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GF-SK-1
Ground Fault Sensor Switch
For
FSS AND FSP Series Cart Heaters



	⚠ WARNING
	<p>IMPORTANT SAFETY INFORMATION INSIDE</p> <ul style="list-style-type: none">• Serious injury or death possible• Read, understand, and follow all safety information and instructions in this manual before using or servicing this product.





REFER TO COMPLETE INDEX
OF INFORMATION ON
PAGE 2

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ATTENTION:

The table to the right provides definitions of the signal words that can be found throughout this manual. These signal words are used to express the severity of the hazard at hand. The signal words are generally used in conjunction with safety symbols that correspond to the text for that particular hazard. As you read this manual, refer back to this table when you are unsure of the signal word definition.

SIGNAL WORD DEFINITIONS	
 DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
 WARNING	WARNING indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury
 CAUTION	CAUTION indicates an imminently hazardous situation which, if not avoided, may result in minor or moderate injury
 CAUTION	CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.
As defined in ANSI Z535-4-2002	

GENERAL DESCRIPTION AND USE


	⚠ WARNING
	<p style="text-align: center; margin: 0;">ELECTRICAL SHOCK HAZARD</p> <p style="text-align: center; margin: 0;">FIRE HAZARD</p> <p style="text-align: center; margin: 0;">EXPLOSION HAZARD</p> <ul style="list-style-type: none"> Serious injury or death may occur. Not for indoor residential use. Do not use in locations containing hazardous or explosive atmospheres. Do not use outdoors in wet conditions and in unprotected locations. Do not use in wash down applications.

The Fostoria GF-SK-1 ground fault sensor switch is designed to protect equipment by providing a reliable and effective way to quickly shut off power to FSS and FSP series flat panel emitter element heaters in the event of a ground fault occurrence. Fostoria's infrared heaters are equipped with heating elements that are manufactured using materials with exceptional mechanical and thermal performance and are built with precise process control to provide rugged and reliable infrared performance in challenging environments. It is our understanding that these precision characteristics can change with time, specifically in environments with high humidity or where mechanical damage can occur, causing the internal electrical insulation to weaken. Use of Fostoria's GF-SK-1 ground fault sensing switch will monitor this gradual change and interrupt power to the heaters prior to any arc-fault type failures thereby protecting against a possible fire or burn hazard. The GF-SK-1 can be mounted directly on the FSP-43 or FSP-95 portable heaters. It can also be wall mounted and used to monitor the heaters mentioned above as well as the FSP-14 FSP-31 and the FSS-14, FSS-31, FSS-43 and FSS-95 models.

Options for using the GF-SK-1 with Fostoria FSS and FSP series Heaters:

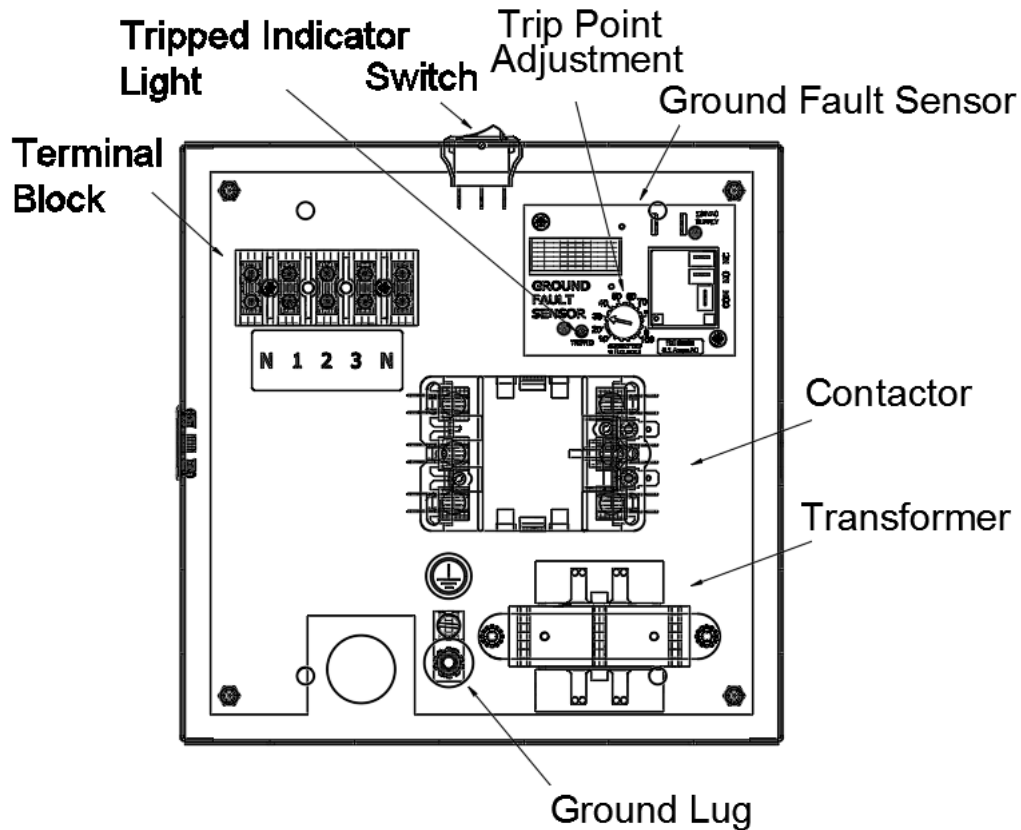
Mounting Option	Heater Compatibility
Mounting GF-SK-1 directly onto Heater	FSP-43, FSP-95 (cannot be mounted to FSS-14 and FSS-31)
Wall mounting the GF-SK-1 (see explanation below)	All FSS and FSP models.

