

Time Tested. Industry Trusted. That's **Sonnax**®

Since our founding in 1978, the Sonnax name has become synonymous with the highest quality products for the automotive aftermarket.

For years, our message has been that - if you want to fix the transmission right - you have to fix the valve body. Building on this philosophy, our top technicians and engineers craft innovative parts which solve root-cause transmission problems and restore valve bodies to standards meeting or exceeding OEM.

Sonnax products are the #1 choice of:

- Veteran independent transmission specialists
- Large production transmission remanufacturers
- Quality valve body rebuilders

When you bring Sonnax into your shop, you're getting far more than our parts and tools. We also believe in sharing our knowledge.

The Best Tech Support

Contact us anytime for comprehensive assistance with Sonnax products. Our tech team includes seasoned automotive professionals and product specialists dedicated to helping you get the most out of the transmission solutions we offer.



For Tech Support

8:30 a.m. – 5 p.m. ET

(800) 843-2600

info@sonnax.com

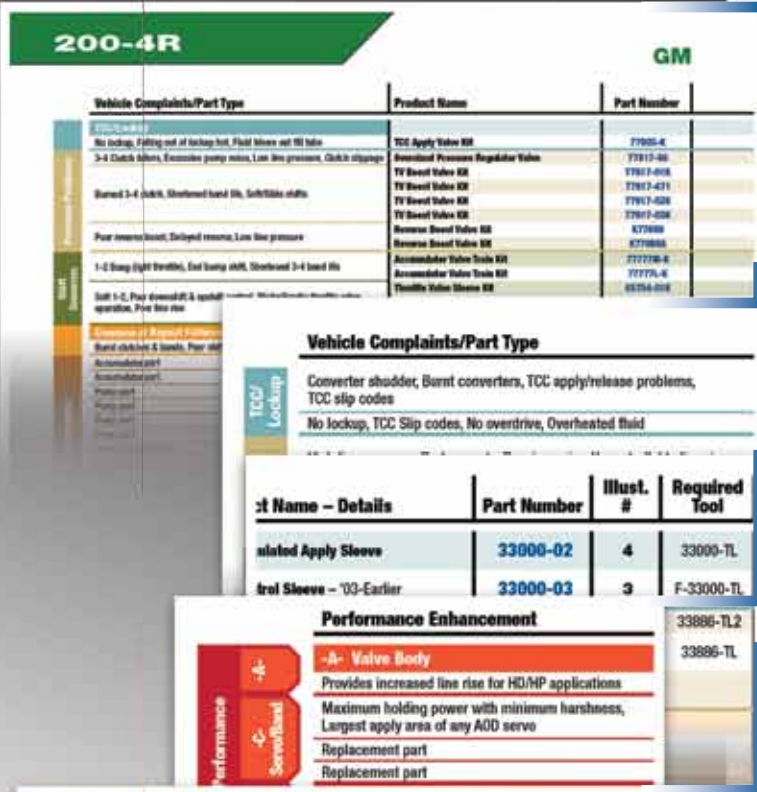
Online Resources

www.sonnax.com is the best place to find Sonnax product specifications, installation instructions, diagnostic guides, in-depth technical articles, training materials and much more. It's all available free, 24 hours a day, seven days a week, whenever you're looking for help.

**Nobody knows
valve bodies
like Sonnax.™**



We designed this
transmission catalog to
showcase how Sonnax
fixes resolve specific
transmission complaints.



Welcome to **Sonnax**® Transmission Products Catalog

Customers go to transmission shops with problems they want solved, not parts they want replaced. It's your job to figure out what "It makes strange noises and shifts funny" really means and select the right solution. To help, we designed our Volume 8 transmission catalog to showcase how Sonnax fixes resolve your specific transmission complaints.

Look Up Application & Unit

Parts are easy to find - we've organized them by application, allowing you to locate all the parts available for a given unit in one place.

Find Your Transmission Problem

Once you've turned to a valve body page, just locate a particular transmission problem – pressure issues, TCC/lockup, shift concerns, etc. – and select the Sonnax part designed to address it.

Identify Special Tools & Performance Products

Any tool, fixture or machining required for a given Sonnax product is clearly identified in this catalog. Unit-specific parts available for high-performance and heavy duty applications also appear on these pages.

View Parts & Valve Bodies

Unit-specific product charts also are accompanied by our award-winning transmission layouts, a quick and easy way to see Sonnax parts "in action." Parts are identified by number for easy cross reference with product charts.

Ready to order?

You can obtain genuine Sonnax transmission parts from our global network of approved distributors in North America, Europe, Australia, South America, the Middle East and Asia. Visit www.sonnax.com to find an authorized Sonnax distributor or call us at (800) 843-2600 or (802) 463-9722 to be referred.



Where can you find
the industry's **BEST**
transmission parts?

On the industry's
BEST Web site

www.sonnax.com

Any time of the day, any day of the week,
the expertise of Sonnax top technicians,
engineers and TASC™ Force members is
at your fingertips at www.sonnax.com:

- **Comprehensive Product Details**
- **Detailed Images & Diagrams**
- **Installation Instructions**
- **Technical Articles & Guides**
- **Current Distributor Information**

**Our technical library
is better than ever!**

We've dusted off the Sonnax Technical Library
to make it quick and easy to find the articles you want.

Whether it's researching a problem with a unit that's just come into
your shop or seeking pro rebuilding tips, we've made many years of
our professional technical resources available online.

We add more resources to the Sonnax technical library all the time, so it's always
worth a visit to see what's new. Many articles have appeared in leading industry
publications, others are exclusive content created for Sonnax users.

Detailed Product Information

Sonnax product information sheets offer a wealth of know-how
and address many of the FAQs we get from builders and
technicians. View online or print them out for easy access
during tear-downs or builds:

- Product images alongside housing or mating parts
for easy identification.
- Practical product information detailing common
complaints and probable cause, diagnostic procedures,
product specifications, features and benefits.
- Step-by-step installation instructions, in words or pictures.
- Valve body layouts such as those seen in this catalog are
available online for many popular units.

Flexible Search Features

Our Web site makes it easy to find what you're looking for, whether
it's all the parts available for specific applications, new products or
a single part number. If a part you look up requires a tool and/or
fixture, you'll be given that information right up front. Tools which
work for multiple parts will have those parts listed separately along
with all the units that a part or tool is used in.

All the Latest from Sonnax

New products, industry events, customer notices and more go up on
our Web site all the time. Sign up for E-news updates by becoming
a Sonnax Insider. You also can join the growing
community of automotive professionals who fre-
quent our Facebook page and Twitter to find out
what's going on at Sonnax.

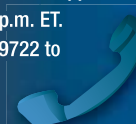


Online Tech Support

Submit your Sonnax product-related
technical questions or comments
anytime online!

- Fill out the online contact form
at www.sonnax.com
- E-mail info@sonnax.com

Need immediate assistance? Our tech support
call center is open 8:30 a.m. to 5 p.m. ET.
Call (800) 843-2600 or (802) 463-9722 to
speak with Sonnax specialists.

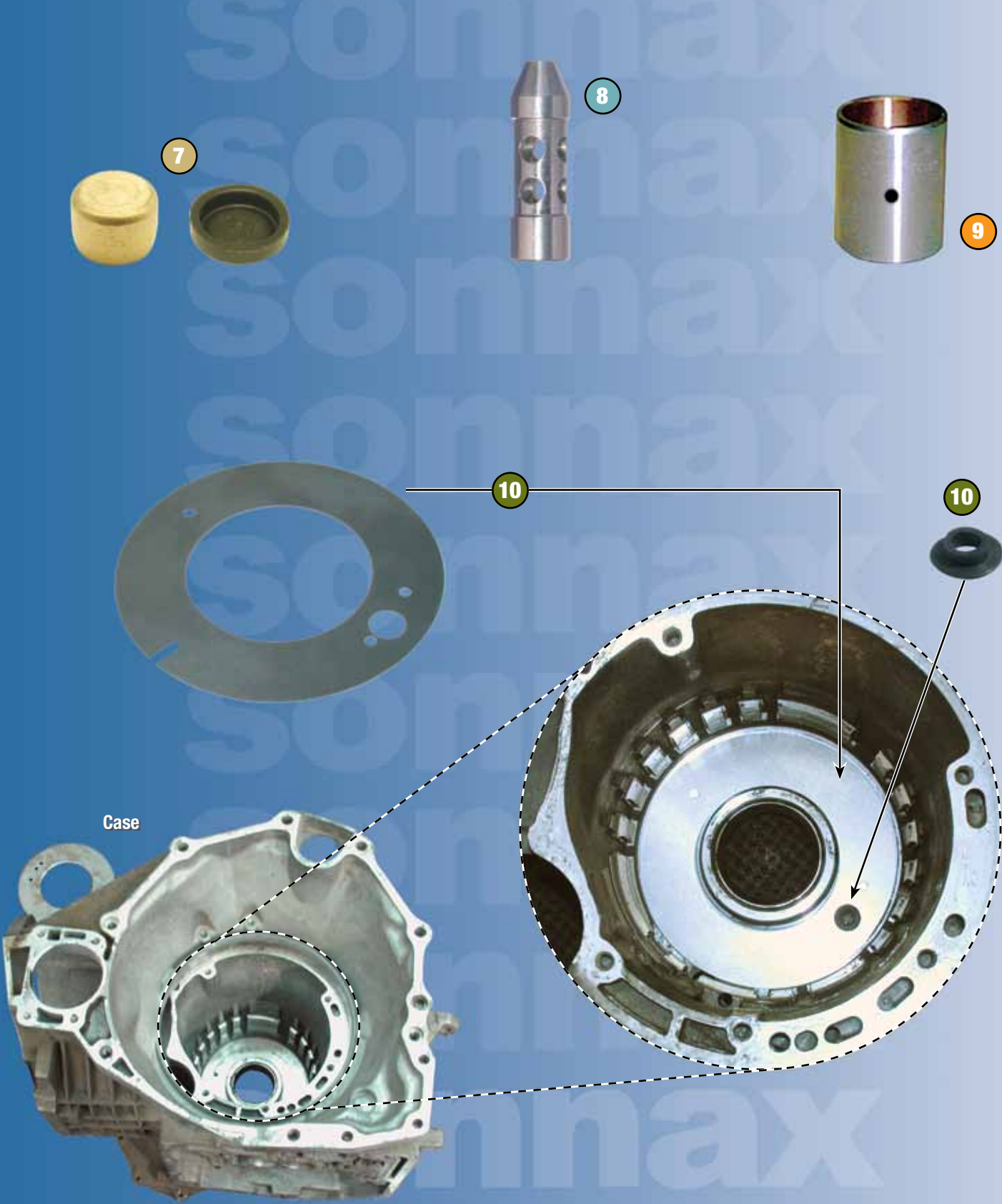
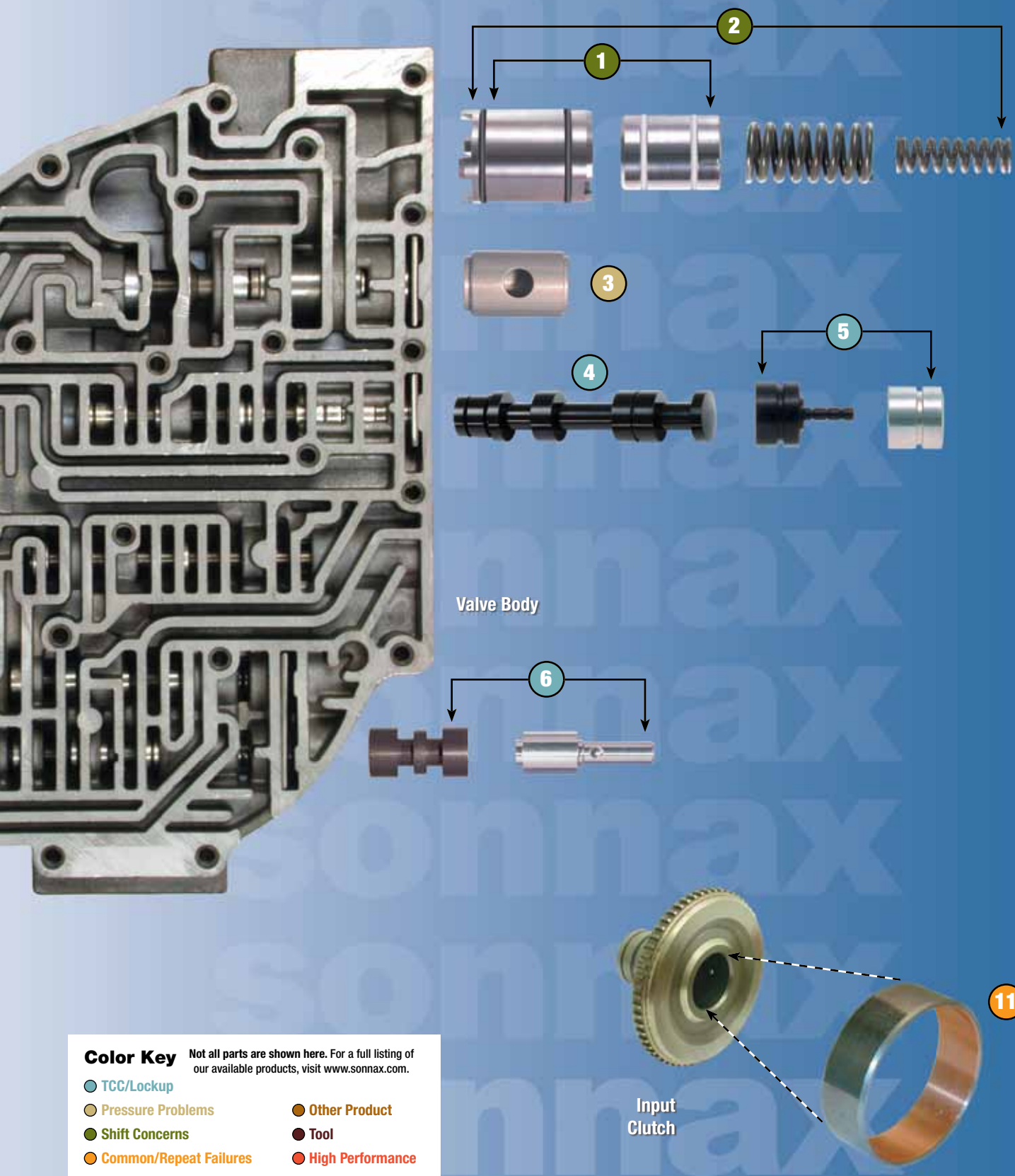


**The Sonnax Technical Library contains hundreds
of articles written by rebuilders, FOR rebuilders:**

- Detailed diagnostics on the latest, increasingly complicated units.
- Top industry builders and technical experts, members of the
Sonnax TASC™ Force, share their findings and best practices.
- Commonsense articles cover everyday transmission issues
as well as unique rebuilding challenges.

**PLUS: Step-by-step rebuilding guides, manuals,
videos, charts & much more!**

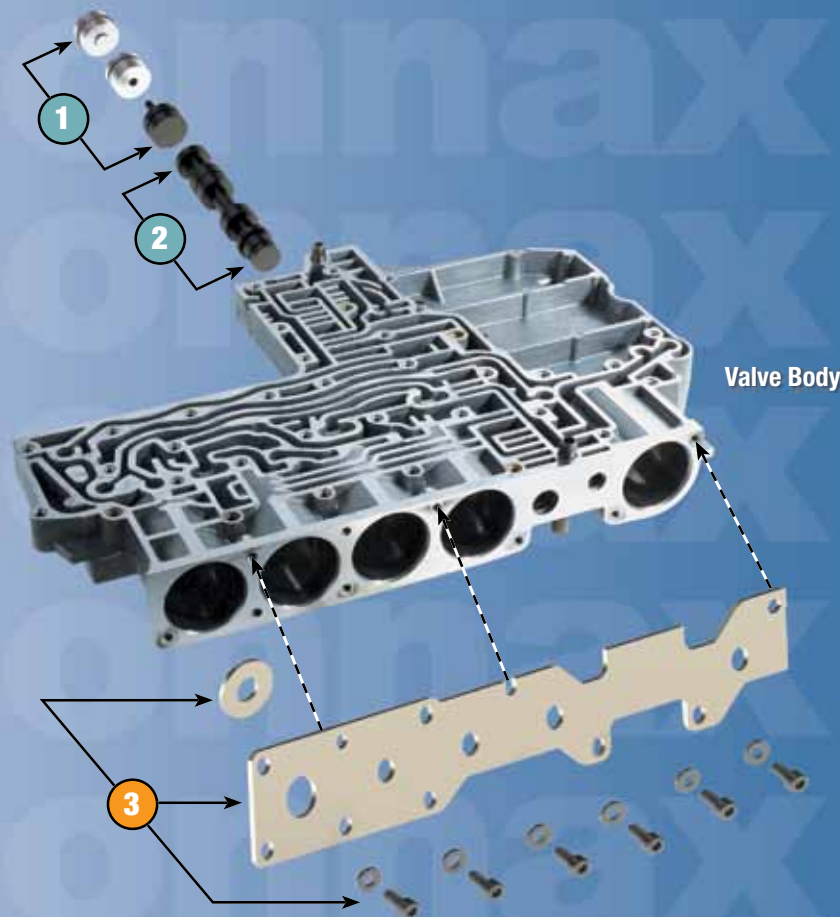




	Vehicle Complaints/Part Type	Product Name	Part Number		Illustration Number	41TE	42LE	42RLE	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
TCC/Lockup	Erratic/No TCC, 2nd Gear starts, Low/Reverse switch code	Solenoid Switch Valve Plug Kit	92835-02K		5	Y	Y	Y	Non-VLP units		
	Erratic/TCC, 2nd Gear starts, Low/Reverse switch code, Worn switch valve plug bore	Oversized Solenoid Switch Valve Plug Kit	92835-18K		5	Y	Y	Y	Non-VLP units with excessively worn bores	92835-RM	
		Oversized Solenoid Switch Valve Plug Kit	92835-22K		5	Y		Y	VLP units with excessively worn bores	92835-RM22	
	Converter shudder & failure, TCC deflection & lining failure, Cooler restriction caused by lining material, Transmission/Converter overheating	Converter Regulator Valve Kit	92835-03K		6	Y	Y	Y			
	No TCC apply, Various hydraulic switch codes, Wrong gear starts, Loss of 2nd gear	Oversized Solenoid Switch Valve	92835-21		4	Y	Y	Y		F-92835-TL	VB-FIX
	Lockup shudder, Low cooler flow, Erratic switch codes, Long soft 1-2	Bypass Plug	92836-01K		8	Y			'94-'97 With internal bypass valve, 2/bag		
Pressure Problems	High line pressure, Erratic TCC apply pressure, Poor lube control, Harsh shifts	Pressure Regulator Sleeve	92835-07		3	Y	Y	Y			
		Solenoid Pack Repair Kit	92836-03K		7	Y	Y		3 Diaphragms & 3 contacts, services one complete Solenoid pack		
	Intermittent pressure switch codes 21, 22, 23 & 24	Solenoid Diaphragm	92836-02			Y	Y		Diaphragms for 3 solenoid packs, 9/bag		
		Solenoid Brass Contact	92836-03			Y	Y		Contacts for 3 solenoid packs, 9/bag		
Shift Concerns	Delayed reverse, Codes 24 & 60, High low/reverse clutch volume index (CVI)	Low/Reverse Piston Retainer Oil Feed Seal Kit	92106-01K		10	Y	Y	Y			
	Intermittent low reverse clutch apply & release problems, No forward or reverse, Burned low/reverse clutch, Harsh 2-1	Clutch Channel Insert Kit	92834-02K			Y	Y				
	1-2 Shudder, Coastdown clunk, High CVIs, Slide shifts	Accumulator Sleeve & Piston Kit	92834-03K		1	Y	Y	Y	Firmer shift than OEM		
		Accumulator Sleeve & Piston Kit	92834-05K		2	Y	Y	Y	Restores OEM shift quality		
Common or Repeat Failures	Premature underdrive clutch failure	Input Clutch Hub Bushing	92003-01K		11	Y	Y	Y		92003-TL*	
	Planetary failure, Shaft breakage	Overdrive Clutch Hub Bushing	92004-L		9	Y	Y	Y	.941" Housing I.D., steel backed, late style, 5/bag		
		Overdrive Clutch Hub Bushing	92004-LOS		9	Y	Y		.937" Housing I.D., steel backed, late style, 5/bag		
		Overdrive Clutch Hub Bushing	92004-SP		9	Y	Y		.959" Housing I.D., steel backed, early style, 5/bag		
	Dipstick reads full when unit is low on fluid, Delayed engagement/slips on acceleration due to low fluid, Code 35	Dipstick Tube Shield	92834-07			Y			For early design tubes extending 1.125" into case†		
	Valve Body Reconditioning Kit										
	Sure Cure® Kit	41TE Sure Cure® Kit	SC-41TE			Y	Y		See page 152 for details.	92003-TL*	
Other Products	Bearing	Torrington® Bearing Kit	SBK-C14			Y	Y				
	Bushing	Pump Bushing	12502-01			Y	Y	Y	Upgraded, 5/bag		
	Shim	Output & Transfer Shaft Shim	92965-Z5			Y			.005" Thick, 10/bag		
	Shim	Output & Transfer Shaft Shim	92965-30			Y			.030" Thick, 10/bag		
	Shim	Output & Transfer Shaft Shim	92965-45			Y			.045" Thick, 10/bag		
	Shim	Differential Bearing Shim	39539-Z5			Y	Y		For 2.48" differential bearing, 10/bag		
	Shim	Differential Bearing Shim	39540-Z5			Y	Y		For 2.88" differential bearing, 10/bag		
Tools	Tool	Installation Tool	92003-TL			Y	Y		For input clutch hub bushing 92003-01K		
	Tool	Reamer	92835-RM			Y	Y	Y	For oversized solenoid switch valve plug kit 92835-18K		
	Tool	Tool Kit	F-92835-TL			Y	Y	Y	For oversized solenoid switch valve 92835-21		VB-FIX
	Tool	Reamer	92835-RM22			Y		Y	For oversized solenoid switch valve plug kit 92835-22K		

† Will not fit late-style replacement filler tubes which extend into case 4.75".

Red Part Number = New in Vol. 8



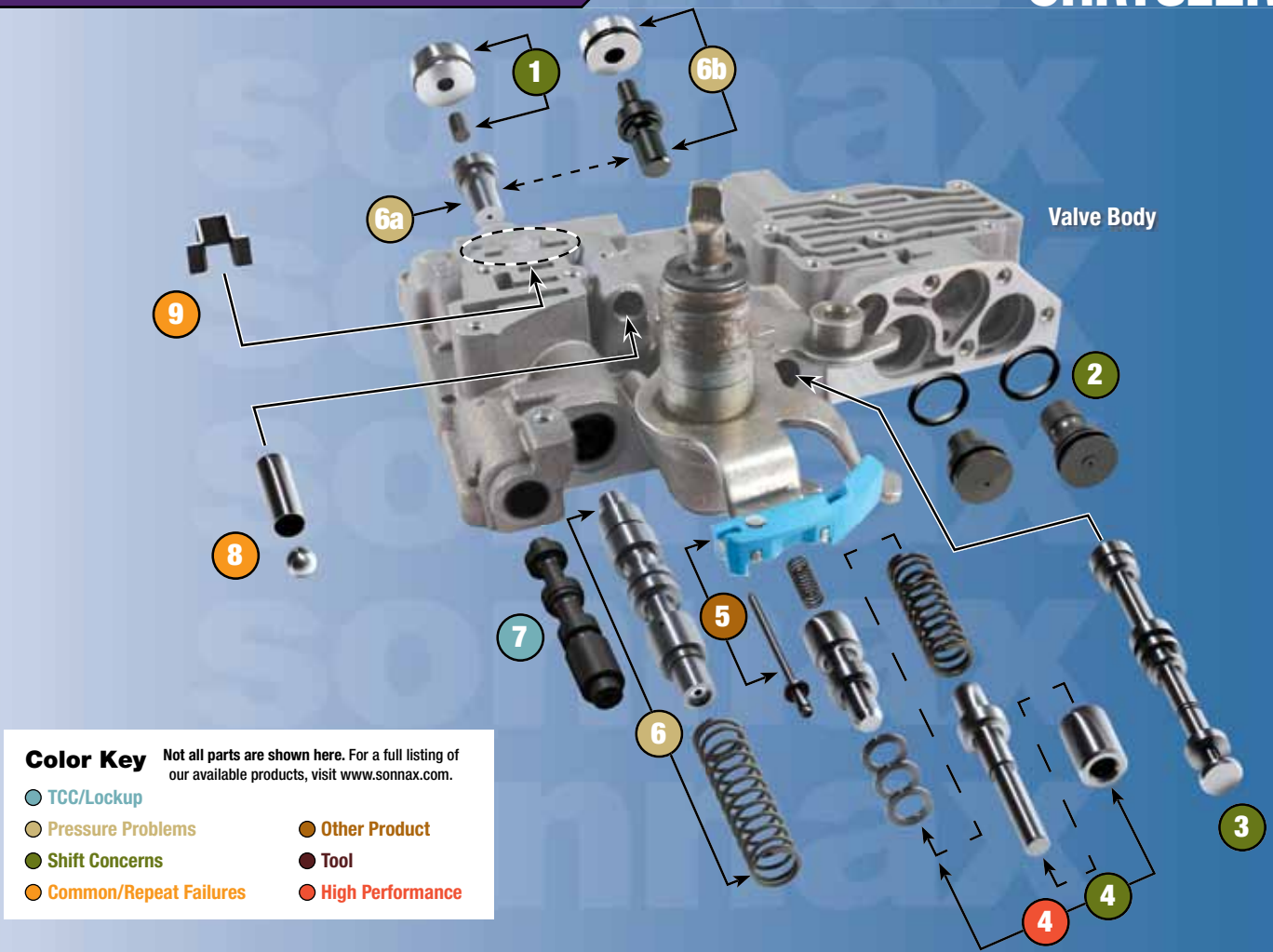
Color Key

- TCC/Lockup
- Pressure Problems
- Shift Concerns
- Common/Repeat Failures
- Other Product
- Tool
- High Performance

Not all parts are shown here.
For a full listing of our available products, visit www.sonnax.com.

Vehicle Complaints/Part Type		Product Name	Part Number	Illustration Number	45RFE	545RFE	68RFE	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
TCC/Lockup	Erratic/No TCC, 2nd Gear starts, Low/reverse switch code	Solenoid Switch Valve Plug Kit	92835-02K	1	Y	Y	Y			
	Erratic/No TCC, 2nd Gear starts, Low/reverse switch code, Worn switch valve plug bore	Oversized Solenoid Switch Valve Plug Kit	92835-18K	1	Y	Y	Y	Units with excessively worn bores	92835-RM	
	No TCC apply, Various hydraulic switch codes, Wrong gear starts, Loss of 2nd	Oversized Solenoid Switch Valve	92835-21	2	Y	Y	Y		F-92835-TL	VB-FIX
	Delayed engagements, Loss of power & fuel economy, Overheated converter, Low TCC release pressure, Low cooler flow	TC Limit Valve & Sleeve Kit	44912-03K	6	Y	Y	Y		F-44912-TL	VB-FIX
	Harsh TCC Engagement	TCC Accumulator Valve Spring	44912-01	4	Y	Y	Y	5/Bag		
	OEM spring breaks, Delayed engagement, Engine stall on engagement	Torque Converter Limit Spring	44912-02	5	Y	Y	Y	5/Bag		
Pressure Problems										
	Line pressure too low, especially for higher load/heavy duty situations	Line Pressure Booster	44957-LB1				Y	10-15 psi increase over OEM		
		Line Pressure Booster	44957-LB2		Y	Y		15-30 psi increase over OEM		
Common or Repeat Failures										
	Damaged/Cracked accumulator plate, Plate not available separately from OEM	Accumulator Plate Kit	44892-01K	3	Y	Y	Y		44892-TL	
Other Products										
	Solenoid Block	Remanufactured Solenoid Block	44836		Y			Black connector, early style, '99-'03		
	Solenoid Block	Remanufactured Solenoid Block	44836A			Y	Y	White connector, late style, '04-later		
Tools	Tool	Tool Kit	44892-TL		Y	Y	Y	For accumulator plate kit 44892-01K		
	Tool	Reamer	92835-RM		Y	Y	Y	For oversized solenoid switch valve plug kit 92835-18K		
	Tool	Tool Kit	F-44912-TL		Y	Y	Y	For TC limit valve & sleeve kit 44912-03K		VB-FIX
	Tool	Tool Kit	F-92835-TL		Y	Y	Y	For oversized solenoid switch valve 92835-21		VB-FIX

Red Part Number = New in Vol. 8



Color Key Not all parts are shown here. For a full listing of our available products, visit www.sonnax.com.

● TCC/Lockup	● Other Product
● Pressure Problems	● Tool
● Shift Concerns	● High Performance
● Common/Repeat Failures	



Note: Some of these parts also fit A727 & A904. See pages 16 & 17 for details.

Vehicle Complaints/Part Type		Product Name	Part Number	Illustration Number	42RH/RE	46RH/RE	47RH/RE	48RE	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
TCC/Lockup	Lockup shudder, Overheated converter, Reduced cooler flow, Soft TCC apply, Build-up of release pressure during lockup	4-Spool Switch Valve	22771A-01	7	Y	Y	Y	Y				
		Oversized 4-Spool Switch Valve	22771A-13	7	Y	Y	Y	Y			22771A-TL13	
	TCC slip, Forward clutch failure, Damage to sealing rings/stator tube	Stator Support Shaft Bushing	22005A-01K				Y	Y				
Pressure Problems	Delayed engagement, Lube failures, Converter Bushing failure, PR valve buzz	Lube Regulated Pressure Regulator Valve	22771A-02K	6	Y	Y	Y	Y		Y		
	Valve bodies with worn PR bores can't be salvaged, Converter drainback	Oversized Pressure Regulator Valve Kit	22771A-07K	6 & 6a	Y	Y	Y				F-22771A-TL7	VB-FIX
	Valve bodies with worn PR & line/TV pressure plug bores can't be salvaged	Oversized Pressure Regulator Valve Kit	22771A-16K	6 & 6b				Y		Y	F-22771A-TL7	VB-FIX
Shift Concerns	Shift timing concerns & throttle buzz, Poor kickdown due to low TV pressure, Late 2-3, Oversensitive 3-2	Throttle Valve Kit	22771-03K	4	Y	Y	Y	Y				
		Oversized Throttle Valve Kit	22771-04K	4	Y	Y	Y	Y			F-22771-TL	VB-FIX
	Delayed engagement & converter bushing failure	Manual Valve	22771-09	3	Y	Y	Y	Y				
	Early/Late upshifts, 2nd gear starts	Primary Governor Valve	12802-01		Y	Y	Y		'90-'03, RH units only			
	Sluggish 3-4 shifts	3-4 Accumulator Spring	12861-01		Y	Y	Y	Y	Matches OEM 47RE diesel calibration			
	Slips in reverse, Poor cooler charge at idle, Poor line control, Poor forward & reverse engagement	Line Pressure Plug & Sleeve Kit	22229-01K	1	Y	Y	Y		.200" Dia. plug	Y		
		Line Pressure Plug & Sleeve Kit	22229-04K	1	Y	Y	Y		.264" Dia. plug			
	Long slide 2-3 shift, Direct clutch failure, Low line pressure	Front Servo Piston Cover Kit	22827-01			Y	Y	Y	Includes O-Ring	Y		
	Soft 1-2, Delayed engagements, Forward clutch failure	Intermediate Accumulator Sleeve Kit	22841-01K		Y	Y	Y	Y				
	1-2 Shuttle, Sensitive 2-3 & 3-2, Difficulty adjusting shift timing with TV linkage	Governor Bore Plug Kit	22771-14K	2	Y	Y	Y	Y				

Red Part Number = New in Vol. 8

Vehicle Complaints/Part Type		Product Name	Part Number		Illustration Number	42RH/RE	46RH/RE	47RH/RE	48RE	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
Common or Repeat Failures	Burnt bands, Sticking/Broken rear servo piston, Worn piston pin bore	Rear Servo Piston	22912				Y			2.800" O.D.	Y		
		Rear Servo Piston	22912A			Y				2.540" O.D.			
		Rear Servo Piston	22912B					Y		'94-'96			
		Rear Servo Piston	22912C					Y	Y	'97-Later, RE units only			
	Reverse drum/retainer/planet failures, Loss of lube to the gear train	Piston Retainer Kit	12962N-01K		11	Y				Improved oil flow & material	Y		
		Oversized Piston Retainer Kit	12962N-02K		11	Y				Improved oil flow & material		Requires Machining	
		Piston Retainer Kit	22754N-01K		11		Y	Y	Y	Improved oil flow & material	Y		
		Oversized Piston Retainer Kit	22754N-02K		11		Y	Y	Y	Improved oil flow & material		Requires Machining	
	Oil leaks due to cracked case	Cooler Line Repair Kit	22000-01K			Y	Y	Y	Y	Adapters for units with .250" fittings, Includes tap, 5/bag		Tap	
		Cooler Line Adapter	22000-01			Y	Y	Y	Y	Single adapter only		Tap from 22000-01K	
	Poor lube oil control, Recontamination of new parts, Shafts difficult to clean	Intermediate Plug & Pilot Kit	22171A-02K			Y	Y	Y		5/Bag			
	Fluid leaks from manual shaft case seal	Shift Lever Case Bore Repair Sleeve	22179-02			Y	Y	Y	Y			56361-TL	
	Late cases can't be used for early applications	NSS Adapter Kit	22179-06K			Y	Y	Y		Allows '01-later cases to be used in earlier vehicles			
	Case damage, One-way roller clutch failures	Case Repair Bearing	22556-BRG				Y	Y	Y	3/Bag		Requires Machining	
	Reverse servo piston plug wear/breakage, No reverse, Burned reverse band	Reverse Servo Piston Plug Kit	22912-01K			Y	Y	Y	Y		Y		
	Transmission slips, 4th gear oil/TCC oil pressure leakage	Boost Valve Spring Retainer	22990-01		9	Y	Y	Y	Y	5/Bag			
	No start, Delayed engagement, Linkage loose	Valve Body Detent Ball & Sleeve Kit	22771-12K		8	Y	Y	Y	Y			22771-TL12	
	Valve Body Reconditioning Kit												
	Sure Cure® Kit	42RH/RE Sure Cure® Kit	SC-42RHE			Y				See page 152 for details.			
	Sure Cure® Kit	46-47RH/RE, 48RE Sure Cure® Kit	SC-46/47RHE				Y	Y	Y	See page 152 for details.			
Other Products	Bearing	Bearing & Plate	12860-01K			Y	Y			O.D. Sun gear to planet			
	Bearing	Torrington® Bearing Kit	SBK-C16			Y	Y			RH units only			
	Bushing	Overdrive Sprag Pilot Bushing	12509-01			Y	Y	Y		Oversized		Requires Machining	
	Bushing	Output Pilot Bushing	12510-01			Y	Y	Y		'90-Later			
	Bushing	Pump Bushing	12502-01			Y				Improved fit, 5/bag			
	NSS Repair Kit	Neutral Safety Back-Up Insulator Service Kit	22229-03		5	Y	Y	Y		'02-Earlier			
	Servo/Band part	Oversized Band Strut	22900-10				Y	Y	Y	.100" Longer than OEM			
	Servo/Band part	Oversized Band Strut	22900-15				Y	Y	Y	.150" Longer than OEM			
	Shaft	Intermediate Shaft	12913A			Y				Direct OEM replacement			
	Shim	Endplay Shim	12780-Z			Y				For 3 or 4 tanged OEM, .010" thick, 10/bag			
	Shim	Endplay Shim	22700-Z				Y	Y		For 3 or 4 tanged OEM, .010" thick, 10/bag			
	Shim	Overdrive Set-Up Shim Kit	12783-01K			Y	Y	Y	Y				
	Sun Gear	Overdrive Sun Gear	12655C-1				Y			15 Degree, helical cut, '95-later			
Tools	Tool	Tool Kit	56361-TL			Y	Y	Y	Y	For shift lever case bore repair sleeve 22179-02			
	Tool	Tool Kit	F-22771A-TL7			Y	Y	Y	Y	For valve kits 22771A-07K & 22771A-16K			VB-FIX
	Tool	Tool Kit	F-22771-TL			Y	Y	Y	Y	For oversized throttle valve kit 22771-04K			VB-FIX
	Tool	Tool Kit	22771A-TL13			Y	Y	Y	Y	For oversized 4-spool switch valve 22771A-13			

Performance Enhancement		Product Name	Part Number		Illustration Number	42RH/RE	46RH/RE	47RH/RE	48RE	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
High Performance	-A-	-A- Valve Body										
		Reduces throttle sensitivity	Throttle Valve Kit	22771-HDK3	4	Y	Y	Y	Y			
	-C-	-C- Servo Band										
		Increases apply area & improves sealing	2nd Gear Super Hold Servo Kit	22301B-01K	13		Y	Y	Y	16% More apply area than OEM, reduces leakage		
		Withstands increased band apply force	Heavy Duty Kickdown Band Strut	22825-01			Y	Y	Y	High strength steel		
	-D-	-D- Internal										
		One-piece design eliminates weak link	Heavy Duty Input Shaft/Hub Assembly	22121B-01	12			Y	Y	300M material		
	-E-	-E- Case										
		Greatly improves strength & sealing	Dual Seal Billet Accumulator Piston Kit	22841-04K	10	Y	Y	Y	Y	Anodized aluminum piston with dual Teflon® rings & dual D-Rings		

Red Part Number = New in Vol. 8

Vehicle Complaints/Part Type		Product Name	Part Number		Illustration Number	A727	A904	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
Pressure Problems	TCC/Lockup	4-Spool Switch Valve	22771A-01		7	Y	Y	Only late units with OEM 4-spool switch valve			
	Delayed engagement, Lube failures, Converter bushing failure, Pressure Regulator valve buzz	Lube Regulated Pressure Regulator Valve	22771A-02K		6	Y	Y	'78-Later	Y		
	Valve bodies with worn pressure regulator bores can't be salvaged, Converter drainback, Delayed engagement	Lube Regulated Pressure Regulator Valve	22771A-10K			Y	Y	'62-'77	Y		
Shift Concerns	Valve bodies with worn pressure regulator bores can't be salvaged, Converter drainback, Delayed engagement	Oversized Pressure Regulator Valve Kit	22771A-07K		6 & 6a	Y	Y	'78-Later		F-22771A-TL7	VB-FIX
	Shift timing concerns & throttle buzz, Poor kickdown due to low TV pressure, Late 2-3, Oversensitive 3-2	Throttle Valve Kit	22771-03K		4	Y	Y				
		Oversized Throttle Valve Kit	22771-04K		4	Y	Y			F-22771-TL	VB-FIX
	Delayed engagement & converter bushing failure	Manual Valve	22771-09		3	†	†				
	Slips in reverse, Poor cooler charge at idle, Poor line control, Poor forward & reverse engagement	Line Pressure Plug & Sleeve Kit	22229-01K		1	Y		.200" Plug diameter with boost tube only			
		Line Pressure Plug & Sleeve Kit	22229-04K		1	Y		.264" Plug diameter with boost tube only			
	1-2 Shuttle, Sensitive 2-3/3-2, Difficulty adjusting shift timing with TV linkage, Governor pressure low	Governor Bore Plug Kit	22771-14K		2	Y	Y				
	Long slide 2-3 shift, Direct clutch failure, Low line pressure	Front Servo Piston Cover Kit	22827-01			Y		Includes O-Ring	Y		
Common or Repeat Failures	Soft 1-2, Delayed engagements, Forward clutch failure	Intermediate Accumulator Sleeve Kit	22841-01K			Y	Y				
	Burnt bands, Rear servo piston sticking/broken, Worn piston pin bore	Rear Servo Piston	22912			Y		2.800" O.D.			
		Rear Servo Piston	22912A				Y	2.540" O.D.			
	Oil leaks due to cracked case	Cooler Line Repair Kit	22000-01K			Y	Y	For units with .250" fittings, includes tap, 5/bag		Tap	
	Fluid leaks from manual shaft case seal	Cooler Line Adapter	22000-01			Y	Y	Single adapter		Tap from 22000-01K	
	Case damage, One-way roller clutch failures	Shift Lever Case Bore Repair Sleeve	22179-02			Y	Y			56361-TL	
	No start, Delayed engagement, Linkage loose	Case Repair Bearing	22556-BRG			Y		3/Bag		Requires Machining	
Other Products	Reverse servo piston plug wear/breakage, No reverse, Burnt reverse band	Valve Body Detent Ball & Sleeve Kit	22771-12K		9	Y	Y			22771-TL12	
		Reverse Servo Piston Plug Kit	22912-01K			Y	Y				
	Bushing	Pump Bushing	12502-01				Y	5/Bag			
	NSS part	Neutral Safety Back-Up Insulator Service Kit	22229-03		5	Y	Y				
	Servo/Band part	Oversized Band Strut	22900-10			Y		.100" Longer than OEM			
	Servo/Band part	Oversized Band Strut	22900-15			Y		.150" Longer than OEM			
	Shim	Endplay Shim	12780-Z				Y	.010" Thick, for 3 or 4 tanged OEM, 10/bag			
Tools	Shim	Endplay Shim	22700-Z			Y		.010" Thick, for 3 or 4 tanged OEM, 10/bag			
	Overrun Clutch part	Overrun Clutch Spring & Roller Kit	22960			Y	Y	12/Bag			
	Tool	Tool Kit	22771-TL12			Y	Y	For valve body detent ball & sleeve kit 22771-12K			
	Tool	Tool Kit	56361-TL			Y	Y	For shift lever case bore repair sleeve 22179-02			
	Tool	Tool Kit	F-22771A-TL7			Y	Y	For oversized pressure regulator valve kit 22771A-07K			VB-FIX
	Tool	Tool Kit	F-22771-TL			Y	Y	For oversized throttle valve kit 22771-04K			VB-FIX

Performance Enhancement		Product Name	Part Number		Illustration Number	A727	A904	Product/Application Details		Required Tool (*Recommended Tool)	Required Fixture
High Performance	-A- Valve Body										
	Reduces throttle sensitivity, especially in diesel or other high torque applications	Throttle Valve Kit	22771-HDK3		5	Y	Y				
	-C- Servo Band										
	Increases apply area & improves sealing	2nd Gear Super Hold Servo Kit	22301B-01K		13	Y		16% more apply area than OEM, reduces leakage			
	Withstands increased band apply force	Heavy Duty Kickdown Band Strut	22825-01			Y	Y	High strength steel			
	-E- Case										
	Greatly improves strength & sealing	Dual Seal Billet Accumulator Piston Kit	22841-04K		10	Y	Y	Anodized aluminum piston with dual Teflon® rings & dual D-Rings			

Note: Some of these parts also fit 42-46-47-48RH/RE and are illustrated on pages 12 and 13.

*If pressure regulator valve matches '78-later style.

Red Part Number = New in Vol. 8

Part Type	Product Name	Part Number	Product/Application Details	Required Tool	Required Fixture
A670					
Part	Pump Bushing	12502-01	Improved fit, 5/bag		
A404, 413, 470, 670					
Part	Governor Bracket & Spring Kit	32204-03K			
Part	Oversized Throttle Valve Kit	32229-01K		F-22771-TL	VB-FIX
Part	Transfer Gear Shim	32539-Z5	.005" Thick, 10/bag		
Part	Reverse Band Strut	32710-01	Stronger material, thicker		
Part	Pinion Shim	35539-Z5	.005" Thick, 10/bag		
Part	Differential Preload Shim	39539-Z5	For 2.48" bearing, .005" thick, 10/bag		
Part	Differential Preload Shim	39540-Z5	For 2.88" bearing, .005" thick, 10/bag		
Part	Tapered Roller Bearing Kit	K32976A	Output shaft & rear carrier		
Part	Tapered Roller Bearing Kit	K32978	Transfer shaft & differential		
Tool	Tool Kit	F-22771-TL	For oversized throttle valve kit 32229-01K		VB-FIX

Red Part Number = New in Vol. 8

Time-Tested Techniques for Today's Technology

A change in technology can cause apprehension or relief. Compare the Ford VV carburetor to Port Fuel Injection or an older, strictly hydraulic transmission to a modern, computer-controlled unit. In 1968, if a vehicle shifted late or harsh, we adjusted the TV linkage or vacuum modulator. Today you can diagnose and alter shift quality from the driver's seat or from your office using a wireless reflash. When new technology comes along there is a learning curve, but most would agree that the new is better than the old.

This technology transition is reflected in the current move from the hydraulic valve body to the Mechatronic (mechanical/electronic) control assembly. The assembly is both valve body and TCM rolled into one, located inside the transmission. The TCM will be loaded with a vehicle application upon installation, then proceed to adapt to changes in clutch fill and exhaust requirements. Feedback from multiple speed sensors is required to control clutch fill and exhaust rates across as many as 8-gear ratios. In addition to all that complex control capability, features such as skip-shift timing, clutch overlap and multi-vehicle, plug-n-play applications add to the complexity. All that technology is enveloped in an electro-hydraulic control unit, similar in size to the C-6 valve body (**Figure 1**).

The intent of this article is to offer some precautions and to outline existing valve body test procedures that can be carried over to the Mechatronic. In older, 3-speed applications, drivability relied upon the switch action of shift valves: they stroked and remained inboard or outboard. In

current 6- and 8-speed applications, clutch control requires valve modulation and flow control. The valves and solenoids become active early, often in preparing for the next shift, and this frequent activity takes a toll on valve bores and solenoids.

Divide & Conquer: Diagnosing the Electronic Side of the Mechatronic

- When testing in the vehicle, check the TCM with your scan device first.
- Pull all codes from the TCM and other modules which might influence the TCM, such as the engine controller, ABS, air conditioning, etc.
- Check power sources (battery and bus) during cranking and as accessories operate.
- If your scan tool is CAN bi-directional, control the solenoids and compare amperages of similar designs.
- When no codes are present and the drivability issue is repeatable, check for reflash programs.

Testing at the bench should include looking for signs of damage from heat and vibration or of chemical attack by water or additives. If the fluid is discolored or there is clutch material in the pan or filter, inspection should include a water or anti-freeze test (**Figure 2**). One method to identify water is to place a few drops of the ATF on a hot plate. A

Figure 1

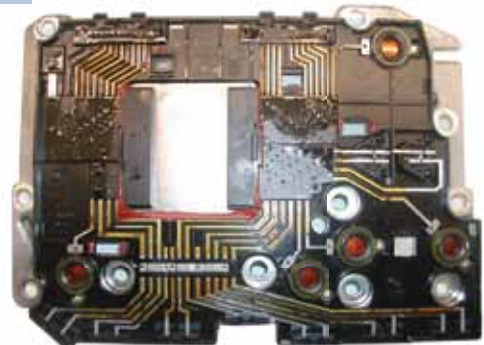


**1968 3-Speed,
C-6 Valve Body**

**2008 6-Speed 6R60
Mechatronic Unit**

In 1968 a Ford F-100 had a MSRP of \$2,375. The current F-150 6-speed 6R60E Mechatronic unit has a MSRP of \$2,275.

Figure 2



In the Jatco RE5R05A sections of many circuits are exposed to possible water or antifreeze damage.

sizzle will occur with moisture, but with pure ATF it will smoke and burn-off. Glycol test kits are available from Mercedes under Part No. 000-989-009 and Part No. 000-989-0014 or from ESP Chemicals under Part No. HI 3859.

Loose terminals or overheated circuits and solenoids created by vibration should be evaluated by a test that loads the circuit. When using electronic test controllers, tap and wiggle on the TCM and solenoids to interrupt circuits during the circuit test. In some instances, heating and cooling the TCM can identify weak circuits. Several manufacturers require the elimination of Electro-Static-Discharge (ESD). This involves conductive floor covering and personal grounding straps to prevent static discharge into the TCM.

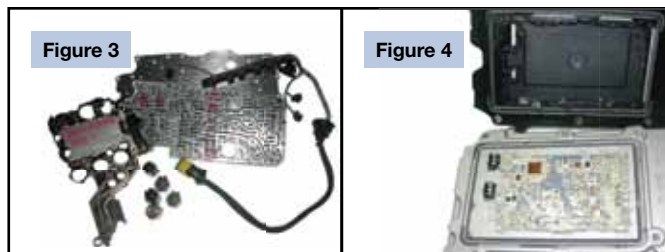
Component testing is possible in some Mechatronic units because the circuit board with the TCM can be separated from the solenoids (**Figure 3**). In others, the TCM is glued to the casting (**Figure 4**). Solenoids should be demagnetized, cleaned and flow tested. In some instances, each solenoid flow rate is programmed into the TCM and the solenoid cannot be exchanged. In others, the TCM has enough range of adaption to allow for solenoid replacement. Any cleaning or swap may require a drive-cycle relearn (**Figure 5**).



With solenoids cleaned, tested or replaced, this completed assembly awaits installation and will require a re-learn procedure.

Before You Begin: Establish Process Control

Establish a pass-fail test for each step in the rebuilding process. Testing is most effective if you can duplicate the interaction between parts such as clutch piston travel or solenoid-to-valve action. By evaluating each part before the final assembly test, problems are isolated, corrections made and labor or warranty expenses saved.



Mechatronic unit with TCM separated from the solenoids (left).
Mechatronic unit with TCM glued to casting (right).

A clutch piston travel and free clearance test is required because of the clutch-to-clutch shifting in Mechatronic units. The TCM has a specific range of adaption before it sets a code or corrects drivability. Valve bore leaks, excess or insufficient clutch tolerance can exceed that range of adaption.

Testing Valve Bodies

1. Air Test Plates

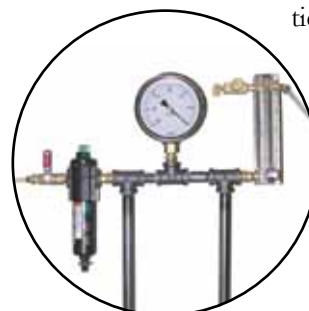


Air Test Plates allow a leak-down test on each valve bore independently and offer an overview of what will be required to service the valve body before starting the job. With a test cycle of less than 10 minutes, Air Test Plates also can be used to sort cores. This test is listed first because it does not require cleaning or disassembly of the valve body.

Air testing requires a regulated pressure chamber with a calibrated flow meter and gauge to measure pressure drop across the valve. Dedicated test locations for specific circuits are predetermined and easy to locate.

2. Vacuum Testing

Vacuum testing is more effective than a Wet Air Test because it has a measurable outcome. A vacuum pump is tied to a calibration stand, which allows for subtle adjustment. Although less expensive than Air Test Plates, vacuum testing does require operator experience to locate the proper point in the circuit, seal it effectively and establish



Continued on page 22...

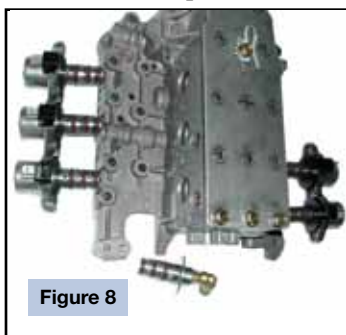
...Continued from page 20

pass/fail standards for your specific vacuum equipment. It also requires more preparation than using Air Test Plates, as the valve body must be cleaned and dried beforehand.

3. Wet Air Testing

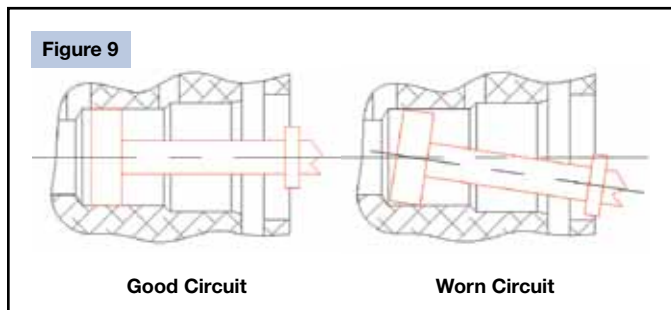
The Wet Air Test (WAT) is the traditional air test described in service manuals for clutch circuits with the addition of fluid. The process also can be used for a valve bore, solenoid circuits and line pressure integrity testing.

Wet Air Testing involves filling a cavity with ATF and pushing that fluid with regulated air pressure. A worn bore will allow the fluid to escape past the valve without building up sufficient force to push the valve. In a good bore, the valve will either stroke before the fluid escapes or it takes a longer time for the ATF to leak. Because there must be valve-to-bore clearance for the valve to stroke, fluid will eventually be forced around the spool by the air pressure. Once the fluid is pushed out, only air pressure remains and that air aggressively leaks past the valve.



Modified solenoid used as a test adapter on a Mitsubishi F4A / F5A.

The WAT uses a regulated air supply of 30-60 psi, a controllable air nozzle and some method to enclose a circuit. That enclosure can be a rag, a finger, a test plate, or a handmade tool such as the modified solenoid in **Figure 8**. Judging the pass/fail in time required to push the fluid will take experience. Rebuilders should test numerous valves from both good and worn bores to gain familiarity with this procedure.



In a worn circuit, clearance allows the valve to sag or deflect off the bore centerline.

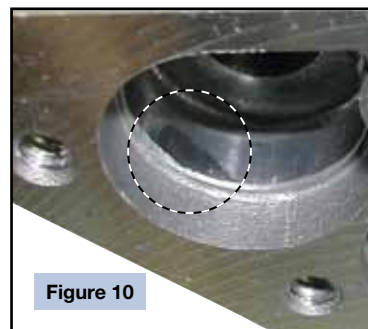
4. Deflection Tests

Sonnax tech articles sometimes refer to the “Sag-Wiggle-Deflection” test. This refers to positioning either the OEM valve or a tool that matches the diameter and length of the valve spool into the operating position and measuring deflection. Deflection can be measured and used as a definitive go-no-go test (**Figure 9**). The process requires some calculation and measuring tools to define the pass/fail standard.

5. Visual Inspection

The visual inspection process is placed near the end of this list because the valve body must be completely disassembled for a proper visual inspection. It requires the least amount of tools, but more time and experience.

The bore also will wear at both ends due to the spring and fluid loading the spool onto the bore. The highest rate of wear occurs in the area where modulated valves cycle within the bore.



Valve bore wear typically looks like a polished half moon worn into the bore on the side opposite the fluid entry

6. Hydraulic Test Stands

The hydraulic valve body test stand (VBT) is last on this list due to cost. The VBT's mate the electro-hydraulic elements of the valve body and run off external controllers. In earlier solenoid controlled valve bodies, an external computer would test the solenoid circuitry first, then operate in sequence to duplicate on-car shift strategy. Later units with internal TCM and CAN control have increased that operating complexity. Designated test bench CAN controllers have been developed to operate the Mechatronics.

Hydraulic test stands are very effective, but you have to be mindful that when the valve body does not work, it requires the processes previously listed to isolate the issue. You also must deal with the fact that the vehicle has changing load, temperature and other factors that cannot be duplicated on a VBT. To duplicate some of the on-car variables, VBT testing and data can include the following: varied fluid temperature, special viscous test stand fluid, varying input pressure and flow, varied solenoid control strategy and timed clutch flow/application data. Requirements for

hydraulic test stands will continue to change along with the test plates and harness.

