

Immersion Tank Heaters Owner's Manual

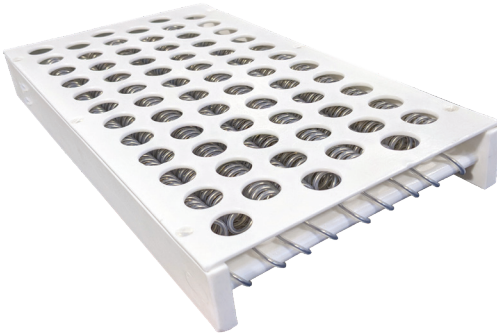


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Materials Warranty

Heateflex® warranties the equipment offered to be free from defects in material and workmanship, under normal handling and proper usage, for a period of one year from the date of shipment. All products purchased from manufacturers by Heateflex® will carry that manufacturer's warranty period. This expressed warranty is in lieu of, and excludes all other representations made by advertisements or by agents. There are no implied warranties for the equipment.



Heateflex® agrees to correct any defect in workmanship or material which may develop under normal handling and proper usage during a period of one year from the date of shipment or, by its option, to repair or replace the defective equipment F.O.B. Kamas, UT, USA. Purchaser's remedies shall be limited exclusively to the right of repair or replacement.

Heateflex® shall not be liable for any expenses incurred by the purchaser or any other person by reason of the use, misuse, sale, or fabrication of the equipment regardless of whether the equipment conforms to the specifications.

Items returned for warranty repair must be prepaid and insured for shipment. Warranty claims are processed on the condition that prompt notification of a defect is given within the warranty period. Heateflex® shall have the sole right to determine whether, in fact, a warranty situation exists.

Declaration of Conformity to CE

We, Heateflex®, declare under our sole responsibility that our semiconductor fabrication equipment (models listed below), as delivered, are in conformity with the following European Directives:

Application of Council Directive:	2006/95/EC Low Voltage Directive
	2006/42/EC Machinery Directive
	2004/108/EC Electromagnetic Compatibility (EMC) Directive
Standards to which Conformity is Declared:	IEC 60335-1 ed5.0 Household and similar electrical appliances - Safety - Part 1: General requirements
	IEC 60335-2-35 ed5.0 Household and similar electrical appliances - Safety - Part 2-35: Particular requirements for instantaneous water heaters
	Directive 2006/95/EC Low Voltage Directive, Annex 1
	Directive 2006/42/EC Machinery Directive, Annex 1
	Directive 2004/108/EC Electromagnetic Compatibility (EMC) Directive, Essential Requirements
	EN61000-6-2 Electromagnetic Compatibility (EMC) - Part 6-2: Generic Standards - Immunity for Industrial Environments
	EN61000-6-4 Electromagnetic Compatibility (EMC) - Part 6-4: Generic Standards - Emission Standard for Industrial Environments
Type of Equipment:	Heater
Manufacturer's Trade Name:	Heateflex® Heater
Manufacturer's Model or Type Designation:	All Series Grid, Frame, and Fence Heaters
Year CE Mark was affixed:	2019
Any modification or alteration of the above product(s) unwarranted by Heateflex® will nullify this declaration.	
	 VP of Engineering



1. Product Configuration

Required Optional

HFI - 0705 - 010 - B - J - GE - PTX

0 1 2 3 4 5 6

Accessories	
Description	Part Number
Process T/C, Type J	HAT04-XX-0002
Process T/C, Type K	HAT04-XX-0026
Thermal Cut-Off	Varies on rating

