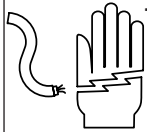


INSTRUCTIONS AND REPAIR PARTS LIST WARRANTY INFORMATION

MC - MH - MJ - MK SERIES AUTOMATIC WATERERS

READ ALL DIRECTIONS CAREFULLY BEFORE BEGINNING INSTALLATION

WARNING



1. INSTALLATION MUST BE MADE AND MAINTAINED IN STRICT ACCORDANCE WITH NATIONAL/LOCAL PLUMBING AND NATIONAL/LOCAL ELECTRICAL CODES (CSA IN CANADA). INSTALLATION MUST BE MADE BY A QUALIFIED ELECTRICIAN. THE APPLICABLE PROVISIONS OF THE ABOVE MENTIONED CODES TAKE PRECEDENT. IMPROPER ELECTRICAL INSTALLATION AND MAINTENANCE MAY RESULT IN SERIOUS INJURY OR DEATH FOR PERSONNEL OR LIVESTOCK.
2. EACH ELECTRICAL UNIT MUST BE WIRED THROUGH A FUSED SWITCH BOX AND FUSED ACCORDING TO AMPS REQUIRED FOR EACH SPECIFIED ELECTRICAL UNIT. SEE EXHIBIT A. CANADIAN ELECTRICAL CODE--PART 1 REQUIRES LIVESTOCK WATERERS INSTALLED IN FEEDLOTS IN OPEN FEEDING AREAS TO BE GROUNDED BY A SEPARATE STRANDED COPPER GROUNDING CONDUCTOR OF AT LEAST NO. 6 AWG TERMINATING AT A POINT WHERE THE BRANCH CIRCUIT RECEIVES ITS SUPPLY.
3. THIS UNIT MUST BE GROUNDED TO A COPPER GROUND ROD 5/8" (1.6CM) DIAMETER BURIED AT LEAST 8 FEET (2.5 METERS) IN UNDISTURBED SOIL. SEE EXHIBIT A.
4. DO NOT USE SUPPLEMENTAL HEAT SUCH AS A SPACE HEATER.

We know that you will be pleased with your decision to purchase a Brower waterer. Please take time to familiarize yourself with this manual. Included are tips that will make use of your waterer more trouble free and more economical. Red and white Brower waterers were marketed under the Marlor label for 25 years. Marlor waterers carried a light green and white color scheme. Brower parts will service most Marlor waterers. This instruction manual covers the following model numbers: MC32E, MC32N, MK32HE, MK32HN, MJ31HE, MJ31HN, MC32HE, MC32HN, MH30E, MH30N.