Testing Valve Bodies

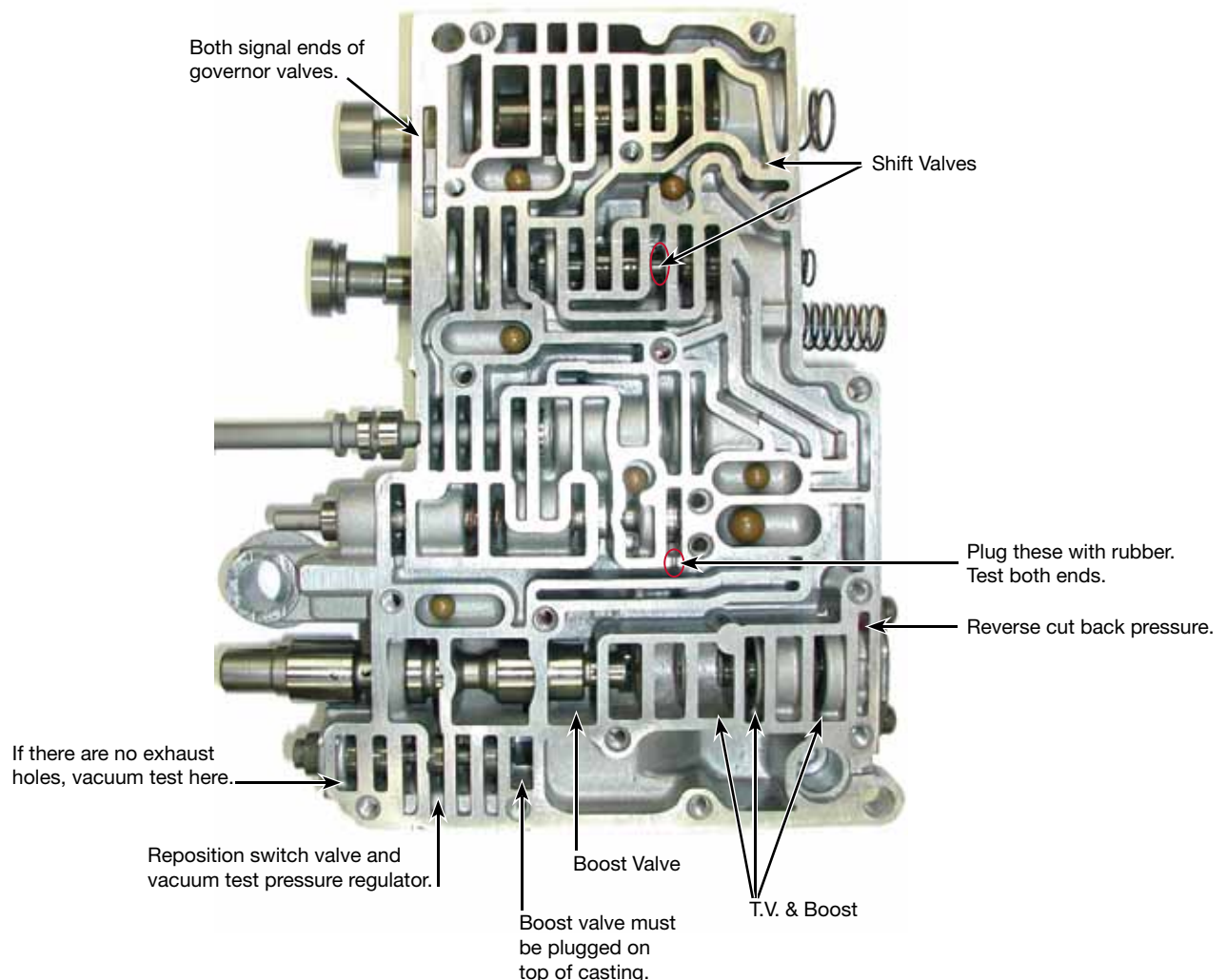
Although it's not a requirement, the valve should be positioned where it operates to obtain the best result from a vacuum test. Modulated and regulating valves will not wear

in the position you see at the bench – they will operate and wear-in at partial stroke and should be tested there if possible.

When a valve body has been machined on both sides, possible vacuum test locations may be exposed on each side. To enable vacuum testing on castings with both sides machined, a foam pad can be purchased to set the casting on and seal the other side.

Figure 11

Vacuum test locations & how to position or seal valve circuits.



For more on valve body testing, see "Valve Body Inspection & Rebuilding" by Bob Warnke. This article was featured in the Sonnax Transmission Specialties Catalog, Vol. 5, and is available online in the Sonnax Technical Library at www.sonnax.com.

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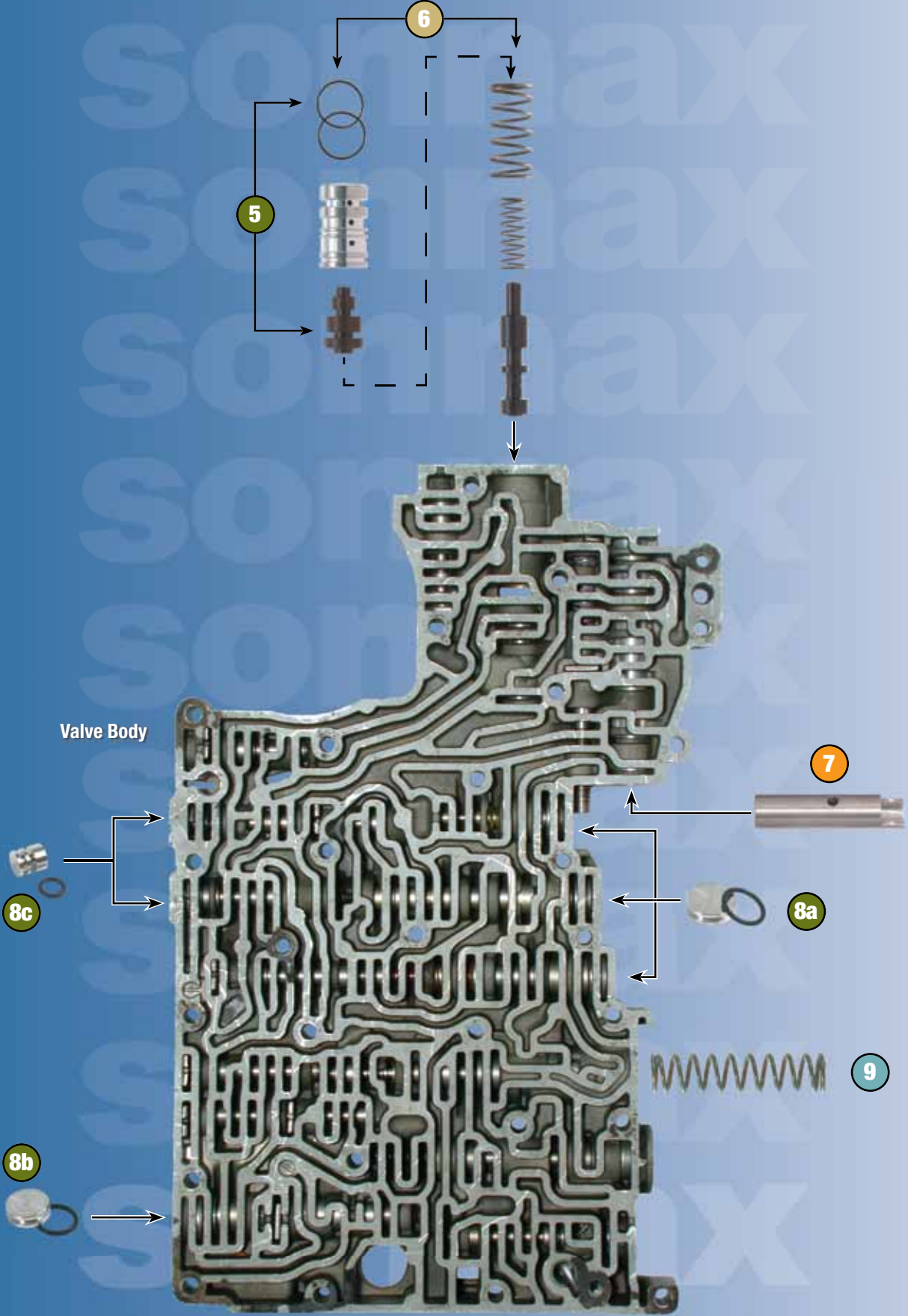
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- TCC/Lockup
- Pressure Problems
- Shift Concerns
- Common/Repeat Failures
- Other Product
- Tool
- High Performance

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	Vehicle Complaints/Part Type	Product Name	Part Number		Illustration Number	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
	TCC/Lockup	Anti-Shudder Spring	56995A		9	2/Bag			
	TCC shudder on coastdown, Engine chuggle								
	Pressure Problems	Oversized Pressure Regulator & Boost Valve Kit	56947-06K		6			56947-TL	
	Delayed engagements, Slow converter fill, TCC slippage, Low line pressure								
Shift Concerns	Delayed reverse, Soft 1-2 or 2-3	Boost Valve & Sleeve Kit	56947-02K		5	Large ratio with O-Rings			
		Boost Valve & Sleeve Kit	56947-05K		5	"Factory" style, small ratio			
	Delayed reverse, 2-3 Flare	Center Support/Direct Drum Sleeve	56219-02K		2				
	Delayed forward, Burned forward clutch, Damaged support	Center Support/Forward Clutch Sleeve	56219-03K		1	Bushing style, supports only		56219-04K*, Req. Machining	
	Delayed engagements, Harsh/Slide shifts, No vacuum control	Oversized Modulator Valve Kit	56833-01K					56833-TL	
	Erratic shift timing, Oil leakage	Valve End Plug Kit	56947-14K		8	3 Large, 1 medium, 2 small with O-Rings			
		Valve End Plug Kit	56947-LRG		8a	3 Large with O-Rings			
		Valve End Plug Kit	56947-MED		8b	3 Medium with O-Rings			
		Valve End Plug Kit	56947-SML		8c	3 Small with O-Rings			
	Overrun clutch spring failure	Center Support/Overdrive Shaft Sleeve Kit	56219-05K		3			56219-06K*	
Common or Repeat Failures	Sticking governor, Bronze in the pan, Sprag thrust washer failure, Damaged case	Low Sprag End Cap & Washer Kit	56250-01K						
		Low Sprag Inner Race	56600B			Late model		56000-DJ*	
		Low Sprag Update Kit	56600B-01K			Late model		56000-DJ*	
	Fluid leaks from manual shaft case seal	Shift Lever Case Bore Repair Sleeve Kit	56361-01K		4			56361-TL	
	Burnt forward clutches, Binding in park	Manual Valve Index	56947-01		7				
	Rear servo bore wear, Delayed forward	Reverse Servo Sleeve Kit	56532-01K					Requires Machining	
Other Products	Bushing	Bell Housing Bushing	56001X			Finish-in-place, 5/bag		Requires Machining	
	Bushing	Front Stator Bushing	56000C-01						
	Bushing	Output Shaft Pilot Bushing	56008						
	Governor part	Governor Weight	56615-35			35mm			
	Planetary part	Pinion Needle Roller	56412-03			For .334" dia. pins, 102/bag			
	Planetary part	Pinion Pin	56412-02			.334" Dia., 6/bag			
	Planetary part	Pinion Washer	56412-04			For .334" dia. pins, 12/bag			
	Planetary part	Planetary Rebuild Kit	56412RK			For .334" dia. pins			
	Pump part	Pump Gear Set	56201A-SP			Powdered metal			
	Pump part	Pump Gear Set	56201A-K			Solid steel billet, shaved teeth			
	Relief Valve	High Radius Relief Valve	10000-02K			10/Bag			
	Spacer	Crankshaft Spacer	56000-CS6			6-Bolt			
	Spacer	Crankshaft Spacer	56000-CS8			8-Bolt			
Tools	Tool	Tool Kit	56219-04K			For 56219-03K sleeve installation, includes 1 sleeve		Requires Machining	
	Tool	Tool Kit	56219-06K			For 56219-05K sleeve installation, includes 1 sleeve			
	Tool	Tool Kit	56361-TL			For shift lever case bore repair sleeve kit 56361-01K			
	Tool	Drill Jig	56600-DJ			To aid in removal of inner races			
	Tool	Tool Kit	56833-TL			For oversized modulator valve kit 56833-01K			
	Tool	Tool Kit	56947-TL			For oversized pressure regulator & boost valve kit 56947-06K			

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● Pressure Problems	● Tool
● Shift Concerns	● High Performance
● Common/Repeat Failures	



	Vehicle Complaints/Part Type	Product Name	Part Number		Illustration Number	4R44E	5R44E	4R55E	5R55E	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
TCC/ Lockup	No TCC apply, Code 1741, Low cooler flow, Poor converter fill/delayed engagements	TCC Modulator Sleeve Kit	37947-07K		11	Y	Y	Y	Y			37947-TL5	
	Converter apply issues, High TCC slip, Codes 628 or 1741, TCC surge/cycle	TCC Regulator Sleeve Kit	37947-09K		10	Y	Y	Y	Y			37947-TL9	
	Converter apply issues, Scratched/Damaged TCC regulator valve	TCC Regulator Valve	37947-38		9	Y	Y	Y	Y	OEM size			
	Low TCC apply pressure due to relaxed/damaged spring	TCC Regulator Valve Spring Kit	37947-46K		8	Y	Y	Y	Y	5 Inner & outer sets, OEM rating			
Pressure Problems	Delayed engagements due to poor converter fill, Soft shifts, Delayed reverse	Pressure Regulator Sleeve Kit	37947-05K		3	Y	Y	Y	Y			37947-TL5	
	High/Low line pressure, Low cooler flow at idle, Overheat conditions	Boost Valve & Sleeve Kit	37947-01K		5	Y	Y	Y	Y	OEM ratio			
		Boost Valve & Sleeve Kit	37947-03K		5	Y	Y	Y	Y	Increased ratio			
	Low EPC pressure, Flare upshifts, TCC slippage, Code 741, Low maximum line	EPC & TCC Relief Valve Kit	37947-40K		1	Y	Y	Y	Y			37947-TL40	
	Low baseline pressure	Elevated Pressure Main Pressure Regulator Spring	56947-17		4	Y	Y	Y	Y	20/Bag			
Shift Concerns	Poor shift quality, Delayed forward, No reverse, Low EPC pressure	EPC & Engagement Control Kit	37947-11K		6	Y	Y	Y	Y			37947-TL11	
	4R: No 4th, 5R: No 2nd/5th, No engine breaking in D-3 to low, No coast clutch apply	Oversized Coast Clutch Valve Kit	37947-33K		7	Y	Y	Y	Y			37947-TL33	
	Shift complaints, Pressure problems, Trouble codes	Baseline Rebuilding Kit	37947-EZ		12	Y	Y	Y	Y				
	Loss of 3rd or 4th hot	End Plug Kit	37947-13K		2	Y	Y	Y	Y				
	Delayed reverse, 2-3 Flare	Center Support/Direct Drum Sleeve	56219-02K			Y	Y						
	Delayed forward, Burned forward clutch, Damaged support	Center Support/Forward Clutch Sleeve	56219-03K			Y	Y			Bushing style supports only		56219-04K* Req. Machining	
Common or Repeat Failures	Overrun clutch spring failure	Center Support/Overdrive Shaft Sleeve Kit	56219-05K			Y	Y	Y	Y			56219-06K*	
	Sticking governor, Bronze in the pan, Sprag thrust washer failure, Damaged case	Low Sprag End Cap & Washer Kit	56250-01K			Y	Y						
		Low Sprag Inner Race	56600B			Y	Y			Late model		56000-DJ*	
		Low Sprag Update Kit	56600B-01K			Y	Y			Late model		56000-DJ*	
	Fluid leaks from manual shaft case seal	Shift Lever Case Bore Repair Sleeve Kit	56361-01K			Y	Y	Y	Y			56361-TL	
Other Products	Rear servo bore wear, Delayed forward	Reverse Servo Sleeve Kit	56532-01K			Y	Y	Y	Y			Requires Machining	
	Bearing	Center Support Thrust Bearing	56241			Y	Y	Y	Y				
	Bushing	Bell Housing Bushing	56001X			Y	Y	Y	Y	Finish-in-place, 5/bag		Requires Machining	
	Bushing	Front Stator Bushing	56000C-01			Y	Y	Y	Y				
	Planetary part	Pinion Needle Roller	56412-03			Y	Y			For .334" dia. pins, 102/bag			
	Planetary part	Pinion Pin	56412-02			Y	Y			.334" Dia., 6/bag			
	Planetary part	Pinion Washer	56412-04			Y	Y			For .334" dia. pins, 12/bag			
	Planetary part	Planetary Rebuild Kit	56412RK			Y	Y			For .334" dia. pins			
	Relief Valve	High Radius Relief Valve	10000-02K			Y	Y	Y	Y	10/Bag			
	Spacer	Crankshaft Spacer	56000-CS6			Y	Y	Y	Y	6-Bolt			
	Spacer	Crankshaft Spacer	56000-CS8			Y	Y	Y	Y	8-Bolt			
Tools	Tool	Tool Kit	37947-TL5			Y	Y	Y	Y	For sleeve kits 37947-05K & 37947-07K			
	Tool	Tool Kit	37947-TL9			Y	Y	Y	Y	For TCC regulator sleeve kit 37947-09K			
	Tool	Tool Kit	37947-TL11			Y	Y	Y	Y	For EPC & engagement control kit 37947-11K			
	Tool	Tool Kit	37947-TL33			Y	Y	Y	Y	For coast clutch valve kit 37947-33K			
	Tool	Tool Kit	37947-TL40			Y	Y	Y	Y	For EPC & TCC relief valve kit 37947-40K			
	Tool	Tool Kit	56361-TL			Y	Y	Y	Y	For shift lever case bore repair kit 56361-01K			
	Tool	Drill Jig	56600-DJ			Y	Y	Y	Y	To aid in removal of inner races			
	Tool	Tool Kit	56219-04K			Y	Y			For 56219-03K sleeve installation, includes 1 sleeve		Requires Machining	
	Tool	Tool Kit	56219-06K			Y	Y	Y	Y	For 56219-05K sleeve installation, includes 1 sleeve			

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● Shift Concerns	● High Performance
● Common/Repeat Failures	

	Vehicle Complaints/Part Type	Product Name	Part Number		Illustration Number	5R55N	5R55W	5R55S	Product/Application Details	Required Tool <i>(*Recommended Tool)</i>	Required Fixture
TCC/ Lockup	Excess TCC slip, Code 741, TCC lining comes off, Overheated converters	Oversized TCC Control Valve Kit	56947J-05K		1	Y	Y	Y		F-56947J-TL2	VB-FIX
	Excess TCC slip, Codes 741 & 1783, Transmission over temperature	TCC Modulator Valve & Sleeve Kit	56947J-15K		8	Y	Y	Y		F-56947J-TL15	VB-FIX
	High TCC slip RPM at increasing load, Slip codes, Elevated fluid temperature	TCC Modulator Sleeve & Plunger Kit	56947J-01K		7		Y	Y	OEM Ratio		
		TCC Modulator Sleeve & Plunger Kit	56947J-03K		7		Y	Y	Increased Ratio		
Pressure Problems	Pump noise, No movement until RPM increased, Low line pressure	Pump Flow Control Valve Assembly	56200-03K			Y	Y	Y	Drop-in replacement		
	Delayed engagements, High line pressure in reverse, Soft shifts	Pressure Regulator Sleeve Kit	56947J-09K		5		Y	Y		56947J-TL9	
	Slipping/loss of forward gears, Burned forward clutch	Forward Engagement Valve & Sleeve Kit	56947J-26K		6		Y	Y		F-27741-TL13	VB-FIX
	Line pressure concerns, Slipping upshifts, Low line pressure	VFS Modulator Control Valve & Sleeve Kit	56947J-19K		2		Y	Y	Two locations	F-56947J-TL19	VB-FIX
	Delayed reverse, Loss of 4th or 5th, Burned direct clutch	Reverse Modulator Valve & Sleeve Kit	56947J-23K		3		Y	Y		F-27741-TL13	VB-FIX
	Slipping/loss of reverse, Burned direct clutch, Delayed reverse	Reverse Engagement Valve & Sleeve Kit	56947J-29K		4		Y	Y		F-27741-TL13	VB-FIX
	Shift Concerns										
	1-2, 2-3, 4-5 Upshift flare or loss of gear	Overdrive & Intermediate Servo Pin Bore Sleeve Kit	56361J-01K			Y	Y	Y		S-56361J-TL	SERVO-FIX
Other Products	Bushing	Bell Housing Bushing	56001X			Y	Y	Y	Finish-in-place, 5/bag	Requires Machining	
	Solenoid Block	Reconditioned Solenoid Block	56954K				Y	Y	'02-'03		
	Solenoid Block	Reconditioned Solenoid Block	56954L				Y	Y	'04 & Later		
	Solenoid Block	Reconditioned Solenoid Block	56954N			Y			'99 & Later		
	Spring	4-3 Pre-Stroke Valve Spring	56947J-S1			Y					
	Spring	PCA Modulator Valve Spring	56947J-S2			Y			5/Bag		
	Spring	TCC Control Valve Spring	56947J-S3			Y	Y	Y	5/Bag		
	Spring	TCC Modulator Spring	56947J-S4			Y			5/Bag		
	Spring	TCC Back Pressure Spring	56947J-S5			Y			5/Bag		
	Spring	Forward Engagement Control Spring	56947J-S6			Y	Y	Y	5/Bag		
	Spring	Increased Pressure Main PR Spring	56947J-S7				Y	Y	5/Bag		
	Spring	Increased Pressure Main PR Spring	56947J-S8			Y			5/Bag		
Tools	Tool	Tool Kit	56947J-TL9				Y	Y	For pressure regulator sleeve kit 56947J-09K		
	Tool	Tool Kit	F-56947J-TL15			Y	Y	Y	For TCC modulator valve & sleeve kit 56947J-15K		VB-FIX
	Tool	Tool Kit	F-56947J-TL19				Y	Y	For VFS modulator control valve & sleeve kit 56947J-19K		VB-FIX
	Tool	Tool Kit	F-56947J-TL2			Y	Y	Y	For oversized TCC control valve kit 56947J-05K		VB-FIX
	Tool	Tool Kit	F-27741-TL13				Y	Y	For kits 56947J-26K, 56947J-23K & 56947J-29K		VB-FIX
	Tool	Tool Kit	S-56361J-TL			Y	Y	Y	For servo pin bore sleeve kit 56361J-01K		SERVO-FIX

Red Part Number = New in Vol. 8



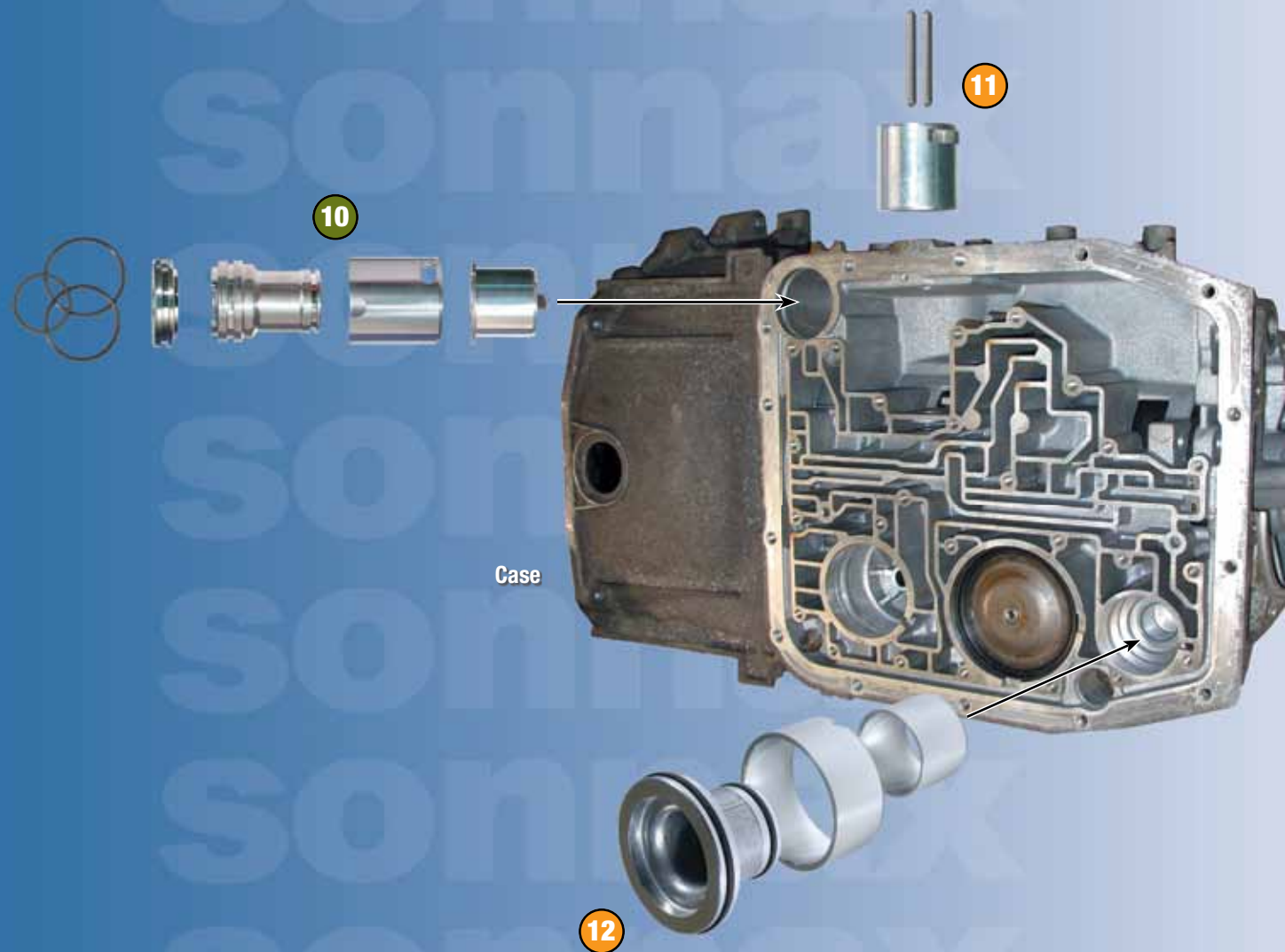
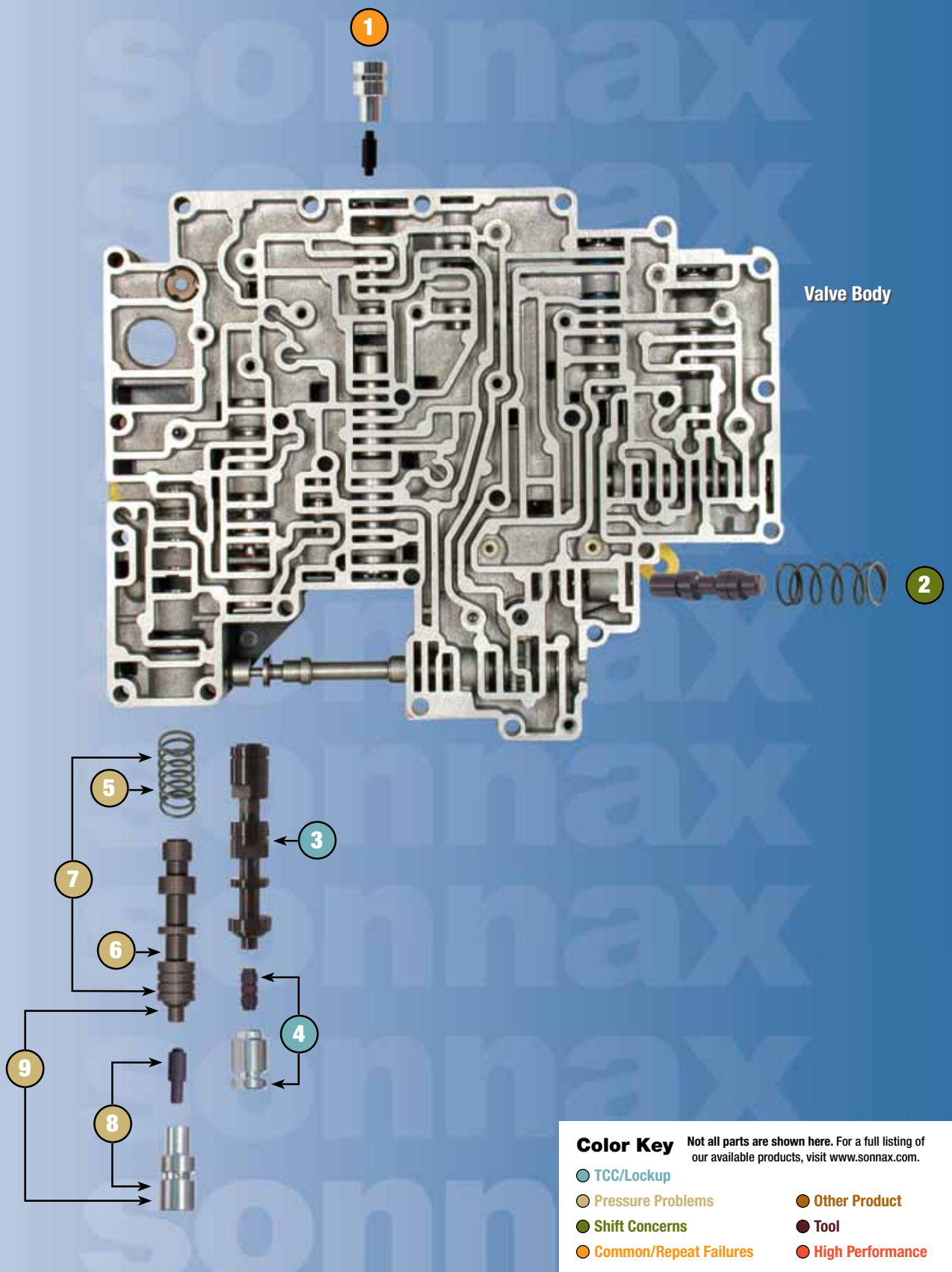
Color Key Not all parts are shown here. For a full listing of our available products, visit www.sonnax.com.

● TCC/Lockup	● Other Product
● Pressure Problems	● Tool
● Shift Concerns	● High Performance
● Common/Repeat Failures	

Vehicle Complaints/Part Type		Product Name	Part Number		Illustration Number	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
Shift Concerns	Pressure Problems								
	Insufficient line rise, Uncontrollable shift timing, Imbalance of TV pressure, Clutch/Band overhear	Throttle Valve Plug & Sleeve Kit	76989K		6	Includes O-Rings			
		Throttle Valve Plug & Sleeve Kit	76989-03K		6	"Factory" style			
	3-4 Tie-up, Forward clutch & overdrive band failure	"A" Servo Spring	76831-SP		12				
	Soft 1-2 & 2-3, Late/No upshifts	Oversized TV Control Valve & Plunger Valve Kit	76970-02K		5			76970-TL	
	Long slide shift into 2nd, Intermediate clutch overhear, Direct clutch failure	Oversized 1-2 Capacity Modulator Valve Kit	76991-01K		2			76991-TL	
Common or Repeat Failures	Erratic shift timing, Oil leakage, Loss of 4th, Late upshifts	Governor Circuit End Plug Kit	76999-04K		4	Mid '83-earlier			
		Governor Circuit End Plug Kit	76999-05K		3	Mid '83-later			
	Direct clutch failure, Insufficient line rise, Soft slide shifts, Delayed Reverse	Boost Valve & Sleeve Kit	76990K		1	OEM ratio, includes O-Rings			
		Boost Valve & Sleeve Kit	76990-03K		1	OEM ratio, "Factory" style			
	Overdrive band failure, 3-4 & 4-3 Shift concerns	Overdrive Servo Pin	76833		11	Includes washer & O-Ring			
	Fluid leaks from manual shaft case seal	Shift Lever Case Bore Repair Sleeve	56361-01K					56361-TL	
Other Products	Intermediate roller clutch/mechanical diode failure, OEM retaining ring falls off	Intermediate Clutch Spiral Retaining Ring Kit	76554RK						
	Restricted lube flow	Spiral Snap Ring	76811-01K		10	For direct drive shaft, 5/bag		†	
	Low line pressure in forward, Direct clutch failure	2-3 Accumulator Piston & Sleeve Kit	76890-21K						
	Burned overdrive band, 3-4 Flare, 3-4 Clutch failure	Servo Pin Bore Sleeve	76890-24K		13			S-76890-TL24	SERVO-FIX
	Accumulator part	1-2 Accumulator Piston	76927B-01			Molded rubber			
	Accumulator part	1-2 Accumulator Spring	76948-08			10/Bag			
Tools	Accumulator part	2-3 Accumulator Piston	76836A			Molded rubber			
	Bearing	Direct Clutch Outer Bearing	76427A						
	Bearing	Forward/Reverse Sun Gear Bearing	76425						
	Bearing	Torrington® Bearing Kit	SBK-F1						
	Bushing	Pump Bushing	36002-01			Finish-in-place		Requires Machining	
	End Plug	O-Ringed End Plug Kit	76999-LRG		9	Large			
	End Plug	O-Ringed End Plug Kit	76999-MED		8	Medium			
	End Plug	O-Ringed End Plug Kit	76999-SML		7	Small			
	Relief Valve	Low Radius Relief Valve	10000-01K			10/Bag			
	Tool	Tool Kit	56361-TL			For shift lever case bore repair sleeve 56361-01K			
	Tool	Tool Kit	S-76890-TL24			For servo pin bore sleeve 76890-24K			SERVO-FIX
	Tool	Tool Kit	76970-TL			For oversized TV control valve & plunger valve kit 76970-02K			
	Tool	Tool Kit	76991-TL			For oversized 1-2 capacity modulator valve kit 76991-01K			

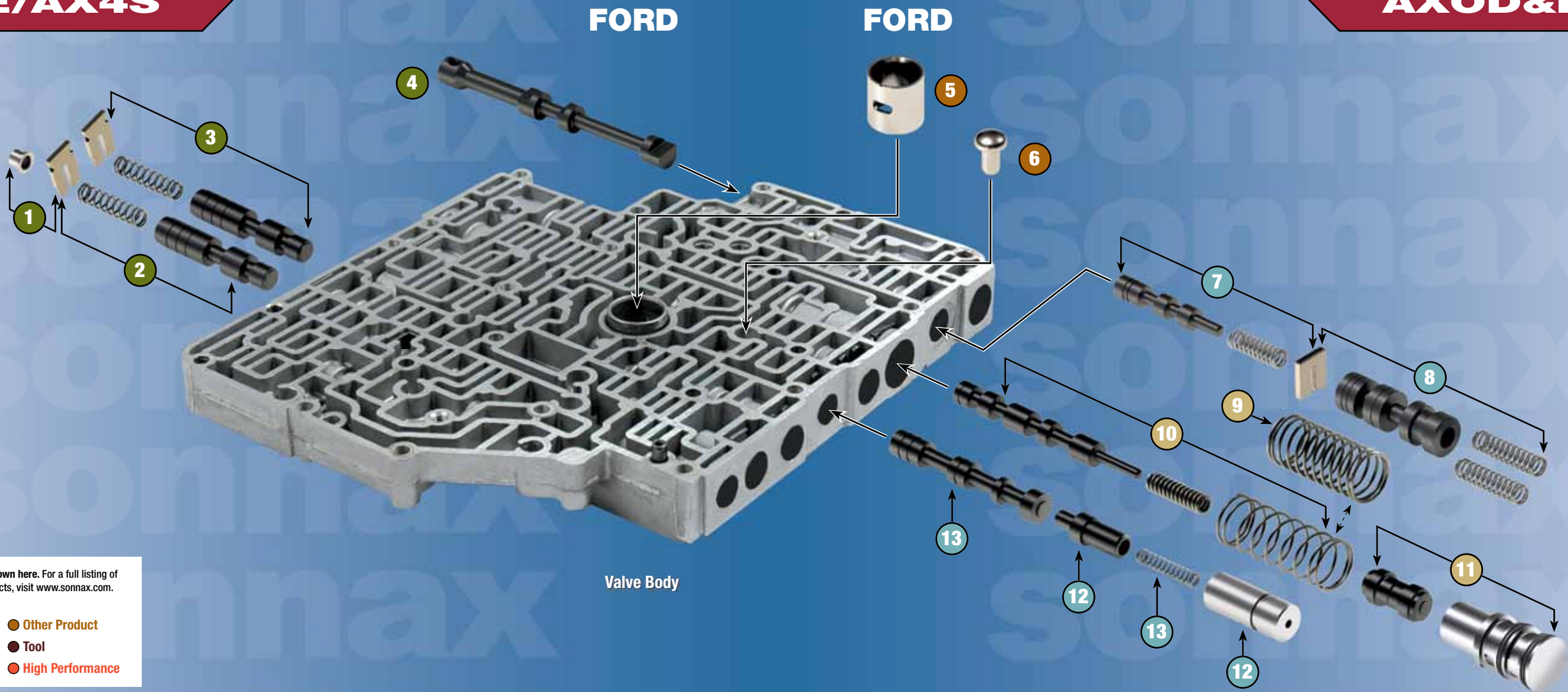
Performance Enhancement		Product Name	Part Number		Illustration Number	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
High Performance	-A- Valve Body							
	Increases line rise for HD/HP applications	Large Ratio Boost Valve Kit	76990-04K			"Factory" style		
	Maximum holding power with minimum harshness, Largest apply area of any AOD servo	Super Hold Servo Kit	76890-17KP			Purple anodized cover		
		Super Hold Servo Kit	76890-17K			Non-Anodized cover		
	Replacement part	Replacement Pin Kit	76890-15K			For super hold servo kits 76890-17K & 76890-17KP		
	Replacement part	Replacement Seal Kit	76890-17SK			For super hold servo kits 76890-17K & 76890-17KP		
	-D- Internal							
	Allows full throw without TV cable pop-out	TV Cable Corrector	AS1-01K			5/Bag		
	Corrected TV geometry for aftermarket carburetors	TV Cable Corrector Bracket	AS2-02K			For use with Holley carburetors		
		TV Cable Corrector Bracket	AS3-03K			For use with Edelbrock/Carter carburetors		

†Some early style shafts require machining.



	Vehicle Complaints/Part Type	Product Name	Part Number		Illustration Number	AODE	4R70W	4R75W	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
Pressure Problems	TCC/Lockup											
	Delayed/No lockup, Shudder condition, Codes 628, 741, 1741, Uncontrollable TCC	Bypass Clutch Control Sleeve & Plunger Valve Kit	76948-04K		4	Y	Y	Y				
	TCC Slip, Loss of lockup, Codes 628,741,1741,1744, Reduced cooler flow	Oversized Bypass Clutch Control Valve	76948-31		3	Y	Y	Y			76948-TL6	
	TCC apply & release problems, Cross leak of converter release oil	Stator Support Sleeve	76204-01			Y	Y	Y			Requires Machining	
	Low line rise, Throttle buzz, Delayed forward engagement, Clutch failures	Main Pressure Regulator Valve	76948-01		6	Y	Y		'91-'95			
		Main Pressure Regulator Valve	76948-09		6	Y	Y	Y	'96-Later			
	Low line rise, Throttle buzz, Delayed forward engagement, Clutch failures, Valve body wear at the pressure regulator bore	Oversized Pressure Regulator Valve & Boost Kit	76948-16K		9	Y	Y		'91-'95		†	VB-FIX
		Oversized Pressure Regulator Valve & Boost Kit	76948-17K		9	Y	Y	Y	'96-Later		†	VB-FIX
	Low baseline pressure	Elevated Pressure Regulator Spring	76948-06		5	Y	Y		'91-'95, 5/Bag			
		Elevated Pressure Regulator Spring & Valve Kit	76948-12K		7	Y	Y	Y	'96-Later			
	Poor reverse boost	Pressure Regulator Boost Valve & Sleeve Kit	76948-02K		8	Y	Y	Y				
	Shift Concerns											
	Delayed forward engagement, Harsh 1-2, Cases with worn 1-2 accumulator bores	1-2 Accumulator Sleeve Kit	76890-01K		10	Y	Y	Y			76890-TL*	
	Erratic shifting, 2-4 Neutral, Neutral after 4th, No 2nd, 2nd & Reverse only	Solenoid Regulator Valve Kit	76948-14K		2	Y	Y	Y			76948-BST2*	
Common or Repeat Failures	Burned overdrive band, Loss of 4th, 4-3 neutral	Overdrive Servo Regulator Valve Kit	76948-29K		1		Y	Y	'01-Later			
	Overdrive band/forward clutch failures	Overdrive Servo Pin	76833E			Y	Y	Y	Includes washer & O-Rings			
	Cross leaks at VB casting, Cracks in separator plate, Fwd/Direct clutch failures	Valve Body Retainer Plate	76507F-01K				Y	Y	'01-Later			
	Fluid leaks from manual shaft case seal	Shift Lever Case Bore Repair Sleeve	56361-01K		11	Y	Y	Y			56361-TL	
	Intermediate roller clutch/mechanical diode failure, OEM retaining ring falls off	Intermediate Clutch Spiral Retaining Ring Kit	76554RK			Y	Y	Y				
	Low line pressure in forward, Direct clutch failure, No forward until RPM increased	2-3 Accumulator Piston & Sleeve Kit	76890-21K		12	Y	Y	Y				
	Burned overdrive band, 3-4 flare, 3-4 clutch failure	Servo Pin Bore Sleeve	76890-24K			Y	Y	Y			S-76890-TL24	SERVO-FIX
Other Products	Valve Body Reconditioning Kit											
	Sure Cure® Kit	AODE ('95-Earlier) Sure Cure® Kit	SC-AODE			Y	Y		See page 154 for details.			
	Sure Cure® Kit	AODE ('96-Later) Sure Cure® Kit	SC-AODE-1			Y	Y	Y	See page 154 for details.			
	Accumulator part	1-2 Accumulator Piston	76927B-01			Y	Y	Y	Molded rubber			
	Accumulator part	2-3 Accumulator Piston	76836A			Y	Y	Y	Molded rubber			
	Bearing	Torrington® Bearing Kit	SBK-F2			Y			First design, '92-earlier			
	Bearing	Torrington® Bearing Kit	SBK-F6				Y		Second design, '92-'95			
	Bushing	Pump Bushing	36002-01			Y	Y	Y	Finish-in-place		Requires Machining	
	Solenoid	Solenoid	76919-01			Y	Y		Shift, dual pack, '92-'97			
	Solenoid	Solenoid	76925-01				Y	Y	Shift, dual pack, '98-later			
Tools	Solenoid	Solenoid	76922-01				Y	Y	TCC lockup, '98-later			
	Tool	Tool Kit	56361-TL			Y	Y	Y	For shift lever case bore repair sleeve 56361-01K			
	Tool	Tool Kit	76890-TL			Y	Y	Y	For 1-2 accumulator sleeve kit 76890-01K			
	Tool	Tool Kit	S-76890-TL24			Y	Y	Y	For servo pin bore sleeve 76890-24K			SERVO-FIX
	Tool	Bore Sizing Tool	76948-BST			Y	Y	Y	For oversized PR valve kits 76948-16K & 76948-17K			
	Tool	Bore Sizing Tool	76948-BST2			Y	Y	Y	For solenoid regulator valve kit 76948-14K			
	Tool	Tool Kit	76948-TL4			Y	Y	Y	For pressure regulator valve kits 76948-16K & 76948-17K			
	Tool	Tool Kit	76948-TL6			Y	Y	Y	For bypass clutch control valve 76948-31			
	Tool	Tool Kit	F-76948-TL			Y	Y	Y	For oversized PR valve kits 76948-16K & 76948-17K			VB-FIX

*F-76948-TL or 76948-TL4 required and 76948-BST Bore Sizing Tool recommended.



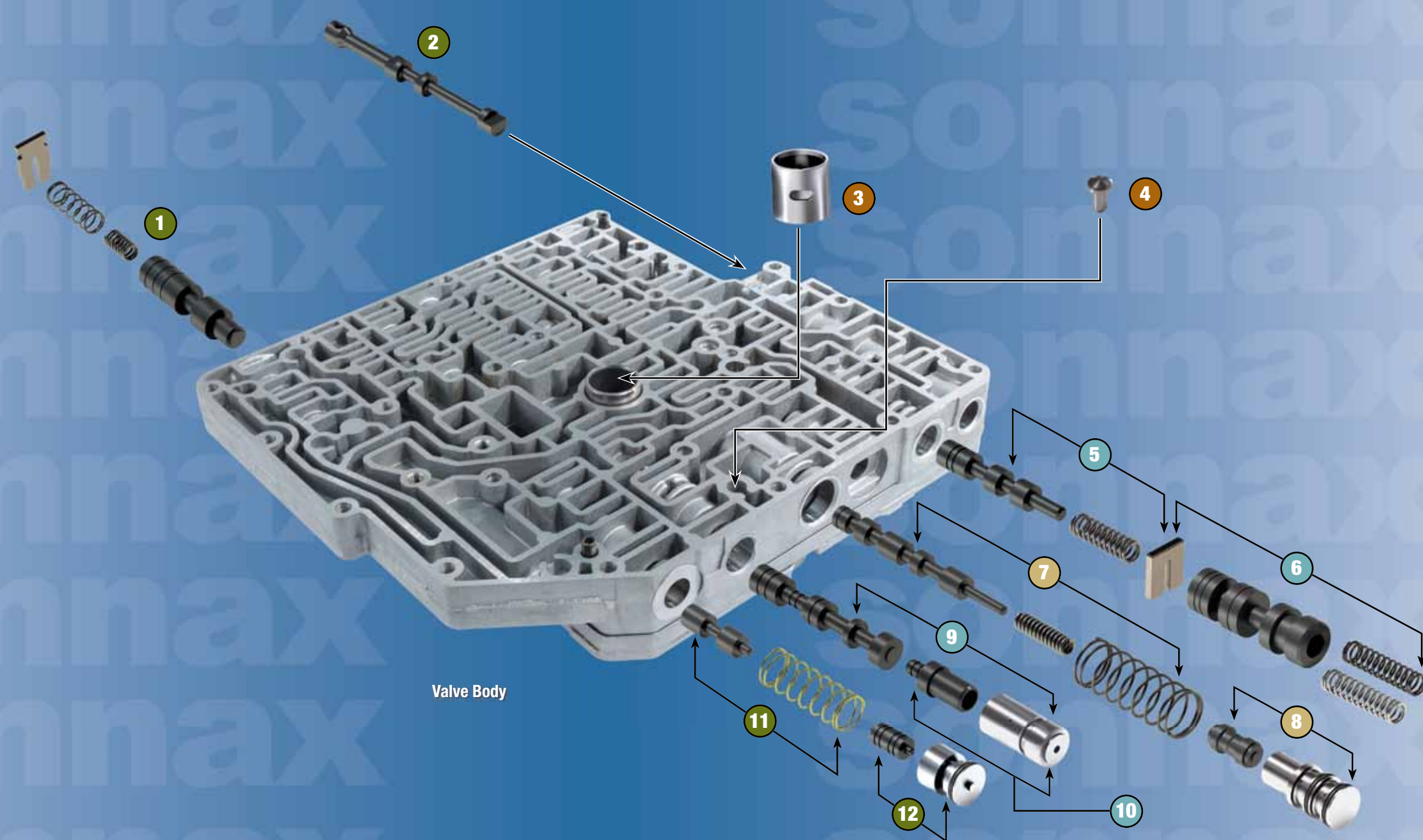
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● TCC/Lockup	● Other Product
● Pressure Problems	● Tool
● Shift Concerns	● High Performance
● Common/Repeat Failures	

	Vehicle Complaints/Part Type	Product Name	Part Number	Illustration Number	AXOD	AXODE & AX4S	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
TCC/Lockup	Excessive cooler circuit oil loss, No/Soft TCC apply, TCC Slip, Codes 628 & 741	Bypass TCC Control Valve & Sleeve Kit	96206-01K	12		Y			
	TCC apply & release control problems, Hydraulic-related converter codes	Oversized Bypass Clutch Control Valve Kit	96201-19K	13		Y		96201-TL	
	Delayed engagement, Flare upshifts, Converter slip codes and/or overheat	Oversized Converter Regulator Valve Kit	96201-23K	8		Y		F-96201-TL23 or 96201-TL3	VB-FIX
	No TCC Apply, Code 741,1741 or 1744, TCC cycle/surge	Oversized Solenoid Regulator Valve Kit	96201-21K	7		Y		96201-TL2	
	Code 628, TCC apply & release problems, Lube failures	Bypass Clutch Control Sleeve & Plunger Valve Kit	96201-06K		Y				
Pressure Problems	Flare 1-2 or 2-3 upshifts, Non-adjustable (high) throttle pressure, 2-1 Downshift clunk, Harsh reverse, Clutch & band failures	Boost Valve & Sleeve Kit	96201-01K	11	Y	Y	For all except 3.0 liter 12 valve, includes O-Rings		
		Boost Valve & Sleeve Kit	96201-12K	11	Y	Y	For 3.0 liter 12 valve, includes O-Rings		
		Boost Valve Sleeve Kit	96201-08K	11	Y	Y	For all except 3.0 liter 12 valve, "Factory" style		
		Boost Valve Sleeve Kit	96201-13K	11	Y	Y	For 3.0 liter 12 valve, "Factory" style		
	Line pressure instability, Pump noise, Pump rotor damage, Delayed engagements	Oversized Pressure Regulator Valve Kit	96206-10K	10		Y		96206-TL2	
Shift Concerns	Low baseline pressure	Elevated Pressure Main Pressure Regulator Spring	96201-28	9		Y	20/Bag		
	Delayed engagements, Flare shifts, Harsh shifts	Accumulator Bore Sleeve Kit	965123K		Y	Y	Master kit, includes accumulator bore sleeve kits 96511K, 96512K & 96513K		
		N-D Accumulator Bore Sleeve Kit	96511K		Y	Y			
		3-4 Accumulator Bore Sleeve Kit	96512K		Y	Y			
		1-2 Accumulator Bore Sleeve Kit	96513K		Y	Y			
	Loss of 4th	Servo Pin Bore Sleeve	96872-01K		Y	Y		S-96872-TL	SERVO-FIX

	Vehicle Complaints/Part Type	Product Name	Part Number		Illustration Number	AXOD	AXODE & AX4S	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
Shift Concerns	Delayed forward engagement, Burned forward clutch	Manual Valve	96201-05		4	Y	Y			
	Slip on 1-2, Loss of 2nd gear	1-2 Accumulator Pin	96706-01			Y	Y	4/Bag		
	No upshift, 3-2 Coast down neutral	Valve Saver Cap Kit	96201-15K		1		Y	For 3-2 timing valve		
	No/Slips forward/reverse, Shifts 1-2-3-2, Burned forward clutch, No 4th	Forward Control Valve Kit	96201-16K		3		Y		96201-BST*	
	No upshift, 3-2 Coast down neutral, 3-2 Slide bump	3-2 Shift Timing Valve Kit	96201-29K		2		Y		96201-BST29	
	No movement, Retaining ring comes loose/pops out	Ring Gear Retaining Ring	96730-RR			Y	Y			
	Common or Repeat Failures									
	Slips in all ranges, Loss of lube oil	Channel Plate Repair Sleeve	96803			Y	Y	5/Bag	Requires Machining	
	Worn driven sprocket bushing journal	Driven Shaft Support Bushing	96008-01			Y	Y			
	TV cable pops out, Valve cannot be set to full stroke	TV Cable Corrector	AS1-01K			Y		5/Bag		
	Valve Body Reconditioning Kit									
	Sure Cure® Kit	AXODE Sure Cure® Kit	SC-AXODE				Y	See page 155 for details.	96201-BST*	
Other Products	Bearing	Final Drive Carrier/Case	96420			Y	Y			
	Bearing	Forward Planetary Bearing	96003-01			Y	Y		96003-MTL*	
	Bearing	Pump Bearing	96855-01K			Y	Y	With integral seal, '99-earlier		
	Bearing	Torrington® Bearing Kit	SBK-F4			Y	Y			
	Bolt	Pan Bolt	96704-01			Y		8mm - 1.25 x 13mm, 100/bag		
	Bushing	Front Sun Gear Shell Bushing	96009-01			Y	Y	Upgraded		
	Check Ball	Check Ball	10000-10			Y	Y	.312" Dia., imidized plastic, 10/bag		
	Clutch Piston	Direct Clutch Piston	96940			Y	Y			
	Plug	Pump Shaft Plug	96855-04K			Y	Y			
	Pump	Pump Bearing	96077-01			Y	Y	Without seal		
	Pump part	Pump Cover	96200-01			Y	Y	Improved design, aluminum		
	Pump part	Pump Slide	96928-01			Y	Y			
	Pump part	Pump Slide Pin	96200-02			Y	Y	5/Bag		
	Pump part	Torrington® Pump Vane	96925			Y	Y	OEM		
	Relief Valve	Low Radius Relief Valve	10000-01K		6	Y	Y	10/Bag		
	Retainer	1-2 Capacity Modulator Valve Retainer	96201-10			Y	Y	10/Bag		
	Retainer	3-2 Timing Valve Retainer	96201-09			Y	Y	10/Bag		
	Retainer	Backout Valve Clip	96201-11			Y	Y	10/Bag		
	Servo part	Low/Intermediate Servo Piston	96728			Y	Y			
	Servo part	Low/Intermediate Servo Cushion Spring Retainer	96728-01			Y	Y			
	Servo part	Low/Intermediate Servo Spring	96995A			Y	Y			
	Servo part	Servo Tube Bracket	96806			Y	Y			
	Servo part	Spring Retaining Clip	96945R			Y	Y	5/Bag		
	Servo part	Servo Pin Kit	96945S			Y	Y			
	Shaft	Oil Pump Shaft	96855-02K			Y	Y	Patented design increases oil flow		
	Shaft	Stator Support Shaft	96849-01K			Y	Y	'03-Earlier		
	Sleeve	Pump Shaft Sleeve	96201-18		5	Y	Y	In valve body		
	Wire Harness	Wire Harness	96966B				Y	'93-Later, OEM F1DZ-7G276-C		
Tools	Tool	Bore Sizing Tool	96201-BST3			Y	Y	For OEM 1-2 modulator valve bore		
	Tool	Bore Sizing Tool	96201-BST				Y	For forward control valve kit 96201-16K		
	Tool	Bore Sizing Tool	96201-BST29				Y	For 3-2 shift timing valve kit 96201-29K		
	Tool	Installation Tool	96003-MTL			Y	Y	For planet bearing 96003-01		
	Tool	Tool Kit	96201-TL				Y	For oversized bypass clutch control valve kit 96201-19K		
	Tool	Tool Kit	96201-TL2				Y	For solenoid regulator valve kit 96201-21K		
	Tool	Tool Kit	96201-TL3				Y	For oversized converter regulator valve kit 96201-23K		
	Tool	Tool Kit	F-96201-TL23				Y	For oversized converter regulator valve kit 96201-23K		VB-FIX
	Tool	Tool Kit	96206-TL2				Y	For oversized pressure regulator valve kit 96206-10K		
	Tool	Tool Kit	S-96872-TL			Y	Y	For servo pin bore sleeve 96872-01K		SERVO-FIX

Red Part Number = New in Vol. 8



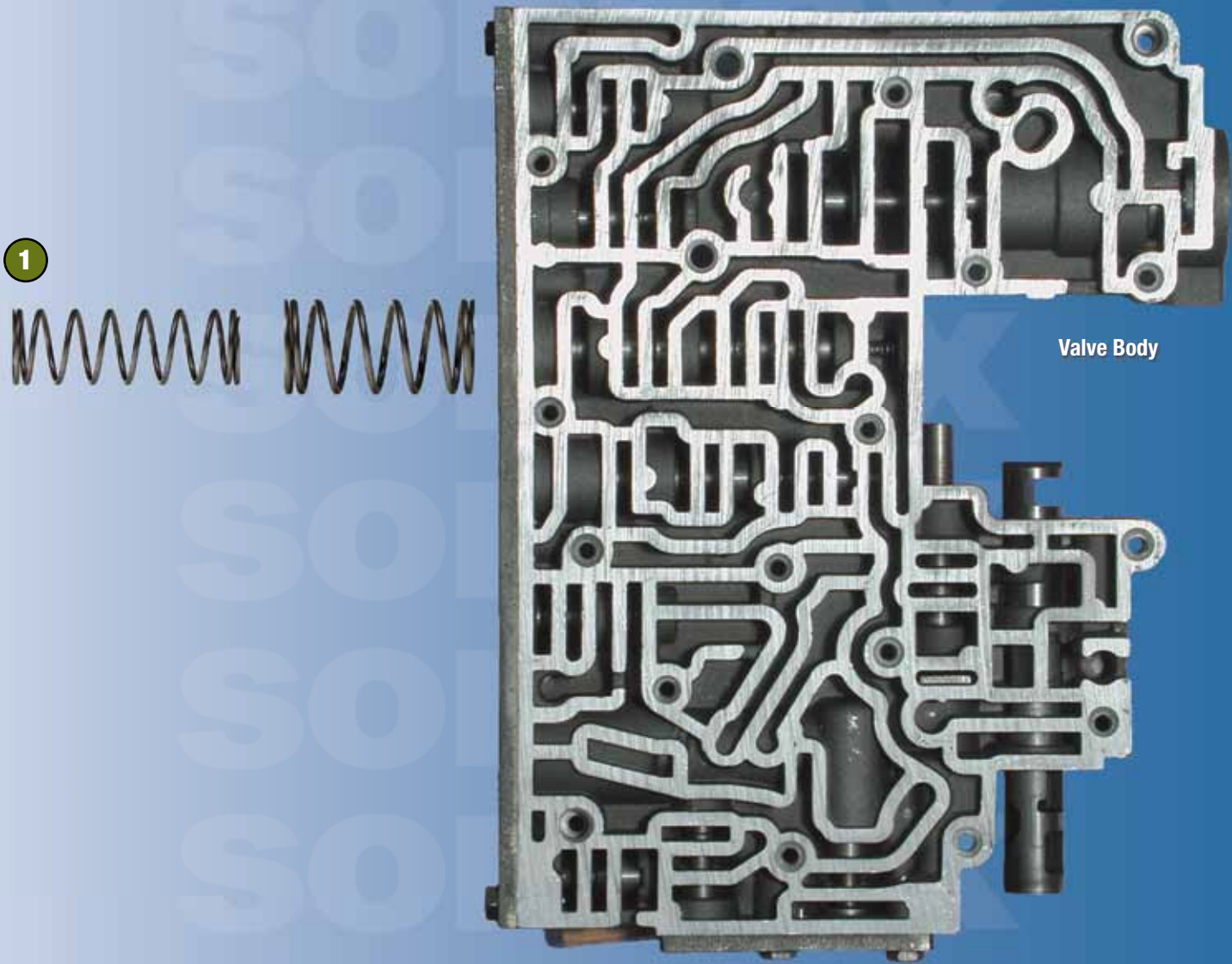
Valve Body

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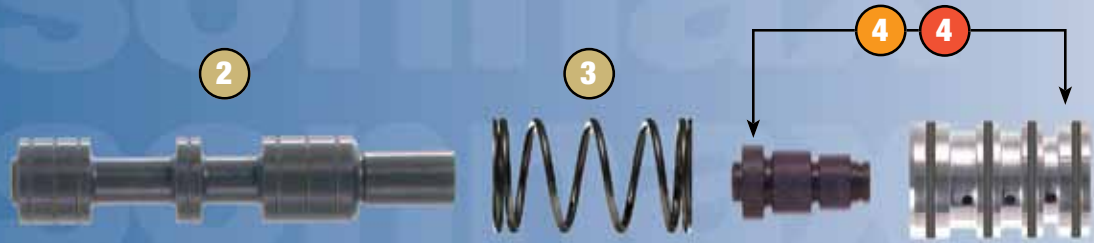
● TCC/Lockup	● Other Product
● Pressure Problems	● Tool
● Shift Concerns	● High Performance
● Common/Repeat Failures	

