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# INIM-PE21020-85282 – Section 5

Adaptive Cruise Control

The Ford logo, consisting of the word "Ford" in a white, stylized script font, is positioned in the bottom right corner of the slide.

# Trade Name / Trim Level

## Adaptive Cruise Control with Stop and Go

- This feature name applies to all vehicle lines within the inquiry
- In some vehicles, “with Lane Centering Assist” is appended to the name, although LCA is a separate, dependent feature.
- Typically, ACC is available on higher trim levels (e.g. Titanium, Platinum, Lariat)

# Adaptive Cruise Control Routine Operation (ACC Off) – 5c.i



ACC Telltale: None

# Adaptive Cruise Control Routine Operation (Active) – 5c.i

Shield in front of vehicle indicates ACC is active  
Vehicle icon on top indicates that a lead vehicle is detected



ACC Telltale:  
Green with set speed green

# Adaptive Cruise Control Routine Operation (Override) – 5c.i

Shield in front of vehicle indicates ACC is active  
Lead vehicle icon is suppressed during override



ACC Telltale:  
Green with set speed grey

# Adaptive Cruise Control Routine Operation (Standby) – 5c.i

No shield in front of vehicle  
indicates ACC is not active



ACC Telltale:  
Grey with set speed strikeout

# Adaptive Cruise Control Routine Operation (Gap Setting) – 5c.i

Shield graphic temporarily replaced by gap setting bars  
The number of blue bars indicates the current setting

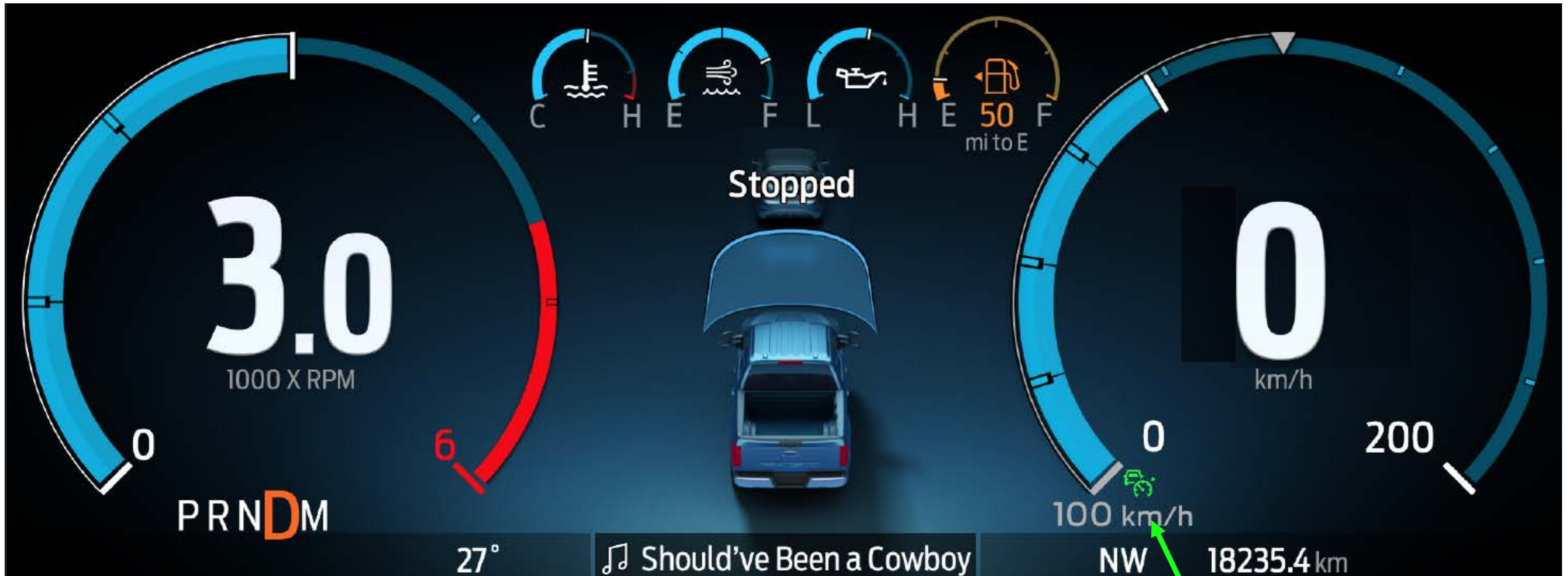


Gap setting adjustment is requested by pressing a steering wheel button



# Adaptive Cruise Control Routine Operation (Stop states) – 5c.i

After ACC follows a lead vehicle to a complete stop, one of three text displays will be presented.



“Stopped”: Cruise control does not resume automatically when this display is active.

ACC Telltale:  
Green with set speed grey

# Adaptive Cruise Control Routine Operation (Stop states) – 5c.i

After ACC follows a lead vehicle to a complete stop, one of three text displays will be presented.



“Press button to resume”: The driver can resume with either a button or accelerator pedal press for a short while after the lead vehicle moves off.

# Adaptive Cruise Control Routine Operation (Stop states) – 5c.i

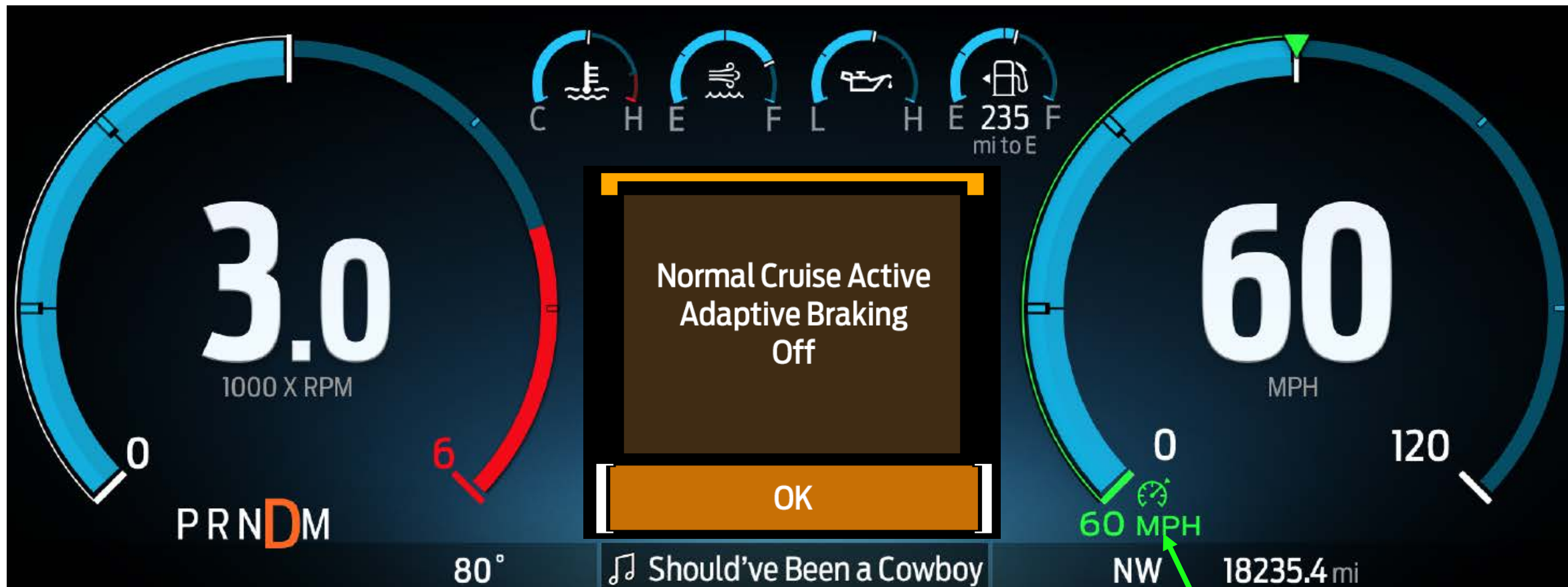
After ACC follows a lead vehicle to a complete stop, one of three text displays will be presented.



“Auto-Resume”: Displays only when on a limited access highway. In this situation, the vehicle resumes following the lead vehicle without a button press or pressing the accelerator pedal. The system can remain in auto-resume state for approximately 30 seconds, after which it no longer automatically resumes. *This feature is implemented only on MY2021 and later F150, Mach E, and MY2022 Expedition and Navigator*

# Adaptive Cruise Control Routine Operation (“Normal Cruise”)– 5c.i

The driver may choose to switch from Adaptive to “Normal” cruise control, which behaves like conventional speed control in that it does not respond to vehicle objects in the subject vehicle’s path.



This warning is displayed (with chime) when the switch is first made, and once in each ignition cycle if the system remains in this setting.

