INJFLUSH

COMPUVALVE CLEANING UTILITY

The software and instructions contained herein are furnished "as is". Every effort has been made to ensure that the information presented in this document is accurate and complete. However, GFI Control Systems, Inc. assumes no liability for errors or for any damages that result from the use of these instructions or the related software. GFI Control Systems, Inc. assumes no liability for the results of using INJFLUSH and denies use of this program for purposes other than stated herein.

WARNING:

The procedures outlined in this document require the use of potentially hazardous material (isopropyl alcohol). The material is extremely flammable - use only in a well ventilated area. Alcohol can be a serious irritant to exposed skin and eyes - use caution in handling new and used material. Use proper procedures for disposing of used material.

Failure to follow instructions or attempting to terminate procedures prematurely may result in personal injury or damage to property or both.

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INTRODUCTION

If fuel sources contain contamination or if other debris is present, this contamination can collect in the operating areas of the compuvalve. This can cause the compuvalve to not function properly including injectors sticking or general poor performance. A GFI approved cleaning procedure is given below. This procedure can be done without removing the compuvalve from the vehicle.

CLEANING PROCEDURE

NOTE: *Contamination may cause deterioration of sealing surfaces in the injectors and other areas of the compuvalve. Step 13 (check for injector "leak thru") is included to determine if there is a possible component failure. Refer to the GFI Warranty & Time / Labor Standards Publications for warranty and warranty claim information.*

1. Bleed system and relieve pressure.

2. Disconnect inlet and outlet hoses from compuvalve (6), discard copper washers.

3. Connect cleaner inlet hose (1) to compuvalve fuel inlet port and cleaner outlet hose (2) to compuvalve fuel outlet port using new copper washers.

   NOTE: *Fabricate inlet and outlet hoses using standard GFI fittings and attach to compuvalve using copper washers. Fit opposite end of inlet hose with a quick release male coupling that attaches to the injector cleaner discharge hose.*

4. Fill injector cleaner reservoir (3) with cleaning solution (approximately 1 liter). The cleaning solution used must be clean, unused, commercial grade isopropyl alcohol with greater than 98% purity.

   WARNING: *Cleaning solution is extremely flammable. Avoid spills and leaks. Do not smoke while performing this operation, or expose cleaning solution to heat sources.*

5. Connect RS-232 cable to connector P-8. Set vehicle ignition switch to the key on with engine off.

6. Connect pressure supply hose (5) to injector cleaner air inlet, turn on air regulator valve (4) and adjust regulator pressure to approximately 20 to 30 psig. Check hoses and fittings for leaks.

   NOTE: *It is recommended that bottled nitrogen or other clean pressure supply be used. Shop air may contain oil or other debris that could contaminate the compuvalve after cleaning.*

7. Run injector cleaning software (refer to page 4). The software routine contains 5 cycles.

   - Fill. The program opens the injectors allowing cleaning solution to flow through the injectors.

   - Soak. The program closes the injectors, trapping cleaning fluid inside to soak for a preset length of time.

   - Flush. After a specified time the program cycles the injectors open and closed to flush and drain the cleaning fluid.

   - Drying. After the cleaning solution is emptied from the injector cleaner reservoir, the program continues to cycle the injectors with air to remove and dry residue cleaning solution.

   - Depressurize. The program will prompt the user to disconnect air pressure supply (pressure) to reservoir, then cycles the injectors to relieve trapped pressure.

   WARNING: *NEVER attempt to remove inlet hose (1) from compuvalve before the cycle is finished. Removing a hose under pressure can cause personal injury and/or damage vehicle.*

8. Disconnect inlet and outlet injector cleaner hoses from compuvalve.

9. Connect fuel inlet and outlet hoses to compuvalve. USE NEW COPPER WASHERS.

10. Turn on tank valve(s).

11. Check fittings for leaks. Repair as required.

12. Start vehicle and allow it to run for approximately 3-5 minutes.

   NOTE: *Initially vehicle may run rough, not idle or hesitate until system has cleared any residual cleaning solution.*

13. Check for injector "leak thru".

   • Turn vehicle off, then turn Key On with Engine Off - Record FAP value.

   • Wait 2 minutes and record new FAP value.

   • If FAP drops more than 10 psi for natural gas or more than 10 in Hg for LPG - check system for leaks and repair as required.

   • If no external leaks are found - compuvalve injectors have been compromised and unit should be replaced.

