

STARTING SYSTEM

1462-01

INDEX

STARTING SYSTEM

GENERAL INFORMATION

| | |
|------------------------|---|
| 1. SPECIFICATIONS..... | 3 |
|------------------------|---|

OVERVIEW AND OPERATING PROCESS

| | |
|---------------------------|---|
| 1. OVERVIEW..... | 4 |
| 2. COMPONENTS..... | 4 |
| 3. OPERATING PROCESS..... | 5 |
| 4. CIRCUIT DIAGRAM..... | 7 |

CONFIGURATION AND FUNCTIONS

| | |
|----------------------------|---|
| 1462-01 STARTER MOTOR..... | 8 |
|----------------------------|---|

REMOVAL AND INSTALLATION

| | |
|-----------------------------------|----|
| 0000-00 CHECK AND INSPECTION..... | 9 |
| 1462-01 STARTER MOTOR..... | 10 |



دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



STARTING SYSTEM**1462-01****GENERAL INFORMATION****1. SPECIFICATIONS**

| Item | Category | Specifications |
|---------------|--------------------|--------------------------|
| Starter motor | Rated voltage(ISG) | 12 V 0.9 kw(12 V 1.4 kw) |

دیجیتال خودرو

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اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

ENGINE
GENERALENGINE
ASSEMBLFUEL
SYSTEMIGNITION
SYSTEMINTAKE
SYSTEMEXHAUST
SYSTEMLUBRICA
TIONCOOLING
SYSTEMCHARGE
GSTARTIN
GCRUISE
CONTROENGINE
CONTRO

E E M

| | |
|--------------------|--|
| Modification basis | |
| Application basis | |
| Allocated VIN | |

