SECTION STR
STARTING SYSTEM

CONTENTS

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow (With GR8-1200 NI)

INFOID:0000000008693425

STARTING SYSTEM DIAGNOSIS WITH GR8-1200 NI

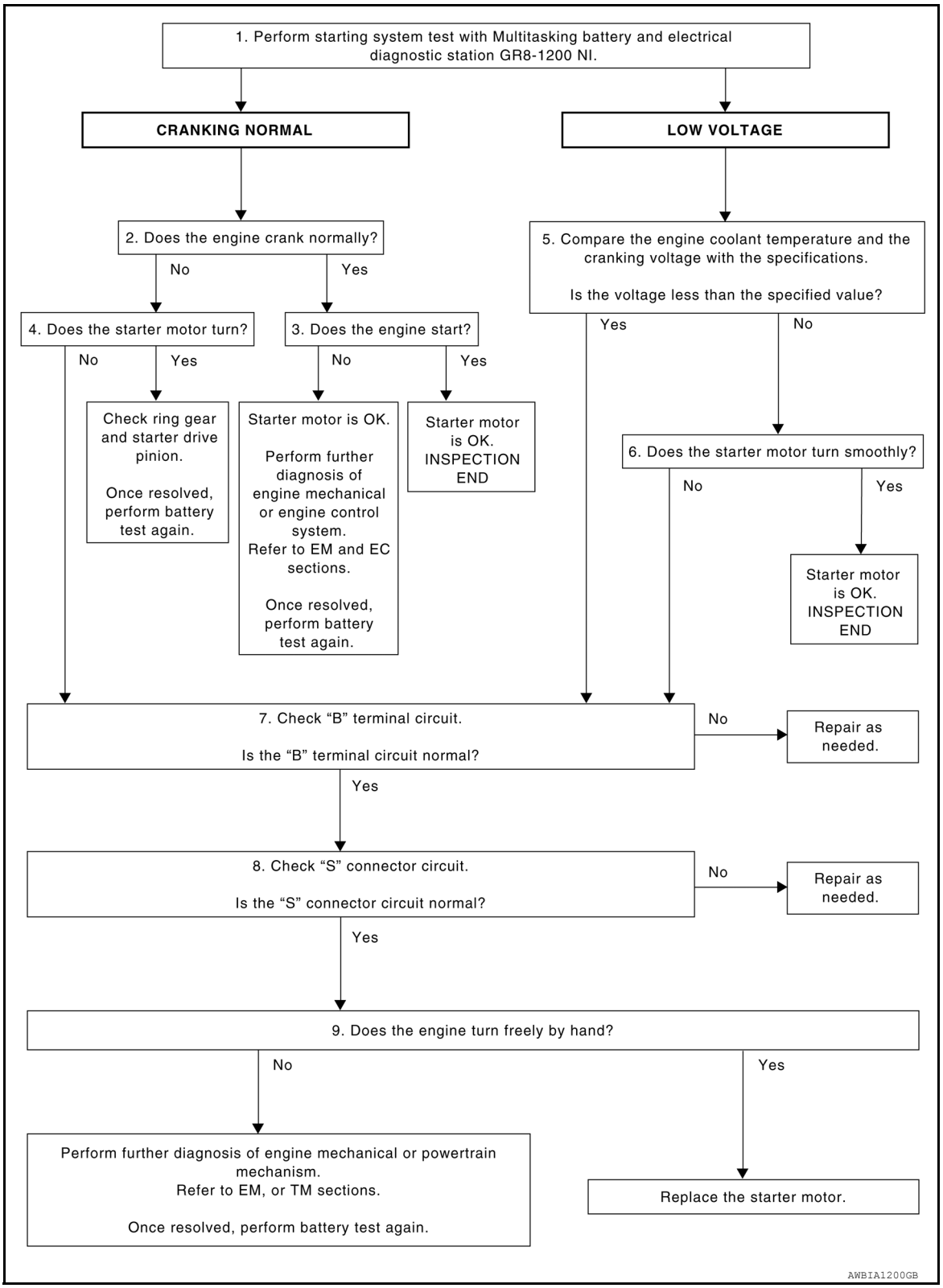
To test the starting system, use the following special service tool:

- GR8-1200 NI Multitasking battery and electrical diagnostic station

NOTE:

Refer to the diagnostic station Instruction Manual for proper starting system diagnosis procedures.

OVERALL SEQUENCE



DETAILED FLOW

NOTE:

To ensure a complete and thorough diagnosis, the battery, starter motor and generator test segments must be done as a set from start to finish.

1. DIAGNOSIS WITH MULTITASKING BATTERY AND ELECTRICAL DIAGNOSTIC STATION GR8-1200 NI

Perform the starting system test with Multitasking battery and electrical diagnostic station GR8-1200 NI. For details and operating instructions, refer to diagnostic station Instruction Manual.

Test result

CRANKING NORMAL>>GO TO 2.
LOW VOLTAGE>>GO TO 5.
CHARGE BATTERY>>Perform the slow battery charging procedure. (Initial rate of charge is 10A for 12 hours.) Perform battery test again. Refer to diagnostic station instruction manual.
REPLACE BATTERY>>Before replacing battery, clean the battery cable clamps and battery posts. Perform battery test again. Refer to diagnostic station instruction manual. If second test result is “REPLACE BATTERY”, then do so. Perform battery test again to confirm repair.

2.CRANKING CHECK

Check that the starter motor operates properly.

Does the engine crank normally?

YES >> GO TO 3.
NO >> GO TO 4.

3.ENGINE START CHECK

Check that the engine starts.

Does the engine start?

YES >> Inspection End.
NO >> Perform further diagnosis of engine mechanical or engine control system. Refer to EM and EC sections. Once resolved, perform battery test again.

4.STARTER MOTOR ACTIVATION

Check that the starter motor operates.

Does the starter motor turn?

YES >> Check ring gear and starter motor drive pinion. Once resolved, perform battery test again.
NO >> GO TO 7.

5.COMPARISON BETWEEN ENGINE COOLANT AND CRANKING VOLTAGE

Compare the engine coolant temperature and verify the cranking voltage is within specifications.

Minimum Specification of Cranking Voltage Referencing Coolant Temperature

Engine coolant temperature [°C (°F)]	Voltage [V]
−30 to −20 (−22 to −4)	8.6
−19 to −10 (−2 to 14)	9.1
−9 to 0 (16 to 32)	9.5
More than 1 (More than 34)	9.9

Is the voltage less than the specified value?

YES >> GO TO 7.
NO >> GO TO 6.

6.STARTER OPERATION

Check the starter operation.

Does the starter motor turn smoothly?

YES >> Inspection End.
NO >> GO TO 7.

7.“B” TERMINAL CIRCUIT INSPECTION

Check “B” terminal circuit. Refer to STR-39, "Diagnosis Procedure".

Is “B” terminal circuit normal?

YES >> GO TO 8.
NO >> Repair as needed.

8.“S” CONNECTOR CIRCUIT INSPECTION

Check “S” connector circuit. Refer to STR-39, "Diagnosis Procedure".

Is “S” connector circuit normal?

YES >> GO TO 9.
NO >> Repair as needed.

9. ENGINE ROTATION STATUS

Check that the engine can be rotated by hand.

Does the engine turn freely by hand?

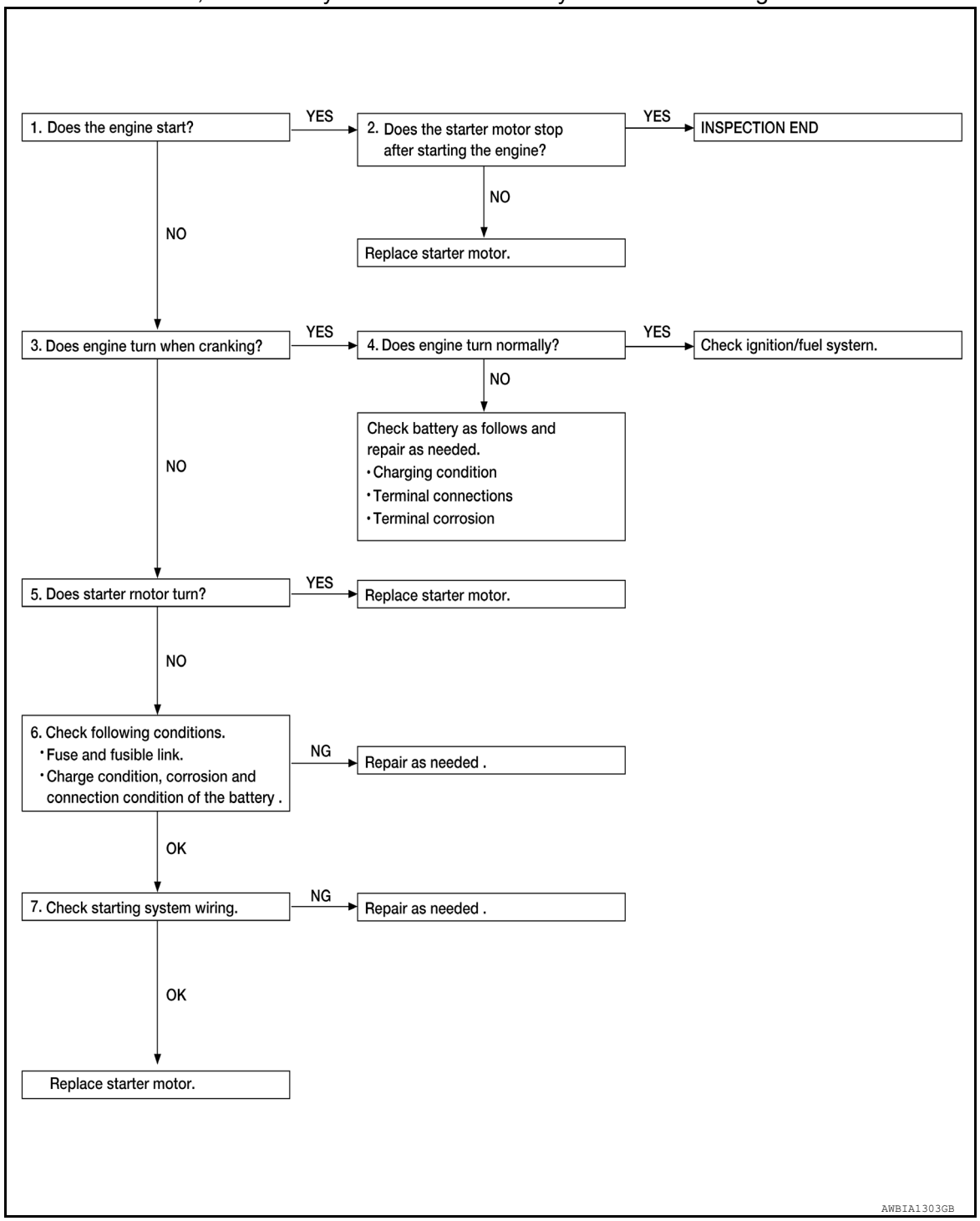
YES >> Replace starter motor.
NO >> Perform further diagnosis of engine mechanical or powertrain mechanism. Once resolved, perform battery test again using Multitasking battery and electrical diagnostic station GR8-1200 NI. Refer to the diagnostic station Instruction Manual for proper testing procedures.

Work Flow (Without GR8-1200 NI)

INFOID:0000000008693426

OVERALL SEQUENCE

If any malfunction is found, immediately disconnect the battery cable from the negative terminal.



DETAILED FLOW

NOTE:

If any malfunction is found, immediately disconnect the battery cable from the negative terminal.

1.CHECK ENGINE START

Crank the engine and check that the engine starts.

Does the engine start?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK THAT THE STARTER MOTOR STOPS

Check that the starter motor stops after starting the engine.

Does the starter motor stop?

YES >> Inspection End.
NO >> Replace starter motor. Refer to STR-30, "Removal and Installation".

3.CHECK THAT THE ENGINE TURNS WHEN CRANKING

Check that the engine turns when cranking.

Does engine turn when cranking?

YES >> GO TO 4.
NO >> GO TO 5.

4.CHECK THE ENGINE SPEED WHEN CRANKING

Check that the engine speed is not low when cranking.

Does engine turn normally?

YES >> Check ignition/fuel system.
NO >> Check charge condition, corrosion and connection condition of the battery.

5.CHECK STARTER MOTOR ACTIVATION

Check that the starter motor runs at cranking.

Does starter motor turn?

YES >> Replace starter motor. Refer to STR-30, "Removal and Installation".
NO >> GO TO 6.

6.CHECK POWER SUPPLY CIRCUIT

Check the following conditions:
- Fuse and fusible link
- Charge condition, corrosion and connection of the battery.

Are these inspection results normal?

YES >> GO TO 7.
NO >> Repair as needed.

7.CHECK STARTING SYSTEM WIRING

Check the following:
- “B” terminal circuit. Refer to STR-39, "Diagnosis Procedure".
- “S” terminal circuit. Refer to STR-41, "Diagnosis Procedure".

Are the inspection results normal?

