

STAR MANUFACTURING COMPANY  
Division of Peabody International Corporation  
9325 Olive Boulevard, St. Louis, Missouri 63132

SERIES EM-14 & EM-40 ELECTRIC FRYERS

GENERAL INSTALLATION DATA

**CAUTION:** This equipment is designed and sold for commercial use only by personnel trained and experienced in its operation and is not sold for consumer use in and around the home nor for use directly by the general public in food service locations. For equipment to be used by the general public, please contact the factory. .

These fryers are equipped for the voltage and wattage indicated on the nameplate mounted on the inside of the cabinet door and are designed for use on alternating current (AC) only.

DO NOT CONNECT TO DIRECT CURRENT (DC)

**INSTALLATION:**

The installation of the Appliance should conform to the

NATIONAL ELECTRIC CODE AND ALL LOCAL ELECTRIC CODES AND  
ORDINANCES AND THE LOCAL ELECTRIC COMPANY RULES AND REGULATIONS

For your protection we recommend that a qualified electrician install this appliance. He should be familiar with electrical installations, and all electrical codes. Proper connections and power supply are essential for efficient performance. The external wiring should be in conduit or an approved type of flexible cable suitable for operation at 90°C and of a proper size to carry the load. The supply circuit should be properly fused and equipped with a means of disconnection, as required by local electric code. **THE BODY OF THE APPLIANCE SHOULD BE GROUNDED, DO NOT GROUND TO A GAS SUPPLY LINE.**

**ATTACHING FEET:**

These fryers are shipped bolted to a skid with feet detached. To mount feet, lay fryer on side and remove skid. Screw the (4) feet into the base and tighten same. **CAUTION: DO NOT INSTALL WITHOUT FEET.**

**LEVELING UNIT:**

Level unit by adjusting the (4) feet, which have an adjustment of 1".

**POWER SUPPLY:**

These units are wired at the factory for operation on three phase 208V or 240V power supply, as indicated on the nameplate

SEE THE ATTACHED WIRING DIAGRAM FOR INFORMATION ON WIRING FRYER FOR SINGLE PHASE POWER SUPPLY.

MODELS EM-40 AND EM-40DL

ELECTRICAL DATA											
RATED WATTAGE	3-PHASE LOADING			NOMINAL AMPERES PER LINE WIRE							
				THREE (3) PHASE						SINGLE PHASE	
	KW PER PHASE			208V			240V			208V	240V
	X-Y	Y-Z	X-Z	X	Y	Z	X	Y	Z		
16000	5.3	5.3	5.3	44.5	44.5	44.5	38.5	38.5	38.5	77	66.7

MODELS EM-14SS AND EM-14DLSS

ELECTRICAL DATA											
RATED WATTAGE	3-PHASE LOADING			NOMINAL AMPERES PER LINE WIRE							
				THREE (3) PHASE						SINGLE PHASE	
	KW PER PHASE			208V			240V			208V	240V
	X-Y	Y-Z	X-Z	X	Y	Z	X	Y	Z		
22000	7.3	7.3	7.3	61.1	61.1	61.1	53.8	53.8	53.8	105.8	91.7

**SPECIAL INSTRUCTION FOR FIRE DETECTION OR EXTINGUISHING SYSTEM**

**CONNECTION OF FRYER TO VENTILATOR FIRE DETECTION OR EXTINGUISHING SYSTEM**

Star Manufacturing Company has manufactured these fryers to be not only one of the most efficient fryers made, but the safest. The units are equipped with terminal block (see enclosed wiring diagram) for connecting into a fire detection system.

An over-temperature in the exhaust system will turn off all power to the fryer when connected per instructions. The terminal block is located in the control cabinet. The fire detection system, when wired into the terminal block in the fryer system, must use a normally closed switch. When the fire detection system is activated, the normally closed switch must open to turn off the power to the fryer contactors solenoid valves. This switch in the detector system should be capable of handling 240 volts at 15 volt amperes: DO NOT connect these leads into a voltage source. The voltage is supplied by the fryer.

