



## SECTION 1

# INDUSTRIAL CONTROL AND GENERAL PURPOSE ENCLOSED TRANSFORMERS

## **HPS Imperator<sup>®</sup>, HPS Spartan<sup>®</sup>, HPS Fusion<sup>™</sup> and Q Series Transformers**

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# SECTION 1

## TRANSFORMER QUICK SELECTION CHARTS

### HPS Imperator®

Pri. Volts	Sec. Volts	Group	Part No.	Page
600, 575, 550	120 x 240, 115 x 230, 110 x 220	A	PH***AJ	36
600, 575, 550	12 x 24, 11.5 x 23, 11 x 22	B	PH***AR	36
240 x 480, 230 x 460, 220 x 440	120 x 240, 115 x 230, 110 x 220	C	PH***MQMJ	37
240 x 480, 230 x 460, 220 x 440	12 x 24, 11.5 x 23, 11 x 22	D	PH***QR	37
208 x 416, 200 x 400, 190 x 380	120 x 240, 115 x 230, 110 x 220	E	PH***SP	38
120 x 240, 115 x 230, 110 x 220	120 x 240, 115 x 230, 110 x 220	F	PH***PP	38
120 x 240, 115 x 230, 110 x 220	12 x 24, 11.5 x 23, 11 x 22	G	PH***PG	39
600/480/240, 575/460/230, 550/440/220	120/100, 115/95, 110/90	H	PH***MBMH	39
480/240, 460/230/208, 440/220/200	120/25, 115/24, 110/23	I	PH***MLI	40
415/400/380	110 x 220	J	PH***MEMX	40
380/277/208	120 x 240	K	PH***MGJ	41

### HPS Spartan®

Pri. Volts	Sec. Volts	Group	Part No.	Page
600/480, 575/460, 550/440	120 x 240, 115 x 230, 110 x 220	A	SP***ACP	47
600, 575, 550	12 x 24, 11.5 x 23, 11 x 22	B	SP***AR	47
240 x 480, 230 x 460, 220 x 440	120 x 240, 115 x 230, 110 x 220	C	SP***MQMJ	48
240 x 480, 230 x 460, 220 x 440	12 x 24, 11.5 x 23, 11 x 22	D	SP***QR	48
347/380	120 x 240	E	SP***KHP	49
347/380	12 x 24	F	SP***KHR	49
277	120	G	SP***NJ	50
120 x 240, 115 x 230, 110 x 220	12 x 24, 11.5 x 23, 11 x 22	H	SP***PR	50
208 x 416, 200 x 400, 190 x 380	120 x 240, 115 x 230, 110 x 220	I	SP***SP	51
208 x 416, 200 x 400, 190 x 380	12 x 24, 11.5 x 23, 11 x 22	J	SP***SR	51

### HPS Fusion™

Pri. Volts	Sec. Volts	Group	Part No.	Page
600/480, 575/460, 550/440	120 x 240, 115 x 230, 110 x 220	A	FS***ACP	55
600, 575, 550	12 x 24, 11.5 x 23, 11 x 22	B	FS***AR	55
240 x 480, 230 x 460, 220 x 440	120 x 240, 115 x 230, 110 x 220	C	FS***MQMJ	56
240 x 480, 230 x 460, 220 x 440	12 x 24, 11.5 x 23, 11 x 22	D	FS***QR	56
347/380	120 x 240	E	FS***KHP	57
347/380	12 x 24	F	FS***KHR	57
277	120	G	FS***NJ	58
120 x 240, 115 x 230, 110 x 220	12 x 24, 11.5 x 23, 11 x 22	H	FS***PR	58
208 x 416, 200 x 400, 190 x 380	120 x 240, 115 x 230, 110 x 220	I	FS***SP	59
208 x 416, 200 x 400, 190 x 380	12 x 24, 11.5 x 23, 11 x 22	J	FS***SR	59

### Q Series

Pri. Volts	Sec. Volts	Part No.	Page
600	12/24	Q***PRC*	62



## WHAT IS A CONTROL TRANSFORMER?

### What is a Control Transformer?

A control transformer is an isolation transformer designed to provide a high degree of secondary voltage stability (regulation during a brief period of overload condition (also referred to as “inrush current”)). Control transformers are also known as Machine Tool Transformers, Industrial Control Transformers or Control Power Transformers.

### When you calculate the VA requirement of a Transformer, do you use the Primary or the Secondary Voltage?

When selecting the VA requirement, you use the Secondary Voltage.

### Can you use a Control Transformer connected in reverse?

HPS strongly discourages back-feeding Industrial Control transformers. Due to the use of compensated windings in these products the resulting voltage will vary from the rating with as much as 10%.

### Can a Control Transformer regulate the output voltage?

A control transformer will not regulate the voltage. Output voltage is a function of the coil’s turn ratio only, times the input voltage.

### What is the benefit of “Vacuum Impregnation” on a Transformer?

All HPS Control Transformers are vacuum impregnated with “VT Polyester Resin” and oven cured which seals the surface and eliminates moisture. Impregnating the entire unit provides a strong mechanical bond and offers protection from environmental conditions.

### Explain the “VA” or “Volt Ampere Output” Rating?

The VA or volt ampere output rating designates the output which a transformer can deliver for a specified time at its rated secondary voltage and rated frequency, without exceeding its specified temperature rise.

### Insulating Materials; what are they made of and what is their purpose?

Hammond Power Solutions utilizes Mylar, Nomex and other high quality insulating materials. Insulation is used to electrically insulate turn-to-turn windings, layer-to-layer windings, primary to secondary windings and ground.

### What is the effect of “Overload”?

When a transformer is continually overloaded, excessive heat develops and the insulation system will begin to breakdown. As a result, the life expectancy of the transformer is shortened due to the heat exceeding the rating of the insulation system.

## Recommendations For Overcurrent Protection

SECTION 1

### UL AND CSA (NORTH AMERICAN) STANDARDS

North American standards, including UL 508, National Electric Code 450 and the Canadian Electrical Code Part I, require overcurrent protection on all control circuit transformers. There are two options for overcurrent protection:

#### Option 1

Provide an overcurrent device in the primary circuit rated to the current of the transformer. The overcurrent limits are as follows:

Primary 9 amps or more:	no more than 125% of rated current.
Primary 2 to 9 amps:	no more than 167% of rated current.
Primary less than 2 amps:	no more than 300% of rated current for power circuits. no more than 500% of rated current for control circuits.

This method is considered less desirable as start-up inrush to the transformer can frequently surpass the current rating of the device and result in nuisance interruptions.

#### Option 2

The second option is to install overcurrent devices in both the primary and secondary circuits of the transformer. In this option, the secondary device must be rated no more than 125% of rated current of the transformer and the primary no more than 250%. CEC permits 300% overcurrent on the primary for this option.

In both options listed, it is recommended that **time delay** fuses be considered to avoid unnecessary interruptions.

### Secondary

The overcurrent protection listed below, in amperes, is 125% of the rated current of the transformer. Choose the next higher fuse rating if these numbers do not correspond with standard fuse selections.

Sec. Voltage	VA Rating															
	25	50	75	100	150	200	250	300	350	500	750	1000	1500	2000	3000	5000
<b>12</b>	2.7	5.3	7.9	11	16	21	27	-	-	-	-	-	-	-	-	-
<b>24</b>	1.4	2.7	4.0	5.3	7.9	11	14	16	19	27	-	-	-	-	-	-
<b>90</b>	0.4	0.7	1.1	1.4	2.1	2.8	3.5	4.2	4.9	7.0	11	14	21	28	-	-
<b>95</b>	0.4	0.7	1.0	1.4	2.0	2.7	3.3	4.0	4.7	6.6	9.9	14	20	27	-	-
<b>100</b>	0.4	0.7	1.0	1.3	1.9	2.5	3.2	3.8	4.4	6.3	9.4	13	19	25	-	-
<b>110</b>	0.3	0.6	0.9	1.2	1.8	2.3	2.9	3.5	4.0	5.7	8.6	12	18	23	-	-
<b>115</b>	0.3	0.6	0.9	1.1	1.7	2.2	2.8	3.3	3.9	5.5	8.2	11	17	22	-	-
<b>120</b>	0.3	0.6	0.8	1.1	1.6	2.1	2.7	3.2	3.7	5.3	7.9	11	16	21	-	-
<b>220</b>	0.15	0.3	0.5	0.6	0.9	1.2	1.5	1.8	2.0	2.9	4.3	5.7	8.6	12	18	29
<b>230</b>	0.14	0.3	0.5	0.6	0.9	1.1	1.4	1.7	2.0	2.8	4.1	5.5	8.2	11	17	28
<b>240</b>	0.14	0.3	0.4	0.6	0.8	1.1	1.4	1.6	1.9	2.7	4.0	5.3	7.9	11	16	27

## Recommendations for Overcurrent Protection

### Primary (UL and CSA)

To assist in the selection of fuses, the following chart recommends the maximum primary fuse rating in amperes. The first number shown is the maximum overcurrent protection when the primary current is less than 2 amps and the overcurrent protection device is rated for 300%. The second number shown (*italic*) is recommended when the primary is less than 2 amps and the overcurrent device is to be rated at 500% of rated current. Where only one number is indicated, the primary is 2 amps or more and one rating of over current protection is shown as optimal. Choose the next higher fuse rating if these numbers do not correspond with standard fuse selections.

Pri.	VA Rating																
	25	50	75	100	150	200	250	300	350	500	750	1000	1500	2000	3000	5000	7500
115	0.6	1.25	1.8	2.5	3.5	5	4	5	5	8	10	15	20	25	-	-	-
	<i>1</i>	<i>2</i>	<i>3.2</i>	<i>4</i>	<i>6.25</i>	<i>8</i>											
120	0.6	1.25	1.8	2.25	3.5	5	4	5	5	8	10	15	15	20	-	-	-
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>6.25</i>	<i>8</i>											
200	0.3	0.75	1.125	1.5	2.25	3	3.5	4.5	5	4.5	7	9	15	15	20	-	-
	<i>0.6</i>	<i>1.25</i>	<i>1.8</i>	<i>2.5</i>	<i>3.5</i>	<i>5</i>	<i>6.25</i>	<i>7.5</i>	<i>8</i>								
208	0.3	0.6	1	1.4	2	2.8	3.5	4	5	4	6	8	12	15	20	30	-
	<i>0.6</i>	<i>1.125</i>	<i>1.8</i>	<i>2.25</i>	<i>3.5</i>	<i>4.5</i>	<i>6</i>	<i>7</i>	<i>8</i>								
220	0.3	0.6	1	1.25	2	2.5	3.2	4	4.5	4	6	8	12	15	20	30	-
	<i>0.5</i>	<i>1.125</i>	<i>1.6</i>	<i>2.25</i>	<i>3.2</i>	<i>4.5</i>	<i>5.6</i>	<i>6.25</i>	<i>7.5</i>								
230	0.3	0.6	0.8	1.25	1.8	2.5	3.2	3.5	4.5	4	6	8	10	15	20	30	-
	<i>0.5</i>	<i>1</i>	<i>1.6</i>	<i>2</i>	<i>3.2</i>	<i>4</i>	<i>5</i>	<i>6.25</i>	<i>7.5</i>								
240	0.3	0.6	0.8	1.25	1.8	2.25	3	3.5	4	3.5	5	7	10	15	15	30	-
	<i>0.5</i>	<i>1</i>	<i>1.5</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6.25</i>	<i>7</i>								
277	0.25	0.5	0.8	1	1.6	2	2.5	3.2	3.5	5	5	6	9	12	15	25	-
	<i>0.4</i>	<i>0.8</i>	<i>1.25</i>	<i>1.8</i>	<i>1.5</i>	<i>3.5</i>	<i>4.5</i>	<i>5</i>	<i>6.25</i>	<i>9</i>							
347	0.25	0.5	0.8	1	1.6	2	2.5	3.2	3.5	5	6.25	5	7.5	10	15	20	30
	<i>0.4</i>	<i>0.8</i>	<i>1.25</i>	<i>1.8</i>	<i>2.5</i>	<i>3.5</i>	<i>4.5</i>	<i>5</i>	<i>6.25</i>	<i>9</i>							
380	0.1875	0.3	0.5	0.75	1.125	1.5	1.8	2.25	2.5	3.5	5.6	4.5	6.25	9	15	20	25
	<i>0.3</i>	<i>0.6</i>	<i>0.8</i>	<i>1.25</i>	<i>1.8</i>	<i>2.5</i>	<i>3.2</i>	<i>3.5</i>	<i>4.5</i>	<i>6.25</i>	<i>9</i>						
400	0.1875	0.3	0.5	0.75	1.125	1.5	1.8	2.25	2.5	3.5	5.6	4.5	6.25	9	12	15	20
	<i>0.3</i>	<i>0.6</i>	<i>0.8</i>	<i>1.25</i>	<i>1.8</i>	<i>2.5</i>	<i>3</i>	<i>3.5</i>	<i>4</i>	<i>6.25</i>	<i>9</i>						
416	0.15	0.3	0.5	0.6	1	1.4	1.8	2	2.5	3.5	5	4	6	8	12	15	20
	<i>0.3</i>	<i>0.6</i>	<i>0.8</i>	<i>1.125</i>	<i>1.8</i>	<i>2.25</i>	<i>3</i>	<i>3.5</i>	<i>4</i>	<i>6</i>	<i>9</i>						
440	0.15	0.3	0.5	0.6	1	1.25	1.6	2	2.25	3.2	5	4	6	8	12	15	20
	<i>0.25</i>	<i>0.5</i>	<i>0.8</i>	<i>1.125</i>	<i>1.6</i>	<i>2.25</i>	<i>2.8</i>	<i>3.2</i>	<i>3.5</i>	<i>5.6</i>	<i>8</i>						
460	0.15	0.3	0.4	0.6	0.8	1.25	1.6	1.8	2.25	3.2	4.5	3.5	6	8	12	15	20
	<i>0.25</i>	<i>0.5</i>	<i>0.8</i>	<i>1</i>	<i>1.6</i>	<i>2</i>	<i>2.5</i>	<i>3.2</i>	<i>3.5</i>	<i>5</i>	<i>8</i>						
480	0.15	0.3	0.4	0.6	0.8	1.25	1.5	1.8	2	3	4.5	3.5	5	7	10	15	20
	<i>0.25</i>	<i>0.5</i>	<i>0.75</i>	<i>1</i>	<i>1.5</i>	<i>2</i>	<i>2.5</i>	<i>3</i>	<i>3.5</i>	<i>5</i>	<i>7.5</i>						
550	0.125	0.25	0.4	0.5	0.8	1	1.25	1.6	1.8	2.5	4	5	4.5	6	9	15	15
	<i>0.2</i>	<i>0.4</i>	<i>0.6</i>	<i>0.8</i>	<i>1.25</i>	<i>1.8</i>	<i>2.25</i>	<i>2.5</i>	<i>3</i>	<i>4.5</i>	<i>6.25</i>						
575	0.125	0.25	0.3	0.5	0.75	1	1.25	1.5	1.8	2.5	3.5	5	4.5	6	9	15	15
	<i>0.2</i>	<i>0.4</i>	<i>0.6</i>	<i>0.8</i>	<i>1.25</i>	<i>1.6</i>	<i>2</i>	<i>2.5</i>	<i>3</i>	<i>4</i>	<i>6.25</i>						
600	0.125	0.2	0.3	0.5	0.75	0.8	1.25	1.5	1.6	2.25	3.5	5	4	6	9	15	15
	<i>0.2</i>	<i>0.4</i>	<i>0.6</i>	<i>0.8</i>	<i>1.25</i>	<i>1.6</i>	<i>2</i>	<i>2.5</i>	<i>2.8</i>	<i>4</i>	<i>6.25</i>						

