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ADVANTAGE ENGINEERING

ENGINE FLUSH SYSTEM – AUTO

OPERATIONS MANUAL

TABLE OF CONTENTS

I. INTRODUCTION
to the **EFS - AUTO**

Congratulations on the purchase of your ENGINE FLUSH SYSTEM.

The ENGINE FLUSH SYSTEM with specially formulated Engine Flush Solution and Filters is a safe, easy to use, quick, and efficient way of reducing sludge buildup in diesel engines. With the adapters provided (and optional adapters available), almost all diesel engines can be serviced

The ENGINE FLUSH SYSTEM removes virtually all of the carry over oil not normally removed with the typical oil change. The engine flush solution dissolves and suspends contaminant buildup, and the filters remove those damaging components not normally caught by the factory specification filter.

Menu driven, the ENGINE FLUSH SYSTEM can provide "static" (engine not running) and "dynamic" (engine running) services. In most cases, the engine flush service can be performed in approximately 15 minutes or less during the normal oil change.

Customers have "clean oil" after a ENGINE FLUSH SYSTEM engine flush, the result of a "complete" oil change. Emission reductions resulting from a reduction in unburned hydrocarbons, a smoother running engine due to reduced friction, and increased performance are other benefits that may be realized.

- The ENGINE FLUSH SYSTEM can be used practically anywhere and with almost all automotive engines
- Compact and mobile, the self-contained system provides ample storage for solution, filters, adapters, and accessories
- Convenient menu driven software allows the system operator to perform engine flush services quickly and efficiently
- Adapters for spin on filter equipped engines are available for almost all automotive engines

II. SAFETY INFORMATION

1.01 IMPORTANT SAFETY NOTICE

For your safety, read this manual thoroughly before operating your ENGINE FLUSH SYSTEM. Your ENGINE FLUSH SYSTEM 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 ENGINE FLUSH SYSTEM, 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, may result in moderate or minor 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 ENGINE FLUSH SYSTEM 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

Vehicle gases contain Carbon Monoxide, which is a colorless & odorless lethal gas.

- **Only run engines in well ventilated areas and avoid breathing exhaust gases.**

Extended breathing of exhaust gases will cause serious injury or death.

WARNING

Improper use and operation.

- **Read, understand and follow all safety messages and operational procedures in this manual before operating the ENGINE FLUSH SYSTEM.**
- **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

Exhaust gases, moving parts, hot surfaces, and potent chemicals may be present during use of the oil flush equipment.

- **When using chemicals always refer to the MSDS sheets and manufacturer's instructions for the proper procedure to handle emergency medical treatment, cleanup, handling, and storage requirements.**

Improper use of the oil flush equipment or exposure to exhaust gases, moving parts, hot surfaces, or moving parts may cause injury.

WARNING

Electrical shock can result from absence of grounding plug.

- **Do not remove or bypass the grounding prong in any electrical plug.**

Electrical shock can cause injury.

WARNING

Risk of expelling pressurized fluids.

- **Verify that engine and machine are off before connecting or disconnecting lines and adapter hoses.**

- **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.**

Chemicals may cause repiratory tract and/or skin and eye irritation.

- **Use only approved chemicals (refer to operator's manual).**
- **Use safety glasses and protective clothing when handling chemicals.**
- **Do not ingest chemicals or breathe vapors**
- **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 motor oil and engine flush solution 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, adapters and service hoses clear of moving parts such as fan blades, belts and pulleys.**
- **Wear safety goggles (user and bystanders).**

Moving components can cause injury.

WARNING

Risk of burns.

- **Wear gloves when working near hot engine components.**
- **Do not touch hot exhaust systems, manifolds, engines, radiators, etc.**

Hot components can cause injury or discomfort.

WARNING

Risk of injury.

- **This equipment should be operated by qualified personnel only.**
- **Use this equipment only as described in this manual.**
- **Loop the power cord loosely in its proper location when machine is not in use.**
- **Do not operate equipment with a damaged power cord 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 power cord and service hoses so that they will not be tripped over or pulled.**
- **Never pull on the power cord or service hoses to transport the ENGINE FLUSH SYSTEM.**
  Damage may occur to these components, or machine may tip over.
- **Keep area of operation clear of unnecessary tools and equipment. Utilize hinged storage area on the top of the machine.**
- **Never leave the machine running unattended.**
- **The ENGINE FLUSH SYSTEM is not designed for any other purpose than the flushing of the lubrication system.**

Operation of your ENGINE FLUSH SYSTEM by anyone other than qualified personnel may result in injury.

CAUTION

Risk of equipment damage.

- **Flushing high mileage engines that have not been previously serviced can cause operating problems in the engine.**
- **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 ENGINE FLUSH SYSTEM is fully automatic. Refer to your control panel at all times.**
- **Never pull on the power cord or service hoses to transport the ENGINE FLUSH SYSTEM. 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!

III. SYSTEM FEATURES & SPECIFICATIONS

2.01 FEATURES

Application

- Automatically flushes and cleans vehicle lubrication system of most diesel engines
- Removes carryover oil and accumulated contaminants in engine crankcases.
- Profitable add-on service for quick lube shops, mass merchants, dealers, fleet operators, general repair shops, specialty repair, etc.

Functions

- User selectable cleaning process, static or dynamic
- Automated service (approx. 10.5 minutes, static)
- Static pre-flush and post-flush for dynamic service
- Thorough, effective four-stage cleaning process
- Closed loop, pressurized system injects and extracts flush solution automatically
- Standard adapter set includes adapters for most spin-on filter applications
- Optional canister adapters for virtually all North America market canister-filter equipped vehicles
- Patented adapter design for quick and secure attachment/detachment
- Uses only AEC filters and flush solution (non-solvent) disposable in the waste oil stream
- Forty (40) services per solution change

Cabinet Features

- Rugged 18 C.R.S. powder-coated steel construction
- Integral front-mounted adapter storage rack
- Highly mobile with 4" locking caster wheels (front) & 8" rear (rigid)
- Ergonomically correct working height
- Upper hinged storage area for manual, adapters, tools, and spare O-rings
- Color-coded service hoses
- Front mounted 10" filter canister
- 15-gallon corrosion resistant solution tank

Electronic Control

- 2 line 16 character display:
  - Programmable heater time clock for automatic pre-heating of flush solution
  - Warning messages
  - Service complete and audible beeper
- Keypad:
  - Flush, fill, drain, pause, and abort function keys
- Audible Alarm
- Main menu routine maintenance counter

2.02 DIMENSIONS & TECHNICAL SPECIFICATIONS

Specifications

- 15 U.S. gallon solution tank capacity
- 17' external hoses
- Dual high volume electric pumps: 4.2 gpm pressure, 4.9 gpm recovery pump
- Filtration: 3 micron recovery and 3 micron pressure
- **Electrical Requirement:** 100/120 VAC, 50/60Hz, 14.5 amps, or 200/240 VAC, 50/60 Hz, 10 amps
- **Dry Weight** (uncrated): 150 lbs. (68 kgs)
- **Dimensions:** 22.5" (57cm) wide
  26.5" (67cm) deep
  47.5" (121cm) high
- One (1) year limited warranty

Standard Accessories

- 0120-10-01-0 Spin-On Adapter Kit (domestic)