**CONTROLS:**

1. The ON-OFF switch and the signal light (POWER ON) are located on the front control panel.
2. The THERMOSTAT CONTROL and the signal light (HEATING) are located on the control housing.
3. The HI-LIMIT THERMOSTAT - Should the fat temperature reach 450°F, this control will shut off electrical power to the fryer, after the fat temperature drops to about 400°F, the Hi-Limit Thermostat must be manually reset. (See attached diagram for location of reset button.) Should the Hi-Limit Thermostat shut off electrical power twice in succession, the primary thermostat should be checked for malfunction.
4. The FUSE HOLDERS, for fire detection system, are located in the front panel of the control cabinet, behind the fryer door.  
FUSE SIZE - 5 or 6 Amp., 250V Max.
5. The FUSE HOLDERS for power supply are located behind the door on the control panel.

**INITIAL STARTING OF FRYER:**

1. CLEAN KETTLE - Take out baskets and basket hangers if equipped, pivot up electric element, and lock in vertical position. Clean protective oil from interior of kettle with a solution of washing soda or equal. Drain through bottom valve and rinse thoroughly with clear water and dry completely before filling with fat.
2. ADDING FAT - Close drain valve and swing element down. Add fat to at least 2" above heating element. Fat capacity is 50 lbs. for EM-14 Fryers and 40 lbs. for EM-40 Fryers. If solid shortening is used, pack carefully around the heating elements.

## RAISING HEATING ELEMENTS:

1. FRYERS WITHOUT AUTOMATIC BASKET LIFTS — To raise heating elements for thorough cleaning of kettle, grasp element handle and raise elements until latch bar snaps into place. To lower, raise elements to clear latch bar, rotate bar down and lower elements.
2. FRYERS WITH AUTOMATIC BASKET LIFTS — To raise heating elements, the basket lift rods must be in a down position. To lower lift rods, remove basket hangers and turn timer dial to the 15 minute position and push in on the center button of the timer dial. When the lift rods are both down, raise the heating elements. After the heating elements are again lowered, the lift rods may be raised before the end of the 15-minute cycle by turning the timer dial to "0".

## GENERAL FRYING DATA

## FOR BEST RESULTS:

1. Avoid heating to high temperatures. With "Star" Hercules Series Fryers, 375<sup>o</sup>F should be the maximum required.
2. Strain breading and burned particles from the fat at least once a day, more often if necessary. Use filter bag, filter cone, or the "Star" model M-14F-14 Filter.
3. Do not salt foods over the fry kettle.
4. Don't hold the frying fat at frying temperature for long periods of time without any frying taking place. Turn down to 250<sup>o</sup>. When needed, it will recover to frying temperature very rapidly.
5. Always use the best frying oils.

## BEFORE FRYING:

1. Have the foods free from too many loose crumbs; to help prevent build up of carbonized material in fry kettle.
2. Have the foods free from an excessive amount of moisture to eliminate too much bubbling and foaming.
3. Use the proper breading mix and follow directions on the package.
4. Don't overload baskets. Pieces should not touch when frying. Shake basket to prevent food from sticking together. Fry similar size food pieces at the same time to serve uniformly finished servings.

## OPERATION:

1. TURNING FRYER ON — Turn ON-OFF switch to "ON" position. "POWER-ON" signal light will come on. Set the thermostat at 200<sup>o</sup>. Refer to Handy Frying Chart.
2. LOWERING BASKET — When the fat has reached the proper temperature, lower the basket and food slowly into the fat. When moist food is lowered too quickly into hot fat, the fat will foam and splatter excessively.
3. DRAINING BASKET — After the food has finished frying, raise the baskets and hang them on the hangers to allow excess fat to drain back into the kettle.
4. IDLING — During idle periods, lower the temperature setting of the thermostat to approximately 250<sup>o</sup>. It is not necessary to maintain full cooking temperature during idle periods, for the fat can be re-heated quickly to the desired temperature. This procedure will result in longer fat life and less power consumption.

NOTE: See the Handy Frying Chart for recommended temperatures and time required to properly fry various foods, as well as procedures and coating suggestions.

## FRYERS WITH AUTOMATIC BASKET LIFTS

Turn timer dial to desired frying time. To lower baskets, push in on center button of timer. After selected frying time has elapsed, baskets will raise automatically. The timer dial need not be reset unless a different frying cycle is desired.

NOTE: The baskets may be raised before the end of the selected frying cycle by turning the timer dial to "O".

CAUTION: Hot fat is potentially dangerous - do not come in direct contact with hot fat.

