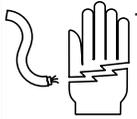


INSTRUCTIONS AND REPAIR PARTS LIST WARRANTY INFORMATION

MC - MH - MJ - MK SERIES AUTOMATIC WATERERS

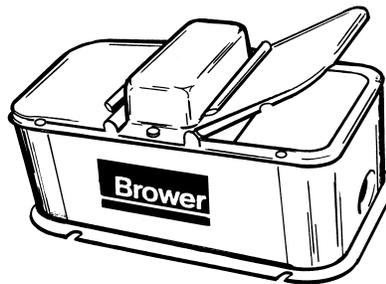
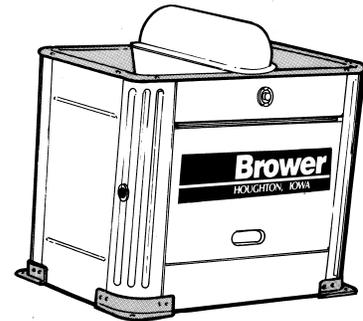
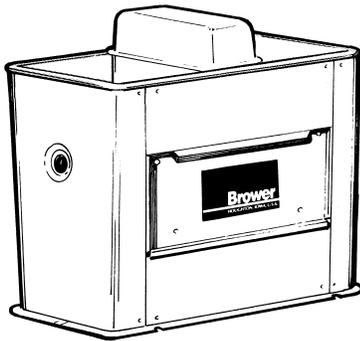
READ ALL DIRECTIONS CAREFULLY BEFORE BEGINNING INSTALLATION

⚠ 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 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 ELECTRIC UNIT. SEE EXHIBIT A. CANADIAN ELECTRICAL CODE - - PART 1 REQUIRES LIVESTOCK WATERERS INSTALLED IN FEEDLOTS IN OPEN FEEDING AREAS TO BE GROUNDED BY A SEPERATE 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 (2.4 METERS) IN UNDISTURBED SOIL. SEE EXHIBIT A.

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.



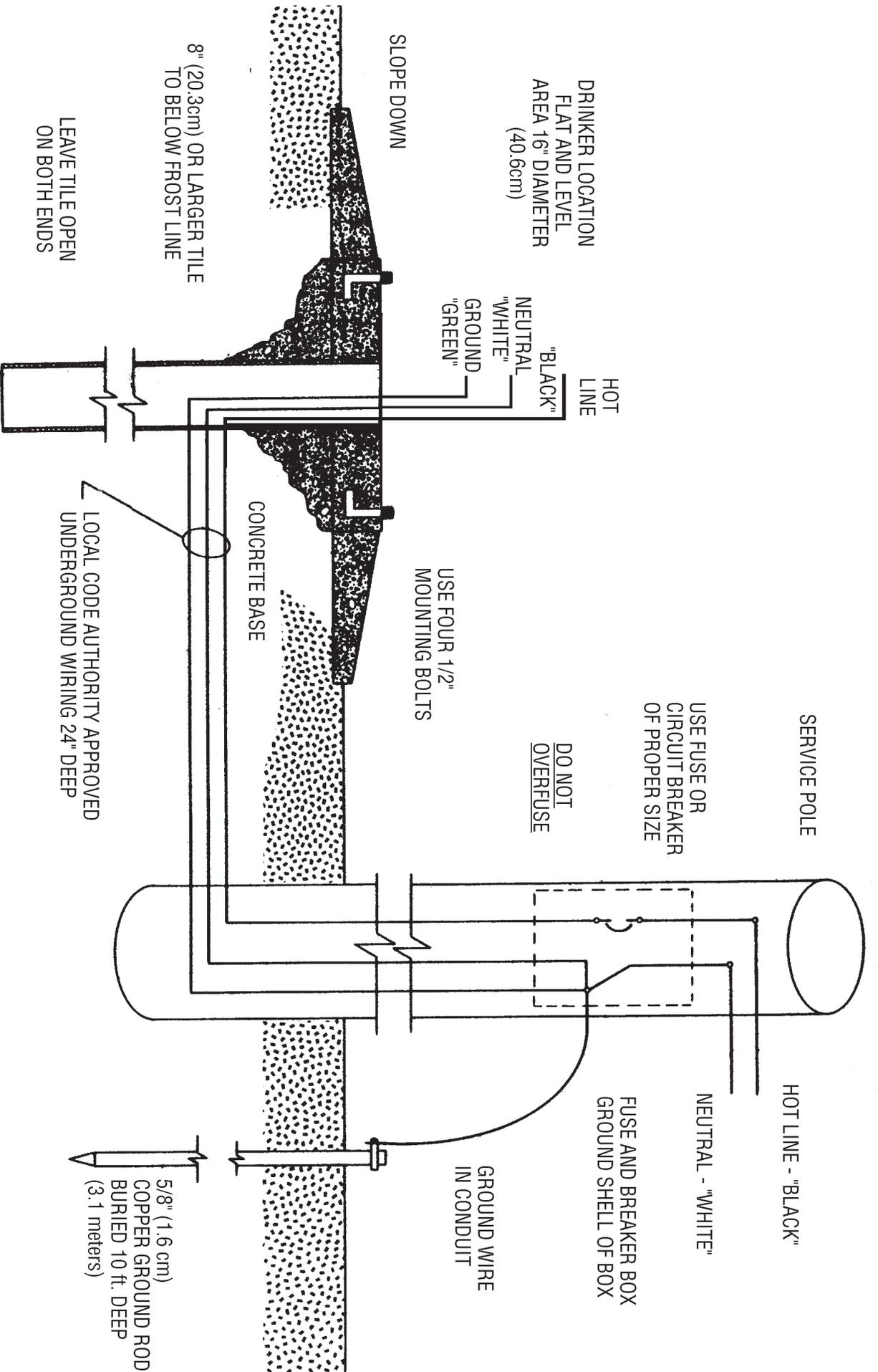


EXHIBIT A

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.

- 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" (10.2 cm) pedestal (on top of the pad) extending 8 inches (20.3 cm) 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.