STARTING SYSTEM

TIVOLI 2015.03

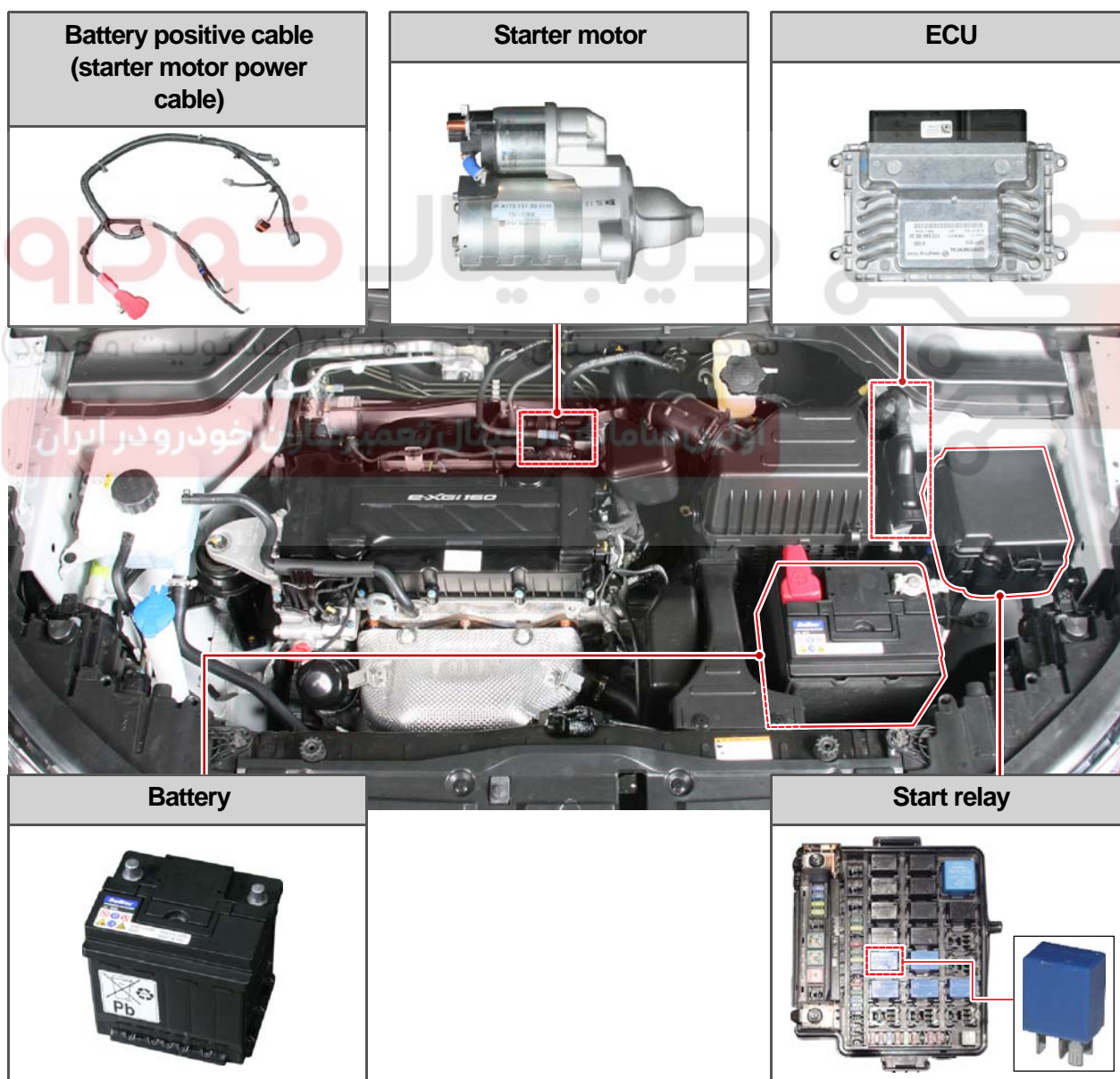
OVERVIEW AND OPERATING PROCESS

1. OVERVIEW

The engine cannot start by itself. It needs starter motor which operates the crankshaft using external force. The starter (starter motor) starts the engine with rotational power by converting the electric energy to the mechanical energy.

When the engine is cranking, the pinion gear meshes with the ring gear. If the ring gear overruns, the pinion gear clutch overruns to protect the pinion gear.

