

# Chromalox®

## Installation, Operation and RENEWAL PARTS IDENTIFICATION

### SERVICE REFERENCE

DIVISION 4

SECTION FXTH

SALES  
REFERENCE

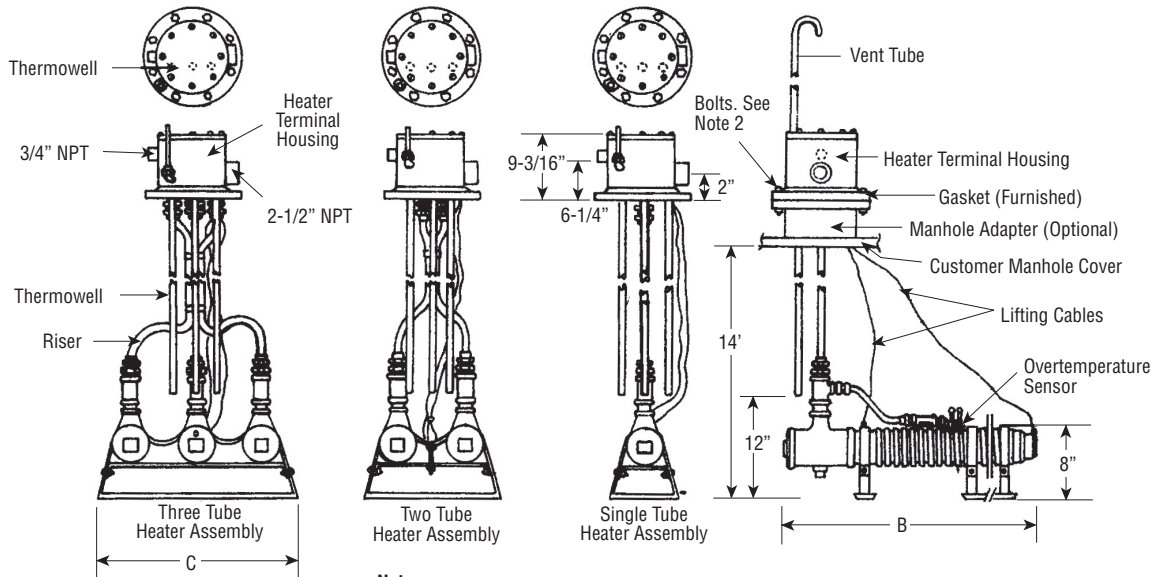
PN401

161-051300-001

DATE

FEBRUARY, 2008

## Chromalox Type FXTH Flexible Tank Heater



#### Notes:

1. Min. fluid Depth for safe heater operation is 12".
2. 5/8" - 11 x 1 in. long hex head bolts. 8 required.

### Specifications – Type FXTH

kW	Amp / Tube		Minimum Manhole Size (in.)	Heater Length B	Heater Width C	No. Tubes and Circuits	Catalog Number*	Approx Net Wt. Lbs.	Catalog Number of Recommended OCC or WCC Control Centers	
	240	480							240V	480V
6	15	7	14	12'3-3/4"	5-1/4	1	FXTH-11206	79	(OCC or WCC)-15-213	WCC-10-413
8	19	10	14	15'3-3/4"	5-1/4	1	FXTH-11508	97	WCC-25-213	WCC-10-413
10	24	12	14	15'3-3/4"	5-1/4	1	FXTH-11510	97	WCC-25-213	WCC-15-413
12	29	14	14	15'3-3/4"	5-1/4	1	FXTH-11512	97	WCC-30-213	WCC-15-413
10	24	12	14	20'3-3/4"	5-1/4	1	FXTH-12010	127	WCC-25-213	WCC-15-413
12	29	14	14	20'3-3/4"	5-1/4	1	FXTH-12012	127	WCC-30-213	WCC-15-413
15	36	18	14	20'3-3/4"	5-1/4	1	FXTH-12015	127	WCC-40-213	WCC-20-413
18	43	22	14	27'1"	5-1/4	1	FXTH-12718	170	WCC-45-213	WCC-25-413
21	51	25	14	30'1"	5-1/4	1	FXTH-13021	190	WCC-55-213	WCC-30-413
24	58	29	14	32'1"	5-1/4	1	FXTH-13224	205	WCC-60-213	WCC-30-413
27	65	33	14	35'1"	5-1/4	1	FXTH-13527	225	WCC-70-213	WCC-35-413
30	72	36	14	40'1"	5-1/4	1	FXTH-14030	250	WCC-75-213	WCC-40-413
12	15	7	18	12'3-3/4"	10-1/4	2	FXTH-21212	157	WCC-15-223	WCC-10-423
16	19	10	18	15'3-3/4"	10-1/4	2	FXTH-21516	194	WCC-25-223	WCC-10-423
20	24	12	18	15'3-3/4"	10-1/4	2	FXTH-21520	194	WCC-25-223	WCC-15-423
24	29	14	18	15'3-3/4"	10-1/4	2	FXTH-21524	194	WCC-30-223	WCC-15-423
20	24	12	18	20'3-3/4"	10-1/4	2	FXTH-22020	253	WCC-25-223	WCC-15-423
24	29	14	18	20'3-3/4"	10-1/4	2	FXTH-22024	253	WCC-30-223	WCC-15-423
30	36	18	18	20'3-3/4"	10-1/4	2	FXTH-22030	253	WCC-40-223	WCC-20-423
36	43	22	18	27'1"	10-1/4	2	FXTH-22736	340	WCC-45-223	WCC-25-423
42	51	25	18	30'1"	10-1/4	2	FXTH-23042	380	WCC-55-223	WCC-30-423
48	58	29	18	32'1"	10-1/4	2	FXTH-23248	405	WCC-60-223	WCC-30-423
54	65	33	18	35'1"	10-1/4	2	FXTH-23554	440	WCC-70-223	WCC-35-423
60	72	36	18	40'1"	10-1/4	2	FXTH-24060	500	WCC-75-223	WCC-40-423
18	15	7	24	15'3-3/4"	15-1/4	3	FXTH-31218	236	WCC-15-233	WCC-10-433
30	24	12	24	15'3-3/4"	15-1/4	3	FXTH-31530	291	WCC-25-233	WCC-15-433
36	29	14	24	15'3-3/4"	15-1/4	3	FXTH-31536	291	WCC-30-233	WCC-15-433
30	24	12	24	20'3-3/4"	15-1/4	3	FXTH-32030	370	WCC-25-233	WCC-15-433
36	29	14	24	20'3-3/4"	15-1/4	3	FXTH-32036	370	WCC-30-233	WCC-15-433
45	36	18	24	20'3-3/4"	15-1/4	3	FXTH-32045	370	WCC-40-233	(OCC or WCC)-20-433

\*Suffix letters with FXTH Catalog Number indicate modification from standard as follows:

V= Voltage, W= Wattage, A= change in riser length, R= low temperature alarm contactor, D= temperature indicator and XX = special.

## GENERAL

The Chromalox FXTH Flexible Tank Heater is designed for heating viscous liquids in large steel, concrete or fibrous glass tanks with normal manhole entry. Standard equipment with every heater includes flexible pipe and 14' riser(s), two lifting cables, 4" high sludge legs and a 50-250° non-indicating thermostat with well, overtemperature probe and weatherproof terminal housing.

The Control Center OCC (NEMA XII, oil and dust-tight construction) or WCC (NEMA IV, weather-resistant construction) is designed for controlling the temperature of the viscous liquids by regulating the FXTH's on-off cycle. It is mounted remotely with standard components consisting of a NEMA XII or NEMA IV enclosure with

vertical wall mounted brackets and hasp and staple for padlocking. Electrical components include: Failsafe overheat device, master circuit-breaker, contactor(s), relay(s), selector switch, pilot lights, fuses and a 120-volt control circuit transformer.

**IMPORTANT-**Before attempting to uncrate or install the FXTH heater, read and understand all of the following instructions. Proper handling is absolutely necessary to obtain satisfactory operation. All electrical connections are to be made by a qualified electrician. To avoid excessive separation, stratification, sludge formation, etc., in your FXTH heated storage tank, consult a qualified oil supplier regarding selection and blending of fuel oils.

