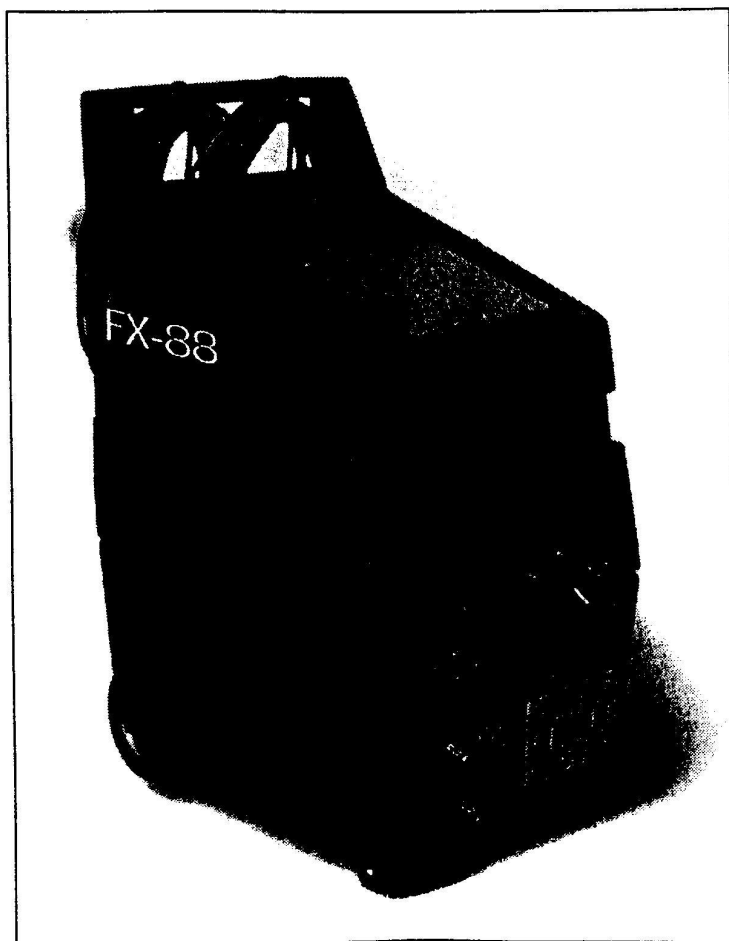


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# FX-88

**7F** HYDRO-FORCE



## **Operating and Maintenance Manual**

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Congratulations and thank you for buying the FX-88 portable extractor. The FX-88 is designed to give you truckmount performance in a portable machine that is versatile to use and easy to transport. Years of experience, engineering, planning, and practical know-how has gone into the design and manufacture of the FX-88. We take a great deal of pride in the FX-88 and want you to be completely satisfied with your purchase. Please take the time to read this manual before operating the machine—it will be time well spent.

## **SETUP AND OPERATION**

### **ELECTRICAL CONNECTIONS**

Plug electrical cords into grounded wall outlets. FX-88 is designed to run on a 15 AMP and a 20 AMP circuit (the right hand cord when you are standing behind the machine). You will normally find 20 AMP circuits in the kitchen and in bathrooms. Never remove the ground plug from the end of the cord. If a circuit breaker trips during operation, reset the breaker and move the electrical cord to a different outlet and resume operation. When cords are plugged into "live" receptacles, the control switches will glow when in the "on" position. If the lights on the switches do not glow, this indicates that the wall receptacle may be dead. Simply move the cord to a different outlet.

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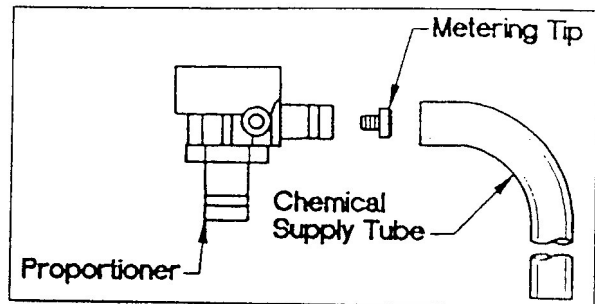
**WARNING:** The FX-88 is designed for use with water based cleaning solutions, such as, low foaming detergents or acid rinses. **NEVER USE DRY SOLVENT SOLUTIONS!** The use of dry solvents in your FX-88 will void the warranty.

