

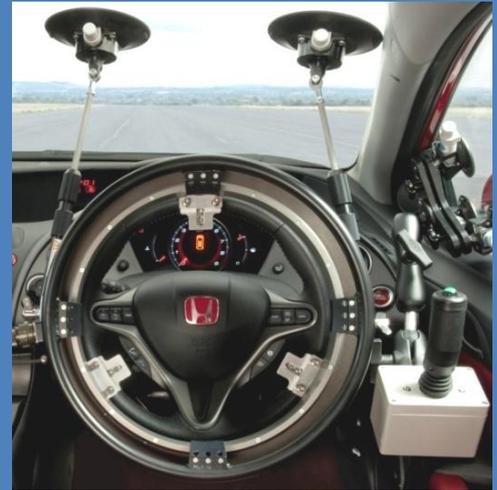


ABD steering robot range: SR15TD – SR30 – SR30S – SR60 – SR60S – Torus – Torus-S – SR150

ABD steering robots have been designed to apply inputs to a vehicle's steering system for testing transient handling behaviour on the test track, or for evaluating the steering system itself. They allow a wide range of steering inputs to be applied with high precision and repeatability, to enable high quality data to be gathered quickly.



SR60 steering robot



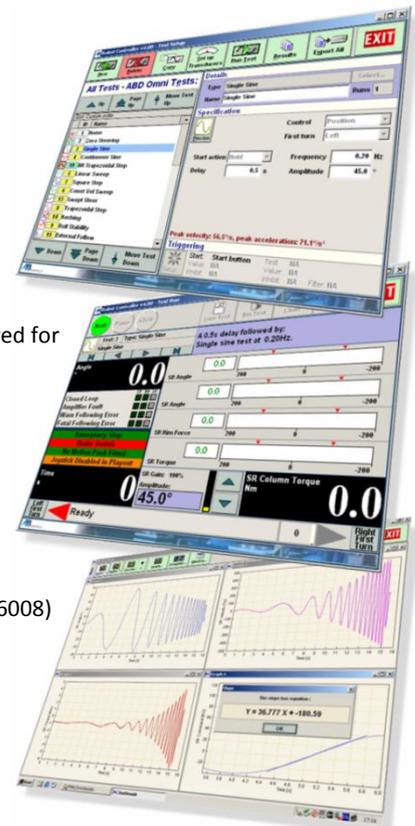
Torus-S steering robot

A range of motor sizes are available to suit all types of test applications. ABD robots can be used with an external data capture system, or alternatively, can be fitted with built-in multi-channel capture to minimise the total hardware required in the vehicle. The Omni controller can be upgraded to allow it to drive multiple actuators, so that it can be used for tests that require simultaneous control of steering, braking and accelerator. The steering robot can be supplied with the single-channel Mono controller as a low-cost alternative to the Omni.

### Standard features of the steering robot range:

- Compact direct-drive\* motor unit
- Integral transducers for steering wheel angle and torque
- Typical installation time: 30 minutes
- Fully programmable and easy-to-use control software running under Windows 7/Vista/XP
- Standard test profiles to meet ISO 7401 and many other test types
- Joystick for manual correction of vehicle's directional drift during testing
- Vehicle can be driven normally when robot disabled
- Integrated electronics package powered from vehicle's 12 or 24V supply (or self-powered for up to an hour).
- Data capture of up to 30 analogue input channels
- Analogue outputs, configurable to output data such as hand-wheel angle and torque
- CAN I/O (optional)
- Spare incremental encoder input(s)
- Inputs and outputs for test and data capture triggering functions
- Multiple safety features and CE compliance
- Upgradeability to control steering, braking and accelerator functions simultaneously.
- The system can be upgraded to perform path-following tests (see ABD specification SP6008)
- Used in ABD's award-winning Driverless Test System

\* SR30, SR60, Torus and SR150; SR15 uses a geared motor



**Hardware:**

Since the steering robot was launched in 1997, it has become an essential tool in many different types of vehicle testing. In recognition of its clients' requirements, ABD has expanded the range of steering robots available, so that whatever the test requirements are, there is a suitable steering robot.

The table on the right shows the performance characteristics of the five types of ABD steering robot motor.

Note that the holding times for rated and maximum torque levels are limited by motor's thermal capacity (refer to ABD for details).

	 SR15	 SR30	 SR60	 TORUS	 SR150
Max torque*	18Nm	35Nm	70Nm	80Nm	175Nm
Rated torque*	15Nm at 500°/s	30Nm at 1000°/s	60Nm at 1300°/s	60Nm at 1500°/s	150Nm at 550°/s
High speed Torque*	> 5Nm at 1000°/s	> 10Nm at 2000°/s	> 20Nm at 2000°/s	> 40Nm at 2000°/s	> 60Nm at 1000°/s
Motor type	Brushless	Brushed	Brushless	Brushless	Brushless
Motor mass	5.6kg	10kg	12.5kg	10.5kg	19kg

The SR15 and Torus models have a key feature: the hole in the middle! This allows these robots to be installed on top of a vehicle's steering wheel without removing or disabling the airbag. This enhances test-driver safety and removes the need to make



custom steering column adaptors. The main benefit, however, is seen in modern vehicles where the removal of the driver's airbag may be detected by the ESC system, triggering a change in the vehicle's dynamic limits. With the SR15 or the Torus, this problem is solved.

**Software:**

The steering 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 by choosing from a library of standard tests. These include sine, sine sweep, step and ramp inputs. A range of special tests is also provided, such as roll stability (used for fish-hook, J-turns etc), catch-up, flick, and spin-out. In addition, 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.

**Options:**

A wide range of options is available to complement the ABD steering robots. This includes:

- storage cases
- sensors (GPS-equipped motion packs, accelerometers, gyroscopes, wheel lift sensors, steering column torque sensor, road-wheel encoder)
- steering wheel adaptor (allows the robot to be mounted onto existing steering wheel)
- low-inertia steering wheel
- grab handles or activate switch for high-g testing
- control PC (laptop or tablet format)
- transducer mounting strut
- climate pack
- outriggers

**17 of the top 20 most successful\* vehicle manufacturers in the world use ABD robots to develop their vehicles.**  
\* by global sales volume, 2009

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