

# OPERATION MANUAL

## BFX-1

### Brake Fluid Exchanger

**IMPORTANT:**

Test drive  
vehicle after  
service to verify  
proper brake  
system  
performance.



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Manual P/N 035-81179-00

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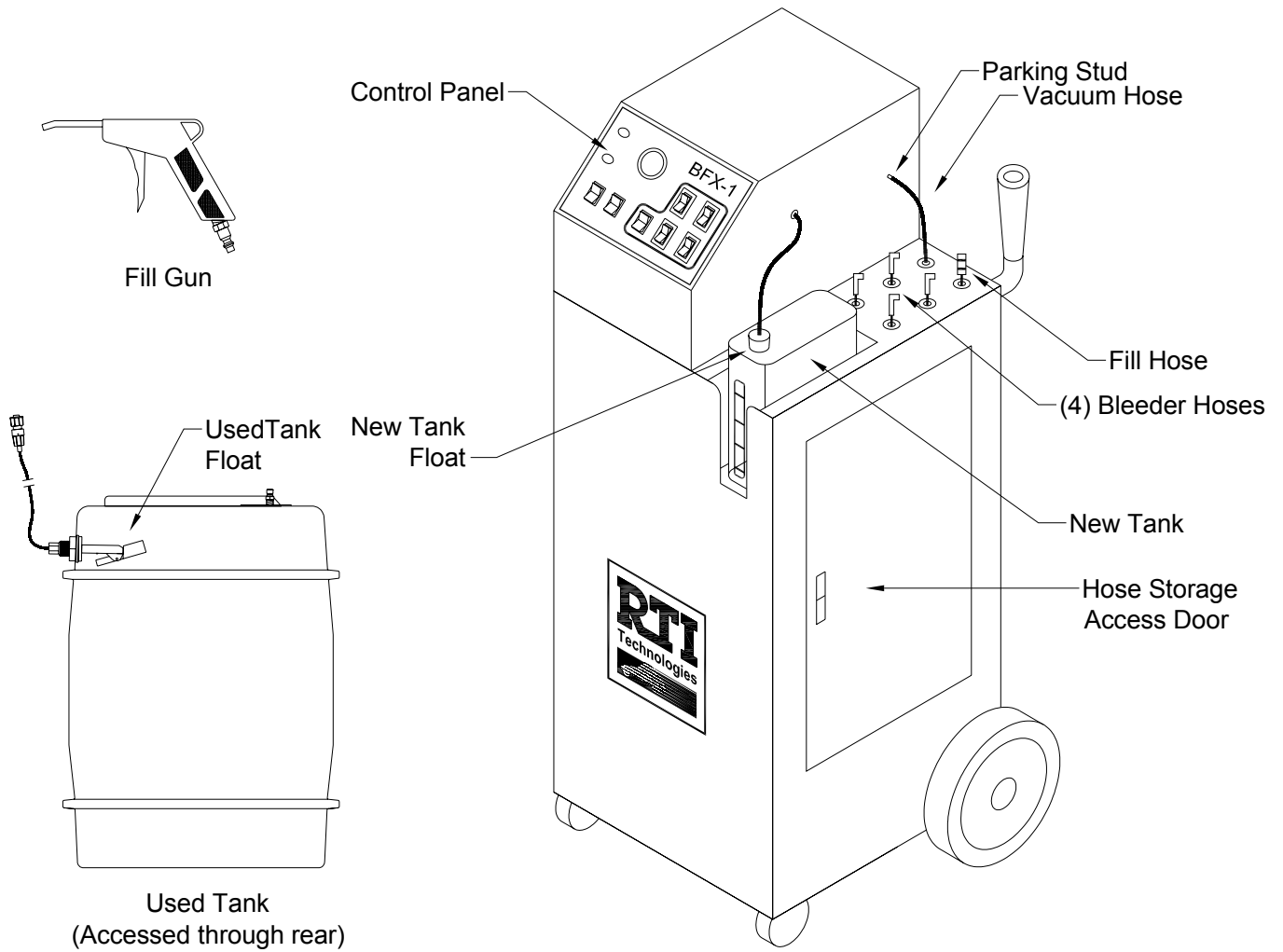
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# Component Description

Unpack all components and verify quantities per this illustration and adapter list on page 6.

