sonnax Technical Bulletin
Vol. 4 • No. 2

Don't be so SENSITIVE

Chrysler FWD 3-speed and RWD 3- and 4-speed transmissions have several things in common, including shift timing complaints. Oversensitive 3-2 downshifts, late 2-3 upshifts or shift timing concerns in general are often found on the FWD units such as the 414, 470 and 670. These problems also plague the RWD 727 and 904 3-speeds or the 4-speed 42-48RH or RE transmissions. The reason all these units share these common problems is that they also share the design and method used for shift timing control.

With the exception of the shifting into or out of 4th gear, which is controlled by the computer on the 4-speed RH and RE units, shift timing for the first three gears on all of these units is still controlled hydraulically. It is the traditional balance of power: Governor pressure and throttle pressure compete for the right to be in control. When road speed and therefore governor pressure rise and overcome a given throttle pressure, an upshift occurs. With increased throttle position and a corresponding increase in throttle pressure, the upshift can be held off or, given enough throttle, a downshift can be induced. Pressures that are either higher or lower than intended, from either side of the equation, upset the balance of power and cause shift timing concerns.

The governor side of things is straightforward in concept. In general, governor pressure should be 1.5 psi or less on hydraulic units or 3 psi or less on the RE units while standing still. In all cases, there should be a smooth linear pressure rise as vehicle speed increases. All but the RE units still rely on a mechanical governor to create this signal. The RE units are unique in that the computer monitors vehicle speed and then commands a solenoid to create a governor pressure signal. Regardless of which method is used to generate that signal, governor pressure is a hydraulic force that becomes one side of the shift timing equation. Governor pressure is also relatively easy to verify and should be checked before addressing any shift timing concern.

The TV pressure side of things brings a host of issues to the game, which will result in a variety of concerns. The good news is the same basic design is used throughout these units. The throttle valve itself regulates how much of the available line pressure will be used to create throttle pressure. This pressure is fed to the shift valves to oppose governor pressure and control shift timing. It is also sent to the pressure regulator valve, where it opposes reduction and balance pressures to provide line rise control in forward gears.

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As seen in Figure 1, TV pressure on the balance end of the throttle valve has matched the force of its regulating spring and has closed off incoming line pressure. Bore or valve wear at this end of the TV line-up results in higher-than-intended TV pressure. This increase upsets the balance of power and results in late upshifts. A very critical area of concern is the valve spool and bore area, where the throttle valve meters or controls the ability of available line pressure to become throttle pressure (see Figure 2). The valve spends much of its life around this position so the wear is greatest at that point. Wear here can allow minor valve movement to have a greater effect on TV pressure changes than intended. The all-too-familiar oversensitive 3-2 and 2-3 shifts are often the result.

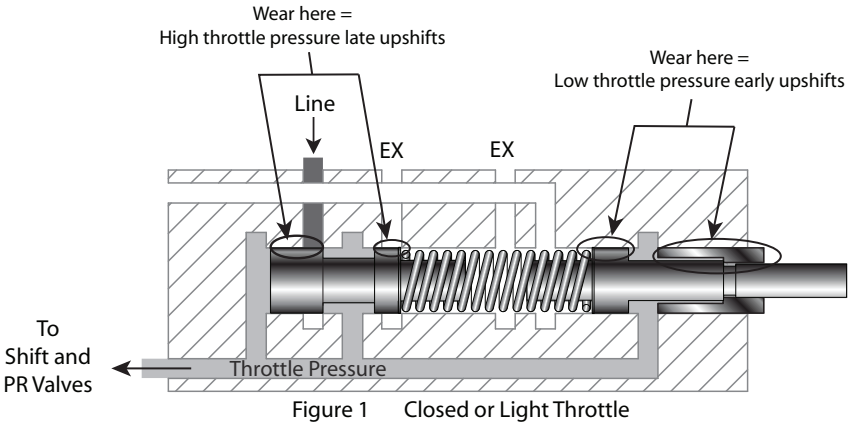

Figure 1 Closed or Light Throttle

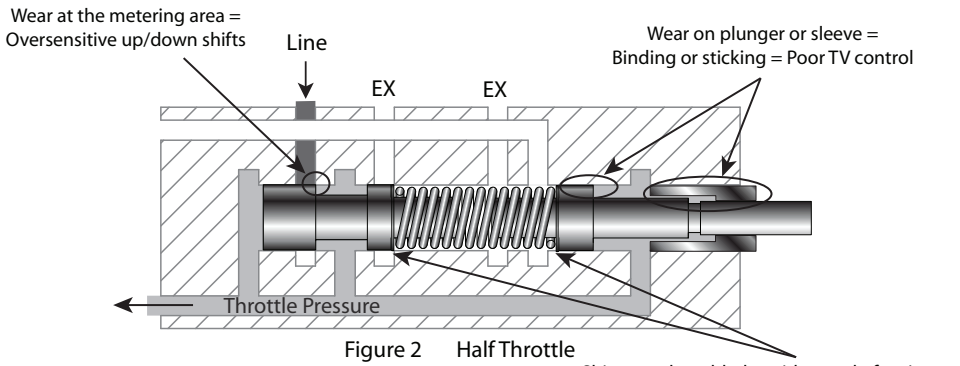

Figure 2 Half Throttle

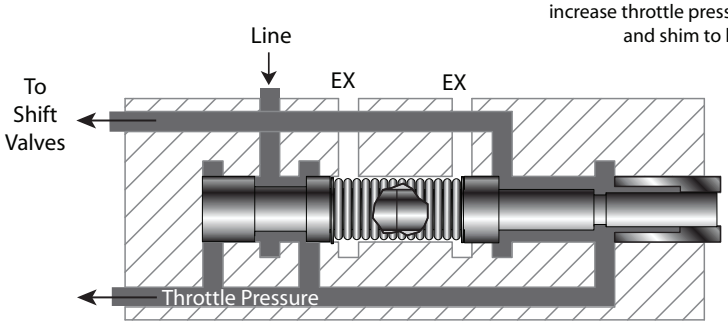

Figure 3 Wide-Open Throttle

The righthand side of the TV line-up is the kickdown or plunger valve and sleeve. This is where actual throttle position gets to influence TV pressure. Figure 1 shows the kickdown valve at a closed or light throttle position. In Figure 2, at half-throttle position, the kickdown valve is held in, loading the spring against the throttle valve. This increased force from the spring side means more throttle pressure must build up on the balance side of the throttle valve before it regulates over and clips off incoming line. The valve and sleeve areas are a potential leak point for TV pressure, which would result in lower TV or early upshifts (see Figure 1). Side loading and mechanical wear can also result in binding or sticking of the plunger, which translates into restricted control over the throttle valve and the resulting throttle pressure (see Figure 2).

Increasing the amount to throttle input continues to exert more force on the spring side of the throttle valve with an increasing high throttle pressure resulting, to a point. At wide-open throttle (see Figure 3), the plunger valve tip can actually come fully against the throttle valve tip. With this mechanical hold in place the TV valve can no longer regulate against the spring. Throttle pressure can now become equal to line pressure.

The following pages include information on throttle valve kits that allow you to repair any of the Chrysler units mentioned here. Standard size valves are available in an OEM ratio and a heavy-duty ratio for the RWD units when only valve wear is evident. When valve and bore wear are encountered, oversized valves are available for both the FWD and RWD units, with one common tool kit used to oversize valve body bores for either design. All kits come with an alternative TV spring and shims (see Figure 2) that will allow the builder to make minor increases or decreases to the standard TV pressures, when needed. Instructions provide guidelines for spring and shim use.