

## MINI Cooper with ZF ecoTronic VT1F Continuously Variable Transmission (CVT)

Gearbox control selections, modes, functions, terms, and behavior description notes from published materials and help by MINI, BMW Group, and ZF Getriebe. This chart shows how this state-of-the-art gearbox works in practical driving situations in each of three Selections.

<b>Gearbox "Selections"</b> (shifter-engaged mechanical choices)			Notes: Do not push-start, and do not tow or push in Neutral; see Owner's Manual. <b>Bold characters are displayed in the speedometer (P R N D SD 1 2 3 4 5 6 EP).</b>
Shifter-Left	Shifter-Right	Shifter-Tip +/-	
<b>P</b> ark			Locks the transmission. Engine will start without brake pedal depressed. Engine is computer-limited to 4000rpm.
<b>R</b> everse			Engages Reverse Clutch Pack. Engine is computer-limited to 4000rpm. Uses lowest gearbox ratio as fixed gear to yield 20mph as rpm-limited top speed in Reverse.
<b>N</b> eutral			Frees the transmission. Engine will start without brake pedal depressed. Engine is computer-limited to 4000rpm. <i>Do not</i> coast, tow or push the car in neutral.
<b>D</b> rive CVT/SAT			Normal position for most driving situations. Selection gives flexible driving characteristics, access to all transmission features, and the best fuel economy.
	<b>SportD</b> rive CVT/SAT		Termed "Sport program" in the MINI Owner's Manual and very similar to Drive, SD uses 20% higher engine rpm and crisp control of the transmission ratios to achieve higher performance. ZF materials say the shift lever is positioned to Low selection.
		<b>Manual 1,2,3,4,5,6</b> ("Steptronic")	Virtual sequential six-speed manual (software-based) puts fun and control into driver-defined situations. The transmission "holds a gear" (even under significant loads) unless the engine limits at 6000rpm (creates upshift) or drops below a set rpm (creates downshift: 2000rpm 6>5; 1800rpm 5>4; 1600rpm 4>3; 1400rpm 3>2). Full stop resets to "2" (Pull-away function). 1 <sup>st</sup> must be manually selected. Fixed ratios ("gears") are 0.562:1 6 <sup>th</sup> , 0.675:1 5 <sup>th</sup> , 0.847:1 4 <sup>th</sup> , 1.117:1 3 <sup>rd</sup> , 1.622:1 2 <sup>nd</sup> and 2.416:1 1 <sup>st</sup> , and 5.76:1 constant ratio.
	Low		The ZF Group materials show a physical lever position for "Low" which is used by BMW in the MINI for SportDrive. "Low" is mentioned in some BMW materials.
<b>Gearbox "Modes"</b> (throttle pedal position-activated behaviors)			Notes:
CVT-mode	CVT-mode	N/A in Steptronic	Native gearbox behavior gives turbine-smooth acceleration if the throttle pedal is held within the range between 0% and the resistance point/switch position (about 85%). Pushing the pedal past the resistance point engages the slower virtual SAT-mode.
SAT-mode	SAT-mode	Kick-Down	Software enabled shift simulation of a 6-speed (geared) Stepped Automatic Transmission (SAT) is engaged in D or SD, or Kick-Down to next logical lower "gear" in Steptronic, by depressing the throttle pedal past the resistance point switch (floored).
<b>Gearbox "Functions"</b> (software engineered behaviors)			Notes:
Creep	Creep	Creep	Clutch pressure is maintained to initiate forward movement if brake pedal is released.
Crawler	Crawler	Crawler	Very low speed functionality to stable behavior for parking lots and driveway maneuvers, suppresses lever selections (D, SD, Step) until 1600rpm. Some "rocking" complaints.
Pull-away [Set-off]	Pull-away [Set-off]	Pull-away [Set-off]	Transmission thrust belt positioned onto the fully-open Primary variator pulley shaft to give maximum purchase (lowest ratio). Gearbox switches out of this mode at specified rpm. Transmission characteristics change above 2,000rpm.
Smooth to 50mph	Not enabled in SD	Not enabled in Step	In Drive only, the engine is heavily managed for efficiency until approximately 50mph.
Downhill	Downhill	Downhill	Excellent engine-braking and speed control. Occasional alarming behavior on certain downslopes in D or SD; engine comes up to 5000rpm and holds until braked to a stop.
Fast-off	Fast-off	Fast-off	Quickly lifting off the throttle pedal ("fast off") holds higher engine rpm with a lower set ratio in the gearbox to make re-accelerating (pickup) intuitive and brisk.
Overdrive	Not enabled in SD	Not enabled in Step	Economy cruise mode only in Drive, using lower rpm and highest gearbox ratio for efficiency and better fuel economy. Cruise Control is very effective with overdrive.
<b>E</b> mergency <b>P</b> rogram	Separate function	Separate function	Detected serious faults will display "EP" in the speedometer and limit the engine to 3000rpm. Unusual transmission failures may prevent this intended limp-home mode.