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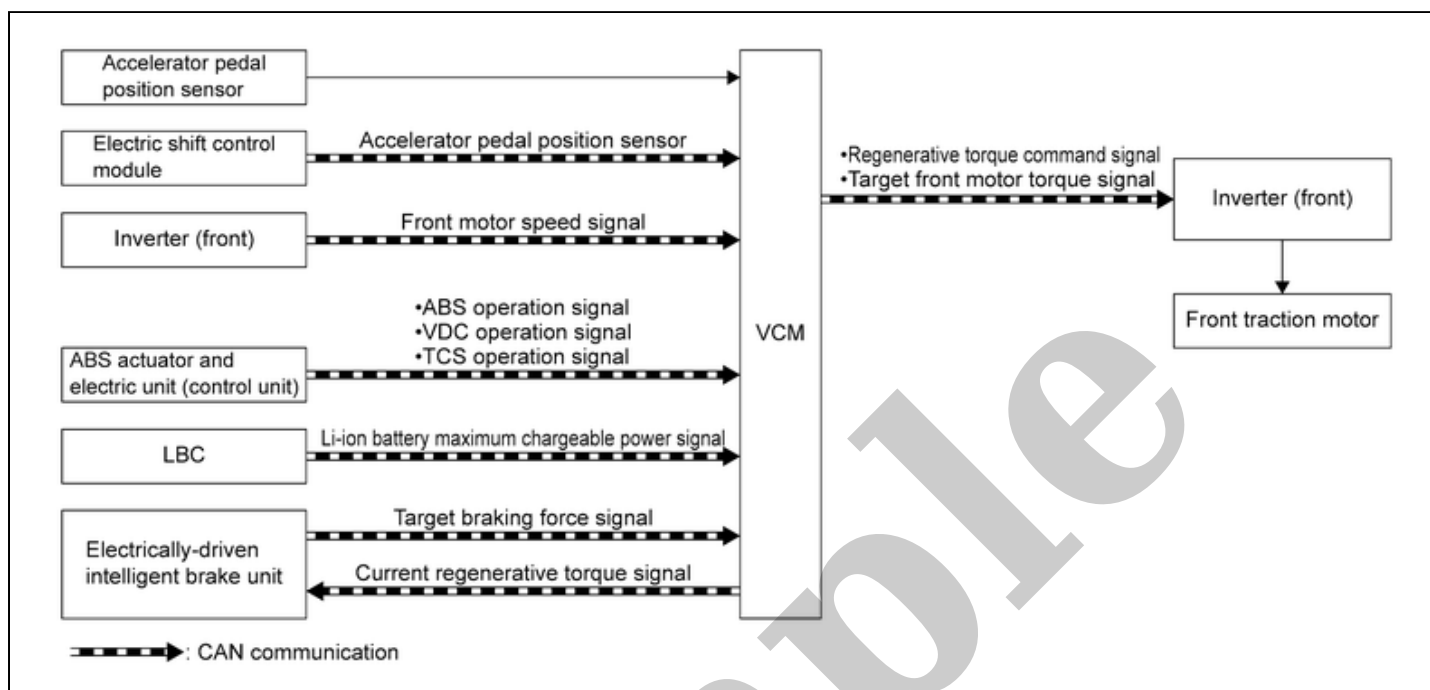
FactoryManuals.net is a great resource for anyone who wants to save money on repairs by doing their own work. The manuals provide detailed instructions and diagrams that make it easy to understand how to fix a vehicle.

2010 NISSAN Navara / Frontier Double Cab OEM Service and Repair Workshop Manual

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2WD models

SYSTEM DIAGRAM



SIEMD-7196737-02-000391592

Component parts	Function
Accelerator pedal position sensor	Transmits accelerator pedal position sensor signal to VCM.
Electric shift control module	Transmits shift information to VCM.
Inverter (front)	Inverter (front) transmits the front motor speed signal to VCM. Receives the following signal from VCM. <ul style="list-style-type: none"> • Regenerative torque command signal • Target front motor torque signal
ABS actuator and electric unit (control unit)	Transmits the following signals to VCM. <ul style="list-style-type: none"> • ABS operation signal • VDC operation signal • TCS operation signal
LBC	LBC transmits Li- ion battery chargeable power signal to VCM.
Electrically-driven intelligent brake unit	Electrically-driven intelligent brake unit transmits target braking force signal to VCM and receives regenerative torque signal from VCM.
VCM	Refer to Component Description .