References: UL 508, 32.7  
 UL 845, 11.16 and 11.17  
 NEC 430-72 (c) exception #2  
 NEC 450-3 (b) 1 and 2  
 CEC Part I, 26-256



## HPS Imperator® Machine Tool Industrial Control Transformer

### The Perfect Solution

The HPS Imperator line of machine tool industrial control transformers are specifically designed to meet the high inrush industrial applications where electromagnetic components such as relays, solenoids etc. are used.

- 11 standard voltage groups
- VA range from 50VA to 1500VA
- Available with standard secondary and optional primary fuse kits
- Optional finger safe terminal covers
- Patented unique terminal block design
- Innovative fusing method
- Lifetime warranty (limited)

The HPS Imperator provides the perfect solution for any applications.

### Superior Quality and Value

The HPS Imperator design, utilizing superior insulation systems and being constructed with high quality silicon steel laminations for optimum performance, will meet or exceed UL and CE standards.

Backed by an industry leading LIFETIME warranty, the HPS Imperator industrial control transformer line offers superior performance, quality and value.



### STANDARDS

HPS Imperator Series Control Transformers meet or exceed the standards established by UL, IEC, and NEMA.

<b>Standard</b>	<b>File #</b>	<b>VA Size</b>
UL (ANSI/UL 506)	E50394	All
IEC 61558		All (excluding PH***AJ & PH***AR)
NEMA (ST-1)		All



At HPS, we rate the VA capacity of our transformers at the output ..... where it counts. Other transformer manufacturers rate their capacity on the input side of the transformer, which can result in a 5% to 20% lower actual VA at the output.

## MACHINE TOOL INDUSTRIAL CONTROL TRANSFORMER SELECTION

Selecting a control transformer requires that you have first hand knowledge of the application for the transformer and that you understand some basic terms related to the selection process. By using the following information, you will be sure to select the HPS Imperator® control transformer which best meets your application.

The HPS Imperator® series machine tool control transformers are specifically designed for high inrush applications requiring reliable output voltage stability. Designed to meet industrial applications where electromagnetic devices such as relays, solenoids, etc. are used, the HPS Imperator series transformers maximize inrush capability and output voltage regulation when electromagnetic devices are initially energized.

To select the proper transformer, three characteristics of the load circuit must first be determined. They are total steady-state (sealed) VA, total inrush VA, and inrush load power factor.

**(A) The total steady state “sealed” VA is the amount of VA that the transformer must supply to the load circuit for an extended length of time.** Simply add the total steady-state VA of all devices in your control circuit. The operating VA data of these components is available from the manufacturers.

**(B) The total inrush VA is the amount of VA that the transformer must supply for all components in the control circuit which are energized together.** Some consideration to the start-up sequence may be required. Inrush VA should be obtained from the device manufacturer.

**(C) The inrush load power factor is difficult to determine without detailed vector analysis of all the control circuit components.** Such information is not generally available. Therefore, HPS is recommending that a 40% power factor be utilized. Although some other control transformer manufacturers still recommend a power factor of only 20%, HPS, through recent tests conducted on many popular brands of control devices, has determined that the 40% power factor value is more accurate.

Once the above circuit variables have

been determined, transformer selection is a six step process.

### SIX EASY STEPS

1. Determine what your Primary (supply) and Secondary (output) voltage requirements are, as well as your required frequency (i.e. 60 Hz)
2. Calculate the Total Sealed VA of your circuit. (See Step A)
3. Calculate the Inrush VA by adding the inrush VA of all components being energized together. Remember to add the sealed VA of all components that do not have inrush VA, (lamps, timers etc.) as they present a load to the transformer during maximum inrush. If the inrush for the components in your circuit are not known, assume a 40% Inrush Power Factor.
4. Calculate the Total Inrush VA using one of the two methods:

A. 
$$\text{Total Inrush VA} = \sqrt{(\text{VA sealed})^2 + (\text{VA inrush})^2}$$

**OR**

B. 
$$\text{Total Inrush VA} = \text{VA Sealed} + \text{VA Inrush}$$

Note: method B will result in a slightly larger transformer being selected.

For VA sealed definition please refer to 1 (A).  
For VA inrush definition please refer to 1 (B).

5. If the nominal supply voltage does not fluctuate more than 5%, then reference the 90% secondary voltage column in the Regulation Data Table for the correct VA rating.

If the supply voltage varies upwards of 10%, the 95% secondary voltage column should be used to size the transformer.

Current standards require electromagnetic devices to operate reliably at a minimum of 85% of their rated voltage. However, contact life may be affected with continuous start-ups at that voltage level. Therefore, the minimum 85% secondary voltage column should only be used as a reference.

6. Using the regulation data tables below, select the appropriate VA rated transformer:

A) With a continuous VA rating that is equal to or greater than the value in Step 2.

B) With a maximum inrush VA equal to or greater than the value obtained in Step 4.

To determine the correct HPS transformer and its catalog part number, just refer to the tables in this catalog for the voltage ratings, frequency and corresponding VA required.

**HPS IMPERATOR® TRANSFORMERS  
REGULATION DATA TABLE**

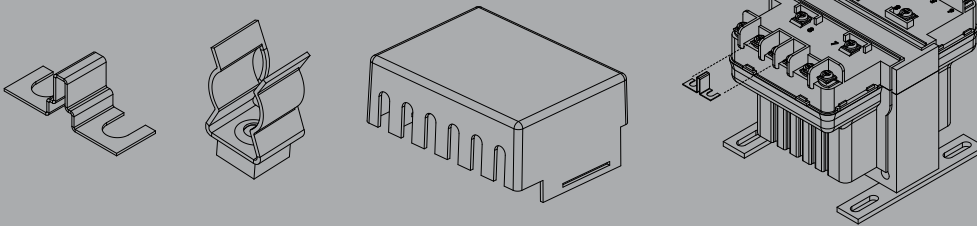
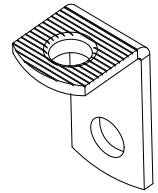
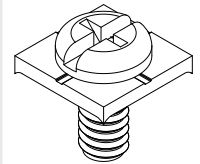
Continuous VA Transformer Nameplate Rating	Inrush VA @ 40% Power Factor		
	85% Secondary Voltage	90% Secondary Voltage	95% Secondary Voltage
50	330	259	192
75	350	258	170
100	620	467	321
150	895	699	512
250	1596	1229	880
350	2464	1889	1345
500	3939	2854	1819
750	6422	4778	3228
1000	9842	7102	4530
1500	12797	9018	5489

It is recommended that a control transformer be sized at a 40% Power Factor. Some components in a circuit, such as electromagnetic devices, typically operate at that level due to their inherently lower power factor. Selecting a transformer at 40% Power Factor will more than adequately size the unit for all the various loads in the circuit.



## FEATURES & BENEFITS

- 600V class, machine tool rated industrial control transformers
- Multi-voltage primary and secondary models increase range of application per unit
- 50/60 Hertz (60Hz on PH\*\*\*AJ & PH\*\*\*AR)
- Termination: standard combination screw connection (including SEMS washers)
- Constructed with high quality silicon steel laminations that provide optimum performance and reliability
- Encapsulated copper wound coils encased in a custom injection molded cover, protects coils and terminations from moisture, dirt and other industrial airborne contaminants
- Mounting Feet: made of heavy steel and welded or bolted to the core, these mounting feet provide superior strength in a compact design.
- Superior insulating materials:
  - 105°C (55°C rise) 50 VA to 150 VA
  - 130°C (80°C rise) 250 VA to 1500 VA
 (Note: Temperature rise based on 25°C ambient)
- Seismically certified in accordance with IBC 2009; Section 1613 Earthquake Loads, for  $S_{Ds} \leq 2.00g$ ,  $z/h = 1.0$ , and  $I_p = 1.5$
- Standard secondary fuse kits - utilizing 13/32" x 1 1/2" midget/type CC fuse clips
- Optional primary fuse kits available utilizing 13/32" x 1 1/2" midget/type CC fuse clips
- Optional finger safe terminal covers available on all units
- UL Listed (approved for U.S. and Canada)
- CE Mark standard on all units (excluding PH\*AR and PH\*AJ)
- RoHS Compliant
- **LIFETIME Warranty (Limited)**



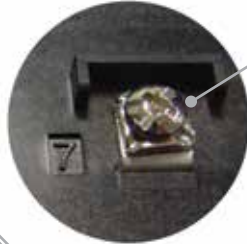
Warranty

Lifetime



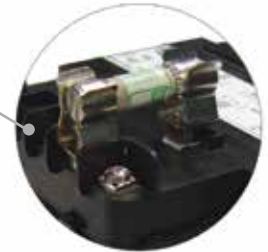
## FEATURES & BENEFITS CONTINUED

Terminal connection numbers molded into the terminal block and correspond to the nameplate and wiring diagrams, make connecting the HPS Imperator quick and simple.



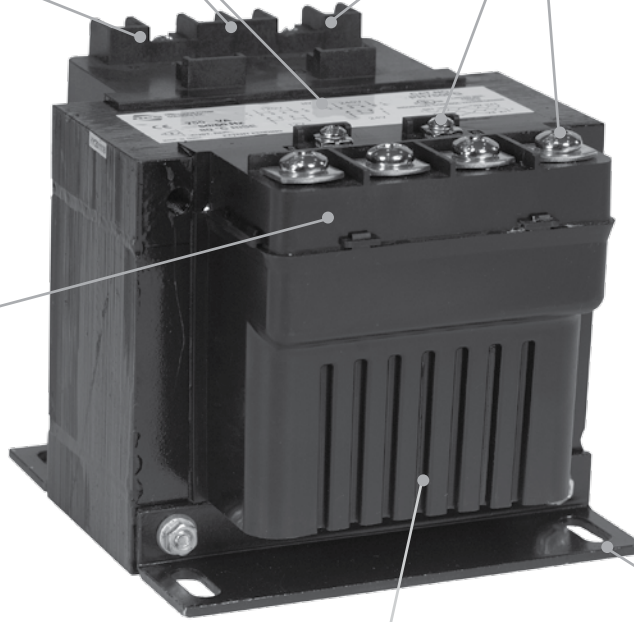
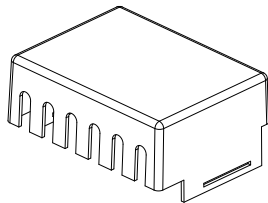
SEMS washer allows for easy connection of supply or load wires with or without terminal connectors.

Standard secondary and optional primary fuse kits utilizing 13/32" x 1 1/2" midget/type CC fuse clips provide an economical solution to your fusing requirements (fuses not available).



Innovative terminal block design provides for easy hook-up and installation of fuse clips.

Optional removable finger safe terminal covers available on all units.



Custom injection molded coil cover with its unique "fin shaped" design combines superior cooling properties with a clean, bold look.

Made of heavy steel and welded or bolted to the core, these mounting feet provide superior strength in a compact design.