## UNCRATING AND HANDLING OF HEATER

**NOTE:** Inspect shipping crates before opening. Contact the carrier if damage is evident.

1. Check to see that all components are included. FXTH immersion heaters are shipped as subassemblies consisting of (a) flexible heater with riser tubes, (b) terminal housing, (c) thermowells and vent tube, and (d) control unit (if ordered).
2. To unpack flexible heater, keep crate in upright and horizontal position when removing heater. Only top boards of crate need to be removed.
3. When lifting heater assembly, do not bend heater to radius less than 22". Heaters should be flexed in vertical plane only. This is a plane perpendicular to the sludge leg base plates. Bending in horizontal plane can damage internal ceramic insulators.

4. Use several people to lift heater - the number depends on the length and weight of the heater. As a guide, four men should be used to lift and handle a dual tube 20 ft. unit.
5. Do not put any stress on the flexible riser tubes. These are not designed for supporting weight. The unit must be lifted by either the 3" heater tubes or the steel lifting cables furnished with heater and located at both ends of heater. See Figure A.
6. Set heater in upright position on flat surface. Avoid any lateral bending.

**CAUTION:** Never drop heater or subject it to mechanical shock.

## PRE-INSTALLATION CHECK OF HEATER

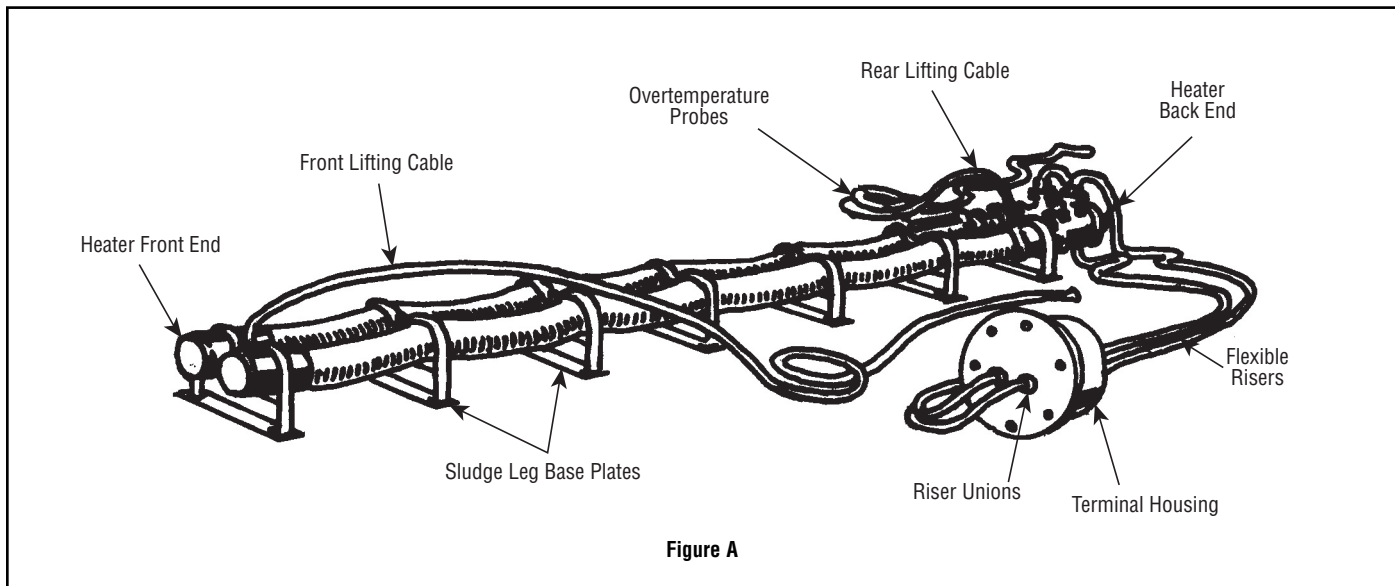


Figure A

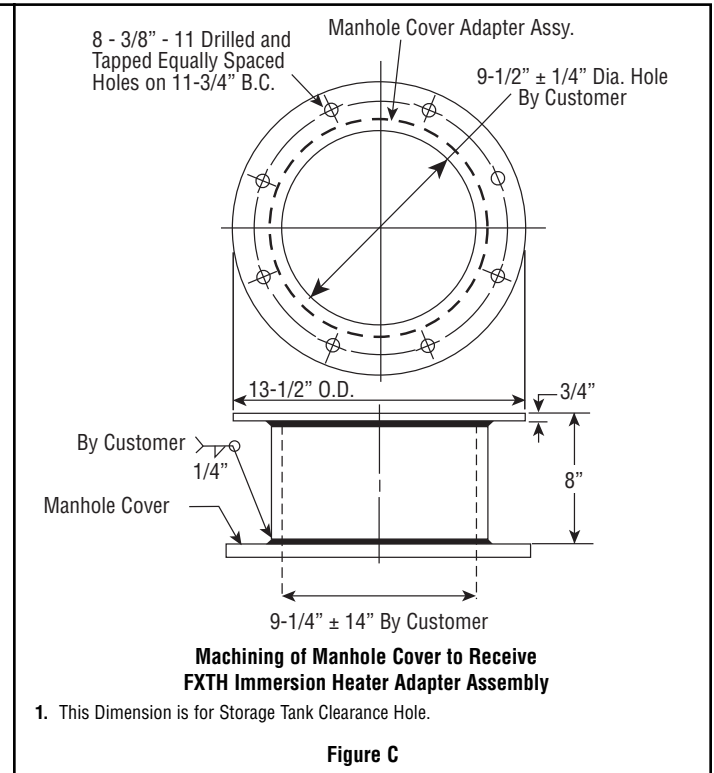
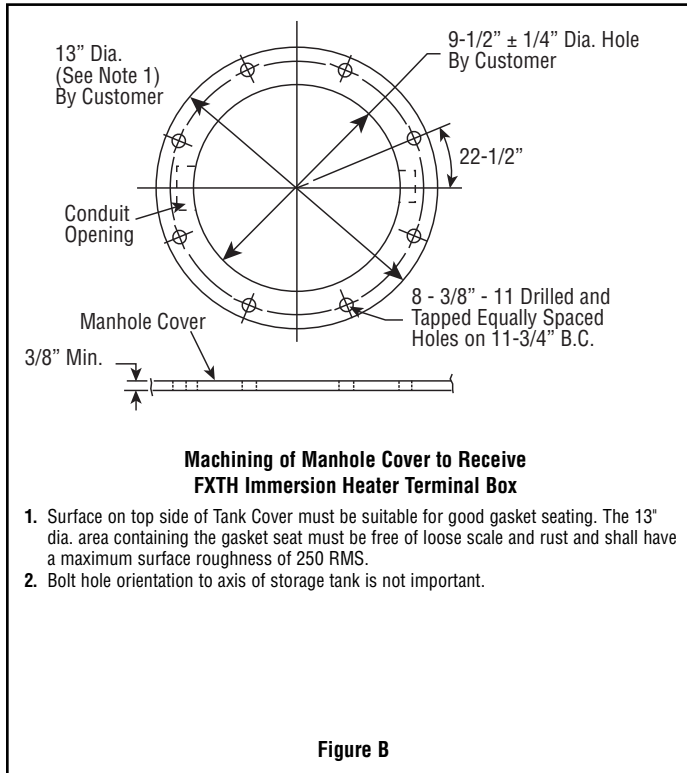
### 1. Mechanical

The heater assembly has undergone a rigorous leak test just prior to shipment from the factory. Visually inspect all joints and flex tube surfaces to insure no mechanical damage has incurred during shipping. Contact carrier if heater shows signs of damage. Do not attempt to install heater if damage is evident. Do not attempt to tighten or remove any of the threaded fittings in the flexible tube assembly. If the sealing performed at the factory has been broken, the unit must undergo another complete leak test supervised by an Authorized Chromalox Serviceman before installing in tank.

### 2. Electrical

- A. Open control unit cover and examine electrical components for any damage which may have been incurred during shipment. Contact carrier and report any damage noted.
- B. **CAUTION:** Retighten all electrical connections and mounted components which may have loosened during shipment.