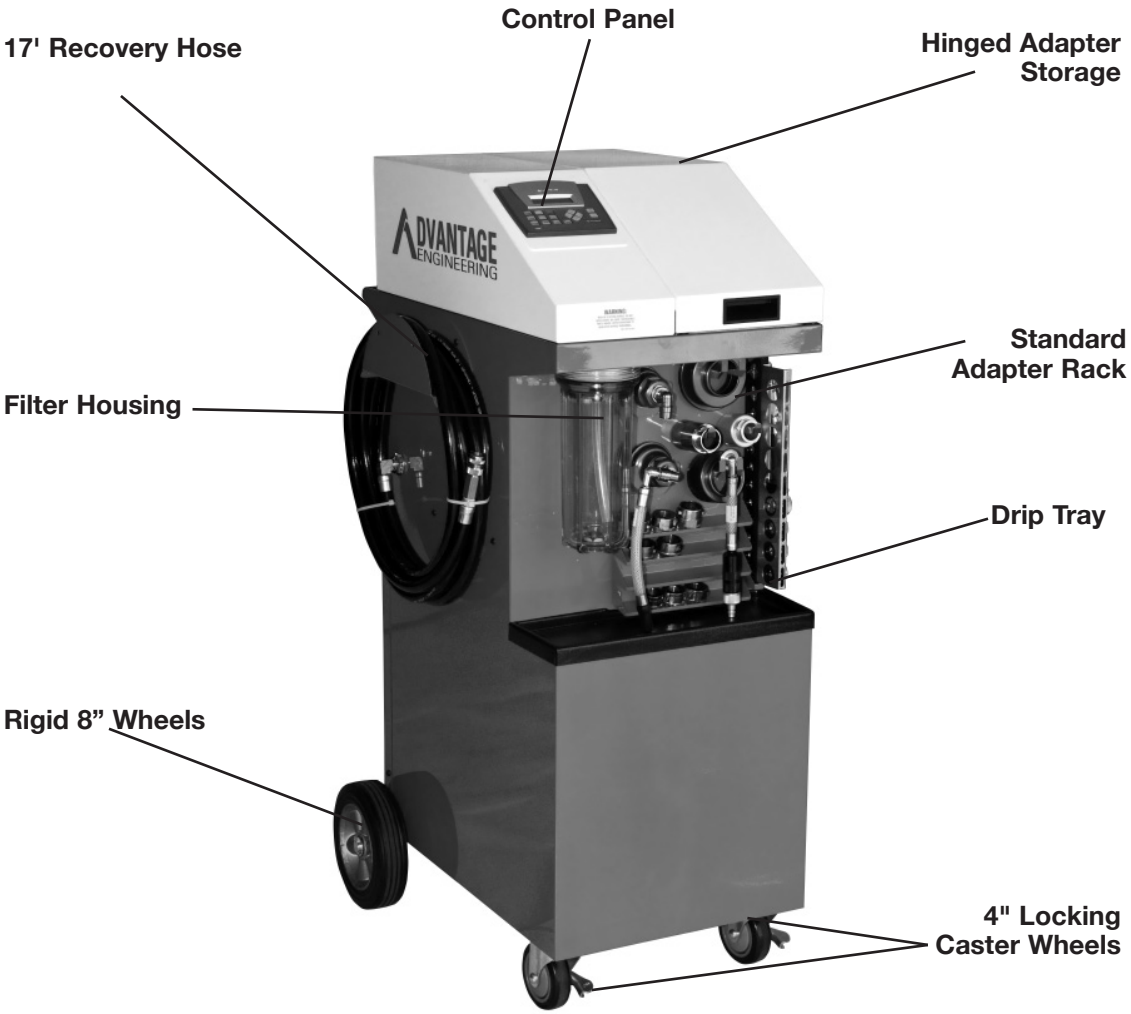
Optional Accessories

- 0512-01-40-1 Engine Flush Kit
  1 @ 0500-01-40-1 – Advantage Engineering Filter Kit
  (40 @ 3 micron cartridges and 1 @ 3 micron spin-on filter) and
  2 @ 0506-01-00-0 - 6 U.S. gallon Advantage Engineering Engine Flush Solution

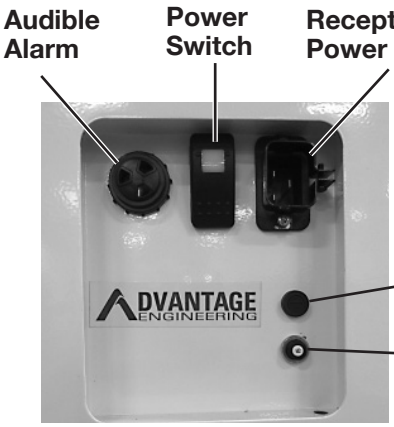
- Optional Adapters:
  Canister adapters

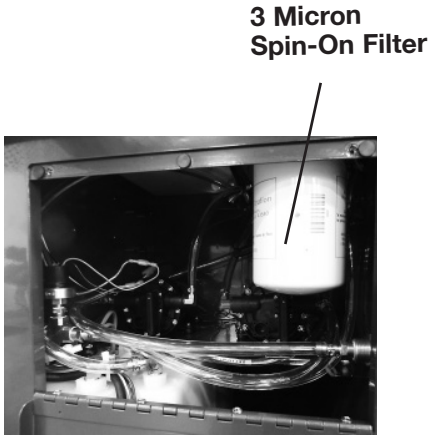
Specifications subject to change without notice.

2.03 MACHINE OVERVIEW

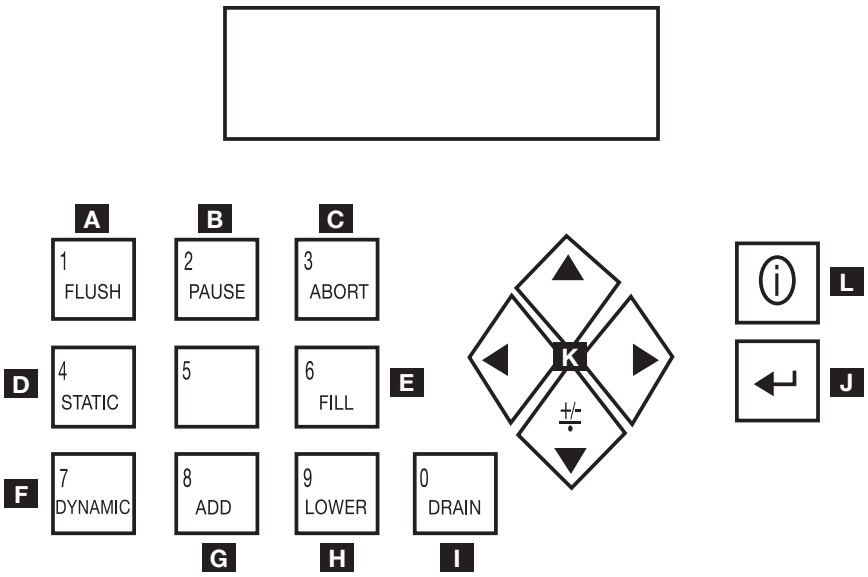


BACK OF MACHINE





2.04 UNDERSTANDING THE KEYBOARD



KEYS NAME	FUNCTION	DETAILS
A. (1) FLUSH KEY	Activates the flush cycle.	**-** Only operates when the display reads “Tank Temp Ready”. - Will not operate with alarms present.
B. (2) PAUSE KEY	Stops the machine at any time, when needed.	- Also used to resume cycle that has been stopped.
C. (3) ABORT KEY	Cancels a cycle only after pressing the **[PAUSE]** key.	Proper sequence for aborting cycle is: a) **[PAUSE]** Key (2) b) **[ABORT]** Key (3) c) **[FILL]** Key (6)
D. (4) STATIC KEY	Is used to select ‘Static Only’ Flush.	- 4 Static flush and recoveries +/- 10 minutes
E. (6) FILL KEY	Is used to fill the internal holding tank with Advantage Engine Flush Solution.	Used during: - Refilling holding tank. - Adding more solution when the holding tank is low. - End of service if front filter canister is not empty. - Also used after an “Abort Cycle” to ensure that all solution has been recovered from oil pan before removing drain adapter. - NOTE: Pressing the “Fill” key recovers solution from any outside source such as oil pan, new AEC 6-gallon solution pails.
F. (7) Dynamic Key	To select Static/Dynamic combination flush.	- 2 Static flush and recoveries - Engine fill followed by dynamic flush (engine running) - 1 Static flush and recovery .