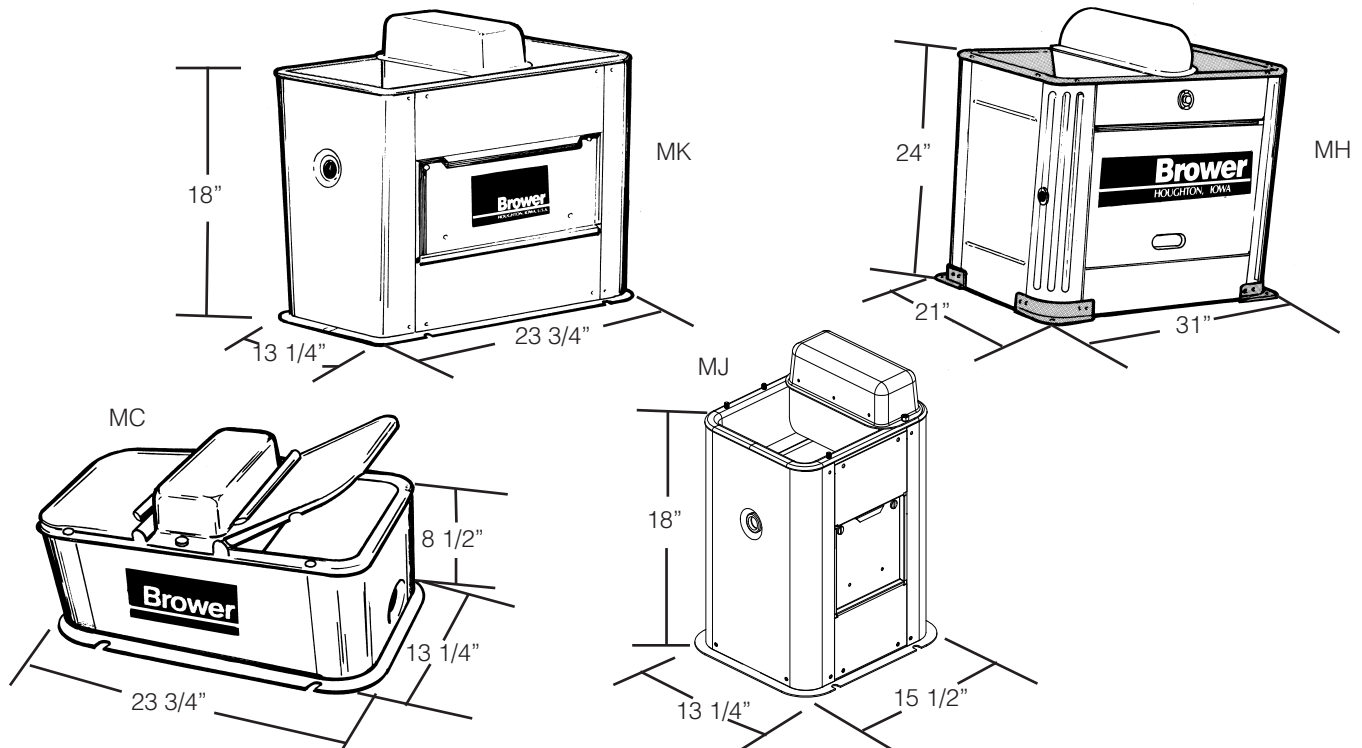
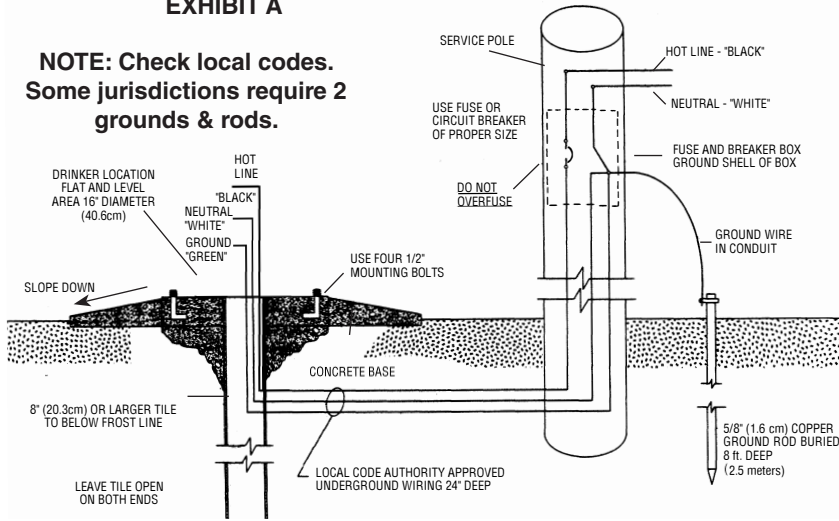


EXHIBIT A

NOTE: Check local codes. Some jurisdictions require 2 grounds & rods.



The following is intended to be used as a general guide for wiring electrically heated waterers. Paragraph 5, 6, and 7 are taken from ASAE Engineering Practice: ASAE EP 342.3. Safety for Electrically Heated Livestock Waterers, October 2015. Installation can only be completed by a qualified electrician.

5. Electrical Service

- 5.1 Service conductors should conform to the following:
 - 5.1.1 Conductors shall have sufficient ampacity for the load to be served.
 - 5.1.2 Overhead conductors shall have mechanical strength for the distance spanned. The conductors shall not be smaller than NO. 8 American wire gage, AWG, copper.
 - 5.1.3 Buried connectors shall be of type USE (or UF when protected as a feeder or

branch circuit) and shall be buried at least 610mm (24 in.) below the ground surface (or according to state/load codes). Wet rated conductors in non-metallic conduit are also recommended for providing service.

5.2 Waterer installed near or in a building may be served by a dedicated 15A GFI from the service equipment of the building.

