EBS Products

EBS Brake Flush

#1000-0020

OPERATIONS MANUAL

Revised 4-1-2013

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I. INTRODUCTION

EBS Brake Flush Equipment

The EBS BRAKE FLUSH system represents the most advanced method for performing a true brake fluid service. It actually performs a brake fluid extraction, flush, change and bleed service in one comprehensive effective ten-minute service.

Brake fluid servicing is extremely critical to the safety of the braking system because bad brake fluid can result in spongy or no brakes under heavy braking conditions when you need them the most. Also, bad brake fluid accelerates the wear and tear on brake components.

European car manufacturers, brake system automotive experts, AAA, Car Care Council, Woman Motorist, NHTSA, etc., recommend brake fluid servicing approximately every 2 years or 24,000 to 36,000 miles for all vehicles to maintain the safety of the braking system. Improvements in pedal feel, system safety and reliability are the result of periodic comprehensive brake system servicing.

There are other extraordinary benefits from the EBS Brake Fluid Service System:

1. Diagnostic and repair
2. Gives the Service Provider confidence that an actual brake fluid service has been performed.
3. Minimize and control hazardous waster material – reduces environmental regulatory exposure.

The EBS equipment utilizes new brake fluid in 32oz to 64oz containers. A 5 gallon container rear loading option is also available.

The EBS System's control and containment of the waste brake fluid reduces technician exposure to the hazardous waste. Once the waste container is full the equipment's computer control system allows the technician to transfer the waste fluid to a larger approved bulk waste container for proper collection and disposal

The EBS Brake Fluid Service equipment is a perfect addition to your equipment line. Brake fluid servicing is an essential and required safety service that is currently not being properly promoted or performed. The patented EBS Brake Fluid Service System is the only system that provides a comprehensive process for safely and effectively performing the brake fluid extraction, flush, change and bleed service.

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II. SAFETY INFORMATION

1.01 IMPORTANT SAFETY NOTICE

For your safety, read this manual thoroughly before operating your EBS Brake Fluid Service system. Always refer to and follow the safety messages, safety instructions and applicable service procedures provided by EBS and the manufacturer of the vehicle being serviced. Only properly trained professional automotive technicians should perform the service, and only authorized attachments and adapters used.

• Safety Symbols


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 – Turn engine off and set parking brake prior to any service.

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

• **Do not operate the vehicle's engine during the EBS Brake Flush service.**

Breathing of exhaust gases will cause serious injury or death.

WARNING

Exhaust gases, hot surfaces, and potent chemicals may be present during the EBS Brake Fluid service.

• When using chemicals always refer to the MSDS sheets for the proper procedure to handle cleanup, handling and storage requirements, and emergency medical treatment,

WARNING

Flammable brake fluid chemical and vapors can ignite.

• Avoid exposure to flames, sparks, hot engine parts, and other ignition sources.

• Keep a fully charged fire extinguisher nearby. The extinguisher should have a class B rating and be suitable for gasoline, chemical, and electrical fires.

• Clean up any brake fluid spills immediately. Refer to MSDS sheets for cleanup requirements

• Dispose of contaminated clean up materials according to governing environmental laws.

• Keep New Brake Fluid container closed except when properly inserted for use in the EBS Brake Flush equipment.

WARNING

Many automotive brake systems maintain residual pressure in components after the engine is turned off.

• Wear safety glasses, chemical resistant gloves, and protective clothing when handling brake fluids and servicing with the EBS Brake Flush equipment.

WARNING

Risk of expelling pressurized fluids.

• Verify that EBS Brake Flush equipment is off before connecting or disconnecting lines and adapters.

• Keep the service hoses away from hot or moving engine parts. Hoses can split or burst causing fluid to be expelled.

• Secure all connections properly.

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

• Do not ingest brake fluid or breathe vapors

• Refer to the MSDS for treatment recommendations and seek medical attention

• Dispose of used brake fluid according to environmental laws and regulations.

WARNING

Risk of injury.

• This equipment should be operated by qualified personnel only.

• 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 EBS Brake Flush equipment. Damage may occur to these components, or machine may tip over.

• Keep area of operation clear of unnecessary tools and equipment. Utilize storage area on the top of the machine.

• Never leave the EBS Brake Flush equipment running unattended.

• The EBS Brake Flush system is not designed for any other purpose than the servicing of hydraulic brake fluid in vehicle hydraulic brake systems and manual clutches that use brake fluid.

Operation of your EBS BRAKE FLUSH system by anyone other than qualified personnel may result in injury.

CAUTION

Risk of equipment damage.

• 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 and adapters.

• The EBS BRAKE FLUSH system is fully automatic. Refer to your control panel at all times.

• Periodically clean the machine by wiping down with a clean, soft, dry cloth.

III. SYSTEM FEATURES & SPECIFICATIONS

2.01 FEATURES

Application

- Automotive brake fluid and manual clutch fluid servicing and bleeding.
- Restores pedal pressure, reduces corrosion of internal brake components, and improves the safety of the braking system.
- Diagnosis of restricted proportioning valves, damaged wheel cylinders, etc.