G. (8) Add Key	To add solution to engine after static/dynamic engine fill cycle. (Bring to max level on dipstick)	- Used with static/dynamic mode.
H. (9) Lower Key	To lower solution level in engine. (Bring to max level on dipstick)	- Used with static/dynamic mode.
I. (0) Drain Key	To drain AEC solution from internal holding tank.	- Only operates when display prompts user to change fluid. (usually after 20 services)
J. ↵ Enter Key	Used when setting time clock & heater time set.	
K. "▼▲" Keys	Used to scroll up or down main menu and to select next screens when setting time clock & heater time set.	
L. "I" Key	Not used.	

3.01 PREPARING MACHINE FOR OPERATION

WARNING

Do not connect any electrical supply to the machine before reading all of the instructions.

1. Unpack Standard Adapter Set. Mount adapters on adapter rack per diagram.
2. Open back door of the machine. Locate and remove red oil filter adapter. Install the 3-micron spin-on filter from the Advantage Engineering Filter Kit in its place. Hand-tighten.
3. Using filter wrench, remove the clear 10" filter canister housing located on the front of the machine.

Inspect for:

- Black O-ring in place
- Damage, including small nicks
- Debris

Reinstall 10" filter canister housing.

4. Plug the machine into a proper VAC grounded power source. The electrical circuit must be separate from the other equipment. If an extension cord is required, it must be rated up to 15 AMP.
5. Power the machine by depressing the power switch located at the rear of the machine.

CHECK THE DISPLAY ON THE FRONT OF THE MACHINE

The display panel will show the top portion of the "Main Menu" as seen here:

PACK SERVICES	**= 0**
TANK TEMP	**= LOW**

THE "MAIN MENU" ALSO INCLUDES THE FOLLOWING FUNCTION ITEMS:

2. Password Cycle:	To be used by Factory Representatives only.
3. Date/Time:	Used to set Date and Time.
4. Heater Time Set:	Used to set the Heater Time Clock.

NOTE: If this "Main Menu" is not shown, unplug the machine, wait ten (10) seconds, check the power source, and then re-plug the machine into the power source. If you still have no display, call your local distributor.

3.02 PROGRAMMING CLOCK & HEATER TIME

(password protected - contact distributor)

FROM MAIN MENU

Pack Count	**0**
Tank Temp	**Low**

CURSOR DOWN TO THE DATE & TIME

2010/03/10
13:45

Press the **[↵ ENTER]** key.

ENTER TIME
??:??

Use numerical keypad to change and/or press **[↵ ENTER]** key to continue.

[⇣] Cursor down to next screen.

DAY/MONTH	**??/??**
YEAR 2010	

Use numerical keypad to change and/or press **[↵ ENTER]** key to continue.

DAY/MONTH	**30/06**
YEAR ????	

Use numerical keypad to change and/or press **[↵ ENTER]** key to continue.

[⇣] Cursor down to next screen.

DAY OF THE WEEK
WEDNESDAY ↵

Press **[↵ ENTER]** key to change or [⇣] Cursor down to next screen.

HEATER TIME SET

1)

HEATER TIME
SET ↵

To check or change heater time set, press **[↵ ENTER]** key.

2)

600	SUN	1800
LOOP ⇣		EDIT ↵

To check [⇣] to loop all screens or press **[↵ ENTER]** key to edit.

3)

START	SUN	STOP
????		1800

Use numerical key pad to change start time and/or press **[↵ ENTER]** key to continue.

4)

START	SUN	STOP
0600		????

Use numerical key pad to change stop time and/or press **[↵ ENTER]** key to continue.

[⇣] Cursor down to next screen.

5)

600	M-F	2000
LOOP ⇣		EDIT ↵

Repeat steps 2 through 4.

[⇣] Cursor down to next screen.

6)

600	**SAT**	**1800**
LOOP ⇣		**EDIT ↵**

Repeat steps 2 through 4.

[⇣] Cursor down to next screen.

7)

REVISION
00001*_

*version

[⇣] Cursor down to “Main Menu”.

8)

PACK COUNT – 0
TANK TEMP – LOW

3.03 FILLING THE MACHINE FOR THE FIRST TIME

1. Unpack two (2) six (6) U.S. gallon containers of Advantage Engine Flush Solution.
2. Uncoil black hose from hose hanger.
3. Connect the 20” long black fill tube to the black hose.
   (Fill tube is located in upper adapter box.)
   NOTE: Listen for audible click to ensure proper connection.
4. Remove caps form new containers of Advantage Engine Flush Solution. Place the fill tube into one of the full containers of Advantage Engine Flush Solution until the fill tube hits the bottom of the container.
5. Press [Fill] key. The machine will automatically pump the Advantage Engine Flush Solution into the holding tank. Pump normally makes a pulsating sound.

   The display will show:

FILL CYCLE	**0**

6. When the first container is empty, transfer the fill tube to the next container of Advantage Engine Flush Solution. Repeat until all 2 container are empty.
   NOTE: The fill cycle will automatically stop once the required level of Advantage Engine Flush Solution is in the holding tank. Do not interrupt this process.

   The display will show:

FILL COMPLETE

7. Press the [**ENTER**] key.

   The display will show:

PACK COUNT	**= 0**
TANK TEMP	**= LOW**

   NOTE: If needed, press the [**FILL**] key to completely remove any Advantage Engine Flush Solution from the clear canister and hoses.

8. Remove fill tube and return to hinged storage box.
9. Dispose of empty container according to Federal, State, and Local Regulations.

3.04 PREPARING TO PERFORM A FLUSH SERVICE

1. Allow the Advantage Engine Flush Solution to automatically heat to +/- 105° F. The machine will heat up the solution automatically as long as the current time is within your time clock setting.
   NOTE: When operating temperature is reached, the display will show “Tank Temp Ready.” The machine takes 15-40 minutes to heat the Advantage Engine Flush Solution, depending on ambient temperature.

   NOTE: To override heater press and hold #5 key and [**FLUSH**] key for +/- 2 seconds.

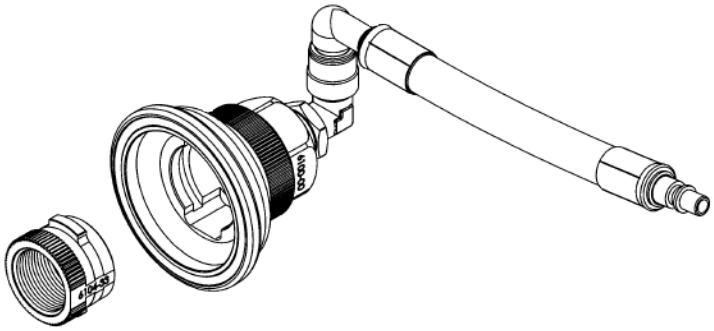
2. Using a filter wrench, install new ultra fine 3-micron filter into the 10” clear canister housing located on the front of the machine. Hand tighten.
   NOTE: Check the canister and black O-ring for any nicks and/or debris. Clean or replace if necessary.

