

Technical Service Bulletin

Mazda North American Operations
Irvine, CA 92618-2922



Subject: AUTOMATIC TRANSMISSION/TRANSAXLE COOLER AND LINES FLUSHING PROCEDURE	Bulletin No.: 05-002/21
	Last Issued : 12/08/2021

BULLETIN NOTES

This bulletin supersedes the previously issued bulletin(s) listed below. The changes are noted in Red.

Previous TSBs:	Date(s) Issued:
05-008/11	09/21/11
05-012/10	09/30/10
05-014/06	12/12/06
K-005/98	04/22/98

APPLICABLE MODEL(S)/VINS

1995-2009 B-Series		1997-2006 MPV		2004- 2013 Mazda3 (except SKYACTIV)
1997-2003 Protege		2001-2011 Tribute		2006- 2015 MX-5
1997-2005 Miata		2003- 2013 Mazda6		2007-2012 CX-7
1997-2002 626		2004-2011 RX-8		2007- 2015 CX-9
1997-2002 Millenia		2006-2012 Mazda5		2011- 2014 Mazda2

DESCRIPTION

Automatic Transaxle/Transmission (A/T) oil cooler and lines must be power flushed completely before an overhauled or replacement A/T is installed (except SKYACTIV-DRIVE). The most common cause of repeat A/T failures is lack of lubrication to the front and rear planetary gears. This is usually caused by an accumulation of metal particles and debris (from a previous A/T failure) on the internal mesh type baffle of the oil cooler. Power flushing will remove the restriction by back flushing, followed by forward flushing to dislodge a restriction, then back flushing again. This will in turn ensure full ATF flow for the transmission when it is operating.

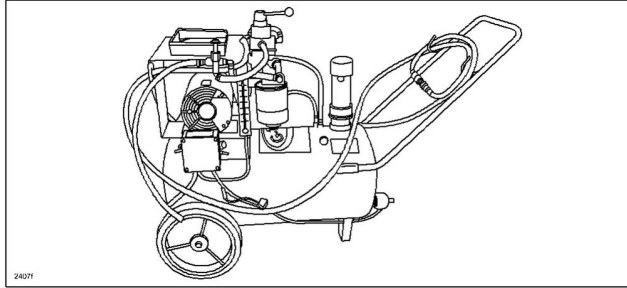
NOTE: Repeat repairs caused by improper or lack of cooler line flushing will not be covered under warranty, and are subject to review and debit by Mazda.

NOTE: For SKYACTIV-DRIVE, flushing is not recommended as part of service maintenance. There are no oil cooler lines and the replacement SKYACTIV-DRIVE will come with a new oil cooler, which is mounted directly to the case.

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Mazda Required Tool (MRT) Power Flushing Equipment

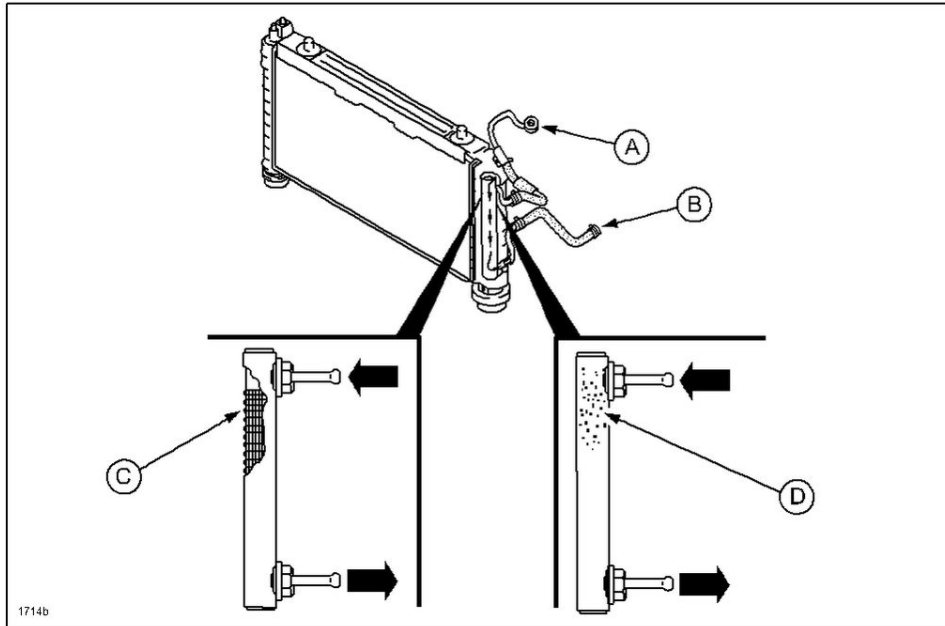
Part Number	Description
GTHTTCF7AR	G-Tech A/T Cooler Line Flusher (Supreme Heated Cooler Line Flusher)

