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Less Info

Title: **Parameters for 16UZL with 16VKW**

Applies To: **Vehicles with both feature codes 16UZL and 16VKW**

CHANGE LOG

Please refer to the change log text box below for recent changes to this article:

05/9/2025 - Initial Article Release

DESCRIPTION

This document will guide the user through an overview of the combination of feature codes 0016UZL No-Idle battery powered HVAC and 0016VKW Thermostat Temperature Control, including driver's best practices, the programmable parameters for these feature codes, their effects, and how they interact with each other.

SYSTEM DESCRIPTION

The No-Idle battery-powered HVAC (16UZL) feature code has been combined with the Thermostat Temperature Control (16VKW) feature code. Thermostat Temperature Control utilizes an auto start/stop system to turn on the engine and run the sleeper HVAC system. This combination allows the No-Idle battery-powered HVAC system to request assistance from the Thermostat Temperature Control, which in turn can command the engine-operated AC system when needed.

The combination of these two feature codes (16UZL & 16VKW) is designed for engine-assisted air conditioning in extreme ambient heat conditions where additional cooling capacity is needed to overcome sunload and high humidity demands. For all other operating conditions, it is recommended to utilize the No-idle battery-powered system without engine assist to optimize efficiency and avoid unnecessary engine operation, which increases fuel consumption. The Engine Assist feature leverages the engine's AC system's cooling capacity in extreme ambient conditions.

Driver Best Practices

Link to PDF Document

Driver Best Practices PDF

Overall / High-level Impact of Changing Parameters:

Factory settings aim to optimize HVAC system to extend engine off times while maintaining comfort, reduce engine starts and reduce engine on times. Updates to these programmable parameters may have a significant impact on engine off times, engine on times and comfort. Please do so with care.

Programmable Parameters

The following chart shows the available programmable parameters and their default values as found in DLB, along with a description of each parameter.

SAC = Sleeper Auto Climate

DLB Parameter ID	Parameter	Description	Default	Min/Max
4123	SAC_Ambient_Air_Temp_High	Ambient Air Temperature High Threshold related to extending run time while at target temperature.	100°F	-40/130
4124	SAC_Ambient_Air_Temp_Low	Ambient Air Temperature Low Threshold related to extending run time while at target temperature.	90°F	-40/130
3371	SAC_Engine_Off_Time	Minimum engine off time. This ensures the vehicle remains off due to sleeper temperature a minimum amount of time.	15min	15/255
3368	SAC_Engine_Run_Time	Engine run time timer, ensures engine runs for minimum amount of time.	20min	15/255
4122	SAC_Fan_Adjustment_Time	This is the time system should wait before increasing blower speed.	45min	1/60
4132	SAC_HVAC_Temp_Setting_Max	The rear HVAC control temperature setting high limit.	76°F	60/85
4131	SAC_HVAC_Temp_Setting_Min	The rear HVAC control temperature setting low limit.	68°F	60/85
4121	SAC_Norm_Max_Run_Time	This is max time system can try achieving the temperature selected by operator in non-extreme temperature conditions. After this timer is elapsed engine will shut down.	1hr	1/20
4120	SAC_Rapid_Activation_Time	This is the wait time before Engine Starts when temperature exceeds SAC_Temp_Drift_High_Thd	1min	1/20
4133	SAC_Rear_HVAC_Fan_Max_Spd	Max blower speed. BCM will increase blower speed till this value in the event of cooling/heating.	4	1/5 Speed
4160	SAC_Setting_Adjust_Time	How often the user setting is overridden to another value. Used when user sets their temperature to a value that is outside the max/min temp settings.	2s	0/200
3944	SAC_Slow_Activation_Time	This is the wait time before Engine Starts when the temperature exceeds SAC_Temp_Drift_Low_Thd.	30min	1/60
4125	SAC_Sun_Load_High_Time	Engine run time timer after the selected temperature is achieved. When Amb >High Threshold.	5min	1/60
4126	SAC_Sun_Load_Med_Time	Engine run time timer after the selected temperature is achieved. When Low Threshold < Amb <High Threshold	5min	1/60
4127	SAC_Sun_Load_Low_Time	Engine run time timer after the selected temperature achieved. When Ambient is < Low Threshold.	5min	1/60
3936	SAC_Temp_Drift_High_Thd	The amount of Degrees F system will allow for tolerance drift from target temperature when Auto Climate requests the engine to start/keep running. When this setting is exceeded, there is a faster response triggered, based on (SAC_Rapid_Activation_Time) setting.	10°F	1/20
3803	SAC_Temp_Drift_Low_Thd	The amount of Degrees F system will allow for tolerance drift from target temperature when Auto Climate requests engine to start/keep running.	8°F	1/20

