

FOREWORD

This workshop manual has been prepared to provide information regarding repair procedures on Hino Vehicles.

Applicable for FM8J and GH8J series, equipped with J08E engine

When making any repairs on your vehicle, be careful not to be injured through improper procedures.

As for maintenance items, refer to the Owner's Manual.

All information and specifications in this manual are based upon the latest product information available at the time of printing.

Hino Motors reserves the right to make changes at any time without prior notice.

Please note that the publications below have also been prepared as relevant workshop manuals for the components and systems in this vehicles.

Manual Name	Pub. No.
Chassis Workshop Manual	S1-MFME05A S1-MFME05A EWD
J08E Engine Workshop Manual	S5-MJ08E12A
Trouble shooting Workshop Manual	S7-MFME02A 2/2

Hino Motors, Ltd.

CHAPTER REFERENCES REGARDING THIS WORKSHOP MANUAL

Use this chart to the appropriate chapter numbers for servicing your particular vehicle.

CHAPTER	MANUAL No.	S7-MFME02A 1/2	
	MODELS	FM8J, GH8J	
GENERAL INTRODUCTION		1-001	
ENGINE		2-001 (J08E)	2-002 (COMMON ITEMS)

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CHAPTER REFERENCES REGARDING THIS WORKSHOP MANUAL

Use this chart to the appropriate chapter numbers for servicing your particular vehicle.

CHAPTER	MANUAL No.	S7-MFME02A 2/2
	MODELS	FM8J, GH8J
TRANSMISSION		4-001
CLUTCH		5-001
PROPELLER SHAFT		6-001
AXLE		7-001
DIFFERENTIAL		8-001
BRAKE		9-001
STEERING		10-001
SUSPENSION		11-001
FRAME AND FRAME ACCESSORY		12-001
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HOW TO IDENTIFY VEHICLE TYPE

LIST OF VEHICLE MODELS

LIST OF APPLICABLE VEHICLE MODELS

EN01H01ZZZ010102002001

Vehicle models		Engine models	Transmission models
GH	8J	J08E-WB	MX06
			ZF 9S1110
FM	8J	J08E-WB	ZF 9S1110

HOW TO IDENTIFY VEHICLE TYPE

HOW TO IDENTIFY VEHICLE TYPE

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F M 8 J L 7 D
 1 2 3 4 5 6

1	Vehicle model classification F, G : Cab over engine type truck	5	Steering wheel position 7 : Left hand drive																																			
2	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">Vehicle classification and driving system</th> </tr> <tr> <th style="width: 30%;">Driving system</th> <th style="width: 70%;">GVMR or GCMR</th> </tr> </thead> <tbody> <tr> <td>C : 4 × 2</td> <td>C : Light</td> </tr> <tr> <td>D : 4 × 2</td> <td></td> </tr> <tr> <td>E : 4 × 2</td> <td></td> </tr> <tr> <td>F : 4 × 2</td> <td></td> </tr> <tr> <td>G : 4 × 2</td> <td></td> </tr> <tr> <td>H : 4 × 2</td> <td></td> </tr> <tr> <td>L : 6 × 2</td> <td style="text-align: center;">?</td> </tr> <tr> <td>M : 6 × 4</td> <td></td> </tr> <tr> <td>R : 6 × 2</td> <td></td> </tr> <tr> <td>S : 6 × 4</td> <td></td> </tr> <tr> <td>Y : 8 × 4</td> <td></td> </tr> <tr> <td>T : 4 × 4</td> <td>T : Heavy</td> </tr> </tbody> </table>		Vehicle classification and driving system		Driving system	GVMR or GCMR	C : 4 × 2	C : Light	D : 4 × 2		E : 4 × 2		F : 4 × 2		G : 4 × 2		H : 4 × 2		L : 6 × 2	?	M : 6 × 4		R : 6 × 2		S : 6 × 4		Y : 8 × 4		T : 4 × 4	T : Heavy	6	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Vehicle Style</th> </tr> </thead> <tbody> <tr> <td>A : Leaf suspension type cargo truck</td> </tr> <tr> <td>B : Leaf suspension type tractor truck</td> </tr> <tr> <td>D : Dump Truck</td> </tr> <tr> <td>G : Air suspension (Rear) type cargo truck</td> </tr> <tr> <td>M : Mixer Truck</td> </tr> </tbody> </table>	Vehicle Style	A : Leaf suspension type cargo truck	B : Leaf suspension type tractor truck	D : Dump Truck	G : Air suspension (Rear) type cargo truck	M : Mixer Truck
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SAFETY INSTRUCTIONS AND READINESS TO WORK

WARNING

WARNING

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Follow the instructions described below in order to ensure safety during work and prevent any damage or loss of a vehicle owned by a customer.

This document was published for use by qualified service engineers who have full knowledge and expertise. Service works engaged by unqualified or untrained engineers or without use of proper tools or equipment and service activities performed in the way not described in this document will not only damage a vehicle but also harm service engineers and others in the surrounding area.

- Proper service/repair works are essential to safety of a service engineer as well as safety and reliability of a vehicle. If parts need to be replaced, Hino's genuine parts must be used as a replacement. Do not use any deteriorated parts.
- All information and instructions provided in this document must be followed in service and repair works. To perform service and repair works in accordance with procedures described in this document, properly use special tools specially designed for each purpose.
- Do not use any tools or work process not recommended in this document. Use of such tools or work process will cause losses of safety of a service engineer and of safety and reliability of a vehicle.
- Various information and instructions provided under "DANGER", "WARNING", "CAUTION" and "NOTICE" in this document must be followed so as to prevent a potential risk of accident or injury during service and repair works and to avoid damage of a vehicle and loss of safety and reliability due to improper work process. Note that these information and instructions under "DANGER", "WARNING", "CAUTION" and "NOTICE" do not cover all kinds of potential risks. Observance of these information and instructions does not necessarily guarantee avoidance of risks.

SAFETY INSTRUCTIONS FOR WORK

SAFETY INSTRUCTIONS FOR WORK AND HANDLING

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1. GENERAL SAFETY INSTRUCTIONS

Follow the safety instructions described below to ensure safety and prevent potential risks during work.

- (1) Outfit
 - a. Use safety glasses.
 - b. In order to prevent a risk of injury, take off a watch, a tie, rings, bracelets, necklaces and other items before starting work.
 - c. Tie long hair at the back.
 - d. Always wear a hat and safety shoes.
- (2) Safety work
 - a. To avoid burn injury, do not touch a radiator, a muffler, an exhaust pipe and a tail pipe immediately after the engine stops.
 - b. Keep clothes and tools away from rotating parts (especially a cooling fan and a V-belt) while the engine rotates.
 - c. Keep the starter key out of a key hole when not used to start the engine.
 - d. Start the engine in a well-ventilated area to avoid high concentration of carbon monoxides in air.
 - e. Keep sparks, lighted cigarettes and open flames away from inflammable fuel and battery gas.
 - f. Toxic and corrosive sulfuric acid is used as battery electrolyte. Use particular care when handling battery electrolyte.
 - g. Carefully avoid short of a battery and a starter cable. Short may cause a risk of cable burn loss and/or burn injury.
 - h. Do not leave tools and clean cloth in the engine room. Any remaining tools or clean cloth will bounce off and cause injury if they contact with engine rotating parts.
 - i. Refer to "TOWING" in Owner's Manual supplied with a vehicle when towing a disabled vehicle.

2. SAFETY INSTRUCTIONS FOR SERVICE WORK

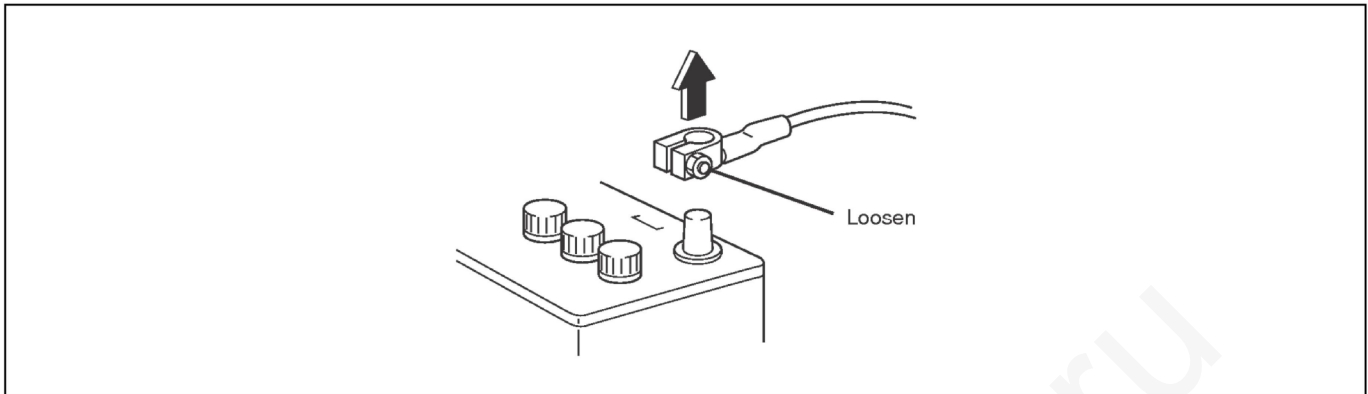
Follow the safety instructions described below in service work.

- (1) Preparation prior to overhaul
 - a. Prepare general tools, special tools and instruments before starting work.
 - b. Before overhauling a complicated area, indicate an engraving mark and/or an alignment mark on the functionally unobstructed area, in order to facilitate subsequent reassembly work. If electrical systems need to be repaired, remove a cable from the negative terminal of the battery before starting repair work.
 - c. Conduct checks and inspections before overhaul in accordance with described procedures.
- (2) Inspection during overhaul
Every time after removing each part, inspect a removed part for its integrity, deformation, breakage, wear and damage.
- (3) Sorting of overhauled parts
Sort removed parts in the right order. Sort and separate parts into replaceable ones and reusable ones.
- (4) Cleaning of overhauled parts
Thoroughly clean and wash reusable parts.
- (5) Inspection and measurement
Inspect and measure parts to be reused if necessary.
- (6) Installation
 - a. Install correct parts in accordance with correct procedures and specified standard values (example: tightening torque and adjustment value).
 - b. If parts need to be replaced, always use genuine parts.
 - c. Use new packings, gaskets, O-rings and cotter pins.
 - d. Use a seal gasket depending on the gasket area. Before installation, apply specified oil or grease to sliding areas where oil must be applied and apply specified grease to oil seal lips.
- (7) Adjustment and check
Use a gauge and a tester to make adjustment to the specified service standard value.
- (8) Before using a high-pressure washing machine to wash a vehicle with water, make sure to stop the engine.
If a vehicle needs to be washed in the unavoidable circumstances, avoid direct water spray to the diesel throttle.

3. SAFETY INSTRUCTIONS FOR HANDLING ELECTRICAL SYSTEMS

(1) Removal of battery cable

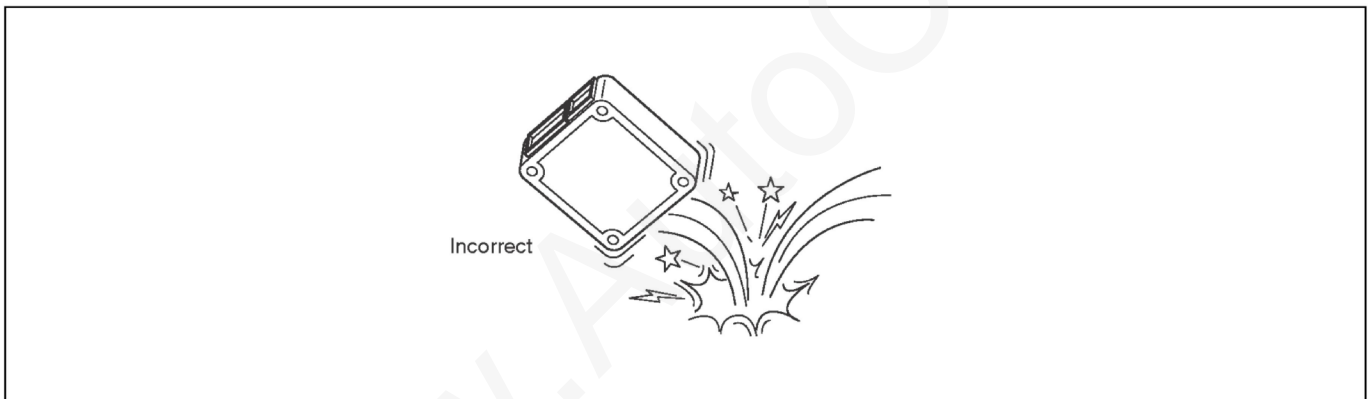
- In order to prevent burn loss caused by short, remove a cable from the negative (minus) terminal of the battery before starting work on electrical systems.
- Fully loosen a nut before removing a battery cable in order to avoid damaging the battery terminal. Do not winkle a battery cable.



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(2) Handling of electronics

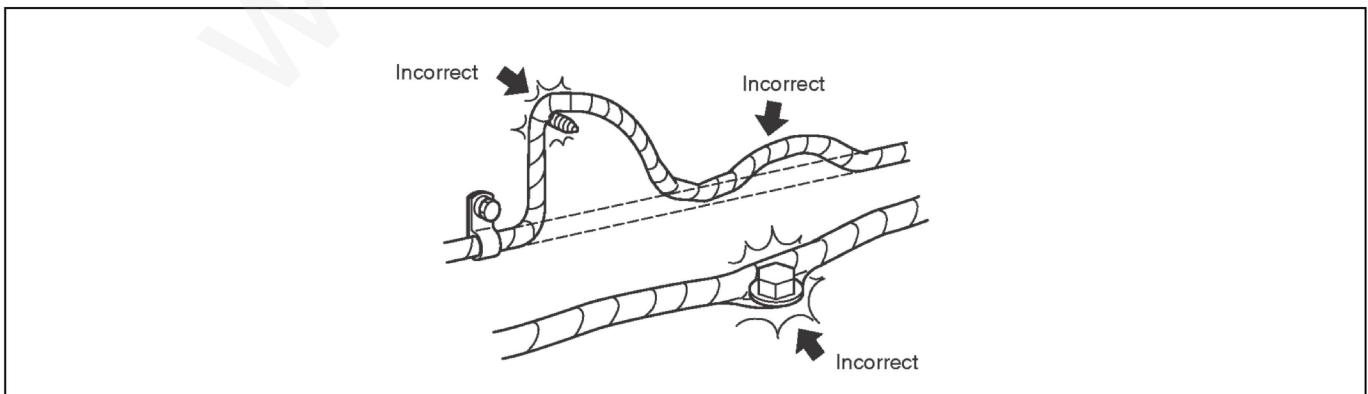
- Avoid impacts on computers and electronics.
- Avoid exposure of electronics to high temperature and/or high humidity.
- Avoid exposure of electronics to water during car washing.



