



TOYOTA

AVENSIS

ZZT22#R (1ZZ-FE / 3ZZ-FE) / AZT220R (1AZ-FE)
FOR EUROPEAN SPEC.

AIR CONDITIONING

ENGLISH

AAAMU-63

INSIDE ENGINE COMPARTMENT
INSTALLATION MANUAL

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INTRODUCTION

IMPORTANT NOTICE

This manual has been designed for technicians who are qualified and educated in the proper procedures of vehicle safety, handling and maintenance; experienced in installation of car air conditioning or who are able to carry out installation procedures when given instructions by an experienced technician in a supervisory capacity; and are certified to handling refrigerant.

1. Take special care to ensure that clearance between air conditioning components and other components such as brake parts, fuel system and electric wires as specified in this manual.
2. If a problem is found with the air conditioning system due to installation, refer back to the manual to correct the problem(s).
3. Vehicle and air conditioning kit components as well as installation procedures are subject to change without prior notice. Refer to the latest installation manual and service information. Any changes affecting the above items will be given in the form of an "Installation instructions for air conditioning (Supplement)" (issued by DENSO) or a service bulletin (issued by the manufacturer).

DEFINITION OF TERMS

-  **WARNING**  : Describes precautions that should be observed in order to prevent injury or death to the user during installation.
-  **CAUTION** : Describes precautions that should be observed in order to prevent damage to the vehicle or its components, which may occur during installation if insufficient care is taken.
-  **NOTE** : Provides additional information that facilitates installation work.
- FRONT, REAR**
LEFT, RIGHT : Shows the direction when viewed from the driver's seat

FOREWORD

This manual has been published to explain how to install the air conditioning for TOYOTA AVENSIS.
When installing the air conditioning, installation should be performed as described in this manual.

[APPLICATION VEHICLE]

VEHICLE NAME	MODEL CODE	PRODUCTION PERIOD	ENGINE TYPE	STEERING POSITION	DESTINATION
AVENSIS	ZZT221R ZZT220R AZT220R	2000.07--->	1ZZ-FE 3ZZ-FE 1AZ-FE	RHD	EUROPE

CAUTION

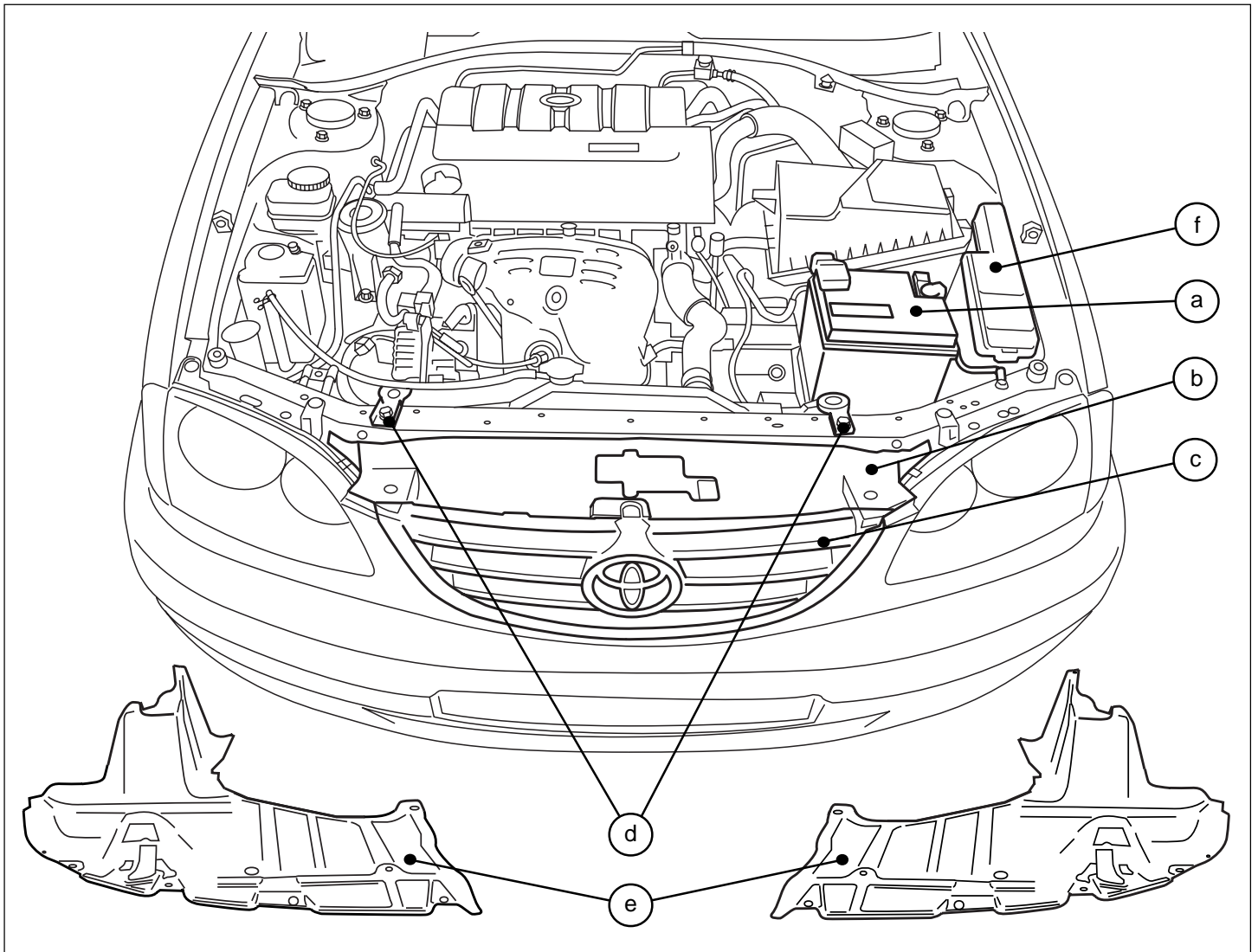
1. Carefully read the separate manual "**GENERAL INFORMATION / AFTER INSTALLATION**" before and after installation. (Document code: AOAMU-02A / Document part number: 988963-3480)
2. Refer to the separate manual "**INSTALLATION MANUAL (INSIDE PASSENGER COMPARTMENT)**" for details on installation for the passenger compartment side. (Document code: AAAMU-60 / Document part number: 988963-4130)

1. INSTALLATION INSIDE ENGINE COMPARTMENT



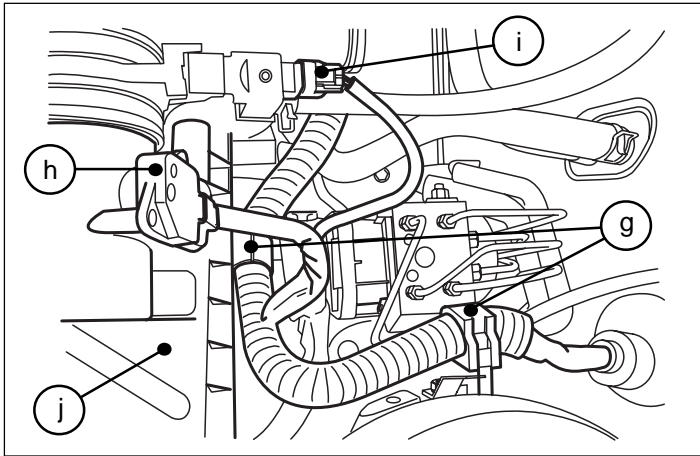
CAUTION

1. Before starting installation, remove the (-) terminal of the battery.
2. Before making any hoses and tubes connections, apply a few drops of compressor oil to the seat of O-ring and coupling nuts.
3. When tightening and loosening the fittings, use two wrenches for support.
4. Ensure fender covers are in position.



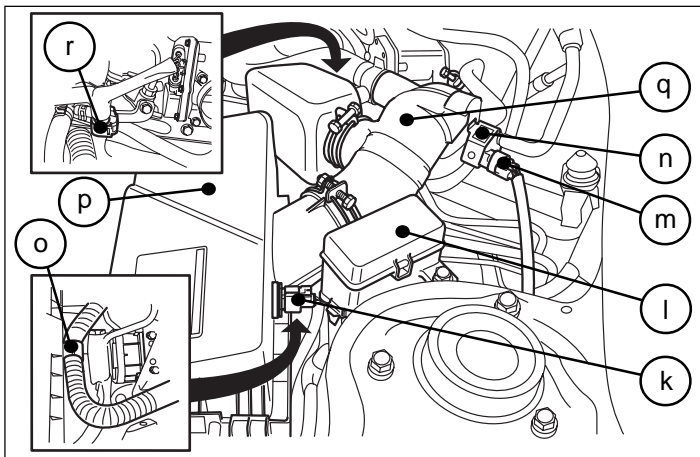
(1) REMOVAL OF PARTS

- (a) Battery and battery carrier.
- (b) Cover above grille.
- (c) Front grille.
- (d) Radiator upper supports.
- (e) Under covers.
- (f) Junction block cover.



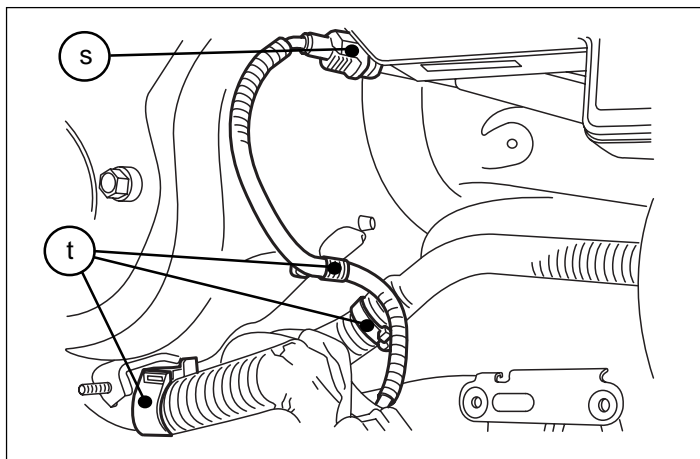
■ **1,3ZZ-FE E/G MODEL ONLY [(g)-(j)]**

- (g) Loosen two clamps of vehicle harness.
- (h) Disconnect vehicle harness connector on air filter box upper cover.
- (i) Disconnect VSV connector.
- (j) Remove air filter box.