2. COMPONENTS

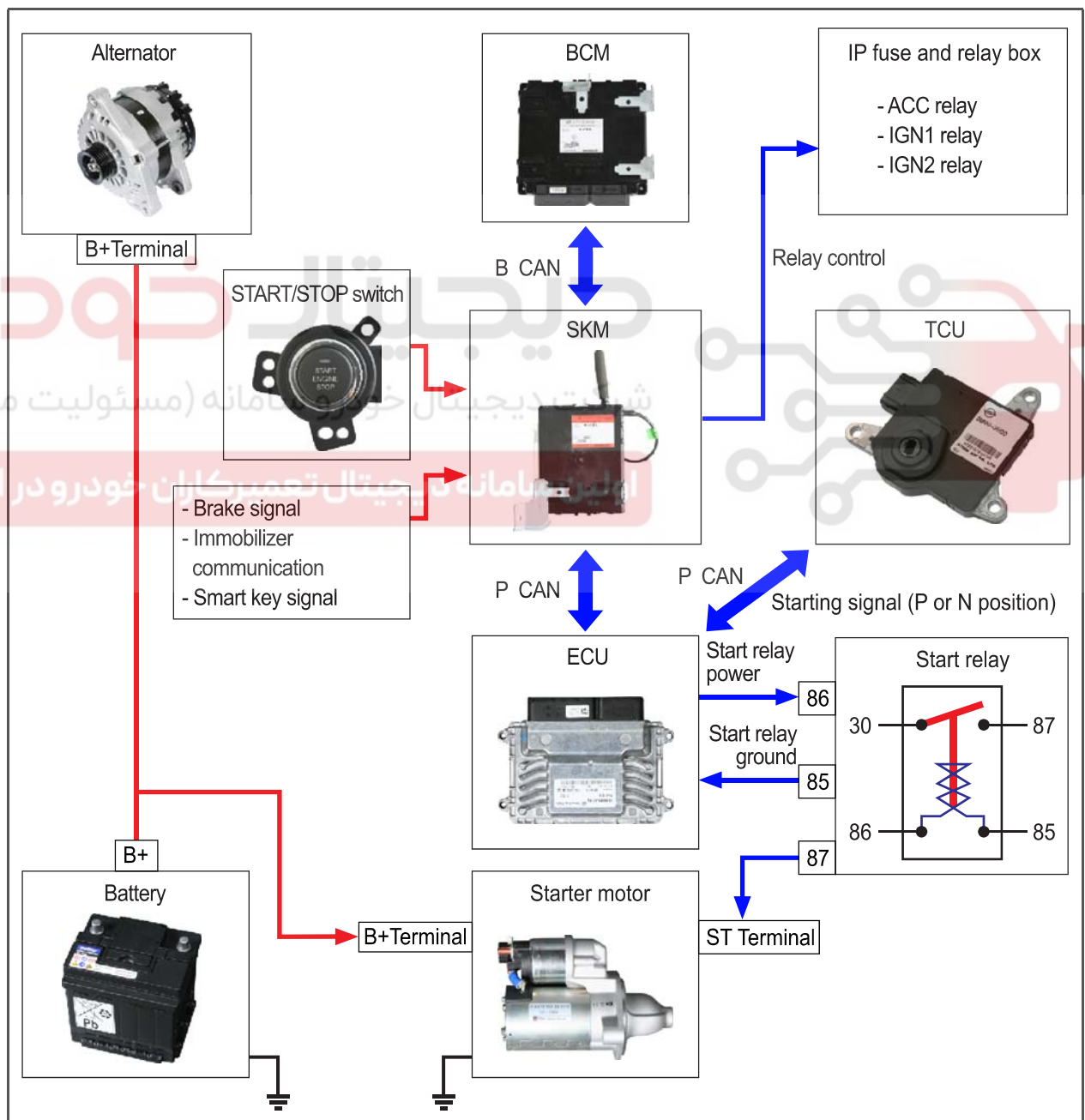


3. OPERATING PROCESS

1) For a Vehicle with Smart Key

When the START/STOP button is pressed with the brake pedal applied and gear selector lever in P or N position, the SKM performs the immobilizer verification. If it is valid, SKM sends the engine START request signal to the ECU through the P-CAN