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(3) Handling of wire harness

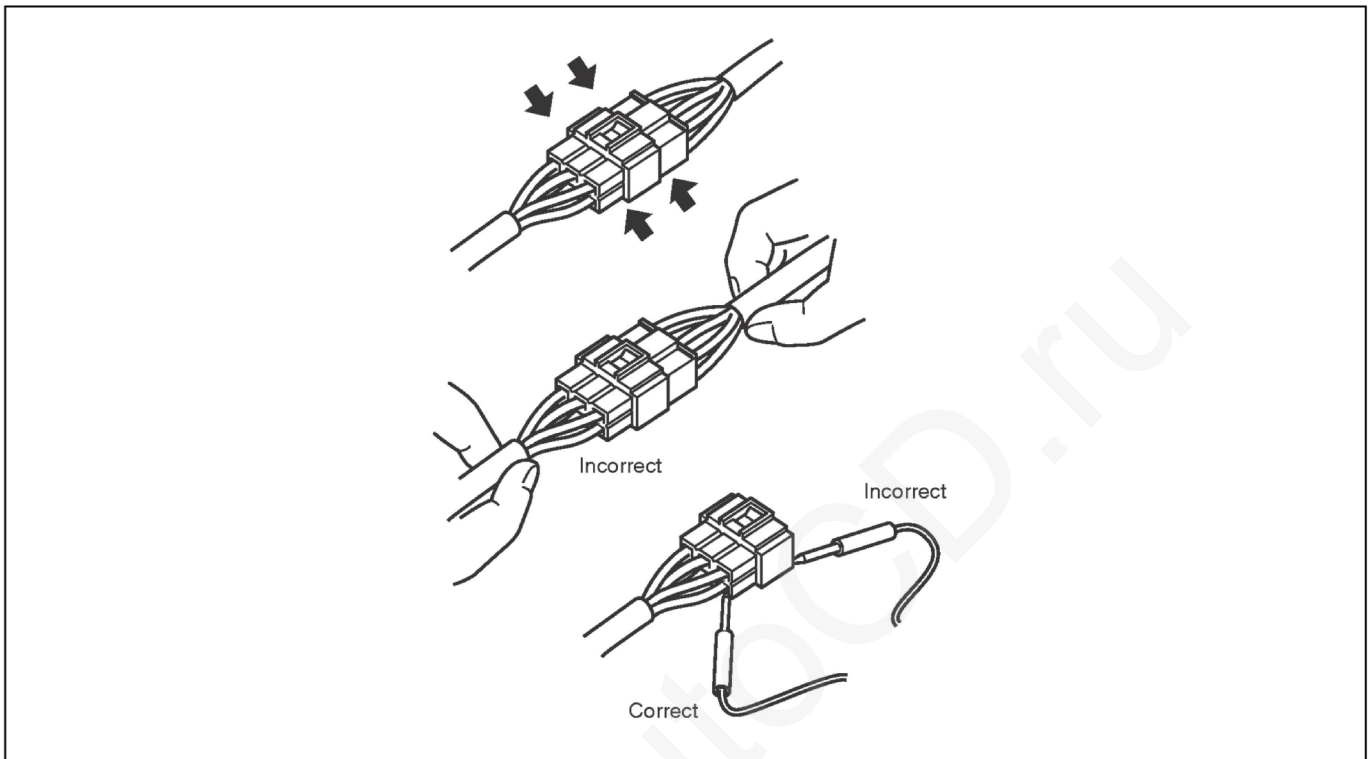
- Make sure to attach clamps and clips to their original positions by marking them so that a harness will not interfere with body ends, sharp edges or bolts.
- Use care to avoid a wire harness from being dragged or caught when installing parts.



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(4) Handling of connectors

- a. When removing a connector, hold a connector (area shown in an arrow in the figure) and then pull it off. Do not pull wire harnesses.
- b. Pull off a lockable connector after unlocking.
- c. When connecting a lockable connector, make sure to insert a lockable connector until it makes a click sound.
- d. When inserting a test lead, insert it from the back of a connector.
- e. If it is difficult to insert a test lead from the back of a connector, make and use an inspection harness.

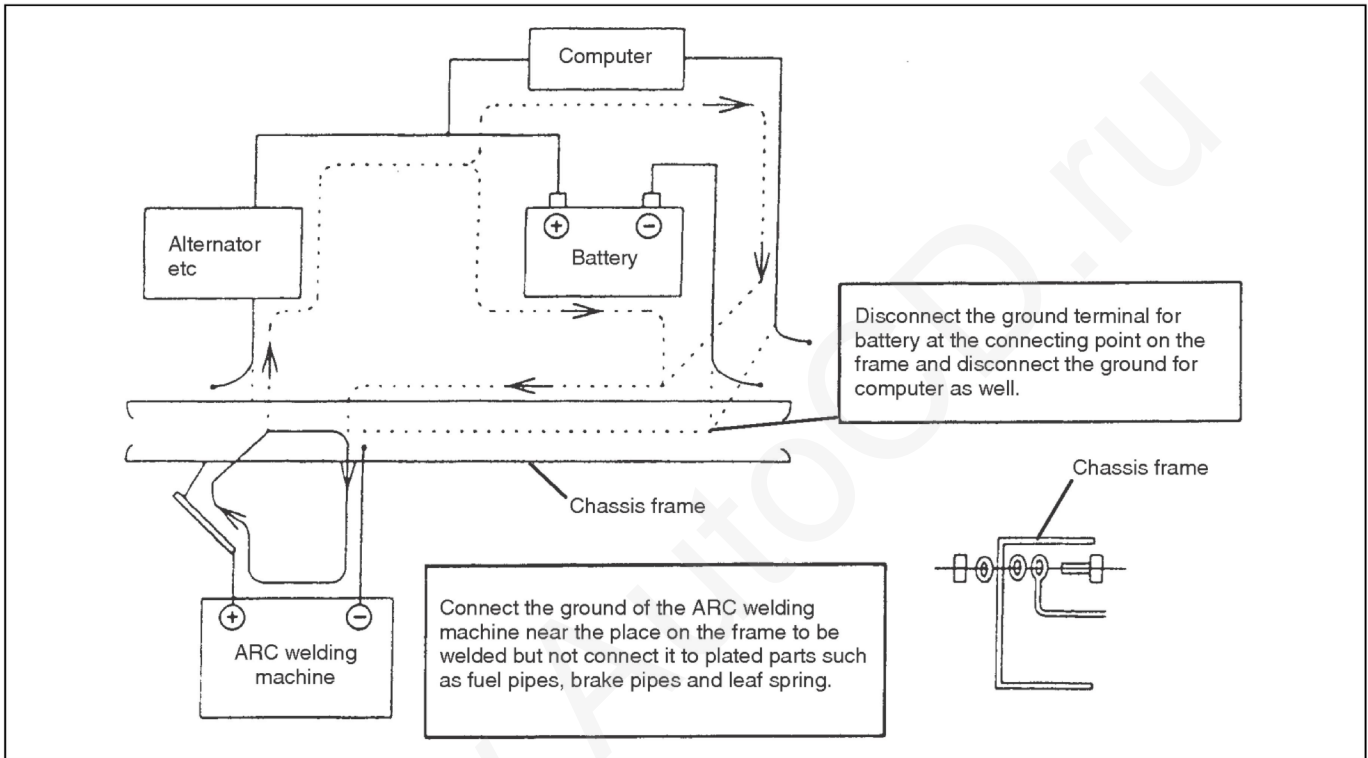


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4. PRECAUTION FOR ELECTRIC WELDING

Electrical components such as the alternator and tachograph are directly connected to the battery and one end is earthed to the chassis frame. Under these conditions, welding current will flow back along the earth circuit if electric welding is carried out and damage may be caused to the alternator, tachograph, electrical components, etc. Consequently, the following precautions are always to be taken during welding.

- (1) Disconnect the earth terminal of the battery at the frame fitment and earth the welding equipment securely to the frame itself. (Do not fit the welding equipment earth to such things as the tire rims, brake pipes or fuel pipes and leaf spring, etc.)
 - a. Turn the starter switch off.
 - b. Disconnect the battery's negative terminal of the battery.
 - c. Earth welding equipment securely, near to the area to be welded.
 - d. Put back battery negative ground as original condition.
 - e. Finally check the functioning of all instruments.



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- (2) In order to prevent damage to ancillary equipment components from sparks during welding, take steps such as putting fire-resistant covers over things like the engine, meters, steering wheel, hoses, leaf spring and tires.

INTRODUCTION TO WORKSHOP MANUAL

GENERAL

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1. SCOPE OF REPAIR DESCRIPTIONS

- (1) There are three major processes in repair work: i.e. "trouble shooting", "removal/installation, replacement, overhaul, assembly, inspection and adjustment" and "final inspection".
- (2) This document covers only the first process (trouble shooting) and the second process (removal/installation, replacement, overhaul, assembly, inspection and adjustment) and omits the third process (final inspection).
- (3) The element tasks listed below are omitted from this document but must be done in actual repair work.
 - a. Jacking and lifting
 - b. Cleaning and washing of removed parts as required
 - c. Visual check

2. STANDARD VALUE

- (1) Standard values, limits, required actions and tightening torques are tabulated in this document.

3. REQUIRED ITEMS

- (1) Special tools, tools, instruments, oil and grease and other items to be prepared before starting work are listed in the section titled "REQUIRED ITEMS". Note that general tools, jacks, rigid racks and other required items supposedly available at a general service shop are omitted from the list.

4. REPRESENTATION OF SECTION AND TITLE

- (1) Under a title containing a system name such as "ENGINE CONTROL SYSTEM", the descriptions cover "INSPECTION", "ADJUSTMENT", "REPLACEMENT" and "OVERHAUL" of components.
- (2) Under a title containing a part name such as "AIR COMPRESSOR ASSEMBLY", the descriptions cover "REPLACEMENT" and "OVERHAUL".

5. UNITS

- (1) This document uses SI units. The SI units are the international system of units defined for the purpose of unifying various traditional systems of units used in different countries into one unit for each kind of quantity so as to facilitate technical interactive communications.
- (2) In this document, the SI units are indicated, followed by traditional units in { }.

Item	SI unit	Traditional unit	Conversion ^{*1} (1 [traditional unit] = X [SI unit])
Force	N	kgf	1 kgf = 9.80665 N
Torque ^{*2}	N·m	kgf·cm	1 kgf·cm = 0.0980665 N·m
Pressure	Pa	kgf/cm ²	1 kgf/cm ² = 98.0665 kPa = 0.0980665 MPa
		mmHg	1 mmHg = 0.133322 kPa
Revolving speed	r/min	rpm	1 rpm = 1 r/min
	min ⁻¹		1 rpm = 1 min ⁻¹
Spring constant	N/mm	kgf/mm	1 kgf/mm = 9.80665 N/mm
Volume	L	cc	1 cc = 1 mL
Efficiency	W	PS	1 PS = 0.735499 kW
Calorie	W·h	cal	1 kcal = 1.13279 W·h
Fuel consumption rate	g/W·h	g/PS·h	1 g/PS·h = 1.3596 g/kW·h

^{*1}: X is a value converted from 1 [traditional unit] into a SI unit and is also used as a conversion factor between a traditional unit and a SI unit.

^{*2}: A torque conversion may vary depending on a device. In proceeding with work, use the standard value defined for each device.

INTRODUCTION TO DESCRIPTIONS

EN01H01ZZZ030102002002

1. TROUBLE SHOOTING FOR EACH TROUBLE SYMPTOM WITH REFERENCE TO THE CHART

7-2

AXLE/TROUBLE SHOOTING

TROUBLE SHOOTING

TROUBLE SHOOTING BY AXLE SYMPTOM

A possible cause and remedy/prevention are indicated for every item, respectively.

FRONT AXLE

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Symptom	Possible cause	Action
Shimmy of steering wheel	Worn-out king pin	Replace king pin.
	The clearance is excessive between king pin and king pin bushing.	Replace king pin bushing.
	Seizure, wear-out, or defective rotation of wheel hub bearing	Replace.
	Improper wheel alignment	Adjust.
	Improper tire inflation pressure	Adjust.
	Loosening of tie rod arm and tie rod end installation castle nut	Tightening.
	Partial wear of front tire	Replace the tire and inspect the wheel alignment.
Heavy steering or poor return of steering wheel to center	Less clearance between king pin and king pin bushing	Replace king pin bushing.
	Seizure of thrust bearing	Replace thrust bearing.
	Decrease in tire air pressure	Adjust.
	Improper wheel alignment	Adjust.
	Lack of lubrication in king pin	Lubricate.
Failure to turn the steering wheel	Less clearance between king pin and king pin bushing	Replace king pin bushing.
	Bent tie rod	Replace.
Steering wheel kept turned to one side	Difference in size between the right and left tires	Adjust tire sizes with each other.
	Excessive difference in outside diameter between the right and left tires	Adjust tire outside diameters with each other.
	Imbalance of air pressure of right and left tires	Adjust.
	Improper wheel alignment	Adjust.
Partial wear or early wear-out of front tire	Improper wheel alignment	Adjust.
	Difference in size or type between the right and left tires	Adjust tire sizes and/or types with each other.
	Inadequate air pressure of right and left tires	Adjust.
	Inadequate handling of tires	Do tire rotation.

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2. INTRODUCTION TO TROUBLE SHOOTING

(1) This document covers the trouble shooting steps 2 and 3 listed below.

(1) Hearing	"Step 1"	Identify a fact through adequate hearings on the situation and environment where a trouble has occurred.
(2) Prior check (3) Reproducing technique	"Step 2"	Conduct a diagnosis inspection, a symptom check, a functional inspection and a basic inspection to identify a symptom. If a symptom check does not gain enough reproducibility, use a reproducing technique.
(4) Trouble shooting for each diagnosis code (5) Trouble shooting for each trouble symptom	"Step 3"	Sort the inspection results obtained from the step 2 and conduct a systematized inspection in accordance with the procedures for trouble shooting for each trouble symptom.
(6) Verification test	"Step 4"	Verify that the same trouble will not occur after trouble shooting. If a trouble is not reproducible enough, conduct a verification test under the reproduced conditions and environment.