BASIC HOOKUP

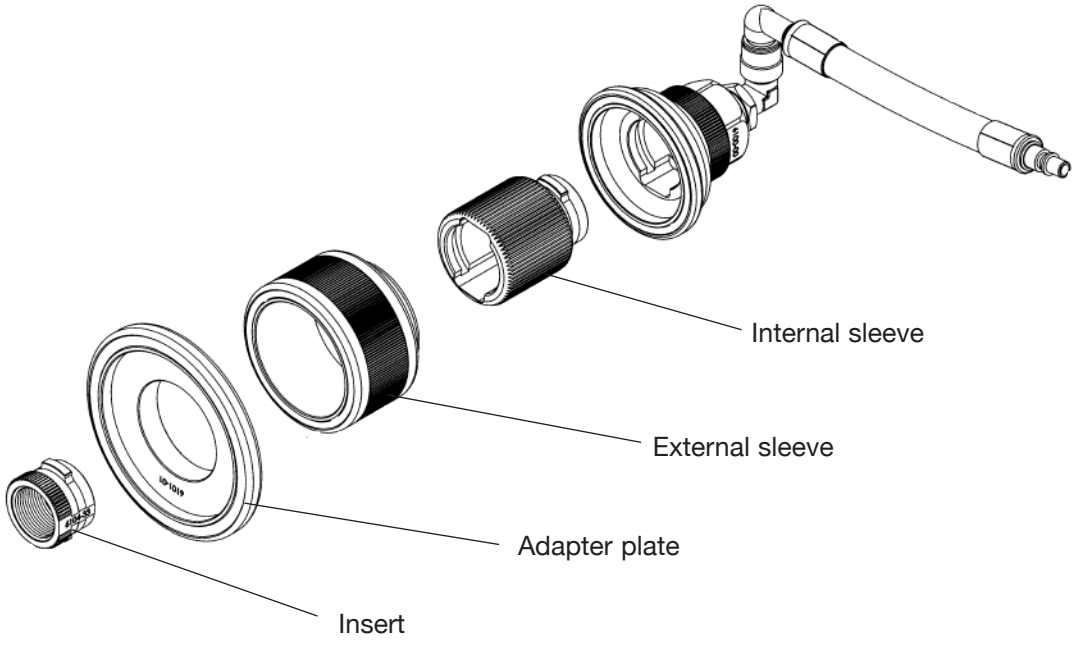
1. Drain oil and remove oil filter from the engine.

SPIN-ON FILTER EQUIPPED VEHICLES
On engines equipped with spin-on filters it will be necessary to use the oil filter base adapter when connecting to the oil filter port of the engine. Depending on the engine's oil filter housing, some combination of one or more of the other upper adapters will be necessary to produce an effective attachment to the engine. In 90% of the cases when a spin-on filter is used, the outer housing lip of the oil filter housing and the center post are level with each other.

2. Attach oil filter port adapter to oil port by selecting the correct insert and lock it into the orifice on the adapter base. This assembly is directly attached to the engine's oil filter housing (hand tighten). Use larger diameter adapter plate if necessary.



3. If the outer lip of the engines oil filter housing is larger in diameter than the oil filter base plate, it will be necessary to add an adapter plate. (Illustrated below.) If there is an extended center-post in the engine's oil filter housing, it will be necessary to add the extension sleeve to the base plate and one of the internal extension sleeves.

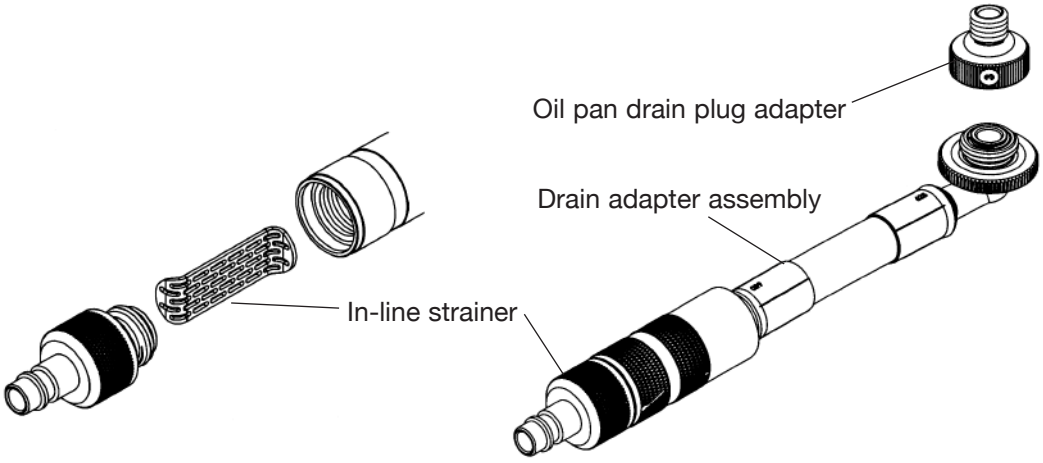


CANISTER FILTER EQUIPPED VEHICLES

4. On engines equipped with canister filters it will be necessary to use canister adapters. Several of these for GM applications are included with the standard Domestic Spin-On Adapter Kit. Others are optional. See Appendix 5.01, Adapter Kits. Install appropriate canister adapters per Appendix 5.02, Adapter Application List, and referenced illustrations in Appendix 5.03.

DRAIN PAN (LOWER) ADAPTERS

5. Select oil pan adapter. Take the appropriate sized oil pan drain plug adapter (silver colored) and screw it into the oil pan drain opening. Hand tight is sufficient. Attach the 90° drain adapter assembly to the drain pan plug turning until hand tight.



IMPORTANT

Adapters and mating engine oil filter port surface must be clean. Engine damage may occur by failing to clean these surfaces.

NOTE: Use a solvent when cleaning adapters.

6. Lock wheel brakes, located on the front of the machine.
   NOTE: Check to ensure brakes are secure.
7. Connect the red hose to the oil filter adapter and the black hose to the drain adapter assembly.
   NOTE: Listen to audible click to ensure proper connection.

IMPORTANT

To avoid engine overfill make sure the hoses are properly aligned and connected to ensure there are no twists or kinks of adapter hoses and red and/or black external hoses.

IMPORTANT

After completion of 40 flushes* you must change the solution. CAUTION: Never press the [DRAIN] key when the ENGINE FLUSH SYSTEM is attached to an engine. If the ENGINE FLUSH SYSTEM is attached (hooked-up) to a vehicle and the [DRAIN] key is pressed, all of the solution in the ENGINE FLUSH SYSTEM will be pumped into the vehicle's engine causing a severe overfill condition."

- Dependent on software, solution change may be different (i.e. 20 or 30).

3.05 PERFORMING A FLUSH SERVICE

The Advantage Engine Flush System, when attached to an engine, becomes a closed-loop, pressurized system that injects and extracts solution through the engine with a patented adapter system.
The Advantage Engine Flush System is shipped with a Domestic Spin-On Adapter Kit that includes Oil Filter Port or Upper Adapters for most spin-on filter equipped vehicles and Oil Pan or Lower Adapters for most engines.