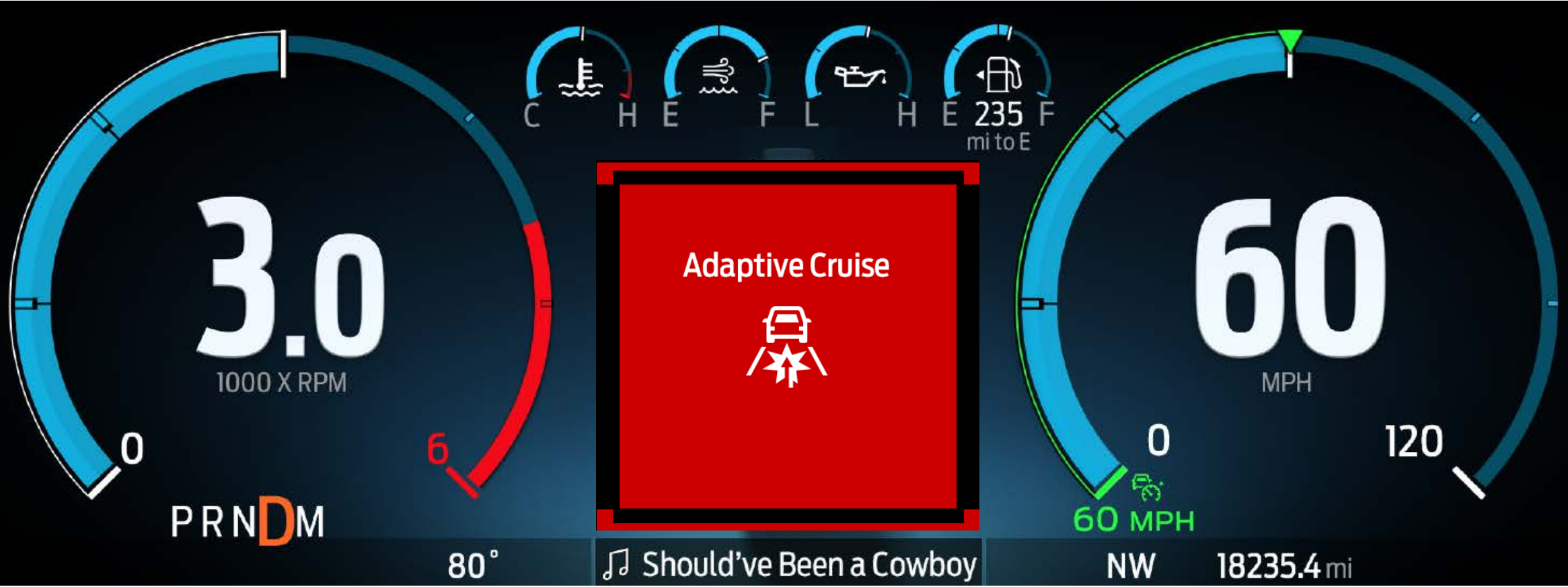
Normal Cruise Telltale:  
Green with set speed green

# Adaptive Cruise Control Driver Intervention (Cancellation)– 5c.ii



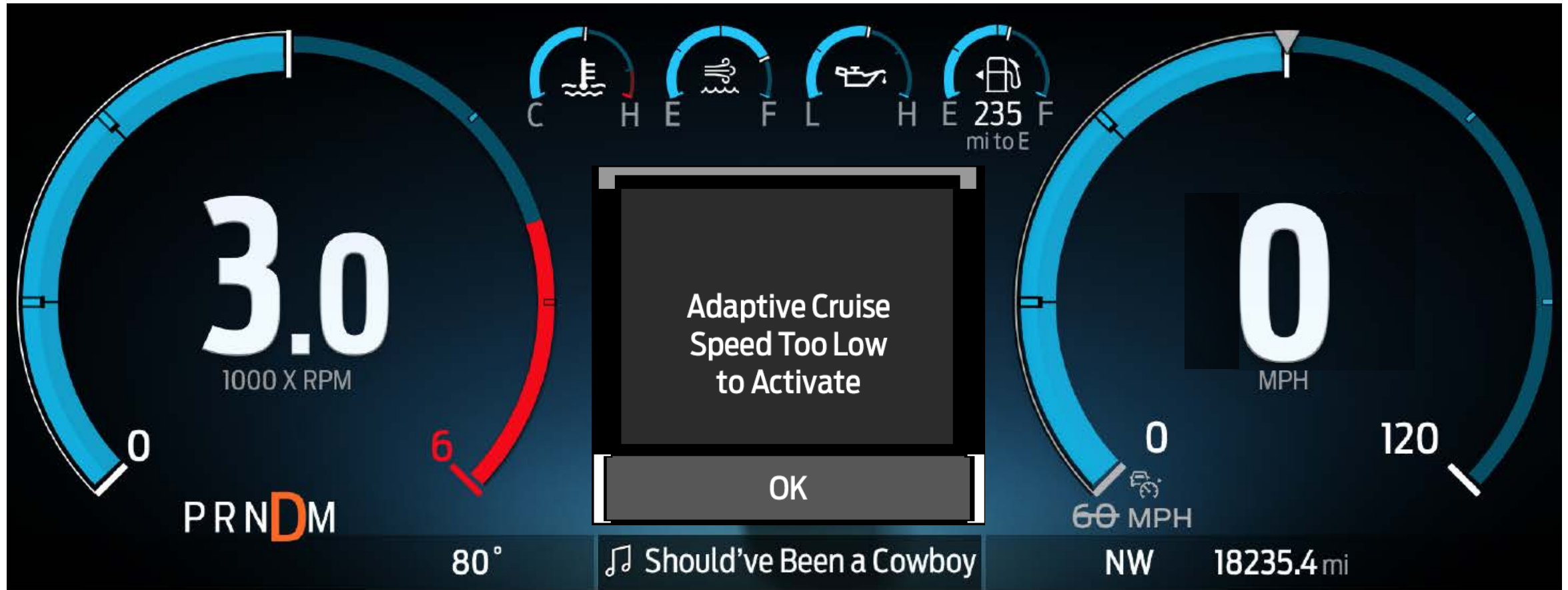
Cancellation occurs when the feature encounters a situation where it cannot provide support any longer (system fault or sensor blockage detected, traction control or ABS event, driver egress or excess stop time). The ACC shield momentarily becomes amber and the word "Cancelled" is displayed with a low-priority chime

# Adaptive Cruise Control Driver Intervention (BrakeCapacityWarning) – 5c.ii



If the system determines that its maximum braking level is not sufficient, an audible warning sounds, a message appears in the information display and flashes when the system continues to brake. The driver should intervene when this warning occurs. If the driver does not intervene, the Pre-Collision Assist feature may activate to mitigate or avoid collision

# Adaptive Cruise Control Driver Intervention (Speed too low)– 5c.ii



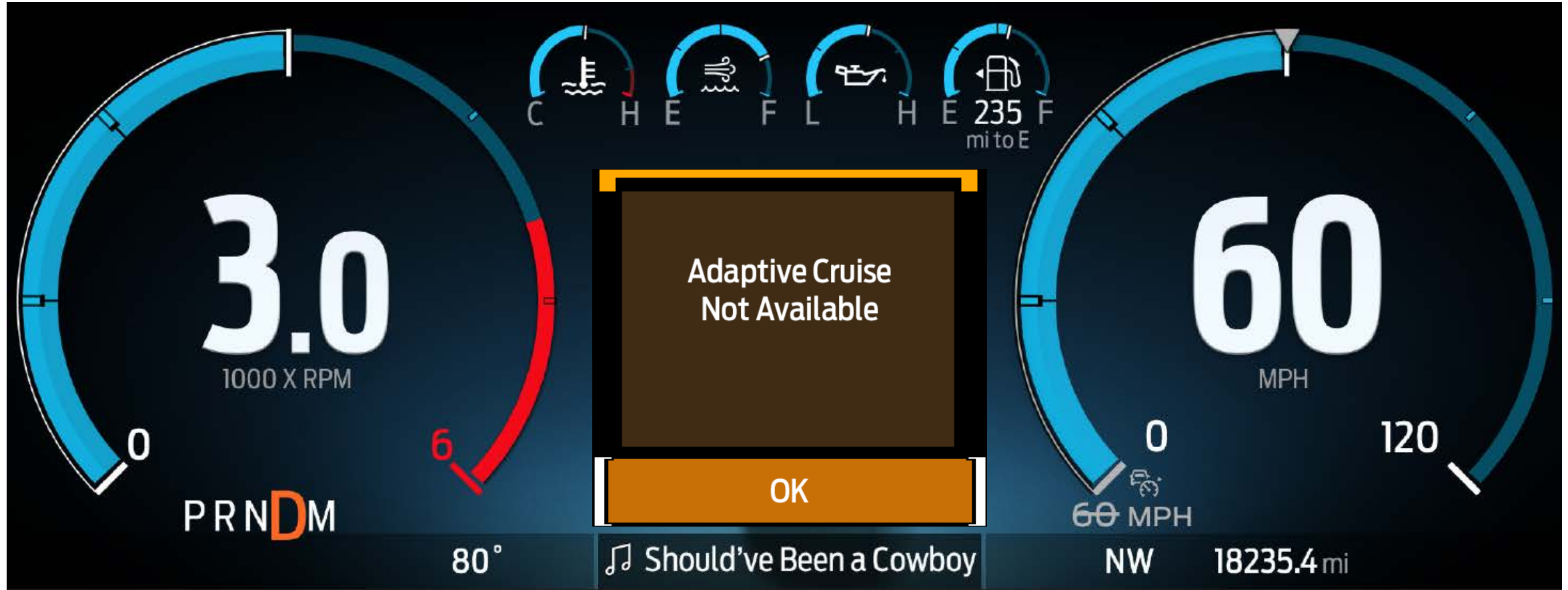
ACC cannot be engaged while stopped or at very low speed without a lead vehicle detected within close proximity. If the driver attempts to activate the feature without a lead vehicle, a message is displayed to inform them why the feature was not activated.