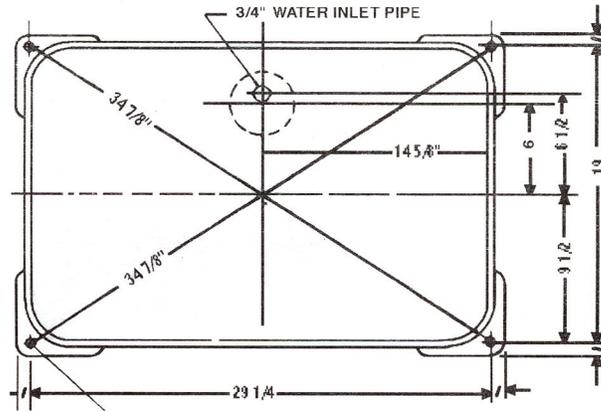
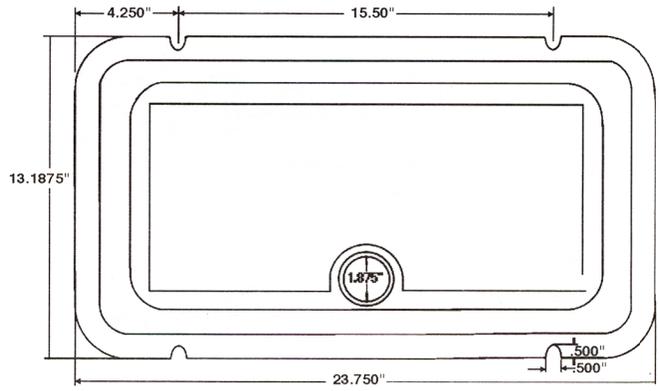
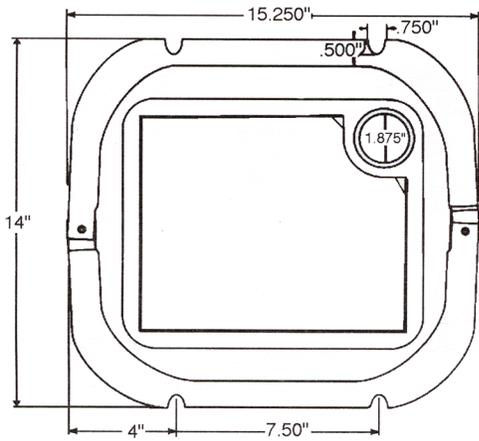
BE SURE TO PLACE A COPPER GROUND ROD TO USE IN GROUNDING THE WATERER AS SHOWN IN EXHIBIT A. THE WATERER MUST BE GROUNDED AT LEAST 8 FEET (2.4 meters) INTO THE GROUND.

- 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.
- 5 CONNECTION TO SUPPLY LINE:** Connect a hose or pipe fitting to the shutoff valve at the top of the concrete. Cut hose or pipe to proper length and connect to waterer. A flexible connector should be used with a small "S" shape to relieve strain if frost heaving is possible. An inflexible connection should use a "swing joint:" to prevent frost heave problems. Hose or pipe should not touch the outside surface of fountain or heating element.
- 6 FLOAT ADJUSTMENT:** The water level in the trough is varied by changing the float position. Loosen the wing screw and try various float positions until the desired level is attained. If a relatively consistent water level cannot be maintained, the problem is most likely a widely varying pressure (more than 20 psi) in the system. In such a case the basic cause of the trouble must be corrected to get proper operation of the valve. Tighten wing screw securely.

If the float, bounces, valve chatter, or you have a pounding noise in the water line when a waterer turns off or on, it is usually due to an excessive amount of air in your water line. In most situations this can be corrected by using a smaller orifice to cut down the water opening in your valve. (See paragraph 7).

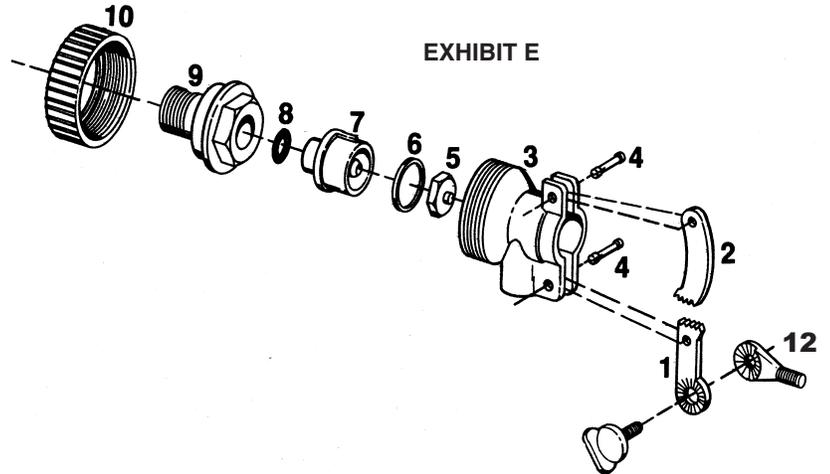
After replacing the float and valve cover, drain and refill the trough several times to ensure that the float arm operates freely.

BASE DIMENSIONS



**MA31E/MA31N/MA31HE/MA31HN
MC32E/MC32N/MC32HE/MC32HN
MJ31HE/MJ31HN
MK32HE/MK32HN
SUPER INSULATED LIVESTOCK WATERER
VALVE PART NO. VP126**

Ref. No.	Part No.	Description	Qty
1	VP19	Power Link, Plastic	1
2	VP110	Cam Link, Plastic	1
3	VP11	Valve Body, Plastic	1
4	VP111	Link Pin, Plastic	2
5	VP18	Plunger, Plastic	1
6	VP113	Diaphragm, Rubber	1
7	VP114	5/32" Orifice, Plastic	1
8	VP112	5/8" Orifice, Rubber	1
9	VP118	Base 1/2" OD, Brass	1
10	VP15	Assembly Nut, Plastic	1
11	VP115*	Adjust Screw, Plastic	1
12	VA225P*	Float Arm, 1 1/8", Plastic	1