CAUTION!!!

- **Never pull on the power cord or service hoses to transport the Advantage Engine Flush System. 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.**
- **Read, understand, and follow Safety Instructions in the front pages of this manual and on product safety labels.**
-

ENGINES NOT RECOMMENDED
THE ADVANTAGE ENGINE FLUSH SERVICE IS NOT RECOMMENDED FOR THE FOLLOWING ENGINES

Horizontal opposed engines such as:
- Porche 911, 912, and 914
- Volkwagen Vanagon
- Chevrolet Corvair

All rotary engines such as:
- Mazda RX-7

All dry sump motors such as:
- Mercedes Benz 6.9 (1976-1979)

Worn Engines:
The purpose of engine flushing is to remove sludge and contaminant build-up from the engine's internal oil system. It is not meant to be a corrective measure for needed mechanical repairs.

STATIC FLUSH:

The Advantage Engine Flush System performs the static service in four (4) stages.

IMPORTANT

WARNING: To avoid engine overfill, make sure the hoses are properly aligned and connected to ensure there are no twists or kinks of adapter hoses and red and/or black external hoses. The oil filler cap and dipstick must be removed before you begin the service.

It should take approximately 30 seconds after pressing the 'Flush' key for the solution to start returning from the engine to the Advantage Engine Flush System. If no solution is flowing back to the Advantage Engine Flush System, or if there are air or solution leaks, press the **[PAUSE]** key and check to ensure that all connections are secure before continuing the service.
Once the problem has been corrected, press the **[PAUSE]** key to continue the flush.
If after an additional 20 to 30 seconds the solution is still not flowing back to the Advantage Engine Flush System, press the **[PAUSE]** key immediately.
Correct the problem before any further attempt is made to perform this service.

The Advantage Engine Flush System will proceed automatically through Stages I through IV. An audible alarm will sound when the service is complete.

Check the clear filter canister to make sure that it is empty of solution. If not, press the **[FILL]** key, which will cause the system to run a 45-second recovery cycle.

	Flush	Recovery
STAGE I	90 Seconds	45 Seconds
STAGE II	90 Seconds	45 Seconds
STAGE III	90 Seconds	45 Seconds
STAGE IV	90 Seconds	90 Seconds

Flush Cycle: Heated and pressurized (+/- 42 PSI), solution is pumped with pulsating action through the oil filter port to the main bearings, rod bearings, oil galleys, camshaft bearings, and valve lifters. Solution flows to the oil pan and is vacuum extracted through the drain plug adapter to the Advantage Flush System. The Advantage Engine Flush System filters the contaminated solution through ultra-fine 3-micron spin-on and 3-micron cartridge filters.

Recovery Cycle: Vacuum extracts all of the solution from the engine and pumps it back to the holding tank.

Final Recovery Cycle: During the first 45 seconds of 'Last' recovery, the air is pumped through the oil filter port adapter to force excess fluid and sludge debris from the engine to the oil pan where it is evacuated. You may notice that the pump sounds as if it is picking up speed. When the service is completed the buzzer will sound five (5) times and the display will show that the service is completed.

NOTE: You can press the **[FILL]** key as often as required to recover all of the Advantage Engine Flush Solution in the 10" clear canister.

1. Detach the red and black hose from the engine and re-hang them.
   NOTE: Avoid dropping and/or dragging the hose ends on the floor. If the hose ends become dirty, clean with solvents.
2. Connect black hose to main oil port adapter and press "FILL" key. This will remove solution from oil filter port.
3. Detach black hose from oil port adapter and rehang it.
4. Remove adapters from the engine.
5. Clean adapters with a clean rag or towel.
6. Return adapters to the adapter rack.
7. Complete the oil change process.
8. Remove the ultra-fine filter from the clear canister. Properly dispose of used filter according to Federal, State, and Local Regulations.

The Advantage Engine Flush System is now ready for next service.

DYNAMIC FLUSH

1. Press "(1) FLUSH" key.

(4) Static or **(7) Dynamic**

2. Press "(7) DYNAMIC" key.

Dynamic Mode **Press Flush**

3. Press "(1) FLUSH" key.

Flush 1 **Running for 90**

Recovery 1 **Running for 45**

Flush 2 **Running for 90**

Recovery 2 **Running for 45**

Engine Fill **Running for 45**

Check Oil Lever **↑ = 8 ↓ = 9 ↵ = Next**

4. Bring engine oil level to full mark, using one of the following steps.

   Step A: If level is low: Press "(8) ADD" key. This will add fluid to engine for as long as key is pressed.

   Step B: If level is high: Press "(9) LOWER" key. This will remove fluid from engine for as long as key is pressed.

   Step C: If level is ok: Press "↵ ENTER" key to proceed to next step.

   Start Engine
   or Press Enter

5. Start engine or press "↵ ENTER" key.

   Oil Pressure OK
   Time 0:00

6. Let engine run for 5 to 10 minutes.
7. Stop engine to resume service.

   Oil Pressure Low
   Static = 4

NOTE:
Audio signal will sound (4 seconds x 2) after 5 minutes running, if still running after 10 minutes audio signal will sound (4 seconds x 3)

8. Press "(4) STATIC" key.

   Are You Sure = Enter

9. Press "↵ ENTER" key (within 5 seconds.)

   Engine Recovery
   TIme = 90

   Flush 4
   Running for 90

   Last Recovery (4)
   Running for 90

   Flush Complete
   Press Enter

10. Press "↵ ENTER" key.

    Pack Count = — —
    Tank Temp = Ready

11. Remove red hose from oil port adapter.
12. Remove black hose from drain adapter and connect to oil port adapter.
13. Press "(6) FILL" key to remove remaining fluid from oil port adapter.
14. Return hoses and adapters for proper storage.

3.06 HOW TO CHANGE THE SOLUTION

NOTE: After 40 services the audible alarm sounds.

The display will show:

PACK COUNT 40
DRAIN TANK = 0

1. Uncoil hoses.
2. Connect the 20" fill tube assembly to the red external 17' hose. Make sure the hose is properly connected and that you hear a positive clicking sound.
3. Insert 20" fill tube assembly into the proper waste holding tank or container. It must hold at least 12 gallons or 45.4 liters for each tank of solution to be changed.
4. Secure or hold the hose as it may move once pressure is applied.
5. Press **[DRAIN]** key.

The display will show:

DRAIN CYCLE
TIMER = 0

NOTE:
Press **[PAUSE]** key to pause drain process at any time.
Press **[PAUSE]** key to resume the drain process.
Machine will automatically stop once the holding tank is completely drained.
Do not interrupt this process.

The display will show:

DRAIN COMPLETED
PRESS ENTER

Press **[ENTER]** key to continue

.

NOTE: "Alarm" shows until alarm is corrected.

7. Remove 20" fill tube assembly from the red external hose, clean and re-install to the oil filter adapter.
8. Remove old 3 micron spin-on filter located at the rear of the machine, dispose of filter according to Federal, State, and Local Regulations.
9. Install new 3 micron spin-on filter, secure in a hand tight manner. (Filter is included in the Filter Pack.)
10. Connect the 20" long clear fill tube assembly to the black external 17' hose (Fill tube is located in the upper adapter box.)