NOTE:

VCM calculates vehicle speed, based on a motor speed.

DESCRIPTION

The front traction motor which is normally used as traction force, is operated as a generator during deceleration to charge Li-ion battery. At the same time the rotational resistance of the generator is utilized as braking force.

For the operation principle, Refer to [System Description](#).

REGENERATIVE BRAKE CONTROL

When the brake pedal is depressed while driving, the target braking force signal is transmitted from the electrically-driven intelligent brake unit to VCM within the range of the regenerative torque signal transmitted from VCM. VCM calculates the target regenerative torque from the signal and transmits the target front motor torque signal to the inverter (front). Further, the electrically-driven intelligent brake unit receives the regenerative torque signal so that the braking force can comprehensively be controlled.

REGENERATION CHARGE CONTROL

VCM determines the regenerative charging amount from the Li-ion battery maximum chargeable power signal sent from the Li-ion battery. Moreover, VCM determines the energy recovery amount while performing a collaborative control with the electrically-driven intelligent brake system so that a suitable braking force is provided according to the brake pedal operation amount.

After determining the energy recovery amount, VCM transmits a regenerative torque command signal to the inverter (front) and starts regeneration charge.

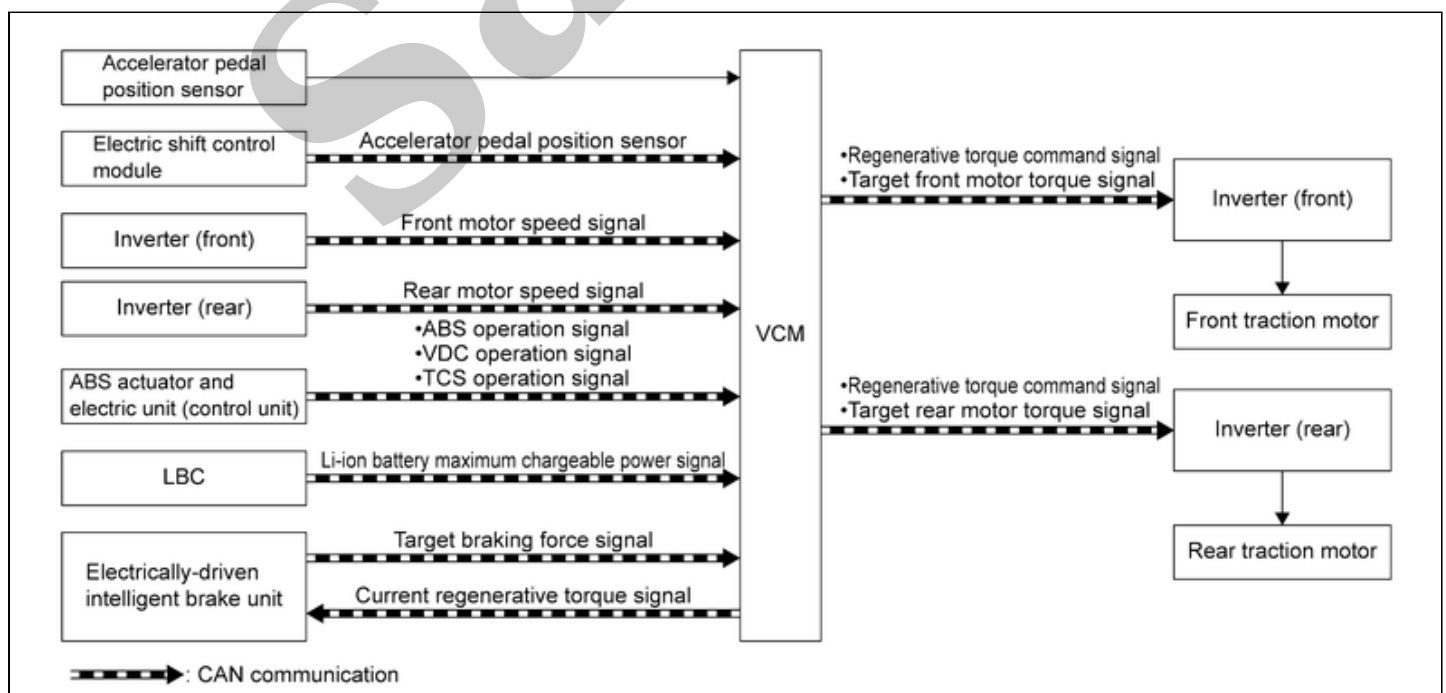


NOTE:

VCM performs the regenerative charge control constantly at deceleration. However, when the Li-ion battery is in the fully charged state, VCM stops the regenerative charge control. Accordingly, deceleration may be felt weak when the accelerator pedal is released during driving.

AWD models

SYSTEM DIAGRAM



SIEMD-7196737-01-000415268

Component parts	Function
Accelerator pedal position sensor	Transmits accelerator pedal position sensor signal to VCM.

Component parts	Function
Electric shift control module	Transmits shift information to VCM.
Inverter (front)	Inverter (front) transmits the front motor speed signal to VCM. Receives the following signal from VCM. <ul style="list-style-type: none"> • Regenerative torque command signal • Target front motor torque signal
Inverter (rear)	Inverter (rear) transmits the rear motor speed signal to VCM. Receives the following signal from VCM. <ul style="list-style-type: none"> • Regenerative torque command signal • Target rear motor torque signal
