

Tips & Technology

For Bosch business partners

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Invented for life

Brake systems

Testing of all-wheel drive vehicles

The number of all-wheel drive vehicles is on the rise

For a variety of reasons there has been a considerable increase in the number of all-wheel drive vehicles on our roads in recent years, not least due to the current trend towards SUVs. Reason enough for workshops to familiarize themselves with such vehicles to be equipped to handle the resultant business.

Brake testing for all-wheel drive vehicles

Testing the brake system of an all-wheel drive vehicle is a real challenge on a single-axle roller dynamometer of the sort found in most workshops.

To make things easier, the following table provides a list of the most common models from the major vehicle manufacturers and an outline of the most important test conditions and settings for the vehicle concerned.



(the table can be found on the next few pages)

Make	Series	Model	Testing	Special features
Alfa Romeo	155 Q4	167	Yes	Test speed max. 7.5 km/h, test time max. 30 s
	156 Q4	932	Yes	Test speed max. 7.5 km/h, test time max. 30 s
	156 Cross wagon	932	Yes	Test speed max. 7.5 km/h, test time max. 30 s
	164 Q4	164	Yes	Deactivate all-wheel drive by removing fuse 3
Audi	All series		Yes	Test speed min. 4, max. 6 km/h
BMW	3 Series with xDrive		Yes	No
	5 Series with xDrive		Yes	No
	X3, X5		Yes	No
Chrysler	300C AWD	LX	Yes	Transmission set to N, test speed max. 5 km/h
	Voyager AWD	ES, GS, RG	No	
Daihatsu	Charade	G112	Yes	Viscous coupling selector lever in "free" position
	Sirion	M110, M111, M311	No	
	Applaus	A111	Yes	Viscous coupling selector lever in "free" position
	YRV	M211	No	
	Materia	M412	No	
	Terios	J100, J102, J200, J210	No	
	Rocky, Feroza	F7, F3	Yes	Selector lever position 2H
Dodge	Nitro	KA, KK	Yes	Switchable all-wheel drive: Activate 2WD mode. Permanent all-wheel drive: Transmission set to N, test speed max. 5 km/h
Fiat	Panda 4X4	141	Yes	Deactivate all-wheel drive via selector lever on center console
	Panda Climbing	169	Yes	Test speed max. 7.5 km/h, test time max. 30 s
	Panda Trekking	169	Yes	Test speed max. 7.5 km/h, test time max. 30 s
	Panda Cross	169	Yes	Test speed max. 7.5 km/h, test time max. 30 s
	Tempra S.W. 4x4	159	Yes	Test speed max. 7.5 km/h, test time max. 30 s
	Sedici	FY	Yes	Deactivate all-wheel drive via switch on handbrake lever
	Ducato 4X4	233, 244, 290	Yes	Deactivate all-wheel drive via switch on left switch module (green warning lamp off during test)
Hyundai	SantaFe		No	
	Tucson		No	
	Terracan	With TOD (grey import)	No	
	Terracan	With EST	Yes	Selector switch set to 2H
	H1 Starex		Yes	Selector switch set to 2H
	Santamo	M-200E	Yes	Test speed max. 6 km/h
	Galopper	JK-T01	Yes	Test speed max. 6 km/h

Make	Series	Model	Testing	Special features
Jeep	Compass, Patriot	MK	Yes	Transmission set to N, 4WD locking switch not actuated, test speed max. 5 km/h
	Wrangler	JK, TJ, YJ	Yes	Activate 2WD mode
	Cherokee	KA, KK	Yes	Switchable all-wheel drive: Activate 2WD mode. Permanent all-wheel drive: Transmission set to N, test speed max. 5 km/h
	Grand Cherokee	WH	Yes	Transmission set to N, test speed max. 5 km/h
		WJ, WG, Z, ZG, ZJ	No	
	Commander	XH	Yes	Transmission set to N, test speed max. 5 km/h
Kia	Sportage		Yes	Remove "AWD" fuse
	Sorento		Yes	Remove "AWD" fuse
Lada	4x4 (formerly Niva)		Yes	"Low-speed test benches", differential lock deactivated
Lancia	Y10 4WD	156	Yes	Deactivate all-wheel drive via selector lever on center console
	Delta Integrale	831, 835	Yes	Test speed max. 7.5 km/h, test time max. 30 s
Land Rover	Freelander	LN	No	
	Freelander 2	LF	No	
	Defender	LD	No	
Lexus	RX 400h, LS 600h		Yes	
Mazda	323 1.6 Turbo GTX		Yes	Deactivate differential lock
	6 MPS		Yes	Remove 4WD fuse
	CX 7		Yes	Remove 4WD fuse
	B-Series, BT-50		Yes	
	Tribute		No	
Mitsubishi	Lancer	C10V, C50, C70	Yes	Test speed max. 6 km/h
		CA0, CA0W	Yes	Test speed max. 6 km/h
	Lancer Kombi		Yes	Selector lever in neutral position, differential lock deactivated
	Space Wagon		Yes	Deactivate all-wheel drive, release free-wheeling hubs
	Space Wagon 2.0	D00W, N30, N50	Yes	Test speed max. 6 km/h
	Space Wagon 2.4 GDI	D00W, N30, N50	Yes	Test speed max. 6 km/h
	Galant	E30, E50	Yes	Test speed max. 6 km/h
	3000 GT	Z10	Yes	Test speed max. 6 km/h
	Pajero Pennin	H60W	Yes	Test speed max. 6 km/h
	Pajero, Pajero Sport	L040, V20, K90	Yes	Test in 2WD mode
	L200, L300	L200, K60T	Yes	Test in 2WD mode
Peugeot	405 GRI/SRI x4	15B DD7, 15E DD7	Yes	Deactivate differential lock
	405 Break GRI x4	15B DD7, 15E DD7	Yes	Deactivate differential lock
	405 SRI x4	4B RFX7, 4E RFX7	No	
	405 Break SRI x4	4B RGZ7, 15B DF7	No	
	405 T 16 x4	4B RFX7, 4E RFX7	No	