Standard Base Models Available	1. Frame *L x W (in)		2. Wattage *Max. (kW)		3. Voltage *Max. (VAC)		Specific kW at VAC											
							120	200	208	220	230	240	380	400	480			
HFI-0705-010-B	7 x 5	0705	1.0	010	120, 1φ	B	1.0	-	-	-	-	-	-	-	-	-	-	
HFI-0705-023-E			2.3	023	230, 1φ	E	-	1.7	1.9	2.1	2.3	-	-	-	-			
HFI-0707-020-B	7 x 7	0707	2.0	020	120, 1φ	B	2.0											
HFI-0707-030-F			3.0	030	240, 1φ	F		2.1	2.3	2.5	2.8	3.0						
HFI-0905-020-B			2.0	020	120, 1φ	B	2.0											
HFI-0905-030-F	9 x 5	0905	3.0	030	240, 1φ	F		2.1	2.3	2.5	2.8	3.0						
HFI-0905-030-XX			3.0	030	400, 1φ	XX							2.7	3.0				
HFI-0907-040-D	9 x 7	0907	4.0	040	220, 1φ	D		3.3	3.6	4.0								
HFI-0909-050-F	9 x 9	0909	5.0	050	240, 1φ	F		3.5	3.7	4.2	4.6	5.0						
HFI-0909-055-L			5.5	055	480, 1φ	L							3.4	3.8	5.5			
HFI-1105-040-D	11 x 5	1105	4.0	040	220, 1φ	D		3.3	3.6	4.0								
HFI-1107-050-F	11 x 7	1107	5.5	055	240, 1φ	F		3.5	3.7	4.2	4.6	5.0						
HFI-1107-055-L			5.0	050	480, 1φ	L							3.4	3.8	5.5			
HFI-1109-070-F	11 x 9	1109	7.0	070	240, 1φ	F		4.8	5.2	5.9	6.4	7.0						
HFI-1111-088-L	11 x 11	1111	8.8	088	480, 1φ	L							5.5	6.1	8.8			
HFI-1305-050-F	13 x 5	1305	5.0	050	240, 1φ	F		3.5	3.7	4.2	4.6	5.0						
HFI-1305-045-L			4.5	045	480, 1φ	L							2.8	3.1	4.5			
HFI-1307-070-F	13 x 7	1307	7.0	070	240, 1φ	F		4.8	5.2	5.9	6.4	7.0						
HFI-1309-070-F	13 x 9	1309	7.0	070	240, 1φ	F		4.9	5.3	5.9	6.4	7.0						
HFI-1309-068-L			6.8	068	480, 1φ	L							4.3	4.7	6.8			
HFI-1311-104-E*	13 x 11	1311	10.4	104	230, 1φ	E		7.9	8.5	9.6	10.4							
HFI-1311-110-L*			11.0	110	480, 1φ	L							6.9	7.6	11.0			
HFI-1505-050-F	15 x 5	1505	5.0	050	240, 1φ	F		3.5	3.7	4.2	4.6	5.0						
HFI-1505-055-L			5.5	055	480, 1φ	L							3.4	3.8	5.5			
HFI-1507-070-XX	15 x 7	1507	7.0	070	400, 1φ	XX							6.3	7.0				
HFI-1509-100-F*	15 x 9	1509	10.0	010	240, 1φ	F		6.9	7.5	8.4	9.2	10.0						
HFI-1509-090-L*			9.0	090	480, 1φ	L							5.6	6.3	9.0			
HFI-1905-070-XX	19 x 5	1905	7.0	070	400, 1φ	XX							6.3	7.0				
HFI-1907-088-L	19 x 7	1907	8.8	088	480, 1φ	L							5.5	6.1	8.8			
HFI-1311-090-Q	13 x 11	1311	9.0	090	240, 3φ	Q		6.2	6.8	7.6	8.3	9.0						
HFI-1311-090-W			400, 3φ	W									8.1	9.0				
HFI-1511-120-O	15 x 11	1511	12.0	120	220, 3φ	O		9.9	10.7	12.0								
HFI-1511-113-W			11.3	113	400, 3φ	W							10.2	11.3				
HFI-1514-150-Q	15 x 14	1514	15.0	150	240, 3φ	Q		10.4	11.2	12.6	13.7	15.0						
HFI-1514-165-V			16.5	165	480, 3φ	V							10.3	11.4	16.5			
HFI-1909-090-Q	19 x 9	1909	9.0	090	240, 3φ	Q		6.2	6.8	7.6	8.3	9.0						
HFI-1909-090-W			400, 3φ	W									8.1	9.0				
HFI-1911-150-Q	19 x 11	1911	15.0	150	240, 3φ	Q		10.4	11.2	12.6	13.7	15.0						
HFI-1911-135-V			13.5	135	480, 3φ	V							8.5	9.4	13.5			
HFI-1914-208-Q	19 x 14	1914	20.8	208	240, 3φ	Q		14.5	15.6	17.5	19.2	20.8						
HFI-1914-205-V			20.5	205	480, 3φ	V							12.8	14.2	20.5			

