

5.3 CRUISE CONTROL

Cruise Control maintains a targeted speed (MPH or RPM) by increasing or decreasing fueling. The targeted speed can be selected and adjusted with dash-mounted switches. Up to five digital inputs are required (four for automatic transmission) for Cruise Control operation. A Vehicle Speed Sensor (VSS) is required for Vehicle Speed Cruise Control or an output shaft speed message over the J1939 data link.

5.3.1 OPERATION

Cruise Control will operate in either Engine or Vehicle Speed Mode.

Vehicle Speed Cruise Control

Vehicle Speed Cruise is enabled when "Enable Cruise" and a Vehicle Speed Sensor (VSS) is installed or output shaft speed is received over J1939. Engine speed and power are varied under Vehicle Speed Cruise Control to maintain the set vehicle speed. The vehicle speed must be above 20 mph (32 km/hr).

This type of Cruise Control is required when either of the following conditions exists:

- Vehicle Speed Limiting -- Vehicle Speed Cruise Control is mandatory if the vehicle speed limit is programmed and Cruise Control is desired. This will prevent the DDEC-ECU from fueling the engine at speeds greater than the vehicle speed limit.
- Automatic Transmissions -- Vehicle Speed Cruise Control must be selected if the vehicle is equipped with an automatic transmission. This will ensure proper transmission upshifts while in Cruise Control. Refer to the transmission manufacturer's manual for more information and see the Vehicle Interface Harness schematic.

Cruise Control can be overridden at any time with the foot pedal if the vehicle is operating at less than the programmed Vehicle Speed Limit.

Clutch pedal, service brake pedal, and throttle interlock input, if configured, are monitored to abort fueling the engine in Cruise Control Active Mode if there is driver action.

There are three Cruise Control operation modes as listed in Table 5-4.

Cruise Control Mode	Conditions	Set Speed	Engine Fuel Controlled By Cruise Control
Off	Cruise Control ON/OFF switch is in OFF position or Cruise Control ON/OFF is switched to ON position although Cruise Control is not allowed.	0 MPH	No
Active	Cruise Control ON/OFF switch in ON position and Cruise Control is allowed and set speed has already been set. The set speed can be increased or decreased by using the Resume/Accel and Set/Coast switches.	Set Speed (+/-)	Yes
Standby	Cruise Control ON/OFF switch in On position and Cruise Control formally active but not allowed anymore or no set speed has been set after switching Cruise Control On and Cruise Control is allowed.	Last Set speed on Hold in Memory	No

Table 5-4 Three Cruise Control Operation Modes

Engine Brakes in Cruise Control (Optional)

When there is vehicle acceleration above set speed, engine brakes (if configured) are activated to keep the desired road speed.

Cruise Auto Resume (Optional)

The Cruise Auto Resume feature will resume Vehicle Speed Cruise Control based on the calibration setting.

- 1 = Cruise Control is resumed immediately after the clutch pedal is released.
- 2 = Cruise Control is resumed if the clutch has been pushed twice and released within three (3) seconds.

Smart Cruise

The Eaton® Smart Cruise® system will send a "heart beat" message on the SAE J1939 Data Link. Manual Cruise Control and Smart Cruise will be disabled if the message is not received over the data link or the message indicates that there is a failure in Smart Cruise. To regain manual control, the driver must toggle the Cruise Master Switch twice within 10 seconds.

Smart Cruise must be configured by VEPS. For additional information on Smart Cruise, contact Eaton Corporation.

Cruise Enable

Cruise Control is enabled, but not active when the Cruise Control Enable digital input is switched to battery ground.

The Cruise Enable switch is a normally open switch.

Set / Coast

The Set/Coast switch is a momentary switch.

Set: Cruise Speed is set by momentarily contacting the switch to the ON position (switching the digital input to battery ground). Cruise Control will become active and maintain the vehicle speed present at the time.

Coast: When Cruise Control is active, the Set/Coast input can be used to reduce power and speed by toggling the switch. Momentarily toggling and releasing the Set/Coast switch will decrease the set point by 1.24 mph (2 km/hr) increments for Vehicle Speed Cruise Control. Holding the Set/Coast will decrease the set point by 1.24 mph (2 km/hr) per second. When released the Cruise Control set point will be at the new speed.