# Adaptive Cruise Control Driver Intervention (Resume Control)– 5c.ii



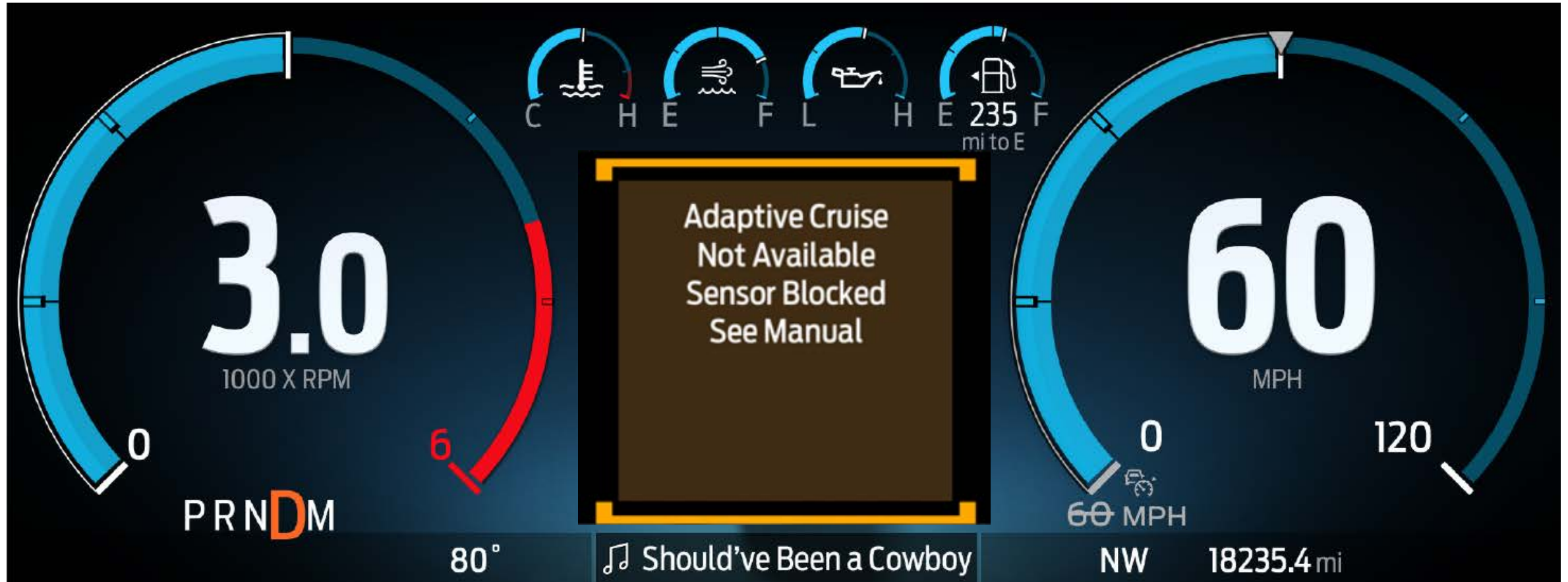
When ACC is in Stop Mode and must cancel due to a system fault, driver egress, or stop time in excess of 3 minutes, AND simultaneously the Electronic Park Brake is faulted or otherwise unavailable, the red “Resume Control” warning and high priority chime will be displayed. The driver is expected to take control from ACC.

# Adaptive Cruise Control Driver Intervention (ACC Unavailable)– 5c.ii



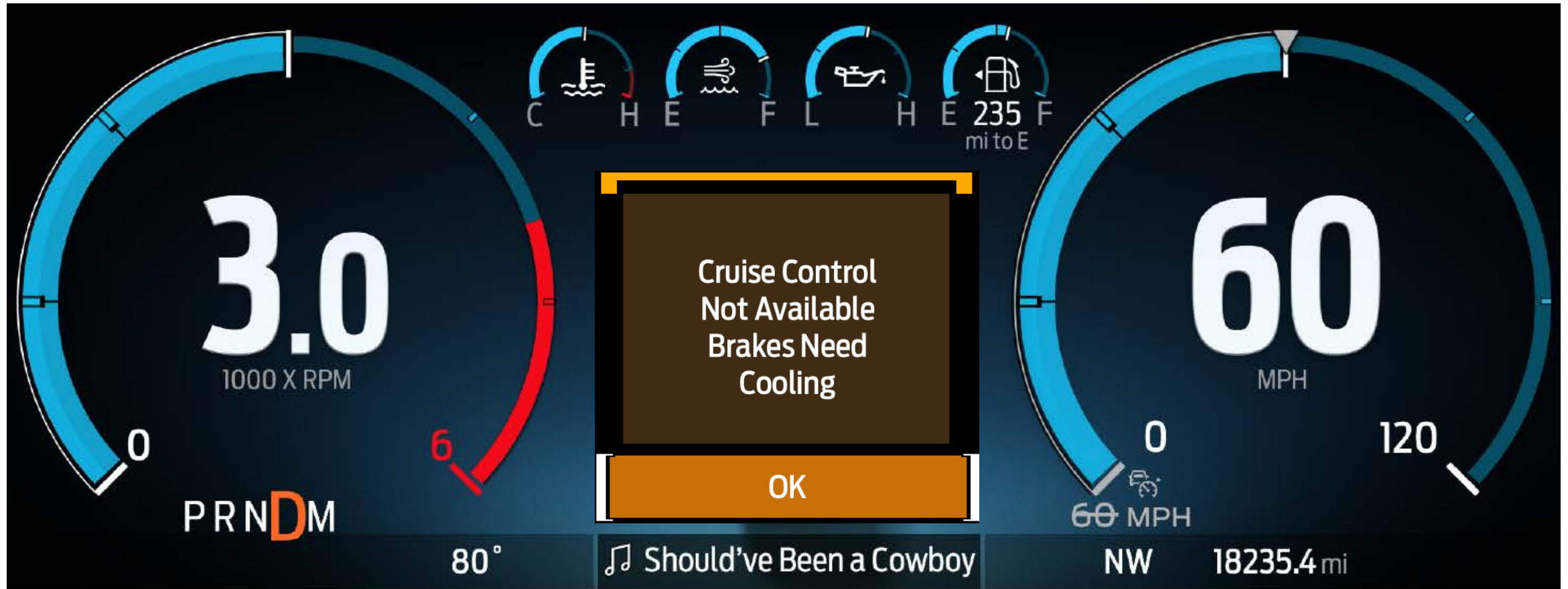
When ACC is unavailable due to a system fault or sensor blockage, a warning and chime are displayed each time the user attempts to activate the feature with a steering wheel button press.

# Adaptive Cruise Control Driver Intervention (ACC Unavailable)– 5c.ii



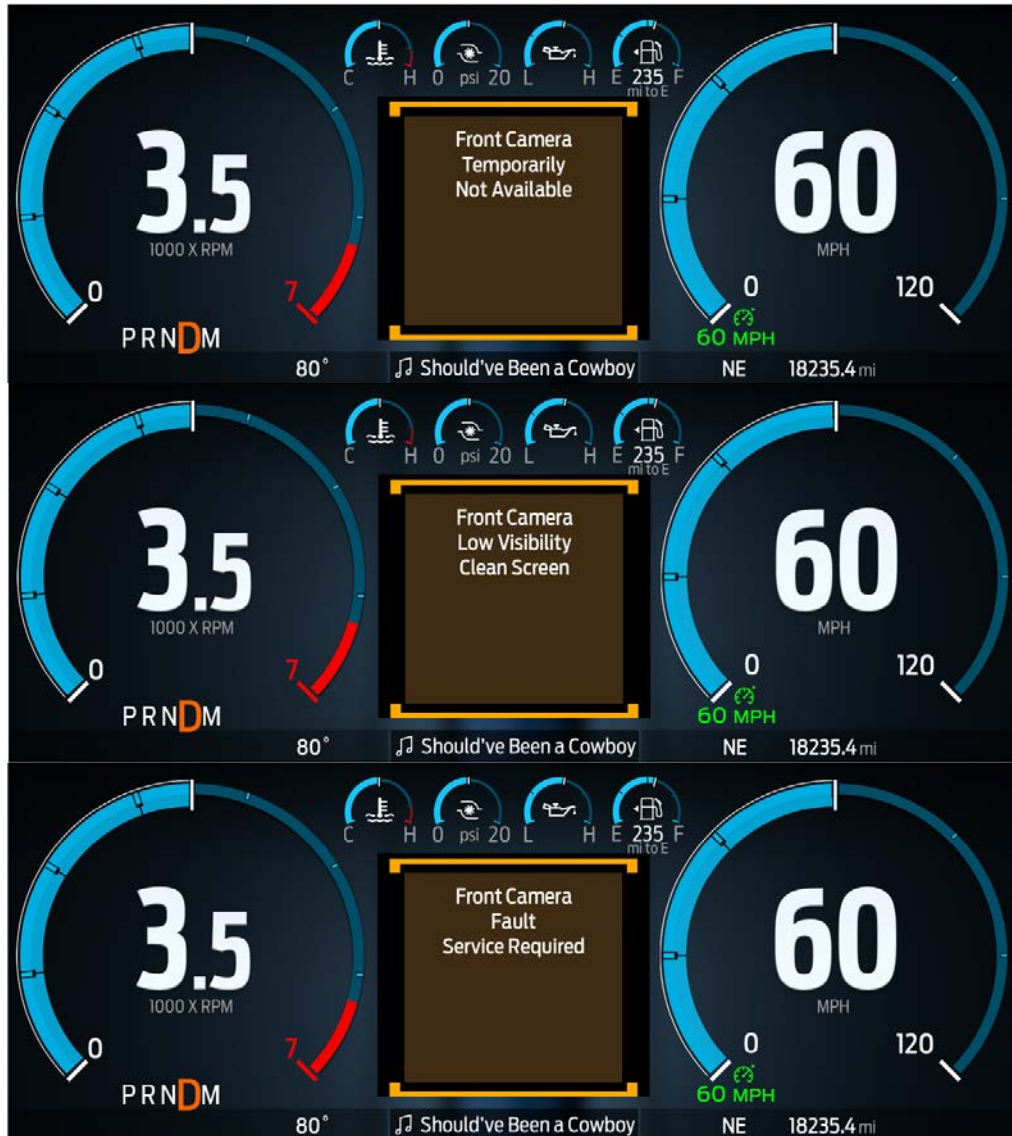
When ACC is unavailable due to front radar sensor blockage, a warning and chime are displayed each time the user attempts to activate the feature with a steering wheel button press. Once the blockage is cleared, the system can be re-engaged.