**REPAIR PROCEDURE**

Before power flushing, inspect the hoses/lines and clamps on the vehicle. Repair or replace as necessary. Power flushing must begin with back flushing, followed by forward flushing to dislodge a restriction, then back flushing again. If back flushing is not performed before forward flushing, the restriction could further reduce the automatic transmission fluid (ATF) flow through the internal mesh type baffle (C) of the cooler and flushing will not be effective or possible.

A	Oil in
B	Oil out
C	Mesh Type Baffle
D	Location of internal metal particles and debris accumulation

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If the cooler is not properly flushed, oil flow from the cooler to the transmission will not be enough to lubricate the transmission. The most common cause of repeat transmission failure is lack of lubrication to the front and rear planetary gears.

Inspecting Oil Lines & Clamps

Be sure to inspect the vehicle transmission lines (hoses/pipes) for cuts, crimps (pinched), cracks or any other damage before reusing them. If any problem exists or the hose comes off when applying oil pressure, replace it.

CAUTION: Always use new clamps when replacing hoses.

FLUSHING PROCEDURE

CAUTION: The G-Tech flushing unit uses hot fluid under pressure. Inspect all flushing unit hoses and connections before operation. Always wear safety glasses, gloves, and protective clothing. If ATF accidentally gets in your eyes or skin, rinse with water immediately.

WARNING: Improper use of this flushing unit can result in burns and other serious injuries. Always wear eye protection and protective clothing and follow all instructions in the manufacturers booklet.

NOTE:

- For best results, perform a back flush, forward flush, and back flush as outlined.
- Be sure to follow these instructions carefully when performing the flushing procedure.
- Depending on the production date, some flushing units may not come equipped with certain options.

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If not, please disregard that step.

- Refer to Appendix for flushing unit illustration and component names where “callout” numbers are indicated.

(STEP A - SETUP)

1. Plug both power lines (if equipped), of the flushing unit directly into a 110V (15 amp) grounded electrical outlet.

ATTENTION - Make sure the following:

- NEVER plug the heater and motor cords into a wall outlet that has anything else plugged into it.
- NEVER plug the heater and/or motor cord into an extension cord.
- ALWAYS place the fluid purge hose in an EPA-approved oil waste container before operating the flusher to prevent fluid spills.
- Before starting or engaging the motor for flushing and purging, be certain that the ATF in the tank has reached about 120F.
- NEVER raise the shop air psi higher than 125 as this will cause damage to the motor, pump, and/or the vehicle’s cooling system.
- Do NOT use mineral spirits, solvents, or any volatile liquid in the flusher!

2. Add 8 gallons of ATF to the flushing unit tank.

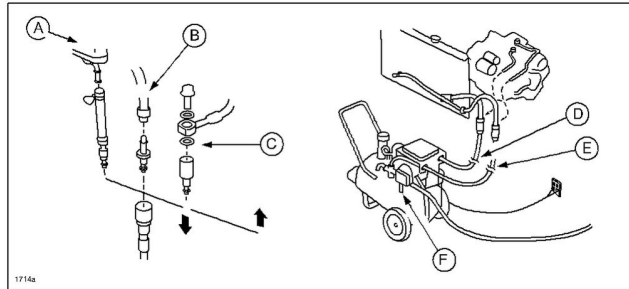
3. Always turn the heater switch (callout 3) to the On position first. The green light will come on. If the red light is lit, then the tank is low on fluid and there will be NO power to the heater. The ATF recommended maximum amount is eight (8) gallons. Do NOT overfill the tank. Allow approximately 15 minutes for the flushing unit to reach operating temperature of above 120 Fahrenheit using the unit’s thermometer (callout #15).

CAUTION: On previous flushing units, the heater may be adjustable. However, doing so is solely at the risk and responsibility of the operator. On current flushing units, the heater is NOT adjustable. Factory setting of the heater is 150-160 Fahrenheit.