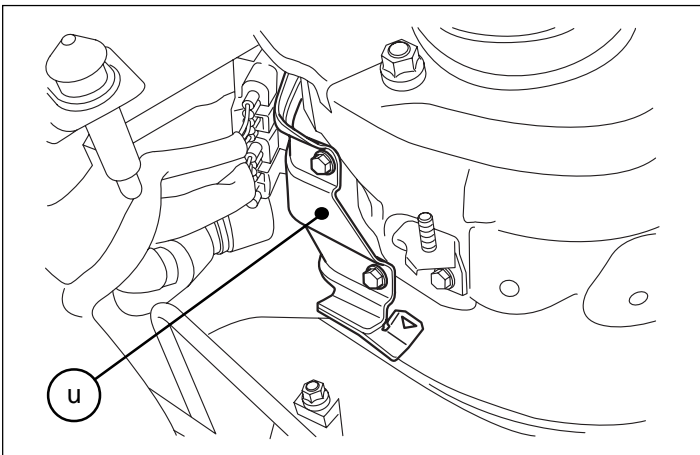


■ **1AZ-FE E/G MODEL ONLY [(k)-(u)]**

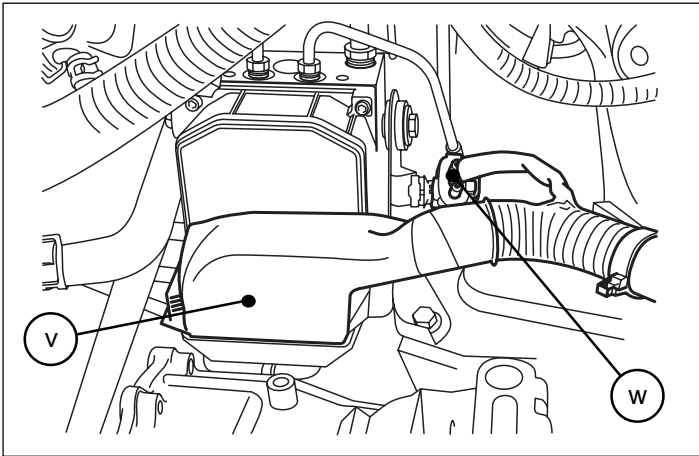
- (k) Air pressure sensor.
- (l) Relay box (if equipped).
- (m) Disconnect VSV connector.
- (n) Loosen VSV.
- (o) Loosen clamp of vehicle harness on air filter box.
- (p) Air filter box.
- (q) Place air hose on top of the engine.
- (r) Loosen clamp of vehicle harness.



- (s) Disconnect vehicle harness connector.
- (t) Loosen three clamps of vehicle harness.



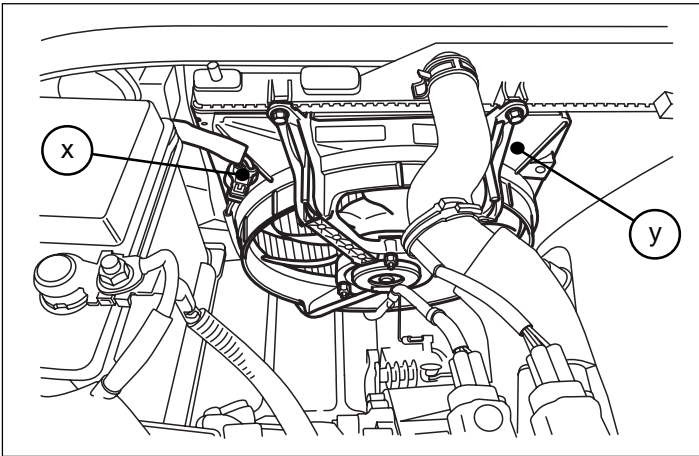
- (u) Remove bracket of vehicle harness clamp.



(v) Disconnect ABS connector.

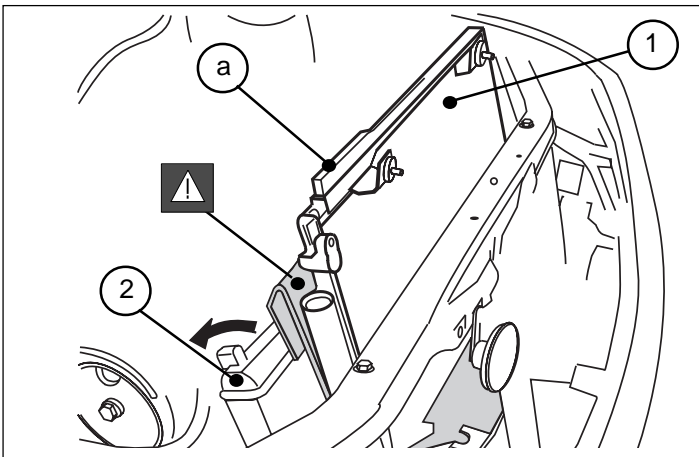
■ 1AZ-FE E/G MODEL ONLY [(w)]

(w) Disconnect vehicle connector.



(x) Disconnect radiator fan connector.

(y) Remove radiator fan.



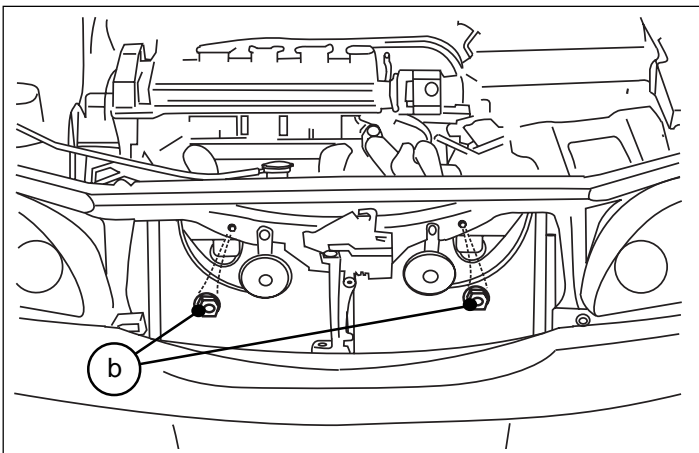
(2) CONDENSER

(a) Insert the condenser (1), leaning the radiator (2) backward.

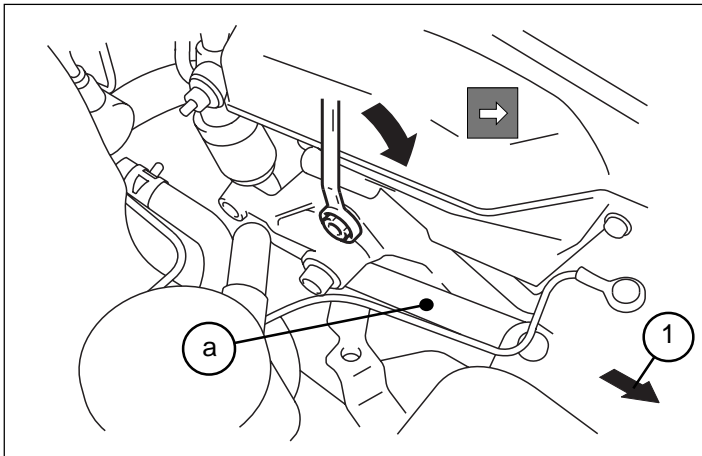


CAUTION

Place a piece of corrugated board in front of the radiator.



(b) Fasten the condenser to the radiator upper support using two nuts (black M6).



(3) COMPRESSOR

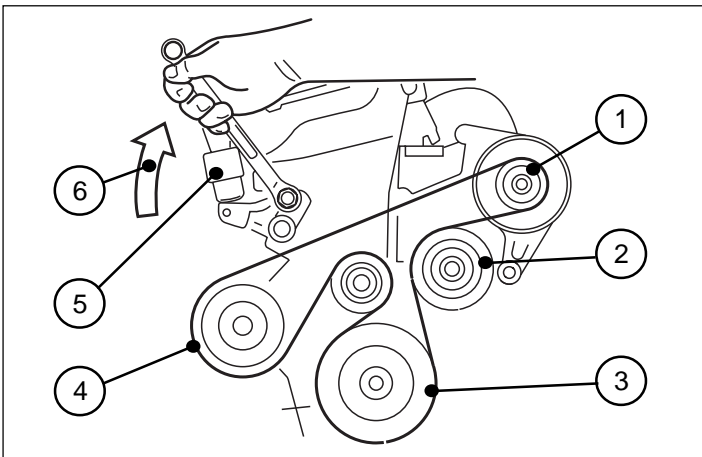
■ 1,3ZZ-FE E/G MODEL ONLY [(a)-(c)]

- (a) Remove and discard the alternator belt from each pulley.



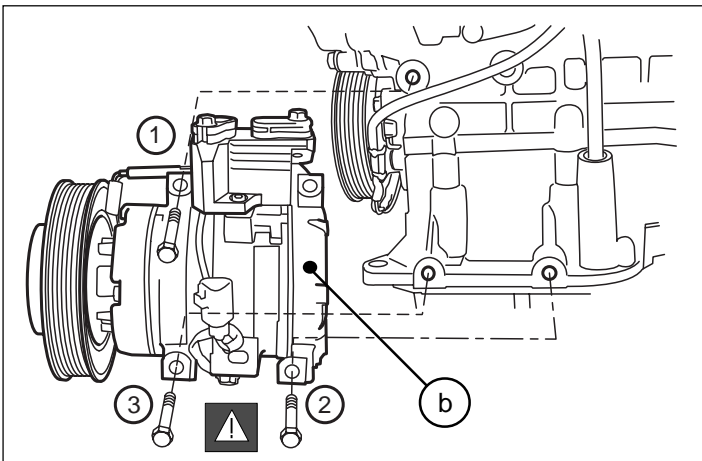
NOTE

Set the wrench as shown in the left figure, and remove the alternator belt from the pulleys while pulling the wrench to the front of the vehicle.



- (1) Front

- (1) Alternator pulley
 (2) Water pump pulley
 (3) Crankshaft pulley
 (4) P/S pulley
 (5) Auto tensioner
 (6) Toward front



- (b) Install the compressor to the engine block using three bolts (M8 x 81).

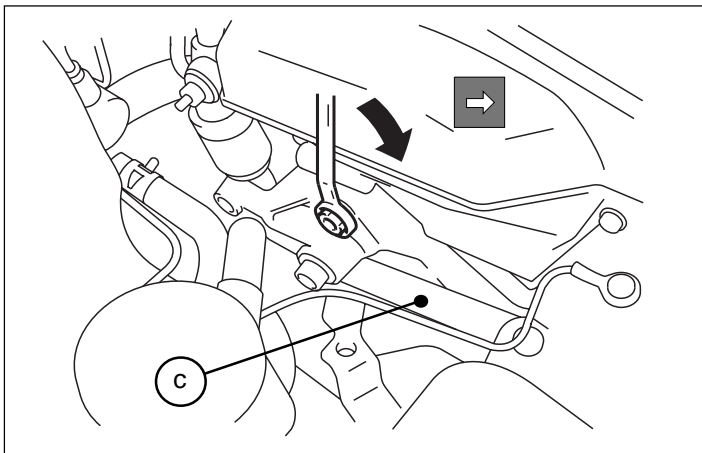
Tightening torque:

24.5 Nm (250 kgf.cm, 18.1 ft.lbf).



CAUTION

Tightening order: 1 --> 2 --> 3

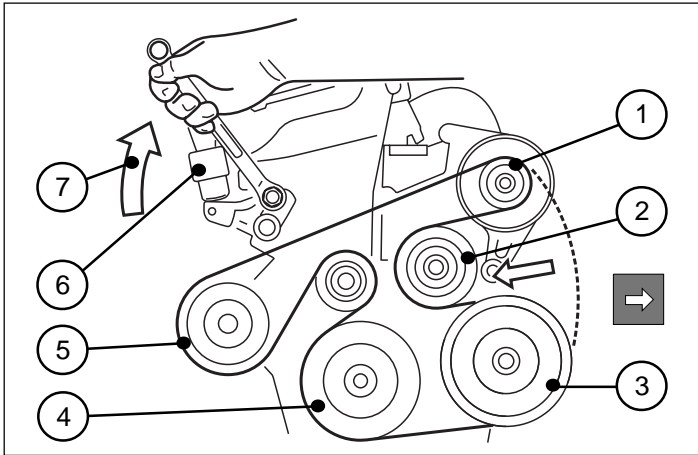


- (c) Install the compressor drive belt to each pulley.