# Adaptive Cruise Control Driver Intervention (Brakes Cooling)– 5c.ii



The brake controller infers brake temperature from the amount of torque being applied over time. If the temperature reaches a threshold defined within the brake controller, ACC will be canceled and remain unavailable until the temperature estimate falls below the reset threshold. This warning is displayed with chime if the driver attempts to engage ACC during that interval.

# Adaptive Cruise Control Driver Intervention (Front Camera)– 5c.ii



If the front windshield camera is not available or is occluded due to debris or other blockage, the following messages could appear:

- Front Camera Temporarily Not Available
- Front Camera Low Visibility Clean Screen

*ACC will continue to function but will be less capable of tracking in curves and detecting stopped vehicles.*

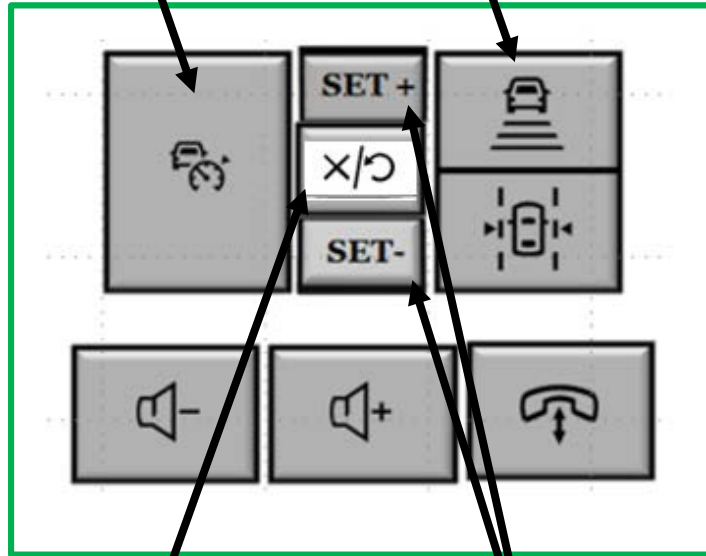
If the front windshield camera or control module has a system fault, the following message will appear (with a chime):

- Front Camera Fault Service Required
- ACC will be disabled*

# Adaptive Cruise Control Driver Control Inputs (Button Pack) – 5e

Adaptive Cruise Control  
On/Off button

Gap selection button



Resume/Cancel button

Set Speed buttons



# INIM-PE21020-85282 – Section 5

BlueCruise / ActiveGlide

*Ford*

# Trade Name / Trim Level

- Ford Vehicles – BlueCruise
  - 2021+ Ford F-150
  - 2021+ Ford Mustang Mach-E
  - 2022 Ford Expedition
- Lincoln Vehicles – ActiveGlide
  - 2022 Lincoln Navigator
- BlueCruise and ActiveGlide are the same feature branded differently for Ford and Lincoln
  - This presentation will reference BlueCruise, but ActiveGlide can also be used interchangeably with any BlueCruise reference

# BlueCruise Routine Operation (Off, F-150) – 5c.i



BlueCruise is off (telltale is grey has no wheel on it)

