ABD steering robots apply accurate, controlled inputs to a vehicle’s steering system as required for a wide range of tests including for transient handling behaviour, ADAS testing, legislative tests (fishhook, sine-dwell etc), steering system evaluation, durability and misuse testing. They enable a wide range of steering inputs to be applied with high precision and repeatability, to enable high quality data to be gathered quickly. All ABD steering robots can be used to form part of a path-following or even driverless system.

A range of motors are available to suit all types of test applications. ABD robots can be used with an external data capture system and also include 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:

- Integral transducers for steering wheel angle and torque
- Typical installation time: 30 minutes
- Fully programmable and easy-to-use control software running under Windows 8/7/Vista/XP
- Standard test profiles to meet ISO 7401 and many other test types
- Some steering robots are suitable for tests specified at FMVSS126, NHTSA
- 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 (robot channels, analogue input, motion pack data, CAN and more)
- 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

“The performance of our robots has exceeded all expectations and they continue to deliver accurate results year after year.”

Brack Benge, Chrysler
Hardware:
Since the steering robot was launched in 1997, it has become an essential tool in many different types of vehicle testing. ABD offers range of steering robots to suit a variety of test requirements.

The table on the right shows the performance characteristics of the six 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).

<table>
<thead>
<tr>
<th></th>
<th>SR15</th>
<th>SR30</th>
<th>SR60</th>
<th>Orbit</th>
<th>Torus</th>
<th>SR150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct drive motor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hollow for use with airbag</td>
<td>*</td>
<td></td>
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<td></td>
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<tr>
<td>Suitable for surround/door</td>
<td></td>
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<tr>
<td>Suitable for path bisecting</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Max torque</td>
<td>20Nm at 100°/s</td>
<td>33Nm at 850°/s</td>
<td>70Nm at 500°/s</td>
<td>70Nm (est) at 380°/s</td>
<td>85Nm at 750°/s</td>
<td>150Nm at 500°/s</td>
</tr>
<tr>
<td>Rated torque</td>
<td>15Nm at 500°/s</td>
<td>30.5Nm at 1000°/s</td>
<td>60Nm at 1300°/s</td>
<td>60Nm (est) at 1300°/s</td>
<td>60Nm at 1500°/s</td>
<td>150Nm at 500°/s</td>
</tr>
<tr>
<td>Max velocity</td>
<td>1000°/s at up to 6Nm</td>
<td>2350°/s at up to 7Nm</td>
<td>2500°/s at up to 10Nm</td>
<td>2500°/s (est) at up to 10Nm</td>
<td>2500°/s at up to 10Nm</td>
<td>1500°/s at up to 20Nm</td>
</tr>
<tr>
<td>Motor mass</td>
<td>5.6kg</td>
<td>10kg</td>
<td>12.5kg</td>
<td>8kg</td>
<td>10.5kg</td>
<td>19kg</td>
</tr>
</tbody>
</table>

The SR15, Orbit and Torus models have a key feature: the hole in the middle! This allows these robots to be attached to the 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, Orbit or 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 sine-dwell, roll stability (used for fish-hook, J-turns etc), catch-up and flick. 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

For more detailed information on this and other related products contact:
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ABD has representatives throughout the world. For details please refer to our website: www.abd.uk.com

All of the top 25 most successful vehicle manufacturers in the world use ABD technology to develop their vehicles

*OICA World Motor Vehicle Production survey 2012