**DRAINING KETTLE:**

Fat should be hot when strained or filtered so it flows freely. If you are not using the Model M-14F-14 Filter, slip a filter bag over the end of the drain valve and tie it in place (so it will not slide off) with a bow knot for easy removal. Place a receptacle under the bag and open the drain valve. When the kettle is empty, use a small pot to pour hot fat vigorously around sides, and bottom of kettle to wash out crumbs, etc. Continue to flush until all crumbs are washed into filter bag. Remove the filter bag and wash for the next use. Close the drain valve, and pour the fat back into the kettle. **HANDLE THE HOT FAT CAREFULLY.**

**FILLING KETTLE WITH FAT**

Make certain the drain valve is closed. If solid shortening is used, pack carefully around the elements. Fill kettles 2" above the element, and turn the thermostat to 250° until fat is melted.

A higher fat level can be used when frying bulky foods, such as chicken or fish cakes. The level should be chosen carefully so that the foaming action does not spill out of the kettle.

**COMPLETE CLEANING OF KETTLE:**

1. When fat is up to cooking temperature, turn fryer off and drain fat from fryer. (See Draining Kettle)
2. Rinse to remove all loose residue and crumbs. When clear and empty, close valve, and move fat & recept. from area.
3. Fill with water, bring to a boil, and add a commercial fryer cleaner. Boiling time will depend on condition of the fryer (30 minutes to 2 hours, or until clean). Be sure water does not boil down below element level.
4. Turn heat off, drain and rinse with clear water until clean.
5. Use a vinegar rinse (2 to 3 cups to a kettle of water), stir, drain, and rinse thoroughly with clear water.
6. Raise elements. See previous instructions.
7. Wipe kettle and elements with a soft cloth, and allow to dry thoroughly.
8. Lower element and fill kettle a minimum of 2" above elements.

**CLEANING THE EXTERIOR (Stainless Steel Only)**

The exterior surface can be kept clean and attractive by regularly wiping it with a clean soft cloth. Any discoloration can be removed with a nonabrasive cleaner.

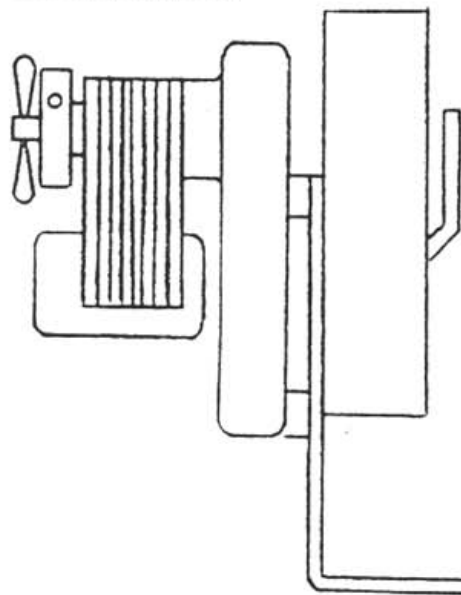
**THERMOSTAT RECALIBRATION**

1. To determine whether or not the thermostat should be recalibrated, use an accurate thermometer located approximately in the center of the kettle with the bulb 1" below the top of the fat.
2. Set thermostat to 350° and check the thermostat when pilot light goes off. Temperature should be approximately 5°F less than the thermostat dial setting.
3. If not:
  - a. Pull knob forward and remove from shaft.
  - b. Turn screw in center of shaft clockwise to decrease temperature or counterclockwise to increase temperature. NOTE: 1/4 turn of this screw will result in a change of approximately 30°F.
  - c. Replace knob.
4. Repeat steps 1, 2, & 3 until correct.

