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INTRODUCTION

to the TSD450

Congratulations on the purchase of your Flo-Dynamics TSD450 automatic transmission fluid exchanging machine!

Simply put, this machine is the cleanest, safest, easiest, fastest, most thorough, and most cost-efficient method of fluid exchange ever devised. Suddenly, regular automatic transmission maintenance becomes a more realistic proposition. With the TSD450, you can exchange the transmission fluid either through the transmission cooler lines OR through the vehicle's dipstick. Transmission and power steering fluid exchanging are cleaner and neater than ever!

Transmission Fluid Exchange:

To attain the highest level of protection for internal transmission components and increase the transmission's life span to the maximum, it is recommended that the transmission's lubrication system is serviced every 15,000 miles (or according to the vehicle owner's manual). The Flo-Dynamics TSD450 exchanges virtually all of the used transmission fluid to new, without even requiring the transmission pan to be dropped. There is no spillage, and no mess.

- **The TSD450 can be used practically anywhere – and with almost any vehicle.**
- **It is compact, mobile, and self-contained.**
- **It operates off the 12-volt battery of the vehicle being serviced.**
- **It does not require a pit, lift, or ramp.**
- **The TSD450 hooks up directly to one of the vehicle's transmission cooler lines for a transmission fluid exchange.**
- **The ATF fluid exchange, from setup to finish, typically takes 15 minutes or less!**

No wonder an ATF exchange is the most requested method of preventative automatic transmission maintenance today.

Please take time to read through this manual to familiarize yourself with the TSD450 before performing your first ATF exchange.

I. SAFETY INFORMATION

1.01 IMPORTANT SAFETY NOTICE

For your safety, read this manual thoroughly before operating your TSD450 unit. Your TSD450 unit is intended for use by properly trained, skilled professional automotive technicians. The safety messages presented below and throughout this user's manual are reminders to the operator to exercise care when using this unit. Before using your TSD450, always refer to and follow the safety messages and applicable service procedures provided by the manufacturer of the vehicle being serviced.

- **Read All Safety Instructions**

Read, understand and follow all safety messages and instructions in this manual. Safety messages in this section of the manual contain a signal word with a three-part message and, in some instances, an icon.

- **Signal Words**

The signal word indicates the level of the hazard in a situation:

 **DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or to bystanders.

 **WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or to bystanders.

 **CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury to the operator or to bystanders.

IMPORTANT

Indicates a situation which, if not avoided, may result in damage to the TSD450 or the vehicle being serviced.

- **Safety Messages**

Safety messages in this section contain three different type styles:

- Normal type states the hazard.
- **Bold type** states how to avoid the hazard.
- *Italic type* states the possible consequences of not avoiding the hazard.

• **Safety Symbols**

A safety symbol, when present, gives a graphical description of the potential hazard, and how to avoid the hazard:



Risk of Fire



Read Instructions Before Use



Risk of Explosion



Mandatory Eye Protection



Risk of Entanglement



Mandatory Protective Gloves



Dangerous Fumes



Mandatory Protective Clothing



Do Not Pull or Move

1.02 IMPORTANT SAFETY INSTRUCTIONS

DANGER



Engine exhaust contains toxic gases.

- **Vent vehicle's exhaust away from work area.**
- **Do not breathe exhaust.**

Exhaust gases will cause injury or death.

WARNING



Improper use and operation.

- **Read, understand and follow all safety messages and operational procedures in this manual before operating the Flo-Dynamics TSD450.**
- **This equipment should be operated only by qualified personnel.**
- **Use this equipment only as described in this manual.**

Improper use and operation of this product can result in injury.

WARNING



Engine systems can malfunction expelling fuel, oil vapors, hot steam, hot toxic exhaust gases and other debris.

- **Wear safety goggles and protective clothing, user and bystander.**

Engine systems that fail can cause serious injury.

WARNING



Risk of expelling pressurized fluids.

- **Wear safety goggles and protective clothing, user and bystander.**
- **Verify that engine and machine are off before connecting or disconnecting cooler lines and adapter hoses.**
- **Always unplug the machine from its power source when not in use.**
- **Keep the service hoses away from hot or moving engine parts. Hoses can split or burst causing fluid to be expelled.**
- **Tighten all connections properly. Insufficient or excessive torque can result in fluid leakage.**
- **Avoid contact with automatic transmission or power steering fluid.**
- **Treatment methods are as follows:**
 - Eyes: Flush eyes with plenty of water.**
 - Skin: Wash with soap and water.**

Inhalation: Move to uncontaminated area.

Ingestion: If large amount, get medical attention.

If any irritation persists, get medical attention.

- **Dispose of used fluid according to environmental laws and regulations.**

Although automatic transmission and power steering fluid pose no significant health hazards, some individuals may experience adverse reactions upon contact. Pressurized fluid can cause serious injury.

WARNING

Risk of unexpected vehicle movement.

- **Block drive wheels before starting vehicle's engine to begin an exchange.**
- **Unless instructed otherwise, set parking brake and put gear selector in park.**
- **Do not leave a running vehicle unattended.**

A moving vehicle can cause injury.

WARNING



Engine has moving parts. Risk of entanglement.

- **Do not place tools on fenders or other places in engine compartment.**
- **Keep yourself, clothing, battery cables and service hoses clear of moving parts such as fan blades, belts and pulleys.**

Contact with moving parts can cause injury.

WARNING



Risk of fire or explosion.

- **Do not operate the TSD450 in the vicinity of open containers of flammable liquids such as gasoline.**
- **Keep hoses and jumper cables away from heat sources and sharp edges.**
- **Do not operate equipment with damaged cords or hoses until they have been examined by a qualified serviceman.**

Fire or explosion can cause injury.

WARNING



Risk of fire or explosion. Gases produced by a battery are highly explosive.

- **Wear safety goggles and protective clothing, user and bystander.**
- **This machine is equipped to operate on 12-volt DC power only. A power source greater than this can result in serious injury to the user as well as damage to the machine.**
- **Do not smoke, place metal tools on battery or allow a spark or flame in vicinity of battery.**
- **Clean battery terminals before hooking the machine's battery clips to them. During cleaning, keep airborne corrosion from eyes, nose and mouth.**

- Be sure both battery cables are tightly connected to the battery terminals as instructed before proceeding with a fluid exchange.
- Never remove battery cables from the battery terminals while the machine is operating. Only use the “EMERGENCY STOP” button located on the control panel to stop an exchange.