and vehicle power status signal to the BCM through the B-CAN. After the START signal from the SKM has been received, the ECU controls the start relay to drive the starter motor.

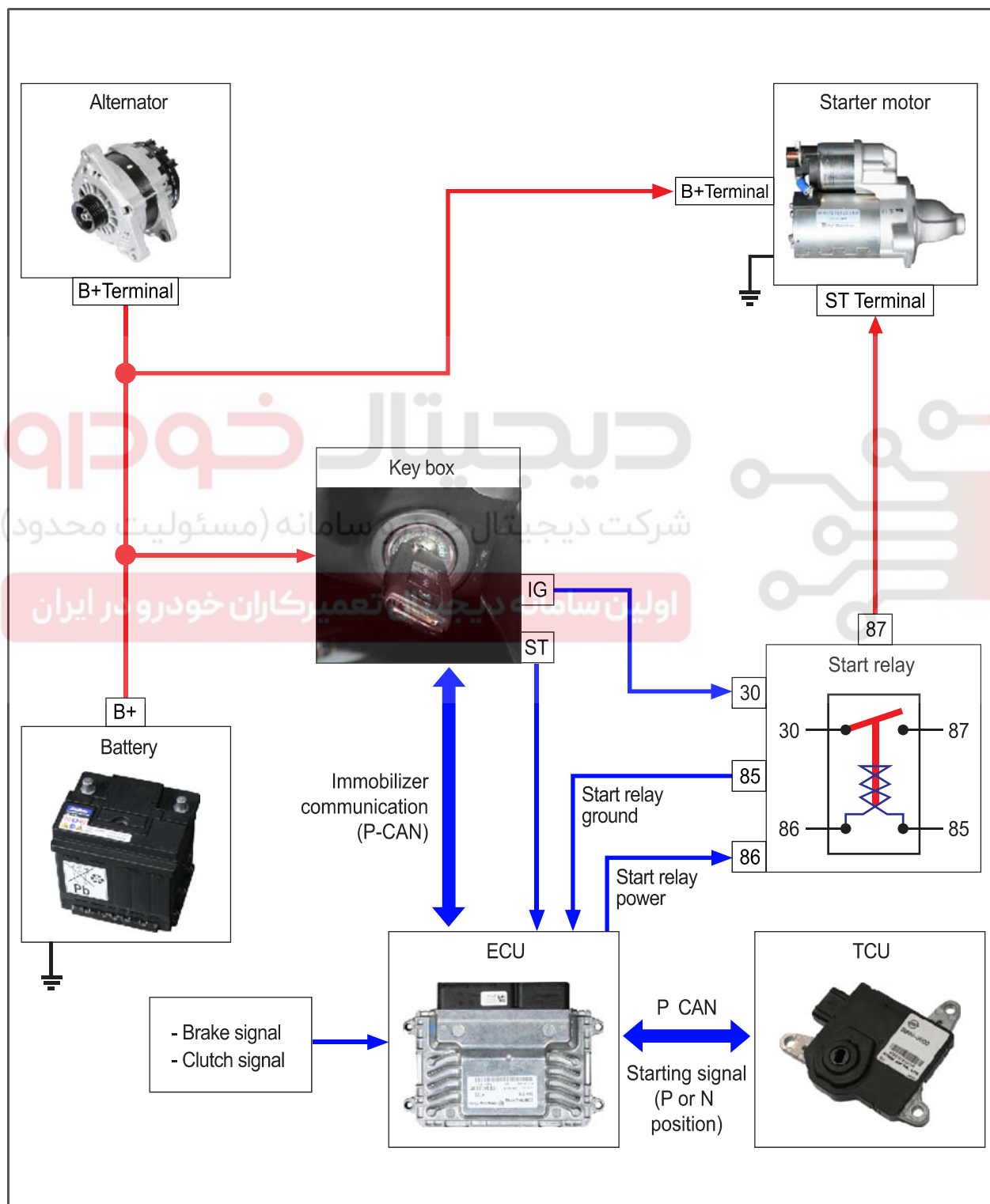
The SKM cuts the power for IGN2 and ACC relays while the engine is cranking because cutting the unnecessary electric load is required.



