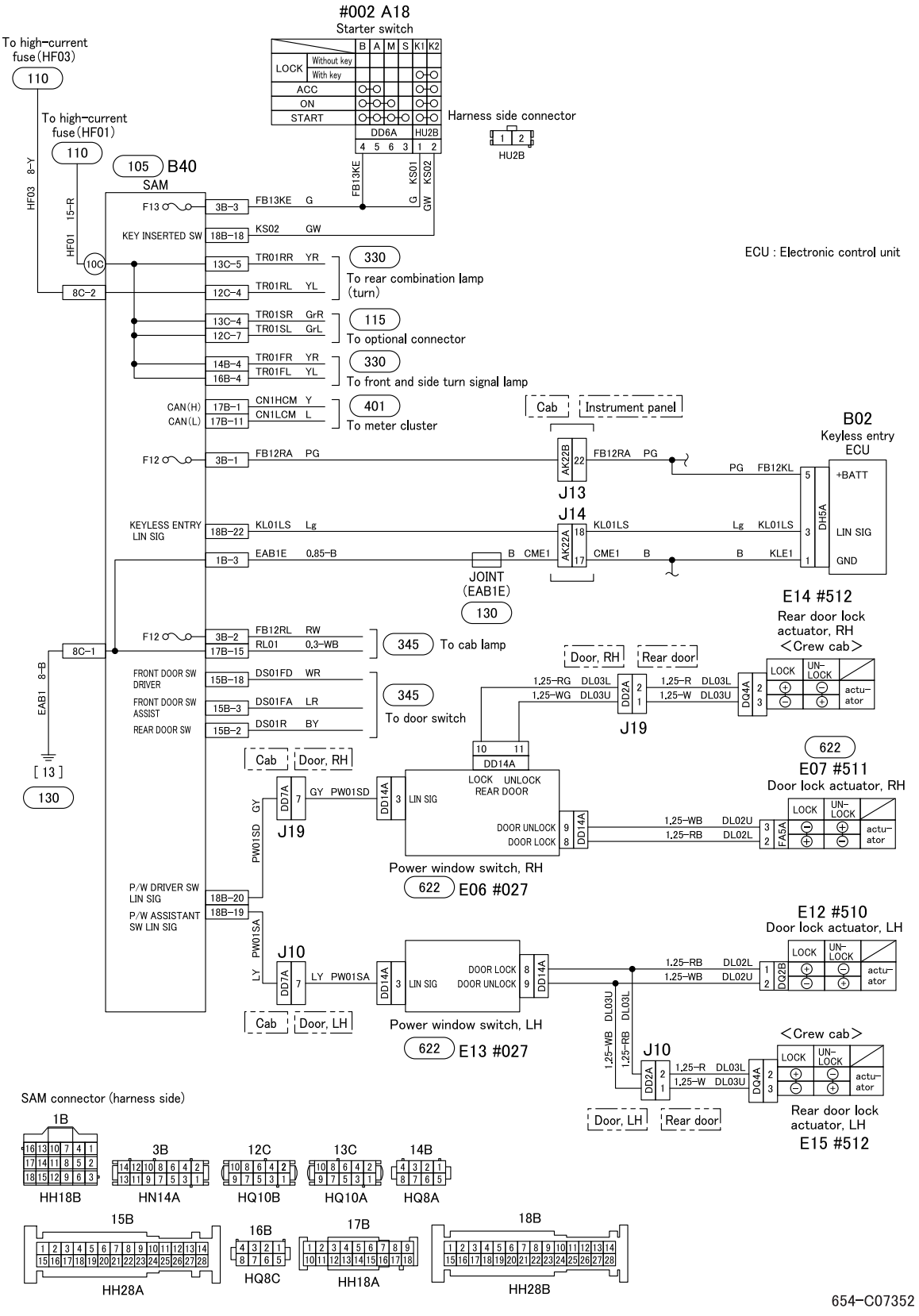


622-C07352

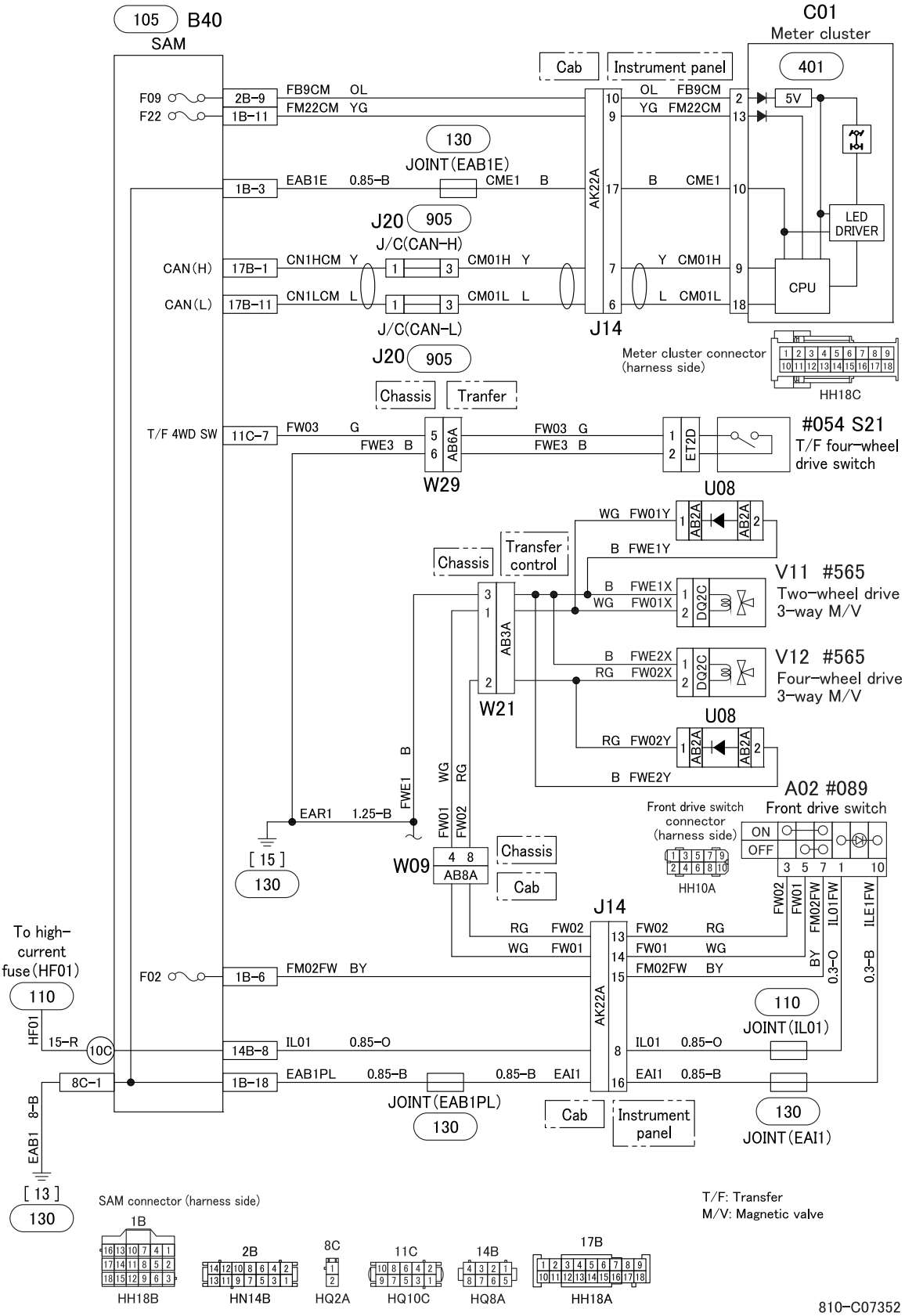
MIRROR HEATER CIRCUIT



KEYLESS ENTRY CIRCUIT

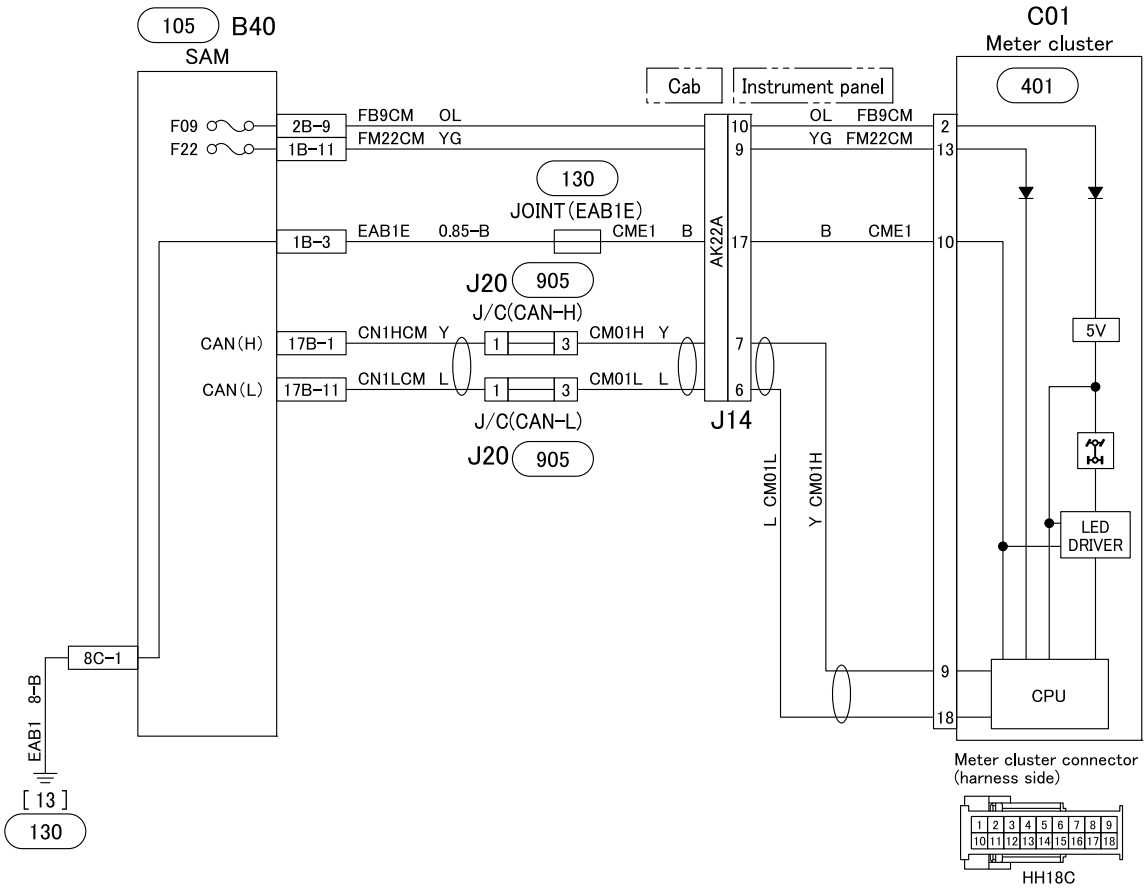


FOUR-WHEEL DRIVE CIRCUIT (1)

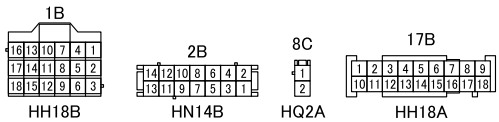


FOUR-WHEEL DRIVE CIRCUIT (2)

＜FECX, FG with High-Low Transfer＞（1/2）



SAM connector (harness side)