Resume / Accel

The Resume/Accel switch is a momentary switch.

Resume: If Cruise Control has been disabled with the service brake or the clutch switch, momentary contact to the ON position (switching the input to battery ground) restores the previously set cruise speed.

Accel: When Cruise Control is active, the Resume/Accel input can be used to increase power and speed by toggling the switch. Momentarily toggling and releasing the Resume/Accel switch will increase the set point by 1.24 mph (2 km/hr) increments for Vehicle Speed Cruise Control. Holding the Resume/Accel will increase the set point by 1.24 mph (2 km/hr) per second (Vehicle Speed CC). When released the Cruise Control set point will be at the new speed.

Clutch Released (Manual Transmissions)

This input indicates that the clutch is released and is used for suspending Cruise Control and Auto Resume.

When the clutch is released, the input is at battery ground. Cruise Control is suspended if the clutch is pressed once. If the clutch pedal is pressed twice within three seconds, Cruise Control is automatically resumed if Cruise Auto Resume is configured depending on the calibration setting selected (refer to “Cruise Auto Resume”).

The digital input logic for the Clutch Switch disables Cruise Control in the unlikely event of a broken clutch switch wire.

This switch is a normally closed switch.

Service Brake Released (Automatic and Manual Transmissions)

This input indicates that the brake is released when switched to battery ground. If the brake is activated, then the input is not grounded and Cruise Control is suspended. Cruise Control is resumed by using the Resume/Accel Switch.

The input logic for the Brake Switch disables Cruise Control in the unlikely event of a broken brake switch wire.

This switch is a normally closed switch.

Throttle Inhibit Switch

This input indicates that the throttle inhibit function is active when switched to battery ground. Cruise Control is deactivated if the throttle inhibit switch is grounded.

Cruise Control Modes

Separate programmable thresholds are available for increasing and decreasing set speed using the Cruise Control switches Resume/Accel and Set/Coast. The difference between the new set speed and road speed is limited to the programmable thresholds.

All Cruise Control modes, conditions, and action taken are listed in Table 5-5.

Cruise Control Mode Status Change	Condition	Action Taken
Standby/Active to Off	Cruise Control ON/OFF switch is switched to OFF position	Set Speed = 0 MPH
Off to Standby	Cruise Control ON/OFF switch is switched from OFF to ON position	Set Speed = Set Speed
Standby to Active	Cruise Control switch is toggled to Set/Coast position	Set Speed = Road Speed
	Cruise Control switch is toggled to Resume/Accel position and the desired road speed has already been set (> 0 MPH)	Set Speed = Set Speed
	Cruise Control switch is toggled to Resume/Accel position and no desired road speed has been set before (=0 MPH)	Set Speed = Road Speed
	Cruise auto resume	Set Speed = Set Speed
Active	Cruise Control switch is toggled to Set/Coast position	Set Speed = Set Speed – Speed Step Down
	Cruise Control switch is held in Set/Coast position for more than one second	Set Speed = Set Speed – Speed Ratio Down Time
	Cruise Control switch is toggled to Resume/Accel position	Set Speed = Set Speed + Speed Step Up
	Cruise Control switch is held in Resume/Accel position for more than one second	Set Speed = Set Speed + Speed Ration up Time
	Cruise Control switch is not toggled	Set Speed Hold in Memory
Active to Standby	Brake switch, clutch switch toggled, vehicle speed drops below min cruise speed	Set Speed Hold in Memory

Table 5-5 Cruise Control Mode Status Change

5.3.2 INSTALLATION

The following is a list of switches and DDEC-VCU sensors that are required for Cruise Control operation.

- Cruise Control ON/OFF (Switch or J1939)
- Service Brake (Switch or J1939)
- Clutch Released for Manual Transmission (Switch or J1939)
- Set/Coast (Switch or J1939)
- Resume/Accel (Switch or J1939)

- Vehicle Speed Sensor (or J1939)

See Figure 5-1 for a diagram of the Cruise Control circuit.