14. Road test vehicle, use FMON diagnostic software to monitor vehicle operation and verify acceptable driveability.
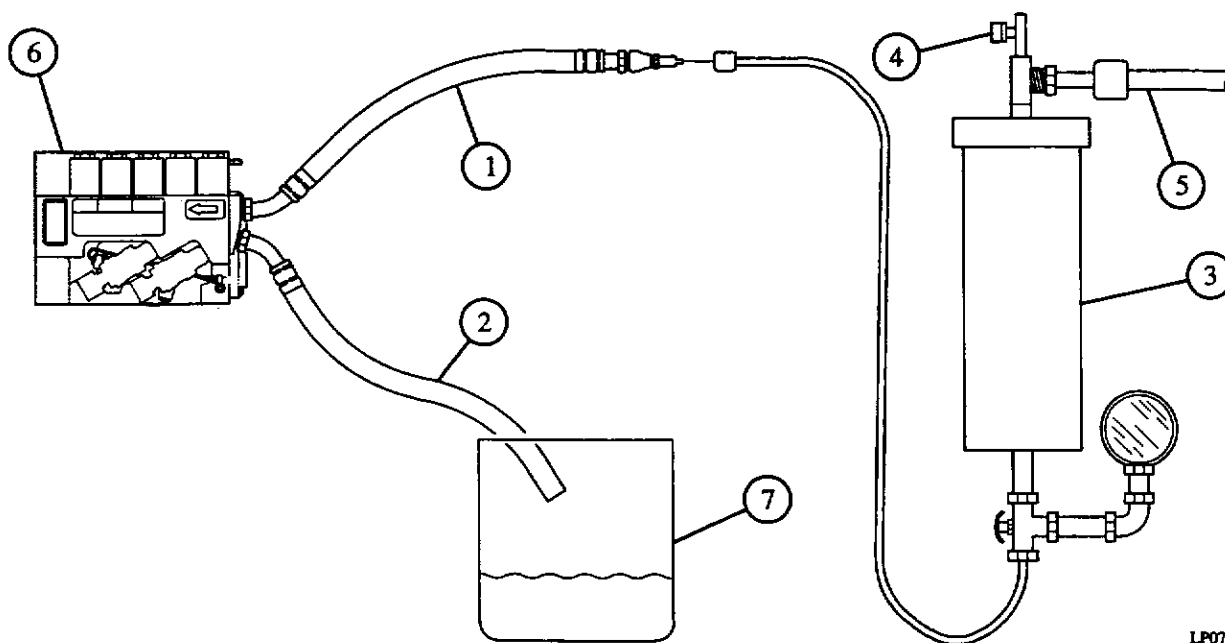
LP071

Figure 1. Schematic of Compuvalve Cleaning Hookup.

INDEX	DESCRIPTION	
1	Inlet Hose Assy	* Fuel Injector Cleaning Kit (p/n 7649) can be
2	Outlet Hose Assy	ordered from:
	Fuel Injector Cleaning Kit*	OTC Division of SPX Corporation
3	Reservoir	655 Eisenhower Drive
4	Regulator Valve (Air Pressure)	Owatonna, MN 55060
5	Hose, Shop Air	Order Desk: (507) 455-1480
6	GFI Compuvalve	Tel: (507) 455-7000 FAX: (507) 955-8329
7	Tank, Return	

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INJFLUSH CLEANING PROGRAM

The INJFLUSH program is designed to allow the technician to perform the cleaning procedures within factory specifications.

SYSTEM REQUIREMENTS
The system requirements for INJFLUSH are listed below.

- Minimum 386SX IBM compatible PC or Laptop
- VGA compatible graphics display
- 640K on board RAM minimum, 1M extended memory recommended
- Coprocessor recommended but not required.
- Serial Port with a RS-232 9 pin connector
- RS-232 Cable (P/N NT20232)
- MS DOS 5.0 or higher
- NNN.SYM files (furnished with dealer calibration software).

PROGRAM INSTALLATION
INJFLUSH is designed to be installed on the hard drive of the diagnostic computer. To install the program and support files from floppy disk to the hard drive:

1. Turn on computer.

2. If DOSSHELL comes up on screen, press F3 to exit. The DOS prompt will then appear. If another program menu appears when the computer is turned on, follow the program directions to exit to the DOS prompt. The DOS prompt will appear as a blank screen with only C:\>.

3. Insert the supplied floppy disk then type a:install and hit the return or enter key.

<p align="center">\>A:INSTALL↲</p>

4. The installation program will display several messages as installation occurs. The program will create a directory called "GFI" if one does not already exist, then the install program will copy the following file to that directory:

   - INJFLUSH.EXE   executable program file.