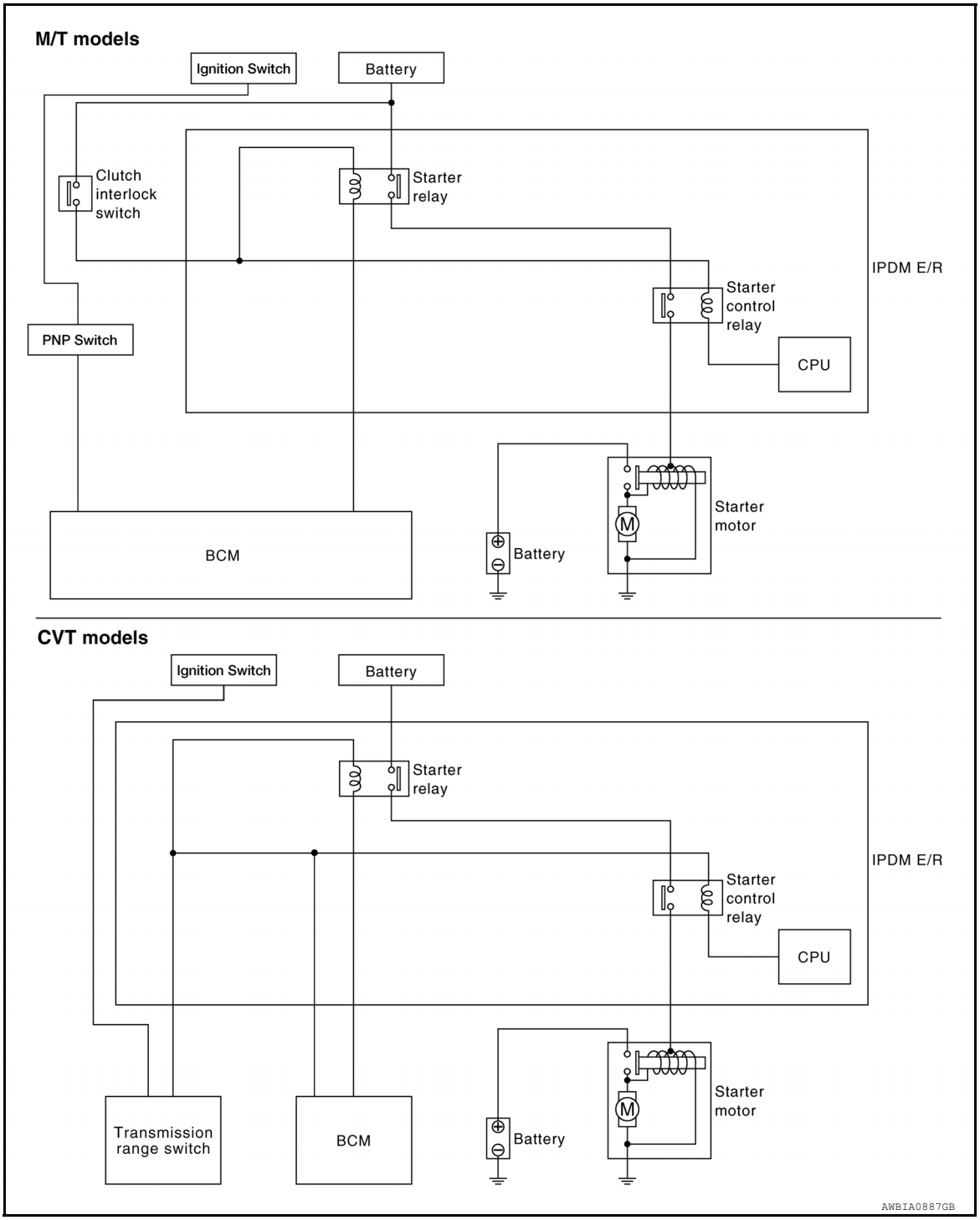
YES >> Replace starter motor. Refer to STR-30, "Removal and Installation".
NO >> Repair as needed.

SYSTEM DESCRIPTION

STARTING SYSTEM

System Diagram

INFOID:0000000006388845



System Description

INFOID:0000000006388846

The starter motor plunger closes and provides a closed circuit between the battery and the starter motor. The starter motor is grounded to the cylinder block. With power and ground supplied, the starter motor operates.

Component Description

INFOID:0000000006388847

Component part	Description
Transmission range switch (CVT models)	Transmission range switch supplies power to the starter relay and starter control relay inside IPDM E/R when the shift selector is placed in the P or N position.
Clutch interlock switch (M/T models)	The switch turns ON and electric power is supplied to the starter relay and starter control relay inside IPDM E/R when the clutch pedal is depressed.
BCM	BCM controls the starter relay inside IPDM E/R.
IPDM E/R	CPU inside IPDM E/R controls the starter control relay.
Starter motor	The starter motor plunger closes and the motor is supplied with battery power, which in turn cranks the engine, when the “S” terminal is supplied with electric power.

DTC/CIRCUIT DIAGNOSIS

B TERMINAL CIRCUIT

Description

INFOID:0000000008693429

Terminal “B” is constantly supplied with battery power.

Diagnosis Procedure

INFOID:0000000008693430

Regarding Wiring Diagram information, refer to STR-14, "Wiring Diagram - Coupe With QR25DE" or STR-20, "Wiring Diagram - Sedan With QR25DE".

CAUTION:
Perform diagnosis under the condition that the engine cannot start by the following procedure.
1. **Remove fuel pump fuse.**
2. **Crank or start the engine (where possible) until the fuel pressure is released.**

1.CHECK “B” TERMINAL CIRCUIT

1. Turn ignition switch OFF.
2. Check that starter motor “B” terminal connection is clean and tight.
3. Check voltage between starter motor connector and ground.

Terminals			Voltage (Approx.)
(+)		(-)	
Starter motor B terminal	Terminal		
F27	B	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check harness between battery and starter motor for open circuit.

2.CHECK BATTERY CABLE CONNECTION STATUS (VOLTAGE DROP TEST)

1. Shift CVT selector lever to P (Park) or N (Neutral) position.
2. Check voltage between battery positive terminal and starter motor B terminal.

Terminals			Condition	Voltage (Approx.)
(+)	(-)			
	Starter motor “B” terminal	Terminal		
Battery positive terminal	F27	B	When the ignition switch is in START position	Less than 0.5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check harness between the battery and starter motor for continuity.

3.CHECK GROUND CIRCUIT STATUS (VOLTAGE DROP TEST)

1. Shift CVT selector lever to P (Park) or N (Neutral) position.
2. Check voltage between starter motor case and battery negative terminal.

Terminals		Condition	Voltage (Approx.)
(+)	(-)		
Starter motor case	Battery negative terminal	When the ignition switch is in START position	Less than 0.2V

Is the inspection result normal?

YES >> “B” terminal circuit is OK. Further inspection is necessary. Refer to STR-32, "Work Flow (With GR8-1200 NI)" or STR-35, "Work Flow (Without GR8-1200 NI)".

NO >> Check the starter motor case to engine mounting for high resistance.

S CONNECTOR CIRCUIT

Description

INFOID:0000000008693431

The starter motor magnetic switch is supplied with power when the ignition switch is turned to the START position while the selector lever is in the P (Park) or N (Neutral) position.

Diagnosis Procedure

INFOID:0000000008693432

Regarding Wiring Diagram information, refer to STR-14, "Wiring Diagram - Coupe With QR25DE" or STR-20, "Wiring Diagram - Sedan With QR25DE".

CAUTION:

Perform diagnosis under the condition that engine cannot start by the following procedure.

1. **Remove fuel pump fuse.**
2. **Crank or start the engine (where possible) until the fuel pressure is released.**

1. CHECK "S" CONNECTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect starter motor connector.
3. Shift selector lever to "P" (Park) or "N" (Neutral) position.
4. Check voltage between starter motor harness connector and ground.

(+)		(-)	Condition	Voltage (Approx.)
Connector	Terminal			
F28	S	Ground	When the ignition switch is in START position	Battery voltage

Is the inspection result normal?

YES >> "S" circuit is OK. Further inspection is necessary. Refer to STR-32, "Work Flow (With GR8-1200 NI)" or STR-35, "Work Flow (Without GR8-1200 NI)".

NO >> GO TO 2.

2. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect IPDM E/R connector.
2. Check continuity between starter motor harness connector and the IPDM E/R harness connector.

Starter motor harness connector		IPDM E/R harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F28	S	F10	80	Yes

Is the inspection result normal?

YES >> Further inspection is necessary. Refer to STR-32, "Work Flow (With GR8-1200 NI)" or STR-35, "Work Flow (Without GR8-1200 NI)".

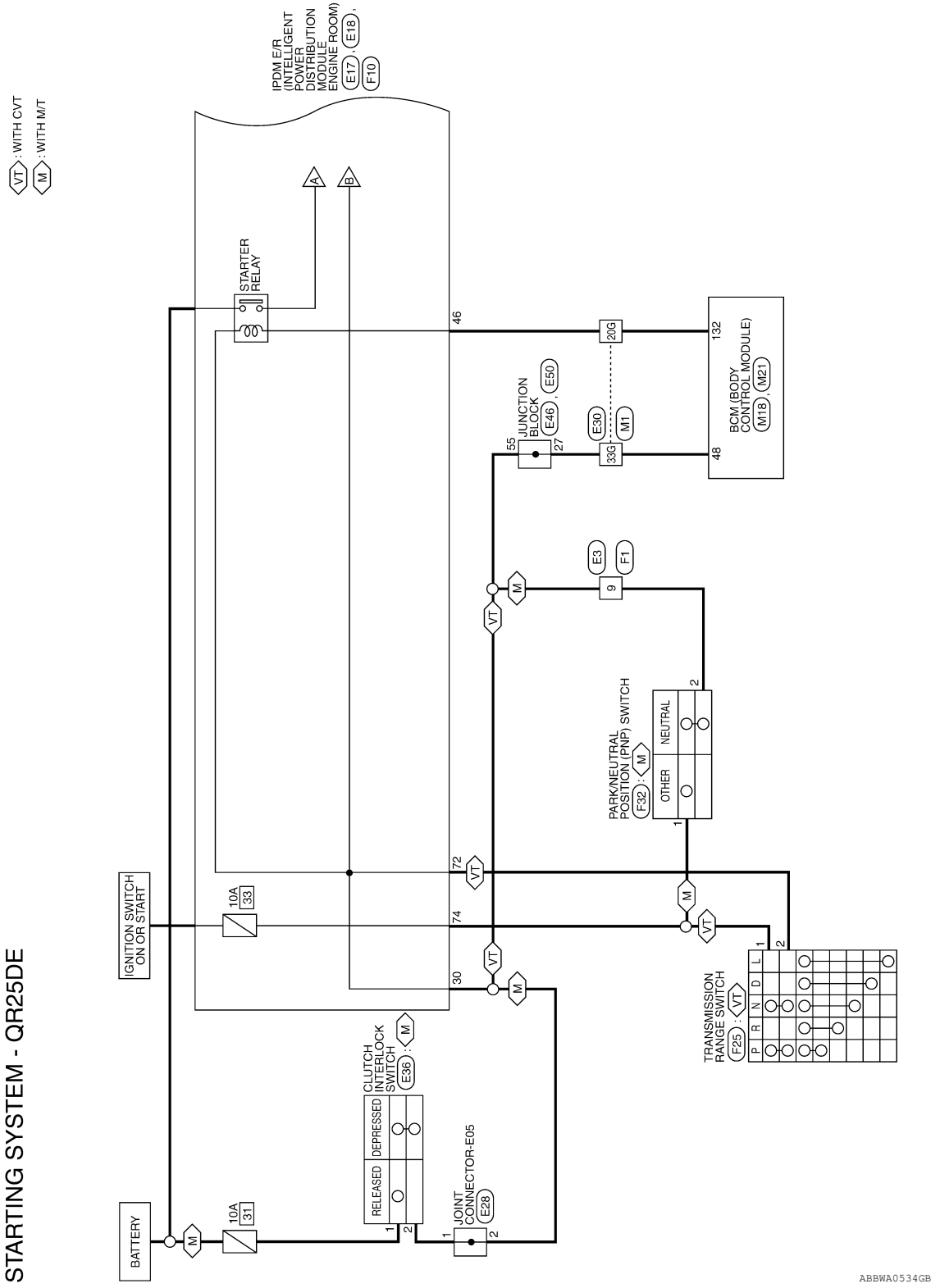
NO >> Repair or replace the harness or connectors.

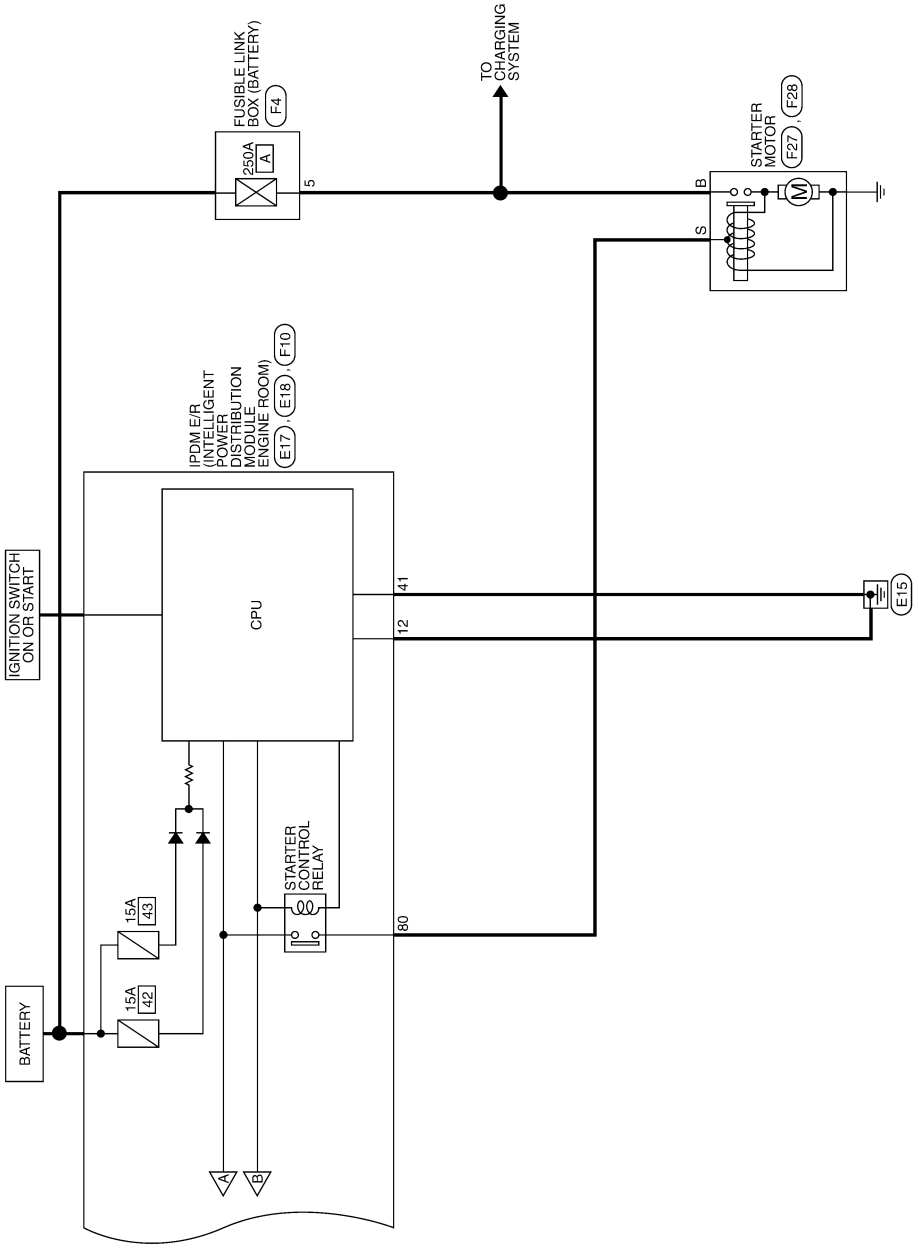
WIRING DIAGRAM

STARTING SYSTEM

Wiring Diagram - Coupe With QR25DE

INFOID:0000000006388852





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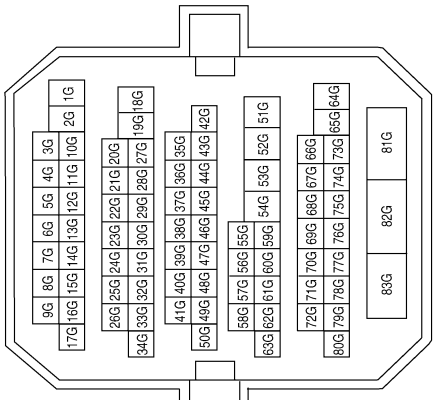
STARTING SYSTEM CONNECTORS - QR25DE

Connector No.	M1
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
20G	R	–
33G	R/G	–

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	GREEN

H.S.

