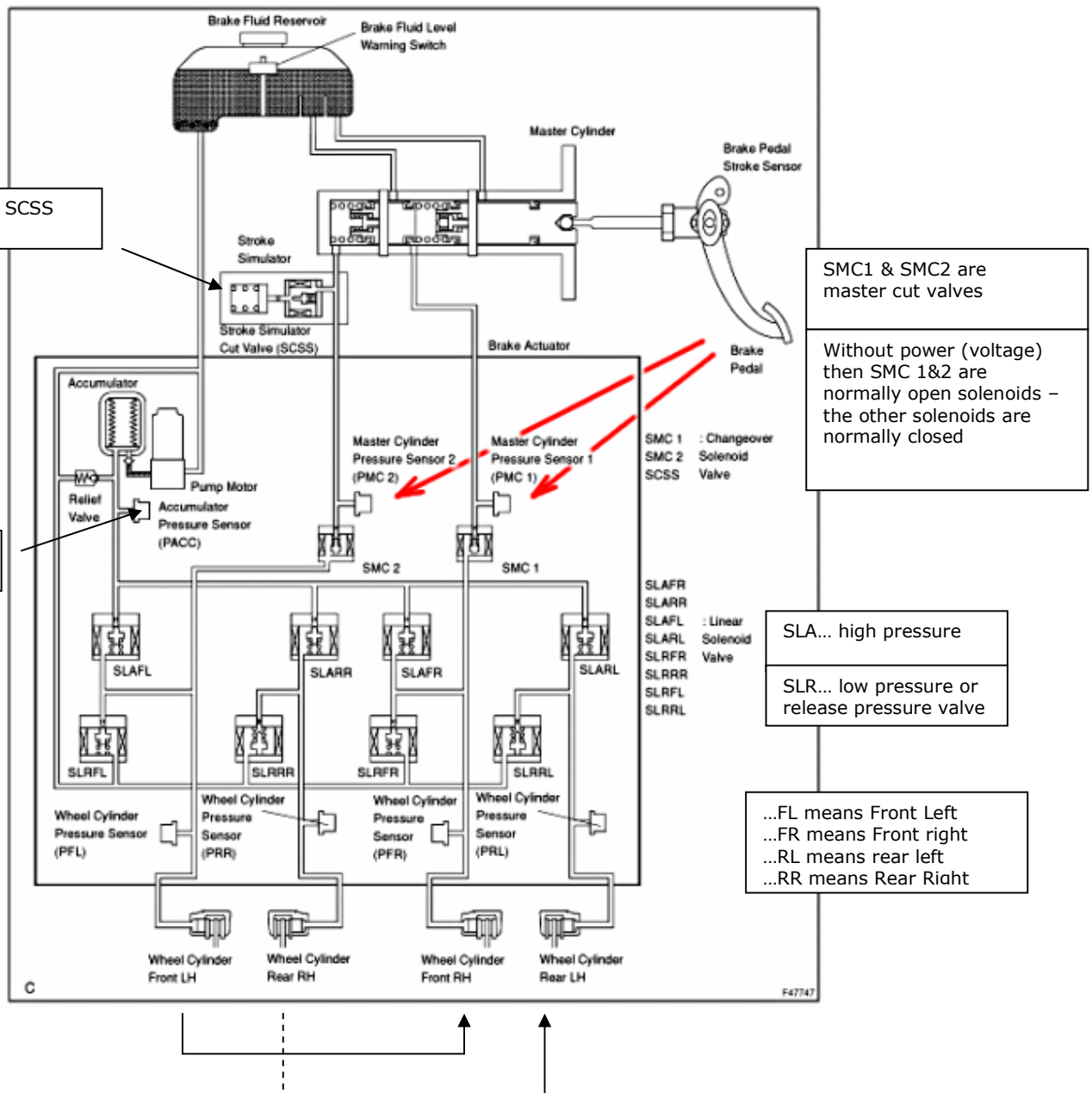


## Prius Brake Hydraulics



This is the hydraulic system - double lines indicate brake pipes. In normal use SMC 1 and SMC 2 are closed, preventing flow from the master cylinder to the front pistons. Pressing the pedal increases the pressure sensed by PMC 1 and PMC 2. The fluid flows into the Stroke Simulator, which provides the pedal feel.

PMC 1 and PMC 2 feed electrically (from the sensors) into the Skid Control ECU, which decides how much braking is required. It asks the Hybrid Vehicle ECU (HV ECU) how much braking force it can provide with regen, and uses the friction brakes to make up the difference, and also any special braking to keep the vehicle stable. The pressure in the actual brake lines comes from the accumulator - basically a

## Prius Brake Hydraulics

reservoir of high-pressure fluid. The pump runs whenever the accumulator pressure (measured by PACC) is lower than a programmed value.

To apply the brake to a given wheel, the appropriate SLA solenoid is opened, which increases the pressure in that brake pipe - it's closed again when the appropriate pressure is reached (measured by PFL, PRR, PFR, PRL). To release the brake, the SLR solenoid is opened, which returns the fluid to the reservoir. By opening and closing these valves, it can modulate the braking force.

It's my belief that any car labeled with 'Electronic Brake force Distribution' has such a 'dual-circuit' braking system. The only wrinkle in the Prius is the interaction with the Hybrid Vehicle ECU for regen.

The box of capacitors, next to the 12V lead-acid aux battery in the rear, is a **back-up power supply** to allow some assist braking, should the 12V supply fail utterly and the Skid Control ECU no longer be able to perform its task. The fail-safe mode - where all valves close except SMC 1, SMC 2, which open - has no assist and can only brake the front wheels.

The following are actuations for AE for ABS / TCS

| Function                                | AE as of October 13, 2013 |
|---|---------------------------|
| Accumulator zero down                   | activates                 |
| Stroke simulator cut pattern            |                           |
| Master cut valve 2 action               | SMC2                      |
| Master cut valve 1 action               | SMC1                      |
| ECB invalid                             |                           |
| Actuator bleed pattern activation       | activates                 |
| Power supply bleed pattern activation 2 | activates                 |
| Power supply bleed pattern activation 1 | activates                 |
| Main relay 2 for ECB                    |                           |
| Main relay 1 for ECB                    |                           |

## Prius Brake Hydraulics