# BlueCruise Routine Operation (Standby, F-150) – 5c.i



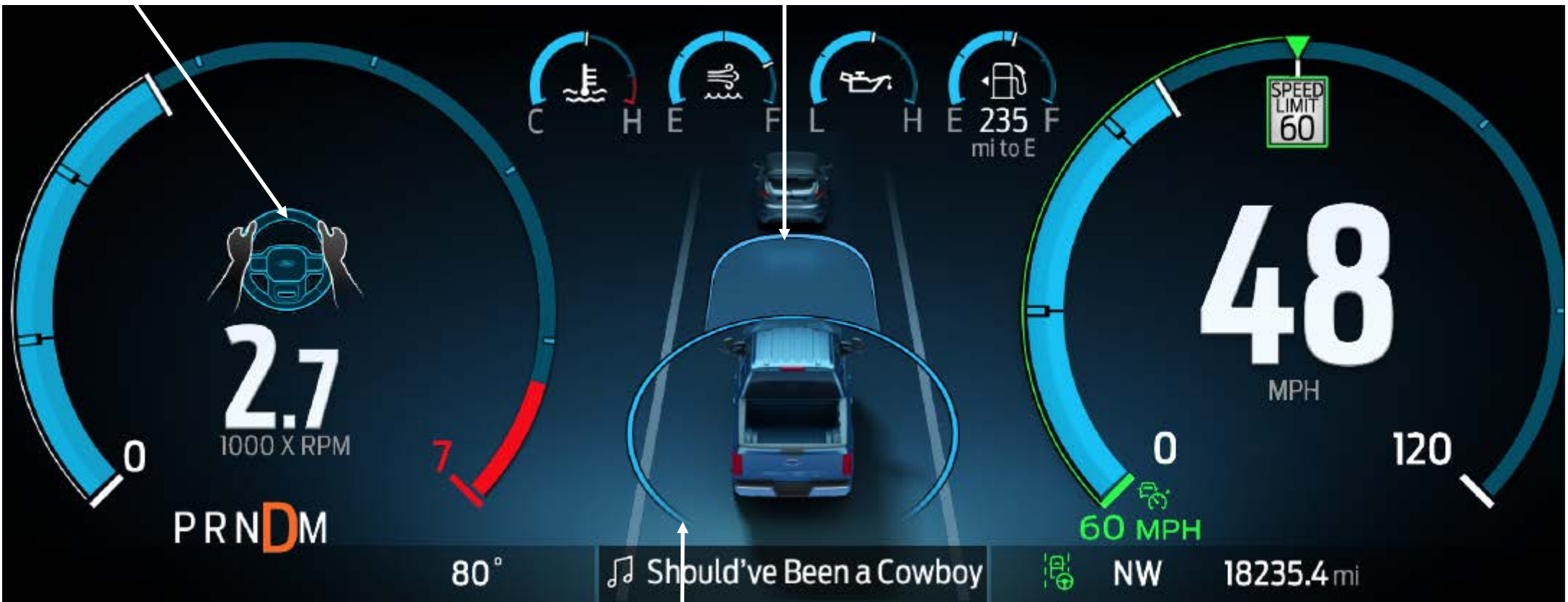
BlueCruise Telltale:  
Grey: Standby

# BlueCruise Routine Operation (Hands-On Mode, F-150) – 5c.i



Steering wheel with hands icon denotes Hands-On Mode active

Shield in front of vehicle denotes ACC is active



Vehicle with circle around it denoting BlueCruise Active

BlueCruise Telltale:  
Green: Hands-On Mode Active

# BlueCruise Routine Operation (Hands-Free Mode, F-150) – 5c.i



Steering wheel and Hands-Free text denotes Hands-Free Mode active

Shield in front of vehicle denotes ACC is active

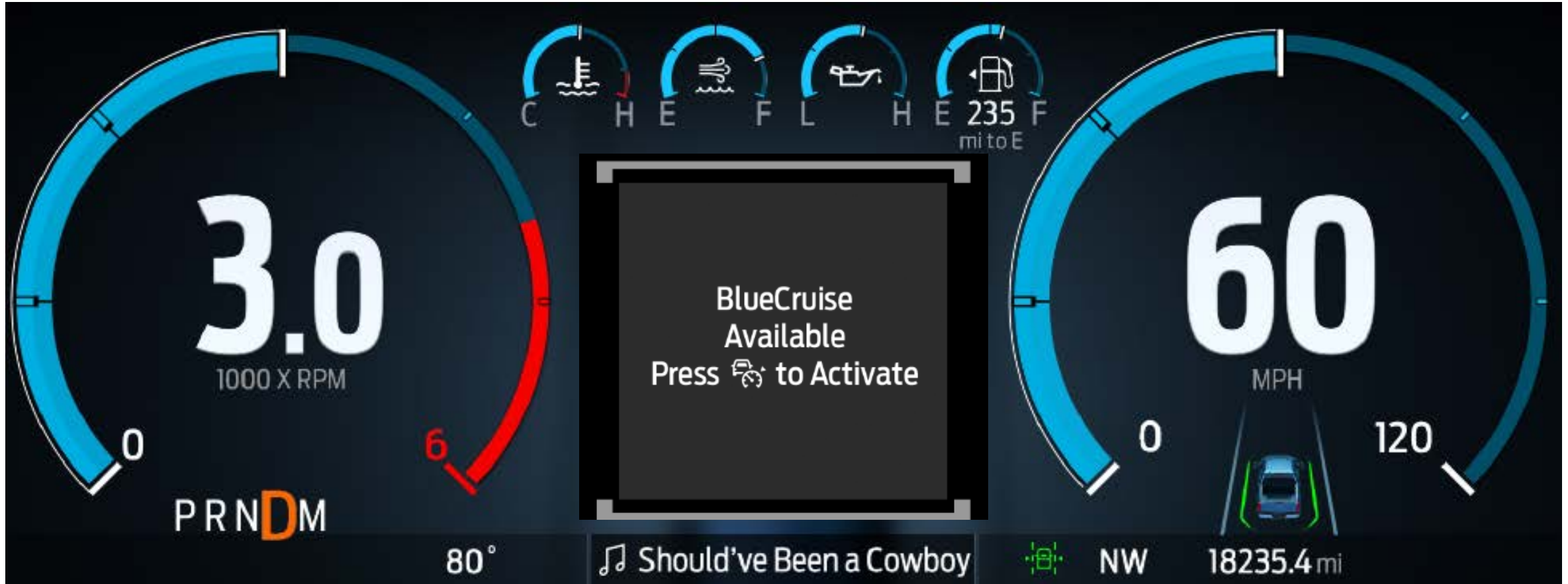


Cluster background turns blue to denote Hands-Free Mode active

Vehicle with circle around it denoting BlueCruise active

BlueCruise Telltale:  
Blue: Hands-Free Mode Active

# BlueCruise Routine Operation (Activation Prompt, F-150) – 5c.i



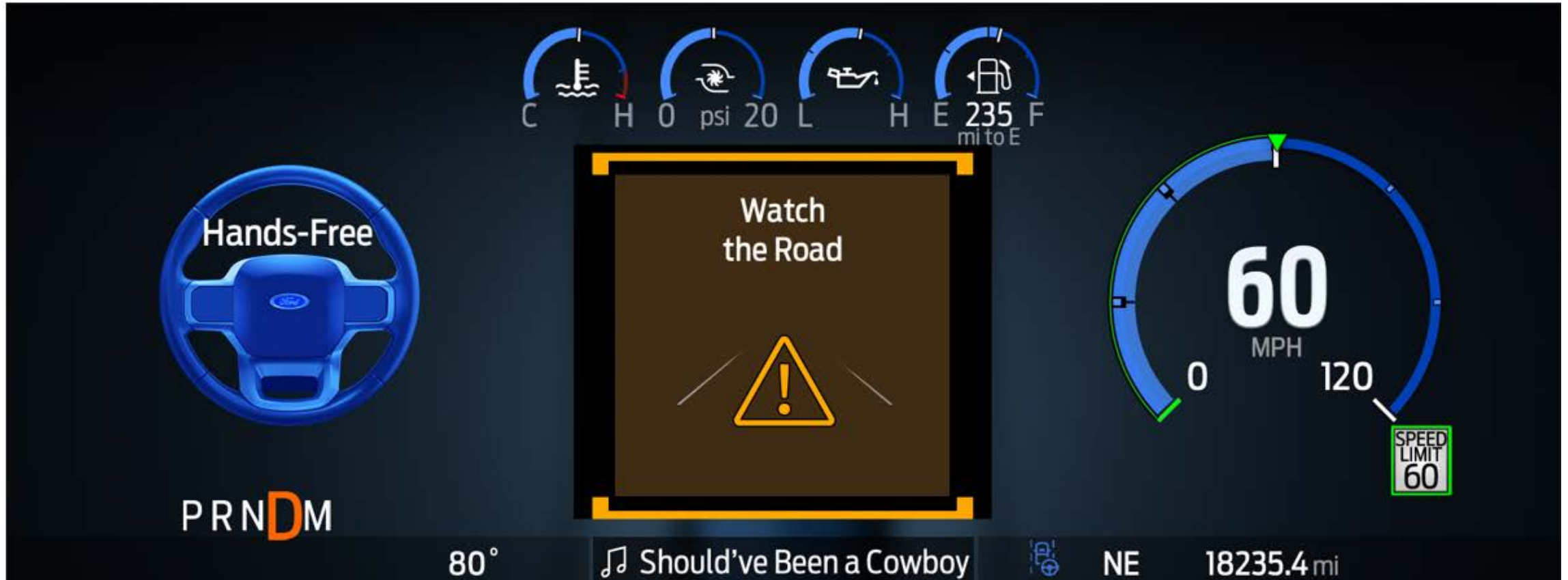
- A BlueCruise Activation Prompt can appear if conditions are met for driver to activate BlueCruise on a limited access roadway (i.e. freeway) and Adaptive Cruise Control is off. The Activation Prompts setting needs to be enabled in Sync for it to appear.

# BlueCruise Driver Intervention (Eyes Off Warning, F-150)– 5c.ii



- Grey Watch the Road warning (visual-only) occurs after five seconds of looking off road and the driver is looking at the cluster at the time the warning is issued

# BlueCruise Driver Intervention (Eyes Off Warning, F-150)– 5c.ii



- Amber Watch the Road warning (visual and audible) occurs:
  - After five seconds of looking off road and the driver is looking off road, but not at the cluster
  - After three seconds of the grey Watch the Road warning being present

# BlueCruise Driver Intervention (Hands Off Warning, F-150)– 5c.ii



- Amber Keep Hands on Steering Wheel warning (visual-only) occurs after fifteen seconds of the driver’s hands being detected off the wheel while in Hands-On mode

# BlueCruise Driver Intervention (Hands Off Warning, F-150)– 5c.ii



- Red Keep Hands on Steering Wheel warning (visual and audible) occurs after four seconds (if traveling above 60kph) or fifteen seconds (if traveling 10-60kph) of the driver's hands being detected off the wheel while in Hands-On mode and the Amber Keep Hands on Steering Wheel warning is active

# BlueCruise Driver Intervention (Takeover Warning, F-150)– 5c.ii



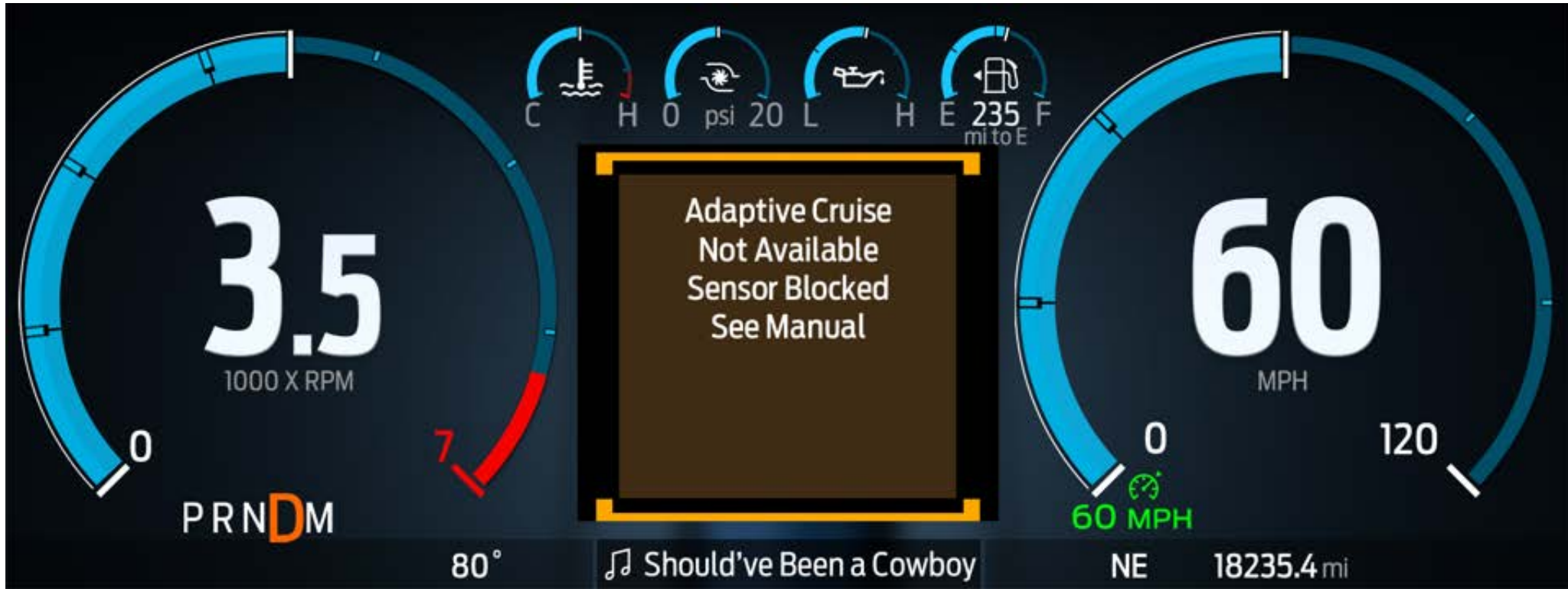
- Red Resume Control warning (visual and audible) occurs after the driver has ignored warnings on the cluster for a period of time (eyes- or hands-off warnings), or the feature encounters a situation where it cannot provide support any longer and the driver is not completely focused on the driving task (eyes off road or hands off wheel)