NOTE

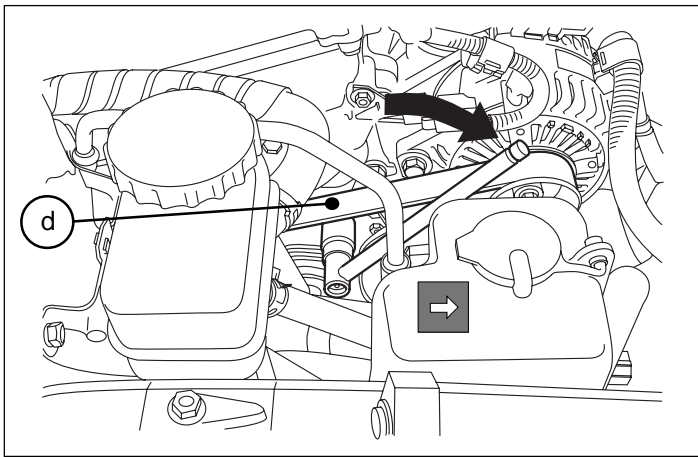
Set the wrench as shown in the left figure.



NOTE

Install the compressor drive belt to each pulley except the water pump pulley. Then pivot the belt auto tensioner toward the front (clockwise) of the vehicle and slide the compressor drive belt onto the water pump pulley, then carefully return the tensioner to its original position.

- (1) Alternator pulley
- (2) Water pump pulley
- (3) Compressor pulley
- (4) Crankshaft pulley
- (5) P/S pulley
- (6) Auto tensioner
- (7) Toward front

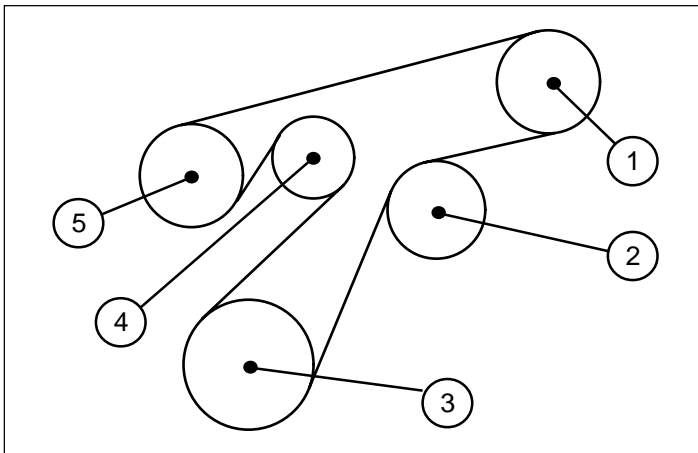


■ 1AZ-FE E/G MODEL ONLY [(d)-(f)]

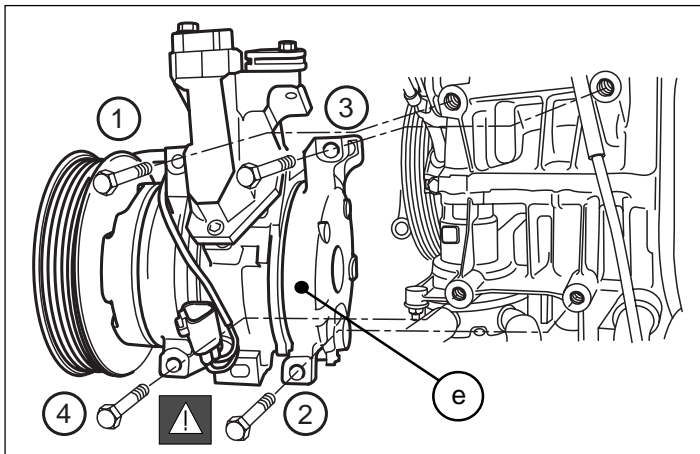
- (d) Remove and discard the alternator belt from each pulley.

NOTE

Set the wrench as shown in the left figure, and remove the alternator belt from the pulleys while pulling the wrench to the front of the vehicle.



- (1) Alternator pulley
- (2) Water pump pulley
- (3) Crankshaft pulley
- (4) Auto tensioner
- (5) P/S pump pulley



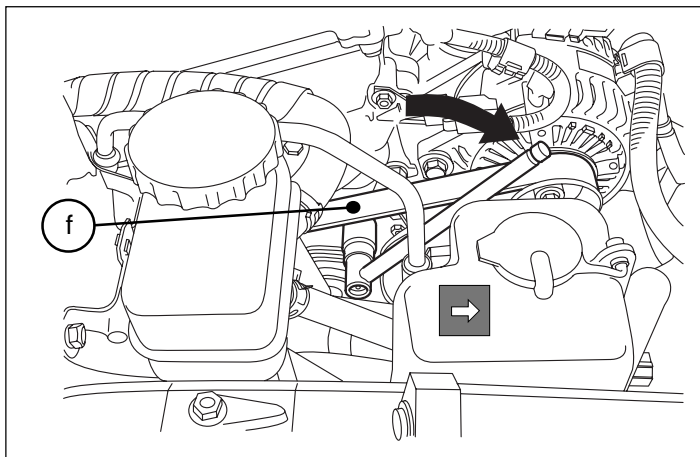
- (e) Install the compressor to the engine block using four bolts (M8 x 81).

Tightening torque:
24.5 Nm (250 kgf.cm, 18.1 ft.lbf).



CAUTION

Tightening order: 1 --> 2 --> 3 --> 4.

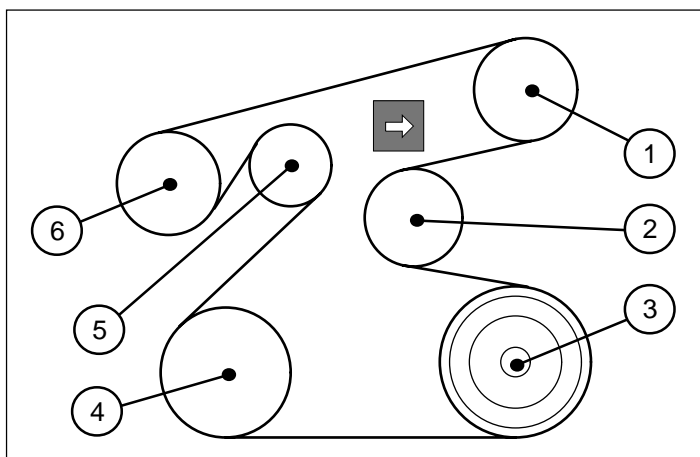


- (f) Install the compressor drive belt to each pulley.



NOTE

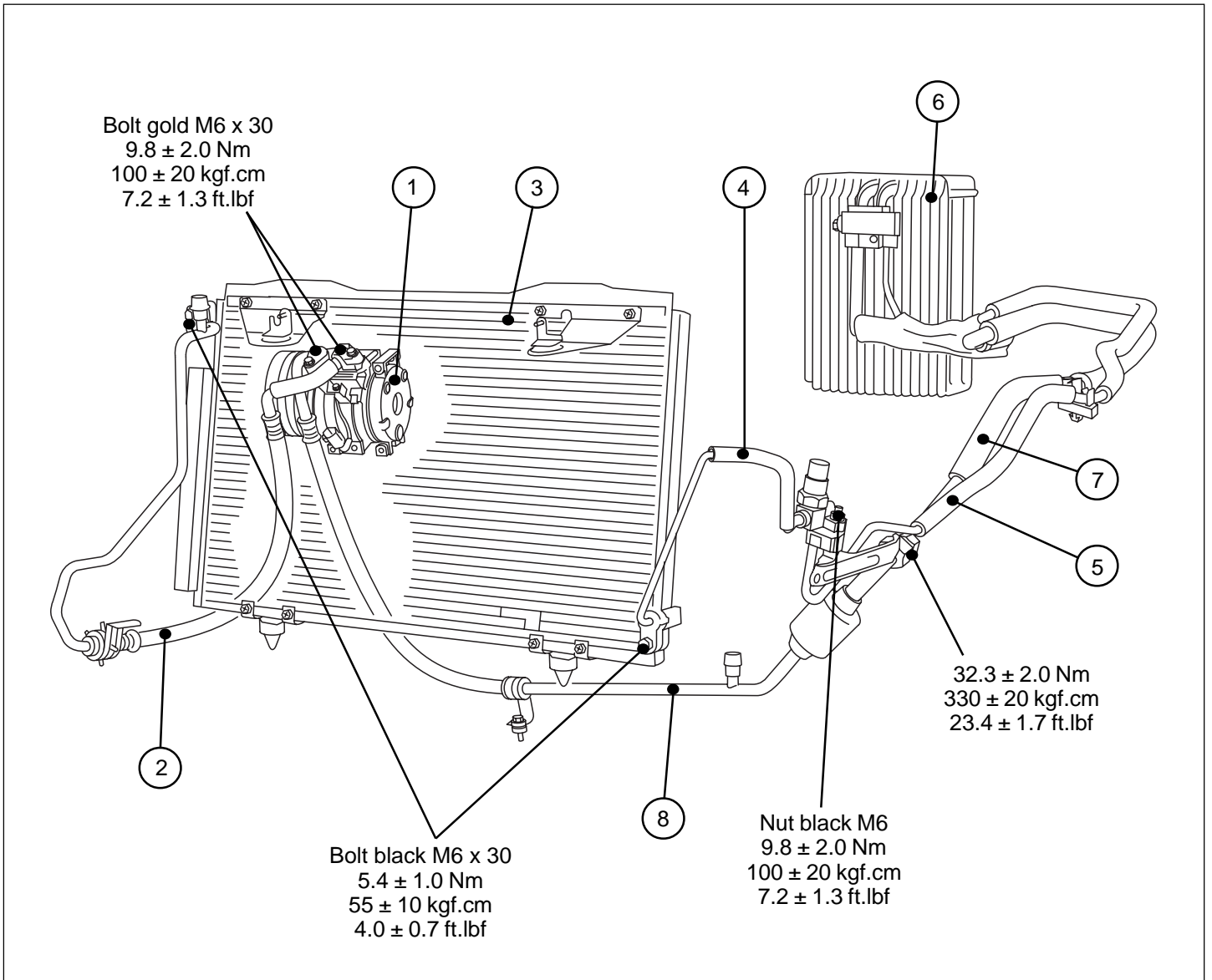
Set the wrench as shown in the left figure.