   NOTE: *All files, including the correct symbol (NNN.SYM) files, must be in the GFI directory for the program to operate. The symbol files are furnished with the dealer calibration software.. If these are not available, contact Customer Service at GFI Control Systems, Inc.*

OPERATING INJFLUSH

To run INJFLUSH follow the basic steps below:

1. Using the RS-232 cable (P/N NT20232), connect the *GFI* computer (J8) to the RS-232 port on the computer.

2. Turn on computer.

3. At the DOS prompt, change the directory to GFI. At the DOS prompt type CD\GFI and hit the return or enter key.
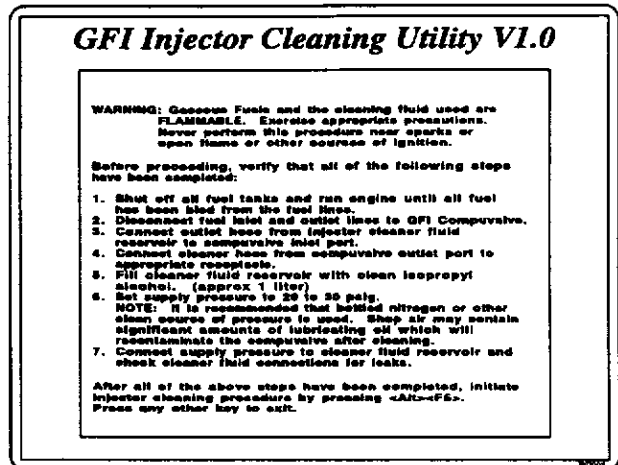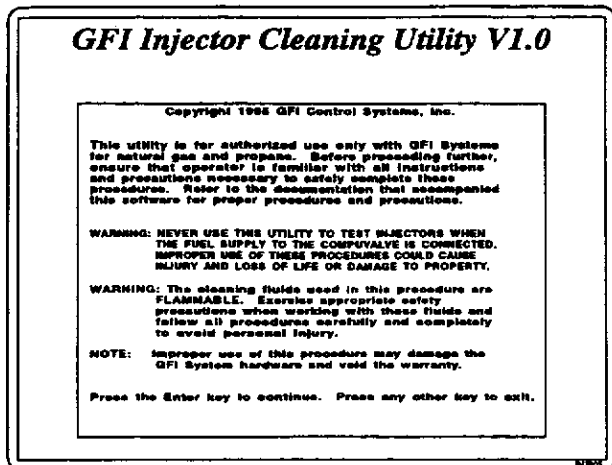
<p align="center">C:\>CD\GFI↲</p>

4. At the DOS prompt, type INJFLUSH and hit the return or enter key.

<p align="center">C:\GFI>INJFLUSH↲</p>

5. If not previously done, turn vehicle ignition key to ON position, engine OFF.
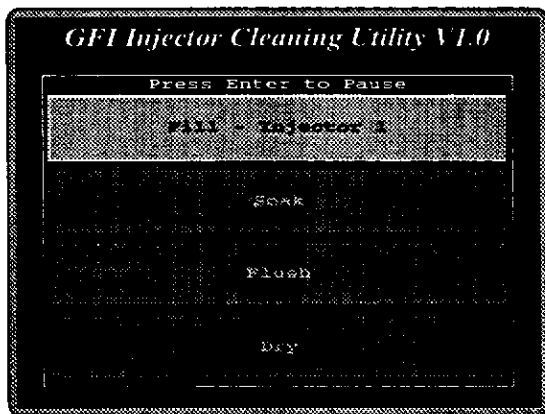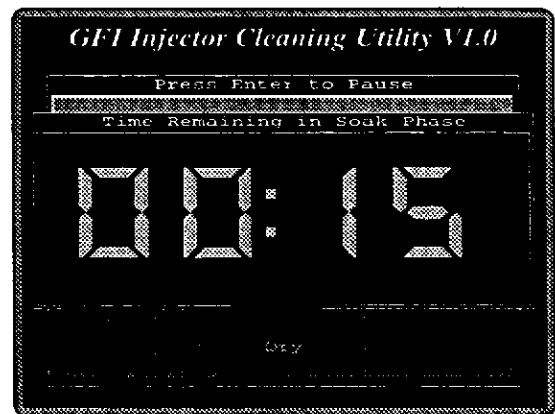
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OPENING SCREENS