## PREPARATION OF TANK TO RECEIVE HEATER

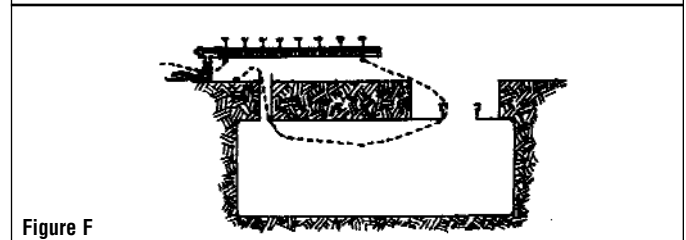
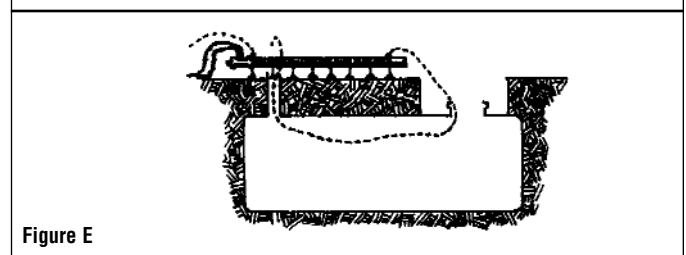
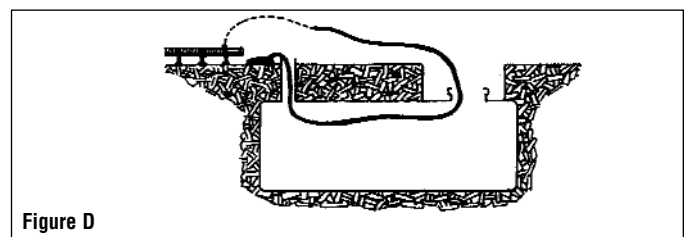


1. Double check internal dimensions of tank to be sure heater legs will stand straight on portion of tank bottom to its full length when in its operating position.
2. Remove any obstructions which may interfere with proper installation of heater into tank.
3. Clean manhole area to eliminate dirt and water which can be picked up by heater during its insertion into tank.
4. Time the installation so oil level in tank is half full or less. This will greatly facilitate insertion and positioning of heater.
5. Check sludge in bottom of tank to ensure it does not interfere with operation of heater. Standard FXTH heaters are supplied with 4" sludge legs. Sludge in excess of 3" must be removed before

6. installing heater. Sludge must not touch the corrugated heating surface of the immersion unit.
  6. Check point of tank suction to make sure it is 12" or more off bottom of tank. This will insure a minimum liquid level of 12" and prevent heater from being uncovered while in operation. The heater must not be energized unless it is completely submerged.
  7. Machine manhole cover per Figure B or install optional terminal housing manhole adapter to manhole cover or storage tank per Figure C. All welds must be liquid tight.
- DANGER: Hazard of Fire.** If adapter is to be welded directly into tank, remove flammable liquids, and vent all combustible gases or vapors from storage tank before performing welding operations.

## INSTALLATION OF HEATER ASSEMBLY IN TANK

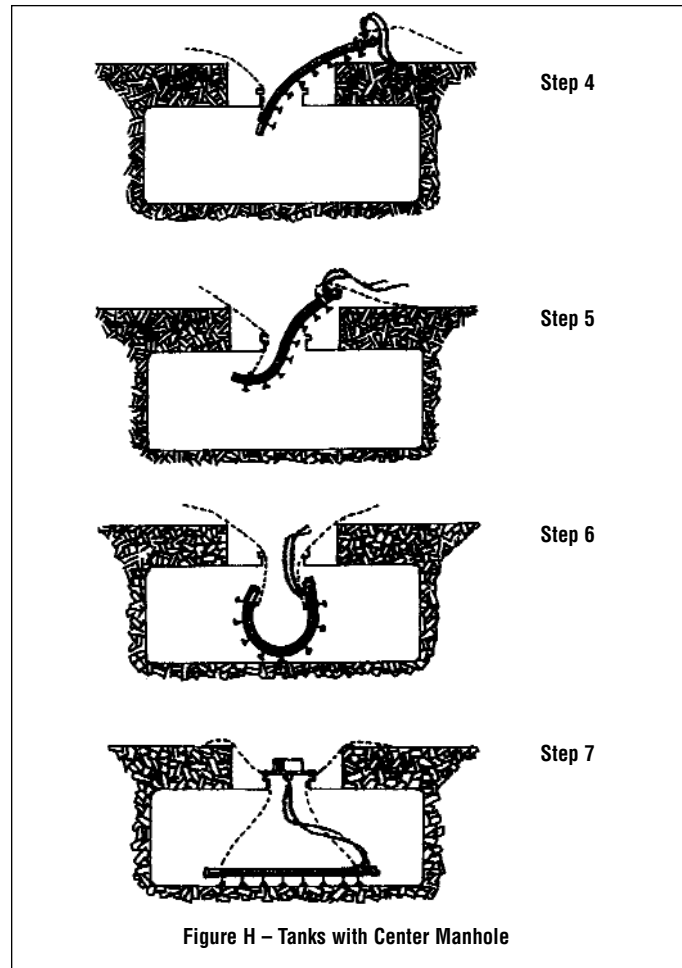
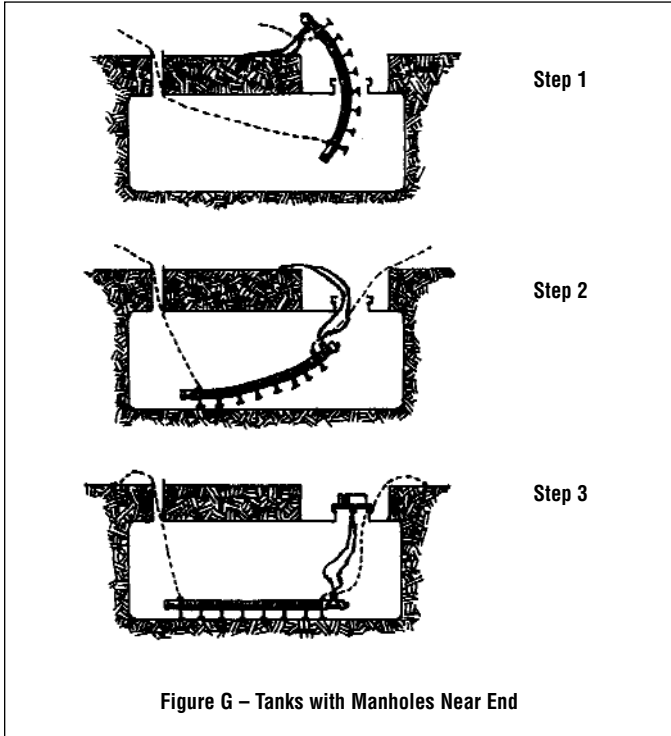
1. If tank is type with manhole located near end of tank rather than in center, install a temporary pulling cable at far end of tank through any available port such as (1) fill pipe, (2) suction port, (3) auxiliary manhole, etc., and thread the cable through the tank and out the manhole to be used for installing the heater. The pulling cable will be used to pull front lifting cable through auxiliary port and then pulling cable is disconnected. See Figure D.
2. Align heater assembly along centerline of tank having rear end (riser end) of assembly farthest from manhole. **Note:** On tanks with manhole near end rather than in center heater assembly should be placed on side of manhole farthest from end of tank. See Figure E.
3. Tie the riser(s) with rope or suitable line at a point just below the union on riser(s). Anchor rope to any convenient nearby anchoring point. Length of rope should be sufficient to allow riser(s) to be inserted into tank just inside manhole but not below oil level. **CAUTION:** If oil gets into riser, it will cause failure of the heating element.
4. Carefully turn heater over, feet upward, taking care it is flexed in only the one plane. (See Figure F.) Support must be maintained on riser end of heater to avoid overstressing riser(s) until heater is lowered into tank.



## INSTALLATION OF HEATER ASSEMBLY IN TANK (cont'd.)

5. Begin lowering heater into tank as per Figure G, Step 1 thru 3 (end manhole) or Figure H, Step 4 thru 7 (center manhole). Once the heater has touched bottom, use pulling wire (front lifting cable) to pull heater toward far end of tank.
6. Before lowering back end of heater, visually gage the remaining length of heater to be laid down, to be certain an equal amount of clearance is allowed at both ends of tank. Back end of heater is lowered into place using rear lifting cable. **CAUTION: NEVER USE RISERS TO SUPPORT HEATER TUBES.**
7. Where additional heater assemblies are to be installed in the same manhole, follow same procedure, being careful not to interfere with risers or cable on the initial heater.

**NOTE:** In tanks where the configuration does not allow following the above procedure, or in above ground tanks, ask for Factory recommendations for installation of heater.