Functions

- 110 VAC powered, converted to 12 vdc operation
- Electrical power is surge protected at the power cord with 10 amp fuse
- All functions controlled and monitored by the system's PC
- Intuitive, touch pad controlled LCD screen with internal fuses, overload and ground protection
- Step-by-step LCD screen guided operation
- An easy to use adapter system to attach the equipment to the vehicle's master cylinder and bleeder valves
- Master cylinder adapters vent air out of the master cylinder reservoir as the equipment fills the master cylinder reservoir with new brake fluid during the service. This maintains full brake fluid levels in the master cylinder reservoir through out and at the completion of the service. This protects the fluid entering the hydraulic system from unnecessary exposure to air and eliminates the injection of air into the braking system
- A safe effective flow through the hydraulic system provided by a combination of pressure (15-20 psi) at the master cylinder and vacuum (20" hg combined) at all 4 bleeder valves at the same time using separate 12-volt pressure and vacuum pumps each rated at one (1) gallon per minute
- A sensor in the waste tank to advise when the waste tank requires emptying
- A controllable handgun wand for vacuuming fluid from the master cylinder
- A third 1.1-gallon per minute rated pump for removal of the waste brake fluid from the internal container to reduce technician exposure to waste brake fluid
- Additional bleeding of the brakes after the service is not required

Cabinet Features

- Mobile equipment cabinet on swivel wheels made from heavy-duty industrial grade polyethylene to withstand brake fluid, and to provide for the safe and secure containment of new and waste brake fluid within the equipment
- Cabinet contains a built- in sturdy handle to assist in movement of the equipment
- Locking 4" swivel front wheels with brakes
- Large 8" rigid rear wheels provide ease of movement in a shop environment
- Several cabinet options for new fluid insertion, including 32oz to 64oz container, or a 5 gallon container rear loaded.
- Cabinet contains a seven (7) gallon waste container to collect and contain all waste fluid removed from serviced vehicles. A separate pump is used to empty this waste container – PC controlled.
- Internal storage for all hoses
- 22 ft power cord with power cord holder attached to cabinet
- 12ft. fill hose – 6ft. black EPDM and 6ft. clear. 10ft. vacuum hose – 9ft. black EPDM and 1ft. clear
- Two (2) 13ft. front bleeder hoses – 10ft. black EPDM and 3ft. clear
- Two (2) 20ft. rear bleeder hoses – 17ft. black EPDM and 3ft. clear
- 50 mesh filtration of waste fluid

2.02 TECHNICAL SPECIFICATIONS & DIMENSIONS

- **Electrical Requirements: 110 or 220VAC (Special Order)**

- One (1) year limited warranty

Machine Dimensions

- Machine Weight 88 lbs.
- Shipping weight of single machine 142lbs.
- Shipping weight of 2 machines (max per standard pallet) is 232lbs.
- Height: 45 inches
- Width: 24 inches
- Depth: 22 inches

Standard Accessories

- Standard Adapter Kit – see convenience adapters in Adapter Appendix
- Adapter Chart shows usage

Optional Accessories

- Special Order Adapters

- See full list on pages 27 and 28

Specifications subject to change without notice.

3. CONTROL PANEL OVERVIEW

Figure 1

KEYS NAME/FUNCTION	DETAILS
1 LCD SCREEN	Displays menu of operations, equipment status, operational messages and warning messages
2 F-1 TOUCH BUTTON	Depress briefly to start vacuum pump and provide vacuum to vacuum wand
3 F-2 TOUCH BUTTON	Depress briefly to start pressure pump and provide fluid flow to fill line
4 F-3 TOUCH BUTTON	Depress briefly to commence flushing operation
5 F-4 TOUCH BUTTON	Depress briefly to provide utility options on LCD SCREEN
6 START BUTTON	Depress briefly to commence operation explained on LCD SCREEN
7 STOP BUTTON	Depress briefly to stop operation equipment is performing

IV. OPERATING PROCEDURES

3.01 TOOL USAGE

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

3.02 IDENTIFYING THE BRAKE SYSTEM TYPE

Identify the brake system type and the OEM brake fluid specification of the vehicle to be serviced before performing any set up or servicing procedure on vehicle.

All vehicle hydraulic brake systems using a master cylinder to direct hydraulic pressure to vehicle wheel cylinders can be serviced by the EBS BRAKE FLUSH equipment. Most hydraulic brake systems incorporate a reservoir over the master cylinder as a supply of brake fluid for the system. The reservoir and master cylinder are typically located in the engine compartment on the driver's side. Check the owner's manual for exact location of the reservoir.

THERE ARE FOUR MAJOR TYPES OF BRAKE FLUIDS USED IN HYDRAULIC BRAKE SYSTEMS

The Department of Transportation (DOT) has established certain performance criteria to identify the various types of brake fluid used in vehicle hydraulic brake systems. The primary criteria are wet and dry boiling temperatures. The following are the most common designations for vehicle hydraulic fluid.

DOT 3

DOT 4

DOT 5 (Silicone)

DOT 5.1 (Super DOT)

Each OEM will specify the appropriate DOT brake fluid to be used in the vehicle to be serviced. Only use the DOT specified by the OEM in the vehicle to be serviced. DOT 3, DOT 4 and DOT 5.1 can be used in the EBS BRAKE FLUSH equipment.

WARNING

- **Do not intermingle DOT 5 (SILICONE) hydraulic brake fluid with DOT 3, 4 or 5.1 as this can cause a sludge which would contaminate vehicle hydraulic brake systems. And the EBS Brake Flush equipment.**
- **Consider a separate EBS BRAKE FLUSH equipment for sole use with DOT 5 (SILICONE) brake fluids.**

3.03 PREPARATION

Vehicle Preparation

1. Insure vehicle is safely parked on a lift and engine is off.
2. Repair any leaks or malfunction prior to brake fluid service.
3. **Refer to OEM maintenance manual for compliance with manufacturer's precautions or recommendations prior to exchanging fluid.**

Equipment Preparation- Insure correct brake fluid DOT 3 or 4

1. Place equipment in a safe area on the driver side of the vehicle's engine compartment and lock equipment wheels.
2. Plug machine into a grounded 110 vac electrical outlet. Extension cords must be rated at 15 amps and grounded.
3. Turn equipment on. Verify that "Power" switch is illuminated.
4. Check computer screen for any instructions – take necessary actions before continuing with service – main screen must show to commence service.

