



# Axle NVH 250 (AVNH 250)

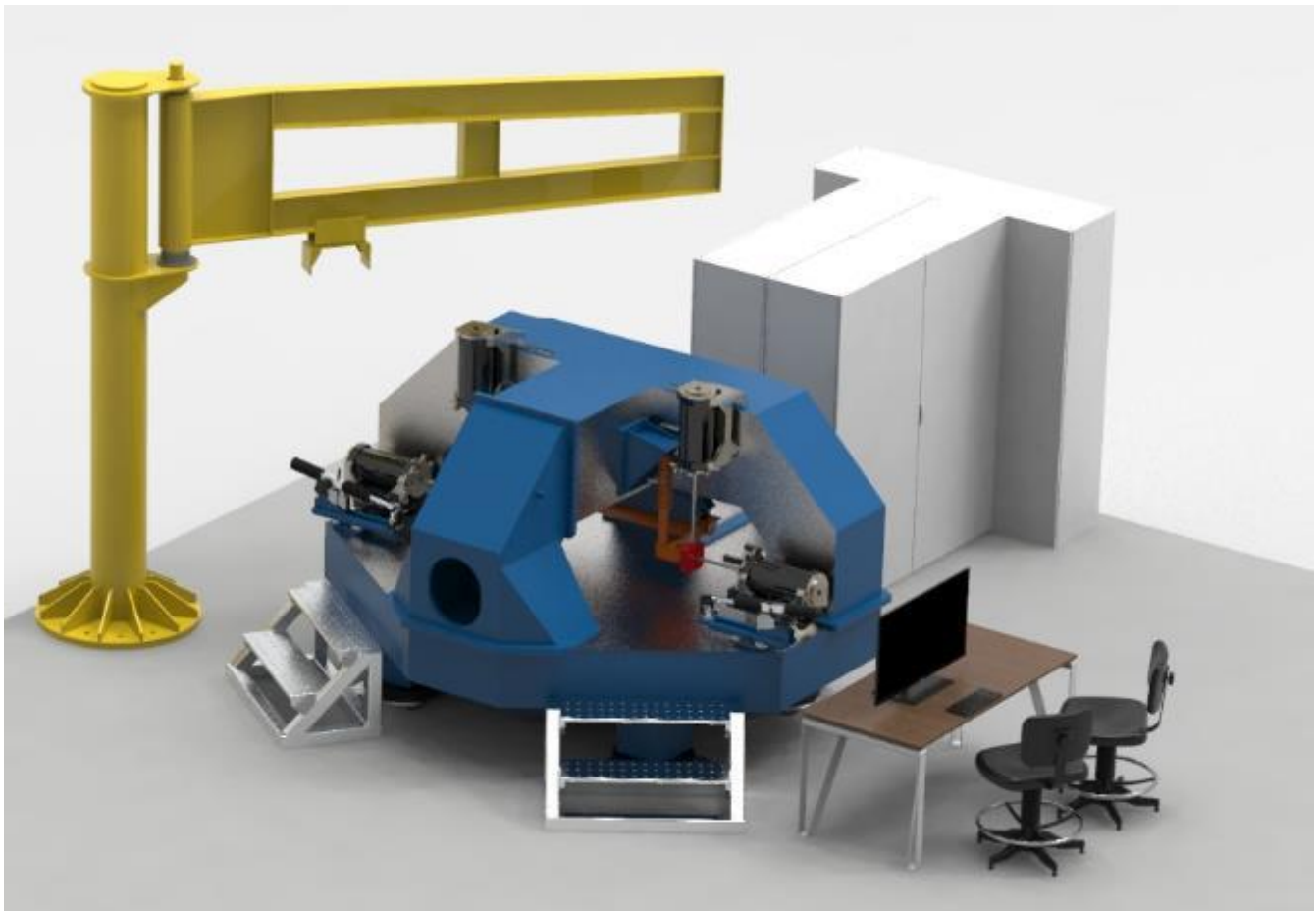
## System specification

The ANVH 250 is an axle level NVH rig for measuring noise, vibration and harshness transmission from the wheel hubs via suspension components into the suspension mounting points. The data generated allows improved correlation between the modelled and actual characteristics of the axle system, enabling the NVH characteristics of the prototype axle system to be optimised early in the design process. This avoids the need for expensive and compromised NVH fixes in the production vehicle.

The class leading performance of the ANVH 250 is achieved by combining an innovative and exceptionally stiff frame design, with AB Dynamics' high frequency linear actuator, which applies precise electrically controlled motion to the wheel hub at frequencies up to 250Hz.

The ANVH 250 is designed to allow a wide range of vehicle sub frame assemblies to be loaded and fixed to the frame with custom mounts. The 10kN vertical actuators use a pneumatic preload system to hold the axle at ride height, precisely controlled motion is then applied electrically. The 6kN horizontal actuators are used to apply either lateral or longitudinal motion to the wheel hub.

Tri-axial load cells measure forces transmitted to each of the vehicle body attachment points, whilst accelerometers and lasers measure the mode shapes of the system components. As an option the ANVH 250 may be fitted with ABD's Dynamic Arm wheel position measurement system. This enables the Kinematics and Compliance characteristics of the axle subframe to also be measured.



ANVH 250 with optional Dynamic Arm Wheel Position Measurement System

# Overview

## Actuation system:

- 6-off locations for AB Dynamics direct-acting tubular slotless linear electric actuators, forcing in X,Y,Z at each wheel hub
- Position control using feedback from BiSS-C absolute encoder
- Static pneumatic pre-load/ ride height control using 7 bar air supply: 10kN pull preload

## Vertical actuator performance:

- Max stroke:  $\pm 50\text{mm}$
- Bandwidth: 250Hz
- Max Load:  $\pm 10\text{kN}$
- Static pneumatic pre-load/ ride height control using 7 bar air supply: 10kN pull preload

## Horizontal actuator performance:

- Max stroke:  $\pm 20\text{mm}$
- Bandwidth: 250Hz
- Max Load:  $\pm 6\text{kN}$

## Axle fitment envelope:

- Track width: 1450 – 1730mm
- Length (foremost to rearmost point) up to 1300mm
- Height up to 1100mm (axle centre line to top of strut)

## Test Frame characteristics:

- Lowest frame resonance 260Hz with axle installed
- Isolated from ground at <3Hz

The Measurement and data acquisition system will be configured to meet the users requirements.

## Typical system components include:

- Tri-axis Kistler piezo-electric load cells at all body and actuator attachment points
- Tri-axis Kistler piezo-electric accelerometers for fixing to axle links and arms as required
- Keyence laser displacement sensors for frame and component deflection and displacement as required.
- ABD Dynamic Arm wheel position measurement system for measuring wheel hub displacement
- Data capture system with Linux Real Time computer



The AB Dynamics high frequency linear actuator