4. Install the appropriate quick disconnect line adaptors to the ATF cooler inlet and outlet lines using any of the three methods in Figure below (radiator (A), hose (B), or banjo bolt (C)). Connect the red pressure hose to the cooler inlet line (E). Connect the blue return hose to the cooler outlet line (D) (the line coming from the vehicle’s cooler tank going to the transmission).

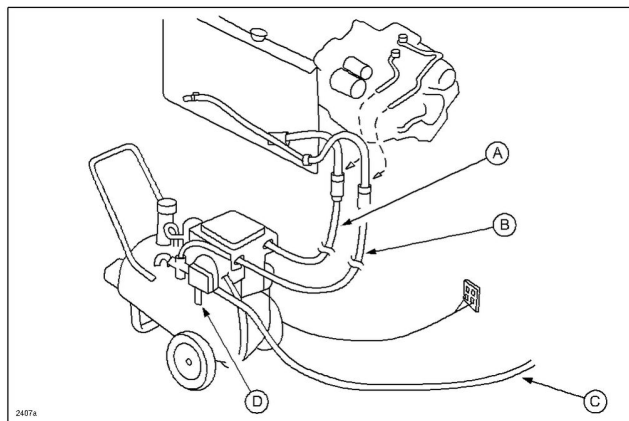
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Three ways to attach the flusher to the vehicle:



A	To radiator
B	To hose
C	To banjo bolt
D	Return out hose (blue line)
E	Pressure in hose (red line)
F	Air purge hose

5. Connect a shop air hose (C) (less than 125 psi) to the air purge valve (D) (callout #20) as shown.



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A	Return out hose (blue line)
B	Pressure in hose (red line)
C	Shop air line
D	Air purge hose

NOTE: The quick connect fitting on the air purge valve has a one-way check valve to keep ATF from entering your shop's air system. Do NOT remove or replace this fitting. Attach the coupler provided with the flushing unit to your air shop line if your coupler is not compatible.

6. Secure the end of the fluid purge hose (blue short hose with open end) into an EPA-approved waste container. ATTENTION – The pressure is very high and purging takes only a few seconds. Be sure to adequately secure the short hose into a container to prevent spills.

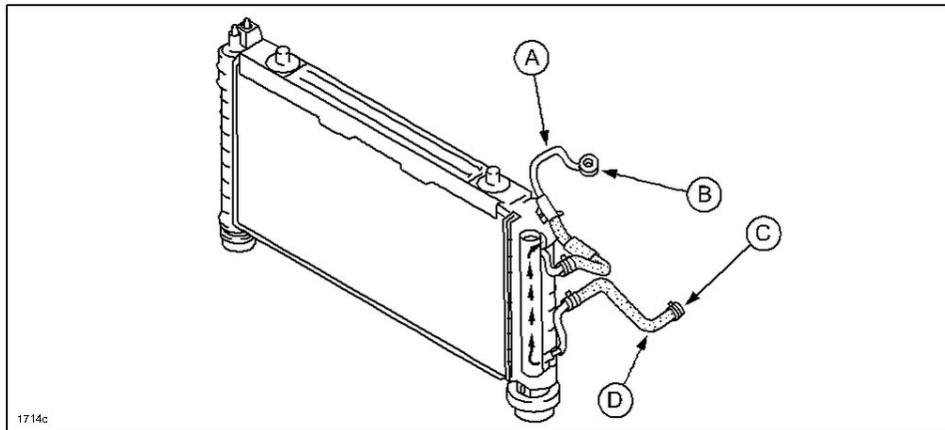
7. Turn the fluid purge valve handle (callout #6) so that the needle points toward the fluid purge hose (the "purge" position). Turn the motor switch ON (callout #3) and purge the dirty fluid. Allow the fluid to flow until fluid turns clear. Then turn the motor switch off. The amount of purge will vary based on each vehicle and when the fluid turns clear. This amount will average between one pint and one quart. Always turn the fluid purge handle (callout #6) to the flush position (the needle faces toward the filters) after each purge.

8. Replenish ATF to the flushing unit's tank, if the low fluid indicator (red) light (callout #3) comes On after purging.

(STEP B - BACK FLUSH)

9. The best method for flushing is to back-flush the cooler first. If possible to back-flush the cooler (see note), set the reverse lever (callout #21) to the "2" position. If not possible, set the lever to the "1" position for forward-flush.