6. Supply Circuits

- 6.1 Waterers installed within or near a building and shall be served by a dedicated 15A GFI from the service equipment of the building and shall be connected as in Exhibit B.
 - 6.1.1 The equipment grounding conductor shall originate at the service equipment of the building.
 - 6.1.2 The equipment grounding conductor shall be connected to the equipment grounding terminal of the waterer and bonded to any intermediate enclosure or device that requires grounding. The equipment grounding conductor shall be isolated from the grounded (neutral) conductor at every point beyond service equipment.
- 6.2 An individual waterer installed in a lot and served by separate service equipment shall be connected as in Exhibit C.
 - 6.2.1 Overhead conductors shall be firmly attached to support points and conform to 5.1.1 and 5.1.2. Buried conductors shall conform to 5.1.3.
 - 6.2.2 The incoming grounded conductor shall be bonded to the service equipment enclosure and to a grounding electrode conductor at the grounding bar in the service equipment. The grounding electrode conductor shall extend to a grounding electrode (a ground rod or other effective electrode).
 - 6.2.3 An equipment grounding conductor shall originate at the service equipment and shall be installed with the circuit conductors to the waterer.
 - 6.2.4 The equipment grounding conductor shall be installed as described in 6.1.2.

7. Multiple Installations

- 7.1 When more than one waterer is to be served from a central service, the service equipment should be located near the load center.
- 7.2 Each waterer shall be connected as specified in 6.2.

NOTE: THE USE OF THE RISER PIPE AS A GROUNDING MEANS IS NOT RECOMMENDED

There shall be only **one** ground fault interrupter in the electrical delivery to the waterer.

