

Brake Robots

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OUTLINE SPECIFICATION - issue 1



Brake robot installed in a Ford Focus. (Inset shows prototype unit with driver)

The ABD Brake Robot is designed to apply inputs to a vehicle's brake pedal for braking characterisation and handling behaviour measurement. It is typically used to apply step or ramped force or position inputs to the brake pedal. It can also be used to control vehicle deceleration when an accelerometer is used for feedback. The Brake Robot can be used with an external data capture system, or alternatively it can be fitted with built-in multi-channel capture to minimise the hardware required in the vehicle. When it is used in conjunction with ABD's steering robot, it is possible to perform accurate and repeatable synchronised braking and steering tests for braking-in-a-bend studies.

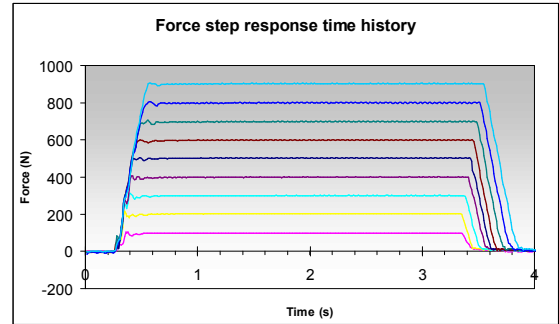
Standard features of the Brake Robot

- Adjustable to enable easy installation in most vehicles and to suit most drivers
- Vehicle can be driven normally and safely with brake robot installed
- Force measurement in line-of-action of driver's foot
- Can be driven in displacement or force control (using the load cell supplied)
- Can be driven in deceleration control using feedback from an accelerometer
- Integrated electronics package powered from vehicle's 12 or 24V supply
- Fully programmable and easy-to-use control software running under Windows™ /XP/2000
- A range of standard test types supplied
- Custom tests can be added on request
- Multiple safety features and CE compliance
- Inputs and outputs for test and data capture triggering.
- Data capture of up to 30 analogue input channels
- 1 spare incremental encoder input.
- Analogue outputs, configurable to output data such as pedal force and position
- The *Omni* controller offers upgradeability to control steering, braking and accelerator functions simultaneously. Alternatively the brake robot can be supplied with the single-channel *Mono* controller as a low-cost option.

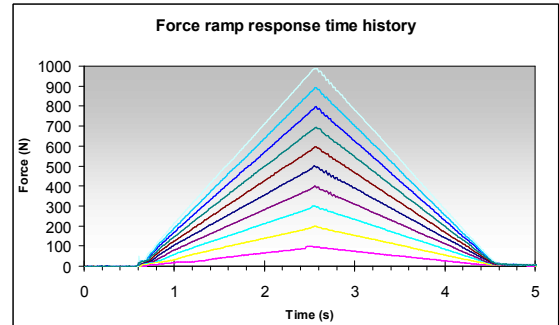


Capability:

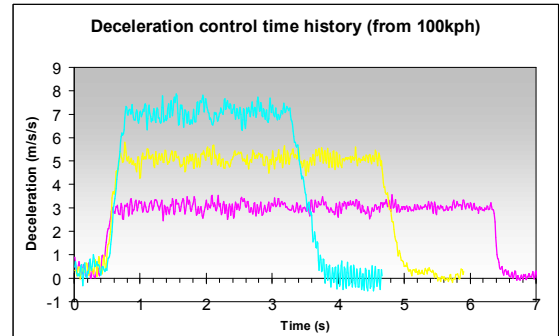
The Brake Robot can apply rapid and accurate force steps to the brake pedal using feedback from a load cell mounted along the normal line of action of the driver's leg. This plot shows a series of results for different magnitudes of stepped force input, obtained using the prototype system installed in a Ford Focus. Typically, in most vehicles, it is possible to apply a force to the brake pedal, sufficient to achieve maximum braking effort, in less than 0.2s.



The rate of application of force can also be programmed to allow a more gradual, ramped force, application. Force accuracy and repeatability is far better than can be achieved by human drivers. Please contact ABD for Application Notes with examples of particular tests types which have been successfully performed with the brake robot.



If an accelerometer is used for feedback control (optional) instead of the load cell, the robot can be programmed to provide constant deceleration control. The third plot shows results obtained from a Ford Focus being driven initially at 100kph and programmed to stop at 3, 5 and 7 m/s².



The brake robot can also be used to control the position of the brake pedal using either encoder or analogue feedback.

Software:

The brake robot's user interface software runs on any standard PC running Windows. The software enables the driver to define and run new tests quickly and easily. Test profiles can be recorded from direct driver input using a learn mode, or played out from data stored in an ASCII file. The robot can also follow an external input signal.

Results can be viewed immediately after a test has been completed using the built-in quick plotting facility. The plots can show any captured channel plotted against any other channel or time and have zoom and slope calculation functions. Results from different tests can be overlaid.

Specifications:

The brake pedal robot can be supplied with a choice of capacities:

BR1000 (single actuator):		BR2000 (single actuator):		BR3000 (twin actuators):	
Peak force:	1400N	Peak force:	2100N	Peak force:	1400N
Max. no-load velocity:	800mm/s	Max. no-load velocity:	550mm/s	Max. no-load velocity:	1600mm/s
Typical peak velocity at load:	700mm/s at 400N	Typical peak velocity at load:	490mm/s at 800N	Typical peak velocity at load:	tbc

For more detailed information on this and other related products contact:

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