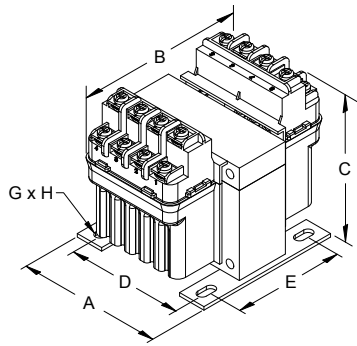


FIGURE A

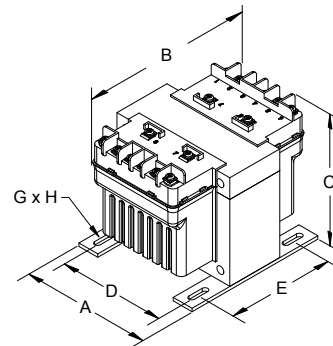



FIGURE B

## Group A

Primary Voltage: **600** || 575 || 550  **60 Hertz**  
 Secondary Voltage: **120 X 240** || 115 X 230 || 110 X 220

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50AJ	A	0.42/0.21	3.00	3.81	3.19	2.50	2.25	0.22 x 0.44	4.00	5.25	2.70	PFK1	FG1*/FGF1
75	PH75AJ	A	0.63/0.31	3.25	3.69	3.56	2.63	2.50	0.22 x 0.44	4.37	5.13	2.80	PFK1	FG2*/FGF2
100	PH100AJ	A	0.83/0.42	3.25	4.06	3.63	2.63	2.63	0.22 x 0.44	4.44	5.50	4.10	PFK1	FG2*/FGF2
150	PH150AJ	B	1.25/0.63	4.00	4.63	3.81	3.38	2.75	0.22 x 0.75	4.50	6.13	4.90	PFK2	FG3
250	PH250AJ	B	2.08/1.04	4.50	5.25	3.81	3.75	3.13	0.22 x 0.75	4.50	6.75	6.97	PFK2	FG3
350	PH350AJ	B	2.92/1.46	4.50	4.88	4.44	3.75	3.75	0.22 x 0.75	5.18	6.38	8.30	PFK3	FG4
500	PH500AJ	B	4.17/2.08	4.75	5.56	4.31	4.06	3.44	0.31 x 0.94	5.13	7.06	11.6	PFK3	FG4
750	PH750AJ	B	6.25/3.13	5.13	6.38	4.31	4.38	4.00	0.31 x 0.81	5.13	8.13	16.6	PFK3	FG4
1000	PH1000AJ	B	8.33/4.17	5.25	6.50	4.94	4.50	4.09	0.31 x 0.81	5.56	8.00	21.0	PFK3	FG5
1500	PH1500AJ	B	12.5/6.25	5.25	7.56	4.94	4.50	5.44	0.38 x 1.00	5.56	9.06	30.0	PFK3	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers. All dimensions in inches  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 63 for wiring schematic drawing. Custom voltage and VA sizes available upon request.

## Group B

Primary Voltage: **600** || 575 || 550  **60 Hertz**  
 Secondary Voltage: **12 X 24** || 11.5 X 23 || 11 X 22

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50AR	A	4.17/2.08	3.00	3.81	3.19	2.50	2.25	0.22 x 0.44	4.00	5.25	2.70	PFK1	FG1*/FGF1
75	PH75AR	A	6.25/3.13	3.25	3.69	3.56	2.63	2.50	0.22 x 0.44	4.37	5.13	2.80	PFK1	FG2*/FGF2
100	PH100AR	A	8.33/4.17	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150AR	B	12.5/6.25	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250AR	B	20.8/10.4	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350AR	B	29.2/14.6	4.50	4.88	4.44	3.75	3.75	0.22 x 0.75	5.18	6.38	8.30	PFK3	FG4
500	PH500AR	B	41.7/20.8	4.75	5.56	4.31	4.06	3.44	0.31 x 0.94	5.13	7.06	11.6	PFK3	FG4

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied with transformers. All dimensions in inches  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 64 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

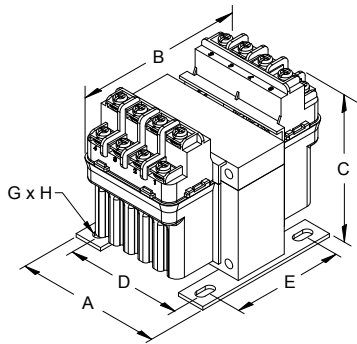


FIGURE A

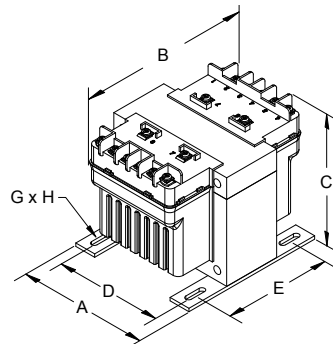


FIGURE B

## Group C

Primary Voltage: **240 X 480** || 230 X 460 || 220 X 440  
 Secondary Voltage: **120 X 240** || 115 X 230 || 110 X 220



50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50QMJ	A	0.42/0.21	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK1	FG1*/FGF1
75	PH75QMJ	A	0.63/0.31	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK1	FG2*/FGF2
100	PH100QMJ	A	0.83/0.42	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150QMJ	B	1.25/0.63	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250QMJ	B	2.08/1.04	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350QMJ	B	2.92/1.46	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK3	FG4
500	PH500QMJ	B	4.17/2.08	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK3	FG4
750	PH750QMJ	B	6.25/3.13	5.13	6.69	4.31	4.38	4.31	0.31 x 0.81	5.13	8.19	16.6	PFK3	FG4
1000	PH1000QMJ	B	8.33/4.17	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK3	FG5
1500	PH1500QMJ	B	12.5/6.25	5.25	8.19	4.94	4.50	6.06	0.38 x 1.00	5.56	9.69	32.0	PFK3	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers.

All dimensions in inches

\*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.

Refer to page 65 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

\*\*\* Available with FACTORY INSTALLED Primary and Secondary Fuse Kits up to 1500VA. To order, add the suffix "-FK" to the above part number. Refer to page 42 for details. \*\*\*

## Group D

Primary Voltage: **240 X 480** || 230 X 460 || 220 X 440  
 Secondary Voltage: **12 X 24** || 11.5 X 23 || 11 X 22



50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50QR	A	4.17/2.08	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK1	FG1*/FGF1
75	PH75QR	A	6.25/3.13	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK1	FG2*/FGF2
100	PH100QR	A	8.33/4.17	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150QR	B	12.5/6.25	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250QR	B	20.8/10.4	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350QR	B	29.2/14.6	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK3	FG4
500	PH500QR	B	41.7/20.8	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK3	FG4

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers.

All dimensions in inches

\*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.

Refer to page 66 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

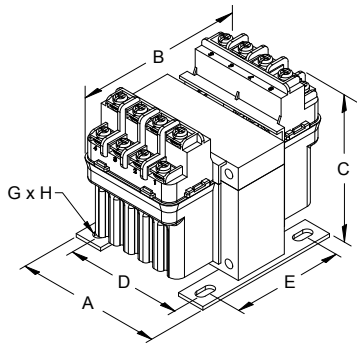


FIGURE A

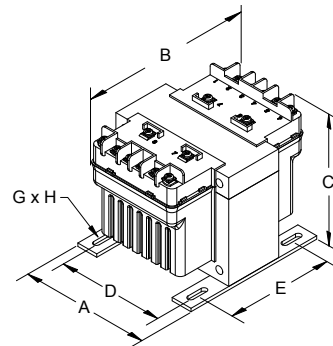


FIGURE B

## Group E

Primary Voltage: **208 X 416** || 200 X 400 || 190 X 380  
 Secondary Voltage: **120 X 240** || 115 X 230 || 110 X 220



50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E	G X H					
50	PH50SP	A	0.42/0.21	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK1	FG1*/FGF1
75	PH75SP	A	0.63/0.31	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK1	FG2*/FGF2
100	PH100SP	A	0.83/0.42	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150SP	B	1.25/0.63	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250SP	B	2.08/1.04	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350SP	B	2.92/1.46	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK3	FG4
500	PH500SP	B	4.17/2.08	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK3	FG4
750	PH750SP	B	6.25/3.13	5.13	6.69	4.31	4.38	4.31	0.31 x 0.81	5.13	8.19	16.6	PFK3	FG4
1000	PH1000SP	B	8.33/4.17	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK3	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers.  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 67 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group F

Primary Voltage: **120 X 240** || 115 X 230 || 110 X 220  
 Secondary Voltage: **120 X 240** || 115 X 230 || 110 X 220



50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E	G X H					
50	PH50PP	A	0.42/0.21	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK1	FG1*/FGF1
75	PH75PP	A	0.63/0.31	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK1	FG2*/FGF2
100	PH100PP	A	0.83/0.42	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150PP	B	1.25/0.63	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250PP	B	2.08/1.04	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350PP	B	2.92/1.46	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK3	FG4
500	PH500PP	B	4.17/2.08	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK3	FG4
750	PH750PP	B	6.25/3.13	5.13	6.69	4.31	4.38	4.31	0.31 x 0.81	5.13	8.19	16.6	PFK3	FG4
1000	PH1000PP	B	8.33/4.17	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK3	FG5
1500	PH1500PP	B	12.5/6.25	5.25	8.19	4.94	4.50	6.06	0.38 x 1.0	5.56	9.69	32.0	PFK3	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers.  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 68 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches



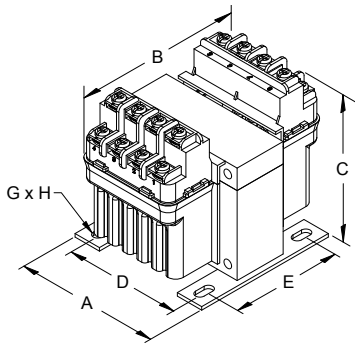


FIGURE A

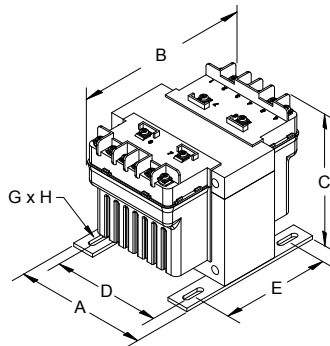


FIGURE B

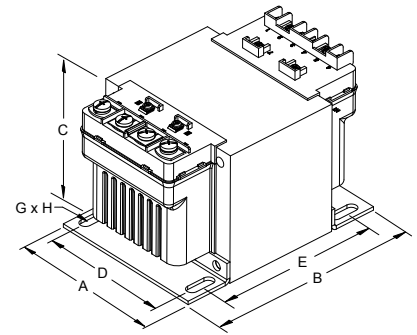


FIGURE C

## Group G

Primary Voltage: 120 X 240 || 115 X 230 || 110 X 220  
 Secondary Voltage: 12 X 24 || 11.5 X 23 || 11 X 22

  50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E	G X H					
50	PH50PG	A	4.17/2.08	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK1	FG1*/FGF1
75	PH75PG	A	6.25/3.13	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK1	FG2*/FGF2
100	PH100PG	A	8.33/4.17	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150PG	B	12.5/6.25	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250PG	B	20.8/10.4	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350PG	B	29.2/14.6	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK3	FG4
500	PH500PG	B	41.7/20.8	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK3	FG4
750	PH750PG	C	62.5/31.3	5.25	6.25	4.94	4.38	4.31	0.31 x 0.81	5.56	7.88	16.6	PFK3	FG5
1000	PH1000PG	C	83.3/41.7	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK3	FG5

Secondary fuse clips and fuse clip mounting screws supplied standard with transformers up to and including 500VA. Primary and Secondary voltage links/jumpers supplied standard with transformers. All dimensions in inches

\*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.

Refer to page 69 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

\*\*\* Available with FACTORY INSTALLED Primary and Secondary Fuse Kits up to 1000VA. To order, add the suffix "-FK" to the above part number. Refer to page 42 for details. \*\*\*

## Group H

Primary Voltage: 600/480/240 || 575/460/230 || 550/440/220  
 Secondary Voltage: 120/100 || 115/95 || 110/90

  50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E	G X H					
50	PH50MBMH	A	0.43	3.25	4.06	3.63	2.63	2.63	0.22 x 0.44	4.50	5.50	4.10	PFK5	FG2*/FGF2
75	PH75MBMH	A	0.65	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK5	FG2*/FGF2
100	PH100MBMH	B	0.87	4.00	4.63	3.81	3.38	2.75	0.22 x 0.75	4.50	6.25	4.90	PFK6	FG3
150	PH150MBMH	B	1.30	4.00	5.44	3.81	3.38	2.75	0.22 x 0.75	4.50	6.94	7.60	PFK6	FG3
250	PH250MBMH	B	2.17	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK6	FG4
350	PH350MBMH	B	3.04	4.50	5.56	4.44	3.75	3.75	0.22 x 0.75	5.18	7.06	11.0	PFK7	FG4
500	PH500MBMH	B	4.35	4.75	6.69	4.31	4.06	4.50	0.31 x 0.94	5.13	8.19	16.3	PFK7	FG4
750	PH750MBMH	B	6.52	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK7	FG5
1000	PH1000MBMH	B	8.70	5.25	8.19	4.94	4.50	5.81	0.31 x 0.81	5.56	9.69	31.2	PFK7	FG5
1500	PH1500MBMH	B	13.0	5.25	8.19	4.94	4.50	6.06	0.38 x 1.0	5.56	9.69	32.0	PFK7	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers. All dimensions in inches

\*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.

Refer to page 70 for wiring schematic drawing. Custom voltage and VA sizes available upon request.