Contact RTI if any items are missing.



**IMPORTANT:**

**Test drive vehicle after service to verify proper brake system performance.**

# Safety Precautions

**WARNING: Failure to follow these precautions can result in serious injury or death.**

- Read and understand the Operation Manual completely before operating this unit.
- Always wear proper eye and skin protection when operating and maintaining this equipment.
- Only disassemble or reassemble unit parts when directed by an RTI representative.
- Clean any spills that may occur immediately. Brake fluid is corrosive and is a high slip hazard.
- Avoid exposure with painted surfaces. Brake fluid is corrosive and will damage the finish on most painted surfaces. Use of fender covers is recommended.
- Always use vehicle specified brake fluid. Failure to do so may cause brake system damage. The BFX is designed to use DOT 3 or 4 brake fluid. Use of any other fluid type is not recommended and may void warranty.
- Comply with local, state and federal regulations for fluid disposal.
- **Material Safety Data Sheets** (MSDS) must be obtained on all chemicals and placed in a shop file for reference. Note: MSDS can be found on the RTI web site [www.rtitech.com](http://www.rtitech.com).
- It is important to test drive every vehicle after the service to verify proper brake system operation. Failure to do so could result in undetected brake system failure.

**CAUTION:** Failure to follow the precautions as outlined in the Operation Manual can result in damage to the engine, vehicle or equipment which will not be supported or covered under warranty.

**IMPORTANT:** Test drive vehicle after service to verify proper brake system performance.

# System Priming

**Note:** The System Priming Procedure is only necessary before the first time use of the BFX or when changing brake fluid types. Between normal operation cycles, this procedure will not be necessary.

1. Connect red (positive) clamp on power cable to red (positive) terminal on vehicle battery. Connect the black (negative) clamp to a **good** ground. A good ground can be located by following the negative cable from the battery to where it is connected to the chassis.

**Warning:** Handle battery connection cable with extreme caution. Batteries generate explosive gases during normal operation. Working in the vicinity of a lead-acid or other automotive battery is dangerous. Wear eye protection. Never smoke or allow a spark or flame in the vicinity of the battery. Do not connect the black power clip to the negative post of the battery to avoid a spark.

2. Fill New Tank with desired brake fluid.
3. Connect Fill Gun to Fill Hose.
4. Disconnect coupler on Used Fluid Tank Line and remove the cap.
5. Turn on FILL MASTER CYLINDER switch.
6. Place outlet tip of Fill Gun into the Used Fluid Tank opening and squeeze Fill Gun trigger.
7. Continue until fluid is moving smoothly through the Fill Gun tip and into the Used Tank without turbulence (air bubbles) visible in the Used Tank.
8. Turn off FILL MASTER CYLINDER switch.
9. Disconnect Fill Gun from the Fill Hose.
10. Replace Used Tank cap and connect coupler.

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# Exchange

**BEFORE SERVICE:** Verify that the Brake System does not have any malfunctions. If the system is found to be malfunctioning verify that the malfunction will not interfere with the exchange process. Perform all necessary repairs prior to exchanging.

1. Verify that the vehicle engine is off.
2. Verify new and used fluid tank levels. Add new fluid or empty used as required.
3. Verify that all Switches and Attention Lights on the BFX control panel are OFF.
4. Connect red (positive) clamp on power cable to red (positive) terminal on vehicle battery. Connect the black (negative) clamp to a **good** ground. A good ground can be located by following the negative cable from the battery to where it is connected to the chassis.