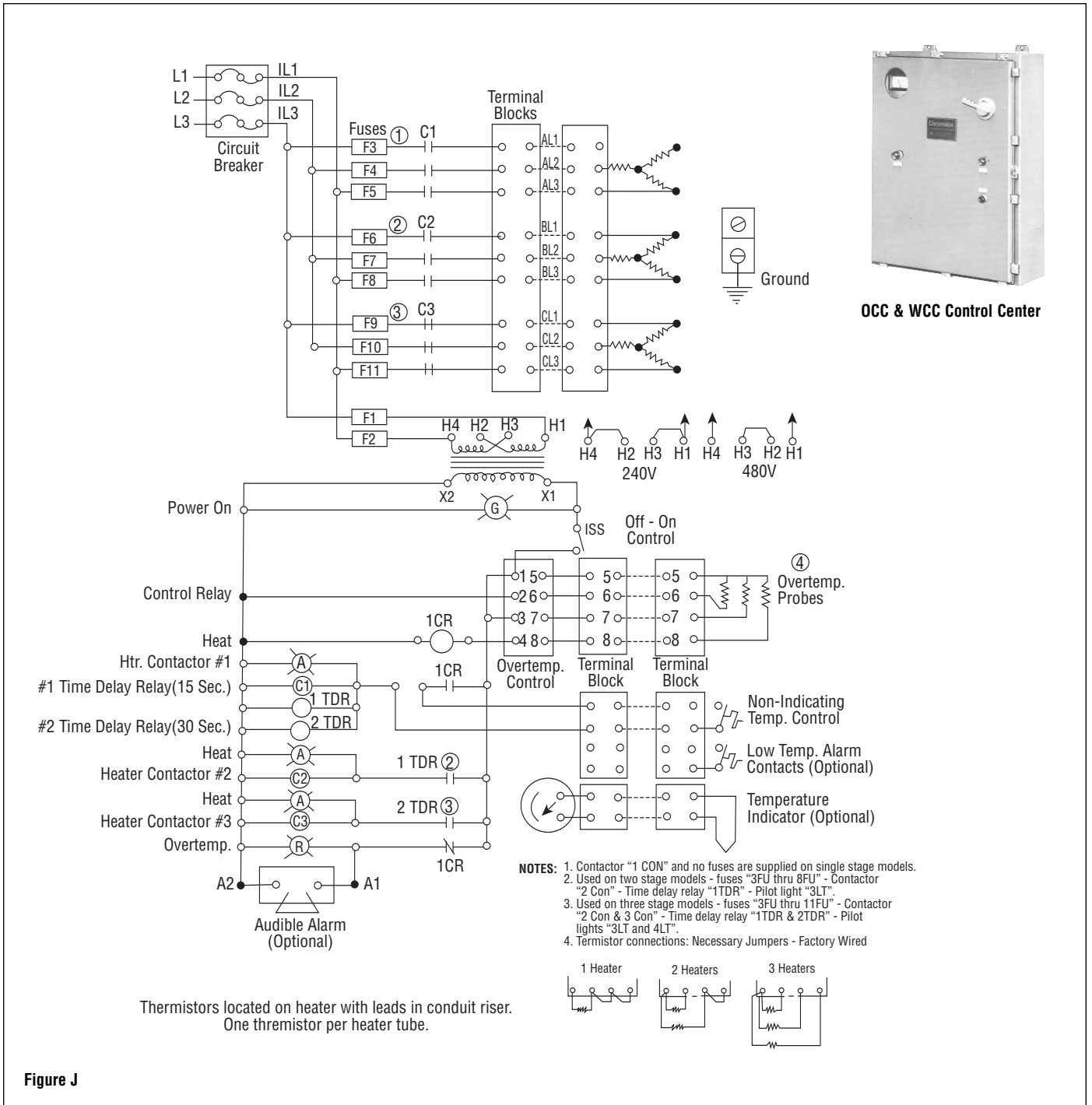
## INSTALLATION OF FXTH TERMINAL HOUSING

- A. Position manhole cover adjacent to manhole. Very carefully untie rope from anchoring point and pass it through (1) manhole gasket, (2) opening in manhole cover, and (3) terminal housing gasket. Securely refasten rope to anchoring point. Do not allow riser end(s) to fall into oil, or permanent damage will result to the heater. Bolt down manhole cover using a suitable gasket sealant if required to obtain water-tight seal.
- B. Pull riser(s) upward into position next to terminal housing. Wrap teflon tape on threaded riser connections and fasten into underside of terminal housing. Unused connections on bottom of housing will already contain flush plugs. Attach lifting cables to ring on under side of terminal housing.
- C. Bolt terminal housing to manhole cover or manhole cover adapter, again using suitable gasket cement. If manhole cover is machined per Figure B, be sure to install copper gasket washers under bolt heads. Position housing so conduit connections are in the most convenient position for your particular installation. Connect all riser leads to terminals, following markers on wires and terminals referring to wiring diagram Figure J.
- D. Install power leads from terminal housing to control center. See Specifications Table, Page I for amperages to determine wire and conduit size as determined by the National Electric Code.
- E. To install thermostat wells, insert closed end of the well into brass fitting in bottom of terminal housing. Push well completely to bottom of tank. A preliminary measurement from manhole level to tank bottom will aid proper insertion. The well may first hit the heater. It is then necessary to manipulate the well so that it will glance off the rounded heater surface and extend to tank bottom. Mark side of tube at the swage fitting and then pull upward several feet to working level. Using a tube cutter, cut the tube at a point exactly 7" below the mark. Once the tube is cut, be extremely careful the tube is not allowed to drop through fitting and into tank. Partially tighten fitting so this cannot happen. Position the upper end of well 5" off top of tube fitting, then firmly tighten the fitting. Insert bushing (located in shipping bag inside of terminal housing) into top of well. This will prevent burrs on tube from cutting the bulb or capillary of thermostat. Repeat this procedure until all wells are installed. There can be as many as three wells; (1) Thermostat, (2) Temperature Indicator, (3) Low Limit Alarm.
- F. Install thermostat mounting plate. Make sure thermowells are aligned with openings in plate and over-temperature leads from riser are brought through plate. Fasten plate into position.

## INSTALLATION OF HEATER ASSEMBLY IN TANK (cont'd.)

- G.** Carefully unwind and straighten thermostat capillary tube. The capillary must be reasonably straight. Be absolutely certain the bulb is seated at bottom of well. Carefully coil any excess capillary and position next to thermostat and away from electrical connections. Repeat same procedure if low limit alarm is provided. Attach wire for overtemperature sensor to terminals.
- NOTE:** Over-temperature control is located in the Chromalox Control Center. If heater is supplied without control center, be sure to obtain an over-temperature control for a positive thermostat, otherwise heater will be without over-temperature protection.
- H.** If the low temperature thermostat is being used, connect annunciator leads directly to terminals on this thermostat and provide an independent power source. The switch rating is; 20 amp @ 115V, 15 amp @ 230V, pilot duty 125VA.

- I.** If temperature indicator is employed, wire in accordance with Figure J. Use wire size as recommended for connecting to control center.
- J.** Install control wiring through 3/4" conduit connection as indicated on page 1. Leave lid off terminal housing until operational check is completed. Install breather tube on the outside of the terminal box as shown on page 1, Make sure top of tube is at least 12" above the drainage water level. **CAUTION:** All conduit connections to terminal housing must be sealed to prevent entry of any water, water vapor or condensation into terminal housing. Breather tube length may be cut to shorten height, or extended for higher flood levels by using 3/8" compression tube coupling and 3/8" tubing, as desired between formed breather tube and elbow fitting on side of terminal housing.



## ELECTRICAL AND OPERATIONAL CHECKS

- A. Having circuit breaker and power switch in "off" position, make sure proper voltage supplied matches voltage of control panel and elements.
- B. Adjust controlling thermostat in terminal housing to a 50°F reading. Increase setting until thermostat switch just "clicks". This setting is to be used for initial heater checkout.
- C. Turn circuit breaker to "on" and note green power light coming on. Turn on power switch and note first amber light will come on, and then subsequent amber light(s) as explained in Section.
- D. Observe control panel as heater goes through several heating cycles. A cycle is determined when all amber lights are off. Cycle interval can vary widely depending on amount of oil in tank. However, the thermostat has been set to keep the cycle time to a minimum.
- E. Turn off circuit breaker and power switch, then re-set thermostat to desired setting for normal operation. The thermostat contains a factory adjusted stop which prevents settings above 150°F.
- F. If low temperature alarm feature is provided, set this control 10° to 15°F below the control thermostat setting.
- G. Installation of terminal housing lid and gasket (with proper gasket sealant) completes the check-out procedure.
- H. If any difficulties are encountered during the installation and check-out, call your local Chromalox Representative or Chromalox Product Service.