NOTE

Install the compressor drive belt to each pulley except the water pump pulley. Then pivot the belt auto tensioner toward the front (clockwise) of the vehicle and slide the compressor drive belt onto the water pump pulley, then carefully return the tensioner to its original position.

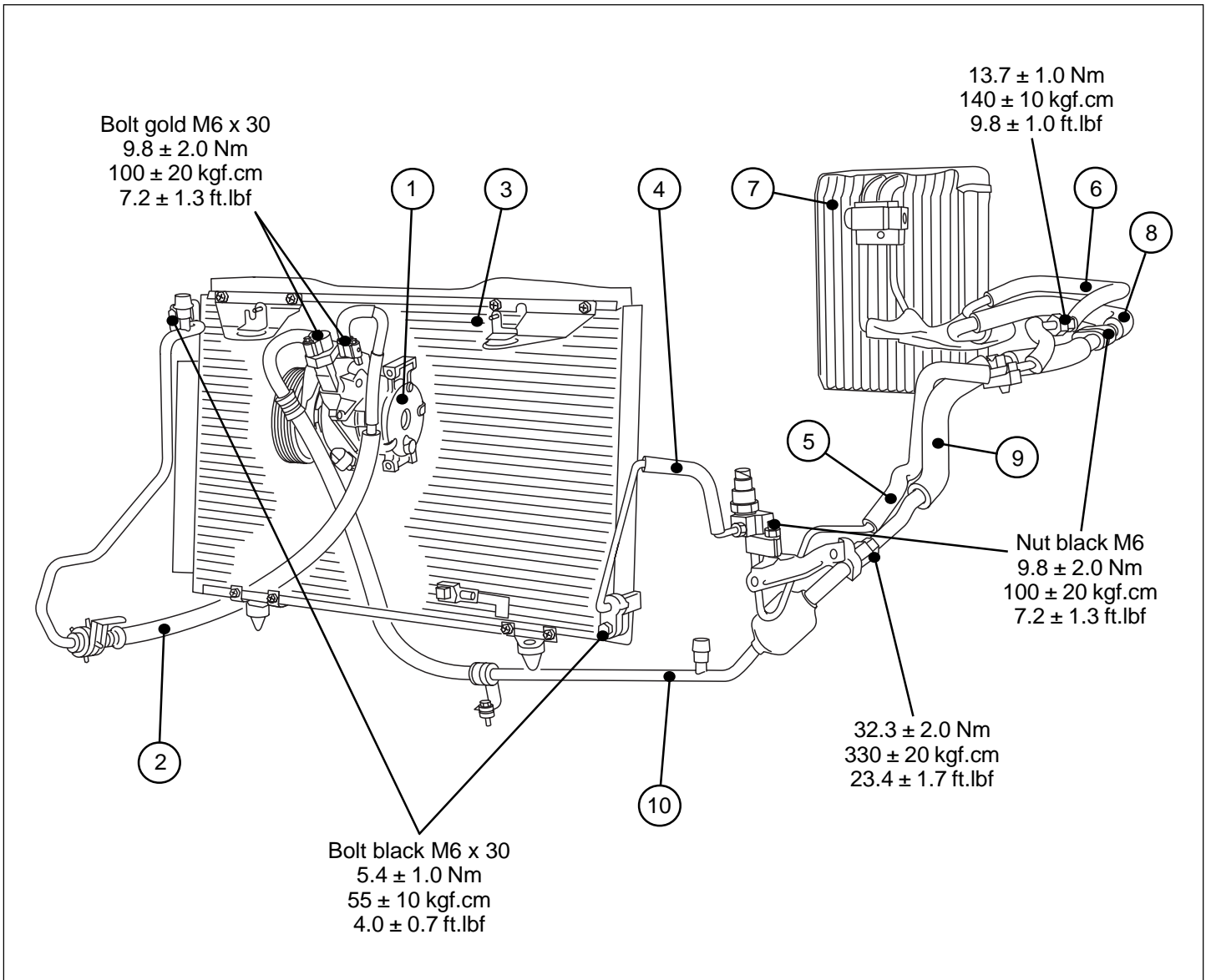
- (1) Alternator pulley
- (2) Water pump pulley
- (3) Compressor pulley
- (4) Crankshaft pulley
- (5) Auto tensioner
- (6) P/S pump pulley



(4) PIPING LAYOUT

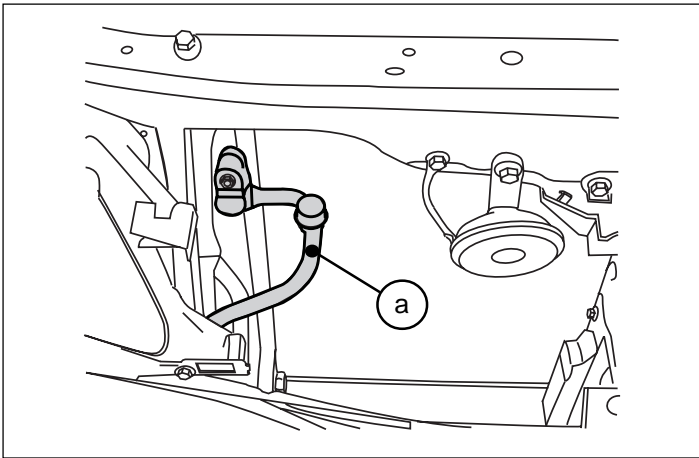
■ 1,3ZZ-FE E/G MODEL ONLY [(1)-(8)]

- (1) Compressor.
- (2) Discharge hose.
- (3) Condenser.
- (4) Liquid tube no.1.
- (5) Liquid tube no.2.
- (6) Evaporator.
- (7) Suction tube.
- (8) Suction hose.



■ 1AZ-FE E/G MODEL ONLY [(1)-(10)]

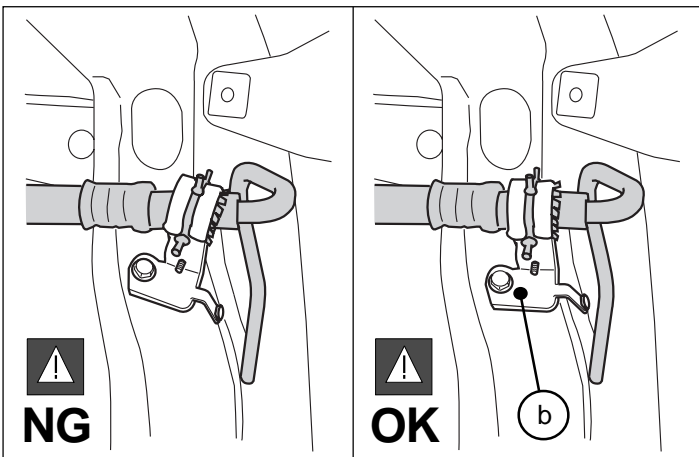
- (1) Compressor.
- (2) Discharge hose.
- (3) Condenser.
- (4) Liquid tube no.1.
- (5) Liquid tube no.2.
- (6) Liquid tube no.3.
- (7) Evaporator.
- (8) Suction tube no.1.
- (9) Suction tube no.2.
- (10) Suction hose.



- (a) Connect the discharge hose to the condenser using a bolt (black M6 x 30).

Tightening torque:

$5.4 \pm 1.0 \text{ Nm}$ ($55 \pm 10 \text{ kgf.cm}$ / $4.0 \pm 0.7 \text{ ft.lbf}$).

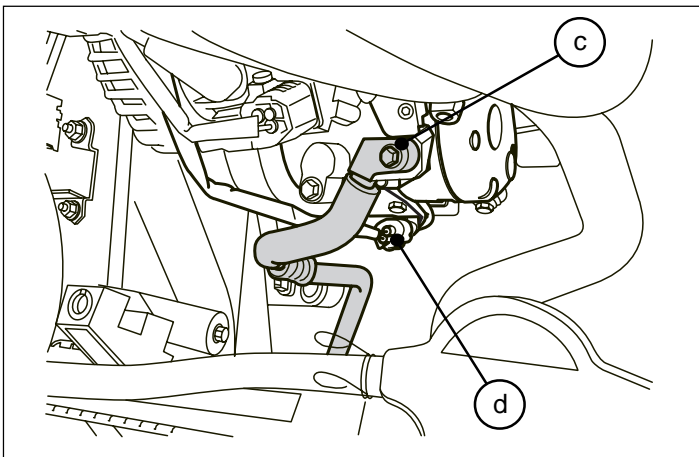


- (b) Install the bracket of the discharge hose to the body using a bolt (gold M6 x 14).



CAUTION

Make sure the bracket is in line with the discharge hose.



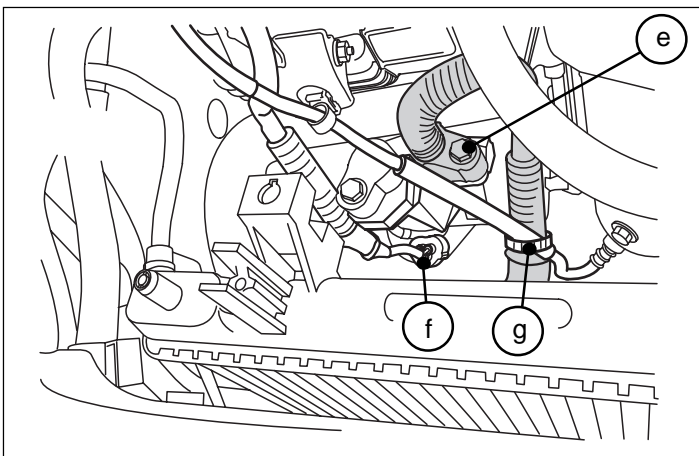
■ **1,3ZZ-FE E/G MODEL ONLY [(c)-(d)]**

- (c) Connect the discharge hose to the compressor using a bolt (gold M6 x 30).

Tightening torque:

$9.8 \pm 2.0 \text{ N}\cdot\text{m}$ ($100 \pm 20 \text{ kgf.cm}$ / $7.2 \pm 1.3 \text{ ft.lbf}$).

- (d) Connect the vehicle harness (3-P) to the compressor.