39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20
59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40

Terminal No.	Color of Wire	Signal Name
48	R/G	SHIFT N/P

Connector No.	M21
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	GRAY

H.S.

131	130	129	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
151	150	149	148	147	146	145	144	143	142	141	140	139	138	137	136	135	134	133	132

Terminal No.	Color of Wire	Signal Name
132	R	ST CONT USM

Connector No.	E3
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name
9	BR	–

Connector No.	E17
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

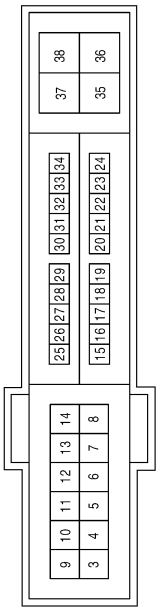
42	41	40	39
46	45	44	43

Terminal No.	Color of Wire	Signal Name
41	B	GND (SIGNAL)
46	BR	START CONT

AABIA0643GB

Connector No.	E18
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
12	B	GND (POWER)
30	R	CLUTCH_I/L_SW (WITH M/T)
30	BR	ECM (WITH CVT)

Connector No.	E28
Connector Name	JOINT CONNECTOR-E05
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	R	–
2	R	–

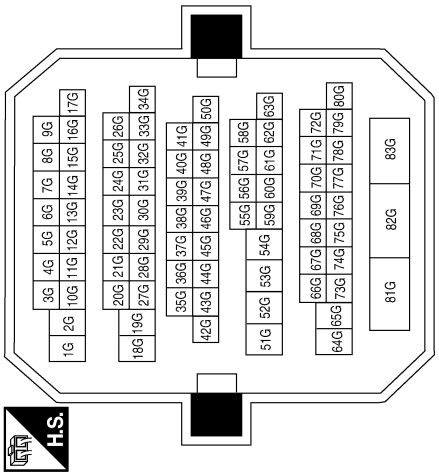
Connector No.	E36
Connector Name	CLUTCH INTERLOCK SWITCH
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	–
2	R	–

Connector No.	E30
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
20G	BR	–
33G	BR	–

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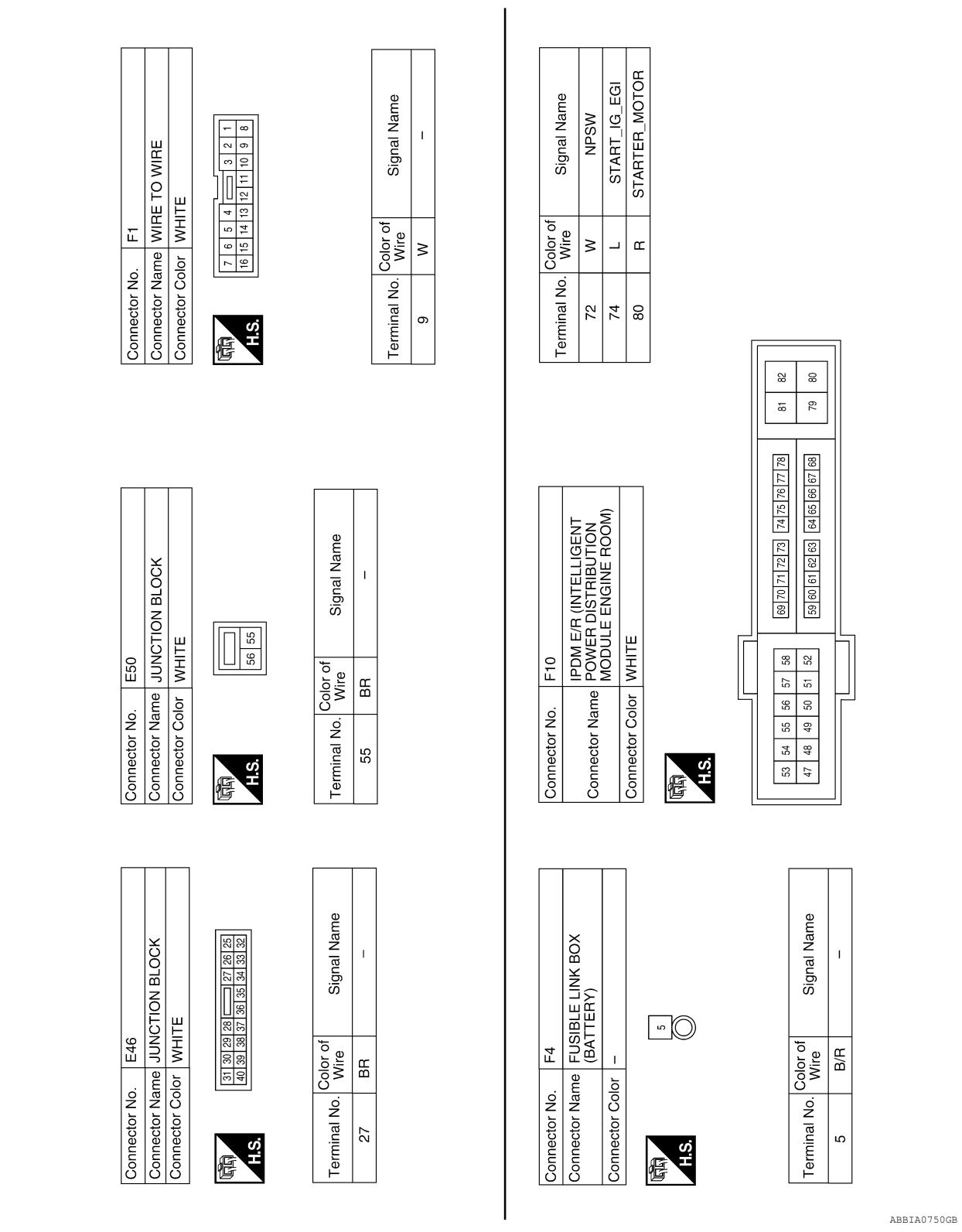


ABBIA0750GB

Connector No.	F25
Connector Name	TRANSMISSION RANGE SWITCH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	–
2	W	–

Connector No.	F27
Connector Name	STARTER MOTOR
Connector Color	–

H.S.

Terminal No.	Color of Wire	Signal Name
B	B/R	BAT

Connector No.	F28
Connector Name	STARTER MOTOR
Connector Color	–

H.S.

Terminal No.	Color of Wire	Signal Name
S	R	START

Connector No.	F32
Connector Name	PARK/NEUTRAL POSITION (PNP) SWITCH
Connector Color	BLACK

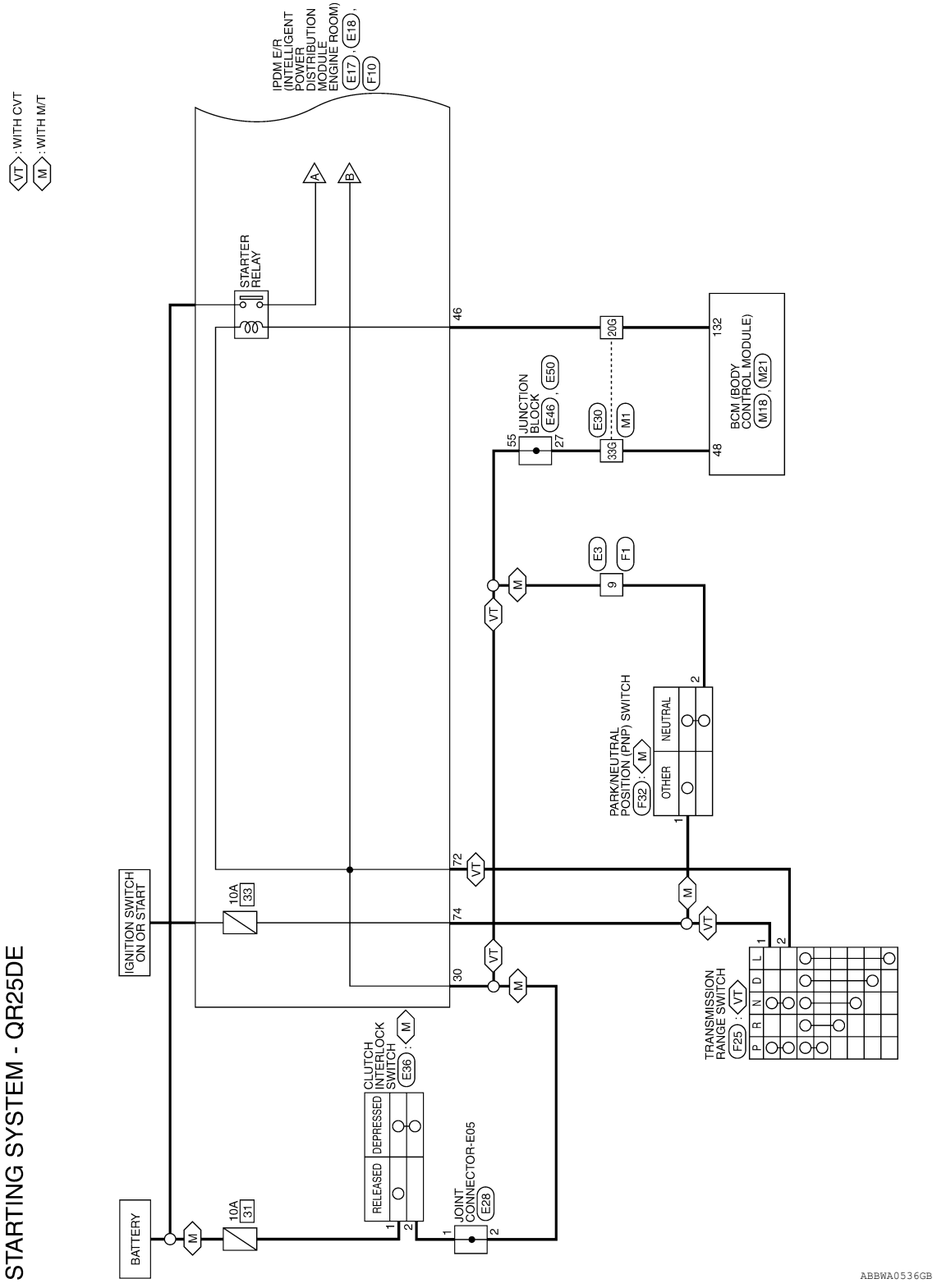
H.S.