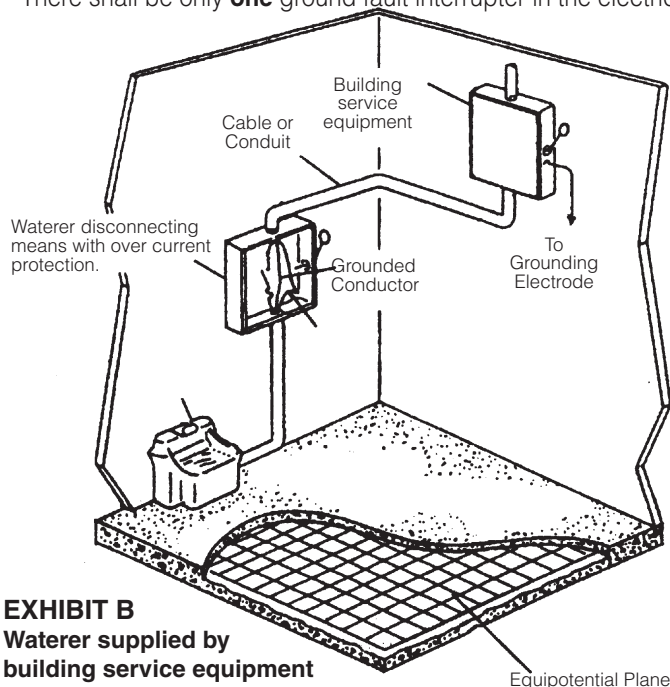


EXHIBIT B
Waterer supplied by building service equipment

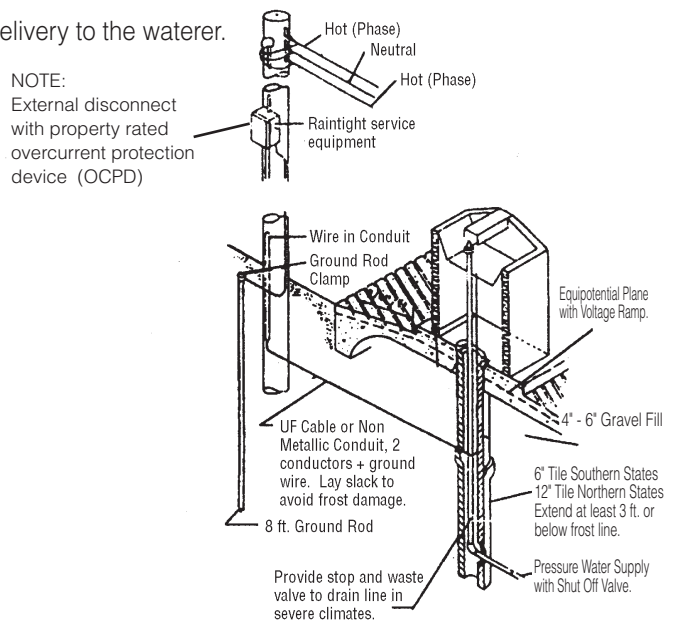


EXHIBIT C
Waterer supplied by its own service equipment

INSTALLATION

- 1** LOCATION: Locate waterer in a place sheltered from the prevailing winds for reduced energy consumption. Install the waterer 25 feet or more from self-feeders or bunk feeders to reduce the amount of feed and salt that is dropped into the waterer.
- 2** WATER SUPPLY LINE: Horizontal underground waterline should be sized to account for any pressure drop relating to distance. The vertical supply pipe should be rigid plastic, copper or galvanized. We suggest you use a 1/2" (1.27 cm) pipe for hog waterers and a 3/4" (1.91 cm) for cattle waterers. Water lines over 50 feet (15.3 m) should be one inch (2.54 cm), or larger. Use of undersized feeder pipe causes excessive pressure drop and loss of recovery capacity of waterer. Models are equipped with the following for supply connection: MH- 1/2 inch (1.27 cm), MC, MJ, and MK – 1/4 inch (.635 cm)

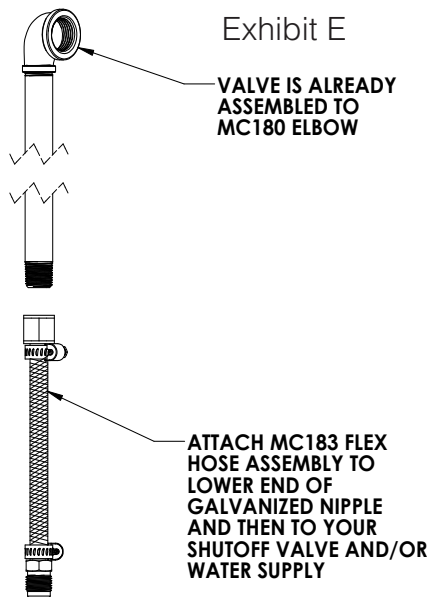
A shutoff valve should be provided under the waterer to shut off water when servicing. Flush supply pipe thoroughly before connecting to fountain. Water supply with foreign material such as sand, rust, etc. may require a filter to keep valve working properly.

The full length of the vertical supply pipe must be centered in a 6-inch (15.3 cm) (or larger if the waterer will accommodate it) riser tile or PVC casing. Extend the tile from a point 1 inch (2.54 cm) above the top of your platform to a point below the frost line. DO NOT place insulation or other materials in the tile. This will stop the air flow and cause water line to freeze up. Consider using an insulated foam sleeve on the vertical supply line (not included).

- 3** MOUNTING PAD: Waterer must be mounted on a concrete pad. The pad should be sloped about one-quarter inch per foot away from the waterer. We recommend a minimum thickness of four inches (10.2 cm). The size of the pad is left to the user's discretion but we suggest you pour a pad large enough for livestock to stand on while drinking. This is about 8' square (.75 square meter) for MC, MJ, and MK models and 16' square (1.5 square meters) for model MH. An additional 4" to 6" pedestal (on top of the pad) extending 10 to 12 inches from the waterer on all four sides will provide protection from livestock backing up to or rubbing against the waterer. It will also protect it from manure and manure handling equipment. A rough broom finish to the concrete surface provides a better footing for livestock.

BE SURE TO PLACE A COPPER GROUND ROD TO USE IN GROUNDING THE WATERER AS SHOWN IN EXHIBIT A. THE WATERER MUST BE GROUNDED AT LEAST 8 FEET (2.4 meters) INTO THE GROUND.