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### **AUTOMATIC CHEMICAL FEED**

**Chemical Metering:** The FX-88 is equipped with an automatic water fill / chemical feed metering system. As the solution tank fills with water, cleaning concentrate is drawn into the solution tank at a designated rate via a metering tip. A complete set of metering tips is included.

**Figure 1**



*Metering Tip Replacement*

To adjust the amount of cleaning concentrate being drawn, simply remove the plastic supply tube from the chemical feed metering valve (see Figure 1). Unscrew the colored metering tip and replace with the tip that corresponds to the portable dilution ratio for your cleaning product (refer to Figure 2). Reconnect the plastic supply tube.

**Liquid Concentrates:** The FX-88 comes with the orange metering tip installed at the factory. This tip is rated for .4 oz. of chemical per gallon of water, which is a standard dilution ratio for the most popular liquid cleaning products on the market. Refer to your product's dilution ratio for portable extractors, and select the proper metering tip from Figure 2 ("Liquid Concentrated Dilution Ratio").

**Powder Concentrates:** For powdered cleaning detergents, a liquid concentrate must be made. Combine two (2) cups of powder in a one gallon solution jug. Fill the jug with water up to the one gallon mark. Use the tip that corresponds to the portable dilution ratio for your powdered cleaning product (refer to Figure 2, "Powder Concentrated Dilution Ratio").

**Fresh Water Rinse:** For fresh water rinsing simply leave the chemical supply tube in the solution tank.

**Manual Filling:** To use the FX-88 without the automatic filling system, simply pre-mix your solution in a bucket of water, and pour into the solution tank. See Figure 3 for a detailed breakdown of the chemical feed system.

**Figure 2**

Tip Color	Concentrated Dilution Ratio (oz/gal)	
	Liquids	Powders
Tan	0.30	—
Orange	0.40	—
Turquoise	0.50	—
Pink	0.75	—
Clear	1.00	—
Brown	1.12	—
Red	1.50	—
White	1.75	—
Green	2.00	0.25
Blue	2.50	0.30
Yellow	3.75	0.47
Black	5.00	0.63
Purple	8.50	1.06
Gray	11.50	—
None	16.25	—

*Metering Tip Dilution Ratios*

**Setup:** Inside the solution tank is a bottle float. Check the chemical feed supply foot valve for debris, and clean if necessary. Insert the line into the cleaning concentrate so that it touches the bottom of the bottle. Set cleaning

concentrate on the machine or inside the fresh water solution tank opening.

Connect the fill hose to the quick disconnect located on the back of the machine. Attach the water supply hose to any available faucet. A faucet-to-hose adapter is provided to properly attach your water supply hose to the most commonly found faucets. It may require adapters to fit the various faucet combinations you will encounter. Never force a threaded fitting. Place a towel over the faucet connection so that any spray will be controlled. Turn on the water and check the hose connections for leaks.