**Warning:** Handle battery connection cable with extreme caution. Batteries generate explosive gases during normal operation. Working in the vicinity of a lead-acid or other automotive battery is dangerous. Wear eye protection. Never smoke or allow a spark or flame in the vicinity of the battery. Do not connect the black power clip to the negative post of the battery to avoid a spark.

5. Remove master cylinder cover and inspect the master cylinder for damage. Repair any damage found before continuing.
6. Turn on EMPTY MASTER CYLINDER switch and use the Vacuum Hose to remove all of the fluid from the master cylinder.
7. Turn off EMPTY MASTER CYLINDER switch when master cylinder is empty and **return Vacuum Hose to Parking Stud.**

**Note:** Failure to park Vacuum Hose on Parking Stud will result in minimum to no vacuum at bleeder hoses.

8. Connect Fill Gun to Fill Hose. Turn on FILL MASTER CYLINDER switch and squeeze trigger on Fill Gun to dispense fluid until master cylinder level is at the fill/max mark. Turn off FILL MASTER CYLINDER and disconnect Fill Gun from the Fill Hose.














**Note:** To avoid fluid discharge from Fill Gun do not squeeze trigger after disconnecting from Fill Hose.

9. Connect Master Cylinder Adapter.

**IMPORTANT:** Test drive vehicle after service to verify proper brake system performance.

# Exchange continued

- Identify appropriate adapter for the Master Cylinder being serviced from list below.
- Seat adapter on the Master Cylinder and tighten snugly.
- Connect Fill Hose Coupler to the adapter coupler .

 <p><b>BA01</b> Chrysler &amp; Others 025-88001-00 3 tab, twist on with expandable O-ring fits most Chrysler models. 2001+ PT Cruiser, 2002+ Grand Voyager, 1996+ Voyager LE, 1994+ Voyager SE, Dodge: Power Ram, Caravan, 2003+ Viper, 2001 Neon Jeep 1996+ Wrangler, 1996+ Grand Cherokee, 1999+ Wrangler Sport and others.</p>	 <p><b>BA05</b> European 025-88005-00 European Vehicles with the threaded master cylinder reservoir. Chrysler 2003+ Crossfire Ford 1995 Cougar, Escort, Focus, Probe, Galaxy, Festiva Suzuki Samarai Toyota 2003 Corolla</p>	 <p><b>BA10</b> Toyota &amp; Others 025-88009-00 Toyota reservoirs with small round opening.</p>	 <p><b>BA11</b> Toyota &amp; Others 025-88010-00 Toyota reservoirs with large round opening.</p>
 <p><b>BA02</b> Ford 025-88002-00 2 tab, twist on with expandable O-ring fits all Ford models with a two tab plastic twist on cap.</p>	 <p><b>BA07</b> Universal 025-88006-00 All Vehicles with a round master cylinder.</p>	 <p><b>BA13</b> 025-88014-00 Nissan Ultima &amp; Xterra</p>	
 <p><b>BA03</b> Ford &amp; Others 025-88003-00 Ford with 3 tab plastic twist cap. Chrysler New Yorker, 1999-2002 Crossfire, 1999+ 300 M, 1999+ Grand Voyager, 2001+ Sebring. Dodge 2001 Neon, 1999+ Stratus, Jeep Cherokee 1995 Hyundai 1995+ Sonata, 1995+ Accent, 2001+ Elantra Mazda 1999+ MPV, 1995+ 121 Mitsubishi 2003 Lancer, Outlander, 1999+ Wagons Nissan 1995+ 100SX, 200 SX, 1995+ Maxima Subaru 1989+ Outback, 1998+ Impreza, 1999+ Forrester</p>	 <p><b>BA08</b> Honda &amp; Others 025-88007-00 Honda, Acura reservoirs with round opening. Honda 1992+ Prelude, 1991+ Legend, All Civics. Isuzu 1989+ Trooper, 1989+ Monterey, 1989+ Frontera</p>	 <p><b>BA12</b> Universal Cast 025-88011-00 For rectangular cast iron master cylinders. Inside Dimensions: 7 in. x 4.5 in.</p>	
 <p><b>BA04</b> GM 025-88004-00 General Motors with 3 tab plastic twist cap. Cadillac 1996+ Northstar, Eldorado, Seville SLE, STS, 2001+ CTS, 2003+ SRX, XLR. Chevrolet 1996+ Corvette, 1999+ Blazer, Camaro, 1999+ Transport, 2003+ Tahoe. Mazda 2001+ MPV, 2001+ Tribute Pontiac Firebird all models, Transport.</p>	 <p><b>BA09</b> Honda 025-88008-00 Honda reservoirs with round opening. Honda 1985+ Accord, 1991 Prelude, 1999 + NSX-T</p>	 <p><b>ST100</b> 025-88012-00 GM and Chrysler</p>	

