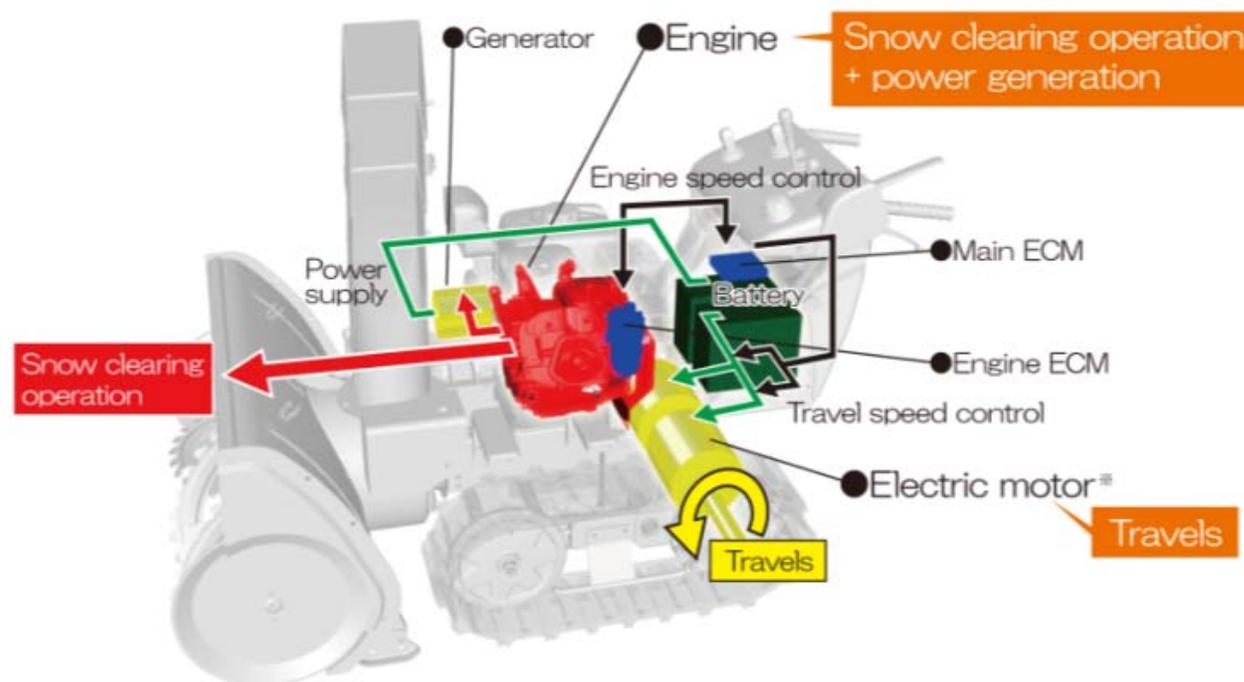


1. Explain how the all-new Honda 1336i hybrid snowblower operates. How do the engine and electric motor work together to power the machine?

Honda Power Equipment, a division of American Honda Motor Co., Inc., is introducing the Honda HS1336i snowblower – the first Honda hybrid snowblower design available for the U.S. market. As the below diagram illustrates, the hybrid configuration of the HS1336i model combines a gasoline engine that simultaneously drives the snowblower auger/fan apparatus (clearing and throwing the snow) and charges the battery, with the electric motors (two in parallel) controlling the track drive forward propulsion. These motors also function as a generator during deceleration of the snowblower – serving to regenerate electrical energy.

Equipped with the Honda iGX390 four-stroke engine, the operation of the HS1336i snowblower results in lower fuel consumption and lower emissions as compared to a conventional snowblower. The all-new hybrid model also boasts superior control/ease-of-use; powerful operation/snow throwing; lower noise and vibration; reliable operation; and enhanced technology.

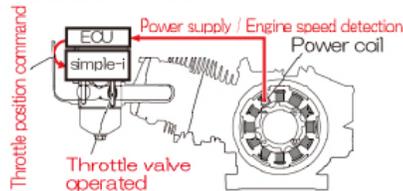
Honda HS1336i Operation



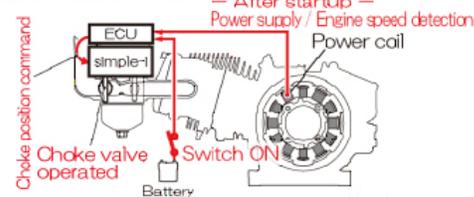
2. Provide technical details about the operation and benefits provided by the Honda iGX390 engine as part of the new Honda 1336i hybrid snowblower.

Central to the iGX engine is an integrated electronic control unit (ECU) with a Self Tuning Regulator (STR™) Governor system. The ECU controls such functions as starting, throttle opening, ignition timing, and diagnostics. It is a precise but simple structure, making this system compact and reliable. In almost any condition, the engine speed is regulated almost perfectly with virtually no governor droop. For example, controlling the throttle with a stepping motor makes it possible to stabilize the engine speed (note following diagram on the left); as the right diagram illustrates, a single motor controls the throttle and the choke in combination, and the wax element with a heater optimizes the choke opening to make the steps from startup to warming automatic.

- Engine speed is controlled depending on the setup mode.



- No need to operate the choke before and after engine start.



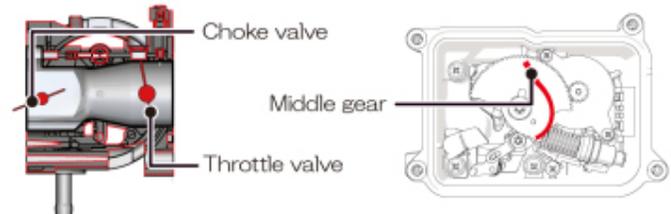
The ECU / Carburetor assembly of the Honda iGX390 is designed with innovative technology, including proprietary new ECU construction techniques. The assembly also includes stepping motors, reduction gears, a power regulator, and carburetor hardware. This technology enables exceptional control of engine speed under varying load conditions, remote control of engine start / stop and drive-by-wire remote control capabilities. Additionally, engine speed and governor characteristics can be programmed and varied based on the equipment application's load, speed and power requirements. This design is in contrast to a more conventional engine's mechanical governor where the engine rpms are detected by the governor's fly weight and the throttle moves to the balance point between spring and governor force. In this case, there is a design compromise in tuning the governor system to work on varying applications. And, inevitably a droop or gap will occur between the target RPM and the actual RPM depending on load conditions.

3. How is the iGX technology optimized for the new Honda 1336i hybrid snowblower?

This optimization can be broken down into the following points:

The throttle and choke valves are controlled in combination with a middle gear, making it possible to operate the blower even during warm-up in cold temperatures.

The wax element with an electric heater keeps the choke valve fully open after warm-up to prevent choking during hot restart.



The choke valve has a relief mechanism to respond to the load change while the choke is operating.

In addition, the throttle is fixed at the full open position because the engine speed is controlled with the choke valve when the choke is operating (during warm up). On the snowblower, the load control system of the blower recognizes the 'throttle fully opened' status to be equal to the 'large load' status, which, as a result, might block the operation until warm-up is completed.