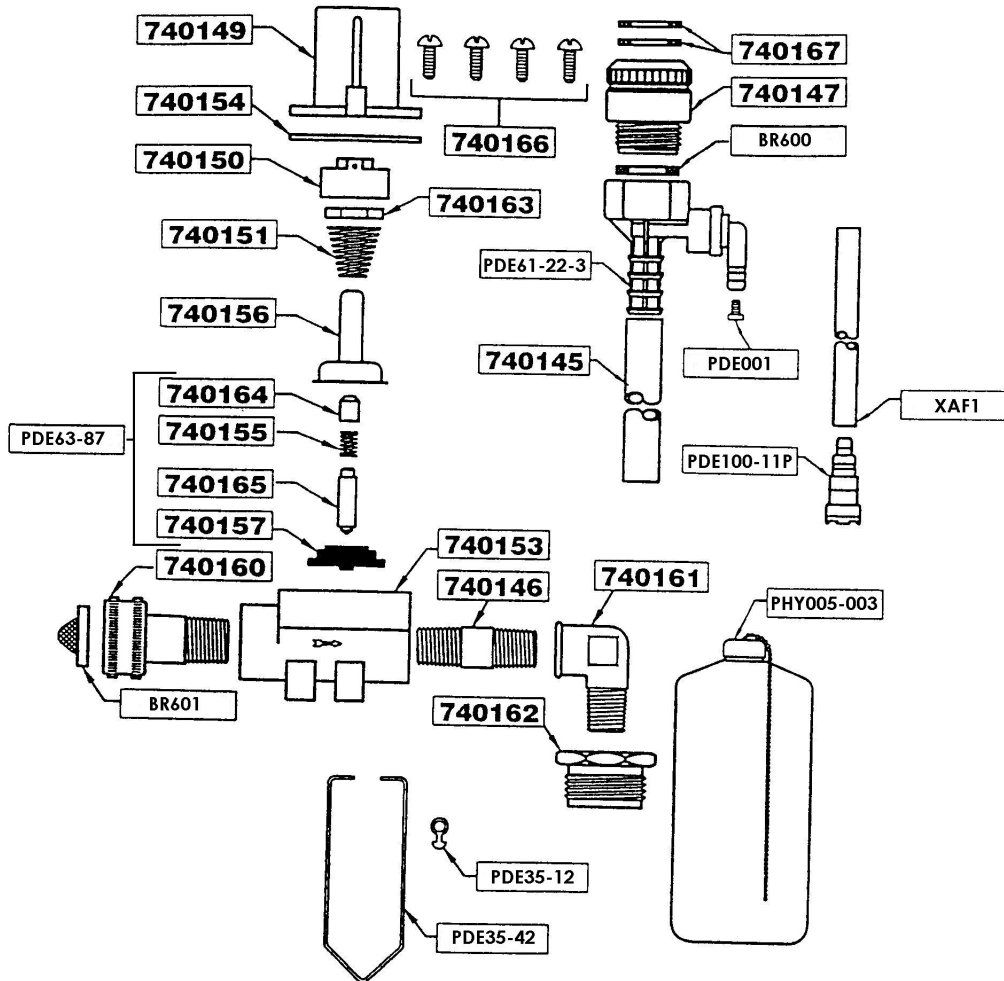
The solution tank will fill approximately half full (about 9 gallons). As the tank is filling, cleaning concentrate is being drawn into the solution tank.

**Shutdown:** Before the end of each job, turn off the water supply, to prevent the solution tank from being completely full. With the cleaning completed and the solution pump turned off, disconnect the fill hose from the faucet, drain the water in the fill hose back into the solution tank, and remove the fill hose. Remove the chemical feed supply tube from the chemical solution jug, clean the filter, and place into the solution tank. Vacuum out the solution tank, and clean the solution tank water filter.

## PRESSURE PUMP SYSTEM

The FX-88 utilizes a twin piston pump which is adjustable from 50-450 PSI. Never operate the pump at a pressure setting over 450 PSI OR without water in the solution tank. Doing so could damage the pump and will void the warranty. Anytime the FX-88 has been stored for a period of time or has had the pump run "dry", the solution pump will have to be primed to remove air which might be trapped in the pumping system (see "Priming the Solution Pump" at the end of this section).

**Figure 3**  
**AUTOMATIC CHEMICAL FEED SYSTEM**



PART NO.	DESCRIPTION
740145	3 FT. DISCHARGE TUBING
740146	PIPE NIPPLE
740147	BACKFLOW PREVENTER
PDE35-12	FLOAT HANGER CLIP
740149	MAGNET HOUSING
740150	MAGNET HOLDER
740151	SPRING
PDE35-42	FLOAT HANGER WIRE
740153	VALVE BODY
740154	FLANGE
740155	SPRING
740156	ENCLOSING TUBE
740157	DIAPHRAGM
PDE001	METERING TIP KIT