ABS actuator and electric unit (control unit)	Transmits the following signals to VCM. <ul style="list-style-type: none"> • ABS operation signal • VDC operation signal • TCS operation signal
LBC	LBC transmits Li- ion battery chargeable power signal to VCM.
Electrically-driven intelligent brake unit	Electrically-driven intelligent brake unit transmits target braking force signal to VCM and receives regenerative torque signal from VCM.
VCM	Refer to Component Description .



NOTE:

VCM calculates vehicle speed, based on a motor speed.

DESCRIPTION

The front traction motor and rear traction motor which is normally used as traction force, is operated as a generator during deceleration to charge Li-ion battery. At the same time the rotational resistance of the generator is utilized as braking force.

For the operation principle, Refer to [System Description](#)(Front traction motor), [System Description](#)(Rear traction motor).

REGENERATIVE BRAKE CONTROL

When the brake pedal is depressed while driving, the target braking force signal is transmitted from the electrically-driven intelligent brake unit to VCM within the range of the regenerative torque signal transmitted from VCM. VCM calculates the target regenerative torque from the signal and transmits the target motor torque signal to the inverter (front) and inverter (rear). Further, the electrically-driven intelligent brake unit receives the regenerative torque signal so that the braking force can comprehensively be controlled.

REGENERATION CHARGE CONTROL

VCM determines the regenerative charging amount from the Li-ion battery maximum chargeable power signal sent from the Li-ion battery. Moreover, VCM determines the energy recovery amount while performing a collaborative control with the electrically-driven intelligent brake system so that a suitable braking force is provided according to the brake pedal operation amount.

After determining the energy recovery amount, VCM transmits a regenerative torque command signal to the inverter (front) and inverter (rear) and starts regeneration charge.



NOTE:

VCM performs the regenerative charge control constantly at deceleration. However, when the Li-ion battery is in the fully charged state, VCM stops the regenerative charge control. Accordingly, deceleration may be felt weak when the accelerator pedal is released during driving.