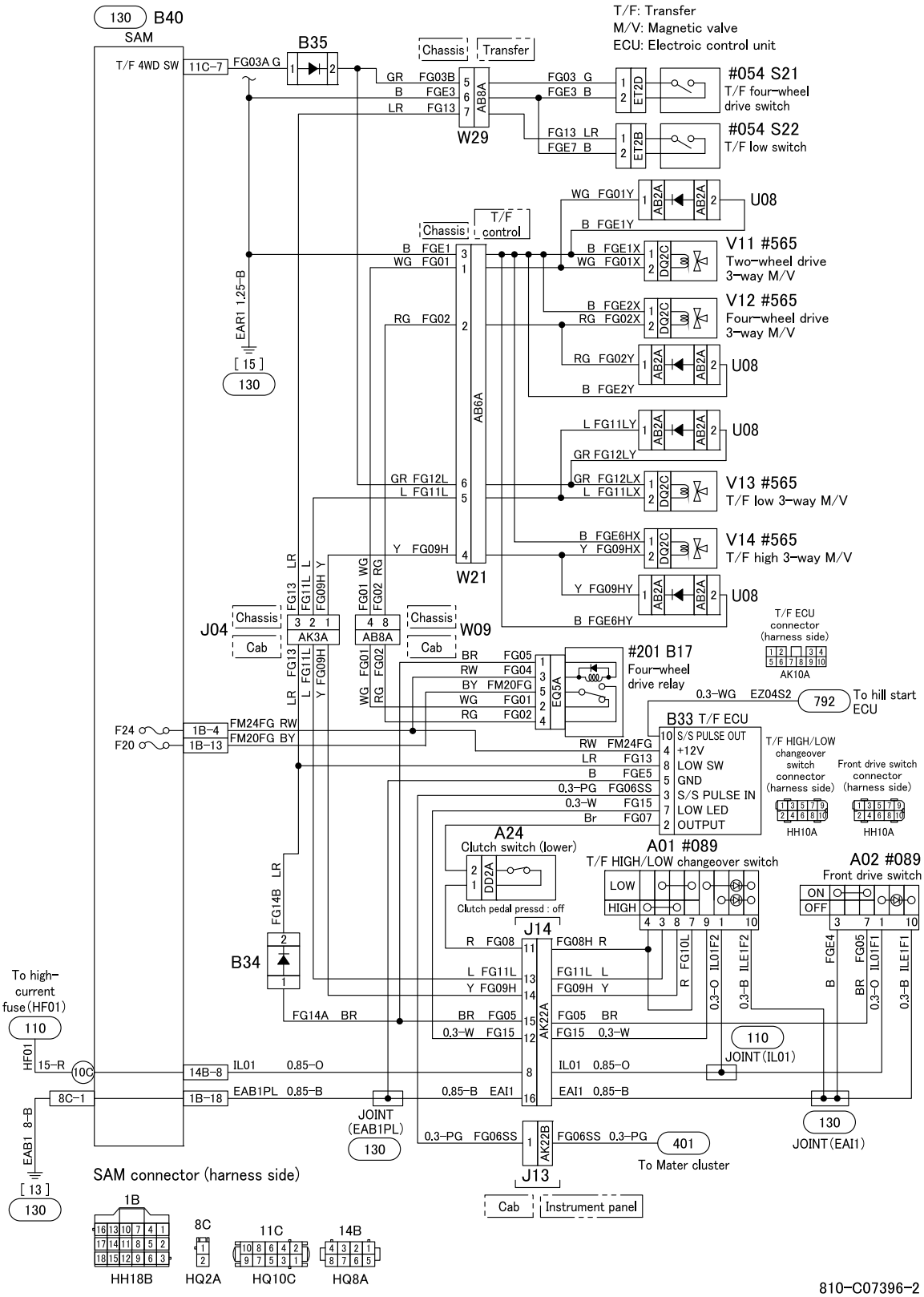


810-C07396-1

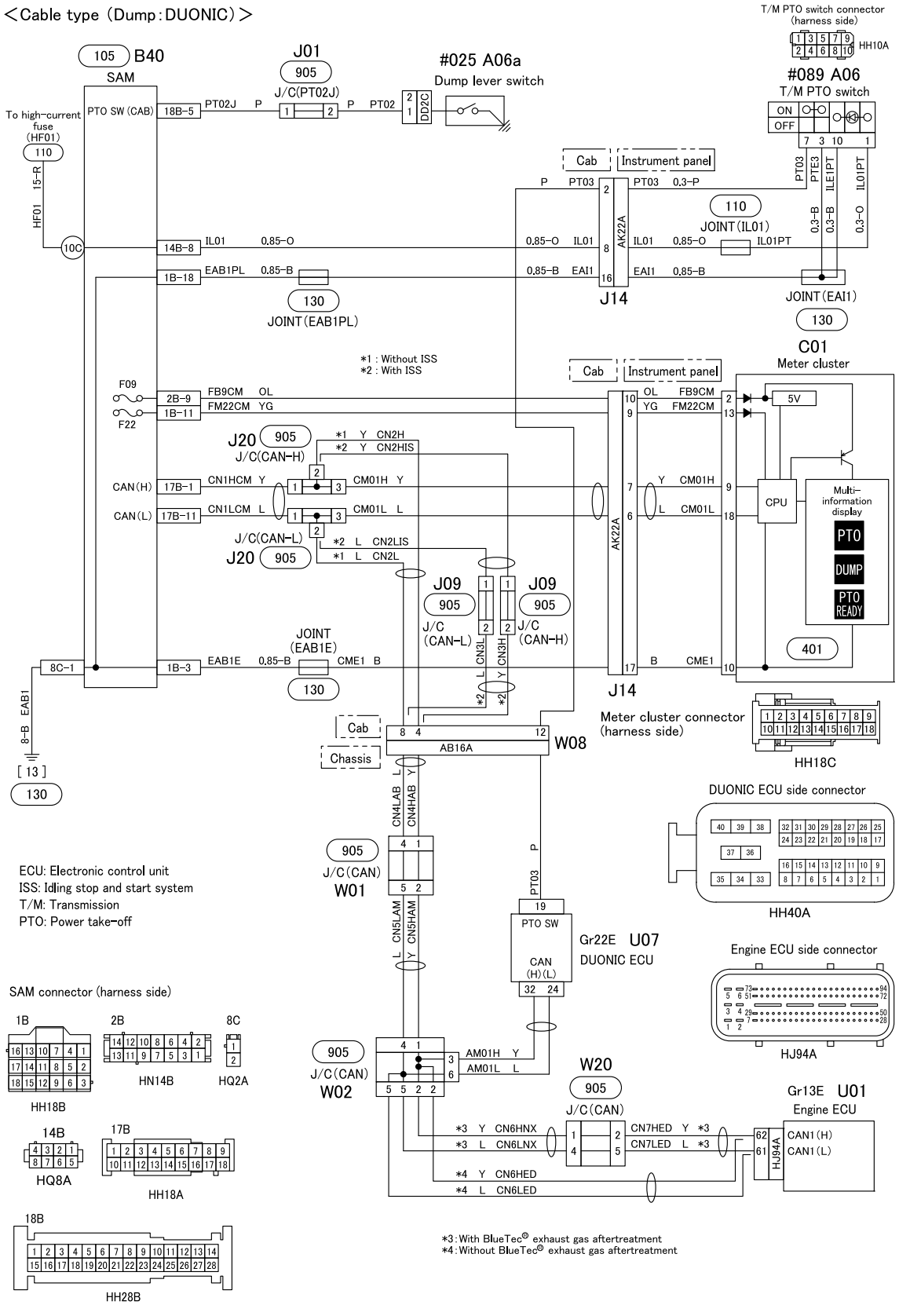
FOUR-WHEEL DRIVE CIRCUIT (3)

C

＜FECX, FG with High-Low Transfer＞ (2/2)