Battery explosion can cause injury.

WARNING



Battery acid is a highly corrosive sulfuric acid.

- **Wear safety goggles and protective gloves, user and bystander.**
- **Have plenty of fresh water and soap nearby. If battery acid contacts skin, clothing, or eyes, flush exposed area with soap and water for 10 minutes.**
- **While cleaning battery’s terminals, keep airborne corrosion from eyes, nose and mouth.**
- **Do not touch eyes while working near battery.**

Battery acid can burn eyes and skin.

WARNING



Risk of burns.

- **Wear gloves when working near hot engine components.**
- **Do not touch hot exhaust systems, manifolds, engines, radiators, etc.**
- **The automatic transmission fluid coming from the vehicle along with some of the machine’s components that the fluid comes into direct contact with (i.e. external: hoses and quick-disconnect fittings; internal: hoses and all fittings) may reach temperatures uncomfortable to the touch. Exercise caution in avoiding contact with these items.**

Hot components can cause injury or discomfort.

CAUTION

Ratchet mechanisms and tools may slip or break if dirty. Mismatched or partially worn parts can cause ratchet or any tool to slip or break.

- **Frequently inspect and clean any tools used, and lubricate all non-sealed ratchet mechanisms with light oil.**
- **Do not replace worn parts individually. If adapter hose fittings become worn, see “Appendix C – Replacement Parts” to order new hoses.**
- **The use of any other accessories not specified in this manual may create a hazard.**

Tools that slip or break can cause injury.



Risk of injury.

- This equipment should be operated by qualified personnel only.
- Use this equipment only as described in this manual.
- Always unplug the machine from its power source when not in use.
- Loop the power cord loosely in its proper location when machine is not in use.
- Do not operate equipment with a damaged battery cables or hoses, or if the equipment has been dropped or damaged, until it has been examined by a qualified service representative.
- Care should be taken to arrange the battery cables and service hoses so that they will not be tripped over or pulled.
- Never pull on the power cables or service hoses to transport the TSD450. Damage may occur to these components, or machine may tip over.
- Keep area of operation clear of unnecessary tools and equipment. Utilize recessed tool storage areas on the top of the machine.
- Never leave the machine running unattended.
- The TSD450 is not designed for any other purpose than the exchanging of automatic transmission and power steering fluid.

Operation of your TSD450 unit by anyone other than qualified personnel may result in injury.

IMPORTANT

Risk of equipment damage.

- Flushing high mileage cars that have not been previously serviced can cause operating problems in the transmission.
- Connect battery cables to a 12-volt power source only (i.e. vehicle's battery).
- Servicing, transporting, or storing this machine in an attitude other than the normal operating position can result in fluid spillage and/or component damage.
- Use only the manufacturer's recommended attachments.
- The Flo-Dynamics TSD450 is fully automatic. Refer to your control panel at all times.
- Never pull on the power cables or service hoses to transport the TSD450. Damage may occur to these components, or machine may tip over.
- Periodically clean the machine by wiping down with a clean, soft, dry cloth.

Improper operation of equipment may result in damage to machine or components.

SAVE AND FOLLOW THESE INSTRUCTIONS!

II. SYSTEM FEATURES & SPECIFICATIONS

2.01 FEATURES

Mechanical Features

- Accurate sensor technology allows optimum fluid level to be maintained in vehicle's transmission.
- Two in-line 22-micron absolute fluid filters capture microscopic particles and contaminants.
- Numbered quick-disconnect hoses with adapters save time in identifying the proper hoses for the application
- Easy to use adapters allow quick hookup to virtually any automobile make and model, saving time and money.
- Diverter valve reverses fluid flow without having to switch hoses.
- Clear service hoses give visual confirmation of new and used fluid movements.
- Ergonomically correct working height means greater productivity, less stress and strain.
- Durable roto-cast polyethylene body and tanks prevent vehicle damage. The unit is also lightweight and durable, for easier handling and longer life.
- Large 5-inch locking caster wheels make machine easy to maneuver.
- Easy-access service panel provides hassle-free operations for greater efficiency.

Electronic Features

- Self-contained battery cables hook up to the vehicle's 12-volt battery
- Automatic monitoring of fluid in new and used fluid tanks assures safe operation
- Accurate sensor technology (+/- 3%)
- Digital counter display with cumulative ATF options
- Indicating lamps are activated to show all machine operations and status functions
- Four capacity selections on machine to automatically pump specified quantity of ATF into transmission (capacities: 4, 12, 16 or 20 quarts)
- Fluid measurements can be changed from quarts to liters
- Drain used fluid tank (no need to tip machine upside-down)
- Drain new fluid tank
- Add new fluid to transmission in 2/10 quart increments (approx. 1/8" on the dipstick)
- Remove fluid from transmission in 2/10 quart increments (approx. 1/8" on the dipstick)
- Cycle valves feature allows you to electronically clean out valves
- Totalizer check (indicates lifetime use)
- Interactive options menu:
 - "Auto Prime" feature automatically primes the system
 - Indicate new fluid volume
 - Indicate used fluid capacity

2.02 DIMENSIONS & TECHNICAL SPECIFICATIONS

DIMENSIONS:

39" Tall
24 3/4" Wide
25" Deep

Service Hoses:
10' outside of machine

Wheels:
5" locking casters (front)
5" casters (back)

Fluid Tanks:
24-Quart New Fluid Tank
24-Quart Used Fluid Tank

Weight:
95 lbs

TECHNICAL SPECIFICATIONS:

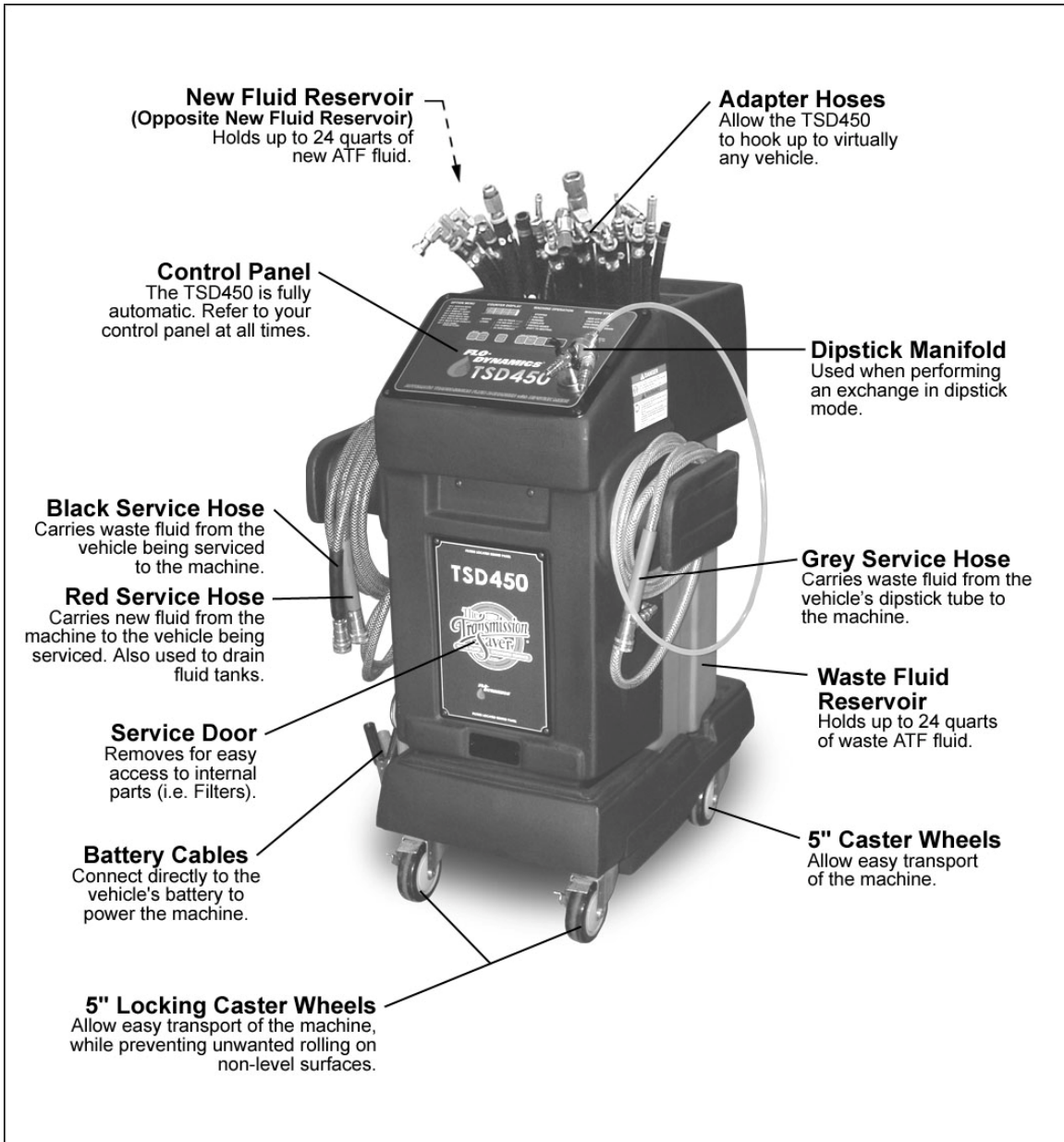
Power:
12-Volt DC from vehicle battery

Fluid Sensors:
+/- 3% accurate sensors

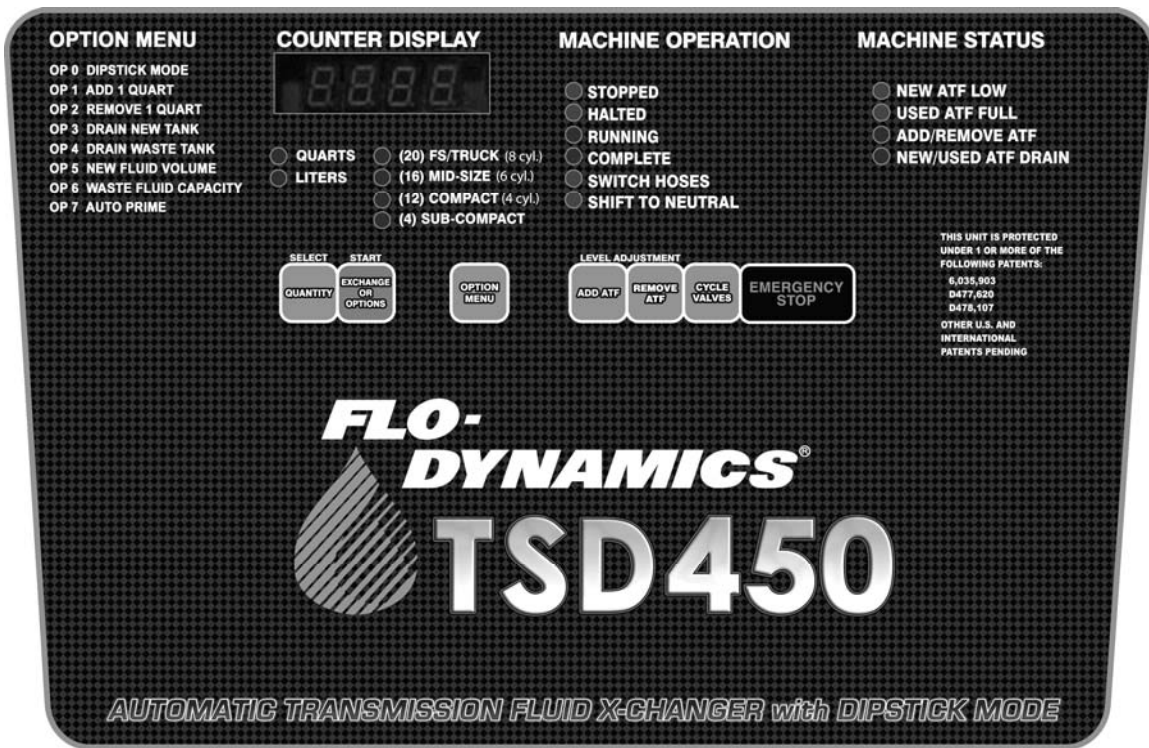
Filters:
22-micron absolute fluid filters