(2) Prior check

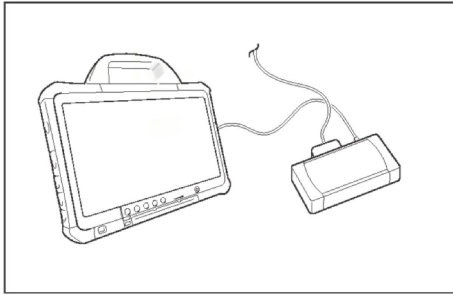
Prior check	<ul style="list-style-type: none"> • Take the following prior check steps. Diagnosis inspection→diagnosis deletion→trouble symptom verification (use a reproducing technique if not reproducible.)→diagnosis recheck • Prior to a reproduction test, identify a system suspected to have a trouble, attach a tester and other apparatuses and then conduct both a symptom check and an examination on a suspected trouble. For a suspected cause of a trouble symptom, the trouble shooting chart. • Instantaneous occurrence of a trouble symptom will also trigger a failure code. If no troubles are observed, use a reproducing technique in performing each trouble shooting activity. • Trouble symptom verification If not reproducible, take the steps 2, →3 and →4. If not reproducible, use a reproducing technique (e.g. adjust external conditions and inspect each wire harness and connector part).
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3. INTRODUCTION TO TROUBLE SHOOTING FOR EACH DIAGNOSIS MONITOR CODE

- (1) The "diagnosis code list" and the "trouble shooting for each code" are contained in this document to address each system for which a diagnosis monitor code will be output. If a diagnosis monitor code is already identified, it is possible to immediately proceed with a trouble shooting process based on the code list.

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ENGINE (COMMON ITEMS)/TROUBLESHOOTING

INSPECTION PROCEDURE: P0606**1 Reading DTC [HINO DX II]**

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1. Turn the starter key to the "LOCK" position.
2. Connect the diagnostic tester (HINO DX II) to the vehicle.
3. Turn the starter key to the "ON" position.
4. On the diagnostic tester screen, select [VCS] and check that no vehicle speed signal-related DTC, P0501 or P0503, is detected.

Is DTC P0501 or P0503 detected?

YES

NO

Perform troubleshooting for related DTC.

Go to step 2.

2 Inspecting the CAN communication line

1. Inspect the CAN communication line.

Is any defect found?

YES

NO

Repair or replace the CAN communication line.

Replace the vehicle control ECU.

SHTS01ZZZ0300007

DEFINITION OF TERM

EN01H01ZZZ030102002003

DEFINITION OF TERM

Terms used in this document are defined as follows.

DIRECTION

1. CHASSIS RELATED

- (1) Longitudinal direction
 - a. The forward direction and the reverse direction of a vehicle are respectively defined as front and rear in the installed position in a vehicle.
- (2) Rotational direction
 - a. The clockwise direction and the counterclockwise direction viewed from the rear side of a vehicle are defined as right-handed and left-handed respectively.
- (3) Vertical direction
 - a. The upward direction and the downward direction in the installed position in a vehicle are defined as an upper side and a lower side respectively.
- (4) Lateral direction
 - a. The leftward direction and the rightward direction viewed from the back of a vehicle are respectively defined as a left side and a right side in the installed position in a vehicle.

2. INDIVIDUAL DEVICES

- (1) Longitudinal direction
 - a. The input side and the output side of motive power are defined as a front side and a rear side respectively.
- (2) Rotational direction
 - a. The clockwise direction and the counterclockwise direction viewed from the back side are defined as right-handed and left-handed respectively.
- (3) Vertical direction
 - a. The upward direction and the downward direction of a device in its installed position in a vehicle (chassis) are defined as an upper side and a lower side respectively.
- (4) Lateral direction
 - a. The leftward direction and the rightward direction as viewed from the back side are defined as a left side and a right side respectively.

STANDARD VALUE

Represents a basic dimension (excluding a tolerance), and a clearance arising from tolerances when two parts are assembled.




REPAIR LIMIT

Represents a numerical value indicating need of correction. A symbol "+" or "-" indicated next to a repair limit represents an increase or a decrease from a standard value.

SERVICE LIMIT

Represents a numerical value indicating need of replacement. A symbol "+" or "-" indicated next to a repair limit represents an increase or a decrease from a standard value.

DEFINITION OF SAFETY TERMS

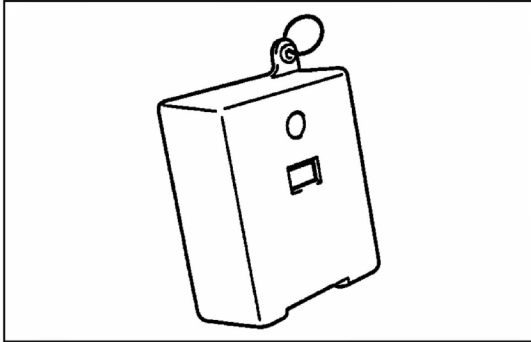
 DANGER	Indicates an extremely hazardous situation if proper procedures are not followed and could result in death or serious injury.
 WARNING	Indicates a potential hazardous situation if proper procedures are not followed and could result in death or serious injury.
 CAUTION	Indicates a hazardous situation if proper procedures are not followed and could result in serious injury or damage to parts/equipment.
NOTICE	Indicates the need to follow proper procedures and to pay attention to precautions so that efficient service is provided.
HINT	Provides additional information to help you to perform the repair efficiently.

TROUBLE SHOOTING

TROUBLE SHOOTING WITH DIAGNOSIS MONITOR

STEP OF TROUBLE SHOOTING

EN01H01ZZZ040301002001



SHTS01ZZZ0400001

1. DIAGNOSIS MONITOR

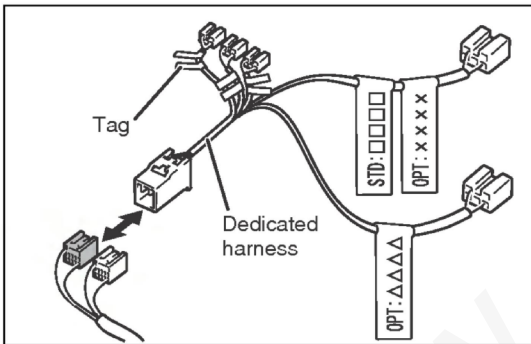
- (1) When the diagnosis monitor is connected to the dedicated diagnosis connector for each system, it will indicate a malfunction, if any, with sound and light.

SST: S0963-01370
Diagnosis monitor

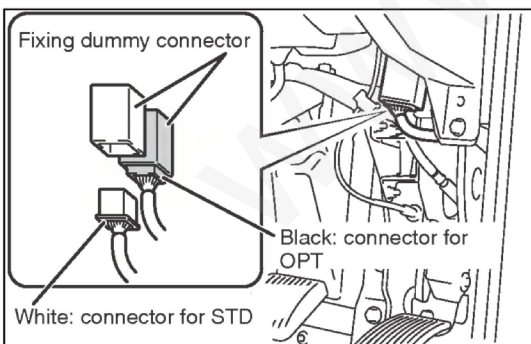
2. CONNECTION OF DIAGNOSIS MONITOR

- (1) Turn the starter key ON.
- (2) There are two centralized diagnosis connectors located on the right side under the instrument panel on the driver's seat side. Connect the dedicated harness to a black (or white) connector and the diagnosis monitor to the connector with a tag indicating each "system name".

SST: S0963-02300
Dedicated harness



SHTS01ZZZ0400002



SHTS01ZZZ0400003

NOTICE

The centralized diagnosis connectors are usually connected to fixing dummy connectors. For using the centralized diagnosis connectors, remove them from dummy connectors and pull them to the front. When not used, make sure to connect them to the fixing dummy connectors.

3. INDICATION OF DIAGNOSIS MONITOR CODE

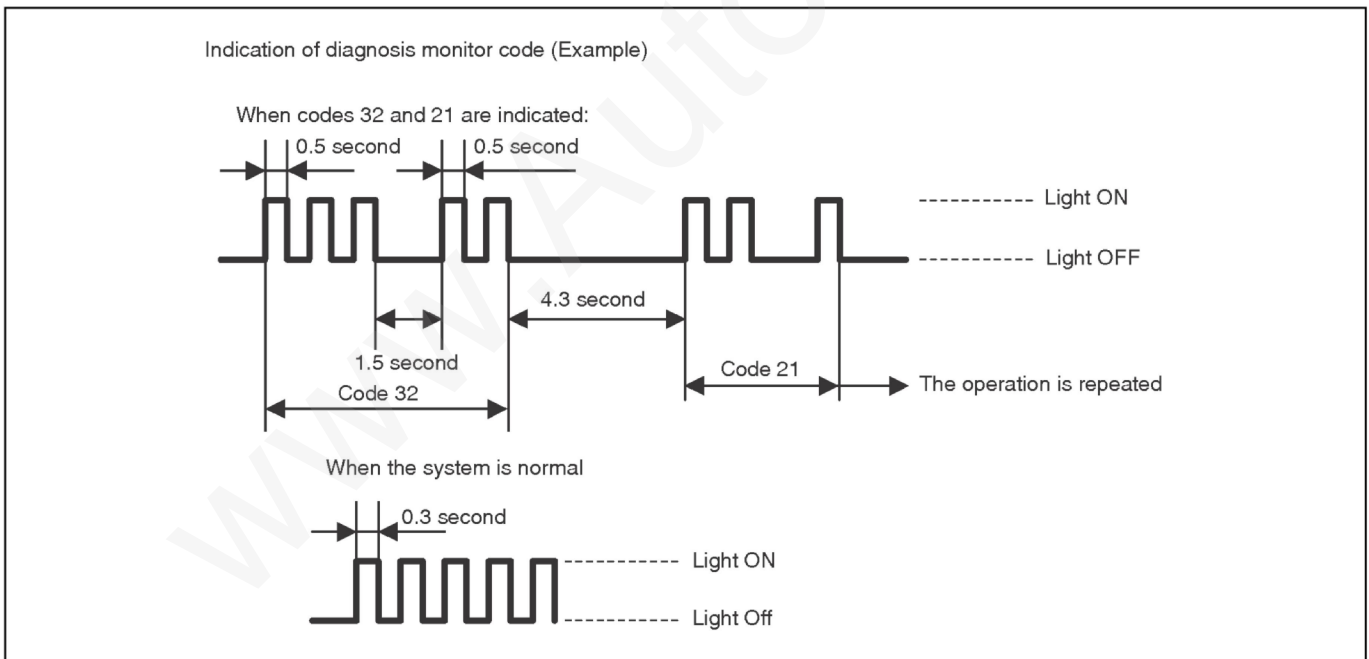
- (1) A diagnosis monitor code can be identified by viewing the diagnosis monitor and the check engine light. The example shown below represents how to identify diagnosis monitor codes 32 and 21. Intervals between light flashings will identify a diagnosis monitor code. For the first code, the number "3" in the ten's place of the first code will be represented by three 0.5-second flashings, followed by an interval of 1.5 seconds. Then, the light will flash twice. For the next code, after an interval of 4.3 seconds, two flashings will be followed by one flashing in the similar fashion to the first code. This flashing pattern will be repeated. If no system malfunctions are detected, the light will repeat a 0.3-second flashing pattern.

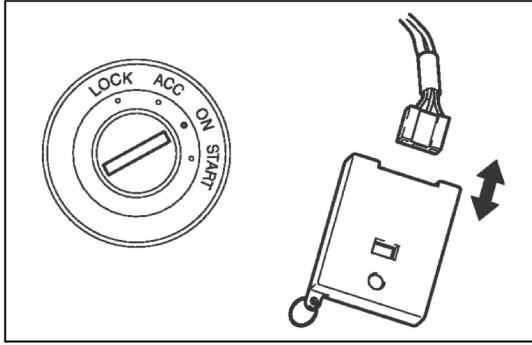
NOTICE

As individual systems have different diagnosis monitor code outputting patterns, follow the descriptions provided for each system.

HINT

- This figure indicates a typical indication of diagnosis monitor codes. For details, refer to the descriptions provided for individual systems.
- If no malfunctions are detected, the "diagnosis monitor code 1" will be indicated.
- Malfunction codes will be repeatedly output in the ascending order regardless of present or past malfunction codes. For deleting past malfunction codes, refer to "4. DELETION OF PAST MALFUNCTION CODE".





SHTS01ZZZ0400005

4. DELETION OF PAST MALFUNCTION CODE

- (1) Record the first output diagnosis monitor code.
- (2) With the starter key kept in the ON position, remove the diagnosis monitor.

NOTICE

- With the starter key turned to the LOCK position, a past malfunction code will not be deleted. Make sure to keep the starter key in the ON position. Past malfunction information recorded in the combination meter of the multi information system will not be deleted. After repair work, also delete the information recorded in the meter.
 - For the engine ECU, use the HINO DX II to delete a past malfunction code.
- (3) Wait at least 5 seconds before connecting the diagnosis monitor. Then output a present malfunction code.

