Lexus RX450h PACMod 3.0 System

Automated research development vehicle

Overview

The AutonomouStuff PACMod 3.0 System delivers comprehensive drive by-wire control for the Lexus RX450h automated research development vehicle. PACMod stands for Platform Actuation and Control Module, which is the proprietary system designed and built by AStuff engineers.

It provides precise by-wire control of core driving functions and ancillary components with intuitive safety features, such as immediate return to full manual control in urgent situations. Audible and visual signals from the PACMod 3.0 alert occupants to the vehicle's operational mode, as well as any faults in the by-wire platform and some stock vehicle components.

The platform can be fully customized to accommodate a wide range of applications, while also harnessing vehicle feedback for analysis. The range of available feedback will expand with firmware updates, enhancing research potential.

Control and feedback

In the AStuff Lexus RX450h, the PACMod 3.0 System allows by-wire control of driving and other functions, while generating vehicle feedback data.

Controlled by-wire:

- Accelerator
- Brake
- Steering
- Shifting
- Horn
- Turn signals
- Hazard lights
- Headlights (off/on & high beam/low beam)

Feedback generated:

- Throttle percentage (0% - 100%)
- Brake percentage (0% - 100%)
- Vehicle speed
- Steering wheel angle
- Gear (Park, Neutral, Drive and Reverse)
- Individual wheel speeds
- Turn signal status
- Headlight status
- Horn status
- Hazard status (button press only)

Safety maneuvers

AutonomouStuff prioritizes safety and has designed safeguards for the AStuff Lexus RX450h automated platform that are triggered by a driver's natural reactions to hazards, allowing full manual control to be easily regained through some simple, intuitive maneuvers. The system also automatically alerts operators to faults in a variety of stock and aftermarket components.

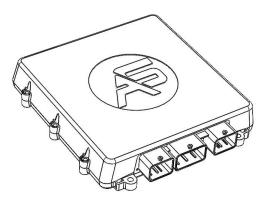Operators can immediately regain manual control using the following safety takeovers.

- Press the emergency stop (E-Stop) button.
- Push the brake pedal.
- Push the accelerator pedal.
- Turn the steering wheel.

The PACMod 3.0 System also detects certain faults and instantly communicates them to operators with audible and visual signals. Monitored functions include steering, acceleration, braking and shifting. Others may be monitored, but the system is not designed to be comprehensive.

The AStuff PACMod

Key features

The AStuff Lexus RX450h and PACMod 3.0 System include the following features and options.

- CAN interface
- Mode status indication
- Visual and audible fault alerts
- Joystick control interface
- Speed and steering controller available
- ROS node available
- DBC file
- Mute for audible alarms

What is the PACMod 3.0 System?

The AStuff Platform Actuation and Control Module (PACMod) 3.0 System provides drive by-wire control and can be installed into virtually any vehicle. At a minimum, PACMod will provide control of acceleration, braking, steering, shifting and turn signals. It can be customized to fit into any research and development platform.

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