When starting the program, two opening screens appear. These contain important warnings and notes for safety. Follow the directions as shown. To begin the program, press the alternate key <Alt> and the F5 key at the same time.
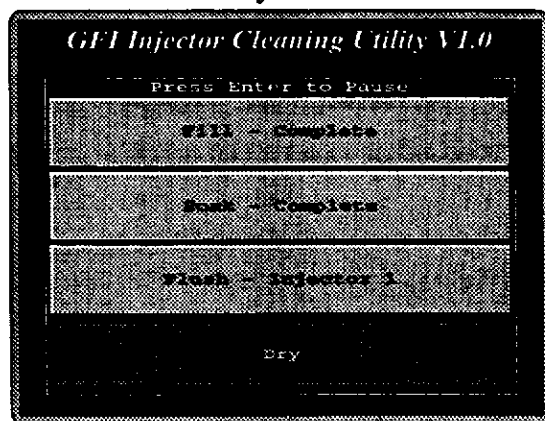
THE OPERATION

The program is automated for the cleaning procedure. Screen displays show the status of program process. The active portion of the program is highlighted. The injector being processed is listed in the highlighted area.
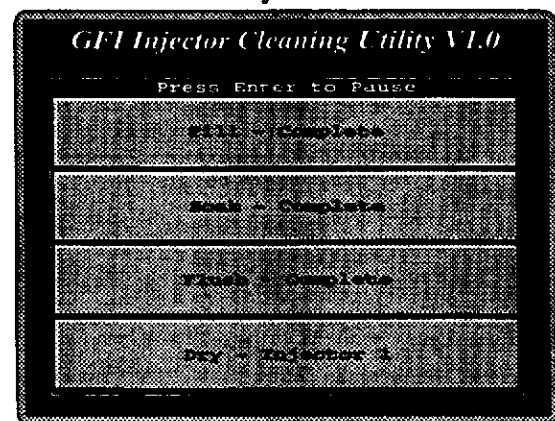

Cycle 1

Cycle 2

Cycle 3

Cycle 4

For the soak cycle, a time display indicating time remaining for the soak cycle is shown.

GFI Utility Software
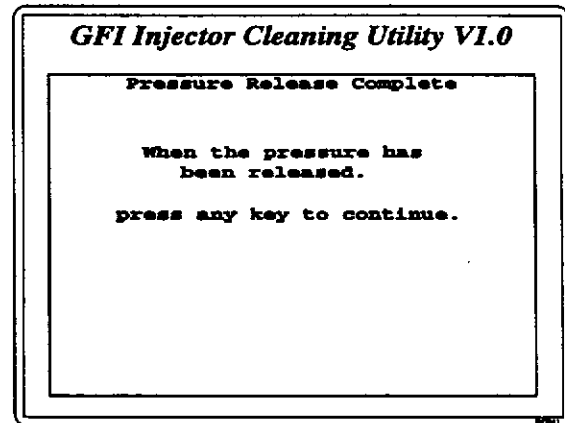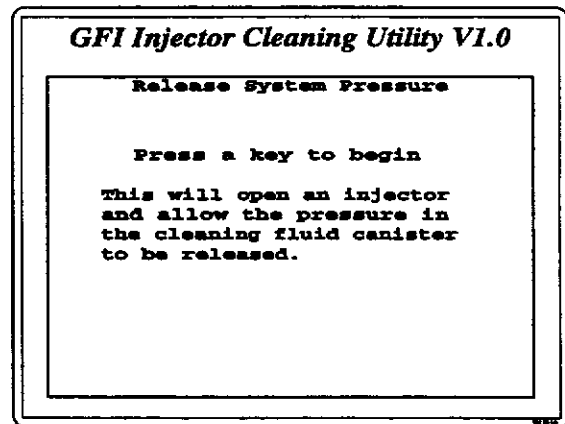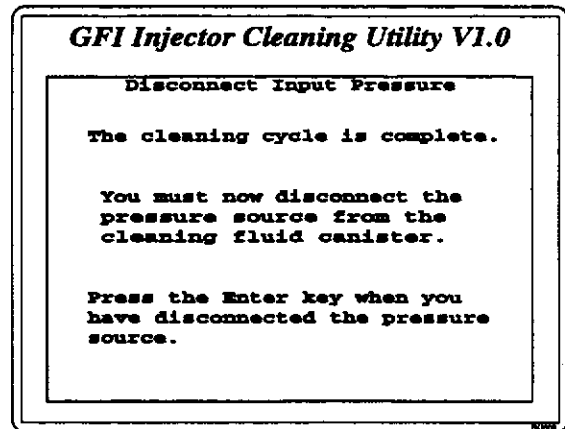
Final Cycle - Depressurizing the Injectors

WARNING: *After running the program, the injectors are still pressurized. Do not attempt to remove the inlet hose to the compuvalve before depressurizing the system.*

Before disconnecting the cleaning system, it is necessary to depressurize the system and injectors. The screens on the right will appear. FOLLOW THE DIRECTIONS ON THE SCREEN.

