FORD MOTOR CO. SURE TRACK BRAKE SYSTEM

Continental Mark IV
Lincoln Continental
Mercury
Thunderbird

DESCRIPTION

System is designed to prevent loss of control during emergency or maximum braking condition. To avoid wheel lockup and resultant skidding with brakes fully applied, system automatically releases and re-applies rear brakes up to four alternating cycles per second. System consists of three major components:

Sensor – Mechanically driven electromagnetic sensor (stator) mounted on rear axle drive pinion bearing retainer housing. Rotor is pressed onto machined outer surface of rear universal joint companion flange outboard of grease seal. When drive shaft rotates, AC voltage impulses generated by sensor are transmitted to module.

Control Module – Consists of solid state electronic components sealed in a container. Mounted near glove box (Lincoln, T-Bird, Mk IV) or under front passenger seat (Mercury), it is connected to sensor and actuator solenoid. Module receives electrical impulses from sensor and controls operation of actuator as required to prevent rear brake lockup.

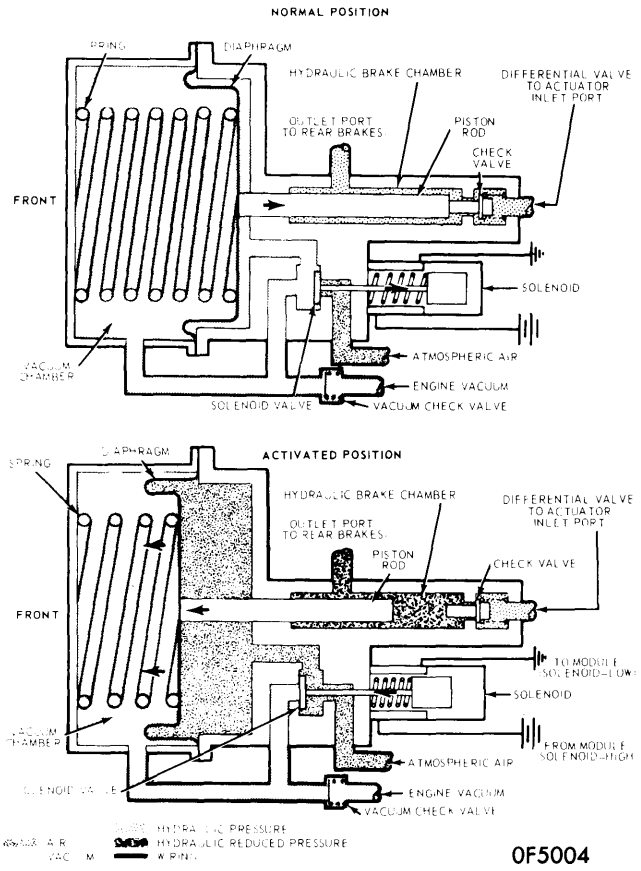
Actuator – Attached to bracket on inside of right front frame rail under toe board. Similar in appearance to a vacuum brake booster, it consists of three parts; a chamber divided by a vacuum suspended diaphragm, a hydraulic cylinder connected to diaphragm, and solenoid connected electrically to control module.

OPERATION

AC voltage impulses generated by sensor are transmitted to module. Module receives signals in form of current and continually monitors drive shaft speed. When signals drop abruptly below pre-determined level due to rapid deceleration (maximum braking), module sends electrical signal to actuator solenoid to release and re-apply rear brakes. Cycle occurs up to four times per second until vehicle speed drops to about four miles per hour or brakes are released by driver.

Actuator (Normal Position) – The solenoid valve spring holds solenoid valve against atmospheric air port and prevents air from entering vacuum chamber. Front side of diaphragm draws vacuum, and vacuum goes past solenoid valve to rear side of diaphragm. The spring holds diaphragm rearward. Rear brakes are connected through actuator hydraulic brake chamber, and function normally when actuator is in normal position (with port check valve held open by actuator piston rod). *See illustration.*

Actuator (Activated Position) – When electrical signal from module energizes actuator solenoid, solenoid valve moves to close vacuum passage to rear side of diaphragm. Rear side of diaphragm is then vented to atmosphere, resulting in a pressure imbalance to diaphragm which moves it forward. The hydraulic chamber piston rod moves forward and brake chamber check valve closes. Volume of the pressure chamber is increased, reducing line pressure and releasing rear brakes. *NOTE – With actuator in activated position, rear brakes are isolated from rest of system.* As brakes are released, drive shaft revolutions increase and module stops electrical signal and de-energizes solenoid. Solenoid valve returns to its normal position, vacuum is restored to rear side of diaphragm, and diaphragm is moved rearward. Brake chamber piston rod moves back in the pressure chamber, brake chamber check valve opens and rear brake pressure is re-applied (normal position). *See illustration.*