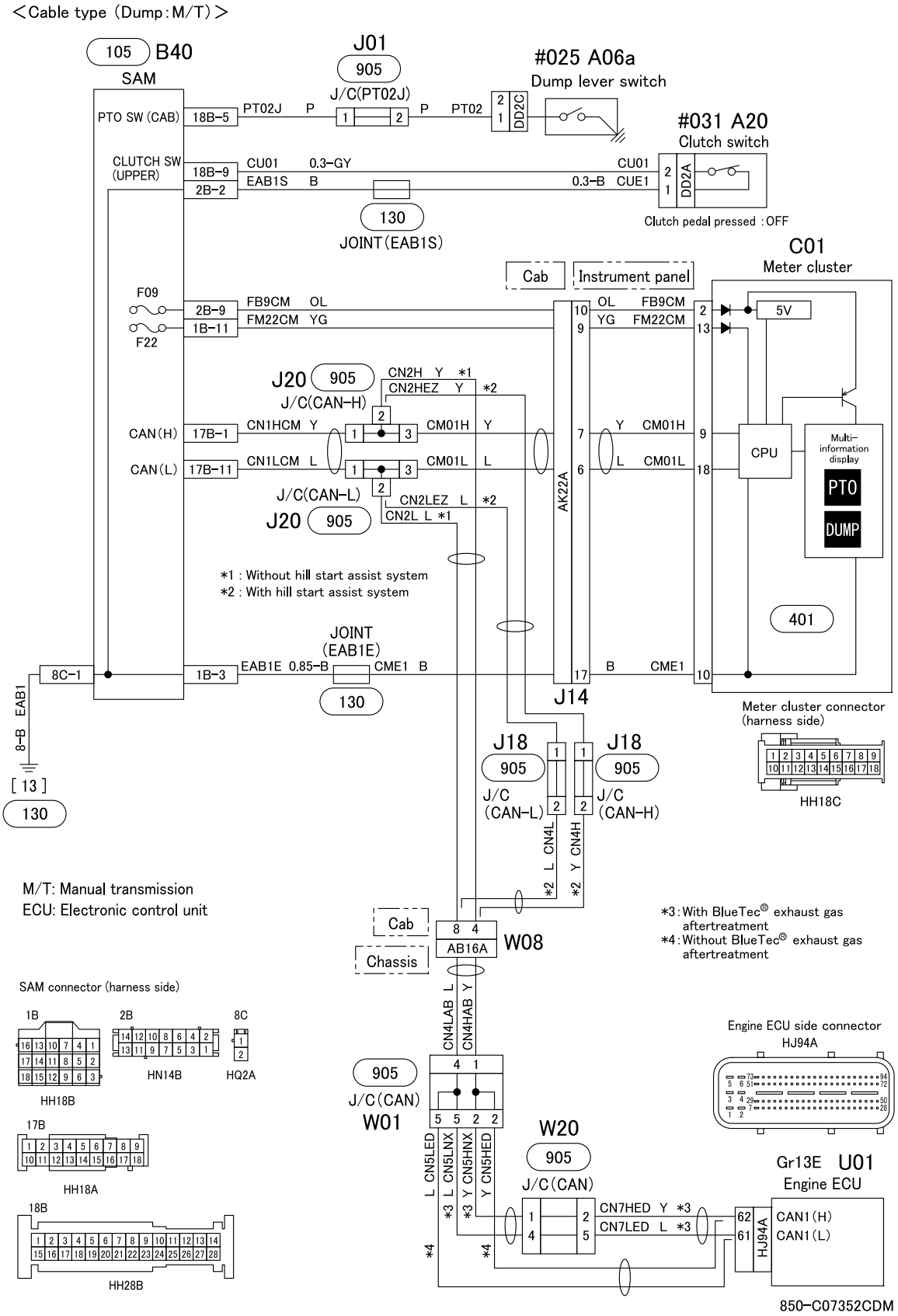


TRANSMISSION POWER TAKE-OFF CIRCUIT (1)