	Vehicle Complaints/Part Type	Product Name	Part Number		Illustration Number	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
TCC/Lockup	No TCC apply, Code 741, 1741 or 1744, TCC cycle/surge, Lube system failures	Bypass Clutch Control Sleeve & Plunger Kit	96206-03K		10	.486" Spool dia.		
		Bypass Clutch Control Sleeve & Plunger Kit	96206-13K		10	.496" Spool dia.		
	TCC apply & release control problems, Code 741, 1741 or 1744	Oversized Bypass Clutch Control Valve Kit	96206-05K		9		96206-TL	
	Delayed engagement, Flare upshifts, Converter slip codes and/or overheat	Oversized Converter Regulator Valve Kit	96201-23K		6		96201-TL3 or F-96201-TL23	VB-FIX
	No TCC apply, Code 741,1741 or 1744, TCC cycle/surge	Oversized Solenoid Regulator Valve Kit	96201-21K		5		96201-TL2	
Pressure Problems		Boost Valve & Sleeve Kit	96201-01K		8	All except 3.0 liter 12 valve, includes O-Rings		
		Boost Valve & Sleeve Kit	96201-12K		8	3.0 Liter 12 valve, includes O-Rings		
	Flare 1-2 or 2-3 upshifts, Non-adjustable (high) throttle pressure, 2-1 Downshift clunk, Harsh reverse, Clutch & band failures	Boost Valve & Sleeve Kit	96201-08K		8	All except 3.0 liter 12 valve, "Factory" Style		
		Boost Valve & Sleeve Kit	96201-13K		8	3.0 Liter 12 valve, "Factory" Style		
	Line pressure instability, Pump noise, Pump rotor damage, Delayed engagements	Oversized Pressure Regulator Valve Kit	96206-10K		7			
Shift Concerns	Low Baseline Pressure	Elevated Pressure Main Pressure Regulator Spring	96201-28			20/Bag		
	Harsh shifts, Harsh 1-2, Soft shifts	Oversized Accumulator Pressure Control Valve Kit	36948-20K		11	'97-Earlier	36948-TL	
	No forward, No 4th, Neutral condition after obtaining 4th	Forward Control Valve Kit	96206-07K		1		96206-BST*	
	Soft 1-2 and/or 2-3, Intermittent harsh shifts	Line Pressure Modulator Valve & Sleeve Kit	96948-01K		12	'97-Earlier		
	Delayed forward engagement, Burned forward clutch	Manual Valve	96201-05		2			
	Loss of 4th	3-4 Accumulator Bore Sleeve Kit	96512K					
		Servo Pin Bore Sleeve	96872-01K				S-96872-TL	SERVO-FIX
	Slip on 1-2, Loss of 2nd	1-2 Accumulator Pin	96706-01			4/Bag		
	Common or Repeat Failures							
	Slips in all ranges, Loss of lube oil	Channel Plate Repair Sleeve	96803			5/Bag	Requires Machining	
Valve Body Reconditioning Kit	Worn driven sprocket bushing journal	Driven Shaft Support Bushing	96008-01					
	Sure Cure® Kit	AX4N Sure Cure® Kit	SC-AX4N			See page 155 for details.	†	
Other Products	Bearing	Rear Sun Gear Bearing & Race Assembly	96423			Includes race assembly		
	Bearing	Forward Planetary Bearing	96003-01				96003-MTL*	
	Bearing	Pump Bearing	96419-01			'00-Later		
	Bearing	Pump Bearing	96855-01K			With integral seal, '99-earlier		
	Pump part	Pump Slide Pin	96200-02			5/Bag		
	Pump part	Torrington® Pump Vane	96925			Torrington® OEM		
	Relief Valve	Low Radius Relief Valve	10000-01K		4			
	Shaft	Stator Support Shaft	96849-01K			'03-Earlier		
	Shaft	Stator Support Shaft	96849-02K			'04-Later		
	Shaft	Oil Pump Shaft	96855-02K			Upgraded		
Tools	Sleeve	Pump Shaft Sleeve	96201-18		3			
	Tool	Tool Kit	36948-TL			For oversized accumulator pressure control valve kit 36948-20K		
	Tool	Installation Tool	96003-MTL			Recommended for planet bearing 96003-01		
	Tool	Tool Kit	96201-TL2			For oversized solenoid regulator valve kit 96201-21K		
	Tool	Tool Kit	96201-TL3			For oversized converter regulator valve kit 96201-23K		
	Tool	Bore Sizing Tool	96206-BST			For forward clutch control valve kit 96206-07K		
	Tool	Tool Kit	96206-TL			For oversized bypass clutch control valve kit 96206-05K		
	Tool	Tool Kit	96206-TL2			For oversized pressure regulator valve kit 96206-10K		
	Tool	Tool Kit	F-96201-TL23			For oversized converter regulator valve kit 96201-23K		VB-FIX
	Tool	Tool Kit	S-96872-TL			For servo pin bore sleeve 96872-01K		SERVO-FIX

† 96206-TL, 96206-BST,96201-TL2, 96201-TL3



Valve Body



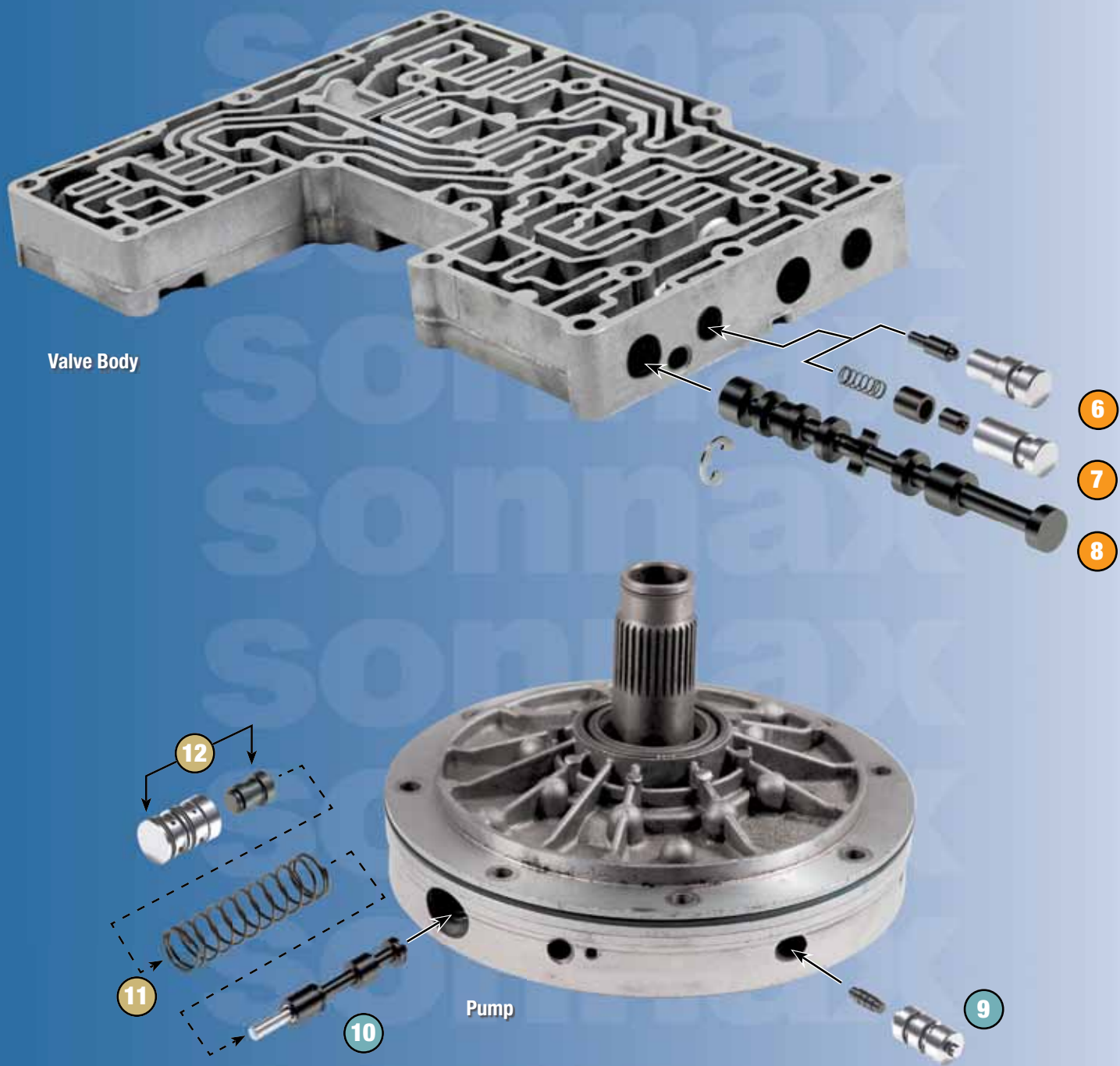
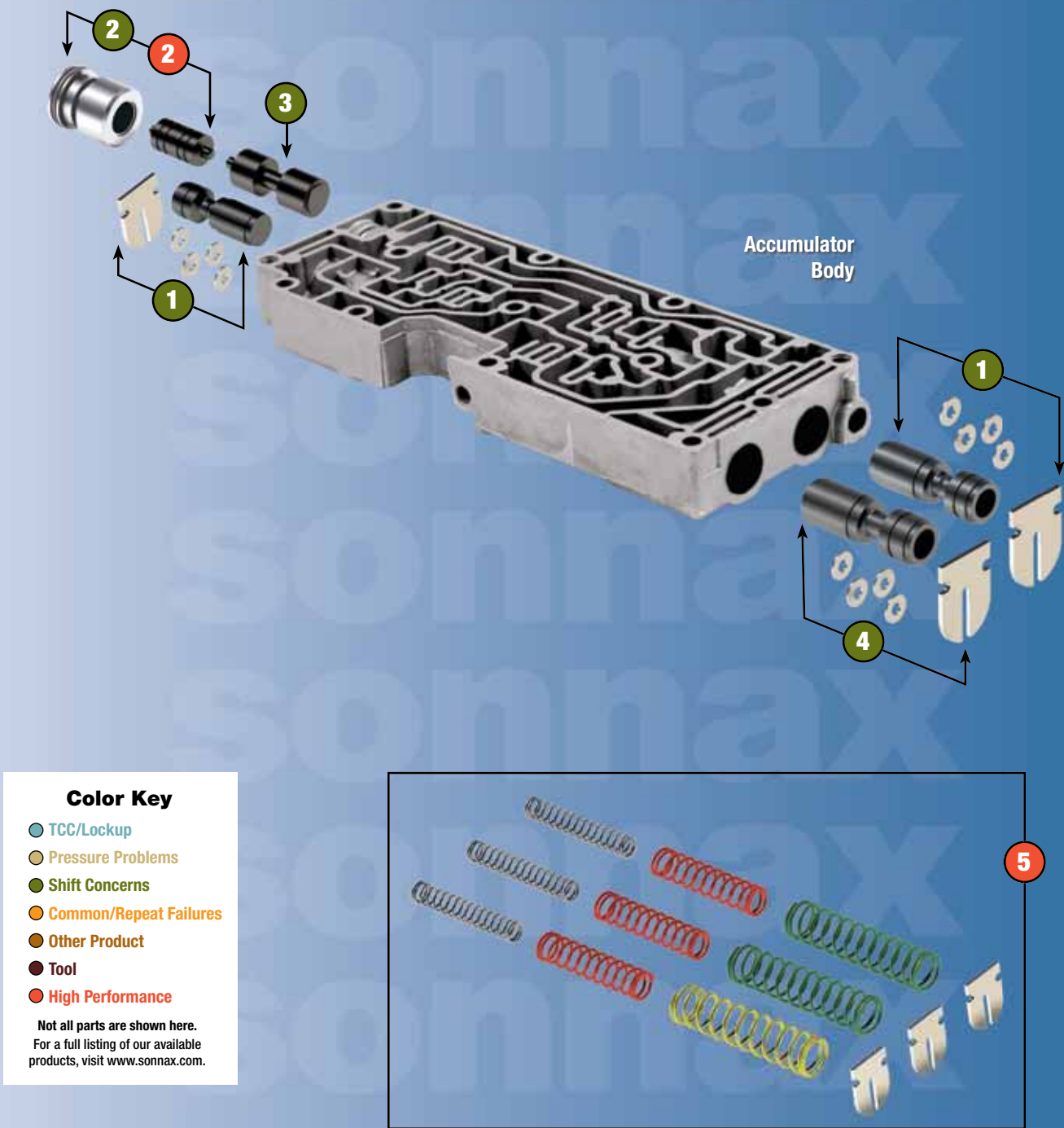
Color Key Not all parts are shown here. For a full listing of our available products, visit www.sonnax.com.

● TCC/Lockup	● Other Product
● Pressure Problems	● Tool
● Shift Concerns	● High Performance
● Common/Repeat Failures	

Vehicle Complaints/Part Type		Product Name	Part Number		Illustration Number	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
Common or Repeat Failures	Pressure Problems								
	Erratic line pressure, Reverse chatter/slip, 2-4 Flare, PR valve buzz	Oversized Pressure Regulator Valve Kit	36946-10K		2			36946-TL	
	Low baseline pressure	Elevated Pressure Main PR Spring	36946-13		3	2WD, non-diesel			
	Shift Concerns								
	Harsh 1-2, Long slide 1-2, Burned band, Broken accumulator spring	1-2 Accumulator Spring Kit	36946-05K		1	5 Inner springs, 5 outer springs			
	Direct clutch failure, Poor line rise, Reverse shudder	Reverse Boost Valve & Sleeve Kit	36946-01K		4	Includes O-Ring, gas ratio	Y		
		Reverse Boost Valve & Sleeve Kit	36946-02K		4	Includes O-Ring, diesel ratio			
		Reverse Boost Valve & Sleeve Kit	36946-03K		4	"Factory" style, diesel ratio			
		Reverse Boost Valve & Sleeve Kit	36946-04K		4	"Factory" style, gas ratio			
	Rear case bushing spun out, Case damaged	Oversized One-Piece Rear Case Bushing	36008A		9	Early style, no groove to back, 4/bag		†	T36605-04
		One-Piece Rear Case Bushing	36008B		9	Early style, no groove to back, 4/bag		T36008A*	
Other Products	Driveline slack, Engagement noise	Sunshell Saver Shim	36414-01K				Y		
	Damaged/Excessively worn forward planetary bushing journal	Forward Planetary Repair Sleeve	36440-01					Requires Machining	
	Bearing	Rear Sun Gear Bearing & Race Assembly	96423			With race assembly			
	Bearing	Torrington® Bearing Kit	SBK-F7						
	Bolt	Pan Bolt	26341-01			Also fits C4, 100/bag			
	Bushing	Pump Bushing	36002-01			Finish-in-place		Requires Machining	
	Pan	Oil Pan	36950-01		7	Heavy gauge, 25% thicker than OEM	Y		
	Race	Low Sprag Inner Race	36429E			1.013" Thick, late style			
	Race	Low Sprag Race & Bearing Kit	36429E-K		8	Includes OEM bearing			
	Shim	Reverse Planetary Endplay Shim	36428A-Z			4 Slot, .010" thick, 10/bag			
Tools	Tool	Installation Tool	T36008A			For bushing 36008A or 36008B			
	Tool	Reamer	T36605-03			For bushing 36008A			T36605-04
	Tool	Reamer Fixture	T36605-04			For bushing 36008A		T36605-03	

† T36605-03 & T36605-04 required, T36008A recommended.

Performance Enhancement		Product Name	Part Number		Illustration Number	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
High Performance	-A- Valve Body							
	Increases line pressure	Boost Valve Kit	36941-01K		4	"Clicker" type valve body		
	Firmer shifts, More holding power, Stronger than OEM	Servo Apply Lever	36916E		5	For OEM E Ratio (1.85)		
		Servo Apply Lever	36916FF		6	For special FF Ratio (2.82)		
	Over 9 sq. inches of apply surface for superior hold & firmer shifts	"R" Code Servo Kit	K36528R			R Ratio		
		Replacement Seal Kit	K36528R-SK			Replacement seal kit for R ratio servo piston kit K36528R		
	Wider than OEM, Maximum holding power	Alto Extra Wide Band	S026968		10	Red material, '66-later		
		Alto Extra Wide Band	S026968K		11	Kevlar® material, '66-later		



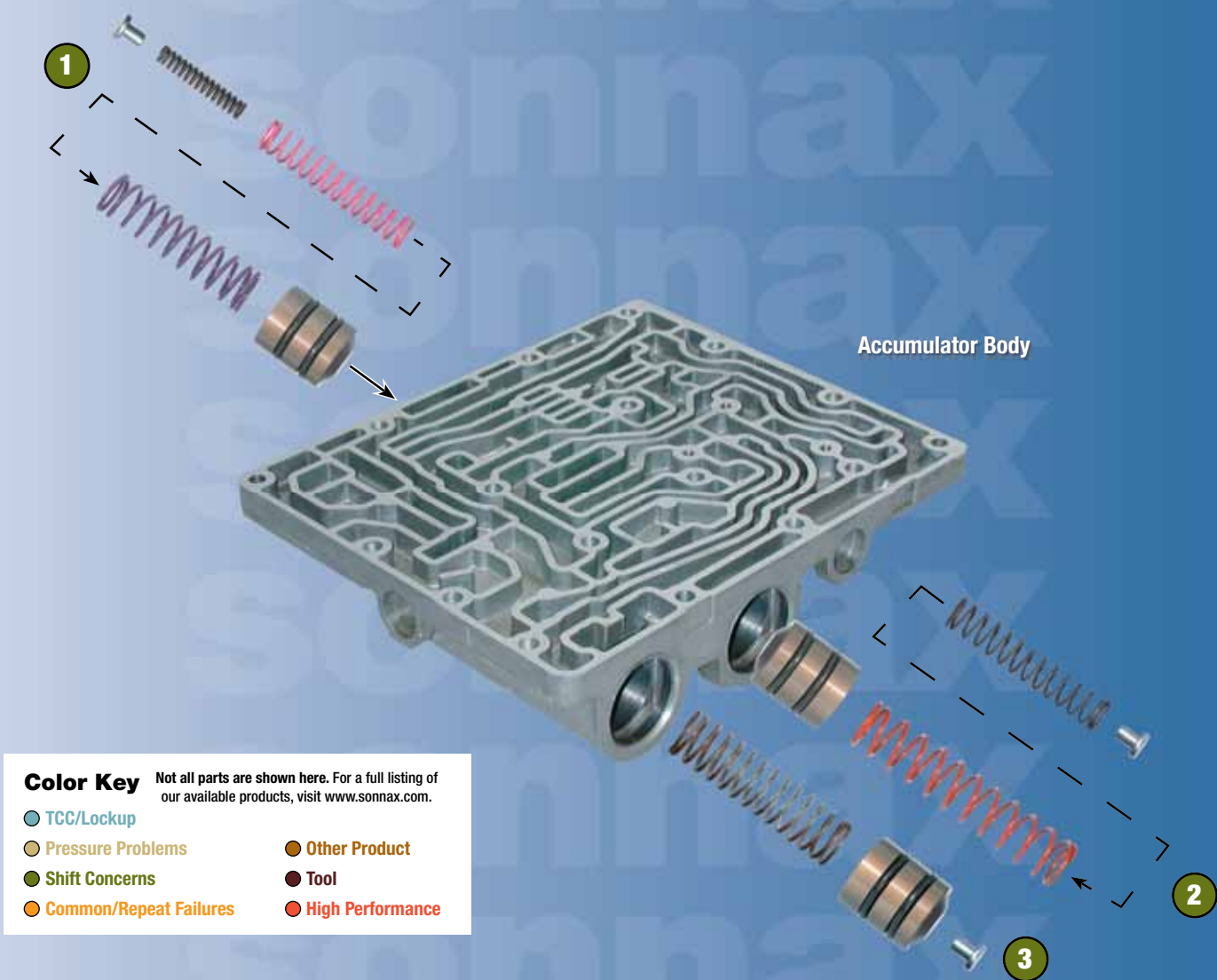
Vehicle Complaints/Part Type		Product Name	Part Number	Illustration Number	E4OD	4R100	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
TCC/ Lockup	Converter overheat, Code 62, 628 or 1744, High line pressure, Engine stumble/stall on reverse engagement	Line-To-Lube Pressure Regulator Valve	36424-04K	10	Y	Y	PWM 4R100 applications only	Y		
	Lockup shudder, TCC cycling, Visible wear in sleeve	TCC Control Sleeve Assembly	36424-08K	9		Y				
	TCC slippage, Soft apply, Codes 1741 & 1744, Low cooler flow, Overheated converter	Cooler Bypass Valve Kit	36605-02K		Y	Y		Y		

Vehicle Complaints/Part Type		Product Name	Part Number		Illustration Number	E40D	4R100	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
Pressure Problems	Poor line rise, Soft shifts, Delayed reverse	Boost Valve & Sleeve Kit	36424-01K		12	Y	Y	Includes O-Rings			
		Boost Valve & Sleeve Kit	36424-03K		12	Y	Y	"Factory" style			
	Low pressure, Excessive pump noise, Code 62, 628 or 1744, Damaged pump gears	Pump Gear Set	36438A			Y	Y	OEM Style, '95-later, F5/F8 pumps	Y		
		Pump Gear Set	36438AX-01K			Y	Y	Oversized, '95-later, F5/F8 pumps	Y	Requires Machining	
Shift Concerns	Low baseline pressure	Elevated Pressure Main PR Spring	36424-10		11	Y	Y	20/Bag	Y		
	Soft 1-2 or 2-3, Intermittent harsh shift, Low EPC pressure, Poor line rise	Line Pressure Modulator Plunger & Sleeve Kit	36948-03K		2	Y	Y	6 Cylinder/Small 8 cylinder, .331" dia.			
		Line Pressure Modulator Plunger & Sleeve Kit	36948-05K		2	Y	Y	8 Cylinder, .372" dia.			
	Harsh shift complaints, Harsh 1-2, Soft shifts	Oversized Accumulator Pressure Control Valve	36948-19		3	Y	Y			36948-TL	
	Loss 2nd, Soft shifts, Premature clutch failure	1-2 Accumulator Control Valve Kit	36948-13K		1	Y	Y			36948-12*	
	Loss of 3rd or 4th, Soft shifts, Premature clutch failure	2-3 & 3-4 Accumulator Control Valve Kit	36948-09K		4	Y	Y			36948-12*	
Common or Repeat Failures	Spun-out rear case bushing, Case damaged	Oversized One-Piece Rear Case Bushing	36008A			Y		Early style: no groove to back, 4/bag	Y	†	
		Oversized One-Piece Rear Case Bushing	36008C			Y	Y	Late style: one groove to back, 4/bag	Y	†	
	Rear case bushing failure/premature wear	One-Piece Rear Case Bushing	36008B			Y		Early style: no groove to back, 4/bag	Y	T36008A*	
		One-Piece Rear Case Bushing	36008D			Y	Y	Late style: one groove to back, 4/bag	Y	T36008A*	
	Overdrive planetary failure	Front Lube/Drainback Valve Kit	36425-01K			Y	Y	Melt-proof aluminum			
	Damaged/Excessively worn front planetary bushing journal	Forward Planetary Repair Sleeve	36440-01			Y				Requires Machining	
	Cross leaks caused by case deflection	Center Support Shim	36743-01			Y	Y	10/Bag	Y		
	Input drum wear at the center support, Excessive wear of center support & case lug contact points	Support Ring	36743-02			Y	Y		Y	Requires Machining	
	Forward clutch failure, Poor lube oil flow	Center Support Gasket	36743G			Y	Y	Printed silicone bead, 5/bag			
	Burnt/Failed intermediate/direct clutches, No 2nd, Soft 1-2, Slip 2-3 or 3-2	Center Support Seal Kit	36424-24K			Y	Y		Y		
	Overdrive piston retaining ring pops out of groove, E40D loosens overdrive, 4R100 catastrophic failure	Sure Lock™ Overdrive Spiral Snap Ring	36744-01			Y	Y				
	Low/Reverse clutch distress, Low clutch pressure, Loss of engine braking in D1	Low/Reverse Modulator Valve Plunger & Sleeve Kit	36947-06K		6	Y	Y	OEM ratio, '96-later			
		Heavy Duty Low/Reverse Modulator Sleeve Kit	36947-09K		7	Y	Y	Higher ratio than OEM, '96-later			
	Low/Reverse clutch failure, Delayed/Slipping reverse	Oversized Manual Valve Kit	36947-13K		8	Y	Y			F-36947-TL13	VB-FIX
	Valve Body Reconditioning Kit										
	Sure Cure® Kit	4R100 Sure Cure® Kit	SC-4R100HD			Y	Y	Includes several HD/HP upgrades. See page 154 for details.	Y	36948-12* & T36008A*	
	Sure Cure® Kit	E40D Sure Cure® Kit	SC-E40D			Y	Y	Restores OEM quality shifts. See page 155 for details.		36948-12* & T36008A*	
Other Products	Bearing	Rear Sun Gear Bearing & Race Assembly	96423			Y					
	Bearing	Center Support Ball Bearing	96423-01			Y	Y	'95-Later			
	Bearing	Center Support Ball Bearing	R16			Y	Y	1.000" x 2.000" x .375"			
	Bearing	Torrington® Bearing Kit	SBK-F5			Y					
	Bushing	Output Shaft Pilot Bushing	56008			Y					
	Bushing	Pump Bushing	36002-01			Y		Finish-in-place		Requires Machining	
	Clutch Piston	Forward Clutch Piston	36434A			Y	Y				
	Hub	Center Support Hub	36743H			Y		Bored for R16 bearing, taper to press fit			
	Hub	Center Support Hub & Bearing	36743H-01			Y	Y	'95-Later			
	Race	Low Sprag Inner Race	36429E			Y		1.013" Thick, late style			
	Shim	Rear Planet Endplay Shim	36402-Z			Y	Y	10/Bag			
Tools	Tool	Bore Sizing Tool	36948-12			Y	Y	For kits 36948-09K & 36948-13K			
	Tool	Tool Kit	36948-TL			Y	Y	For pressure control valve 36948-19			
	Tool	Tool Kit	F-36947-TL13			Y	Y	For oversized manual valve kit 36947-13K			VB-FIX
	Tool	Installation Tool	T36008A			Y	Y	For rear case bushings 36008A, 36008B, 36008C & 36008D			
	Tool	Reamer	T36605-03			Y	Y	For rear case bushings 36008A & 36008C			
	Tool	Reamer Fixture	T36605-04			Y	Y	For oversized bushing reamer T36605-03			

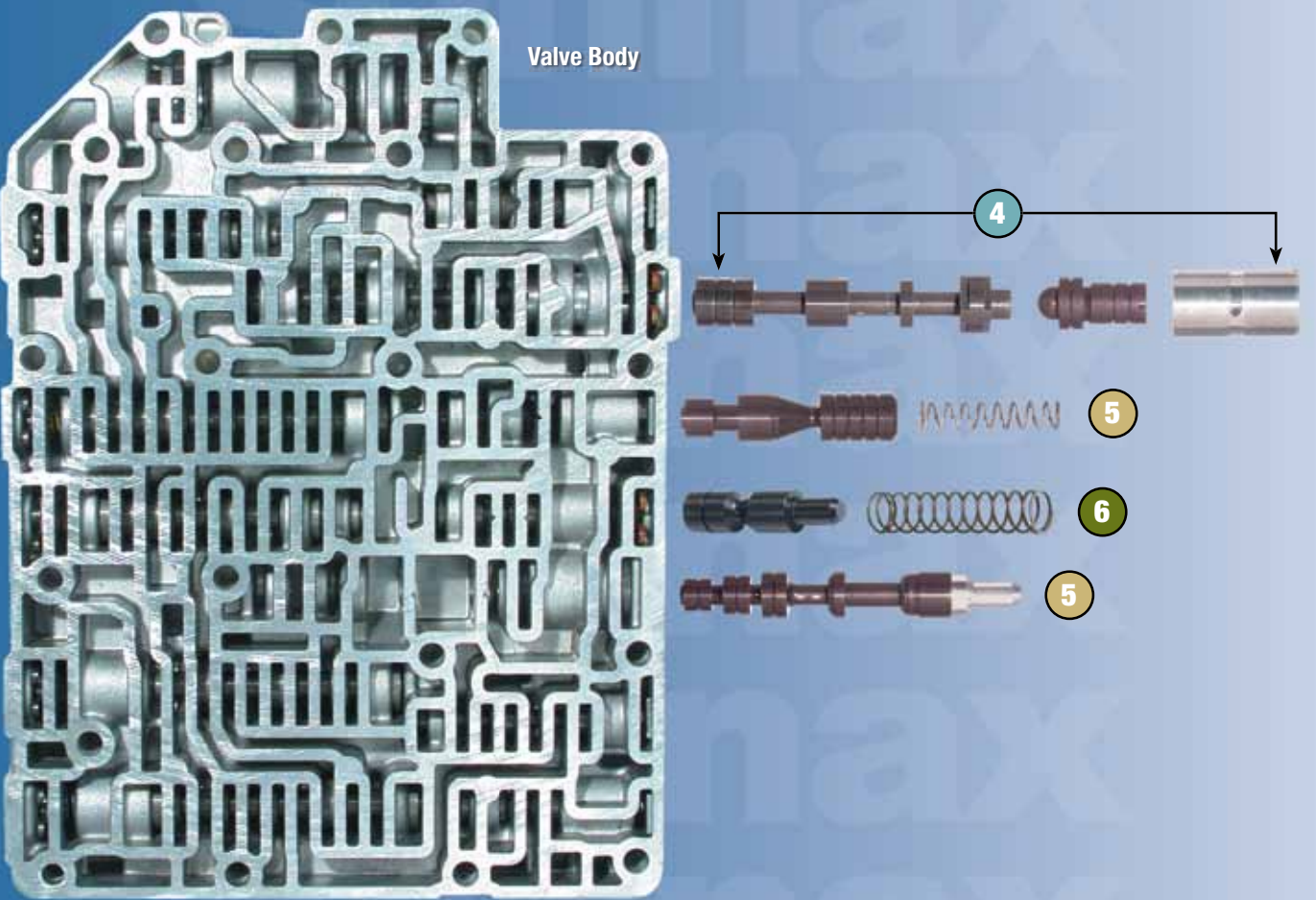
Vehicle Complaints/Part Type		Product Name	Part Number		Illustration Number	E40D	4R100	Product/Application Details		Required Tool (*Recommended Tool)	Required Fixture
High Performance	-A-	-A- Valve Body									
		Significantly firmer shifts at any gear	Line Pressure Modulator Plunger & Sleeve Kit	96948-01K		2	Y	Y	Heavy duty, .427" dia.		
			Line Pressure Modulator Plunger & Sleeve Kit	96948-05K		2	Y	Y	Extreme heavy duty, .500" dia.		
		Aggressive shifts	Performance Rated Accumulator Spring Kit	36948-18K		5	Y	Y	"Tri-Cumulator" springs		

Red Part Number = New in Vol. 8

† T36605-03 & T36605-04 required, T36008A recommended



	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
	TCC/Lockup					
	Code 628, 1740 or 1744, TCC slip/no lockup, Low converter charge	Bypass Clutch Control Kit Master Clutch Control & PR Valve Kit – Includes kits 73840-RK & 73840-BK	73840-BK 73840-MK	4 4 & 5	73840-BTL 73840-MTL†	
	Pressure Problems					
	High line pressure, Broken hard parts, Delayed forward/reverse	Pressure & Converter Regulator Valve Kit	73840-RK	5	F-73840-TL or 73840-RTL	VB-FIX
Shift Concerns	Bump in 2nd or 4th, Soft/Harsh shifts	2-4 Accumulator Piston Kit	73840-24	3		
	Soft/Harsh/Delayed forward engagement	Forward Accumulator Piston Kit	73840-FWD	2		
	Soft/Harsh/Delayed reverse	Low Reverse Accumulator Piston Kit	73840-LR	1		
	Erratic shift quality, Harsh/Long 1-2, High line pressure, Poor line rise	Oversized Line Modulator Valve Kit	73840-27K	6	F-73840-TL27	VB-FIX
	2-3 Flare, Soft 1-2 or 3-4	Servo Return Spring – Fits all except '97 & '98	73708			



	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Common or Repeat Failures	Low pump output	Pump Gear – Standard size	73426-SP			
	Excessive endplay, Driveline clunk, Lube oil loss	Endplay Shim Kit	73251-01K			
	Broken retaining tabs on wiring connector, Connector pushes into case	Wiring Harness Connector Bracket	73949-01			
	Bushing failure and/or reverse clutch drum journal damage	Reverse Clutch Drum Sleeve	73300-01		Requires Machining	
Tools	Other Products					
	Bearing	Torrington® Bearing Kit	SBK-F18			
	Tool	Tool Kit – For kit 73840-BK	73840-BTL			
	Tool	Tool Kit – For valve kit 73840-RK	F-73840-TL			VB-FIX
	Tool	Tool Kit – For valve kit 73840-RK	73840-RTL			
	Tool	Master Tool Kit – For kits 73840-BK, 73840-RK or 73840-MK†	73840-MTL			
	Tool	Tool Kit – For valve kit 73840-27K	F-73840-TL27			VB-FIX
	Tool	Lube Modification Drill Kit – 3 Drill bits: .062", .042" & .052"	73840-DK			

†Master tool kit 73840-MTL contains both 73840-BTL and 73840-RTL tool kits.

Part Type	Product Name	Part Number	Product/Application Details	Required Tool	Required Fixture
ATX					
Part	1-2 Accumulator Inner Spring	86940-04	Late style, 5/bag		
Part	Boost Valve Kit	86940-05K			
Part	Intermediate Clutch Drum Bearing	86460			
Part	Speedo/Governor Drive Gear	57415X	2 Lug, split		
Part	Throttle Control Valve Sleeve	86940-03	Hard-Coat finish		
Part	Throttle Plunger Sleeve	86940-01	Hard-Coat finish		
Part	Torrington® Bearing Kit	SBK-F3			
4F27E					
Part	Oversized Pressure Regulator Valve	46892-01K		F-46892-TL	VB-FIX
Part	Shift Control Solenoid	46950	On-Off		
Part	Shift Control Solenoid	46951	PWM		
Part	Turbine Shaft Pump Support Bushing	46000-01K	2/Bag		
Tool	Tool Kit	F-46892-TL	For oversized PR valve 46892-01K		VB-FIX
5FNR					
Part	Oversized Pressure Regulator Valve	46892-01K		F-46892-TL	VB-FIX
Tool	Tool Kit	F-46892-TL	For oversized PR valve 46892-01K		VB-FIX
5R110W					
Part	TCC Control Plunger & Sleeve Kit	36940-01K			
Part	Oversized Pressure Regulator Valve Kit	36940-03K		F-36940-TL3 & VB-06	VB-FIX
Part	Low/Reverse Retaining Ring	36885			
Part	Oversized Manual Valve	36940-11		F-36940-TL11	VB-FIX
Part	Pressure Switch End Plug Kit	36940-17K			
Tool	Tool Kit	F-36940-TL3	For oversized PR valve kit 36940-03K	VB-06	VB-FIX
Tool	Tool Kit	F-36940-TL11	For oversized manual valve 36940-11		VB-FIX
C4, C5					
Part	"C" Code Servo Kit	K13259C	Anodized cover		
Part	"C" Code Servo Kit	K13259C-1	Non-Anodized cover		

Red Part Number = New in Vol. 8

Italicized Red Part Number = Available Early 2011

The Economics of Sonnax Valve Kits & Tools

How do you continue to make economical transmission repairs when you're faced with ever-increasing costs of purchasing new valve bodies or good quality cores? How do you ensure your repairs are not quick, cheap fixes, but durable enough to exceed a unit's warranty period? The answer is transmission solutions from Sonnax. Our products address the root cause of specific transmission problems, allowing rebuilders to avoid either expensive overhauls or band-aid fixes by making truly effective repairs which meet or exceed OEM standards.

The key to many Sonnax transmission enhancements is the use of valves or sleeves in oversized bores. This over-sizing repair technique requires that our valve-bore-specific "F-Tool" reaming kits be used with the patented Sonnax VB-FIX reaming fixture.

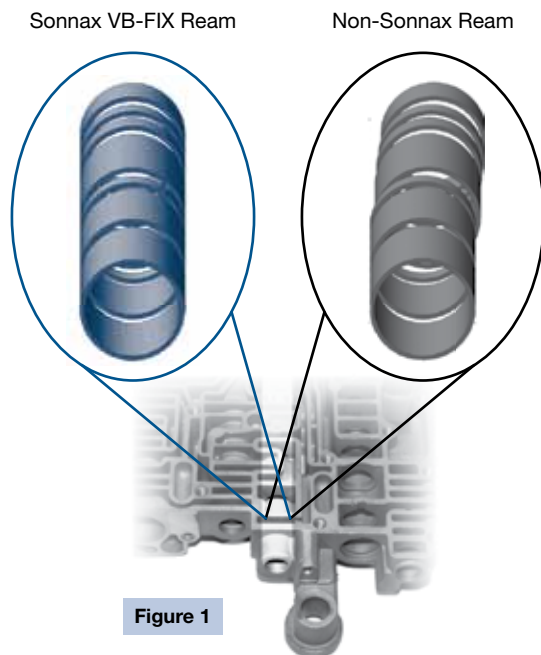


Figure 1

The Numbers Don't Lie

Analysis has shown that gasket and end cover surfaces are not always aligned with bores. Over a 3" bore, misalignment of one tenth (.1°) of one degree will result in five thousandths (.005") of an inch misalignment at the inner lands of the bore.

The patented Sonnax VB-FIX precisely aligns the reamer with the center of the bore, guaranteeing consistent bore-to-valve clearances.



Why are these specialized tools necessary? We make the best valves in the business, but even our valves can be rendered useless if the reaming process doesn't prepare the bore properly. Years of work by the top technicians and engineers resulted in many innovative parts, numerous patents, and repairs that restore function and durability to the transmissions you rebuild.

Our research has shown that standard reaming techniques produce flawed results which can seriously compromise the integrity of valve or sleeve repairs. To eliminate this concern, our "F-Tool" reamers were developed along with the VB-FIX, the only valve body reaming fixture on the market capable of consistent, precision reams. It's one of the many ways we make sure Sonnax replacement parts produce the highest quality valve body repairs every time.

As you can see in **Figure 1**, the bore trace of a Chrysler TV bore reamed with the Sonnax VB-FIX system shows perfectly straight, properly aligned bore lands. By comparison, using a competitor's system, the deeper you ream, the further out of alignment you become.

Tools You Can Rely On

How do the VB-FIX and “F-Tools” make rebuilding valve bodies economical? Most importantly, the purchase of a VB-FIX and an “F-Tool” kit cannot be looked at as a one-time cost attributed to one unit being repaired on a given day. It is an expense to be averaged over the life of the tools and represents significant long-term savings compared to other repair methods.

- Faced with a unit with worn valves, a rebuilder can confidently ream and install replacement parts instead of purchasing a new valve body.
- The cost of Sonnax reaming tools can be stretched over many valve bodies, as the tools can be used many times without fail. The “F-Tool” life is 75+ reams – compare this to other, inferior reaming kits that quickly dull and must be purchased over and over again.
- The initial investment in the VB-FIX pays off even more each time a shop adds another Sonnax valve-bore-specific “F-Tool” to its workbench.

Basic Cost Analysis Over Time*	
Cost for VB-FIX	\$300
Cost for one “F-Tool” Kit	\$225
Total Initial Tool Expense	\$525
\$300/75 reams = \$4 VB-FIX cost per reamed bore	
\$225/75 reams = \$3 “F-Tool” Kit cost per ream based on one “F-Tool” Kit purchase	

Sonnax “F-Tool” Kit with reamer and reamer jig.



Sonnax Valve Kit



Warranties You Can Count On

Once a Sonnax VB-FIX, “F-Tool” kit and replacement parts are purchased, it is time to evaluate the cost-difference between using new OEM valve bodies, used valve bodies and repairing the valve body that came out of the unit with Sonnax parts. The price gap between new and used valve bodies can be great; however, what matters is having a good, usable valve body that meets your warranty period.

If you compare the cost of a new valve body to that of repairing a unit with Sonnax parts, the gap widens even further. There also are significant savings between used valve bodies and the Sonnax-repaired unit. These savings as shown below are direct-to-the-bottom-line on the per-unit cost of the job as well as future warranty issues associated with comebacks.

Sonnax Valve Kits & Tools Save You Money*

	New	Used	Sonnax
Valve Body	\$900	\$450	\$0
Sonnax Valve Kit	\$0	\$0	\$45
Labor	\$0	\$40	\$80
Amortized Tool & VB-FIX	\$0	\$0	\$7
Total Cost Per Valve Body	\$900	\$410	\$132

Savings using Sonnax Valve Kit

Savings over New Valve Body	\$768
Savings over Used Valve Body	\$278

Sonnax-repaired unit savings are significant over either new or used valve bodies.

At Sonnax we are focused on engineering innovative and economical solutions for today’s transmission specialists. We offer more than 85 “F-Tool” kits for over 50 different transmission units, with new parts and reamers being developed all the time. Watch for the “F” in the part numbers of this catalog to identify our special “F-Tool” reamers. Turn to pages 160-161 to learn more about the VB-FIX. As with all our products, comprehensive instructions and outstanding technical support are part of the package. Visit www.sonnax.com for the most up-to-date availability of “F-Tool” products or contact your distributor for more information.

* All costs are estimates-only used for this example and account for one valve being replaced. These numbers are based on proper tool handling and usage procedures outlined in the tool kit instructions provided with each kit.



Many more technical articles are available online in the Sonnax Technical Library – visit www.sonnax.com today!

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for the BEST aluminum
driveshaft builds?**

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DRIVELINE**

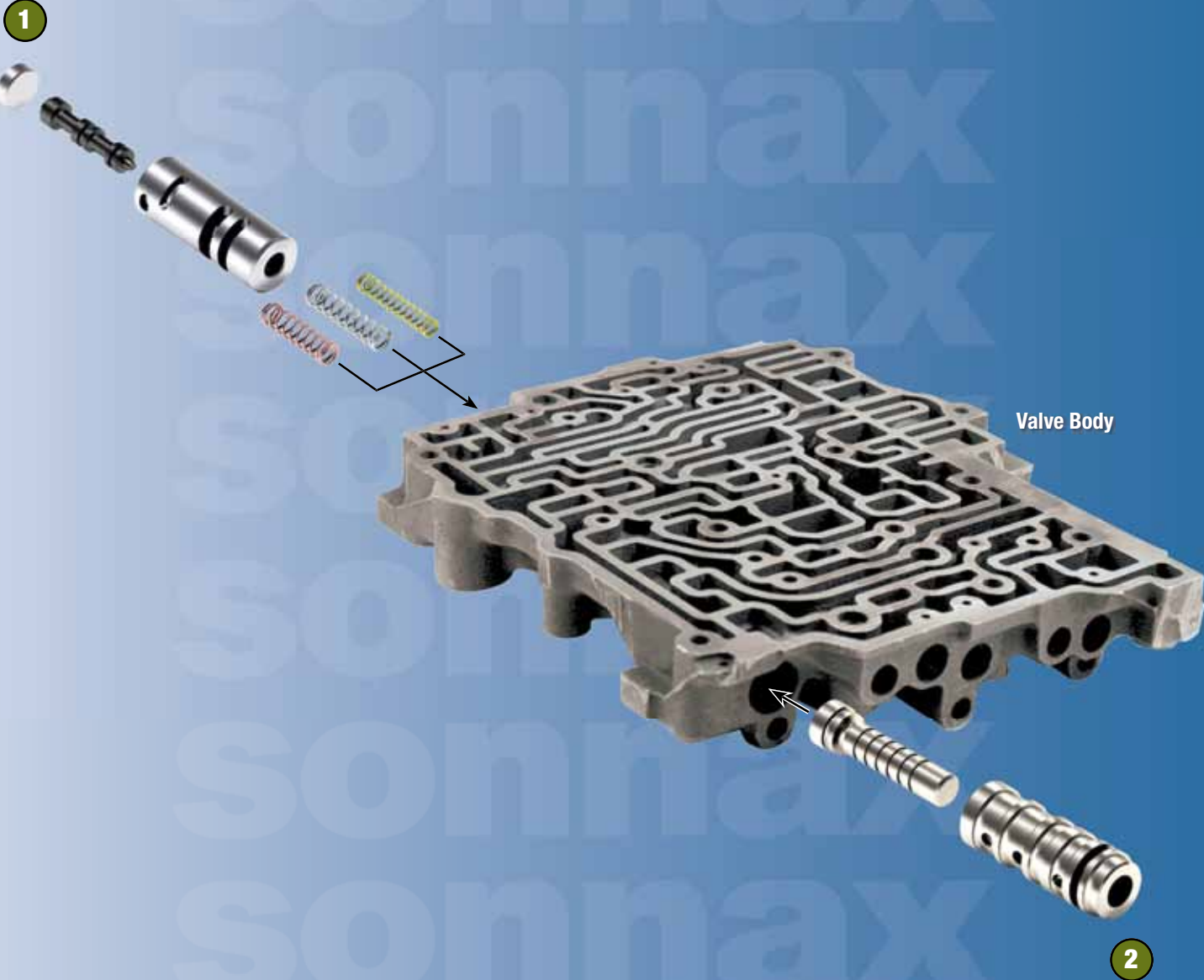


The Sonnax recipe is simple:

Start with the best materials, use the most advanced and innovative designs, then proceed through a manufacturing and inspection process that is second to none.

Aluminum Weld Yokes ■ Alcoa® Tubing
Aluminum Bushings/Extensions

Learn more online at www.sonnax.com



Color Key Not all parts are shown here. For a full listing of our available products, visit www.sonnax.com.

TCC/Lockup	Other Product
Pressure Problems	Tool
Shift Concerns	High Performance
Common/Repeat Failures	

Pump



Vehicle Complaints/Part Type		Product Name	Part Number		Illustration Number	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
Pressure Problems	TCC/Lockup								
	No lockup, Falling out of lockup hot, Fluid blows out fill tube	TCC Apply Valve Kit	77805-K		7	Steel valve with Teflon® seal			
	3-4 Clutch failure, Excessive pump noise, Low line pressure, Clutch slippage	Oversized Pressure Regulator Valve	77917-06		3			77917-TL or 77917-TLC	
	Burned 3-4 clutch, Shortened band life, Soft/Slide shifts	TV Boost Valve Kit	77917-01K		6	.423" Bore dia., O-Ring style			
		TV Boost Valve Kit	77917-471		6	.471" Bore dia., O-Ring style			
		TV Boost Valve Kit	77917-02K			.423" Bore dia., "Factory" style			
		TV Boost Valve Kit	77917-03K			.471" Bore dia., "Factory" style			
	Poor reverse boost, Delayed reverse, Low line pressure	Reverse Boost Valve Kit	K77898		5	Large ratio, O-Ring style	Y		
Reverse Boost Valve Kit		K77898A		5	Large ratio, "Factory" style				
Shift Concerns	1-2 Bang (light throttle), End bump shift, Shortened 3-4 band life	Accumulator Valve Train Kit	77777M-K		1	Heavy weight vehicles			
		Accumulator Valve Train Kit	77777L-K		1	Medium weight vehicles			
	Soft 1-2, Poor downshift & upshift control, Sticky/Erratic throttle valve operation, Poor line rise	Throttle Valve Sleeve Kit	65754-01K		2	.357" Dia.			
		Throttle Valve Sleeve Kit	65754-02K		2	.390" Dia.			
		Throttle Valve Sleeve Kit	65754-03K		2	.430" Dia.	Y		
Common or Repeat Failures									
	Burnt clutches & bands, Poor shift quality	Pinless Accumulator Piston Kit	77998-03K			Includes, piston, seal & balls, for 3-4 location only	Y		
Other Products	Accumulator part	Oversized Accumulator Pin & Reamer Kit	77999-02K			Starter kit, includes 10 pins & reamer	Y	Reamer from 77999-02K	
	Accumulator part	Oversized Accumulator Pin Kit	77999			Includes 4 pins only	Y		
	Pump part	Pump Vane	1280			Torrington® OEM			
	Pump part	Pump Vane Guide	4734			10 Vane, plastic			
	Pump part	Pump Slide Pivot Pin	65797			5/Bag			
	Pump part	Pump Bushing	77005T			Teflon® coated	Y		
	Stator Support Shaft	Stator Support Shaft	65917S			27 External splines, heat treated			
	TV Cable part	Universal TV Cable Repair Kit	77872-02K						
	TV Cable part	TV Cable Corrector Kit	AS1-01K			5/Bag			
	TV Cable part	TV Cable Corrector Bracket Kit	AS2-02K			For Holley carburetors	Y		
	TV Cable part	TV Cable Corrector Bracket Kit	AS3-03K			For Edelbrock/Carter carburetors	Y		
	Tools	Tool	Reamer & Drill Jig	77917-TL			For oversized pressure regulator valve kits 77917-06 & 77917-07		
Tool		Carbide Reamer & Drill Jig	77917-TLC			For oversized pressure regulator valve kits 77917-06 & 77917-07			

		Performance Enhancement	Product Name	Part Number		Illustration Number	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
High Performance	-A- Pump	-A- Valve Body							
		Increases throttle pressure & line pressure	TV Plunger Spring	77968-01K			5/Bag		
	-B- Pump	Highest OEM TV boost ratio, Maximum line rise	TV Boost Valve Kit	77917-500		6	.500" Bore dia., O-Ring style		
			TV Boost Valve Kit	77917-04K			.500" Bore dia., "Factory" style		
		Increases base line pressure	Elevated Pressure Regulator Spring	77917-08		4			
		Maintains high pump volume position at high RPM	Pump Slide Spring	77722-01K			Replaces 2 OEM springs, 5/bag		
		Higher & more stable pump output	Pump Spring Spacer	77917-RV			10/Bag		
	-C- Pump	-C- Servo/Band							
		Maximizes holding power for firmest 1-2, 2-3 shifts	Super Hold Servo	K65703			Purple anodized cover		
			Super Hold Servo	K65703-1			Non-anodized cover		
			Wider, thicker band improves 1-2 shifts	Alto Extra Wide Intermediate Band	S043961			Red material	
	-D- Pump	-D- Internal							
Improves clutch apply & durability		Direct Clutch Piston Insert	65772J-01						
-E- Pump	-E- Case								
	Plugs unused speedo gear hole while maintaining output bushing lube	Speedometer Hole Plug Kit	35922-01K						

Part Type	Product Name	Part Number	Product/Application Details	HP or HD Use	Required Tool	Required Fixture
125C (3T40)						
Part	Accumulator Piston & Pin Kit	75921-01K	Includes 1 piston & 1 pin			
Part	Oversized Accumulator Pin & Reamer Kit	75921-03K	Starter kit, 10 pins & reamer			
Part	Oversized Accumulator Pin Kit	75921-02K	Includes 4 pins only		Reamer from 75921-03K	
Part	Pump Bearing	75153A				
Part	Pump Shaft	75877A	Late style, '84-later			
Part	Pump Vane	1937				
Part	Pump Vane	1280	Torrington® (OEM)			
Part	Bearing Kit	SBK-G13	Torrington® (OEM)			
Part	Universal TV Cable Repair Kit	77872-02K				
180, 180C						
Part	Accumulator Pin & Seal Kit	54250-03K	Starter kit, 10 pins & reamer			
Part	Accumulator Pin & Seal Kit	54250-02K	Includes pins, E-clips & seals only		Reamer from 54250-03K	
Part	Accumulator Piston Seal Kit	54250-02SK	Includes seals only			
Part	Bell Housing Bushing	54253-01	Improved fit, reduced clearance			
Part	Bi-Metal Thrust Washer & Shim Kit	54701-03K	3-Tab, fits pump & stator support			
Part	Governor Body Cover	54410A-01				
Part	Servo Pin Bore Sleeve	76890-24K			S-76890-TL24	SERVO-FIX
Tool	Tool Kit	S-76890-TL24	For servo sleeve kit 76890-24K			SERVO-FIX
200, 200C						
Part	Direct Clutch Piston Insert	65772J-01		Y		
Part	Super Hold Servo	K65703		Y		
Part	Governor Cover	203	Includes O-Rings			
Part	Thrust Bearing	65405	Front internal gear to carrier, '78-'87			
Part	Pressure Regulator Valve Kit	65912-01K				
Part	Throttle Valve Sleeve Kit	65754-01K	.357" Dia.			
Part	Throttle Valve Sleeve Kit	65754-02K	.390" Dia.			
Part	Throttle Valve Sleeve Kit	65754-03K	.430" Dia.	Y		
Part	Torrington® Bearing Kit	SBK-G15				
Part	Universal TV Cable Repair Kit	77872-02K				
325-4L						
Part	Oversized Accumulator Pin & Reamer Kit	77999-02K	Starter kit, 10 pins & reamer			
Part	Oversized Accumulator Pin Kit	77999	Includes 4 pins only		Reamer from 77999-02K	
Part	Universal TV Cable Repair Kit	77872-02K				
350, 350C						
Part	1-2 Accumulator Piston Cover	35988-01K		Y		
Part	1-2 Accumulator Sleeve & Piston Kit	35719-01K		Y		
Part	Boost Valve & Sleeve Kit	35754-01K	'69-'86	Y		
Part	Converter Bolt	B63	3/8" x 24" x 9/16"			
Part	Converter Bolt	B78	RWD metric LU converters only			
Part	Rear Endplay Shim	77406-10				
Part	Front Endplay Shim	77409-15				
Part	Governor	350				
Part	Governor Gear Kit	352				
Part	Intermediate Overrun Clutch Outer Race	35723HD-01		Y		
Part	Intermediate Servo Sleeve Kit	35709-01K				
Part	Oversized Accumulator Pin & Reamer Kit	35718-02K	Starter kit, 10 pins & reamer			
Part	Oversized Accumulator Pin Kit	35718-01K	Includes pins & rings only		Reamer from 35718-02K	
Part	Pan Bolt	35801-01	100/Bag			
Part	Replacement Late Front Stator Bushing	35007A				
Part	Speedometer Hole Plug Kit	35922-01K		Y		
Part	Bearing Kit	SBK-G9	Torrington® (OEM)			

Red Part Number = New in Vol. 8



Color Key

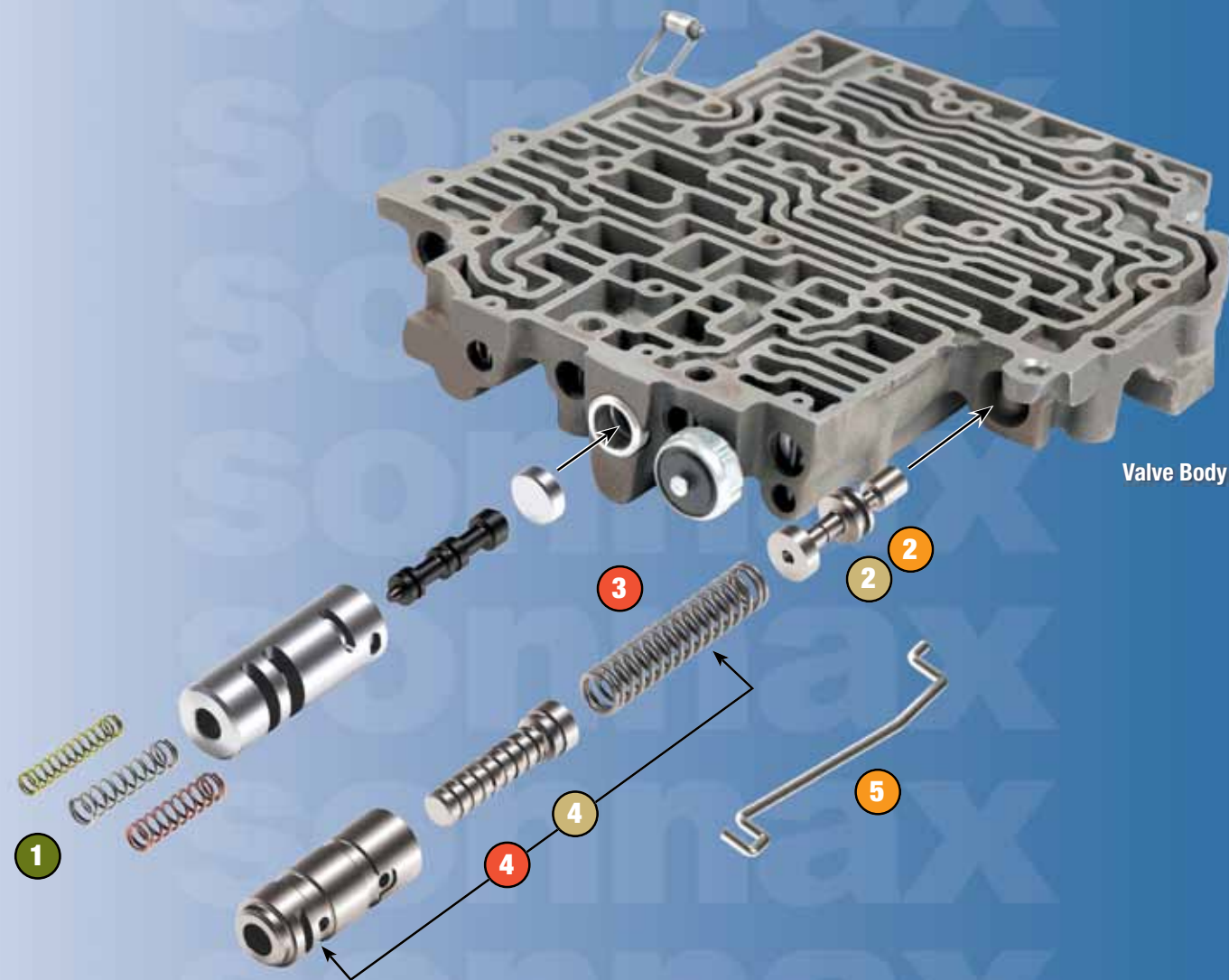
- TCC/Lockup
- Pressure Problems
- Shift Concerns
- Common/Repeat Failures
- Other Product
- Tool
- High Performance

Not all parts are shown here.
For a full listing of our available
products, visit www.sonnax.com.