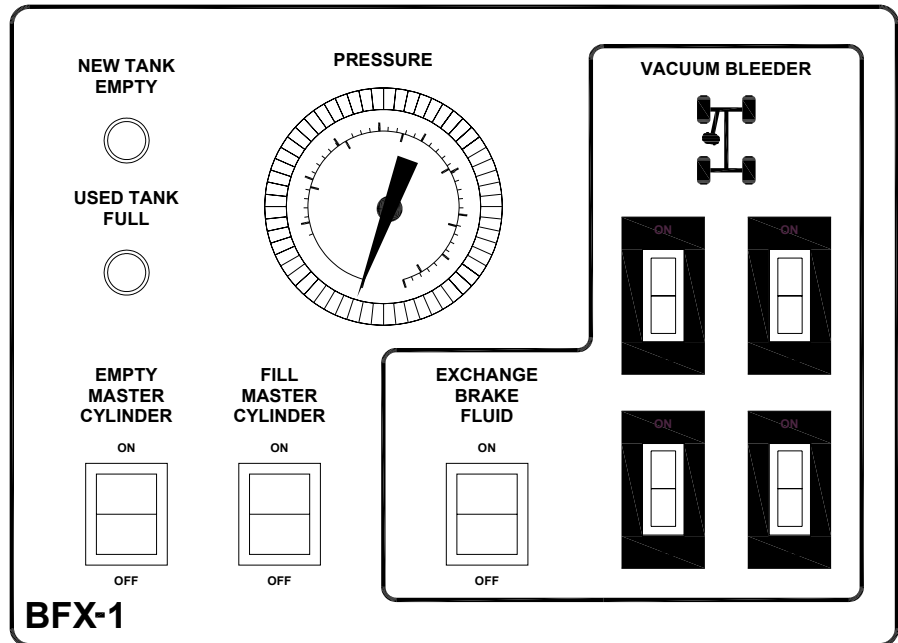
**IMPORTANT:** Test drive vehicle after service to verify proper brake system performance.

# Exchange continued

10. Turn on FILL MASTER CYLINDER switch. Verify that fluid is flowing through the Fill Hose into the Master Cylinder and that the pressure stops and holds at approximately 17 psi as shown on the BFX Pressure Gauge.

**Note: If pressure does not remain constant as indicated on Pressure Gauge, check master cylinder adapter for leaks and tighten.**

11. Verify hose and battery cable clearance, then raise vehicle.
12. Connect Bleeder Hoses to the bleeder valves located on each wheel cylinder. Match color code on each bleeder line to the graphic located on the BFX Control Panel.
13. Turn off FILL MASTER CYLINDER switch.
14. Turn on EXCHANGE BRAKE FLUID switch.



15. Using the four VACUUM BLEEDER switches, vacuum each wheel bleeder. **Always follow the OEM recommend service for the correct sequence.** Select appropriate switch and turn on. Loosen corresponding bleeder until adequate flow is observed.
16. Monitor flow and color of fluid in Bleeder Hose and turn off VACUUM BLEEDER switch when fluid becomes clear or the desired amount of fluid has been exchanged.