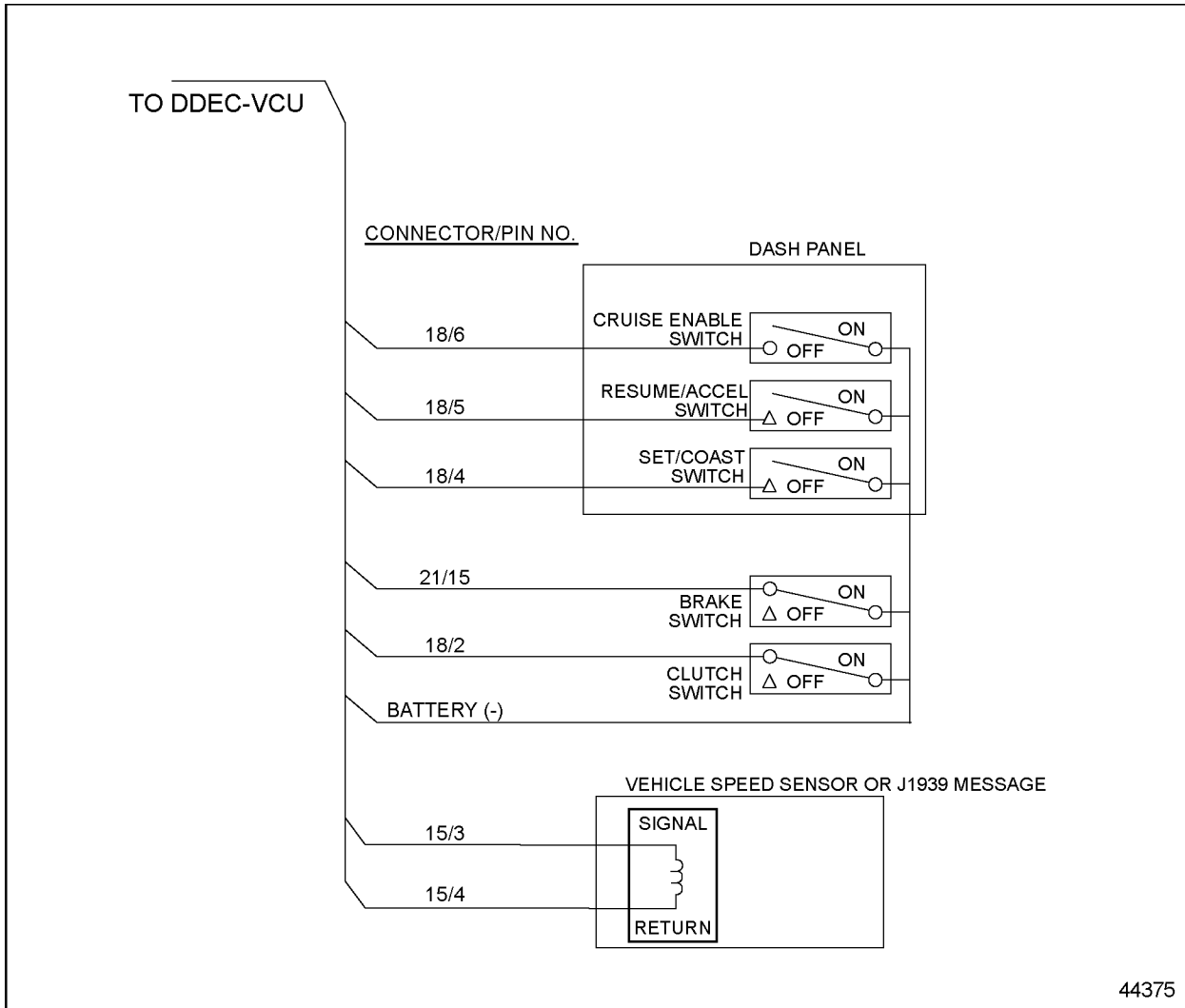


Figure 5-1 Cruise Control Circuit

5.3.3 PROGRAMMING REQUIREMENTS AND FLEXIBILITY

To configure an engine for Cruise Control, the digital inputs listed in Table 5-6 must be selected. These parameters can be set with VEPS, DRS or the minidiag2. Refer to section 4.1, “Digital Inputs,” for more information.