PART NO.	DESCRIPTION
PDE61-22-3	PROPORTIONER
740160	INLET HOSE ADAPTER
740161	STREET ELBOW
740162	ADAPTER
740163	MAGNET
740164	SPACER
740165	PLUNGER
740166	SCREWS
BR600	RUBBER WASHER
PDE100-11P	FOOT VALVE
XAF1	8' PLASTIC TUBING (1/4" I.D.)
BR601	INLET WASHER SCREEN
PHY005-003	FLOAT ASSEMBLY
PDE63-87	VALVE REPAIR KIT

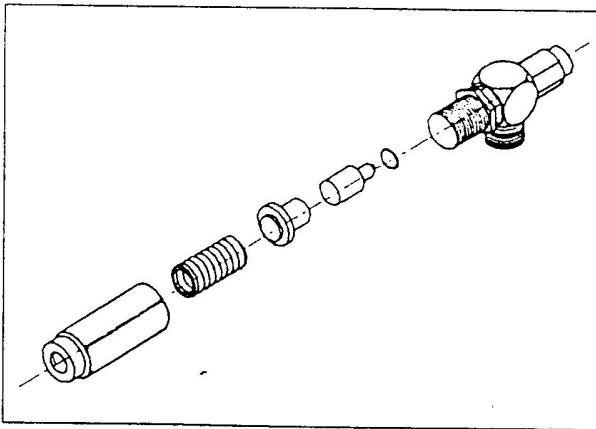


When the wand valve is engaged, a pressure drop of approximately 50 PSI is considered normal. However, if pressure drops greatly exceed 50 PSI, or if there is strong pulsation in the solution hose, you should prime the pump.

**Pump Motor:** The twin piston pump is directly driven by a 1/2 HP, dual capacitor, energy efficient motor. The electric motor requires no maintenance.

**Pressure Regulator:** Pressure is easily adjusted by a pressure regulator located on the front of the machine next to the pressure gauge. To increase the solution pressure, twist the regulator handle clockwise. To lower pressure, turn the handle counterclockwise. Do not operate the pump above 450 PSI. Refer to Figure 4, should the pressure regulator ever need maintenance or require reassembly.

**Figure 4**



*Pressure Regulator Breakdown*

**Priming the Solution Pump:** Connect the pressure hose to the female quick disconnect (QD) on the front of the machine. Turn the shut off valve on the pressure hose to the off position. Insert an open-ended male QD into the female QD on the end of the pressure hose. Turn on the Pressure Pump Switch and the vacuum switches (all three switches). Direct the solution back into the waste tank through the vacuum inlet and turn the shutoff valve to the

on position. Cup your hands around the vacuum inlet allowing the vacuum from the FX-88 to pull the solution through the solution hose. Allow solution to run for 10 seconds. This allows the solution to push out any air in the pumping system. Repeat this procedure if necessary. When the pressure hose is connected to the wand, the pressure drop should only be approximately 50 PSI.

### VACUUM SYSTEM

**Vacuum Motors:** The FX-88 utilizes a unique three vacuum system which produces both outstanding vacuum lift and air flow for superior extraction and drying times. The vacuum system can be used with one or two vacuum motors for cleaning delicate fabrics, or all three vacuum motors for carpet cleaning and water extraction.

**Automatic Vacuum Shut Off:** The flapper assembly shut off, on the vacuum stand pipe, prevents the waste tank from overflowing the stand pipe and damaging the vacuum motors. This will cut off vacuum to the waste tank, vacuum hose, and wand. When this happens, immediately turn off the vacuum switches and empty the waste tank.

The flapper assembly has a two-part filter to prevent lint and debris from entering the stand pipe. Refer to the MAINTENANCE section for removal and proper cleaning.

**Waste Tank:** The vacuum system requires proper maintenance of the waste tank filter bag. Refer to the MAINTENANCE section for removal and proper cleaning of the filter.

It is also necessary to use a defoamer to eliminate foam build-up in the waste tank which could lead to foam/moisture entering the vacuums and contributing to early failure of the vacuum motors.

Failure to properly maintain the filtration system and utilize defoamer, will void the warranty on the vacuum motors.

If moisture does enter the vacuum motors, refer to "WD-40 Vac Motors" under MAINTENANCE.

To prevent moisture from damaging the vacuum motors during storage, empty the waste tank and store with the lid open.