**Warning: Monitor both the NEW TANK EMPTY and USED TANK FULL Indicator Lights. If either illuminates during service, immediately turn all switches off, add new or remove used fluid as needed and continue with procedure.**

**Note: The appearance of air bubbles in the Bleeder Hoses is due to air being pulled around the thread of the bleeders. This is a common occurrence and does not indicate a malfunction with the process.**

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## Exchange continued

17. When the fluid in all 4 Bleeder Hoses has been adequately exchanged turn all four VACUUM BLEEDER switches on, close the bleeder valves and turn off the EXCHANGE BRAKE FLUID and VACUUM BLEEDER switches.
18. Remove Bleeder Hoses from bleeders, return to unit and lower vehicle.
19. Relieve pressure in master cylinder:
  - Twist on Adapter - Slowly unscrew black cap to relieve pressure
  - Chain Connected Adapter - Slowly loosen chains to relieve pressure
  - Threaded Adapter - Slowly loosen to relieve pressure
20. Remove Master Cylinder Adapter from the master cylinder
21. Disconnect Fill Hose from the Master Cylinder Adapter.
22. Adjust level in the master cylinder by using the Vacuum Hose and the EMPTY MASTER CYLINDER switch to lower or the FILL MASTER CYLINDER switch and the Fill Gun on the New Fluid Hose to raise.
23. Remove battery connections and install the master cylinder cover.

**24. Test the brake system for proper pedal pressure. Press pedal to floor, hold for 5 seconds, release and inspect bleeders for leaks. Tighten bleeder if needed and retest. Take vehicle on test drive.**

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# Empty Used Tank

1. On the Used Fluid Tank, disconnect the fluid line coupler as well as the electrical float switch connection.
2. Twist the cap counterclockwise to remove.
3. Empty into an appropriate bulk waste container.
4. Replace cap on Used Fluid Container (turn clockwise).
5. Connect fluid line coupler as well as the electrical float switch connection and place tank in rear of BFX.

**Note:** Follow all federal and local laws and regulations when disposing of hazardous material.

**Warning:** Not removing the electrical connection can cause serious damage that may make the BFX nonoperational.

# Fill New Tank

1. On the New Tank, remove the New Tank Float Stopper and pour new brake fluid into the opening.
2. Replace Stopper into New Fluid Tank securely.

**Note:** For varying new tank heights slide the New Tank Float Stopper up or down the New Tank Float until the appropriate height is obtained.

**Warning:** Failure to properly set the height of the New Tank Float Stopper can result in a New Tank Float malfunction which could allow air into the brake system.

**Warning:** Brake fluid is Hygroscopic (absorbs moisture). It is recommended that the new fluid container is emptied if unit will not be operated for an extended period of time.

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# Troubleshooting & Maintenance

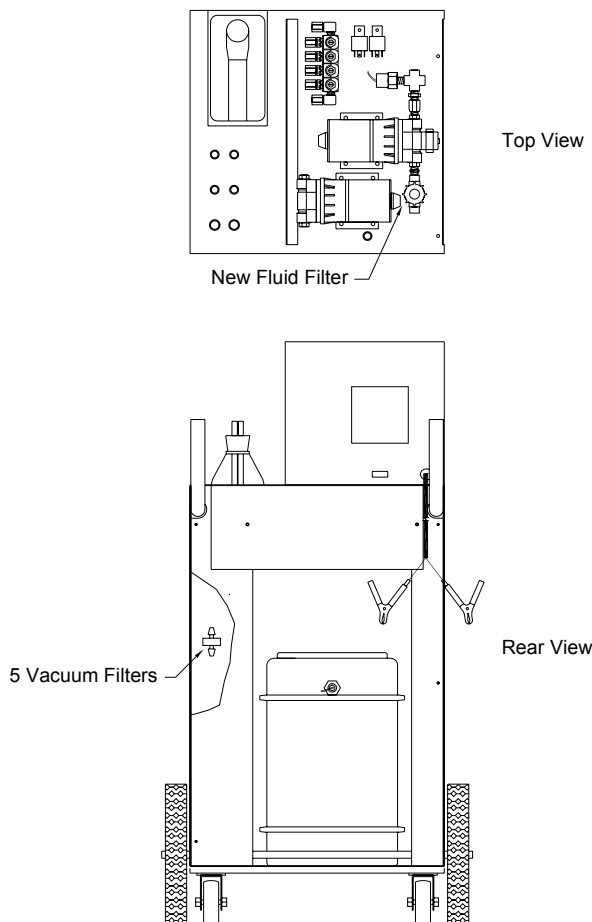
The BFX-1 has six filters to prevent any debris from entering internal components and possibly causing problems. The location of the filters is illustrated below.