## INSTALLATION OF REMOTE CONTROL CENTER

**CAUTION:** Hazard of electric shock. Any installation involving electric must be grounded to earth to eliminate shock hazard.

1. A safe maximum temperature limit on control cabinet components is 125°F. Choose a mounting location not in direct sunlight or exposed to any other source of excessive heat. If the panel must be mounted in direct sun, a sun shield must be employed.
2. Install proper control and power wiring to control center as per Figure J. Power lines are to be sized for the particular heater load. Double check to insure proper grounding procedures have been followed for heaters and control panel.
3. Available inside control panel are connections A and A1 which provide for an over-temperature alarm; such as, horn, bell, etc., to be mounted remotely as required. These terminals are rated at 50VA, 120V.
4. Electrical
  - A. **CAUTION: Hazard of severe shock. Make sure circuit breaker and panel switch are in "off" position.**
  - B. Make knockouts in control cabinet which are desired for final wiring installation.
  - C. Connect leads from riser(s) to identified terminals shown on Figure J.
  - D. **TEMPORARY WIRING TO SIMULATE ACTIVATION OF CONTROL CIRCUIT.**
    1. Jumper terminals S to S<sup>1</sup>.
    2. Connect overtemperature control leads to terminals 5, 6, 7 or 8 as shown on Figure J.
    3. Connect green ground wire lead from riser(s) to grounding lug in control box and from control box to a suitable ground.
    4. Connect power cable of proper voltage to input of control box.
    5. Secure control box door, then place circuit breaker in "on" position and energize heater with panel switch. Start with 45 second time interval and increase until a definite rise in temperature on each heater tube can be felt with the bare hand. **NOTE:** Adjustable time delay(s) in multi-stage units have been preset at factory to provide steps for energizing individual circuits.
    6. Observe green light (which indicates "power") when closing circuit breaker, first amber light with panel switch "on" and subsequent amber light(s) (if any) at approximately 15 second intervals.
    7. Have qualified electrician, using an amprobe, check amperage in individual heater leads to insure uniform amperage.
    8. Turn circuit breaker to "off" position and remove temporary jumper from terminals Sand S<sup>1</sup>

### Specifications – OCC and WCC Control Center (All Phases)

Max. kW	Volts	Max. Amps Per Circuit	No. of Circuits	Catalog Number		Dimensions Inches			Approx. Net Wt. Lbs.
				Dust and Oil Tight Models	Weatherproof Models	H	W	D	
6	240	15	1	OCC-15-213	WCC-15-213	24	20	8	64
8	240	25	1	OCC-25-213	WCC-25-213	24	20	8	65
12	240	30	1	OCC-30-213	WCC-30-213	24	20	8	65
15	240	40	1	OCC-40-213	WCC-40-213	24	20	8	66
18	240	45	1	OCC-45-213	WCC-45-213	30	24	8	89
21	240	55	1	OCC-55-213	WCC-55-213	30	24	8	91
24	240	60	1	OCC-60-213	WCC-60-213	30	24	8	91
27	240	70	1	OCC-70-213	WCC-70-213	30	24	8	96
30	240	75	1	OCC-75-213	WCC-70-213	30	24	8	96
12	240	15	2	OCC-15-223	WCC-15-223	30	24	8	84
16	240	25	2	OCC-25-223	WCC-25-223	30	24	8	86
24	240	30	2	OCC-30-223	WCC-30-223	30	24	8	86
30	240	40	2	OCC-40-223	WCC-40-223	30	24	8	91
36	240	45	2	OCC-45-223	WCC-45-223	42	30	8	126
42	240	55	2	OCC-55-223	WCC-55-223	42	30	8	128
48	240	60	2	OCC-60-223	WCC-60-223	42	30	8	128
54	240	70	2	OCC-70-223	WCC-70-223	42	30	8	135
60	240	75	2	OCC-75-223	WCC-75-223	42	30	8	135
18	240	15	3	OCC15-233	WCC-15-233	36	30	8	113
30	240	25	3	OCC-25-233	WCC-25-233	36	30	8	120
36	240	30	3	OCC-30-233	WCC-30-233	36	30	8	125
45	240	40	3	OCC-40-233	WCC-40-233	36	30	8	127
6	480	10	1	OCC-10-413	WCC-10-413	24	20	8	64
8	480	15	1	OCC-15-413	WCC-15-413	24	20	8	64
15	480	20	1	OCC-20-413	WCC-20-413	24	20	8	64
18	480	25	1	OCC-25-413	WCC-25-413	24	20	8	64
21	480	30	1	OCC-30-413	WCC-30-413	24	20	8	64
27	480	35	1	OCC-35-413	WCC-30-413	24	20	8	64
30	480	40	1	OCC-40-413	WCC-30-413	24	20	8	64
12	480	10	2	OCC-10-423	WCC-10-423	30	24	8	84
20	480	15	2	OCC-15-423	WCC-15-423	30	24	8	84
30	480	20	2	OCC-20-423	WCC-20-423	30	24	8	84
36	480	25	2	OCC-25-423	WCC-25-423	30	24	8	89
42	480	30	2	OCC-30-423	WCC-30-423	30	24	8	91
54	480	35	2	OCC-35-423	WCC-35-423	30	24	8	91
60	480	40	2	OCC-40-423	WCC-40-423	30	24	8	96
18	480	10	3	OCC-10-433	WCC-10-433	36	30	8	113
36	480	15	3	OCC-15-433	WCC-15-433	36	30	8	113
45	480	20	3	OCC-20-433	WCC-20-433	36	30	8	113



## OPTIONAL EQUIPMENT

**Temperature Indicators (Suffix "D")**  
**(FXTH Heater Assembly and Control Center will have**  
**suffix "D" e.g. FXTH-11206D, WCG15-213D)**

### MOUNTING

Temperature indicators are balanced for accurate reading in a normal vertical position unless specified otherwise. All pyrometers labeled "shielded meter" may be used in any type of panel with little or no effect on calibration. Those labeled "non-magnetic" must be used only on aluminum, plastic, wood or other non-magnetic panels. They will read low if mounted in a steel panel. Pyrometers which are labeled "magnetic" are intended for installation on steel panels. A steel compensating ring is normally supplied where panel material is not specified. Discard the ring when mounting on a steel panel. If the pyrometer is used on a non-magnetic panel, the steel ring must be used. Be sure the slit in the ring is at the top of the meter barrel and the ring is pushed as far forward as it will go.

### THERMOCOUPLE SELECTION AND CALIBRATION

Each pyrometer is marked on the dial with the type of thermocouple and the total external resistance for which it is calibrated. Use of any other type of thermocouple or one with a higher resistance than marked will result in incorrect readings. (Type J thermocouples are normally used.) All standard pyrometers are calibrated for 10 ohms external thermocouple resistance and are provided with a 10 ohm calibrating resistor bobbin. (Non-standard pyrometers are usually calibrated for the specific external resistance ordered and no resistor bobbin is supplied.) This resistor bobbin must be adjusted so the total resistance of the thermocouple and the bobbin add up to 10 ohms in order to maintain calibration accuracy. Therefore, for a 5 foot, 20 gauge, iron-constantan thermocouple, the resistance of the thermocouple would be approximately 1.75 ohms and this resistance must be subtracted from the calibrating bobbin. Each turn of the wire on the resistor bobbin represents 0.5 ohms and for this example, 3-1/2 turns would be removed. The total resistance of the thermocouple plus the resistor bobbin would then add up to 10 ohms. For other values of thermocouple resistance, simply remove more or less turns to adjust for the total value of external resistance marked on the pyrometer dial.

It is very important the resistor wire be properly soldered after adjusting.

**NOTE:** When Thermocouples with external resistance higher than 10 ohms will be used, a special pyrometer will be required. The use of other than thermocouple wire for leads or extensions may result in improper ambient compensation.

### ABBREVIATED TABLE OF THERMOCOUPLE RESISTANCE

The table lists the resistance in ohms per pair-foot for various types of commonly used thermocouples for a number of different gauges of wire. By using this table, it is necessary only to measure the length of the thermocouple, knowing the type and gauge, to determine its approximate resistance. (Actual measurement of the thermocouple resistance is preferred to using the table.)

