

Wiring Systems and Power Management - Description and Operation - CT6**DESCRIPTION AND OPERATION****ELECTRONIC PARK LOCK DESCRIPTION AND OPERATION**

If the vehicle is equipped with automatic transmission and a floor mounted console gear shift, it has an electronic park lock system. The electronic park lock system purpose is to prevent the ignition from being switched to the OFF/Vehicle OFF position when the transmission is in any position other than PARK and the vehicle may still be moving. The electronic park lock system incorporates the park position switch that located in the A/T shift lock control switch. When the transmission shift selector is in PARK, the park position switch closes and the BCM allows the ignition to be turned OFF/Vehicle OFF.

If the vehicle is not in PARK, the ignition will return to ACC/ACCESSORY and display the message SHIFT TO PARK in the Driver Information Center. When the vehicle is shifted into PARK, the ignition system will switch to OFF/Vehicle OFF.

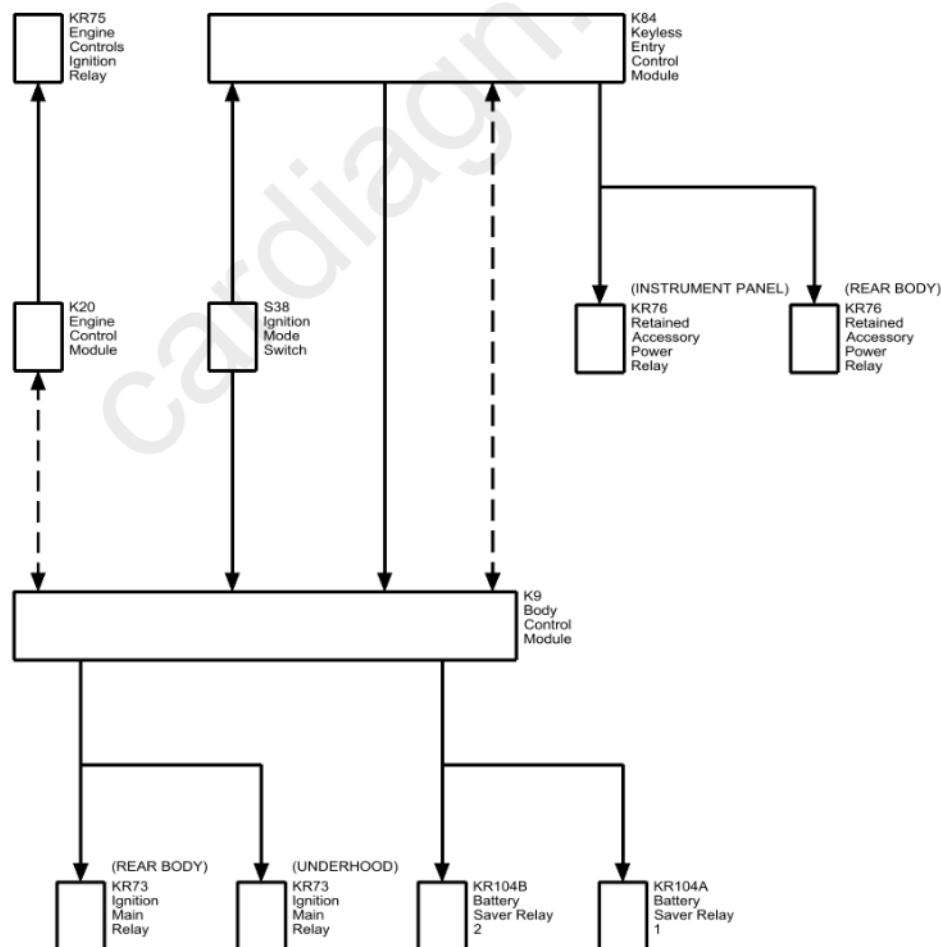
POWER MODE DESCRIPTION AND OPERATION (WITHOUT HP9)**Power Mode Block Diagram**