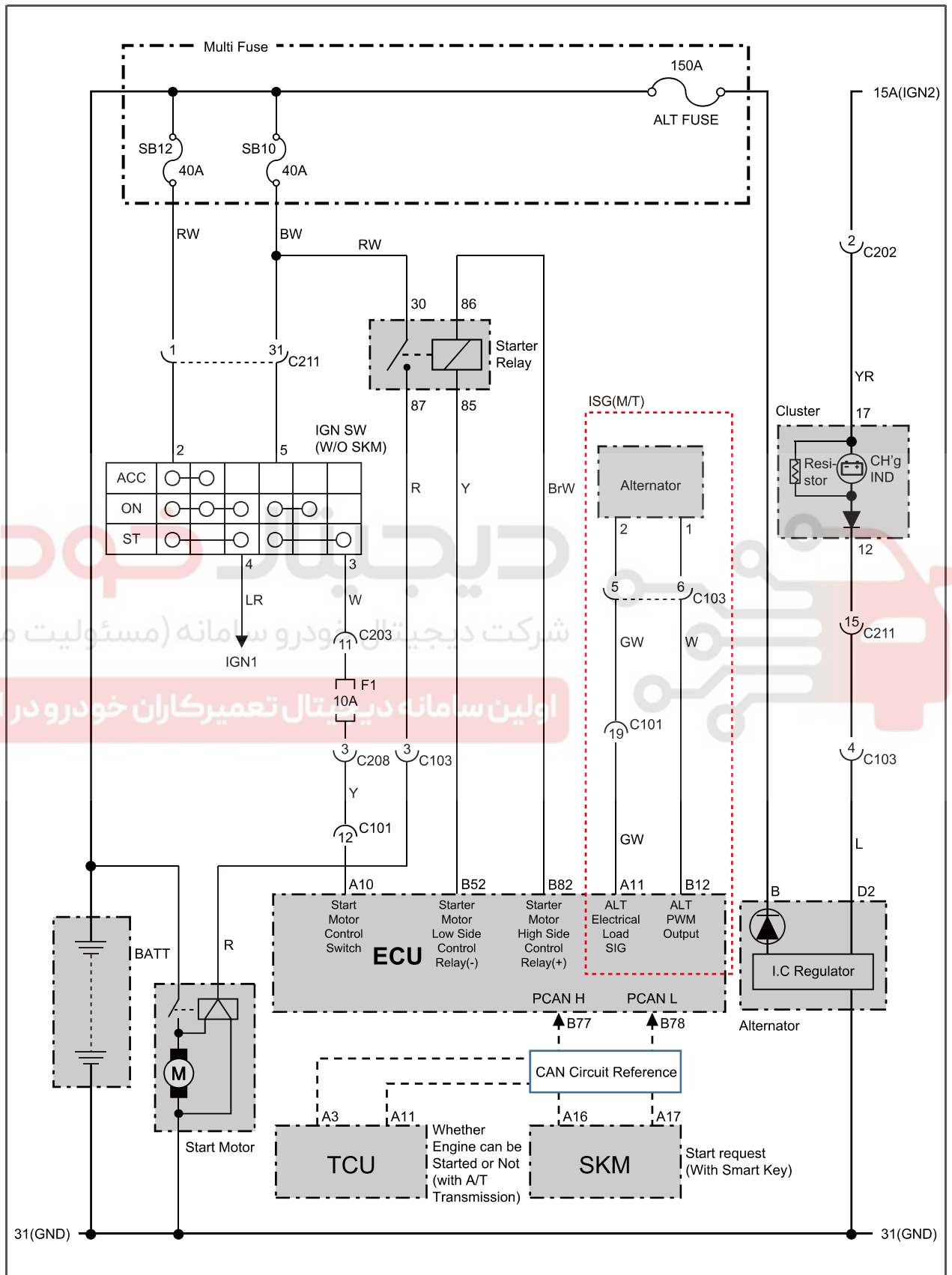
| | |
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| Modification basis | |
| Application basis | |
| Allocated VIN | |