- 4** SETTING THE WATERER: Once the concrete is firm, mark the concrete for bolts by referring to Exhibits B, C, and D. Space the bolts so you can easily line up the inlet pipe connection in the waterer. It is advisable to make a template of the base of the waterer to check holes before the concrete is set. Alternatively, you may wish to mark the concrete after it has set and drill holes to hold the anchor bolts. Install four 3/8" (.95 cm) x 5" (12.7 cm) bolts (not included) in the concrete. When the concrete is dry, we recommend that you caulk (all weather sealant) the area of waterer base contact. This will prevent air from leaking under the waterer and decreasing energy efficiency. Also a sheet of aluminum foil placed over the concrete pad inside the waterer will reduce heat loss. Also a sheet of aluminum foil or an aluminum faced foam board (not included) placed over the concrete pad inside the waterer will reduce heat loss.



6 INSTALL FLOAT: SEE EXHIBITS F AND G. Screw either VA225P 1 1/8" arm (MC, MJ, MK) or WC726P 3 5/8" arm (Ref No 10) into the boss on OP321 Float (Ref no 11). The hole on the float is not threaded. Make sure the arm is threaded in as straight as possible. Note that the float goes in the water in the vertical position. The arm can be tightened using VP115 (ref No 9) adjust screw (wing nut or thumb screw). You can alter the water level in the trough by changing the float position. Loosen the adjust screw and try various float positions until the desired level is attained. Tighten adjust screw securely. Place the valve cover, drain and refill the trough several times to ensure that the float arm operates freely. If the float tilts to one side or the other, loosen the assembly nut (Ref No 8) and turn the valve body slightly. If you still think there is interference, you may need to trim some insulation underneath of the cover. If you have high water pressure, it may be that the float will not always stay in the same position where you would like to have it. A star washer (not included) placed between the VP29 valve arm and the float arm will help secure the float at the desired height.

7 VALVE ADJUSTMENT: Water flow is controlled to a degree by the size of the valve orifice (Ref No 5). More water flows with the VP26 1/4" orifice than with VP24 1/8" orifice. The two orifices are interchangeable without changing the valves. If you have low or gravity flow pressure, you might be able to use a VP26 orifice in a VP226 valve to get higher water flow. If your valve will not shut off completely, check your water pressure. The valve works best on water pressure up to about 60 psi. Higher pressures may require the installation of a pressure regulator. If the float bounces, valve chatters or there is a pounding noise in the water line when the water turns on or off, it can be due to an excessive amount of air in the water line. The best course probably is to consult an experienced plumber as there can be several options to correct this.

If there are issues with valves, they tend to be related to high water pressure as discussed above. The origin of high water pressure issues tend to be rural or urban water systems. If your water source is your own well, low pressure is more likely to be an issue. Low water pressure from wells can have many sources including: low water yields from the well, size of the well casing, adequacy and working condition of the pump, pressure settings if available, size of distribution pipes among others. Consult a well driller or knowledgeable plumber. Higher pressures may require the installation of a pressure regulator. ALSO NOTE: If you purchased Models MC, MJ or MK, you are receiving our VP226 valve, which comes with VP24 orifice. VP24 orifice has an 1/8 inch opening. See Exhibit F. Also included with VP226 valve, is a small poly pack containing a VP25 orifice. If water drip is a problem and you believe you have done everything correctly- installation, controlled water pressure, etc, try VP25 orifice. It has a 3/32 inch opening. It flows about .5 to 1.5 gallons per minute.

8 HEATER: Model 77 heater is installed on our MC, MJ, MK, and MH waterers. Model 77 is a 500 watt heater that plugs into a 120 volt outlet. It draws a maximum of 4 amps. The heater features a control knob which allows a range of 15 watts (at the lowest setting) to a maximum of 500 watts. You will probably never need to turn the knob more than about half way. The electrical supply line needs to be installed by a qualified electrician in accordance with all electrical codes. See the WARNING on page 1 and Exhibit A on page 2. When heat is not needed, we recommend that you unplug the heater. The heater is not thermostatically controlled. The heater is not immersible.

Model 77 Utility Heater is warranted for 18 months. Please return your warranty card. The serial number for your model 77 heater is found on the label which is around the control knob. Look for it just below the knob.

If a new unit fails to operate after installation of the unit has been installed and working and then begins to freeze, check the following:

Make sure the heater is getting 120 volts of electricity. Low voltage will reduce the heat put out. If no electricity is present, turn off the main fuse box for the unit. Check all wire connections to sure they are correct and tight. Check all fuses. Then, turn on the electricity.

