HEADLIGHT AUTO LEVELING SYSTEM

id091800010900

Outline

- The headlight auto leveling system automatically adjusts the headlight LO optical axis in response to changes in load and passenger conditions to prevent blinding of oncoming vehicles from headlight glare and to assure a range of visibility.

Function

- The headlight auto leveling system is controlled by the auto leveling control module/AFS control module/adaptive LED headlights control module.

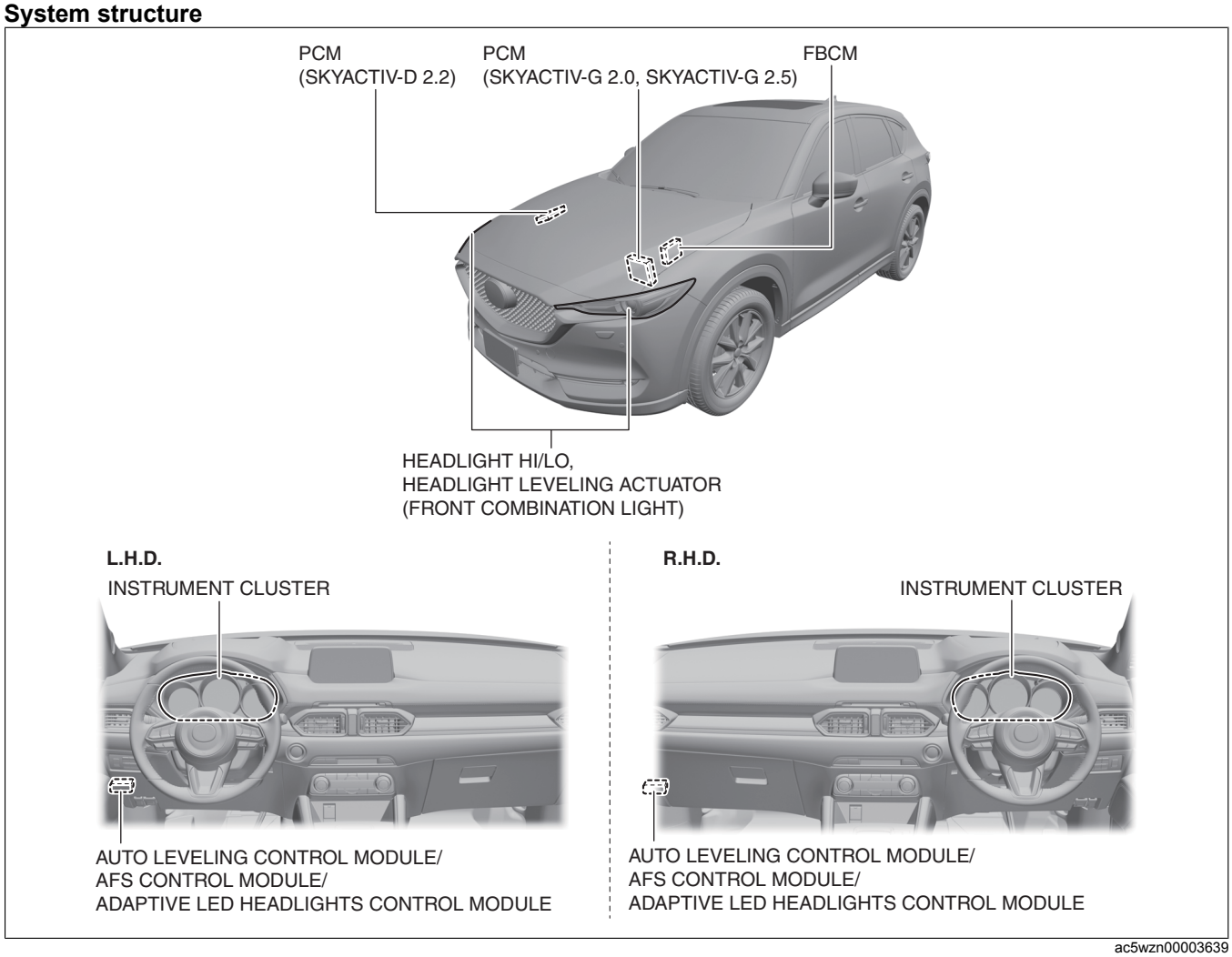
Optical axis adjustment function

- If there is a vehicle height change with the ignition switched ON (engine on or off) and the headlights LO turned on, the auto leveling