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A	Cooler-in line
B	Flushing fluid out
C	Flushing fluid in
D	Cooler-out line

NOTE:

- Some coolers cannot be back-flushed due to a directional check valve that makes back-flushing impossible. In some circumstances, it is possible to temporarily remove the check valve which will allow back-flushing of the system. Be sure to re-install the check valve.
- If there is a one way check valve in the line, the flow forward on a clear system will be above 4 gpm and in the back-flushing position zero (0) gpm. The pressure release valve will open and all fluid will go from the pump back into the tank. The flow meter will read zero (0) gpm.
- When the reverse lever is set to position "1", the fluid flows from the red hose into the cooler. The red hose is the "pressure" line and the blue hose is the "return" line.
- When the reverse lever is set to position "2", the fluid reverses and flows from the blue hose into the cooler. The blue hose is the "pressure" line and the red hose is the "return" line.

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10. Turn the motor switch ON. Let the flushing unit back flush for 15 minutes. Regulate the air supply to 90-100 psi. Also verify the flow meter (callout #9) reads a minimum 3-4 gallons per minute (gpm) for proper flow.

11. While the flushing unit is running, open the air purge valve (callout #20) for 10-15 seconds to cause agitation and improve the flushing process. Then close the air purge valve for 5 minutes. Repeat the opening and closing three (3) times.

12. Turn the motor switch OFF.

(STEP C - FORWARD FLUSH)

13. To change flow of the cleaning process for forward flushing, turn the reverse lever (callout #21) to the opposite setting, ie: position "1". Turn the motor switch ON and let the flushing unit forward flush for 5 minutes. Regulate the air supply to 90-100 psi. Also verify the flow meter (callout #9) reads a minimum 3-4 gpm for proper flow. While the flushing unit is running, open the air purge valve (callout #20) for 10-15 seconds to cause agitation and improve the flushing process. Then close the air purge valve.

14. Turn the motor switch OFF, leaving the air purge valve open for at least 15 seconds to purge the lines of residual ATF. Close the air purge valve.

(STEP D - BACK FLUSH)

15. To change flow of the cleaning process for back flushing, turn the reverse lever (callout #21) to the opposite setting, ie: position "2". Turn the motor switch ON and let the flushing unit back flush for 15 minutes. Regulate the air supply to 90-100 psi. Also verify the flow meter (callout #9) reads a minimum 3-4 gpm for proper flow. While the flushing unit is running, open the air purge valve (callout #20) for 10-15 seconds to cause agitation and improve the flushing process. Then close the air purge valve for 5 minutes. Repeat the opening and closing three (3) times.

16. Turn the motor switch OFF, leaving the air purge valve open for at least 15 seconds to purge the lines of residual ATF. Close the air purge valve.

(STEP E - VERIFY FLUSH)

17. Remove the bypass (left side) spin-on filter and install a filter screen on top of the filter. Reinstall the bypass filter back onto the flushing unit. Turn the motor switch ON and back-flush for 5 minutes. Turn the motor switch OFF.

18. Turn the air purge valve to the purge position to purge the lines and filters of ATF.

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19. Remove the bypass spin-on filter and visually check the filter screen.

- a. If debris is present in the filter screen, remove filter screen and flush vehicle again by repeating Steps B – D.
- b. If no debris is present, remove filter screen and re-install the bypass filter. Turn the heater switch OFF.

NOTE: If the vehicle was flushed completely and properly but debris is still present in the filter screens, check these areas:

- Non-bypass (NBP) spin-on filter for damage or pollution.
- Severe contamination of the holding tank and/or flushing unit hoses.

20. Turn the motor and heater toggle switches OFF and disconnect the pressure and return hoses from the vehicle cooler lines.

- Never leave the heater on overnight.

21. Install the test coupling (provided with your adaptor kit) to connect the pressure and return hoses to each other for storage.

22. Unplug the flushing unit from the wall outlet.

23. Flushing is now complete.

MAINTENANCE

- The most important maintenance you can do on your Heated Cooler Line Flusher is changing the filters*.
- Changing the filters is integral to the flusher’s effectiveness.
- Changing the filters every 100 flushes.