# BlueCruise Driver Intervention (Cancellation, F-150)– 5c.ii



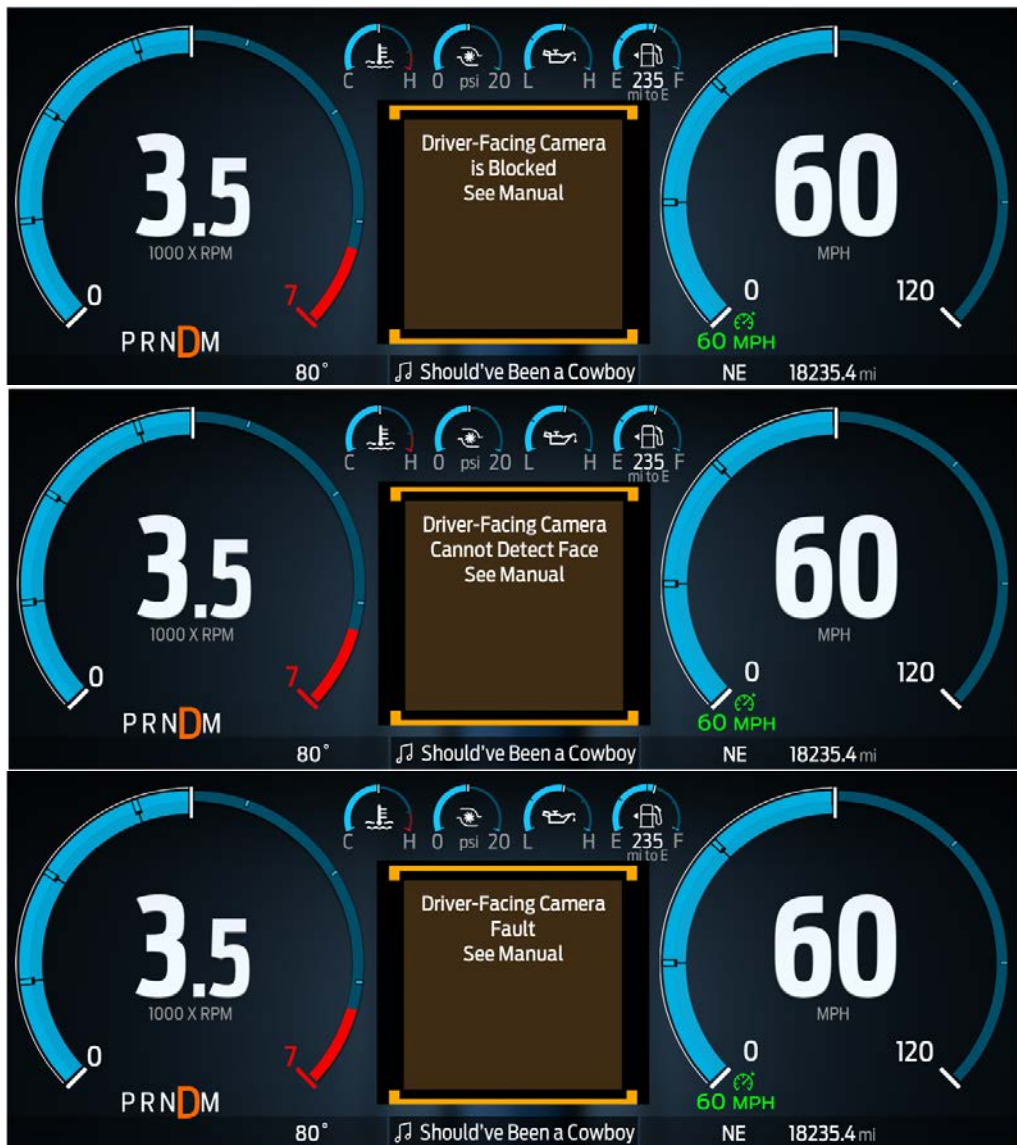
- Cancellation occurs when the feature encounters a situation where it cannot provide support any longer and the driver is paying attention to the driving task (eyes on road and hands on wheel)

# BlueCruise Driver Intervention (ACC Unavailable, F-150)– 5c.ii



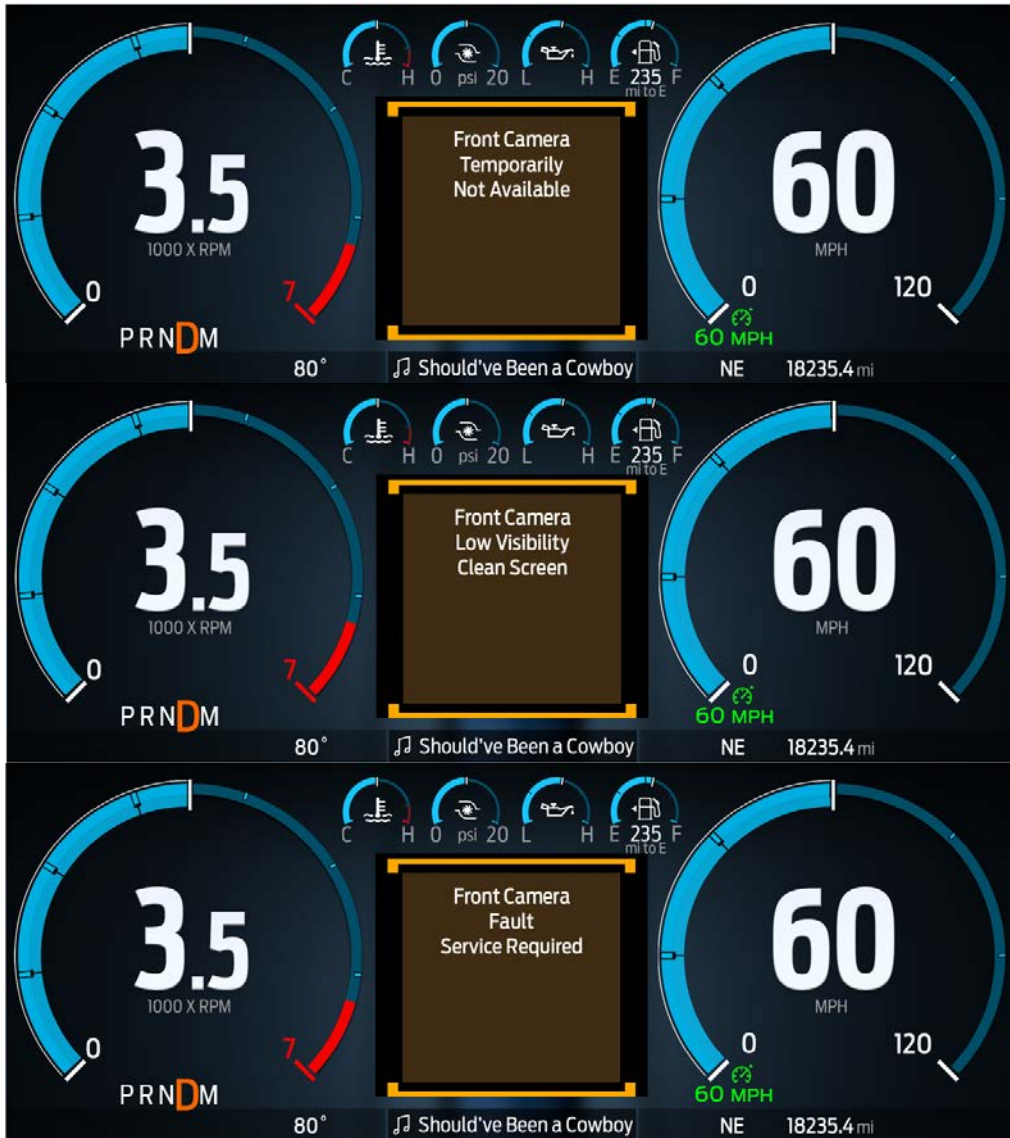
- If the front radar of the vehicle is blocked due to debris, this will inhibit BlueCruise from activating because Adaptive Cruise Control cannot activate. The above message will be displayed to the driver if this occurs.

# BlueCruise Driver Intervention (Driver Facing Camera, F-150)– 5c.ii



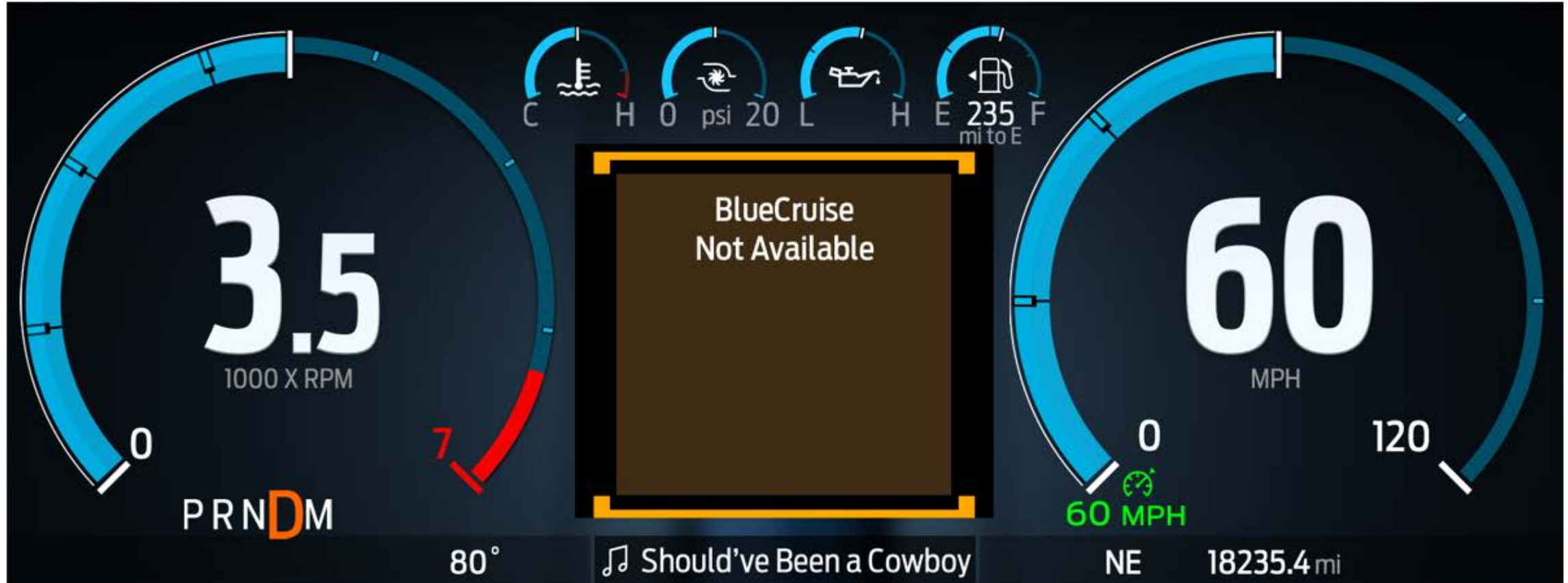
- If the driver-facing camera cannot detect the driver due to camera blockage or inability to detect the driver's facial features, the following messages will appear (with a chime):
  - Driver-Facing Camera is Blocked See Manual
  - Driver-Facing Camera Cannot Detect Face See Manual
- If the driver-facing camera has a system fault, the following message will appear (with a chime):
  - Driver-Facing Camera Fault See Manual