	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Common or Repeat Failures	TCC/Lockup Code 1870, TCC slip-related issues, Valve sticks in sleeve due to sleeve wear	TCC Regulator Valve Sleeve – '00-Later PWM only	54754-02	3		
	Pressure Problems Low line pressure, Burnt clutches, Soft shifts, Delayed reverse	Boost Valve & Sleeve Kit – Medium ratio Boost Valve & Sleeve Kit – High ratio Boost Valve & Sleeve Kit – Low ratio	54200-01K 54200-06K 54200-14K	2 2 2		
	Burnt clutches & bands, Leakage at accumulator pin bore	Oversized Accumulator Pin & Seal Kit – Includes reamer, 10 pins, 20 clips & 10 seals Oversized Accumulator Pin & Seal Kit – Includes 4 pins, 8 clips & 4 seals only	54250-03K 54250-02K	1 1	Reamer from 54250-03K	
	Burnt clutches & bands, Leakage past accumulator seals	Accumulator Piston Seal Kit – 10/Bag	54250-02SK			
	OEM plastic thrust washers break/melt, Excessive endplay after machining parts	Bi-metal Thrust Washer & Shim Kit – 3-Tab, fits pump & stator support	54701-03K			
	Burnt bands, Burned 2nd clutch	Servo Pin Bore Sleeve Kit	76890-24K		S-76890-TL24	SERVO-FIX
	Front seal leak, Poor fitting aftermarket bushings	Bell Housing Bushing – Improved fit, reduced clearance	54253-01			
	Tools					
	Tool	Tool Kit – For servo sleeve kit 76890-24K†	S-76890-TL24			SERVO-FIX

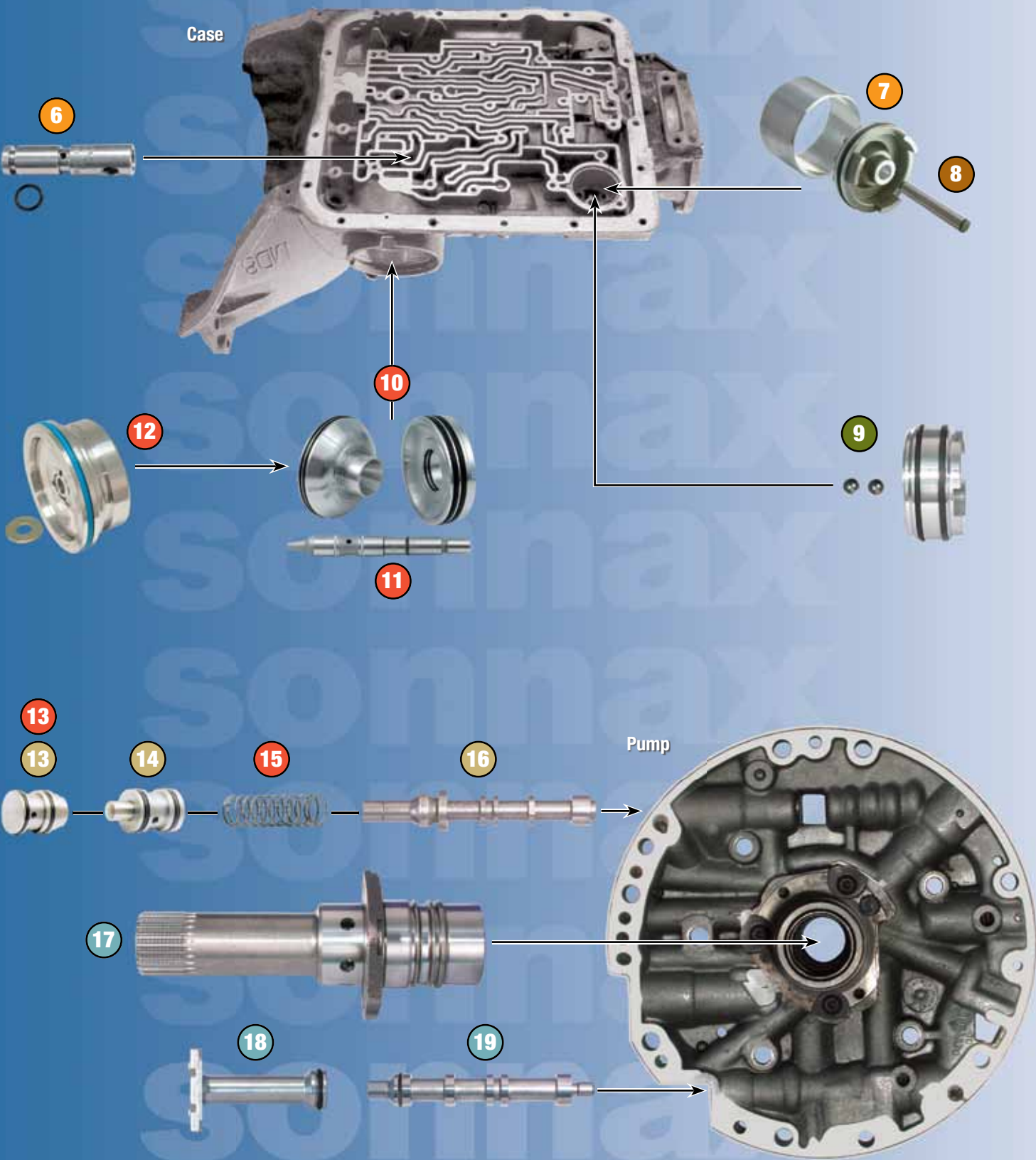
† Used on multiple Ford & GM applications

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● TCC/Lockup	● Other Product
● Pressure Problems	● Tool
● Shift Concerns	● High Performance
● Common/Repeat Failures	



	Vehicle Complaints/Part Type	Product Name	Part Number		Illustration Number	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
TCC/ Lockup	No lockup, Falling out of lockup hot, Code 1870, Fluid blown out of fill tube	TCC Apply Valve Kit	77805-K		19	Steel with Teflon® seal	Y		
	Converter overheat, Delayed reverse, No 3rd	Stator Support Shaft	77918S-K		17	298mm Converter, '82-later			
	Converter apply issues, Converter overheat	TCC Solenoid Snout Kit	77942-01K		18				
Pressure Problems	3-4 Clutch failure, Excessive pump noise, Low line pressure during boost	Oversized Pressure Regulator Valve	77917-06		16			77917-TL or 77917-TLC	
		TV Boost Valve Kit	77917-01K		13	.423" Bore dia., O-Ring style			
		TV Boost Valve Kit	77917-471		13	.471" Bore dia., O-Ring style			
	Burned 3-4 clutch, Shortened band life, Soft/Slide shifts	TV Boost Valve Kit	77917-02K		13	.423" Bore dia., "Factory" style			
		TV Boost Valve Kit	77917-03K		13	.471" Bore dia., "Factory" style			
	Poor line rise, Early soft upshifts, Low line pressure, Premature 3-4 clutch failure	Throttle Valve Plunger & Sleeve Kit	77966-93K		4	OEM #93			
		Throttle Valve Plunger & Sleeve Kit	77966-94K		4	OEM #94			
	Poor reverse boost, Delayed reverse, Low line pressure	Reverse Boost Valve Kit	K77898		14	Large ratio, O-Ring style	Y		
		Reverse Boost Valve Kit	K77898A		14	Large ratio, "Factory" style			
	Poor line rise, 3-4 Clutch failure	Oversized Throttle Valve	77968		2			77968-RM	
Shift Concerns	Low line pressure, Pump slide sticking	Pump Slide Pivot Pin	65797			5/Bag			
	Soft 1-2 or 3-4 shifts	1-2 or 3-4 Accumulator Spring	74926			5/Bag, purple			
		Accumulator Valve Train Kit	77777M-K		1	Heavy weight vehicles			
	1-2 Light throttle bang/end bump shift	Accumulator Valve Train Kit	77777L-K		1	Medium weight vehicles			
	Burnt clutches & bands, Poor shift quality	Pinless Accumulator Piston Kit	77998-03K		9	Includes pinless accumulator piston, D-Ring, Teflon® seal & steel balls	Y		
Common or Repeat Failures		Pinless Accumulator Piston Kit	77998-04K		9	Includes pinless accumulator piston & steel balls only			
	Worn/Scored accumulator bores	3-4 Accumulator Sleeve Kit	77998-01K		7				
	Reduced 3-4 clutch life, Poor 2-3 shift feel	Servo Release Check Valve	77701-076		6		Y		
	3-4 Clutch/Band failures, Poor line rise, Soft shifts	Shortened TV Link	77872-01		5		Y		
	Damaged/Modified original throttle valve	Throttle Valve	77968-02		2	Direct replacement			
	Collapsed 3-4 clutch boost springs	3-4 Clutch Boost Spring	77763-01			10/Bag, '88-later			
	Poor 1-2 shift, Worn 2nd apply servo piston bore	Metal Clad Viton® Seal	77911-02			2nd Apply servo piston, 5/bag		Requires Machining	
		Reaction Shaft Thrust Washer	77401-01			Bi-metal, PTFE coated, '82-'01	Y		
	Damaged/Worn thrust washer and/or reaction shaft	Oversized Reaction Shaft Thrust Washer	77401-02			.012" Thicker than OEM, bi-metal, PTFE coated, '82-'01	Y		
	Damaged reaction carrier shaft/bushing	Wide Sun Gear Bushing	77010-01				Y		
Other Products	Valve Body Reconditioning Kit								
	Sure Cure® Kit	4L60 Sure Cure® Kit	SC-4L60			See page 156 for details.		77917-TL or 77917-TLC	
	Accumulator part	Oversized Accumulator Pin & Reamer Kit	77999-02K		8	Starter kit, includes 10 pins & reamer			
	Accumulator part	Oversized Accumulator Pin Kit	77999		8	Includes 4 pins only		Reamer from 77999-02K	
	Bearing	Torrington® Bearing Kit	SBK-G12						
	Bushing	Stator Support Bushing Kit	77918SBK			For stator support shaft 77918S-K			
	Bushing	Replacement Early Stator Front Bushing	35007B			With small input shaft, '82-'84			
	Bushing	Replacement Late Stator Front Bushing	35007A			With large (1" dia.) input shaft, '84-later			
	Bushing	Rear Stator Support Bushing	77002B						
	Governor part	Governor Gear Kit	702						
	Governor	Governor	729			Mostly diesel			
	Governor	Governor	730			Gas, Corvette & others			
	Governor	Governor	731			Gas, 250, 305 & 350 engines			
	Planetary part	Rear Planetary Batwing Washer	77731-05						
	Planetary part	Rear Planetary Needle Roller	77731-03			80/Bag			
	Planetary part	Rear Planetary Oil Deflector	77731-08						
	Planetary part	Rear Planetary Pinion Gear	77731-01						
	Planetary part	Rear Planetary Pinion Pin	77731-02K			4/Bag			
	Planetary part	Rear Planetary Rebuild Kit	77731-RK			4 Pinion planetary			
	Planetary part	Rear Planetary Round Washer	77731-04						
	Planetary part	Rear Planetary Thrust Bearing	77731-09						
	Pump part	Pump Vane Guide	4734			10 Vane, plastic			
	Pump part	Pump Vane	1280			Torrington® (OEM)			
	Seal	Replacement Seal Kit	77701-04SK			For 2nd gear "Corvette" ratio servo kit 77701-04K	Y		

Red Part Number = New in Vol. 8

Vehicle Complaints/Part Type		Product Name	Part Number		Illustration Number	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
Other Products	Seal	Replacement Seal Kit	77767K-SK			For 4th gear super hold dual servo kit 77767K	Y		
	Seal	Replacement Seal Kit	77998-03SK			For pinless 1-2 or 3-4 accumulator piston kit 77998-03K			
	Seal	Replacement Seal Kit	77911-03SK			For 2nd gear super hold servo kit 77911-03K	Y		
	Shim	Rear Endplay Shim	77406-10			.010", Use at output shaft bearing, 10/bag			
	Shim	Front Endplay Shim	77409-15			.015", Use at input housing, 10/bag			
	Thrust Washer	Reaction Shaft Thrust Washer	77401-01			PTFE coated, '82-later			
	Thrust Washer	Oversized Reaction Shaft Thrust Washer	77401-02			.012" Thicker than OEM, PTFE coated, '82-later			
	TV Cable part	Universal TV Cable Repair Kit	77872-02K						
	TV Cable part	TV Cable Corrector Kit	AS1-01K			5/Bag			
	TV Cable part	TV Cable Corrector Bracket Kit	AS2-02K			For Holley carburetors	Y		
Tools	TV Cable part	TV Cable Corrector Bracket Kit	AS3-03K			For Edelbrock/Carter carburetors	Y		
	Tool	Reamer & Drill Jig	77917-TL			For oversized pressure regulator valves 77917-06 & 77917-07			
	Tool	Carbide Reamer & Drill Jig	77917-TLC			For oversized pressure regulator valves 77917-06 & 77917-07			
	Tool	Reamer	77968-RM			For oversized throttle valve 77968			

Performance Enhancement		Product Name	Part Number		Illustration Number	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
High Performance	-A- VB	Eliminates part throttle 4-3 kickdown	Throttle Valve Plunger & Sleeve Kit	77966-94MK	4	Prevents forced 4-3 kickdown until 3-4 throttle		
		Provides firmer, quicker shifts	Enhanced Performance Accumulator Spring	77704S		5/Bag		
		Increases throttle pressure & line pressure	TV Plunger Spring	77968-01K	3	5/Bag		
	-B- Pump	Highest OEM TV boost ratio, Max line rise	TV Boost Valve Kit	77917-500	13	.500" Bore dia., O-Ring style		
			TV Boost Valve Kit	77917-04K		.500" Bore dia., "Factory" style		
		Increases base line pressure	Elevated Pressure Regulator Spring	77917-08	15			
		Reduces friction on cold start, Extends bushing life	Pump Bushing	77005T		Teflon® coated		
		Increases pump output & stabilizes pressure	Pump Spring Spacer	77917-RV		10/Bag		
		Maintains high volume slide position at high RPM	Pump Slide Spring	77722-01K		Replaces 2 OEM springs, 5/bag		
		Wider, improved fit & longer lasting stator bushing	Teflon® Lined Rear Support Stator Bushing	77002BT-01		See page 168-169 for details.		
	-C- Servo/Band	The largest OEM ratio servo	2nd Gear "Corvette" Ratio Servo Kit	77701-04K				
		18% larger than "Corvette" ratio for maximum hold	2nd Gear Super Hold Servo Kit	77911-03K	10			
		40% more holding power than OEM servos	4th Gear Super Hold Dual Servo Assembly	77767K	12			
		15% more contact area & strengthened anchor	Alto Extra Wide Intermediate Band	77700-01		Red material, street version		
		Same as 77700-01 band plus Kevlar® for racing	Alto Extra Wide Intermediate Band	77700-01K				
		Upgraded servo pin material, sealing & length	Extra Long Servo Pin Kit	77787-02K	11	With seals		
	-D- Internal	More durability & strength than OEM cast piston	Billet Forward Clutch Piston	77764-01		Improved durability & strength over OEM.		
		Reinforces input drums where they need it most	Input Drum Reinforcement Kit	77733-01K		Includes sleeve, seal & piston. See page 168-169 for details.		
			Input Drum Reinforcement Kit	77733-02K		Includes sleeve & seal only. See page 168-169 for details.	Requires Machining	
		Eliminates endplay thrust loads on rear sun gear & rear planet bearing	Heavy Duty Reinforced Sun Shell Kit	77749-02K		Laser welded, thicker material, heat-treated splines & drive lugs		

Red Part Number = New in Vol. 8
Italicized Red Part Number = Available Early 2011



TECH NOTE

TCC Regulator Bore Tool Kit Requirements

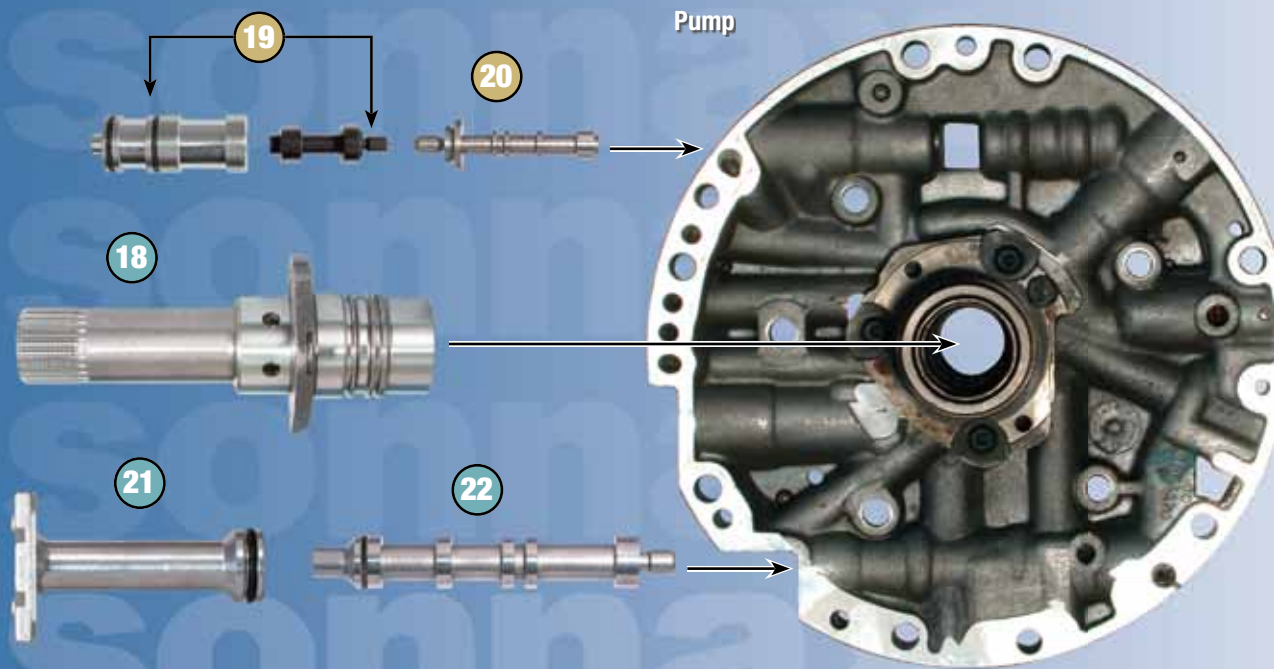
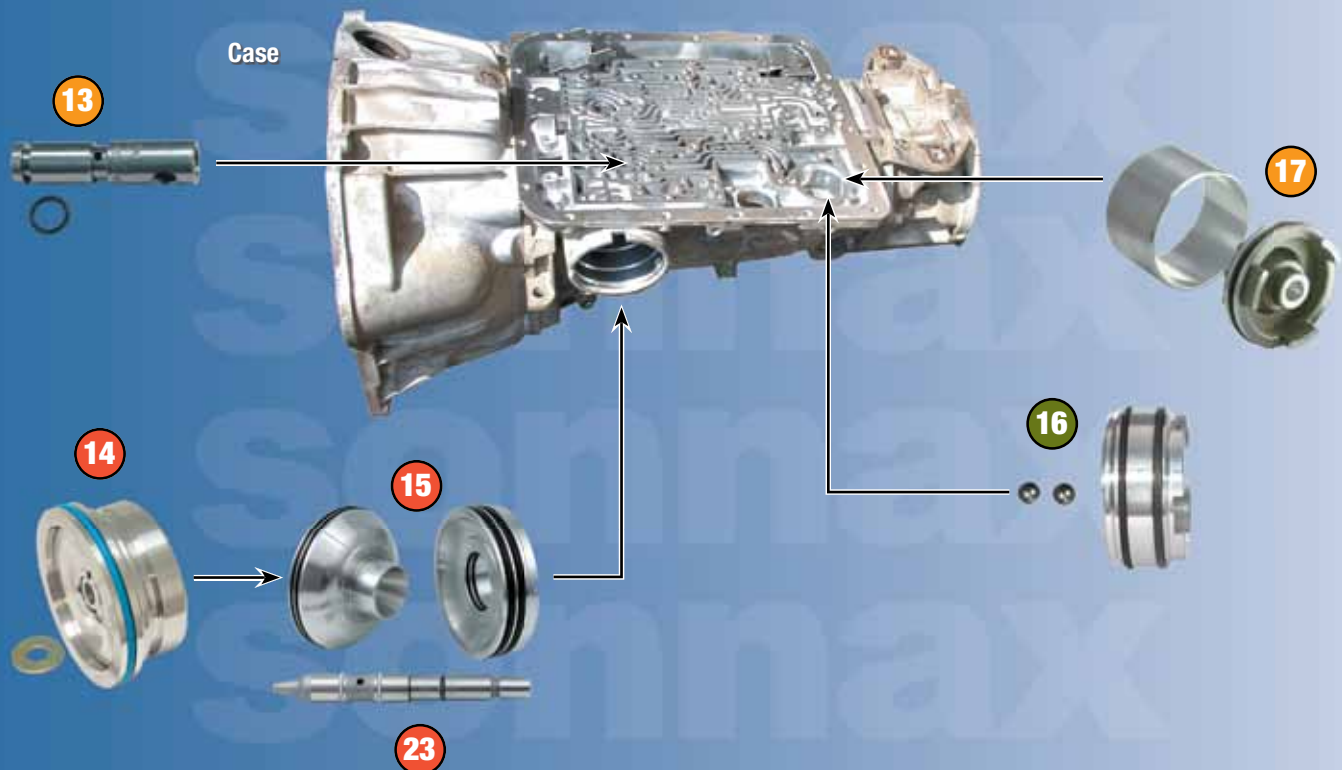
If the valve body has NOT been serviced (GM Remanufactured) and does NOT have a worn-out isolator bore, use either **77754-R2** or **F-77754-TL4** tool kit then install either of the TCC Regulator Valve kits.

If the valve body has NOT been serviced (GM Remanufactured), but DOES have a worn-out isolator bore, use either **77754-R2** then **77754-RM5** reamer or **F-77754-TL4** tool kit, then install 77754-ISO sleeve and either of the TCC Regulator Valve kits.

If the valve body HAS been serviced (GM Remanufactured), use either **77754-SERV** reamer then **77754-RM5** reamer or **F-77754-SERV** then **F-77754-TL4** tool kit, then install **77754-ISO** sleeve and either of the TCC Regulator Valve kits.

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● TCC/Lockup	● Other Product
● Pressure Problems	● Tool
● Shift Concerns	● High Performance
● Common/Repeat Failures	



	Vehicle Complaints/Part Type	Product Name	Part Number		Illustration Number	4L60-E	4L65-E	4L70-E	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
TCC/Lockup	Code 1870, TCC slip, Converter overheat, Harsh 1-2	TCC Regulator Valve Kit	77754-04K		11	Y	Y	Y	Fits all years & EC3 units		See Tech Note on Page 78	
		TCC Regulator Valve Kit	77754-03K		11	Y			Non-EC3 units, '97-earlier	Y	See Tech Note on Page 78	
	Code 1870, 3-4 Clutch failure, TCC slip/cycling	Isolator Valve Sleeve Repair Kit	77754-IS0		12	Y	Y	Y	For worn isolator bore in unserviced VB or for any factory-reman. VB		See Tech Note on Page 78	
		Stator Support Shaft	77918S-1K		18	Y	Y	Y	300mm or 280mm Converter, non-reluctor style, '99-'04			
		Stator Support Shaft	77918S-K		18	Y			298mm or 245mm Converter, non-reluctor style, '93-'04			
	Code 1870, Delayed reverse, Converter overheat	Stator Support Shaft	77918S-08K			Y			298mm Converter, reluctor style, '04-later			
		Stator Support Shaft	77918S-09K			Y	Y	Y	280 or 300mm Converter, reluctor style, '04-later			
	Code 1870, No lockup, Falls out of lockup hot, Converter overheat	TCC Apply Valve Kit	77805E-K		22	Y	Y	Y	Aluminum with Teflon® seal (PWM only)	Y		
		TCC Apply Valve Kit	77805-K		22	Y			Steel with Teflon® seal (4L60-E, non-PWM only)	Y		
	Converter overheat, Fluid venting, OEM cracked ball seat, No TCC hot	TCC Solenoid Snout Kit	77942-01K		21	Y			'96-Earlier			
		TCC Solenoid Snout Kit	77942-02K		21	Y	Y	Y	With anti-drainback valve, '97-later			
Pressure Problems	Poor line rise, 3-4 Clutch failures	Boost Valve & Sleeve Kit	77898E-4K		19	Y	Y	Y	.470" Dia., with O-Rings, early pump design			
		Boost Valve & Sleeve Kit	77898E-K		19	Y	Y	Y	.490" Dia., with O-Rings, early pump design	Y		
		Boost Valve & Sleeve Kit	77898E-7K		19	Y	Y	Y	.490" Dia., with O-Rings, late pump design	Y		
		Boost Valve & Sleeve Kit	77898E-3K			Y	Y	Y	.490" Dia., "Factory" style, early pump design			
		Boost Valve & Sleeve Kit	77898E-6K			Y	Y	Y	OEM .470" dia., "Factory" style, early pump design			
		Oversized Pressure Regulator Valve	77917-07		20	Y	Y	Y			77917-TL or 77917-TLC	
	Line pressure instability, Rotor fracture, Pump noise	Pump Slide Pivot Pin	65797			Y	Y	Y	5/Bag			
Shift Concerns	Soft 1-2 or 3-4 shifts	1-2 or 3-4 Accumulator Spring	74926			Y	Y	Y	Purple, 5/bag			
	3-2 Control valve spring broken, 3-2 Bind	3-2 Control Valve Spring	77754-23		9	Y	Y	Y				
	No 4th gear, Drops out of 4th	3-4 Relay O-Ringed End Plug Kit	77964-08K			Y	Y	Y				
	No 4th gear, Low 4th gear pressure, Burned 2-4 band	4-3 Sequence Valve Kit	77964-04K		10	Y	Y	Y			77964-RM2	
		Accumulator Valve Train Kit	77777M-K		2	Y			Heavy weight vehicles			
	1-2 Light throttle bang/end bump shift	Accumulator Valve Train Kit	77777L-K		2	Y			Medium weight vehicles			
	Wrong gear starts, Solenoid codes, Clutch & band failures	Actuator Feed Limit Valve Kit	77754-09K		1	Y	Y	Y			77754-TL	
	2-3 Shift valve sticks, Code 756, No 1st or 2nd	2-3 Shift Valve	77754-33		3	Y	Y	Y	Aluminum			
		Pinless Accumulator Piston Kit	77998-03K		16	Y	Y	Y	Includes piston, seals & balls	Y		
	Burnt clutches & bands, Poor shift quality	Pinless Accumulator Piston Kit	77998-04K		16	Y	Y	Y	Includes piston & balls only			
Common or Repeat Failures	Loss of 4th	3-4 Accumulator Sleeve Kit	77998-01K		17	Y	Y	Y				
	Reduced 3-4 clutch life, Poor 2-3 shift feel	Servo Release Check Valve	77701-076		13	Y	Y	Y		Y		
	Delayed reverse, Burned 3-4 clutch, 2-4 band and/or low/reverse clutch	Forward & Reverse Abuse Bore Plug	77754-21		5	Y	Y	Y	Fits either location			
	Delayed forward, Low/Reverse clutch failures	Forward & Reverse Abuse Valve Kit	77754-35K		6	Y	Y	Y	Improved design, fits either location			
	Delayed engagements, Slipping in forward gears	Pinless Forward Accumulator Piston Kit	77987-01K		7	Y	Y	Y	Aluminum, dual seal	Y		
	Collapsed 3-4 clutch boost springs	3-4 Clutch Boost Spring	77763-01			Y	Y	Y	'88-later, 10/Bag			
	Poor 1-2 shift, Worn 2nd apply servo piston bore	Metal Clad Viton® Seal	77911-02			Y	Y	Y	For 2nd apply servo piston, 5/bag		Requires Machining	
	Damaged/Worn thrust washer and/or reaction shaft	Reaction Shaft Thrust Washer	77401-01			Y			4 Tab, bi-metal, PTFE coated, '82-'01	Y		
		Oversized Reaction Shaft Thrust Washer	77401-02			Y			.012" Thicker than OEM, bi-metal, PTFE coated, '82-'01			
	Damaged reaction carrier shaft or bushing	Wide Sun Gear Bushing	77010-01			Y	Y	Y		Y		
Other Products	Valve Body Reconditioning Kit											
	Sure Cure® Kit	4L60-E (PWM) Sure Cure® Kit	SC-4L60E			Y	Y	Y	See page 156 for details.		77754-R2, 77754-TL¹	
	Accumulator Pin	Oversized Accumulator Pin & Reamer Kit	77754-02K		8	Y	Y	Y	Starter kit, includes 10 pins & reamer			
	Accumulator Pin	Oversized Accumulator Pin	77754-01K		8	Y	Y	Y	Includes 4 pins only		Reamer from 77754-02K	
	Bearing	Captured Front Planetary Bearing	77747-01			Y	Y	Y	2.157" x .199" Black, '99-later			
	Bearing	Torrington® Bearing Kit	SBK-G12			Y	Y	Y				
	Bracket	Shift Cable Mount Bracket	34913-01			Y						
	Bracket	Wiring Harness Connector Bracket	77980-01K			Y	Y	Y				
	Bushing	Stator Support Bushing Kit	77918SBK			Y	Y	Y	For stator support shaft 77918S-K			
	Bushing	Replacement Late Stator Front Bushing	35007A			Y	Y					
	Bushing	Stator Rear Bushing	77002B			Y	Y	Y				
	End Plug	AFL Valve End Plug	77754-39			Y	Y	Y	5/Bag			
	Planetary part	Rear Planetary Batwing Washer	77731-05			Y						
	Planetary part	Rear Planetary Needle Roller	77731-03			Y			80/Bag			

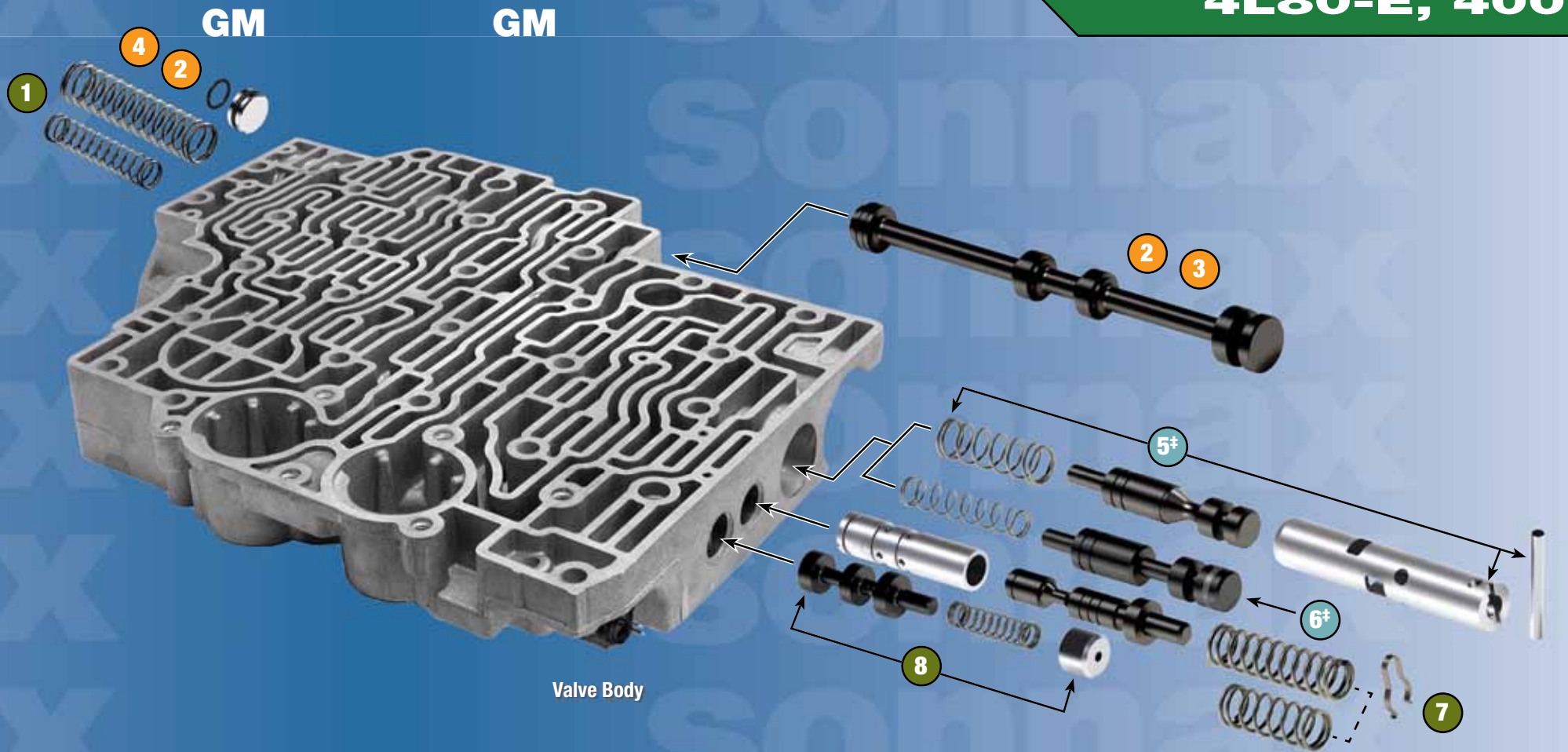
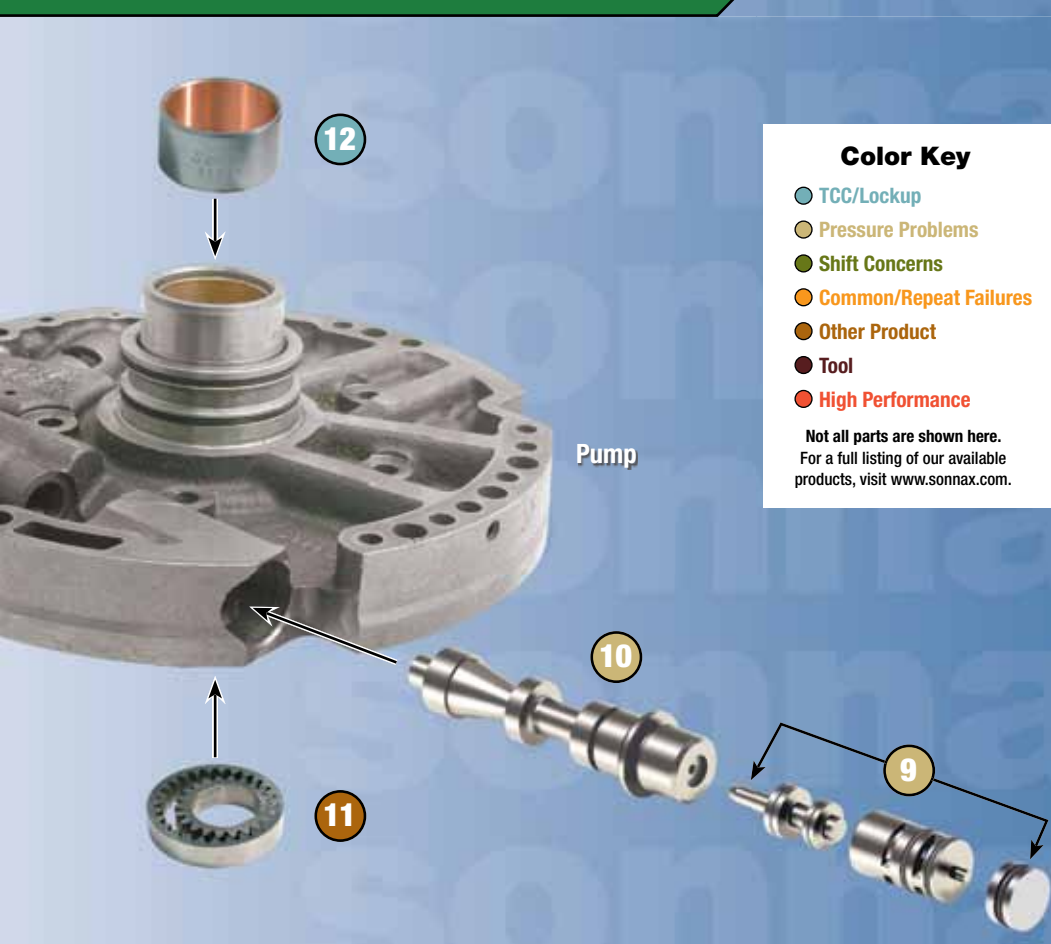
Red Part Number = New in Vol. 8

¹77917-TL, 77917-TLC

Vehicle Complaints/Part Type		Product Name	Part Number		Illustration Number	4L60-E	4L65-E	4L70-E	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
Other Products	Planetary part	Rear Planetary Needle Roller	77732-03				Y	Y	100/Bag			
	Planetary part	Rear Planetary Oil Deflector	77731-08			Y						
	Planetary part	Rear Planetary Pinion Gear	77731-01			Y	Y	Y				
	Planetary part	Rear Planetary Pinion Pin	77731-02K			Y			4/Bag			
	Planetary part	Rear Planetary Pinion Pin	77732-02				Y	Y	5/Bag			
	Planetary part	Rear Planetary Rebuild Kit	77731-RK			Y			4 Pinion planetary			
	Planetary part	Rear Planetary Rebuild Kit	77732-RK				Y	Y	5 Pinion planetary			
	Planetary part	Rear Planetary Round Washer	77731-04			Y						
	Planetary part	Rear Planetary Round Washer	77732-04				Y	Y	10/Bag			
	Planetary part	Rear Planetary Thrust Bearing	77731-09			Y	Y	Y				
	Planetary part	Rear Planetary Tri-Metal Washer	77732-05				Y	Y	10/Bag			
	Pump part	Pump Vane Guide	4734			Y			10 Vane, plastic			
	Pump part	Pump Vane	1280			Y	Y	Y	Torrington® (OEM)			
	Seal	Replacement Seal Kit	77998-03SK			Y	Y	Y	For pinless accumulator piston kit 77998-03K			
	Seal	Replacement Seal Kit	77701-04SK			Y	Y	Y	For 2nd gear "Corvette" ratio servo kit 77701-04K	Y		
	Seal	Replacement Seal Kit	77911-03SK			Y	Y	Y	For 2nd gear super hold servo kit 77911-03K	Y		
	Seal	Replacement Seal Kit	77767K-SK			Y	Y	Y	For 4th gear super hold dual servo kit 77767K	Y		
	Shim	Rear Endplay Shim	77406-10			Y	Y	Y	.010" Thick (rear ring gear to bearing), 10/bag			
	Shim	Front Endplay Shim	77409-15			Y	Y	Y	.015" Thick (input housing to bearing), 10/bag			
Tools	Tool	Reamer & Drill Jig	77917-TL			Y	Y	Y	For oversized PR valve kits 77917-06 & 77917-07			
	Tool	Carbide Reamer & Drill Jig	77917-TLC			Y	Y	Y	For oversized PR valve kits 77917-06 & 77917-07			
	Tool	Reamer	77754-SERV			Y	Y	Y	For isolator valve sleeve repair kit 77754-ISO			
	Tool	Reamer	77754-R2			Y	Y	Y	For TCC regulator valve kits 77754-03K & 77754-04K			
	Tool	Reamer	77754-RM5			Y	Y	Y	For isolator valve sleeve repair kit 77754-ISO			
	Tool	Reamer	77964-RM2			Y	Y	Y	For 4-3 sequence valve kit 77964-04K			
	Tool	Tool Kit	77754-TL			Y	Y	Y	For actuator feed limit valve kits 77754-09K & 34200-16K			
	Tool	Tool Kit	F-77754-TL4			Y	Y	Y	For kits 77754-03K, 77754-04K, 77754-ISO			VB-FIX
	Tool	Tool Kit	F-77754-SERV			Y	Y	Y	For GM reman. use kits 77754-03K, 77754-04K, 77754-ISO		F-77754-TL4	VB-FIX
	Tool	Torx® Plus Bit	77000-HBK			Y	Y	Y				

Performance Enhancement		Product Name	Part Number		Illustration Number	4L60-E	4L65-E	4L70-E	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
High Performance	-A- VB	Heavy duty, high performance calibration kit	Performance Pack	HP-4L60E-01		Y	Y	Y	'94-Later. See pages 168-169 for details.		
		Produces firmer, quicker shifts	Enhanced Performance Accumulator Spring	77704S		Y	Y	Y	5/Bag		
		Improves input sprag & FWD clutch life	Heavy Duty 2-3 Shift Valve	77754-41	4	Y	Y	Y			
	-B- Pump	Increases line pressure & provides firmer shifts	High Performance Pressure Regulator Spring	77917-10		Y	Y	Y			
		Reduces friction on cold start, Extends bushing life	Pump Bushing	77005T		Y	Y	Y	Teflon® coated		
		Increases pump output, Stabilizes pressure	Pump Spring Spacer	77917-RV		Y	Y	Y	10/Bag		
		Maintains high volume slide position at high RPM	Pump Slide Spring (replaces 2 OEM springs)	77722-01K		Y	Y	Y	5/Bag, replaces 2 OEM springs		
		Wider, improved fit, Longer lasting stator bushing	Teflon® Lined Rear Stator Support Bushing	77002BT-01		Y	Y	Y	See pages 168-169 for details.		
	-C- Servo/Band	The largest OEM ratio servo	2nd Gear "Corvette" Ratio Servo	77701-04K		Y	Y	Y			
		18% larger than "Corvette" ratio for maximum hold	2nd Gear Super Hold Servo Assembly	77911-03K	15	Y	Y	Y			
		40% more holding power than OEM servos	4th Gear Super Hold Dual Servo Assembly	77767K	14	Y	Y	Y			
		15% more contact area & strengthened anchor	Alto Extra Wide Intermediate Band	77700-01		Y	Y	Y	Red material, street version		
		Same as 77700-01 band plus Kevlar® for racing	Alto Extra Wide Intermediate Band	77700-01K		Y	Y	Y			
		Upgraded servo pin material, sealing & length	Extra Long Servo Pin Kit	77787-02K	23	Y	Y	Y	With seals		
	-D- Internal	More durability & strength than OEM cast piston	Billet Forward Clutch Piston	77764-01		Y	Y		Improved durability & strength over OEM.		
		Reinforces input drums where they need it most	Input Drum Reinforcement Kit	77733-01K		Y	Y	Y	Includes sleeve, seal & piston. See pages 168-169 for details.	Requires Machining	
			Input Drum Reinforcement Kit	77733-02K		Y	Y	Y	Includes sleeve & seal only. See pages 168-169 for details.		
		Upgrade to the strongest available input assembly	Reinforced Input Housing & Upgraded Input Shaft Kit	77733-04K		Y	Y	Y	300mm, Reluctor style, OEM high strength shaft, '04-later. See pgs 168-169.		
		Upgrade & update input assembly in earlier units	Reinforced Input Housing & Upgraded Input Shaft Kit	77733-05K		Y			300mm, Non-relector style, Kryptonite™ Teflon® lined rear bushing, '98-'05		
		Eliminates endplay thrust loads on rear sun gear & rear planet bearing	Heavy Duty Reinforced Sun Shell Kit	77749-02K		Y			Laser welded, thicker material, heat treated splines & drive lugs.		

Red Part Number = New in Vol. 8
Italicized Red Part Number = Available Early 2011



	Vehicle Complaints/Part Type	Product Name	Part Number	Illustration Number	4L80-E	400	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
TCC/Lockup	Converter shudder, Burnt converters, TCC apply/release problems, TCC slip codes	TCC Regulator Valve & Sleeve Kit	34994-18K‡	5	Y		Sleeve corrects worn bore problems		F-34994-TL18	VB-FIX
		TCC Regulator Valve Kit	34994-01K‡	6	Y		Includes seal, for use in mildly worn bores			
	No lockup, TCC Slip codes, No overdrive, Overheated fluid	Front Stator Support Bushing	34016-W	12	Y		Wider than OEM for increased support, 4/bag			
Pressure Problems	High line pressure, Broken parts, Buzzing noise, Uncontrollable line rise	Boost Valve & Sleeve Kit	34200-01K	9	Y		Includes O-Rings			
		Boost Valve & Sleeve Kit	34200-03K	9	Y		"Factory" style			
	Broken case, servo/clutch piston	Self-Regulating Boost Valve & Sleeve Kit	34200-10K	9	Y		Limits EPC pressure to 95-105 psi			
	Engine surge at idle, Reduced cooler flow, Reduced converter release pressure	Line-to-Lube Pressure Regulator Valve Kit	34200-14K	10	Y					
	High/Uncontrollable line pressure, Delayed converter charge	Pressure Regulator Valve Kit	34910-03K			Y	'71-Later			
Shift Concerns	Wrong gear starts, Solenoid codes, Clutch/Band failure, 3rd Neutral condition	Actuator Feed Limit Valve Kit	34200-16K	7	Y				F-34200-TL16 or 77754-TL	VB-FIX
	Loss of 4th accumulator control, Poor shift quality, Damaged accumulator bore	4th Accumulator Repair Kit	34805-01K		Y		Repair sleeve, pinless piston & seals			
	Soft shifts, Low accumulator pressure, Elevated line pressure in drive	Oversized Accumulator Control Valve Kit	34994-22K	8	Y		Fits all years, upgrades '91-'96 units to '97 specifications		F-34994-TL22	VB-FIX
	Delayed forward engagement, Burned forward clutch/intermediate band	Front Servo Piston & Sleeve Kit	34989-06K		Y	Y				
	Delayed engagements, Low line pressure, Front servo bore wear	Front Servo Piston & Sleeve Kit	34989-02K		Y					
	No 4th gear, 3-4 Neutrals, 2nd Gear starts, Repeated solenoid B Codes 86 or 87	1-2 & 3-4 Shift Valve Spring Kit	34994-02K	1	Y					
	No reverse, Broken low/reverse servo piston	Rear Servo Spacer Kit	34528-01K		Y		'96-Later	Y		
	Soft 1-2 & 2-3, Delayed/Shudder in reverse, Poor line rise	Reverse Boost Valve Kit	34910-01K			Y	Includes O-Rings			
Common or Repeat Failures		Reverse Boost Valve Kit	34910-05K			Y	"Factory" style			
	Bushing walk-out/damaged case, Output shaft & case damage, Metal contamination	No Walk-Out Case Bushing	34006-SP		Y	Y				
		No Walk-Out Oversized Case Bushing	34006-OS		Y	Y	Use when damaged bore will not hold standard size bushing		†	
	Wear grooves in forward clutch drum ID bore, Delayed engagements	Oversized Seal Rings	34716-01		Y		2/Bag		34716-TL*†	
	Damaged stator support turbine shaft sleeve	Stator Support Sleeve	34203-01K		Y					
	Direct clutch failure, Delayed/No 3rd/Reverse, TCC slip codes, No 4th	Direct Drum Sleeve	34838-01K		Y	Y			34838-TL*†	

Red Part Number = New in Vol. 8

‡ Both 34994-18K & -01K kits have two springs. The heavier spring for OEM lockup feel. The lighter-duty spring for a firmer lockup, best for towing applications.

† Requires Machining

Vehicle Complaints/Part Type		Product Name	Part Number		Illustration Number	4L80-E	400	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
Common or Repeat Failures	Lost/Erratic output sensor signal, OEM ring cracked or broken	Output Speed Sensor (Reluctor) Ring	34880-01			Y					
	'94-'95 Cases cannot be used in '96-later applications	Shift Cable Mount Bracket	34913-01			Y		Adapts early cases for '96-later use			
	'97-Later cases cannot be used in earlier vehicles	Case Cooler Line Conversion Kit	34918-01K			Y		Adapts '97-later cases to earlier vehicles			
	Bore wear, Bent manual valve, 2nd gear starts, Loss of 4th, Poor line rise	Manual Valve	34994-16		3	Y					
	Broken AFL filters, Leaking AFL end plug	AFL Filter Kit	34994-17K		4	Y		Includes O-Rings			
	Bore wear, Bent manual valve, 2nd gear starts, Loss of 4th, Poor line rise	Manual Valve & AFL Filter Kit	34994-16K		2	Y		Includes 34994-16 & 34994-17K			
	Connector pushed down into pan area, Connector retention tabs broken	Wiring Harness Connector Bracket Kit	34998-01K			Y		Late-style gray connector only			
Other Products	Valve Body Reconditioning Kit										
	Sure Cure® Kit	4L80-E Sure Cure® Kit	SC-4L80E			Y		See page 156 for details.		F-34200-TL16 or 77754-TL	VB-FIX
	Bearing	Torrington® Bearing Kit	SBK-G10			Y	Y				
	Bolt	Pan Bolt	35801-01				Y	100/Bag			
	Bolt	Pan Bolt	77801-01			Y		100/Bag			
	Clutch Hub	Forward Clutch Hub	34322-01			Y	Y	Heavy duty	Y		
	End Plug	End Plug	34200-05K			Y		.625" Dia, for TCC/PR bores, 5/bag			
	End Plug	TCC Valve End Plug Kit	34994-14K			Y		.668" Dia., includes O-Rings, 5/bag			
	Governor	Governor	400				Y	2nd Design			
	Governor part	Governor Gear Kit	402				Y				
	Planetary part	Overdrive Planetary Thrust Bearing	34821-01			Y		'91-Later			
	Planetary part	Pinion Washer	34875-03			Y	Y	8/Bag			
	Planetary part	Pinion Pin	34875-01			Y	Y	4/Bag			
	Planetary part	Pinion Roller	34875-02			Y	Y	72/Bag			
	Planetary part	Pinion Thrust Washer	34875-04			Y	Y	8/Bag			
	Planetary part	Planetary Batwing Washer	34821-08			Y		8/Bag			
	Planetary part	Planetary Pin Roller	34821-06			Y		80/Bag			
	Planetary part	Planetary Pinion Pin	34821-05			Y		4/Bag			
	Planetary part	Planetary Rebuild Kit	34875RK			Y	Y	'99-Earlier			
	Planetary part	Planetary Thrust Washer	34821-07			Y		8/Bag			
	Planetary part	Reaction & Output Planetary Batwing Thrust Washer	34880-03			Y		'99-Later, 8/bag			
	Planetary part	Reaction & Output Planetary Needle Roller	34880-02			Y		'99-Later, 72/bag			
	Planetary part	Reaction & Output Planetary Rebuild Kit	34880RK			Y		'99-Later			
	Pump part	Pump Gear Set	34201E-SP		11	Y		Standard size			
	Retainer	Rear Servo Piston Retaining Clip	34989-01			Y		10/Bag			
	Shaft	Shift Lever Shaft	38511-01K			Y	Y	'91-'94 Short version 4L80-E, all 400			
	Shim	Endplay Shim	34006-05			Y	Y	.005" Thick, 10/bag	Y		
	Shim	Front Unit Endplay Shim	34500-Z			Y	Y	.010" Thick, 10/bag			
	Thrust Washer	Forward Clutch Drum Selective Washer	34301-078			Y	Y	.078" Thick, 5/bag			
	Thrust Washer	Forward Clutch Drum Selective Washer	34301-094			Y	Y	.094" Thick, 5/bag			
	Thrust Washer	Forward Hub Washer	34298-078			Y	Y	.078" Thick, 5/bag	Y		
Tools	Tool	Sizing Tool	34716-TL			Y		For seal ring kit 34716-01			
	Tool	Installation Tool	34838-TL			Y	Y	For direct drum sleeve kit 34838-01K			
	Tool	Tool Kit	77754-TL			Y		For AFL valve kit 34200-16K			
	Tool	Tool Kit	F-34200-TL16			Y		For AFL valve kit 34200-16K			VB-FIX
	Tool	Tool Kit	F-34994-TL18			Y		For TCC regulator valve & sleeve kit 34994-18K			VB-FIX
	Tool	Tool Kit	F-34994-TL22			Y		For accumulator control valve kit 34994-22K			VB-FIX

Performance Enhancement		Product Name	Part Number		Illustration Number	4L80-E	400	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
HP -B-	-B- Pump									
	Material & design upgrades for added strength	Heavy Duty Stator Support Shaft	34910S-01				Y	Heat-treated chrome-moly		

Red Part Number = New in Vol. 8



Color Key

Not all parts are shown here. For a full listing of our available products, visit www.sonnax.com.

TCC/Lockup

Pressure Problems

Shift Concerns

Common/Repeat Failures

Other Product

Tool

High Performance

	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
TCC/Lockup	TCC slip/ratio codes, Transmission/Converter overheat, Delayed/No reverse	TCC Regulator Valve & Sleeve Kit	55211-04K	8	F-55211-TL4	VB-FIX
	Incorrect TCC apply & release, No lockup, Falling out of lockup hot, Insufficient lube	TCC Control Valve – For single valve pumps	55211-21	1		
		TCC Control & Enable Valve Kit – For dual valve pumps	55211-22K	2	F-55211-TL22	VB-FIX
Pressure Problems	Low line pressure, Worn PR valve bore, Gear ratio codes, Pump slide wear, Gear fracture	Pressure Regulator Valve & Sleeve Kit	55211-08K	4	55211-TL8	
	Insufficient line rise/high reverse pressure, Flare upshifts, TCC slippage/gear ratio codes	Boost Valve, Sleeve & Spacer Kit – Valve spool diameters .531" & .492"	55209-01K	3		
		Boost Valve & Sleeve Kit – OEM valve spool diameters .474" & .441"	55209-04K	3		
	Reduced line pressure, Gear ratio slip codes, 2nd gear starts, Loss of 4th or 5th, TCC slip	AFL Valve & Sleeve Kit	55211-01K	9	F-55211-TL	VB-FIX

Red Part Number = New in Vol. 8
Italicized Red Part Number = Available Early 2011



	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Shift Concerns	Common or Repeat Failures					
	3-2-1 Coastdown bump, Harsh/No engine braking in 1st, 2nd or 3rd, Clutch failures	Low Pressure Control Valve Kit	55211-17K	6		
	Loss of reverse, TCC overheat, Burned reverse clutch, Burned low/reverse clutch	Reverse Lockout Valve & Sleeve Kit	55211-11K	7	F-55211-TL	VB-FIX
Tools	1-2 Bind-up, 3-4 Flare, 4-5 Shift complaints, Clutch distress	3-4, 4-5 Safety Mode Valve Kit	55211-14K	5	F-55211-TL14	VB-FIX
	Tool	Tool Kit – For PR valve kit 55211-08K	55211-TL8			
	Tool	Tool Kit – For kits 55211-01K & 55211-11K	F-55211-TL			VB-FIX
	Tool	Tool Kit – For valve & sleeve kit 55211-04K	F-55211-TL4			VB-FIX
	Tool	Tool Kit – For valve kit 55211-22K	F-55211-TL22			VB-FIX
	Tool	Tool Kit – For valve kit 55211-14K	F-55211-TL14			VB-FIX
	Tool	Tool Kit – For valve kit 55211-17K	F-55211-TL17			VB-FIX

“ *The TASC Force has been very helpful in addressing the needs and problems of the European, and especially the U.S. market.*”

Adrian Marty
Automaten-Meyer AG

Sonnax and the TASC Force have invested thousands of hours in testing. The results of these efforts allow the transmission industry to produce a quality product at a competitive price.