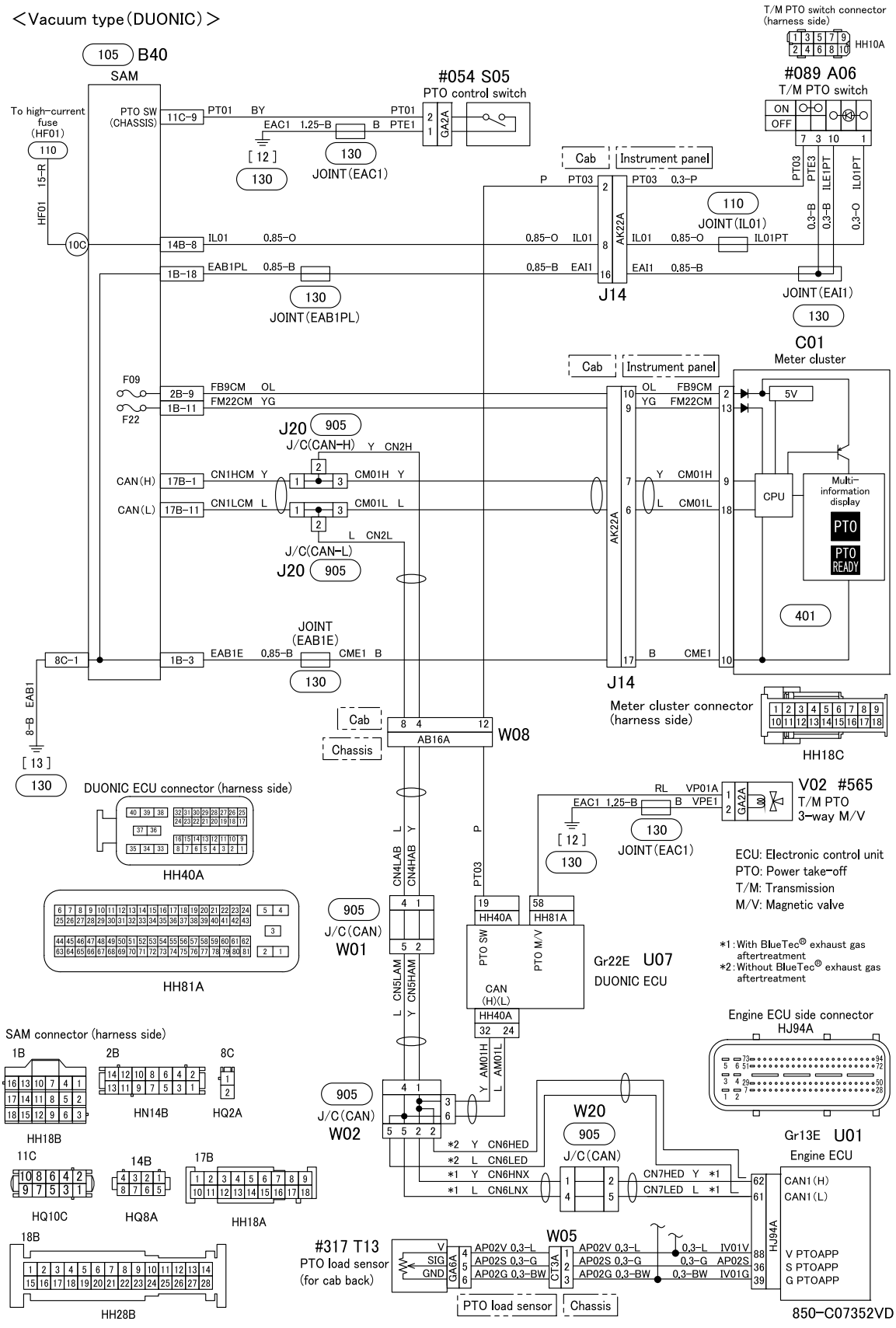


850-C07352CDD

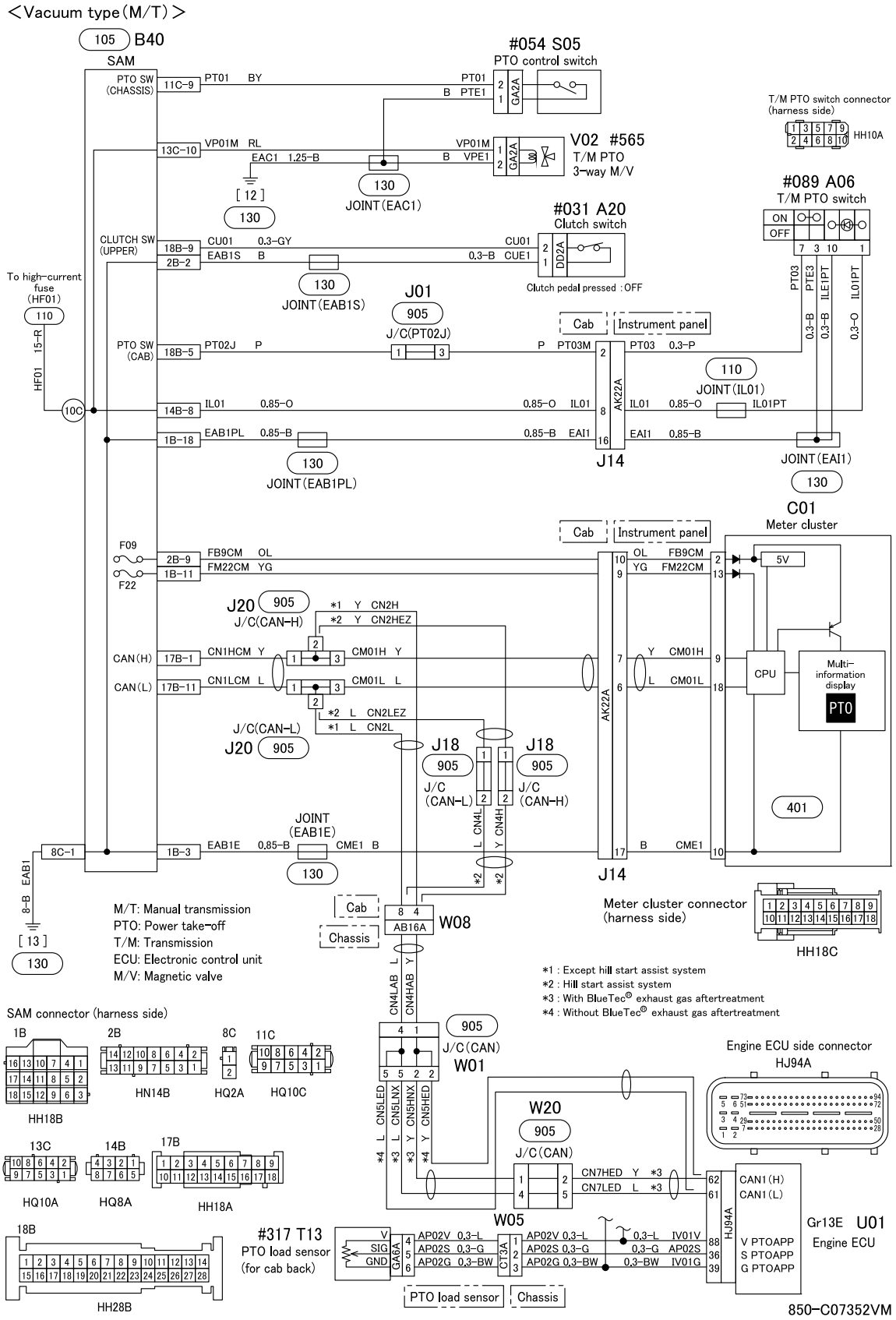
TRANSMISSION POWER TAKE-OFF CIRCUIT (2)