2) For a Vehicle with Ignition Key

When the ignition key is turned to ST position with the brake pedal (for a vehicle A/T) or clutch pedal (for a vehicle M/T) applied and gear selector lever in P or N position, the TCU sends the engine START signal to the ECU through the hard wire. The ECU controls the start relay to drive the starter motor.



4. CIRCUIT DIAGRAM



| | |
|--------------------|--|
| Modification basis | |
| Application basis | |
| Allocated VIN | |

STARTING SYSTEM

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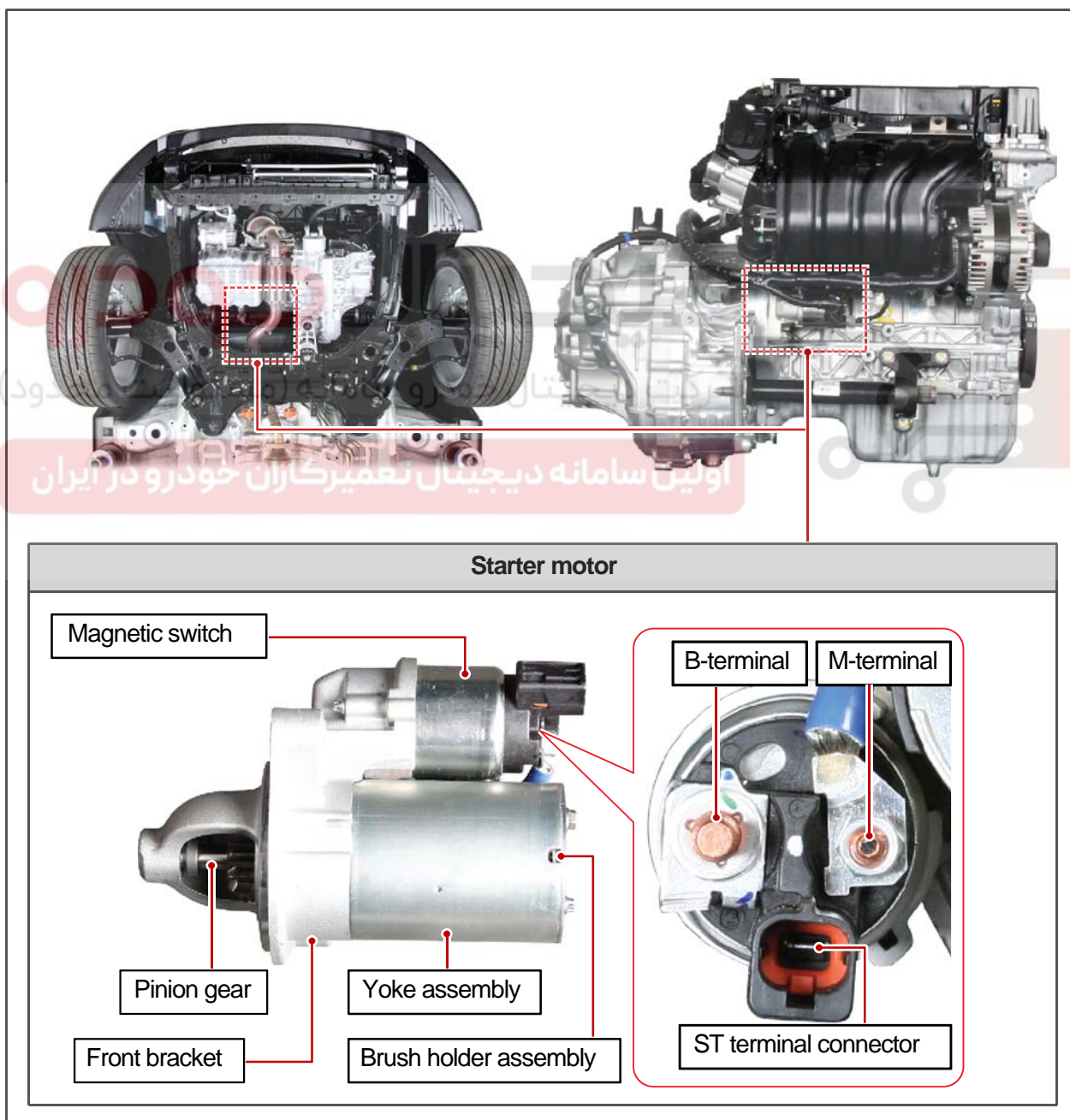
CONFIGURATION AND FUNCTIONS