Ohms Per Pair - Foot			
Gauge B & S	Iron/Constantan (Type J)	Copper/Constantan (Type T)	Chromel/Alumel (Type K)
8	.0215	.0184	.0365
10	.0341	.0293	.0580
12	.0542	.0466	.0922
14	.0863	.0741	.1470
16	.1370	.1180	.2330
18	.2180	.1870	.3710
20	.3570	.2980	.5900
22	.5510	.4690	.9370
24	.8770	.7530	1.490
26	1.390	1.200	2.370
28	2.220	1.910	3.770
30	3.520	3.030	5.980

## CHROMALOX TYPE TMC 7-DAY TIMER

TMC 7-day Calendar, Electric Dial Timer is used to provide automatic start-up/off-on control of large tank heaters or could be set up for non-peak operation. Standard features: 7-day calendar dial permits different on/off schedules on different days of week. 2 to 14 replaceable trippers for up to 4 on/off operations per day, up to 28 on/off operations per week. 3 hour minimum on or off time; 21 hour maximum on or off time. Independent 4-pole design allows SPST, DPST, SPDT, switching. Manual on/off lever transfers switch operation without disturbing daily or weekly preset schedule. Heavy duty synchronous motor suitable for operation between -40°F and +140°F. Switch slider bar assures positive switching. Heavy duty terminals accommodate up to AWG No.8 wire.

### OPERATION

**"Off" Setting** - de-energizes the entire zone control circuit, thus de-energizing all heating-cooling equipment in the zone. This setting can be used for extended summer shutdowns, etc.

**"Automatic" Setting** - allows the Day-Night Clock Panel to cycle the control system according to the program clock dial tripper settings.

**To Set Trippers** - Refer to picture for typical setup of a Seven Day Program. Two trippers must be used for each day; an "A" tripper for switching from "Night Setback" to "Day Operation" and a "B" tripper for switching from "Day Operation" to "Night Setback".

**CAUTION:** To set the correct day and time at beginning of initial start-up, ROTATE THE PROGRAM CLOCK DIAL CLOCKWISE ONLY. DO NOT ATTEMPT TO TURN POINTER!

### Adjusting and Maintenance of Time Switch:

1. Periodically check trippers to insure that they are tightly fastened to Program Clock dial. CAUTION: TIGHTEN TRIPPERS WITH FINGERS ONLY!
2. Rotate Program Clock dial CLOCKWISE one hour in Spring to adjust for daylight saving time (in areas where required). In Fall, carefully rotate clock dial CLOCKWISE approximately one full turn to reset at correct day and time for standard time. Check all trippers to insure they have not moved during rotation.
3. The Program Clock motor is permanently lubricated. Lubrication of other parts is not required.
4. The Program Clock switch contacts are factory set and need no field adjustment.

Model	Renewal Part No.	Operation	Volts 60 Hz	Switch	Amps
TMC71	311-057070-001	Seven Day	120	4 Pole 2 N.O. 2 N.C.	40

## RENEWAL PARTS IDENTIFICATION

Catalog No.	kW	Voltage	
		240	480
		Element Part Number	Element Part Number
FXTH-11206	6	063-115244-004	063-115244-002
FXTH-11508	8	063-115244-003	063-115244-004
FXTH-11510	10	063-115244-005	063-115244-006
FXTH-11512	12	063-115244-009	063-115244-010
FXTH-12010	10	063-115244-007	063-115244-008
FXTH-12012	12	063-115244-011	063-115244-012
FXTH-12015	15	063-115244-013	063-115244-014
FXTH-12718	18	063-115244-015	063-115244-016
FXTH-13021	21	063-115244-017	063-115244-018
FXTH-13224	24	063-115244-019	063-115244-020
FXTH-13527	24	063-115244-021	063-115244-022
FXTH-14030	30	063-115244-023	063-115244-024
FXTH-21212	12	063-115244-001 (2)	063-115244-002 (2)
FXTH-21516	16	063-115244-003 (2)	063-115244-004 (2)
FXTH-21520	20	063-115244-005 (2)	063-115244-006 (2)
FXTH-21524	24	063-115244-009 (2)	063-115244-010 (2)
FXTH-22020	20	063-115244-007 (2)	063-115244-008 (2)
FXTH-22024	24	063-115244-011 (2)	063-115244-012 (2)
FXTH-22030	30	063-115244-013 (2)	063-115244-014 (2)
FXTH-22736	36	063-115244-015 (2)	063-115244-016 (2)
FXTH-23042	42	063-115244-017 (2)	063-115244-018 (2)
FXTH-23248	48	063-115244-019 (2)	063-115244-020 (2)
FXTH-23554	54	063-115244-021 (2)	063-115244-022 (2)
FXTH-24060	60	063-115244-023 (2)	063-115244-024 (2)
FXTH-31218	18	063-115244-001 (3)	063-115244-002 (3)
FXTH-31530	30	063-115244-005 (3)	063-115244-006 (3)
FXTH-31536	36	063-115244-009 (3)	063-115244-010 (3)
FXTH-32030	30	063-115244-007 (3)	063-115244-008 (3)
FXTH-32036	36	063-115244-011 (3)	063-115244-012 (3)
FXTH-32045	45	063-115244-013 (3)	063-115244-014 (3)

### What the Catalog Number means:

FXTH - 2 12 12	WCC - 10 - 423
1 2 3 4	1 2 345
1 - Flexible Tank Heater	1 - OCC - Oil Tight & Dust Tight Control Center
2 - Number of Tubes	WCC - Weatherproof Control Center
3 - "B" Dimension	2 - Maximum Amperage per Circuit
4 - kW Rating	3 - Maximum Voltage 2 - 240, 4 - 480, 6 - 600
	4 - Number of Circuits
	5 - Phase

### Modified FXTH Standard Heater (FXTH-32036A)

Voltage.....	V	Wattage.....	W
Change in Riser Length.....			A
Low Temp. Alarm Contacts.....			R
Temperature Indicator.....			D
WCC			
Voltage.....	V		
Audible Alarm.....			H
Time Clock.....			T
Temperature Indicator.....			D
All Others.....			XX

Common Parts	Part Number
Terminal Housing Manhole adapter.....	306-115694-001
Manhole adapter Flange.....	121-115692-001
Manhole adapter Housing.....	065-115693-001
Flange Gasket.....	132-115515-001
Housing Gasket.....	132-113661-001
Thermostat.....	300-115621-001
Thermocouple Probe.....	309-121168-001
Circuit Breaker Handle (150 Amps or less).....	139-071820-000
Circuit Breaker Handle (151 Amps to 225 Amps).....	139-071820-010
Pilot Light - Red.....	213-120816-005
Amber.....	213-120816-001
Green.....	213-120816-002
Plexiglass Window.....	207-121061-001
Alarm.....	385-122101-001
Selector Switch (WCC only).....	292-120827-002
Selector Switch (OCC only).....	292-120827-001
Moto-gard Overtemp. Control.....	300-115550-001
Control Relay 300V, 10A, 3 Pole.....	072-120451-001
Time Clock - 7-day.....	311-057070-001
Pyrometer.....	308-051161-001
NEMA - IV Seal on Circuit Breaker Handle.....	139-071820-013

Note: Number in ( ) indicates quantity of same part number used.