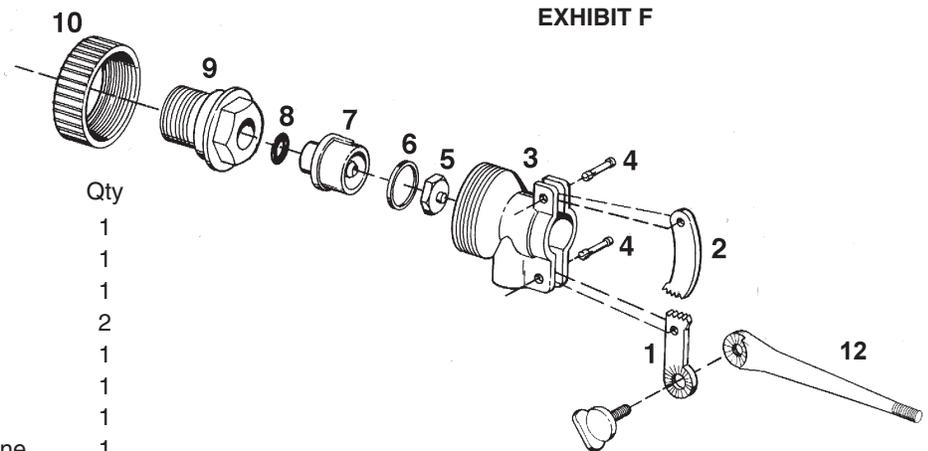


VP115 Adjust Screw and VA225P Float Arm are not included. You must order these two parts separately.

These models use Float Part No. OP286, a 4" round poly float. The float needs to be ordered separately.

**MF30E/MF30N
MH30E/MH30N
ML30E/ML30N
SUPER INSULATED LIVESTOCK WATERER
VALVE PART NO. VP126**

Ref. No.	Part No.	Description	Qty
1	VP19	Power Link, Plastic	1
2	VP110	Cam Link, Plastic	1
3	VP11	Valve Body, Plastic	1
4	VP111	Link Pin, Plastic	2
5	VP18	Plunger, Plastic	1
6	VP113	Diaphragm, Rubber	1
7	VP16	1/4" Orifice, Plastic	1
8	VP112	5/8" "O" Ring x .103 Neoprene	1
9	VP13	Base, 3/4" OD x 1/4" ID, Plastic	1
10	VP15	Assembly Nut, Plastic	1
11	VP115*	Adjust Screw, Plastic	1
12	WC726P*	Float Arm, Plastic, 3 5/8"	1



*VP115 Adjust Screw and WC726P Float Arm are not included. You must order these two parts separately.

These models use float Part No. A405P, a 4 x 5 black poly float. The float needs to be ordered separately.

If the float should catch on any part of the waterer, its lateral position can be changed by loosening the large assembly nut (VP15) and turning the valve body slightly. If float is rubbing on the insulation in the valve cover you can trim the insulation with an ordinary knife.

7 VALVE ADJUSTMENT: All Brower pressure waterers are equipped with valves with interchangeable orifices when shipped. This dependable valve has served our customers since 1975. The standard valve for your unit normally operates on a range of 20 to 60 psi. When your waterer is installed on a gravity flow or low pressure system, you may adjust your valves for more water volume by using a larger orifice in the valve. If your waterer is installed on a high pressure water system (over 60 pounds) you may compensate for extra pressure by using a smaller orifice in the valve. For severe high pressure situations, you may need to install a pressure regulator.

See EXHIBITS E & F for valve repair parts. Table 1 shows valve capacities in gallons per minute at various pressures.

Table 1
VP1 VALVE CAPACITIES
Gallons Per Minute

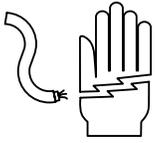
PSI	VP1-14 5/32" Orifice	VP1-6 1/4" Orifice	VP1-7 3/8" Orifice
20	2.44	3.70	5.00
40	3.70	6.25	8.33
60	4.55	7.69	9.62
80	5.00	7.94	9.60

CAUSES OF INADEQUATE PRESSURE INCLUDE:

- **WELL DEPTH:** If you have a shallow well, a deep well will probably solve the water shortage problem. If the water-yielding capacity of the aquifer (water-bearing stratum) is less than your demand for water, install a storage tank
- **SIZE OF WELL CASING:** If you have a large pump on a small diameter well and the water output is slow, then possibly your well diameter is too small.
- **PUMP NEEDS REPAIR OR REPLACING:** Keeping equipment in good repair will assure an adequate water supply at all times. Often screens, foot valves, jets, etc, plug up after use
- **SIZE OF PUMP & PRESSURE SETTING:** Before replacing your old pump or installing a new one, determine your exact water needs, then select a pump based on that determination. One rule of thumb for estimating water requirements in the home is that you need a gallon-a-minute capacity for every water outlet—faucet, sink etc.
- **DISTRIBUTION PIPES TOO SMALL:** Long lengths of pipe and many pipe fittings can greatly reduce the pressure at distant locations from the pump. Running a larger, new line to a distant location of high water demand will solve the problem.
- Consult a trusted well driller or plumber if you suspect any of the above problems.

ELECTRIC HEATING UNIT OPERATION

WARNING



1. INSTALLATION MUST BE MADE AND MAINTAINED IN STRICT ACCORDANCE WITH NATIONAL/LOCAL PLUMBING AND NATIONAL/LOCAL ELECTRICAL CODES (CSA INCANADA). INSTALLATION MUST BE MADE BY A QUALIFIED ELECTRICIAN. THE 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 ELECTRIC UNIT. SEE EXHIBIT A. CANADIAN ELECTRICAL CODE- - PART 1 REQUIRES LIVESTOCK WATERERS INSTALLED IN FEEDLOTS IN OPEN FEEDING AREAS TO BE GROUNDED BY A SEPERATE 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 10 FEET (3.1 METERS) IN UNDISTURBED SOIL. SEE EXHIBIT A.

MC32E/MK32HE/MJ31HE/MC32HE HEATING ELEMENT

If you have purchased one of the following waterer models—MC32E/MK32HE/MJ31HE/MC32HE—your waterer is supplied with Model 77 Utility Heater.

Model 77 Utility Heater is a 500 watt heater that plugs into a 120 volt outlet. This heater has been used successfully on farms for some 15 years.

The heater features a control knob which allows a range of 15 watts (at the lowest setting) to a maximum of 500 watts. You probably will never need to turn the knob more than about half way.

The electrical supply line still needs to be installed by a qualified electrician in accordance with the electrical codes. When heat is not needed, we recommend that you unplug the heater.

Model 77 Utility Heater is not immersible.