Dale Desveaux
Dale's Transmission
Ont., Canada

The TASC Force is another example of what happens when people in this industry get together to address common issues. The people I've met on the TASC Force are some of the sharpest in the industry and the work they do helps the entire industry. Keep it up.

Dennis Madden
CEO ATRA/Gears

We have always looked at what causes failures, as well as what actually failed. This is the only true way of doing a great job for our customers. By becoming involved with the TASC Force, and using Sonnax products religiously, we are better able to do just that.

Scott Medori
Parkland Transmission
Red Deer, Alberta, Canada

“Transmission Digest” continues to depend on the TASC Force for answers and explanations our readers need to address everyday rebuilding issues and seldom encountered pitfalls in their shop operations. Our TASC Force Tips column is highly regarded by an avid and interested readership.

Bobby Mace
Publisher • Transmission Digest



When you see the TASC Force logo on a Sonnax product, it means the product has passed stringent testing by Sonnax and by TASC Force member shops.

True collaboration toward a common goal is not something you see everyday, but that is what the Sonnax TASC Force is all about.

The Sonnax Technical Automotive Specialties Committee (TASC) Force is composed of experienced transmission rebuilders and technicians who value technical innovations and have hands-on understanding of the latest units and industry developments. From around the globe, the best minds in the transmission industry willingly share their know-how, with the understanding that everyone benefits when good ideas and products emerge from centuries of combined transmission wisdom.

Independent TASC members work for large shops, small shops, volume transmission and volume valve body rebuilders. Alongside Sonnax engineers and specialists, they are helping to develop repairs which will be used by their companies and by the rest of the transmission aftermarket.

TASC Force members contribute product ideas, test new products, troubleshoot results, and get together on a regular basis to listen, discuss and compare findings. Their efforts help provide answers and repairs for the entire industry. Everybody wins.



Technical articles written by TASC Force members are available online in the Sonnax Technical Library – visit www.sonnax.com today!

**Color Key**

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● TCC/Lockup

● Pressure Problems

● Shift Concerns

● Common/Repeat Failures

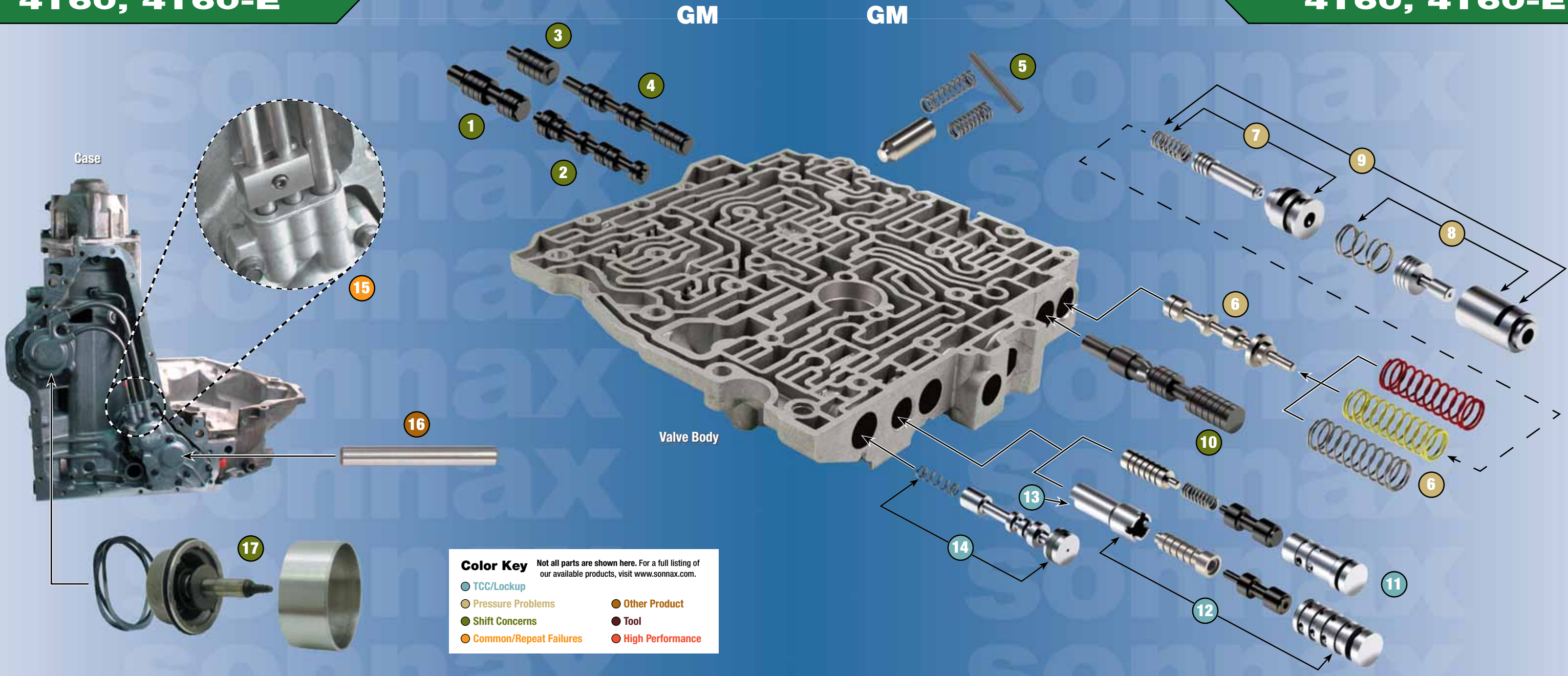
● Other Product

● Tool

● High Performance

	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
TCC/Lockup	No TCC apply, Soft/Slipping apply, Converter slip codes	TCC Regulated Apply Sleeve	33000-02	4	33000-TL	
	TCC valve apply & release problems, Converter overheat	TCC Control Sleeve – '03-Earlier	33000-03	3	F-33000-TL	VB-FIX
Pressure Problems	High/Low line pressure, Squawk/Shudder 2-3	Oversized Pressure Regulator Valve	33886-02	1	33886-TL2	
	High pressure in reverse, Blown VB gaskets, Code 1811	AFL Sleeve Kit	33886-01K	5	33886-TL	
	High/Low line pressure, Harsh/Soft shifts, Delayed/No reverse	Boost Valve & Sleeve Kit	33886-03K	2		
Common or Repeat Failures	Common or Repeat Failures					
	Pump bearing/seal failure, Converter codes	Pump Shaft Bearing – With seal	33000-01			
	Worn channel plate sleeve	Channel Plate Sleeve Kit – '95-Later	33530-01K			
Tools	Tool	Tool Kit – For sleeve kit 33000-02	33000-TL			
	Tool	Tool Kit – For sleeve kit 33000-03	F-33000-TL			VB-FIX
	Tool	Tool Kit – For sleeve kit 33886-01K	33886-TL			
	Tool	Tool Kit – For PR valve 33886-02	33886-TL2			

Red Part Number = New in Vol. 8



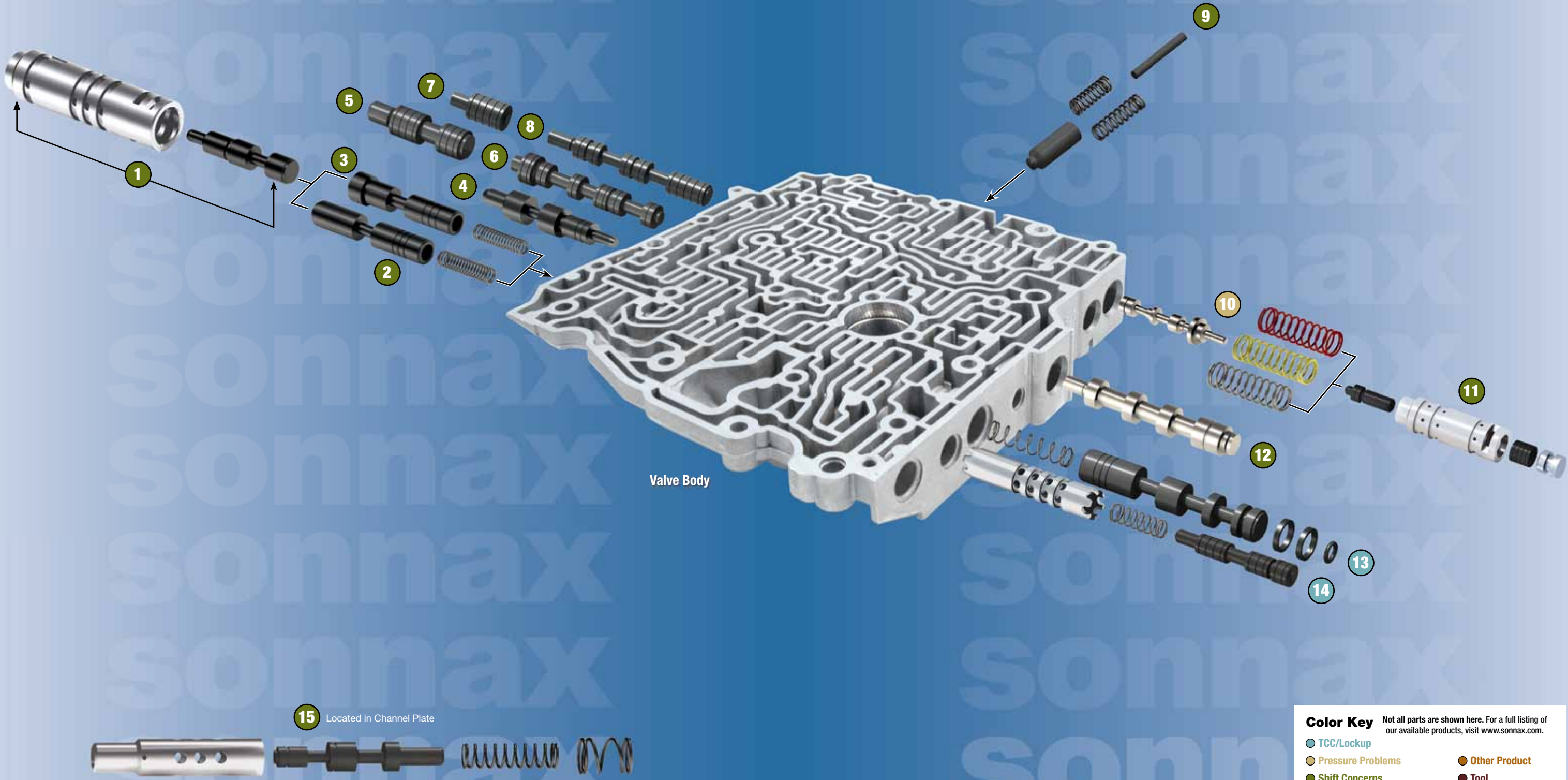
	Vehicle Complaints/Part Type	Product Name	Part Number	Illustration Number	4T60		4T60-E	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
TCC/Lockup	Codes 39, 740 or 1870, Converter shudder/overheat, Falling out of lockup hot	TCC Regulator & Isolator Valve Kit	84754-01K	12			Y	'93-Later		
		TCC Regulator & Isolator Valve Kit	84754-08K	11			Y	'91-'92	84754-RM	
		Isolator Valve Sleeve	84754-06	13			Y	'93-Later, use when inner bore worn	84754-TL6	
	Codes 39, 740 or 1870, Converter shudder/overheat, Falling out of lockup hot, Reduced cooler flow	TCC Apply Valve Kit	84754-22K	14	Y		Y	Standard valve, Teflon® seal, large spool less than 15mm, '96-earlier		
		Oversized TCC Apply Valve Kit	84754-16K	14	Y		Y	Teflon® seal, large spool less than 15mm, '96-earlier	84754-TL5	
		TCC Apply Valve Kit	84754-98K	14			Y	Standard valve, Teflon® seal, large spool more than 15mm, '97-later		
		Oversized TCC Apply Valve Kit	84754-97K	14			Y	Teflon® seal, large spool more than 15mm, '97-later	84754-TL5	

Red Part Number = New in Vol. 8

	Vehicle Complaints/Part Type	Product Name	Part Number		Illustration Number	4T60	4T60-E	Product/Application Details	Required Tool (*Recommended Tool)	Required Fixture
Pressure Problems	High/Unstable line pressure, Slide & rotor failures, Lube/Converter overheat	Oversized Pressure Regulator Valve Kit	84754-46K		6	Y	Y		84754-TL46	
	Soft shifts, Poor line rise, 2nd and/or 3rd Clutch distress	Modulated Line Boost Valve Kit	84754-12K		8	Y	Y	Low ratio, .276" small spool dia.		
		Modulated Line Boost Valve Kit	84754-17K		8	Y	Y	High ratio, .199" small spool dia.		
	Poor reverse boost	Reverse Boost Valve Kit	84754-14K		7	Y	Y	Low ratio, .273" small spool dia.		
		Reverse Boost Valve Kit	84754-19K		7	Y	Y	High ratio, .293" small spool dia.		
	Soft shifts, Poor line rise, 2nd and/or 3rd Clutch distress, Poor reverse boost	Reverse & Modulated Line Boost Valve Kit	84754-24K		9	Y	Y	Low ratio		
		Reverse & Modulated Line Boost Valve Kit	84754-25K		9	Y	Y	High ratio		
Shift Concerns	Low line pressure due to worn pin, Low/High line pressure due to incorrect pin	Pump Slide Pivot Pin	84881			Y	Y	Solid version, 5/bag		
		Pump Slide Pivot Pin	84881A				Y	Grooved version, 5/bag		
	2-3 Flare, No 3rd gear, Delayed/Slip in reverse, Low line pressure	1-2 Servo Sleeve Kit	84791-01K		17	Y	Y			
	Delayed engagement, Flare 1-2, Low reverse pressure, Burned 1-2 band	Oversized 1-2 & Reverse Servo Boost Valve Kit	84754-40K		5	Y	Y		†	
	Erratic/Temperature sensitive shifts, Shuttle shifts/loss of gear	1-2 Shift Valve	84754-23K		10	Y	Y			
		2-3 Shift Valve	84754-36K		2		Y	Anodized valve, '94-later		
		3-2 Downshift Valve	84754-37K		1		Y	Anodized valve		
		3-4 Shift Valve	84754-38K		4		Y	Anodized valve		
		4-3 Downshift Valve	84754-39K		3		Y	Anodized valve		
	Common or Repeat Failures									
	Differential lube failures, Lube tubes fall out	Differential Lube Tube Retainer	84532-01K		15		Y			
	No movement, Rattle noise in park	1-2 Roller Clutch Spring Kit	K84956-SP				Y	Not for '96-later black plastic roller clutch		
	Oil leak between side cover & channel plate	Side Cover Repair Plate	84995-01			Y	Y			
	Valve Body Reconditioning Kit									
	Sure Cure® Kit	4T60-E ('93-'96) Sure Cure® Kit	SC-4T60E				Y	'96-Earlier. See page 157 for details.	84754-TL5	
	Sure Cure® Kit	4T60-E ('97-Later) Sure Cure® Kit	SC-4T60E-1				Y	'97-Later. See page 157 for details.	84754-TL5	
Other Products	Accumulator part	Oversized Accumulator Pin & Reamer Kit	84573-02K		16	Y	Y	Starter kit, 10 pins & reamer		
	Accumulator part	Oversized Accumulator Pin	84573-01K			Y	Y	Includes 4 pins only	Reamer from 84753-02K	
	Bearing	4th Clutch Hub Bearing	84450			Y	Y			
	Bearing	Overdrive Planetary Thrust Bearing	34821-01			Y	Y			
	Bearing	Torrington® Bearing Kit	SBK-G11			Y	Y			
	Channel Plate part	Channel Plate Sleeve	8041			Y	Y			
	Clutch Hub	4th Clutch Hub	848608				Y	Late style, '96-later		
	Internal part	Input Carrier Lube Dam	8368			Y	Y			
	Pump part	Pump Vane	4662			Y	Y	Torrington® (OEM)		
	Shaft	Oil Pump Drive Shaft	84874			Y	Y			
	Shim	Differential Carrier-to-Case Shim	75410-10			Y	Y	10/Bag		
	Shim	Input Clutch Hub Shim	84733-10			Y	Y	.010" Thick, 10/bag		
	Shim	Input Clutch Hub Shim	84733-20			Y	Y	.020" Thick, 10/bag		
	Spring	Anti-Shudder Spring	84812			Y		Helps reduce lockup shudder		
	Sun Gear	Final Drive Sun Gear	75884B-01K			Y	Y			
	Throttle Valve part	Universal TV Cable Repair Kit	77872-02K			Y				
	Thrust Washer	Differential Side Gear Thrust Washer	75890-30			Y	Y	2-3/16" O.D., 4/bag		
Tools	Tool	Reamer	84754-RM				Y	For TCC regulator & isolator valve kit 84754-08K		
	Tool	Tool Kit	84754-TL2				Y	For oversized 1-2 & reverse servo boost valve kit 84754-40K		
	Tool	Tool Kit	84754-TL4			Y		For oversized 1-2 & reverse servo boost valve kit 84754-40K		
	Tool	Tool Kit	84754-TL46			Y	Y	For oversized pressure regulator valve kit 84754-46K		
	Tool	Tool Kit	84754-TL5			Y	Y	For oversized TCC apply valve kit 84754-16K & 84754-97K		
	Tool	Tool Kit	84754-TL6				Y	For isolator valve sleeve 84754-06		

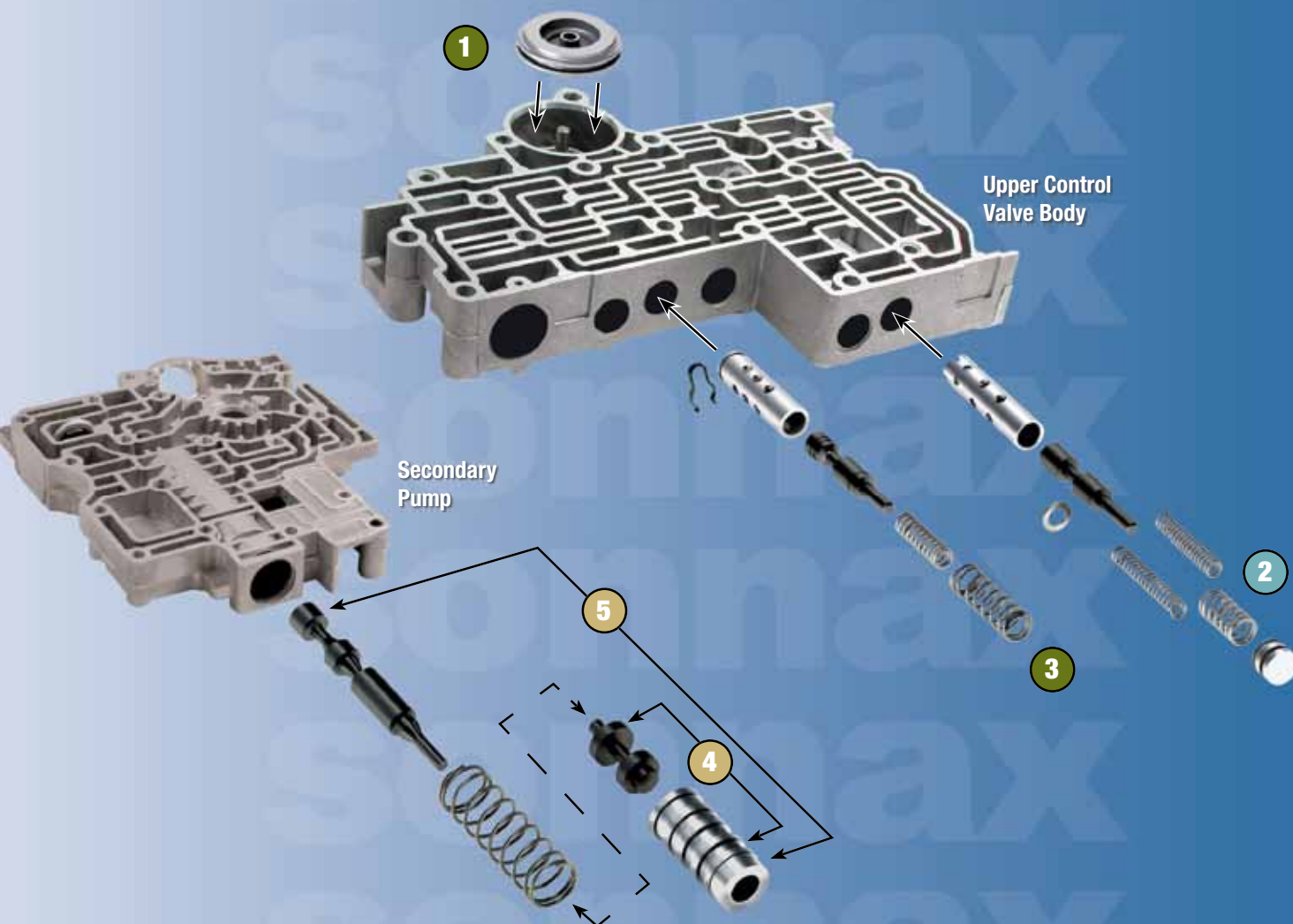
† 84754-TL4 (4T60), 84754-TL2 (4T60-E)

Red Part Number = New in Vol. 8



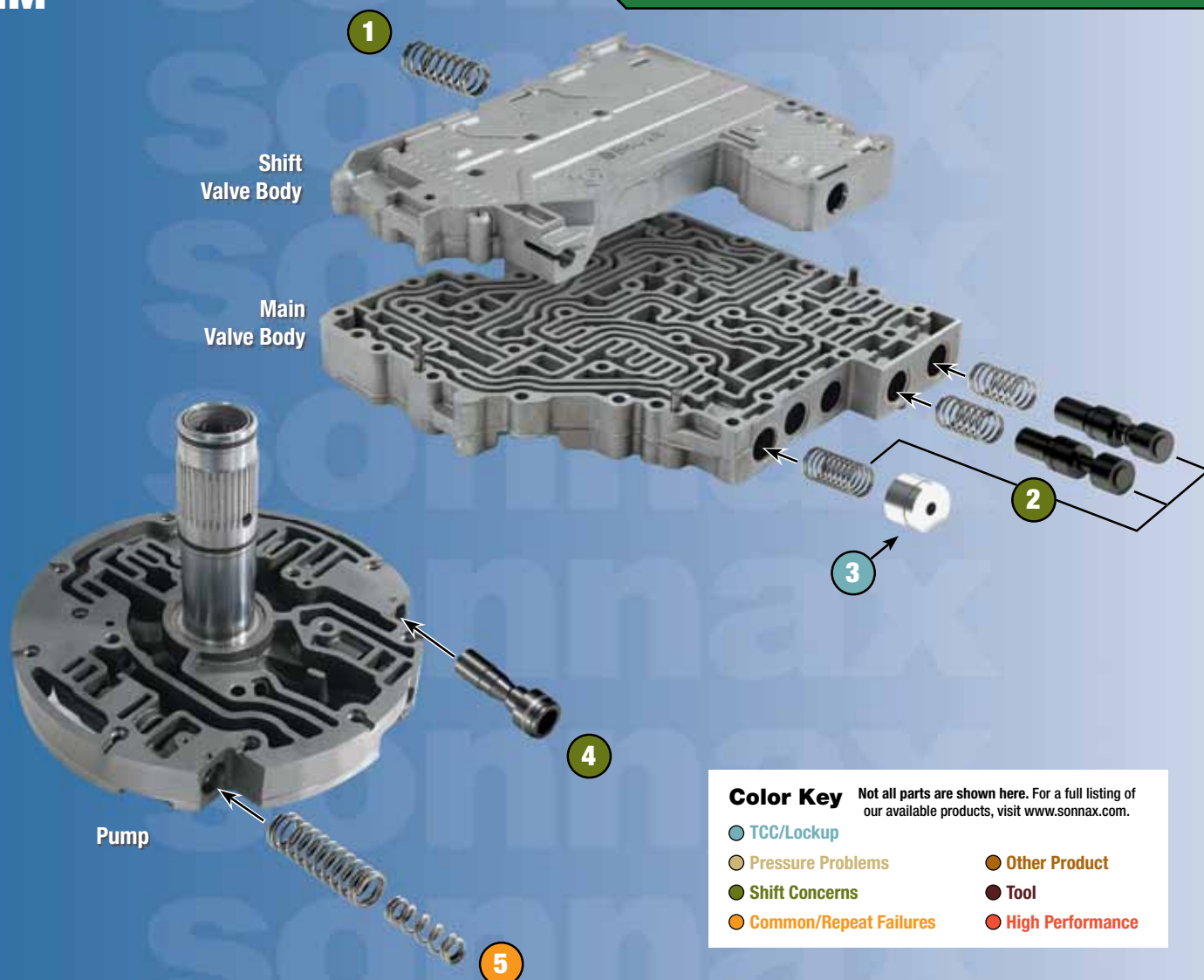
	Vehicle Complaints/Part Type	Product Name	Part Number		Illustration Number	Product/Application Details	HP or HD Use	Required Tool (*Recommended Tool)	Required Fixture
TCC/ Lockup	TCC slip, Code 741, Ratio codes	TCC Regulated Apply Valve Kit	84754-34K		14			84754-TL3	
	Code 741, No lockup, Falling out of lockup hot, Converter shudder, High slip RPM	TCC Apply Valve Kit	84754-43K		13	Includes Teflon® seal for minor bore wear			
		Oversized TCC Apply Valve Kit	84754-50K		13	For bores with significant wear		F-84754-TL50	VB-FIX
	TCC slippage, Repeat converter failure, Reduced cooler flow, Loss of lube	TCC Relief Valve Kit	84757-01K			'97-later, 10/bag			
	Pressure Problems								
	High/Unstable line pressure, Slide/rotor failures, Lube /Overheated converter issues	Oversized Pressure Regulator Valve Kit	84754-46K		10			84754-TL46	
	Low line pressure due to worn pin	Pump Slide Pivot Pin	84881A			Grooved, 5/bag			
Shift Concerns	Code 1811, Maximum adaptive/long shift, TCC slippage, TCC piston failure	AFL Valve & Sleeve Kit	84596-02K		15			F-84596-TL	VB-FIX
	Code 1811, Poor/Intermittent line rise, Slip/Shudder condition, TCC Codes 741, 742	Enlarge Torque Signal Valve	84754-44		12	'97-Later		84754-TL44	
	Harsh reverse engagement, Soft shifts especially 1-2, Low line rise forward/reverse	Boost Valve & Sleeve Kit	84754-30K		11				
		2-3 Shift Valve	84754-36K		6	Anodized, '94-later, GM valve bodies only			
		3-2 Downshift Valve	84754-37K		5	Anodized			
		3-4 Shift Valve	84754-38K		8	Anodized			
		4-3 Downshift Valve	84754-39K		7	Anodized			
	Erratic/Temperature sensitive shifts, Wrong gear starts, Worn shift valves								
	Delayed engagements, Flared 1-2, Low reverse pressure, Burned 1-2 band	Oversized 1-2 & Reverse Servo Boost Valve Kit	84754-40K		9			84754-TL2	
	3-4 Shift complaints, Burned 4th clutch, No 4th	3-4 Accumulator Piston	84880M-01						
	1-2 Shift complaints, Soft shifts, Poor line rise	Oversized 1-2 Accumulator Valve Kit	84754-57K		4			F-84754-TL57	VB-FIX
	2-3 Shift complaints, Soft shifts, Poor line rise	2-3 Accumulator Valve Kit	84754-53K		1				
		Oversized 3-4 Accumulator Valve Kit	84754-55K		3	GM valve bodies		F-84754-TL55	VB-FIX
		Oversized 3-4 Accumulator Valve Kit	84754-58K		2	Volvo valve bodies		F-84754-TL55	VB-FIX
		Oversized 1-2, 2-3 Accumulator Pin & Reamer Kit	84754-52K			Includes reamer & 10 pins			
	Burnt clutches, Inconsistent shifts, High adaptives	Oversized 1-2, 2-3 Accumulator Pin Kit	84754-51K			4/Bag		Reamer from 84752-52K	
	Common or Repeat Failures								
	Differential lube failures, Differential lube tubes fall out	Differential Lube Tube Retainer	84532-01K						
	Worn channel plate sleeve	Channel Plate Sleeve	84596-01K						
Other Products	Valve Body Reconditioning Kit								
	Sure Cure® Kit	4T65-E Sure Cure® Kit	SC-4T65E			See page 157 for details.		84754-TL3, F-84754-TL	VB-FIX
	Planetary part	Overdrive Planetary Thrust Bearing	34821-01						
	Shim	Input Clutch Hub Shim	84733-10			.010" Thick, 10/bag			
	Shim	Input Clutch Hub Shim	84733-20			.020" Thick, 10/bag			
	Solenoid	Shift Solenoid	84421G			1-2 & 2-3, '97-Later			
	Solenoid	EPC Solenoid	84431G			'97-'02			
	Solenoid	EPC Solenoid	84431H			'03-Later			
Tools	Tool	Tool Kit	84754-TL2			For oversized 1-2 & reverse servo boost valve kit 84754-40K			
	Tool	Tool Kit	84754-TL3			For TCC regulated apply valve kit 84754-34K			
	Tool	Tool Kit	84754-TL44			For torque signal valve 84754-44			
	Tool	Tool Kit	84754-TL46			For oversized pressure regulator valve kit 84754-46K			
	Tool	Tool Kit	F-84596-TL			For AFL valve & sleeve kit 84596-02K			VB-FIX
	Tool	Tool Kit	F-84754-TL50			For TCC apply valve kit 84754-50K			VB-FIX
	Tool	Tool Kit	F-84754-TL55			For 3-4 accumulator valve kits 84754-55K & 84754-58K			VB-FIX
	Tool	Tool Kit	F-84754-TL57			For 1-2 accumulator valve kit 84754-57K			VB-FIX

Red Part Number = New in Vol. 8



	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Shift Concerns	TCC/Lockup Converter apply/release problems, Code 39 or 741	TCC Regulator Valve Kit	72854-03K	2	72854-TL2	
	Pressure Problems Delayed engagement, Low line pressure	Oversized PR Valve & Boost Valve Kit	72754-03K	5	F-72754-TL3	VB-FIX
	High/Low line pressure, Harsh/Soft shifts	Boost Valve Kit	72754-01K	4		
	Wrong gear starts, Solenoid codes, Clutch/Band failures	AFL Valve Repair Kit	72854-01K	3	72854-TL	
	Soft 2-3 or 4-3, Worn/Damaged pin bore	2-3 Accumulator Piston – '94-Later	72871-01	1		
	Soft/Loss of 4th, Low line pressure, Long 1-2	3-4 Accumulator Piston	72872-01			
	Other Products					
Tools	Bushing	Scavenger Pump Bushing – 2/Bag	72901-01			
	Tool	Tool Kit – For valve kit 72854-01K	72854-TL			
	Tool	Tool Kit – For valve kit 72854-03K	72854-TL2			
	Tool	Tool Kit – For valve kit 72754-03K	F-72754-TL3			VB-FIX

Red Part Number = New in Vol. 8



	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Shift Concerns	TCC/Lockup					
	Converter slip code P0741, Elevated operating temperatures	F-Trim Valve Sleeve – '04-Earlier	37000-03	3		
	Code 872, 3rd Gear start, Pressure switch stuck on	E-Shift Valve Spring	37000-02	1	37000-02BST*	
	Harsh/Delayed bump on forward engagement	C-1 Valve & Seal Kit – '03-Earlier	37000-05K	4		
Common or Repeat Failures	Premature clutch wear in HD applications	Trim Valve & Spring Kit – '02-Later	37000-12K	2	37000-TL12	
Other Products						
	Lube Regulator & Converter Relief Spring Kit – '03-Earlier	37000-01K	5			
Tools	Sensor	Turbine Speed Sensor	S29536408			
	Tool	Bore Sizing Tool – Recommended for shift valve spring 37000-02	37000-02BST			
	Tool	Tool Kit – For kit 37000-12K	37000-TL12			

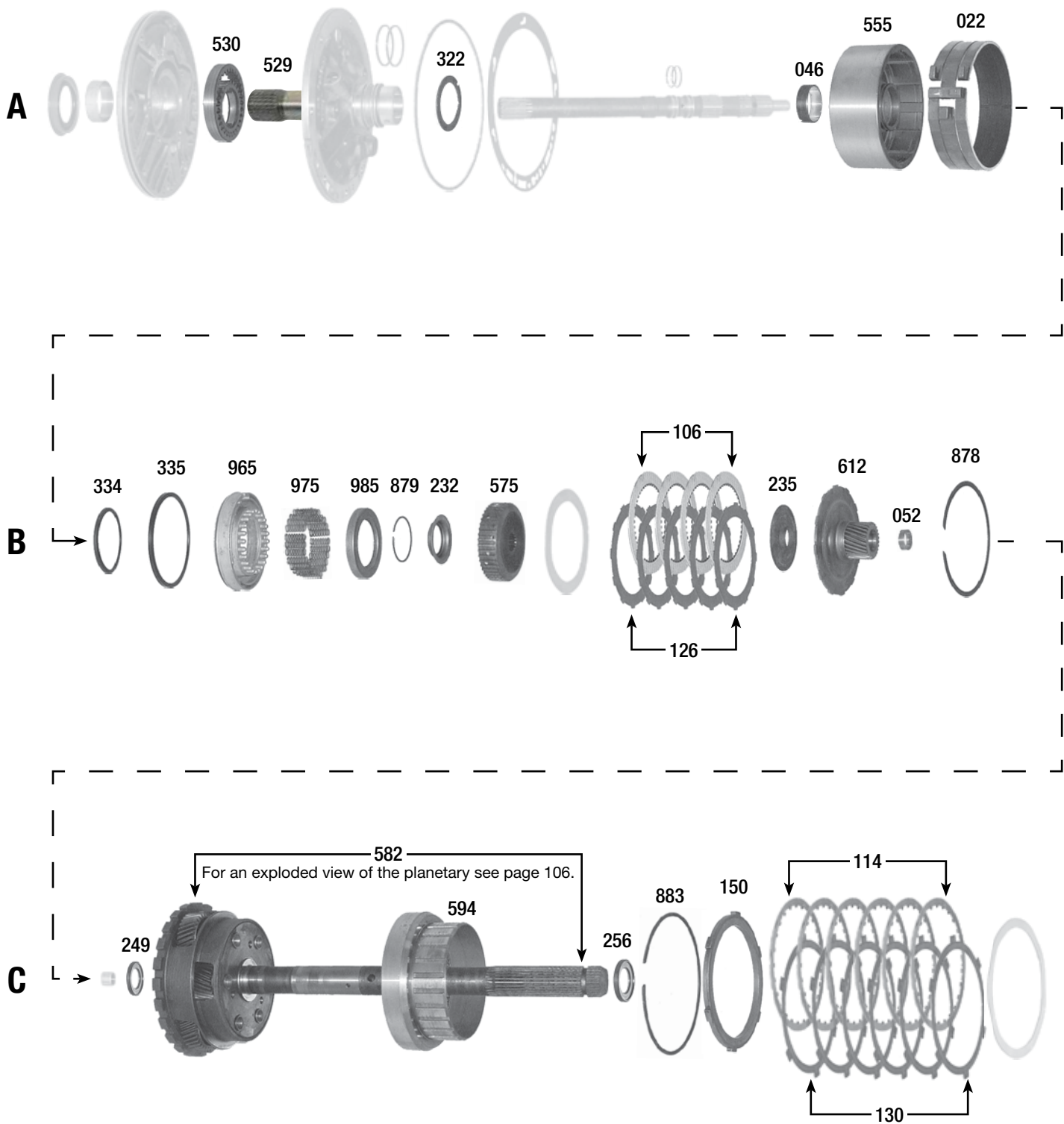
*Recommended Tool



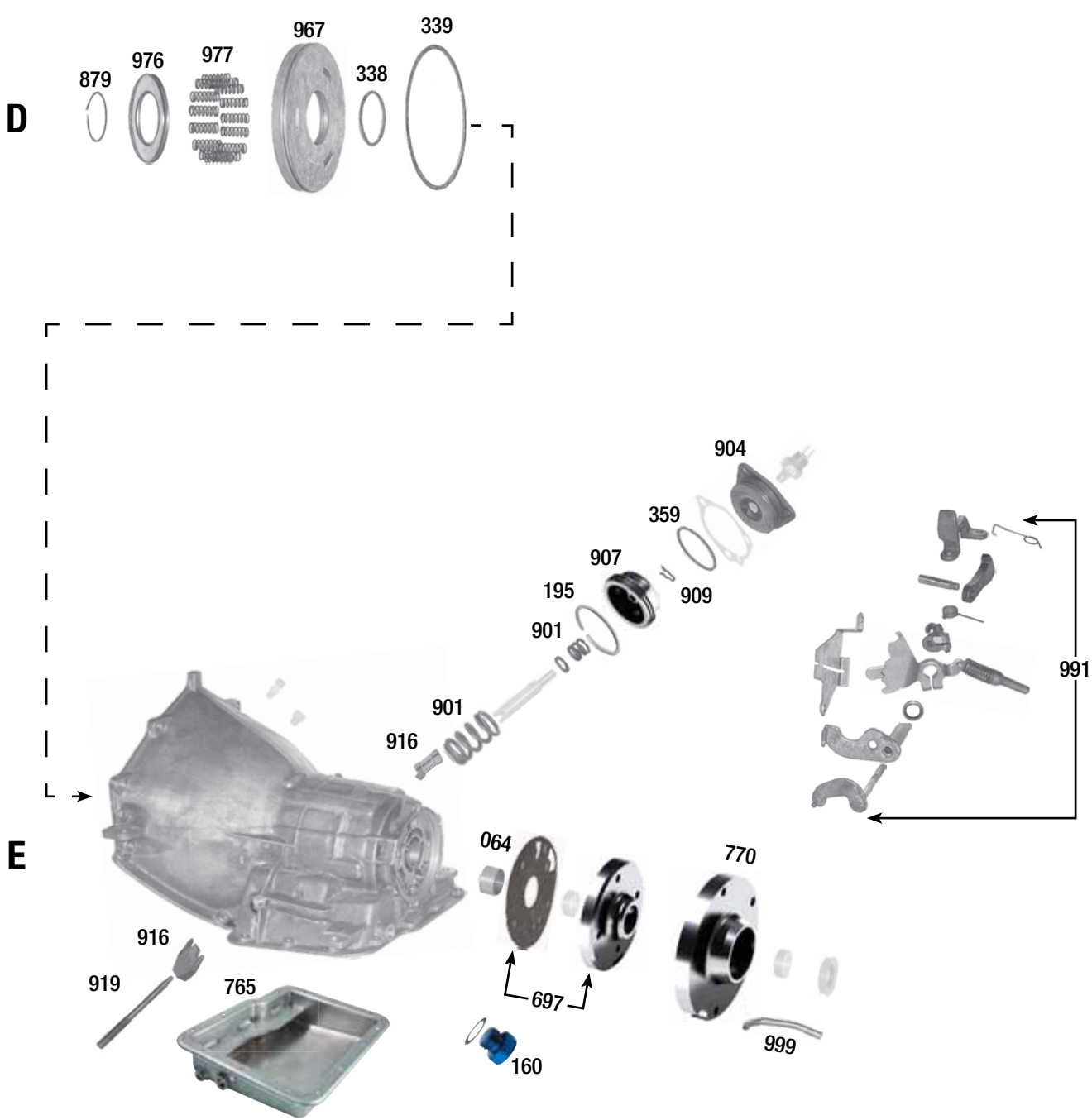
OEM #	Product Name	Part Number	Applications	Details
6756782	Converter Cover Bushing	S6756782	MT-600	
6758036	Lockup Piston Seal Ring	S6758036	MT-600	
6770845	Lockup Piston	S6770845	MT(B)640, 643, 650, 653	
6770845	Lockup Piston	S6770845-OE	MT-600	OEM equivalent
6774966	Stator Spring	S6774966	MT(B)640, 643, 650, 653	
6774968	Stator Roller	4968	MT(B)640, 643, 650, 653	
6834221	Clutch Hub	S6834221	MT-600	4th Clutch drive hub
6834488	Clutch Steel	56715	HT-700	.103" Thick, 2nd clutch, 16 tooth
6834679	Clutch Steel	56713	HT-700	Forward clutch, 14 tooth
6834720	Clutch Steel	S6715A	HT-700	.120" Thick, 2nd clutch, 16 tooth
6835605	Clutch Hub	S6835605	HT-700	4th Clutch drive hub
6837206	Stator Race	S6837206	MT(B)640, 643, 650, 653	
6837607	Stator Roller	S6837607	CRT 3000	
6837976	Stator Roller	S6837976	HT-700; MT(B)644, 654	
6881466	Governor	460	AT-500	
6883044	Oil Pan Filter	SP6883044	AT-500, MT-600	Sealed power, for deep pan
6883901	Rear Sun Gear	S6883901	MT-600	
6883938	Governor Gear Kit	425	AT-500; CLBT; CLT; HT-700; MT-600; V-700	Glass-filled nylon, fits governors #460, 461 & 462
6884902	Rear Sun Gear	S6884902	AT-500	
6885570	Governor	461	AT-500, HT-700, MT-600	
6885571	Governor	462	AT-500; HT-700; MT-600; V-700	
9428135	Thrust Bearing	S9428135	AT543; MT(B)640, 643, 650, 653	
9436642	Oil Pan Plug	S9436642	AT-500; MT-600	For deep pan (S23045906) heater hole
23013906	Impeller Hub	S23013906	MT(B)640, 643, 650, 653	
23014304	Ground Sleeve	S23014304	AT-500	With bushing & bearing
23015831	Stator Spring	S23015831	MT-600	

Red Part Number = New in Vol. 8

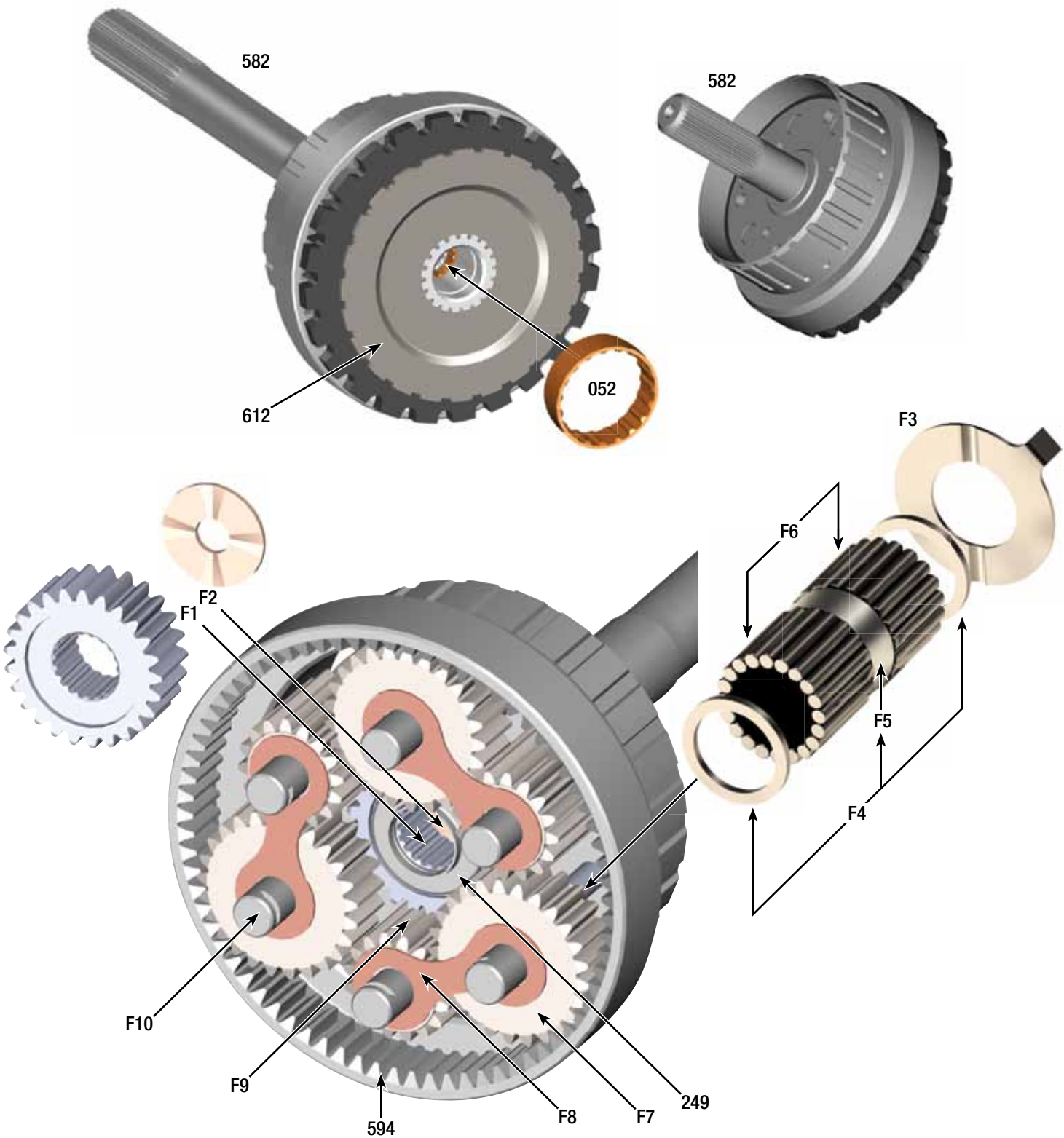
OEM #	Product Name	Part Number	Applications	Details
23016681	Oil Pan Gasket	S23016681	HT-700; CLBT	OEM grade, fits HT-700 6", 7", 8" pans & CLBT pan
23016722	Impeller Hub	S23016722	MT(B)640, 643, 650, 653	
23016866	Thrust Bearing	S23016866	AT543; MT(B)640, 643, 650, 653	
23017267	Clutch Hub	S23017267	MT-600	4th Clutch driving hub
23017444	Washer	S23017444	MT(B)640, 643, 650, 653	Stator wide plate washer
23018535	Stator Spring	S23018535	MT(B)644, 647, 654; HT-700	
23018884	Oil Pan	S23018884	MT-600	Deep pan
23019201	Oil Pan Filter & Gasket Kit	SP23019201	AT-500; MT-600	Sealed power, for deep pan
23019782	Thrust Bearing Assembly	S23019782	MT-600	Front & center support thrust bearing
23045906	Oil Pan	S23045906	AT-500	Deep pan, ribbed with heater hole
23046108	Converter Clutch Plate	S23046108	MT(B)640, 643, 650, 653	
23047771	Clutch Steel	56711	HT-700	.103" Thick, first clutch, 38 tooth
23047772	Clutch Steel	56711A	HT-700	.120" Thick, first clutch, 38 tooth
23047959	Ball Bearing Assembly	S23047959	AT540; MT-600	Main shaft
23047970	Ball Bearing Assembly	S23047970	AT543; MT-600	Output housing
29500063	Stator Roller	S29500063	MD-B300, B400	
29500064	Stator Spring	S29500064	MD-B300, B400	
29500738	Oil Pan Bolt	S29500738	AT-500; MT-600; HT-700	25/Bag
29501160	Oil Pan Gasket	S29501160	AT-500; MT-600	
29501358	Oil Pan	S29501358	AT-500	Deep pan, dual fill tube locations
29503196	Converter Cover Bushing	S29503196	MD-B300, B400	
29503772	Oil Pan	S29503772	MT-600	Shallow pan, zinc plated, larger, strong magnet
29506149	Rear Sun Gear	S29506149	AT-500	33-Tooth internal spline
29509450	Oil Pan	S29509450	HT-700	7" Deep pan, with magnet
29513517	Stator Spring	S29513517	MT(B)640, 643, 650, 653	
29514677	Converter Back Plate	S29514677	HD-B500	
29514799	Pump Hub Extension	S29514799	MD-B300, B400	PTO
29514799	Pump Hub Extension	S29514799-SP	MD-B300, B400	PTO, shot peened pump drive tabs
29514804	Converter Back Plate	S29514804	MD-B300, B400	
29516484	Ground Sleeve	S29516484	MD-B300, B400	Non-PTO
29516486	Ground Sleeve	S29516486	MD-B300, B400	PTO
29516488	Ground Sleeve	S29516488	HD-B500	Non-PTO
29516490	Ground Sleeve	S29516490	HD-B500	PTO
29516957	Converter Back Plate	S29516957	HT-700	
29524116	Converter Cover	S29524116	MT(B)640, 643, 650, 653	Improved billet cover
29524335	Pump Bushing	S29524335	MD-B300, B400	Early style
29527101	Pump Bushing	S29527101	MT(B)640, 643, 650, 653	
29527102	Pump Bushing	S29527102	HD4000	Early style
29533975	Pump Bushing	S29533975	MD-B300, B400	Bi-Metal
29537879	Reduced Modulation Modification Kit	S29537879	AT-500	
29542026	Pump Bushing	S29542026	MD-B300, B400	Late style
29542029	Pump Bushing	S29542029	HD4000	Late style
29543432	Speed Sensor	S29543432	MD-B300, B400; HD-B500	
29543434	Speed Sensor	S29543434	MD-B300, B400	With retarder
29543435	Speed Sensor	S29543435	HD-B500	
29543439	Speed Sensor	S29543439	HD-B500	With retarder
23018535, 6837976	Stator Spring & Roller Kit	AL-SR-1K	MT(B)644, 654; HT-700	10 Springs & 10 rollers
29513517, 6774968	Stator Spring & Roller Kit	AL-SR-2K	MT(B)643, 653	10 Springs & 10 rollers
6774966, 6774968	Stator Spring & Roller Kit	S6775657	MT(B)640, 643, 650, 653	10 springs & 10 rollers



Red Part Number = New in Vol. 8



F Planetary Exploded View



Red Part Number = New in Vol. 8

Category	Product Name	Part Number	Diagram	Illust. #	Description
Band	Extra Wide Band	S019961K	A	022	Kevlar® material
Band	Extra Wide Band	S019961	A	022	Red material
Band	Band Adjusting Screw Jam Nut	28127	E	919	Chrome-moly steel
Band	Band Adjustment Screw Kit	28612-01K	E	919	Includes jam nut
Band	Band Anchor Strut	28108	E	916	
Band	Band Apply Strut	28107	E	916	
Band	Powerglide® Band	28314-K	A	022	Kevlar® lining material
Band	Powerglide® Band	28314	A	022	Red lining material
Case	Case Bushing	28002	E	064	
Case	Modulator Plug Kit	28738-01K	E	160	
Case	Speedometer Hole Plug Kit	35922-01K			
High Clutch	Clutch Drum	28755-01	A	555	Holds 10 frictions
High Clutch	Clutch Drum Bushing	28005	A	046	Replacement bushing
High Clutch	Clutch Drum Bushing	28005X	A	046	Finish-in-place bushing
High Clutch	Clutch Drum Kit	28755-08K			With bearing, holds 10 frictions
High Clutch	Clutch Drum Kit	28755-01K			Holds 10 frictions
High Clutch	Clutch Drum Small Lip Seal	28755-07	B	334	
High Clutch	Clutch Drum Piston	28765-04	B	965	Forged, for 10-clutch drum
High Clutch	Clutch Drum Piston	28765-03	B	965	Forged, OEM replacement
High Clutch	Clutch Drum Retaining Ring	28755-04	B	878	Large, 5/bag
High Clutch	Clutch Drum Retaining Ring	28755-03	B	879	Small, 5/bag
High Clutch	Clutch Drum Spring Retainer	28755-02	B	985	
High Clutch	Clutch Drum Wear Plate	28755-05	B	235	Large, 5/bag
High Clutch	Clutch Drum Plate	28755-06	B	232	Small, 5/bag
High Clutch	Clutch Drum	28755-08	A	555	With bearing, holds 10 frictions
High Clutch	Clutch Drum Thrust Washer	28406B	A	322	.061" Thick
High Clutch	Clutch Drum Thrust Washer	28406C	A	322	.078" Thick
High Clutch	Clutch Hub	28304	B	575	With lightening holes, for standard drum
High Clutch	Clutch Hub	28304-01	B	575	With lightening holes, for 10-friction drum
High Clutch	Clutch Hub	28304-02	B	575	Without lightening holes, for 10-friction drum
High Clutch	Clutch Hub	28304-SP	B	575	Without lightening holes, for standard drum
High Clutch	Clutch Return Spring	28320	B	975	24/Bag
High Clutch	Clutch Drum Piston Large Lip Seal	28765-02	B	335	
Frictions/Steels	Alto Front Frictions	S019740A	B	106	.061" Thick, red material
Frictions/Steels	Alto Front Frictions	S019740	B	106	.098" Thick, red material
Frictions/Steels	Alto Reverse Frictions	S032744	C	114	.098" Thick, red material
Frictions/Steels	Alto Kolene® Steels	S019715HK-150	B	126	24-Tooth, .060" thick, with turbulator holes
Frictions/Steels	Alto Front Kolene® Steels	S019701AK	B	126	.060" Thick, without turbulator holes
Frictions/Steels	Alto Front Kolene® Steels	S019701K	B	126	.070" Thick, without turbulator holes
Frictions/Steels	Alto Reverse Kolene® Steels	S019703K	C	130	.070" Thick
Lever/Linkage	Detent Lever	28119	E	991	
Lever/Linkage	Detent Spring	28861-03	E	991	
Lever/Linkage	Shift Lever	28431-05K	E	991	Bolt-Together

Category	Product Name	Part Number	Diagram	Illust. #	Description
Lever/Linkage	Shift Lever	28431	E	991	One-piece
Lever/Linkage	Shift Lever	28431-06	E	991	One-piece, anti-leak
Pan & Filter	Filter Extension Kit	28801-S09K			For standard Powerglide® valve body & filter
Pan & Filter	Filter Extension Kit	28801-S11K			Hipster valve body, Chrysler filter
Pan & Filter	Oil Pan	28801-S	E	765	Stamped aluminum with slanted profile
Pan & Filter	Oil Pan Stud Kit	28711-01K			14 Nuts & studs
Park Mechanism	Park & Gear Selector Lever Guide Plate	28130	E	991	
Park Mechanism	Park & Gear Selector Lever Spring Retainer	28116			
Park Mechanism	Park/Lock Actuator Assembly	28111	E	991	
Park Mechanism	Park/Lock Actuator Retaining Clip	28121	E	991	E-Clip for 3/16" shaft, 5/bag
Park Mechanism	Park/Lock Actuator Retaining Clip	28122	E	991	E-Clip for 5/16" shaft, 5/bag
Park Mechanism	Park/Lock Reaction Bracket	28110	E	991	
Park Mechanism	"Rooster Comb" Park & Gear Selector Lever	28862	E	991	
Park Mechanism	Parking Pawl	28109	E	991	
Park Mechanism	Parking Pawl Pin	28115	E	991	
Park Mechanism	Parking Pawl Retaining Clip	28120	E	991	C-Clip for 5/16" shaft, 5/bag
Park Mechanism	Parking Pawl Torsion Spring	28113	E	991	
Planetary	Complete Rebuild Kit	28922-01K	F		For 1.76:1 ratio carrier
Planetary	Front Thrust Washer	8415	F	F8	For 1.76:1 ratio carrier
Planetary	Needle Roller Bearing	28413	F	F6	For 1.76:1 ratio carrier, 185/bag
Planetary	Pinion Pin Kit	28435-01K	F	F10	Includes 6 pins & retainer, for 1:76 ratio carrier
Planetary	Rear Thrust Washer	8415B	F	F3	For 1.76:1 ratio carrier
Planetary	Roller Spacer Kit	K28414	F	F4	For 1.76:1 ratio carrier
Planetary	Thick Roller Spacer	28414	F	F5	For 1.76:1 ratio carrier
Planetary	Thrust Washer Kit	8415BK			For 1.76:1 ratio carrier
Planetary	1.69 Ratio Complete Gear Set	169S-K			Fits 1:76 ratio carrier
Planetary	1.80 Ratio Complete Gear Set	180S-K			Fits 1:76 ratio carrier
Planetary	1.80 Ratio Carrier Assembly	28180G-01	C, F	582	OEM length shaft, 12-tooth drum flange
Planetary	1.80 Ratio Carrier Assembly	28180G-01S	C, F	582	Short shaft, 12-tooth drum flange
Planetary	1.80 Ratio Carrier Assembly	28180G-04	C, F	582	OEM length shaft, 24-tooth drum flange
Planetary	1.80 Ratio Carrier Assembly	28180G-04S	C, F	582	Short shaft, 24-tooth drum flange
Planetary	Front Thrust Washer	8415A	F	F8	For 1.82:1 ratio carrier
Planetary	Thrust Washer Kit	8415AK	F	F6	For 1.82:1 ratio carrier, 6/bag
Planetary	Carrier-to-Case Thrust Bearing	28438-01K	C	256	
Planetary	Rear Sun Gear Thrust Washer	38208	F	F2	Bronze
Planetary	Sun Gear Bushing	8436	B, F	052	
Planetary	Sun Gear Thrust Bearing	28321	C, F	249	
Planetary	Sun Gear	180S-FSF	B, F	612	1.80:1 Ratio, with flange
Planetary	Sun Gear	180S-24FSF	B, F	612	1.80:1 Ratio, 24-tooth, with flange
Planetary	Long Pinion	180S-LPK	F	F9	1.80:1 Ratio, 3/bag
Planetary	Short Pinion	180S-SPK	F	F7	1.80:1 Ratio, 3/bag
Planetary	Planetary Ring Gear	180S-R	C, F	594	1.80:1 Ratio

Red Part Number = New in Vol. 8
Italicized Red Part Number = Available Early 2011

Category	Product Name	Part Number	Diagram	Illust. #	Description
Planetary	Rear Sun Gear	180S-RS	F	F1	1.80:1 Ratio
Planetary	Sun Gear	169S-FSF	B, F	612	1.69:1 Ratio, with flange
Planetary	Sun Gear	169S-24FSF	B, F	612	1.69:1 Ratio, 24-tooth, with flange
Planetary	Long Pinion	169S-LPK	F	F9	1.69:1 Ratio, 3/bag
Planetary	Short Pinion	169S-SPK	F	F7	1.69:1 Ratio, 3/bag
Planetary	Planetary Ring Gear	169S-R	C, F	594	1.69:1 Ratio
Planetary	Rear Sun Gear	169S-RS	F	F1	1.69:1 Ratio
Pump	Front Pump Bolt	28136			7/Bag
Pump	Front Pump Stud Kit	28711-03K			7/Bag
Pump	Pump Gear Set	28201	A	530	OEM replacement gears
Reverse Clutch	Reverse Clutch Pack Pressure Plate	28131	C	150	
Reverse Clutch	Reverse Clutch Pack Retaining Ring	28124	C	883	
Reverse Clutch	Reverse Clutch Piston	28761-01K	D	967	
Reverse Clutch	Reverse Clutch Piston Seal Kit	28761-01SK	D	338/339	
Reverse Clutch	Reverse Clutch Return Spring	28320A	D	977	17/Bag
Reverse Clutch	Reverse Clutch Spring Retainer	28709	D	976	"No-Flex" design
Reverse Clutch	Reverse Piston Hub Retaining Ring	28123	D	879	
Seal/Gasket	Replacement Gasket	3543L-5			For modulator plug kit 28738-01K, 5/bag
Seal/Gasket	Seal/Gasket Kit	28715-01SK			"Shorty" rear cover
Seal/Gasket	Replacement Seal Kit	28821-09SK	E		For 28821-09K super hold servo kit
Servo	Super Hold Servo Kit	28821-09K	E		30% More apply area, stock cover height
Servo	Servo Apply Line	28117	E	999	
Servo	Servo Cover Kit	28821-06K	E		Non-Anodized
Servo	Servo Cover Kit	28821-03K	E		Anodized
Servo	Servo Pin Clip	28132	E	909	
Servo	Servo Piston & Cover Kit	28821-07K	E	904/907	O-Ring type, non-anodized
Servo	Servo Piston & Cover Kit	28821-04K	E	904/907	O-Ring type, anodized
Servo	Servo Piston & Cover Kit	28821-08K	E	904/907	Teflon® sealing ring type, non-anodized
Servo	Servo Piston & Cover Kit	28821-05K	E	904/907	Teflon® sealing ring type, anodized
Servo	Servo Piston Kit	28821-01K	E	907	O-Ring type
Servo	Servo Piston Kit	28821-02K	E	907	Teflon® sealing ring type
Servo	Servo Piston O-Ring	28821-OR	E	359	2 Required
Servo	Servo Piston Return Spring	28133	E	901	
Servo	Servo Piston Sealing Ring	18608T	E	195	Teflon®, 2 required
Servo	Servo Piston	28821-02	E	907	Teflon® sealing ring type
Servo	O-Ring & Gasket Kit	28821-OK	E		For O-Ring type servos
Servo	Sealing Ring & Gasket Kit	28821-TK	E		Teflon®, for Teflon® sealing ring type servos
Support	Output Shaft Support	28080K	E	697	Includes roller bearing
Support	Output Shaft Housing	28715-01K	E	770	"Shorty" rear cover, replaces extension housing
Support	Stator Support Shaft	28154S	A	529	THM spline
Valve Body	Boost Valve Assembly	28999-01K			.489" Dia.
Valve Body	Pressure Regulator Valve	28999-03			



Valve Body



Color Key

Not all parts are shown here. For a full listing of our available products, visit www.sonnax.com.