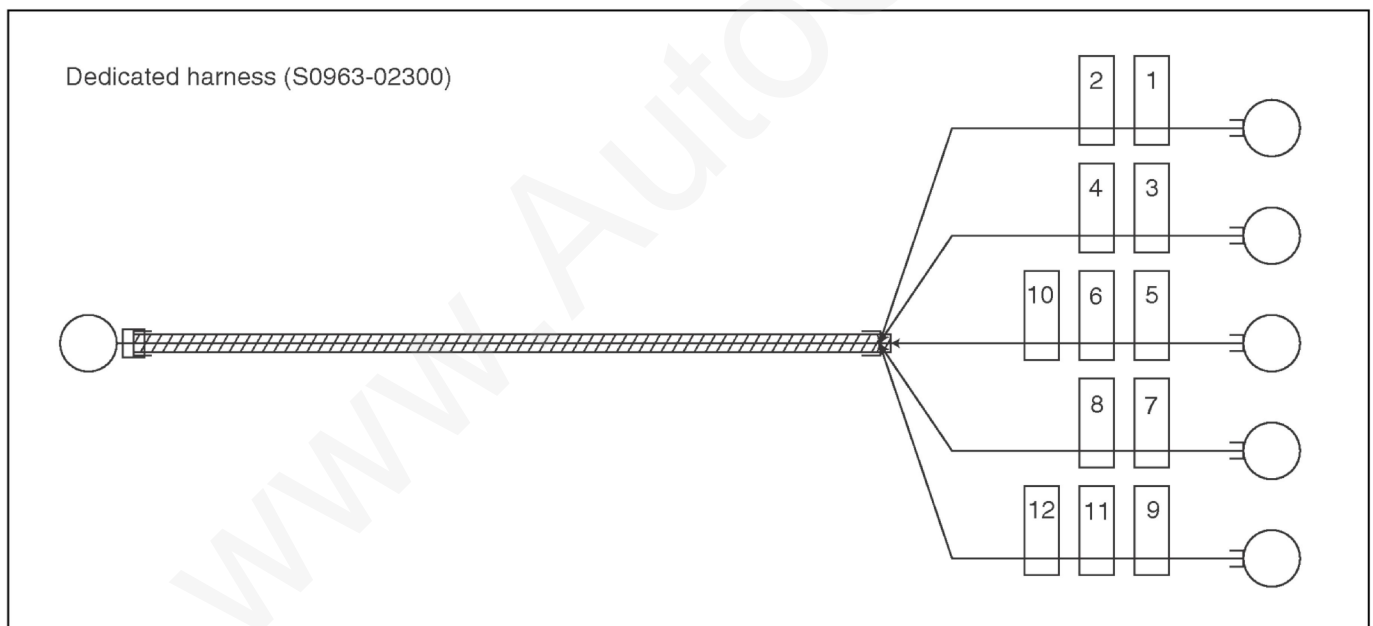
www.AutoCD.ru

APPARATUS FOR TROUBLE SHOOTING

EN01H01ZZZ040301002002

1. TAG CODE AND SYSTEM NAME LIST FOR DEDICATED HARNESS

No.	Tag name	Name of system to be diagnosed
1	STD: ENG	Common rail
3	STD: AIR BAG	Not used
5	STD: ABS/ASR	ABS
7	STD: ES START	Not used
10	STD: VSC	VSC
11	STD: TIRE	Not used
2	OPT: RTD/4WD	Not used
4	OPT: SHAKAN	Not used
6	OPT: AIR SUS	AIR SUS
8	OPT: IDL STOP	VCS
9	OPT: ATM	Not used
12	OPT: PRO SHIFT	Not used

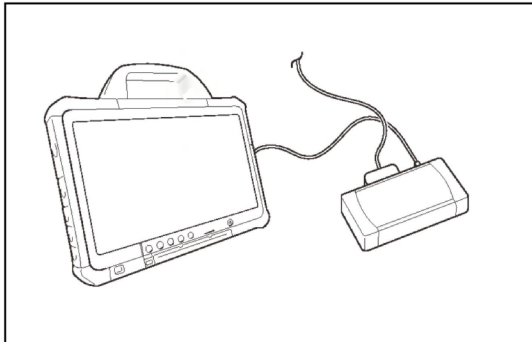


SHTS01ZZZ0400006

TROUBLE DIAGNOSIS USING THE COMPUTER (HINO DX II)

STEP OF TROUBLE DIAGNOSIS

EN01H01ZZZ040301003001



SHTS01ZZZ0400007

1. PREPARATION FOR CONNECTING HINO DX II

- (1) The "HINO DX II " is a failure diagnosis tool for the common rail fuel injection system and the chassis system. For connecting the computer to a vehicle, the "DST-i" and the dedicated cable will be required.

SPECIAL TOOL: Computer interface

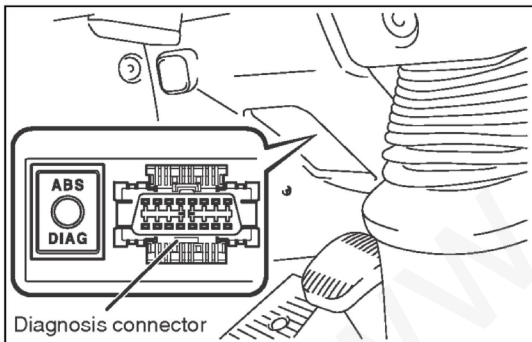
Part name	Part No.
DENSO DST-i Set (Without LCD)	Without Bluetooth® 95171-01021
	With Bluetooth® 95171-01041
DENSO DST-i Set (With LCD)	Without Bluetooth® 95171-01031
	With Bluetooth® 95171-01051

HINT

Install the "Hino Diagnostic eXplorer II " (HINO DX II) software in a computer. For detailed installation procedures, refer to the HINO DX II OPERATION MANUAL supplied on the Global Service Portal Site (Hino-GSPS).

2. CONNECTION OF HINO DX II

- (1) Connect the DST-i to the trouble diagnosis connector located in the electrical component box in the instrument panel or located in the electrical component box behind the rearmost seat.
- (2) Connect the computer in which the HINO DX II is installed, to the DST-i.
- (3) Turn the starter key to "ON".
- (4) Turn on the power switch of the computer to start the HINO DX II .


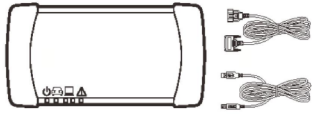

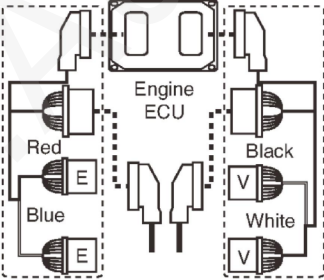
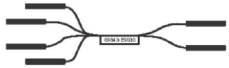


SHTS01ZZZ0400008

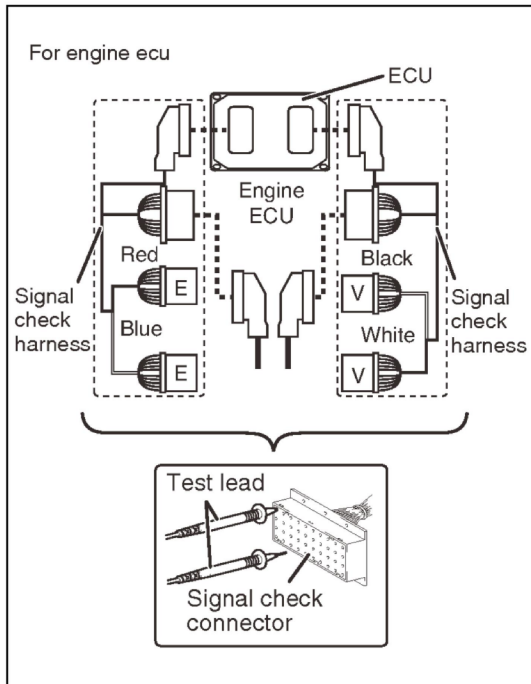
APPARATUS FOR TROUBLE SHOOTING

EN01H01ZZZ040301003002

1. APPARATUS FOR TROUBLE SHOOTING

Part name	Part No.	Illustration of appearance	Outline/function
Laptop computer* ¹	—		<p>The following specifications are necessary for operation of HINO DX II .</p> <ul style="list-style-type: none"> • Operating system (OS): Windows7 Professional 32 bit. • Browser: Microsoft Internet Explorer 8.0, 9.0 • CPU: 32 bit processors more than 1GHz. • Memory: More than 1Gbyte. • HDD: More than 100Gbyte.
DENSO DST-i Set (without LCD)	Without Bluetooth® 95171-01021 With Bluetooth® 95171-01041		Computer interface These parts are supplied by DENSO Distributor.
DENSO DST-i Set (with LCD)	Without Bluetooth® 95171-01031 With Bluetooth® 95171-01051		
Signal check harness	09843-E4050 (For engine ECU)		This harness can be attached in between the vehicle harness and the ECU so that a tester rod can be used for checking under current-carrying conditions.
	09843-E9030 (For DCU)		This signal check harness is designed to be routed between the vehicle harness and the DCU and allows a check to be conducted with a test probe while power is being supplied.

(*¹): Complete function of HINO DX II is confirmed on "Panasonic CF-D1".



2. SIGNAL CHECK HARNESS

- (1) In order to prevent ECU connector breakage and increase workability, connect the signal check harness and place a test rod onto the signal check connector of the signal check harness to take measurement.
 - a. Remove the connector from the ECU.

⚠ CAUTION

Use care not to bend or damage the connector lock tab.

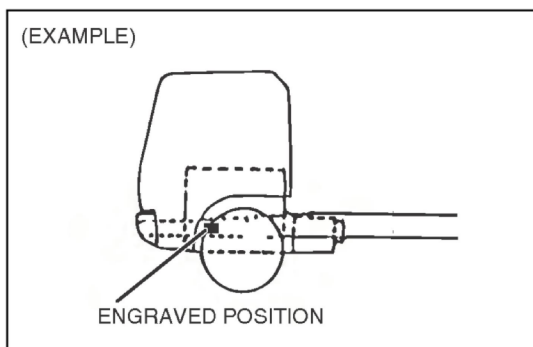
- b. Connect the signal check harness to the vehicle harness and to the ECU.
Signal check harness
Part No.
09843-E4050

VEHICLE IDENTIFICATION NUMBER AND ENGINE SERIAL NUMBER

LOCATION OF VEHICLE IDENTIFICATION NUMBER

SERIAL NUMBER AND NUMBER PLATE

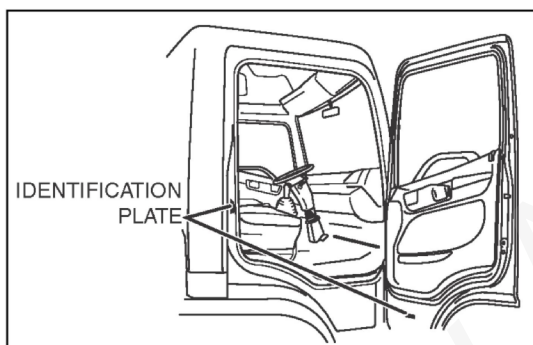
EN01H01ZZZ050401001



SHTS01ZZZ0500001

1. VEHICLE IDENTIFICATION SERIAL NUMBER

- (1) Vehicle identification serial number is stamped near the front wheel on the RH or LH of the chassis frame.



SHTS01ZZZ0500002

2. VEHICLE IDENTIFICATION NUMBER PLATE

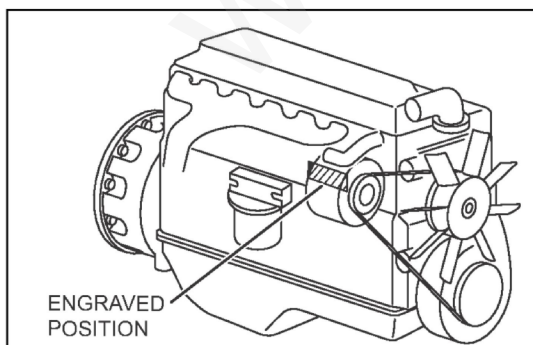
- (1) An identification plate having stamped production number, production series code (P.S. Code) and the vehicle identification number are fitted on the pillar or lower part of the door.

NOTICE

According to the country, the production series code (P.S. Code) may not be stamped on the identification plate.

LOCATION OF ENGINE SERIAL NUMBER

EN01H01ZZZ050401002



SHTS01ZZZ0500003

1. J08E ENGINE

- (1) The engine model code and the engine serial number of the J08E engine are stamped on the RH of the cylinder block. When placing an order for part(s), the engine model code and the engine serial number will aid in facilitating an order process.

GLOSSARY

DEFINITION OF ABBREVIATION

LIST OF ABBREVIATION

EN01H01ZZZ060102001001

Abbreviations	Meaning, or Official Name
A/C	Air Conditioner
ABS	Anti-lock Brake System
ACC	Accessory
ACU	Auto Clutch Unit
AMT	Automated Manual Transmission
ASR	Anti-Slip Regulator
ATC	After Turbo Catalyst
ATF	Automatic Transmission Fluid
CA	Crank Angle
CAN	Controller Area Network
CD-ROM	Compact Disc Read Only Memory
CPU	Central Processing Unit
dB	Decibel
DC	Direct Current
D-CAT	Diesel-Clean Advanced Technology System
DC motor	Direct Current Motor
DCU	Dosing Control Unit
DEF	Diesel Exhaust Fluid
DPR	Diesel Particulate active Reduction system
DSS	Driving Support System
ECU	Electronic Control Unit
EEPROM	Electronically Erasable and Programmable Read Only Memory
EGR	Exhaust Gas Recirculation
ELR	Emergency Locking Retractor
ENG	Engine
ES START	Easy and Smooth start system
F/A	Front axle
FCCB	Fuel Control Cylinder Balance
FCV	Fuel Cutoff Valve
FF shift	Feather touch & Finger shift
FL	Fusible link

Abbreviations	Meaning, or Official Name
Fr	Front
FRP	Fiber Reinforced Plastic
FUP	Front Underrun Protector
GND	Ground
GVW	Gross Vehicle Weight
Hi	High
HINO DX	Hino Diagnostic eXplorer
HV	Hybrid Vehicle
HVAC	Heating, Ventilating and Air-Conditioning unit
I.S.C.	Idle Speed Control
IC	Integrated Circuits
ID	Identification
IPD	Intelligent Power Device
ISO	International Organization for Standardization
JIS	Japanese Industrial Standards
LED	Light Emitting Diode
LEV	Low Emission Vehicle
LH	Left Hand
LLC	Long Life Coolant
Lo	Low
MAX	Maximum
MIL	Malfunction Indicator Light
MIN	Minimum
MS evaporator	Multi-tank and Super slim structure evaporator
MT	Manual Transmission
No.	Number
NOx	Nitrogen Oxide
NMR	No load Maximum Revolution
OHC	Over Head Camshaft
PC	Personal Computer
PCD	Pitch Circle Diameter
PCS	Pre-Crash Safety
PCV	Pump Control Valve
PCV valve	Positive Crankcase Ventilation valve
PM	Particulate Matter
PPG	Glass-fiber-reinforced Polypropylene
ppm	Parts Per Million
PS	Power Steering

Abbreviations	Meaning, or Official Name
PVD	Physical Vapor Deposit
PWR	Power
QR code	Quick Response Code
R/A	Rear axle
RH	Right Hand
SCR	Selective Catalytic Reduction
SCV	Suction Control Valve
SST	Special Service Tool
SW	Switch
T/M	Transmission
VCS	Vehicle Control System
VNT	Variable Nozzle Turbine
VSC	Vehicle Stability Control
VSS	Vehicle Speed control System

ENGINE (J08E)

2-001

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TROUBLE SHOOTING

TROUBLE SHOOTING BY ENGINE SYMPTOM

ENGINE MECHANICALS

EN01H02116030601001001

Symptom	Possible cause	Action
Engine overheat (coolant)	Insufficient coolant	Add coolant.
	Malfunction of thermostat	Inspect and replace the thermostat.
	Coolant leakage from cooling system	Correction
	Malfunction of coolant pump	Inspect and replace the coolant pump.
	Poor sealing performance of head gasket	Replace the head gasket.
Engine overheat (radiator)	Clogged radiator core	Clean the radiator core.
	Corroded inner area of cooling system	Clean and repair inside the cooling system.
	Clogged front face of radiator core	Clean the radiator core.
	Malfunction of radiator cap	Inspect and replace the radiator cap.
	Clogged front face of intercooler core	Clean the intercooler core.
Engine overheat (compression pressure)	Incorrect injection timing	Inspect the engine ECU.
	Degraded fuel	Replace with optimum fuel.
	Malfunction of injector	Inspect and replace the injector(s).
Engine overheat (lubricating system)	Deteriorated engine oil	Replace engine oil.
	Malfunction of oil pump	Inspect and replace the oil pump.
	Insufficient engine oil	Add engine oil.
Excessive engine oil consumption (piston, cylinder liner and piston rings)	Wear of piston rings and/or cylinder liner	Inspect and replace piston rings and cylinder liner.
	Damage of piston ring	Inspect and replace piston rings and cylinder liner.
	Improper tension of piston ring	Inspect and replace piston rings and cylinder liner.
	Improperly assembled piston ring	Reassemble the piston rings.
	Degraded engine oil	Replace engine oil.
	Improper position of piston ring end gap	Reassemble the piston rings.
Excessive engine oil consumption (valve and valve guide)	Wear of valve stem and valve guide	Replace the valve and valve guide.
	Improperly assembled valve stem seal	Replace the valve stem seal.
	Excessive supply of lubrication oil to rocker arm	Inspect an oil clearance between a rocker arm and a rocker shaft.
Excessive engine oil consumption (others)	Excessively filled engine oil	Adjust the oil level.
	Engine oil leakage	Repair oil leakage or replace parts.
Seizure of piston (during driving)	Abruptly stopped engine after driving at high speed	Enforce idling a vehicle before stopping the engine.
Seizure of piston (lubricating system)	Insufficient engine oil	Add engine oil.
	Deteriorated engine oil	Replace engine oil.
	Improper engine oil	Replace with optimum engine oil.
	Drop in oil pressure	Inspect the lubricating system.
	Malfunction of oil pump	Inspect and replace the oil pump.