    NOTE: Listen for audible click to ensure proper connection.
11. Remove caps from two (2) containers of Engine Flush Solution. Place the fill tube into one of the full containers of Engine Flush Solution until the fill tube hits the bottom of the container.
12. Press **[FILL]** key. The machine will automatically pump the Engine Flush Solution into the holding tank. Pump makes a normal pulsating sound.

The display will show:

FILL CYCLE
PRESS FILL = 6

13. When the first container is empty, transfer the fill tube to the second container of Engine Flush Solution. Repeat until second container is empty.

    NOTE: The fill cycle will automatically stop once the required level of Engine Flush Solution is in the holding tank. Do not interrupt this process.

The display will show:

FILL IS COMPLETE
PRESS ENTER

14. Press the **[↵ ENTER]** key.

The display will show:

PACK SERVICES	**=**	**0**
TANK TEMP	**=**	**LOW**

NOTE: If needed, press **[FILL]** key to completely remove any Engine Flush Solution from clear canister and hoses.

15. Remove the fill tube and return to hinged storage box.
16. Dispose of empty canisters according to Federal, State, and Local Regulations. 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.

3.07 SHUTTING OFF THE MACHINE

NOTE: Do not shut off the power source to the ENGINE FLUSH SYSTEM during any operating cycle.
The ENGINE FLUSH SYSTEM is equipped with an energy saver time clock and should not be disconnected from electrical power during non-business hours. Machines can be programmed to pre-heat the Engine Flush Solution before business opening hour and shut heater off after closing hour. (See page 16 & 17, Section 3.04)
NOTE: If you have any questions or require any assistance contact your local distributor.

3.08 MAINTAINING THE ENGINE FLUSH SYSTEM

The machine requires a routine maintenance to be performed by an authorized technician, after every 588* flushes. The Main Menu line item " MAINTENANCE IN" always displays the number of flushes remaining before the next required routine maintenance. The counter will automatically count down after each service is completed.
When the machine has only 20 flushes remaining.

The display will show:

TTL SERVICES	**=**	**568**
MAINT IN 20 FLUSHES		
PACK SERVICES	**=**	**8**
TANK TEMP	**=**	**READY**

After completion of every flush the alarm will sound and a message will appear.

The display will show:

20 CYCLES LEFT
CALL TECH.

Press **[↵ ENTER]** key to return to main screen.
Please contact you local distributor and set up an appointment for a routine maintenance before reaching 0 flushes as the machine will be disabled after 0 flushes is reached.

*588 or 999 services depending on software.

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V. TROUBLESHOOTING & ADDITIONAL HELP

4.01 TROUBLESHOOTING GUIDE

Problem: No display

Cause: No power
Solution: Check the wall receptacle for the proper voltage.

Cause: Machine not plugged in
Solution: Plug in.

Cause: On/Off switch is not in the "On" position
Solution: Turn the On/Off switch, located on the back of the machine, to the "On" position.

Cause: Fuse blown or circuit breaker tripped
Solution: Check the 4 AMP Fuse, replace if blown and press to reset 15 AMP circuit breaker. See page 10 for location.

Cause: Loose wires / bad connection
Solution: Confirm that wiring is secure. If wire(s) are loose, UNPLUG MACHINE, tighten wire(s), and recheck.

Problem: Tank temperature low

Cause: Low voltage from wall outlet
Solution: Check voltage in shop. If voltage is lower than 92% of the normal required voltage, the unit will not heat properly.

Cause: Amperage on extension cord not rated at 15 AMPS
Solution: Remove extension cord and replace with a cord that is 15 AMP rated, or plug directly into the wall power outlet.

Cause: Machine is low in solution
Solution 1: Press the **[FILL]** key, check for "Low Fill Cycle". If counters run, let the counter run until cycle has completed. Wait 20-60 minutes for the machine to heat the solution.
Solution 2: Repeat Solution 1. If counters do not run, add one (1) six (6) U.S. gallon container of solution to the internal tank. Wait 20-60 minutes for the machine to heat solution.

Cause: Bad mechanical relay
Solution: Check for 24 VDC on purple and colored wires, located on mechanical relay(s). If 24 VDC is present, check for closed contact position. If contact is not closed, replace relay(s).

Problem: No fluid circulation

Cause: Internal 3 micron filter loose or not installed
Solution: Make sure 3 Micron Filter is installed and hand tightened.

Cause: Quick release fitting
Solution: Check for proper connection between adapters and hose connection.

Cause: Pump is not working
Solution: Call your local distributor for assistance.

Problem: Filter canister empty

Cause: Bad connection at the return quick connect

Solution: Check the quick release connection on the oil pan adapter.

Problem: Fluid does not return to the unit

Cause: Clogged return quick connect

Solution: Clean the quick connect.

Cause: Kinked recovery hose (black)

Solution: Check (black) hose for kinks.

Problem: Flush Cycle not working

Cause: Low tank temperature

Solution: Wait for the tank temperature to be " Ready".

Problem: [DRAIN] key not working

Cause: Pack services not at 40 count

Solution: Wait until 40 count services are reached.

Problem: Ultra Fine Filter Canister leaking

Cause: Canister not tightly closed

Solution: Press the **[PAUSE]** key to pause service. Using canister wrench, tighten canister, then press **[PAUSE]** key to resume service.

Cause: No O-ring or damaged O-ring

Solution: Press the **[PAUSE]** key to pause service. Replace the O-ring, then press the **[PAUSE]** key to resume service.

Problem: No solution flowing through the canister after the [FLUSH] key was pressed

Cause: Hoses are not connected properly to adapters

Solution: Press the **[PAUSE]** key to pause service. Disconnect and reconnect hose fitting adapters. Press **[PAUSE]** key to resume service.

Problem: No recovery, [FILL] key must be pressed several times

Cause: Drain adapter is clogged with sludge or debris

Solution: Clean and inspect adapter.

VI. REPLACEMENT PARTS AND ADAPTERS

5.01 REPLACEMENT PARTS

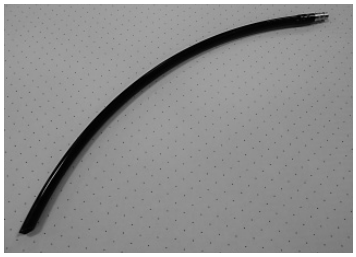
0901-58-90-1
Hose, 1/2"ID X 17' Long X NS6
External Recovery Assy. (Black)

0901-56-90-2
Hose, 1/2"ID X 17' Long X NS6
External Pressure Assy. (Red)

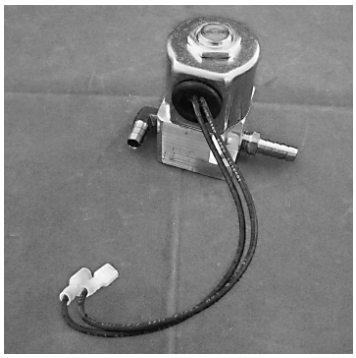
1632-08-80-1
Wheel, Offset Hub 8" OD X
2 1/2" WD W/Bearing

1635-44-40-4
Wheel, Caster 4" OD X
1 1/4" WD W/Brake (Gray)

2022-12-10-1
Quick Disc.Coupler Body
S/22 X 1/4"Fpt (Red Hose)



2025-31-21-1
Fill Tube, S/25 Plug X 1/2"Od Hose
(Black)



2143-11-01-4
Valve, Solenoid 3.0 Orif. Assy
(Vacuum Breaker)

2025-32-10-1
Quick Disc. Coupler Body
S/25 X 3/8"Fpt (Black Hose)