**New Fluid Filter:** Filters fluid from the new fluid tank. If the fluid flow seems slow while trying to fill the master - check and clean this filter.

The filter is inside the control box on top of the machine. Remove screws and gently raise the control box to access the filter. Unscrew the cover and clean the screen as required.

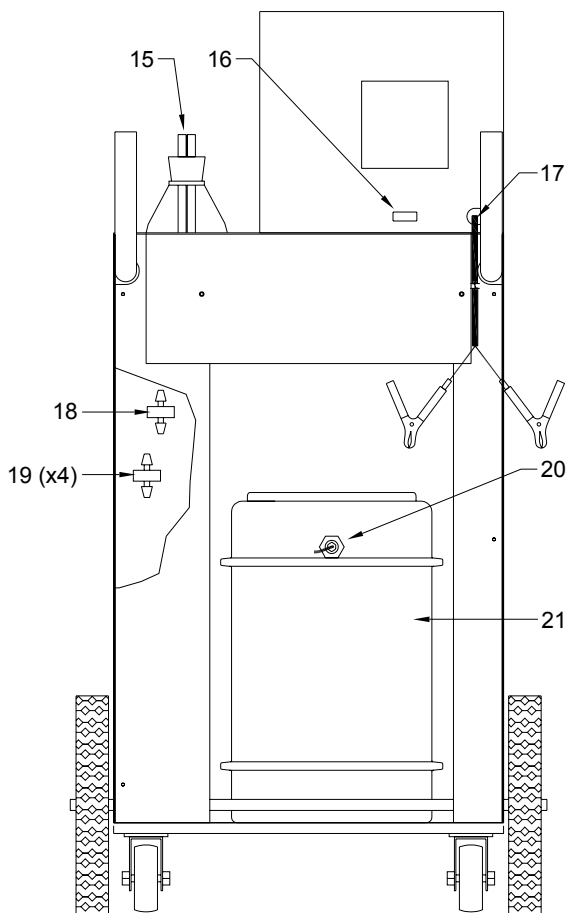
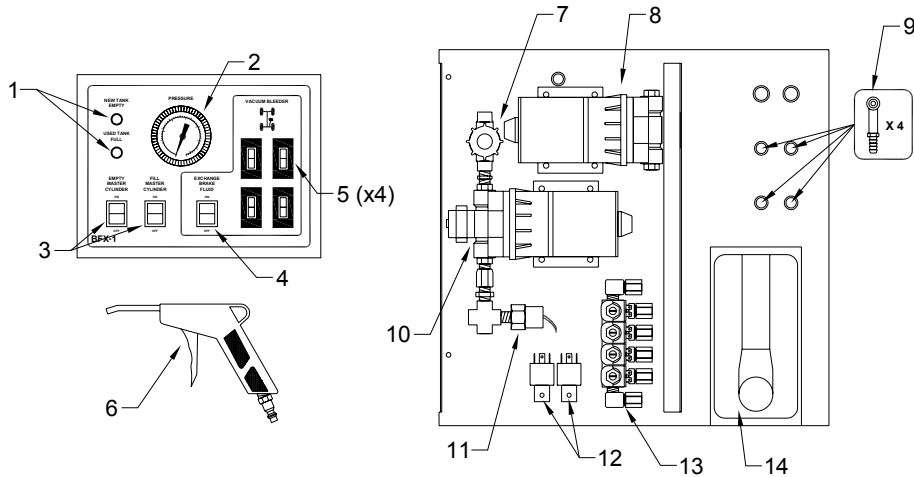
**Vacuum Filter:** Filters fluid in the five vacuum hoses which attach to the bleeder valves and clean out the master cylinder. A filter is mounted in-line on each of the vacuum hoses. If the fluid flow seems slow from the bleeders - check and clean these filters.