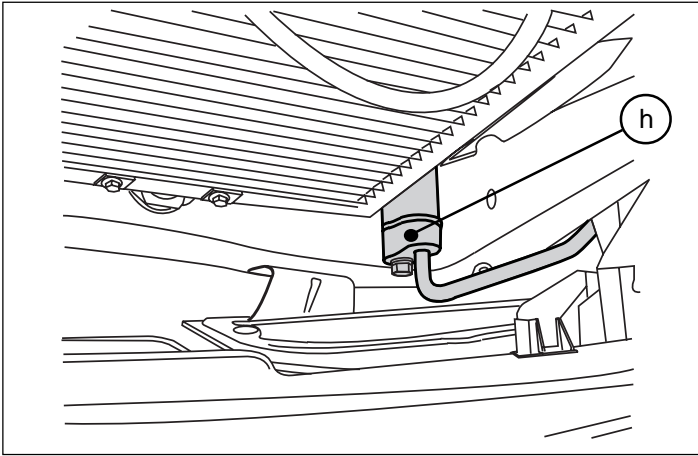
■ **1AZ-FE E/G MODEL ONLY [(e)-(g)]**

- (e) Connect the discharge hose to the compressor using a bolt (gold M6 x 30).

Tightening torque:

$9.8 \pm 2.0 \text{ N}\cdot\text{m}$ ($100 \pm 20 \text{ kgf.cm}$ / $7.2 \pm 1.3 \text{ ft.lbf}$).

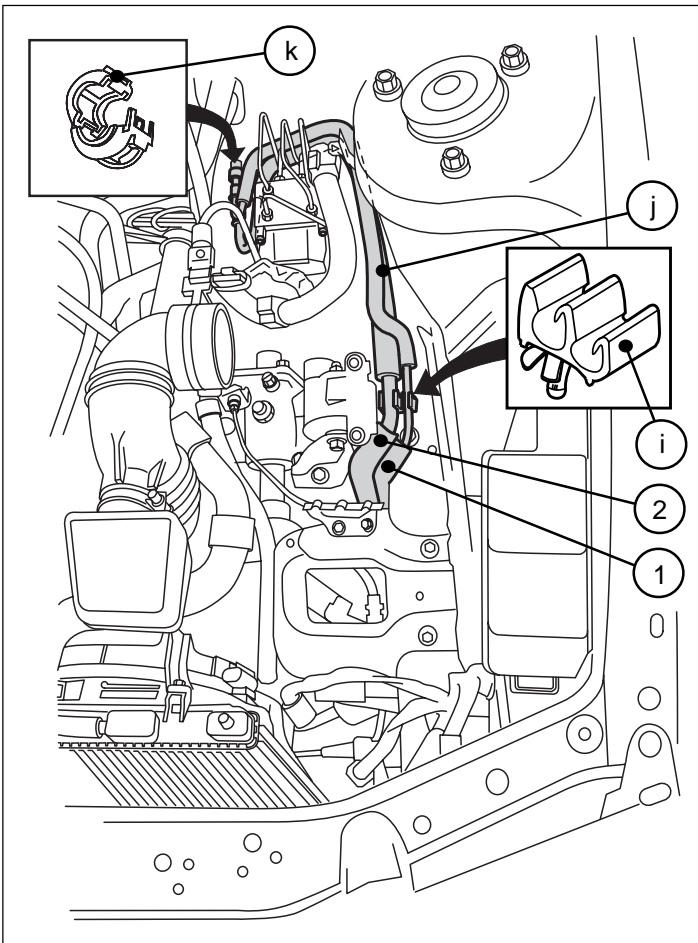
- (f) Connect the vehicle harness (3-P) to the compressor.
- (g) Fasten the O₂ sensor harness to the discharge hose using a clamp.



- (h) Connect the liquid tube no.1 to the condenser using a bolt (black M6 x 30).

Tightening torque:

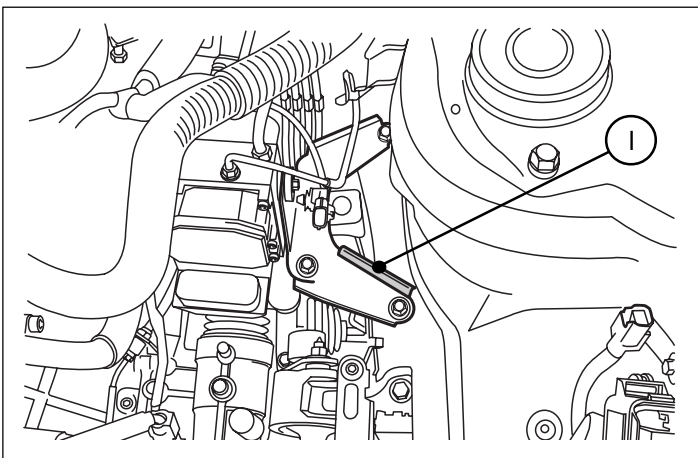
$5.4 \pm 1.0 \text{ Nm}$ ($55 \pm 10 \text{ kgf.cm}$ / $4.0 \pm 0.7 \text{ ft.lbf}$)



■ **1,3ZZ-FE E/G MODEL ONLY [(i)-(k)]**

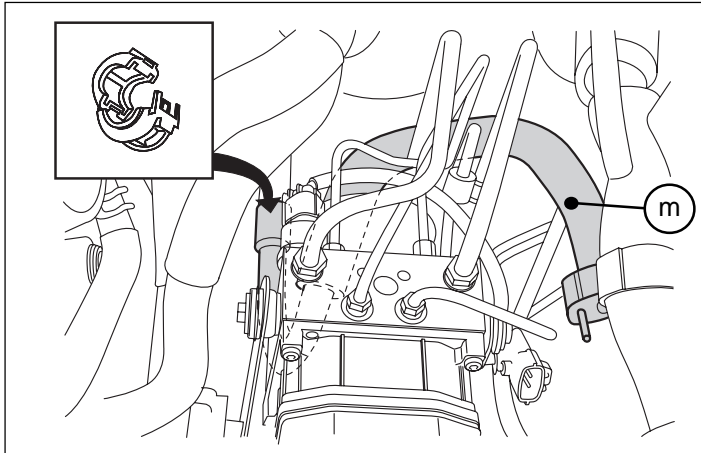
Install the tubes according following order:

- (i) Install the white clamp to the body.
- (j) First put in position the liquid tube no.2 (1), then put in position the suction tube (2).
- (k) First install the large quick joint clamp to the suction tube, then install the small quick joint clamp to the liquid tube no.2.

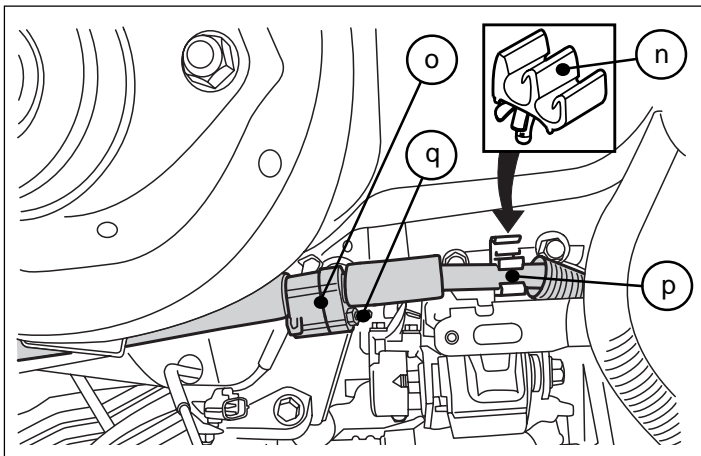


■ **1AZ-FE E/G MODEL ONLY [(l)-(q)]**

- (l) Put a piece of packing on the bracket of the ABS unit.

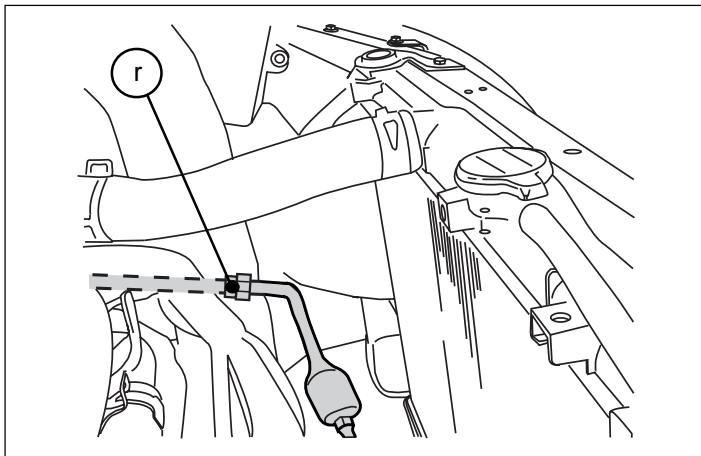


- (m) Insert the suction tube no.1 to the evaporator and install the quick joint clamp.



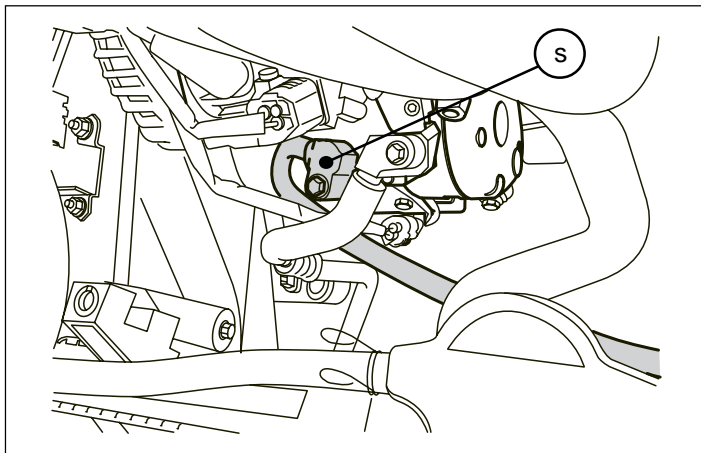
- (n) Install the white clamp to the body.
- (o) Connect suction tube no.2 to suction tube no.1.
- (p) Install the suction tube no.2 to the white clamp.
- (q) Tighten the block fitting of suction tube no.1 and suction tube no.2.

Tightening torque:
 $9.8 \pm 2.0 \text{ N}\cdot\text{m}$ ($100 \pm 20 \text{ kgf}\cdot\text{cm}$ / $7.2 \pm 1.3 \text{ ft}\cdot\text{lbf}$).



- (r) Connect the suction hose to the suction tube using the union type coupling.