Engineering Level Non-Programmable Parameters

DLB Parameter ID	Parameter	Description	Default
3379	AAT_High_Extreme	Extreme High Ambient Temp above which Engine on can run for 10hrs.	140°F

4141	SAC_Extreme_Max_Run_Time	Max Engine On Time if unable to achieve target temp beyond Extreme Ambient Limits.	10hrs
4144	SAC_Cooling_Tolerance	Degrees F above Target Temp, SAC will accept as meeting target to begin Engine Run Time Timer.	4°F
4145	SAC_Heating_Tolerance	Degrees F below Target Temp, SAC will accept as meeting target to begin Engine Run Time Timer.	4°F

Parameter Detail Effects

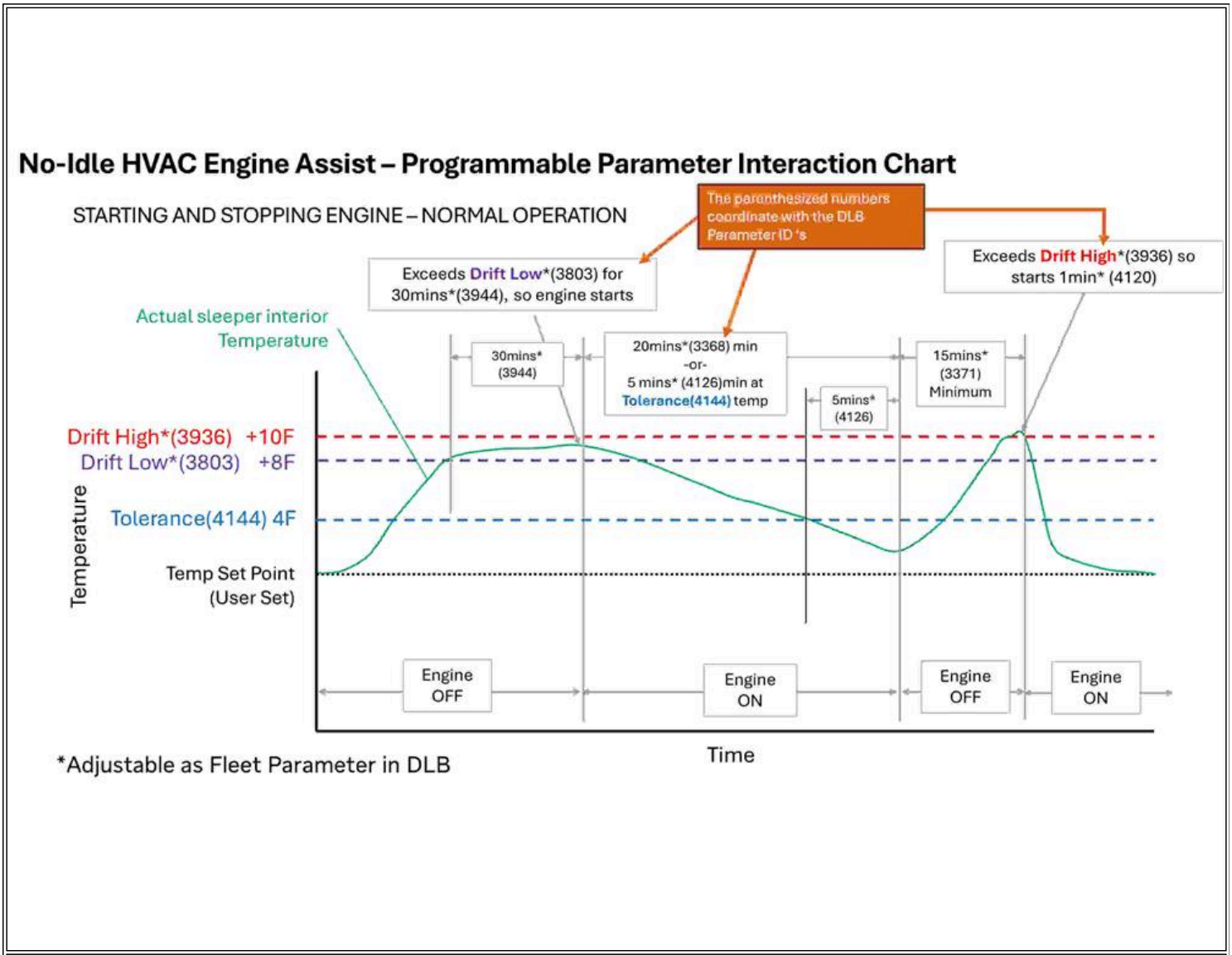

Figure #1: Parameter Chart Interaction Normal State

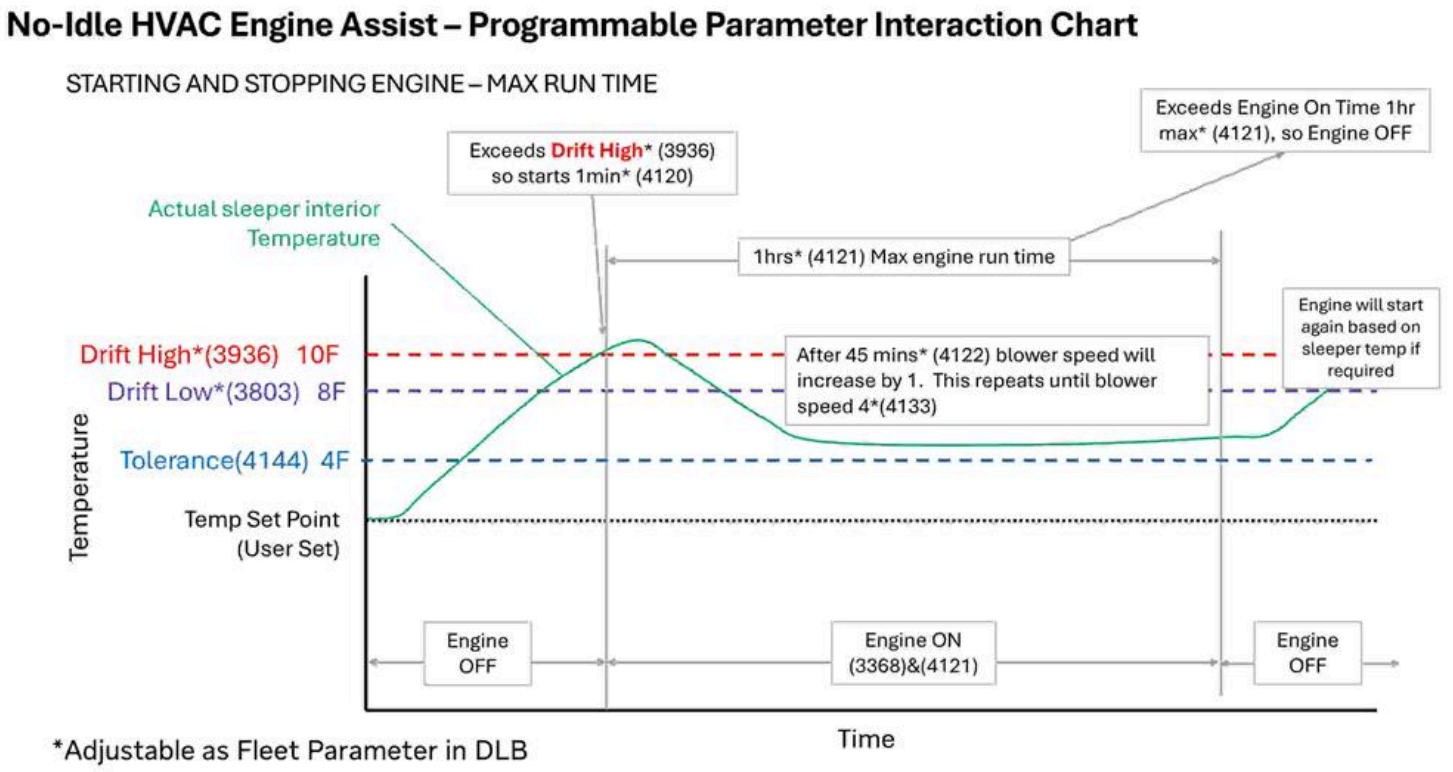

Figure #2: Parameter Chart Interaction with Engine Max Run Time

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Parameter Details and Interaction:

1. **Engine Run and Off Times:** These parameters set the minimum and maximum run times for the engine to either remain off or running when reacting to the HVAC temperature settings.
    - **3371 SAC_Engine_Off_Time:** Engine off time timer, time the engine is off during a start/stop event. This ensures the vehicle remains off due to sleeper temperature a minimum amount of time.
        - Default 15 mins, adjustable between 15 and 255 mins.
    - **3368 SAC_Engine_Run_Time:** Engine run time timer, ensures engine runs for a minimum amount of time.
        - Default 20 mins, adjustable between 20 and 255 mins.
    - **Summary:** The default times were chosen to help protect the integrity of the engine by requiring a minimum run time to prevent conditions where excessive cycling could occur if an error state emerges during operation and to protect batteries to ensure they are charged a minimum amount.
2. **Temperature Settings:** This sets the minimum and maximum temperatures the driver would be able to adjust the target temperatures to.
    - **4132 SAC_HVAC_Temp_Setting_Max:** The rear HVAC control temperature setting high limit. This is maximum temperature setting the driver is allowed to adjust the sleeper to.
        - Default 76°F, adjustable between 60°F and 85°F.
    - **4131 SAC_HVAC_Temp_Setting_Minimum:** The rear HVAC control temperature setting low limit. This is the minimum temperature setting the driver is allowed to adjust the sleeper to.
        - Default 68°F, adjustable between 60°F and 85°F.
    - **Summary:** The default settings have been determined to be the most effective settings during system testing that the No-Idle system is capable of achieving in most ambient conditions.
        - Note - extreme conditions can heavily impact engine run times with Minimum and Maximum temperatures beyond what they are set at default.
3. **Temperature Thresholds:** These parameters indentify the thresholds of if interior temperatures are rising over the target temperature to command the engine to run, they set the temperatures and times for the system to react.

- **3803 SAC_Temp_Drift_Low_Thd:** In addition to target (set) temperature, will determine when Auto Climate requests the engine to start/keep running. If target temperature is exceeded by this threshold, Engine will be commanded on based on the parameter "SAC_Slow_Activation_Time".
  - Default 8°F, adjustable between 1°F and 20°F.
- **3936 SAC_Temp_Drift_High_Thd:** In addition to target (se) temperature will determine when Auto Climate requests engine to start/keep running. If target temperature is exceeded by this secondary threshold, Engine will be commanded on based on "SAC_Rapid_Activation_Time".
  - Default 10°F, adjustable between 1°F and 20°F.
- **3944 SAC_Slow_Activation_Time:** This is the wait time before Engine Starts when temperature exceeds " SAC_Temp_Drift_Low_Thd".
  - Default 30 mins, adjustable between 1 and 60 mins.
- **4120 SAC_Rapid_Activation_Time:** This is the wait time before Engine Starts when temperature exceeds "SAC_Temp_Drift_High_Thd".
  - Default 1 mins, adjustable between 1 and 20 mins.
- **4121 SAC_Norm_Max_Run_Time:** This is max time system can try achieving the temperature selected by operator in non-extreme temperature conditions. After this timer is elapsed engine will shut down. Non Extreme conditions are set between parameters – "SAC_Ambient_Air_Temp_High" & "SAC_Ambient_Air_Temp_Low".
  - Default 1 hr, adjustable between 1 and 20 hrs.
- **Summary:** These parameters are here to help when interior temperatures are rising over the target temperature to command the engine to run in a faster timeframe, if temps rise past the "SAC_Temp_Drift_High_Thd" threshold, the engine is commanded on with "SAC_Rapid_Activation_Time" a faster reaction time, to add additional capacity to the No_Idle system to help cool or heat the interior system.