● TCC/Lockup

● Pressure Problems

● Shift Concerns

● Common/Repeat Failures

● Other Product

● Tool

● High Performance

	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Pressure Problems	No/Delayed reverse w/harsh engagement, Poor line pressure control (high or low pressure), Blown filters	Pressure Regulator Valve – Fits Type 1 or Type 2 valve bodies	95200-06	2		
		Pressure Regulator Sleeve Kit – Fits Type 1 or Type 2 valve bodies	95200-05K	1	95200-TL	
	Low/Erratic line pressure	PR Valve Cushion Spring – Fits Type 1 or Type 2 valve bodies	95200-01	3		
	Delayed/Harsh reverse engagement, Insufficient line rise	Boost Valve Kit – Fits Type 2 valve bodies only	95200-03K	4		
	Valve Body Reconditioning Kit					
	Sure Cure® Kit	TAAT Sure Cure® Kit – See page 153.	SC-TAAT		95200-TL	
	Tools					
	Tool	Tool Kit – For PR sleeve kit 95200-05K	95200-TL			

Red Part Number = New in Vol. 8

The Prescription for Optimum Pressure

Sometimes a little more pressure is just what the doctor ordered. Raising line pressure is the most basic change you can make to your transmission. It can breath new life into old transmissions with sagging pressure regulator springs, or provide extra clutch and band apply pressure in hard-working units. Raising line pressure is typically done by using a stronger pressure regulator spring, installing a larger boost valve or doing both.

Sonnax offers several products which raise line pressure and, more importantly, vary the rate of pressure increase. Our lineup of pressure regulator springs and larger ratio boost valves is continuously growing, providing more and more options when you want to tweak a unit above stock pressures.

Stronger Springs vs. Larger Boost Valves

A stronger spring and larger boost valve will both increase pressure, just not in the same way, so it's important to understand the differences before making any changes.

Stronger springs have a “linear” effect on pressure. This means you get the same amount of pressure increase at the low and high ends of the pressure range (‘A’ on **Figure 1**). While a stronger pressure regulator spring will raise line pressure, there is a limit to how much you can get away with before troubles surface. A significant pressure increase that tightens upshifts under heavy load can be too much of an increase when shifting into reverse in the garage. This increase also puts extra load on the pump at idle and can result in the TCC clutch dragging due to reduced cooler flow.

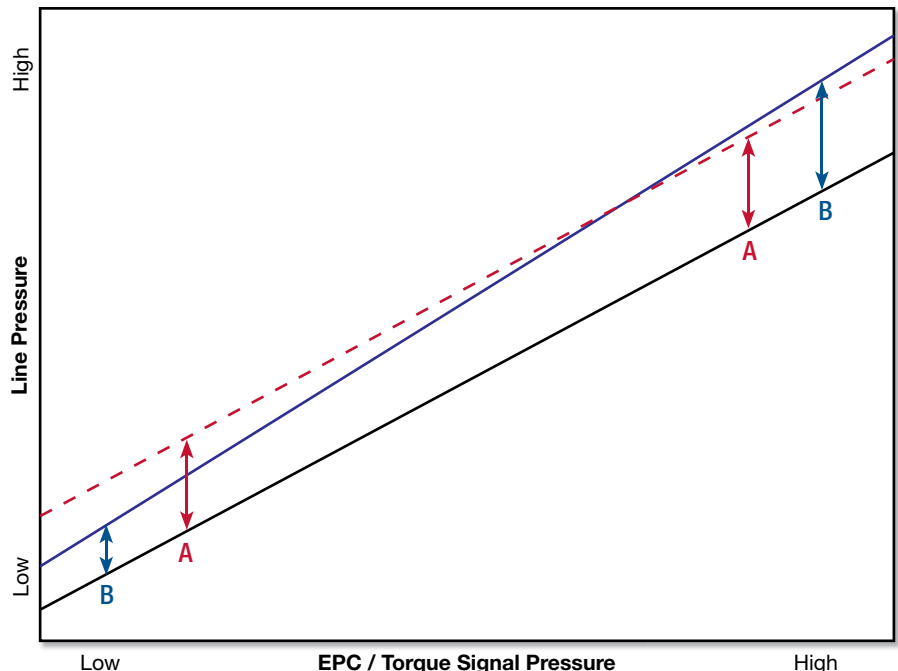
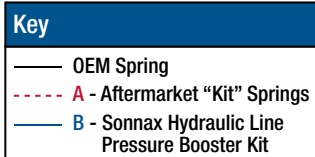
Larger boost valves have a “progressive” effect on pressure: they change the rate of pressure increase. Using larger boost valves (‘B’ on Figure 1), it's possible to have a very small pressure increase at the low end of the pressure range and a far greater increase at the high end. This creates an ideal situation: smooth engagements and lower load on the pump at idle, plus a greater increase in pressure as the transmission is worked harder. The significance of changing the rate of pressure increase with larger valves – rather than simply increasing pressure by the same amount with springs – is that higher pressure is created when it is needed most.

Figure 1

Increases in Line Pressure

Stronger Springs vs. Larger Boost Valves

Stronger springs have a “linear” effect and will raise overall line pressure. Larger boost valves have a “progressive” effect and will change the rate of pressure increase.



Sonnax hydraulic line pressure booster kits contain pressure regulator springs and boost valves designed to work together. Our pressure regulator springs are about 10% stronger than the OEM springs, but far more conservative than other aftermarket “kit” springs. When the Sonnax springs and larger ratio boost valves are combined, you get the best of both worlds: a modest pressure increase at the low end, with a high end pressure that is equal to or greater than that of “kit” springs. Driving a vehicle with this combination of Sonnax parts will result in normal engagements, normal light throttle shifts and smooth coast-down shifts. When pushed harder or driven aggressively, pressure increase becomes progressively greater, ensuring that shifts are not too soft. You may not need this for great-grandma’s grocery-getter, but for most other vehicles, Sonnax hydraulic line pressure booster kits will add just the right touch to make sure the pressure is there when needed.

How Does a Boost Valve Work?

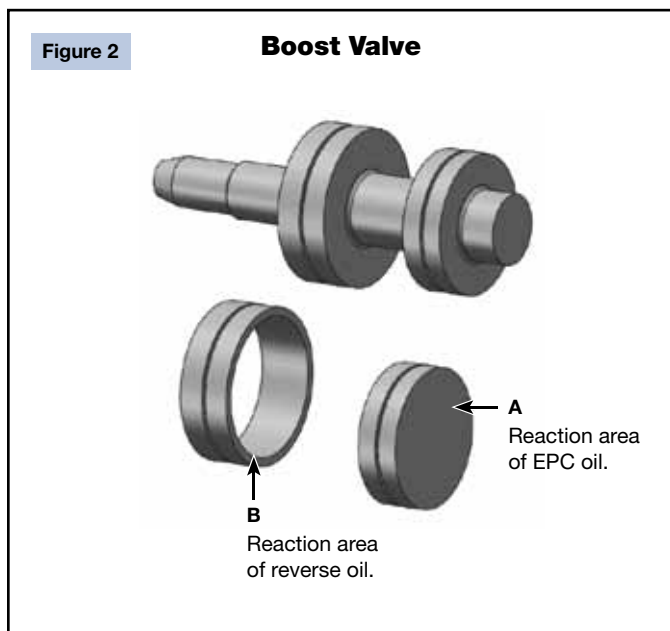
The pressure regulator spring sets the base line pressure. The job of the boost valve is to help the pressure regulator spring increase line pressure as needed. In typical applications, oil pressure from the EPC solenoid, vacuum modulator or TV valve is directed to the end of the boost valve (‘A’ on **Figure 2**). As this oil pressure changes, so does the force assisting the pressure regulator spring, causing line pressure to increase. This variable pressure allows higher pressure under loads and during acceleration when it is

needed most. When the diameter or reaction area on the boost valve is made larger, more force will be created to help the pressure regulator spring.

Many boost valves feature an additional reaction area where reverse oil reacts to increase pressure in reverse (‘B’ on **Figure 2**). Sonnax boost valves are designed to get the right combination of pressures through tuning these two reaction areas. The new, larger ratio Sonnax 4L80-E boost valve (4L80E-LB1) is an example of “tuning out” some of the reverse pressure so that the majority of the pressure increase is in the forward ranges.

Electronic Line Boosters

Automakers possess many different systems to regulate and vary line pressure. The Chrysler 45RFE, 545RFE and 68RFE are unique because they utilize a true closed-loop pressure control system where the computer reads line pressure at all times through a full-range pressure sensor. This means traditional methods of raising line pressure by installing a stiffer pressure regulator spring or making changes to the pressure regulator valve will have no effect because the computer simply re-adjusts the pressure until the voltage signal from the pressure sensor matches what the computer wants to see.



To circumvent this type of closed-loop system, Sonnax developed two pressure signal modifiers which raise line pressure by tricking the computer into thinking pressure is low. Our electronic line pressure booster kits 44957-LB1 and 44957-LB2 install between the pressure sensor and vehicle harness using OEM-style sealed connectors. They do not require any modifications to the transmission – simply unplug the vehicle harness and reinstall with one of these parts.



Many more technical articles are available online in the Sonnax Technical Library – visit www.sonnax.com today!

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BEFORE it gets to the drivetrain?

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- **Fuse sets available for light to heavy duty applications from 1,500 to 25,500 ft. lbs. torque capacity**



Power Train Savers should be installed by a qualified driveline shop. Contact Sonnax to learn more about becoming an authorized installer or stocking distributor.

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Product shown here
is display model only.

Line Pressure Booster Kits

4L60-E Kit

Part No. 4L60E-LB1

- Boost Valve & Sleeve Assembly
- Pressure Regulator Spring
- O-Rings (2)
- Spacer

4L60 & 200-4R Kit

Part No. 700R4-LB1

4L80-E Kit

Part No. 4L80E-LB1

4R100 & E40D Kit

Part No. 4R100-LB1

400 Kit

Part No. 400-LB1

The four kits above include the following parts:

- Boost Valve & Sleeve Assembly
- Pressure Regulator Spring
- O-Rings (2)

4T65-E Kit

Part No. 4T65E-LB1

350 Kit

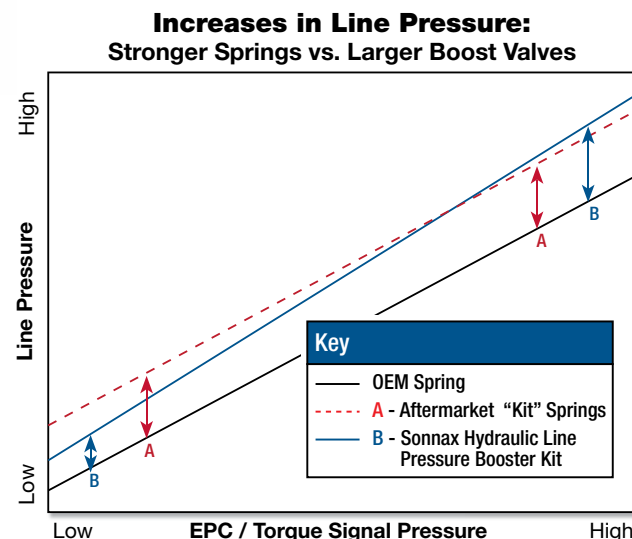
Part No. 350-LB1

Both kits above include the following parts:

- Boost Valve & Sleeve Assembly
- Pressure Regulator Spring

Hydraulic Line Pressure Booster Kits

Sonnax hydraulic line pressure booster kits contain pressure regulator springs and boost valves designed to work together to provide progressive pressure increases as driving conditions become more demanding.



Our pressure regulator springs are approximately 10% stronger than OEM and more conservative in impact than other aftermarket "kit" springs. Boost valves increase pressure proportionally based on demand. The combination of these springs and valves in a Sonnax kit gives you the best of both worlds: a modest pressure increase at the low end, with a high end pressure that is equal to or greater than that of other aftermarket "kit" springs.

Features & Benefits

- Improved band and clutch holding capacity for increased durability
- Progressive pressure increase as driving conditions become more demanding
- All the benefits of increased line pressure without overloading the pump at idle
- Does not produce excessively harsh low speed shift or harsh engagement

Learn more...

- "The Prescription for Optimum Pressure" on pg. 111

Electronic Line Pressure Booster Kits

Automakers use many different systems to regulate pressure. The Chrysler 45RFE, 545RFE and 68RFE are unique because they utilize a true closed-loop pressure control system: the computer reads line pressure at all times through a full range pressure sensor. This means traditional methods of raising line pressure such as installing a stiffer pressure regulator spring or making changes to the pressure regulator valve will have no effect because the computer simply re-adjusts the pressure until the voltage signal from the pressure sensor matches what the computer wants to see.

Sonnax electronic line pressure boosters alter the pressure signal sent to the computer causing the computer to raise line pressure.

The booster installs between the pressure sensor and vehicle harness using OEM style sealed connectors. Simply unplug the vehicle harness and reconnect with one of these parts. The **44957-LB1** (68RFE) kit has 10-15 psi increase and **44957-LB2** (45/545RFE) kit has 15-30 psi increase.



Higher line pressure increases clutch holding power and torque capacity, but with these Chrysler transmissions, the increase has a limited effect on shift feel. Changes in shift feel will be noticed mostly under aggressive driving or loaded conditions. These booster kits are ideal for heavy duty and modified vehicles and even stock transmissions when a little extra pressure is desired. No other modifications are required.

Features & Benefits

- Increased line pressure
- Increased clutch clamping force and torque capacity
- Installs on outside of transmission
- Easy plug-and-play installation

Line Pressure Booster Kit

For 68RFE

Part No. 44957-LB1

- Wiring harness with connectors
- Green wire
- Black wires (2)

Line Pressure Booster Kit

For 45/545RFE

Part No. 44957-LB2

- Wiring harness with connectors
- Black wires (3)

Detailed installation instructions for these parts are available online at www.sonnax.com.



Color Key
Not all parts are shown here. For a full listing of our available products, visit www.sonnax.com.

TCC/Lockup

Pressure Problems

Shift Concerns

Common/Repeat Failures

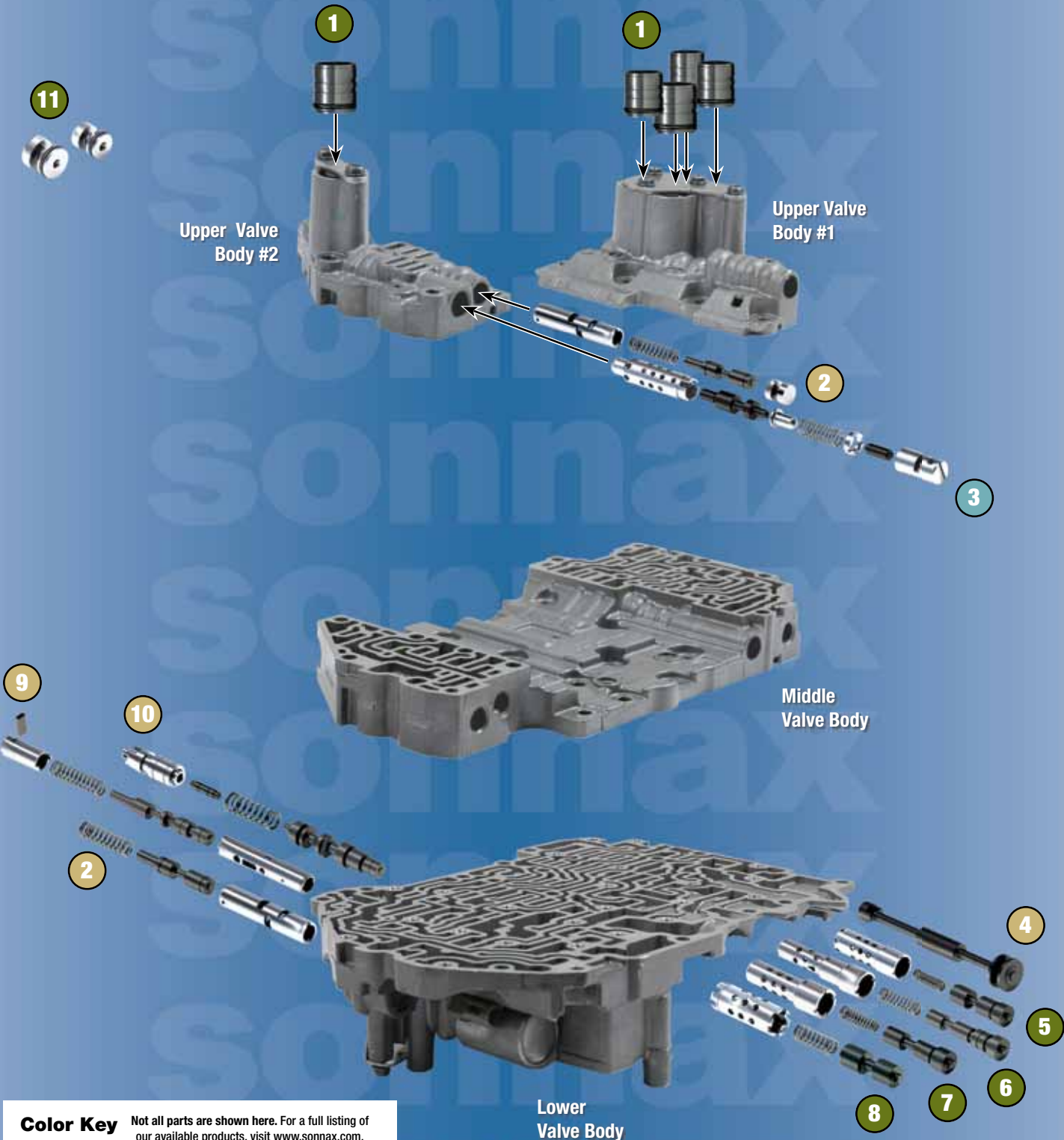
Other Product

Tool

High Performance

	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
TCC/Lockup	TCC apply & release problems, Inadequate lubrication, Converter codes	Lockup Relay Control Valve & Sleeve Kit	59947-01K	3		
	TCC apply & release problems, Converter codes, Burnt converters	Lockup Control Valve & Sleeve Kit	59947-03K	4		
	No TCC apply, Shift concerns, Harsh shifts in all ranges, Engine stalls on engagement, B5 Clutch distress, No/Flare 2-3	Solenoid Relay Valve & Sleeve Kit	59947-05K	2		
Shift Concerns	Pressure Problems					
	Wear at the main PR valve bore, Harsh/Soft shifts, Delayed engagements, TCC apply/release issues, Late shifts	Oversized Pressure Regulator Valve & Boost Valve Kit	59947-12K	9	F-59947-TL12	VB-FIX
	Delayed engagements, Harsh/Soft upshifts, Erratic reverse pressure	Main Boost Valve & Sleeve Kit	59947-07K	8		
	Loss of 3rd, 4th or 5th gear, No TCC apply, Low line pressure, Delayed forward, 2-3 Flare	Solenoid Modulator Valve Capsule Kit	59947-09K	1		
	Delayed forward, 2-3 Flare, Low SLT, TCC slip/fluid overheat, 3-2 Neutral, Poor shift quality	O-Ringed End Plug Kit	59947-21K	10		
	Flare 2-3, 3-2 Shift concerns, 3-2 Neutral, Harsh 3-2 coastdown, 2-3 Flare/Neutral	B4 Release Valve Kit	59947-26K	7	F-59947-TL26	VB-FIX
	Delayed forward engagement, Low line pressure, Flare 2-3, Harsh shifts, Erratic SLT pressure	LPC Accumulator Piston Kit	59947-LPC	5		
Tools	Common or Repeat Failures					
	Overheating fluid/bushings/converter, Harsh reverse, TCC slip/surge, Poor shift quality	Secondary Regulator Valve & Spring Kit	59947-16K	6	F-59947-TL16	VB-FIX
	Tool	Tool Kit – For valve kit 59947-12K	F-59947-TL12			VB-FIX
	Tool	Tool Kit – For valve & spring kit 59947-16K	F-59947-TL16			VB-FIX
	Tool	Tool Kit – For valve kit 59947-26K	F-59947-TL26			VB-FIX

Red Part Number = New in Vol. 8



Color Key

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TCC/Lockup

Pressure Problems

Shift Concerns

Common/Repeat Failures

Other Product

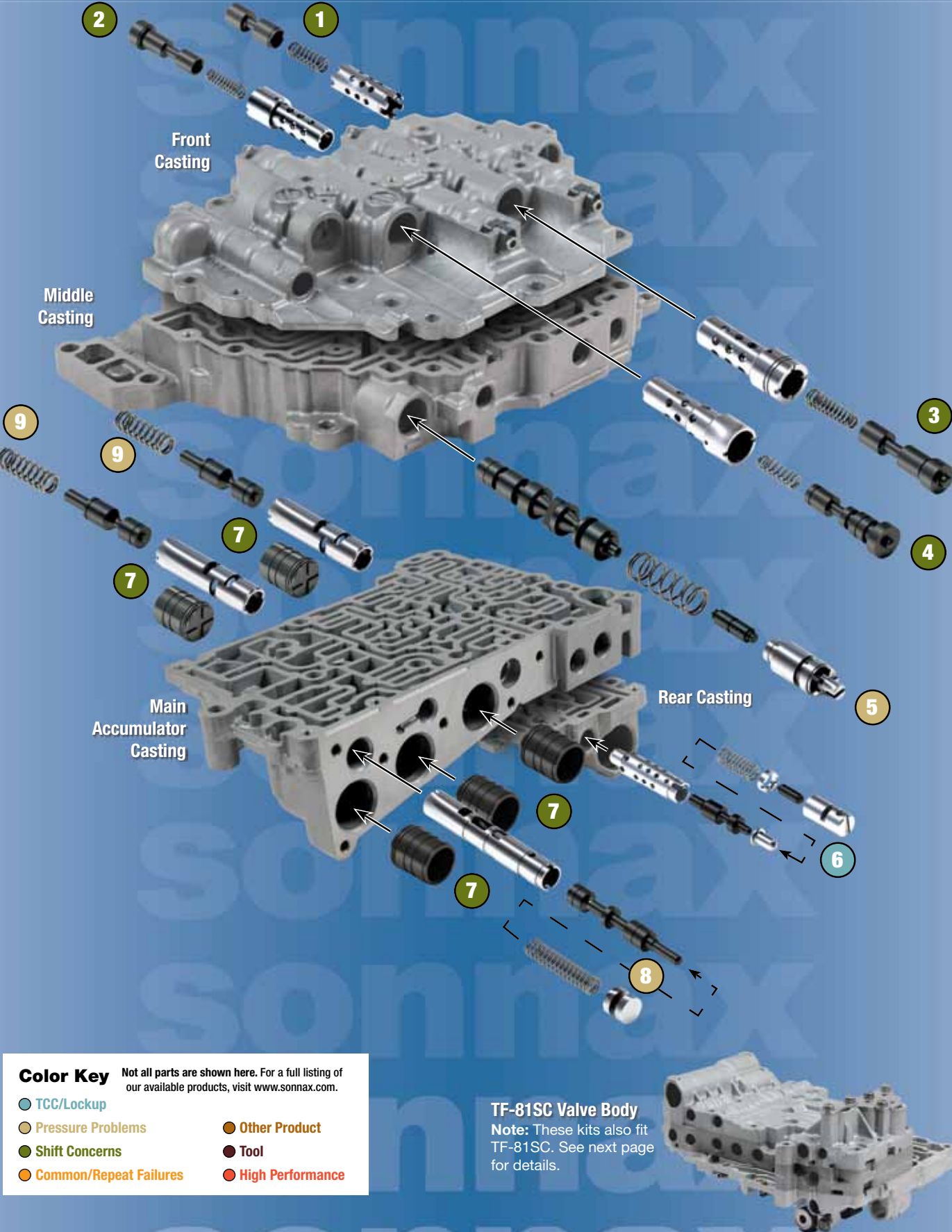
Tool

High Performance

	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Pressure Problems	TCC/Lockup Converter remains applied causing harsh downshifts/RPM surge on coast, Fluid overheat, TCC apply/release complaints	Lockup Clutch Control Valve Kit	15741-29K	3	F-15741-TL29, F-15741-TL29PL	VB-FIX
	Excess pressure in reverse, Fluid & converter overheat, Bushing failure, Poor line rise in drive/reverse	Oversized Pressure Regulator & Boost Valve Kit	15741-01K	10	F-15741-TL	VB-FIX
	High/Low SLT pressure, Overheating bushings & converter, Harsh reverse, TCC slip/surge	Secondary Regulator Valve Kit	15741-11K	9	15741-TL11	
	Codes P0734, P0735 or P0729, Slipping/Shock on kickdown, Slip in steady driving 4th or 5th or 6th	Solenoid Modulator Valve Kit – Can be used in either of 2 locations	15741-18K	2	F-15741-TL18, F-15741-TL29PL	VB-FIX
	Reduced line pressure, Delayed drive/reverse engagement	Oversized Manual Valve	15741-41	4	F-15741-TL41	VB-FIX
Shift Concerns	Flare upshifts, Coast downshift bumps, Delayed engagement	C1 Clutch Control Valve Kit K2 Clutch Control Valve Kit K3 Clutch Control Valve Kit	15741-25K 15741-05K 15741-08K	8 7 5	F-15741-TL25 F-15741-TL5 F-15741-TL8	VB-FIX VB-FIX VB-FIX
	Harsh downshifts, Flare on 1-2 or 2-3 or 5-6, B-1 band distress, Firm 3-2 or 2-1 or 6-5 coastdown	B1 Brake Control Valve Kit	15741-22K	6	F-15741-TL22	VB-FIX
	Delayed engagements, Slipping forward gears, Burnt bands/clutches	Accumulator Piston Kit – Can be used in any of 5 locations	15741-14K	1		
	Various shift complaints	O-Ringed End Plug Kit – Includes 5 End Plugs (9mm) & 7 O-Rings	15741-35K	11		
		O-Ringed End Plug Kit – Includes 5 End Plugs (11mm) & 7 O-Rings	15741-36K	11		
	Slip on 3-4, Loss of 4th, K2 clutch seal ring sleeve spins on case	K-2 Clutch Seal Ring Sleeve Kit	15759-01K			
Tools	Tool	Tool Kit – For PR valve kit 15741-01K	F-15741-TL			VB-FIX
	Tool	Tool Kit – For valve kit 15741-18K	F-15741-TL18			VB-FIX
	Tool	Tool Kit – For valve kit 15741-22K	F-15741-TL22			VB-FIX
	Tool	Tool Kit – For valve kit 15741-25K	F-15741-TL25			VB-FIX
	Tool	Tool Kit – For valve kit 15741-29K	F-15741-TL29			VB-FIX
	Tool	VB-FIX Adapter Plate – For 15741-29K	F-15741-TL29PL			VB-FIX
	Tool	Tool Kit – For valve kit 15741-05K	F-15741-TL5			VB-FIX
	Tool	Tool Kit – For valve kit 15741-08K	F-15741-TL8			VB-FIX
	Tool	Tool Kit – For manual valve 15741-41	F-15741-TL41			VB-FIX
	Tool	Tool Kit – For valve kit 15741-11K	15741-TL11			

Note: The solutions shown here fit BMW 6F21WA & VW/Audi 09G, 09K, 09M.

Red Part Number = New in Vol. 8



Color Key

● TCC/Lockup

● Pressure Problems

● Shift Concerns

● Common/Repeat Failures

● Other Product

● Tool

● High Performance

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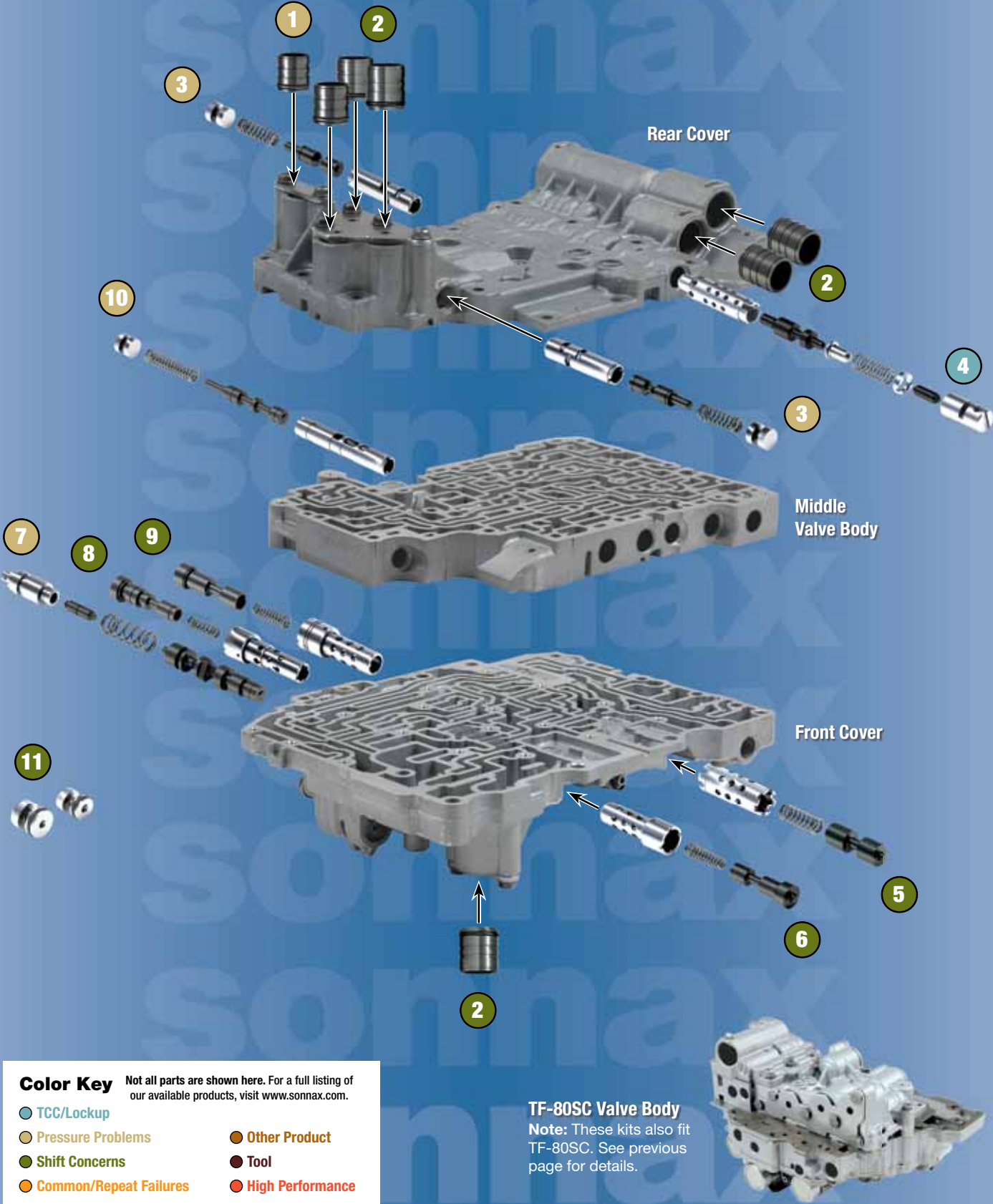
TF-81SC Valve Body
Note: These kits also fit TF-81SC. See next page for details.



	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Pressure Problems	TCC/Lockup Converter remains applied causing harsh downshifts/RPM surge on coast, Fluid overheat, TCC apply/release complaints	Lockup Clutch Control Valve Kit	15741-29K	6	F-15741-TL29, F-15741-TL29PL	VB-FIX
	Excess pressure in reverse, Fluid & converter overheat, Bushing failure, Poor line rise in drive/reverse	Main Pressure Regulator & Boost Valve Kit	39741-01K	5	F-39741-TL	VB-FIX
	High/Low SLT pressure, Overheating bushings & converter, Harsh reverse, TCC slip/surge	Secondary Regulator Valve Kit	39741-11K	8	F-39741-TL11	VB-FIX
	Codes P0734, P0735 or P0729, Slipping/Shock on kickdown, Slip in steady driving 4th, 5th or 6th	Solenoid Modulator Valve Kit – Can be used in either of 2 locations	39741-18K	9	F-39741-TL18	VB-FIX
Shift Concerns	Flare upshifts, Coast downshift bumps, Delayed engagement	C1 Clutch Control Valve Kit	15741-25K	1	F-15741-TL25	VB-FIX
		C2 Clutch Control Valve Kit	39741-05K	2	F-39741-TL5	VB-FIX
		C3 Clutch Control Valve Kit	39741-08K	3	F-39741-TL5	VB-FIX
	Harsh downshifts, Flare on 1-2 or 2-3 or 5-6, B-1 band distress, Firm 3-2 or 2-1 or 6-5 coastdown	B1 Band Control Valve Kit	39741-22K	4	F-39741-TL22	VB-FIX
	Delayed engagements, Slipping forward gears, Burnt bands/clutches	Accumulator Piston Kit – Can be used in any of 5 locations	15741-14K	7		
	Various shift complaints	O-Ringed End Plug Kit – Includes 5 end plugs (9mm) & 7 O-Rings	15741-35K			
Tools		O-Ringed End Plug Kit – Includes 5 end plugs (11mm) & 7 O-Rings	15741-36K			
	Tool	Tool Kit – For valve kit 15741-25K	F-15741-TL25			VB-FIX
	Tool	Tool Kit – For valve kit 15741-29K	F-15741-TL29			VB-FIX
	Tool	VB-FIX Adapter Plate – For 15741-29K	F-15741-TL29PL			VB-FIX
	Tool	Tool Kit – For valve kit 39741-01K	F-39741-TL			VB-FIX
	Tool	Tool Kit – For kits 39741-05K & 39741-08K	F-39741-TL5			VB-FIX
	Tool	Tool Kit – For valve kit 39741-11K	F-39741-TL11			VB-FIX
	Tool	Tool Kit – For valve kit 39741-18K	F-39741-TL18			VB-FIX
	Tool	Tool Kit – For valve kit 39741-22K	F-39741-TL22			VB-FIX

Note: The solutions shown here fit Volvo (AM6), Opel (AF40), Peugeot (TF80), Saab (AF40/6) & Land Rover (TF80).

Red Part Number = New in Vol. 8



Color Key

Not all parts are shown here. For a full listing of our available products, visit www.sonnax.com.

TCC/Lockup

Pressure Problems

Shift Concerns

Common/Repeat Failures

Other Product

Tool

High Performance

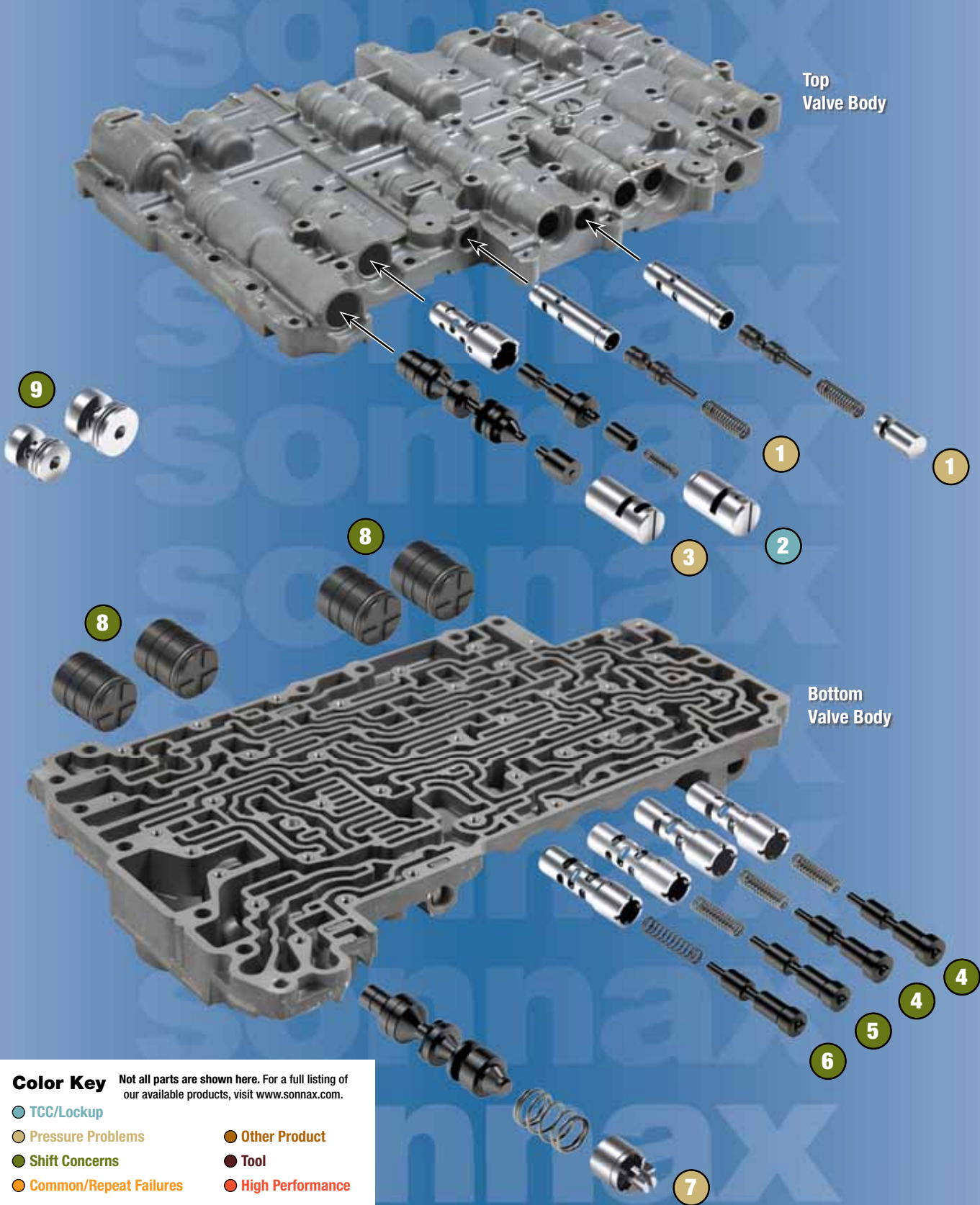
TF-80SC Valve Body
Note: These kits also fit TF-80SC. See previous page for details.



	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Pressure Problems	TCC/Lockup Converter remains applied causing harsh downshifts/RPM surge on coast, Fluid overheat, TCC apply/release complaints	Lockup Clutch Control Valve Kit	15741-29K	4	F-15741-TL29	VB-FIX
	Excess pressure in reverse, Fluid & converter overheat, Bushing failure, Poor line rise in drive/reverse	Main Pressure Regulator & Boost Valve Kit	39741-01K	7	F-39741-TL	VB-FIX
	High/Low SLT pressure, Overheating bushings & converter, Harsh reverse, TCC slip/surge	Secondary Regulator Valve Kit	39741-11K	10	F-39741-TL11	VB-FIX
	Codes P0734, P0735 or P0729, Slipping/Shock on kickdown, Slip in steady driving 4th, 5th or 6th	Solenoid Modulator Valve Kit – Can be used in either of 2 locations	39741-18K	3	F-39741-TL18	VB-FIX
	Reduced throttle signal/solenoid feed oil pressure, Shift complaints & codes	Secondary Modulator Accumulator Piston Kit – Can be used in either of 2 locations	39741-14K	1		
Shift Concerns	Flare upshifts, Coast downshift bumps, Delayed engagement	C1 Clutch Control Valve Kit	15741-25K	5	F-15741-TL25	VB-FIX
		C2 Clutch Control Valve Kit	39741-05K	6	F-39741-TL5	VB-FIX
		C3 Clutch Control Valve Kit	39741-08K	9	F-39741-TL5	VB-FIX
	Harsh downshifts, Flare on 1-2 or 2-3 or 5-6, B-1 band distress, Firm 3-2 or 2-1 or 6-5 coastdown	B1 Band Control Valve Kit	39741-22K	8	F-39741-TL22	VB-FIX
	Delayed engagements, Slipping forward gears, Burnt bands/clutches	Accumulator Piston Kit – Can be used in any of 5 locations	15741-14K	2		
Tools	Various shift complaints	O-Ringed End Plug Kit – Includes 5 end plugs (9mm) & 7 O-Rings	15741-35K	11		
		O-Ringed End Plug Kit – Includes 5 end plugs (11mm) & 7 O-Rings	15741-36K	11		
	Tool	Tool Kit – For valve kit 15741-25K	F-15741-TL25			VB-FIX
	Tool	Tool Kit – For valve kit 15741-29K	F-15741-TL29			VB-FIX
	Tool	Tool Kit – For valve kit 39741-01K	F-39741-TL			VB-FIX
	Tool	Tool Kit – For kits 39741-05K & 39741-08K	F-39741-TL5			VB-FIX
	Tool	Tool Kit – For valve kit 39741-11K	F-39741-TL11			VB-FIX
	Tool	Tool Kit – For valve kit 39741-18K	F-39741-TL18			VB-FIX
	Tool	Tool Kit – For valve kit 39741-22K	F-39741-TL22			VB-FIX

Note: The solutions shown here fit Ford (AF21) & Mazda (AW6A-EL).

Red Part Number = New in Vol. 8



	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Pressure Problems	TCC/Lockup Converter remains applied causing harsh downshifts/RPM surge on coast, Fluid overheat, TCC apply/release complaints	Lockup Clutch Control Valve Kit	25741-29K	2	F-25741-TL29	VB-FIX
	Excess pressure in reverse, Fluid & converter overheat, Bushing failure, Poor line rise in drive/reverse	Oversized Pressure Regulator & End Plug Kit	25741-01K	7	F-25741-TL	VB-FIX
	High/Low SLT pressure, Overheating bushings & converter, Harsh reverse, TCC slip/surge	Secondary Regulator Valve Kit	25741-11K	3	F-25741-TL11	VB-FIX
	Codes P0734, P0735 or P0729, Slipping/Shock on kickdown, Slip in steady driving 4th or 5th or 6th	Solenoid Modulator Valve Kit – Can be used in either of 2 locations	25741-18K	1	F-25741-TL18	VB-FIX
Shift Concerns	Flare upshifts/harsh coast downshifts, Delayed engagement	K1 Clutch Control Valve Kit	25741-25K	6	F-25741-TL25	VB-FIX
		K2 Clutch/B1 Brake Control Valve Kit	25741-05K	4	F-25741-TL5	VB-FIX
		K3 Clutch Control Valve Kit	25741-08K	5	F-25741-TL8	VB-FIX
	Delayed engagements, Slipping forward gears, Burnt bands/clutches	Accumulator Piston Kit – Can be used in any valve body location	15741-14K	8		
Tools	Various shift complaints	O-Ringed End Plug Kit – Includes 5 end plugs (9mm) & 7 O-Rings	15741-35K	9		
		O-Ringed End Plug Kit – Includes 5 end plugs (11mm) & 7 O-Rings	15741-36K	9		
	Tool	Tool Kit – For valve kit 25741-01K	F-25741-TL			VB-FIX
	Tool	Tool Kit – For valve kit 25741-05K	F-25741-TL5			VB-FIX
Tools	Tool	Tool Kit – For valve kit 25741-08K	F-25741-TL8			VB-FIX
	Tool	Tool Kit – For valve kit 25741-18K	F-25741-TL18			VB-FIX
	Tool	Tool Kit – For valve kit 25741-11K	F-25741-TL11			VB-FIX
	Tool	Tool Kit – For valve kit 25741-25K	F-25741-TL25			VB-FIX
Tools	Tool	Tool Kit – For valve kit 215741-29K	F-25741-TL29			VB-FIX
	Tool	Tool Kit – For valve kit 215741-29K	F-25741-TL29			VB-FIX

Note: The solutions shown here fit VW/Audi 09D.

Red Part Number = New in Vol. 8



Color Key
● TCC/Lockup
● Pressure Problems
● Shift Concerns
● Common/Repeat Failures

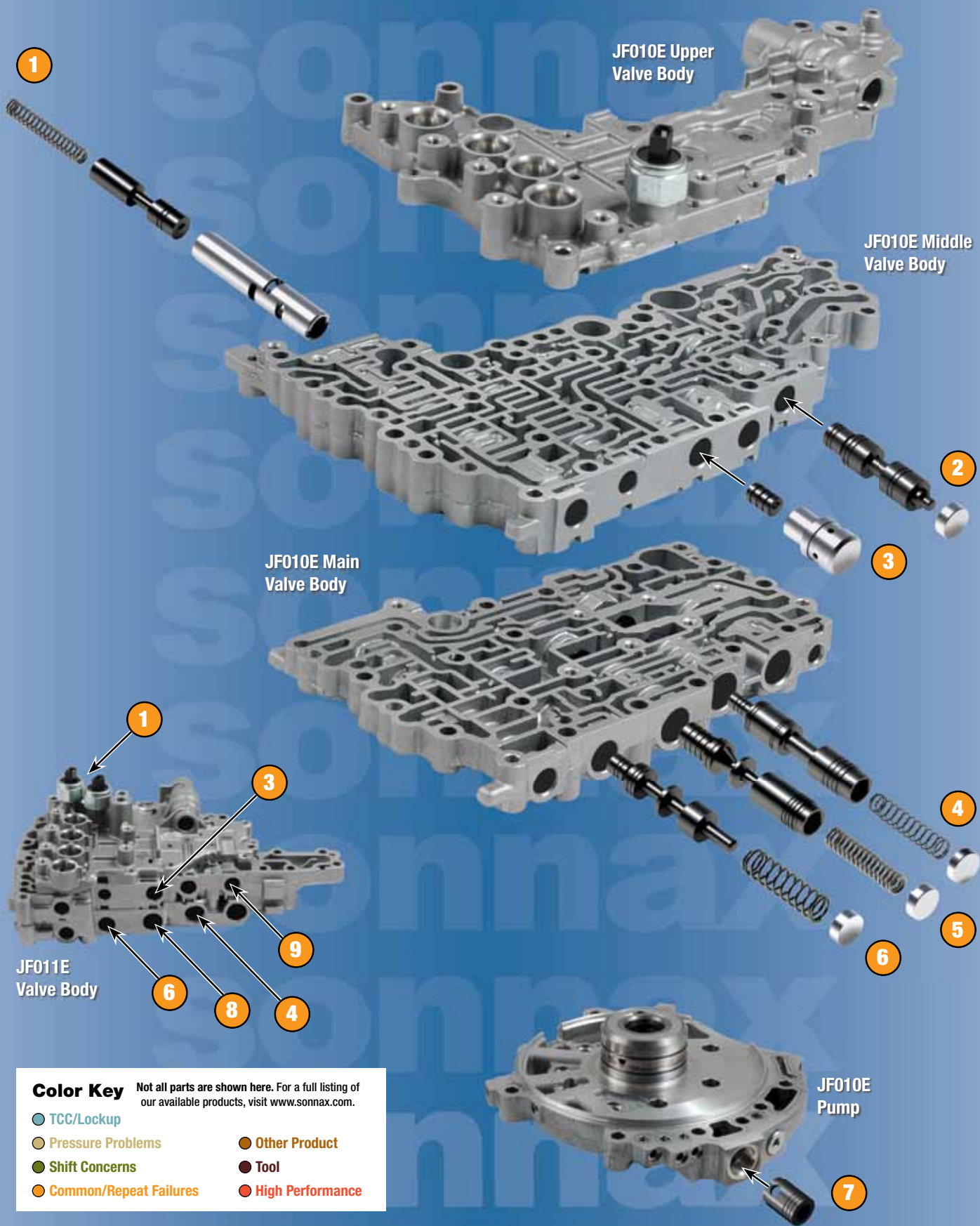
Not all parts are shown here. For a full listing of our available products, visit www.sonnax.com.
● Other Product
● Tool
● High Performance

	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Shift Concerns	TCC/Lockup Lockup shudder, TCC cycling, Burned converter	TCC Control Sleeve Kit	63741-05K	1		
	Pressure Problems High line pressure, Reduced converter & lube flow, Delayed forward, Harsh reverse, Harsh 2-3	Oversized PR Valve & Boost Valve Kit	63741-01K	6	F-63741-TL	VB-FIX
	Delayed engagement, Converter overheat, Lube failures, Poor performance/Higher stall speed	TCC Regulator Valve Kit	63741-17K	3	F-63741-TL13	VB-FIX
	Delay/Slipping reverse, Burnt clutches/bands	Reverse Boost Valve & Sleeve Kit – Late style (long neck on valve)	63741-09K	4		
		Reverse Boost Valve & Sleeve Kit – Early style (short neck on valve)	63741-12K	5		
	Delayed engagements, Erratic shifts, Linear solenoid codes, Loss of forward/reverse	Pilot Valve Kit – Fits "A" or "B" location	63741-13K	8	F-63741-TL13	VB-FIX
	Shift-feel complaints & related codes	Accumulator Control Valve Kit	63741-20K	7	F-63741-TL13	VB-FIX

Red Part Number = New in Vol. 8

	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Tools	Common or Repeat Failures Fluid overheat, Diminished lubrication, Burnt hard parts/planetaries/converters	Cooler Bypass Valve Kit	63741-07K	2	F-63741-TL7	VB-FIX
	Tool	Tool Kit – For PR & boost valve kit 63741-01K	F-63741-TL			VB-FIX
	Tool	Tool Kit – For valve kit 63741-07K	F-63741-TL7			VB-FIX
	Tool	Tool Kit – For 63741-13K, 63741-17K & 63741-20K	F-63741-TL13			VB-FIX

Note: The solutions shown here fit Nissan, Infinity RE5R05A & KIA A5SR1/A5SR2.



Color Key Not all parts are shown here. For a full listing of our available products, visit www.sonnax.com.