Make sure the water trough is clear of mud and silt. Mud can insulate and not allow the water to heat.

If you are sure that adequate electricity is being delivered to the unit and there is still no heat, most likely the heater needs to be replaced.

EXHIBIT F- FOR MC, MJ, MK

VP226 VALVE
VA225P FLOAT ARM
OP321 FLOAT

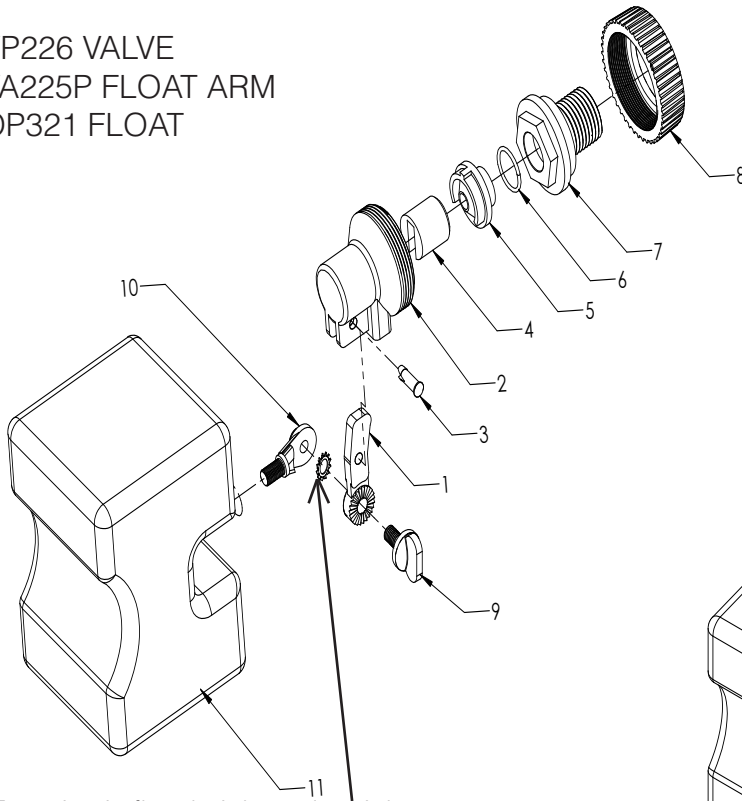
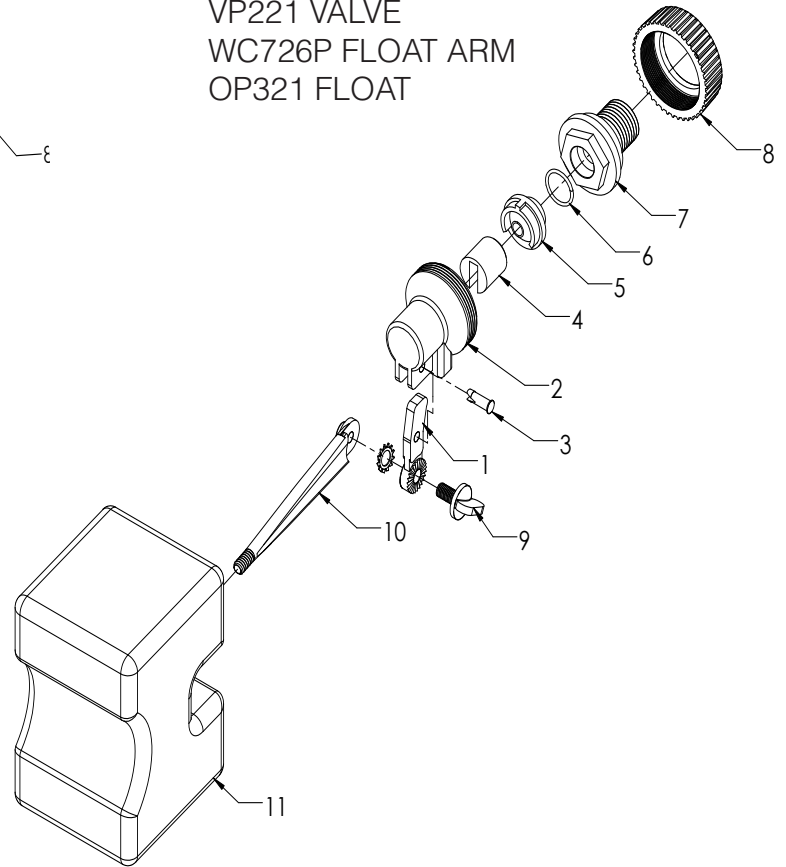


EXHIBIT G- FOR MH

VP221 VALVE
WC726P FLOAT ARM
OP321 FLOAT



To maintain float height under high water pressure, consider adding a star washer (not included) between the valve arm and the float arm.