control module/AFS control module/adaptive LED headlights control module automatically adjusts the headlight LO optical axis.
- The auto leveling control module/AFS control module/adaptive LED headlights control module controls the optical axis adjustment function based on the following signals.

Signal name	Sending module/part name	Communication method
Vehicle speed signal	PCM	HS-CAN
Ignition switch position signal	Instrument cluster	
Headlight LO on condition signal	Front body control module (FBCM)	

Structure/Construction

System structure



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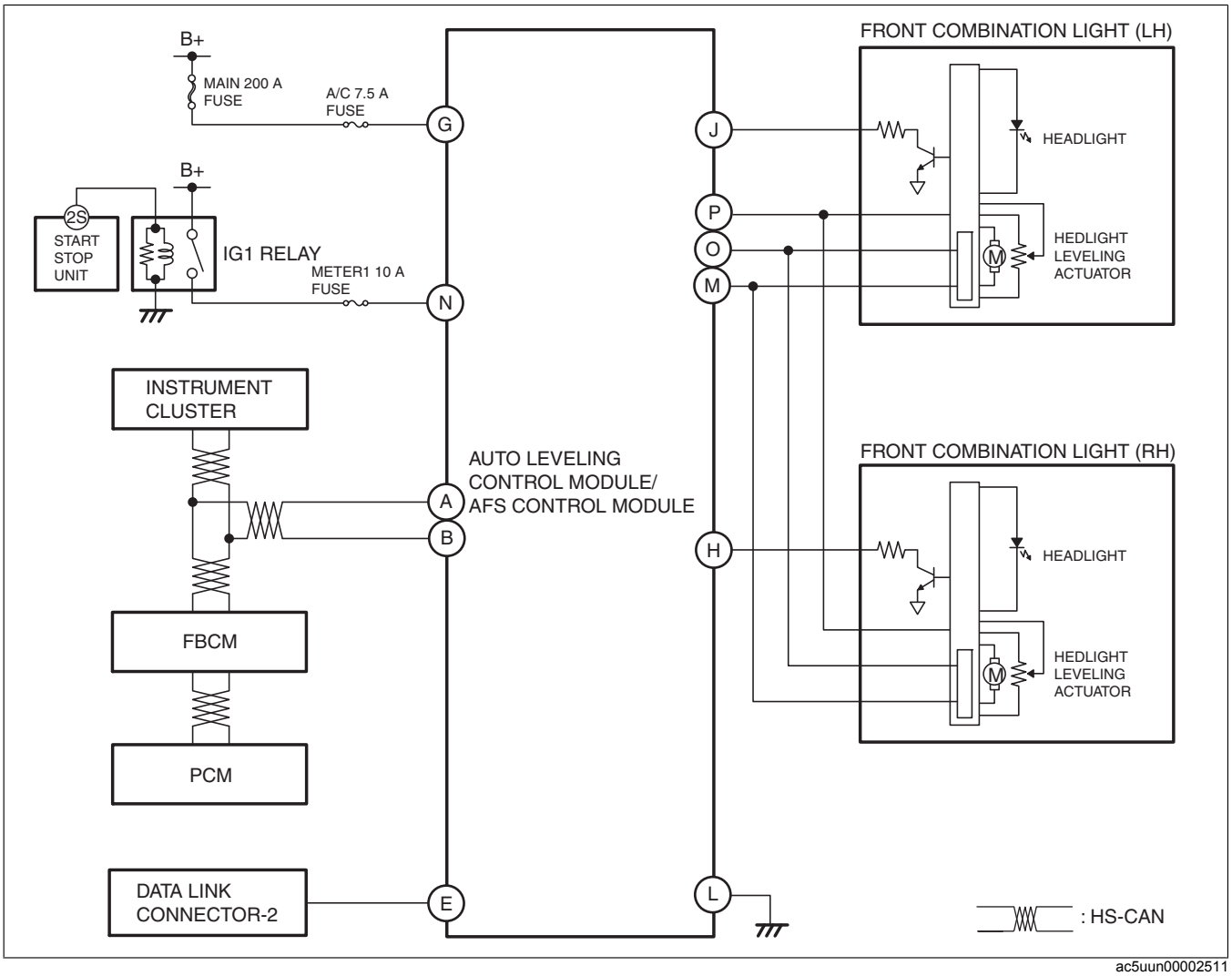
System wiring diagram