Make	Series	Model	Testing	Special features
	405 Mi 16 x4	4B RGZ7, 15B DF7	No	
	4007		Yes	Can be tested in 2WD mode, test duration max. 30 s, interval min. 5 min
	J5 x4		No	
	Boxer		Yes	Can be tested in 2WD mode
Renault				No information
Skoda	Octavia I 4x4		Yes	Switch off the ignition
	Octavia II 4x4		Yes	Remove the Haldex oil pump fuse
	Octavia II Scout		Yes	Remove the Haldex oil pump fuse
	Superb II 2.0 TDI 4x4		Yes	Remove the Haldex oil pump fuse
	Superb 3.6 V6 DSG 4X4		Yes	Remove the Haldex oil pump fuse
			Yes	Remove the Haldex oil pump fuse
Subaru	Justy	Up to MY 2003	Yes	Set selector shaft on transmission to 2WD
	Justy	As of MY 2004	No	
	Impreza		Yes	
	Impreza WRX STI		No	
	Lagacy, Forester		Yes	
Suzuki	Swift, Baleno	EA, EG	Yes	Set lever on underside of transfer case to 2WD
	Swift, Liana, Ignis	MZ, ER, FH, MH	Yes	Test speed max. 7 km/h, test duration max. 30 s
	Wagon R+	EM	Yes	Set lever on right side of rear axle differential to 2WD
	SX4	EY	Yes	Set toggle switch next to handbrake lever to 2WD
	Grand Vitara	JT	Yes	Set rotary switch at center console to 4H, test speed max. 7 km/h
Toyota	All series		Yes	
Volvo	With viscous coupling	Up to MY 2002 except S60	No	
	With Haldex coupling	Up to MY 2008	Yes	Haldex oil pump fuse removed or ignition off
	With Haldex coupling	As of MY 2009	Yes	Haldex oil pump fuse removed or ignition off
				Test speed max. 5 km/h, test time max. 1 min
VW	Golf II Synchro		Yes	For front axle testing, reverse onto rollers
	Golf II Country		Yes	For front axle testing, reverse onto rollers
	Golf III Synchro		Yes	For front axle testing, reverse onto rollers
	Passat Variant GT		Yes	For front axle testing, reverse onto rollers
	Synchro		Yes	For front axle testing, reverse onto rollers
	Sharan 4Motion		Yes	For front axle testing, reverse onto rollers
	Passat 4Motion (predecessor)		Yes	Test speed max. 6 km/h

Make	Series	Model	Testing	Special features
	Golf IV 4Motion		Yes	Remove the Haldex oil pump fuse
	Golf V 4Motion		Yes	Remove the Haldex oil pump fuse
	Tiguan 4Motion		Yes	Remove the Haldex oil pump fuse
	Passat 4Motion		Yes	Remove the Haldex oil pump fuse
	Passat CC 4Motion		Yes	Remove the Haldex oil pump fuse
	Phaeton		Yes	No information
	Touareg		Yes	No information

Brake dynamometers from Bosch

Bosch developments are synonymous with innovative progress. Bosch can also supply brake dynamometer versions with all-wheel drive capability on which a neutral value is generated for the differential by reversing the direction of one roller. There is thus no power transmission to the rear axle; this prevents lifting of the vehicle off the rollers.

The BSA 434x series features automatic all-wheel drive recognition. In addition to manual selection of 4WD mode, the sensors can detect that the vehicle being tested is an all-wheel drive model from the higher rolling friction of the differential and switch the dynamometer automatically to all-wheel drive mode.



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