(F 1) M/C CLEAN OUT

(F 2) M/C FILL

(F 3) FLUID EXCHANGE

(F 4) UTILITY

3.04 M/C CLEAN OUT (master cylinder reservoir clean out)

1. Inspect master cylinder reservoir for leaks or damage. If leaks or damage are evident correct problem before the brake fluid service.
2. Remove master cylinder reservoir cover and any removable screen.
3. Inspect fluid in master cylinder reservoir for indications of possible part damage or system malfunction. Correct any problem prior to continuing.
4. Press **F-1 (M/C CLEAN OUT)** button on touch pad, this will start the vacuum pump and provide vacuum to the vacuum hose.
5. Use the Vacuum Wand attached to the Vacuum Hose –see figure 2 below- to vacuum all old brake fluid from master cylinder reservoir. All waste brake fluid vacuumed will be contained in the waste brake fluid container within the equipment. **Do not use the vacuum wand to vacuum any other material except brake fluid.** Other fluid will damage the EBS BRAKE FLUSH internal parts. After vacuuming the waste brake fluid from the master cylinder reservoir return the Vacuum Wand to the equipment and press the "STOP" button.

Figure 2

3.05 BRAKE FLUID CHANGING PROCEDURE

1. Attach appropriate master cylinder adapter cap to master cylinder. See Figure 3 (Standard Adapter Set) and Figure 4, 5 and 6 for Screw On, Twist On, and Hold Down types of attachment.

Figure 3

Figure 4

Figure 5

2. Connect M/C Fill Hose to adapter with quick connect fitting insuring that the quick connect fitting is seated.

3. If the equipment is not bar code protected proceed to step 7.
4. If bar code protected, press either F-2 or F-3 – screen will show:

   Read Brake Flush Kit Bar Code

   Push Stop to Abort

4. Place new Brake Flush Kit bottle in front of bar code reader on front of machine. See Fig. 7

Figure 7

5. If non-approved bottle is read, computer screen will read:

   Not Approved

   Try again or call for Service

6. Once approved Brake Flush Kit bottle is read, computer screen will display:

   Insert Appropriate

   EBS DOT Brake Fluid Canister

   Press (START) Button (for main menu)

7. Verify main menu is on screen. Remove bottle cap and protective aluminum seal. Do not allow pieces of seal to enter bottle. Slide fill hose into bottle – see Figure 8

Figure 8

Figure 9

8. Push bottle up into equipment bottle cap and set flat in enclosure – see Figure 9
9. Press **(F 2) M/C Fill** on the touch pad.
10. Check for fluid flow to the master cylinder and check for leaks. Fluid will flow for several cycles until the master cylinder has been filled. Any air in the fill line or in the reservoir will be vented from the adapter vent. Press “Stop” when the master cylinder has been filled and **proceed to Step #15**. If no fluid is moving into the master cylinder or a “No flow” warning comes on the screen, it may be necessary to prime the fill pump – proceed to step 11.

11. To prime the Fill Pump or the Vacuum Pump connect the Fill Tube to the Vacuum Tube using the “Prime Tool” – see figure 10 below.

Figure 10

12. Press (F-4) Utility and the following screen will appear:

    (F 1) EMPTY WASTE

    (F 2) SYSTEM PRIME

    SELECT JOB (?)

13. Press (F-2) for “System Prime”. Follow the instructions then press “**Start**”. The equipment will prime and stop itself when completed. When complete disconnect the “Prime Tool”, reconnect the fill tube to the master cylinder adapter and continue servicing – return to step 9.

14. If no fluid is seen flowing to the master cylinder after several primes check :

    a. Master cylinder adapter vent is open.

    b. Possible kinked hose.

    c. Check the level of the new fluid container.

    d. If still no flow call for Service.

15. Raise car – check for clearance of the fill hose. Connect a vacuum hose bleeder fitting – see figure 11 – to each bleeder valve and open the bleeder valve approximately ¼ turn (connect all wheels to perform a true flush).

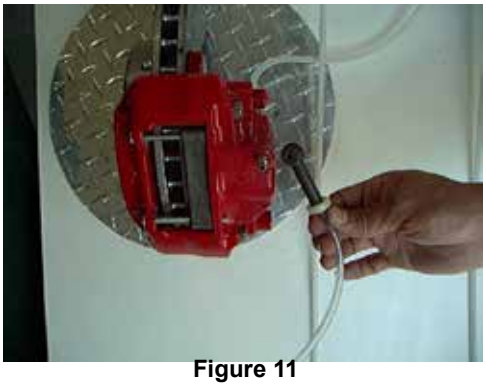

Figure 11

16. Press **FLUID EXCHANGE (F-3)** to start the flush/change. Brake fluid, under pressure at the master cylinder and vacuum at all four bleeder valves, will start flowing through the vehicle’s brake system, through the bleeder lines to the equipment’s waste tank. If there is no flow to the any wheel, stop service, check for OEM requirements for opening proportioning valves or master cylinder line access and continue servicing. The equipment will move approximately ½ quarts of brake fluid per minute through the brake system.

17. Monitor bleeder hoses for flow and color of fluid being evacuated. A non-flowing hose may indicate blockage in the wheel caliper or bleeder valve and must be corrected. If it is necessary to pause the service for any reason, Press “**STOP**”. The service can be restarted by pressing the “**START**” button, which will bring the Main Manu back on the screen, then Press F-3 to recommence the service.