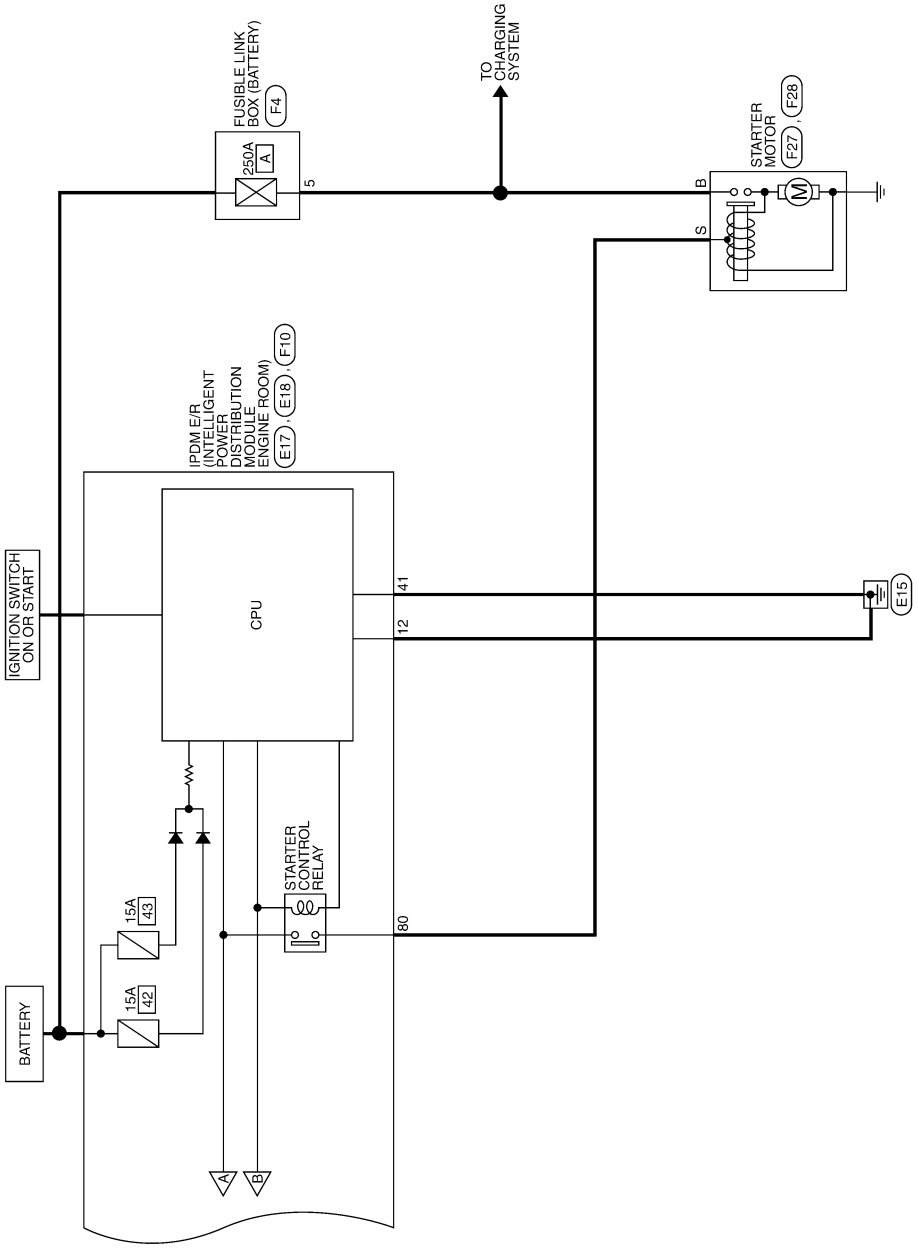
Terminal No.	Color of Wire	Signal Name
1	L	–
2	W	–

AABIA0644GB

Wiring Diagram - Sedan With QR25DE

INFOID:0000000006388853

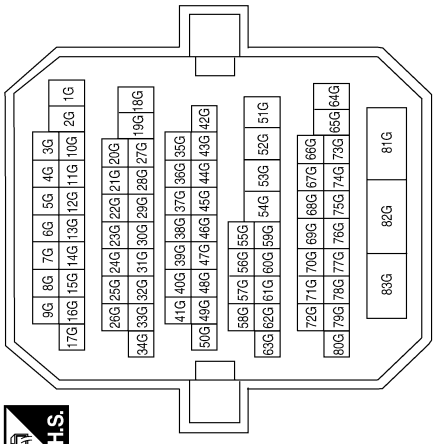



FUSIBLE LINK BOX (BATTERY) F4
250A A
5
TO CHARGING SYSTEM
STARTER MOTOR F27, F28
B
S
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E17, E18, F10
IGNITION SWITCH ON OR START
CPU
41
12
80
E15
STARTER CONTROL RELAY
15A 43
15A 42
BATTERY
A
B
ABBWA0539GB

STARTING SYSTEM CONNECTORS - QR25DE

Connector No.	M1
Connector Name	WIRE TO WIRE
Connector Color	WHITE

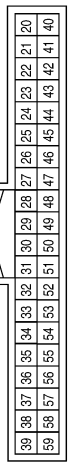
H.S.



Terminal No.	Color of Wire	Signal Name
20G	R	–
33G	R/G	–

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	GREEN

H.S.



Terminal No.	Color of Wire	Signal Name
48	R/G	SHIFT N/P

Connector No.	M21
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
132	R	ST CONT USM

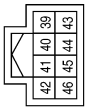
Connector No.	E3
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
9	BR	–

Connector No.	E17
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

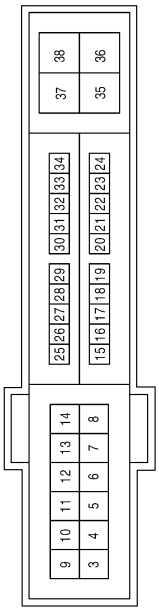


Terminal No.	Color of Wire	Signal Name
41	B	GND (SIGNAL)
46	BR	START CONT

ABBIA0902GB

Connector No.	E18
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
12	B	GND (POWER)
30	R	CLUTCH_I/L_SW (WITH M/T)
30	BR	ECM (WITH CVT)

Connector No.	E28
Connector Name	JOINT CONNECTOR-E05
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	R	–
2	R	–

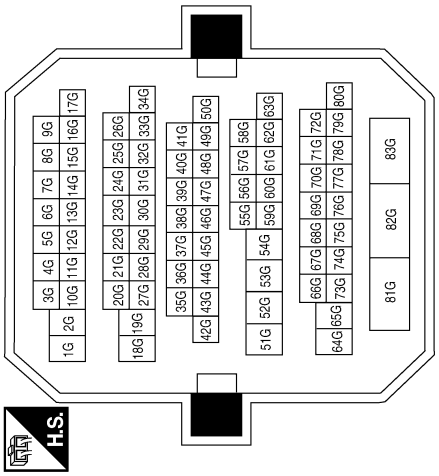
Connector No.	E36
Connector Name	CLUTCH INTERLOCK SWITCH
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	–
2	R	–

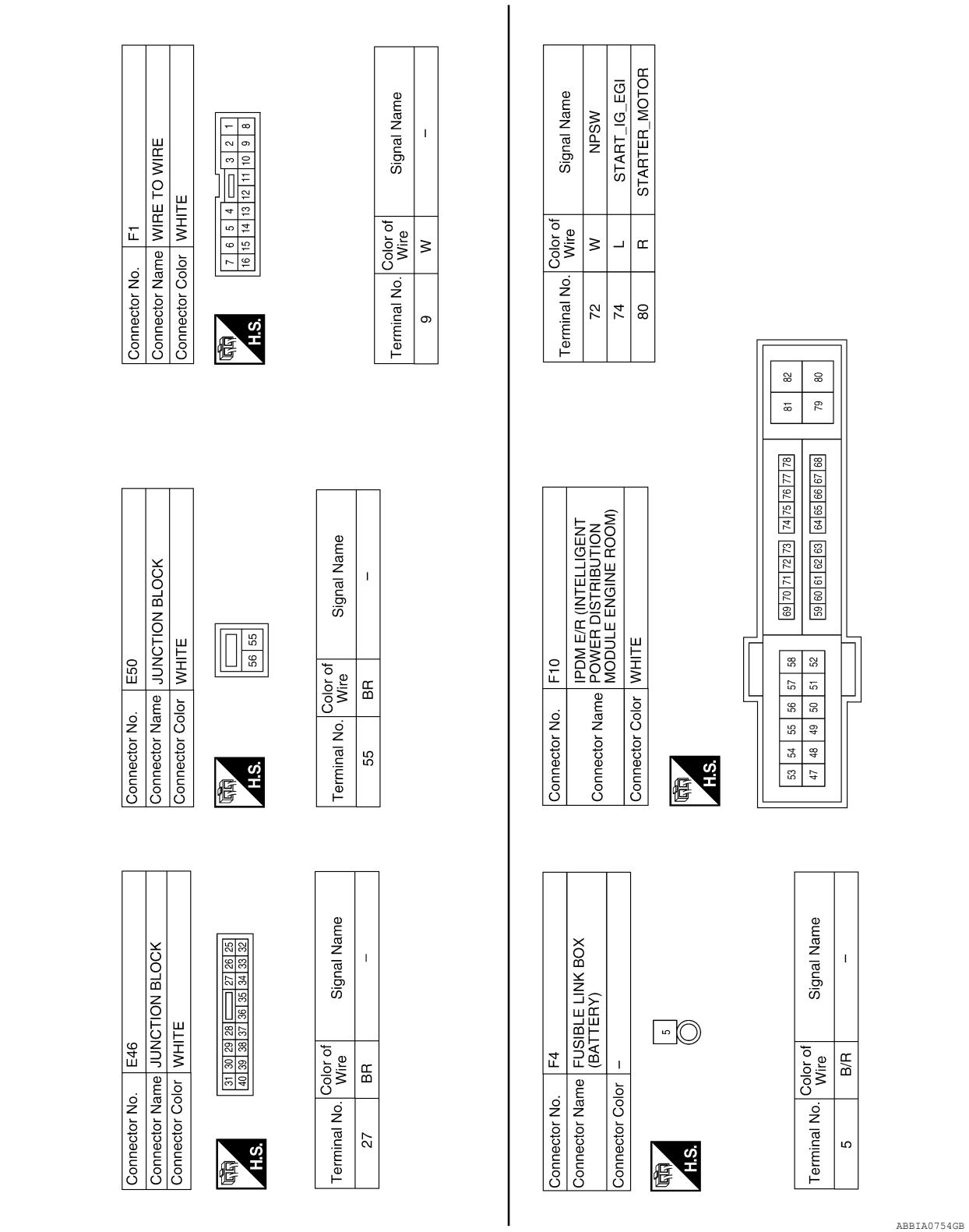
Connector No.	E30
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
20G	BR	–
33G	BR	–

ABBIA0753GB


Connector No. E46
Connector Name JUNCTION BLOCK
Connector Color WHITE
H.S.
31 30 29 28 27 26 25
40 39 38 37 36 35 34 33 32
Terminal No. Color of Wire Signal Name
27 BR –
Connector No. E50
Connector Name JUNCTION BLOCK
Connector Color WHITE
H.S.
56 55
Terminal No. Color of Wire Signal Name
55 BR –
Connector No. F4
Connector Name FUSIBLE LINK BOX (BATTERY)
Connector Color –
H.S.
5
Terminal No. Color of Wire Signal Name
5 B/R –
Connector No. F10
Connector Name IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE
H.S.
53 54 55 56 57 58
47 48 49 50 51 52
69 70 71 72 73 74 75 76 77 78
59 60 61 62 63 64 65 66 67 68
81 82
79 80
Terminal No. Color of Wire Signal Name
72 W NPSW
74 L START_IG_EGI
80 R STARTER_MOTOR
Connector No. F1
Connector Name WIRE TO WIRE
Connector Color WHITE
H.S.
7 6 5 4 3 2 1
16 15 14 13 12 11 10 9 8
Terminal No. Color of Wire Signal Name
9 W –
ABBIA0754GB

Connector No.	F25
Connector Name	TRANSMISSION RANGE SWITCH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	–
2	W	–

Connector No.	F27
Connector Name	STARTER MOTOR
Connector Color	–

H.S.

Terminal No.	Color of Wire	Signal Name
B	B/R	BAT

Connector No.	F28
Connector Name	STARTER MOTOR
Connector Color	–

H.S.

Terminal No.	Color of Wire	Signal Name
S	R	START

Connector No.	F32
Connector Name	PARK/NEUTRAL POSITION (PNP) SWITCH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	–
2	W	–

ABBIA0755GB

SYMPTOM DIAGNOSIS

STARTING SYSTEM

Symptom Table

INFOID:0000000006388854

Symptom	Reference
No normal cranking	Refer to STR-3, "Work Flow (With GR8-1200 NI)" or STR-6, "Work Flow (Without GR8-1200 NI)".
Starter motor does not rotate	

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000006388855

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000006388856

NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

This vehicle is equipped with a push-button ignition switch and a steering lock unit.
If the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.
If turning the steering wheel is required with the battery disconnected or discharged, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Carry the Intelligent Key or insert it to the key slot and turn the push-button ignition switch to ACC position. (At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)

6. Perform self-diagnosis check of all control units using CONSULT.

PREPARATION

PREPARATION

Special Service Tool

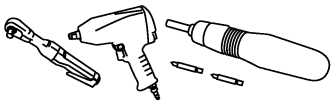
INFOID:0000000008655638

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (—) Model GR8-1200 NI Multitasking battery and electrical diagnostic station  AWIIA1239ZZ	Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.

Commercial Service Tool

INFOID:0000000008655639

Tool name	Description
Power tool  PIIB1407E	Loosening nuts, screws and bolts

REMOVAL AND INSTALLATION

STARTER MOTOR

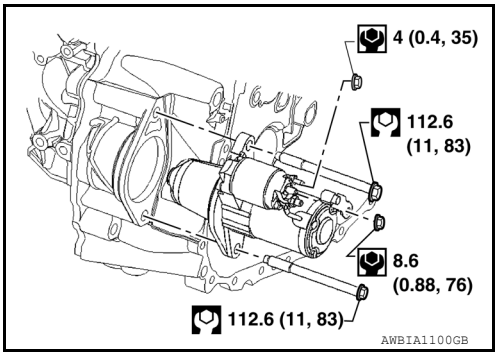
Removal and Installation

INFOID:0000000006388859

M/T Models

Removal

1. Disconnect the negative battery terminal.
2. Disconnect the starter motor harness connectors.
3. Remove the two starter motor bolts using power tools.
4. Remove the starter motor.

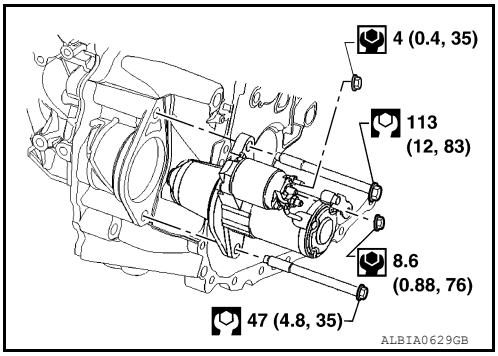


INSTALLATION
Installation is in the reverse order of removal.

CVT Models

REMOVAL

1. Remove the battery and battery tray. Refer to PG-69, "Removal and Installation (Battery Tray)" for Coupe, and PG-141, "Removal and Installation (Battery Tray)" for Sedan.
2. Disconnect the starter motor harness connectors.
3. Remove the starter motor bolts using power tools.
4. Remove the starter motor.



INSTALLATION
Installation is in the reverse order of removal.

SERVICE DATA AND SPECIFICATIONS (SDS)

STARTER MOTOR

Starter

INFOID:0000000006388861

Application		QR25DE	
		M/T model	CVT model
Type *		Melco M000T22272	Melco M000TA0173
		Reduction gear type	
System voltage		12V	
No-load	Terminal voltage	11V	
	Current	90A Max.	
	Revolution	2,000 rpm Min.	

*: Always check with the Parts Department for the latest parts information.