## REPLACEMENT PARTS FOR OCC AND WCC CONTROL CENTER

Qty.	Description	Part Number
<b>OCC or WCC-10-413, 480V, 1-3φ, 6 &amp; 8 kW</b>		
1	Circuit Breaker, 480V, 15 Amp, 3 pole.....	104-071818-017
1	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
2	Fuses, 1/2 (F1 and F2).....	128-114696-010
1	Transformer, 150VA.....	315-048507-018
<b>OCC or WCC-10-423, 480V, 2-3φ, 12 &amp; 16 kW</b>		
1	Circuit Breaker, 480V, 25 Amp, 3 pole.....	104-071818-019
2	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
2	Fuses, FNQ 6/10 (F1 and F2).....	128-114696-005
6	Fuses, KTK-15 (F3 thru F8).....	128-047763-002
1	Transformer, 150VA.....	315-048507-018
1	Time Delay Relay.....	311-115540-001
<b>OCC or WCC-10-433, 480V, 3-3φ, 18 kW</b>		
1	Circuit Breaker, 480V, 30 Amp, 3 pole.....	104-071818-020
3	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
9	Fuses, KTK-15 (F3 thru F11).....	128-047763-002
1	Transformer 250VA.....	315-048507-024
2	Relay Time Delay.....	311-115540-001
2	Fuse FNQ 6/10 (F1 and F2).....	128-114696-005

Qty.	Description	Part Number
<b>OCC or WCC-15-213, 240V, 1-3φ, 6 kW</b>		
1	Circuit Breaker, 240V, 20 Amp, 3 pole.....	104-071818-003
1	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
2	Fuses, FNQ 8/10 (F1 and F2).....	128-114696-011
1	Transformer, 150VA.....	315-048507-018
<b>OCC or WCC-15-223, 240V, 2-3φ, 12 kW</b>		
1	Circuit Breaker, 240V, 40 Amp, 3 pole.....	104-071818-007
2	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
2	Fuses, FNM8/10 (F1 and F2).....	128-114696-012
6	Fuses, KTK-20 (F3 thru F8).....	128-047763-002
1	Time Delay Relay.....	311-115540-001
1	Transformer, 150VA.....	315-048507-018
<b>OCC or WCC-15-233, 240V, 3-3φ, 18 kW</b>		
1	Circuit Breaker, 240V, 60 Amp, 3 pole.....	104-071818-010
3	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
9	Fuses, KTK-20.....	128-047763-002
1	Transformer, 250VA.....	315-048507-024
2	Time Delay Relay.....	311-115540-001
2	Fuse FNM 1- 4/10.....	128-114696-013



## REPLACEMENT PARTS FOR OCC AND WCC CONTROL CENTER (cont'd.)

Qty.	Description	Part Number
<b>OCC or WCC-15-413, 480V, 1-3Ø, 10 &amp; 12 kW</b>		
1	Circuit Breaker, 480V, 20 Amp, 3 pole.....	104-071818-018
1	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
2	Fuses, FNQ 1/2 (F1 and F2).....	128-114696-010
1	Transformer, 150VA.....	315-048507-018

Qty.	Description	Part Number
<b>OCC or WCC-25-233, 240V, 3-3Ø, 30 kW</b>		
1	Circuit Breaker, 240V, 100 Amp, 3 pole.....	104-071818-014
3	Contactors, 600V, 30 Amp, 3 pole .....	072-120812-005
9	Fuses, KTK-30 (F3 thru F11).....	128-047763-005
1	Transformer, 250VA.....	315-048507-024
2	Time Delay Relay.....	311-115540-001
2	Fuses, FNM 1- 4/10 (F1 and F2).....	128-114696-013

<b>OCC or WCC-15-423, 480V, 2-3Ø, 20 &amp; 24 kW</b>		
1	Circuit Breaker, 480V, 40 Amp, 3 pole.....	104-071818-022
2	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
2	Fuses, FNQ 6/10 (F1 and F2).....	128-047763-002
6	Fuses, KTK-20 (F3 thru F8).....	128-047763-003
1	Transformer, 150VA.....	315-048507-018
1	Time Delay Relay.....	311-115540-001

<b>OCC or WCC-25-413, 480V, 1-3Ø, 18 kW</b>		
1	Circuit Breaker, 480V, 30 Amp, 3 pole.....	104-071818-020
1	Contactors, 600V, 30 Amp, 3 pole.....	072-120812-001
2	Fuses, FNQ V2 (F1 and F2).....	128-114696-010
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-10-433, 480V, 3-3Ø, 30 kW</b>		
1	Circuit Breaker, 480V, 50 Amp, 3 pole.....	104-071818-024
3	Contactors, 600V, 20 Amp, 3 pole .....	072-120812-005
9	Fuses, KTK-20 (F3 thru F11).....	128-047763-002
1	Transformer, 250VA.....	315-048507-024
2	Time Delay Relay.....	311-115540-001
2	Fuses, FNQ 6/10 (F1 and F2).....	128-114696-005

<b>OCC or WCC-25-423, 480V, 2-3Ø, 36 kW</b>		
1	Circuit Breaker, 480V, 60 Amp, 3 pole.....	104-071818-025
2	Contactors, 600V, 30 Amp, 3 pole.....	072-120812-001
2	Fuses, FNQ 4/10 (F1 and F2).....	128-114696-010
6	Fuses, FRS-35 (F3 thru F8).....	128-121133-063
1	Transformer, 150VA .....	315-048507-018
1	Time Delay Relay.....	311-115540-001

<b>OCC or WCC-15-433, 480V, 3-3Ø, 36 kW</b>		
1	Circuit Breaker, 480V, 70 Amp, 3 pole.....	104-071818-026
3	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
9	Fuses, KTK-20 (F3 thru F11).....	128-047763-003
1	Transformer, 250VA.....	315-048507-024
2	Time Delay Relay .....	311-115540-001
2	Fuses, FNQ 6/10 (F1 and F2).....	128-114696-005

<b>OCC or WCC-30-213, 240V, 1-3Ø, 12 kW</b>		
1	Circuit Breaker, 240V, 40 Amp, 3 pole .....	104-071818-007
1	Contactors, 600V, 30 Amp, 3 pole.....	072-120812-005
2	Fuses, FNQ 8/10 (F1 and F2).....	128-114696-011
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-20-413, 480V, 1-3Ø, 15 kW</b>		
1	Circuit Breaker, 600V, 25 Amp, 3 pole.....	104-071818-019
1	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
2	Fuses, FNQ V2 (F1 and F2).....	128-114696-010
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-30-223, 240V, 2-3Ø, 24 kW</b>		
1	Circuit Breaker, 240V, 80 Amp, 3 pole.....	104-071818-012
2	Contactors, 600V, 30 Amp, 3 pole.....	072-120812-001
2	Fuses, FNM 8/10 (F1 and F2).....	128-114696-012
6	Fuses, FRN (F3 thru F8).....	128-121133-077
1	Time Delay Relay.....	311-115540-001
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-20-423, 480V, 2-3Ø, 30 kW</b>		
1	Circuit Breaker, 480V, 50 Amp, 3 pole.....	104-071818-024
2	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
2	Fuses, FNQ 6/10 (F1 and F2).....	128-114696-005
6	Fuses, KTK-25 (F3 thru F8).....	128-047763-004
1	Transformer, 150VA.....	315-048507-018
1	Time Delay Relay .....	311-115540-001

<b>OCC or WCC-30-233, 240V, 3-3Ø, 36 kW</b>		
1	Circuit Breaker, 600V, 125 Amp, 3 pole.....	104-071818-045
3	Contactors, 600V, 30 Amp, 3 pole.....	072-120812-005
9	Fuses, FRN 40 (F3 thru F11).....	128-121133-077
1	Transformer, 250VA.....	315-048507-024
2	Relays, Time Delay.....	311-115540-001
2	Fuses, FNM 1- 4/10 (F1 and F2).....	128-114696-013

<b>OCC or WCC-20-433, 480V, 3-3Ø, 45 kW</b>		
1	Circuit Breaker, 480V, 70 Amp, 3 pole.....	104-071818-026
3	Contactors, 600V, 20 Amp, 3 pole.....	072-120812-005
9	Fuses, KTK-25 (F3 thru F11).....	128-047763-004
1	Transformer, 250VA.....	315-048507-024
2	Time Delay Relay .....	311-115540-001
2	Fuses, FNQ 6/10 (F1 and F2).....	128-114696-005

<b>OCC or WCC-30-413, 480V, 1-3Ø, 21 &amp; 24 kW</b>		
1	Circuit Breaker, 480V, 40 Amp, 3 pole.....	104-071818-022
1	Contactors, 600V, 30 Amp, 3 pole.....	072-120812-001
2	Fuses, FNQ V2 (F1 and F2).....	128-114696-010

<b>OCC or WCC-25-213, 240V, 1-3Ø, 3 &amp; 8 &amp; 10 kW</b>		
1	Circuit Breaker, 240V, 30 Amp, 3 pole.....	104-071818-005
1	Contactors, 600V, 30 Amp, 3 pole.....	072-120812-005
2	Fuses, FNQ 8/10 (F1 and F2).....	128-114696-011
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-30-423, 480V, 2-3Ø, 42 kW</b>		
1	Circuit Breaker, 480V, 70 Amp, 3 pole .....	104-071818-026
2	Contactors, 600V, 30 Amp, 3 pole.....	072-120812-001
2	Fuses, FNQ 4/10 (F1 and F2).....	128-114696-010
6	Fuses, FRS-40 (F3 thru F8).....	128-121133-064
1	Transformer, 150VA.....	315-048507-018
1	Time Delay Relay.....	311-115540-001