Model 77 Utility Heater is warranted for 2 years. Please return your warranty card. The Serial Number for your Model 77 Heater is found on the label around the control knob (look for it just below the knob).

TROUBLE SHOOTING FOR A QUALIFIED ELECTRICIAN ONLY:

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

WATER FREEZES:

- Make sure the electric unit is getting 115 volts of electricity. If no electricity is present, turn off the main fuse box to the unit. Check all wire connections to make sure they are correct and tight. Check all fuses in the line and then turn on electricity.
- Make sure water trough is clear of mud and silt; mud can insulate and not allow heat to reach the water.
- If you still cannot feel any heat at the element, your Model 77 needs to be replaced.

OFF SEASON MAINTENANCE: For extended life of the electrical unit, remove the unit from your waterer in the spring and store in a dry area. Check the unit in the fall before installing in the waterer and you will have less trouble during the heating season.

MH30E HEATING ELEMENT

If you have purchased waterer Model MH30E, your waterer is supplied with heater Model HE1031A. Following is information about your heater and other repair heaters.

- 1 TEMPERATURE ADJUSTMENT:** The thermostat is pre-set at the factory for economical ice-free use (about 40°F, 4°C). To adjust your specific installation temperature, turn the temperature control knob clockwise to increase the temperature of the water (1/4 turn equals about 4°F). Only small adjustments should be made at one time. One complete turn is the maximum at any one time. The small light in the thermostat will glow when the element is on.

To recalibrate you will need a container of water about 40°F (4°C). Place the sensory bulb in water. The indicator light should come on. If not, turn adjusting screw slowly until light comes on. This will calibrate the unit to turn on at approximately 40°F (4°C). It is advisable to remove the heating unit during the summer months. The minimum summer precaution is to turn off electricity to the unit.

- 2 WIRE AND FUSE SELECTION:** Check charts below for correct fuse size (Table 2) and wire size (Table 3) for your specific waterer. All heating units are 115V-AC unless otherwise specified.

**Table 2
Fuse Size**

Water Model	Heater Model	Ratings Watts	At 115V Amps ¹	Waterer Model	Heater Model	Ratings Watts	At 115V Amps ¹
MC32	HE1035	250	2.2	MK32	HE1035	250	2.2
MH30	HE1031	500	4.4	ML30	HE1031	500	4.4
MJ31	HE1035	250	2.2				

¹For straight resistance load, Amps = Watts/Volts; therefore at 120 volts, amps are reduced.

**Table 3
Voltage Drop**

MINIMUM SIZED AWG COPPER WIRE REQUIRED TO ALLOW NOT MORE THAN 2% VOLTAGE DROP ¹							
TOTAL HEATER RATINGS ^{115V}		LENGTH OF CIRCUIT(ONE WAY) IN FEET					
WATTS	AMPS	50	100	160	200	280	360
250	2.2	14 ²	14	14	14	12	10
325	2.8	14	14	12	12	10	8
600	5.2	14	12	10	10	8	6
750	6.5	14	10	8	6	6	6
800	7.0	12	10	8	6	6	5
1000	8.7	12	8	6	6	5	4
1400	12.2	12	8	6	6	4	2
1600	13.9	12	8	6	4	4	2

¹Mechanical strength is not considered; overhead spans over 50 feet should be no less than #8 AWG; under 50 feet no less than #10 AWG.

²#14 AWG is smallest wire allowed regardless of circuit length.

CAUTION: When installing and/or servicing this unit, be certain the disconnect switch is locked in the "off position."

- 3** If your Heating Element Wires are **Black - Red - Green** (current models):

The **Green** (ground) wire is secured in the box.

The **Red** wire connects to the Red wire from the control.

The Black wire connects to the **White** (neutral) wire from the control and power source.

If your Heating Element Wires are **Red - White - Green** (current models):

The **Green** (ground) wire is secured in the box.

The **White** wire connects to the **White** (neutral) from the control and power source.

The **Red** wire connects to the **Red** wire from the control.

(If your element wires are **Black - White - Green**, wire **Black to Red**)

When there are multiple heating elements involved, twist the wire ends together and secure with wire nuts. Exhibit G is the wiring illustration for Model HE10 electric unit and all current waterer models.

- 4 TROUBLE SHOOTING FOR A QUALIFIED ELECTRICIAN ONLY:** If the new unit fails to operate after installation; OR the unit has been installed and working and then begins to freeze up; OR after installation of a new component part, heating element, or thermostat, the unit fails to operate, check the following:

WATER FREEZES:

- Make sure the electric unit is getting 115 volts of electricity. If no electricity is present, turn off the main fuse box to the unit. Check all wire connections to make sure they are correct and tight. Check all fuses in the line and then turn on electricity.
- Make sure water trough is clear of mud and silt; mud can insulate the heating element and thermostat from the water.
- Turn temperature adjusting screw ¼ turn clockwise – check to see if indicator light is on – if not, turn adjusting knob one more ¼ turn clockwise. One quarter turn is about 4°F.
- Check to see that the temperature sensing end of probe is submerged below water level but does not touch bottom of trough.
- If electric unit is on and the waterer still has freeze-up or icing trouble, check the line voltage at the unit when the full load on that line is operating. Low voltage will greatly reduce the heating capacity of the heating element.

If none of the above results in proper operations, then:

- Turn off electricity at fuse box.
- Remove cover from junction box inside waterer.
- Completely remove the thermostat from the waterer to avoid short-circuit possibilities. Then wire the heating element directly to your the heater to the black (hot) from your fuse box and green heater to green (ground).
- Turn on electricity; if element heats, thermostat needs to be replaced.
- Turn on electricity; if element does not heat, element must be replaced.

WATER OVERHEATS:

- Turn temperature control screw counter-clockwise —¼ turn at a time and not over a ½ turn. Then check the waterer in a couple of hours or the next morning. If the temperature is still too warm, repeat procedure.
- If adjusting temperature control screw fails to correct overheating, replace thermostat. Return immediately if still under warranty.

- 5 OFF SEASON MAINTENANCE:** For extended life of the electric unit, remove the units from the waterers in the spring and store in dry area. Check the units in the fall before installing in the waterers and you will have less trouble during the heating season.

