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<b>Model Year Start:</b> 2013	<b>Model:</b> LX570	<b>Prod Date Range:</b> [01/2012 -     ]
<b>Title:</b> BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: SYSTEM DESCRIPTION; 2013 MY LX570 [01/2012 -     ]		

## SYSTEM DESCRIPTION

### 1. SYSTEM DESCRIPTION

#### HINT:

The skid control ECU is built into the hydraulic brake booster.

#### (a) Multi-terrain Anti-lock Brake System (Multi-terrain ABS)

This function detects off-road driving in sand, mud, gravel, dirt and so on based on signals from the yaw rate and acceleration sensor, the speed sensor and the ECM, and then automatically switches to the ABS control most appropriate for the current road conditions.

#### (b) EBD (Electronic Brake Force Distribution)

EBD control utilizes the ABS and performs proper brake force distribution between the front and rear wheels in accordance with the driving conditions. When the brakes are applied while cornering, it also controls the braking forces of the right and left wheels, helping to maintain vehicle stability.

#### (c) BA (Brake Assist)

The primary purpose of the brake assist system is to provide auxiliary brake force to assist drivers who cannot generate a brake force large enough during emergency braking, thus helping to maximize the vehicle's braking performance.

#### (d) VSC (Vehicle Stability Control)

The VSC system helps prevent the vehicle from slipping sideways when front or rear wheel skidding occurs while cornering.

#### (e) A-TRAC (Active Traction Control)

During rugged off-road driving, this system controls the engine output and the brake fluid pressure that is applied to the slipping wheel and distributes the drive force that would have been lost through the slippage to the remaining wheels in order to achieve an LSD (Limited Slip Differential) effect.

#### (f) Hill-start Assist Control

When the vehicle starts off on a steep hill, hill-start assist control detects the backward descent of the vehicle and performs 4-wheel hydraulic pressure control to reduce the speed of the vehicle.

#### HINT:

- Depressing the brake pedal cancels control of the hill-start assist control system.
- The system does not operate when the shift lever is in P or N, or when the vehicle is being driven/rolling back up a slope with the shift lever in R.

#### (g) CRAWL (Crawl Control)

Crawl Control is a system that provides assistance when driving on bumpy off-road surfaces, slippery road surfaces, etc. When Crawl Control is operating, the engine output and braking force are controlled automatically to enable driving while maintaining a constant speed. As a result, the driver can concentrate on steering the vehicle without having to operate the accelerator and brake pedals very much.

#### (h) Turn Assist Control

When the driver is attempting to go around a tight corner and the steering wheel needs to be turned quickly in the opposite direction, the turn assist function recognizes the intent of the driver using the value from the steering angle sensor and raises the brake fluid pressure applied to the brake of the rear inner wheel to

increase the turning ability of the vehicle and help reduce the number of times the steering wheel has to be turned.

Turn assist control can operate during automatic driving under Crawl Control.

(i) Multi-terrain Select Control

When multi-terrain select control is active, A-TRAC brake control most appropriate for the selected road mode are performed automatically. In this way, superior off-road driveability is achieved.

(j) Trailer Sway Control

If the vehicle is towing a trailer with an inappropriate hitch load, trailer sway could be caused by crosswinds, imbalance caused by load, or the driver's steering. Trailer sway control reduces trailer sway by controlling the engine output and the braking of each wheel.

## 2. FUNCTION OF COMPONENTS

COMPONENTS	FUNCTIONS
Speed sensor	Detects the wheel speed of each wheel.
Hydraulic brake booster	Upon receiving a brake control signal from the skid control ECU, the hydraulic brake booster controls the hydraulic circuit and sends hydraulic pressure to each wheel. The master cylinder solenoid is removable.
Skid control ECU (Master cylinder solenoid)	Detects the vehicle condition based on signals from the sensors and sends a brake control signal to the hydraulic brake booster.
Motor relay	Supplies power to the pump motor.
Solenoid relay	Supplies power to each solenoid.
Steering sensor	Detects the steering angle and amount of movement of the steering wheel, and then sends signals to the skid control ECU.
Yaw rate sensor assembly	Detects the vehicle's yaw rate and acceleration and sends a signal to the skid control ECU.
Master cylinder pressure sensor	Built into the master cylinder solenoid. Detects the pressure inside the master cylinder.
Accumulator pressure sensor	Built into the master cylinder solenoid. Detects the accumulator pressure.
Pressure control sensor*	<ul style="list-style-type: none"> <li>Built into the master cylinder solenoid.</li> <li>Detects the controlled fluid pressure.</li> </ul>
ECM	<ul style="list-style-type: none"> <li>Sends sensor signals (throttle opening angle, engine speed) to the skid control ECU.</li> <li>Controls the engine based on a traction control signal from the skid control ECU.</li> </ul>
VSC OFF switch (Combination switch assembly)	Enables the driver to select Normal Mode, TRAC OFF Mode or VSC OFF Mode.
CRAWL ON/OFF switch (Integration control and panel assembly)	The ON/OFF switch of the CRAWL switch turns Crawl Control on and off and the speed selector switch of the Crawl Control switch changes the control mode.

COMPONENTS	FUNCTIONS
Turn assist function switch (Integration control and panel assembly)	During CRAWL control, turn assist operation can be selected by pressing the turn assist switch.
CRAWL speed selector switch (Integration control and panel assembly)	Changes the CRAWL speed among 5 levels.
Multi-terrain select mode switch (Integration control and panel assembly)	Selects from 5 different road surface modes.
ABS warning light	Illuminates to inform the driver that a malfunction in the ABS has occurred.
Brake warning light	<ul style="list-style-type: none"> <li>• Illuminates to inform the driver that the parking brake is applied when the system is normal, and when the amount of brake fluid has decreased.</li> <li>• Illuminates to inform the driver that a malfunction in the EBD has occurred.</li> </ul>
Slip indicator light	<ul style="list-style-type: none"> <li>• Illuminates to inform the driver that a malfunction has occurred in the TRAC or VSC system.</li> <li>• Blinks to inform the driver that TRAC or VSC is operating.</li> </ul>
TRAC OFF indicator light	Informs the driver that TRAC OFF mode has been entered using the VSC OFF switch.
VSC OFF indicator light	Illuminates to inform the driver that VSC OFF mode has been entered using the VSC OFF switch.
CRAWL indicator light	Illuminates to inform the driver that Crawl Control is ready to operate.
Turn assist indicator light	Illuminates to inform the driver that turn assist control is ready to operate.
Multi-terrain select indicator light	Illuminates to inform the driver that multi-terrain select control is ready to operate.
Multi-information display	<ul style="list-style-type: none"> <li>• Informs the driver of the status of the Crawl Control operation.</li> <li>• Displays multi-terrain select operation assist messages.</li> </ul>
Buzzer	<ul style="list-style-type: none"> <li>• Built into the combination meter.</li> <li>• Intermittently sounds to inform the driver that the accumulator has a malfunction.</li> </ul>

\*: w/ Dynamic Radar Cruise Control System