2106-08-00-1
Clamp, .157 Oetiker (1-Ear)

2226-01-00-4
Housing, Canister 10" Clear Poly
Bowl W/O-Ring

2251-54-61-3
Pump, Recovery 230VAC/4.9GPM
Assy (EFS-AUTO / OIL PRO)

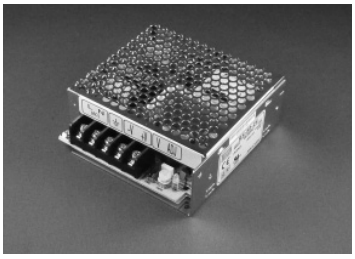
5.01 REPLACEMENT PARTS (CONTINUED)

2251-54-82-3
Pump, Recovery 115VAC/4.9GPM
Assy (EFS-AUTO / OIL-PRO)

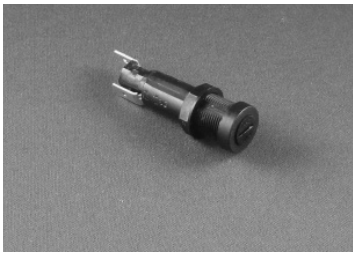
2252-54-61-3
Pump, Pressure
230VAC/4.3GPM Assy

2252-54-81-3
Pump, Pressure
115VAC/4.3GPM Assy

3020-35-00-1
Display & PLC Combo (Jazz)

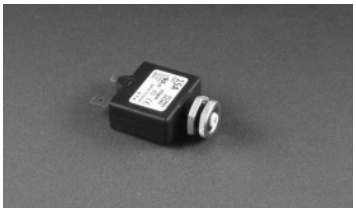


3042-24-50-1
Power Supply, 100-240 VAC X 24
VDC - 2.2 AMP

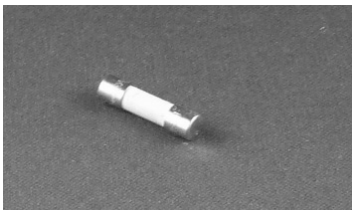


3050-11-20-0
Fuse Holder for M20 fuses

3050-21-40-0
1 1/4" fuse holder



3050-71-40-0
Push to Reset 15 AMP
Circuit Breaker 120VAC



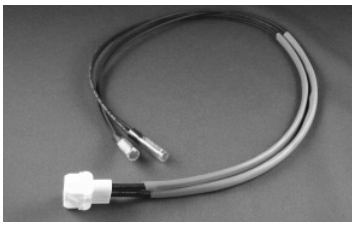
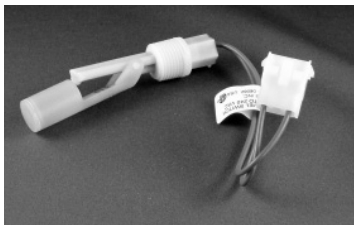
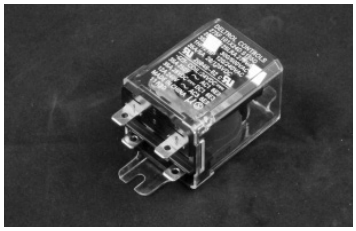
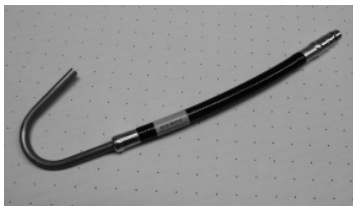
3051-04-21-1
Fuse, 4 AMP-250V (FAST) X M20
(Ceramic)

3051-10-31-1
250VAC fuse

3070-15-10-4
Power cord, K-120VAC X 15' Long
SJTOW X 90 X C19

3072-13-01-4
Power cord, A-230VAC
13.1' X 90 X C19

5.01 REPLACEMENT PARTS (CONTINUED)

 **3074-13-04-5** Power cord, D-240VAC 15' X 90 X C19	 **3090-13-11-3** Switch, Rocker 250VAC Neon W/ Actuator	 **3108-52-30-1** Switch, Pressure 1/8"MPT X 0-20 PSI
 **3110-00-51-1** Sensor, Temp. 22" LONG X 3 PIN Molex Assy.	 **3113-58-50-5** Sensor, Level 1/2" MPT X 6" Leads X 3 Pin Molex Assy.	 **3116-35-12-1** Relay, 35 AMP X 24 VDC Coil X 4 PIN (Electro/Mech.)
 **3160-68-12-1** Audio Signal, 3-28 VDC	 **6110-13-01-3** Adapter, Drain Universal Extended Assy.	 **6111-10-01-0** Adapter, Drain Suction Hose Assy.
 **6115-04-01-3** Adapter, Drain Extended Insert #2.1 Assy. (M12-1.5)	 **6115-10-01-3** Adapter, Drain Extended Insert #5.1 Assy. (M14-1.5)	 **6115-22-11-0** Adapter, Drain Block Insert #21 Assy. (M22-1.5)

5.02 ORDERING REPLACEMENT PARTS

To order replacement parts for the ENGINE FLUSH SYSTEM,

call **877 906-1395 or 714 444-1395**

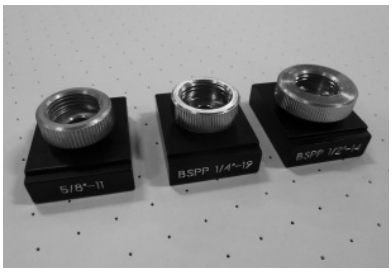
5.03 Standard Spin-on Adapter Kit (domestic) - 0120-10-01-0

1.	6100-00-01-4	ADAP, OIL FILTER STANDARD ASSY (RED)
2.	6100-01-01-4	ADAP, OIL FILTER MINICAR ASSY (BLUE)
3.	6101-00-01-4	ADAP, PLATE 3.625” OD ASSY (CHEVY) (RED)
4.	6101-01-01-4	ADAP, PLATE 4.25” OD ASSY (FORD, MBZ) (RED)
5.	6102-00-01-4	ADAP, EXT. SLEEVE OUTER ASSY (RED)
6.	6103-00-00-4	ADAP, EXT. SLEEVE INNER 1.72” LONG (CLEAR)
7.	6104-09-00-3	ADAP, INSERT M22-1.5 (OILPORT)
	6104-11-00-3	ADAP, INSERT M20-1.5 (OILPORT)
	6104-14-00-3	ADAP, INSERT M18-1.5 (OILPORT)
	6104-30-00-3	ADAP, INSERT 1 1/2”-16 X 3” LONG (OILPORT)
	6104-35-00-3	ADAP, INSERT 1”-12 (OILPORT)
	6104-37-00-3	ADAP, INSERT 1”-16 (OILPORT)
	6104-40-00-3	ADAP, INSERT 13/16”-16 (OILPORT)
	6104-41-00-3	ADAP, INSERT 13/16”-16 EXTENDED (OILPORT) (GM 5,5.7 LITER)
	6104-44-00-3	ADAP, INSERT 3/4”-16 (OILPORT)
8.	6110-00-02-3	ADAP, DRAIN SWIVEL X 90 X S/25 PLUG ASSY W/IN-LINE STRAINER
9.	6112-00-01-3	ADAP, 1/2” OD X 90 X HOSE X S/22 PLUG ASSY (OILPORT)