- 6** The dealer you purchased your waterer from should normally have parts available. However, should he be temporarily out, he will order parts for you. Keep your equipment in good repair and it will give you many years of good service. Please fill out the warranty card and return immediately.

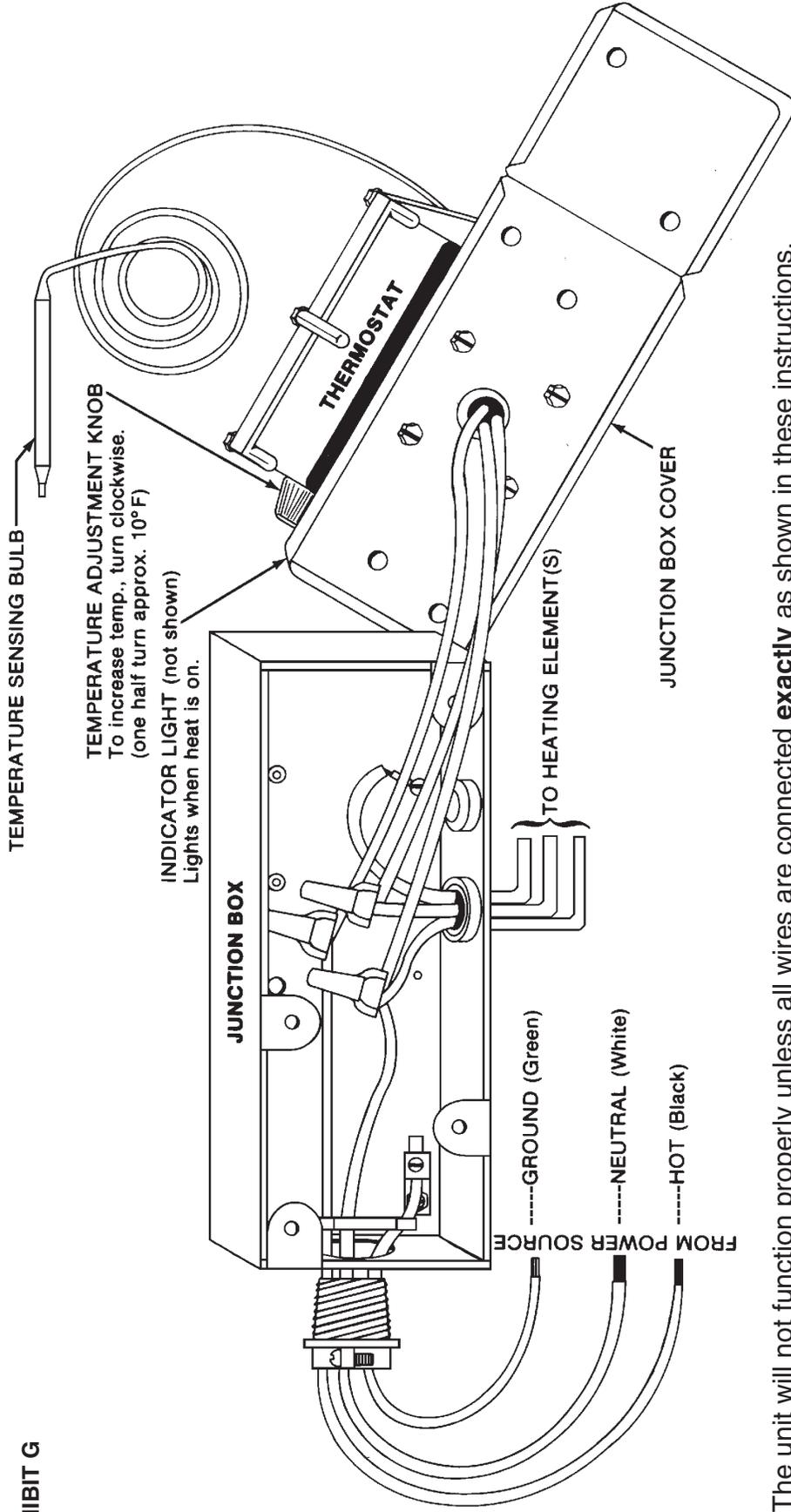
WARRANTY

The Electric Heating Unit in all Brower heated waterers (HE Series or Model 77) carries a two year guarantee. All electric units will be repaired at no charge during the warranty period, provided they have been registered with the manufacturer on the card which accompanies the waterer. If the heating unit shows signs of customer abuse, it will be repaired but at the customer's expense. The manufacturer reserves the right to repair the defective unit or replace it with a new unit if the cost of repair is prohibitive. When the warranty period has expired or a unit is returned that has not been registered for warranty, it will be repaired or replaced and the customer charged accordingly.

All other parts of Brower heated waterers are also covered with a one-year guarantee from the date of purchased against defects due to materials and workmanship. Warranted components should be returned to your dealer for shipment to our factory-Highway 16 West, P.O. Box 2000, Houghton, Iowa 52631. USA.

WIRING ILLUSTRATION FOR MODEL HE 10 ELECTRIC UNIT

EXHIBIT G



The unit will not function properly unless all wires are connected **exactly** as shown in these instructions.

WARNING: Installation must be in strict accordance with National Electrical Code (Canadian Electrical Code in Canada) and local codes. Improper electrical installation and maintenance may result in serious injury or death for personnel or livestock.

Connections in the junction box are as follows:

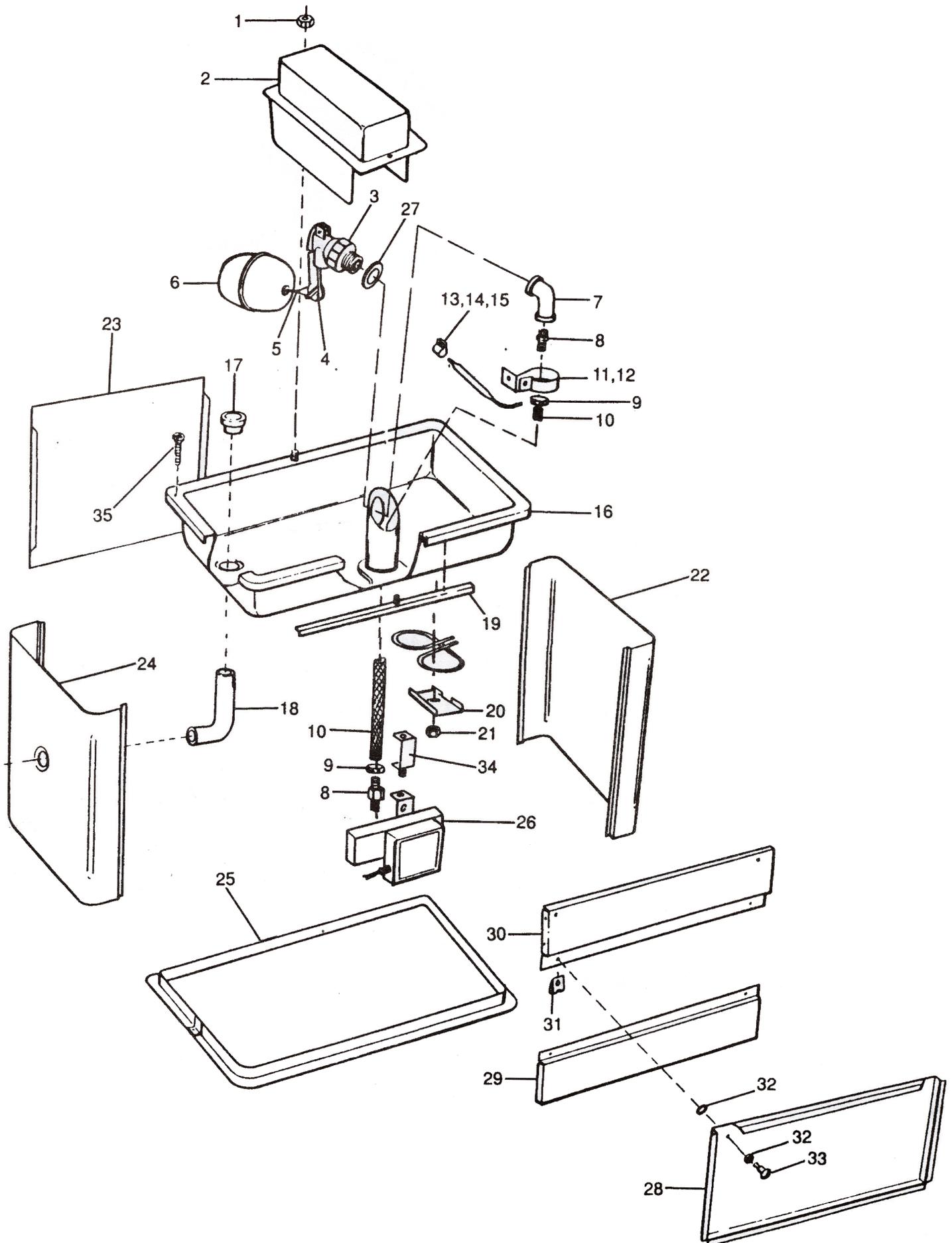
1. **The Black wire** from thermostat fastens to the **incoming hot wire**.
2. **All White wires** (one from thermostat, each heating element, **incoming neutral**) fasten together.
3. **All Red wires** fasten together (this is the switch wire from the thermostat).
4. **All Green or ground wires** fasten to junction box.

“Make sure all wire connections are tight!”

MK32HE SUPER INSULATED LIVESTOCK WATERER

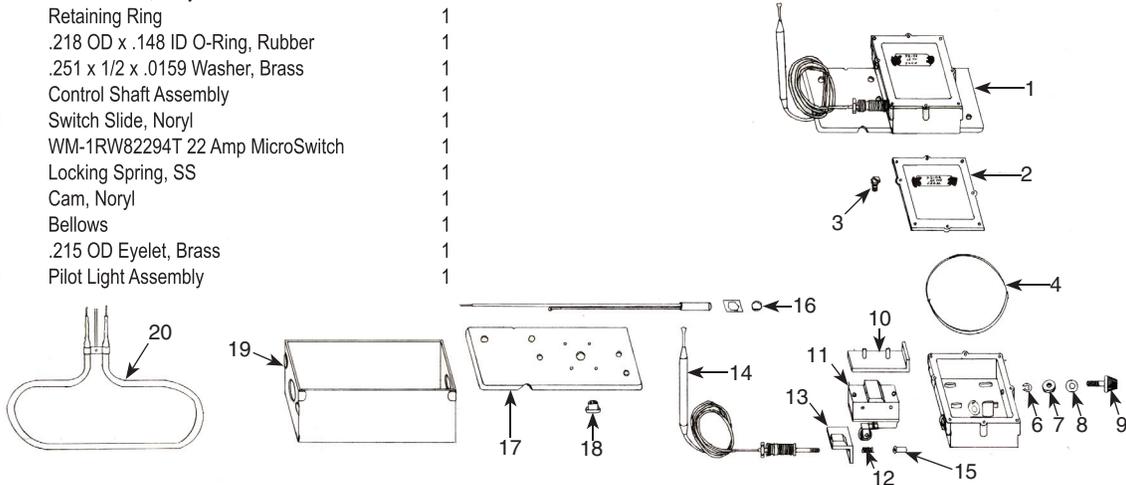
Ref. No.	Part No.	Description	Quantity
1	OF146	⁵ / ₁₆ - 18 Hex Open End Cap Nut, Brass	2
2	MA165	Float and Valve Cover Assembly	1
3	VP126	Valve Assembly, ⁵ / ₃₂ , Orifice	1
4	VP115	Adjusting Screw, Plastic	1
5	VA225P	Float Arm, ¹ / ₄ - 20 x 1, Plastic	1
6	OP286	2 ¹ / ₂ x 3 ³ / ₄ Float, Copper	1
	MK320	Inlet Hose Assembly, MK320 includes Ref. Nos. 7,8,9 and 10	
7	MC180	¹ / ₂ x ¹ / ₄ 90 Degree Reducing Elbow, Galvanized	1
8	OP110	¹ / ₄ MPT x ¹ / ₄ Hose Barb	2
9	OP124	Hose Clamp, SS	2
10	MK321	¹ / ₄ Nylon Braided Hose	1
	MC182	Includes Ref. Nos. 11, 12, 13, 14, and 15	
11	MC181	Thermostat Mounting Bracket	1
12	OF18	¹ / ₄ - 20 x ¹ / ₂ Slotted Indented Hex Head Machine Screw, Brass	1
13	HE8127	Ground Clamp, SS	1
14	OF324	8 - 32 x ¹ / ₂ Indented Hex Head Machine Screw, Zinc	1
15	OF294	8 - 32 Hex Machine Screw Nut, Zinc	1
16	MC168	Trough Assembly	1
17	A203R	Rubber Stopper	1
18	MC163	Drain Fitting, Rubber	1
19	MC170	Top Angle Assembly	2
20	WG284	Heater Clamp	1
21	OF58	⁵ / ₁₆ - 18 Hex Nut, Brass	1
22	MJ155	End Panel, Plain	1
23	MK157	Back Panel	1
24	MJ156	End Panel, Drain	1
25	MC165	Base Angel Assembly	1
26	HE1035A	Electric Unit	1
27	MF197	Washer	3
28	MK311	Access Door Assembly	1
29	MK313	Lower Panel Assembly	1
30	MK314	Upper Panel	1
31	OP78	Clip-on Receptacle, SS	2
32	OP79	¹ / ₄ Nut Retainer	4
33	OP77	¹ / ₄ Stud, SS	2
34	MK315	Junction Box Standoff Assembly (Mounts to the trough; HE1035A electric unit mounts to MK315)	1
35	OF196	¹ / ₄ - 20 x ³ / ₄ Phillips Truss Head Type 1 Thread Cutting Screw, Zinc	
	ISBWATERER	Brower Waterer Manual	
	OM25	2 ³¹ / ₆₄ x 2 ³¹ / ₃₂ Model Number Nameplate	
	OM24	5 x 5 Super Insulation Decal	
	70761	6 ³ / ₄ x 4 Brower Decal	