Without adaptive LED headlights



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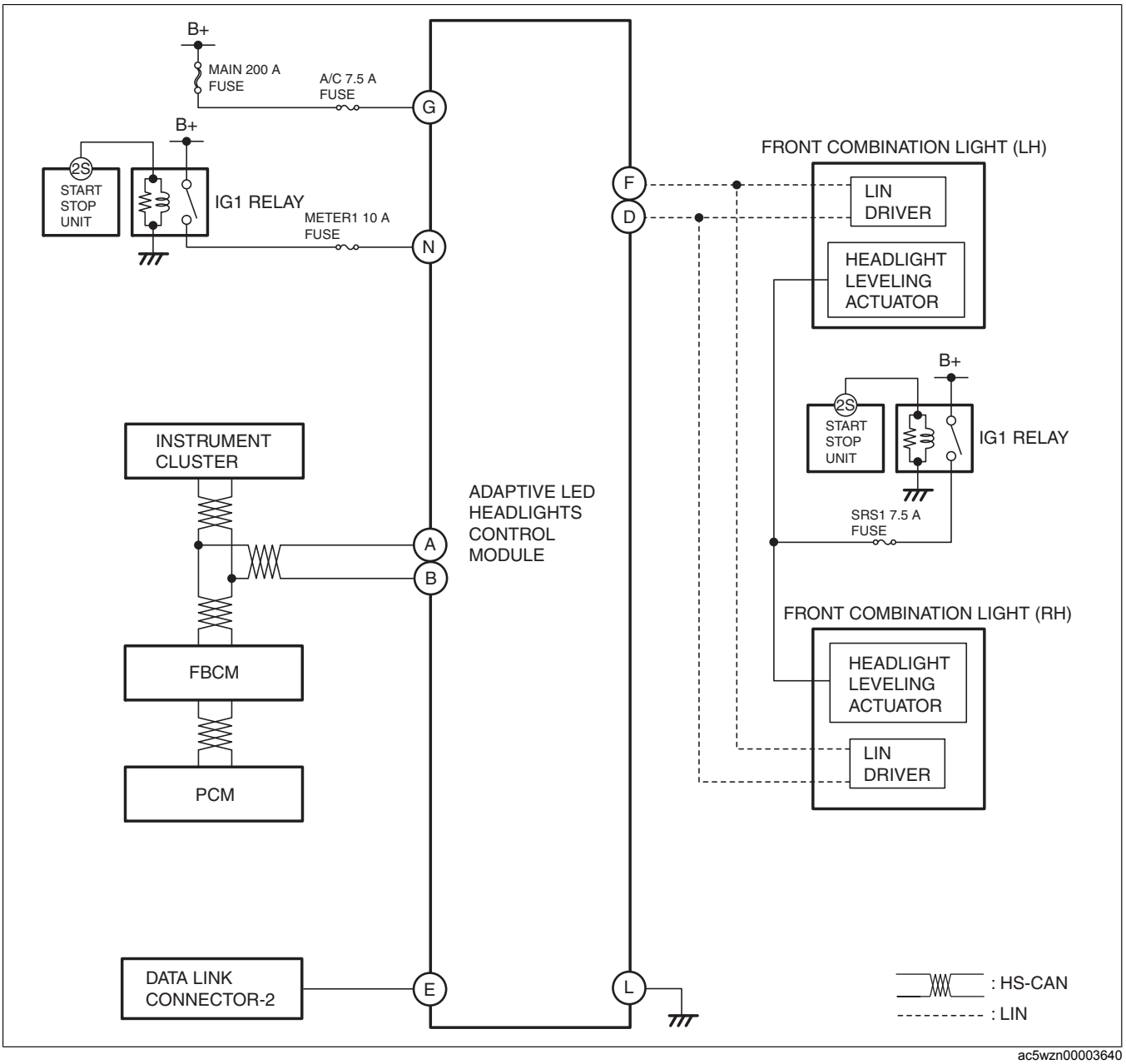
With adaptive LED headlights