**TO OIL MOTOR:**

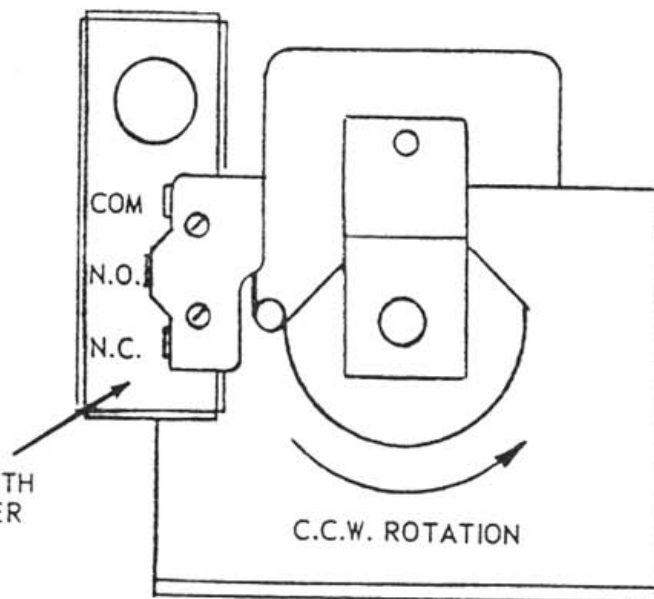
1. Remove lower rear panel.

OIL MOTOR HERE



2. Motors require oiling only once a year with a few drops of SAE No. 20 motor oil.
3. Replace panel.

CAM SWITCH WITH ROLLER LEVER



**CAM POSITION:**

When basket is in the up position, the cam must be down as shown with Cam Switch Roller Lever "OFF" cam.

**OPERATION:**

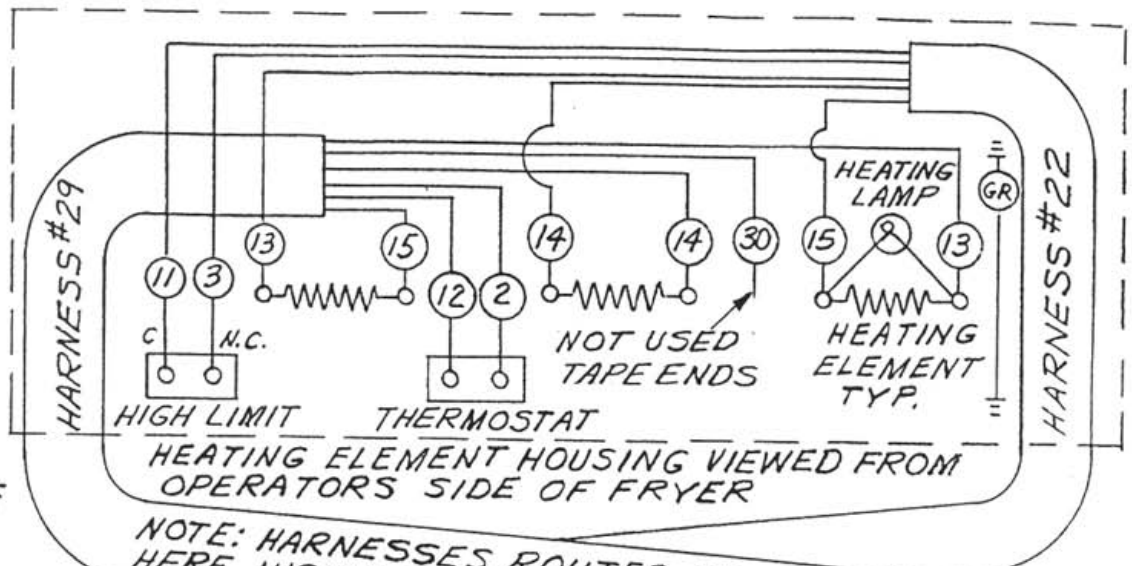
1. With basket in the up position, timer starts basket down. Cam Switch Roller Lever is off cam and remains off cam while basket is going down.

2. When Cam Switch Roller rides up on cam it stops the basket in the down position.
3. Timer starts basket up with Cam Switch Roller Lever riding on Cam.
4. When Cam Switch Roller Lever rides off of cam, it stops the basket in the up position.

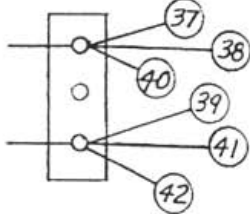
**NOTE:** To bring basket up from down position, turn timer pointer knob to "zero" or wait the indicated time.

**FREEING LIFT RODS:**

If the lift rods jam under element housing when the elements are in the "UP" position, remove the upper inspection plate, which is located in the rear of the fryer. Remove the two screws in the connecting rod, and the basket lift rod section will drop down. Lower heating elements. Fasten the two sections back together again, and replace the panel.