These filters can be accessed through the door on the side of the BFX-1. Remove hoses from both ends of the filter and try clearing the filter with compressed air. Replacement filters (P/N 026-80372-00 for the 4 bleeder line and a 026-80325-00 for the master cylinder line) can be ordered from RTI.



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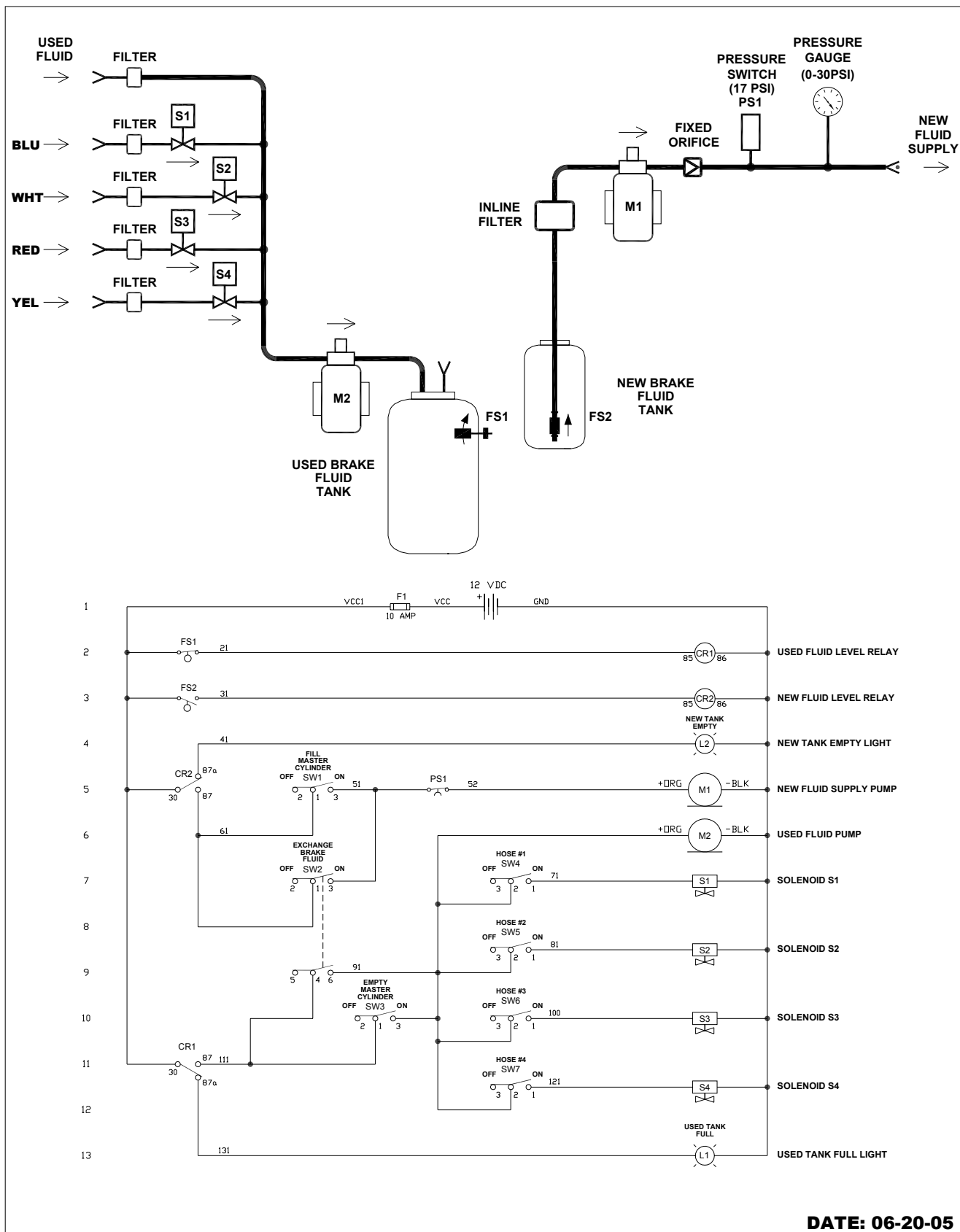
# Parts Identification



