Revision Control			
Rev	Released	Change	By
1	27/10/2005	Initial release	AM
2	21/11/2005	Additional Information Included	JM

TLC 78/79 SIBS™ LCV1: Standard Operating Procedure

Description:

SIBS™ (Sealed Integrated Braking System) are sealed disc brakes. The operation of these brakes is in the same manner as the OEM Toyota brakes they replace with the following differences:

- Each rotor (or brake disc) runs in oil that is contained within two sealed housings.
- The Park/Emergency Brake (on the rear wheels) function is performed with a spring applied – hydraulically released system. The control box (usually mounted on the dash) operates the hydraulic pump and manifold to release and apply the Park/Emergency Brake.
- The Park/Emergency brake also has an interlock function (where fitted) that applies the Park Brake automatically should this be tripped. For example: door open – the Park Brake will apply, and will not be able to be released, until the door is shut.

Service Brake Standard Operating Procedure

The service brakes on SIBS are actuated via the brake pedal, as per the OEM system it replaces. There should be no noticeable difference in the operation of the service brakes.

The hydraulic circuit (primary and secondary), Load Proportioning Valve (LPV) are existing Toyota. A replacement Master Cylinder (and Brake Booster when supplied) is fitted.

Proper operation of the service brake requires that the LPV is functioning and setup for SIBS. Refer to the fitment manual for details.

Park/Emergency Brake (EMMA) Standard Operating Procedure

The SIBS Park/Emergency Brake system is referred to by the acronym EMMA – Electrically Modulated – Mechanically Applied.

The EMMA brakes are spring applied and hydraulically released. The Control Box (usually mounted on the dashboard above the drivers position) is the primary method of engaging and releasing the brakes. This is done via the large red Operator Button.

The Red Operator Button is wired into the ignition so that the vehicle key is needed to release the brakes. However, the yellow or black Momentary Release Button allows the brakes to be released in a situation where the key is not available – but only as long as the button remains depressed. This prevents the brakes being left off. The Red/Green LED in the centre of the control provides a visual indication of the circuit operation.

Figure 1: EMMA Control Box

To Release the EMMA Brakes:

1. With the ignition ON, check the LED display is RED. If it is not, push the Red Operator Button in. This indicates the system is reset.

2. Now gently twist the Red Operator Button clockwise (~15°) and pull. The LED display should change to GREEN – indicating brake release is in operation.

3. Full brake release is indicated when the Brake Warning Light in the dashboard goes out. However, the vehicle should be able to be moved very soon (~1-2seconds) after the pump starts to run.

To Engage the EMMA Brakes:

4. With the ignition ON, and the LED display GREEN (indicating brake release), push the Red Operator Button in. The LED display will change to RED, indicating brakes are engaged.

Interlock:

5. The EMMA brake can also be engaged if the vehicle looses power or the interlock device is tripped. This will result in a modulated brake application.

6. The rate of EMMA brake application during the interlock event can be modulated by adjusting the relief valve. Refer to the SIBS Fitment and Service Manual for details.

CAUTION
After an automatic application, the brakes will not automatically release on the removal of the signal or switching on of the ignition. The Operator Button must be reset to release the brakes. In the event of an electrical failure or a triggering event such as a door opening, the vehicle is brought to a controlled stop.

EMMA Brake Failure Modes

1. Hydraulic leak: should there be a leak in the hydraulic system when the EMMA brake is OFF, the pressure switch will trip the pump to switch ON. This will prevent any unwanted brake application.

2. Power loss: a loss of power will initiate a modulated brake application, as the pressure in the EMMA brake dumps via the relief valve and orifice valve. This will ensure a safe stop

Hill Start

1. Performing a hill start or other start using the EMMA brake is fundamentally similar to the procedure for the standard OEM brakes.

2. With the EMMA brake applied find the friction point in the clutch travel.

3. Release the brakes as described above and apply pressure to the accelerator as the brake releases.