TRANSMISSION POWER TAKE-OFF CIRCUIT (3)



TRANSMISSION POWER TAKE-OFF CIRCUIT (4)



JOINT CONNECTOR (1)

(1/4)

SRS airbag(CAN-H)

1	2	3	4
CB2HAG	CB3H	AG04H	–

1	CB2HAG	G
2	CB3H	G
3	AG04H	G
4		

Gr52E

SRS airbag(CAN-L)

1	2	3	4
CB2LAG	CB3L	AG04L	–

1	CB2LAG	W
2	CB3L	W
3	AG04L	W
4		

Gr52E

Meter cluster(CAN-H)

1	2	3	4
CN1HCM	CN2H CN2HIS CN2HEZ	CM01H	–

1	CN1HCM	Y
2	CN2H, CN2HIS, CN2HEZ	Y
3	CM01H	Y
4		

Gr13E

Meter cluster(CAN-L)

1	2	3	4
CN1LCM	CN2L CN2LIS CN2LEZ	CM01L	–

1	CN1LCM	L
2	CN2L, CN2LIS, CN2LEZ	L
3	CM01L	L
4		

Gr13E

Immobilizer(CAN-H)

1	2	3	4
CB1HIM	CB2HAG	IM01H	–

1	CB1HIM	G
2	CB2HAG	G
3	IM01H	G
4		

210

Immobilizer(CAN-L)

1	2	3	4
CB1LIM	CB2LAG	IM01L	–

1	CB1LIM	W
2	CB2LAG	W
3	IM01L	W
4		

210

SRS: Supplemental restraint system

905-C07352-1

JOINT CONNECTOR (2)

(2/4)

ISS(CAN-H)

1	2	3	4
CN2HIS	CN3H	IS01H	–

1	CN2HIS	Y	275
2	CN3H	Y	
3	IS01H	Y	
4			

ISS(CAN-L)

1	2	3	4
CN2LIS	CN3L	IS01L	–

1	CN2LIS	L	275
2	CN3L	L	
3	IS01L	L	
4			

Hill start assist system(CAN-H)

1	2	3	4
CN2HEZ	CN4H	EZ01H	–

1	CN2HEZ	Y	Gr35E
2	CN4H	Y	
3	EZ01H	Y	
4			

Hill start assist system(CAN-L)