VP2 PARTS LIST

Ref No	Item Number	Description	VP226 Valve for MC, MJ, MK	VP221 Valve for MH	VP2-1/8RP* Repair	VP2-1/4RP* Repair
1	VP29	Valve Arm, Poly	•	•	•	•
2	VP21	Valve Body, Poly	•	•	•	•
3	VM106	Lock Pin, Poly	•	•	•	•
4	VP28	Plunger, Poly/Rubber	•	•	•	
5	VP24	1/8" Diameter Orifice, Poly	•		•	
5	VP26	1/4" Diameter Orifice, Poly		•		•
6	VP112	5/8" O-Ring x .103, Rubber	•	•	•	•
7	VP117	3/4" NPT Base, Brass		•		
7	VP118	1/2" NPT Base, Brass	•			
8	VP15	Assembly Nut, Poly	•	•		
Adjust screw, Float Arms, Float (none are included as part of the valve)						
9	VP115	Adjust Screw, Poly	•	•		
10	VA225P	1 1/8" Float Arm, Poly	•			
10	WC726P	3 5/8" Float Arm, Poly		•		
11	OP321	Float Poly 3 1/2" x 4 1/2" x 3"	•	•		

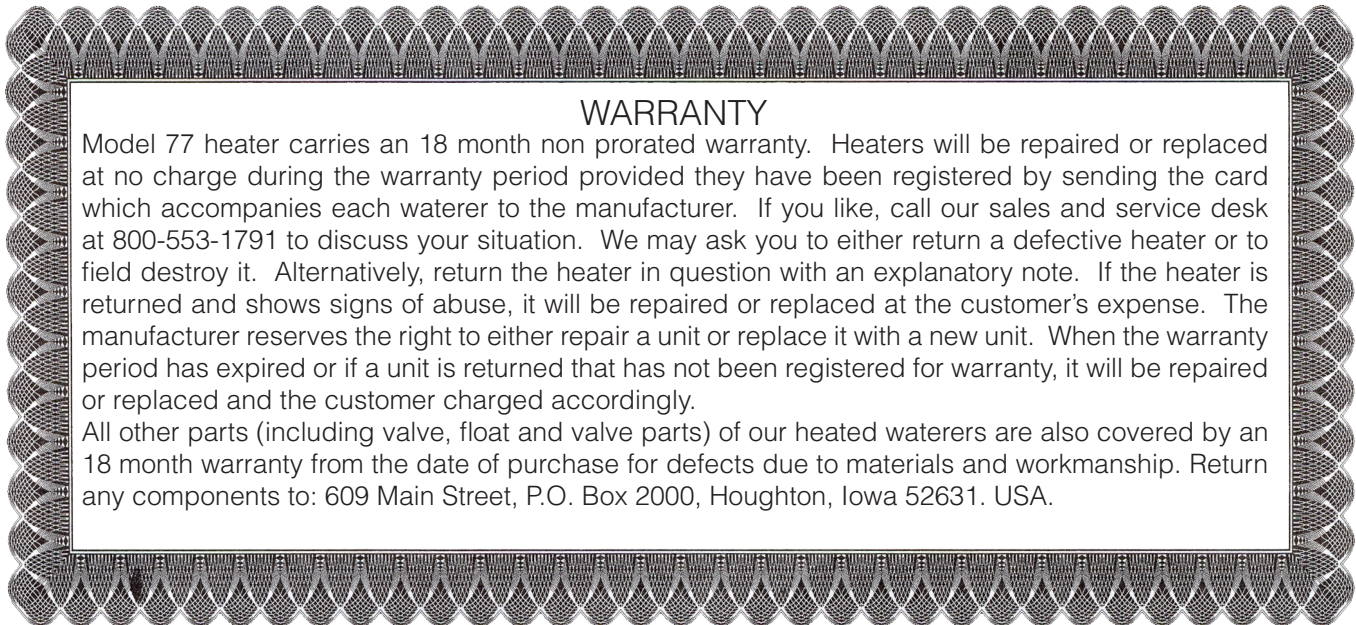
*You can purchase individual parts or you can purchase the 2 repair kits which include Ref. nos. 1 through 6. These kits do not include the brass base or the assembly nut.