Fig. 1: Power Mode Block Diagram

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
K9	K9 Body Control Module
KR73	KR73 Ignition Main Relay
K20	K20 Engine Control Module
KR73	KR73 Ignition Main Relay
KR104B	KR104B Battery Saver Relay 2
KR104A	KR104A Battery Saver Relay 1
S38	S38 Ignition Mode Switch
K84	K84 Keyless Entry Control Module
KR76	KR76 Retained Accessory Power Relay
KR76	KR76 Retained Accessory Power Relay
KR75	KR75 Engine Controls Ignition Relay

The power mode master receives ignition switch or ignition mode switch signals to identify the operators desired power mode. The Power Mode Parameter tables below illustrate the correct state of these input parameters (circuits) in correspondence to the ignition switch position or ignition mode switch with the transmitter to vehicle range:

Power Mode Parameters

Power Mode	Power Mode Transmitted	Push Button Ignition Switch (Power Button Switch Circuit Input to the BCM)	Push Button Ignition Switch Voltage Push Button Ignition Switch Voltage Input to the BCM	Key in Cylinder Switch/Key Fob in Vehicle (Transmitter in Range to the BCM Signal)
Transmitter in Range	OFF	Inactive	9 V	Yes
Transmitter out of Range	OFF	Inactive	9 V	No
Vehicle On Power Mode, then Press the Power Button Switch (Foot on or OFF the Brake Pedal) Transmitter in Vehicle	OFF	Active (pushed) / Inactive (not pushed)	5-6 V (pressed)	Yes
Vehicle OFF Power Mode, then Press the Power Button Switch with foot OFF the Brake Pedal; Transmitter in Vehicle	Accessory Mode	Active (pushed) / Inactive (not pushed)	5-6 V (pressed)	Yes
Vehicle OFF Power Mode, then Press the Power Button Switch with foot on the Brake Pedal; Transmitter in Vehicle	Vehicle in Run/Start Mode (Ignition ON engine running.)	Active (pushed) / Inactive (not pushed)	5-6 V (pressed)	Yes

Power Mode	Power Mode Transmitted	Push Button Ignition Switch (Power Button Switch Circuit Input to the BCM)	Push Button Ignition Switch Voltage Push Button Ignition Switch Voltage Input to the BCM	Key in Cylinder Switch/Key Fob in Vehicle (Transmitter in Range to the BCM Signal)
Vehicle OFF Power Mode, then Press and Hold the Power Button Switch for 5 s with foot OFF the Brake Pedal; Transmitter in Vehicle	Vehicle in Run/Start Mode (Ignition ON without the engine running)	Active (pushed) / Inactive (not pushed)	5-6 V (pressed)	Yes
Vehicle OFF Power Mode, then Press and Hold the Power Button Switch for 10 s with foot OFF the Brake Pedal; Transmitter in Vehicle	Vehicle In Service Mode (Ignition ON without the engine running)	Active (pushed) / Inactive (not pushed)	5-6 V (pressed)	Yes

Relay Controlled Power Mode

The BCM and keyless entry control module use discrete push button switch inputs, transmitter in range status, current power mode state, transmission shift lever position and brake pedal position state to distinguish the correct power mode (OFF, Accessory Mode, Vehicle in Run/Start Mode). The BCM and keyless entry control module, after determining the desired power mode, will activate the appropriate relays for that power mode.

The retained accessory power relay remains on for a timed period after the Ignition is turned OFF. Refer to [Retained Accessory Power Description and Operation](#) for more information on the retained accessory power function.

Push Button Start

The ignition mode switch has 2 LEDs that indicate the vehicle power mode. When the vehicle is in the OFF mode, both LED's will be OFF. Momentarily pressing the ignition mode switch button once (brake pedal not applied), will enter the vehicle into accessory mode and the amber LED (ACC) will illuminate. The accessory mode has a 10 min time out to reduce battery drain. With the ignition OFF (brake pedal not applied) then pressing and holding the push button start switch for 5 s will place the vehicle in run/start mode (Ignition ON without the engine running). The vehicle will stay powered up for 3 hours and the green LED (Run/Start) will illuminate. After being in run/start mode (ignition ON without the engine running) for 1.5 hours, the vehicle will look to see if the transmitter is still present. If the transmitter is not present in the vehicle, it will power down instead of staying powered up for the full 3 hours. With the ignition OFF, (brake pedal not applied) then pressing and holding the push button start switch for at least 10 s will place the vehicle into Vehicle In Service Mode (Ignition ON without the engine running) and the green LED (Run/Start) will illuminate. Vehicle In Service Mode is used for service and diagnostics not requiring the operation of the gas engine. The vehicle will stay in Vehicle In Service mode until the vehicle is manually turned OFF.