* Two heaters per frame.

4. Hi-Limit Sensor	
Type J T/C	J

5. Ground Wire	
No Ground	GN
Encapsulated	GE

6. Perforated Grid			
No Grids	Blank	Bottom Grid Only	PXB
Top Grid Only	PTX	Top & Bottom Grid	PTB



2. Receiving Inspection Procedure

This shipment was carefully inspected, checked, and properly packaged at our company, and delivered to the carrier in good condition. We fully expect your merchandise to arrive in your hands in good condition.

ALL PRODUCTS ARE SHIPPED F.O.B. FACTORY; THEREFORE, WHEN IT IS DELIVERED TO THE CARRIER, IT BECOMES YOUR PROPERTY. THUS, IT IS IMPORTANT THAT YOU TAKE NOTE OF ANY DAMAGE, WHETHER OBVIOUS OR HIDDEN, AND REPORT SAME TO THE TRANSPORTATION COMPANY WITHIN FIVE (5) DAYS OF RECEIPT OF THE SHIPMENT AT YOUR PREMISE TO AVOID FORFEITING CLAIMS FOR DAMAGE.

2.1 What To Do If Your Shipment Is Damaged:

Leave the items, packing material, and carton "as is". Notify your carrier's local office and ask for immediate inspection of the carton and its content.

After inspection has been made by the carrier, and you have received acknowledgment in writing as to the damage, please contact our Customer Service Department at (626) 599-8566 for return authorization. If writing for return authorization, please indicate your purchase order number.

We will either repair or replace the merchandise depending upon the extent of the damage.

It is your responsibility to follow the above instructions, or the carrier will not honor any claims for damage. If there are any shortages or questions regarding this shipment, please notify us within ten (10) days.

2.2 Handling Guidelines

The possibility of heater damage during installation has prompted Heateflex® to develop handling guidelines on PFA products for the OEM and end user market.

The heater is shipped inside of a sealed plastic bag, wrapped in bubble wrap and placed inside of a box. Do not open the sealed plastic bag until the work surface and tank has been cleaned to provide some protection against physical damage to the element before installation. Sharp objects in the tank are serious risks to the heater. Thus, common equipment such as drills, scrapers, screwdrivers, and metal shavings are all potential hazards to PFA products.







During installation, be cautious to not cut wire coatings to prevent exposing the conductor as it is pulled through holes, fittings, cracks, or gaps that may have sharp edges.

Our product is durable and reliable, but exposure to fabrication process tools greatly increases the possibility of damage. Awareness is your best protection.





3. Precautions & Safety Warnings

Label	Safety Warning
 	High-Voltage Electrical Equipment
 WARNING	Electric immersion heaters subject personnel to shock hazard if not properly installed and maintained.
 WARNING	Electric immersion heaters may ignite many plastic tanks such as polypropylene and polyethylene.
 CAUTION	All heaters should be equipped with a thermal over-temperature device and the tank should have a liquid level control to reduce the potential of fire. It is the customer's responsibility to purchase thermal and liquid level control protection.
 CAUTION	Do NOT lift by lead wires





4. Heater Operating Instructions

Verify heater has the following safeties and are properly interlocked to prevent unsafe heater conditions.