Operating Temperature:
60° to 150°F (15° to 65°C)

2.03 MACHINE OVERVIEW



2.04 CONTROL PANEL OVERVIEW



OPTION MENU

Option:

OP 0 – DIPSTICK MODE

OP 1 – ADD 1 QUART

OP 2 – REMOVE 1 QUART

OP 3 – DRAIN NEW TANK

OP 4 – DRAIN WASTE TANK

OP 5 – NEW FLUID VOLUME

OP 6 – WASTE FLUID CAPACITY

OP 7 – AUTO PRIME

Function:

Performs exchange through vehicle’s dipstick.

Quickly adds fluid; Used for filling the pan.

Quickly drains fluid; Used for draining the pan.

Allows operator to drain the fluid from the new fluid tank.

Allows operator to drain the fluid from the waste fluid tank.

Indicates exactly how much fluid is in the new fluid tank.

Indicates the remaining capacity of the waste fluid tank.

Automatically purges any air out of the system.

BUTTONS**Button:**

SELECT / QUANTITY

START / EXCHANGE
or OPTIONS

OPTION MENU

ADD ATF

REMOVE ATF

CYCLE VALVES

STOP

Function:

Allows operator to choose one of four different exchange volumes.

Starts an exchange at the amount selected. Also activates options when selected in the option menu.

Scrolls through options.

Adds 2/10 qt. of new ATF to the vehicle.
*(approx. 1/8" on the dipstick)*Removes 2/10 qt. of ATF from the vehicle.
(approx. 1/8" on the dipstick)

Allows operator to manually cycle both valves.

Stops operations.

MACHINE OPERATION (LED lights)**Light:**

STOPPED

HALTED

RUNNING

COMPLETE

SWITCH HOSES

SHIFT TO NEUTRAL

Indication:

The machine is stopped.

The machine has halted operation.

The machine is running.

The exchange is complete.

The service hoses need to be reversed.

The vehicle needs to be shifted to neutral.

MACHINE STATUS (LED lights)**Light:**

NEW ATF LOW

USED ATF FULL

ADD / REMOVE ATF

NEW / USED ATF DRAIN

Indication:

There is not enough fluid in the new fluid tank to complete the quantity selected.

The waste fluid tank does not have enough remaining capacity to complete the exchange.

The operator is either adding or removing ATF.

One of the tanks is being drained.

2.05 SPECIAL FUNCTIONS

DANGER



- Wear safety goggles and protective clothing, user and bystander.
- Do not smoke, place metal tools on battery or allow a spark or flame in vicinity of battery.
- Clean battery terminals before hooking the machine's battery clips to them.
- Avoid contact with automatic transmission or power steering fluid.
- Dispose of used fluid according to environmental laws and regulations.
- Read, understand and follow Safety Instructions in the front pages of this manual and on product safety labels.

• TOTALIZER CHECK

Hold "STOP" button for approximately 5 seconds.

The control panel will first display a dash with up to a 3 digit number. This number indicates how many times the totalizer has rolled over at 9999 quarts/liters. After a short delay, the total amount of fluid used since last rollover will be displayed in quarts/liters.

• COMPLETELY DRAIN TANKS

By draining the tanks using Options 3 and 4, a small amount of fluid is left in the tanks. To empty ALL the fluid, select either Option 3 or 4 by repeatedly pressing the "OPTIONS" button. Press and hold the "START" button for 13 seconds, until tank begins to drain. The pump will continue to run until the "STOP" button is pressed.

NOTE: After tanks are completely drained, the system must be primed again before another exchange is performed.

• SENSOR CHECK

This feature allows you to test the accuracy of the new and used fluid sensors.

1. Press and hold the "OPTIONS" button for at least 6 seconds, until you hear an audible beep.
2. Scroll through the options menu by repeatedly pressing the "OPTIONS" button, until "OP 8" shows on the display, followed by a number.
3. Reset this number to zero by pressing the "START" button.
4. Pour 1 quart of ATF fluid into the new fluid reservoir, and record the number that shows up on the display.
5. Scroll through the options menu until "OP 9" shows on the display, followed by a number.
6. Reset this number to zero by pressing the "START" button. Remove the used fluid screen located in the bottom of the recessed hose tray compartment.
7. Pour 1 quart of ATF fluid into the used fluid reservoir, and record the number that shows up on the display.
8. If the difference between the new and used fluid sensor values is less than 3, the sensors are within tolerance.
9. If the difference between the new and used fluid sensor values is greater than 3, repeat steps 1 - 8.
10. If the difference between the values is still greater than 3, refer to *Appendix C - Replacement Parts* to order a new board.

NOTE: After tanks are completely drained, the system must be primed again before another exchange is performed.

III. OPERATING PROCEDURES

3.01 SUGGESTED ADDITIONAL TOOLS

⚠ CAUTION

- Frequently inspect and clean any tools used, and lubricate all non-sealed ratchet mechanisms with light oil.
- The use of any other accessories not specified in this manual may create a hazard.
- Read, understand and follow Safety Instructions in the front pages of this manual and on product safety labels.

Line Wrenches

3/8"
7/16"
1/2"
9/16"
5/8"
11/16"
3/4"

End Wrenches

3/8"
7/16"
1/2"
9/16"
5/8"
11/16"
3/4"

Hex Wrenches

1/8"
11/16"

Nut Drivers (American)

3/16"
1/4"
5/16"
3/8"
7/16"

Nut Drivers (Metric)

6 mm
8 mm
9 mm
10 mm
11 mm
12 mm
13 mm
14 mm

Filter Band Clamp

For replacing canister filters

Metric End or Line Wrenches

10 mm
11 mm
12 mm
13 mm
14 mm
15 mm
16 mm
17 mm
18 mm
19 mm
20 mm

Screwdrivers

Phillips	Standard
1 long	1 long
1 short	1 short

⚠ DANGER

- Vent vehicle's exhaust away from work area.
- Do not breathe exhaust.
- Read, understand and follow Safety Instructions in the front pages of this manual and on product safety labels.