With the ignition OFF (brake pedal applied), pressing the ignition mode switch button once, the vehicle will enter run/start mode and the green LED (Run/Start) will illuminate. This will start the engine. If the vehicle is left in PARK with the engine running and the transmitter out of the vehicle, the vehicle will automatically turn off after 1.5 hours. If the vehicle is left in PARK with the engine running and the transmitter in the vehicle, the vehicle will automatically turn OFF after 3 hours. The timer will stop

when the vehicle is shifted out of PARK and the timer will reset after the vehicle is placed back in PARK with the engine running.

Both LED's have the voltage supplied from the body control module (BCM). The ignition mode switch sends the ignition mode switch status to the passive entry passive start module (PEPS) and to the BCM. The PEPS module sends a redundant signal to the BCM with the ignition mode switch status.

Battery Saver Mode (Transport Mode)

Battery saver mode (transport mode) reduces the parasitic load of some modules during overseas shipment or during vehicle storage conditions. This improves the drain time on the battery (up to 70 days without the battery going dead). When a vehicle is in transport/storage, some features may have reduced functionality while in the battery saver mode, such as disabling keyless entry, afterblow and content theft features. Battery saver mode is initiated by turning on the hazard flashers, applying the brake pedal and then turning the ignition key to the start position or pushing the ignition mode switch with the foot on the brake for greater than 15 s. The mode is disengaged by repeating the previous process. The driver information center (if equipped) will display Transport Mode is On when battery saver mode is enabled and Transport Mode is OFF when battery saver mode is disabled. For vehicles not equipped with a driver information center, the battery indicator light will constantly flash on the Instrument Cluster when battery saver mode is enabled. This feature can be used as many times as necessary if the vehicle is to be stored for an extended period of time.

BCM Awake/Sleep States

The BCM is able to control or perform all of the BCM functions in the awake state. The BCM enters the sleep state when active control or normal monitoring of system functions has stopped and a time limit has passed. The BCM must detect certain wake-up inputs before entering the awake state. The BCM monitors for these inputs during the sleep state.

The BCM will enter the awake state if any of the following wake-up inputs are detected:

- Activity on the serial data line
- Detection of a battery reconnect
- Any door open signal
- Headlamps ON
- Ignition ON
- Park lamps ON
- Keyless entry or remote start message

The BCM will enter a sleep state when all of the following conditions exist:

- Ignition OFF, transmitter is out of range
- No activity exists on the serial data line.
- No outputs are commanded.
- No delay timers are actively counting.
- No wake-up inputs are present.

If all these conditions are met, the BCM will enter a low power or sleep condition.

POWER MODE DESCRIPTION AND OPERATION (WITH HP9)