Parameter	Setting	Default	Parameter ID
Enable Service Brake Input	1 = Enable 2 = Disable	1 = Enabled	1 13 04
Service Brake Input Configuration	0 = Hardwired 1 = Source Address 1 (SA1) 2 = Source Address 2 (SA2) 3 = Source Address 3 (SA3)	0 = Hardwired	1 13 05
Enable Park Brake Input	1 = Enable	1 = Enabled	1 13 08
Service Brake Input Configuration	0 = Hardwired 1 = Source Address 1 (SA1) 2 = Source Address 2 (SA2) 3 = Source Address 3 (SA3)	0 = Hardwired	1 13 09
Configuration Cruise Control On/Off Switch	0 = Hardwired 1 = Source Address 1 (SA1) 2 = Source Address 2 (SA2) 3 = Source Address 3 (SA3)	0 = Hardwired	1 13 11
Cruise Control Set/Coast and Resume/Control Switches Configuration	0 = Hardwired 1 = Source Address 1 (SA1) 2 = Source Address 2 (SA2) 3 = Source Address 3 (SA3)	0 = Hardwired	1 13 12
Clutch Switch Configuration	0 = Hardwired 1 = Source Address 1 (SA1) 2 = Source Address 2 (SA2) 3 = Source Address 3 (SA3)	0 = Hardwired	1 13 15
Source Address 1 (SA1) for Receiving Multiplexed Switch Status	0 — 55	23	1 01 09
Source Address 2 (SA2) for Receiving Multiplexed Switch Status	0 — 255	33	1 01 10
Source Address 3 (SA3) for Receiving Multiplexed Switch Status	0 — 255	49	1 01 11

Table 5-6 Cruise Control Input Configuration

A Vehicle Speed Sensor must be configured for Vehicle Speed Cruise Control. Refer to section 3.7.6, "Vehicle Speed Sensor," for additional information.

The Cruise Control parameters listed in Table 5-7 can be set by minidiag2.

Parameter	Description	Range	Default	Parameter ID	Access
Min Road Speed	Minimum road speed for Cruise Control	38 – 152 km/hr	48 km/hr	1 15 01	Nexiq DDR, DDDL, DRS, VEPS, minidiag2
Max Set Speed	Cruise Control vehicle set speed cannot be faster than this value.	48–152 km/hr	152 km/hr	1 15 02	Nexiq DDR, DDDL, DRS, VEPS, minidiag2
Cruise Set Speed Increment	Set Speed increment for every Resume/Accel switch momentary press.	0–10 km/hr	2 km/hr	1 15 03	VEPS, DRS, minidiag2
Cruise Set Speed Decrement	Set Speed decrement for every Set/Coast switch momentary press.	0–10 km/hr	2 km/hr	1 15 04	VEPS, DRS, minidiag2
Cruise Set Speed Ramp Up	Set Speed increment for Resume/Accel switch continuous press.	0–20 km/hr/sec	2 km/hr	1 15 05	VEPS, DRS, minidiag2
Cruise Set Speed Ramp Down	Set Speed decrement for Set/Coast switch continuous press.	0–20 km/hr/sec	2 km/hr	1 15 06	VEPS, DRS, minidiag2
Enable Cruise Auto Resume	Enables or disables the auto resume feature.	0 = Disable 1 = Enable after 1st clutch release 2 = Enable after clutch released twice	0	1 15 07	Nexiq DDR, DDDL, DRS, VEPS, minidiag2
Enable Engine Brakes on Cruise Control	Enables or disables the engine brakes during Cruise Control.	0 = Disable 1 = Enable	0	1 10 06	Nexiq DDR, DDDL, DRS, VEPS, minidiag2

Table 5-7 Cruise Control Parameters

If Smart Cruise is installed on the vehicle the parameter listed in Table 5-8 must be enabled by VEPS, DRS or the minidiag2.

Parameter	Description	Choice	Default	Parameter ID
Adaptive Cruise Control	Enables/Disables the feature.	0 = Disable 1 = Enable	0	1 15 10

Table 5-8 Smart Cruise Parameter