Sample

CONTROL OUTLINE

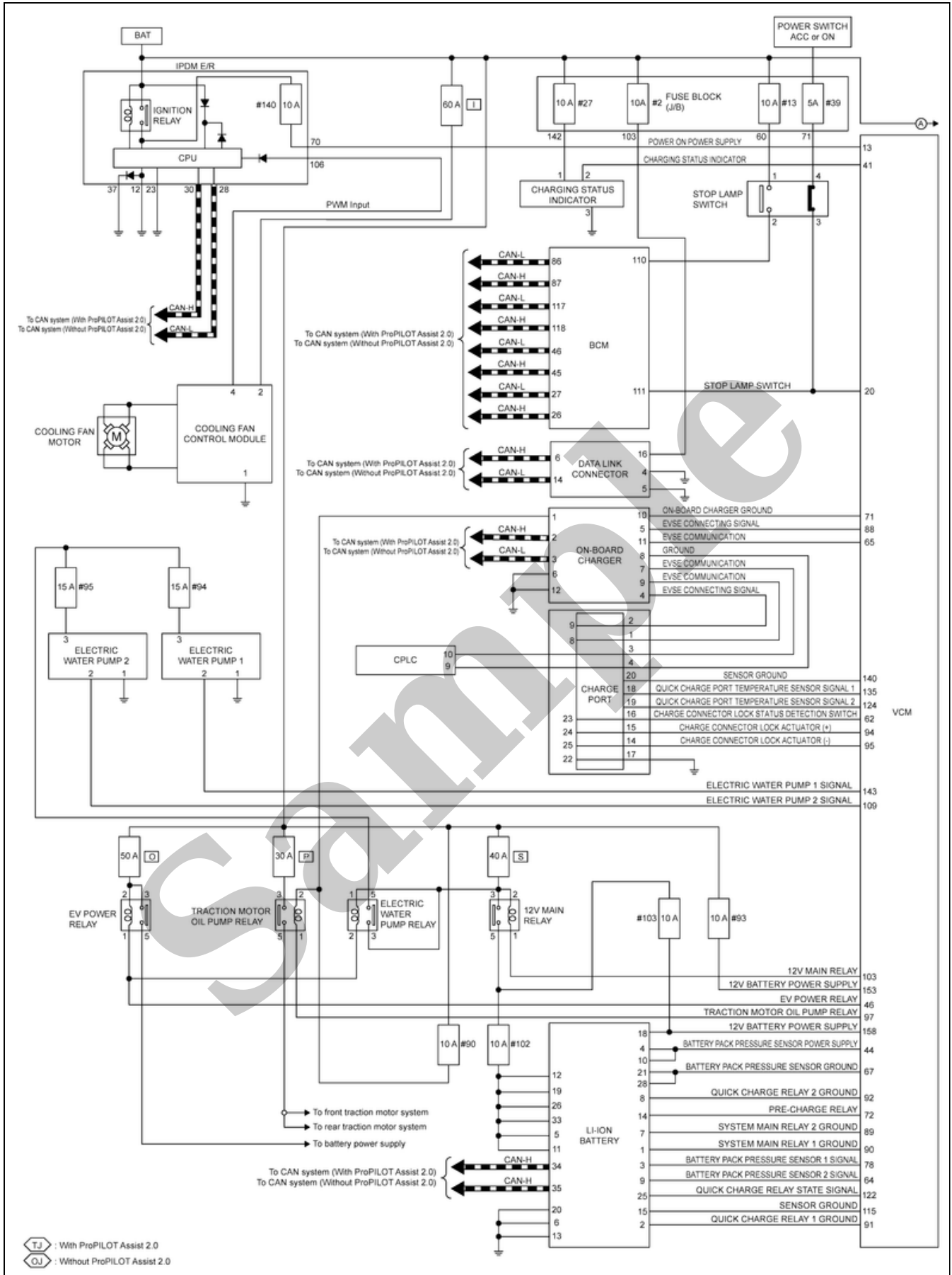
EV requires all electric power source for the system operation.