1462-01 STARTER MOTOR

1) Overview

The starter (starter motor) located at the bottom of the intake manifold starts the engine with rotational power by converting the electric energy to the mechanical energy from the meshed gears (pinion gear and flywheel ring gear).

2) Mounting Location and Components



REMOVAL AND INSTALLATION

S.G.N.

0000-00

CHECK AND INSPECTION

| Item | Cause | Action |
|---|---|----------------------------------|
| Not cranking | Low battery voltage | Charge or replace |
| | Loose, corroded or worn battery cable | Repair or replace |
| | Faulty starter motor or open circuit | |
| | Faulty start switch or open circuit to power fuse | Replace the start switch or fuse |
| | Defective engine grounding | Repair |
| Slow cranking | Low battery voltage | Charge or replace |
| | Loose, corroded or worn battery cable | Repair or replace |
| | Faulty starter motor | |
| Continuous rotating starter motor | Faulty starter motor | Replace |
| | Faulty start switch | |
| starter motor rotates but engine not cranking | Damaged clutch pinion gear or faulty start motor | Replace the starter motor |
| | Damaged flywheel ring gear | Replace the flywheel |
| | Open circuit in the related circuit | Repair |

| | |
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| Modification basis | |
| Application basis | |
| Allocated VIN | |

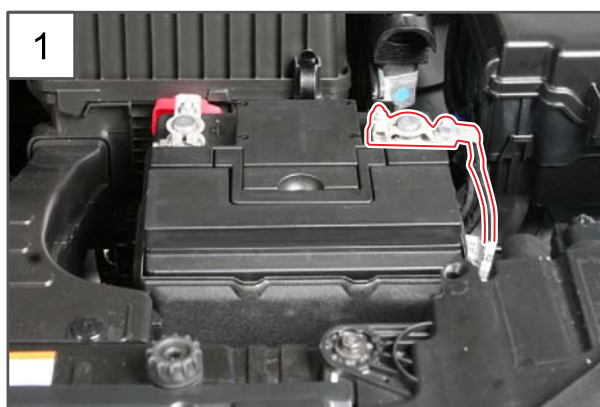
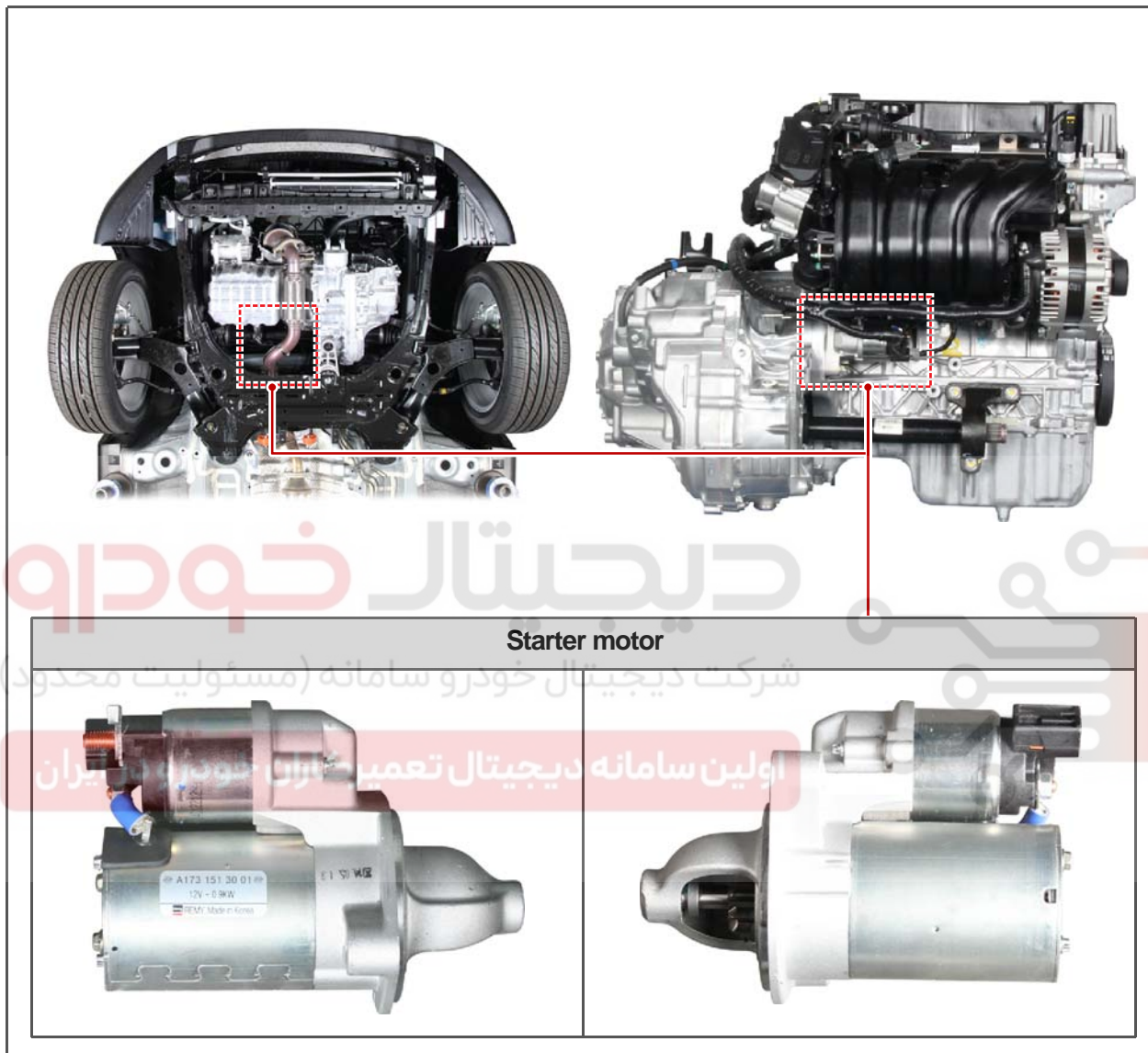
STARTING SYSTEM

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1462-01 STARTER MOTOR**Preceding work**

- Remove the rear undercover.
(Tightening torque when installing: 13.8 to 17.6 Nm)



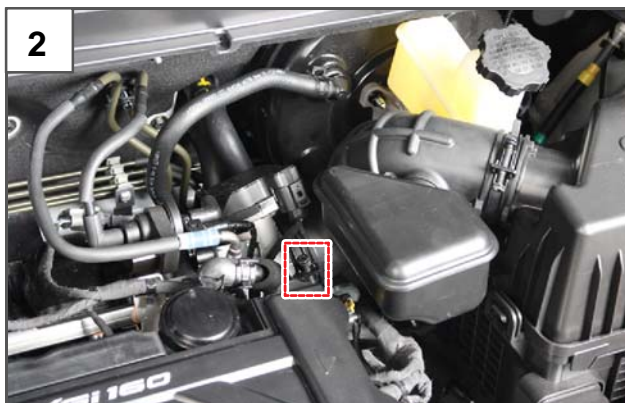
1. Disconnect the negative battery cable.