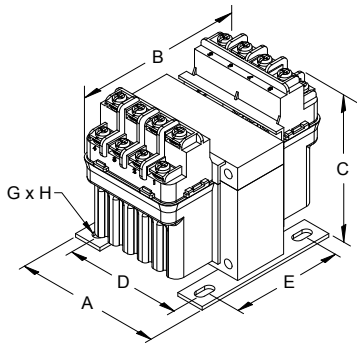


FIGURE A

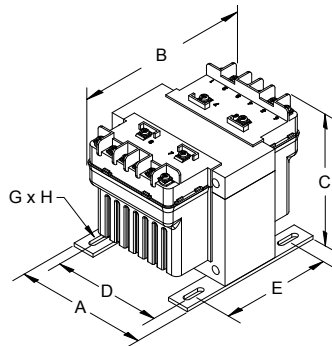


FIGURE B

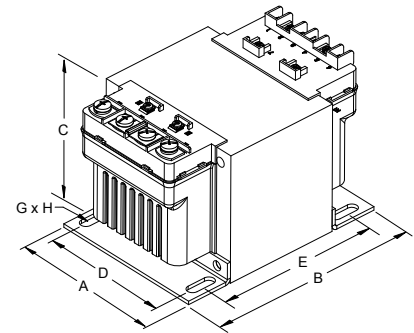


FIGURE C

## Group I

Primary Voltage: 480/240 || **460/230/208** || 440/220/200  
 Secondary Voltage: 120/25 || **115/24** || 110/23

50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50MLI	A	0.43/2.08	3.25	4.06	3.56	2.63	2.50	0.22 x 0.44	4.37	5.50	4.00	PFK5	FG2*/FGF2
75	PH75MLI	A	0.65/3.13	3.25	4.25	3.56	2.63	2.50	0.22 x 0.44	4.37	5.63	4.60	PFK5	FG2*/FGF2
100	PH100MLI	A	0.87/4.17	3.25	4.69	3.63	2.63	2.63	0.22 x 0.44	4.50	6.25	5.20	PFK5	FG2*/FGF2
150	PH150MLI	B	1.30/6.25	4.00	5.44	3.81	3.38	2.75	0.22 x 0.75	4.50	6.94	7.60	PFK6	FG3
250	PH250MLI	B	2.17/10.42	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK6	FG4
350	PH350MLI	B	3.04/14.58	4.50	5.56	4.44	3.75	3.75	0.22 x 0.75	5.18	7.06	11.0	PFK7	FG4
500	PH500MLI	B	4.35/20.83	4.75	6.69	4.31	4.06	4.50	0.31 x 0.94	5.13	8.19	16.3	PFK7	FG4
750	PH750MLI	C	6.52/31.25	5.25	6.50	4.94	4.50	4.13	0.31 x 0.81	5.56	8.31	21.0	PFK7	FG5
1000	PH1000MLI	C	8.70/41.67	5.25	8.19	4.94	4.50	5.81	0.31 x 0.81	5.56	9.69	31.2	PFK7	FG5

Secondary fuse clips and fuse clip mounting screws supplied standard with transformers up to and including 500VA. All dimensions in inches  
 Primary and Secondary voltage links/jumpers supplied standard with transformers up to and including 1000VA.  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 71 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
 \*\*\* Available with FACTORY INSTALLED Primary and Secondary Fuse Kits up to 1000VA. To order, add the suffix "-FK" to the above part number. Refer to page 42 for details. \*\*\*

## Group J

Primary Voltage: 415/400/380  
 Secondary Voltage: 110 X 220

50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50MEMX	A	0.45/0.23	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK4	FG1*/FGF1
75	PH75MEMX	A	0.68/0.34	3.25	4.06	3.63	2.63	2.63	0.22 x 0.44	4.44	5.50	4.10	PFK5	FG2*/FGF2
100	PH100MEMX	A	0.91/0.45	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.44	5.63	4.50	PFK5	FG2*/FGF2
150	PH150MEMX	B	1.36/0.68	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK6	FG3
250	PH250MEMX	B	2.27/1.14	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK6	FG3
350	PH350MEMX	B	3.18/1.59	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK7	FG4
500	PH500MEMX	B	4.55/2.27	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK7	FG4
750	PH750MEMX	B	6.82/3.41	5.25	6.50	4.94	4.50	4.13	0.31 x 0.81	5.56	8.00	21.0	PFK7	FG5
1000	PH1000MEMX	B	9.09/4.55	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK7	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers. All dimensions in inches  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 72 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

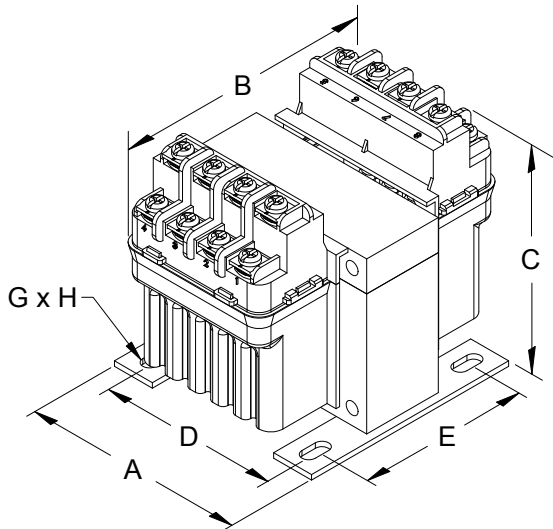


FIGURE A

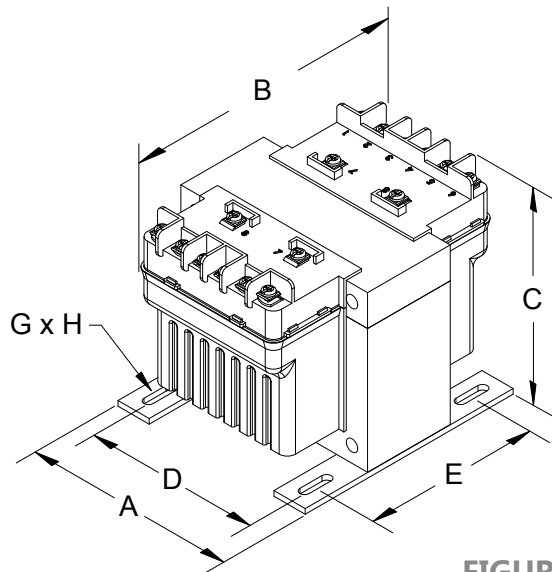


FIGURE B

## Group K

Primary Voltage: 380/277/208

Secondary Voltage: 120 X 240



50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50MGJ	A	0.42/0.21	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK5	FG2*/FGF2
75	PH75MGJ	A	0.63/0.31	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.44	5.63	4.50	PFK5	FG2*/FGF2
100	PH100MGJ	A	0.83/0.42	3.25	4.69	3.63	2.63	2.63	0.22 x 0.44	4.50	6.13	5.20	PFK5	FG2*/FGF2
150	PH150MGJ	B	1.25/0.63	4.00	5.44	3.81	3.38	2.75	0.22 x 0.75	4.50	6.94	7.60	PFK6	FG3
250	PH250MGJ	B	2.08/1.04	4.50	4.88	4.44	3.75	3.75	0.22 x 0.75	5.18	6.38	8.30	PFK6	FG4
350	PH350MGJ	B	2.92/1.46	4.50	5.56	4.44	3.75	3.75	0.22 x 0.75	5.18	7.06	11.0	PFK7	FG4
500	PH500MGJ	B	4.17/2.08	4.75	6.69	4.31	4.06	4.50	0.31 x 0.94	5.13	8.19	16.3	PFK7	FG4
750	PH750MGJ	B	6.25/3.13	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK7	FG5
1000	PH1000MGJ	B	8.33/4.17	5.25	7.25	4.94	4.50	4.83	0.31 x 0.81	5.56	9.69	25.5	PFK7	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers.

All dimensions in inches

\*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43. Refer to page 73 for wiring schematic drawings. Custom voltages and VA sizes available upon request.

## Field Installed Fuse Kits

### Standard Secondary Fuse Kits (Field Installed)

All HPS Imperator control transformers are supplied with standard secondary fuse kits which include: 13/32" x 1 1/2" midget/ type CC fuse clips, fuse clip mounting screws, primary and secondary voltage links and the PHAK1 instruction sheet (note: secondary fuse clips and fuse clip mounting screws are not supplied on the PH750PG, PH1000PG, PH750MLI, and PH1000MLI).

### Optional Primary Fuse Kits (Field Installed)

All HPS Imperator series machine tool industrial control transformers up to and including 1500VA are available with the following optional primary fuse kits:

Kit Part Number	Applicable Transformer Part Number Suffix's	Applicable VA Sizes	Parts Included in Kit
PFK1	Refer to Specification Tables on Pages 36 to 41 for Optional Primary Fuse Kit P/N		4 fuse clips, 4 mtg. screws, PHAK1 instruction sheet
PFK2			4 fuse clips, 4 mtg. screws, PHAK1 instruction sheet
PFK3			4 fuse clips, 4 mtg. screws, PHAK1 instruction sheet
PFK4			4 fuse clips, 4 mtg. screws, 1 jumper, 1 finger guard, PHAK1 instruction sheet
PFK5			4 fuse clips, 4 mtg. screws, 1 jumper, 1 finger guard, PHAK1 instruction sheet
PFK6			4 fuse clips, 4 mtg. screws, 1 jumper wire, PHAK1 instruction sheet
PFK7			4 fuse clips, 4 mtg. screws, 1 jumper wire, PHAK1 instruction sheet

**Note:** Maximum allowable current rating on all primary and secondary fuse kits is 30 amps.

## Factory Installed Fuse Kits

### Factory Installed Primary and Secondary Fuse Kits

HPS now stocks some HPS Imperator series voltage groups with FACTORY INSTALLED primary and secondary fuse clips. To order, just add the suffix "-FK" to the end of the standard part number.

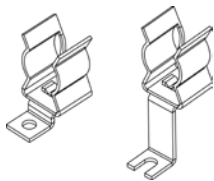
Factory installed fusing only available on units up to 1500VA. The voltage groups that are stocked are:

**Group C (p/n: PH\*\*\*MQMJ-FK) | Group G (p/n: PH\*\*\*PG-FK) | Group I (p/n: PH\*\*\*MLI-FK)**

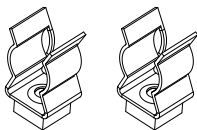
On PH750PG-FK, PH1000PG-FK, PH750MLI-FK, and PH1000MLI-FK, only primary fuse clips are included on factory installed units. Secondary fuse clips are not included or available on these units.

Other voltage groups available with factory installed fuse kits. Please contact your HPS sales or customer service representative for details.

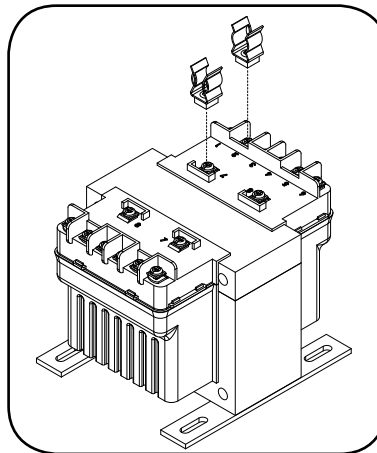
**Note:** All factory installed fuse kits are pre-wired at the transformers highest primary voltage and the lowest secondary voltage. To hook up at a different primary or secondary voltage, please refer to the wiring instruction sheet included with the transformer.



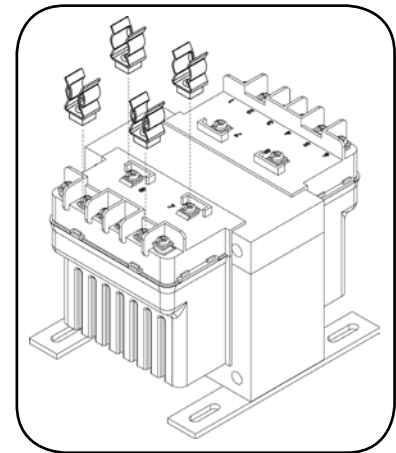
**Sample Accessory Drawing for Fuse Clips**  
(for 50, 75 and 100VA)



**Sample Accessory Drawing for Fuse Clips**  
(for 150VA to 1500VA)



**Sample Assembly Drawing for Secondary Fuse Clip Installation**  
(For 150VA to 1500VA)



**Sample Assembly Drawing for Primary Fuse Clip Installation**  
(For 150VA to 1500VA)

**Note:** HPS Imperator primary and secondary fuse kits are not suitable for branch circuit applications!



## Optional Accessories

### Finger Guards

The HPS Imperator line of machine tool industrial molded control transformers are available with the following optional finger guard kits:

#### Optional Unfused Finger Guard Kits

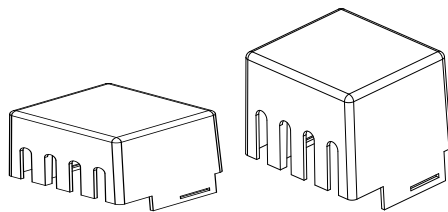
Kit Part Number	Applicable Transformer Part Number Suffixes	Applicable VA Sizes
<b>FG1</b>	AJ, AR, MQMJ, MEMX, QR, SP, PG, PP	50
<b>FG2</b>	MBMH, MGJ, MLI	50
<b>FG2</b>	All	75
<b>FG2</b>	All (excluding PH100MBMH) Refer to FG3, FG4 or FG5 below	100 150 to 1500

**Note:** Each finger guard kit supplies either the primary or secondary side.  
Included in the kit: 1 finger guard (unfused) and PHAK1 instruction sheet

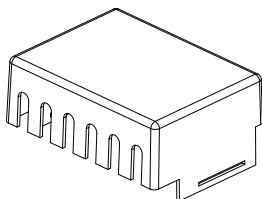
#### Optional Fused Finger Guard Kits

Kit Part Number	Applicable Transformer Part Number Suffixes	Applicable VA Sizes	Parts Included in Kit
<b>FGF1</b>	AJ, AR, MQMJ, MEMX, QR, SP, PG, PP	50	1 finger guard (fused), PHAK1 instruction sheet
<b>FGF2</b>	MBMH, MGJ, MLI	50	1 finger guard (fused), PHAK1 instruction sheet
<b>FGF2</b>	All	75	1 finger guard (fused), PHAK1 instruction sheet
<b>FGF2</b>	All (excluding PH100MBMH)	100	1 finger guard (fused), PHAK1 instruction sheet
<b>FG3</b>	MBMH	100	1 finger guard, PHAK1 instruction sheet
<b>FG3</b>	All	150	1 finger guard, PHAK1 instruction sheet
<b>FG3</b>	AJ, AR, MQMJ, MEMX, QR, SP, PG, PP	250	1 finger guard, PHAK1 instruction sheet
<b>FG4</b>	MBMH, MGJ, MLI	250	1 finger guard, PHAK1 instruction sheet
<b>FG4</b>	All	350, 500	1 finger guard, PHAK1 instruction sheet
<b>FG4</b>	AJ, AR, MQMJ, QR, SP, PP	750	1 finger guard, PHAK1 instruction sheet
<b>FG5</b>	MBMH, MEMX, MGJ, MLI, PG	750	1 finger guard, PHAK1 instruction sheet
<b>FG5</b>	All	1000, 1500	1 finger guard, PHAK1 instruction sheet

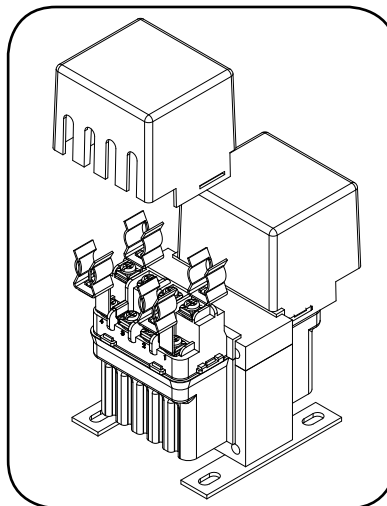
**Note:** Each finger guard kit supplies either the primary or secondary side.