- Hi-Limit
- Liquid Level
- Thermal Cut-Off
- Process Fluid Over Temperature

Non-compliance to the Heater Operating Instructions will void warranty. See safety connections and drawings for recommended wiring and installation. Suggested wiring of these safeties are located in the "Recommended Wiring Schematic". (See Section 5.1)

4.1 Hi-Limit

The Hi-limit safety consists of a thermocouple used to monitor the temperature at the heater and is connected to a Hi-limit controller which signals when the heater exceeds the Hi-limit set point to prevent the heating element from getting to an unsafe condition.

1. Connect the thermocouple bundled with the lead wire to the Hi-limit controller. This thermocouple now becomes the Hi-limit or over-temperature thermocouple.
 - 1.1. If the supplied heater does not have a Hi-limit or over-temperature thermocouple, we highly recommend that you purchase one on future units. The purpose of this safety is to protect the heater and your equipment from a boil-dry situation. This is a redundant safety backup in case the process over temperature and liquid level safeties fall.
2. Connect the thermocouple that is by itself on the output port of the heater to the process temperature controller. This thermocouple now becomes the process thermocouple.
 - 2.1. If the supplied heater does not have a process thermocouple, we highly recommend that you purchase one on future units. The purpose of this safety is to protect the heater and your equipment from an over-temperature situation.
3. Set the process temperature controller to desired operating temperature. (Example: Process set point = 60°C.)
4. Temporarily the Hi-limit controller set point at 150°C.
5. When the process temperature reaches about 80% of the process set point (Example: About 48°C), bring down the Hi-limit temperature set point until the control relay trips the heater. (Note the Hi-Limit set point). At this point, add 5°C to 10°C to the Hi-limit temperature controllers. This is the Hi-limit safety set point for the heater.
 - 5.1. Example: Hi-limit control set point (110°C + 10°C = 120°C)





4.2 Liquid Level

Your Heateflex® immersion heater should always be under liquid when operating. Operating heater in air or with a crystalline or precipitate solution that may coat the heater or sensors may result in damage to the heater and severely damage your equipment.

Utilizing proper liquid level monitoring will guard against unsafe dry run conditions. Remember to set the liquid level monitoring so that the heater is adequately submerged.

4.3 Thermal Cut-Off

A mechanical one-shot sensor which opens when process fluid exceeds set temperature.

The thermal cut-off rating is dependent on the user's process fluid and must be determined by the user at time of order.

Available Thermal Cut-Off Sensor Temperatures		
72°C	109°C	167°C
77°C	117°C	184°C
84°C	121°C	192°C
93°C	128°C	216°C
98°C	141°C	228°C
104°C	152°C	240°C

4.4 Process Fluid Over Temperature

The process over temperature set point should be set at 5°C above the process set point.

For questions, please contact Heateflex's customer service department at (626) 599-8566.