18. When fluid being vacuumed from each bleeder valve becomes clear, shut that bleeder valve (the front wheels will generally show clean first, in approximately one to two minutes). Leave all bleeder hoses on the vehicle's bleeder fittings until the service is complete so vacuum is not lost through disconnected hoses. **Insure that "FLUID EXCHANGE" has not timed out (equipment will automatically shut off after 5 minutes) before any bleeder valve is closed.** This is to insure that the system has also been bled. If the equipment times out before the bleeders have been closed, **restart "Fluid Exchange" – Press (F 3)** – and restart the flow before closing the bleeder valves to insure bleeding has been completed (the equipment will continue the flush for one additional minute only). Remember that the fluid container contains 2 quarts of brake fluid, which will be emptied in 4 – 5 minutes with all bleeder valves open.
19. When all bleeder valves are turned off press "**STOP**" on touch pad to stop fluid exchange (note that it is not necessary to bleed the brakes after the service is completed as bleeding is accomplished by the service – see #18 above). The screen will ask if service is complete, if so press **F-4** to clear the system.
20. Remove hoses from bleeder valves and return hoses to equipment.
21. Replace bleeder valve protective caps and lower vehicle.
22. Remove master cylinder fill hose, then adapter from the master cylinder. Be careful as the equipment will have kept reservoir levels full for the service.
23. Check for correct fill level in master cylinder (you can use the vacuum wand to reduce fluid levels in the master cylinder by using

    (F-1 – M/C CLEAN OUT)
24. Immediately replace the master cylinder cover to reduce possible contamination of the new brake fluid.
25. Properly store hoses and adapter to prevent their damage.
26. Although bleeding is accomplished by the EBS brake fluid exchange/flush service, **always check for proper pedal pressure after the service is complete.**
27. Brake fluid system servicing is complete.

V. TROUBLESHOOTING GUIDE

4.01 TROUBLESHOOTING GUIDE

Problem: No power light on switch and LCD screen is blank

Solution: Check power source. Check for proper plug in of power cord to wall outlet and equipment. Check fuse in equipment power cord receptacle.

Problem: No vacuum from vacuum wand.

Solution: Check for kinked vacuum line. Check for clogged vacuum gun or quick connect fitting. Prime system (see instruction 11, 12 and 13) and try again.

Problem: No fluid flow from fill line and "No Flow" warning on LCD screen.

Solution: Check for fluid in new fluid tank. Prime system (see instruction 11, 12,13 and 14) and try again.

Problem: No fluid flow but no "No Flow" warning on LCD screen.

Solution: Check for kinked fill line. Check for open vent on adapter (adapter vent must be open to allow venting of air). Check for properly connected fill line quick connect fitting to adapter.

Problem: No vacuum from bleeder fittings.

Solution: Check for open Vac line or bleeder lines as this will cause loss of vacuum from the bleeders.

Problem: No vacuum from the vacuum gun?

Solution: Clean the gun itself. Then remove the quick connect and blow air thru it to remove debris. Clean the interior filter housing and filter located under the lid of the EBS-20. See operations manual for more info.

Problem: I'm not getting any fluid flow from one or more Bleeder lines during flush process-what should I do?

Solution: Press STOP, check bleeder valve in caliper for restrictions, remove bleeder from caliper and blow shop air through bleeder or clean out with wire if clogged, then return to caliper. Make sure the EBS-20 bleeder fitting itself is not clogged with debris. Reattach the EBS bleeder fitting to bleeder and start process (F-3) again. If there is still no flow, then lower vehicle and use your hand to slowly pump the brake 3 to 4 times until you see flow (this should force out debris clogging the line). Repeat the EBS flush process again. If there is still no flow from bleeder then vehicle probably has a bad line or caliper damage which should be corrected.

Problem: I'm getting leakage from the master cylinder adapter-what should I do?

Solution: Always check to see if master cylinder reservoir is not damaged prior to servicing. Many solvent cleaners can damage the plastic that most master cylinders are made of. In fact carburetor cleaner will crystallize many master cylinders. Also check for irregularities in the opening that would prevent a seal. Vacuum all dirty fluid from the reservoir and wipe any visible particles out of the reservoir. Make sure all rubber seals are clean and not damaged. Re-connect to make sure adapter is seated correctly on master cylinder reservoir. Hand tighten adapter and try again.

ADDITIONAL HELP

In the unlikely event that problems persist with the unit call Technical Support, have your model and serial numbers available before you call.

Remember to send in your warranty card, otherwise service will be delayed.

TEL: 1-877-955-0515

APPENDIX A – MAINTENANCE

5.01 MAINTENANCE PROCEDURES

New Fluid Empty (warning)

1. A warning sound and visual message will indicate an empty new fluid container or the absence of fluid flow from the new fluid tank.
2. Check fluid level in Brake Fluid container.
3. If there **is fluid** in the container:
    a. Press "Start" and then perform "SYSTEM PRIME" function(see instruction 11, 12, 13 and 14)
    b. Check to insure that there are no kinks or loose connections in any of the hoses going from the new fluid container to the container cap.
    c. If still no flow, call for Tech Support.
    d.

Emptying Waste Tank

1. **The equipment has an internal waste tank that will hold approximately 7 gallons of waste brake fluid. A warning will sound when this tank is full and the equipment will not perform any functions until the waste is removed. Follow all screen instructions carefully.**
2. From the main screen press **F-4 "Utility".**

3. Press F-1 Waste Empty and follow on screen instructions.
4. Waste brake fluid may only be transferred to a properly marked "**waste brake fluid" container**. You must follow all local, state, and federal regulations regarding the disposal of waste brake fluid.
5. When all waste brake fluid has been removed from the equipment press "STOP". It takes 6 to 7 minutes to empty the waste tank.
6. Replace waste hose securely on hook provided.
7. Press START to return to the Main Screen.

Hose Change

The clear extensions on all exterior hoses will eventually discolor from contact with brake fluid. We recommend changing approximately every ninety (90) days with EBS part #1000-2101. Follow these procedures to change. Please use high quality polyurethane flexible tubing as supplied by your dealer for this maintenance.

1. Clip clear hoses off the black connecter fitting and the barb on the quick connect fitting.
2. Clean and dry the black fitting and barb.
3. Slightly moisten the fitting and barb and slide the new clear hose over the ends.
4. Place a tie wrap over the clear tubing used on the fill line for safety.

Filter Service

Call your distributor for interior filter maintenance. This should be performed every 3 to 6 months.

For further assistance contact Service toll free at 1-877-955-0515

APPENDIX B FAQ's

Do I need to fill the master cylinder reservoir before I attach the adapter?
No. Attach the adapter first then press F-2 for Fill. This will check new fluid flow to the reservoir, the security of the adapter and the proper function of the vent on top of the adapter (the vent vents air out of the reservoir – not brake fluid.