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow (With GR8-1200 NI)

INFOID:0000000008693427

STARTING SYSTEM DIAGNOSIS WITH GR8-1200 NI

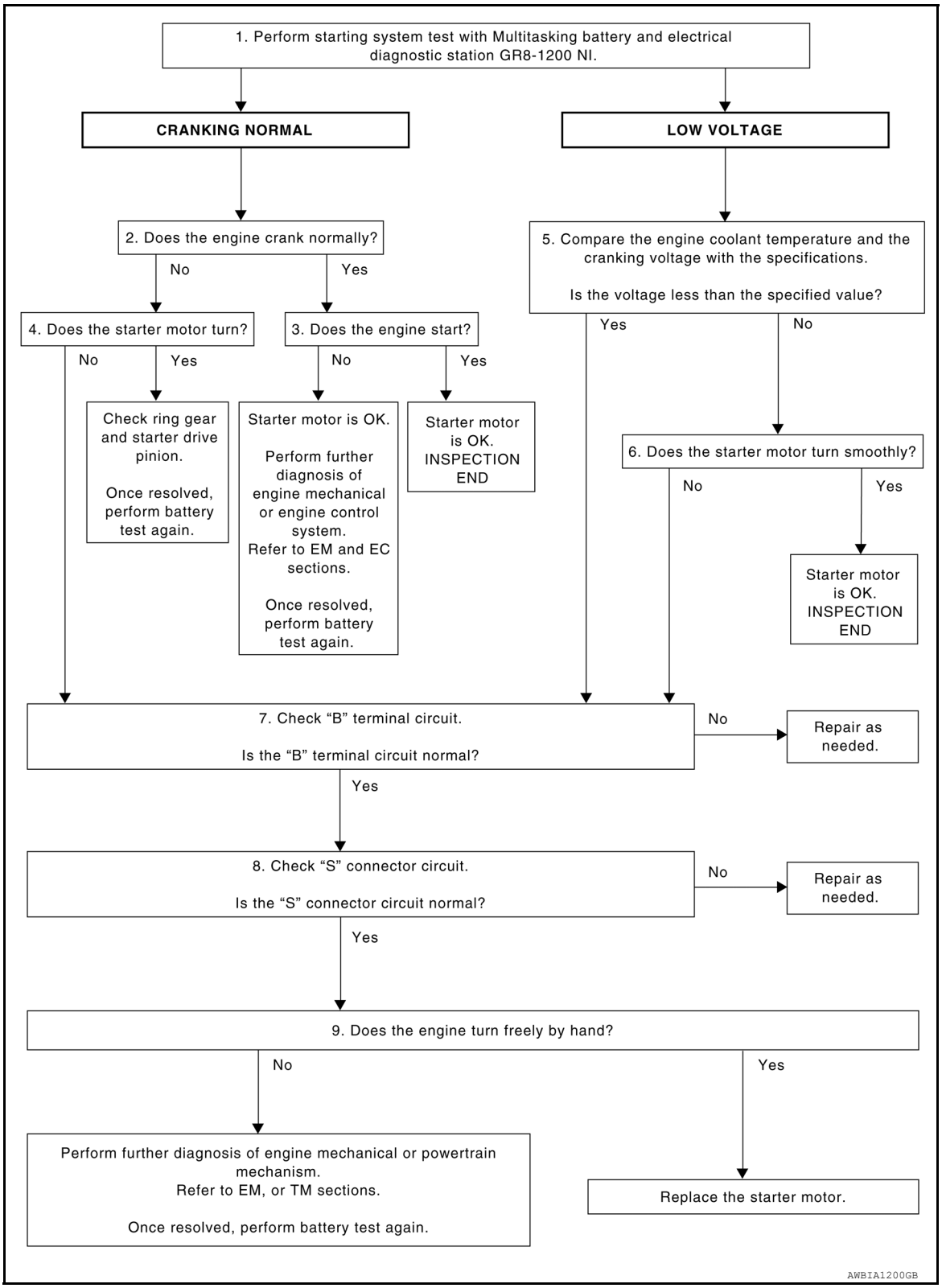
To test the starting system, use the following special service tool:

- GR8-1200 NI Multitasking battery and electrical diagnostic station

NOTE:

Refer to the diagnostic station Instruction Manual for proper starting system diagnosis procedures.

OVERALL SEQUENCE



DETAILED FLOW

NOTE:

To ensure a complete and thorough diagnosis, the battery, starter motor and generator test segments must be done as a set from start to finish.

1.DIAGNOSIS WITH MULTITASKING BATTERY AND ELECTRICAL DIAGNOSTIC STATION GR8-1200 NI

Perform the starting system test with Multitasking battery and electrical diagnostic station GR8-1200 NI. For details and operating instructions, refer to diagnostic station Instruction Manual.

Test result

CRANKING NORMAL>>GO TO 2.
LOW VOLTAGE>>GO TO 5.
CHARGE BATTERY>>Perform the slow battery charging procedure. (Initial rate of charge is 10A for 12 hours.) Perform battery test again. Refer to diagnostic station instruction manual.
REPLACE BATTERY>>Before replacing battery, clean the battery cable clamps and battery posts. Perform battery test again. Refer to diagnostic station instruction manual. If second test result is "REPLACE BATTERY", then do so. Perform battery test again to confirm repair.

2.CRANKING CHECK

Check that the starter motor operates properly.

Does the engine crank normally?

YES >> GO TO 3.
NO >> GO TO 4.

3.ENGINE START CHECK

Check that the engine starts.

Does the engine start?

YES >> Inspection End.
NO >> Perform further diagnosis of engine mechanical or engine control system. Refer to EM and EC sections. Once resolved, perform battery test again.

4.STARTER MOTOR ACTIVATION

Check that the starter motor operates.

Does the starter motor turn?

YES >> Check ring gear and starter motor drive pinion. Once resolved, perform battery test again.
NO >> GO TO 7.

5.COMPARISON BETWEEN ENGINE COOLANT AND CRANKING VOLTAGE

Compare the engine coolant temperature and verify the cranking voltage is within specifications.

Minimum Specification of Cranking Voltage Referencing Coolant Temperature

Engine coolant temperature [°C (°F)]	Voltage [V]
−30 to −20 (−22 to −4)	8.6
−19 to −10 (−2 to 14)	9.1
−9 to 0 (16 to 32)	9.5
More than 1 (More than 34)	9.9

Is the voltage less than the specified value?

YES >> GO TO 7.
NO >> GO TO 6.

6.STARTER OPERATION

Check the starter operation.

Does the starter motor turn smoothly?

YES >> Inspection End.
NO >> GO TO 7.

7."B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to STR-39, "Diagnosis Procedure".

Is "B" terminal circuit normal?

YES >> GO TO 8.
NO >> Repair as needed.

8."S" CONNECTOR CIRCUIT INSPECTION

Check "S" connector circuit. Refer to STR-39, "Diagnosis Procedure".

Is “S” connector circuit normal?

YES >> GO TO 9.
NO >> Repair as needed.

9. ENGINE ROTATION STATUS

Check that the engine can be rotated by hand.

Does the engine turn freely by hand?

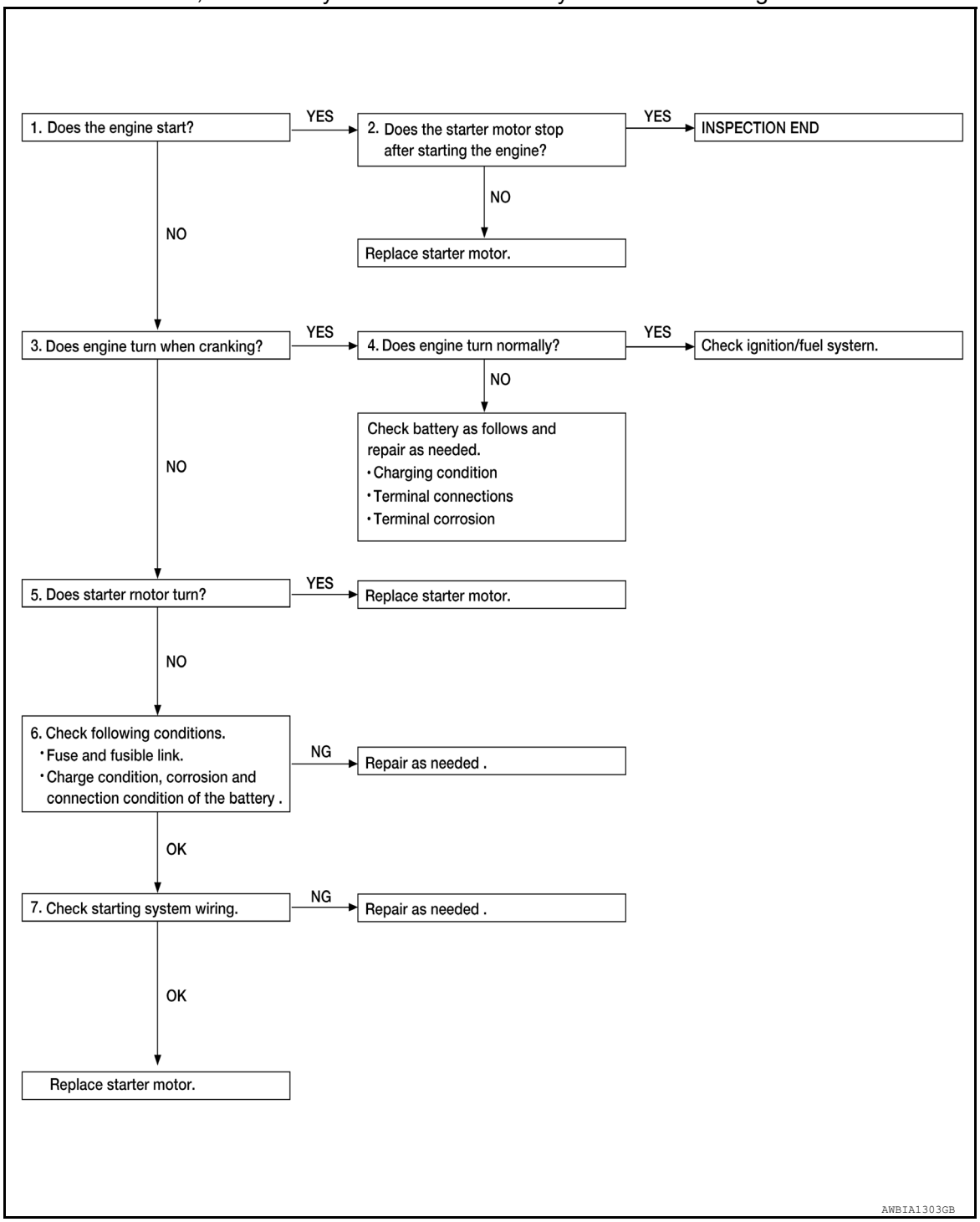
YES >> Replace starter motor.
NO >> Perform further diagnosis of engine mechanical or powertrain mechanism. Once resolved, perform battery test again using Multitasking battery and electrical diagnostic station GR8-1200 NI. Refer to the diagnostic station Instruction Manual for proper testing procedures.

Work Flow (Without GR8-1200 NI)

INFOID:0000000008693428

OVERALL SEQUENCE

If any malfunction is found, immediately disconnect the battery cable from the negative terminal.



DETAILED FLOW

NOTE:

If any malfunction is found, immediately disconnect the battery cable from the negative terminal.

1.CHECK ENGINE START

Crank the engine and check that the engine starts.

Does the engine start?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK THAT THE STARTER MOTOR STOPS

Check that the starter motor stops after starting the engine.

Does the starter motor stop?

YES >> Inspection End.
NO >> Replace starter motor. Refer to STR-56, "Removal and Installation".

3.CHECK THAT THE ENGINE TURNS WHEN CRANKING

Check that the engine turns when cranking.

Does engine turn when cranking?

YES >> GO TO 4.
NO >> GO TO 5.

4.CHECK THE ENGINE SPEED WHEN CRANKING

Check that the engine speed is not low when cranking.

Does engine turn normally?

YES >> Check ignition/fuel system.
NO >> Check charge condition, corrosion and connection condition of the battery.

5.CHECK STARTER MOTOR ACTIVATION

Check that the starter motor runs at cranking.

Does starter motor turn?

YES >> Replace starter motor. Refer to STR-56, "Removal and Installation".
NO >> GO TO 6.

6.CHECK POWER SUPPLY CIRCUIT

Check the following conditions:
- Fuse and fusible link
- Charge condition, corrosion and connection of the battery.

Are these inspection results normal?

YES >> GO TO 7.
NO >> Repair as needed.

7.CHECK STARTING SYSTEM WIRING

Check the following:
- “B” terminal circuit. Refer to STR-39, "Diagnosis Procedure".
- “S” terminal circuit. Refer to STR-41, "Diagnosis Procedure".

Are the inspection results normal?