4. **Blower Speed:** SAC system will increase blower speed based on these settings if system cannot achieve target temperature when engine is on. it will also determine how long the system will wait before each increase in blower speed based on these settings.
   - **4133 SAC_Rear_HVAC_Fan_Max_Spd:** Max blower speed. BCM will increase blower speed till this set value is met if system cannot achieve target temperature when engine is on.
     - Default max speed 4, adjustable between 1 and 5.
   - **4122 SAC_Fan_Adjustment_Time:** This is the time system should wait before increasing blower speed.
     - Default 45 mins, adjustable between 1 and 60 mins.
   - **Summary:** This feature helps reduce engine starts, if the operator selects too low of a blower speedthe to achieve target temperature, the setting will increase blower speed as described above. Although we recommend running at blower speed 5 in most cases, we realize there may be times a lower blower speed can achieve the desired balance between comfort and engine starts.
5. **Ambient Air Temperature Thresholds:** These set high and low ambient temperatures for the system to tell it to run at extended intervals to help cool when the ambient temps meet the threshold settings. For example, when ambient is 100F we want to tell the AC to run for extended run times to help when the temps are 100F or more.
   - **4123 SAC_Ambient_Air_Temp_High:** Ambient Air Temperature High Threshold related to extending run time while at target temperature.
     - Default 100°F, adjustable between -40°F and 130°F.
   - **4124 SAC_Ambient_Air_Temp_Low:** Ambient Air Temperature Low Threshold related to extending run time while at target temperature.
     - Default 90°F, adjustable between -40°F and 130°F.
   - **See next section:** "Engine run time after achieving temperature" parameters for their description, these are the parameters that react / operate off of the high and low settings here.
6. **Engine Run Time After Achieving Temperature:** These Parameters are used in reaction to the "Ambient Air Temperature Thresholds" both the high and low.
   - **4125 SAC_Sun_Load_High_Time:** Engine run time timer after the selected temperature achieved.
     - When Amb >High Threshold.
     - Default 5 mins, adjustable between 1 min and 60 min.
   - **4126 SAC_Sun_Load_Med_Time:** Engine run time timer after the selected temperature achieved.
     - When Low Threshold < Amb <High Threshold.
     - Default 5 mins, adjustable between 1 min and 60 min.
   - **4127 SAC_Sun_Load_Low_Time:** Engine run time timer after the selected temperature achieved.
     - When Ambient is < Low Threshold.
     - Default 5 mins, adjustable between 1 min and 60 min.
   - **Summary:** These parameters allow you to extend engine on time ("run time") after achieving tolerance temperature based on ambient temperature. After development, we saw no significant value in varying these times, so we set them all the same at 5 minutes regardless of ambient temperature. For example, at temperatures above 100°F (Ambient Air Temp HIGH 4123), we could have had the system run for 15 minutes (4125) after achieving tolerance temperature. However, for ambient temperatures between 100°F (4123) and 90°F (4124), we could have it run for only 5 minutes (2126).
7. **Engineering level Parameters**: Non-Adjustable
   - **3379 AAT_High_Extreme:** Extreme High Ambient Temp above which Engine on can run for 10hrs.
     - Default 140 °F
   - **4141 SAC_Extreme_Max_Run_Time:** Max Engine On Time if unable to achieve target temp beyond Extreme Ambient Limits.
     - Default 10hrs
   - **4144 SAC_Cooling_Tolerance:** Degrees F above Target Temp, SAC will accept as meeting target to begin Engine Run Time Timer.
     - Default 4°F
   - **4145 SAC_Heating_Tolerance:** Degrees F above Target Temp, SAC will accept as meeting target to begin Engine Run Time Timer
     - Default 4°F
   - **Summary:** SAC Cooling and Heating tolerance parameters were limitations of the No-Idle system's ability to control within a tolerance. Adjustments outside of these defaults were found to significantly impact engine off and on times.

Additional Details:

- **Engine Start/Stop Logic:**
  - The engine starts if the sleeper temperature exceeds the set thresholds for a specified duration.
  - Minimum engine off time is 15 mins (3371 SAC_Engine_Off_Time), and minimum engine on time is 20 mins (3368 SAC_Engine_Run_Time), adjustable based on fleet parameters.
  - If the system cannot achieve the target temperature within 45 mins (4122 SAC_Fan_Adjustment_Time), the blower speed will incrementally increase up to a maximum speed of 4 (4133 SAC_Rear_HVAC_Fan_Max_Spd).

WARRANTY INFORMATION

Warranty Claim Coding:

Refer to the Warranty Coding Manual for Group and Noun Codes.

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Refer to the SRT Manual for Repair Times

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