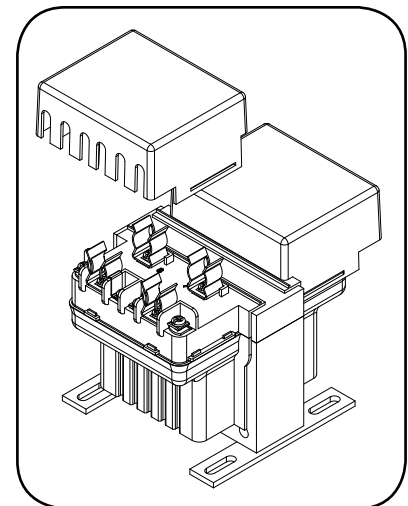
**Sample Accessory Drawing for Fused & Unfused Finger Guards**  
(for 50, 75 and 100VA)



**Sample Accessory Drawing for Finger Guards**  
(for 150VA and 1500VA)



**Sample Assembly Drawing for Finger Guard Installation**  
(For 50, 75 and 100VA)



**Sample Assembly Drawing for Finger Guard Installation**  
(For 150VA to 1500VA)

## HPS Spartan® Industrial Open-Style Control Transformer

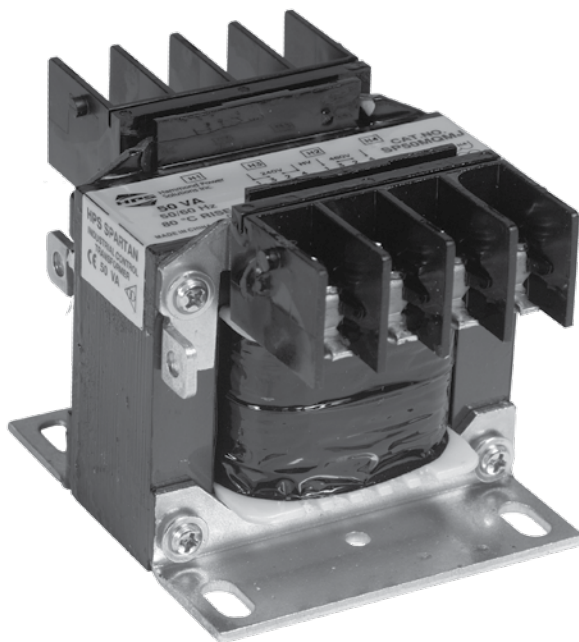
### The Economical Solution

The HPS Spartan® line of industrial control transformers are ideally suited for general purpose, industrial and light duty loads. Designed for applications where high inrush or machine tool duty are not necessary, the HPS Spartan industrial open-style control transformer offers an efficient and economical solution. These units are well suited for HVAC applications, signal and alarm systems, motor control circuits, lighting and circuit isolation.

The HPS Spartan control transformer is an open style unit with molded terminal blocks up to 3000 VA or 30 amps. Optional Finger guards and a fuse block adapter kit are available upon request.

For an economical approach to control transformers, the HPS Spartan is the transformer of choice.

SECTION 1



#### STANDARDS

The HPS Spartan Control Transformers meet or exceed the standards established by UL, CSA, IEC and NEMA.

Standard	File #	VA Size
UL (ANSI/UL506)	E50394	All
CSA	LR3902	All
IEC 61558		All
NEMA (ST-1)		All



## INDUSTRIAL OPEN-STYLE CONTROL TRANSFORMER SELECTION

Selecting a control transformer requires that you have first hand knowledge of the application for the transformer and that you understand some basic terms related to the selection process. By using the following information, you will be sure to select the HPS Spartan® control transformer which best meets your application.

The HPS Spartan line of industrial control transformers are ideally suited for general purpose, industrial and light duty loads. Designed for applications where inrush requirements are not as high.

To select the proper transformer, three characteristics of the load circuit must first be determined. They are total steady-state (sealed) VA, total inrush VA, and inrush load power factor.

**(A) The total steady state “sealed” VA is the amount of VA that the transformer must supply to the load circuit for an extended length of time.** Simply add the total steady-state VA of all devices in your control circuit. The operating VA data of these components is available from the manufacturers.

**(B) The total inrush VA is the amount of VA that the transformer must supply for all components in the control circuit which are energized together.** Some consideration to the start-up sequence may be required. Inrush VA should be obtained from the device manufacturer.

**(C) The inrush load power factor is difficult to determine without detailed vector analysis of all the control circuit components.** Such information is not generally available. Therefore, HPS is recommending that a 40% power factor be utilized. Although some other control transformer manufacturers still recommend a power factor of only 20%, HPS, through recent tests conducted on many popular brands of control devices, has determined that the 40% power factor value is more accurate.

Once the above circuit variables have been determined, transformer selection is a six step process.

### SIX EASY STEPS

1. Determine what your Primary (supply) and Secondary (output) voltage requirements are, as well as your required frequency (i.e. 60 Hz)
2. Calculate the Total Sealed VA of your circuit. (See Step A)
3. Calculate the Inrush VA by adding the inrush VA of all components being energized together. Remember to add the sealed VA of all components that do not have inrush VA, (lamps, timers etc.) as they present a load to the transformer during maximum inrush. If the inrush for the components in your circuit are not known, assume a 40% Inrush Power Factor.
4. Calculate the Total Inrush VA using one of the two methods:

A. 
$$\frac{\text{Total Inrush VA} = (\text{VA sealed})^2 + (\text{VA inrush})^2}{\sqrt{\quad}}$$

**OR**

B. 
$$\text{Total Inrush VA} = \text{VA Sealed} + \text{VA Inrush}$$

Note: method B will result in a slightly larger transformer being selected.

For VA sealed definition please refer to 1 (A).  
For VA inrush definition please refer to 1 (B).

5. If the nominal supply voltage does not fluctuate more than 5%, then reference the 90% secondary voltage column in the Regulation Data Table for the correct VA rating.

If the supply voltage varies upwards of 10%, the 95% secondary voltage column should be used to size the transformer.

Current standards require electromagnetic devices to operate reliably at a minimum of 85% of their rated voltage. However, contact life may be affected with continuous start-ups at that voltage level. Therefore, the minimum 85% secondary voltage column should only be used as a reference.

6. Using the regulation data tables below, select the appropriate VA rated transformer:

A) With a continuous VA rating that is equal to or greater than the value in Step 2.

B) With a maximum inrush VA equal to or greater than the value obtained in Step 4.

To determine the correct HPS transformer and its catalog part number, just refer to the tables in this catalog for the voltage ratings, frequency and corresponding VA required.

**HPS SPARTAN® TRANSFORMERS  
REGULATION DATA TABLE**

Continuous VA Transformer Nameplate Rating	Inrush VA @ 40% Power Factor		
	85% Secondary Voltage	90% Secondary Voltage	95% Secondary Voltage
50	177	139	102
100	350	275	203
150	715	554	400
250	1653	1264	895
350	2604	1947	1321
500	4004	3023	2090
750	6933	5088	3352
1000	10087	7340	4764
1500	14178	10232	6508
2000	17604	12669	8080
3000	39213	27539	16780
5000	68344	47498	28803

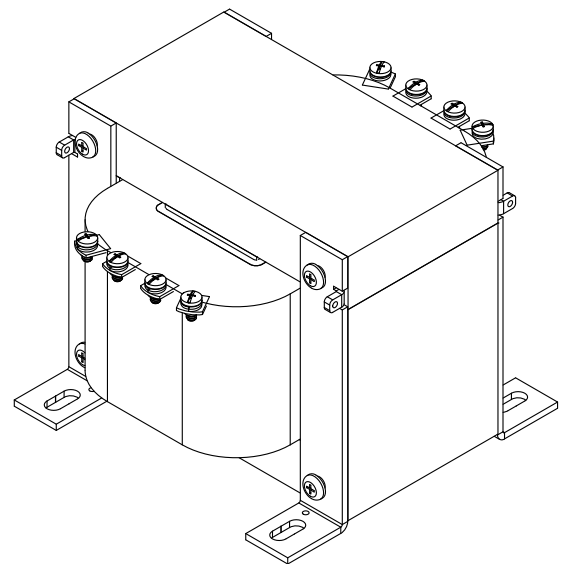
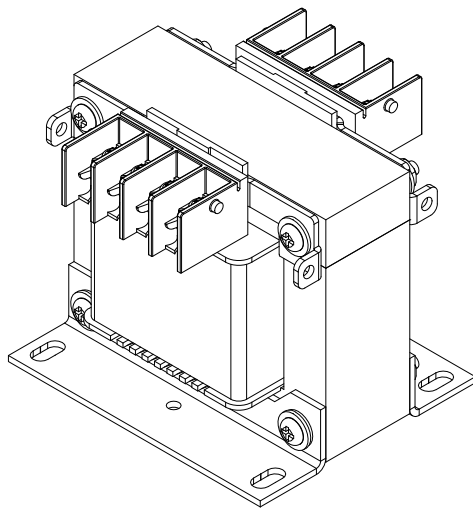
It is recommended that a control transformer be sized at a 40% Power Factor. Some components in a circuit, such as electromagnetic devices, typically operate at that level due to their inherently lower power factor. Selecting a transformer at 40% Power Factor will more than adequately size the unit for all the various loads in the circuit.



## Features and Benefits

- Multi-voltage primary and secondary models increase range of application per unit
- Standard molded terminal blocks or primary and secondary up to 3000VA (30A) units
- Solid terminal block with standard combination screw connection
- 50/60 Hz (60 Hz on SP\*\*\*ACP and SP\*\*\*AR)
- Copper wound coils with high dielectric strength insulation
- Bolted core construction
- Bolt-on mounting brackets
- Vacuum Impregnated with Polyester Resin and oven cured
- Seismically certified in accordance with IBC 2009; Section 1613 Earthquake Loads, for  $S_{DS} \leq 2.00g$ ,  $z/h = 1.0$ , and  $I_p = 1.5$
- Superior insulating materials. The HPS Spartan series transformers offer the following insulation systems:
  - 130°C (80°C rise) up to 1500 VA
  - 180°C (115°C rise) 2000 VA to 5000 VA
- All units supplied with primary and secondary voltage links/jumpers
- Optional finger guards available<sup>1</sup>
- Optional fuse block adapter kit available<sup>1</sup>
- Supplied with trilingual installation and wiring instruction sheets
- "Premium Packaging"<sup>1</sup> which feature:
  - Premium fluted cartons
  - Custom molded foam inserts
  - Easy removal and repacking
  - Industry's best box label
- **15 year warranty**

<sup>1</sup> up to and including 3000VA or 30 amps



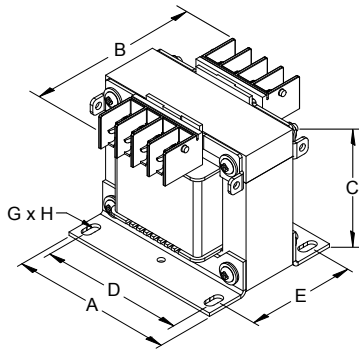


FIGURE A

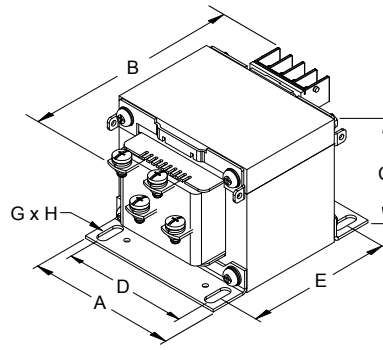


FIGURE B

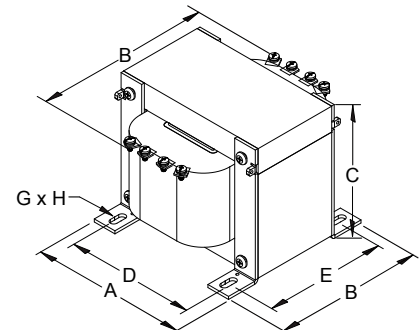


FIGURE C

## Group A

Primary Voltage: 600/480 || 575/460 || 550/440  
 Secondary Voltage: 120 X 240 || 115 X 230 || 110 X 220



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E				
50	50	SP50ACP	A	0.42/0.21	2.60	3.82	2.60	2.13	2.64	0.22 x 0.44	2.98	2.79	2.2
100	100	SP100ACP	A	0.83/0.42	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3.3
150	150	SP150ACP	A	1.25/0.63	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.4
250	160	SP250ACP	A	2.08/1.04	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.4
350	250	SP350ACP	A	2.92/1.46	3.78	4.49	3.40	3.31	3.39	0.22 x 0.44	3.78	3.59	7.5
500	300	SP500ACP	A	4.17/2.08	4.49	4.69	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11
750	500	SP750ACP	A	6.25/3.13	5.25	5.08 <sup>1</sup>	4.37	4.50	4.06	0.31 x 0.81	4.75	4.56	18
1000	650	SP1000ACP	A	8.33/4.17	5.25	5.47 <sup>1</sup>	4.37	4.50	4.45	0.31 x 0.81	4.75	4.56	21
1500	1000	SP1500ACP	A	12.5/6.25	5.25	6.85 <sup>1</sup>	4.37	4.50	5.83	0.31 x 0.81	4.56	4.37	28
2000	1300	SP2000ACP	A	16.7/8.33	6.38	5.87 <sup>1</sup>	5.31	5.75	4.84	0.31 x 0.81	5.69	5.50	34
3000	2000	SP3000ACP	A	25.0/12.5	7.50	7.50	6.50	6.30	6.85	0.44 x 1.00	6.50	6.50	60
5000	3000	SP5000ACP	C	41.7/20.8	8.98	9.88	7.76	7.40	7.13	0.44 x 1.00	N/A	N/A	93

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 74 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
<sup>1</sup> Note: For 750 through 2000 VA units actual overall depth is 0.24" plus the value in column B.