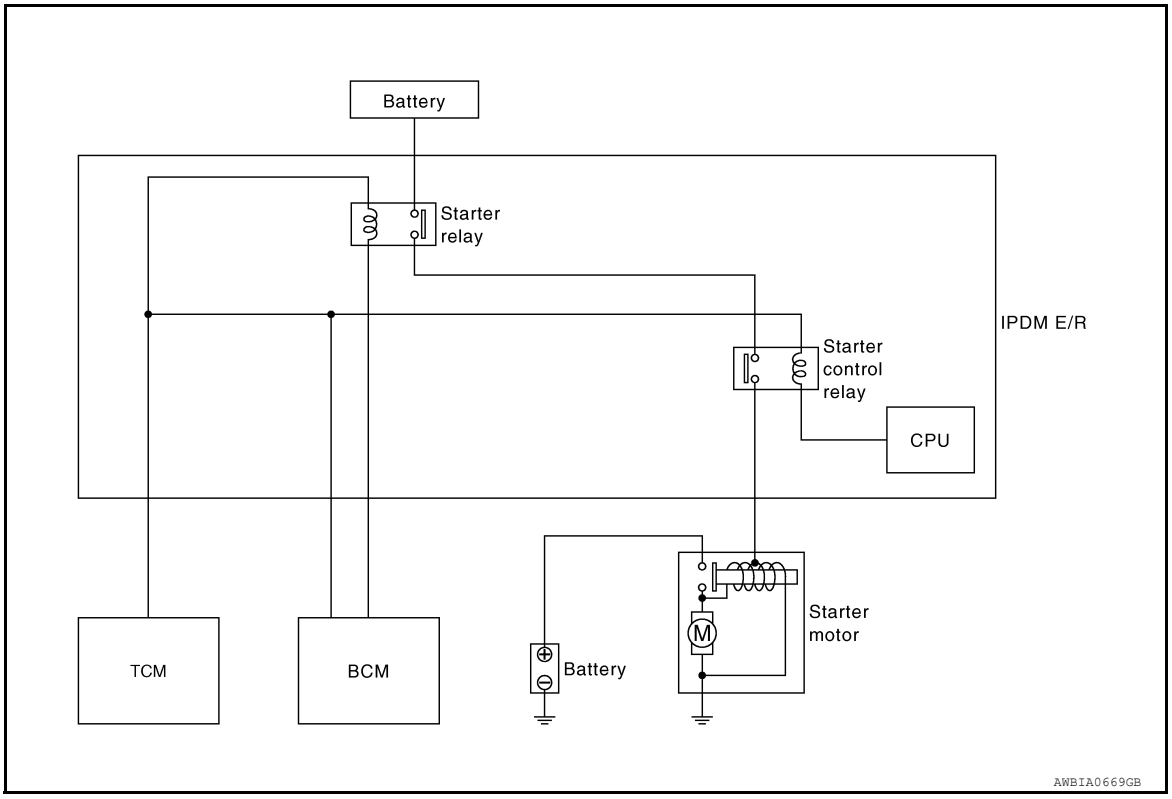
YES >> Replace starter motor. Refer to STR-56, "Removal and Installation".
NO >> Repair as needed.

SYSTEM DESCRIPTION

STARTING SYSTEM

System Diagram

INFOID:0000000006388863



System Description

INFOID:0000000006388864

The starter motor plunger closes and provides a closed circuit between the battery and the starter motor. The starter motor is grounded to the cylinder block. With power and ground supplied, the starter motor operates.

Component Description

INFOID:0000000006388865

Component part	Description
TCM	TCM supplies power to the starter relay and starter control relay inside IPDM E/R when the shift selector is placed in the P or N position.
BCM	BCM controls the starter relay inside IPDM E/R.
IPDM E/R	CPU inside IPDM E/R controls the starter control relay.
Starter motor	The starter motor plunger closes and the motor is supplied with battery power, which in turn cranks the engine, when the “S” terminal is supplied with electric power.

DTC/CIRCUIT DIAGNOSIS

B TERMINAL CIRCUIT

Description

INFOID:0000000008693433

Terminal “B” is constantly supplied with battery power.

Diagnosis Procedure

INFOID:0000000008693434

Regarding Wiring Diagram information, refer to STR-42, "Wiring Diagram - Coupe With VQ35DE" or STR-47, "Wiring Diagram - Sedan With VQ35DE".

CAUTION:
Perform diagnosis under the condition that the engine cannot start by the following procedure.
1. **Remove fuel pump fuse.**
2. **Crank or start the engine (where possible) until the fuel pressure is released.**

1.CHECK “B” TERMINAL CIRCUIT

1. Turn ignition switch OFF.
2. Check that starter motor “B” terminal connection is clean and tight.
3. Check voltage between starter motor connector and ground.

Terminals			Voltage (Approx.)
(+)		(-)	
Starter motor B terminal	Terminal		
F27	B	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check harness between battery and starter motor for open circuit.

2.CHECK BATTERY CABLE CONNECTION STATUS (VOLTAGE DROP TEST)

1. Shift CVT selector lever to P (Park) or N (Neutral) position.
2. Check voltage between battery positive terminal and starter motor B terminal.

Terminals			Condition	Voltage (Approx.)
(+)	(-)			
	Starter motor “B” terminal	Terminal		
Battery positive terminal	F27	B	When the ignition switch is in START position	Less than 0.5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check harness between the battery and starter motor for continuity.

3.CHECK GROUND CIRCUIT STATUS (VOLTAGE DROP TEST)

1. Shift CVT selector lever to P (Park) or N (Neutral) position.
2. Check voltage between starter motor case and battery negative terminal.

Terminals		Condition	Voltage (Approx.)
(+)	(-)		
Starter motor case	Battery negative terminal	When the ignition switch is in START position	Less than 0.2V

Is the inspection result normal?

YES >> “B” terminal circuit is OK. Further inspection is necessary. Refer to STR-32, "Work Flow (With GR8-1200 NI)" or STR-35, "Work Flow (Without GR8-1200 NI)".

NO >> Check the starter motor case to engine mounting for high resistance.

S CONNECTOR CIRCUIT

Description

INFOID:0000000008693435

The starter motor magnetic switch is supplied with power when the ignition switch is turned to the START position while the selector lever is in the P (Park) or N (Neutral) position.

Diagnosis Procedure

INFOID:0000000008693436

Regarding Wiring Diagram information, refer to STR-42, "Wiring Diagram - Coupe With VQ35DE" or STR-47, "Wiring Diagram - Sedan With VQ35DE".

CAUTION:

Perform diagnosis under the condition that engine cannot start by the following procedure.

1. **Remove fuel pump fuse.**
2. **Crank or start the engine (where possible) until the fuel pressure is released.**

1.CHECK “S” CONNECTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect starter motor connector.
3. Shift selector lever to “P” (Park) or “N” (Neutral) position.
4. Check voltage between starter motor harness connector and ground.

(+)		(-)	Condition	Voltage (Approx.)
Connector	Terminal			
F28	S	Ground	When the ignition switch is in START position	Battery voltage

Is the inspection result normal?

YES >> “S” circuit is OK. Further inspection is necessary. Refer to STR-32, "Work Flow (With GR8-1200 NI)" or STR-35, "Work Flow (Without GR8-1200 NI)".

NO >> GO TO 2.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect IPDM E/R connector.
2. Check continuity between starter motor harness connector and the IPDM E/R harness connector.

Starter motor harness connector		IPDM E/R harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F28	S	F10	80	Yes

Is the inspection result normal?

YES >> Further inspection is necessary. Refer to STR-32, "Work Flow (With GR8-1200 NI)" or STR-35, "Work Flow (Without GR8-1200 NI)".

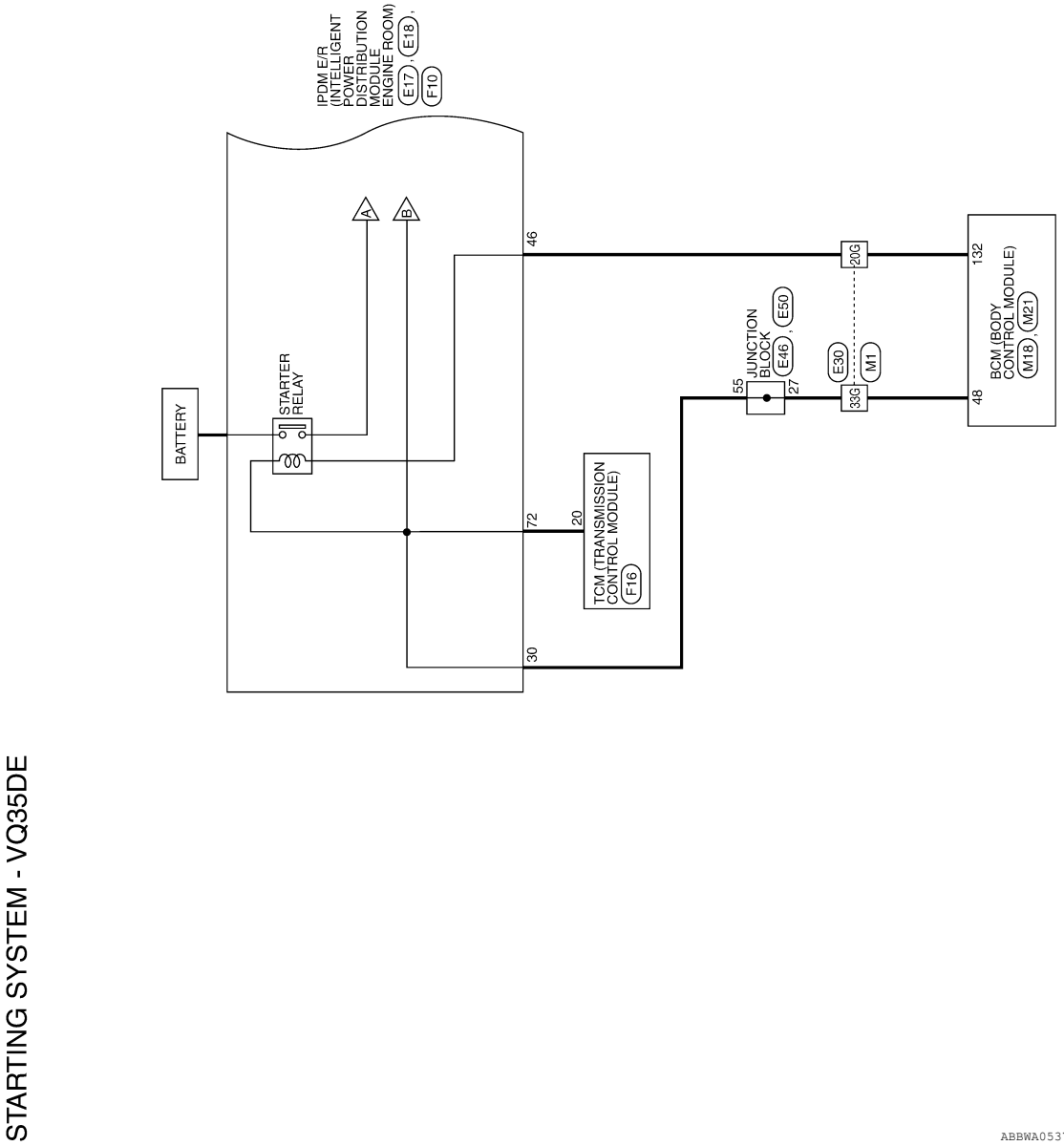
NO >> Repair or replace the harness or connectors.

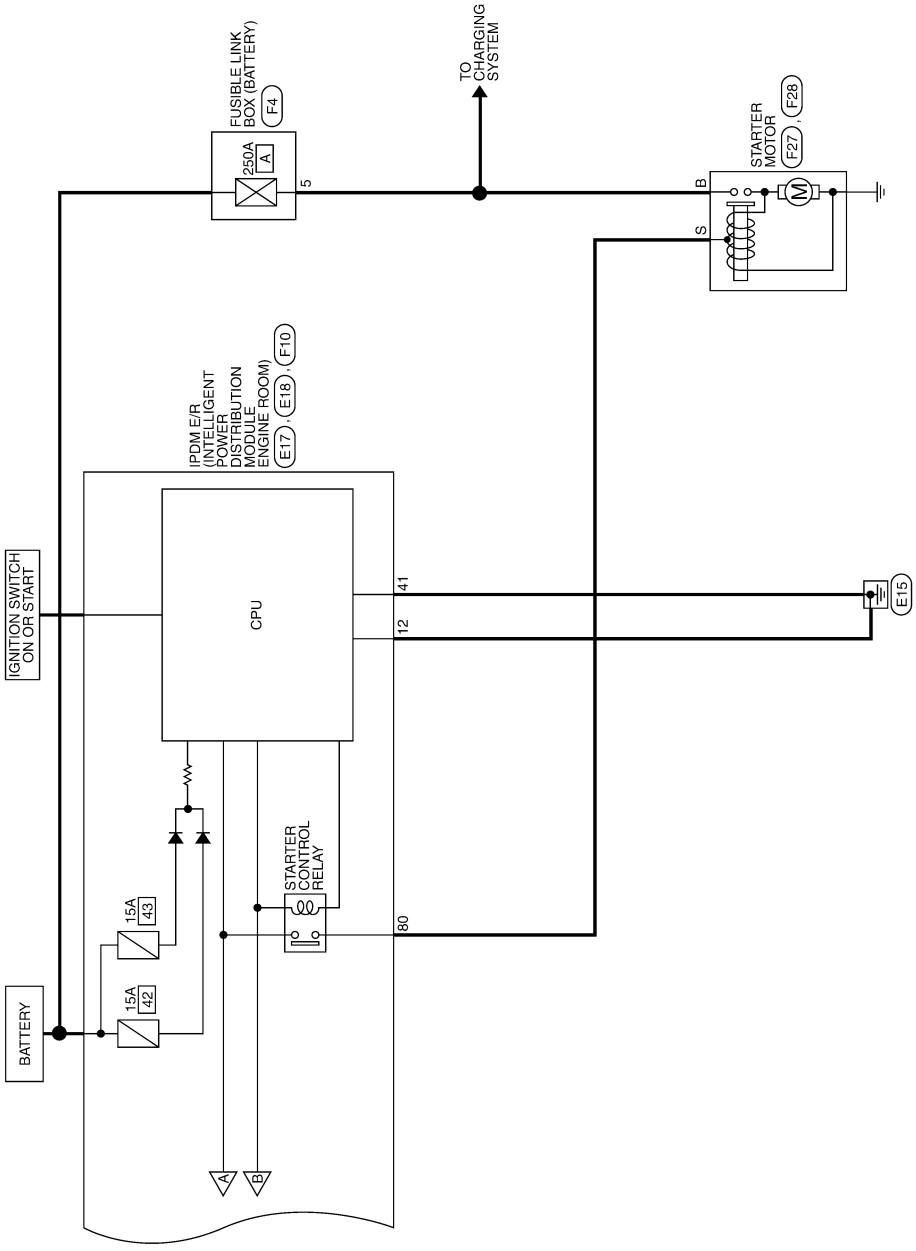
WIRING DIAGRAM

STARTING SYSTEM

Wiring Diagram - Coupe With VQ35DE

INFOID:0000000006388870





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STARTING SYSTEM CONNECTORS - VQ35DE

Connector No.	M1
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

9G	8G	7G	6G	5G	4G	3G		1G
17G	16G	15G	14G	13G	12G	11G	10G	2G
	26G	25G	24G	23G	22G	21G	20G	19G
	34G	33G	32G	31G	30G	29G	28G	27G
	41G	40G	39G	38G	37G	36G	35G	18G
50G	49G	48G	47G	46G	45G	44G	43G	42G
	58G	57G	56G	55G				
63G	62G	61G	60G	59G	54G	53G	52G	51G
	72G	71G	70G	69G	68G	67G	66G	
80G	79G	78G	77G	76G	75G	74G	73G	65G
								64G
			83G		82G		81G	

Terminal No.	Color of Wire	Signal Name
20G	R	–
33G	R/G	–

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	GREEN

H.S.