Do I need to do a separate bleed after the service?
No. If the bleeders are turned off while the EBS-20 is in the F-3 function, additional bleeding is not necessary. In fact the EBS-20 is an excellent tool to use when you have a bleed problem.

Can an EBS-20 service help with ABS warning lights?
While the EBS-20 is in the F-3 "Flush" mode use a tech/scanner tool to cycle the ABS valves and pumps. This has been a very successful cure for ABS contaminant issues.

Can the EBS-20 service damage the master cylinder, ABS system or other brake system hydraulic parts?
EBS-20 uses a pressure of 15 to 20psi during service. When the brake pedal is pushed pressures over 1,000psi are exerted on the systems hydraulic parts. The EBS-20 will not damage any parts of the system.

I see air bubbles coming from the bleeder lines, is this from the vehicle?
Generally no. The EBS-20 uses a combination of Pressure at the reservoir and Vacuum at the bleeder valves to service the brake system. The vacuum at the bleeders can suck air from the brake system can also suck air from around the bleeders and the bleeder fittings.

Do we flush the ABS unit?
Yes we flush the ABS system. What we don't flush is the maybe a teaspoon of fluid in the individual ABS valves. This can be flushed by using a tech/scanner tool to cycle the ABS valves during the EBS-20 service.

Why should you flush and change brake fluid?
Because like any other fluid in the vehicle, it goes bad. Contaminants can reduce efficiency and cause damaging corrosion, which can compromise safety. Why take the chance of dangerous brake system failure. All the major authorities

such as AAA, Car Care Council, Woman Motorist, Automotive Magazines, and Department of Commerce recommend changing the brake fluid in your vehicle every 2 to 3 years or 24,000 to 36,000 miles. Be safe-do it!

Do any OEM's recommend or not recommend brake fluid servicing?
European OEM's, the Asian OEM's except Nissan and Infinity recommended servicing the brake fluid. Some US manufacturers are now recommending. No OEM's specifically don't recommend brake fluid servicing?

Is there a way to test brake fluid to see if it's bad?
Yes. There are several methods for testing brake fluid such as boiling point, copper contamination, conductivity, optically, etc.; however the easiest way is the use of authoritative recommendations of changing every 2 to 3 years or 24,000 to 36,000 miles. However, if there is any doubt about the quality or cleanliness of the brake fluid – change it.

What can happen with moisture contamination in a brake system?
The boiling point of brake fluid decreases as moisture contamination is absorbed into the brake fluid – brake fluid is hydroscopic and is designed to absorb free moisture in the braking system. If the brake fluid reaches the lowered boiling temperature during heavy use the brake fluid can vaporize resulting in a soft or no brake pedal. Not a pretty thought.

What is the difference in DOT 3 and DOT 4 brake fluid? Which should I use?
Use what the manufacturer recommends. Some people think that DOT 4 fluid is better that DOT 3 because the boiling point is higher; however it can degrade faster that DOT 3. Use what the manufacturer recommends.

What is a bleed sequence? Do I need to sequence with the EBS-20?
When "bleeding" today's ABS systems one wheel at a time it is very difficult to remove trapped air or contaminates in the system. As a consequence bleed sequences were set up to help create different movements of fluid in the system to help move contaminants out of the system. At last count we know of 32 different sequences. No sequencing is necessary with the EBS-20 because all 4 wheels are serviced at once with a combination of pressure and vacuum. There's no place for the contaminants to hide, so to speak. Try the EBS-20 service when you have a bleed problem with a vehicle and see what we mean.

What should I charge for the service?
Service Providers are charging between $89 and $149 for the service. Customers understand the difference for a bleed ($29 to $39) vs. a true Flush, Change and Bleed.

Can I use the EBS-20 to service hydraulic clutches?
Yes. This is a great add on EBS-20 service. Vacuum any old fluid from the clutch reservoir/slave cylinder using function F-1. Attach either the Brina II, or III adapter that fits the clutch slave cylinder/reservoir. Use F-2 to check the adapter connection. Connect one EBS bleeder fitting to the clutch bleeder. You must block off the other three EBS-20 bleeder fittings with a prime tool or other plug to focus vacuum on the bleeder fitting attached to the clutch. Open the clutch bleeder and press F-3 and go through flush process until fluid color has changed to new.

Can I use the EBS-20 to just bleed a system?
Yes. Just attach the master cylinder adapter to the master cylinder reservoir and one or more EBS-20 bleeder fittings to the wheel bleeder (block off any EBS-20 bleeder fittings that are not attached to the vehicle). Press F-3 and perform the bleed. Make sure the vehicles bleeder fittings are closed while the EBS-20 is in the F-3 mode to prevent any back checking of air into the vehicles wheel cylinder.

Can I use the EBS-20 to bleed a new master cylinder or ABS unit?
Yes, it is possible. Connect the new unit to the vehicle. Attach the EBS-20 and perform a service. While in the F-3 mode press the brake pedal to fill the cavity behind the primary cup seals in the master cylinder. If a new ABS unit is installed use the tech/scanner tool to cycle the ABS valves during F-3 mode to prime the valves. Always due a full system bleed after a master cylinder or ABS installation and bleed.

Is brake fluid a hazardous material? Can it be dumped in the waste engine oil?

Check with your Local, State and Federal waste agency.

How do I use the EBS-20 to fill a low brake fluid reservoir?
Clean the vacuum gun and attach to the fill line. Press F-2 and a small amount of new fluid into a waste container to clean the gun. Then top off the master cylinder reservoir.

Do I need to prime the EBS-20 before every service?
No. Priming is necessary when you first receive the equipment or after it has been sitting for an extended period, but generally priming is not necessary before each service. An exception is when changing between DOT 3 and DOT 4 brake fluids. A prime should be performed in this case.