For repair parts on other models of waterers, please contact our sales desk at 800-553-1791



**MA31E/MA31N/MA31HE/MA31HN • MC32E/MC32N/MC32HE/MC32HN
 MJ31HE/MJ31HN • MK32HE/MK32HN
 ELECTRIC UNIT MODEL NO. HE1035A
 COIL PART NO. HE10146**

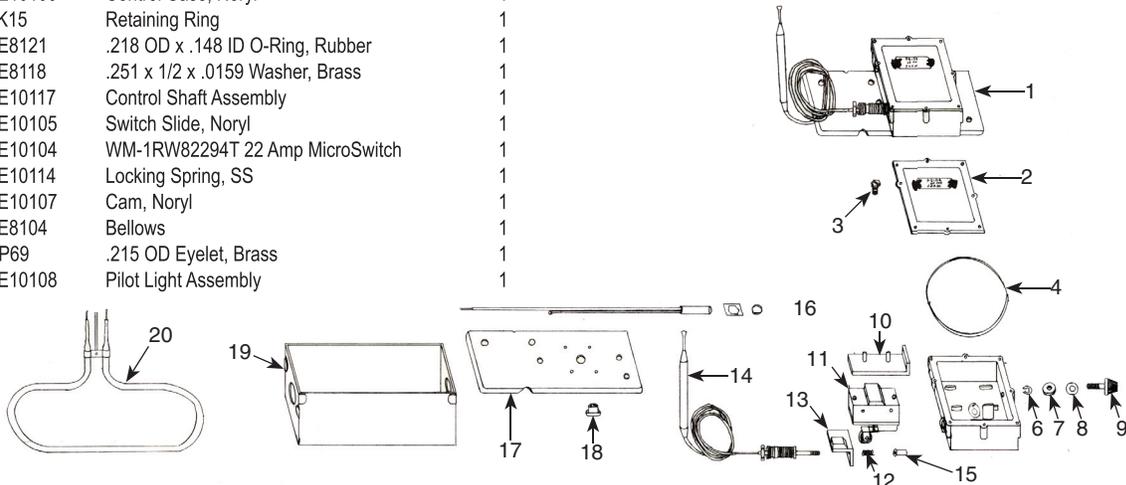
Ref. No.	Part No.	Description	Qty	Ref. No.	Part No.	Description	Qty
1	HE10125	Control Assembly	1	17	HE10116	Universal Junction Box Cover	1
2	HE10101	Control Case Cover, Noryl	1	18	HE10111	Seal	1
3	HE10103	6-32 x 5/16 Slotted Indented Hex Head Machine Screw, Zinc	12	19	ME1091	Junction Box	1
4	HE10126	3.00 ID x .070 Thick O-Ring, Rubber	1	20	HE10146	250 Watt Coil and Lead Assembly, 22" Lead	1
5	HE10100	Control Case, Noryl	1		ISHHEME	Instruction Sheet	1
6	VK15	Retaining Ring	1				
7	HE8121	.218 OD x .148 ID O-Ring, Rubber	1				
8	HE8118	.251 x 1/2 x .0159 Washer, Brass	1				
9	HE10117	Control Shaft Assembly	1				
10	HE10105	Switch Slide, Noryl	1				
11	HE10104	WM-1RW82294T 22 Amp MicroSwitch	1				
12	HE10114	Locking Spring, SS	1				
13	HE10107	Cam, Noryl	1				
14	HE8104	Bellows	1				
15	OP69	.215 OD Eyelet, Brass	1				
16	HE10108	Pilot Light Assembly	1				



NOTE: The following numbers may appear on old instruction sheets and repair part books. Electric Unit HE101A, ME1035A. Coil and Lead Assembly HE10147. Do not use these numbers when ordering. Use HE1035A Electric Unit and HE10146 Coil and Lead Assembly.