Daily	Check ATF level daily by removing the fill cap/gray tower and making sure the ATF stays 3-4 inches from the top of the fill neck. Do not overfill. Clean any ATF from the top of the electrical box to prevent seepage.
Quarterly	Change the ATF in the flusher unit tank every three months or when fluid becomes dirty/dark. ATF must be cold at the time of fluid change. Snap the test coupling into the quick-disconnect end of the pressure hose, and secure this end into an EPA-approved waste disposal container. Then turn on the motor of the flusher and let it pump empty. Clean out any sludge in the bottom of the tank by using the

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	flusher's drain plug. After cleaning, refill the tank with 8 gallons of clean ATF.
Yearly (Fragile)	<p>Unplug the heater from the electrical box and remove the heater from the tank. Clean the heater's coils and replace/replug the heater.</p> <p>Unplug the float switch and very carefully remove it from the tank.</p> <p>ATTENTION: The float switch is very delicate! Check for any metal shavings or damage to the magnet end and/or the float tip. Carefully replace/replug the float switch making sure the arrow point up. Do not overtighten!</p>

* Please refer to the Filter Cross Reference Guide if you intend to use a bypass filter and no bypass filter other than those available through G-TEC. It is essential that you do NOT use two bypass filters, which are common auto filters. They will allow 20% of the flow to bypass the filter, which will contaminate the holding tank with debris. In addition, when a bypass filter reaches its capacity, it will allow 100% of the flow to bypass the filter and recontaminate the cooler. The bypass filter must always be on the left side of the filter mount (standing at the handle end of the flusher).

TROUBLESHOOTING

CAUTION: Always unplug the flushing unit before any troubleshooting.

Problem 1	No heat and red light is On
Solution	<ol style="list-style-type: none"> 1. Make sure fluid level is above the float switch (callout #18) or 3-4 inches from the top of the fill neck 2. Check wall outlet is working properly 3. Check continuity at the float switch
Problem 2	Pump/motor not working or overheating
Solution	<ol style="list-style-type: none"> 1. Make sure flushing unit is plugged into a 110V (15 amp) outlet with NOTHING else plugged in. 2. Make sure flushing unit is NOT plugged into a drop light, extension cord, etc. 3. Check if heater is at 150-160 F before engaging motor (otherwise ATF is too thick). 4. Check motor voltage with a voltmeter (Specification = 110 Volts).
Problem 3	No or low fluid coming from pressure line
Solution	<ol style="list-style-type: none"> 1. Using two wrenches, unscrew the quick-disconnect coupling from the end of the pressure line hose. 2. Carefully remove washer and spring and clean out the hose and related parts. 3. Reinstall parts in reverse order and tighten the connections
Problem 4	ATF leak around connections and fittings

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Solution	1. Re-tighten or replace worn clamps 2. Check hoses for pin holes or punctures
Problem 5	Flushing unit does not appear to be cleaning
Solution	1. Change both spin-on filters 2. If ATF in the holding tank is black, replace fluid 3. Check for restrictions by connecting the pressure and return hoses with the provided coupling so that fluid circulates through the flushing unit only
Problem 6	Shop's circuit breaker tripping or Thermal switch on motor is tripping
Solution	1. Clear entire flushing system of debris. 2. Check for restrictions from motor to hoses to connectors 3. Make sure flushing unit is plugged into a 110V (15 amp) outlet with NOTHING plugged in. 4. Heater must be at 150-160 F before engaging motor (otherwise ATF is too thick) 5. Check motor voltage with a voltmeter (Specification = 110 Volts). 6. Reset thermal switch on back of motor

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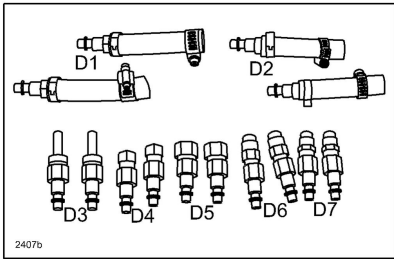
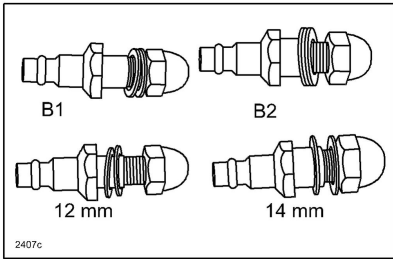
PARTS INFORMATION

Part Number	Description	Qty.	Note 1
*TTCF-BPF	By-Pass Filter	1	1 spin on filter
*TTCF-BPF-12	By-Pass Filter	12	12 spin on filters
*TTCF-NBP	Non By-Pass Filter	1	1 spin on filter
*TTCF-NBP-12	Non By-Pass Filter	12	12 spin on filters
TTCF-DA	Domestic adapter kit	1	Set of 14 See figure A
TTCF-BA	Banjo adapter kit	1	Set of 4 See figure A
TTCF-HA	Adapter kit	1	Set of 7 See figure A
TTCF-FS	Filter screens	1	Set of 2