39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20
59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40

Terminal No.	Color of Wire	Signal Name
48	R/G	SHIFT N/P

Connector No.	M21
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	GRAY

H.S.

131	130	129	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
151	150	149	148	147	146	145	144	143	142	141	140	139	138	137	136	135	134	133	132

Terminal No.	Color of Wire	Signal Name
132	R	ST CONT USM

Connector No.	E17
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

42	41	40	39
46	45	44	43

Terminal No.	Color of Wire	Signal Name
41	B	GND (SIGNAL)
46	BR	START CONT

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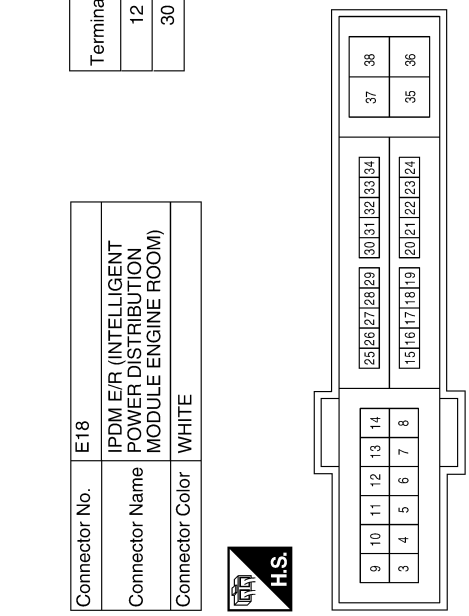
Connector No.	E18
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

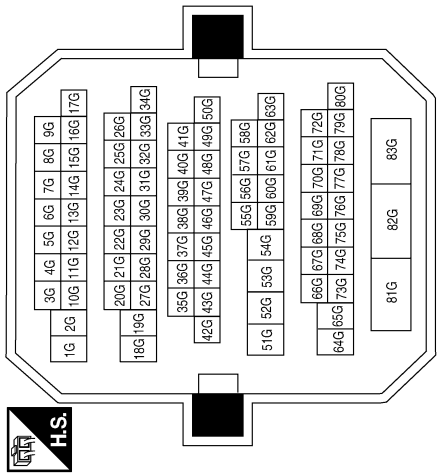
H.S.



Terminal No.	Color of Wire	Signal Name
12	B	GND (POWER)
30	BR	ECM (WITH CVT)

Connector No.	E30
Connector Name	WIRE TO WIRE
Connector Color	WHITE

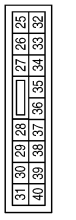
H.S.



Terminal No.	Color of Wire	Signal Name
20G	BR	–
33G	BR	–

Connector No.	E46
Connector Name	JUNCTION BLOCK
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
27	BR	–

Connector No.	E50
Connector Name	JUNCTION BLOCK
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
55	BR	–

Connector No.	F4
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Color	–

H.S.

Terminal No.	Color of Wire	Signal Name
5	B/R	–

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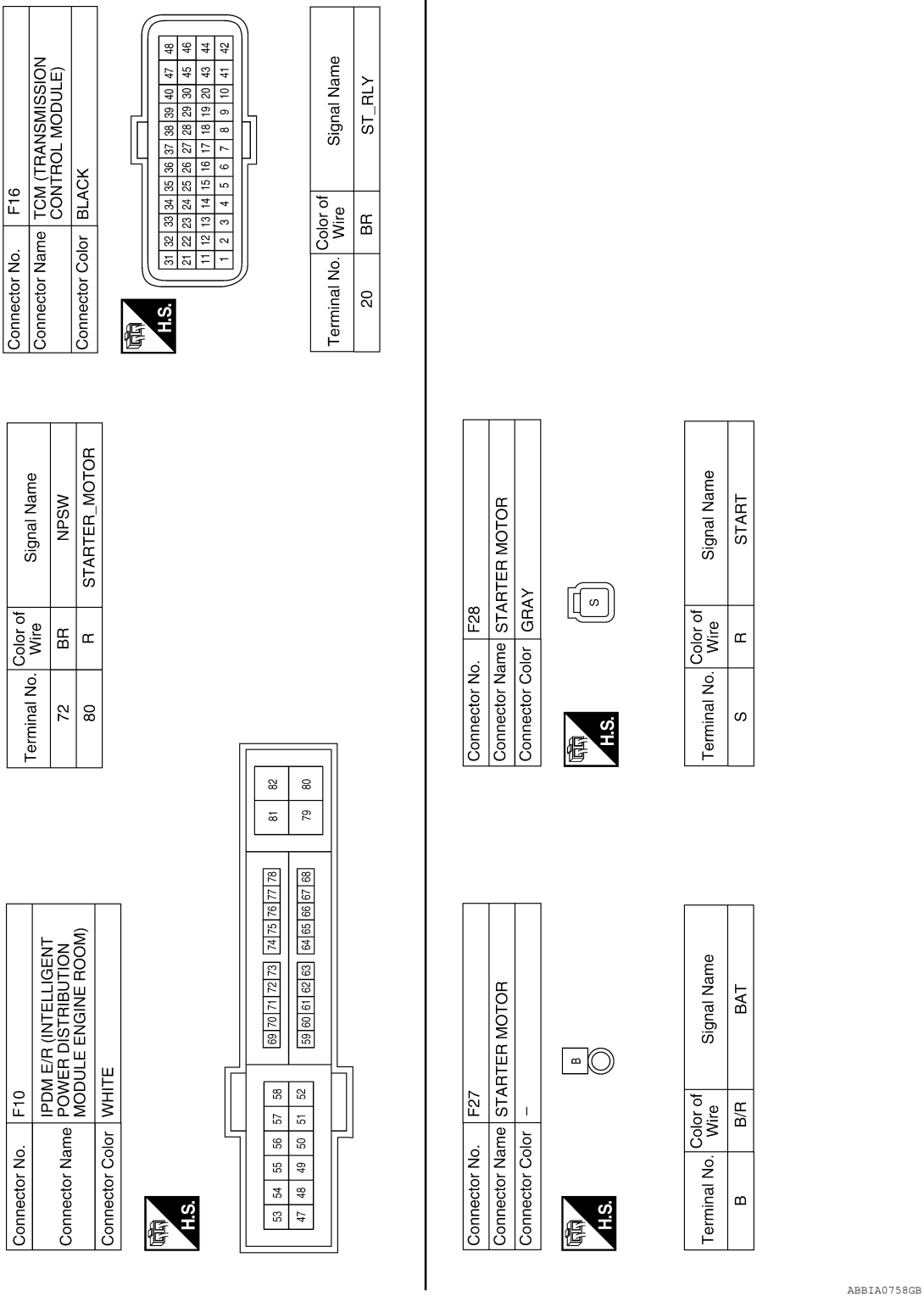

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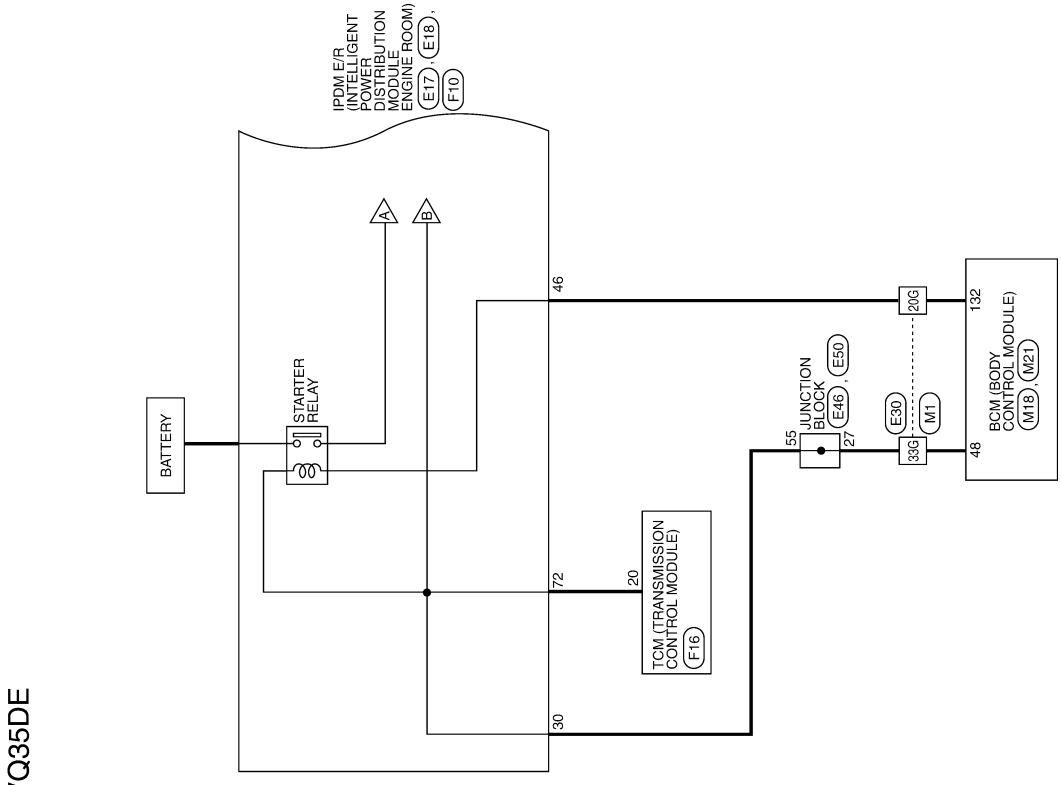
Wiring Diagram - Sedan With VQ35DE

INFOID:0000000006388871



STARTING SYSTEM - VQ35DE

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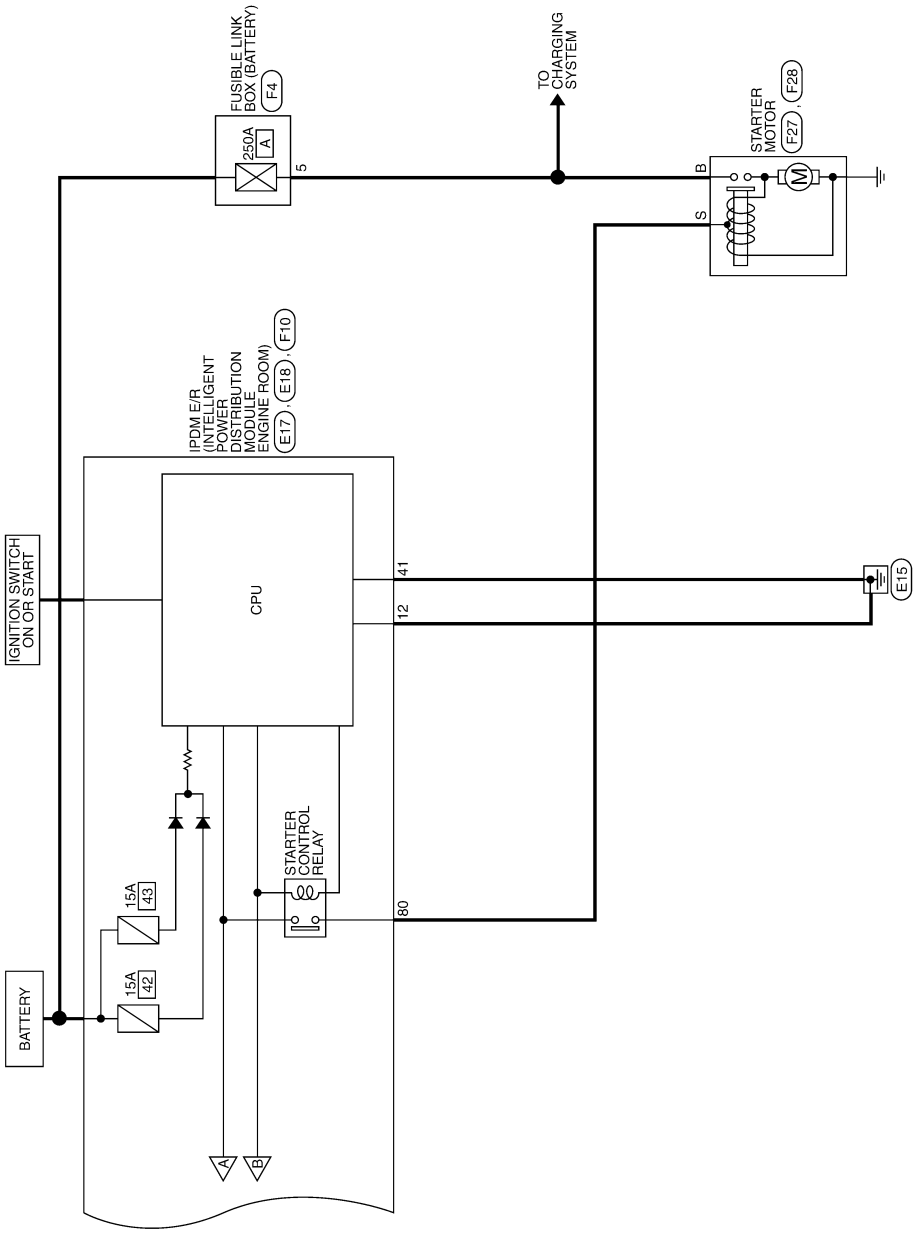

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STARTING SYSTEM CONNECTORS - VQ35DE

Connector No.	M1
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

9G	8G	7G	6G	5G	4G	3G		
17G	16G	15G	14G	13G	12G	11G	10G	2G	1G
26G	25G	24G	23G	22G	21G	20G		
34G	33G	32G	31G	30G	29G	28G	27G	19G	18G
41G	40G	39G	38G	37G	36G	35G		
50G	49G	48G	47G	46G	45G	44G	43G	42G	
58G	57G	56G	55G						
63G	62G	61G	60G	59G	54G	53G	52G	51G	
72G	71G	70G	69G	68G	67G	66G		
80G	79G	78G	77G	76G	75G	74G	73G	65G	64G
83G				82G				81G	

Terminal No.	Color of Wire	Signal Name
20G	R	–
33G	R/G	–

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	GREEN

H.S.