<b>OCC or WCC-25-223, 240V, 2-3Ø, 16 &amp; 20 kW</b>		
1	Circuit Breaker, 240V, 70 Amp, 3 pole.....	104-071818-011
2	Contactors, 600V, 30 Amp, 3 pole.....	072-120812-001
2	Fuses, FNM 8/10 (F1 and F2).....	128-114696-012
6	Fuses, KTK-30 (F3 thru F8).....	128-047763-005
1	Transformer, 150VA.....	315-048507-018
1	Time Delay Relay.....	311-115540-001

<b>OCC or WCC-30-423, 480V, 2-3Ø, 48 kW</b>		
1	Circuit Breaker, 480V, 80 Amp, 3 pole.....	104-071818-027
2	Contactors, 600V, 30 Amp, 3 pole.....	072-120812-001
2	Fuses, FNQ 4/10 (F1 and F2).....	128-114696-010
6	Fuses, FRS-45 (F3 thru F8).....	128-121133-065
1	Transformer, 150VA.....	315-048507-018
1	Time Delay Relay.....	311-115540-001

## REPLACEMENT PARTS FOR OCC AND WCC CONTROL CENTER (cont'd.)

Qty.	Description	Part Number
<b>OCC or WCC-35-413, 480V, 1-3<math>\phi</math>, 27 kW</b>		
1	Circuit Breaker, 480V, 45 Amp, 3 pole.....	104-071818-023
1	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNQ V2 (F1 and F2).....	128-114696-010
1	Transformer, 150VA.....	315-048507-018

Qty.	Description	Part Number
<b>OCC or WCC-55-213, 240V, 1-3<math>\phi</math>, 21 kW</b>		
1	Circuit Breaker, 240V, 70 Amp, 3 pole.....	104-071818-011
1	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNQ 8/10 (F1 and F2).....	128-114696-011
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-35-423, 480V, 2-3<math>\phi</math>, 54 kW</b>		
1	Circuit Breaker, 480V, 90 Amp, 3 pole .....	104-071818-028
2	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNQ 4/10 (F1 and F2).....	128-114696-010
6	Fuses, FRS-50 (F3 thru F8).....	128-121133-066
1	Transformer, 150VA.....	315-048507-018
1	Time Delay Relay.....	311-115540-001

<b>OCC or WCC-55-223, 240V, 2-3<math>\phi</math>, 42 kW</b>		
1	Circuit Breaker, 600V, 150 Amp, 3 pole .....	104-071818-046
2	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNM 8/10 (F1 and F2).....	128-114696-012
6	Fuses, FRN-70 (F3 thru F8) .....	128-121133-081
1	Transformer, 150VA.....	315-048507-018
1	Time Delay Relay .....	311-115540-001

<b>OCC or WCC-40-213, 240V, 1-3<math>\phi</math>, 15 kW</b>		
1	Circuit Breaker, 240V, 50 Amp, 3 pole.....	104-071818-009
1	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNQ 8/10 (F1 and F2).....	128-114696-011
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-60-213, 240V, 1-3<math>\phi</math>, 24 kW</b>		
1	Circuit Breaker, 240V, 80 Amp, 3 pole.....	104-071818-012
1	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNQ 8/10 (F1 and F2).....	128-114696-011
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-40-223, 240V, 2-3<math>\phi</math>, 30 kW</b>		
1	Circuit Breaker, 240V, 100 Amp, 3 pole.....	104-071818-014
2	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNM 1- 4/10 (F1 and F2).....	128-114696-013
6	Fuses, FRN-45 (F3 thru F8).....	128-121133-078
1	Time Delay Relay.....	311-115540-001
1	Transformer, 250VA.....	315-048507-024

<b>OCC or WCC-60-223, 240V, 2-3<math>\phi</math>, 48 kW</b>		
1	Circuit Breaker, 600V, 150 Amp, 3 pole.....	104-071818-046
2	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNM 8/10 (F1 and F2).....	128-114696-012
6	Fuses, FRN-80 (F3 thru F8).....	128-121133-082
1	Transformer, 150VA.....	315-048507-018
1	Time Delay Relay.....	311-115540-001

<b>OCC or WCC-40-233, 240V, 3-3<math>\phi</math>, 45 kW</b>		
1	Circuit Breaker, 600V, 150 Amp, 3 pole .....	104-071818-046
3	Contactors, 600V, 60 Amp, 3 pole .....	072-120812-002
9	Fuses, FRN 45 (F3 thru F11) .....	128-121133-078
1	Transformer, 250VA.....	315-048507-024
2	Time Delay Relay .....	311-115540-001
2	Fuses, FNM 1-4/10 (F1 and F2).....	128-114696-013

<b>OCC or WCC-70-213, 240V, 1-3<math>\phi</math>, 27 kW</b>		
1	Circuit Breaker, 240V, 90 Amp, 3 pole.....	104-071818-013
1	Contactors, 600V, 100 Amp, 3 pole.....	072-120812-003
2	Fuses, FNQ 8/10 (F1 and F2).....	128-114696-011
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-40-413, 480V, 1-3<math>\phi</math>, 30 kW</b>		
1	Circuit Breaker, 480V, 50 Amp, 3 pole.....	104-071818-024
1	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNQ 1/2 (F1 and F2).....	128-114696-010
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-70-223, 240V, 2-3<math>\phi</math>, 54 kW</b>		
1	Circuit Breaker, 600V, 175 Amp, 3 pole .....	104-071819-019
2	Contactors, 600V, 100 Amp, 3 pole .....	072-120812-003
2	Fuses, FNM 1-1/8 (F1 and F2).....	128-114696-020
6	Fuses, FRN-90 (F3 thru F8).....	128-121133-083
1	Transformer, 250VA.....	315-048507-024
1	Time Delay Relay.....	311-115540-001

<b>OCC or WCC-40-423, 480V, 2-3<math>\phi</math>, 60 kW</b>		
1	Circuit Breaker, 480V, 100 Amp, 3 pole.....	104-071818-029
2	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNQ 4/10 (F1 and F2).....	128-114696-010
6	Fuses, FRS-35 (F3 thru F8).....	128-121133-063
1	Transformer, 150VA.....	315-048507-018
1	Time Delay Relay.....	311-115540-001

<b>OCC or WCC-75-213, 240V, 1-3<math>\phi</math>, 30 kW</b>		
1	Circuit Breaker, 240V, 100 Amp, 3 pole.....	104-071818-014
1	Contactors, 600V, 100 Amp, 3 pole.....	072-120812-003
2	Fuses, FNQ 8/10 (F1 and F2).....	128-114696-011
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-45-213, 240V, 1-3<math>\phi</math>, 18 kW</b>		
1	Circuit Breaker, 240V, 60 Amp, 3 pole.....	104-071818-010
1	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNQ 8/10 (F1 and F2).....	128-114696-011
1	Transformer, 150VA.....	315-048507-018

<b>OCC or WCC-72-223, 240V, 2-3<math>\phi</math>, 60 kW</b>		
1	Circuit Breaker, 600V, 200 Amp, 3 pole.....	104-071819-020
2	Contactors, 600V, 100 Amp, 3 pole .....	072-120812-003
2	Fuses, FNM 1-1/8 (F1 and F2).....	128-114696-020
6	Fuses, FRN-100 (F3 thru F8) .....	128-121133-084
1	Transformer, 250VA.....	315-048507-024
1	Time Delay Relay.....	311-115540-001

<b>OCC or WCC-45-223, 240V, 2-3<math>\phi</math>, 36 kW</b>		
1	Circuit Breaker, 600V, 125 Amp, 3 pole.....	104-071818-045
2	Contactors, 600V, 60 Amp, 3 pole.....	072-120812-002
2	Fuses, FNM 8/10 (F1 and F2).....	128-114696-012
6	Fuses, FRN-60 (F3 and F8).....	128-121133-080
1	Transformer, 150VA.....	315-048507-018
1	Time Delay Relay.....	311-115540-001



**Limited Warranty:**  
Please refer to the Chromalox limited warranty applicable to this product at  
<http://www.chromalox.com/customer-service/policies/termsofsale.aspx>.

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**PRECISION HEAT AND CONTROL**

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