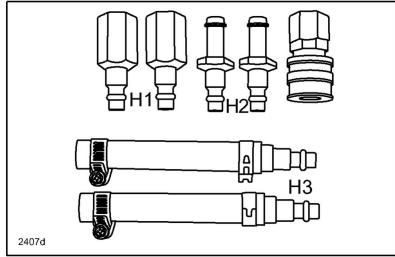
***Spin On Filter Cross Reference Guide**

Filter	G-Tec	AC	Fram	Super Tech	Motorcraft	STB
Non-bypass	TTCF-NBP	PF1232	PH3682	ST2827	FL839	S2827
Bypass	TTCF-BP	PF2	PH8A	S-01	FL1A	S-01

Figure A - adapter kits

 <p>2407b</p>	 <p>2407c</p>
TTCF-DA Domestic Adapter Kit	TTCF-BA Banjo Adapter Kit

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TTCF-HA Honda Adapter Kit

WARRANTY INFORMATION

NOTE:

- This warranty information applies only to verified customer complaints on vehicles eligible for warranty repair.
- This repair will be covered under Mazda’s New Vehicle Limited Warranty term for a Powertrain component.
- Additional diagnostic time cannot be claimed for this repair.
- To claim the additional labor time for power flushing the automatic transmission cooling system, add labor operation number K0101XRU/0.4 hours to the automatic transmission replacement claim/problem.

Operation Number / Labor Hours:

K0101XRU/0.4 hrs. (Additional flushing for cooler and lines)

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For additional troubleshooting assistance or for parts orders not listed in this bulletin, contact the G-Tech technical assistance line.

Inside US: 800-725-6499

Outside US: 417-725-6400

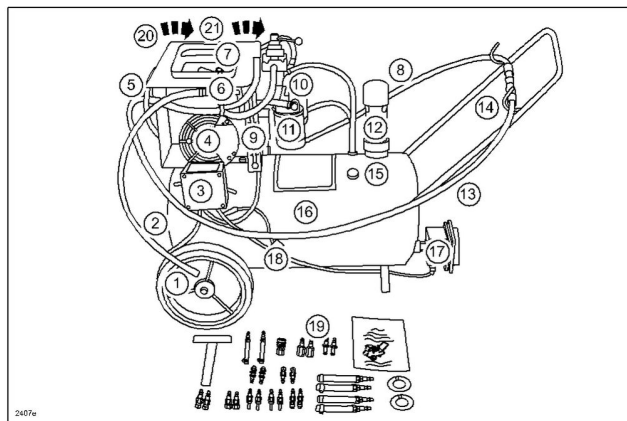
Fax: 417 725-3577

E-mail: sales@g-tec.com

Website: www.g-tec.com

Hours of operation: 9am to 5pm Central Standard Time Monday through Friday

APPENDIX



CALLOUT DEFINITIONS

1	10-inch semi-pneumatic rubber tires for easy mobility and obstacle clearance
2	1-inch drain plug allows quick and easy cleaning of tank
3	Switch box contains motor on/off switch and heat on/off switch which both have green indicator lights and a red low fluid indicator light
4	Commercial-grade Baldor motor with ½ HP service factor and a thermal protection switch
5	Two grommet holes for hoses to pass through thus preventing damage from vibration

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6	Hydraulic purge valve meets OSHA requirements by preventing ATF vapors in the environment and prolongs life of the filters and fluid
7	Improved deeper plastic tool tray reduces noise and holds tools and adaptors for the flushing unit
8	6-feet of hose with quick disconnect couplings
9	GPM flow meter shows actual flow through cooler lines and reports any system blockage or restriction
10	Dual filter mount holds 2 non-bypass automotive-style filters
11	G-tec filters (17 micron) equipped with a magnet on the bottom to pull all ferrous metal out of the flushing solution
12	Tower vent must be used with Air Purge Adaptor (APA) to vent injected air safely into the atmosphere
13	6-feet of hose with quick disconnect couplings
14	Longer handle for easy mobility
15	1-inch temperature gauge displays monitoring from 0-220 degrees F
16	10-gallon low profile all steel tank, powder-coated for lasting durability
17	Internal immersion heater (non-adjustable)
18	Low fluid level float switch turns heater power off when fluid level drops, activating red warning light on switch box
19	Line fittings adapt flushing unit to most vehicle's cooler lines (see Parts Information)
20	On left side: Air Purge Valve
21	Reverse lever

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