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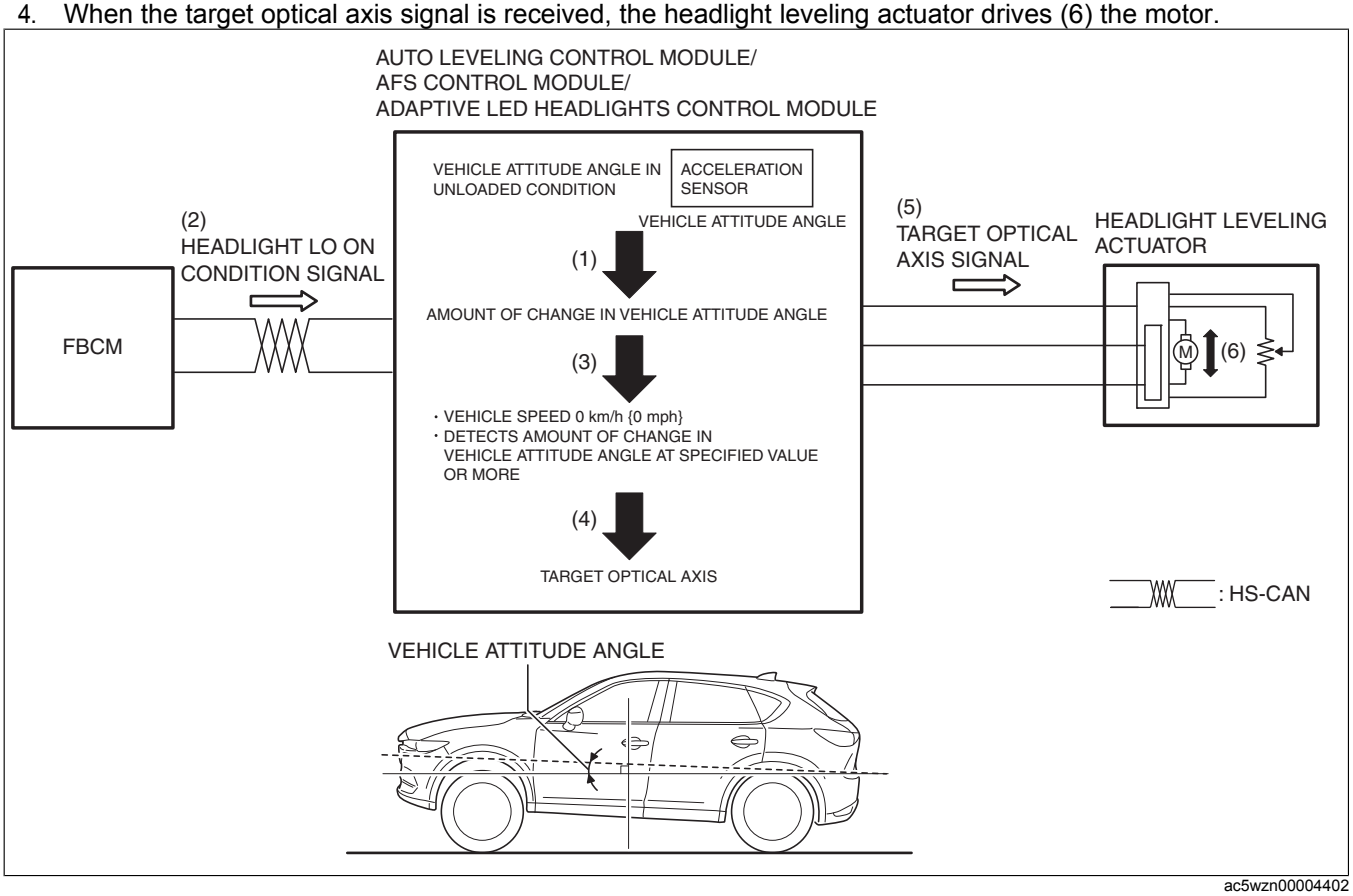
Operation
Vehicle attitude angle changes while vehicle is stopped
Operation conditions