⚠ WARNING

- Wear safety goggles and protective clothing, user and bystander.
- Do not operate the TSD450 in the vicinity of open containers of flammable liquids such as gasoline.
- This machine is equipped to operate on 12-volt DC power only.
- Do not smoke, place metal tools on battery or allow a spark or flame in vicinity of battery.
- Clean battery terminals before hooking the machine's battery clips to them. During cleaning, keep airborne corrosion from eyes, nose and mouth.
- Keep yourself, clothing, battery cables and service hoses clear of moving parts such as fan blades, belts and pulleys.
- Unless instructed otherwise, set parking brake and put gear selector in park.
- Do not leave a running vehicle unattended.
- Keep the service hoses away from hot or moving engine parts. Hoses can split or burst causing fluid to be expelled.
- Tighten all connections properly. Insufficient or excessive torque can result in fluid leakage.

⚠ CAUTION

- Use this equipment only as described in this manual. Use only the manufacturer's recommended attachments.
- Care should be taken to arrange the battery cables and service hoses so that they will not be tripped over or pulled.
- The TSD450 is fully automatic. Refer to your control panel at all times.

⚠ CAUTION

- Flushing high mileage cars that have not been previously serviced can cause operating problems in the transmission.
- Never pull on the power cables or service hoses to transport the TSD450. Damage may occur to these components, or machine may tip over.
- Servicing, transporting, or storing this machine in an attitude other than the normal operating position can result in fluid spillage and/or component damage.

3.02 TRANSMISSION FLUID EXCHANGE

IMPORTANT

Turn vehicle's A/C system OFF before starting an exchange.

New transmission fluid **MUST** be 65°F or above for optimal performance.

FIRST TIME OPERATION (Priming the System)

(Only necessary when machine is received, before first operation.)

System must be primed before first use.

1. Fill new fluid tank with at least 3 quarts of transmission fluid.
2. Insert *master connectors* into *service hoses* (refer to *Appendix A – Hoses & Adapters*).
3. Connect and fasten two mating *adapter hoses* together (i.e. #72 & #73).
4. Select "AUTO PRIME" (Option 7) by repeatedly pressing the "OPTION MENU" button. Press "START". The system will automatically prime.
5. Disconnect *adapter hoses*, leaving *master connectors* attached to *service hoses*.

NOTE: If the system does not prime, refer to Section 4.01- Common Problems/Solutions for troubleshooting.

BASIC HOOKUP

1. Position the TSD450 in front of vehicle to be serviced.
2. Refer to *Section 5.01- Adapter Hoses* to identify the specific adapter hoses required for each particular vehicle.
3. Locate and disconnect the most easily accessible hose or fitting at the radiator end of the transmission cooler system.
4. Attach the two *adapter hoses* to the vehicle. Be sure the *master connectors* are inserted into the *adapter hoses*.
5. Attach TSD450's *service hoses* to the *adapter hoses*.

BASIC OPERATION

1. Check vehicle owner's manual for recommended fluid type, and fill the machine with new fluid by removing the black new fluid cap on the back of the machine.
2. Ensure the vehicle's battery terminals are free of any corrosion.
3. Connect the TSD450's battery cables to the vehicle's battery (*refer to control panel*).
NOTE: If the vehicle's battery is not putting out enough voltage to run the ProMax40, "Low E" will show up in the display. If this happens, connect the machine to a better 12V power source. Stand-alone shelf batteries will not work.
4. Start the vehicle's engine (*vehicle will automatically go into bypass*).
 - a. Check transmission fluid level.
 - b. Check for any possible leaks at connection points.
5. Using the "QUANTITY" button, select the amount of fluid required for the particular vehicle (*refer to vehicle's owner's manual*).
6. Press green "EXCHANGE" button.
7. If the exchange does not begin within 5-10 seconds, and the "Shift to Neutral" light comes on, set the vehicle's emergency brake, and shift the vehicle into Neutral. This will engage the vehicle's transmission pump. Press "EXCHANGE" again.
8. If the exchange does not begin within 5-10 seconds, and the "Reverse Machine Hoses" light comes on, turn vehicle off, switch the hoses (**leave the *master connectors* on *adapter hoses***), and then restart the vehicle and press "EXCHANGE" again.
9. After the exchange, the machine will automatically shut off (*vehicle will automatically return to bypass*) and the counter display will indicate the amount of fluid flushed.
10. Check transmission fluid level.

- a. If the level is low, push the “ADD ATF” button. This will add 2/10 qt. of fluid (approximately 1/8 of an inch on the dipstick).
 - b. If the level is high, push the “REMOVE ATF” button. This will remove 2/10 qt. of fluid (approximately 1/8 of an inch on the dipstick).
11. Turn the vehicle’s engine off.
 12. Disconnect the adapters (leave the *master connectors* attached to the *adapter hoses*), and connect the cooler line to the radiator.
 13. Start the vehicle for final inspection.
 - a. Check transmission fluid level.
 - b. Check for any possible leaks at connection points.

DIPSTICK EXCHANGE OPERATION:

1. Use the “OPTION” button to toggle to Option 0.
2. Using the “QUANTITY” button, select the amount of fluid required for the particular vehicle (refer to vehicle’s owner’s manual).
3. Insert tube to pan down dipstick.
4. Connect Red Service Hose to adapter with check valve and red shrink wrap; Connect Grey Service Hose to adapter without check valve.
5. Press green “EXCHANGE” button.
6. Machine will run and prompt you to start the vehicle’s engine.
7. Start the vehicle’s engine and press “EXCHANGE”.
8. When finished, add or remove fluid as needed.

DRAINING THE WASTE ATF FLUID

With the battery cables connected to a 12-volt battery source, connect an open-end hose (i.e. #55 w/ master connector attached) to the **red service hose**. Place this hose in your *waste fluid receptacle* (be sure black service hose is disconnected from vehicle and is not connected to an adapter hose) and then select “DRAIN WASTE TANK” (Option 4).