CT6 Power Moding

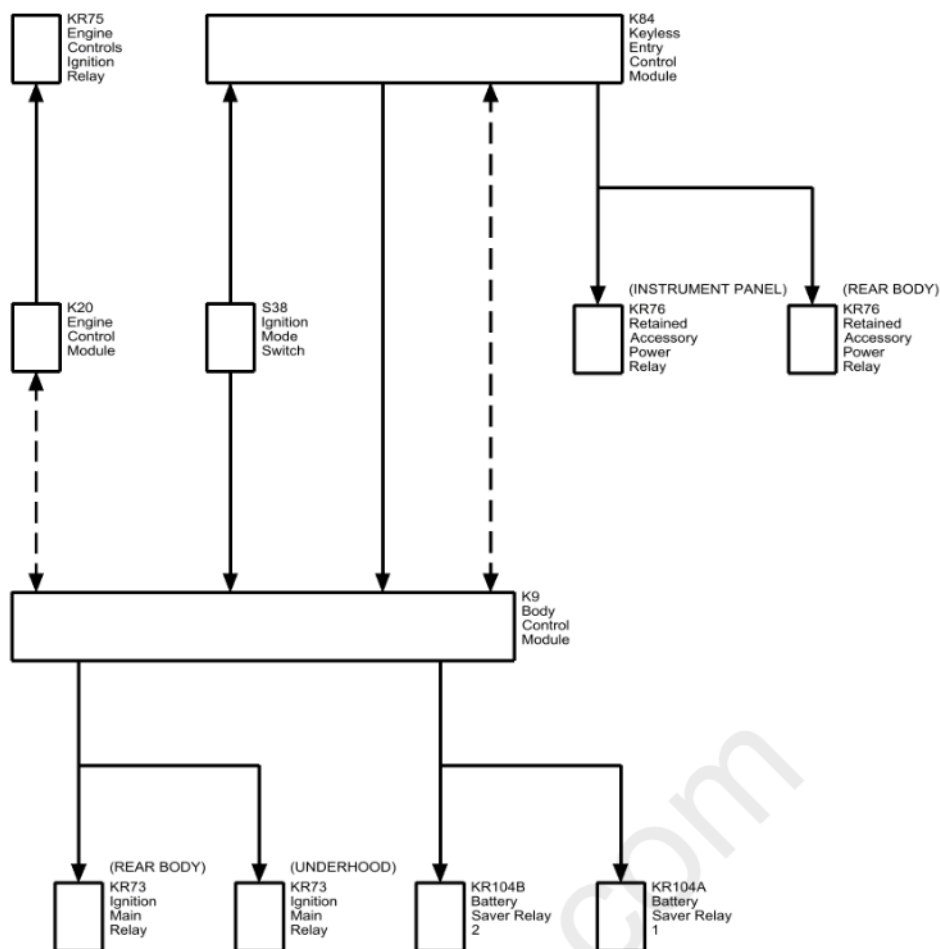


Fig. 2: Power Mode Block Diagram

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
K9	K9 Body Control Module
KR73	KR73 Ignition Main Relay
K20	K20 Engine Control Module
KR73	KR73 Ignition Main Relay
KR104B	KR104B Battery Saver Relay 2
KR104A	KR104A Battery Saver Relay 1
S38	S38 Ignition Mode Switch
K84	K84 Keyless Entry Control Module
KR76	KR76 Retained Accessory Power Relay
KR76	KR76 Retained Accessory Power Relay
KR75	KR75 Engine Controls Ignition Relay

The power mode master receives ignition switch or ignition mode switch signals to identify the operators desired power mode. The Power Mode Parameter tables below illustrate the correct state of these input parameters (circuits) in correspondence to the ignition switch position or ignition mode switch with the transmitter to vehicle range:

Power Mode Parameters

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Power Mode	Power Mode Transmitted	Push Button Ignition Switch (Power Button Switch Circuit Input to the BCM)	Push Button Ignition Switch Voltage Push Button Ignition Switch Voltage Input to the BCM	Key in Cylinder Switch/Key Fob in Vehicle (Transmitter in Range to the BCM Signal)
Transmitter in Range	Vehicle OFF	Inactive	9 V	Yes
Transmitter out of Range	Vehicle OFF	Inactive	9 V	No
Vehicle On Power Mode, then Press the Power Button Switch (Foot on or OFF the Brake Pedal) Transmitter in Vehicle	Vehicle OFF	Active (pushed) / Inactive (not pushed)	5-6 V (pressed)	Yes
Vehicle OFF Power Mode, then Press the Power Button Switch with foot OFF the Brake Pedal; Transmitter in Vehicle	Accessory Mode	Active (pushed) / Inactive (not pushed)	5-6 V (pressed)	Yes
Vehicle OFF Power Mode, then Press the Power Button Switch with foot on the Brake Pedal; Transmitter in Vehicle	Vehicle in Run/Start (Vehicle ON) Mode.	Active (pushed) / Inactive (not pushed)	5-6 V (pressed)	Yes
Vehicle OFF Power Mode, then Press and Hold the Power Button Switch for 5 s with foot OFF the Brake Pedal; Transmitter in Vehicle	Vehicle in Service Mode	Active (pushed) / Inactive (not pushed)	5-6 V (pressed)	Yes
Vehicle OFF Power Mode, then Press and Hold the Power Button Switch for 10 s with foot OFF the Brake Pedal; Transmitter in Vehicle	Vehicle in Service Mode	Active (pushed) / Inactive (not pushed)	5-6 V (pressed)	Yes

Relay Controlled Power Mode

The BCM and keyless entry control module use discrete push button switch inputs, transmitter in range status, current power mode state, transmission shift lever position and brake pedal position state to distinguish the correct power mode (Vehicle OFF, Accessory Mode, Vehicle in Run/Start Mode). The BCM and keyless entry control module, after determining the desired power mode, will activate the appropriate relays for that power mode.