39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20
59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40

Terminal No.	Color of Wire	Signal Name
48	R/G	SHIFT N/P

Connector No.	M21
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	GRAY

H.S.

131	130	129	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
151	150	149	148	147	146	145	144	143	142	141	140	139	138	137	136	135	134	133	132

Terminal No.	Color of Wire	Signal Name
132	R	ST CONT USM

Connector No.	E17
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

42	41	40	39
46	45	44	43

Terminal No.	Color of Wire	Signal Name
41	B	GND (SIGNAL)
46	BR	START CONT

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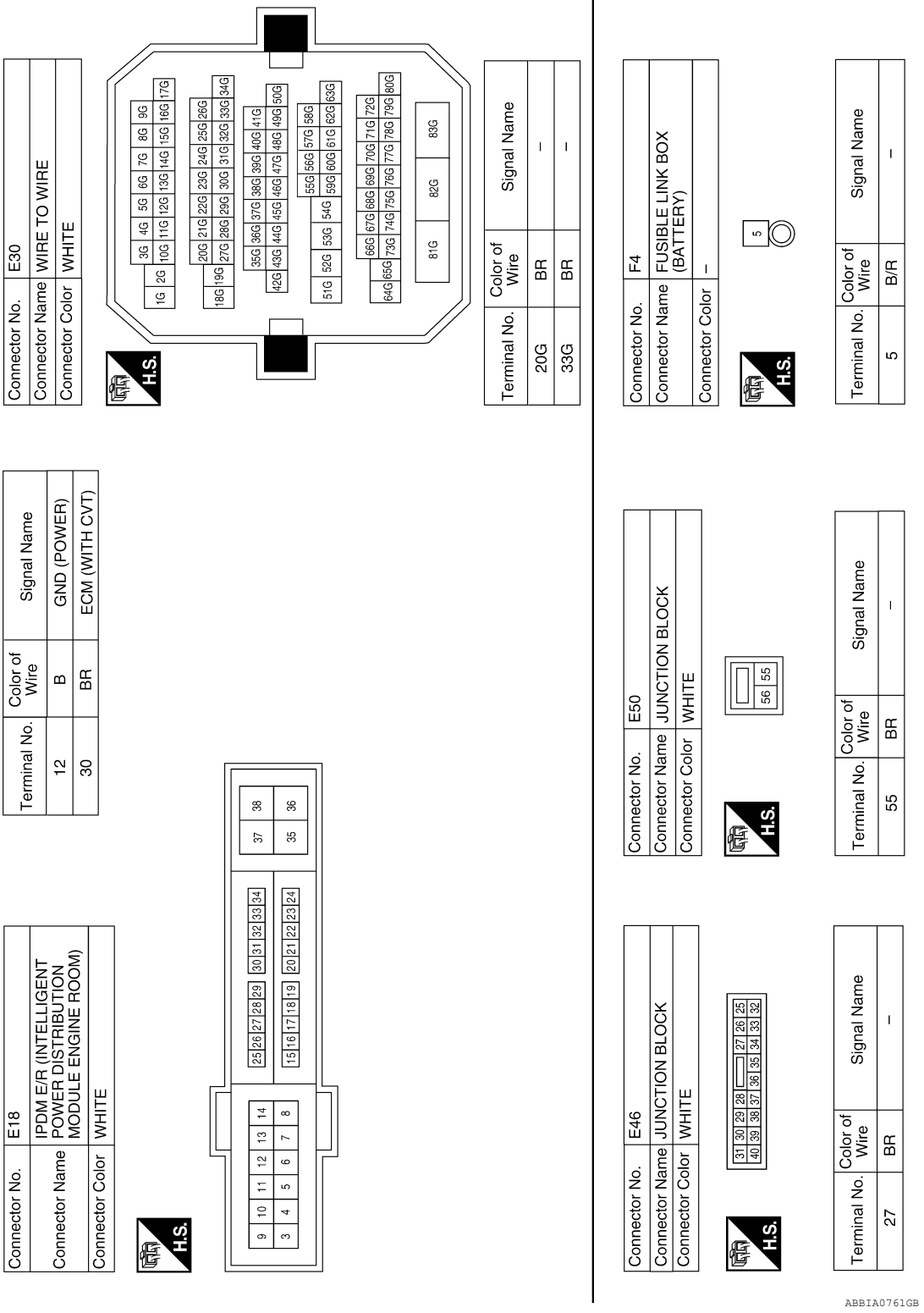
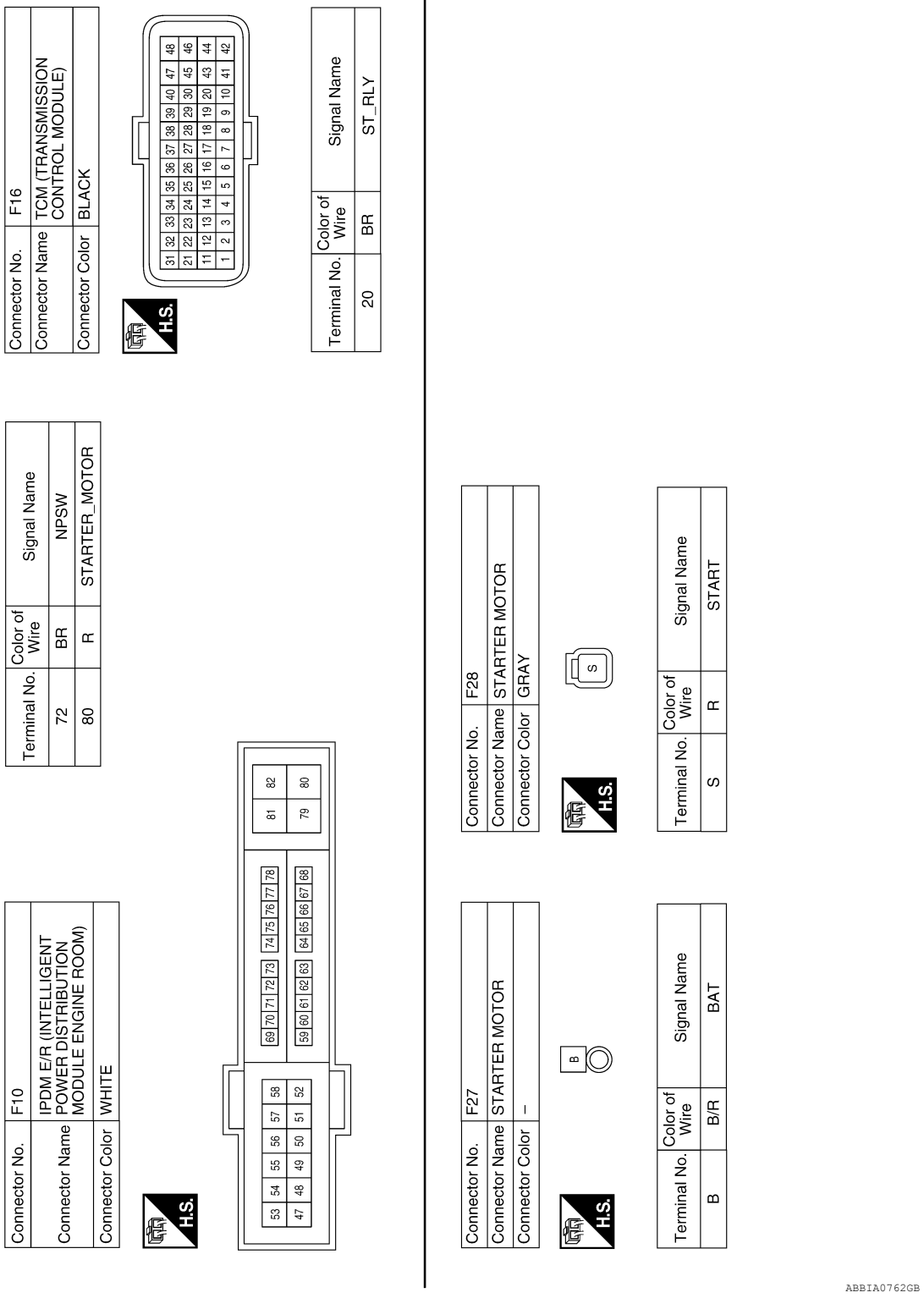

Connector No. E18
Connector Name IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE
H.S.
9 10 11 12 13 14
3 4 5 6 7 8
25 26 27 28 29 30 31 32 33 34
15 16 17 18 19 20 21 22 23 24
37 38
35 36
Terminal No. Color of Wire Signal Name
12 B GND (POWER)
30 BR ECM (WITH CVT)
Connector No. E30
Connector Name WIRE TO WIRE
Connector Color WHITE
H.S.
1G 2G 3G 4G 5G 6G 7G 8G 9G
10G 11G 12G 13G 14G 15G 16G 17G
18G 19G 20G 21G 22G 23G 24G 25G 26G
27G 28G 29G 30G 31G 32G 33G 34G
35G 36G 37G 38G 39G 40G 41G
42G 43G 44G 45G 46G 47G 48G 49G 50G
51G 52G 53G 54G 55G 56G 57G 58G
59G 60G 61G 62G 63G
64G 65G 66G 67G 68G 69G 70G 71G 72G
73G 74G 75G 76G 77G 78G 79G 80G
81G 82G 83G
Terminal No. Color of Wire Signal Name
20G BR –
33G BR –
Connector No. F4
Connector Name FUSIBLE LINK BOX (BATTERY)
Connector Color –
H.S.
5
Terminal No. Color of Wire Signal Name
5 B/R –
Connector No. E50
Connector Name JUNCTION BLOCK
Connector Color WHITE
H.S.
56 55
Terminal No. Color of Wire Signal Name
55 BR –
Connector No. E46
Connector Name JUNCTION BLOCK
Connector Color WHITE
H.S.
31 30 29 28 27 26 25
40 39 38 37 36 35 34 33 32
Terminal No. Color of Wire Signal Name
27 BR –
ABBIA0761GB


Connector No. F10
Connector Name IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE
H.S.
53 54 55 56 57 58
47 48 49 50 51 52
69 70 71 72 73 74 75 76 77 78
59 60 61 62 63 64 65 66 67 68
81 82
79 80
Terminal No. Color of Wire Signal Name
72 BR NPSW
80 R STARTER_MOTOR
Connector No. F16
Connector Name TCM (TRANSMISSION CONTROL MODULE)
Connector Color BLACK
H.S.
31 32 33 34 35 36 37 38 39 40 47 48
21 22 23 24 25 26 27 28 29 30 45 46
11 12 13 14 15 16 17 18 19 20 43 44
1 2 3 4 5 6 7 8 9 10 41 42
Terminal No. Color of Wire Signal Name
20 BR ST_RLY
Connector No. F27
Connector Name STARTER MOTOR
Connector Color –
H.S.
B
Terminal No. Color of Wire Signal Name
B B/R BAT
Connector No. F28
Connector Name STARTER MOTOR
Connector Color GRAY
H.S.
S
Terminal No. Color of Wire Signal Name
S R START
ABBIA0762GB

SYMPTOM DIAGNOSIS

STARTING SYSTEM

Symptom Table

INFOID:0000000006388872

Symptom	Reference
No normal cranking	Refer to STR-32, "Work Flow (With GR8-1200 NI)" or STR-35, "Work Flow (Without GR8-1200 NI)".
Starter motor does not rotate	

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000006388873

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000006388874

NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

This vehicle is equipped with a push-button ignition switch and a steering lock unit.
If the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.
If turning the steering wheel is required with the battery disconnected or discharged, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Carry the Intelligent Key or insert it to the key slot and turn the push-button ignition switch to ACC position. (At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)

6. Perform self-diagnosis check of all control units using CONSULT.

PREPARATION

PREPARATION

Special Service Tool

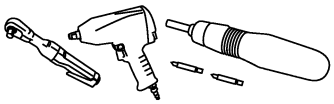
INFOID:0000000008655643

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (—) Model GR8-1200 NI Multitasking battery and electrical diagnostic station  AWIIA1239ZZ	Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.

Commercial Service Tool

INFOID:0000000008655644

Tool name	Description
Power tool  PIIB1407E	Loosening nuts, screws and bolts

REMOVAL AND INSTALLATION

STARTER MOTOR

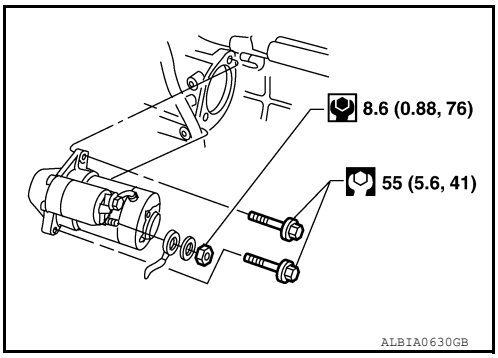
Removal and Installation

INFOID:0000000006388877

CVT Models

REMOVAL

1. Remove the battery and battery tray. Refer to PG-68, "Removal and Installation (Battery)" for Coupe, and PG-140, "Removal and Installation (Battery)" for Sedan.
2. Disconnect the starter motor harness connectors.
3. Remove the starter motor bolts using power tools.
4. Remove the starter motor.



INSTALLATION

Installation is in the reverse order of removal.

SERVICE DATA AND SPECIFICATIONS (SDS)

STARTER MOTOR

Starter

INFOID:0000000006388878

Application		VQ35DE
		CVT model
Type*		Melco M000TA0072
		Reduction gear type
System voltage		12V
No-load	Terminal voltage	11V
	Current	90A Max.
	Revolution	2,400 RPM/Min.

*:Always check with the Parts Department for the latest parts information.