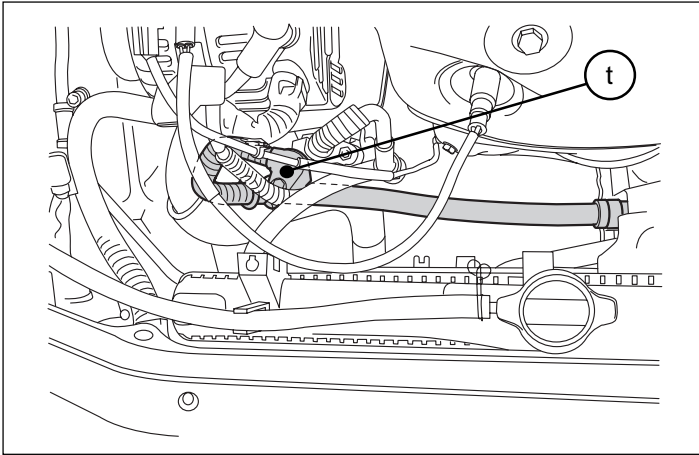
Tightening torque:
 $32.3 \pm 2.0 \text{ Nm}$ ($330 \pm 20 \text{ kgf}\cdot\text{cm}$, $23.4 \pm 1.7 \text{ ft}\cdot\text{lbf}$).



■ **1,3ZZ-FE E/G MODEL ONLY [(s)]**

- (s) Connect the suction hose to the compressor using a bolt (gold M6 x 30).

Tightening torque:
 $9.8 \pm 2.0 \text{ N}\cdot\text{m}$ ($100 \pm 20 \text{ kgf}\cdot\text{cm}$ / $7.2 \pm 1.3 \text{ ft}\cdot\text{lbf}$).

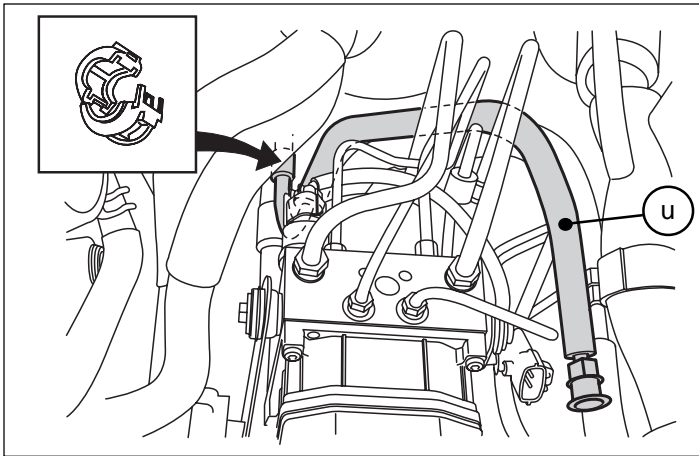


■ 1AZ-FE E/G MODEL ONLY [(t)-(v)]

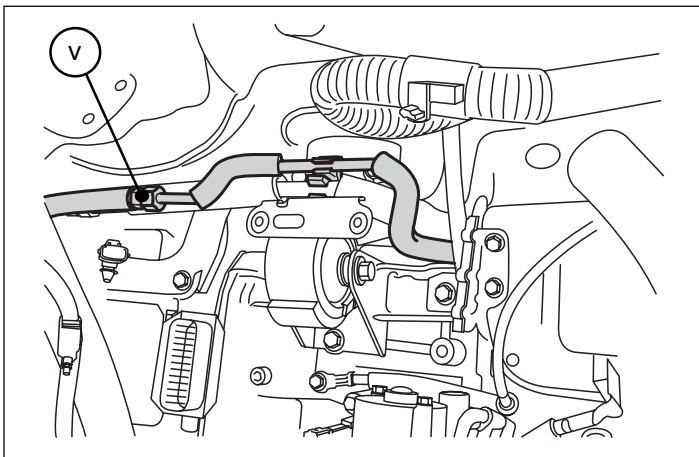
- (t) Connect the suction hose to the compressor using a bolt (gold M6 x 30).

Tightening torque:

9.8 ± 2.0 N·m (100 ± 20 kgf·cm / 7.2 ± 1.3 ft.lbf).



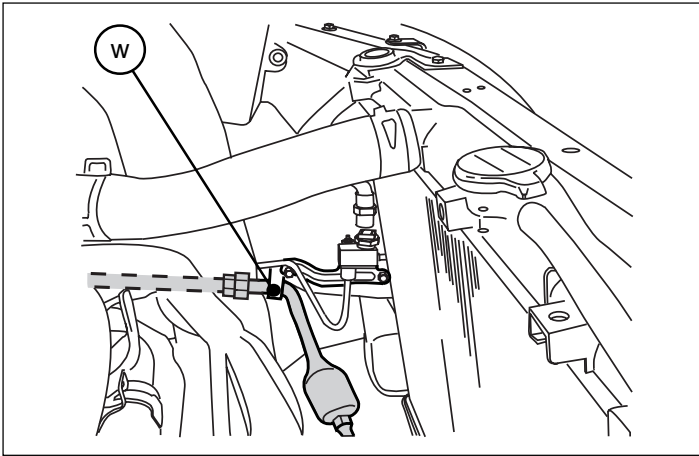
- (u) Connect liquid tube no. 3 to the evaporator and install the quick joint clamp.



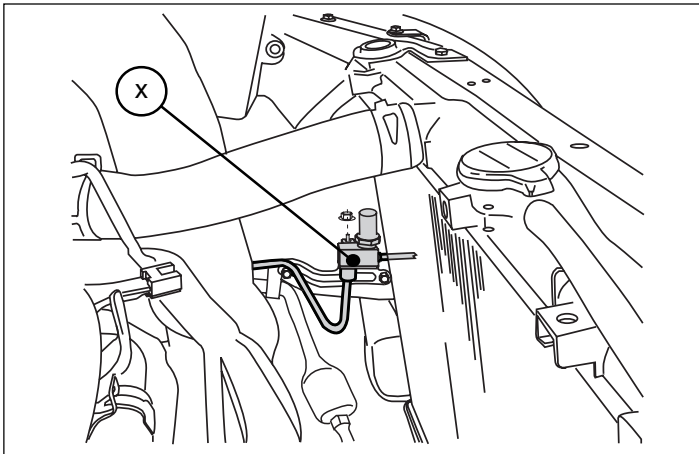
- (v) Connect liquid tube no. 2 to liquid tube no. 3.

Tightening torque:

13.7 ± 1.0 Nm (140 ± 10 kgf·cm / 9.8 ± 1.0 ft.lbf).



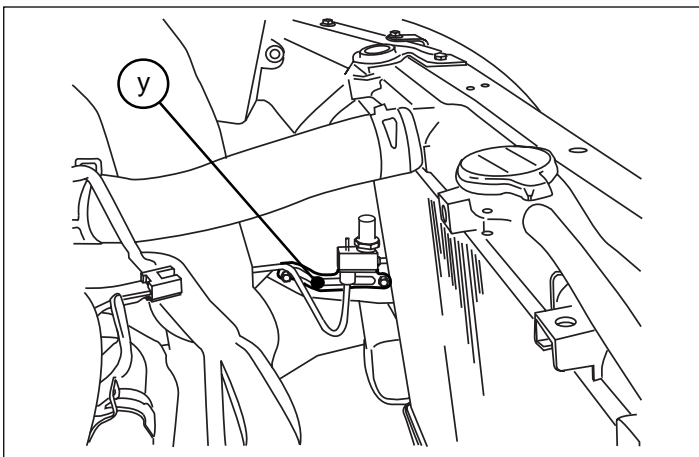
- (w) Install the suction hose to the bracket of liquid tube no.2.



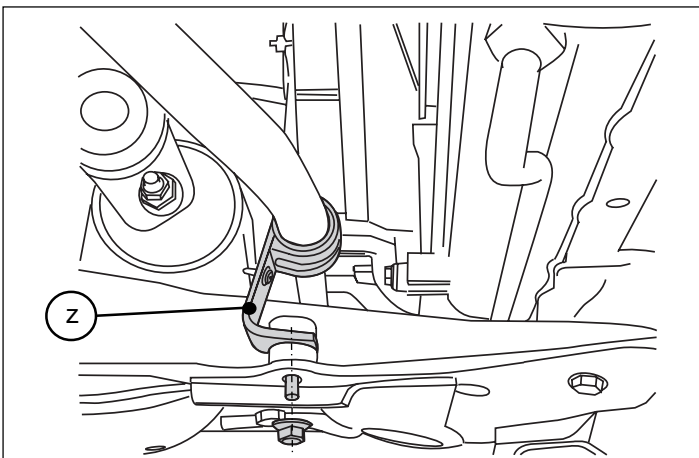
- (x) Connect the liquid tube no.1 to the liquid tube no.2 using a nut (black M6).

Tightening torque:

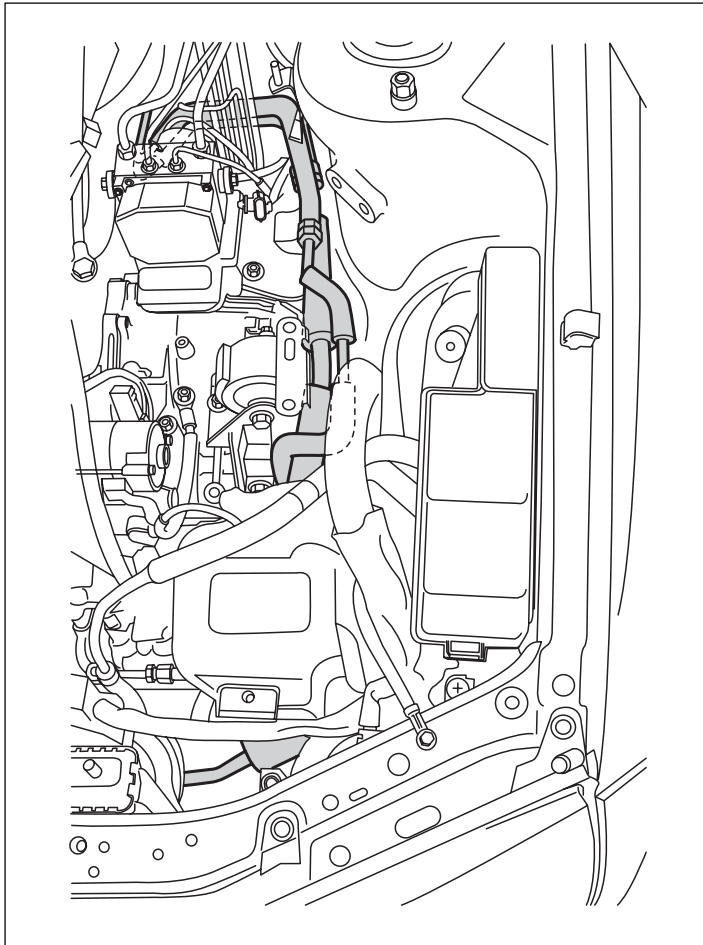
9.8 ± 2.0 N·m (100 ± 20 kgf·cm / 7.2 ± 1.3 ft.lbf).



- (y) Install the bracket of liquid tube no. 2 to the body using 2 bolts (gold M6 x 14).



- (z) Install the bracket of the suction hose to the crossmember using a nut (black M6).