The retained accessory power relay remains on for a timed period after the Ignition is switched to Vehicle OFF. Refer to [**Retained Accessory Power Description and Operation**](#) for more information on the retained accessory power function.

Push Button Start

The ignition mode switch has 2 LEDs that indicate the vehicle power mode. When the vehicle is in the Vehicle OFF mode, both LED's will be OFF. Momentarily pressing the ignition mode switch button once (brake pedal not applied), will enter the vehicle into accessory mode and the amber LED (ACC) will illuminate. The accessory mode has a 10 min time out to reduce battery drain. Vehicle OFF (brake pedal not applied) then pressing and holding the push button start switch for 5 s will place the vehicle into Vehicle in Service Mode for up to 3 hours and the green LED (Run/Start) will illuminate. After being in Vehicle in Service Mode for 1.5 hours, the vehicle will look to see if the transmitter is still present. If the transmitter is not present in the vehicle, it will power down instead of staying powered up for the full 3 hours. Vehicle OFF (brake pedal not applied), then pressing and holding the push button start switch for at least 10 s will place the vehicle into Vehicle In Service Mode until the vehicle is manually turned OFF.

Vehicle OFF (brake pedal applied), pressing the ignition mode switch button once, the vehicle will enter run/start (Vehicle ON) mode and the green LED (Run/Start) will illuminate. The gas engine will only start if needed. The electric propulsion system is active in this power mode. The gas engine will start if the hood is opened while in this power mode. The vehicle can be charged while in this power mode. If the vehicle is left in PARK while in run/start (Vehicle On) mode and the transmitter is removed from the vehicle, the vehicle will automatically turn off after 1.5 hours. If the vehicle is left in PARK while in run/start (Vehicle ON) mode and the transmitter is in the vehicle, the vehicle will automatically turn OFF after 3 hours. The timer will stop when the vehicle is shifted out of PARK and the timer will reset after the vehicle is placed back in PARK while in run/start (Vehicle On) mode.

Both LED's have the voltage supplied from the body control module (BCM). The ignition mode switch sends the ignition mode switch status to the passive entry passive start module (PEPS) and to the BCM. The PEPS module sends a redundant signal to the BCM with the ignition mode switch status.

Battery Saver Mode (Transport Mode)

Battery saver mode (transport mode) reduces the parasitic load of some modules during overseas shipment or during vehicle storage conditions. This improves the drain time on the battery (up to 70 days without the battery going dead). When a vehicle is in transport/storage, some features may have reduced functionality while in the battery saver mode, such as disabling keyless entry, afterblow and content theft features. Battery saver mode is initiated by turning on the hazard flashers, applying the brake pedal and then pushing the ignition mode switch with the foot on the brake for greater than 15 s. The mode is disengaged by repeating the previous process. The driver information center (if equipped) will display Transport Mode is On when battery saver mode is enabled and Transport Mode is OFF when battery saver mode is disabled. For vehicles not equipped with a driver information center, the battery indicator light will constantly flash on the Instrument Cluster when battery saver mode is enabled. This feature can be used as many times as necessary if the vehicle is to be stored for an extended period of time.

BCM Awake/Sleep States

The BCM is able to control or perform all of the BCM functions in the awake state. The BCM enters the sleep state when active control or normal monitoring of system functions has stopped and a time limit has passed. The BCM must detect certain wake-up inputs before entering the awake state. The BCM monitors for these inputs during the sleep state.

The BCM will enter the awake state if any of the following wake-up inputs are detected:

- Activity on the serial data line

- Detection of a battery reconnect
- Any door open signal
- Headlamps ON
- Vehicle ON/Vehicle in Service Mode
- Park lamps ON
- Keyless entry or remote start message

The BCM will enter a sleep state when all of the following conditions exist:

- Vehicle OFF, transmitter is out of range
- No activity exists on the serial data line.
- No outputs are commanded.
- No delay timers are actively counting.
- No wake-up inputs are present.