# BlueCruise Driver Intervention (Front Camera, F-150)– 5c.ii



- If the front windshield camera is not available or is occluded due to debris or other blockage, the following messages could appear:
  - Front Camera Temporarily Not Available
  - Front Camera Low Visibility Clean Screen
- If the front windshield camera has a system fault, the following message will appear (with a chime):
  - Front Camera Fault Service Required

# BlueCruise Driver Intervention (System Fault, F-150)– 5c.ii



- If BlueCruise cannot activate due to a system fault, or the driver is locked out of BlueCruise (due to entering the Slowdown stage more than once, which can be calibrated), the message above will appear on the cluster alerting the driver that BlueCruise is not available

# BlueCruise Driver Engagement – 5d.i



Activation  
button

Eye/Head  
tracking  
camera

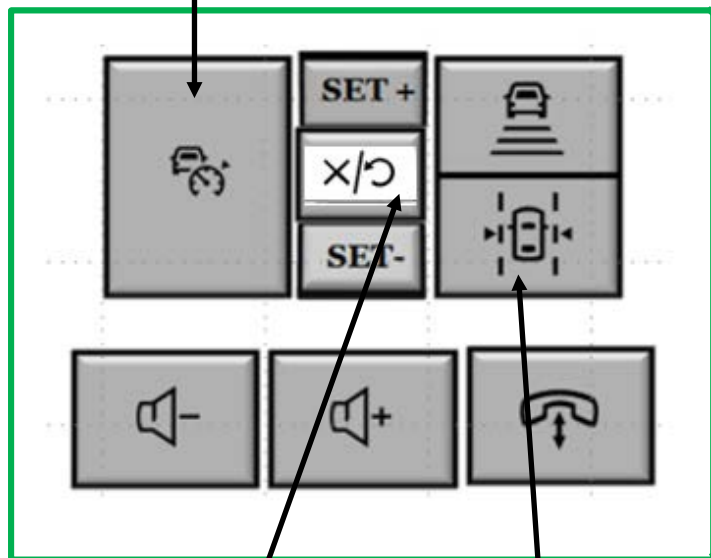
Infrared  
LEDs

SW Torque  
Hands  
On/Off

- All vehicles equipped with BlueCruise utilize both eye tracking (via Driver Facing Camera and infrared LEDs) and hands on-off detection (via steering wheel torque sensing) to determine driver engagement.
  - 2021 F-150 equipped with BlueCruise shown above.

# BlueCruise Driver Control Inputs (Button Pack, F-150) – 5e.i, 5e.ii

Adaptive Cruise Control button



Resume/Cancel button

Lateral Support button



# BlueCruise Functions, Override and Resumption – 5e.iii, 5e.iv



- If a driver override (steering input, brake pedal press, button press) cancels BlueCruise, the feature will revert to Standby (steering input, graphics shown above) or Off (brake pedal press, button press)
  - No chime will accompany this reversion to Standby because driver input caused the feature cancellation
  - After entering Standby via steering input, when the conditions for feature activation are reestablished, BlueCruise will enter Hands-On or Hands-Free mode (depending on the situation)

» Conditions for feature activation can be found in Section 5a.i slides

Backup

*Ford*

# Eyes Off Warning – Hands-On Mode



# Hands Off Warning – Hands-On Mode



# CX727E Lane Centering Assist ECE79 ACSF B1 Homologation

## Lateral acceleration over vehicle speed, limitation concept and test results

02-Jul-2020 (original test date)

21-Apr-2021 (updated plots with new filter settings for ECE79-R03 Supp3)

# INIM-PE21020-85282 – Section 5

Lane Centering Assist

The Ford logo, rendered in its signature script font, is positioned in the bottom right corner of the slide.

# Trade Name / Trim Level

- Ford Vehicles – Adaptive Cruise Control with Stop-and-Go and Lane Centering
  - 2019+ Ford Edge
  - 2020+ Ford Explorer
  - 2020+ Ford Escape
  - 2021 Ford Bronco Sport
  - 2021 Ford F-150
  - 2021 Ford Mustang Mach-E
  - 2022 Ford Maverick
- Lincoln Vehicles – Adaptive Cruise Control with Stop-and-Go and Lane Centering, or Adaptive Cruise Control with Traffic Jam Assist
  - 2019+ Lincoln Nautilus
  - 2020+ Lincoln Aviator
  - 2020+ Lincoln Corsair
  - 2022 Lincoln Navigator
- Throughout this presentation, Lane Centering Assist (LCA) will be used to refer to the feature

# LCA Routine Operation (Off, F-150) – 5c.i



LCA is off (telltale is grey has no wheel on it)

# LCA Routine Operation (Standby, F-150) – 5c.i

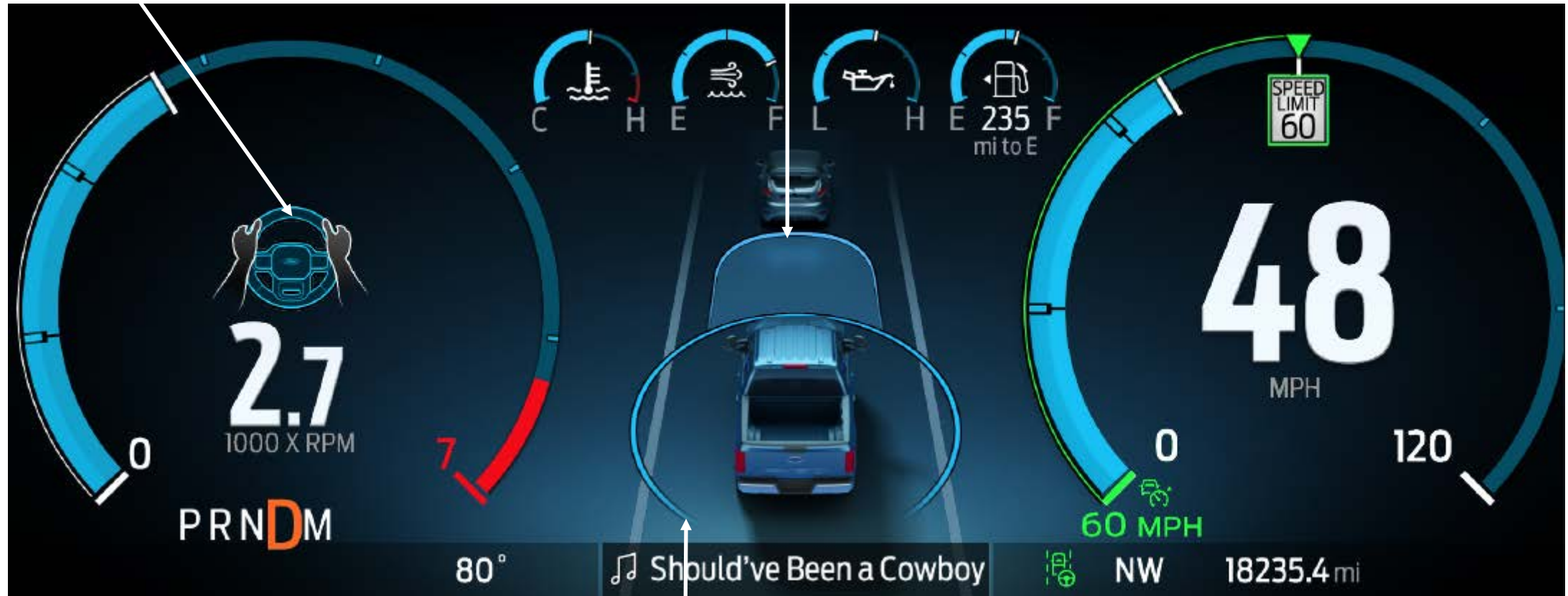


LCA Telltale:  
Grey: Standby

# LCA Routine Operation (F-150) – 5c.i

Steering wheel with hands icon denotes LCA is active

Shield in front of vehicle denotes ACC is active



Vehicle with circle around it denoting LCA Active

LCA Telltale: Green: LCA Active

# LCA Driver Intervention (Hands Off Warning, F-150)– 5c.ii



- Amber Keep Hands on Steering Wheel warning (visual-only) occurs after fifteen seconds of the driver’s hands being detected off the wheel while in Hands-On mode

# LCA Driver Intervention (Hands Off Warning, F-150)– 5c.ii



- Red Keep Hands on Steering Wheel warning (visual and audible) occurs after four seconds (if traveling above 60kph) or fifteen seconds (if traveling 10-60kph) of the driver's hands being detected off the wheel while in Hands-On mode and the Amber Keep Hands on Steering Wheel warning is active