Table 1
VP2 VALVE FLOW RATES
Gallons Per Minute

PSI	VP226	VP221
	VP24 - 1/8" (.125) Orifice	VP26 - 1/4" (.25) Orifice
25	1.1	4.2
40	1.3	7.5
60	1.6	9.2
80	1.9	9.7

Flow rates at discharge can vary depending on the diameter of the supply line, the distance water travels to the waterer, variability in water pressure, the buildup of deposits inside the water supply line among other factors.

ELECTRIC HEATING UNIT OPERATION



ELECTRICALLY HEATED WATERERS AND ENERGY USE

Our waterers are insulated with polyurethane foam with an R value of 7.14 per inch. Our foam contains no formaldehyde and is not attractive as a food source to vermin. Here is a check list of items to consider in the management of your waterer with regard to energy use

1. Inspect condition of wiring and insulation before each heating season.
2. Check waterers daily for cleanliness and proper operation of the water valve and heater.
3. In warm seasons, make sure excess condensation is not forming inside the lower cabinet of the waterer which can contribute to the deterioration of insulation and the heater.
4. Counter the effects of cold winter winds with a wind barrier which will reduce energy consumption.
5. Repair leaking valves to eliminate wasting water which has already been pumped and heated.
6. Caulk or close up openings in the waterer cabinet especially around the foundation.
7. Make sure the electric service wires are of the proper size.
8. Make sure waterers are properly grounded to prevent leakage (as well as to ensure safety).

OPTIMAL WATER TEMPERATURE: Studies have shown that there is little, if any, variation in daily water intake, feed intake, daily gain or feed efficiency with different water temperatures. Heating the water above say 40 degrees F in the winter will increase costs but there is no evidence to suggest improved animal performance. Animal water consumption is more dictated by ambient air temperature than by the temperature of the drinking water.

REPAIR PARTS

Valve and float part numbers are shown on page 6. Following are other parts available. There may be some other parts available, such as cabinet panels, which are not listed. Ask our sales desk about these.

	MC	MJ	MK	MH
Trough Assembly	MC168-1 (1 Stud for Heater)	MA168-0 (No Stud)	MC168-0 (No Stud)	MH302SS (No Stud)
Top Angle Assembly 1/4-20 x 3/4	MC170		MC170	
Truss Screw Tough Corner	OF196	OF196	OF196	MH30SS
Cover Drain Fitting, Rubber	MC163	MC163	MC163	MF164
Plug F/ Trough, Rubber	A203R	A203R	A203R	OM5R
Valve Cover Assembly	MC166	MA165	MC166	MH315
5/16 Hex Nut Brass (to retain valve cover)	OF146	OF146	OF146	OF146
Access Door Assembly	MC175	MJ313	MK311	WE539
Hardware for Door:				
1/4" Turn Stud, SS	OF196	OP77	OP77	
1/4" Clip on Receptacle		OP78	OP78	
Stud Retainer		OP79	OP79	WE343 LATCH ARM
Heater:	77	77	77	77 (Takes 2)
Heater Bracket (Attaches Heater to Trough)	M77MB			
Heater Standoff (Attaches Heater to Cabinet)	None	MK315	MH316	MH316
Washer for Valve	MF197	MF197	MF197	OF627
Inlet Pipe Assembly (Elbow & Pipe Nipple)	MC174	MK317	MK317	MF186
Flex Hose Assembly	MC183	MC183	MC183	None
Hinge Rod	MC162			
1/8" x 3/4" Cotter Pin	OF78			
Mud Grate	MC158			
Trough Lid	MC167			
Trough Lid Hinge	MC159			