If all these conditions are met, the BCM will enter a low power or sleep condition.

RETAINED ACCESSORY POWER DESCRIPTION AND OPERATION

CT6 Retained Accessory Power

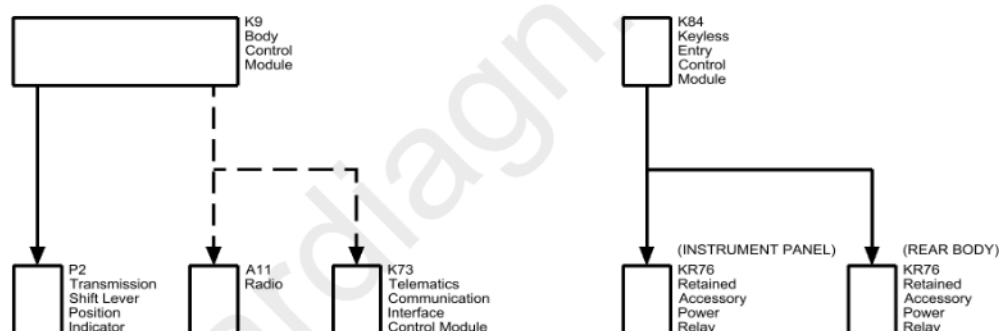


Fig. 3: Retained Accessory Power Block Diagram

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
A11	A11 Radio
K73	K73 Telematics Communication Interface Control Module
P2	P2 Transmission Shift Lever Position Indicator
K9	K9 Body Control Module
KR76	KR76 Retained Accessory Power Relay
K84	K84 Keyless Entry Control Module
KR76	KR76 Retained Accessory Power Relay

Retained Accessory Power

The body control module (BCM) monitors the vehicle power modes, battery condition and each door ajar/open switch status to determine whether the retained accessory power should be initiated or terminated. Retained accessory power is controlled by two different methods; relay control and serial data. Some modules receive a retained accessory power message from the BCM over the serial data circuits. Serial data controlled retained accessory power is deactivated as required by their modules retained accessory power mode operation. Other subsystems are activated directly. Components and systems that are active in retained accessory power are also activated anytime the vehicle power mode is any state other than ignition OFF/Vehicle OFF regardless of the door switch signals.

Interruptible Retained Accessory Power Relay Controlled Retained Accessory Power

The Keyless entry control module keeps the relay energized during all power modes, except ignition OFF/Vehicle Off. The relay is also energized for approximately 10 min after moving to the Ignition OFF/Vehicle OFF state and moving the transmitter out of range, providing no door is opened. The keyless entry control module controls components in the same manner as BCM direct controlled retained accessory power with one exception; interruptible retained accessory power is deactivated during transmitter authentication. The keyless entry control module will deactivate components that may cause radio frequency (RF) interference when the ignition mode switch is pressed which may result in "NO REMOTE DETECTED" displayed on the driver information center.

Relay controlled retained accessory power will end when one of the following conditions is met:

- The keyless entry control module receives a message that any door ajar or open switch indicating the opening of any door after entering the ignition Off state and the transmitter is out of range.
- The keyless entry control module detects a decrease in battery capacity below a prescribed limit.

NOTE: If the keyless entry control module is receiving any door ajar or open signal from those switches when the ignition Off state is entered and the transmitter is out of range, retained accessory power will not initiate.

Systems powered by the retained accessory power relay during the retained accessory power mode are as follows:

- Accessory Power Receptacle
- Cigarette Lighter Receptacle

Serial Data Controlled Retained Accessory Power

Retained accessory power systems controlled by serial data are as follows:

Radio

Radio retained accessory power activation / termination is the same as relay operation with one exception; the only door switch that will turn off the radio during retained accessory power is the driver door open switch.

Vehicle Communication Interface Module (VCIM) (Onstar®) (If Equipped)

VCIM RAP activation/termination is the same as radio operation with 1 exception; if there is an active call when the ignition is turned off the VCIM will remain in RAP mode and keep the radio in RAP mode until the call is terminated.