All dimensions in inches

## Group B

Primary Voltage: 600 || 575 || 550  
 Secondary Voltage: 12 X 24 || 11.5 X 23 || 11 X 22



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E				
50	50	SP50AR	A	4.17/2.08	2.60	3.23	2.60	2.13	2.05	0.22 x 0.44	2.98	2.79	1.5
100	100	SP100AR	A	8.33/4.17	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3.3
150	150	SP150AR	A	12.5/6.25	2.99	4.09	2.85	2.52	2.95	0.22 x 0.44	3.23	3.04	3.9
250	160	SP250AR	A	20.8/10.4	3.78	3.70	3.40	3.31	2.60	0.22 x 0.44	3.78	3.59	5.2
350	250	SP350AR	A	29.2/14.6	3.78	4.29	3.40	3.31	3.19	0.22 x 0.44	3.78	3.59	7.1
500	300	SP500AR	B	41.7/20.8	4.49	5.08	3.78	3.78	3.27	0.31 x 0.81	4.16	3.97	9.9

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 74 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

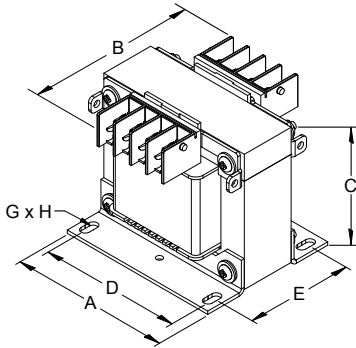


FIGURE A

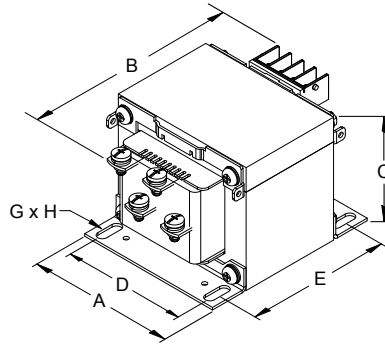


FIGURE B

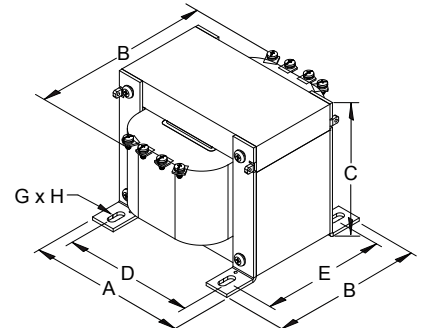


FIGURE C

## Group C

Primary Voltage: 240 X 480 || 230 X 460 || 220 X 440  
 Secondary Voltage: 120 X 240 || 115 X 230 || 110 X 220



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E				
50	50	SP50MQMJ	A	0.42/0.21	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.7
100	100	SP100MQMJ	A	0.83/0.42	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3
150	150	SP150MQMJ	A	1.25/0.63	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.3
250	160	SP250MQMJ	A	2.08/1.04	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.5
350	250	SP350MQMJ	A	2.92/1.46	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.2
500	300	SP500MQMJ	A	4.17/2.08	4.49	4.69	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11
750	500	SP750MQMJ	A	6.25/3.13	5.25	4.69 <sup>1</sup>	4.37	4.50	3.66	0.31 x 0.81	4.75	4.56	16
1000	650	SP1000MQMJ	A	8.33/4.17	5.25	5.47 <sup>1</sup>	4.37	4.50	4.45	0.31 x 0.81	4.75	4.56	21
1500	1000	SP1500MQMJ	A	12.5/6.25	5.25	6.85 <sup>1</sup>	4.37	4.50	5.83	0.31 x 0.81	4.75	4.56	28
2000	1300	SP2000MQMJ	A	16.7/8.33	6.38	5.87 <sup>1</sup>	5.31	5.75	4.84	0.31 x 0.81	5.50	5.31	35
3000	2000	SP3000MQMJ	A	25.0/12.5	7.50	7.50	6.50	6.30	7.28	0.44 x 1.00	6.50	6.50	64
5000	3000	SP5000MQMJ	C	41.7/20.8	8.98	9.88	7.76	7.40	7.28	0.44 x 1.00	N/A	N/A	97

Primary and Secondary voltage links/jumpers supplied standard with all transformers. All dimensions in inches  
 Refer to page 75 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
<sup>1</sup> Note: For 750 through 2000 VA units actual overall depth is 0.24" plus the value in column B.

## Group D

Primary Voltage: 240 X 480 || 230 X 460 || 220 X 440  
 Secondary Voltage: 12 X 24 || 11.5 X 23 || 11 X 22



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E				
50	50	SP50QR	A	4.17/2.08	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.7
100	100	SP100QR	A	8.33/4.17	2.99	3.54	2.85	2.52	2.40	0.22 x 0.44	3.23	3.04	3
150	150	SP150QR	A	12.5/6.25	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.3
250	160	SP250QR	A	20.8/10.4	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.5
350	250	SP350QR	A	29.2/14.6	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.3
500	300	SP500QR	B	41.7/20.8	4.49	5.47	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11

Primary and Secondary voltage links/jumpers supplied standard with all transformers. All dimensions in inches  
 Refer to page 75 for wiring schematic drawing. Custom voltages and VA sizes available upon request.



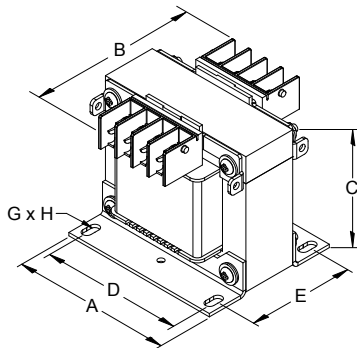


FIGURE A

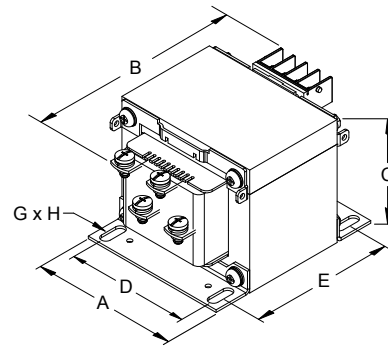


FIGURE B

## Group E

**Primary Voltage:** 380/347  
**Secondary Voltage:** 120 X 240



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50KHP	A	0.42/0.21	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.7
100	100	SP100KHP	A	0.83/0.42	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3.4
150	150	SP150KHP	A	1.25/0.63	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.4
250	160	SP250KHP	A	2.08/1.04	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.7
350	250	SP350KHP	A	2.92/1.46	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.4
500	300	SP500KHP	A	4.17/2.08	4.49	4.69	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	12
750	500	SP750KHP	A	6.25/3.13	5.25	4.69 <sup>1</sup>	4.37	4.50	3.66	0.31 x 0.81	4.75	4.56	17
1000	650	SP1000KHP	A	8.33/4.17	5.25	5.47 <sup>1</sup>	4.37	4.50	4.45	0.31 x 0.81	4.75	4.56	21
1500	1000	SP1500KHP	A	12.5/6.25	6.38	4.88 <sup>1</sup>	5.31	5.75	3.86	0.31 x 0.81	5.69	5.31	29

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 76 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
<sup>1</sup> Note: For 750 through 1500 VA units actual overall depth is 0.24" plus the value in column B.

All dimensions in inches

## Group F

**Primary Voltage:** 380/347  
**Secondary Voltage:** 12 X 24



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50KHR	A	4.17/2.08	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.7
100	100	SP100KHR	A	8.33/4.17	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3.3
150	150	SP150KHR	A	12.5/6.25	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.4
250	160	SP250KHR	A	20.8/10.4	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.4
350	250	SP350KHR	A	29.2/14.6	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.1
500	300	SP500KHR	B	41.7/20.8	4.49	5.47	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 76 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

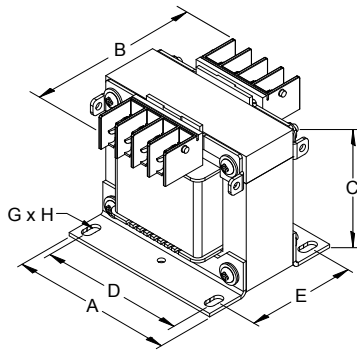


FIGURE A

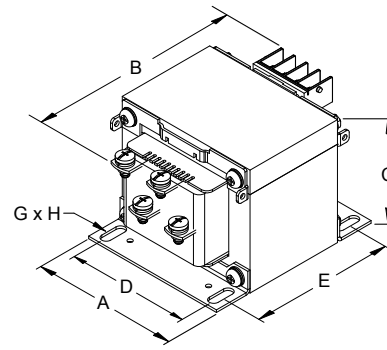


FIGURE B

SECTION 1

## Group G

**Primary Voltage:** 277  
**Secondary Voltage:** 120




**50/60 Hertz**

VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50NJ	A	0.42	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.6
100	100	SP100NJ	A	0.83	2.99	3.54	2.85	2.52	2.40	0.22 x 0.44	3.23	3.04	3.2
150	150	SP150NJ	A	1.25	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.3
250	160	SP250NJ	A	2.08	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.4
350	250	SP350NJ	A	2.92	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.1
500	300	SP500NJ	A	4.17	4.49	4.69	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11
750	500	SP750NJ	A	6.25	5.25	5.08 <sup>1</sup>	4.37	4.50	4.06	0.31 x 0.81	4.75	4.56	18
1000	650	SP1000NJ	A	8.33	5.25	5.47 <sup>1</sup>	4.37	4.50	4.45	0.31 x 0.81	4.75	4.56	20
1500	1000	SP1500NJ	A	12.50	5.25	6.85 <sup>1</sup>	4.37	4.50	5.83	0.31 x 0.81	4.75	4.56	29

Primary and Secondary voltage links/jumpers supplied standard with all transformers. All dimensions in inches  
 Refer to page 77 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
<sup>1</sup> Note: For 750 through 1500 VA units actual overall depth is 0.24" plus the value in column B.

## Group H

**Primary Voltage:** 120 X 240 || 115 X 230 || 110 X 220  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22




**50/60 Hertz**

VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50PR	A	4.17/2.08	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.7
100	100	SP100PR	A	8.33/4.17	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3
150	150	SP150PR	A	12.5/6.25	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.3
250	160	SP250PR	A	20.8/10.4	3.78	3.90	3.40	3.31	2.80	0.22 x 0.44	3.78	3.59	5.9
350	250	SP350PR	A	29.2/14.6	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.2
500	300	SP500PR	B	41.7/20.8	4.49	5.47	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11

Primary and Secondary voltage links/jumpers supplied standard with all transformers. All dimensions in inches  
 Refer to page 77 for wiring schematic drawing. Custom voltages and VA sizes available upon request.



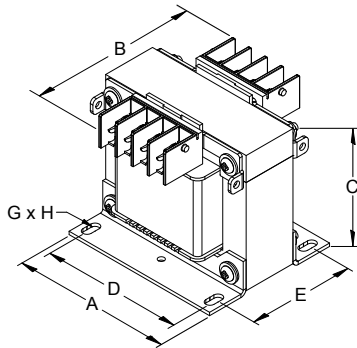


FIGURE A

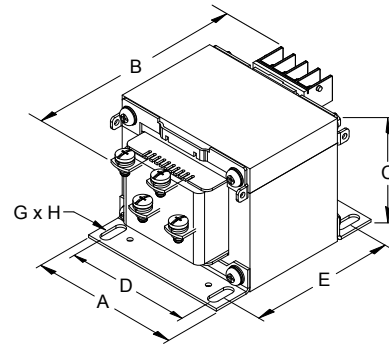


FIGURE B

## Group I

**Primary Voltage:** 208 X 416 || 200 X 400 || 190 X 380  
**Secondary Voltage:** 120 X 240 || 115 X 230 || 110 X 220



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50SP	A	0.42/0.21	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.60	1.6
100	100	SP100SP	A	0.83/0.42	2.99	3.54	2.85	2.52	2.40	0.22 x 0.44	3.23	2.85	3
150	150	SP150SP	A	1.25/0.63	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	2.85	4.3
250	160	SP250SP	A	2.08/1.04	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.40	6.5
350	250	SP350SP	A	2.92/1.46	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.40	8.3
500	300	SP500SP	A	4.17/2.08	4.49	4.69	3.78	3.78	3.66	0.31 x 0.81	4.16	3.78	11
750	500	SP750SP	A	6.25/3.13	5.25	4.69 <sup>1</sup>	4.37	4.50	3.66	0.31 x 0.81	4.75	4.75	16
1000	650	SP1000SP	A	8.33/4.17	5.25	5.47 <sup>1</sup>	4.37	4.50	4.45	0.31 x 0.81	4.75	4.75	20
1500	1000	SP1500SP	A	12.5/6.25	6.38	4.88 <sup>1</sup>	5.31	5.75	3.86	0.31 x 0.81	4.75	5.69	27

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 78 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
<sup>1</sup> Note: For 750 through 1500 VA units actual overall depth is 0.24" plus the value in column B.