- Operates when all of the following conditions are met:
  - Vehicle speed is **0 km/h {0 mph}** (**0 km/h {0 mph}** vehicle speed signal is received)
  - Ignition is switched ON (engine off or on)(ignition switch position ON signal is received)
  - Headlights LO on (headlight LO on condition signal reception)
  - Detects amount of change in vehicle attitude angle* at specified value or more

Operation

1. The auto leveling control module/AFS control module/adaptive LED headlights control module calculates (1) the amount of change in the vehicle attitude angle based on the vehicle attitude angle in the unloaded condition and the vehicle attitude angle detected by the internal acceleration sensor.
2. When the auto leveling control module/AFS control module/adaptive LED headlights control module detects (3) change in the vehicle attitude angle at a vehicle speed of **0 km/h {0 mph}** and the amount of change in the vehicle attitude angle at the specified value or more while it receives (2) a headlight LO on condition signal via CAN communication from the front body control module (FBCM), it calculates (4) the target optical axis based on the calculated amount of change in the vehicle attitude angle.
3. The auto leveling control module/AFS control module/adaptive LED headlights control module sends (5) the calculated target optical axis signal to the headlight leveling actuator.

4. When the target optical axis signal is received, the headlight leveling actuator drives (6) the motor.



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* : The amount of change in the vehicle attitude angle is the calculated value for the vehicle attitude angle information in the unloaded condition recorded by the auto leveling control module/AFS control module/adaptive LED headlights control module for the initial learning and the vehicle attitude angle information detected by the acceleration sensor.