### **AUTOMATIC WASTE PUMP-OUT**

Connect the black 1 1/4" x 50' drain hose to the automatic pump-out port located in the upper left corner on the front of the machine. Secure the other end of hose where you wish to direct the discharge of waste water, such as a toilet or sink.

Fasten the discharge end of hose tightly. Turn on the Automatic Pump-Out switch. The pump will turn on automatically when water in the waste tank is approximately 2/3rds full. The pump will discharge the waste water down to a level of about 2 inches in the waste tank. DO NOT TURN ON THE AUTOMATIC PUMP-OUT SWITCH WITHOUT THE DRAIN HOSE IN PLACE. This pump-out system has been designed to stay up with flood restoration work and is capable of pumping 20 gallons per minute.

## **Maintenance**

<b>OPERATION</b>	<b>INTERVAL</b>
Clean Fill Hose Screen	Each Job/Daily
Clean Chemical Feed Foot Valve	Each Job/Daily
Clean Fresh Water Tank Filter	Each Job/Daily
Clean Waste Tank Filter Bag	Each Job/Daily
Clean Vac Shut Off Foam Insert	Daily
Clean Vac Shut Off Screen	Daily
Clean Auto Pump-out	Daily As Needed
Clean Wand Jets	Weekly
Grease Pump	Every Two Weeks
Run Auto Pump-out	Every Two Weeks
Flush Solution System	Monthly
WD-40 Vac Motors	As Needed

The above operations are fully outlined on the following two pages. Proper maintenance is necessary to achieve maximum operating performance from your FX-88. Failure to properly maintain your machine could void the warranty.

## **ACCESSING COMPONENTS**

Disconnect all hoses, unplug the electrical cord, and drain the solution and waste tanks.

### **FILL HOSE SCREEN**

Located in the female garden hose fitting on the Automatic Fill Hose. Remove screen, clean, and replace.

### **CHEMICAL FEED FOOT VALVE**

The foot valve is on the end of the chemical supply tube of the automatic chemical feed system. It is not necessary to remove the filter from the tubing. Just rinse with fresh water. If necessary, use a tooth brush to remove detergent build-up. Note: a heavy build-up is a warning sign that the solution system should be flushed—see “Flushing Solution System.”

### **FRESH WATER TANK FILTER**

Located at the bottom of the solution tank. Unscrew the filter counterclockwise and rinse with fresh water. If necessary use a tooth brush to remove detergent build-up. Note: a heavy build-up is a warning sign that the solution system should be flushed—see “Flushing Solution System.”

### **WASTE TANK FILTER BAG**

The waste tank filter bag should be cleaned out after every job. This filter bag will catch the larger debris and most lint. The filter bag is attached by a drawstring. Untie the drawstring, clean the filter bag, and reinstall. Never operate the FX-88 without the filter bag in place.

### **VAC SHUT OFF FOAM INSERT AND SCREEN**

Inside the vacuum waste tank, on top of the stand pipe, is the vacuum shut off flapper

assembly. Twist off the flapper assembly from the stand pipe, remove the foam insert, and clean both the insert and the screen. If the insert is excessively dirty, it may be rinsed with water. However, do not reinstall it until it has thoroughly dried.

These screens should be cleaned frequently if the FX-88 is being operated in an environment which has an abnormal buildup of lint and debris, such as cleaning newly installed carpet. Loss of vacuum is most normally associated with lint buildup in these filters at the top of the vacuum stand pipe.

### **AUTO PUMP-OUT**

The Automatic Pump-Out system is capable of handling most debris that passes through the waste filter bag. However, for optimum performance, keep the waste tank clean and remove debris from the filter screen of the pump-out. This should be done on a daily basis, or as needed, depending upon use, and amount of debris.

Every two weeks, run the pump-out with a full tank of clean water, to insure that debris and lint are not accumulating in the base of the pump.

To service the pump-out more thoroughly, unhook the vacuum cuff, cut the zip tie around the looped electrical cord, and lift it out of the waste tank. Unsnap the screen from the bottom, clean, and clean out the area inside.

If necessary, remove the six screws holding the base to the motor housing, and clean the base. If the impeller is removed make sure that a spacing of .050" with shaft pushed toward housing is maintained when reassembled.