All dimensions in inches

## Group J

**Primary Voltage:** 208 X 416 || 200 X 400 || 190 X 380  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50SR	A	4.17/2.08	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.6
100	100	SP100SR	A	8.33/4.17	2.99	3.54	2.85	2.52	2.40	0.22 x 0.44	3.23	3.04	3.1
150	150	SP150SR	A	12.5/6.25	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.3
250	160	SP250SR	A	20.8/10.4	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.5
350	250	SP350SR	A	29.2/14.6	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.3
500	300	SP500SR	B	41.7/20.8	4.49	5.47	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 78 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

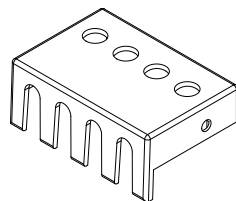
## Optional Accessories

### Finger Guards

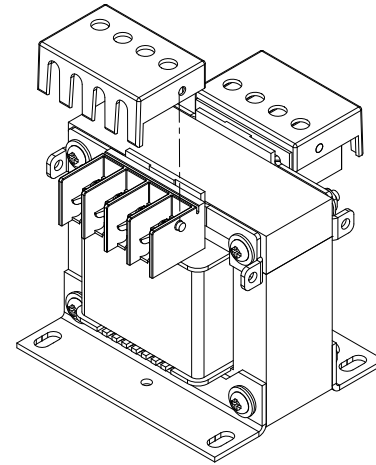
HPS Spartan industrial control transformers up to and including 3000VA or 30 amps are available with optional finger guards.

Part Number	Applicable Transformer Part Number Suffixes	Applicable VA Sizes
SPFG1	AR, QR, PR, KHR, SR	50 to 350
SPFG1	KHP, SP, NJ	50 to 1500
SPFG1	ACP, MQMJ	50 to 3000

Note: Each finger guard supplies either the primary or secondary side. Finger guard option not available on SP5000ACP and SP5000MQMJ standard units. Add 0.38" per finger guard to overall depth (column B) on units from 50 VA to 500 VA and 0.31" to units from 750 VA to 2000 VA when finger guard has been installed. For custom units, optional finger guards are only available on units up to 3000VA or 30 amps.



**Finger Guard**  
(Optional)



**Sample Assembly Drawing for Optional Finger Guard Installation**  
(Only available for units supplied with either a primary or secondary molded terminal block)

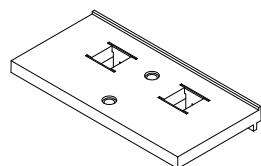
### Fuse Block Adapter Kit

HPS Spartan industrial control transformers up to and including 3000VA or 30 amps are available with optional fuse block adapter kits. The Fuse Block Adapter Kit is designed to allow for the installation of any third party after market fuse block assembly onto the industrial control transformer. The transformer must be a unit that incorporates a molded terminal block on either the primary or secondary side.

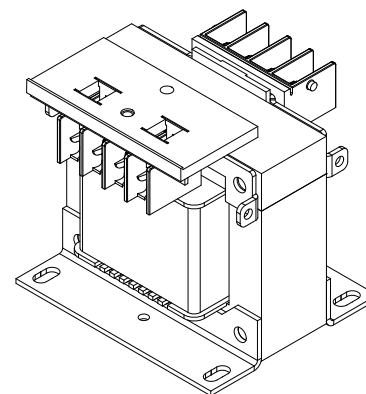
**Note: HPS does not provide any jumpers or appropriate fuses for any after market fuse block you install on the HPS Spartan industrial control transformer. The HPS fuse block adapter kit provides only the mechanical means of attaching a third party after market fuse block. HPS does not recommend any specific fuse block or fuse supplier. For a recommended size of fuse, please see page # 30.**

Kit Part Number	Applicable Transformer Part Number Suffixes	Applicable VA Sizes
SPFBAK1	AR, QR, PR, KHR, SR	50 to 500
SPFBAK1	KHP, SP, NJ	50 to 1500
SPFBAK1	ACP, MQMJ	50 to 3000

Note: Only 1 fuse block adapter kit is required per transformer. Fuse block adapter kit not available on SP5000ACP and SP5000MQMJ standard units. Add 0.38" per fuse block adapter to overall depth (column B) on units from 750 VA to 3000 VA when optional fuse block adapter is installed. For custom units, optional fuse block adapter kit is only available on units up to 3000VA or 30 amps.



**Fuse Block Adapter Kit**  
(Optional)



**Sample Assembly Drawing for Optional Fuse Block Adapter Installation**

For detailed installation instructions of HPS Spartan transformers or the optional finger guards and fuse block adapter kits, please visit our website under Products - Product Links - Instruction Sheets. Or go to the following link: <http://www.hammondpowersolutions.com/instruction-sheets/>

## HPS Fusion™ General Purpose Enclosed Transformer

### The Ideal Solution

The HPS Fusion™ line of single phase, general purpose enclosed transformers are ideally suited for general purpose, industrial and light duty loads. They have been designed for indoor applications and offer an efficient and economical solution. These units are well suited for HVAC applications, signal and alarm systems, motor control circuits, lighting and circuit isolation. The HPS Fusion control transformer is an enclosed style unit with either molded terminal blocks (on units up to 3000 VA or 30 amps) or coil face termination. Optional Finger guards and a fuse block adapter kit are available upon request. For an economical approach to general purpose loads, the HPS Fusion is the transformer of choice.

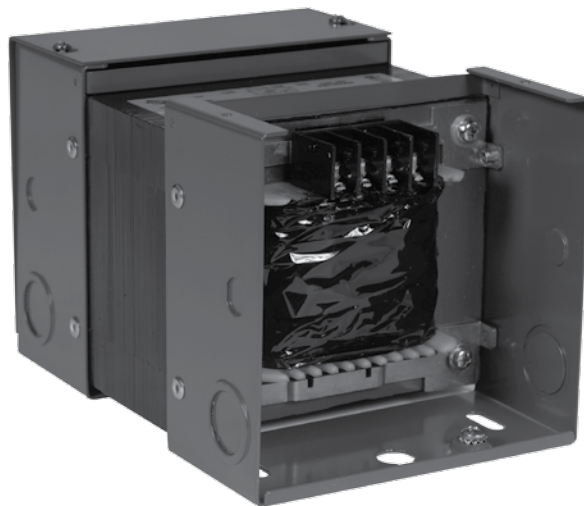


STANDARDS		
The HPS Fusion Control Transformers meet or exceed the standards established by UL, CSA, IEC and NEMA.		
Standard	File #	VA Size
UL (ANSI/UL506)	E50394	All
CSA	LR3902	All
IEC 61558		All
NEMA (ST-1)		All



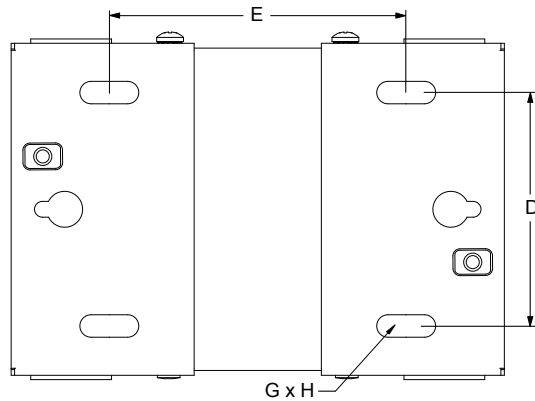
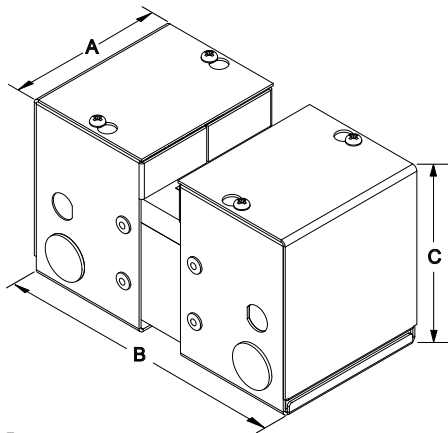
## Features and Benefits

- Multi-voltage primary and secondary models increase range of applications per unit.
- Standard molded terminal blocks on primary and secondary up to 3000 VA (30A) units.
- Solid terminal block with standard combination screw connections.
- 50/60 Hz (60 Hz on FS\*\*\*ACP and FS\*\*\*AR).
- Copper wound coils with high dielectric strength insulation.
- Bolted core construction.
- Vacuum Impregnated with Polyester Resin and oven cured.
- Superior insulating materials:
  - 130°C (95°C rise) 50 VA to 1500 VA
  - 180°C (115°C rise) 2000 VA to 5000 VA  
(Note: Temperature rise based on 25°C ambient)
- All units supplied with primary and secondary voltage links/jumpers.
- Rugged TYPE 1 enclosure with split side covers provides easy access to wiring compartment.
- Finish - green powder coat.
- Primary and secondary ground lug.
- Four (0.88") wiring knockouts and four (0.50") accessory knockouts.
- Optional panel mount fuse holder.
- Easy mounting and installation via four mounting slots and two keyhole slots.
- Most HPS Fusion units incorporate "Premium Packaging" which feature:
  - Premium fluted cartons
  - Custom molded foam inserts
  - Easy removal and repacking
  - Industry's best box label
  - Environmentally neutral
- **15 Year Warranty.**



# SECTION 1

# GENERAL PURPOSE ENCLOSED



## Group A

**Primary Voltage:** 600/480 || 575/460 || 550/440  
**Secondary Voltage:** 120 X 240 || 115 X 230 || 110 X 220



60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50ACP	0.42/0.21	2.7	6.4	3.33	1.66	4.16	0.22 x 0.44	3.0
100	100	FS100ACP	0.83/0.42	3.09	6.3	3.6	2.05	3.5	0.22 x 0.44	4.2
150	150	FS150ACP	1.25/0.63	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.3
250	160	FS250ACP	2.08/1.04	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.6
350	250	FS350ACP	2.92/1.46	3.9	7	4.3	2.52	4.3	0.22 x 0.44	8.7
500	300	FS500ACP	4.17/2.08	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.3
750	500	FS750ACP	6.25/3.13	5.6	7.6	5.1	4	4.9	0.31 x 0.81	20.3
1000	650	FS1000ACP	8.33/4.17	5.6	8	5.1	4	5.3	0.31 x 0.81	22.9
1500	1000	FS1500ACP	12.5/6.25	5.6	9.4	5.1	4	6.7	0.31 x 0.81	30.3
2000	1300	FS2000ACP	16.7/8.33	6.6	9.1	6	5.1	5.7	0.31 x 0.81	37.1
3000	2000	FS3000ACP	25.0/12.5	7.8	11.3	6.7	6.3	6.9	0.31 x 0.81	64.0
5000	3000	FS5000ACP	41.7/20.8	9.3	14.9	8	7.1	7.3	0.31 x 0.81	99.7

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 74 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group B

**Primary Voltage:** 600 || 575 || 550  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22



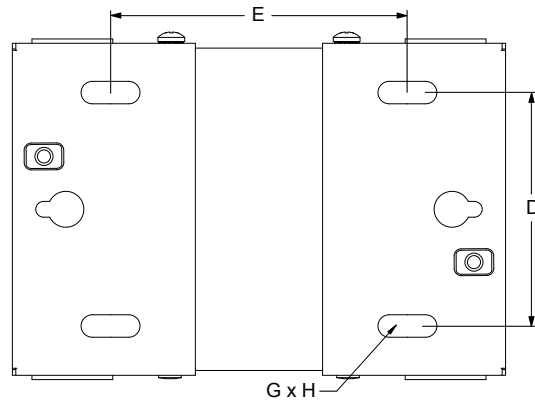
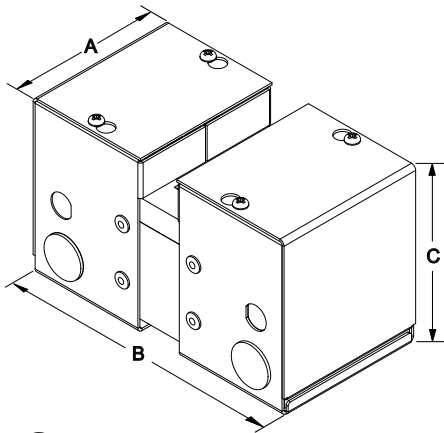
60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50AR	4.17/2.08	2.7	5.8	3.33	1.66	3.58	0.22 x 0.44	2.3
100	100	FS100AR	8.33/4.17	3.09	6.3	3.6	2.05	3.5	0.22 x 0.44	4.2
150	150	FS150AR	12.5/6.25	3.09	6.7	3.6	2.05	3.9	0.22 x 0.44	4.8
250	160	FS250AR	20.8/10.4	3.9	6.2	4.3	2.52	3.5	0.22 x 0.44	6.4
350	250	FS350AR	29.2/14.6	3.9	6.8	4.3	2.52	4.1	0.22 x 0.44	8.3
500	300	FS500AR	41.7/20.8	4.6	6.8	4.1	3.3	4.5	0.31 x 0.81	11.8

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 74 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches





SECTION 1

## Group C

**Primary Voltage:** 240 X 480 || 230 X 460 || 220 X 440  
**Secondary Voltage:** 120 X 240 || 115 X 230 || 110 X 220




**50/60 Hertz**

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50MQMJ	0.42/0.21	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.5
100	100	FS100MQMJ	0.83/0.42	3.09	6.3	3.6	2.05	3.5	0.22 x 0.44	3.9
150	150	FS150MQMJ	1.25/0.63	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250MQMJ	2.08/1.04	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.7
350	250	FS350MQMJ	2.92/1.46	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.4
500	300	FS500MQMJ	4.17/2.08	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.2
750	500	FS750MQMJ	6.25/3.13	5.6	7.2	5.1	4	4.5	0.31 x 0.81	18.0
1000	650	FS1000MQMJ	8.33/4.17	5.6	8	5.1	4	5.3	0.31 x 0.81	22.8
1500	1000	FS1500MQMJ	12.5/6.25	6.6	8.5	6	5.1	5.1	0.31 x 0.81	31.1
2000	1300	FS2000MQMJ	16.7/8.33	6.6	9.1	6	5.1	5.7	0.31 x 0.81	38.1
3000	2000	FS3000MQMJ	25.0/12.5	7.8	11.7	6.7	6.3	7.3	0.31 x 0.81	68.5
5000	3000	FS5000MQMJ	41.7/20.8	9.3	15.1	8	7.4	7.3	0.31 x 0.81	104.2