	Part No.	Description
1	025-80358-00	Indicator Light Red 12VDC
2	325-80048-00	Pressure Gauge Assy (BFX-1)
3	024-80076-00	Switch Rocker SPDT (On-On)
4	024-80075-00	Switch Rocker DPDT (On-On)
5	024-80066-00	Rocker Switch SPDT (On-On)Visi-Red
6	325-80002-00	Wand/Gun Assy (BFX)
7	026-80358-00	Sight Glass 1/4 FPT (Nylon)
8	325-80034-00	Vacuum Pump w/terminals Assy
9	023-80344-00	Adapter Brake Nipple x 3/16 Barb
10	325-80029-00	Supply Pump w/terminals Assy
11	325-80031-00	Press Switch 14-17 psi SPST EPDM 1/4 MPT w/Terminals
12	024-80091-00	Relay 40 Amp SPDT 12VDC
13	025-80361-00	Manifold 4 Valve 12VDC 1/4FPT
14	325-80045-00	New Tank Assy (BFX-1)
15	024-80099-00	Float Switch Assy (New Tank)
16	360-81763-00 025-80342-10	Fuse Holder ATO Panel Mount Fuse 10 Amp ATO Fast Blow
17	320-80005-00	Cord Power 14/2 SPT3 Battery Clamps 12FT
18	026-80325-00	Filter Inline 1/4 Barb 150 Micron
19	026-80372-00	Filter Inline 3/16 Barb 150 Micron
20	325-80022-00	Float Switch Assy (Used Tank)
21	325-80004-00	Used Tank Assy (BFX-1)

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# Flow Diagram & Electrical Schematic



DATE: 06-20-05

**BFX-1 MACHINE ELEC & FLOW (2004)**

570-80262-00

**IMPORTANT:**

Test drive vehicle after service to verify proper brake system performance.

# EC Declaration of Conformity for Machinery

## Directive 98/37/EC



**RTI Technologies, Inc.**  
10 Innovation Drive  
York, Pennsylvania 17402 USA  
Phone: 717-840-0678

Herewith declares that:

- BFX-1 Brake Fluid Exchanger
- is in conformity with the provisions of the Machinery Directive (directive 98/37/EC) and with the national implementing legislation
- is in conformity with the provisions of the following other EC directives:

Electromagnetic Compatibility (EMC) Directive 89/336/EEC

Electromagnetic Emissions EN 61000-6-4: 2001

Electromagnetic Immunity EN 61000-6-2: 1999

The BFX-1 is certified to the EMC Directive like the ATX-2 tested by:

TÜV America Inc.  
1775 Old Highway 8 NW Ste. #104  
New Brighton, MN 55112  
Phone: 651-638-0262



Thomas L. Crandall

A handwritten signature in black ink that reads 'Thomas L. Crandall'.

Vice President - Technology

Dated: January 10, 2005