# LCA Driver Intervention (Takeover Warning, F-150)– 5c.ii



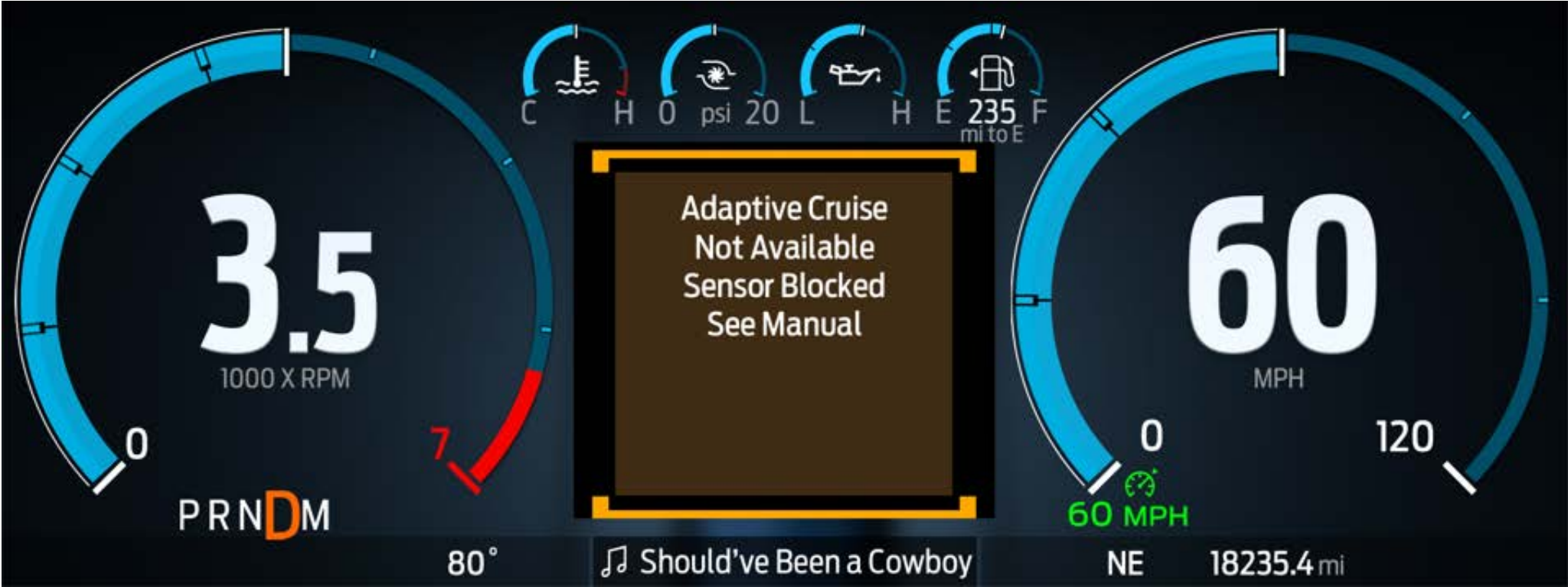
- Red Resume Control warning (visual and audible) occurs after the driver has ignored warnings on the cluster for a period of time (eyes- or hands-off warnings), or the feature encounters a situation where it cannot provide support any longer and the driver is not completely focused on the driving task (eyes off road or hands off wheel)

# LCA Driver Intervention (Cancellation, F-150)– 5c.ii



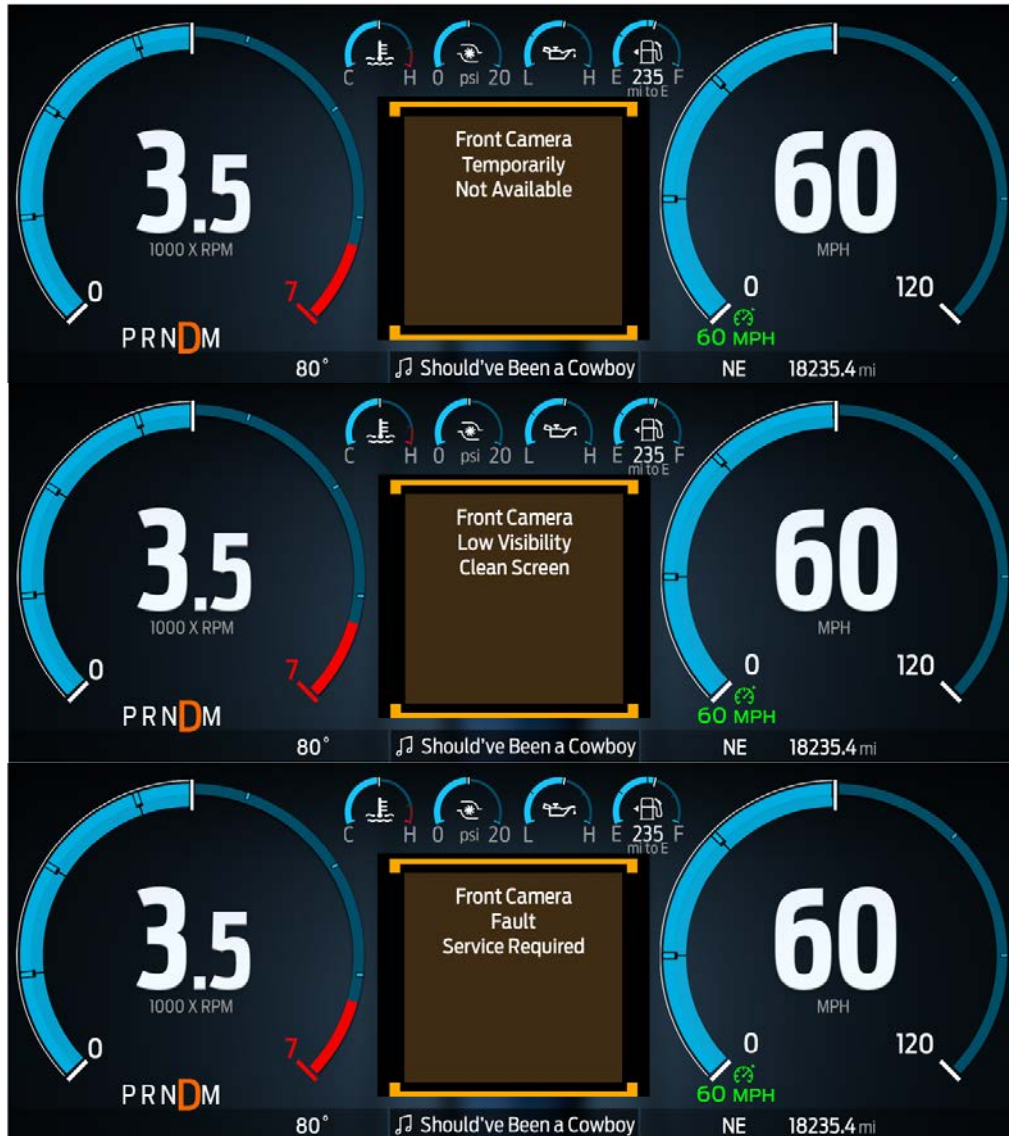
- Cancellation occurs when the feature encounters a situation where it cannot provide support any longer and the driver is paying attention to the driving task (eyes on road and hands on wheel)

# LCA Driver Intervention (ACC Unavailable, F-150)– 5c.ii



- If the front radar of the vehicle is blocked due to debris, this will inhibit LCA from activating because Adaptive Cruise Control cannot activate. The above message will be displayed to the driver if this occurs.

# LCA Driver Intervention (Front Camera, F-150)– 5c.ii



- If the front windshield camera is not available or is occluded due to debris or other blockage, the following messages could appear:
  - Front Camera Temporarily Not Available
  - Front Camera Low Visibility Clean Screen
- If the front windshield camera has a system fault, the following message will appear (with a chime):
  - Front Camera Fault Service Required

# LCA Driver Intervention (System Fault, F-150)– 5c.ii



- If LCA cannot activate due to a system fault, or the driver is locked out of LCA (due to entering the Slowdown stage more than once, which can be calibrated), the message above will appear on the cluster alerting the driver that LCA is not available

# LCA Driver Engagement – 5d.i

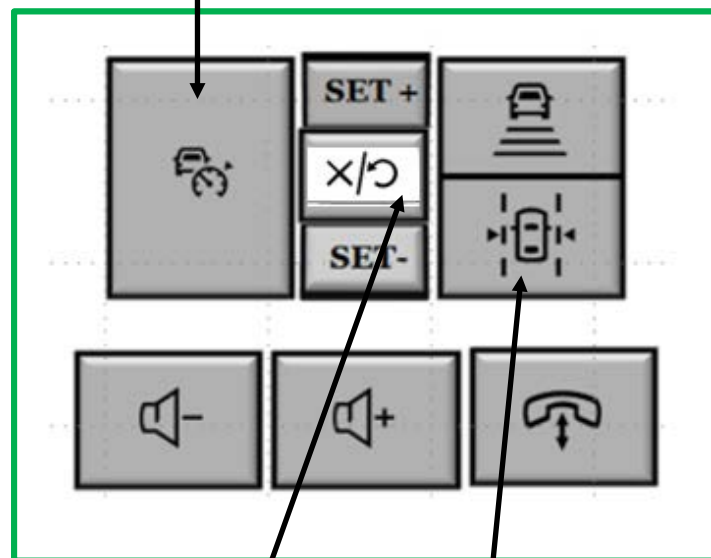


LCA button

- All vehicles equipped with LCA utilize hands on-off detection (via steering wheel torque sensing) to determine driver engagement.
  - 2020 Lincoln Nautilus equipped with LCA shown above.

# LCA Driver Control Inputs (Button Pack, F-150) – 5e.i, 5e.ii

Adaptive Cruise Control button



Resume/Cancel button

LCA button



# LCA Driver Control Inputs (Button Pack, Nautilus) – 5e.i, 5e.ii



Resume button

LCA button

Cancel Button

Adaptive Cruise Control button

# LCA Functions, Override and Resumption – 5e.iii, 5e.iv



- If a driver override (steering input, brake pedal press, button press) cancels LCA, the feature will revert to Standby (graphics shown above) or Off (button press, brake pedal press)
  - No chime will accompany this reversion to Standby because driver input caused the feature cancellation
  - After entering Standby via steering input, when the conditions for feature activation are reestablished, LCA will enter Hands-On or Hands-Free mode (depending on the situation)

» Conditions for feature activation can be found in Section 5a.i slides

# CX727E Lane Centering Assist ECE79 ACSF B1 Homologation

## Lateral acceleration over vehicle speed, limitation concept and test results

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