0F5004

CROSS SECTION DIAGRAM OF ACTUATOR

MALFUNCTION INDICATOR

A time delay switch mounted on actuator will cause system power supply fuse to blow and brake warning light to come on if diaphragm remains in forward position for more than four to six seconds. Also, warning light will come on should fuse blow or a malfunction occur in power supply system, or if solenoid or sensor is not connected. Control circuit solenoid is functioned through one cylcle each time ignition key is turned to "ON" position. When cycle occurs, an audible click and cycling sound may be heard.

TESTING

FUNCTIONAL TEST

If determined that difficulty is in the Sure Track Brake System, engine idle speed, vacuum level and standard brake system must be verified to be within limits of ser-

FORD MOTOR CO. SURE TRACK BRAKE SYSTEM (Cont.)

vice specifications before proceeding with standard testing. *NOTE – A road test should be made ONLY when operator is CERTAIN that brakes will stop vehicle.* The following test of anti-skid control and hydraulic system will determine if system is operating and should be made after repairs, to verify correct system operation.

1) Turn ignition key ON. Listen for solenoid click and actuator cycling sound.

2) Position vehicle on hoist and raise rear wheels to clear floor. Start engine and warm up until normal operating temperature is reached.

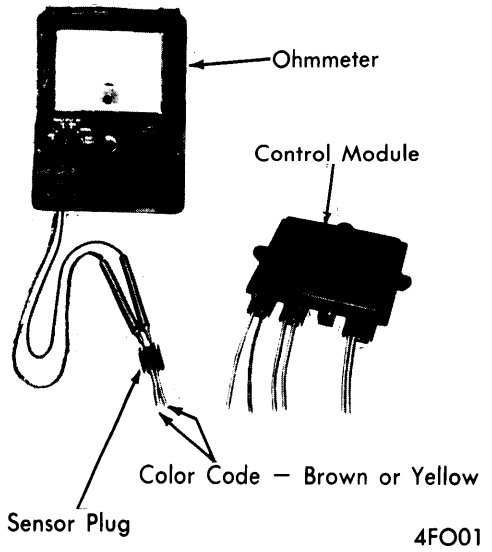
3) Place transmission in DRIVE, and accelerate to approximately 25-30 MPH.

4) Apply brakes quickly and firmly and observe rear wheels. If Sure Track Brake System is functioning properly, it will cycle 5 or 6 times or until brake pedal is released.

ELECTRICAL TESTS

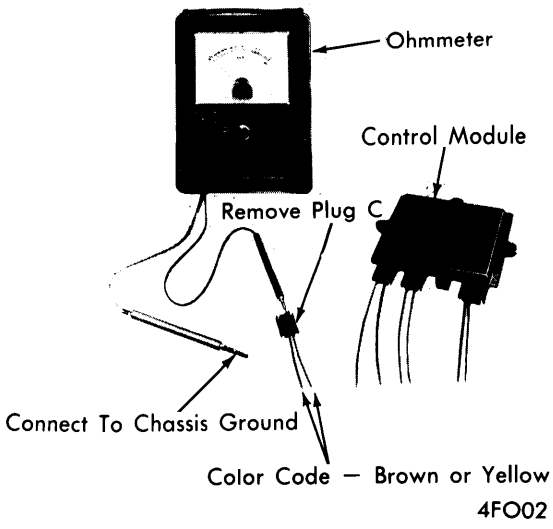
Electrical power is provided to anti-skid control system when ignition is turned ON. Circuit protection is provided by a 3 Amp. fuse located in fuse panel (Lincoln, T-Bird, Mk IV), or in-line (Mercury). *CAUTION – To prevent damage to control module, do not use fuse of higher rating than 3 Amp. (8AG3).* The following tests are made using an ohmmeter which must be calibrated to scale being used in each test.

Sensor Test – Remove plug C from the module *(See illustration).* Connect ohmmeter between contacts of sensor lead plug. Resistance should be 2400-3200 ohm.