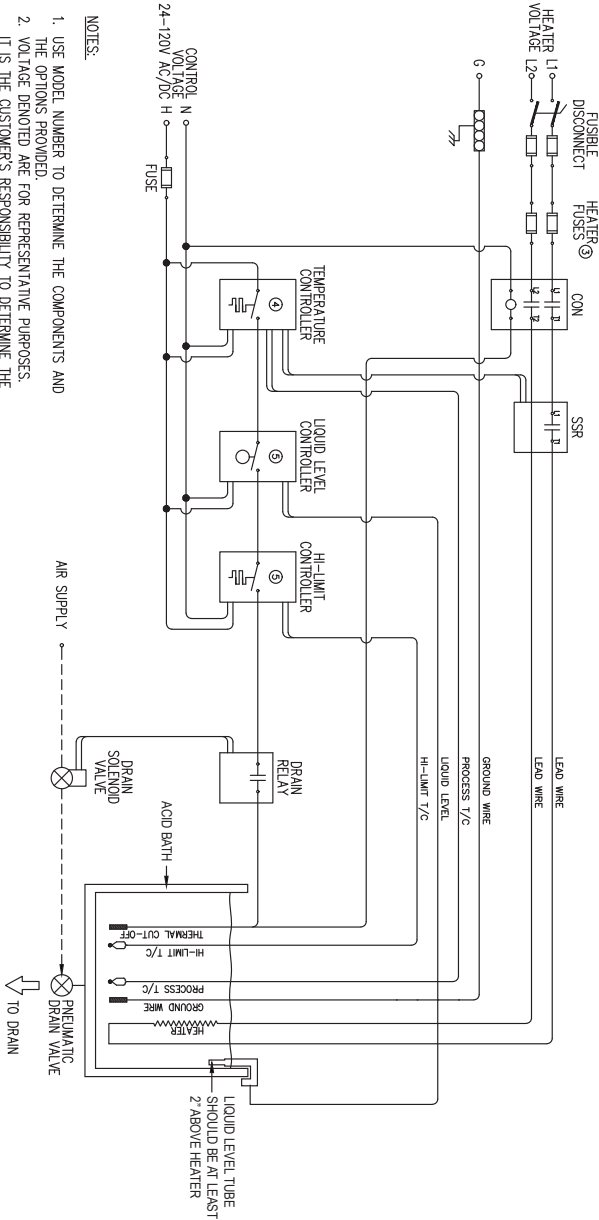




5. Drawings

5.1 Recommended Wiring Schematic

- NOTES:
1. USE MODEL NUMBER TO DETERMINE THE COMPONENTS AND THE OPTIONS PROVIDED.
 2. VOLTAGE DENOTED ARE FOR REPRESENTATIVE PURPOSES. IT IS THE CUSTOMER'S RESPONSIBILITY TO DETERMINE THE CORRECT CONTROL AND HEATER VOLTAGE, WIRING, FUSING, AND THE SIZING OF CONTACTORS AND SFBS TO BE USED.
 3. FUSES MUST BE HIGH SPEED/CLASS "F" (HSLI TYPE) AND AT 25% ABOVE NOMINAL AMPERAGE DRAIN.
 4. OVER TEMPERATURE ALARM.
 5. SEE INSTALLATION NOTES OF QUALITY CONTROL SHEET FOR LIQUID LEVEL & HI-LIMIT CONTROLLER WIRE CONNECTION.



REV	DATE	DESCRIPTION	DESIGNER	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD
02	10/09/79	REVISED TO CURRENT STANDARDS & ADDED NOTES.										
01	09/09/79	REVISED THERMOCOUPLE TO CURRENT STANDARDS.										
00	08/19/79	REVISED THERMOCOUPLE TO CURRENT STANDARDS.										