The GF-SK-1 can monitor a single heater as denoted above but the most cost effective arrangement of the system is realized when monitoring a circuit of multiple heaters. The total number of heaters that can be monitored by one GF-SK-1 is dependent upon the heater models selected and the supply voltage. Using the total watts of the selected heaters to be monitored, the known supply voltage (be certain the heater voltage rating matches the supply voltage), and the phase of the supply, the total load or "amps" can be calculated. The GF-SK-1 is capable of monitoring a heater circuit of up to 50 amps maximum. A licensed electrician or design engineer must do the necessary calculations.

	⚠ WARNING
	<p style="text-align: center; margin: 0;">FIRE HAZARD</p> <ul style="list-style-type: none"> Serious injury or death may occur. Heater circuit load calculations and circuit design must be done by a licensed electrician or engineer.

SPECIFICATIONS

Operating Voltages (VAC)	208,240,277,480,600 (cannot be used with 120VAC)
Phase	Single or three phase
Amps	50A maximum
Control Voltage	120VAC
Switch	Illuminated SPST
Enclosure	Type 1
Conduit	Openings for 3/4" fittings
Load characteristics	Balanced or unbalanced



Shown with cover removed

INSTALLATION

⚠ WARNING

ELECTRICAL SHOCK HAZARD

- Serious injury or death may occur.
- Disconnect from electrical supply before installing or servicing this product.
- Make certain the power source conforms to specifications on heater label.
- Always securely connect green wire from heater to bonding (ground) wire from electrical supply, not to a live or “hot” conductor.
- Follow state, local and national electric codes (NEC).



To install the GF-SK-1 on the FSP-43 AND FSP-95 models:

1. Remove (2) screws and cover from bottom 4x4 field wiring box. Retain the screws. Loosen conduit from bottom 4x4 field wiring box. See illustration 1.
2. Remove sub-panel from GF-SK-1 (see below).
3. Attach GF-SK-1 enclosure to the terminal box. Use the screws that were removed from the 4x4 wiring box and the two lockwashers supplied. See illustration 2.
4. Remount the sub-panel.
5. Re-attach the conduit to the GF-SK-1 enclosure.