Can I use the Vacuum gun to vacuum other fluids like power steering fluid?
Absolutely not. The EBS-20 pumps and valves use specialty seal materials compatible with the glycols in brake fluid. Other fluids will damage these seals. This will necessitate a non warranty repair.

Can I use the Brina I, II or III adapter instead of the listed Screw On, Twist On or Pressure Fit Specialty Adapters?
Yes. In fact many technicians prefer the Brinas.

Can I flush a bleeder valve on the ABS unit itself?
Yes. We recommend putting an extra bleeder rubber on the end of the vacuum gun and placing the bleeder rubber over the ABS bleeder screw, squeeze the vacuum gun trigger and open the ABS bleeder screw. Fluid will flow thru the ABS bleeder screw into the vacuum gun. Make sure the EBS Brake Flush is on when you close the bleeder screw then release the vacuum gun trigger.

APPENDIX C – WARRANTY

Warranty Information

LIMITED TWO (2) YEAR WARRANTY

EBS Brake Flush Equipment

EBS 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 two year from the date of original purchase. 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-**the use of the equipment with non-brake fluids is misuse**; (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.

APPENDIX D
PRODUCT: BRAKE FLUID HEALTH AND HAZARD INFORMATION

SECTION VI HEALTH HAZARD INFORMATION

Recommended TLV of Product		Not Established	
EYE CONTACT	Low hazard for usual handling.	SKIN CONTACT	Prolonged contact with skin could result in irritation.
INHALATION	Low hazard at ambient condition. Avoid prolonged inhalation of mist or vapors. Acute or chronic overexposure may be irritating to the respiratory tract. Severe intoxication may lead to drowsiness, dullness, numbness, and headache followed by dizziness, weakness, and nausea.	INGESTION	Do not ingest. Ingestion of large quantities may be fatal.
OTHER	None known.		

SECTION VII EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT	Flush with water for 15 minutes thoroughly and continue flushing until irritation subsides.
SKIN CONTACT	Wash with soap and water thoroughly. Remove contaminated clothing and wash before re-use. If redness or irritation occurs, seek medical attention.
INHALATION	Remove effected person to fresh air immediately.
INGESTION	If person is conscious, give large quantities of water immediately. Induce vomiting. Get immediate medical attention.

SECTION VIII SPECIAL PROTECTION INFORMATION

	CONSUMER	BULK HANDLING (Prolonged Exposure)
RESPIRATORY PROTECTION	N/A	If TVL is exceeded, wear NIOSH approved respirator.
VENTILATION	Use with adequate ventilation.	General.
EYE PROTECTION	N/A	Goggles or face shield.
PROTECTIVE CLOTHING	N/A	Impervious synthetic rubber clothing (bots, gloves, aprons, etc.) over parts of the body subject to exposure.

SECTION IX PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL OR LEAK PROCEDURE	Remove all sources of ignition. Small spills may be collected with absorbent materials. For larger spills, flush area with water spray. Prevent runoff from entering drains, sewers, or streams. Large spills may be picked up using vacuum pumps, shovels, buckets, or other means and placed in drums or other suitable containers.
WASTE DISPOSAL METHOD	Dispose in accordance with all local, state and federal regulations. Department of transportation (DOT) regulations may apply for transporting this material when spilled. Waste material may be land filled or incinerated at an approved facility. Materials should be recycled if possible.
STORAGE AND HANDLING PRECAUTIONS	Store in properly marked, closed containers away from heat, sparks, open flame, and oxidizing agents.
OTHER PRECAUTIONS	Wearing contact lenses is inadvisable. Wash thoroughly after handling. Good hygiene practice should be followed which includes minimizing skin contact. Keep away from children and animals.

While EBS believes this is accurate as of revision date, we make no warranty with respect to the data and we expressly disclaim all liability for thereon. The data is offered solely for your information, investigation, and verification.

APPENDIX E – EBS BRAKE FLUSH ADAPTERS

6.01 Adapter Listing – STD after part# indicates included in Standard Set

Master Tool # EBS1100-0010 - STD

Attaches to all adapters that do not have vents such as the Brina II. The fill line attaches to the Quick connect plug.

Hold Down #EBS110-0020- STD

Holds adapters that do not have integral connection means.

Brina II #EBS1100-0040-STD

A universal adapter for round opening master cylinder reservoir caps. Requires the Master Tool and Hold Down adapter to hold in place on the reservoir.

Brina Tool #EBS1100-0030-STD

Provides a variable fitting adapter for round opening master cylinder reservoir caps. Requires the Hold Down Adapter.

Brina III #EBS 1100-0050-STD

See Brina II above. Can also be used for clutches.

B-Plate #EBS 1100-0250-STD

Covers all large rectangular opening reservoirs. Requires Master Tool

CF-4 #EBS1100-0065-STD

C-3 Hanging #EBS1100-0090-STD

Used in conjunction with the Master Tool for connection to Chrysler and Ford vehicles that have threaded or screw on master cylinder reservoir caps.

C-Blank #EBS1100-0080 and C-3 #EBS1100-0070-STD

Used on Chrysler vehicles that have screw on master cylinder reservoir caps that are hard to reach unless the cabin shroud is removed. This adapter will fit under the shroud

Uni-Hang #EBS 1100-0100-STD

Used on Chrysler vehicles that have dual screw on master cylinder reservoir caps.

GM-4 #EBS1100-0125-STD

For hard to reach M/C reservoirs. Use with almost any adapter to eliminate shroud re-removal.

LT #EBS1100-0130-STD

Used with the Master Tool for connection to GM screw on master cylinder reservoir caps.

THN 2.9 #EBS1100-0160-STD

Used for Lexus and Toyota vehicles that have a push on type master cylinder reservoir cap This is used with the Master Tool and Hold Down adapters

MITS 3.0 #EBS1100-0140-STD

Used for Asian vehicles that have a push on type master cylinder reservoir cap. This is used with the Master Tool and Hold Down adapters.