For the first screen, disconnect the pressure supply source from the cleaning solution canister. Press the enter key when done.

The second screen appears and directs the user to press any key to begin. This cycles the injectors to relieve trapped pressure.

The third screen will appear. The user will hear a hissing sound as the trapped air is released; when the hissing has quit, press any key - this ends the program.

```
GFI Injector Cleaning Utility V1.0

     Disconnect Input Pressure

  The cleaning cycle is complete.


     You must now disconnect the
     pressure source from the
     cleaning fluid canister.

     Press the Enter key when you
     have disconnected the pressure
     source.
```

```
GFI Injector Cleaning Utility V1.0

      Release System Pressure


        Press a key to begin

     This will open an injector
     and allow the pressure in
     the cleaning fluid canister
     to be released.
```

```
GFI Injector Cleaning Utility V1.0

     Pressure Release Complete


        When the pressure has
          been released.

     press any key to continue.
```

Upon completion of the program, the screen returns to the DOS prompt. The following message will appear:

```
INJFLUSH result:
Successful completion.
```

The program is completed and the technician may disassemble apparatus and return vehicle to operating condition. Refer to instructions on page 3.
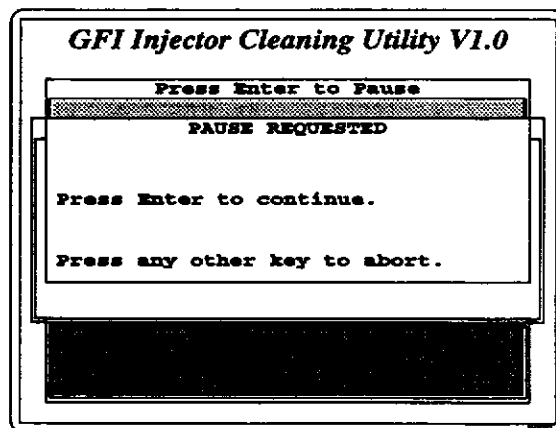
GFI UTILITY SOFTWARE

PAUSING OR EXITING BEFORE PROGRAM FINISHED

After the program has been started, pressing the Enter key will cause the program to stop. The message screen shown on the right appears.

CAUTION: *The system will be pressurized if the program is stopped early. Use extreme care.*

If the user chooses to abort, the program will advance to the Final Cycle - Depressurizing the Injectors on page 6. Then the following message will appear on the screen:

```
INJFLUSH result:
Program ended by user request
```


GFI Injector Cleaning Utility V1.0

Press Enter to Pause

PAUSE REQUESTED

Press Enter to continue.

Press any other key to abort.

ERROR MESSAGES

Should a fault occur the following error messages may appear:

```
INJFLUSH result:
Internal error setting up Borland character maps.
```

```
INJFLUSH result:
Internal error setting up Borland graphics drivers.
```

These two errors indicate that the computer being used has too little free memory for the program to operate. Remove any resident TSR's and try again, if the problem persists - call GFI Customer Services.

```
INJFLUSH result:
Error - could not find correct symbol match for GFI kit
Verify version with FCOM and try again.
```

If the correct symbol table file (NNN. SYM) is not located in the GFI directory, the error above will appear. Use FCOM to determine required file and ensure that it is located in the directory with INJFLUSH.EXE. Contact GFI Customer Services if you do not have the correct symbol file.

```
INJFLUSH result:
Error - could not put GFI into communications mode.
Make sure key is on and engine is off.
INJFLUSH result:
Error - communications failure in checking kit mode.
INJFLUSH result:
Error - GFI kit is not in communications mode.   Cannot continue.
Check that the engine is off and try again.
INJFLUSH result:
Error - GFI kit is not set to run mode. Possible communications failure.
Check that communications works with FCOM then try INJFLUSH again.
INJFLUSH result:
Error - GFI kit will not change to run mode.   Possible communications
failure.   Test communications with FCOM and try again.
```

The 5 error messages above are communications errors that the INJFLUSH program may encounter. Ensure that the Key is ON with Engine Off; confirm communications using FMON if communications is active, contact GFI Customer Services.

```
INJFLUSH result:
Unknown error code returned.
```

An unknown condition has caused the program to abort, contact GFI Customer Services.