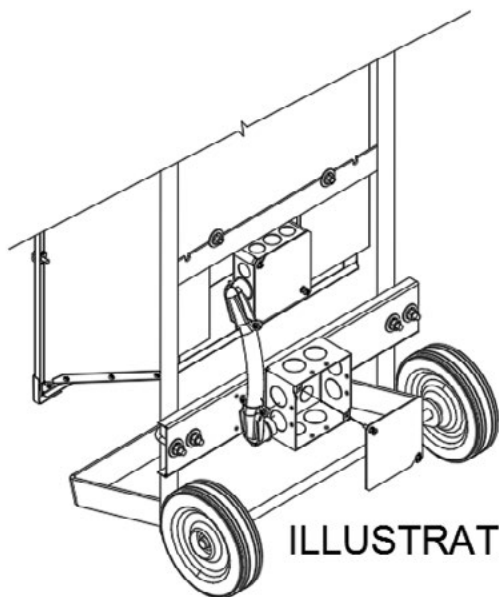
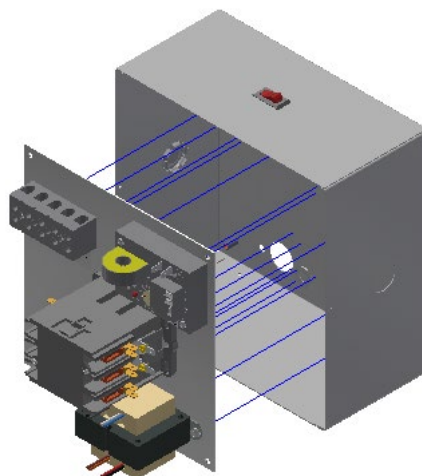
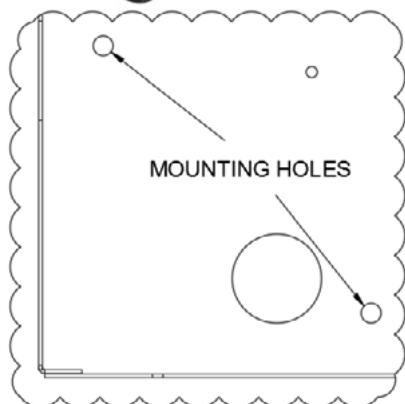


ILLUSTRATION 1



Removal of sub-panel for enclosure mounting.

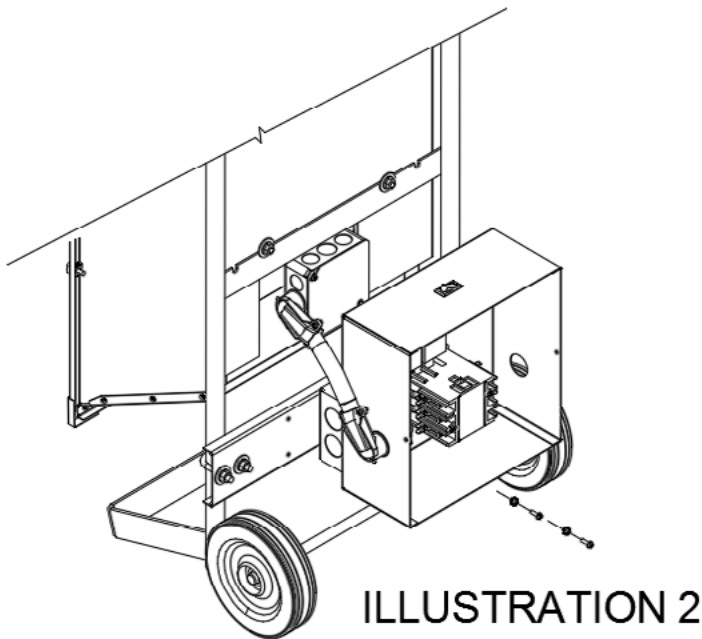


GF-SK-1 CONTROL BOX
Mounting hole location.

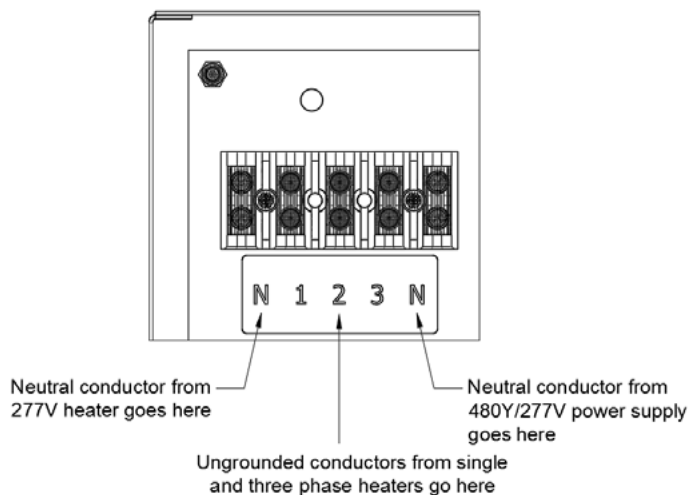
GF-SK-1 WALL MOUNTING

To install the GF-SK-1 in a wall mount application:

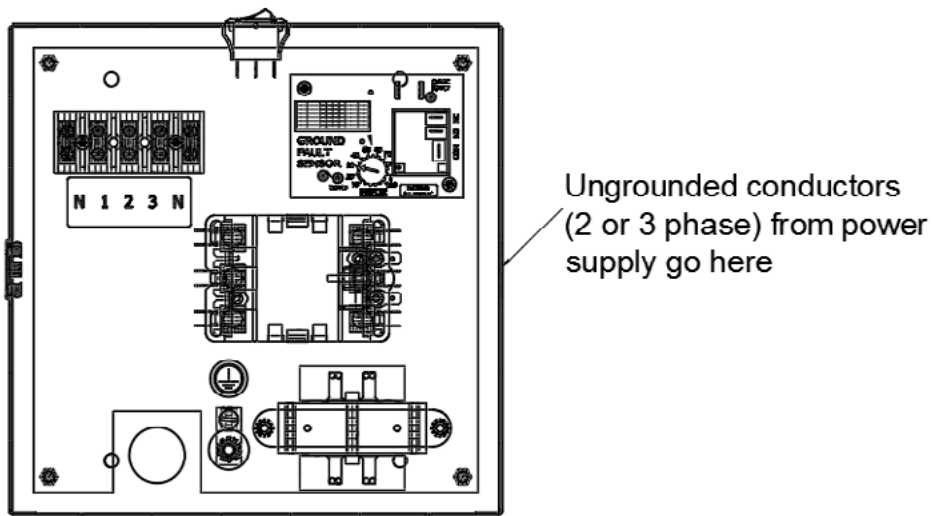
1. Remove the enclosure cover and sub-panel.
2. Mount enclosure using hardware suitable for the intended surface. The mounting must be able to support the assembled GF-SK-1 and any conduit attached to the enclosure.
3. Re-mount the sub-panel and make conduit connections.
4. Wire according to GF-SK-1 wiring diagram and the heater instructions manual.



CONNECTING HEATERS AND POWER SUPPLY



At left is a close-up view of the terminal block inside the GF-SK-1 enclosure. The bottom side of this block is where the wires from your heater or heater circuit must be connected. The four terminals on the left side are for heater connections. The one terminal on the right is for the neutral from a 3-phase, 4-wire power supply. Below is a view of the enclosure showing where to land the ungrounded conductors from the power supply (2 or 3 as necessary). The exact connections for your heater and power supply are shown on the following page.



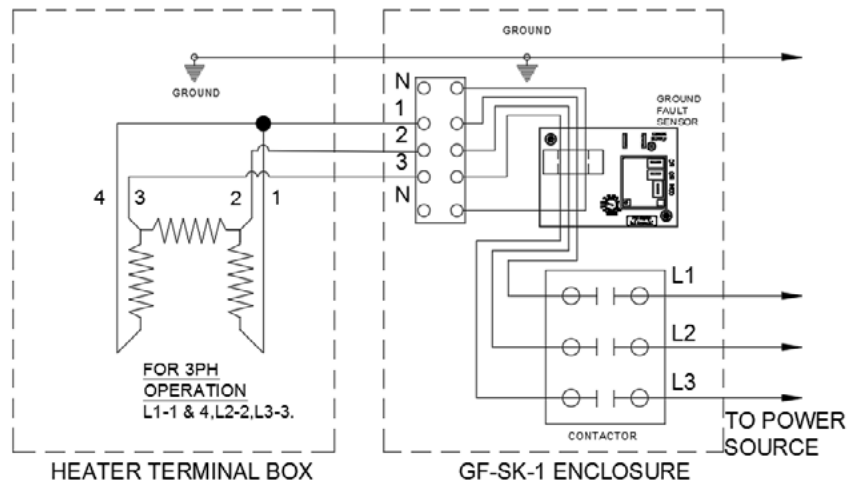
CONNECTING HEATERS AND POWER SUPPLY (cont.)