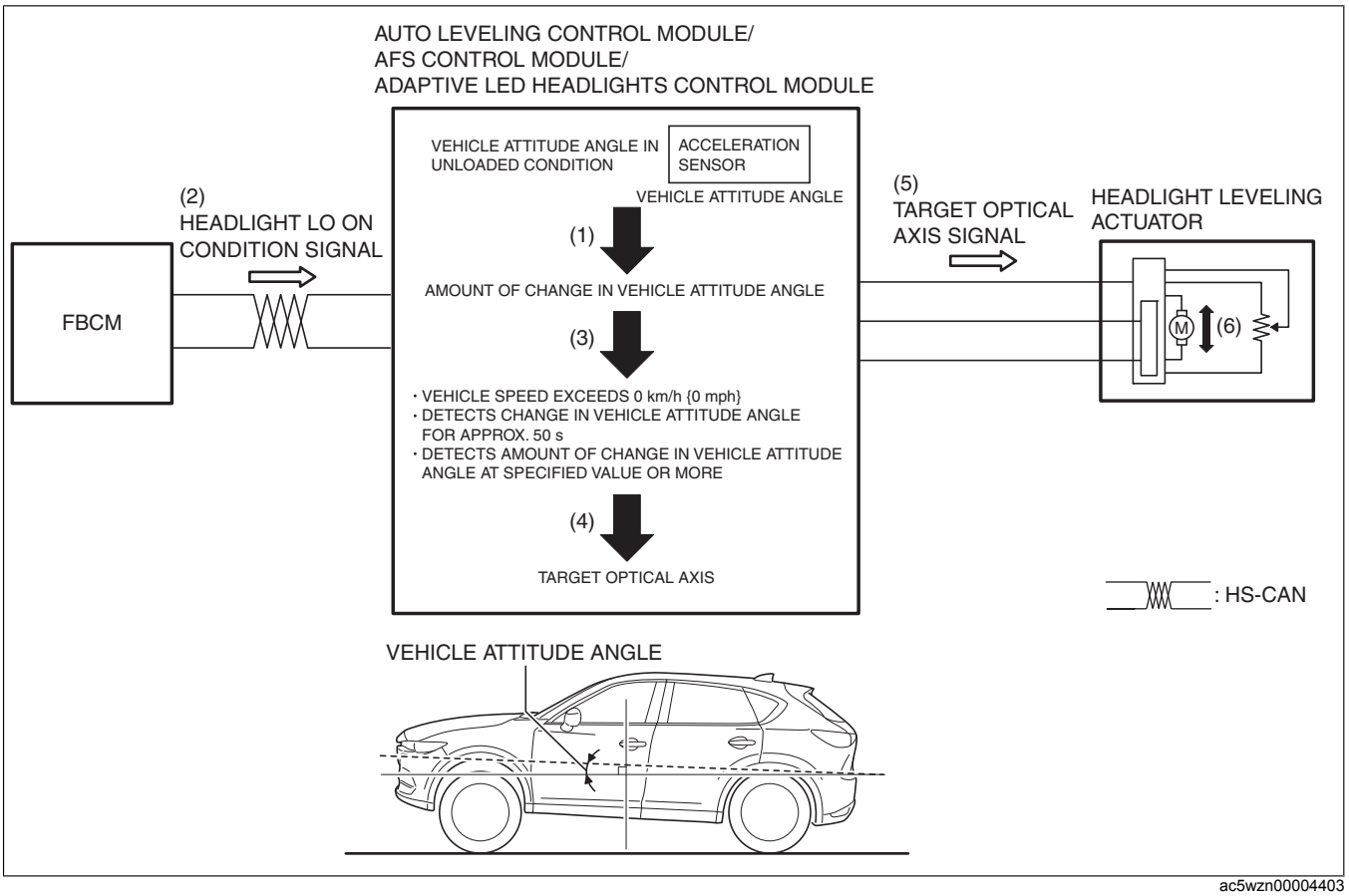
Vehicle attitude angle changes while vehicle is being driven

Operation conditions

- Operates when all of the following conditions are met:
  - — Vehicle speed exceeds **0 km/h {0 mph}** (vehicle speed signal of exceeding **0 km/h {0 mph}** is received)
  - — Headlight LO on (headlight LO on condition signal reception)
  - — Detects change in vehicle attitude angle for **approx. 50 s**
  - — Detects amount of change in vehicle attitude angle* at specified value or more

Operation

1. The auto leveling control module/AFS control module/adaptive LED headlights control module calculates (1) the amount of change in the vehicle attitude angle* based on the vehicle attitude angle in the unloaded condition and the vehicle attitude angle detected by the internal acceleration sensor.
2. When the auto leveling control module/AFS control module/adaptive LED headlights control module detects (3) change in the vehicle attitude angle at a vehicle speed of **0 km/h {0 mph} or more** for **approx. 50 s** and the amount of change in the vehicle attitude angle at the specified value or more while it receives (2) a headlight LO on condition signal via CAN communication from the front body control module (FBCM), it calculates (4) the target optical axis based on the calculated amount of change in the vehicle attitude angle.
3. The auto leveling control module/AFS control module/adaptive LED headlights control module sends (5) the calculated target optical axis signal to the headlight leveling actuator.
4. When the target optical axis signal is received, the headlight leveling actuator drives (6) the motor.



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* : The amount of change in the vehicle attitude angle is the calculated value for the vehicle attitude angle information in the unloaded condition recorded by the auto leveling control module/AFS control module/adaptive LED headlights control module for the initial learning and the vehicle attitude angle information detected by the acceleration sensor.