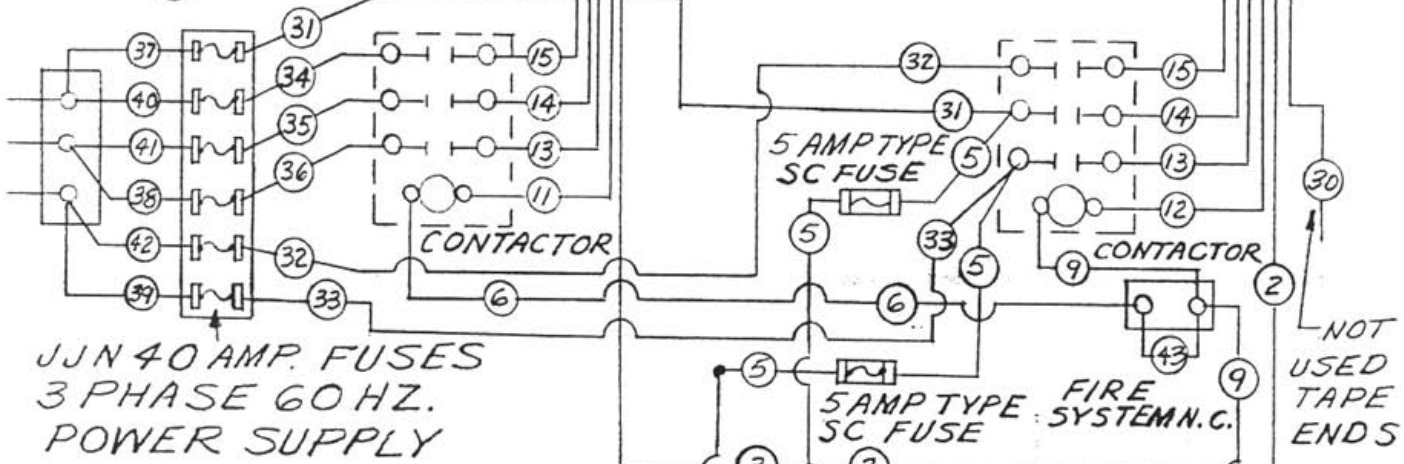


SINGLE PHASE  
60 HZ.



WIRE  
HARNESS  
#22

WIRE HARNESS  
#29



RATED WATTAGE 22,000					
NOMINAL AMPERES PER LINE					
THREE PHASE			SINGLE PHASE		
208 VOLTS			240 VOLTS		
X	Y	Z	X	Y	Z
61.1	61.1	61.1	53.0	53.0	53.0
FOR POWER SUPPLY USE			FOR POWER SUPPLY USE		
3 AWG WIRE			4 AWG WIRE		
			1/0	2	
			AWG	AWG	