**WAND JETS**

Remove jets and visually check for wear and debris. Water or compressed air is best for cleaning—NEVER use a metal object to remove debris, as it may damage the jet orifice. If excessive wear is apparent, the jet should be replaced. Under normal operating conditions, it is recommended that the jets be replaced every 6 months. If the wand is equipped with jet screens, those should be cleaned by rinsing with water. Reinstall the jets using Teflon tape on the threads. Hook up the wand to machine, and check jet alignment.

**GREASE PUMP**

Refer to "ACCESSING COMPONENTS," above, to gain access to the pump. Remove the white safety cap at the front of pump exposing the grease fitting. **Grease pump with only a 1/4 stroke of grease gun. Too much grease or too much pressure will blow out the bearing seal. Over greasing will break seal. Once this seal is broken, no amount of grease will stay in bearing, voiding pump warranty.** Use a quality, high temperature bearing grease. Wipe away excess grease and reinstall safety cap.

**FLUSH SOLUTION SYSTEM**

At least once a month, the FX-88, hoses, and tools should be flushed to remove alkaline residues. Follow the steps on page 8 of the "Recommended Procedure for Storage," using a solution of one part warm water with three parts white vinegar, in place of the antifreeze solution. Then, repeat the steps using two gallons of fresh water.

**WD-40 VAC MOTORS**

Should moisture ever enter the vacuum motors, completely drain the waste tank, open the waste tank lid, remove the vac shut off flap-

per assembly, turn on all three vacuum motors, and spray a five second burst of WD-40 into the standpipe. Continue to run the vacuum motors for at least three minutes.

To prevent moisture from damaging the vacuum motors during storage, empty the waste tank and store with the lid open.

## **STORAGE AND FREEZE PROTECTION**

Care must be taken to protect your FX-88 from freezing. Freezing could seriously damage the FX-88 as well as fittings and valves. Freezing is not covered under the limited warranty and you should always store your equipment in areas where the temperature remains above 40° F. If you plan on storing the FX-88 for a prolonged period of time, the following procedure should help prevent your FX-88 from freezing, and prevent the pump seals from drying out.

### **Recommended Procedure for Storage:**

- STEP ONE:** In a separate container, mix ½ gallon of water with ½ gallon of automotive radiator antifreeze (ethylene glycol type). Mix well, and pour into the solution tank.
- STEP TWO:** Connect the pressure hose to the female quick disconnect (QD) on the front of the machine. Turn the shut off valve on the pressure hose to the off position. Insert an open-ended male QD into the female QD on the end of the pressure hose.
- STEP THREE:** Prime the solution pump, directing the flow of solution back into the solution tank. When primed, turn down the pressure to 100psi.
- STEP FOUR:** Disconnect the open-ended QD and connect the solution hose to the male QD at the auto fill/chemical feed connection.
- CAUTION:** Applying high pressure (over 100 psi) to the chemical feed system will damage the mechanism.
- STEP FIVE:** With the chemical feed supply tube at the bottom of the solution tank, turn on the pump, and allow to circulate for 10 minutes. Check to make sure the chemical supply tube is drawing the antifreeze solution. This will introduce antifreeze into the chemical feed system.
- STEP SIX:** Disconnect the solution hose from the chemical feed, and allow the system to bypass for 10 minutes. This will work antifreeze into the pressure gauge.
- STEP SEVEN:** Attach any wands and hand tools that will also be stored with your FX-88. Open valve for 30 seconds, directing the spray to the solution tank. Disconnect hose and with valve open and the jets pointing down, depress the dimple on the male QD. This will drain the solution out of the tool. Drain thoroughly before storing.
- STEP EIGHT:** Turn off the pump and disconnect all hoses and tools. Vacuum out the solution tank and thoroughly drain the waste tank and vacuum hose.

**The automatic pump-out does not require freeze protection, as long as the waste tank is completely drained, and allowed to thoroughly dry.**

**Return to Service:** To return the FX-88 to service, flush the pressure system by repeating the above steps, using fresh water in place of the antifreeze solution.