STARTING SYSTEM

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| Modification basis | |
| Application basis | |
| Affected VIN | 021 62 99 92 92 |

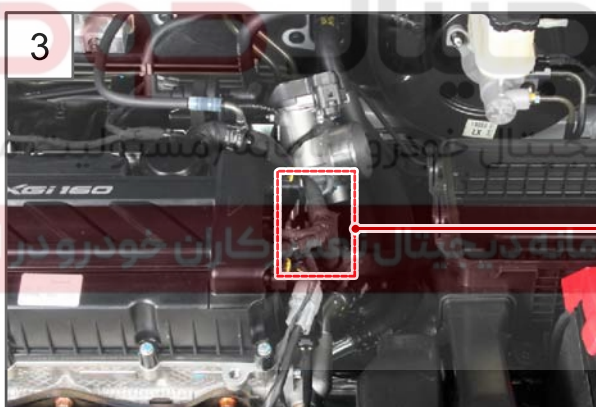
2. Remove the air duct and air cleaner upper cover to make a room for removal of the starter motor upper mounting bolt.



Disengage the duct hose spring clamp (10 mm).

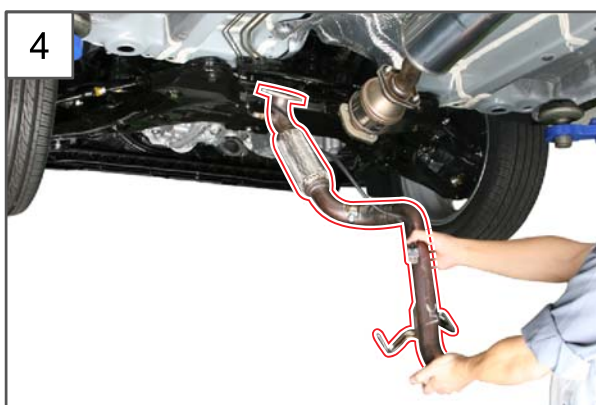


Remove the air cleaner upper cover mountings to remove the air duct hose with the air cleaner upper cover.



3. Unscrew the starter motor upper mounting bolt (14 mm).

Tightening torque $45 \pm 5.0 \text{ Nm}$



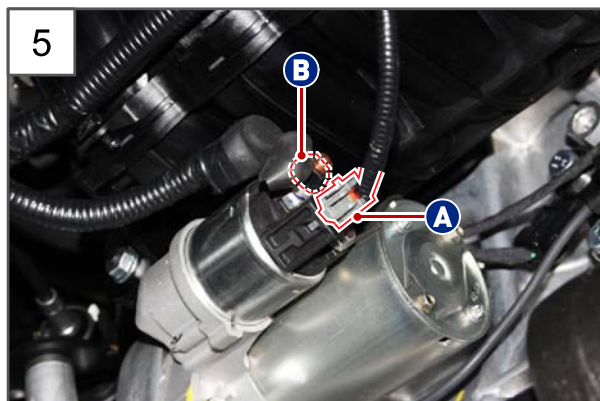
4. Remove the front exhaust pipe to make room for removal of the starter motor.



NOTE

Refer to "FRONT EXHAUST PIPE" under "REMOVAL AND INSTALLATION" subsection of "EXHAUST SYSTEM" section in "G16DF ENGINE" chapter.

| | |
|--------------------|--|
| Modification basis | |
| Application basis | |
| Allocated VIN | |



5. Remove the ST terminal connector (A) from the starter motor and unscrew the B+ terminal mounting nut (12 mm).

Tightening torque $15 \pm 1.5 \text{ Nm}$



6. Unscrew the starter motor lower mounting bolt (14 mm).

Tightening torque $45 \pm 5.0 \text{ Nm}$



7. Remove the starter motor.



8. Install in the reverse order of removal.