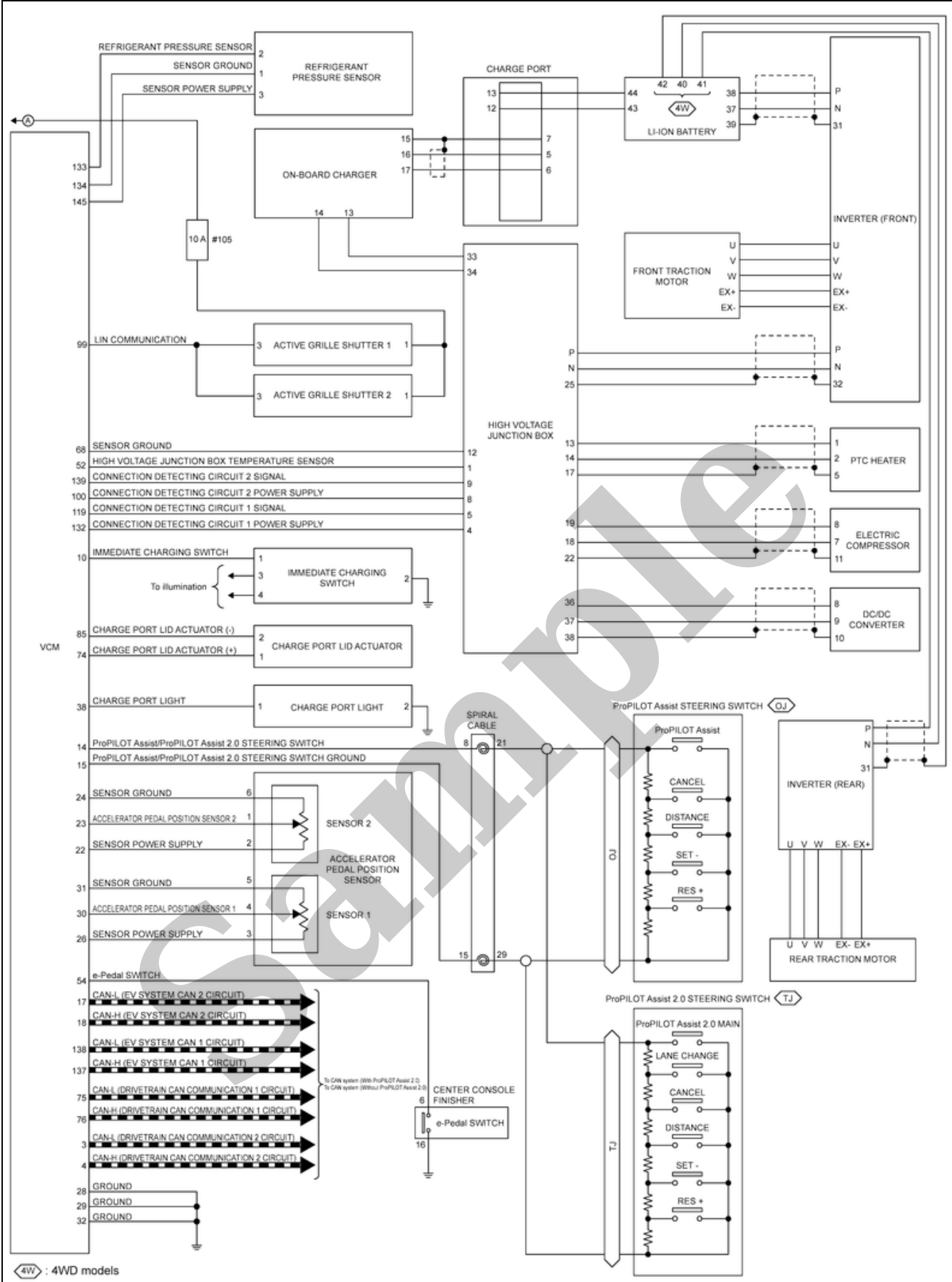
The power charged in the Li-ion battery is supplied as high-voltage direct current to the high-voltage system. Meanwhile the power is converted by the DC/DC converter and supplied to the 12 V power system.

VCM judges the vehicle status from various information and performs various EV system controls in a comprehensive manner.