● TCC/Lockup	● Other Product
● Pressure Problems	● Tool
● Shift Concerns	● High Performance
● Common/Repeat Failures	

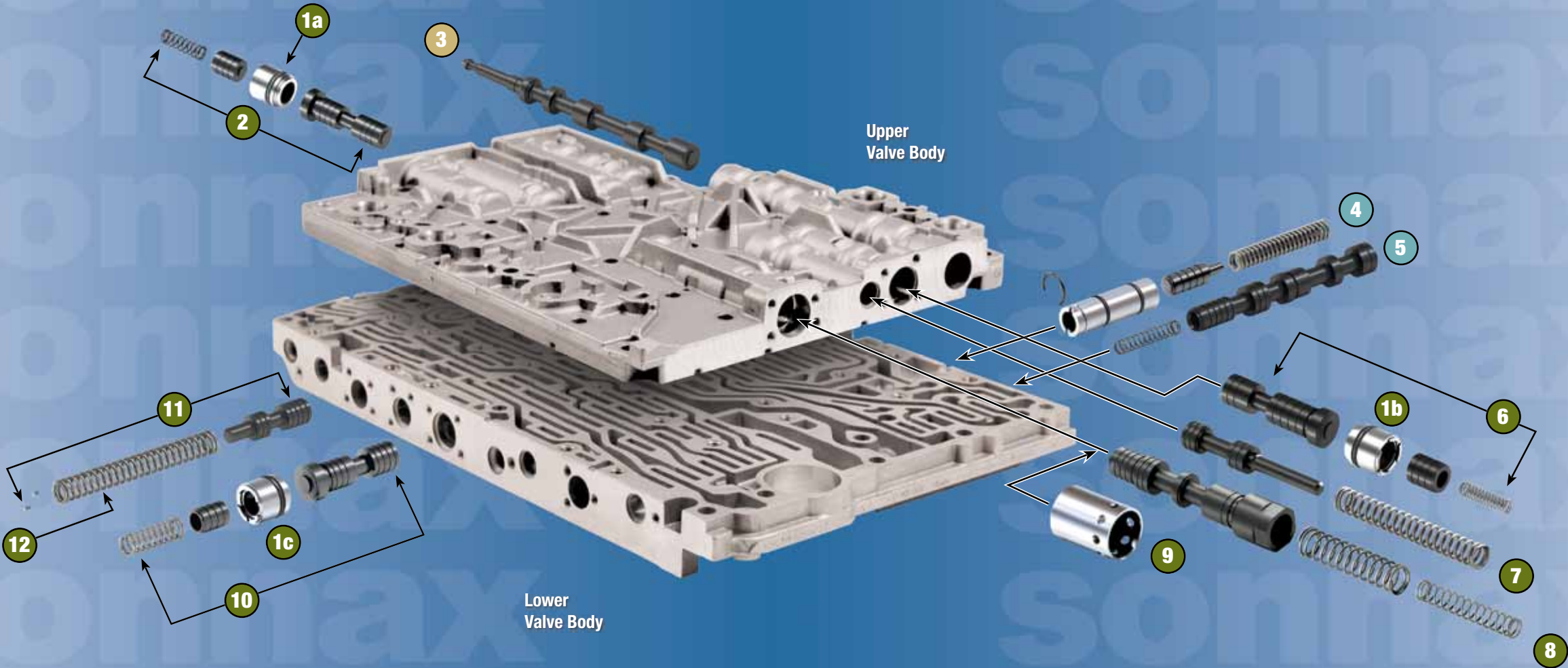
Vehicle Complaints/Part Type		Product Name – Details	Part Number	Illust. #	JF010E	JF011E	Required Tool	Required Fixture
Common or Repeat Failures	Chatter on acceleration, High/Low line pressure, Slips forward/reverse, Pulley breakage	Oversized Primary PR Valve Kit	113741-09K	4	Y	Y	F-113741-TL9	VB-FIX
	Chatter/Noise on acceleration, Loss of ratio change, Low solenoid feed pressure, Poor line rise	Solenoid Regulator Line Pressure Valve Kit	113741-01K	1	Y	Y		
	Engine stalls on engagement, Loss of lockup, Ratio codes, Increased RPM on acceleration	Oversized TCC Limit & Lube Valve Kit	113741-04K	6	Y	Y	F-113741-TL4	VB-FIX
	Jerking on coastdown/harsh engagements, High engine RPM due to no lockup	Lockup Control Sleeve & Plunger Valve Kit	113741-11K	3	Y	Y		
	Slippage, Delayed engagements into forward & reverse	Oversized Pump Flow Control Valve	113741-07	7	Y		F-113741-TL7C	VB-FIX
	Chain slippage & pulley fracture, RPM surge/Chatter on acceleration	Oversized Secondary Regulator Valve Kit	113741-13K	8		Y	F-113741-TL13	VB-FIX
			113741-15K	5	Y		F-113741-TL13	VB-FIX
		Oversized Secondary Pulley Control Valve Kit	113741-17K	2	Y		F-113741-TL17	VB-FIX
			113741-19K	9	Y	Y	F-113741-TL17	VB-FIX
Tools	Tool	Tool Kit – For valve kit 113741-04K	F-113741-TL4		Y	Y		VB-FIX
	Tool	Tool Kit – For valve 113741-07	F-113741-TL7C		Y			VB-FIX
	Tool	Tool Kit – For valve kit 113741-09K	F-113741-TL9		Y	Y		VB-FIX
	Tool	Tool Kit – For kits 113741-13K & 113741-15K	F-113741-TL13		Y	Y		VB-FIX
	Tool	Tool Kit – For kits 113741-17K & 113741-19K	F-113741-TL17		Y	Y		VB-FIX

Red Part Number = New in Vol. 8

Color Key

- TCC/Lockup
- Pressure Problems
- Shift Concerns
- Common/Repeat Failures
- Other Product
- Tool
- High Performance

Not all parts are shown here.
For a full listing of our available products, visit www.sonnax.com.



	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Shift Concerns	TCC/Lockup					
	Converter apply & release complaints, Converter codes, Lube failures, Bore wear, Sticking valve	TC Lockup Clutch Regulator Valve Kit	68942-10K	5	F-68942-TL10	VB-FIX
	Harsh lockup	TCC Damper Valve & Sleeve Kit	68942-23K	4		
	Pressure Problems					
	Reduced line pressure, Delayed engagements	Oversized Manual Valve	68942-16	3	F-68942-TL16	VB-FIX
	Loss of 2-3, 4-3 neutral, Soft shifts under acceleration, TCC slip codes, Delayed engagement, Loss of lockup	Pressure Regulator Valve Kit	68942-07K	8	F-68942-TL7	VB-FIX
	Loss of 2-3, 4-3 neutral, Soft shifts under acceleration, TCC slip codes	Outer PR Sleeve – Repairs outer bore only	68942-06	9	F-68942-TL6	VB-FIX
	Delayed engagements, Upshift/Downshift flares, Shift codes, Poor line rise/long shift duration	Oversized Regulating Valve Pressure Control Valve Kit	68942-17K	11	F-68942-TL14	VB-FIX
	Delayed engagement, Poor performance/ higher stall speeds, Converter overheating, Lube failures	Lubricating Pressure Control Valve Kit	68942-14K	7	F-68942-TL14	VB-FIX
	Harsh/Flare/Cycling of 1-2/4-5 shifts	1-2, 4-5 Overlap Control Valve Kit	68942-19K	10	F-68942-TL19	VB-FIX
	Harsh/Bumpy/Flare 2-3 shifts, Slipping gears	2-3 Overlap Control Valve Kit	68942-27K	6	F-68942-TL27	VB-FIX
	Harsh/Bumpy/Flare 3-4 shifts, Slipping gears	3-4 Overlap Control Valve Kit	68942-31K	2	F-68942-TL31	VB-FIX

Red Part Number = New in Vol. 8

	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Shift Concerns		Overlap Control Valve Sleeve Kit – 3 Sleeves	68942-05K	1		
	Harsh/Bumpy/Flare shifts, Slipping gears	1-2, 4-5 Overlap Control Sleeve	68942-02	1c		
		2-3 Overlap Control Sleeve	68942-03	1b		
		3-4 Overlap Control Sleeve	68942-04	1a		
	Delayed engagements, Flare 2-3, 3-4 or 4-5	Solenoid Pressure Regulator Spring	68942-01	12		
Other Products	Common or Repeat Failures					
	Pump leaks, Bushing spins in housing	Oversized Pump Bushing – Finish-in-place	68004-02		†	
	Planetary failure	Input Shaft Bushing	68410-01			
	Bearing & Seal	Bearing & Seal Kit – For K2 clutch drum	68410-02K			
	Bushing	Pump Bushing	68004-01			
Tools	Bushing	Rear Pump Stator Bushing	68915-01			
	Tool	Tool Kit – For outer PR sleeve 68942-06	F-68942-TL6			VB-FIX
	Tool	Tool Kit – For outer PR valve kit 68942-07K	F-68942-TL7			VB-FIX
	Tool	Tool Kit – For valve kit 68942-10K	F-68942-TL10			VB-FIX
	Tool	Tool Kit – For kits 68942-14K & 68942-17K	F-68942-TL14			VB-FIX
	Tool	Tool Kit – For manual valve 68942-16	F-68942-TL16			VB-FIX
	Tool	Tool Kit – For valve kit 68942-19K	F-68942-TL19			VB-FIX
	Tool	Tool Kit – For valve kit 68942-27K	F-68942-TL27			VB-FIX
	Tool	Tool Kit – For valve 68942-31K	F-68942-TL31			VB-FIX
	Tool					

†Requires Machining



Color Key
● TCC/Lockup
● Pressure Problems
● Shift Concerns
● Common/Repeat Failures

Not all parts are shown here. For a full listing of our available products, visit www.sonnax.com.
● Other Product
● Tool
● High Performance

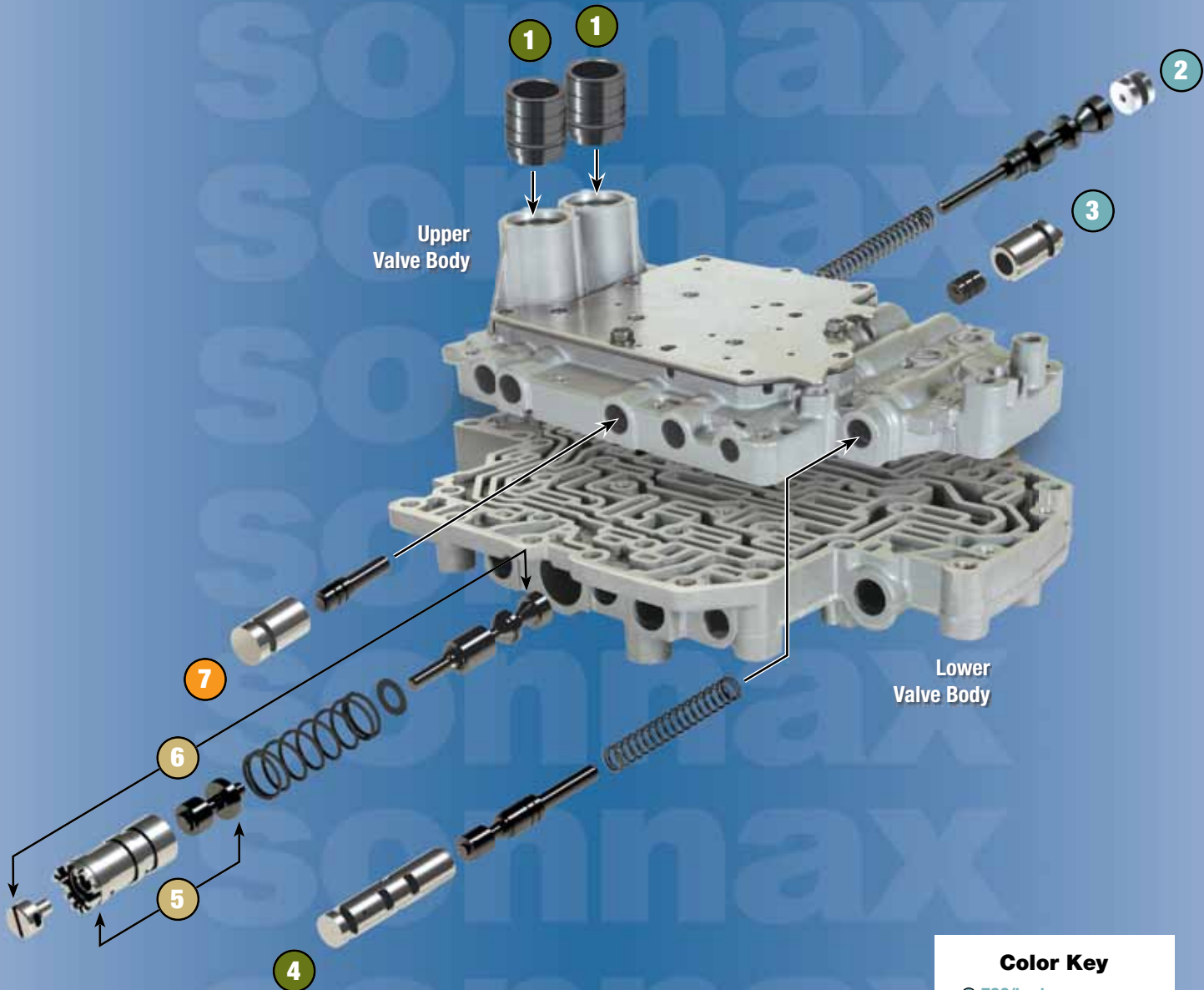
	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Shift Concerns	TCC/Lockup Converter apply & release issues, Excess slip RPM, TCC cycling, High TCC release pressure	TCC Control Valve & Sleeve Kit	41954-03K	4		
	Pressure Problems Low/High line pressure, Soft/Harsh shifts, Low converter pressure, Loss of lube, Uncontrolled clutch pressures, UD/OD clutch failures	Oversized Pressure Regulator Valve	41954-01K	3	F-41954-TL	VB-FIX
	Shift flares, Shuttle shifts, RPM cycles during shift, Delayed engagements, Burnt clutches	Pressure Control Valve & Sleeve Kit – No orifice	41954-06K	2a		
		Pressure Control Valve & Sleeve Kit – With orifice	41954-07K	2b		

Red Part Number = New in Vol. 8



	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
Tools	Common or Repeat Failures Worn accumulator bores, Delay/Shudder on engagement, Soft/Harsh shifts	Accumulator Piston with Dual Seals	41954-02K	1		
	Other Products Bushing	Pump Bushing – For Mitsubishi 40 & 50 series	41005-01		41005-TL	
	Tool	Pump Alignment Tool – For Mitsubishi 40 & 50 series	41005-TL			
	Tool	Tool Kit – For PR valve 41954-01K	F-41954-TL			VB-FIX

Note: The solutions shown here fit Mitsubishi F4A41/42/51, B4/V4A51, F5A51, A5HF1, A5GF1, '96 & later.



Color Key

TCC/Lockup

Pressure Problems

Shift Concerns

Common/Repeat Failures

Other Product

Tool

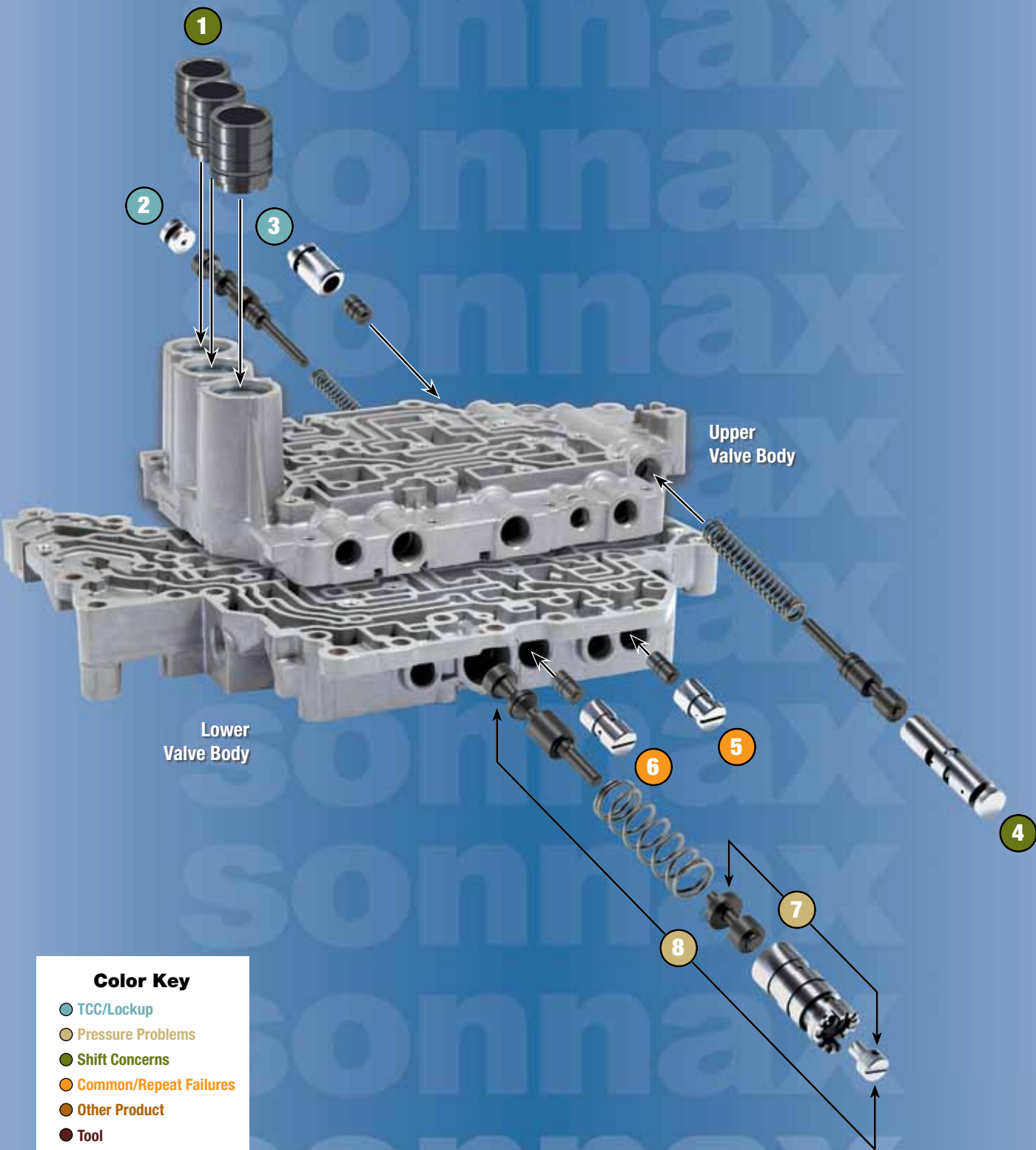
High Performance

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	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
TCC/ Lockup	TCC apply & release problems, Converter codes, Burnt converters	Lockup Control Plunger Valve & Sleeve Kit	57917E-03K	3		
	TCC apply & release problems, Harsh lockup, Burnt converters, Lube failures	Oversized Secondary Pressure Regulator Valve Kit	57917E-16K	2	F-57917E-TL16	VB-FIX
Pressure Problems	Low/High line pressure, Soft/Harsh shifts, Clutch & band failures, Higher than normal pressure in reverse, Low converter pressure	Oversized Pressure Regulator & Boost Valve Kit	57917E-08K	6	57917E-TL8	
	Insufficient line rise in drive ranges, Higher than normal pressure in reverse, Soft shifts	Boost Valve Kit	57917E-01K	5		
Shift Concerns	Harsh/Flare upshifts, TCC slip/cycling, Low cooler flow/overheating, Excess reverse pressure	Solenoid Modulator Valve Kit	57917E-13K	4	F-57917E-TL13	VB-FIX
	Delayed engagements, Slips/Flares in forward gears, Burnt clutches	Accumulator Piston Kit – Can be used in either of 2 locations	57917E-19K	1		
	Common or Repeat Failures					
	Clutch failures, Burnt clutches, Shift complaints	Clutch Apply Control Plunger Valve & Sleeve Kit	57917E-05K	7		
Tools	Tool	Tool Kit – For valve kit 57917E-08K	57917E-TL8			
	Tool	Tool Kit – For valve kit 57917E-13K	F-57917E-TL13			VB-FIX
	Tool	Tool Kit – For valve kit 57917E-16K	F-57917E-TL16			VB-FIX

Red Part Number = New in Vol. 8



Color Key

TCC/Lockup

Pressure Problems

Shift Concerns

Common/Repeat Failures

Other Product

Tool

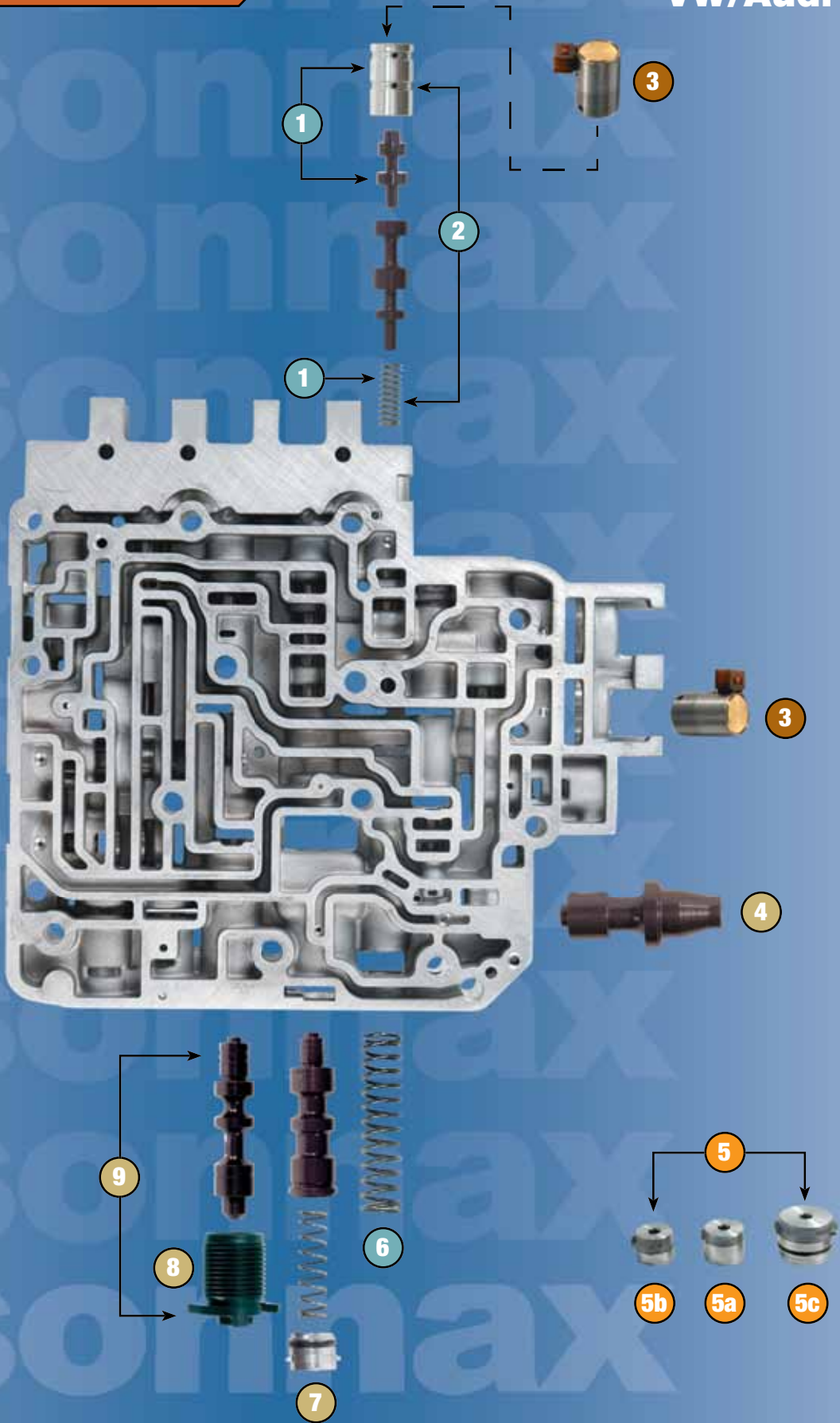
High Performance

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For a full listing of our available
products, visit www.sonnax.com.

	Vehicle Complaints/Part Type	Product Name – Details	Part Number	Illust. #	Required Tool	Required Fixture
TCC/ Lockup	Harsh lockup, Converter apply/release complaints	Oversized Secondary Pressure Regulator Valve Kit	57917E-16K	2	F-57917E-TL16	VB-FIX
	TCC apply/release problems, Converter codes	Lockup Control Plunger Valve & Sleeve Kit	57917E-03K	3		
	Pressure Problems					
	Insufficient line rise in drive ranges, Soft shifts	Boost Valve Kit	27741-01K	7		
	Low/High line pressure, Soft and/or harsh shifts	Oversized PR & Boost Valve Kit	27741-08K	8	57917E-TL8	
	Shift Concerns					
	Harsh/Flare upshifts, TCC slip, RPM cycling	Solenoid Modulator Valve Kit	27741-13K	4	F-27741-TL13	VB-FIX
	Delayed engagements, Slips/Flares in forward gears, Burnt clutches	Accumulator Piston Kit – Can be used in either of 3 locations	57917E-19K	1		
	Common or Repeat Failures					
	Burned B2 brake/clutch, Delayed reverse	B2 Apply Control Plunger Kit	27741-06K	5		
	Burned B1 brake/clutch, 2-3 or 4-3 bind-up	B1 Apply Control Plunger Kit	27741-04K	6		
Tools	Tool	Tool Kit – For valve kit 27741-08K	57917E-TL8			
	Tool	Tool kit – For valve kit 27741-13K	F-27741-TL13			VB-FIX
	Tool	Tool kit – For valve kit 57917E-16K	F-57917E-TL16			VB-FIX

Red Part Number = New in Vol. 8

Valve Body



Color Key

- TCC/Lockup
- Pressure Problems
- Shift Concerns
- Common/Repeat Failures
- Other Product
- Tool
- High Performance

Not all parts are shown here.
For a full listing of our available products, visit www.sonnax.com.

Vehicle Complaints/Part Type		Product Name – Details	Part Number	Illust. #	01M, 01N, 01P	096, 097, 098	Required Tool	Required Fixture
TCC/Lockup	Engine stalls during stop/neutral drive engagement, Converter overheat	TCC Boost Valve Kit	119940-01K	1	Y			
	No lockup, Falls out of lockup hot, Engine stalls/shudders on engagement, Code 1582	Oversized TCC Regulator Valve Kit	119940-04K	2	Y		119940-TL4	
	TCC slip code, Converter hub & stator damage, High converter apply pressure	TCC Regulator Valve Spring – 5/Bag	119940-19	6	Y			
Pressure Problems	Erratic line pressure, Engine stall at idle, Delayed engagements	Main Pressure Regulator Valve Kit	119940-03K	7	Y		F-119940-TL3	VB-FIX
		Main Pressure Regulator Valve Kit	119940-08K	7	Y	Y	F-119940-TL8	VB-FIX
	Excessive line pressure in reverse, Low/Excessive line rise, Delayed engagements	Boost Regulator Valve Kit	119940-05K	9	Y		F-119940-TL5	VB-FIX
		Boost Regulator Valve Kit	119940-07K	9	Y	Y	F-119940-TL7	VB-FIX
	No 3-4 or 2-3, Loss of gear/wrong gear starts, No line rise	Solenoid Regulator Valve Kit	119940-06K	4	Y	Y	F-119940-TL6	VB-FIX
Shift Concerns	Line pressure cannot be adjusted, Broken boost regulator end plug	Ratcheting End Plug	119940-22	8	Y	Y	119940-TL9	
	2-3, 3-2 Shift complaints, Soft shifts, Insufficient line rise, Erratic buzz, Excessive pressure in reverse	Check Ball Springs – 10/Bag	119940-20		Y			
	Delayed reverse, Low line in reverse, Clutch failures, Shudder/Slip on shifts, Low clutch circuit pressure	Bushing & Thrust Washer Kit	119905-01K		Y	Y	119905-TL1*, 119905-TL2*, 119905-TL5*	
Common or Repeat Failures	OEM plastic shift valve end plugs break, No shift, Uncontrolled shifts	Aluminum Shift Cup Kit	119940K	5	Y			
		Aluminum Shift Cup – Medium	119940-10	5a	Y			
		Aluminum Shift Cup – Small	119940-11	5b	Y			
		Aluminum Shift Cup – Large	119940-12	5c	Y			
	Lost/Bent manual valve operating rod	Manual Valve Operating Rod	119940-23		Y	Y		
Valve Body Reconditioning Kit	OEM coolers cannot be flushed effectively, Leaking coolers	Remote Transmission Cooler Adapter Kit	119814-01K		Y	Y		
	Sure Cure® Kit	01M/01N/01P Sure Cure® Kit – For Phase 2 units. See page 153 for details.	SC-01M/01N/01P		Y		F-119940-TL3, 119940-TL4, F-119940-TL5, F-119940-TL6	VB-FIX
	Sure Cure® Kit	096/097/098 Sure Cure® Kit – For Phase 0 & 1 units. See page 153 for details.	SC-096/097/098			Y	F-119940-TL6, F-119940-TL7, F-119940-TL8	VB-FIX
Tools	Other Products							
	Solenoid	EPC or TCC Solenoid – Supersedes 119954-01	119954-02	3	Y	Y		
	Tool	Installation/Removal Tool – For K1 bushing	119905-TL1		Y	Y		
	Tool	Installation Tool – For K2 bushing	119905-TL2		Y	Y		
	Tool	Installation Tool – For small K1 bushing	119905-TL5			Y		
	Tool	Tool Kit – For valve kit 119940-04K	119940-TL4		Y			
	Tool	Tool – For ratcheting end plug 119940-22	119940-TL9		Y	Y		
	Tool	Tool Kit – For main PR valve kit 119940-03K	F-119940-TL3		Y			VB-FIX
	Tool	Tool Kit – For valve kit 119940-05K	F-119940-TL5		Y			VB-FIX
	Tool	Tool Kit – For valve kit 119940-06K	F-119940-TL6		Y	Y		VB-FIX
	Tool	Tool Kit – For valve kit 119940-07K	F-119940-TL7			Y		VB-FIX
	Tool	Tool Kit – For valve kit 119940-08K	F-119940-TL8			Y		VB-FIX

*Recommended Tool

Red Part Number = New in Vol. 8

Make	Product Name – Details	Part Number	Required Tool	Required Fixture
Aisin AW				
AW450-43LE	Cutback Valve & Sleeve Kit	94987-01K		
AW50-40/42LE	Lockup Control Plunger & Sleeve Kit	59954-01K		
AW50-40/42LE	Main Boost Valve & Sleeve Kit	59954-03K		
Honda				
4-Speed, 5-Speed	O-Ringed End Plug Kit	98892-01K		
4-Speed, 5-Speed	O-Ringed End Plug – 12mm	98892-01		
4-Speed, 5-Speed	O-Ringed End Plug – 14mm	98892-02		
4-Speed, 5-Speed	End Plug – 15mm	98892-03		
4-Speed	CPC Valve Spring – Honda Civic '96-'99	88894		
4-Speed, 2-Shaft	Bronze Thrust Washer – For mainshaft 2nd gear assembly	88406-SP		
4-Speed, 5-Speed	Solenoid Adjustment Tool – '96-Later	88950-T		
4-Speed, 2-Shaft	Bronze Thrust Washer – For mainshaft 2nd gear assembly	88406C		
Jatco				
JF506E	Oversized Pressure Regulator Valve Kit	122892-03K	F-122892-TL3	VB-FIX
JF506E	TC Pressure Regulator Valve & Sleeve Kit	122892-10K	F-122892-TL10	VB-FIX
JF506E	TCC Control Plunger & Sleeve Kit	122892-01K		
JF506E	TCC Control Valve & Plunger Kit	122892-06K		
JF506E	Tool Kit – For oversized pressure regulator valve kit 122892-03K	F-122892-TL3		VB-FIX
JF506E	Tool Kit – For TC pressure regulator valve kit 122892-10K	F-122892-TL10		VB-FIX
JR403E	Overdrive Servo Piston Kit	62170-01K		
RE/RL4F02A	Pressure Regulator Boost Sleeve	93990		
RE/RL4F02A	Servo Pin Kit – Includes O-Ring	93903-01K		
RE4F02A	Elevated Pressure Main Pressure Regulator Spring – 20/Bag	93940-01		
RE4F04A, 4F20E	Accumulator Shift Valve Kit	63940-03K		
RE4F04A, 4F20E	Accumulator Valve Kit – Maxima '99-earlier, all others '01-earlier	63940-02K	63940-BST	
RE4F04A, 4F20E	Bore Sizing Tool – For accumulator valve kit 63940-02K	63940-BST		
RE4F04A, 4F20E	Oversized Pressure Regulator Valve Kit	63940-01K	63940-TL	
RE4F04A, 4F20E	Tool Kit – For oversized pressure regulator valve kit 63940-01K	63940-TL		
RE4F04B	Cooler Check Valve Spring & Plug Kit	63940-07K		
RE4R01A	Elevated Pressure Main Pressure Regulator Spring – '88-'94, 20/Bag	69880-01		
RE4R01A	Elevated Pressure Main Pressure Regulator Spring – '95-Later, 20/bag	69880-02		
RE4R01A/3A, RL4R01A	Servo Pin Kit – Includes O-Ring	69903-01K		
RL4F02A	Splined Repair Insert – Front planetary, features hardened splines	93897S	Requires Machining	
RL4R01A	Governor Bore Sleeve	69835		
Mazda				
F4A-EL	3-4 Drum Test Kit – Includes cap, screw & O-Rings	74828-TL		
F4A-EL, F4E-III, FA4A-EL	Oversized Pressure Modifier Valve	74846-07K	74846-TL7	
F4A-EL, GF4A-EL	Pump Rebuild Kit – Includes discharge valve & compression spring	K74878		
F4A-EL, GF4A-EL, F4EAT	Boost Valve Kit	74846-01K		
F4A-EL, F4EAT, F4E-III, FA4A-EL	Oversized Pressure Regulator Valve	74846-06K	74846-TL6	
F4A-EL, F4EAT, F4E-III, FA4A-EL	Tool Kit – For oversized pressure regulator valve 74846-06K	74846-TL6		
F4EAT, G4A-ELIHL, G4A-FEL	Stator Support Sleeve	71812-01	Requires Machining	
FN4A-EL	Turbine Shaft Pump Support Bushing	46000-01K		
G4A-EL	3-4 Drum Test Kit	71828-TL		
G4A-EL	Boost Valve Kit	71846-01K		
G4A-EL	Front Pump Support Shim – .015" Thick, 5/bag	71400-15		
G4A-EL/HL, G4EAT	Pump Rebuild Kit – Includes valve, spring & valve expander ring	71912-01K		

Red Part Number = New in Vol. 8

Make	Product Name – Details	Part Number	Required Tool	Required Fixture
Mazda				
G4A-EL/HL, GF4A-EL	Oversized Pressure Regulator Valve	74846-05	74846-TL5	
G4A-EL/HL, GF4A-EL	Tool Kit – For pressure modifier valve 74846-05	74846-TL5		
GF4A-EL	Oversized Pressure Modifier Valve	74846-04	74846-TL4	
GF4A-EL	Tool Kit – For pressure regulator valve 74846-04	74846-TL4		
Mitsubishi/KM				
KM Series 4-Speed	Manual Valve – All KM 4-speeds except Hyundai	41750-03		
Renault/DPO				
DPO, AL-4	E1/E2 Clutch Drum Bushing	120002		
DPO, AL-4	Oversized Pressure Regulator Valve Kit	120940-01K	F-120940-TL	VB-FIX
DPO, AL-4	Pump Bushing	120001		
DPO, AL-4	Pump Bushing – Finish-in-place	120001A	Requires Machining	
DPO, AL-4	Pump Stator Bushing – Large, '00-later	120003-02	120003-TL	
DPO, AL-4	Pump Stator Bushing – Small, '00-later	120003-01	120003-TL	
DPO, AL-4	Pump Stator Bushing Kit – Small & large, '00-later	120003K	120003-TL	
DPO, AL-4	Tool Kit – For pump stator bushings 120003K, 120003-01, 120003-02	120003-TL		
DPO, AL-4	Tool Kit – For oversized pressure regulator valve kit 120940-01K	F-120940-TL		VB-FIX
Toyota				
A130, 131, 140	Boost Valve & Sleeve – High ratio	89010-02K		
A130, 131, 140	Boost Valve & Sleeve – Low ratio	89010-01K		
A140, A340	Tool Kit – For PR valve kits 89010-03K, 97855-24K & 89010-04K	89010-TL		
A140, A540E	Oversized Pressure Regulator Valve Kit	89010-03K	89010-TL	
A340, A340E, A340F	Boost Valve & Sleeve	97855-23K		
A340, A340E, A340F	Lockup Relay Valve Sleeve Kit – '84-'00	97855-27K		
A340, A340E, A340F	Oversized Pressure Regulator Valve Kit	97855-24K	89010-TL	
A340E, A340F	Boost Valve & Sleeve Kit – .546"/.480" Valve O.D.	97855-30K		
A540E	Boost Valve & Sleeve – High ratio	89031-01K		
A540E	Oversized PR Valve Kit – '98-'00 with "A540Y" stamped valve body	89010-04K	89010-TL	
ZF				
ZF4HP14/18	Oversized Pressure Regulator Valve	85991-01	85991-TL	
ZF4HP14/18	Tool Kit – For oversized pressure regulator valve 85991-01	85991-TL		
ZF4HP18	Servo Cushion Washers – Belleville type	85701-01		
ZF4HP22	Stator Support Shaft	82810		
ZF5HP18/19	F-Clutch Bushing & Seal Kit	85110-01K		
ZF5HP19	Oversized Pump Bushing – Finish-in-place	85916-01U	Requires Machining	
ZF5HP19	Oversized Precision Pump Bushing	85916-01	Requires Machining	
ZF5HP19	Oversized Pressure Regular Valve – Early style (E17)	85755-01	F-85755-TL1	VB-FIX
ZF5HP19	Oversized Pressure Regulator Valve – Late style (E18.2)	85755-02	F-85755-TL2	VB-FIX
ZF5HP19	Tool Kit – For oversized pressure regulator valve 85755-01	F-85755-TL1		VB-FIX
ZF5HP19	Tool Kit – For oversized pressure regulator valve 85755-02	F-85755-TL2		VB-FIX
ZF5HP24	Oversized Pressure Regulator Valve Kit	139740-01K	F-139740-TL	VB-FIX
ZF5HP24	Tool Kit – For oversized pressure regulator valve kit 139740-01K	F-139740-TL		VB-FIX
ZF5HP30	Case Dowel Pins – Improved durability, 6/bag	85000-01		

Embracing Change

A doctor takes his car to a mechanic and complains “Your fee is more per hour then we get for medical care.” “Yeah doc,” the mechanic replies, “But your models haven’t changed since Adam and Eve, and we have to stay up-to-date with new models coming out every month.”

How true is that! It seems that no sooner have we wrapped our heads around how the “new” model or component functions than we find them taking a backseat to something even “newer.” As Bob Dylan sang in 1964, “... *for the times they are a-changin’*.” That was the same year that Ford introduced their C-4 Cruise-O-Matic with one of the industry’s first aluminum cases, and when rebuild prices and financing were much different than today.



Transmission repair ad from *The Miami News*, Feb. 3, 1964.

In the automatic transmission industry, huge changes have occurred over the past 40 years and now seem to be happening at an ever-increasing rate. To stay in business and be profitable, it’s critical to acknowledge and understand these new technologies. Benjamin Franklin said it best: “When you’ve finished changing, you’re finished.” In other words, those who don’t adapt to and

adopt change will limit their potential and soon be shutting their doors for good.

In the mid-to-late-1980s, transmissions started incorporating electronics, first with simple pressure switches, then on-off solenoids, computers and various sensors. More recently, Pulse-Width Modulated (PWM) type solenoids were introduced in some applications so that pressures could be modulated. Now, many of these PWM solenoids are being updated to linear solenoids for pressure control.

There are a number of differences between PWM and linear solenoids, but the primary one is in their basic principle of operation. The PWM solenoid – usually operating at a low hertz frequency – has both the hydraulic and mechanical systems average the pressure and flow pulsations created by the solenoid duty cycle. This results in the control pressure and flow rate being more susceptible to variations in duty cycle. The linear solenoid – generally operating at a high hertz frequency – uses only the electronic and magnetic parts of the system to average the duty cycle, while the valve spool hydraulically balances control pressure and flow rate. This results in very little pressure and flow rate variations as duty cycle changes. Other differences are noted in **Figure 2**.

Figure 2

PWM Solenoids vs. Linear Solenoids Advantages/Disadvantages	
PWM Solenoids	Linear Solenoids
<ul style="list-style-type: none"> • Less expensive • Typically operates at lower Hertz • Control pressure is a ratio, dependent upon duty cycle and the supply pressure • There is always a controlled leak of fluid pressure • The actuator (ball) strokes from stop-to-stop on each cycle • The control pressure has a variance at the PWM frequency • Supply pressure variation has a greater effect on control pressure • Lower flow capacity • Flow rate affected by duty cycle 	<ul style="list-style-type: none"> • More expensive • Typically operates at higher Hertz • Control pressure is proportional to coil current (if supply pressure is high enough) • Less exhaust or intentional leakage of fluid pressure • The actuator (valve) balances pressure and floats in narrow linear band of operation • Because the valve does not average the electrical signal, but balances pressure, there is no control pressure variance at the PWM frequency • Higher flow capacity • Flow rate not affected by duty cycle

Most “newer” components have advantages and disadvantages over the previous design, so let’s take a closer look at PWM and linear solenoids to understand the functional changes that have occurred over the years and how those changes impact your rebuild procedures.

PWM vs. Linear Solenoid Function

PWM Solenoids

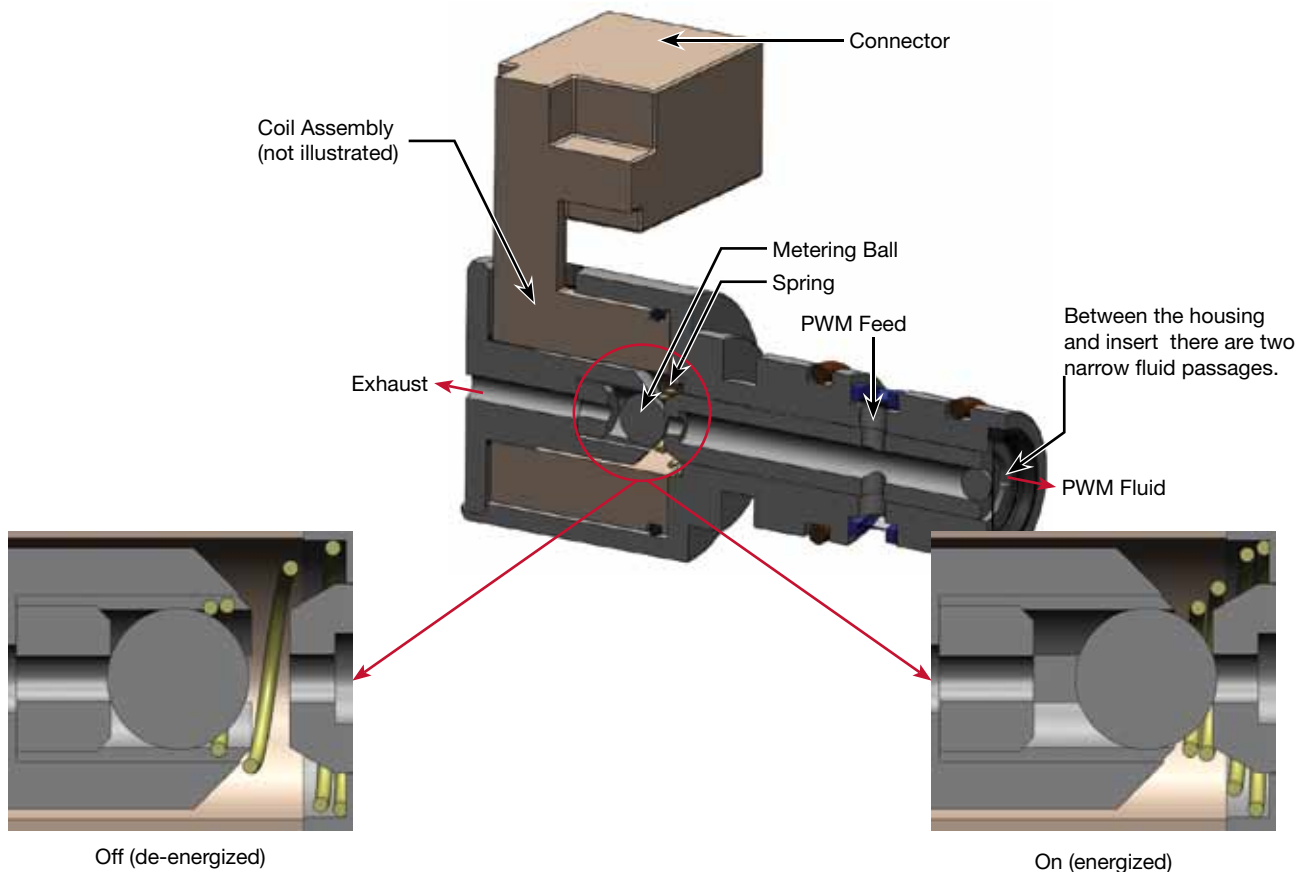
A typical PWM solenoid is essentially an electronic pressure regulator valve (**Figure 3**). The solenoid shown below from a 4T60E is used to convert PWM feed (line pressure) into the PWM signal used to control converter clutch apply pressure. This is accomplished by the following process:

1. The Powertrain Control Module (PCM) sends on/off signals at 32Hz (32 times/second) to the solenoid.
2. The on/off signals change the current through the coil assembly (electromagnet), altering the magnetic force on the metering ball.
3. Metering ball changes affect the controlled leakage of PWM feed fluid, which controls the resultant PWM signal pressure sent to the isolator valve.

The ratio of on/off signal time at the solenoid is referred to as the duty cycle and ranges from 0 to 100%. This ratio of on-time during a cycle (in this case, 1/32 of a second) controls the leakage and alters the pressure. Pressure is inversely proportional to duty cycle. When fully energized, or 100% duty cycle, PWM pressure is at a minimum, resulting in minimum converter clutch apply pressure. When the normally open solenoid is at 0% duty cycle, full PWM feed (line) pressure flows through the solenoid and strokes the converter clutch regulator to allow maximum converter apply pressure. The duty cycle often is between these

Figure 3

PWM Solenoid



two extreme percentages, as the computer continuously monitors vehicle speed, gear range, throttle angle and other parameters to adjust the duty cycle and allow a controlled slip apply or release of the converter clutch.

Linear Solenoids

Now let's take a look at a TCC lockup pressure control linear solenoid valve from an AW55-50SN (**Figure 4**). This style solenoid also uses pulse-width modulation and functions electrically much like PWM solenoid in **Figure 2**.

1. A signal from the Transmission Control Module (TCM) is pulsed to the solenoid at 300Hz with a varying amount of on/off time.
2. The current through the coil assembly creates the electromagnetic force that moves the plunger in or out against spring force to adjust the position of the spool valve (housed in the long cast aluminum snout portion of the linear solenoid).
3. The spool valve hydraulically regulates pressure control by balancing the internal forces.

When the solenoid current changes, the force generated by the solenoid changes causing the valve to alter the control pressure until a new balance point is found. The control pressure is proportional to input current. For this particular linear solenoid, increased current results in the

plunger moving toward the snout which then moves the spool valve to an increased control pressure position. This then sends TCC signal pressure to the lockup control and relay valves, resulting in apply of the converter clutch.

Linear solenoids are becoming more common in late model transmissions, taking the place of PWM solenoids to control pressure. Aisin Warner uses linear solenoids in 5- and 6-speed units to provide a pilot pressure for controlling converter clutch apply and release, for influencing line pressure with a solenoid-generated electronic pressure control (EPC) and for controlling clutch pressure.

These types of applications and linear solenoids also are being successfully used in Honda and Toyota transmissions, although there are significant differences in design (**Figure 5**). Many of the Honda linear solenoids are integrated into



Figure 5

Linear Solenoids: (L-R) Honda MRMA/BCLA/MCLA, U151E SL1, A750E SL1, AW55-50SN Clutch Pressure and TF80 Clutch Pressure.

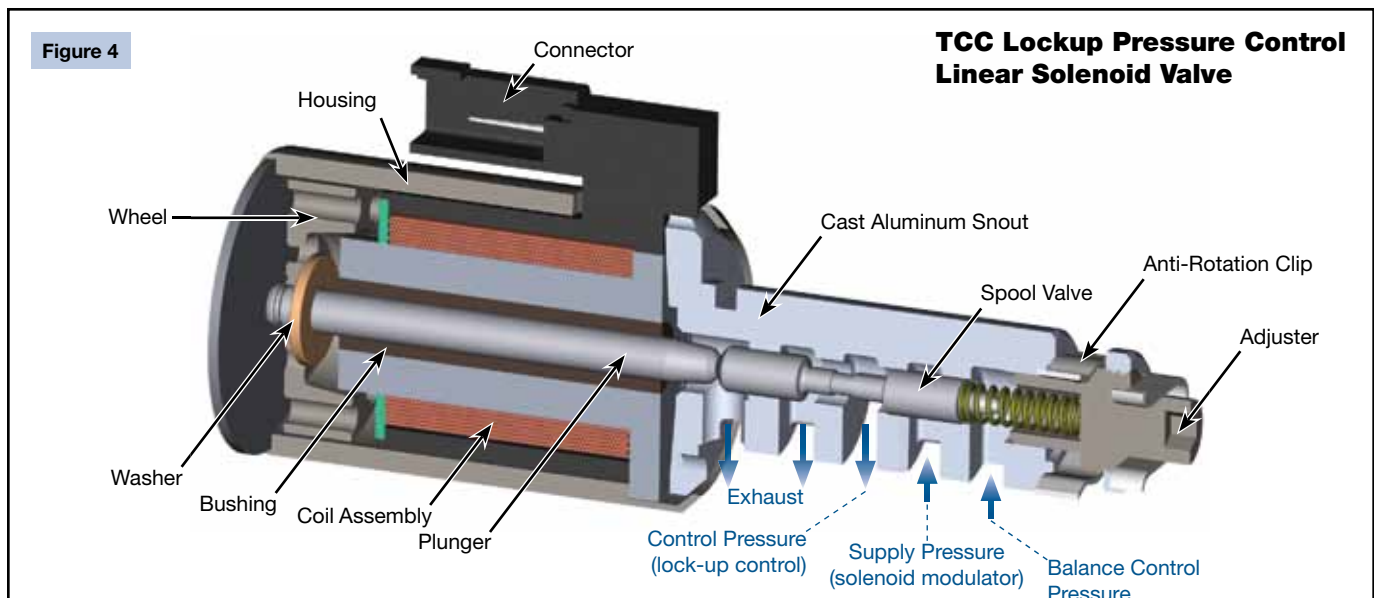


Figure 4

TCC Lockup Pressure Control Linear Solenoid Valve

a cast aluminum manifold that is bolted externally to the transmission case. The Aisin Warner and Toyota linear solenoids have the snout crimped to the electronic can and are mounted in the valve body bores.

It also should be noted that – with the new transmissions – the design of the solenoids is getting smaller. Not only does this provide weight and space savings for the valve body, but manufacturing costs are reduced as well. Most of the control valves are being designed smaller and switched from steel to aluminum to make them much more reactive and capable of effective operation at higher signal frequencies. Making the snout and the valve out of similar materials also allows for the same hydraulic clearance at variable temperatures, which provides better response time and reliability.

Reuse, Rebuild or Replace?

Understanding how something works is often the first step in knowing how to diagnose a malfunction. Linear solenoids tend to be more expensive than the simple PWM solenoids, so the choice of whether to re-use, rebuild or replace these parts needs to be made. There is no universally right or wrong decision. Ultimately, you will balance

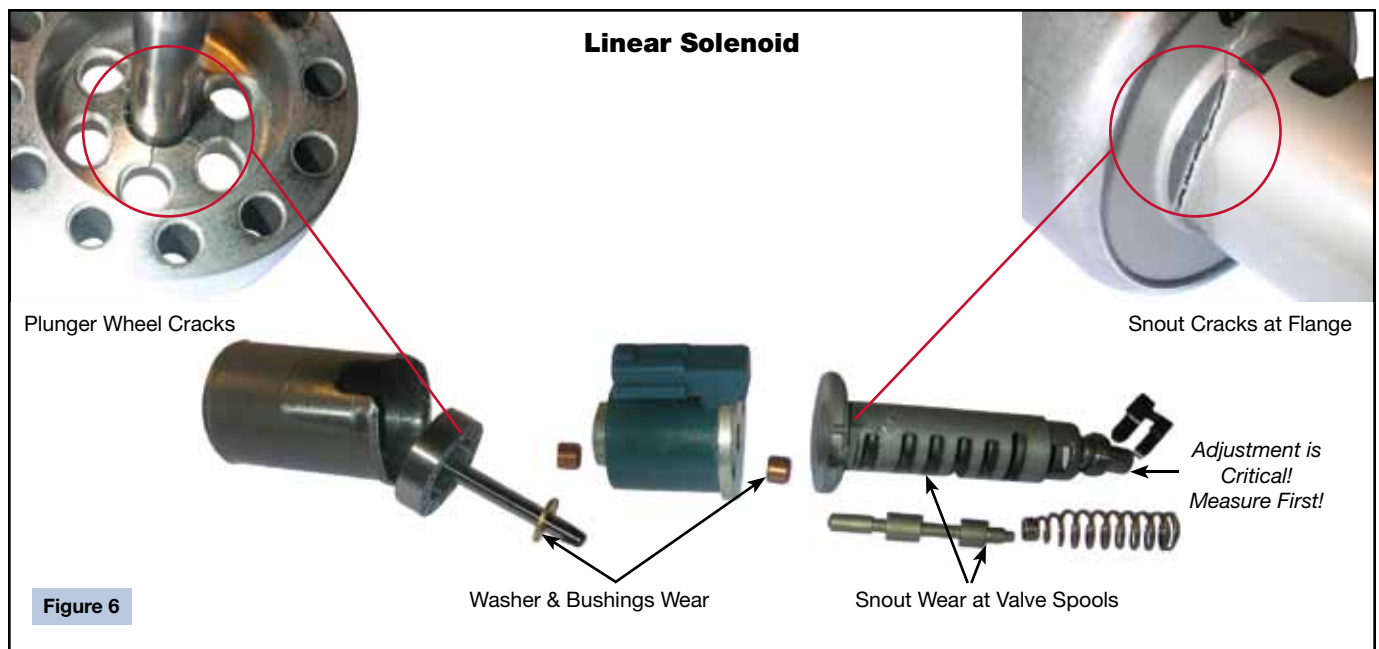
the needs of your customer, the cost of your time and your warranty structure and costs. Because the PWM and linear solenoids operate the same electrically, standard techniques can be used for both to determine electrical integrity. With the addition of the hydraulic spool and valve portion of linear solenoids, however, additional areas for failure need to be checked.

Check for Damage at the Cast Snout Flange & Plastic Connector

A quick check of the cast snout flange and the plastic connector should always be at the top of the list, as these areas tend to crack and break during the handling and shipping of valve bodies (**Figure 6**). Like other valve locations, the integrity of the bore-to-spout clearance is critical in maintaining the proper hydraulic sealing in order to maintain pressures. Visual wear can be seen in some instances, and some solenoids are designed so that the valve and spring can be removed for better inspection. Care should be taken in disassembly, though, as the snout end cap is sometimes designed as a tunable component for setting specific pressures at the factory during assembly.

Establish Base Measurements

Taking measurements and/or marking the solenoid prior to disassembly is a must for ensuring proper recalibration. Using the valve body as the manifold and performing a



vacuum test on the solenoid spool valve is a quick way to determine hydraulic integrity. Keep in mind that the integrity of the snout to valve body casting interface also is being tested, so vacuum numbers may be lower than a typical valve-to-bore check.

Open, Re-Crimp & Clean

Other components of the linear solenoid subject to wear or damage include the plunger, bushings and washer, but these cannot be seen and examined without taking the solenoid apart. There are aftermarket tools available that allow you to open and re-crimp the solenoid/snout to inspect these components and clean debris from the solenoid. Companies also are now entering the aftermarket with rebuilt and tested solenoids as well as newly designed replacement solenoids.

Solenoid Modules & Mechatronic Units

Not only is solenoid functionality changing, but their valve body integration method is evolving as well. Typically solenoids have been held in the valve body casting by a mechanical retainer, often at the outer bore of the valve that it was actuating. But in some of the newer transmissions (6L80E, 6T70, 6F50, 5R55N/S/W, 42RLE, 45/68RFE, 62TE) we are seeing most, if not all, of the solenoids being bundled together into their own module (**Figure 7**). Whether OEM calls it a solenoid body, block or pack, this module is then bolted onto the valve body. In most instances, other pressure switches and sensors also are incorporated into these solenoid modules.

Figure 7



Solenoid Block for 5R55W/S Sonnax Part #56954L

From a factory standpoint, the modular design provides many advantages over the use and assembly of solenoids as single components:

- It significantly reduces or even eliminates the amount of wiring and redundant parts. Now the OEMs can pre-wire components, incorporate circuit boards, use a single connector back to the computer, reduce overall valve body size, make modules adaptable to various transmissions and pre-calibrate the blocks to specific vehicles.
- Damage to the sensitive electronic components can be reduced during assembly, shipping and handling when they are put into a module instead of being installed individually.
- It is more advantageous for testing purposes to keep the solenoids bundled, as the modules can be pre-tested prior to assembling onto the valve bodies. This also reduces the time spent diagnosing electrical versus mechanical or hydraulic issues in the event of a failure, which reduces cost and the potential for damage or failure due to lengthy wiring and unprotected connectors.