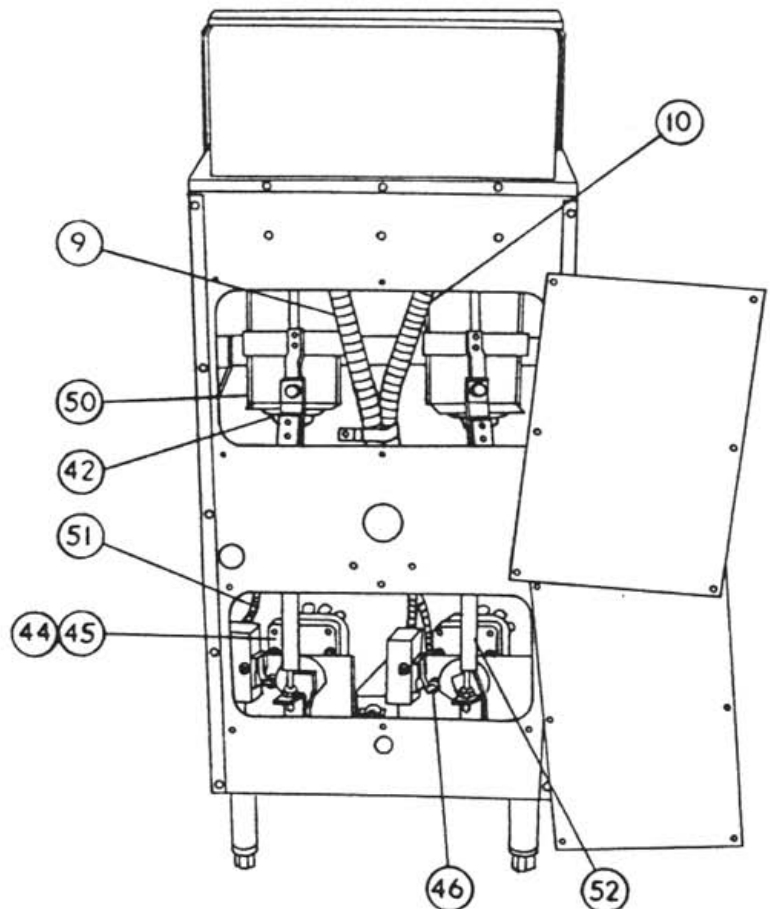
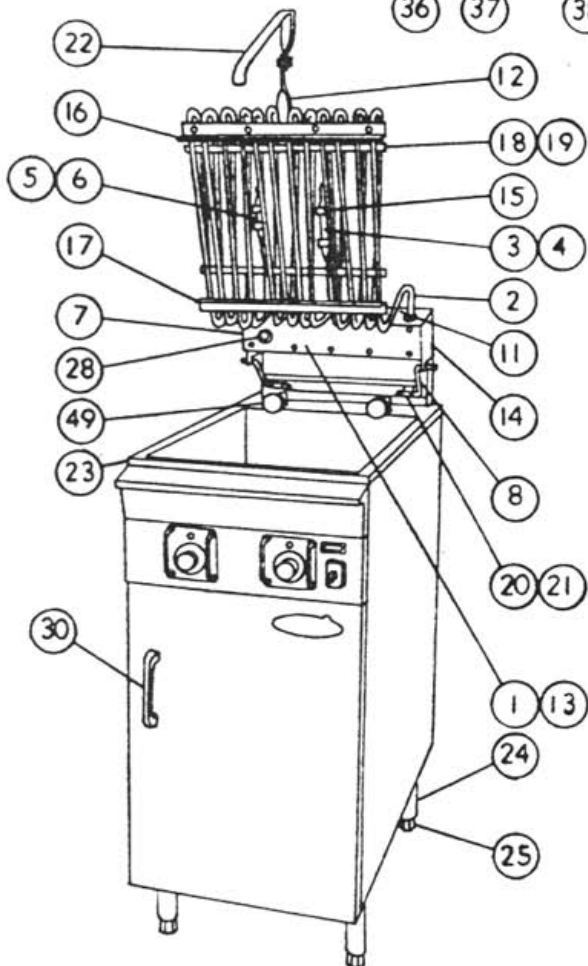
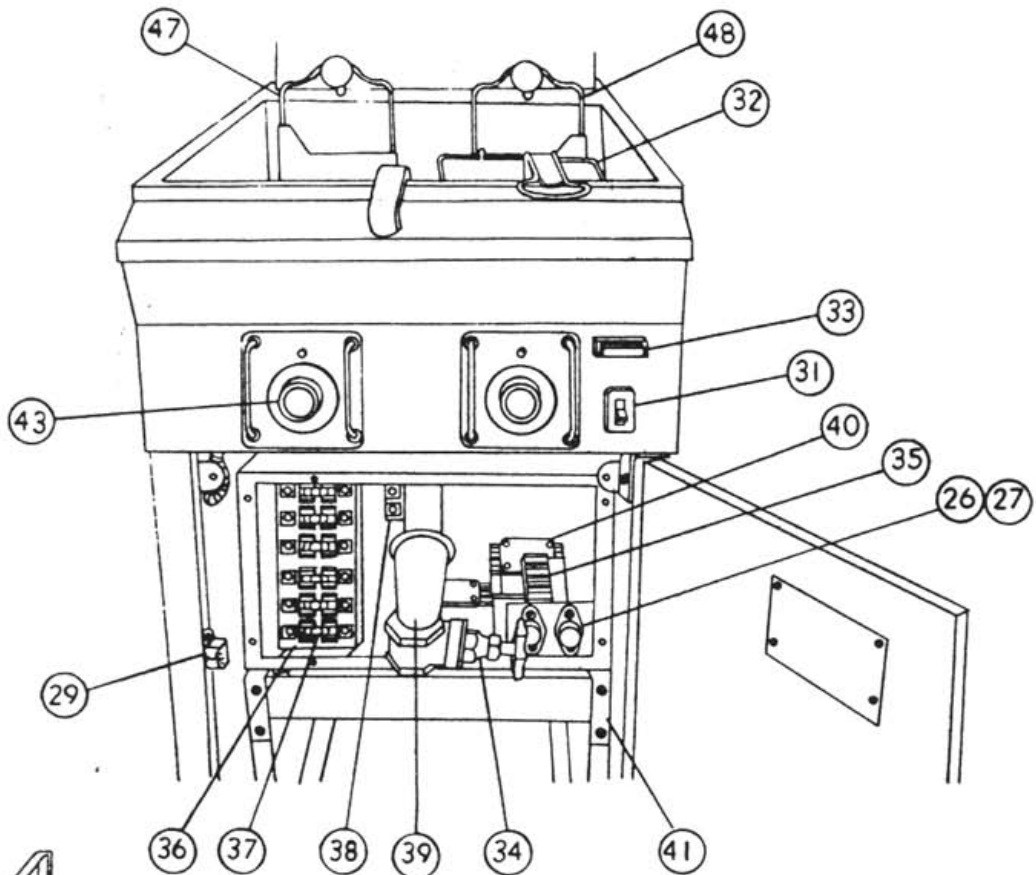
1. FOR POWER SUPPLY WIRES USE COPPER WIRE ONLY
2. USE 60°C INSULATION FOR 3 PHASE AND 75°C ON SINGLE PH.
3. WIRE SIZES:

HARNESS #22 KEYS 3, 11, 16 #16 GA. KEYS 13, 14, 15 #10 GA.  
 HARNESS #29 KEYS 30, 2, 12 #16 GA. KEYS 13, 14, 15 #10 GA.  
 ALL OTHER INTERNAL WIRE IS #16 GA.

STAR MFG. CO. ST. LOUIS MO. MODEL EM-4 SS

Y4039





# PARTS LIST

EFFECTIVE— JANUARY 15, 1982

MODEL EM14, EM14DL,  
EM40, EM40DL, SERIAL #1450521 & UP

KEY NUMBER	PART NUMBER	NUMBER PER UNIT	DESCRIPTION
1	F1-145106	1	ELEMENT HOUSING COMPLETE (EM14DL)
1	F1-145107	1	ELEMENT HOUSING COMPLETE (EM14)
1	F1-146009	1	ELEMENT HOUSING COMPLETE (EM40)
1	F1-146026	1	ELEMENT HOUSING COMPLETE (EM40DL)
2*	2N-Y3081	3	ELEMENT 240V (EM14 SERIES)
2	2N-Y3082	3	ELEMENT 208V (EM14 SERIES)
2*	2N-Y3072	3	ELEMENT 240V (EM40 SERIES)
2	2N-Y3073	3	ELEMENT 208V (EM40 SERIES)
3	2T-Y2133	1	THERMOSTAT
4	2R-Y1955	1	THERMOSTAT KNOB
5*	F1-Y3106	1	SAFETY THERMOSTAT
6	2P-5737	10	CLIP - CAPELLARY
7	2I-Y3104	1	GASKET - ELEMENT HOUSING
8	F1-145032	1	HOUSING CATCH
9	F1-145059	1	HARNES (THERMOSTAT SIDE)
10	F1-145085	1	HARNES (LIMIT CONTROL SIDE)
11	F1-145046	1	SIGNAL LIGHT - HEATING
12	F1-146001	1	HANDLE BRACKET (EM40 & EM40DL)
12	F1-145049	1	HANDLE BRACKET (EM14 & EM14DL)
13	145051	1	WIRE - GROUND (NOT SHOWN)
14	F1-145058	1	HOUSING HINGE (COMPLETE)
15	E1-7363	4	THERMOSTAT BULB CLAMP
16	F1-Y4044	1	ELEMENT CLAMP (FRONT NOTCHED) (EM14 & EM14DL)
16	F1-Y4032	1	ELEMENT SUPPORT (EM40 & EM40DL)
17	F1-Y4031	1	ELEMENT CLAMP (REAR NOTCHED) (EM40 & EM40DL)
17	F1-Y2126	1	ELEMENT CLAMP (REAR NOTCHED) (EM14 & EM14DL)
18	F1-Y2128	1	ELEMENT CLAMP (PLAIN) (EM14SS, EM14DLSS, & EM40 ONLY)
19	F1-Y2184	1	ELEMENT CLAMP (THREADED) (ALL MODELS)
20	F1-Y2127	2	HINGE - HOUSING CATCH
21	F1-Y2172	2	SPRING - HOUSING CATCH
22	F1-146008	1	ELEMENT HANDLE ASSEMBLY (EM40 & EM40DL)
22	F1-145105	1	ELEMENT HANDLE ASSEMBLY (EM14 & EM14DL)
23	F1-145101	1	KETTLE ASSEMBLY (EM14DL)
23	F1-145100	1	KETTLE ASSEMBLY (EM14)
23	F1-146027	1	KETTLE ASSEMBLY (EM40DL)
23	F1-146005	1	KETTLE ASSEMBLY (EM40)
24	F3-141037	4	FOOT HOUSING ASSEMBLY
25	2A-9627	4	FOOT