Main Control Contents of VCM

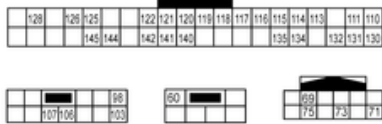
Control	Reference
EV system start up control	Refer to System Description .
High voltage power supply control	Refer to System Description .
Power cut off control	Refer to System Description .
Motor power control	Refer to System Description .
Motor regeneration control	Refer to System Description .
AWD system	Refer to System Description .
Air conditioner control	Refer to System Description .
Li-ion battery charge control	Refer to System Description .
Charge port control	Refer to System Description .
Motor regeneration control	Refer to System Description .
MAC (Message Authentication Code)	<p>MAC (Message Authentication Code) is a function that prevents unauthorized communication from other than the ECU with MAC function by secure authentication communication.</p> <p>VCM can write a MAC key required for communication between the ECUs and perform MAC diagnosis.</p>



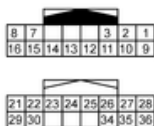


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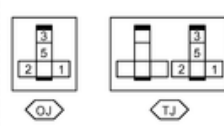
FUSE BLOCK (J/B)



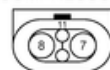
SPIRAL CABLE



EV POWER RELAY



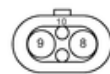
ELECTRIC COMPRESSOR



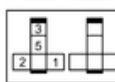
PTC HEATER



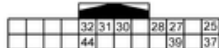
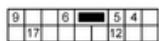
DC/DC CONVERTER



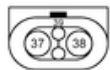
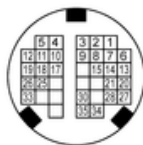
ELECTRIC WATER PUMP RELAY



IPDM E/R



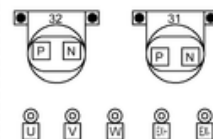
LI-ION BATTERY



ON-BOARD CHARGER



INVERTER (FRONT)



FRONT TRACTION MOTOR



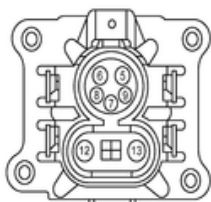
TRACTION MOTOR OIL PUMP RELAY



12V MAIN RELAY



CHARGE PORT



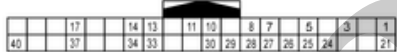
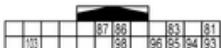
ELECTRIC WATER PUMP 2



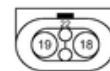
CENTER CONSOLE FINISHER



BCM



HIGH VOLTAGE JUNCTION BOX



DATA LINK CONNECTOR



REFRIGERANT PRESSURE SENSOR



ACTIVE GRILLE SHUTTER 1



ACTIVE GRILLE SHUTTER 2



COOLING FAN CONTROL MODULE



ACCELERATOR PEDAL POSITION SENSOR



CHARGING STATUS INDICATOR



IMMEDIATE CHARGING SWITCH



CHARGE PORT LIGHT



ELECTRIC WATER PUMP 1



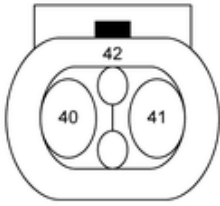
STOP LAMP SWITCH




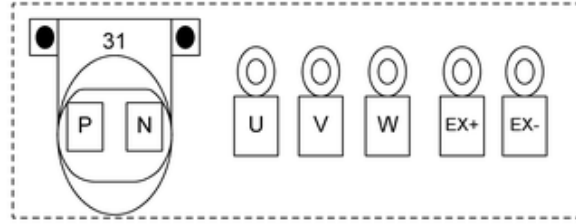
CHARGE PORT LID ACTUATOR




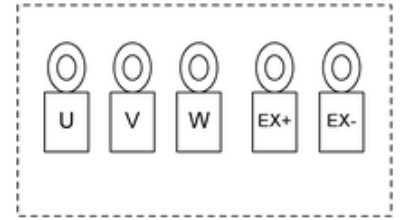
LI-ION BATTERY : 



INVERTER (REAR) : 



REAR TRACTION MOTOR : 



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Sample