1	2	3	4
CN2LEZ	CN4L	EZ01L	–

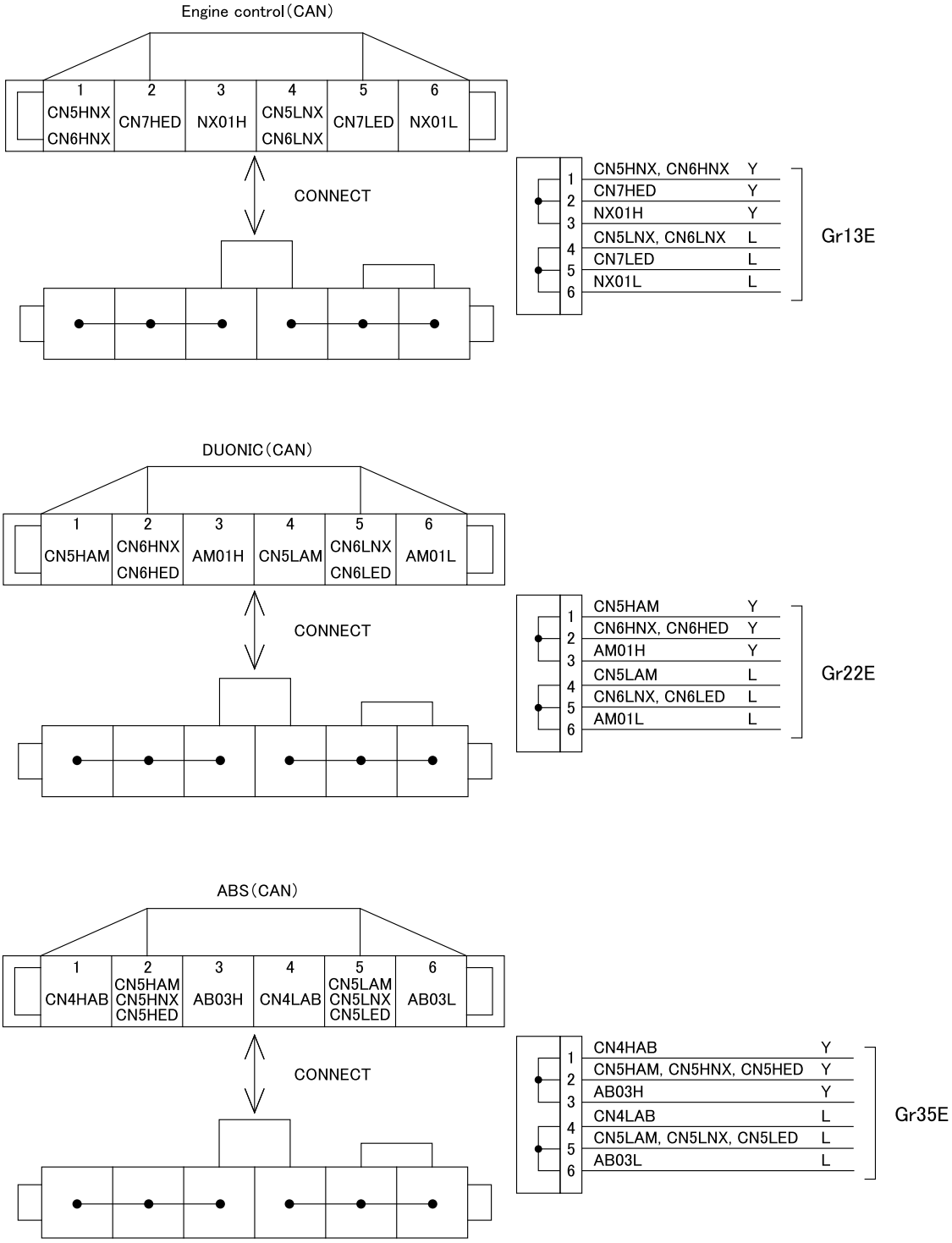
1	CN2LEZ	L	Gr35E
2	CN4L	L	
3	EZ01L	L	
4			

ISS: Idling stop and start system

905-C07352-2

JOINT CONNECTOR (3)

(3/4)



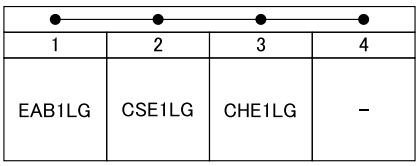
ABS: Anti-lock brake system

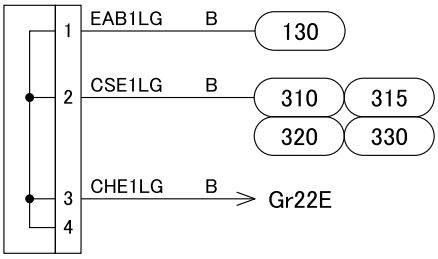
905-C07352-3

JOINT CONNECTOR (4)

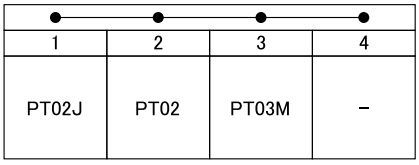
(4/4)

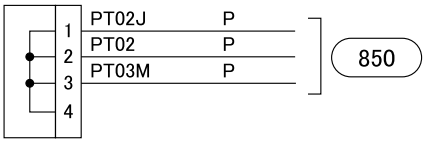
Ground (EAB1LG)



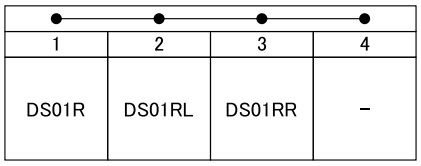


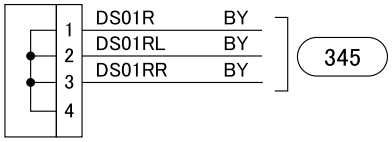
PTO (PT02J)





Rear door switch (040)





PTO: Power take-off

905-C07352-4

Revision record <Electrical systems section>

E	28.February.2020	Safety equipment added
D	3. April. 2015	Other models added
C	20. September. 2013	Other models added
B	3. August. 2012	Other models added
A	25. January. 2012	Added notices for wiring
–	24. October. 2011	Newly issued
Rev. code	Date issued	Remarks

NOTE:

1, Chapter 1-9 is Common Section for all markets and to be revised without any special notification. Therefore, please note that this version is not necessarily the latest one.

2, Chapter 10 is for specific market(s). MFTBC will distribute the latest version whenever it will be revised.

BlueTec®: The trademark of Daimler AG.
AdBlue®: The trademark of the German Association of the Automobile Industry (VDA).
DUONIC®: The trademark of Daimler AG.

Body/equipment mounting directives <Electrical systems section>

CANTER

Australia

MITSUBISHI FUSO TRUCK & BUS CORPORATION

February. 2020 TL2FA