Symptom	Possible cause	Action
Seizure of piston (others)	Abnormal combustion	Refer to "Overheat".
	Malfunction of cooling system	Refer to "Overheat".
Insufficient engine power (air cleaner)	Clogged air cleaner element	Clean or replace the air cleaner element.
Insufficient engine power (fueling system)	Improper injection from injector	Replace the injector.
	Improper injection from injector caused by adhesion of carbon	Replace the injector.
	Entry of air into fuel system	Air bleeding of fuel system
	Clogged fuel filter	Replace the element.
	Degraded fuel	Replace with optimum fuel.
Insufficient engine power (supply pump)	Damage suction control valve.	Replace suction control valve.
	Use of poor fuel	Use good quality fuel.
Insufficient engine power (others)	Overheat	Refer to "Overheat".
	Abnormal compression pressure	Refer to "Engine overheat (compression pressure)".
	Wear of piston, cylinder liner and/or piston rings	Replace the piston, cylinder liner and piston rings.
Difficult engine start (electric system)	Faulty battery	Inspect and replace the battery.
	Improper wiring to starter	Inspect the starter wirings. Retighten bolts or replace wirings.
	Looseness in battery cable	Tighten the battery terminal connection or replace the cable.
	Malfunction of starter	Replace the starter.
	Malfunction of start aid	Inspect and replace the start aid.
	Faulty harness circuit	Replace the ECU main relay. Replace the engine-related fuse(s).
Difficult engine start (air cleaner)	Clogged air cleaner element	Clean or replace the air cleaner element.
Difficult engine start (supply pump)	Defective supply pump	Replace the supply pump.
	Use of poor fuel	Use good quality fuel.
Difficult engine start (fueling system)	Insufficient fuel	Add fuel and bleed the fueling system of air.
	Clogged fueling system	Clean the fueling system and replace the fuel filter.
	Air suction through connections in fueling system	Tighten connections.
	Clogged fuel filter	Replace the fuel filter.
	Looseness in injection pipe connection	Tighten nuts on the injection pipe connections.
	Seizure of injector	Replace the injector.
	Water in fuel	Drain and clean fuel system
Difficult engine start (lubricating system)	Excessively high viscosity of engine oil	Replace with engine oil having optimum viscosity.
Difficult engine start (others)	Seizure of piston	Replace the piston, piston rings and cylinder liner.
	Seizure of main bearing	Replace the main bearing and crankshaft.
	Drop in compression pressure	Overhaul the engine.
	Damage of ring gear	Replace the ring gear and starter pinion gear.
Rough idling (injector)	Improper injection	Inspect and replace the injector(s).
	Use of poor fuel	Use good quality fuel.

Symptom	Possible cause	Action
Rough idling (supply pump)	Damage suction control valve	Replace suction control valve.
	Use of poor fuel	Use good quality fuel.
Rough idling (valve system)	Improper valve clearance	Adjust valve clearance.
	Irregular contact of valve seat	Adjust or replace the valve and valve seat.
Rough idling (others)	Low coolant temperature	Enforce warming up the engine.
	Large variance in compression pressure between cylinders	Overhaul the engine.
Gas leakage (head gasket)	Damage of head gasket	Replace the head gasket.
	Improperly assembled head gasket	Replace the head gasket.
Gas leakage (head bolt)	Wrong sequential order of tightening or incorrect tightening torque	Tighten in the correct tightening order and with the specified torque.
	Looseness in or stretch of head bolt	After inspecting each area, replace the head bolt.
Gas leakage (cylinder head)	Crack in cylinder head	Replace the cylinder head.
	Deflection in bottom surface of cylinder head	Make adjustment by grinding the bottom surface of the cylinder head or replace the cylinder head.
Gas leakage (cylinder block)	Crack in cylinder block	Replace the cylinder block.
	Deflection in upper surface of cylinder block	Make adjustment by grinding the upper surface of cylinder block or replace the cylinder block.
	Sunken position of inserted cylinder liner (insufficient protrusion of cylinder liner from cylinder block)	Replace the cylinder liner or cylinder block.
Gas leakage (cylinder liner)	Crack in cylinder liner	Replace
	Corroded cylinder line	Replace
	Insufficient protrusion of cylinder liner from cylinder block	Replace the cylinder liner or cylinder block.

ALTERNATOR

EN01H02116030601001002

Symptom	Possible cause	Action
The headlight lights up but no charging current is applied.	Faulty regulator (PTr open)	Replace the regulator.
	Faulty stator coil (disconnection or layer short)	Inspect and replace the stator coil.
	Faulty field coil (disconnection or layer short)	Inspect and replace the field coil.
	Faulty diode (open/short-circuit)	Inspect and replace the rectifier.
	Irregular contact or disconnection of lead wires (plate, support, etc.)	Inspect and replace lead wires.
	Disconnection of wiring or fuse	Inspect for disconnection. Eliminate a cause of fuse blowout or replace the fuse.
A voltmeter reads 29 V or higher.	Faulty regulator (PTr short-circuit)	Inspect and replace the regulator.
The headlight lights up but charging current is always low, causing flat battery.	Faulty stator coil (disconnection of one phase or layer short)	Inspect and replace the stator coil.
	Faulty diode (open/short-circuit)	Inspect and replace the rectifier.
	Irregular contact or disconnection of lead wires (plate, support, etc.)	Inspect and replace lead wires.
Illumination of the headlight is dark and charging current is always low, causing flat battery.	High operating load (load unbalance)	Reduce load.
Illumination of the headlight is dark but charging current is always high, resulting in a shorter life of battery electrolyte.	Faulty regulator (PTr short-circuit)	Inspect and replace the regulator.
	Close to the end of battery life	Inspect and replace the battery.
Abnormal noise	Faulty stator coil (layer short or earthing failure)	Inspect and replace the stator coil.
	Internal contact (wear of bearing and/or bracket)	Inspect and replace the bearing.
	Improper V-belt tension (belt slip)	Inspect the belt tensioner.

STARTER

EN01H02116030601001003

Symptom	Possible cause	Action
The starter does not run or the starter speed is low.	Improper connection of ignition switch	Inspect and replace the ignition switch.
	Flat battery	Charge or replace the battery.
	Disconnection, looseness or corrosion in battery terminal	Retighten the battery terminal after cleaning a contact point.
	Disconnection of earth	Secure the earth.
	Improper engine oil used	Replace with optimum oil.
	Irregular contact of start magnet switch assembly	Inspect and replace the start magnet switch assembly.
	Irregular contact or malfunction of starter relay	Inspect and replace the starter relay.
	Wear of starter brush	Replace the brush.
	Seizure of commutator	Replace the commutator.
	Wear of commutator	Adjust an undercut or make replacement.
	Short-circuit in armature	Inspect and replace the armature.
	Insufficient tension of brush spring	Replace the brush spring.
	Malfunction of clutch located in the starter	Clean or replace the clutch

AIR COMPRESSOR

EN01H02116030601001004

Symptom	Possible cause	Action
Degraded filling capability	Severe wear, damage or irregular contact of delivery valve, suction valve and/or unloader valve	Replace the valve seat and/or unloader valve.
	Wear of piston or cylinder liner	Replace the piston and cylinder liner.
	Seizure of piston	Replace the piston and cylinder liner.
	Wear or breakage of piston ring	Replace the piston rings.
	Leakage of compressed air	Replace or retighten joints.
	Clogged air pipe	Inspect and clean the air pipe.
	Clogged air cleaner element	Clean or replace the air cleaner element.
Abnormal noise	Wear of piston pin hole or piston pin	Inspect and replace the piston and piston pin.
	Seizure/breakage or wear of connecting rod at small end	Overhaul
	Wear of piston or cylinder liner	Inspect and replace the piston, piston rings and cylinder liner.
	Breakage of piston	Inspect and replace the piston.
	Adhesion of foreign matters onto upper surface of piston	Clean the inner area or replace the piston.
	Breakage or wear of journal bearing or connecting rod bearing	Replace the damaged or worn bearing(s).
Malfunction of unloader valve	Unsmooth motion of unloader valve	Clean or replace the unloader valve.
	Air leakage	Inspect and retighten joints.
	Malfunction of pressure regulator	Adjust or replace the pressure regulator.
Excessive adhesion of foreign matters or entry of oil into cylinder head or high-pressure line	Wear or breakage of piston ring	Inspect and replace the piston rings and cylinder liner.
	Improper tension of piston ring	Inspect and replace the piston rings and cylinder liner.
	Wrong position or orientation of installed piston ring (upside down)	Reinstall piston rings in the correct position or orientation.

TURBOCHARGER

EN01H02116030601001005

Symptom	Possible cause	Action
Sudden drop in oil level	Severe wear or breakage of seal ring caused by excessively worn bearing	Replace the turbocharger.
	Entry of engine oil into exhaust gas before entering turbocharger	Inspect and service each part of the engine.
	Engine oil flowing out to blower or turbine caused by deformed or clogged oil return pipe	Repair or replace the oil pipe.
	Engine oil flowing out to blower caused by increased vacuum pressure on the back of the blower impeller	Inspect and replace the oil pipe. Replace or clean the air cleaner element.
Drop in engine output	Clogged air cleaner element	Clean or replace the air cleaner element.
	Air intake port closed	Recover to ensure proper condition.
	Gas leakage from some areas in the exhaust system	Inspect and eliminate all troubles.
	Insufficient turbocharger rotation speed caused by deformed or clogged piping in the exhaust system	Recover to ensure proper condition
	Air leakage from discharge area on the blower side	Inspect and eliminate all troubles.
	Uncleanliness or breakage of turbocharger	Clean or replace the turbocharger.
	Seizure of bearing caused by insufficient oil or clogged oil pipe	Inspect each area in the engine oil feed system and eliminate detected troubles. Replace engine oil and the turbocharger.
	Seizure of bearing caused by excessive oil pressure	Inspect each area in the engine oil feed system and eliminate detected troubles. Replace engine oil and the turbocharger.
	Seizure of bearing caused by off-centering of rotor	Inspect each area in the engine oil feed system and eliminate detected troubles. Replace engine oil and the turbocharger.
Seizure of bearing caused by abruptly stopped engine during heavy-duty operation	Observe operational instructions provided in the manual. Replace the turbocharger.	
Poor acceleration (low follow ability or no rotation of turbocharger)	Dull rotation of turbine caused by carbon deposit accumulated and stuck on turbine (vane seal area)	Replace engine oil as well as the turbocharger.
	Air and/or gas leakage from some areas in the intake/exhaust systems	Inspect and eliminate all troubles.
	Degraded fuel	Inspect the engine fuel system and ensure optimum fuel condition.
	Seizure of bearing caused by insufficient oil or clogged oil pipe	Inspect each area in the engine oil feed system and eliminate detected troubles. Replace engine oil and the turbocharger.
	Seizure of bearing caused by excessive oil temperature	Inspect each area in the engine oil feed system and eliminate detected troubles. Replace engine oil and the turbocharger.

Symptom	Possible cause	Action
Abnormal noise	Backflow of blower discharge air due to acceleration or severely narrowed gas passage caused by clogged turbine case nozzle (this symptom is called surging.)	Replace the turbocharger.
	Contact of rotating area	Replace the turbocharger.
	Air and/or gas leakage from some areas in the intake/exhaust systems	Inspect and eliminate all troubles.
Vibration	Looseness in installation of turbocharger, intake/exhaust pipe or oil pipe	Inspect installation of the turbocharger and eliminate all troubles.
	Bend or breakage of turbine rotor or blower impeller caused by malfunction of metal, contact of rotating area with peripheral area or entry of foreign matters	Replace the turbocharger. Remove all foreign matters if entry of foreign matters is a cause of this symptom.

ENGINE ECU

CAUTIONS ON TROUBLE SHOOTING

EN01H02116030102002001

- Before inspection, check that each connector is correctly connected.
- Before disconnecting the connector, be sure that the starter key is in the "LOCK" position.
- If a part is judged to have an abnormality, do not repair but replace it.
- Record and erase the past malfunction memory and perform troubleshooting again to confirm the present malfunction.
- After analyzing the malfunction, erase the past malfunction memory.

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1. ABOUT THE CONNECTOR DIAGRAM AND TERMINAL MEASUREMENT

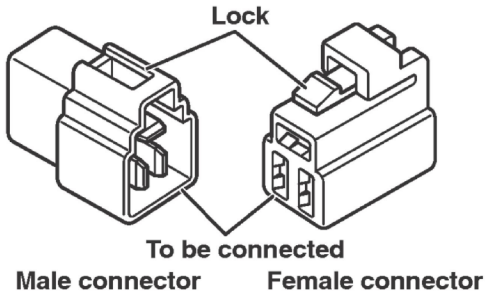


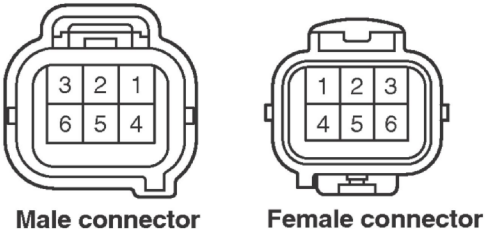
ILLUSTRATION OF CONNECTOR

The illustration of a connector contained in this document represents an image of a connector with its lock positioned on top as viewed from the connecting face.