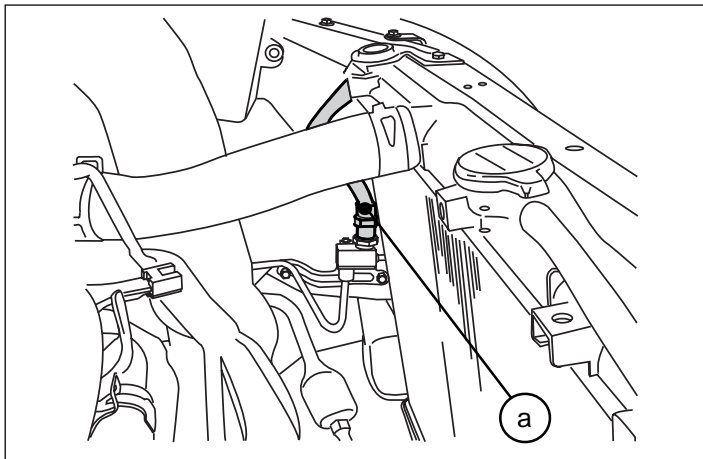
(5) SPECIFIED TIGHTENING TORQUES

Tighten union type coupling at the specified torque:
 Tube 5/8" : 32.3 ± 2.0 Nm (330 ± 20 kgf.cm / 23.4 ± 1.7 ft.lbf).

Tube 8 mm: 13.7 ± 1.0 Nm (140 ± 10 kgf.cm / 9.8 ± 1.0 ft.lbf).

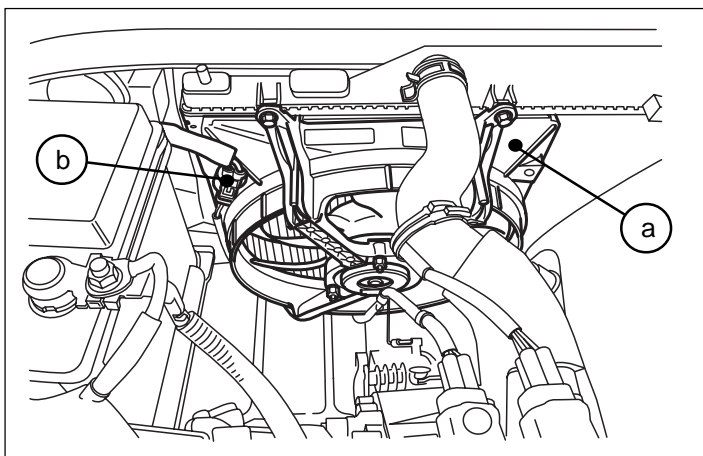
Tighten the bolts of the tubes and hoses to the:
 Compressor : 9.8 ± 2.0 N·m (100 ± 20 kgf.cm / 7.2 ± 1.3 ft.lbf).

Condenser : 5.4 ± 1.0 Nm (55 ± 10 kgf.cm / 4.0 ± 0.7 ft.lbf)



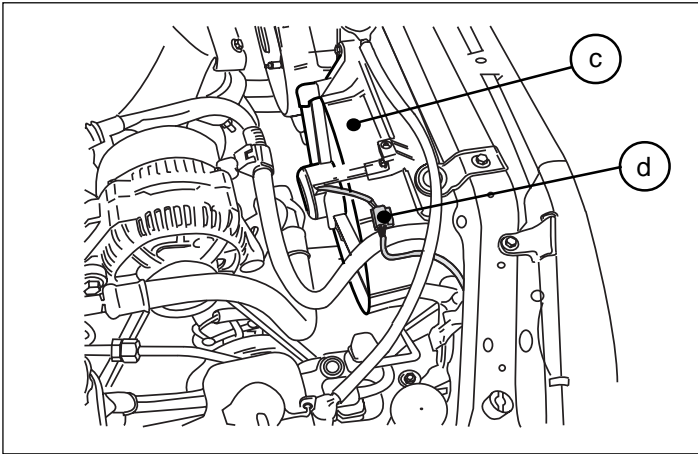
(6) PRESSURE SWITCH

- (a) Connect the vehicle harness (4-P) to the pressure switch.

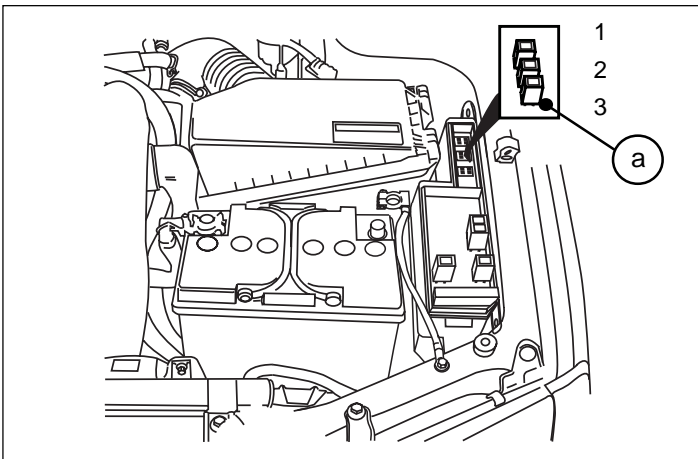


(7) CONDENSER FAN

- (a) Reinstall the radiator fan.
- (b) Reconnect radiator fan connector.

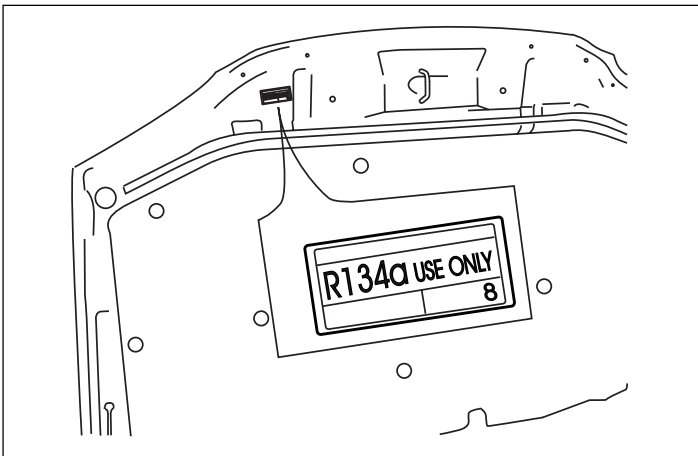


- (c) Install the condenser fan behind the radiator using three bolts (silver M6 x 16)
- (d) Connect the vehicle harness (2-P) to the condenser fan.



(8) JUNCTION BLOCK

- (a) Install three relays:
 - (1) Black relay
 - (2) Black relay
 - (3) Orange relay



(9) CAUTION LABEL

- (a) Attach the caution label to the engine hood.

(10) REINSTALLATION

- (a) Reinstall all temporarily removed parts.

2. AFTER INSTALLATION



CAUTION

Refer to the separate manual "**GENERAL INFORMATION / AFTER INSTALLATION**" for details on what to do after installation. (Document code: AOAMU-02A / Document part number: 988963-3480)

2-1 CHARGING REFRIGERANT (HFC-134a)

For additional information on charging refrigerant using the charging cylinder, refer to "**GENERAL INFORMATION / AFTER INSTALLATION**" (pages 12-14, 20).

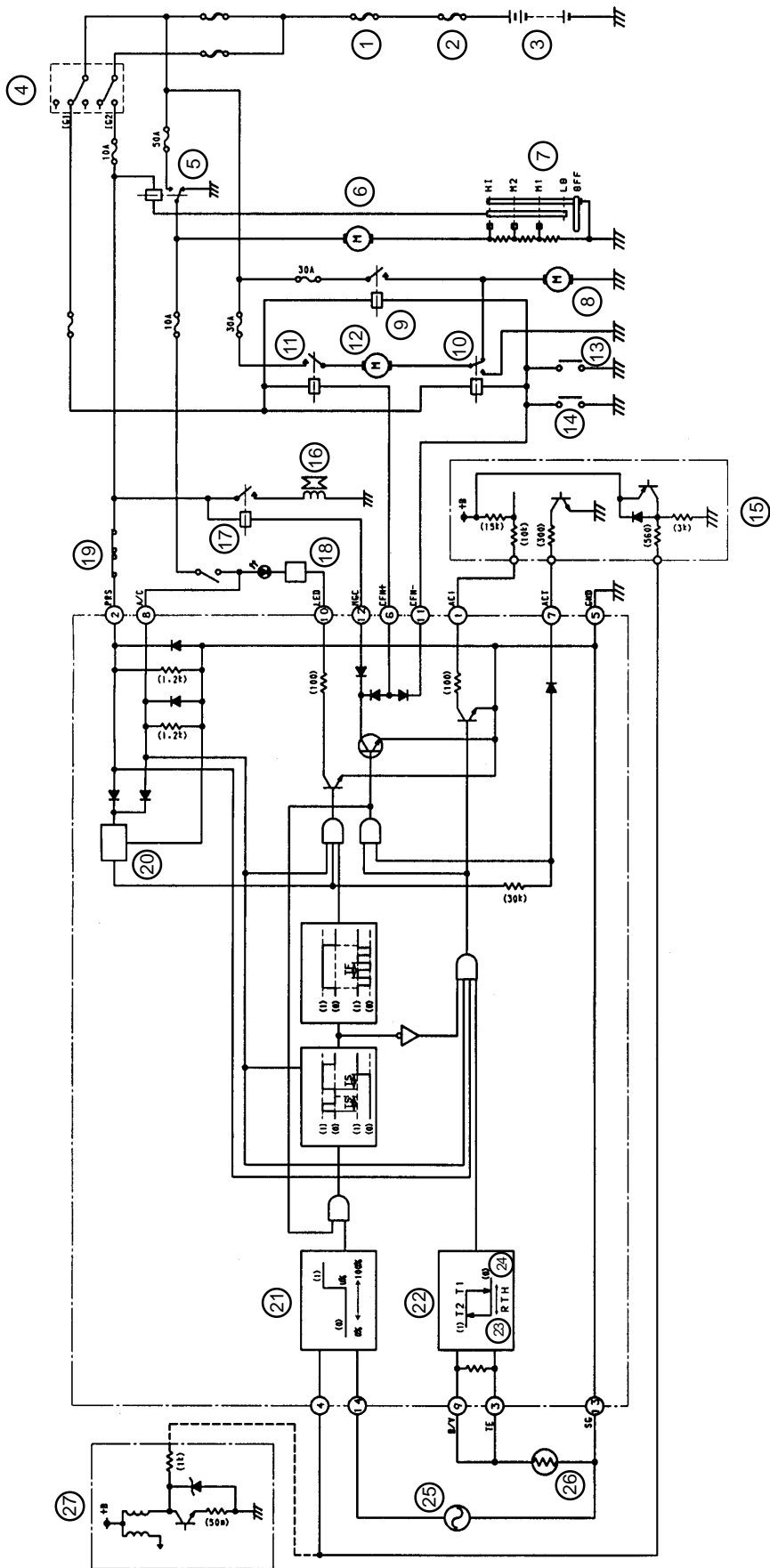
STANDARD AMOUNT OF REFRIGERANT

450^{+50}_{-0} grams



CAUTION

Ensure to fill the refrigerant to the specified amount.