\*SUGGESTED PARTS STOCKING—

IMPORTANT: WHEN ORDERING SPECIFY VOLTAGE OR TYPE GAS DESIRED  
INCLUDE MODEL AND SERIAL NUMBER—(1) MINIMUM PARTS ORDER—\$5.00

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**STAR MANUFACTURING COMPANY**

9325 OLIVE BLVD. • P.O. BOX 8492 • ST. LOUIS, MO. 63132

PHONE: (314) 994-0880



# PARTS LIST

EFFECTIVE— JANUARY 15, 1982

MODEL ~~EM14, EM14DL,~~  
EM40, EM40DL, SERIAL #1450521 & UP

KEY NUMBER	PART NUMBER	NUMBER PER UNIT	DESCRIPTION
26*	F1-145082	2	FUSE HOLDER ASSEMBLY
27*	2E-Y2342	2	FUSE 5 AMPERE
28	2K-8043	1	SNAPPER BUSHING
29	2G-Y3057	1	DOOR CATCH WITH STRIKE
30	2R-7349	1	DOOR HANDLE
31	2E-8343	1	ON-OFF SWITCH
32	2B-9134	2	BASKET
33	2S-Y1560	1	LIGHT - SIGNAL (POWER ON)
34	2V-9135	1	DRAIN VALVE
35	2E-Y1654	1	TERMINAL BLOCK
36	2A-Y4007	1	FUSE HOLDER
37*	2E-Y4012	6	FUSE CARTRIDGE 40 AMPERE
38	2E-Y4008	1	TERMINAL BLOCK (POWER SUPPLY)
39	Y1331	1	ELBOW - DRAIN
40*	2E-Y1677	2	CONTACTOR (EM40 & EM40DL)
40*	2E-Y2164	2	CONTACTOR (EM14 & EM14DL)
41	F1-Y2160	2	BRACKET, CONTROL PANEL
			<u>MODEL EM14DL &amp; EM40DL ONLY</u>
42	2P-9615	2	BEARING - FLANGE
43	2P-9177	2	TIMER - PARAGON
44*	2U-Y2152	2	MOTOR 240V
45*	2U-Y2153	2	MOTOR 208V
46*	2E-8456	2	MICRO SWITCH
47	F1-145021	1	BASKET HANGER ASSEMBLY LEFT (EM40DL)
47	F1-145103	1	BASKET HANGER ASSEMBLY LEFT (EM14DL)
48	F1-145022	1	BASKET HANGER ASSEMBLY RIGHT (EM40DL)
48	F1-145102	1	BASKET HANGER ASSEMBLY RIGHT (EM14DL)
49	F1-145025	2	BASKET LIFT ASSEMBLY
50	F1-145026	2	TRACK ASSEMBLY
51	F1-145039	1	HARNES ASSEMBLY (LIFT MOTOR)
52	F1-145018	2	LINKAGE ASSEMBLY
			<u>CASTER SET (CONSISTS OF)</u>
	2C-9212	4	SET SCREW 1/4 - 20
	2P-Y1610	2	CASTER WITH BRAKE
	2P-Y1611	2	CASTER WITHOUT BRAKE
	Y3-143015	4	ADAPTER ASSEMBLY
	Y3-9217	4	INSERT
	2G-9207	4	SET SCREW 10-32

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OF 2

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