⚠ WARNING

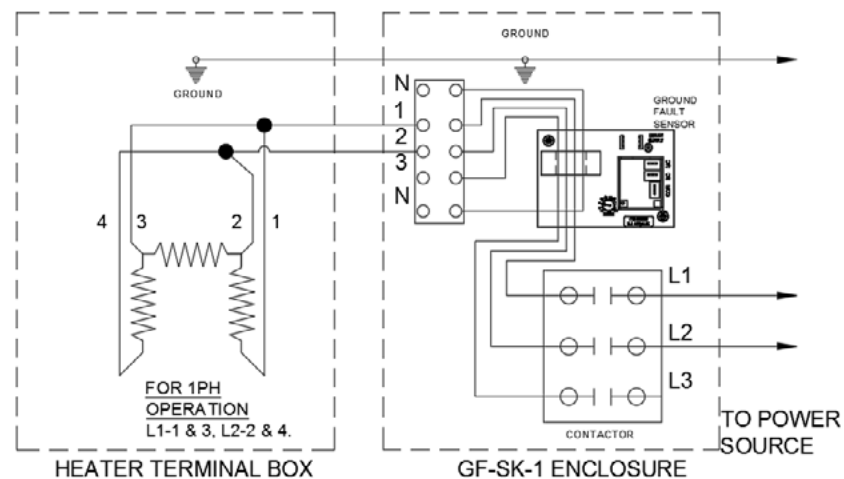
ELECTRICAL SHOCK HAZARD

- Serious injury or death may occur.
- Disconnect from electrical supply before installing or servicing this product.
- Always securely connect green wire from heater and green wire from power supply to ground lug provided inside GF-SK-1.
- Follow state, local and national electric codes (NEC).
- All wiring must be performed by a licensed electrician.

For field wiring and heater clearances, refer to the Installation Manual included with your heater. All wiring must be performed by a licensed electrician.