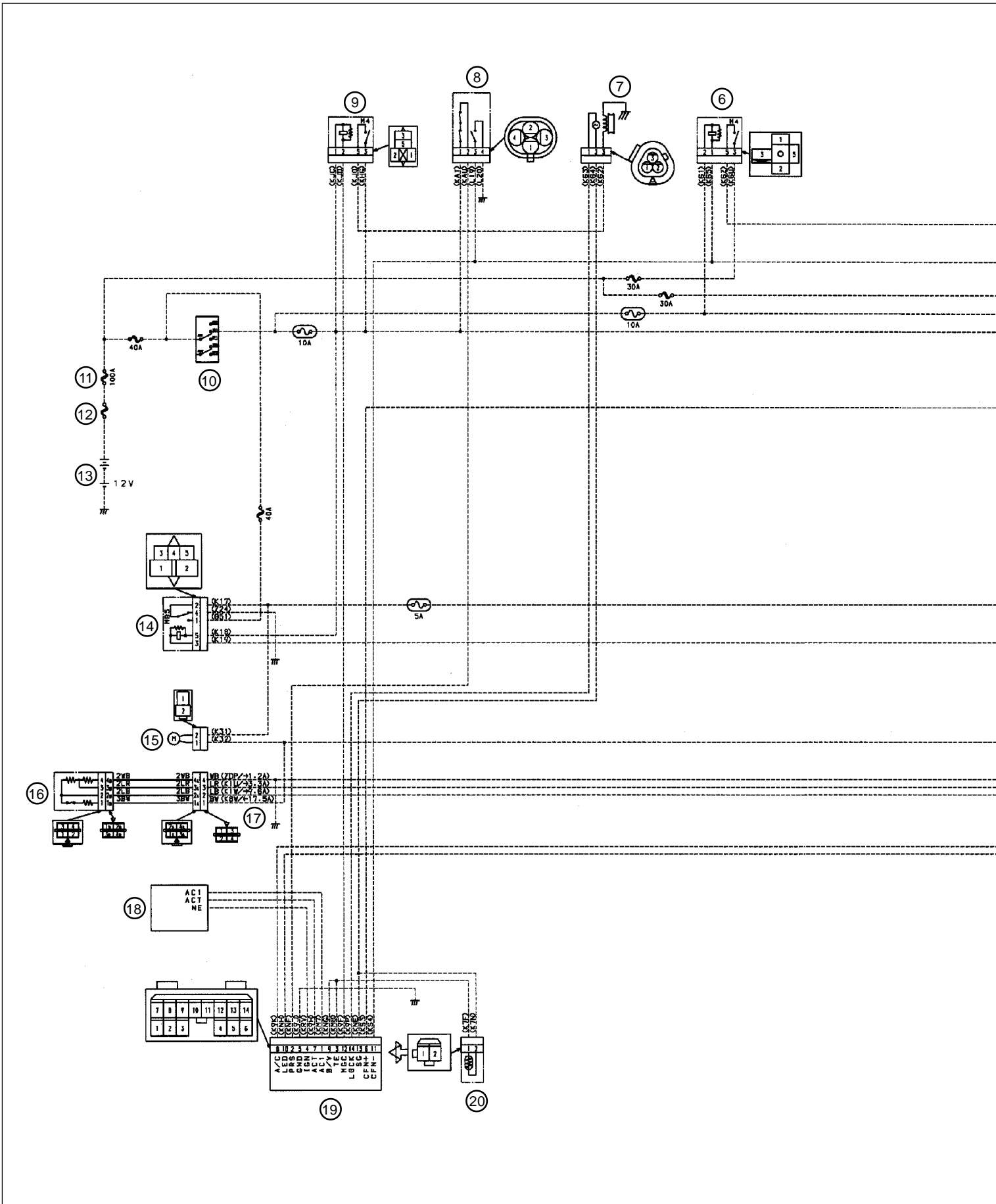


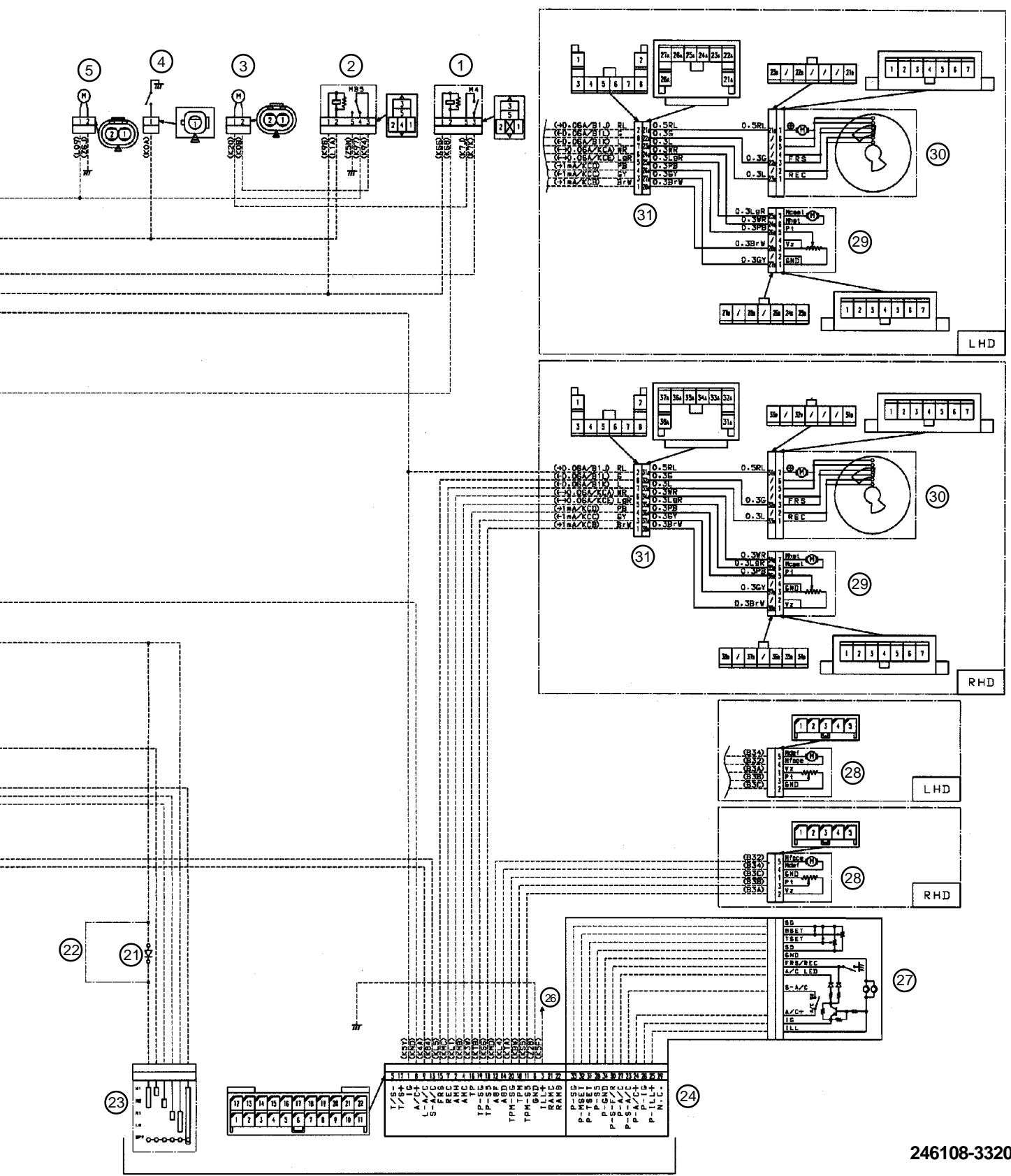
277100-1400

3. A/C AMPLIFIER

- 1 F/L Alternator
- 2 F/L main
- 3 Battery 12V
- 4 Ignition S/W
- 5 Heater main relay
- 6 Blower motor
- 7 Blower S/W
- 8 Radiator fan motor
- 9 Fan relay No. 1
- 10 Fan relay No. 2
- 11 Fan relay No. 3
- 12 A/C sub motor
- 13 Medium pressure S/W
- 14 Water temperature S/W
- 15 E/G ECU
- 16 Mg/C
- 17 Mg/C relay
- 18 Dimmer circuit
- 19 Pressure S/W
- 20 Voltage regulator
- 21 Slip rate
- 22 Temperature
- 23 Low
- 24 High
- 25 Compressor rev. sensor
- 26 Thermistor RTH
- 27 Igniter

4. WIRING DIAGRAM





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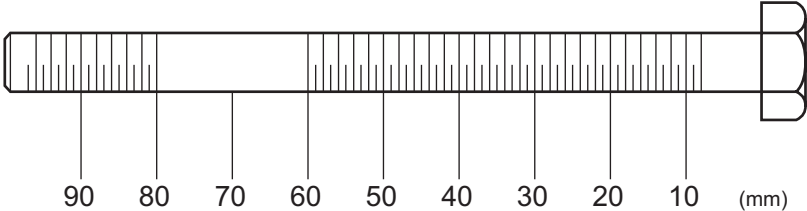
4. WIRING DIAGRAM

- 1 Fan relay No. 3
- 2 Fan relay No. 2
- 3 Condenser fan motor
- 4 Water temperature SW
- 5 Radiator fan motor
- 6 Fan relay No. 1
- 7 Compressor
- 8 Pressure SW
- 9 Mg/C relay
- 10 Ignition SW
- 11 F/L Alternator
- 12 F/L Main
- 13 Battery
- 14 Heater main relay
- 15 Blower motor
- 16 Blower resistor
- 17 Vehicle harness
- 18 EGR ECU
- 19 A/C AMP
- 20 Evaporator thermistor
- 21 236F E/G only
- 22 236F E/G except
- 23 Blower SW
- 24 Heater control AMP
- 25 Heater control
- 26 Tail relay
- 27 Panel
- 28 Mode servo motor
- 29 A/M servo motor
- 30 R/F servo motor
- 31 Vehicle harness

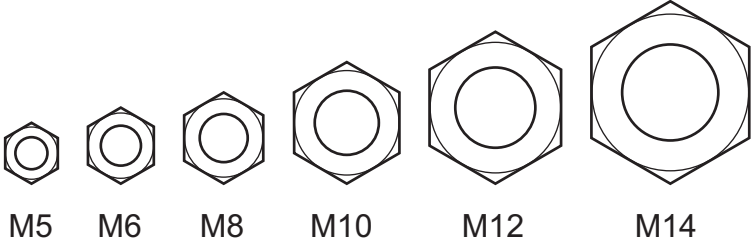
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BOLT LENGTH RULER (mm)



BOLT DIAM. & HEX. HEAD (mm)



AAAMU-63
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