**MF30E/MF30N • MH30E/MH30N • ML30E/ML30N
 ELECTRIC UNIT MODEL NO. HE1031A
 COIL PART NO. HE10146**

Ref. No.	Part No.	Description	Qty	Ref. No.	Part No.	Description	Qty
1	HE10125	Control Assembly	1	17	HE10116	Universal Junction Box Cover	1
2	HE10101	Control Case Cover, Noryl	1	18	HE10111	Seal	1
3	HE10103	6-32 x 5/16 Slotted Indented Hex Head Machine Screw, Zinc	12	19	ME440	Junction Box	1
4	HE10126	3.00 ID x .070 Thick O-Ring, Rubber	1	20	HE10146	250 Watt Coil and Lead Assembly, 22" Lead	2
5	HE10100	Control Case, Noryl	1		ISHHEME	Instruction Sheet	1
6	VK15	Retaining Ring	1				
7	HE8121	.218 OD x .148 ID O-Ring, Rubber	1				
8	HE8118	.251 x 1/2 x .0159 Washer, Brass	1				
9	HE10117	Control Shaft Assembly	1				
10	HE10105	Switch Slide, Noryl	1				
11	HE10104	WM-1RW82294T 22 Amp MicroSwitch	1				
12	HE10114	Locking Spring, SS	1				
13	HE10107	Cam, Noryl	1				
14	HE8104	Bellows	1				
15	OP69	.215 OD Eyelet, Brass	1				
16	HE10108	Pilot Light Assembly	1				



NOTE: The following numbers may appear on old instruction sheets and repair part books. Electric Unit HE101A, ME1035A. Coil and Lead Assembly HE10147. Do not use these numbers when ordering. Use HE1035A Electric Unit and HE10146 Coil and Lead Assembly.

BROWER WATERERS AND ENERGY USE

As energy costs continue to escalate, more attention is being focused on products which are more energy efficient. We've been selling livestock waterers since 1963 and are continuing our tradition of leadership. Newly introduced is the best insulation on the market which is standard on all automatic cattle waterers and hog waterers. Extra-thick insulation with an R-value of 7.14 per inch is used to completely insulate the trough and jackets of our waterers.

WHAT IS R-VALUE: By definition, R-value is a "relative measure of resistivity to the flow of heat through a specific thickness of a particular material". The higher R-value, the better. An R-value of 7.0 has twice the insulative value of an R-value of 3.5.

Please note the following R-value of competing insulation materials:

Material	R-value Per Inch of Material
Polyurethane Foam	7.1429
Expanded Polyurethane	4.1667
Glass Fibre	2.6786
Mortar cement or sand & gravel aggregate	.0833
Most of our competition is using expanded polyurethane.	

POLYURETHANE FOAM, USED ON BROWER WATERERS, HAS THE BEST INSULATIVE PROPERTIES OF ANY MATERIAL USED FOR WATERER INSULATION ON THE MARKET TODAY. Also, remember – polyurethane foam:

1. Contains no formaldehyde
2. Contains no protein (and is, therefore, not attractive to vermin as a food source.)

OTHER FACTS ABOUT POLYURETHANE FOAM: "Rigid polyurethane foams were among the earliest applications developed during World War II, when their high strength-to-weight ratio was recognized and used for stiffening and strengthening aircraft components adding very little weight gain to the resulting structure. The high strength-to-weight ratio, although an important attribute in many applications, has been largely overshadowed by the outstanding thermal-insulating properties of low-density rigid polyurethane and polyisocyanurate foams. Rigid polyurethane and polyisocyanurate foams exhibit among the lowest thermal conductivities of any commercially available insulant. Their predominantly closed-cell structure resists water absorption, condensation, and wicking (transport by capillary action) and provides positive buoyancy in marine applications. They will not sag, buckle, pack down, or mat from ordinary use. They are resistant to fungi and mildew. They can be applied easily on the job site by spray, froth, or pour techniques, or as lightweight panels that can be cut and trimmed with ordinary hand tools common to the building trades. They are highly resistant to weathering, oxidation, ozone, oils and most fuels. Because of these advantages, polyurethane elastomers have replaced natural and synthetic rubbers in many applications where they have outlasted rubber factors of 10 times or more."

Source: American Society of Heating, Refrigeration and Air Conditioning Engineers Reference Book (ASHRAE) Appendix A.

TIPS TO SAVE ENERGY—SIMPLY AND INEXPENSIVELY: Energy used for freeze prevention can be reduced by better temperature control, insulation, unit selection, location and water preservation. While producers must assure a continually available water supply, good management can significantly reduce livestock watering costs.

The national Food and Energy Council made a checklist for producers to improve their waterers with a farm energy analysis program. The first checklist can be completed at no cost to the producer. The second checklist has some low-cost maintenance practices, and the third checklist is for those wishing to make improvements or investments in their watering system.

NO COST

1. Inspect condition of wiring, insulation and burner before using heaters each fall.
2. Check waterers daily for cleanliness and proper operation of the water valve and heating elements.
3. Make certain covers operate freely and close completely to minimize heat loss in winter.
4. Set the thermostat below the temperature of incoming water or slightly above freezing.
5. Provide natural ventilation of enclosed compartments, in summer, to reduce deterioration of insulation, wiring burner or related equipment.

LOW COST

1. Use a wind barrier to protect the waterer from the direct effect of cold winter winds.
2. Provide covers (insulated if possible) for all water surfaces.
3. Replace leaking float valves immediately to eliminate wasting water that has already been pumped and heated.
4. Replace or quickly dry any insulation that becomes wet.
5. Replace or add insulation to waters with less than two inches of insulation.
6. Insure that insulation is well protected from damage by livestock and rodents.
7. Caulk or close up openings in the waterer enclosure, especially around the foundation.
8. Paint the exterior a dark color to absorb heat in winter

IMPROVEMENT OPTIONS

1. Install the waterer with an insulated thermal break between the waterer and the concrete foundation to prevent transmitting heat to the floor.
2. Install the waterer over a 12- to 20-inch tile extending from the waterer base to below the frost line.
3. Buy well-insulated waterers with lids when replacing old units.
4. Take special care in selecting new waterers so that the drinking area size is matched to the type and numbers of animals being served.
5. Be sure that electric service wires are of the proper size to ensure maximum efficiency.
6. Insulate electric heat tapes.
7. Make sure that all electric waterers are properly grounded to prevent leakage and to enhance safety.
8. Make sure that water lines serving the waterers are the correct size to minimize energy.

OPTIMAL WATER TEMPERATURE: A recent study at Kansas State University examined the effect of water temperature on animal performance and compared electric costs for water heating.

The test results showed no difference in daily water intake, feed intake, daily gain or feed efficiency with different water temperatures. Heating the water above 40 degrees increased cost of production, yet failed to improve the performance of the cattle. It appeared that the amount of water consumed by the animals was more dictated by daily minimum ambient air temperature than by the temperature of the drinking water.