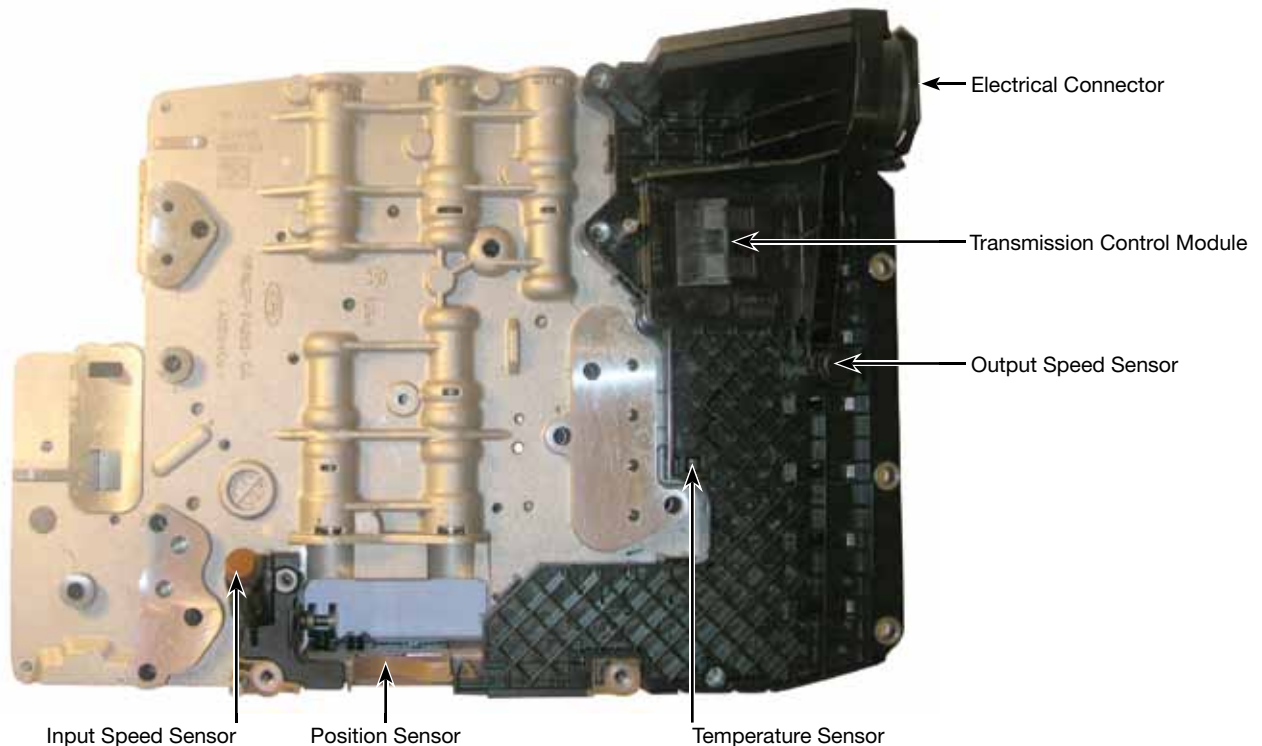
While this module design is great for the OEMs, it can be daunting from a rebuilder standpoint. Gone are the days of replacing individual solenoids or sensors due to failure. Modular solenoid blocks must be replaced as a unit, even if only one of the components has failed—a pricey proposition. As often happens when challenges arise, though, this has opened the doors for ingenuity. Companies are developing methods for rebuilding these solenoid blocks and filling a need in the aftermarket.

The likes of ZF (ZF6HP19/26/32 series, 6R60) and Jatco (RE5R05A) have taken the module approach one step further: they have incorporated all of the benefits of the solenoid/actuator module and combined the computer and the valve body into one assembly (**Figure 8**). Known as a “mechatronic” unit, this design provides yet another level of cost savings for the factory, both in manufacturability and testing:

- The ability to tune the computer parameters for each valve body and solenoid module allows the factory to loosen manufacturing tolerances on those components, thereby reducing cost and allowing the computer to compensate.

Figure 8

Mechatronic Computer Valve Body Assembly



- Since the computer, actuators and valve body can now be tested as one mechatronic unit prior to final vehicle assembly, reduction in post-testing and modifications/rebuilds can be eliminated due to earlier detection.
- The mechatronic unit also can be precisely calibrated for the specific vehicle in which it will be assembled, providing much better drivability characteristics.

All of these factory benefits from mechatronic units create new headaches (and opportunities) for the aftermarket. As with the ZF 6-speeds, since the computer is calibrated to the vehicle, swapping out an entire mechatronic unit for a used core will not work. Some manufacturers permanently mount the computer to the valve body. The ZF design allows you to separate them, making it possible for the valve body portion (hydraulic and mechanical functions) to be changed or rebuilt as long as the base type (19/21/26/28/32/34) remains the same, but the computer needs to stay with the vehicle. Thankfully the ZF computer portion of the mechatronic is easily removable and fairly durable, but

handle with care! Electrostatic discharge can leave you with a very expensive paperweight.

Reading into the tea leaves of these transmission changes, it seems the future is going to hold a lot more electronics, modular components and international designs that can be made to fit different vehicles with slight changes. All this leads to transmissions tuned for specific vehicles at the factory. Does this make our job more difficult? You bet! But with change comes opportunity, and what you want to make of that charts your own destiny.

So who knew that Bob Dylan was transmissionally clairvoyant back in the '60s when he sang, *"If your time to you is worth savin', then you better start swimming, or you'll sink like a stone, for the times they are a-changin'."* Or, if you prefer a more modern song and upbeat attitude, put on some Cheryl Crow, 'cause: *"a change will do you good."* So, I guess, *"The only thing that stays the same is change."* Wait, I've got more....



Many more technical articles are available online in the Sonnax Technical Library – visit www.sonnax.com today!

Transfer Case Fixes

Shift Fork Guide Roller Repair Kit

Part No. 100329-01K

- Roller
- Push-on Retainer
- Roller Shaft

Main Bearing Shim Kit

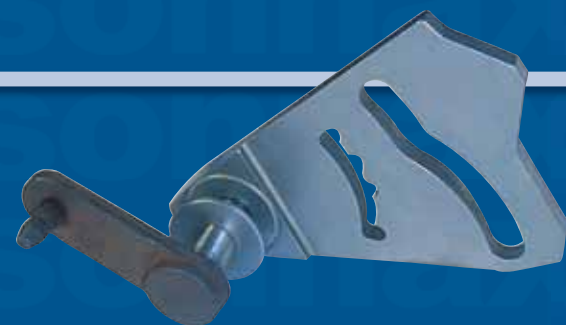
Part No. 100567A-01K

- Rear Output Bearing Shims (4)
- Input Bearing Shims (4)

Pump Stop Tab Repair Kit

Part No. 100912-01K


- Pump Tab Stop
- Bolts (2)
- Spring Pin
- Washers (2)



Transfer Case Saver Spacers

Part No. 36605-01

Case Saver Spacers (5)

 Detailed installation instructions for these parts are available online at www.sonnax.com.



Borg Warner 4405 & 4411 Repair Kits

Address noise/engagement issues found in many Borg Warner transfer cases.

Typical problems these repair kits fix include:

- Erosion at the case material (slotting) where the pump tab contacts the case, allowing excessive motion at the tab
- Unexpected loss of 4-wheel drive engagement
- Excess axial play in the main bearing pockets

Features & Benefits

- Saves case and provides increased support
- New pump tab stop relocates the contact point
- Shims reduce bearing/shaft end play and reduce stress on all internal components

Borg Warner 1356 Spacers

Takes up excess play and keeps linkage in position in Borg Warner manual shafts.

Many Ford F-series 4x4 trucks and full-size Broncos come in with complaints of “no movement” or an occasional neutral condition. This is usually caused by the linkage wearing the transfer case at its point of contact (in 1356 manual shift models only).

Sonnax **36605-01** space savers fit between the shift selector cam and the case to take up excess play and keep linkage in position, effectively preventing one or both shift forks from becoming disengaged from the shift cam.

Features & Benefits

- Spacers require no special tools to install
- Spacers are a specific size and thickness not commonly found in ordinary flat washers

New Process 230 & 240 Split Ring Retainers

The bullet-proof solution for common output snap ring breakage.

Sonnax split ring retainers **100420-01K** and **100420-02K** upgrade the OEM open-end style retainers in New Process 230 and 240 series. These retainers often break when the OEM snap ring directly behind the rear output shaft bearing fails from fatigue cracks caused by the on/off loading of the snap ring. The OEM open-end-style snap rings cannot withstand the loads from the forward force of the drive shaft.

Features & Benefits

- Made from high-strength chrome-moly steel through-hardened to increase strength and wear-resistance
- Unique design allows use without modification to the shaft or mating parts

New Venture/New Process Magnesium Case Plates

Prevent or eliminate wear on magnesium transfer case housings.

Accelerated wear of magnesium transfer case housings has been documented any time internal parts move against the magnesium. This is particularly evident in New Venture/New Process 136, 149, 236, 246, 261 and 263 transfer cases.

Transfer Case Pump Plate #100246-01

An improved, harder version of the OEM plate that serves as a drop-in replacement.

Case Saver Anti Wear Plate #100246-02K

This kit eliminates all metal-magnesium contact of the pump by replacing the OEM pump tabs with low-friction plastic inserts and eliminating the U-shaped steel insert.

- Tab design relocates contact away from the original wear points, so any weld or patches on worn housings will not be disturbed
- Bolt-on plate is quick and easy to install
- May be used with previously patched/welded case

Transfer Case Fixes

Split Ring Retainer

For 230 Series with 1.180" dia. shaft

Part No. 100420-01K

Split Ring Retainer

Split Ring Retainer

For 230 & 240 Series with 1.375" dia. shaft

Part No. 100420-02K

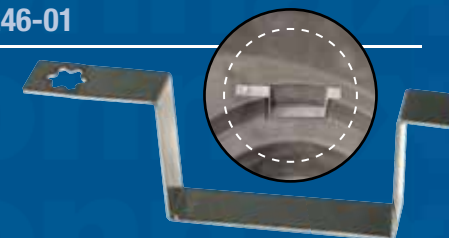
Split Ring Retainer



Case Saver Anti-Wear Plate Kit

Part No. 100246-01

Anti-Wear Plate

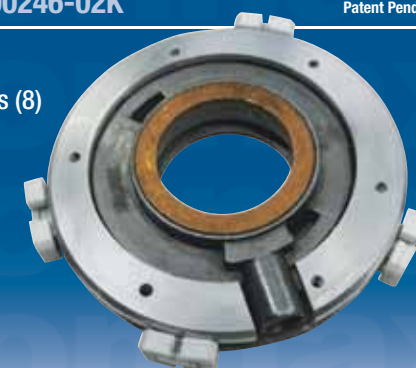


Transfer Case Pump Plate

Part No. 100246-02K

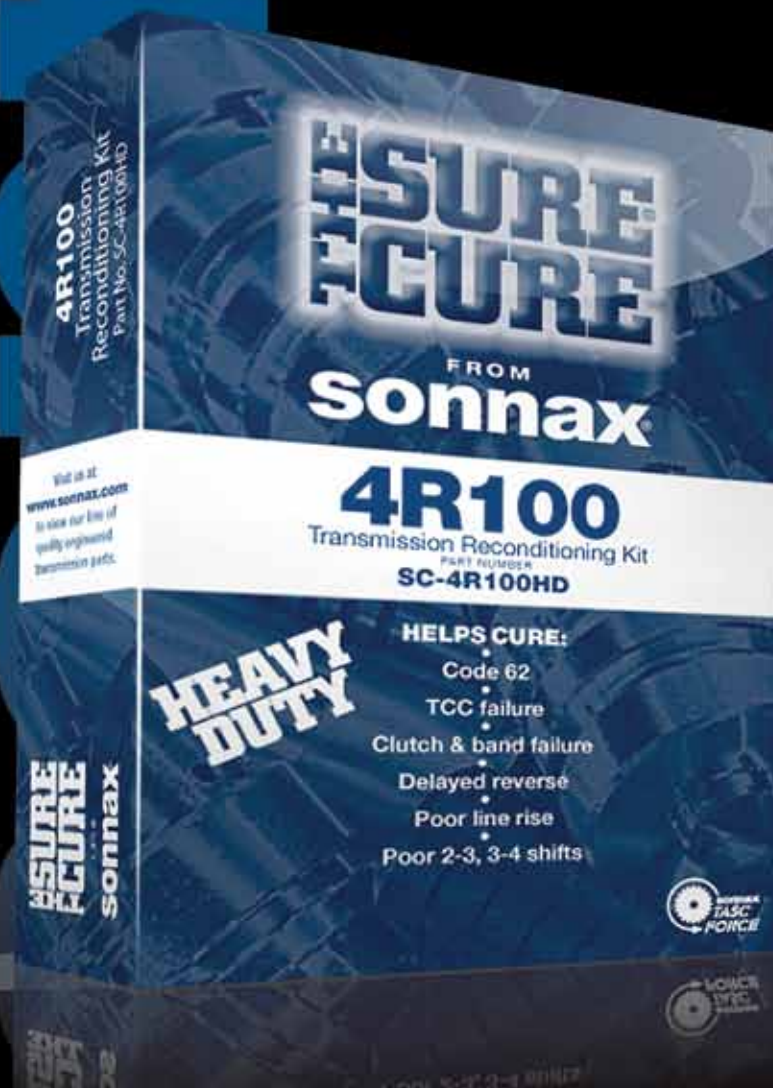
Patent Pending

- Plate
- Plastic Tabs (8)
- Screws (6)



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- Extend the life of your rebuild
- Reduce comebacks
- Simplify ordering, stocking & job costs

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Kit components are the same Sonnax parts sold individually to resolve common valve body complaints as well as other transmission problems. You can be sure every kit is backed by hundreds of hours of diagnoses, design, development and testing by Sonnax engineers and transmission specialists.

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It's an ever-increasing challenge, knowing exactly what parts to replace in troublesome transmissions. Sonnax Sure Cure kits solve this problem for you. Each kit also comes with easy-to-read, step-by-step installation instructions which covers the inspection and repair of the most critical areas of the valve body unit. The instructions even include a reference list of rebuilding specifications.

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Sure Cure® Kits

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42RH/RE Kit

VW/Audi pg. 153

01M/01N/01P Kit 096/097/098 Kit

Ford pg. 154-155

4R100 Heavy Duty Kit AX4N (4F50N) Kit
AODE ('95-Earlier) Kit AX0DE Kit
AODE ('96-Later) Kit E40D Kit

GM pg. 153 (TAAT), 156-157

TAAT Kit 4T60-E ('93-'96) Kit
4L60 (700-R4) Kit 4T60-E ('97-Later) Kit
4L60-E Kit 4T65-E Kit
4L80-E Kit

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41TE (A604) Sure Cure® Kit

Part No. SC-41TE

- Converter Regulator Valve Kit
- Pressure Regulator Sleeve
- Solenoid Pack Repair Kit
- Solenoid Switch Valve Plug Kit
- Pump Bushing
- Overdrive Clutch Hub Bushings
- Input Clutch Hub Bushing
- Bypass Plug
- Accumulator Sleeve & Piston Kit
- Output & Transfer Shaft Shim
- Differential Bearing Shim
- Low/Reverse Piston Retainer Oil Feed Seal Kit

Note: Installation Tool #92003-TL recommended

42RH/RE Sure Cure® Kit

Part No. SC-42RHE

46-47RH/RE • 48RE Sure Cure® Kit

Part No. SC-46/47RHE

Both kits above include the following parts:

- Pressure Regulator Valve
- Line Pressure Plug & Sleeve Kit
- Manual Valve
- Throttle Valve Kit
- 4-Spool Switch Valve
- Endplay Shim
- 3-4 Accumulator Spring
- Shift Linkage E-Clip
- Intermediate Plug & Pilot Kit
- Fourth Accumulator & Turbine Shaft Seals
- Imidized Plastic Checkballs
- Output Pilot Bushing



Detailed instruction sheets for Sonnax Sure Cure® kits are included in every box and also are available online at www.sonnax.com.



Chrysler 41TE (A604) Sure Cure® Kit

Key parts in this kit help you fix:

TCC Complaints

- Converter shudder & failure
- TCC deflection & lining failure
- Cooler restriction caused by lining material
- Transmission/converter overheating
- Poor lube control
- Erratic TCC apply pressure

Other Complaints

- High line pressure
- Harsh shifts
- 2nd Gear starts
- Low/reverse switch code
- 1-2 Shudder
- Coast down clunk
- High CVIs
- Slide shifts

Chrysler 42-48RH/RE Sure Cure® Kits

Key parts in these kits help you fix:

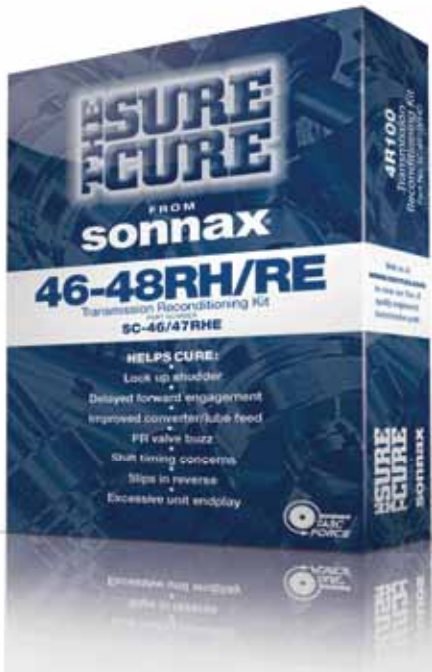
TCC Complaints

- Lockup shudder
- Lube failures
- Converter bushing failure
- Overheated converter

- Reduced cooler flow
- Soft TCC apply
- Build-up of release pressure during lockup

Other Complaints

- Delayed engagement
- PR valve buzz
- Slips in reverse
- Poor cooler charge at idle
- Poor line control
- Poor forward & reverse engagement
- Shift timing concerns & throttle buzz
- Poor kickdown due to low TV pressure
- Late 2-3
- Oversensitive 3-2



VW/Audi 01M/01N/01P Sure Cure® Kit

Key parts in this kit help you fix:

TCC Complaints

- Code 1582
- No lockup
- Falls out of lockup hot
- Engine stalls/shudders on engagement

Other Complaints

- Delayed engagements
- Erratic line pressure
- Excessive line pressure in reverse
- Low/Excessive line rise
- No 3-4 or 2-3
- Loss of gear/ Wrong gear starts
- No line rise

VW/Audi 096/097/098 Sure Cure® Kit

Key parts in this kit help you fix:

- Erratic line pressure
- Delayed engagements
- Excessive line pressure in reverse
- Low/Excessive line rise
- No 3-4 or 2-3
- Loss of gear/wrong gear starts



TAAT Sure Cure® Kit

Key parts in this kit help you fix:

- No/Delayed reverse with harsh engagement
- Poor line pressure control (high or low pressure)
- Blown filters
- Low/Erratic line pressure
- Insufficient line rise

01M/01N/01P Sure Cure® Kit

Part No. SC-01M/01N/01P

- Main Pressure Regulator Valve Kit*
- Oversized TCC Regulator Valve Kit**
- Boost Regulator Valve Kit***
- Solenoid Regulator Valve Kit****
- Small & Medium Aluminum Shift Cups

Note: The following tools are required for installing the above valve kits:

- * Tool Kit #F-11940-03K-TL3
- ** Tool Kit #119940-TL4
- *** Tool Kit #F-119940-05K
- **** Tool Kit #F-119940-06K



Note: Sonnax part numbers beginning with an "F-" must be used with the VB-FIX. See pg. 160 for details.

096/097/098 Sure Cure® Kit

Part No. SC-096/097/098

- Main Pressure Regulator Valve Kit*
- Boost Regulator Valve Kit**
- Solenoid Regulator Valve Kit***

Note: The following tools are required for installing the above valve kits:

- * Tool Kit #F-119940-TL8
- ** Tool Kit #F-119940-TL7
- *** Tool Kit #F-119940-TL6



Note: Sonnax part numbers beginning with an "F-" must be used with the VB-FIX. See pg. 160 for details.

TAAT Sure Cure® Kit

Part No. SC-TAAT

- Pressure Regulator Sleeve Kit*
- Pressure Regulator Valve
- Pressure Regulator Valve Cushion Spring
- Boost Valve Kit (Fits Type 2 valve bodies only)

Note: *Tool Kit #9520-TL required

4R100 Sure Cure® Kit

Part No. SC-4R100HD

- Line Pressure Modulator Plunger & Sleeve Kit
- Boost Valve & Sleeve Kit
- 1-2 Accumulator Control Valve Kit
- 2-3 & 3-4 Accumulator Control Valve Kit
- Front Lube/Drainback Valve Kit
- Relief Valve
- Line-To-Lube Pressure Regulator Valve
- TCC Control Sleeve Assembly
- Performance Rated Accumulator Spring
- Center Support Gasket
- One-Piece Rear Case Bushing
- Rear Planet Endplay Shim
- Sure Lock O.D. Piston Spiral Snap Ring

NOTE: Bore Sizing Tool #36948-12 & Installation Tool #T36008A recommended

AODE ('95-Earlier) Sure Cure® Kit

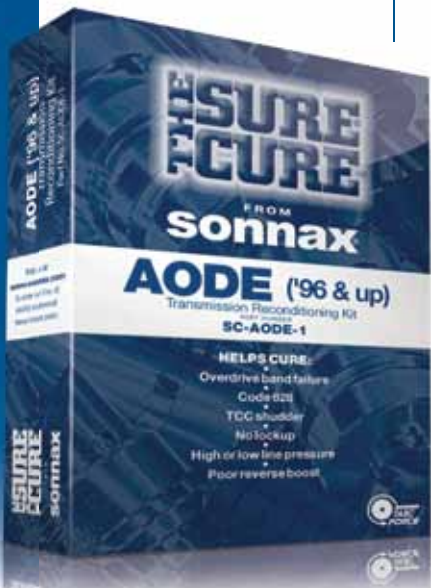
Part No. SC-AODE

AODE ('96-Later) Sure Cure® Kit

Part No. SC-AODE-1

Both kits above include the following parts:

- Main Pressure Regulator Valve
- Pressure Regulator Boost Valve & Sleeve Kit
- Bypass Clutch Control Sleeve & Plunger Valve Kit
- 2-3 Shift Valve End Plug
- Solenoid Regulator Valve Clip
- Overdrive Servo Pin
- Intermediate Clutch Spiral Retaining Ring
- Direct Drum Teflon Rings
- Input Shaft Teflon Rings
- Forward Drum Teflon Rings



Detailed instruction sheets for Sonnax Sure Cure® kits are included in every box and also are available online at www.sonnax.com.

Ford 4R100 Heavy Duty Sure Cure® Kit

This best-selling kit for heavy-duty applications features performance-rated accumulator springs, “melt-proof” front lube/drainback valve and a steel-backed, hardened bushing that replaces the two OEM bushings.

Key parts in this kit help you fix:

TCC Complaints

- Converter overheat
- Codes 62, 628 or 1744
- Lockup shudder
- Engine stumble/stall on reverse engagement
- TCC cycling

Other Complaints

- High line pressure
- Soft 1-2 and/or 2-3
- Intermittent harsh shifts
- Poor line rise
- Soft shifts
- Delayed reverse
- Loss of 2nd
- Premature clutch failure
- Visible wear in sleeve
- Loss of 3rd or 4th



Ford AODE Sure Cure® Kits

Key parts in these kits help you fix:

TCC Complaints

- Uncontrollable TCC
- Delayed/No lockup
- Shudder condition
- Codes 628, 741, 1741

Other Complaints

- Low line rise
- Throttle buzz
- Delayed forward engagement
- Clutch failures
- Poor reverse boost

Ford AX4N (4F50N) Sure Cure® Kit

Key parts in this kit help you fix:

TCC Complaints

- TCC apply & release control problems
- Converter slip codes and/or overheat
- Codes 741,1741 or 1744
- TCC cycle/surge

Other Complaints

- Flare 1-2 or 2-3 upshifts
- Non-adjustable (high) throttle pressure
- 2-1 Downshift clunk
- Harsh reverse
- Clutch & band failures
- Delayed engagement
- No forward/4th
- Neutral condition after obtaining 4th

Ford AXODE Sure Cure® Kit

Key parts in this kit help you fix:

TCC Complaints Same as AX4N above.

Other Complaints

- Flare 1-2 or 2-3 upshifts
- Non-adjustable (high) throttle pressure
- 2-1 Downshift clunk
- Harsh reverse
- Clutch & band failures
- Line pressure instability
- Pump noise/pump rotor damage
- Delayed engagements
- No/Slips forward/reverse
- Shifts 1-2-3-2
- Burned forward clutch
- No 4th

Ford E40D Sure Cure® Kit

Key parts in this kit help you fix:

- Poor line rise
- Soft shifts
- Delayed reverse
- Loss 2nd, 3rd or 4th
- Premature clutch failure
- Overdrive planetary failure



AX4N Sure Cure® Kit

Part No. SC-AX4N

- Pump Slide Pin
- Reverse Boost Valve & Sleeve Kit
- Oversized Bypass Clutch Control Valve Kit*
- Oversized Converter Regulator Valve Kit**
- Oversized Solenoid Regulator Valve Kit***
- Forward Control Valve Kit****
- Low Radius Relief Valve

NOTE: The following tools are required for installing the above valve kits:

- * Tool Kit #96206-TL
- ** Tool Kit #96201-TL3
- *** Tool Kit #96201-TL2
- **** Tool Kit #96206-BST

AXODE Sure Cure® Kit

Part No. SC-AXODE

- Reverse Boost Valve & Sleeve Kit
- Bypass TCC Control Valve & Sleeve Kit
- Forward Control Valve Kit
- Valve Saver Cap Kit
- 1-2 Capacity Modulator Valve Retainer
- Backout Valve Clip
- Low Radius Relief Valve
- Ring Gear Retaining Ring
- Spring Retaining Clip
- Servo Tube Bracket
- TV Cable Corrector

NOTE: Bore Sizing Tool #96201-BST recommended

E40D Sure Cure® Kit

Part No. SC-E40D

- Line Pressure Modulator Plunger & Sleeve Kit
- Boost Valve & Sleeve Kit
- 1-2 Accumulator Control Valve Kit
- 2-3 & 3-4 Accumulator Control Valve Kit
- Front Lube/Drainback Valve Kit
- Relief Valve
- Center Support Gasket
- One-piece Rear Case Bushing
- Rear Planet Endplay Shim
- Sure Lock Overdrive Spiral Snap Ring

NOTE: Bore Sizing Tool #36948-12 & Installation Tool #T36008A recommended

4L60 Sure Cure® Kit

Part No. SC-4L60

- TV Cable Corrector
- Throttle Valve Plunger & Sleeve Kit
- Shortened TV Link
- Stator Rear Bushing
- Reverse Boost Valve Kit
- TV Boost Valve Kit

4L60-E Sure Cure® Kit

Part No. SC-4L60E

- TCC Regulator Valve Kit*
- Valve Body Retainer
- Actuator Feed Limit Valve Kit**
- Boost Valve & Sleeve Kit
- TCC Apply Valve Kit

Note: The following tools are required for installing the above valve kits:

- * Reamer #77754-R2
- ** Reamer Kit #77754-TL

Both kits above also include the following parts:

- 1-2 or 3-4 Accumulator Spring
- Servo Release Check Valve
- Pinless Accumulator Piston Kit
- Imidized Plastic Checkballs
- Oversized Pressure Regulator Valve*
- Pump Slide Pivot Pin
- Pump Bushing
- Endplay Shim
- Endplay Shim
- Viton Rubber D-Rings for 2-4 Servo

NOTE: *Reamer & Drill Jig #77917-TL or #77917-TLC required

4L80-E Sure Cure® Kit

Part No. SC-4L80E

- Boost Valve & Sleeve Kit
- Front Stator Support Bushing
- TCC End Plugs
- End Plug
- Actuator Feed Limit Valve Kit
- TCC Regulator Valve Kit
- 1-2 & 3-4 Shift Valve Spring Kit
- Imidized Plastic Checkballs
- Spring Pins
- No Walk-Out Case Bushing
- Forward Clutch Drum Selective Washer
- Front Unit Endplay Shim

Note: *Tool Kit #F-34200-TL16 or 77754-TL required



Note: Sonnax part numbers beginning with an "F-" must be used with the VB-FIX. See pg. 160 for details.

GM 4L60 (700-R4) & 4L60-E Sure Cure® Kits

Key parts in these kits help you fix:

4L60 Complaints

- Burnt clutches & bands
- Poor line rise
- Poor reverse boost
- Delayed reverse
- Low line pressure
- Soft/Slide shifts
- Early soft upshifts
- Premature 3-4 clutch failure
- 3-4 Clutch failure
- Poor 2-3 shift feel
- Excessive pump noise

4L60-E TCC Complaints

- Code 1870
- TCC slip
- No lockup
- Falls out of lockup hot
- Converter overheat

4L60-E Other Complaints

- Reduced 3-4 clutch life
- Poor 2-3 shift feel
- Burnt clutches & bands
- Poor shift quality
- Harsh 1-2
- Poor line rise
- 3-4 Clutch failures
- Line pressure instability
- Rotor fracture
- Pump noise



GM 4L80-E Sure Cure® Kit

Key parts in this kit help you fix:

TCC Complaints

- Converter shudder
- Burnt converters
- TCC apply/release problems
- TCC slip codes

Other Complaints

- High line pressure
- Broken parts
- Buzzing noise
- Uncontrollable line rise
- Wrong gear starts
- Solenoid codes
- Clutch/band failure
- 3rd Neutral condition
- No 4th gear
- 3-4 Neutrals
- 2nd Gear starts
- Bushing walk-out/damaged case
- Output shaft & case damage
- Metal contamination

GM 4T60-E Sure Cure® Kits

Key parts in these kits help you fix:

TCC Complaints

- Codes 39, 740 or 1870
- Converter shudder/overheat
- Falling out of lockup hot
- Reduced cooler flow

Other Complaints

- Poor reverse boost
- Soft shifts
- Poor line rise
- 2nd and/or 3rd Clutch distress



GM 4T65-E Sure Cure® Kit

Key parts in this kit help you fix:

TCC Complaints

- Codes 39, 740 or 1870
- Converter shudder/overheat
- Falling out of lockup hot
- Reduced cooler flow

Other Complaints

- Poor reverse boost
- Soft shifts
- Poor line rise
- 2nd and/or 3rd Clutch distress



Detailed instruction sheets for Sonnax Sure Cure® kits are included in every box and also are available online at www.sonnax.com.

4T60-E ('93-'96) Sure Cure® Kit

Part No. SC-4T60E

4T60-E ('97-Later) Sure Cure® Kit

Part No. SC-4T60E-1

Both kits above include the following parts:

- TCC Regulator & Isolator Valve Kit
- Oversized TCC Apply Valve Kit*
- Reverse Boost Valve Kit
- Modulated Line Boost Valve Kit
- Pump Slide Pivot Pin
- Boost Valve Retainer E-Ring
- 1-2 Roller Clutch Spring Kit
- Differential Side Gear Thrust Washer
- Input Clutch Hub Shim
- Input Clutch Hub Shim
- Differential Carrier-To-Case Shim
- Imidized Plastic Checkballs

Note: *Tool Kit #84754-TL5 required

4T65-E Sure Cure® Kit

Part No. SC-4T65E

- Boost Valve & Sleeve Kit
- TCC Apply Valve Kit
- TCC Regulated Apply Valve Kit*
- Pump Slide Pivot Pin
- Imidized Plastic Checkballs
- AFL Valve & Sleeve Kit**
- TCC Relief Valve Kit
- Differential Lube Tube Retainer
- Input Clutch Hub Shim
- Input Clutch Hub Shim
- Differential Carrier-To-Case Shim

Note: The following tools are required for installing the above valve kits:

- * Tool Kit #84754-TL3
- ** Tool Kit #F-84596-TL



Note: Sonnax part numbers beginning with an "F-" must be used with the VB-FIX. See pg. 160 for details.

Sonnax VB-FIX Q&A

Question: What is the VB-FIX?

Answer: The VB-FIX is a patented external alignment system that guides specialized Sonnax reamers during the reaming process. Typical reamers use one of two alignment methods for guidance using a part of the valve body to actively guide the reamer:

1. Self Guided
Reamer is guided by one or more diameters of the reamer, typically a non-cutting pilot.
2. Guide Bushing
Reamer is guided by guide bushing inserted into the valve bore.

A third method requires the Sonnax VB-FIX, which uses an alignment pin to center the external guide bushing of the VB-FIX precisely on-center with the bore to be reamed.

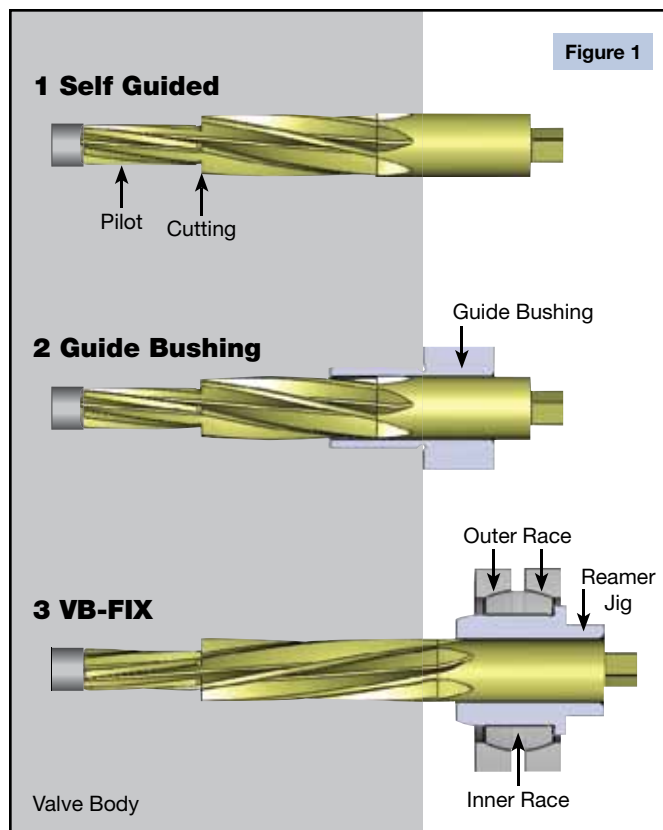
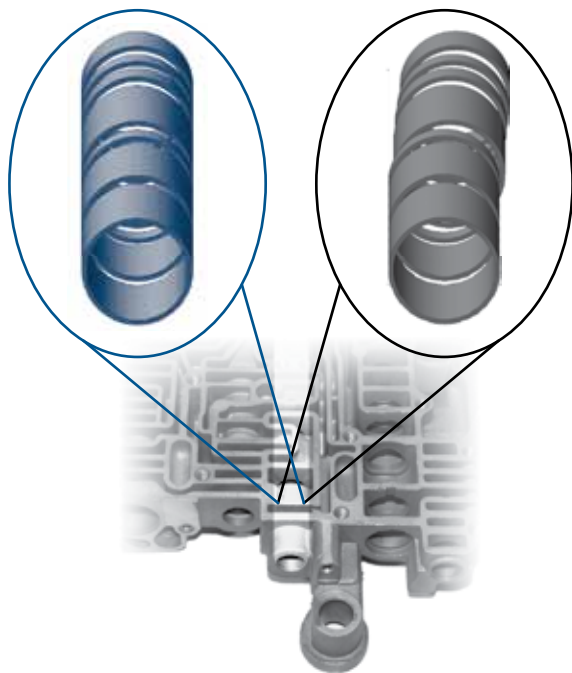


Figure 2

Sonnax VB-FIX Ream

Non-Sonnax Ream



Question: Why is the VB-FIX needed?

Answer: The heart of the VB-FIX is its patented, three-axis adjustability that ensures reamers are precisely aligned with the valve bore. Valve body guided methods one or two will not work in all applications due to size or configuration of the bore. As an alternative, mounting a traditional guide fixture to a gasket or end-plate surface provides no guarantee that valve bores will be parallel or perpendicular to machined surfaces on the valve body. Just one tenth of one degree ($.1^\circ$) misalignment will cause a reamer to be off-center five thousandths of an inch (.005") over the length of a 3" long valve bore (Figure 2). This approach leads to inconsistent and poor quality reaming.

Question: How much does the VB-FIX cost?

Answer: You will have to contact your parts distributor or online retailer for an exact quote, but it is cheaper than most special tools you have to buy. For an eye-opening look at the real-world value of the VB-FIX system, turn to "The Economics of Sonnax Valve Kits & Tools" on page 63.

Question: Can I use the reamers I already own with the VB-FIX fixture?

Answer: No, the VB-FIX will only work with specialized Sonnax tool kits containing reamers, reamer jigs and guide pins developed to work with this system. These kits feature Sonnax part numbers that start with an “F-”. For example, the [F-84596-TL](#) tool kit is designed for the AFL Valve & Sleeve Kit [84596-02K](#) used on the 4T65-E AFL bore in the channel plate.

Question: How many VB-FIX tool kits are available?

Answer: We currently offer more than 85 “F-Tool” kits for over 50 different transmission units, with new parts and reamers being developed all the time.

Question: Are all future Sonnax reamers going to use the VB-FIX reaming fixture?

Answer: No, our engineers look at the technical characteristics of each bore when deciding whether to use the VB-FIX system to service a specific bore. We then choose the method that will do the best job at the lowest cost.

Question: Why do some applications have two different reamer kits available?

For example, the CD4E has two tool kit options for the pressure regulator bore: the [73840-RTL](#) (guide bushing method) or a newer [F-73840-TL](#) (VB-FIX method).

Answer: In this case, the CD4E PR bore is one application where reaming results are not consistent. In 1 or two out of 10 cases, the valve might fit poorly or the bore might not clean up all the way using bushing guided reamers. These issues are not a problem with the VB-FIX alignment system, so the new [F-73840-TL](#) kit is the preferred tool kit. We still support the original [73840-RTL](#) tool kit for shops which continue to request it, however.

Other applications where we offer both tool types are the 4L60-E TCC regulator bore ([F-77754-TL4](#)), 4L80E AFL bore ([F-34200-TL16](#)) and AODE pressure regulator bore ([F-76948-TL](#)). These are high-volume applications where our customers have requested VB-FIX tools to simplify the reaming process.

Question: Do I have to build a reaming station to use the VB-FIX?

Answer: Simply put, a well-organized reaming station reduces your labor time and improves the quality and consistency of your work. Although it is not required, there are many benefits to a reaming station dedicated to the VB-FIX. It usually has a pump for re-circulating cutting fluid and a trap for metal chips, etc. Flushing the bore with cutting fluid clears the bore of chips, which helps reamers last longer and improves surface finish. Having the cutting fluid and all the necessary tools organized in one spot adds efficiency.

The VB-FIX is very adaptable to any production level in your shop. Some shops have adapted it to production machines with air power clamps to speed up the process. Others have multiple fixtures, each one set up and ready for a specific bore. On a smaller scale, you can still do one bore at a time and simply mount the VB-FIX to a common bench vise.

Question: Is there anything else I need to have on hand to use the VB-FIX?

Answer: In addition to cutting fluid and tools to turn the reamer, there are a few things you will want to have the first time you use the VB-FIX:

- A bench vise to hold the VB-FIX
- The reamer kit for the bore you want to fix
- Small C-clamps to secure the valve body to the fixture
- Cauls to protect the valve body from clamp damage

The VB-FIX is designed to be quick and user-friendly, but for first use, allow a little extra time to assemble the fixture and review the procedures. After that you will see that the VB-FIX system is easy-to-use and adaptable to all levels of production. Detailed reaming information comes with all Sonnax parts requiring the VB-FIX. Our knowledgeable technical support department is happy to provide additional assistance should you need it, and as always, technical information is available on our Web site.



Many more technical articles are available online in the Sonnax Technical Library – visit www.sonnax.com today!

Reaming Fixtures



VB-FIX

Part No. VB-FIX

Patent No. 7,220,085

- Base Plate
- Clamp Mounting Plate
- Clamp Plate
- Outer Races (2)
- Inner Race
- Studs (3)
- Washers (3)
- Wing Nuts (3)
- Socket Cap Screws (4)

Oversized Pump Base Plate

Part No. VB-06



Detailed reaming instructions for Sonnax "F-Tool" kits and the VB-FIX are available online at www.sonnax.com.

Learn more...

- "The Economics of Sonnax Valve Kits & Tools" on pg. 63
- "Sonnax VB-FIX Q&A" on pg. 158

VB-FIX

Valve Body Reaming Fixture

Get consistent, reliable results of the highest quality to minimize the potential for reaming errors.

In certain applications there is no way to pilot a reamer to repair a worn valve body bore, forcing rebuilders to purchase new valve bodies.

The patented VB-FIX is a self-aligning fixture that provides an external, rigid pilot bore for the reamer and guide pin, allowing the fixture to be used on multiple valve bodies and valve bores.

The VB-FIX base is large enough to provide ample support for the valve body. For vehicles with bores located inside large pump bodies, an oversize pump base plate - the **VB-06** - can be easily mounted to the VB-FIX.



The VB-FIX is designed for use only with special Sonnax parts and tools which service a specific bore in a certain valve body. Sonnax part numbers for these tool kits begin with an "F-" to distinguish them from stand-alone Sonnax tools.

More than 85 VB-FIX "F-Tools" are available for use with the following units:

Aisin AW

55-50SN	TF-80SC
55-51SN	TF-81SC
TF-60SN	TR-60SN

Chrysler

41TE	68RFE
42LE	A404
42RLE	A413
42/46/47RH/RE	A470
48RE	A670
45RFE	A727
545RFE	A904

Ford

4F27E	4F50N
5R110W	AX0DE
5R55N/W/S	AX4S
A0DE	CD4E
4R70/75W	E40D
AX4N	4R100

General Motors

4L60-E	4L80-E	4T65-E
4L65-E	4T40-E	4T80-E
4L70-E	4T45-E	5L40-E

Jatco

JF506E	RE5R05A
JF010E/JF011E	

Mercedes

722.6

Renault/Citroën

DPO	AL-4
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Toyota

U140E/F	U240/41E
U150E	U250E
U151E/F	

Volkswagen/Audi

096	098	01N
097	01M	01P

SERVO-FIX Pin Bore Reaming Fixture

A highly adaptable, rigid mounting method for repairing servo pin bores in a wide range of transmissions.

Wear and scoring of servo pin bores is a common problem in automatic transmissions. In the past, shift concerns and part failures due to leakage caused by wear could often only be corrected by replacing the case - there was no way to locate and maintain tool concentricity with the pin bore centerline.

The SERVO-FIX pin bore reaming fixture establishes a rigid pilot off the OEM pin bore so that reaming is not affected by piston or seal concentricity issues. The fixture mounts to the case and has a floating bearing guide to ensure proper pin bore centerline.

The SERVO-FIX is designed to offer a variety of mounting options for a wide range of transmission cases (and multiple bores for each case, where required).



The SERVO-FIX must be used in conjunction with special Sonnax "S-Tool" kits designed to service specific servo pin bores. Sonnax part numbers for these tool kits begin with an "S-" to distinguish them from other Sonnax tools.

Specialized "S-Tool" kits are available for use with the following units:

Ford

5R55N/W/S	AX4N
A0D	AX0D
A0DE	AX0DE
4R70/75W	4F50N

GM

4L30-E
180



SERVO-FIX

Part No. SERVO-FIX

Patent Pending

- Base Plate
- Clamp Mounting Plate
- Clamp Plate
- Outer Races (2)
- Inner Race
- Studs (3)
- Washers (3)
- Wing Nuts (3)
- Hardware Mounting Kit



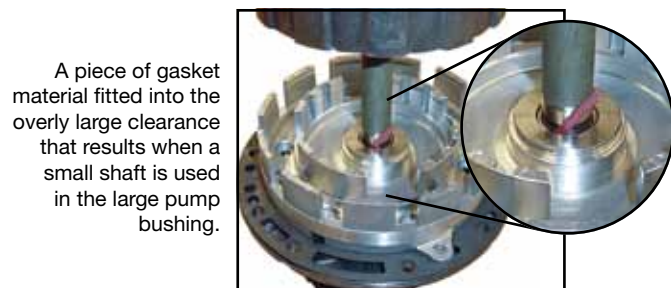
Detailed reaming instructions for Sonnax "S-Tool" kits and the SERVO-FIX are available online at www.sonnax.com.

Don't Blame the Torque Converter

Society often influences us to try to blame others for our problems. From an early age we try to place blame with friends or siblings, and this training continues into school age when the guilty person is “the other guy”...then into the workplace. This is especially true if your workplace happens to be in the automatic transmission industry, where the mysterious inside of a sealed torque converter easily substitutes for the “big dumb kid” at the back of the classroom. In fact, torque converters aren’t all that “smart.” They are actually such simple, straightforward mechanisms that it’s usually impossible for converters to cause the serious transmission problems they often get the blame for.

The 2001 Volvo 740 Code

A 2001 Volvo equipped with a 1.9L engine and 55-50SN transmission was brought to a transmission shop because fluid was leaking out of the front of the transmission. The vehicle had high mileage, but performed very well. This was a typical soft part overhaul and torque converter rebuild. The only hard part that was replaced was the pump. On the road test there was no lockup and a P0740 code was set. Of course the converter came under suspicion immediately, but it was hard to ignore the fact that replacing the pump was the only change made to the unit.



A piece of gasket material fitted into the overly large clearance that results when a small shaft is used in the large pump bushing.

The pump was found to be the reason for the 740 code. There are two different diameter input shafts, .844" and .870", and two different pumps with stator bushings to mate to the shafts.

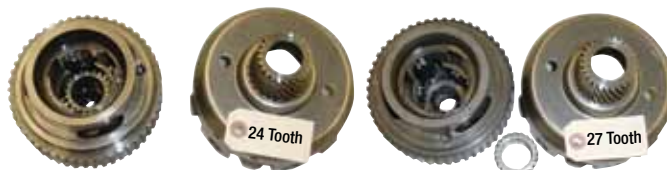
Transmission Digest carried a Tech Tip by Hardparts for Transmission in June 2006 recognizing this problem, and ATSG covered it in a 2007 seminar book. Today most hard part suppliers ask for specific applications for this part or at least the dimensions of the shaft or stator bushings.

The 2001 Jetta 740 Code

A 2001 Volkswagen Jetta equipped with a 2.0L engine and 01M transmission was returned to a transmission shop after having both its transmission and torque converter rebuilt. The vehicle had a 740 trouble code, one of the codes present when the vehicle was first brought to the transmission shop, so the technician thought that something had been missed on the original rebuilds. The converter was sent back to the converter rebuilder who reported that, while it had previously undergone major cleaning because of metal contamination, the friction material was the only thing replaced. Inspection on this return trip did not show any sign of problems inside the converter.

When the transmission was checked, the inside appeared to be pristine so the valve body was replaced with a remanufactured unit and the vehicle taken for a road test. After about 35 miles, the 740 code returned. Convinced that the problem was inside the converter, the technician replaced it with another remanufactured unit and took the Jetta back out on the road. The 740 code returned again.

The technician road tested the vehicle a third time with one difference: he did not allow the transmission to shift into the overdrive range. The 740 code did not return so he began looking for an overdrive ratio difference. He discovered that, during the first rebuild, the original overdrive planetary with a 24-tooth sun gear was replaced with an overdrive planetary with a 27-tooth sun gear...and that turned out to be the problem.



The sun gear used in the rebuild did not match the original overdrive ratio.

Prior to the original repair, the 740 code was being set when the computer commanded overdrive and lockup, but the transmission could not attain desired overdrive ratio because of the failed planetary. The second time around, the 740 code was being set because the overdrive ratio did not match what was expected. As it turned out, the converter was not the cause of the 740 code in either situation.



Many more technical articles are available online in the Sonnax Technical Library – visit www.sonnax.com today!

sonnax® PERFORMANCE

Our customers look to us for guidance on how to build transmissions which are truly stronger and more reliable.

That's why Sonnax offers hundreds of heavy-duty and high performance products for transmissions and torque converters, all engineered to withstand severe use. Many of these parts can be used to fix everyday problems rebuilders see in the shop because our goal is to come up with innovations, upgrades and improvements that make our products better than OEM, not merely equivalent replacements.

Sonnax high performance transmission parts address key issues in a variety of units. These parts allow hard-working, daily-use transmissions to perform longer.

- Larger boost valves
- Line-to-lube pressure regulator valves
- Larger servos
- "Shift-in-a-box" products

Our extensive line of Powerglide® parts for all-out racing ranges from drums, pistons and gear sets right on down to the little linkage parts that are so hard to come by.

High performance torque converter specialists utilize Sonnax specialty parts in everything from street/strip hobby cars to top fuel drag racers. We also offer heavy-duty products for vehicles bearing heavy loads and the HD diesel market, plus our innovative Power Train Savers® for drivetrain protection.

Visit www.sonnax.com to learn more about Sonnax high performance products.

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We Have Your Servo Solutions

Sonnax servos are precision machined from high-quality materials to offer improved sealing and shift tuneability.

Super Hold Overdrive Servo Kit
Sonnax Part #76890-17KP

1-2 Super Hold Servo Kit
Sonnax Part #K65703

Dual O-Ring Servo Kit
Sonnax Part #28821-04K

"R" Code Servo Kit
Sonnax Part #K36528R

"C" Code Servo Kit
Sonnax Part #K13259C

Super Hold Servo Kit
Sonnax Part #28821-09K
Available Early 2011

48RE Performance Upgrades

Throttle Valve Kit

Part No. 22771-HDK3

- Throttle Valve
- Throttle Plunger
- Balance Spring
- Spring Shims (3)
- Alternate TV spring
- Sleeve

Oversized Lube Regulated Pressure Regulator Valve Kit*

Part No. 22771A-16K

- Oversized Pressure Regulator Valve
 - Oversized Line/TV Pressure Plug Assembly
 - Pressure Regulator Spring
- *Requires Tool Kit #F-22771A-TL7

Lube Regulated Pressure Regulator Valve

Part No. 22771A-02K

- Pressure Regulator Valve

Features & Benefits

- Reduced throttle sensitivity, especially in diesel or other high-torque applications
- Spring shims and alternative spring allow adjustment of TV pressure and throttle valve control
- Sleeve, valve and spring made from hardened steel
- Eliminates side loading and restores detent pressure

Features & Benefits

- Pressure regulator valves are designed with an internal check valve that allows oil to flow into the converter charge circuit as soon as the vehicle is started
- Internal valve shuts down once line pressure reaches normal levels
- With engine off, the internal check valve prevents fluid from draining out through the orifice reducing converter drainback
- Improves converter feed/lube oil flow at critical low RPM and high load conditions
- **22771A-16K** Kit includes a matched oversized line/TV pressure plug and pressure regulator spring

Features & Benefits

- 16% More apply area provides more band holding power in 2nd gear
- One easy-to-install part improves 1-2 and 2-3 shifts
- Improved seal design conserves pump volume

Features & Benefits

- Made of high-strength steel
- Withstands the increased band apply forces in performance applications

Features & Benefits

- O-Ring provides positive seal to prevent direct (front) clutch oil leaks

48RE Performance Upgrades

Features & Benefits

- Sonnax billet pistons resist breakage better than the original cast pistons
- Seal ridges on the pistons are rounded to prevent the piston from sticking in the case bore
- Slightly smaller lower piston seal ridge prevents sticking

Features & Benefits

- Machined from hardened steel with more than double the tensile strength of the OEM part
- A larger radius at the spring seat area minimizes the primary stress riser and prevents breakage
- 2-for-1 design works in all applications
- O-Ring eliminates leakage of servo apply oil

Features & Benefits

- One-piece design
- Made from a 300M steel forging
- 23-Tooth input spline
- 62-Tooth clutch spline
- Use with OEM seals

Features & Benefits

- O-Ring prevents loss of lube oil (many OEM supports do not seal well in this area)
- Two O.D. oil delivery grooves are repositioned at high load areas
- Two I.D. oil delivery grooves run full length of load-bearing surface
- High-quality aluminum resists gauling

Features & Benefits

- Made from anodized billet aluminum
- Dual seal “Teflon®/D-Ring” design provides superior sealing capability

Rear Servo Piston

Part No. 22912

- Servo Piston



Reverse Servo Piston Plug Kit

Part No. 22912-01K

- Piston Plug
- Retaining Ring
- O-Ring



Heavy Duty Input Shaft/Hub Assembly

Part No. 22121B-01

- Heavy Duty Input Shaft/Hub Assembly



Piston Retainer Kit

Part No. 22754N-01K

- Piston Retainer
- O-Ring
- Plugs (2)

Oversized Piston Retainer Kit

Part No. 22754N-02K

- Piston Retainer
- O-Ring
- Plugs (2)



Dual Seal Billet Accumulator Piston Kit

Part No. 22841-04K

- Accumulator Piston
- Teflon® Seals (2)
- D-Ring Seals (2)



4L60-E, 4L65-E, 4L70-E Performance Upgrades

Performance Pack

Part No. HP-4L60E-01

- Boost Valve
- Forward Accumulator Kit
- O-Ring .490"
- Accumulator Valve Shim
- High RPM Pump Slide Spring
- Twist Drills (3)
- Spacer
- 1-2 Pinless Accumulator Piston Kit
- 4th Servo Return Spring
- 1-2 Accumulator Inner Spring
- Servo Cushion Spring
- 1-2 Accumulator Outer Spring
- Servo Piston D-Ring Kit
- 1-2 Accumulator Waved Spring
- 3-4 Accumulator Piston Kit
- Accumulator Housing Spacer
- 3-4 Accumulator Spring
- Servo Release Check Valve



Features & Benefits

- Shorter shifts
- Faster line pressure increase and higher overall line pressure for greater clutch/band holding power
- Ultra-reliable Sonnax pinless accumulator pistons in 1-2, 3-4 and FWD locations
- Reduces high RPM pressure drop-off
- Unique 1-2 accumulator spring combination for shifts "with character"
- Patented 3rd accumulator orifice check valve that gets the 2-3 right the first time, every time
- Consistent results on every job, with no guessing on calibration



Servo Release Check Valve

Part No. 77701-076

- Check Valve
- O-Ring



Features & Benefits

- Improved design meters servo release oil, reducing 3-4 clutch failure
- Provides sufficient exhaust for smooth 3-2 downshifts
- Calibrates 3-4 clutch feed orifice without creating shift concerns

Teflon® Lined Rear Stator Support Bushing

Part No. 77002BT-01

- Bushing



Features & Benefits

- Extremely wear-resistant Teflon® lining
- Provides a closely toleranced I.D. typically found in machined-in-place bushings
- Wider than OEM bushings
- No machining required

4th Gear Super Hold Dual Servo Assembly

Part No. 77767K

- Servo Assembly
- Steel Washer



Features & Benefits

- 40% More surface area for greater holding power
- Affects 4th gear only
- Can be used with OEM, Corvette or Sonnax performance 2nd gear servo assemblies
- Easy to install, transmission removal is not required

4L60-E, 4L65-E, 4L70-E Performance Upgrades

Features & Benefits

- 18% More apply area than OEM Corvette servo
- Dual seals on 2nd apply piston and separator
- Two Teflon® rings seal pin to bore
- Servo piston and separator are made from 6061-T6 aluminum
- Servo pin made from chrome-moly steel
- O-Ring seal between pin and 2nd gear piston

Features & Benefits

- Sleeve made from hardened chrome-moly steel
- **77733-01K** Includes a reworked OEM piston and O-Ring
- Can be installed in early- and late-model units
- Sleeve design will not block clutch feed oil

Features & Benefits

- All new high strength shaft and drum assembly
- 57% Harder than standard OEM shaft
- Reinforced input drum
- Includes reworked OEM aluminum overrun clutch piston and seal
- **77733-04K** Kit is a direct upgrade for '04 – Later applications with an existing "reluctor" style shaft
- **77733-05K** Kit includes the same components as the "reluctor" style kit plus a custom pump-stator shaft, fitted with a closely toleranced Teflon® lined rear bushing to adapt the "reluctor" style shaft into "non-reluctor" applications



Detailed installation instructions for these parts are available online at www.sonnax.com.

2nd Gear Super Hold Servo Assembly

Part No. 77911-03K

- Servo Piston
- Servo Separator Piston
- Servo Pin
- D-Ring Seals (4)
- Teflon Seals (2)
- O-Rings (2)



Input Drum Reinforcement Sleeve, Seal & Piston Kit

Part No. 77733-01K

- Sleeve
- Reworked OEM Piston
- O-Ring



Input Drum Reinforcement Sleeve & Seal Kit

Part No. 77733-02K

- Sleeve
- O-Ring



Reinforced Input Housing & Upgraded Input Shaft Kit

Part No. 77733-04K

- Housing/Shaft Assembly
- Seal



Reinforced Input Housing & Upgraded Input Shaft Kit

Part No. 77733-05K

- Housing/Shaft Assembly
- Seal
- Custom Stator Support Shaft



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