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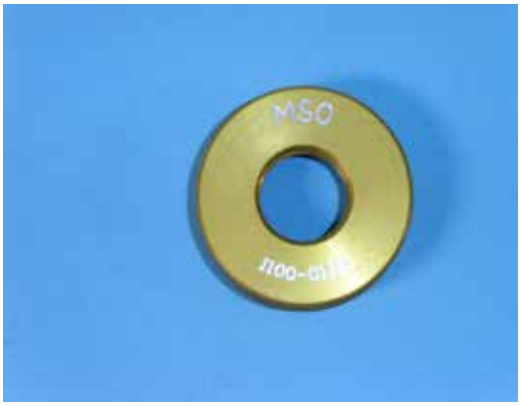
Used for Asian vehicles that have a 3.0 inch screw on type master cylinder reservoir cap. This is used with the Master Tool adapter. The Brina I, can also be used

Euro #EBS1100-1200-STD

Used on European vehicles with screw on M/C reservoir caps. Use with Master Tool.

MSO #EBS 1100-0138



Used for Asian vehicles that have a screw on type master cylinder reservoir cap. This is used with the Master Tool adapter.

N-1 #EBS 1100-0175

Nissan Versa 07 and up, Altima 02, 03, 04, 06

N-I-2 #EBS 1100-0177

Nissan Altima-Infinity 07, 08, 09, 10

Volvo #EBS 1100-0180

Volvo's

F-1 #EBS 1100-0055

Ford 06 and up

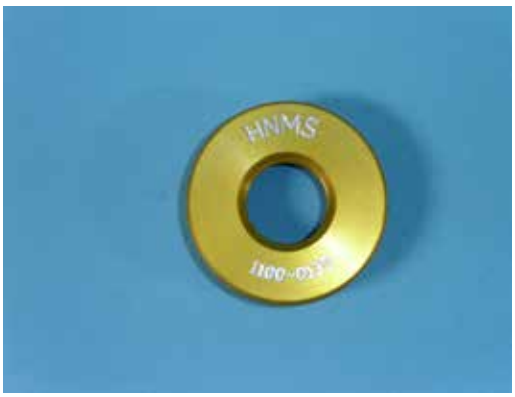
LT-2 #EBS 1100-0132

Various Lexus and Toyota models

THNM 2.2 with ears #EBS 1100-0165E

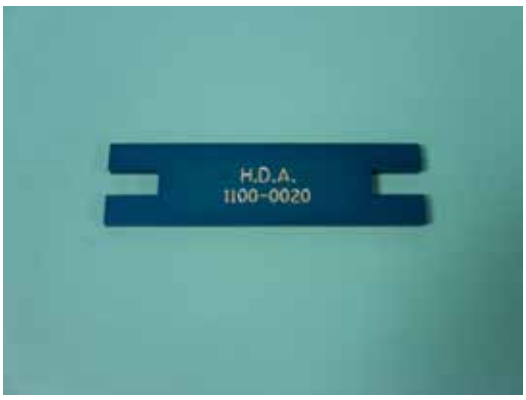
Various Honda models

HNMS EBS#1100-0135



Various Asian Vehicles

Mazda HDA EBS#1100-0020 HDA-STD



Used to protect the reservoir from chain connection

See Adapter usage chart or www.ebsproducts.com for further info

6.02 EBS Brake Flush Parts List

Please call EBS Automotive Services Tech Support at 877-955-0515 for assistance regarding parts

Item	
1000-0020	EBS Brake Flush Equipment (includes standard adapter kit)
1000-0110	EBS Brake Flush Std. Adapter Kit
1000-0005	Adapter Box 16”
1000-5085	Oper. Manual
1000-2100	Complete Hose Set including Fill, Vac and Bleeder Hoses Black with Clear Extensions including check valves and bleeder fittings
1000-2102	Clear Ext. Hose Set (includes 4 bleeder hose pieces @ 3ft.. 1 vac hose piece @ 1ft. and 1 fill hose piece @ 6ft.
1000-2112	Bleeder Hose Set w Clear Extensions (does not include Check Valves or Bleeder Fittings)
1000-2122	Fill & Vac Hose Setup w Clear Ext.(does not include quick connect fittings)
1000-2130	Black Waste 3/8id Hose w male plug - 8.5 ft
1350-0050	PVC bleeder1/8" hose - 100ft. roll
1350-0100	PVC Tubing 1/4" i.d. x 3/8" o.d.-100ft.
1330-1102	Check Valves Set of 4
1100-0010	Master Tool
1100-0011	Master Tool O-Ring
1100-0013	Master Tool Male Connect Plug
1100-0020 - C	Hold Down Adapter – chain alone
1100-0020-HDA	Mazda 2.2 Hold Down
1100-00132	LT-2 Adapter
1100-0030	Brina Tool Adapter
1100-0040	Brina II Adapter
1100-0050	Brina III Adapter
1100-0065	CF-4
1100-0066	CF-4 Adapter Gasket
1100-0070	C-3 Adapter
1100-0071	C-3 or C Blank or C-3 Hanging Adapter Gasket - Set of 3
1100-0080	C-Blank Adapter
1100-0090	C-3 Hanging Adapter
1100-0091	C-3 Hanging Gasket