10.	6115-00-00-4	ADAP, DRAIN METRIC RAIL
	6115-01-01-3	ADAP, DRAIN INSERT #1, M12-1.25 ASSY
	6115-03-01-3	ADAP, DRAIN INSERT #2, M12-1.5 ASSY
	6115-05-01-3	ADAP, DRAIN INSERT #3, M12-1.75 ASSY
	6115-07-01-3	ADAP, DRAIN INSERT #4, M14-1.25 ASSY
	6115-09-01-3	ADAP, DRAIN INSERT #5, M14-1.5 ASSY
	6115-11-01-3	ADAP, DRAIN INSERT #6, M16-1.25 ASSY
	6115-13-01-3	ADAP, DRAIN INSERT #7, M16-1.5 ASSY
	6115-15-01-3	ADAP, DRAIN INSERT #8, M18-1.5 ASSY
	6115-17-01-3	ADAP, DRAIN INSERT #9, M20-1.5 ASSY
	6115-19-01-3	ADAP, DRAIN INSERT #10, M20-2.5 ASSY
	6115-23-01-3	ADAP, DRAIN INSERT #11, M24-1.5 ASSY
	6115-25-01-3	ADAP, DRAIN INSERT #12, M26-1.5 ASSY
	6115-31-11-0	ADAP, DRAIN BLOCK/INSERT #13, 1/2”-20 ASSY
	6115-35-11-0	ADAP, DRAIN BLOCK/INSERT #15, 5/8”-18 ASSY
	6115-37-11-0	ADAP, DRAIN BLOCK/INSERT #16, 3/4”-16 ASSY
	6115-39-11-0	ADAP, DRAIN BLOCK/INSERT #17, 7/8”-18 ASSY
	6116-00-01-3	ADAP, DRAIN BLOCKHOLDER ASSY
11.	6810-02-01-0	O-RING, KIT FOR 0120-11-01-0

Standard Spin-on Adapter Kit (export) - 0120-11-01-0

Includes all adapters in 0120-10-01-0 and adds:



6115-33-11-3	ADAP, DRAIN BLOCK/INSERT #14 (5/8”-11)ASSY.
6115-51-11-0	ADAP, DRAIN BLOCK/INSERT #18 (BSPP 1/4”-19)
6115-53-11-0	ADAP, DRAIN BLOCK/INSERT #19 (BSPP 1/2”-14)

6104-01-00-3	ADAP, INSERT M30-2.0 (OIL PORT)
6104-02-00-3	ADAP, INSERT M30-1.5 (OIL PORT)
6104-05-00-3	ADAP, INSERT M26-1.5 (OIL PORT)
6104-07-00-3	ADAP, INSERT M24-1.5w (OIL PORT)

MATERIAL DATA SAFETY SHEET

Material Safety Data Sheet
May be used to comply with
OSHA's Hazard Communication Standard
29 CFR 1910.1200. Standard must be
consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY *(As Used on Label and List)*
ENGINE FLUSH SOLUTION

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name AEC GROUP	Emergency Telephone Number 714-444-1395
Address (Number, Street, City, State, and ZIP Code) 3600 W. Carriage Drive	Telephone Number for Information
Santa Ana, CA 92704	Date Prepared 7/1/2013
	Signature of Preparer *(optional)*

Section II - Hazardous Ingredients/Identify Information

Hazardous Components (Specific Chemical Identity; Common Names (s))		OSHA PEL	ACGIH TLV	Other Limits Recommended	% *(optional)*
Petroleum Distillates	CAS# 64741-44-2	5 MG/M^3	5 MG/M^3		

Section III - Physical/Chemical Characteristics

Boiling Point	530-623° F	Specific Gravity (H_2O = 1)	0.83	
Vapor Pressure (mm Hg.)	2 mm Hg @ 20 C	Melting Point	-30 F	
Vapor Density (AIR = 1)	>1	Evaporation Rate (Butyl Acetate = 1)	<0.01	
Solubility in Water	<0.1%			
Appearance and Odor	Yellow-brown liquid, oily with a mild petroleum odor			

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	280° F COC	Flammable Limits (estimated values)	LEL 1.3%	UEL 6%

Extinguishing Media: CO_2, foam, dry chemical

Special Fire Fighting Procedures: Use water fog or spray to cool fire exposed containers. Avoid breathing fumes, gases, vapors, or decomposition products. Use supplied-air breathing apparatus in confined space or where needed.

Unusual Fire and Explosion Hazards: Water may cause foaming or spread fire.

(Reproduce locally) OSHA 174, Nov. 1985

ENGINE FLUSH SOLUTION

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	

Incompatibility *(Ma teria ls to Avoid)* Avoid contact with strong oxidants.

Hazardous Decomposition or Byproducts Under Fire Conditions: Oxides of sulfur and carbon.

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	

Section VI - Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin?	Ingestion?
	X	X	X

Health Hazards *(Acute and C hronic)*

Inhalation: Vapors or mist may cause respiratory tract irritation. High levels may also cause central nervous system excitation followed by depression, headache, dizziness, nausea, vomiting, weakness, incoordination, delirium and coma. Skin: May cause smarting, redness, and irritation. Chronic exposure may cause defatting and dryness of the skin, severe irritation, and dermatitis. Ingestion: Acute exposure may cause nausea, cramping, diarrhea, and possible systems of central nervous system depression, pulmonary edema, and death.

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
	N/A	N/A	N/A

Signs and Symptoms of Exposure Inhalation: Respiratory tract irritation. Skin: Smarting, redness, and irritation.

Medical Conditions Generally Aggravated by Exposure Many petroleum hydrocarbons and synthetic lubricants pose potential health risks which vary from person to person. As a precaution, exposure to liquids, fumes, mists and vapors should be minimized.

Emergency and First Aid Procedures

*Ingestion: do not induce vomiting. Call a physician or poison control center immediately. *Eyes: flush immediately with large amounts of water; seek medical attention if irritation develops. *Skin: remove contaminated clothing, wash exposed skin with soap and water or waterless skin cleaner. *Inhalation: move exposed person to fresh air immediately. Perform artificial respiration if breathing has stopped. Consult a physician immediately.

Section VII - Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled Recover free product. Add sand, earth, sawdust, or suitable absorbent to spill area. Keep product out of sewers and waterways by diking or impounding.

Waste Disposable Method Dispose of as required by state and federal laws regulating motor oil.

Precautions to Be Taken in Handling and Storing No ventilation needed during normal use. Neoprene, polyvinyl or polyethylene gloves as required. Chemical goggles. Oil resistant or protective garment if needed.

Other Precautions Keep away from extreme heat or open flame. Do not reuse soiled clothing without laundering.

Section VIII - Control Measures

Respiratory Protection *(S pecify Type)* No special ventilation needed during normal use.

Ventilation	Local Exhaust X	Special	Use supplied air respirator during fire.
	Mechanical *(G eneral)*	Other	

Protective Gloves	Neoprene, polyvinyl or polyethylene	Eye Protection	Chemical goggles.

Other Protective Clothing or Equipment Oil resistant or protective garment if needed.

Work/Hygienic Practices Wash exposed skin with soap and water or waterless skin cleaner.

Page 2

U.S. Government Printing Office : 1987–181-504/64362

LIMITED ONE (1) YEAR WARRANTY

ADVANTAGE ENGINEERING
ENGINE FLUSH SYSTEM-AUTO

Advantage Engineering 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.

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.

MAINTENANCE LOG

Use to keep track of maintenance performed on your ENGINE FLUSH SYSTEM.

Date	Engine Flush Solution (Changed)	Other Maintenance Performed	Performed by: