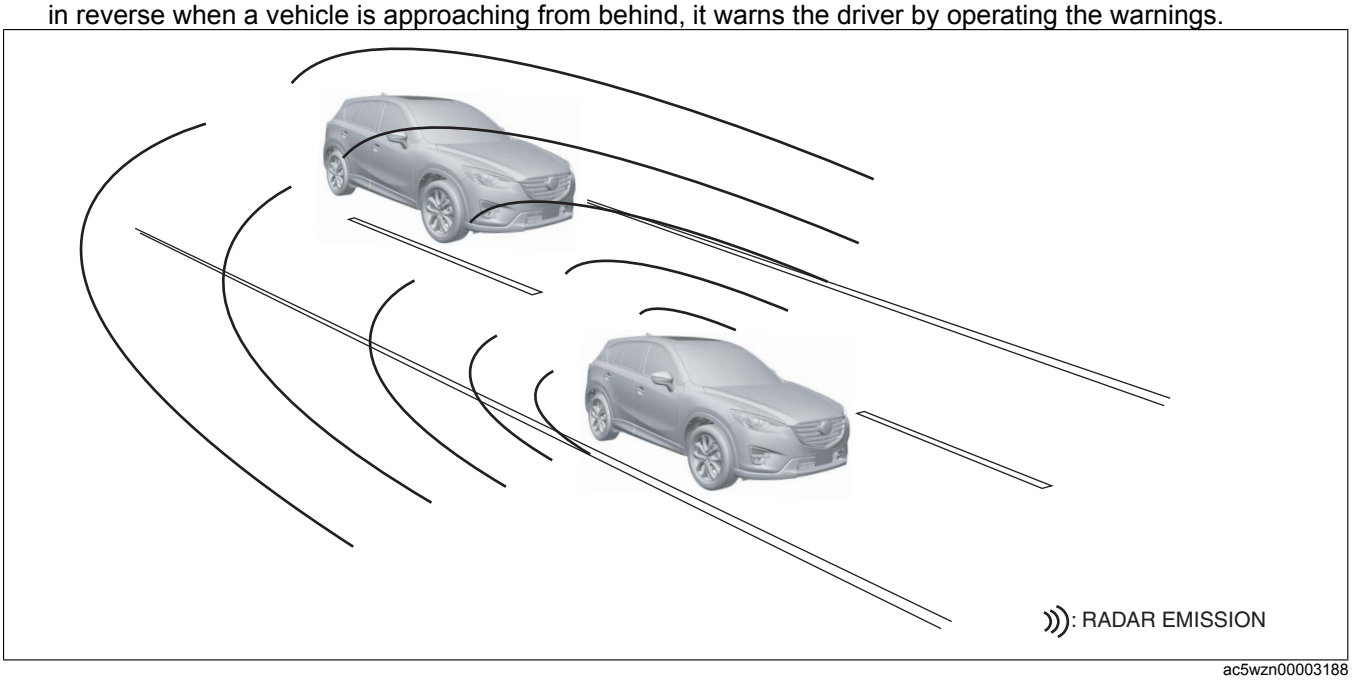
BLIND SPOT MONITORING (BSM) SYSTEM [Except Australian specs.]

id1510000028a2

Outline

- The blind spot monitoring (BSM) system detects vehicles approaching from behind using radar and alerts the driver of the presence of an approaching vehicle.In addition, if the turn switch is operated or the vehicle is driven in reverse when a vehicle is approaching from behind, it warns the driver by operating the warnings.



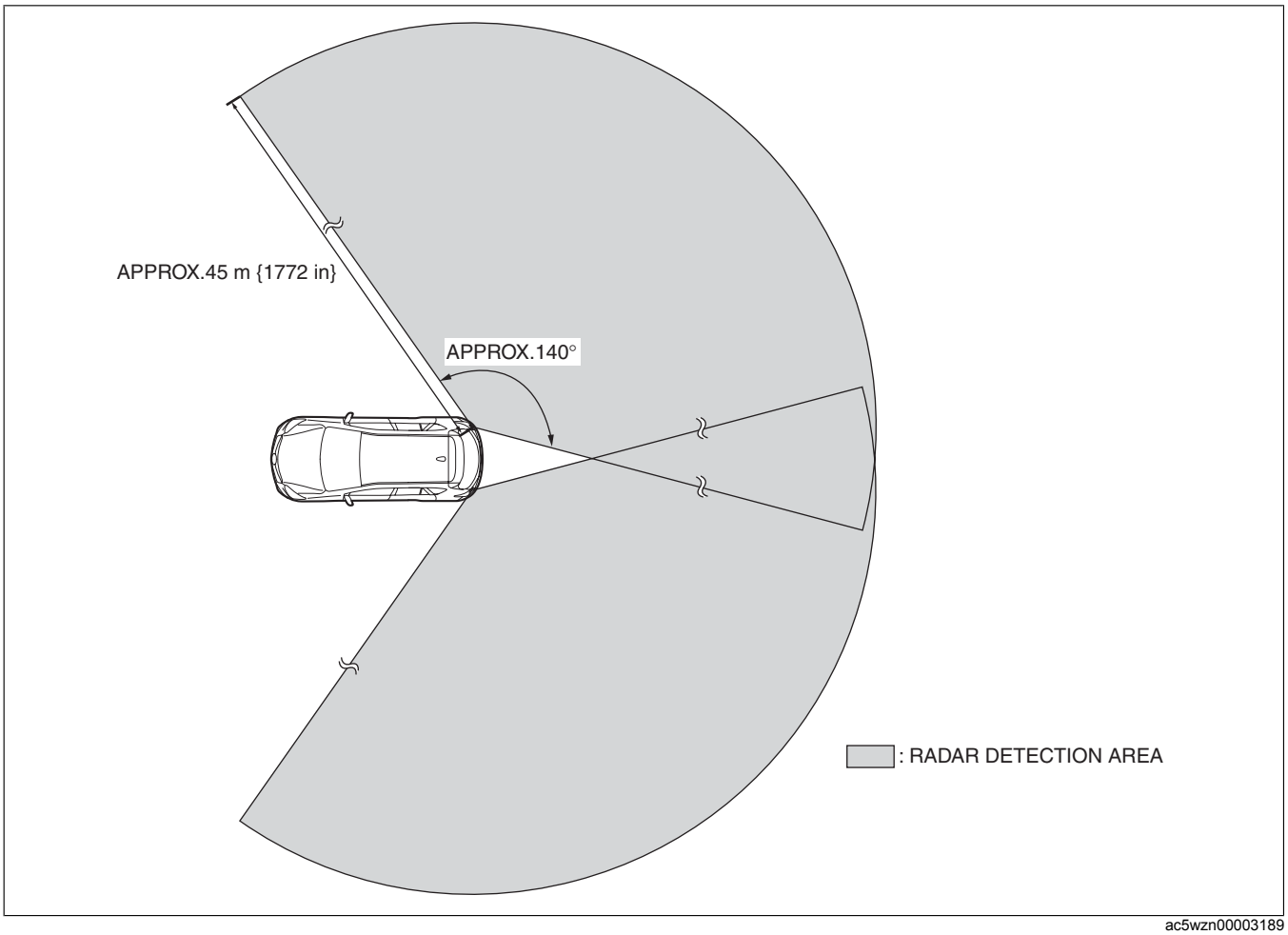
ac5wzn00003188

Functions

- The blind spot monitoring (BSM) system detects vehicles approaching from behind using the obstruction detection function of the blind spot monitoring (BSM) control module. For details on the obstruction detection function, refer to the [BLIND SPOT MONITORING (BSM) CONTROL MODULE]. (See BLIND SPOT MONITORING (BSM) CONTROL MODULE [Except Australian specs.].)
- The blind spot monitoring (BSM) system has a blind spot monitoring (BSM) function which warns when the vehicle is changing lanes, and a rear crossing traffic alert (RCTA) function which warns when the vehicle is reversing.

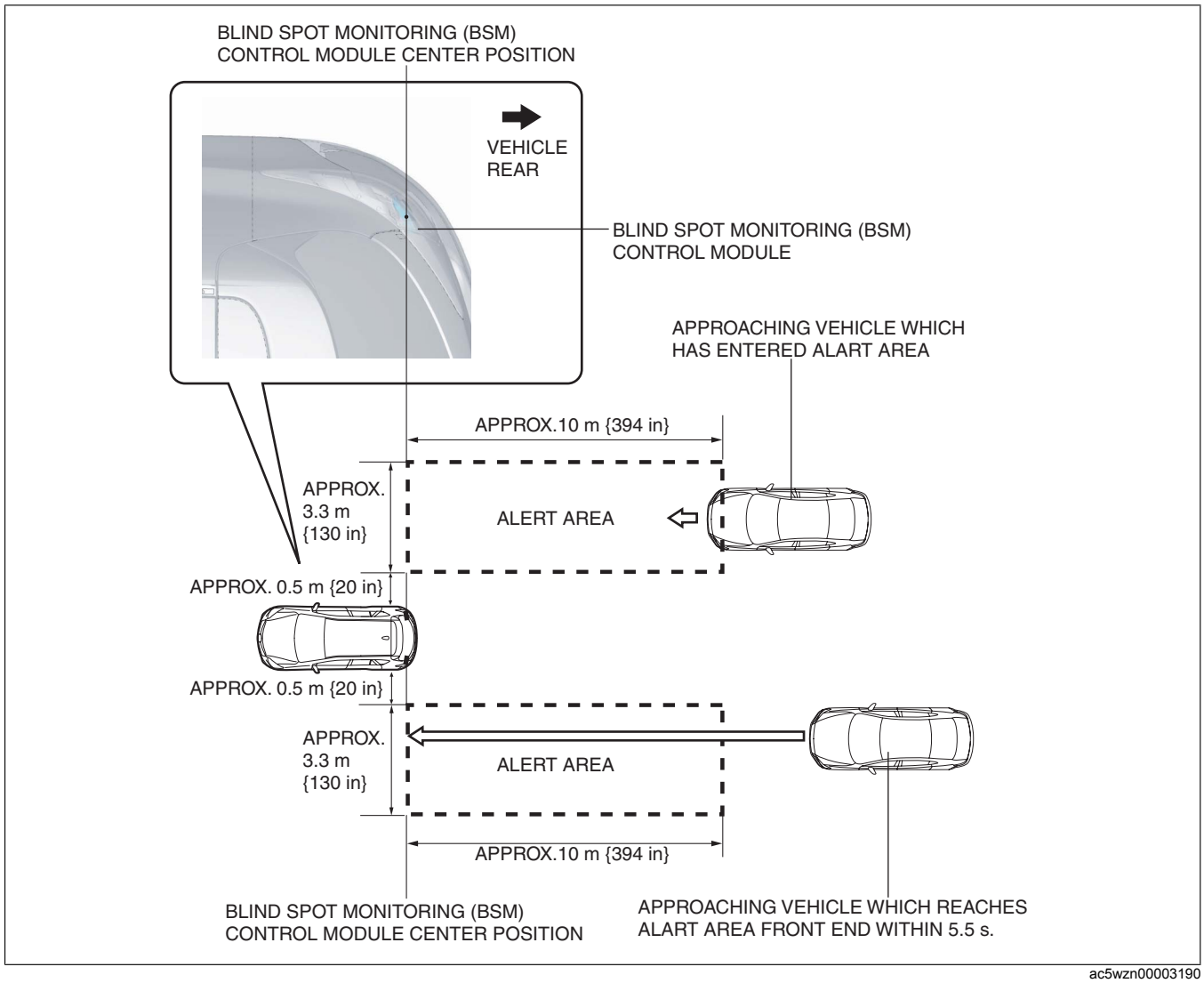
Blind spot monitoring (BSM) function

- When the vehicle speed is 30 km/h {19 mph} or more, the blind spot monitoring (BSM) function launches and starts detecting approaching vehicles.



ac5wzn00003189

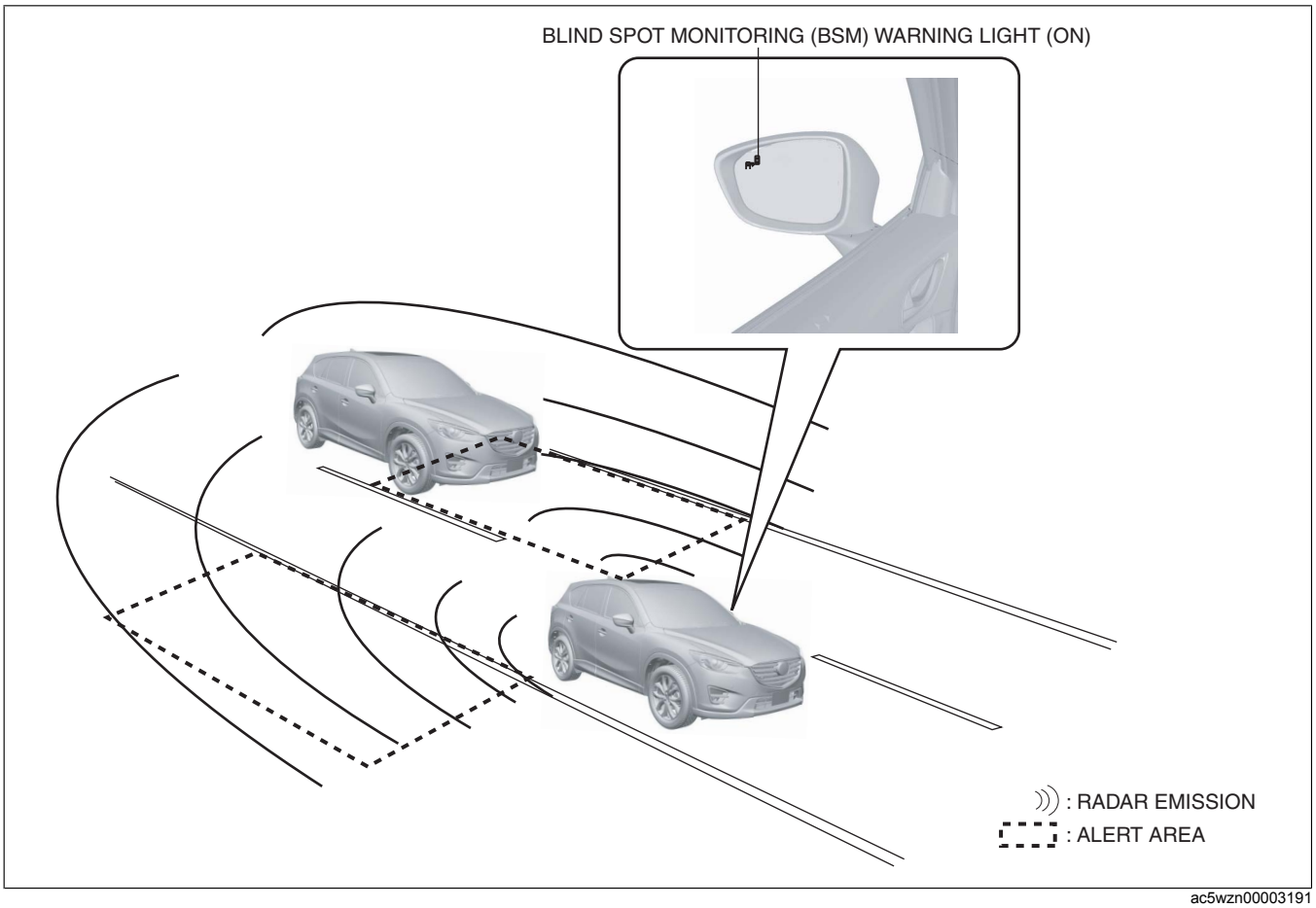
- The blind sport monitoring (BSM) control module operates the following two warnings if a detected approaching vehicle enters the alert area or when it detects an approaching vehicle which will reach the front end of the alert area **within 5.5 s**.



ac5wzn00003190

Warning 1

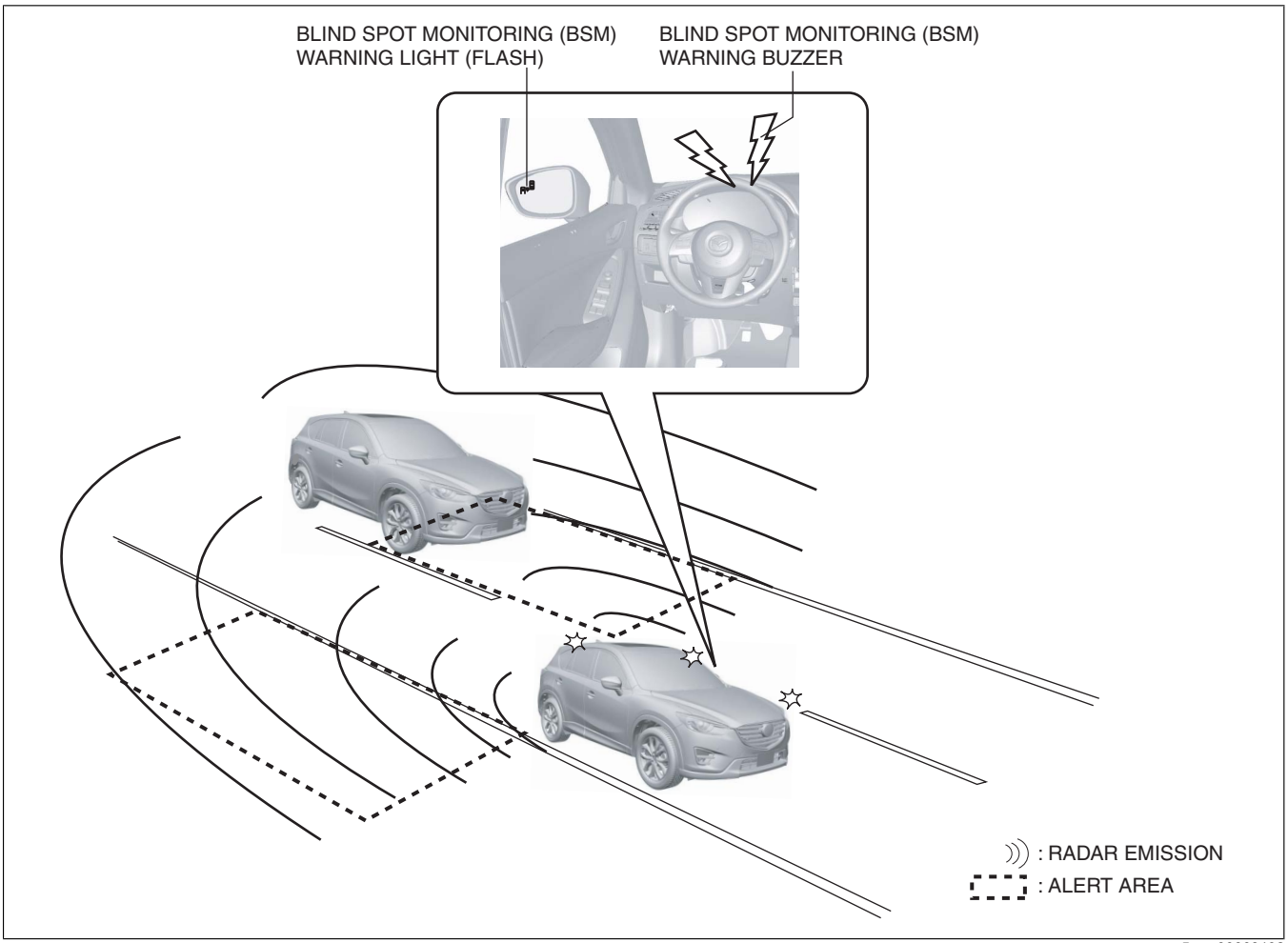
— If the blind spot monitoring (BSM) control module detects an approaching vehicle, it alerts the driver of the approaching vehicle by turning the blind spot monitoring (BSM) warning indicator light on.



ac5wzn00003191

Warning 2

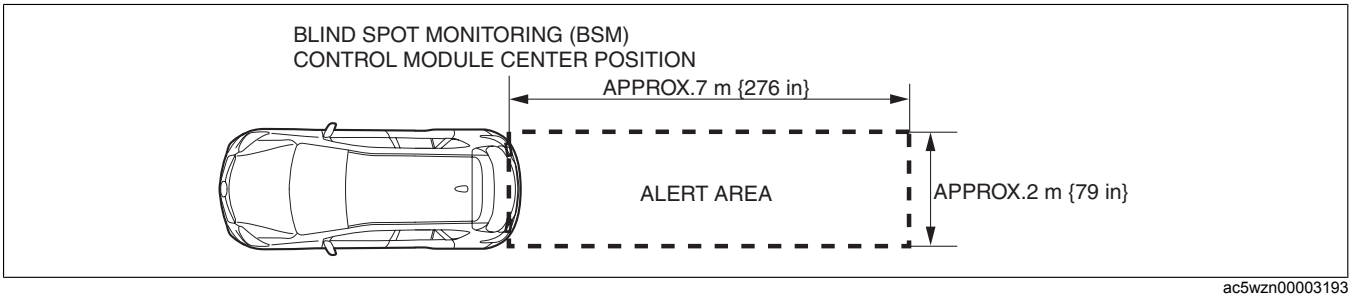
— If the blind spot monitoring (BSM) control module detects a turn switch signal on the side where an approaching vehicle exists while warning 1 is operated, it warns the driver by flashing the blind spot monitoring (BSM) warning indicator light and activating the blind spot monitoring (BSM) warning sound.



ac5wzn00003192

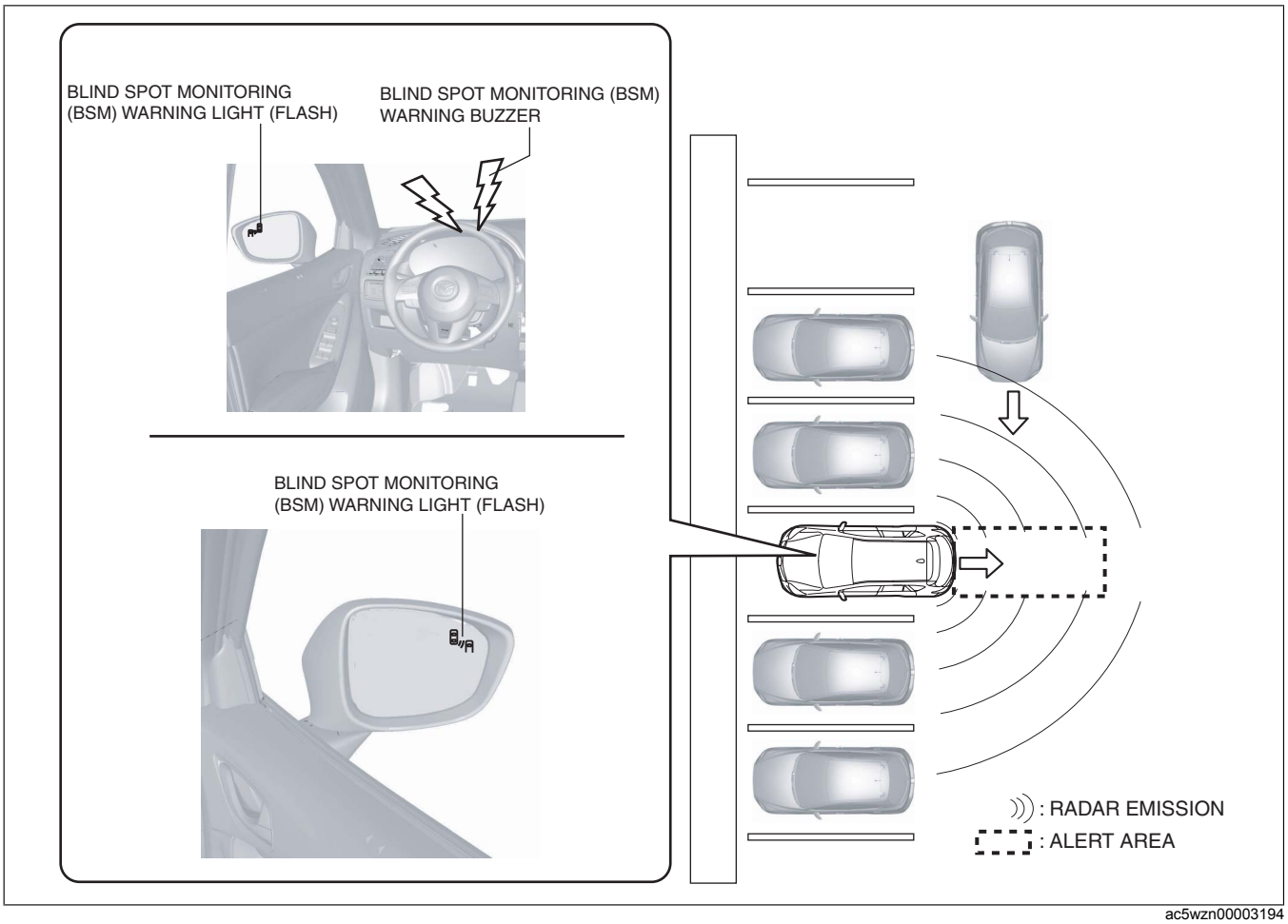
Rear cross traffic alert (RCTA) function

- The rear cross traffic alert (RCTA) function launches when the selector lever (ATX)/shift lever (MTX) is in R position and starts detecting approaching vehicles and pedestrians. The blind spot monitoring (BSM) control module warns when it detects an approaching vehicle or a pedestrian entering the alert area shown in the figure **within 3 s**.



ac5wzn00003193

- When the blind spot monitoring (BSM) control module detects an approaching vehicle or a pedestrian, it warns the driver by flashing the blind spot monitoring (BSM) warning indicator light and activating the blind spot monitoring (BSM) warning sound.



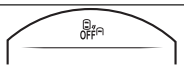
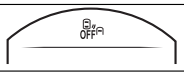
ac5wzn00003194

System check function

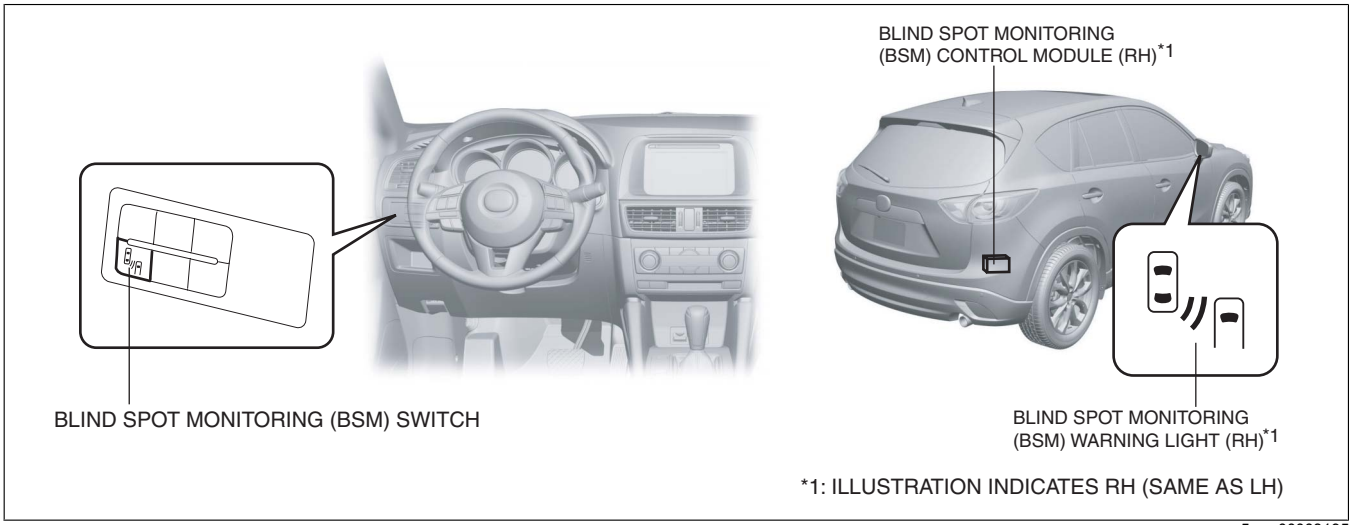
- When the ignition is switched ON (engine off or on), the blind spot monitoring (BSM) control module checks the system conditions for **approx. 3 s**. The blind spot monitoring (BSM) control module turns on the blind spot monitoring (BSM) warning indicator light during the system check, and turns it off when the system check is finished. If a system malfunction is found, the blind spot monitoring (BSM) OFF indicator remains turned on.

System conditions display function

- The blind spot monitoring (BSM) control module displays the system conditions using the indicator lights, the warning sound, and the warning display. For the warning display content on the center display, refer to the [CENTER DISPLAY]. (See CENTER DISPLAY [WITH CENTER DISPLAY].)

System condition		Blind spot monitoring (BSM) Switch	Blind spot monitoring (BSM) OFF Display	Blind spot monitoring (BSM) warning indicator light	Blind spot monitoring (BSM) warning sound	Center display
Right after ignition is switched ON (engine off or on) (System check)		ON	No display	On (**approx. 3 s**)	OFF	No display
Driving at vehicle speed of **30 km/h {19 mph} or more**	No vehicle in alert area or vehicle speed decreased to **25 km/h {16 mph} or less**			Off	OFF	
	Detected approaching vehicle in alert area, or detected vehicle which will reach alert area front end **within 5.5 s**			On (Approaching vehicle detected side)	OFF	
	Detected approaching vehicle in alert area, or detected turn switch signal and vehicle which will reach alert area front end **within 5.5 s**			Flash (Approaching vehicle detected side)	On	
Vehicle is driven in reverse	No approaching vehicle or pedestrian which will reach alert area **within 3 s**			Off	OFF	
	Detected vehicle or pedestrian which will reach alert area **within 3 s**			Flash (Both sides)	On	
Blind spot monitoring (BSM) system malfunction occurred				Off	OFF	Warning display
System stopped		OFF		Off	OFF	No display

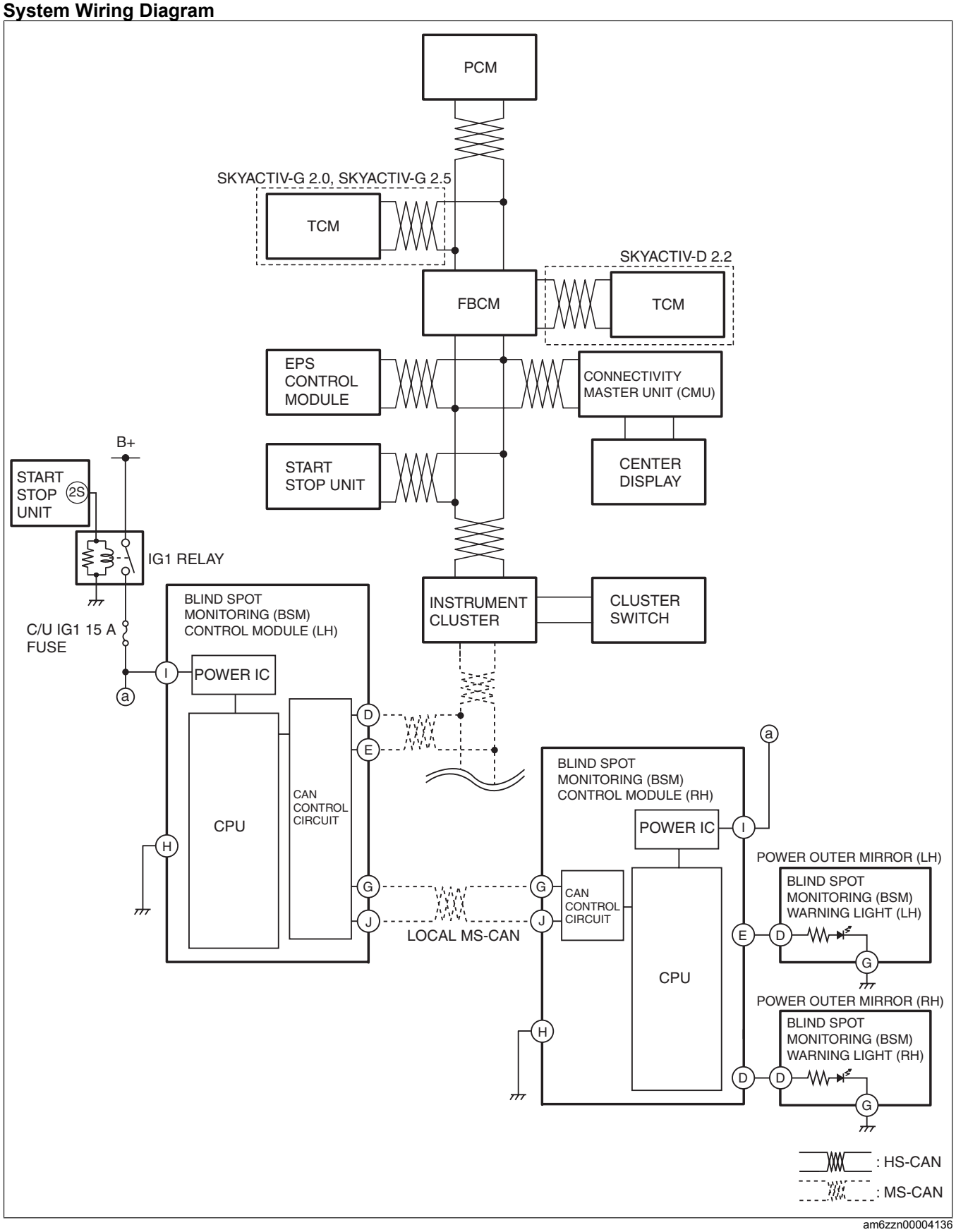
Structural View



*1: ILLUSTRATION INDICATES RH (SAME AS LH)

ac5wzn00003195

System Wiring Diagram



am6zzn00004136

Operation

Warning

- **The blind spot monitoring (BSM) system assists the driver in confirming the area behind the vehicle when changing lanes or backing up. Because of the various restrictions in the system operations, warning may not be performed or delayed even if there is a vehicle in an adjacent lane or at the vehicle rear. Do not rely completely on the system and always take responsibility as the driver in confirming the area behind the vehicle.**

Caution

- **The vehicle detection performance of the blind spot monitoring (BSM) system has limitations. Under the following conditions, the detection performance of the approaching vehicle may be lowered and the system may not operate normally.**
  - **— A part of the rear bumper near the blind spot monitoring (BSM) control module is deformed.**
  - **— The blind spot monitoring (BSM) control module installation position is largely deviated.**
  - **— Ice, snow or dirt is adhering to a part of the rear bumper near the blind spot monitoring (BSM) control module.**
  - **— The vehicle is driven in rain, snow, or fog.**
  - **— The temperature near the blind spot monitoring (BSM) control module is excessively high such as when climbing an uphill road for a long period on a hot day.**
  - **— The battery voltage is low**
  - **— The vehicle is driven on a steep road.**
  - **— The turning radius is small such as when making a sharp turn or turning at an intersection.**
  - **— The height of the driving lane and the adjacent lane are different.**
  - **— Right after switching the system conditions from stop to operation by pressing the blind spot monitoring (BSM) switch.**
- **When towing a trailer or if something is equipped to the rear part of the vehicle such as a bicycle carrier, the radar may be interrupted and the system may not operate normally. When towing a trailer or if something is equipped to the rear part of the vehicle such as a bicycle carrier, do not use the blind spot monitoring (BSM) system.**
- **The warning may not be activated or delayed for the following vehicles/pedestrians:**
  - **— Vehicles which are traveling at nearly the same speed as the detecting vehicle for long periods**
  - **— Vehicles in an adjacent lane where the detecting vehicle is trying to pass**
  - **— Vehicles in an excessively wide adjacent lane**
  - **— Vehicles changing lanes from a distant lane to an adjacent lane**
  - **— Vehicles with low body height such as sports cars, or vehicles with body shapes from which radar may not be reflected such as unloaded trailers**
  - **— Small motorbikes or bicycles**
  - **— Pedestrians with a body height of less than 100 cm {39.4 in}**
- **The blind spot monitoring (BSM) system may trigger the warning accidentally for the following objects:**
  - **— Vehicles in a distant lane if the lane width is excessively narrow**
  - **— Objects on a road or road shoulder (such as guard rail, tunnel wall, street lights, and roadside trees)**

Blind spot monitoring (BSM) operation

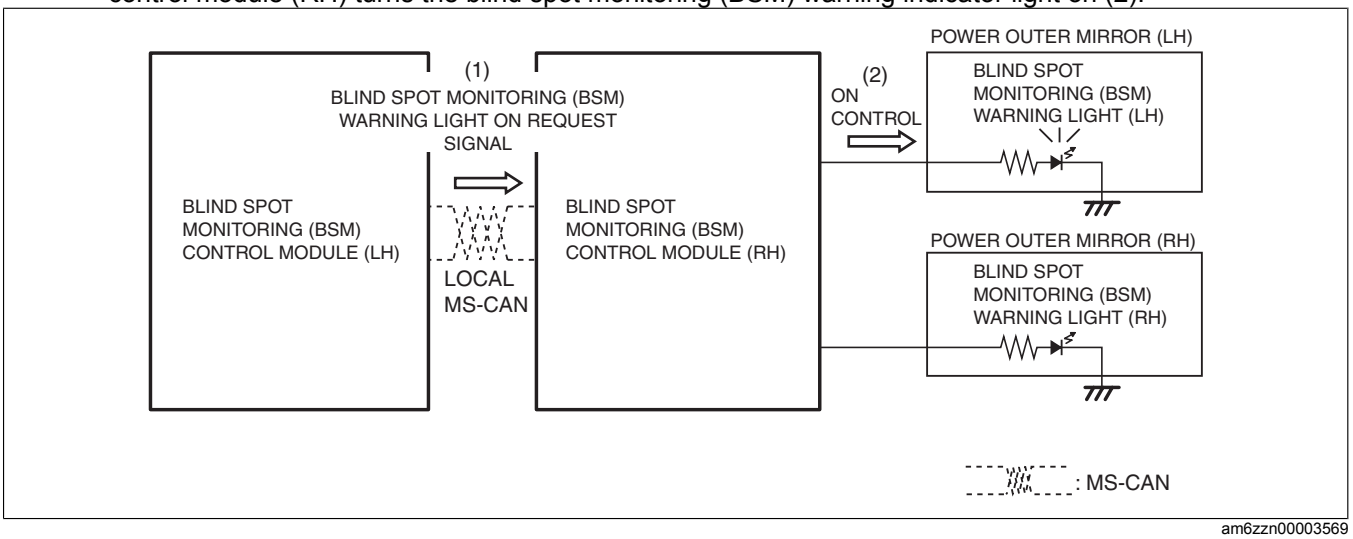
- When all of the following conditions are met, the blind spot monitoring (BSM) function goes on stand-by.
  Preconditions
  - — Blind spot monitoring (BSM) switch is on (system is operating)
  - — Blind spot monitoring (BSM) system is normal
  - — Vehicle speed signal of **30 km/h {19 mph} or more** is received
- The warning is activated when any of the following conditions is met.
  Operation condition
  Warning 1
  - — The approaching vehicle being detected enters the alert area.
  - — An approaching vehicle is detected which will reach the alert area front end **within 5.5 s**.

  Warning 2
  - — With the warning 1 conditions met, a turn switch signal is received on the side the approaching vehicle is detected.
- The blind spot monitoring (BSM) function stops when any of the following conditions is met.
  Stop conditions
  - — Blind spot monitoring (BSM) switch is off (system is stopped)
  - — Blind spot monitoring (BSM) system has a malfunction
  - — Vehicle speed signal of **25 km/h {16 mph} or less** is received

— Warning 1

If a vehicle is approaching on the left side

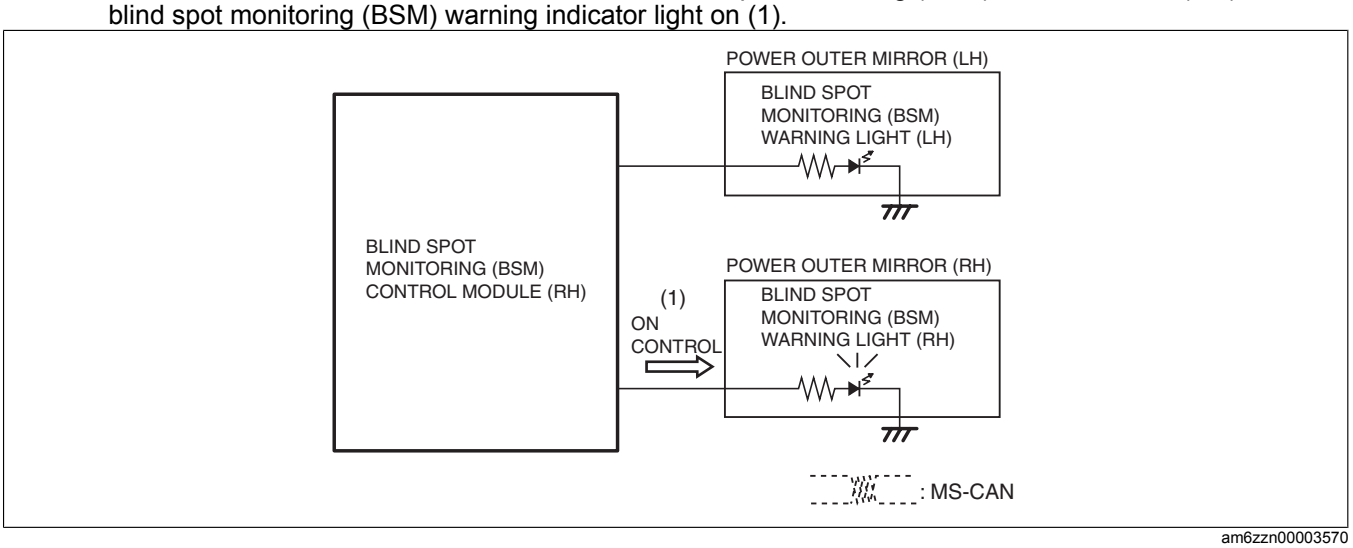
1. When the preconditions are met, the blind spot monitoring (BSM) control module emits radar and starts detecting approaching vehicles.
2. If the detected approaching vehicle enters the alert area or an approaching vehicle is detected which will reach the alert area front end **within 5.5 s**, the blind spot monitoring (BSM) control module (LH) sends a blind spot monitoring (BSM) warning indicator light on request signal to the blind spot monitoring (BSM) control module (RH) (1).
3. Based on the blind spot monitoring (BSM) warning indicator light on signal, the blind spot monitoring (BSM) control module (RH) turns the blind spot monitoring (BSM) warning indicator light on (2).



am6zzn00003569

If a vehicle is approaching on the right side

1. When the preconditions are met, the blind spot monitoring (BSM) control module emits radar and starts detecting approaching vehicles.
2. If the detected approaching vehicle enters the alert area or an approaching vehicle is detected which will reach the alert area front end **within 5.5 s**, the blind spot monitoring (BSM) control module (RH) turns the blind spot monitoring (BSM) warning indicator light on (1).