IMPORTANT

- Dispose of used fluid according to environmental laws and regulations.
- Read, understand and follow Safety Instructions in the front pages of this manual and on product safety labels.

IV. TROUBLESHOOTING & ADDITIONAL HELP

⚠ DANGER



- Vent vehicle's exhaust away from work area.
- Do not breathe exhaust.
- Read, understand and follow Safety Instructions in the front pages of this manual and on product safety labels.

⚠ WARNING



- Wear safety goggles and protective clothing, user and bystander.
- Do not operate the TSD450 in the vicinity of open containers of flammable liquids such as gasoline.
- This machine is equipped to operate on 12-volt DC power only.
- Do not smoke, place metal tools on battery or allow a spark or flame in vicinity of battery.
- Clean battery terminals before hooking the machine's battery clips to them. During cleaning, keep airborne corrosion from eyes, nose and mouth.
- Keep yourself, clothing, battery cables and service hoses clear of hot or moving engine parts such as fan blades, belts and pulleys.
- Block drive wheels before starting vehicle's engine to begin an exchange.
- Unless instructed otherwise, set parking brake and put gear selector in park.
- Do not leave a running vehicle unattended.
- Tighten all connections properly. Insufficient or excessive torque can result in fluid leakage.
- Read, understand and follow Safety Instructions in the front pages of this manual and on product safety labels.

⚠ CAUTION



- Wear safety goggles and protective clothing, user and bystander.
- Avoid contact with automatic transmission fluid.
- Read, understand and follow Safety Instructions in the front pages of this manual and on product safety labels.

⚠ CAUTION

- Frequently inspect and clean any tools used, and lubricate all non-sealed ratchet mechanisms with light oil.
- The use of any other accessories not specified in this manual may create a hazard.
- Read, understand and follow Safety Instructions in the front pages of this manual and on product safety labels.

4.01 COMMON PROBLEMS / SOLUTIONS

Problem: *System does not power up, operates erratically or display reads “Low E”.*

Solution: Check battery connection. Make sure there are no loose connections, and the machine’s battery clips are not reversed. Remove all corrosion from the battery terminals.

Problem: *Exchange does not start within 5-10 seconds, and “Shift to Neutral” LED lights up.*

Solution: Set the vehicle’s emergency brake and shift the vehicle into Neutral. This will engage the vehicle’s transmission pump. Press “EXCHANGE” again.

Problem: *Exchange does not start within 5-10 seconds, and “Reverse Machine Hoses” LED lights up.*

Solution: Pull black knob on diverter valve, and press “EXCHANGE” again.

Problem: *Either new or waste fluid tank will not drain.*

Solution: Tanks will not drain through the Black service hose. Make sure tanks are being drained through the RED service hose.

Problem: *Machine operation becomes slow.*

Solution: Make sure fluid temperature is at least 65°F. If machine is still slow, replace filters.

Problem: *Machine stops after starting an exchange.*

Solution: Make sure system has been primed, and new transmission fluid is at least 65°F.

Problem: *After starting an exchange, the machine powers off.*

Solution 1: The fuse is blown. Disconnect the battery cables, wait 15 seconds, and then re-connect to reset the fuse.

Solution 2: If the fuse blows again, replace the filters and try again.

4.02 CUSTOMER SERVICE CONTACT INFORMATION

If you are still experiencing problems, call technical support at:

1-800-303-5874





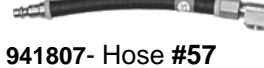


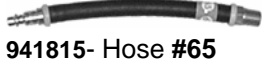
V. APPENDIX A – HOSES & ADAPTERS

⚠ CAUTION









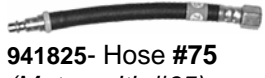



- Do not replace worn parts individually. If adapter hose fittings become worn, see “Appendix C – Replacement Parts” to order new hoses.
- The use of any other accessories not specified in this manual may create a hazard.
- Read, understand and follow Safety Instructions in the front pages of this manual and on product safety labels.


5.01 ADAPTER HOSES

STANDARD HOSES


	-Green-	5/8"-18 [F] SAE 45° Flare - Swivel (Chrysler - 1993 and Newer)
941801- Hose #51 (Mates with #52)		
	-Green-	5/8"-18 [M] SAE 45° Flare (Chrysler)
941802- Hose #52 (Mates with #51)		
	-Blue-	5/8"-18 [M] SAE 45° Flare - Swivel (General Motors with 3/8" Tube Diameter Lines - All Years)
941803- Hose #53 (Mates with #57)		
	-Black-	3/8" Diameter Hose [F] Open End Hose w/Clamp (Import - 1987 and Newer)
941805- Hose #55 (Mates with Step Fitting)		
	-Blue-	5/8"-18 [F] SAE 45° Inverted (General Motors with 3/8" Tube Diameter Lines - 1997 and Newer)
941807- Hose #57 (Mates with #53)		
	-Black-	1/2" Diameter Hose [F] Open End Hose w/Clamp (Import)
941809- Hose #59 (Mates with Step Fitting)		
	-Black-	5/16" Diameter Hose [F] Open End Hose w/Clamp (Import)
941813- Hose #63 (Mates with Step Fitting)		
	-Green-	1/4"-18 [M] NPTF (Jeep Cherokee- 1980-1986)
941815- Hose #65 (Mates with #75)		

(Continued on next page)