1100-0100	Uni Hang Adapter
1100-0101	Uni Hang Adapter O-Ring -package of 3
1100-0110	J Tool Adapter
1100-0055	F-1 Adapter
1100-0156	F-1 Adapter Gasket
1100-0175	N-1 Adapter
1100-0176	N-1 Adapter Gasket
1100-0177	N-I 2 Adapter
1100-0125	GM-4 Adapter
1100-0125	GM-4 Adapter Gasket
1100-0130	LT Adapter
1100-0131	LT Adapter O-Ring
1100-0135	HNMS Adapter
1100-0136	HNMS Adapter O-Ring
1100-0140	MITS 3.0 Adapter
1100-0141	MITS Adapter O-Ring
1100-0150	Euro Adapter
1100-0151	Euro Adapter O-Ring
1100-0160	THN 2.9 Adapter
1100-0163	THN 2.9 Adapter 2 O-Ring Set
1100-0165E	THN 2.2 Adapter with ears
1100-0166	THN 2.2 Adapter O-Ring #1
1100-0167	THN 2.2 Adapter O-Ring #2
1100-0168	THN 2.75
1100-0170	Isuzu Adapter
1100-0171	Isuzu Adapter O-ring
1100-0172	Isuzu Adapter Second O-Ring
1100-0180	Volvo Adapter
1100-0190	MITS - Plate Adapter
1100-0191	Mits Plate O-Ring
1100-0210	A-Tool Adapter
1100-0230	Double Bleeder Set-Up
1100-0240	Triple Bleeder Set-Up
1100-0250	B Plate Adapter
1220-0020	8" Rear Wheel
1220-0026	Front swivel caster with silver side brake
2220-1030	7 Gallon Waste Tank
1220-1031	Waste Tank Level Sensor

2220-1123	New Fluid Pickup Hose
1310-0014	Vac Pump Setup - Serial# 2231 to 4316
1310-0015	Fill Pump Setup - Serial# 2231 to 3850
1310-0016	Waste Tank Pump Setup - Serial# 2700 and up.
2310-0013	Filter Bowl
2310-0014	Filter Screen
1310-0100	Prime Tool
1330-1101B	Bleeder Valve Rubbers-Red-Set of 4
1330-1103	Bleeder/Check Valve Set-Up for each set
1330-2104	Quick Connect Coupler w Fittings for Fill Line
1330-2103	Quick Connect Coupler w Fittings for Vac Line
1330-2110	Vac gun with quick connect plug fitting
1330-3101	Waste Hose Coupler x 3/8mnpt end
1330-3102	Waste Hose Plug x 3/8" barb fitting end
1330-3104	Waste Hose Coupler x 3/8FNPT end
1510-0002	EBS Touch Pad w Power Strip for Model I
1510-0005	EBS Touch Panel for Int. Boards
1520-0010	Power Connector
1520-0011	Fuse-Package of 3
1520-0020	Power Switch
1520-0040	Power Cord

Rev12-10 — EBS Brake Flush Adapter Chart

Part	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-
No.#	OO10	OO20	20hda	OO30	OO40	OO50	OO55	O065	OO70	OO80	OO90	O100	O125	O130	O132	O135	O140	O150	O160	O165E	O170	O175	O180
Description	Mast	Hold	HAD	Bri	Bri	Bri	F-1	CF-4	C-3	C	C-3	Uni	GM-4	LT	LT 2	HNMS	MITS	Euro	THN	THN	Isuzu	N-1	Volvo
	Tool	Down		1	2	3				Blnk	Hng	Hang					3.0		2.9	2.2			
Acura	X	X		X	X	X																	
Alpha Romeo	X			X	X	X												X					
Audi	X			X	X	X												X					
BMW	X			X	X	X												X					
Buick	X	X		X	X	X							X										
Cadillac	X	X		X	X	X							X										
Chev/GMC	X	X		X	X	X						X	X										
Chrysler/Jeep	X	X		X	X	X		X	X	X	X						X						
Dodge	X	X		X	X	X		X	X	X	X						X						
Dakota		X				X						X											
Intrepid	X							X															
Eagle/Renault	X	X		X	X	X		X	X	X	X						X						
Ford	X	X		X	X	X		X				X						X					
Mustang	X						X																
Geo-Asuna	X	X		X	X	X																	
Honda	X	X		X	X	X										X		X	X	X			
Accord																							
CR-V	X																			X			
Civic	X	X																		X			
Hyundai	X	X		X	X	X		X															
Infiniti	X	X		X	X	X		X															
Isuzu	X	X		X	X	X															X		
Jaguar	X			X	X	X											X	X					
KIA	X	X		X	X	X												X					
Land Rover	X			X	X	X											X	X					
Lexus	X	X		X	X	X								X									
Varios	X														X								
Linc/Merc	X	X		X	X	X		X				X						X					
Mazda	X	X		X	X	X										X							
MBZ	X	X		X	X	X												X					
Mitsubishi	X	X		X	X	X											X						
Nissan	X	X		X	X	X										X			X				
Maxima	X	X	X			X																	
Sentra		X	X			X						X											
Murano	X							X															
Altima	X		X			X																X	
Versa	X																					X	
Page 1																							

Rev12-10 — EBS Brake Flush Adapter Chart

Part	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-	1100-
No.#	OO10	OO20	20hda	OO30	OO40	OO50	OO55	65	OO70	OO80	OO90	O100	O125	O130	132	O135	O140	O150	O160	O165	O170	O175	O180
Description	Master	Hold	HAD	Bri	Bri	Bri	F-1	CF-4	C-3	C	C-3	Uni	GM-4	LT	LT 2	HNMS	MITS	Euro	THN	THN	Isuzu	N-1	Volvo
	Tool	Down		1	2	3				Blnk	Hng	Hang					3.0		2.9	2.2			
Oldsmobile																							
Silhouette												X	X										
Pontiac	X	X		X	X	X						X	X										
Vibe														X									
Porsche	X			X	X	X												X					
Rolls Royce	X			X	X	X																	
Saab	X			X	X	X												X					
Saturn	X	X		X	X	X							X					X					
Subaru	X	X		X	X	X										X	X						
Suzuki	X	X		X	X	X																	
Toyota	X	X		X	X	X								X					X				
Matrix	X	X												X									
Volkswagon	X			X	X	X												X					
Volvo	X			X	X	X											X	X					X

1. The "Uni Hang" and "C-3 Hang" tools are used where access to the M/C is diffilcult.