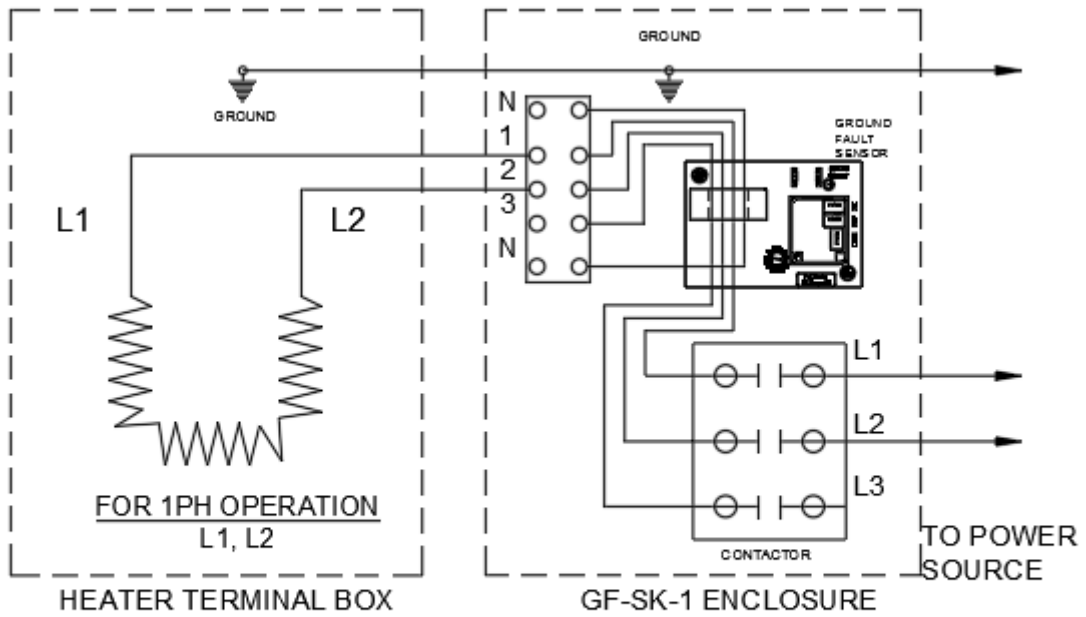


FSS AND FSP THREE PHASE WIRING

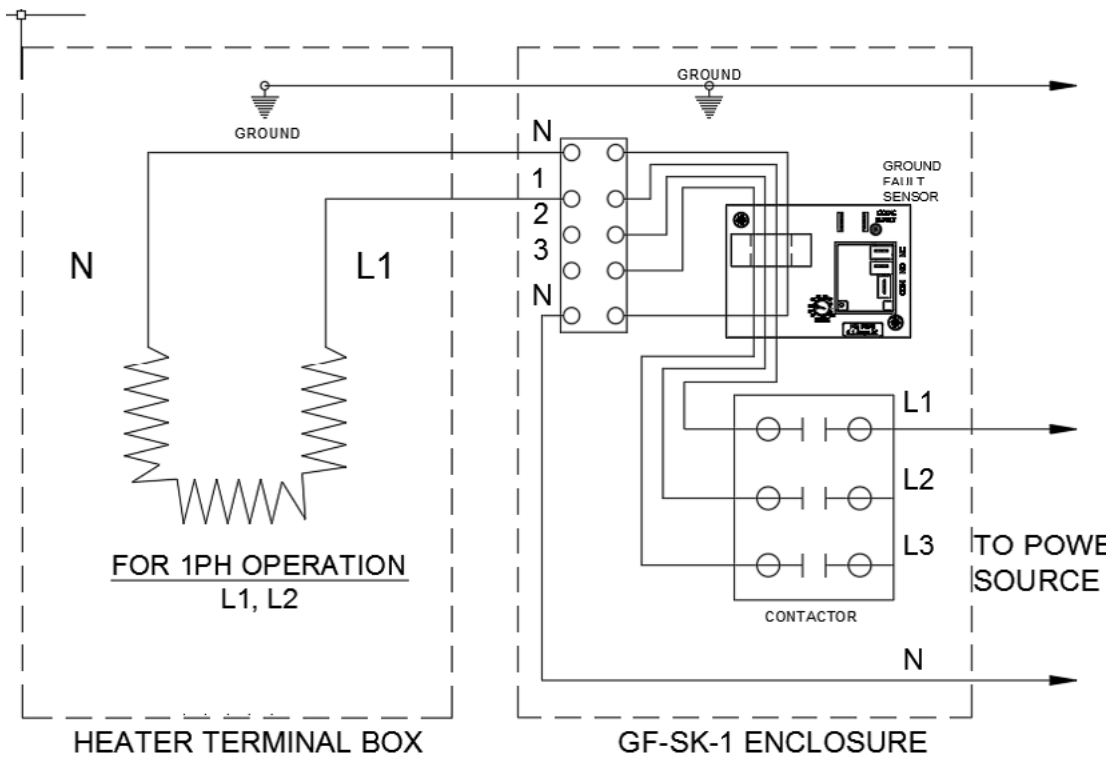


**FSS AND FSP THREE PHASE HEATERS
WIRED SINGLE PHASE**

CONNECTING HEATERS AND POWER SUPPLY (cont.)



**FSS AND FSP SINGLE PHASE
HEATERS**



**FSS AND FSP SINGLE PHASE
277V HEATERS**

FSP SERIES SUPPLY WIRE SPECIFICATIONS

The following tables are provided to assist the installer in the sizing of electric cables and/or plug sizes needed for each FSP heater model. Cords and plugs will have to be obtained through a local supplier or purchased separately from Fostoria Industries. All wiring must be copper, rated 90°C and meet local codes and National Electric Code (NEC) requirements.

TABLE A								
Heater Model	Kw	Volts	Amps		Type SO Cable Size*		Plug Size 3-Ph	Plug Size 1-Ph
			3-PH	1-PH	3-PH	1-PH		
FSP-4320-3	4.3	208	11.94	20.67	12/4	10/3	20A/250V/4 WIRE	30A/250V/3 WIRE
FSP-4324-3	4.3	240	10.36	17.91	14/3	12/3	20A/250V/4 WIRE	30A/250V/3 WIRE
FSP-4327-1	4.3	277	N/A	15.52	N/A	12/3	N/A	20A/277V/3 WIRE
FSP-4348-3	4.3	480	5.18	8.96	14/4	14/3	20A/480V/4 WIRE	20A/480V/3 WIRE
FSP-4357-3	4.3	600	4.14	7.16	14/4	14/3	20A/600V/4 WIRE	20A/600V/3 WIRE
FSP-9520-3	9.5	208	26.39	45.67	10/4	6/3	50A/250V/4 WIRE	50A/250V/3 WIRE
FSP-9524-3	9.5	240	22.9	39.7	10/4	8/3	50A/250V/4 WIRE	50A/250V/3 WIRE
FSP-9527-1	9.5	277	N/A	34.3	N/A	8/3	N/A	50A/277V/3 WIRE
FSP-9548-3	9.5	480	11.44	19.8	12/4	10/3	20A/480V/4 WIRE	30A/480V/3 WIRE
FSP-9557-3	9.5	600	9.54	16.52	12/4	12/3	20A/600V/4 WIRE	30A/600V/3 WIRE

*50FT. Maximum Cable Length

The electric cables in the following table can be purchased from Fostoria Industries for use on the FSP series heaters. They all have copper conductors, are 25 feet long and have 90°C rated jackets. Cable connectors are included.

TABLE B			
ELECTRIC CABLES			
SIZE / TYPE	PART NO.	SIZE / TYPE	PART NO.
16/3 SO	08804300	8/3 SO	08805200
14/3 SO	08804600	8/4 SO	08805100
14/4 SO	08804900	6/4 SO	03164001
12/3 SO	08804500	4/3 SO	08805300
12/4 SO	03164201	2/3 SO	08804700
10/3 SO	08804400		