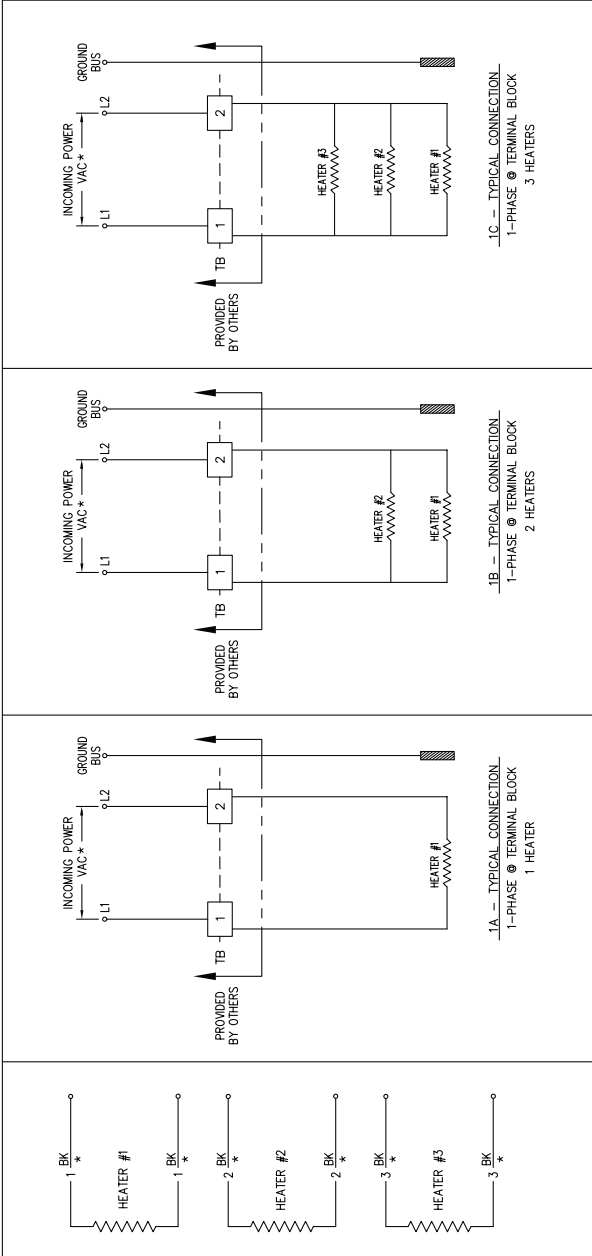
CONTRACT NO.	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD
10019	5/12/99	M. Martinez	W. K.	10/15/19	W. K.	10/17/19	B.	1	1

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TITLE ACID BATH SAFETY INTERLOCK		 HEATEFLEX 10010 S. SHAW BLVD., AMERICA, CA 94003 (415) 875-9999 FAX (415) 875-9998	





5.2 Typical Single Phase Wiring



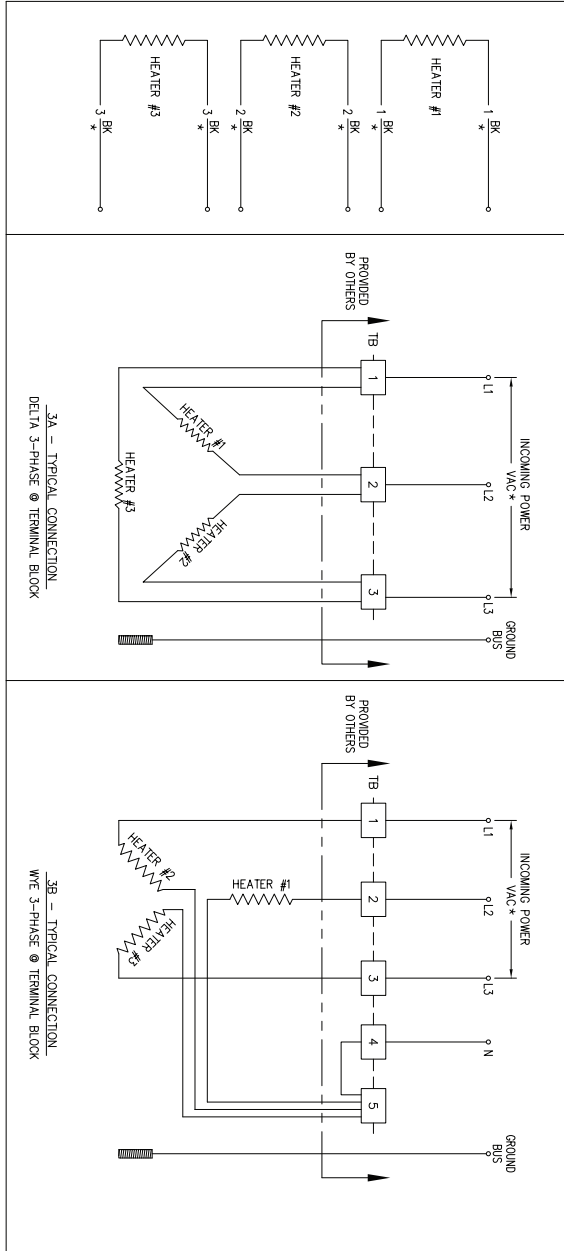
NOTES:

1. * - SEE ENGINEERING SPECIFICATIONS SHEET FOR LEAD WIRE GAUGE & VOLTAGE DETAILS
2. IT IS THE CUSTOMERS RESPONSIBILITY TO DETERMINE THE CORRECT CONTROL & HEATER VOLTAGE, WIRING, FUSING & THE SIZING OF ALL CONTACTORS USED FOR THIS UNIT.

REV	DATE	REVISION TITLE BLOCK	DESCRIPTION
01	09/05/19		
 HEATEFLEX HEATING EQUIPMENT 11500 S. 117th Street Tulsa, OK 74134 TEL: 918.438.5000 FAX: 918.438.5007 WWW.HEATEFLEX.COM			
TYPICAL CONNECTION FOR 1-PH HEATER LEADS			
DATE	DESIGNED BY	CHK. BY	REV
10/15/07	M. Timpico		01
DATE	APPROVED BY	REV	REV
			01
		Part of	UHPH-1001
		1	NOVE



5.3 Typical Three Phase Wiring



- NOTES:
- * - SEE ENGINEERING SPECIFICATIONS SHEET FOR LEAD WIRE GAUGE & VOLTAGE DETAILS.
 - IT IS THE CUSTOMERS RESPONSIBILITY TO DETERMINE THE CORRECT CONTROL & HEATER VOLTAGE, WIRING, FUSING & THE SIZING OF ALL CONTACTORS USED FOR THIS UNIT.

REV	DATE	REVISION TITLE BLOCK	DESCRIPTION	DRAWN
01	09/05/19			JLN
<p>CONDUCTIVITY UNLESS OTHERWISE NOTED</p> <p>THIS UNIT IS DESIGNED TO OPERATE IN A CONDENSING IMMERSION HEATER APPLICATION. THE HEATER IS NOT TO BE USED IN A NON-CONDENSING IMMERSION HEATER APPLICATION. THE USER SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE HEATER TYPE AND VOLTAGE FOR THE APPLICATION. THE USER SHALL BE RESPONSIBLE FOR DETERMINING THE CORRECT WIRING, FUSING & THE SIZING OF ALL CONTACTORS USED FOR THIS UNIT.</p>				
FORM NO.	DATE	REVISED BY	DATE	REV. DES.
M-10000	10/15/07			
<p>TYPICAL CONNECTION FOR 3-PH HEATER LEADS</p>				
FORM NO.	DATE	REVISED BY	DATE	REV. DES.
B-10000	11/11/11			
<p>IN LINE 3-PHASE</p>				
FORM NO.	DATE	REVISED BY	DATE	REV. DES.



6. Quality Certification

PART NUMBER: _____

QUANTITY: _____

T/C TYPE: _____

WATTS: _____

VOLTS: _____

AMPS: _____

OHMS: _____

ASSEMBLED BY: _____

6.1 Quality Inspection

SERIAL NUMBER: _____

PART NUMBER: _____

Seals	Hi-Pot 10kV	Ground Wire			Thermocouple		
		Ta	Pt	Embedded	Continuity	2 kV	μ Amp

INSPECTED BY: _____

DATE: _____

!!! WARNING !!!

You are receiving a PFA immersion type heater. It should always be under liquid when operating. Operating Heater in air or in a crystalline or precipitate, that may coat the heater, will result in burning-up the Heater and may cause severe damage to your equipment. Non-compliance to this procedure will void warranty. Also, seals are fragile. Please take caution when working with them.

For added protection to help prevent mechanical damage to the heater use protective floor,





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