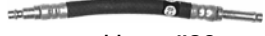
	-Red-	1/2"-20 [F] SAE 45° Inverted (Chrysler, Ford Aerostar, Jaguar, Mercedes, & Cadillac-1985 and Newer) * Needs Ford Slide Tool 940140 for Aerostar / Windstar
941816- Hose #66 (Mates with #67)		
	-Red-	1/2"-20 [M] SAE 45° (Chrysler and Ford)
941817- Hose #67 (Mates with #66)		
	-Red-	5/8"-18 [M] SAE Inverted - Swivel (Ford With Large Nut Adapter - 1980 and Newer)
941818- Hose #68 (Mates with #69)		
	-Red-	5/8"-18 [F] SAE Inverted (Ford)
941819- Hose #69 (Mates with #68)		
	-Blue-	1/2"-20 [M] SAE 90° Inverted - Swivel (General Motors with 5/16" Tube Diameter Lines - All Years)
941820- Hose #70 (Mates with #71)		
	-Blue-	1/2"-20 [F] SAE Inverted (General Motors & Ford Expedition)
941821- Hose #71 (Mates with #70)		
	-Red-	1/2"-20 [F] SAE Inverted (Ford)
941822- Hose #72 (Mates with #73)		
	-Red-	1/2"-20 [M] SAE 90° Inverted - Swivel (Ford 5/16" Small / Long Nut Adapter - 1980 and Newer)
941823- Hose #73 (Mates with #72)		
	-Green-	M14 x 1.5 [F] Swivel O-ring (Jeep Cherokee, Ford Escort - 1980-1986)
941825- Hose #75 (Mates with #65)		
	-Red-	M14 [F] Banjo Fitting (Ford Escort – 1994 and Newer)
940874- Hose #78 (Mates with #79)		
	-Red-	M14 x 1.5 [M] Bolt w/ 2 Washers (Ford Escort - 1994 and Newer)
940875- Hose #79 (Mates with #78)		
	-Black-	1/4" [M] Universal Bump Fitting (Import)
941828- Hose #80 (Mates with #81)		

- 

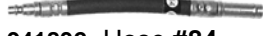
941829- Hose #81
(Mates with #80)

-Black- 1/4" Diameter Hose [F]
Open End Hose w/Clamp
(Import)
- 


941830- Hose #82
(Mates with #63)

-Black- 5/16" [M]
Universal Bump Fitting
(Infiniti, Lexus, and BMW - 1980 and Newer)
- 


941831- Hose #83
(Mates with #55)

-Black- 3/8" [M]
Universal Bump Fitting
(Toyota, Nissan, Honda, Ford and Chrysler - 1975 and Newer)
- 


941832- Hose #84
(Mates with #59)

-Black- 1/2" [M]
Universal Bump Fitting
(Toyota, Nissan and Honda - 1980 and Newer)
- 


941835- Hose #87
(Mates with #88)

-Green- 9/16"-18 [M]
JIC 37° Flare - Inverted
(Dodge Durango/Dakota - All Years)
- 


941836- Hose #88
(Mates with #87)

-Green- 9/16"-18 [F]
JIC 37° Flare - Swivel
(Dodge Durango/Dakota - All Years)
- 


941841- Hose #89
(Mates with #90)

-Black- 3/4"-16 [M]
SAE O-Ring
(Chevy DuraMax w/Allison Transmission – 2001 & Newer)
- 


941842- Hose #90
(Mates with #89)

-Black- 3/4"-16 [F]
SAE O-Ring Adapter
(Chevy DuraMax w/Allison Transmission – 2001 & Newer)
- 


941080- Hose #93
(Mates with #94)

-Red- 5/8-18 [M]
(Ford Focus / Mercury Mystique)
- 


941081- Hose #94
(Mates with #93)

-Red- 5/8-18 [F]
(Ford Focus / Mercury Mystique)
- 

940888- Hose #122
(Mates with #142)

-Yellow- 3/4"-18 [M]
90° Inverted SAE 45° - Swivel
(Ford Torqshift / 250SD / 550SD / Econoline / Excursion)
- 

940389- Hose #142
(Mates with #122)

-Yellow- 3/4"-18 [F]
Inverted SAE 45° Rigid - Straight
(Ford Torqshift / 250SD / 550SD / Econoline / Excursion)
- 

941900- Hose #149
(Mates with 5/8" Adapter)

-Yellow- 5/8" Diameter Hose [F]
Open End Hose w/Clamp
(Chevy DuraMax w/Allison Transmission - 2003 & Newer)

5.02 ADAPTERS

The following adapters allow quick and easy hookup to virtually any vehicle make and model.



940328
1/2" Adapter



942163S
GM Adapter



942162
Quick Disconnect Tool



941899
5/8" Duramax Adapter



940329
3/8" Adapter



940334
5/16" Adapter



940831
Master Hose Connector



941910 (optional)
3/8" Ford Adapter



942169 (optional)
5/8" Medium GM Adapter



941966
Slider Pin Adapter

VI. APPENDIX B – MAINTENANCE

NOTE: *The Flo-Dynamics TSD450 requires a minimal amount of maintenance.*

▲ CAUTION

- Frequently inspect and clean any tools used, and lubricate all non-sealed ratchet mechanisms with light oil.
- The use of any other accessories not specified in this manual may create a hazard.
- Read, understand and follow Safety Instructions in the front pages of this manual and on product safety labels.

6.01 MAINTENANCE PROCEDURES

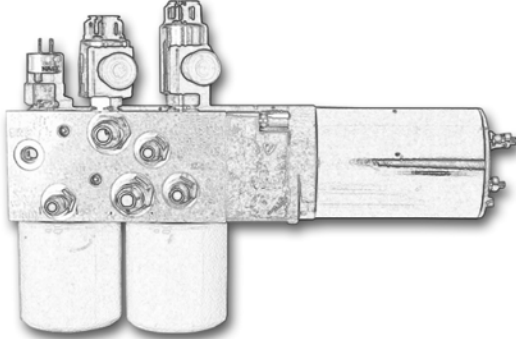
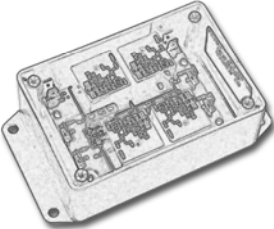




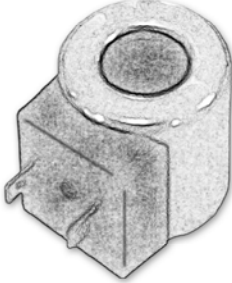
- **Replace Canister Filters (Part#: 940796) every 50 exchanges, or as needed**
Use a standard filter band clamp tool to unscrew old filters, and replace them with new filters. Make sure new filters are on tight.
- **Clean Waste Fluid Screen (Located in bottom of recessed hose tray area)**
This helps eliminate surface tension caused by debris and contamination from the air. Using a sharp pick, remove screen. Clean using degreaser and brush, and blow out with air compressor.
- **Wipe Down Exterior using a soft, damp cloth.**