NUMBERING OF CONNECTOR TERMINALS

The terminals are symmetrically numbered (symmetrically reversed numbering) as viewed on the connecting faces of a pair of connectors.

The terminal #1 is located at the top right corner of a male connector and at the top left corner of a female connector respectively in this document.



PRECAUTIONS FOR TERMINAL MEASUREMENT

Unless otherwise specified in this document, the illustration of a connector represents an image of a connector as viewed from the connecting face. A test probe must access the back face of a connector.

However, some types of connector do not allow a test probe to contact with the back face such as a waterproof connector. In such case, a test probe may be allowed to access the front face of a connector but a special care must be used to avoid a risk of damage in terminals.

As to a connector that is designed to use the signal check harness for terminal measurement, do not place a test probe directly onto the front or back face. Use a contact box of the connected signal check harness to take measurement on terminals.

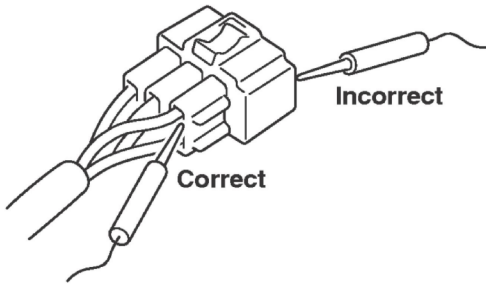
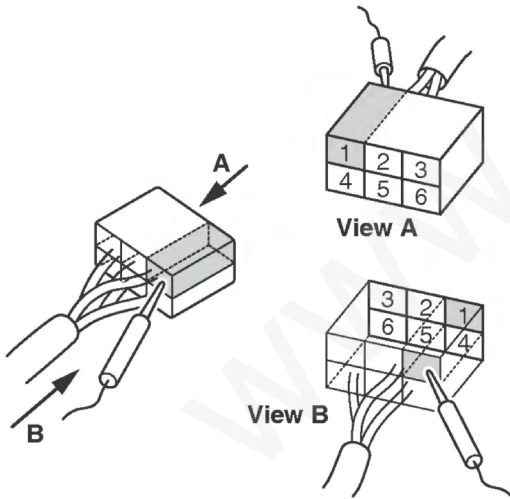


ILLUSTRATION OF CONNECTOR AND MEASUREMENT SURFACE

The illustration of a connector contained in this document represents an image of a connector as viewed from the connecting face. For example, the terminal #1 of a female connector is located at the top left corner of a connector as viewed from the connecting face.

In actual measurement on the terminal #1 of a female connector, a test probe must be placed onto the top right corner on the back face of a connector.



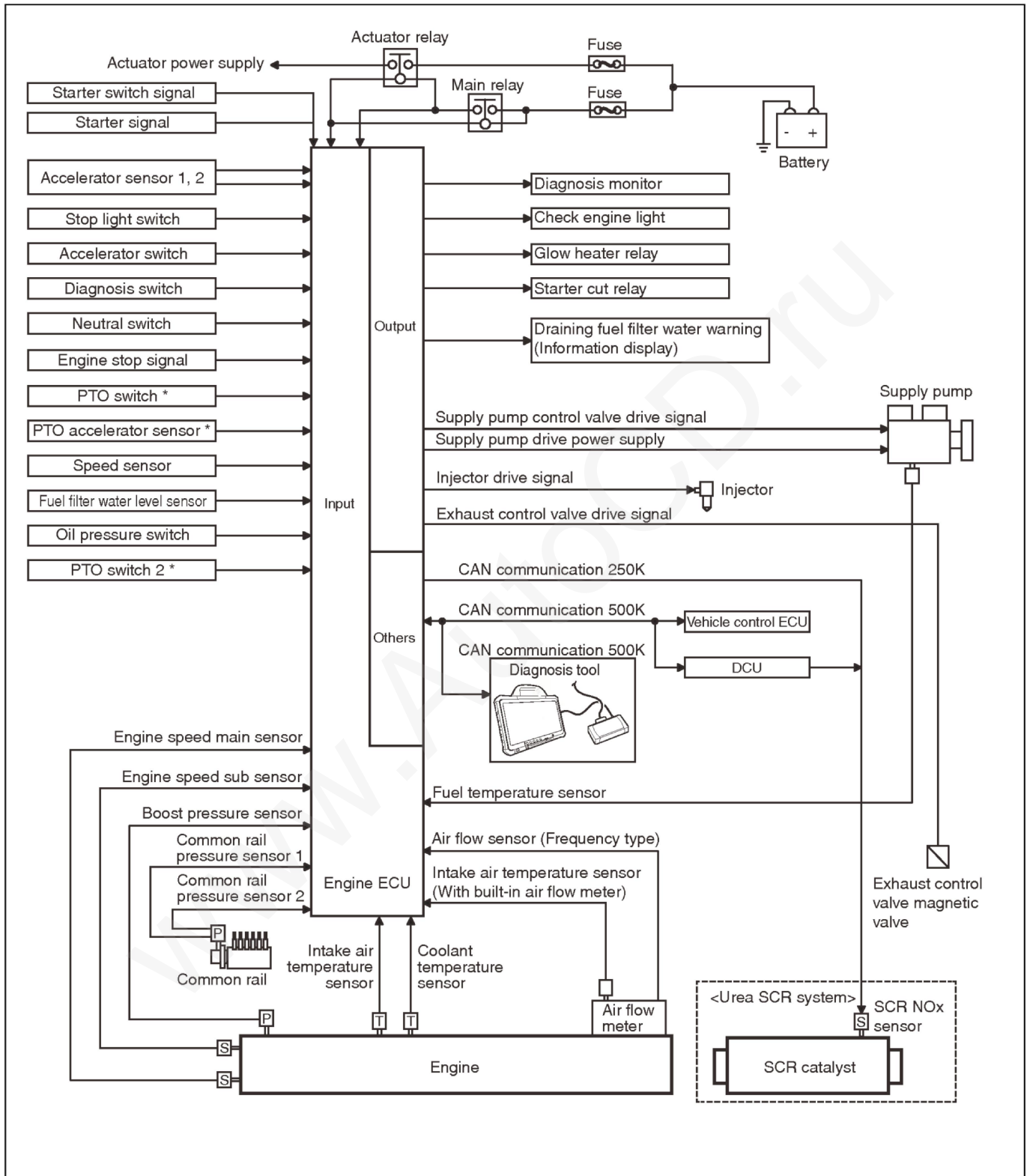
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HINT

If you cannot easily measure with the regular test lead because of the too small connector, prepare a check pin using a paper clip, safety pin or fine wire.

SYSTEM BLOCK DIAGRAM

EN01H02116030405002001



LIST OF CONTROLS

EN01H02116030102002002

System	Description of control
Fuel injection control	Controls fuel injection timing and amount based on basic injection timing computed from engine status and adjusted by signals sent from individual sensors.
Common rail pressure control	According to engine condition, signal will be sent to the supply pump solenoid valve to control the common rail pressure.
Speed limiter control	Controls fuel injection amount so that vehicle speed will not exceed the statutory speed limit.
Starter block control	Keeps the starter from activating during engine run in order to protect the starter.
Diagnosis	Activates lights and multi-information to warn a driver of system errors or failures if any. Provides a troubleshooting function through a troubleshooting system (HINO DX II).
Failsafe	Disables to control and limit outputs for sale purpose and protect engine when one or more failures or troubles occur in the system.

LIST OF SENSORS

EN01H02116030102002003

System	Function	Fuel injection	Common rail pressure	Speed limiter	Starter block
Air flow sensor	Uses hot wire to detect an intake air flow rate.	○			
Intake air temperature sensor	Detects intake air temperature sensed by air flow sensor.	○			
Coolant temperature sensor	Detects coolant temperature.	○	○		
Fuel temperature sensor	Detects fuel temperature.	△	△		
Common rail pressure sensor	Detects fuel pressure in common rail.	○	○		
Boost pressure sensor	Detects boost pressure.	○			
Engine speed main sensor	Detects engine speed.	○	○		○
Engine speed sub sensor	Identifies engine cylinders.	○			
Accelerator sensor	Detects accelerator pedal opening.	○			
Vehicle speed sensor	Detects vehicle running speed.			○	

LIST OF ACTUATORS

EN01H02116030102002004

System	Function	Fuel injection	Common rail pressure	Speed limiter	Starter block
Main relay	Supplies power to engine ECU.	○	○	○	○
Actuator relay	Supplies electric power to engine-related devices (such as VGT and EGR valve).	○			
Injector	Injects precise amount of fuel into cylinders.	○			
Intake volume control valve	Controls a flow rate of fuel pressure-fed from the supply pump to the common rail.	○	○		
Exhaust brake magnetic valve	Supplies air to an air cylinder of an exhaust control valve during warming-up and DPR regeneration (vehicle stop).				

SIGNAL CHECK HARNESS

EN01H02116030301002001

1. SIGNAL CHECK HARNESS

NOTICE

To avoid damaging connectors during engine ECU terminal measurement, connect the signal check harness and apply a tester rod to the signal check harness contact box to take measurement.

HINT

As exemplified below, terminal numbers referred in texts and illustrations in this document are defined in the next section "COMPUTER (ECU) PIN ASSIGNMENT."

ECU terminal number

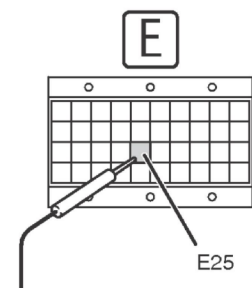
E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	E17	E18	E19	E20
E21	E22	E23	E24	E25	E26	E27	E28	E29	E30	E31	E32	E33	E34	E35	E36	E37	E38	E39	E40
E41	E42	E43	E44	E45	E46	E47	E48	E49	E50	E51	E52	E53	E54	E55	E56	E57	E58	E59	E60
E61	E62	E63	E64	E65	E66	E67	E68	E69	E70	E71	E72	E73	E74	E75	E76	E77	E78	E79	E80

Signal check harness

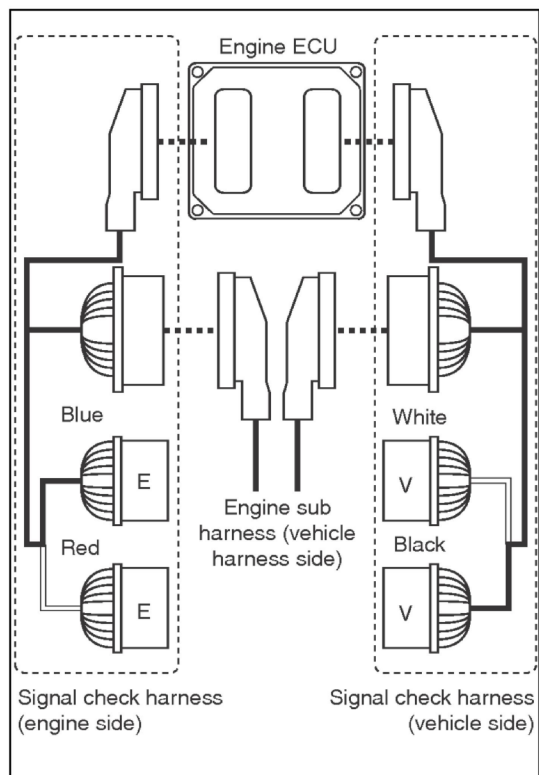


E1	E2	E3	E4	E5	E6	E7	E8	E9	E10										
E11	E12	E13	E14	E15	E16	E17	E18	E19	E20										
E21	E22	E23	E24	E25	E26	E27	E28	E29	E30										
E31	E32	E33	E34	E35	E36	E37	E38	E39	E40										

[Example] E25 terminal



SHTS021160300003



SHTS021160300004

2. CONNECTION OF SIGNAL CHECK HARNESS

- (1) Turn the ignition key to the "LOCK" position and disconnect connectors from the engine ECU.
- (2) Connect the signal check harness to the vehicle check harness and to the engine ECU.

SST: 09843-E4050 Signal check harness

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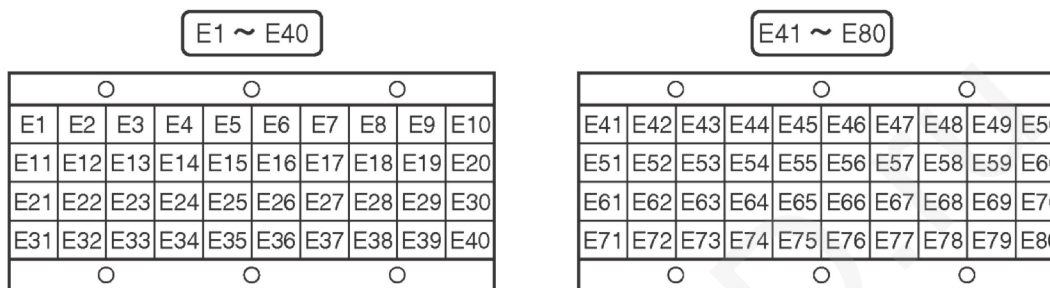
COMPUTER PIN ASSIGNMENT

EN01H02116030404002001

Engine side

E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	E17	E18	E19	E20
E21	E22	E23	E24	E25	E26	E27	E28	E29	E30	E31	E32	E33	E34	E35	E36	E37	E38	E39	E40
E41	E42	E43	E44	E45	E46	E47	E48	E49	E50	E51	E52	E53	E54	E55	E56	E57	E58	E59	E60
E61	E62	E63	E64	E65	E66	E67	E68	E69	E70	E71	E72	E73	E74	E75	E76	E77	E78	E79	E80