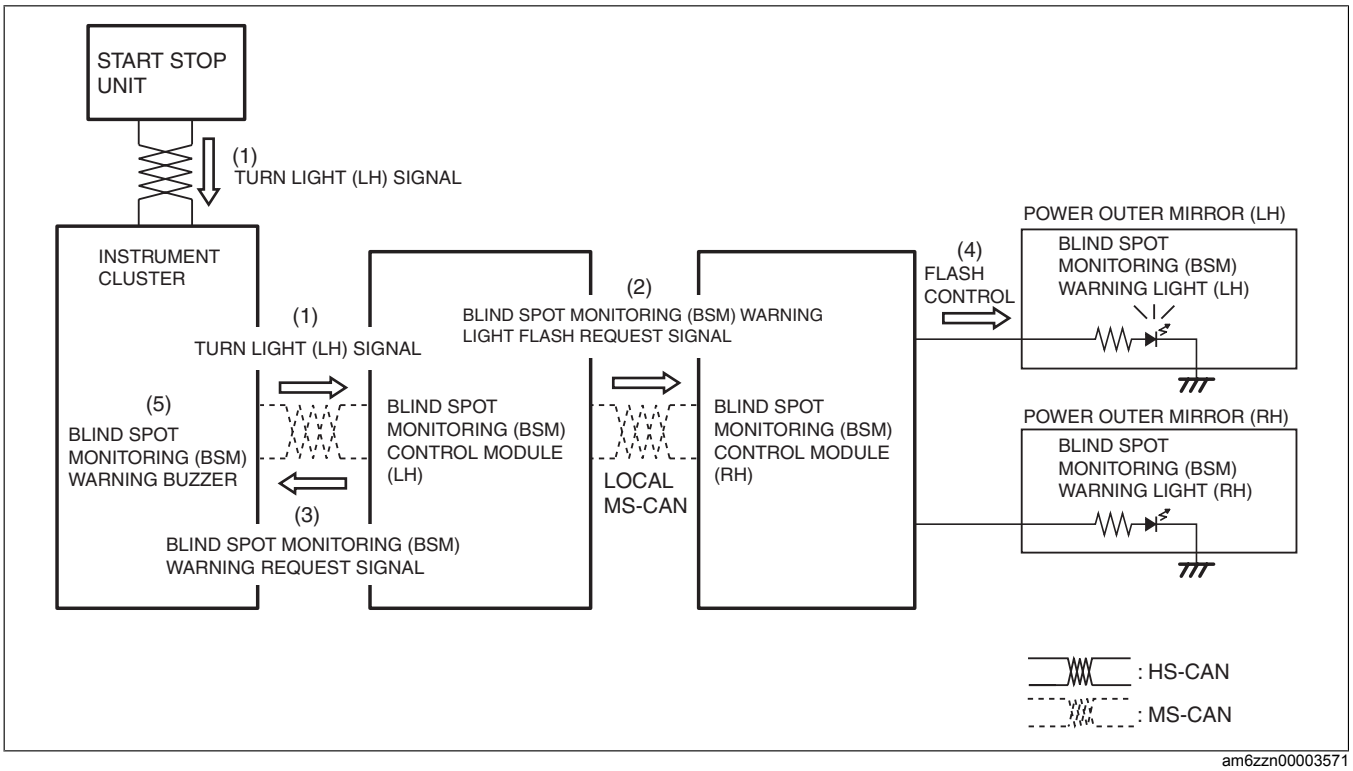


am6zzn00003570

— Warning 2

If a vehicle is approaching on the left side

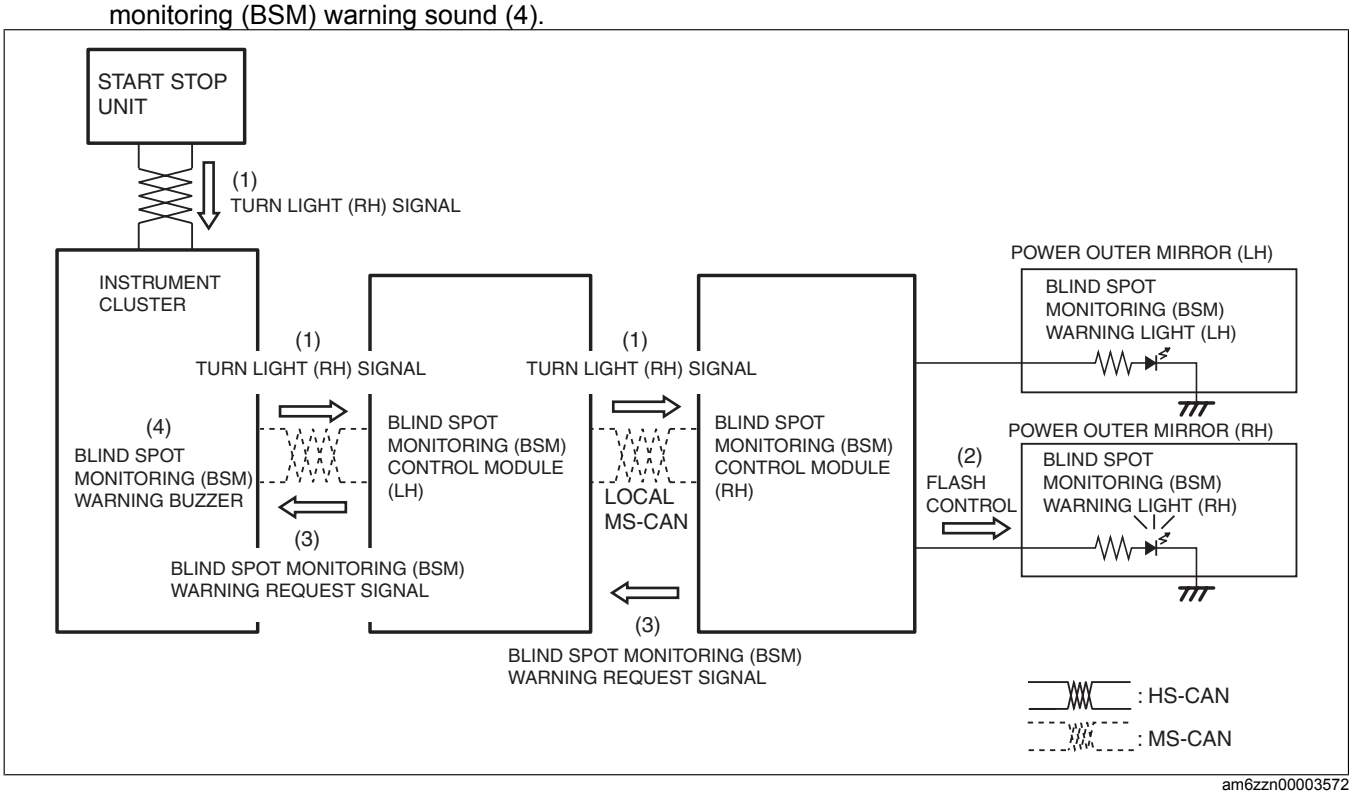
1. If the warning 1 conditions are met and the blind spot monitoring (BSM) control module (LH) receives a turn light (LH) signal from the start stop unit (1), it sends the following signals.
   — Sends a blind spot monitoring (BSM) warning indicator light flash request signal to the blind spot monitoring (BSM) control module (RH) (2).
   — Sends a blind spot monitoring (BSM) warning request signal to the instrument cluster (3).
2. Based on the blind spot monitoring (BSM) warning indicator light flash request signal, the blind spot monitoring (BSM) control module (RH) flashes the blind spot monitoring (BSM) warning indicator light (4).
3. Based on the blind spot monitoring (BSM) request signal, the instrument cluster activates the blind spot monitoring (BSM) warning sound (5).