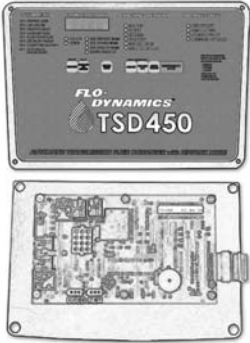

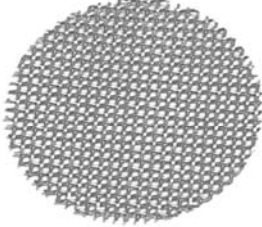
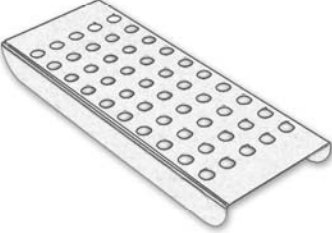
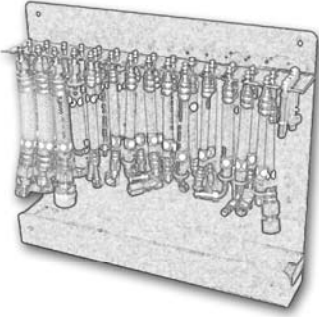

VII. APPENDIX C – REPLACEMENT PARTS

7.01 REPLACEMENT PART LIST

Part #	Description
941700W	Control Panel w/ Elec. Board & Label
940304	Battery Cable Assembly
941617W	Motor Control Box
940474	Sensor Rod
941225	5/8" Fluid Tube
941226	Fluid Tube Elbow Fitting
940468	Manifold / Pump Assembly
940843	Pressure Switch (<i>Factory preset to 6 psi</i>)
940839	3/2 Solenoid Valve [<i>Size 8</i>] (S1)
940840	3/2 Solenoid Valve [<i>Size 10</i>] (S2)
940841	Coil with Spade Connector [<i>Size 8</i>] (S1)
940842	Coil with Spade Connector [<i>Size 10</i>] (S2)
R940775	Hose Kit
H940772	Hose Tray
941220	Hose Rack
940831	Master Hose Connector
940785	Service Hose (Black)
940786	Service Hose (Red)
941728	Service Hose (Grey)
941716W	Adapter Manifold Assembly
941708	Dipstick Reducer Hose
R940750	Chassis
941205	Console
R940752	Top Sink
942113	Tank Cap
941202	Tank Red New
941203	Tank Red Used
941705	Service Panel Label
R942118	Locking Caster Wheel
R942137	Caster Wheel
940796A	Canister Filter
R942150	Used Fluid Screen (<i>1 1/4" Diameter</i>)
941706	Operations Manual
941710	Operational Overview / Hose Chart
940844	Adapter Instruction Sheet

7.02 REPLACEMENT PART ILLUSTRATIONS

 <p>940468 Manifold / Pump Assembly</p>		
 <p>941617W Motor Control Board</p>	 <p>940474 Sensor Rod</p>	 <p>941225 5/8" Fluid Tube 941226 Fluid Tube Elbow Fitting</p>
 <p>940843 Pressure Switch</p>	 <p>940839 3/2 Solenoid Valve [Size 8] (S1) 940840 3/2 Solenoid Valve [Size 10] (S2)</p>	 <p>940841 or 940842 Coil with Spade Connector Size 8 (S1) or Size 10 (S2)</p>

 <p>941700W Control Panel w/ Electronic Board & Label</p>	 <p>940796A Canister Filter</p>	 <p>R942150 Used Fluid Screen</p>
 <p>H940772 Hose Tray</p>	 <p>941220 Hose Rack (Hoses Not Included)</p>	 <p>R942137 Caster R942118 Locking Caster</p>

7.03 ORDERING INFORMATION

To order replacement parts for the Flo-Dynamics TSD450, call:

1-800-303-5874

LIMITED ONE (1) YEAR WARRANTY

Flo-Dynamics TSD450

Flo-Dynamics warrants only to the original Purchaser that under normal use, care and service, the Equipment (except as otherwise provided herein) shall be free from defects in material and workmanship for one year from the date of original invoice. External hoses, remote control modules, adapters and all other attachments, supplies and consumables (except as otherwise provided herein) are warranted for 90 calendar days from the date of original invoice. Filter elements are not warranted. Printed circuit boards purchased from, but not installed by Seller are not warranted.

SELLER'S OBLIGATIONS UNDER THIS WARRANTY ARE LIMITED SOLELY TO THE REPAIR OR, AT SELLER'S OPTION, REPLACEMENT OF EQUIPMENT OR PARTS WHICH TO SELLER'S SATISFACTION ARE DETERMINED TO BE DEFECTIVE AND WHICH ARE NECESSARY, IN SELLER'S JUDGEMENT, TO RETURN THE EQUIPMENT TO GOOD OPERATING CONDITION. NO OTHER WARRANTIES EXPRESS OR IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY AND ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED.

This warranty does not cover (and separate charges for parts, labor and related expenses shall apply to) any damage to, malfunctioning, inoperability or improper operation of the Equipment caused by, resulting from or attributable to (A) abuse, misuse or tampering; (B) alteration, modification or adjustment of the Equipment by anyone other than Seller's authorized representatives; (D) improper or negligent use, application, operation, care, cleaning, storage or handling; (E) fire, water, wind, lightning or other natural causes; (F) adverse environmental conditions, including, without limitation, excessive heat, moisture, corrosive elements, or dust or other air contaminants, radio frequency interference, electric power failure, power line voltages beyond those specified for the equipment, unusual physical, electrical or electromagnetic stress, and/or any other condition outside of Seller's environmental specifications; (G) use of the Equipment in combination or connection with other equipment, attachments, supplies or consumables not manufactured or supplied by Seller; or (H) failure to comply with any applicable federal, state or local regulation.

Repairs or replacements qualifying under this Warranty will be performed on regular business days during Seller's normal working hours within a reasonable time following Purchaser's request. **All requests for Warranty service must be made during the stated Warranty period.** This warranty is non-transferable.