ECU side connector terminal arrangement



Contact box connector terminal arrangement

SHTS021160300005

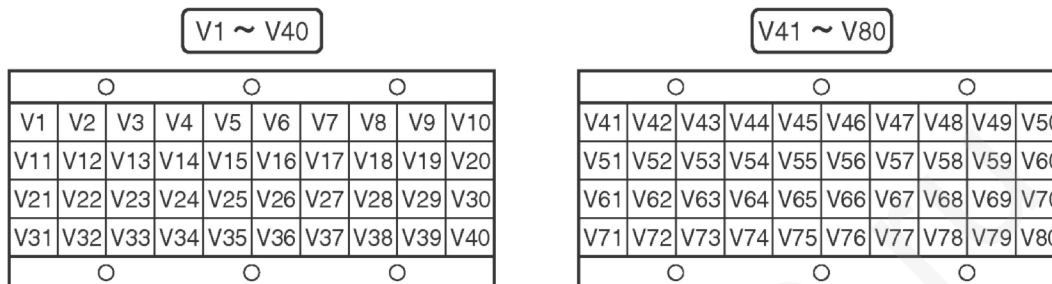
Terminal No.	Terminal name	Signal name	Terminal No.	Terminal name	Signal name
E1	MOT+	D throttle valve drive (+) (DC motor)	E19	INJ2	Injector drive signal 2 (main)
E2	-	-	E20	INJ4	Injector drive signal 4 (main)
E3	-	-	E21	MOT-	D throttle valve drive (-) (DC motor)
E4	PVB4	Power system power supply 4	E22	-	-
E5	-	-	E23	-	-
E6	-	-	E24	PVB2	Power system power supply 2
E7	-	-	E25	PVB3	Power system power supply 3
E8	-	-	E26	-	-
E9	SPV1	SCV drive signal (+) (main)	E27	-	-
E10	SPV2	SCV drive signal (-) (main)	E28	-	-
E11	-	-	E29	SP1S	SCV drive signal (+) (sub)
E12	AFVB	Air flow sensor power supply	E30	SP2S	SCV drive signal (-) (sub)
E13	AVC1	Sensor power supply 1	E31	-	-
E14	IJ1+	Injector power supply 1 (main)	E32	-	-
E15	INJ1	Injector drive signal 1 (main)	E33	AVC2	Sensor power supply 2
E16	INJ3	Injector drive signal 3 (main)	E34	I1+S	Injector power supply 1 (sub)
E17	INJ5	Injector drive signal 5 (main)	E35	IJ01	Injector drive signal 1 (sub)
E18	IJ2+	Injector power supply 2 (main)	E36	IJ03	Injector drive signal 3 (sub)

Terminal No.	Terminal name	Signal name	Terminal No.	Terminal name	Signal name
E37	IJ05	Injector drive signal 5 (sub)	E59	CA3H	CAN communication 3 HIGH
E38	I2+S	Injector power supply 2 (sub)	E60	INJ6	Injector drive signal 6 (main)
E39	IJ02	Injector drive signal 2 (sub)	E61	FPSW	Oil pressure switch (sub)
E40	IJ04	Injector drive signal 4 (sub)	E62	DTS1	D throttle valve opening sensor 1
E41	OLSW	Oil pressure switch	E63	ATI+	Intake manifold temperature sensor
E42	-	-	E64	PCR3	Common rail pressure sensor 2 (main)
E43	EXT+	Exhaust temperature sensor (after ATC) 1st from upstream	E65	PCR4	Common rail pressure sensor 2 (sub)
E44	-	-	E66	THW+	Coolant temperature sensor
E45	-	-	E67	PIM	Boost pressure sensor
E46	DTS2	D throttle valve opening sensor 2	E68	PCR2	Common rail pressure sensor 1 (sub)
E47	THA+	Intake air temperature sensor (built in AFM)	E69	-	-
E48	THF+	Fuel temperature sensor	E70	-	-
E49	PCR1	Common rail pressure sensor 1 (main)	E71	-	-
E50	-	-	E72	NE1-	NE sensor (-)
E51	-	-	E73	G3+	G sensor
E52	NE1+	NE sensor (+)	E74	AFSI	Frequency type AFM
E53	GVCC	G sensor power supply	E75	NESD	NE sensor SLD
E54	GGND	G sensor GND	E76	AGD2	Sensor GND 2
E55	IJSD	Injector SLD	E77	AGD4	Sensor GND 4
E56	AGD1	Sensor GND 1	E78	AGD6	Sensor GND 6
E57	AGD3	Sensor GND 3	E79	CA3L	CAN communication 3 LOW
E58	AGD5	Sensor GND 5	E80	IJ06	Injector drive signal 6 (sub)

Vehicle side

V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20
V21	V22	V23	V24	V25	V26	V27	V28	V29	V30	V31	V32	V33	V34	V35	V36	V37	V38	V39	V40
V41	V42	V43	V44	V45	V46	V47	V48	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V59	V60
V61	V62	V63	V64	V65	V66	V67	V68	V69	V70	V71	V72	V73	V74	V75	V76	V77	V78	V79	V80

ECU side connector terminal arrangement



Contact box connector terminal arrangement

SHTS021160300006

Terminal No.	Terminal name	Signal name	Terminal No.	Terminal name	Signal name
V1	+BF1	+BF power supply 1	V21	+BF2	+BF power supply 2
V2	STCR	Starter cut relay	V22	–	–
V3	MRL1	Main/ACT power supply relay 1	V23	MRL2	Main/ACT power supply relay 2
V4	EBMV	Exhaust brake solenoid valve	V24	GRY1	Heater (glow) relay
V5	ARL1	PTO cut relay	V25	–	–
V6	–	–	V26	WFLP	WIF light
V7	GLOW	Glow indicator light	V27	DGLP	Diagnosis light (C/E)
V8	DPR	DPR regeneration light	V28	EBLP	Exhaust brake light
V9	CE/G	Check engine light (MIL)	V29	BSW1	Stop light switch
V10	PTOS	PTO set switch	V30	DGSW	Diagnosis switch
V11	NUSW	Neutral switch	V31	PTO	PTO switch 1
V12	ST	Starter signal	V32	STOP	Engine stop switch
V13	SSWS	Starter key 1	V33	SWSS	Starter key 2
V14	VS	Vehicle speed signal	V34	–	–
V15	–	–	V35	–	–
V16	CA1L	CAN communication 1 LOW	V36	CA1H	CAN communication 1 HIGH
V17	CA2L	CAN communication 2 LOW	V37	CA2H	CAN communication 2 HIGH
V18	VB1	+B power supply 1	V38	VB2	+B power supply 2
V19	BATT	Backup power supply	V39	PGD1	Power system GND 1
V20	CASE	Case GND	V40	CGD1	Signal system GND 1

Terminal No.	Terminal name	Signal name	Terminal No.	Terminal name	Signal name
V41	PKSW	Parking brake switch	V61	–	–
V42	WIF	WIF signal	V62	PTO2	PTO switch 2
V43	–	–	V63	–	–
V44	–	–	V64	–	–
V45	ADG7	Sensor GND 7	V65	ADG8	Sensor GND 8
V46	ADG9	Sensor GND 9	V66	ADG0	Sensor GND 10
V47	ACS1	Accelerator sensor 1	V67	ACS2	Accelerator sensor 2
V48	–	–	V68	ASCS	Operational accelerator sensor
V49	–	–	V69	ET3+	Exhaust temperature sensor (before DPR) 2nd from upstream
V50	AVC3	Sensor power supply 3	V70	EXPS	DPR differential pressure sensor
V51	AVC4	Sensor power supply 4	V71	AVC5	Sensor power supply 5
V52	–	–	V72	PCS	1-speed/Reverse switch
V53	–	–	V73	–	–
V54	–	–	V74	PTOR	PTO resume switch
V55	–	–	V75	BSW2	Brake switch
V56	DPSW	DPR forced regeneration switch	V76	IDLE	Accelerator full-close switch
V57	ET4+	Exhaust temperature sensor (after DPR) 3rd from upstream	V77	–	–
V58	VB3	+B power supply 3	V78	VB4	+B power supply 4
V59	PGD2	Power system GND 2	V79	PGD3	Power system GND 3
V60	CGD2	Signal system GND 2	V80	PGD4	Power system GND 4

TROUBLE DIAGNOSIS USING THE COMPUTER (HINO DX II)

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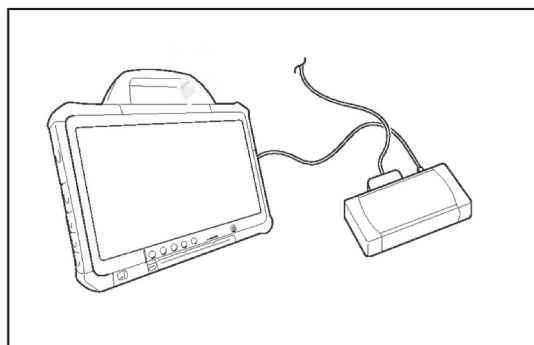
STEP OF TROUBLE DIAGNOSIS

1. PREPARATION FOR CONNECTING HINO DX II

- (1) The "HINO DX II" is a failure diagnosis tool for the common rail fuel injection system and the chassis system. For connecting the computer to a vehicle, the "DST-i" and the dedicated cable will be required.

SPECIAL TOOL: Computer interface

Part name	Part No.
DENSO DST-i Set (Without LCD)	Without Bluetooth® 95171-01021
	With Bluetooth® 95171-01041
DENSO DST-i Set (With LCD)	Without Bluetooth® 95171-01031
	With Bluetooth® 95171-01051



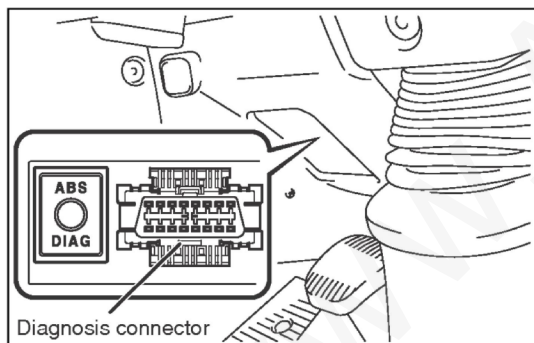
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HINT

Install the "Hino Diagnostic eXplorer II" (HINO DX II) software in a computer. For detailed installation procedures, refer to the HINO DX II OPERATION MANUAL supplied on the Global Service Portal Site (Hino-GSPS).

2. CONNECTION OF HINO DX II


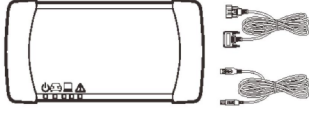
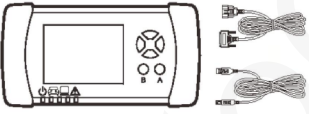
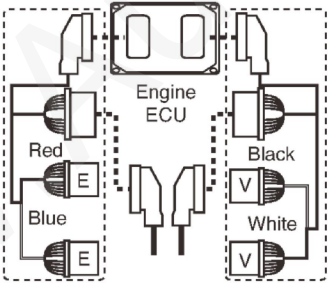
- (1) Connect the DST-i to the trouble diagnosis connector located in the electrical component box in the instrument panel or located in the electrical component box behind the rearmost seat.
- (2) Connect the computer in which the HINO DX II is installed, to the DST-i.
- (3) Turn the starter key to "ON".
- (4) Turn on the power switch of the computer to start the HINO DX II.



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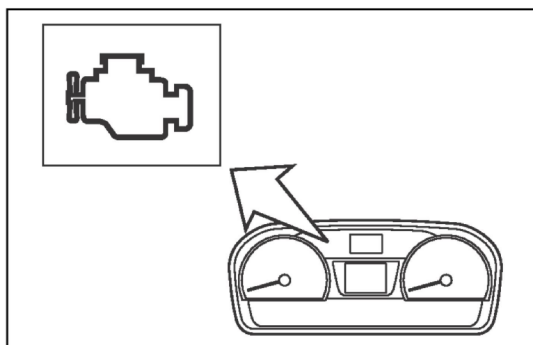
APPARATUS FOR TROUBLE SHOOTING

1. APPARATUS FOR TROUBLE SHOOTING

Part name	Part No.	Illustration of appearance	Outline/function
Laptop computer* ¹	—		<p>The following specifications are necessary for operation of HINO DX II.</p> <ul style="list-style-type: none"> • Operating system (OS): Windows7 Professional 32 bit. • Browser: Microsoft Internet Explorer 8.0, 9.0 • CPU: 32 bit processors more than 1GHz. • Memory: More than 1Gbyte. • HDD: More than 100Gbyte.
DENSO DST-i Set (without LCD)	Without Bluetooth® 95171-01021 With Bluetooth® 95171-01041		Computer interface These parts are supplied by DENSO Distributor.
DENSO DST-i Set (with LCD)	Without Bluetooth® 95171-01031 With Bluetooth® 95171-01051		
Signal check harness	09843-E4050 (For engine ECU)		This harness can be attached in between the vehicle harness and the ECU so that a tester rod can be used for checking under current-carrying conditions.
(* ¹): Complete function of HINO DX II is confirmed on "Panasonic CF-D1".			

MALFUNCTION INDICATOR LIGHT STATUS

EN01H02116030602002001



SHTS021160300013

1. INSPECTION PROCEDURE

- (1) Check that a malfunction indicator light located on the combination meter lights up when the starter key is turned "ON" (do not start the engine).

HINT

- If the malfunction indicator light is lit, perform a system check to see if the malfunction is of the past or present.
- In the case of the past malfunction, this light will turn off if a status is judged to be normal in 3 times of driving.
- DTC must be cleared on the HINO DX II, after malfunction indicator light comes off.

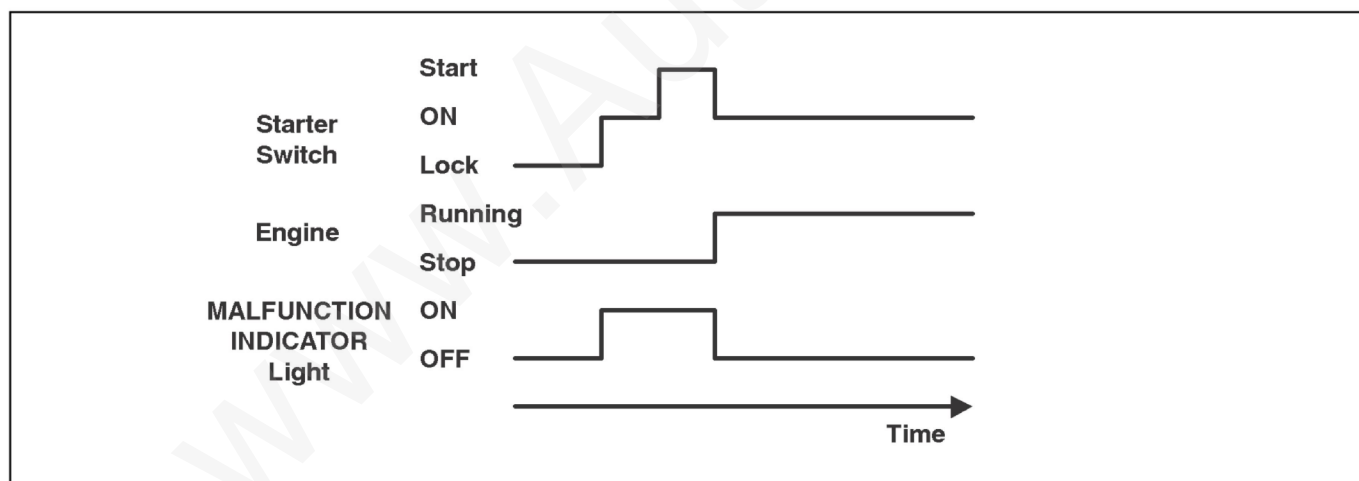
(DEFINITION OF 1 TIME OF DRIVING)

- a. Begins with engine start and ends with engine shut off. (The engine start time must be at least 1 minute.)
- If the malfunction indicator light does not go out, the system is abnormal. Check the system according to diagnosis on the following page.