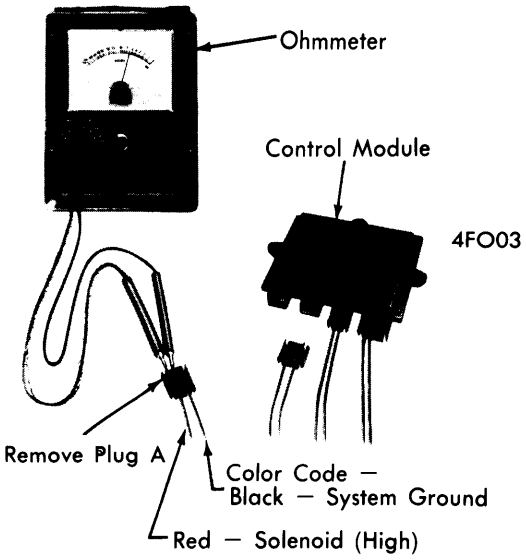
SENSOR TEST

Sensor Leakage Test – Connect an ohmmeter between chassis ground and one of the two contacts of sensor lead plug *(See illustration).* Resistance should be infinite. Repeat check with ohmmeter connected to other sensor contact. If resistance is not within limits on both checks, disconnect sensor lead plug from sensor at rear axle pinion housing. Repeat resistance checks at sensor plug connector. If the resistance is within specifications, problem is in wiring harness between sensor and module.



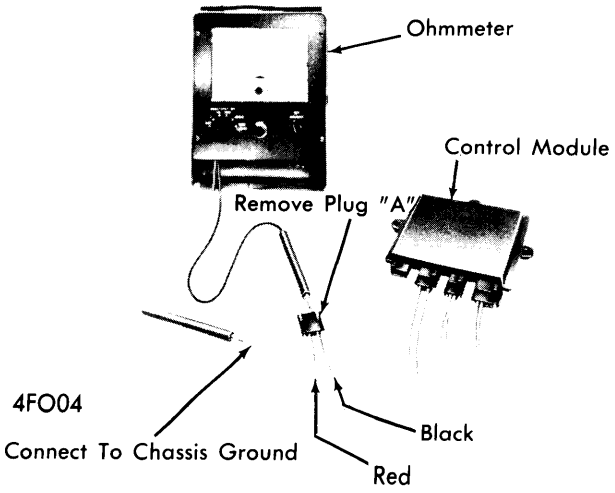
SENSOR LEAKAGE TEST

Solenoid Circuit Test – Remove plug "A" from module (see illustration). Connect ohmmeter between two contacts of solenoid (red) and system ground (black) lead plug. Resistance should be four to eight ohms. If resistance is lower than four ohms, inspect solenoid wiring for grounded condition. If resistance is higher than eight ohms, inspect wiring for an open condition. If wiring is found to be satisfactory, replace actuator assembly.



SOLENOID CIRCUIT TEST

FORD MOTOR CO. SURE TRACK BRAKE SYSTEM (Cont.)

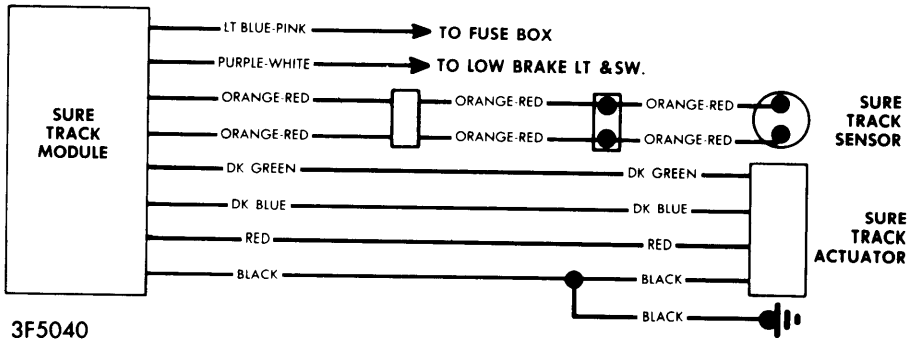


SYSTEM GROUND TEST

System Ground Test – Remove plug "A" from module. Connect an ohmmeter between chassis ground and system ground (black lead of plug). Resistance should be lower than one ohm. If reading is greater than one ohm, check ground system wiring for a loose or broken wire. *NOTE – With ohmmeter connected, move ground wires at actuator harness to intermediate harness connector in and out. If meter fluctuates, it indicates a poor connection. Repair as necessary.*

ADJUSTMENT

No repairs or adjustments are to be made on the anti-skid control system. Damaged or worn parts must be replaced.



FORD SURE TRACK WIRING DIAGRAM