am6zzn00003571

If a vehicle is approaching on the right side

1. If the warning 1 conditions are met and the blind spot monitoring (BSM) control module (RH) receives a turn light (RH) signal from the start stop unit via the blind spot monitoring (BSM) control module (LH) (1), it performs the following:
   - — Flashes the blind spot monitoring (BSM) warning indicator light (2).
   - — Sends a blind spot monitoring (BSM) warning request signal to the instrument cluster via the blind spot monitoring (BSM) control module (LH) (3).
2. Based on the blind spot monitoring (BSM) request signal, the instrument cluster activates the blind spot monitoring (BSM) warning sound (4).



am6zzn00003572

Rear cross traffic alert (RCTA) operation

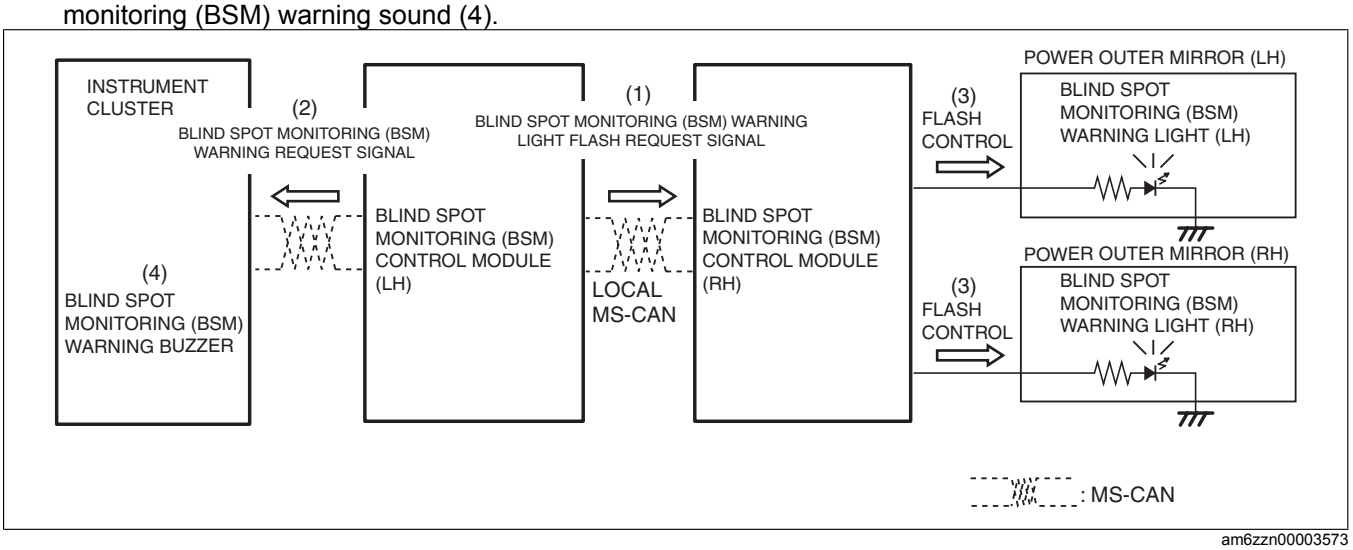
- When all of the following conditions are met, the rear cross traffic alert (RCTA) function goes on stand-by.
  Preconditions

— Blind spot monitoring (BSM) switch is on (system is operating)
— Blind spot monitoring (BSM) system is normal
— Back-up light on request signal is received

- The warning is activated if the following condition is met.
  Operation condition
  — An approaching vehicle or pedestrian is detected which will reach the alert area within **3 s**.
- If any of the following conditions is met, the rear cross traffic alert (RCTA) function stops.
  Stop conditions
  — Blind spot monitoring (BSM) switch is off (system is stopped)
  — Blind spot monitoring (BSM) system has a malfunction
  — Back-up light on request signal is not received

If a vehicle is approaching on the left side

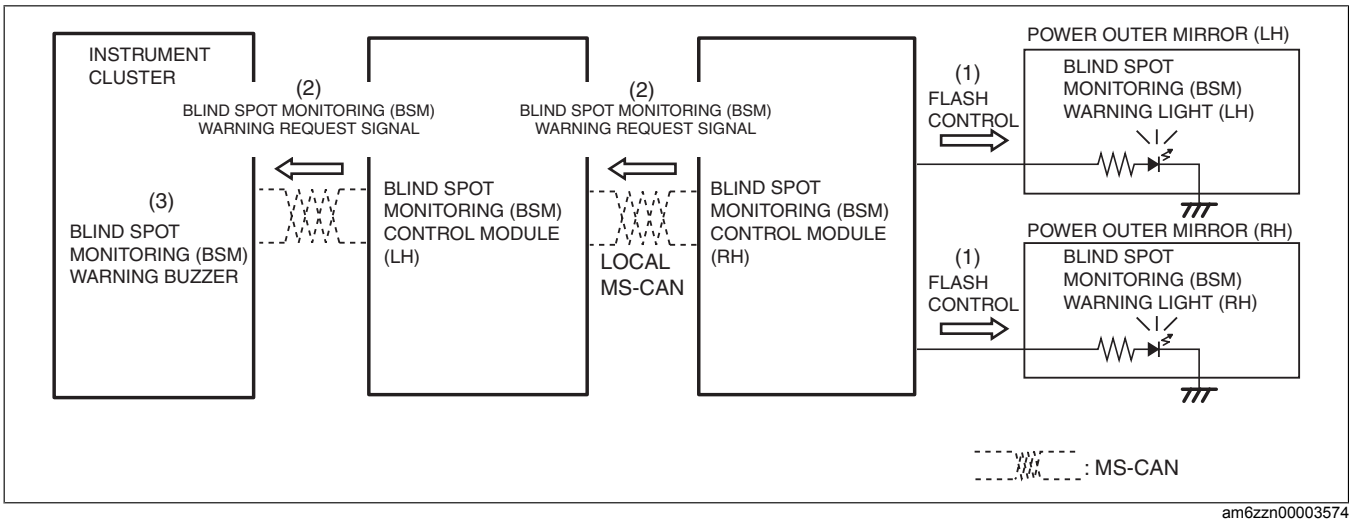
1. When the preconditions are met, the blind spot monitoring (BSM) control module emits radar and starts detecting approaching vehicles and pedestrians.
2. When the blind spot monitoring (BSM) control module (LH) detects an approaching vehicle or a pedestrian which will reach the alert area **within 3 s**, it sends the following signals.
   — Sends a blind spot monitoring (BSM) warning indicator light flash request signal to the blind spot monitoring (BSM) control module (RH) (1).
   — Sends a blind spot monitoring (BSM) warning request signal to the instrument cluster (2).
3. Based on the blind spot monitoring (BSM) warning indicator light flash request signal, the blind spot monitoring (BSM) control module (RH) flashes the blind spot monitoring (BSM) warning indicator light (3).
4. Based on the blind spot monitoring (BSM) request signal, the instrument cluster activates the blind spot monitoring (BSM) warning sound (4).



am6zzn00003573

If a vehicle is approaching on the right side

1. When the preconditions are met, the blind spot monitoring (BSM) control module emits radar and starts detecting approaching vehicles and pedestrians.
2. When the blind spot monitoring (BSM) control module (RH) detects an approaching vehicle or a pedestrian which will reach the alert area **within 3 s**, it performs the following:
   — Flashes the blind spot monitoring (BSM) warning indicator light (1).
   — Sends a blind spot monitoring (BSM) warning request signal to the instrument cluster via the blind spot monitoring (BSM) control module (LH) (2).
3. Based on the blind spot monitoring (BSM) request signal, the instrument cluster activates the blind spot monitoring (BSM) warning sound (3).



am6zzn00003574