MALFUNCTION INDICATOR LIGHT

ILLUMINATION PATTERN

EN01H02116030602002002



SHTS021160300014

DIAGNOSIS CODE TABLE

EN01H02116030602002003

NOTICE

MC No.: Diagnosis Monitor Code (Using the diagnosis monitor)

DTC No.: Diagnosis Trouble Code (Using the PC diagnosis tool)

A: Engine does not start

B: Engine stops

C: Engine has low power

D: Torque limit (EURO 5, on -board diagnostic systems)

E: MIL: Flash

F: Do not erase the past MC or DTC with the generic scan tool within 9600 Hr after confirming no abnormalities.

YES: MIL: Light

NO: MIL: Not light

MIL	SYMPTOM	MC No.	DTC No.	RESUMED CAUSE OF TROUBLE	REGULATIONS/ OTHERS
NO		13	P0016	Abnormality in phases of revolution pulsar (diagnosis of the phase deviation between NE and G sensor pulses)	
YES	C	76	P0087	Abnormality in common rail pressure control [Continued underpressure]	
YES		69	P0088	Excessively high common rail pressure	
YES		76	P0088	Abnormality in common rail control [Continued overpressure]	
E		18	P0096	Abnormality in characteristics of intake manifold temperature sensor	
E		18	P0097	Malfunction of intake manifold temperature sensor [Lo]	
E		18	P0098	Malfunction of intake manifold temperature sensor [Hi]	
E	D	25	P0106	Abnormality in characteristics of boost pressure sensor	
E	C, D	25	P0108	Malfunction of boost pressure sensor [Hi]	
YES		17	P0112	Malfunction of intake air temperature sensor [Lo]	
YES		17	P0113	Malfunction of intake air temperature sensor [Hi]	
YES		11	P0116	Abnormality in characteristics of coolant temperature sensor	
YES	C	11	P0117	Malfunction of coolant temperature sensor [Lo]	
YES	C	11	P0118	Malfunction of coolant temperature sensor [Hi]	
YES		14	P0182	Fuel temperature sensor [Lo]	
YES		14	P0183	Fuel temperature sensor [Hi]	
YES	C	74	P0191	Common rail pressure sensor (main and sub) - out of range	
YES	C	74	P0192	Malfunction of common rail pressure sensor (main) [Lo]	
YES	C	74	P0193	Malfunction of common rail pressure sensor (main) [Hi]	
YES	C	71	P0200	Malfunction of ECU charge circuit [Hi]	
YES		61	P0201	Disconnection of solenoid valve drive system for injector 1	
YES		62	P0202	Disconnection of solenoid valve drive system for injector 2	
YES		63	P0203	Disconnection of solenoid valve drive system for injector 3	

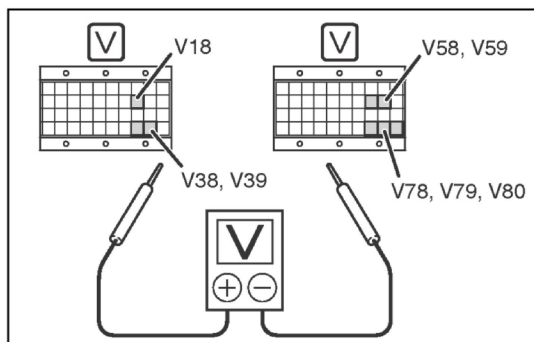
MIL	SYMPTOM	MC No.	DTC No.	RESUMED CAUSE OF TROUBLE	REGULATIONS/ OTHERS
YES		64	P0204	Disconnection of solenoid valve drive system for injector 4	
YES		65	P0205	Disconnection of solenoid valve drive system for injector 5	
YES		66	P0206	Disconnection of solenoid valve drive system for injector 6	
NO		6	P0217	Overheat	
NO		7	P0219	Engine overrun	
E	C, D	25	P0237	Malfunction of boost pressure sensor [Lo]	
YES	A, B, C	13	P0335	Malfunction of engine speed main sensor/malfunctions of both revolution sensors	
NO		13	P0336	Abnormality in engine speed main sensor pulse	
YES	A, B	12	P0340	Malfunction of engine speed sub sensor	
NO		12	P0341	Abnormality in engine speed sub sensor pulse	
YES		9	P0500	Detection of invalid vehicle speed data from vehicle ECU	
YES		21	P0500	Malfunction of vehicle speed sensor [Lo]	
YES		21	P0501	Malfunction of vehicle speed sensor [Hi]	
NO		42	P0510	Malfunction of accelerator switch	
NO		4	P0524	Drop in oil pressure	
NO		53	P0540	Malfunction of preheating system	
YES	A, B	3	P0606	ECU internal malfunction [Hardware detection]	
YES	C	3	P0607	ECU internal malfunction [Malfunction of monitor IC]	
NO		2	P0610	Abnormality in vehicle information reception	
YES	C	71	P0611	Malfunction in ECU charge circuit [Lo]	
NO		45	P0617	Malfunction of starter switch	
YES	C	73	P0628	Malfunction of supply pump solenoid valve 1 (open/GND short circuit)	
YES	A, B, C	75	P0629	Malfunction of supply pump solenoid valve 1 (+B short circuit)	
NO		5	P0642	Malfunction of sensor power supply 1 [Lo]	
NO		5	P0643	Malfunction of sensor power supply 1 [Hi]	
NO		5	P0652	Malfunction of sensor power supply 2 [Lo]	
NO		5	P0653	Malfunction of sensor power supply 2 [Hi]	
YES		51	P0686	Malfunction of main relay	
NO		41	P0704	Malfunction of clutch switch	
NO		52	P081A	Malfunction of starter cut relay [GND short circuit]	
NO		52	P081B	Malfunction of starter cut relay [+B short circuit/Open]	
NO		47	P0850	Malfunction of neutral switch	
NO		23	P1133	Malfunction of operational accelerator sensor [Hi]	

MIL	SYMPTOM	MC No.	DTC No.	RESUMED CAUSE OF TROUBLE	REGULATIONS/ OTHERS
YES		74	P1197	Malfunction of common rail pressure sensor (sub) [Lo]	
YES		74	P1198	Malfunction of common rail pressure sensor (sub) [Hi]	
YES	C	74	P119F	Abnormality in characteristics of common rail pressure sensor	
YES	C	68	P1211	Malfunction of injector solenoid valve drive system common 1 [GND short circuit]	
YES	C	68	P1212	Malfunction of injector solenoid valve drive system common 1 [+B short circuit/open]	
YES	C	68	P1214	Malfunction of injector solenoid valve drive system common 2 [GND short circuit]	
YES	C	68	P1215	Malfunction of injector solenoid valve drive system common 2 [+B short circuit/open]	
NO		46	P1530	Malfunction of engine stop switch closing	
YES		2	P1601	Abnormality in injector multipoint compensation	
YES		57	P1681	Malfunction of exhaust brake magnetic valve [disconnection/GND short circuit]	
YES		57	P1682	Malfunction of exhaust brake magnetic valve [+B short circuit]	
E	D	95	P203F	Low AdBlue level	
E or YES	D	97	P204F	Malfunction of UREA SCR system	
E	D	95	P207F	Abnormality in AdBlue quality	
E	D	27	P2080	Abnormality in characteristics of exhaust temperature sensor	
E	D	94	P20EE	UREA SCR catalyst degradation/deterioration	
YES		22	P2120	Malfunctions of both accelerator sensors	
YES		22	P2121	Abnormal accelerator sensor 1 voltage	
YES		22	P2122	Malfunction of accelerator sensor 1 [Lo]	
YES		22	P2123	Malfunction of accelerator sensor 1 [Hi]	
YES		22	P2126	Abnormal accelerator sensor 2 voltage	
YES		22	P2127	Malfunction of accelerator sensor 2 [Lo]	
YES		22	P2128	Malfunction of accelerator sensor 2 [Hi]	
YES		15	P2227	Abnormality in characteristics of atmospheric pressure sensor	
YES	C	15	P2228	Malfunction of atmospheric pressure sensor [Lo]	
YES	C	15	P2229	Malfunction of atmospheric pressure sensor [Hi]	
NO		75	P2269	Water-in-fuel alarm	
NO		76	P2635	Replacing the supply pump	
YES	C	8	U0073	Malfunction of CAN communication [Engine]	
E	D	8	U010E	CAN communication blackout [DCU]	
YES		9	U1001	Malfunction of CAN communication [vehicle]	
YES		9	U110A	CAN communication blackout [vehicle control ECU]	

INSPECTION OF ECU POWER SUPPLY VOLTAGE

EN01H02116030602002004

1 Measuring voltage between terminals



SHTS021160300015

1. Turn the starter key to "LOCK" and connect the signal check harness to the engine ECU.
2. Turn the starter key "ON" and measure voltage between the terminals as listed below.

Terminal to be measured	
Positive	Negative
V18, V38, V58, V78	V39, V59, V79, V80

Standard value: 20 V or more

Is the measured value within the standard range?

YES

Normal

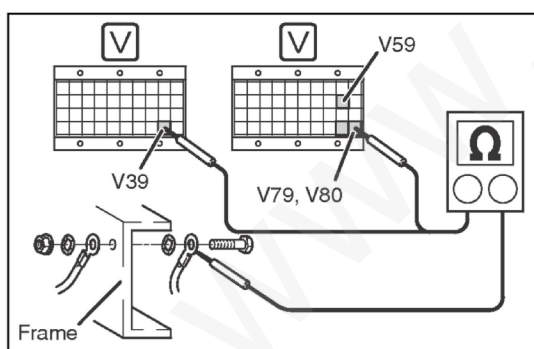
NO

- 0 V: Blowout of fuse, fault in harness, fault in GND, etc.
- 20 V or less: Deteriorated battery, fault in GND, etc.

INSPECTION OF GND

EN01H02116030602002005

1 Measuring resistance between terminals



SHTS021160300016

1. Turn the starter key to "LOCK" and connect the signal check harness to the engine ECU.
2. Disconnect the signal check harness connectors from the ECU and measure resistances between the negative (-) battery terminal and the terminals V39/V59/V79/V80.

ECU terminal No.	Description of terminal
V39	GND
V59	GND
V79	GND
V80	GND

Standard value: 1 Ω or less

Is the measured value within the standard range?

YES

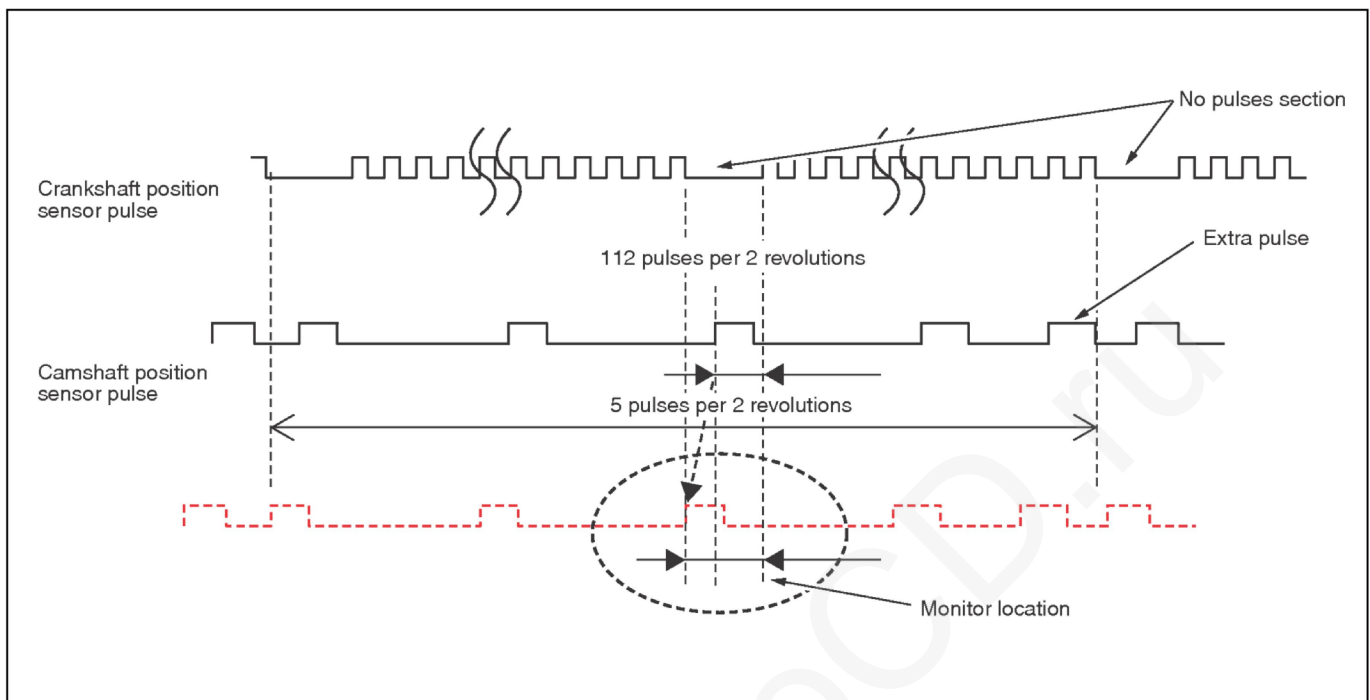
Normal

NO

- Disconnection of GND harness, irregular contact, etc.

DTC: P0016 (Diagnosis monitor code 13)

EN01H02116030602002006

**P0016 (Diagnosis monitor code 13): Abnormality in phases of revolution pulsar
(diagnosis of the phase deviation between NE and G sensor pulses)****INFORMATION**

SHTS021160300017

1. Technical description

- The phase difference (deviation) between the engine speed main sensor (NE sensor) pulse and engine speed sub sensor (G sensor) pulse is diagnosed.

<Description of malfunction>

- The phases of engine speed main sensor pulse and engine speed sub sensor pulse are abnormal.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The battery voltage is 16 V or more and 32 V or less.
- The engine revolution is 450 r/min or more and 1,000 r/min or less.
- The engine coolant temperature is 50 °C {122 °F} or more.
- The difference between the target engine revolution and actual engine revolution is 20 r/min or less.

(2) Judgement criteria

- The phase difference between the engine speed main sensor and engine speed sub sensor 5° or more for 3 seconds or more continuously.

3. Reset condition

- Immediately after return to normal

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe function)>**

- -

<Symptoms on the vehicle due to malfunction>

- -