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 75 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group D

**Primary Voltage:** 240 X 480 || 230 X 460 || 220 X 440  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22



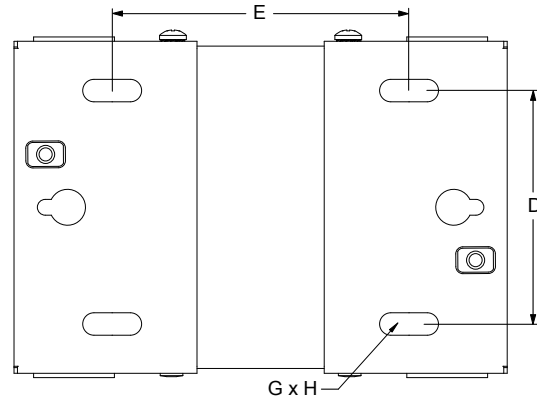
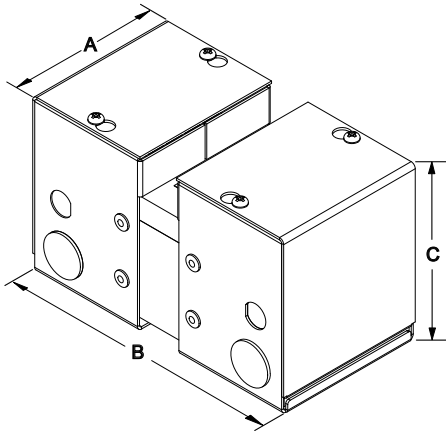

**50/60 Hertz**

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50QR	4.17/2.08	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.5
100	100	FS100QR	8.33/4.17	3.09	6.1	3.6	2.05	3.35	0.22 x 0.44	3.9
150	150	FS150QR	12.5/6.25	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250QR	20.8/10.4	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.7
350	250	FS350QR	29.2/14.6	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.5
500	300	FS500QR	41.7/20.8	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.4

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 75 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches





## Group E

**Primary Voltage:** 380/347  
**Secondary Voltage:** 120 X 240

   50/60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50KHP	0.42/0.21	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.5
100	100	FS100KHP	0.83/0.42	3.09	6.3	3.6	2.05	3.5	0.22 x 0.44	4.3
150	150	FS150KHP	1.25/0.63	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.3
250	160	FS250KHP	2.08/1.04	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.9
350	250	FS350KHP	2.92/1.46	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.6
500	300	FS500KHP	4.17/2.08	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.6
750	500	FS750KHP	6.25/3.13	5.6	7.2	5.1	4	4.5	0.31 x 0.81	19
1000	650	FS1000KHP	8.33/4.17	5.6	8	5.1	4	5.3	0.31 x 0.81	23.5
1500	1000	FS1500KHP	12.5/6.25	6.6	8.5	6	5.1	5.1	0.31 x 0.81	31.6

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 76 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group F

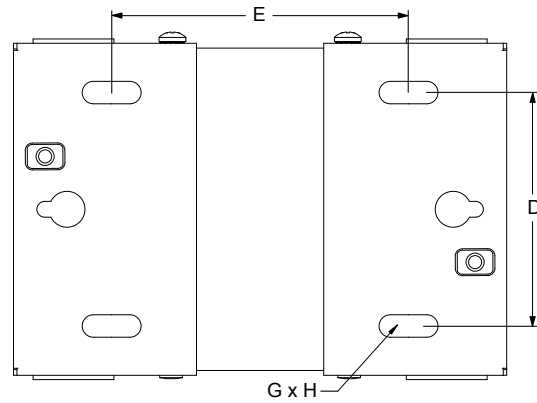
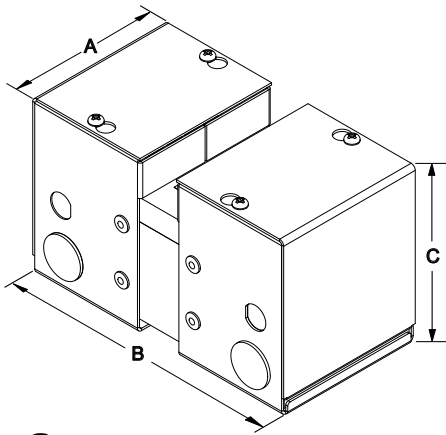
**Primary Voltage:** 380/347  
**Secondary Voltage:** 12 X 24

   50/60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50KHR	4.17/2.08	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.5
100	100	FS100KHR	8.33/4.17	3.09	6.3	3.6	2.05	3.5	0.22 x 0.44	4.2
150	150	FS150KHR	12.5/6.25	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.3
250	160	FS250KHR	20.8/10.4	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.6
350	250	FS350KHR	29.2/14.6	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.3
500	300	FS500KHR	41.7/20.8	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.2

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 76 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches



SECTION 1

## Group G

**Primary Voltage:** 277  
**Secondary Voltage:** 120




**50/60 Hertz**

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50NJ	0.42	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.4
100	100	FS100NJ	0.83	3.09	6.1	3.6	2.05	3.35	0.22 x 0.44	4.1
150	150	FS150NJ	1.25	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250NJ	2.08	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.6
350	250	FS350NJ	2.92	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.3
500	300	FS500NJ	4.17	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.3
750	500	FS750NJ	6.25	5.6	7.6	5.1	4	4.9	0.31 x 0.81	20.1
1000	650	FS1000NJ	8.33	5.6	8	5.1	4	5.3	0.31 x 0.81	22.8
1500	1000	FS1500NJ	12.50	5.6	9.4	5.1	4	6.7	0.31 x 0.81	31.1

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 77 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group H

**Primary Voltage:** 120 X 240 || 115 X 230 || 110 X 220  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22




**50/60 Hertz**

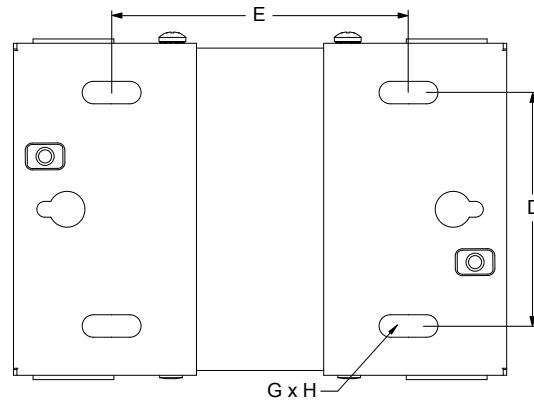
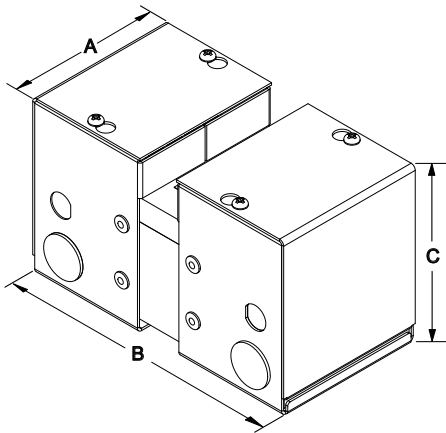
VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50PR	4.17/2.08	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.5
100	100	FS100PR	8.33/4.17	3.09	6.1	3.6	2.05	3.35	0.22 x 0.44	3.9
150	150	FS150PR	12.5/6.25	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250PR	20.8/10.4	3.9	6.4	4.3	2.52	3.7	0.22 x 0.44	7.1
350	250	FS350PR	29.2/14.6	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.4
500	300	FS500PR	41.7/20.8	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.2

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 77 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches







## Group I

**Primary Voltage:** 208 X 416 || 200 X 400 || 190 X 380  
**Secondary Voltage:** 120 X 240 || 115 X 230 || 110 X 220



50/60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50SP	0.42/0.21	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.4
100	100	FS100SP	0.83/0.42	3.09	6.1	3.6	2.05	3.35	0.22 x 0.44	3.9
150	150	FS150SP	1.25/0.63	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250SP	2.08/1.04	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.7
350	250	FS350SP	2.92/1.46	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.5
500	300	FS500SP	4.17/2.08	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.3
750	500	FS750SP	6.25/3.13	5.6	7.2	5.1	4	4.5	0.31 x 0.81	18.2
1000	650	FS1000SP	8.33/4.17	5.6	8	5.1	4	5.3	0.31 x 0.81	22.5
1500	1000	FS1500SP	12.5/6.25	6.6	8.5	6	5.1	5.1	0.31 x 0.81	30.1

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 78 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group J

**Primary Voltage:** 208 X 416 || 200 X 400 || 190 X 380  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22



50/60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50SR	4.17/2.08	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.4
100	100	FS100SR	8.33/4.17	3.09	6.1	3.6	2.05	3.35	0.22 x 0.44	4
150	150	FS150SR	12.5/6.25	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250SR	20.8/10.4	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.7
350	250	FS350SR	29.2/14.6	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.5
500	300	FS500SR	41.7/20.8	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.3

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 78 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

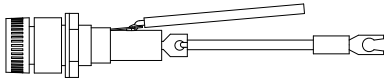
All dimensions in inches

## Optional Accessories

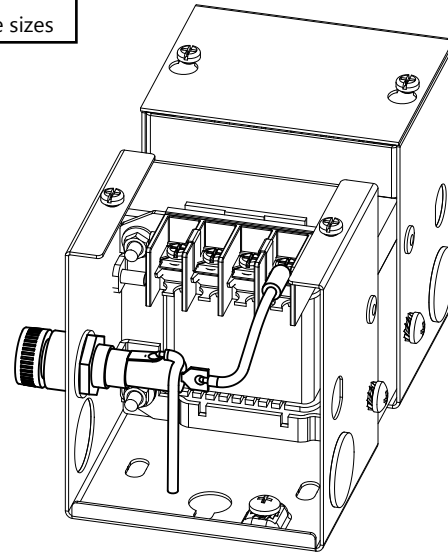
### Fuse Holder Kit

- Optional fuse kit specifically designed up to 250 V (25A) units
- Supplied with leads for easy hook-up/installation
- Fuses NOT included in the kit (must be purchased)
- Fuses should be selected in accordance with CSA, UL and local electrical code

Part Number	Applicable Transformer Part Number Suffixes	Applicable Specifications
<b>FSFH1</b>	All	Up to 20 amps and 250V Designed to accept ¼" x 1 ¼" fuse sizes



**Fuse Kit**  
(Optional)



**Sample Assembly Drawing for  
Optional Fuse Kit Installation**

(Only available for units supplied with either a primary or secondary molded terminal block)

For detailed installation instructions of HPS Fusion transformers or the optional fuse kits, please visit our website under Products - Product Links - Instruction Sheets.

Or go to the following link: <http://www.hammondpowersolutions.com/instruction-sheets/>

## SINGLE PHASE ENCLOSED ENCAPSULATED CONTROL TRANSFORMER FEATURES

For applications where a cost effective approach to general purpose loads indoor or outdoor is required, consider the 'Q' series, single phase encapsulated control transformer. These units are specifically designed for the following applications;

- General purpose enclosed control applications used to adjust a supply voltage to match a load requirement.
- Supplying machine tool circuits.
- Actuating relays, bells, signal and alarm systems.
- Operating small motors, valves and dampers.
- Industrial lighting and circuit isolation.

50 to 5000VA



## SINGLE PHASE ENCLOSED ENCAPSULATED CONTROL STANDARD SPECIFICATIONS

	50 to 5000VA	Benefits
<b>UL Listed</b>	File: E50394	Assures long life and reliable performance.  Rugged one-piece assembly with low noise provides optimum performance and reliability.  Provides enhanced voltage regulation, excellent thermal characteristics and compliments modern winding techniques.  Completely encloses the core and coil to seal out moisture, airborne contaminants and eliminates corrosion & insulation deterioration.  Meets the heavy industrial trade requirements for indoor/outdoor enclosed transformers.  Ample space for transformer connection for primary and secondary terminations.  Facilitates any installation requirement.
<b>CSA Certified</b>	File: LR3902	
<b>Frequency</b>	60 Hertz	
<b>Insulation System</b>	130°C (80°C rise) up to 1 kVA 180°C (115°C rise) 1.5 kVA to 5kVA	
<b>Standard Design</b>	Single Phase, all welded core construction made with high quality, high permeability silicon steel laminations. Computer designed coils, accurately wound with optimum mean turns made from high quality magnetic wire with insulation film.	
<b>Encapsulation</b>	All units from 50VA to 5kVA are encapsulated with electrical grade silica sand and resin compounds.	
<b>Enclosure Type</b>	Heavy Duty Type 3R (conduit knockouts on sides and rear)	
<b>Termination</b>	Front accessible wiring compartment with high and low voltage copper lead wires or tabs.	
<b>Mounting</b>	Designed for vertical or horizontal mounting.	

## SINGLE PHASE, NEMA 3R STYLE ENCLOSURE



**600 Primary Volts**

**12/24 Secondary Volts**

**60 Hz**

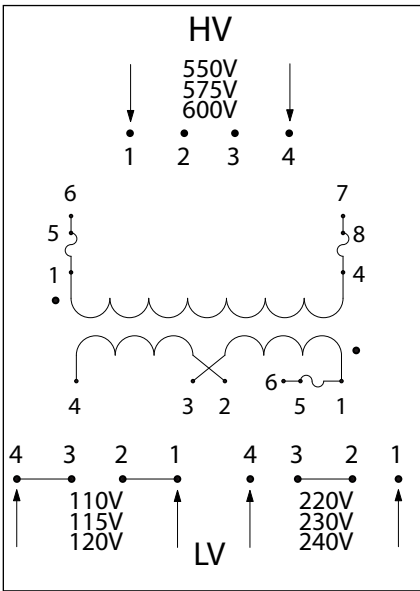
VA Rating	Catalog Number	Case Style (Page 228)	Approx. Dimensions (Inches)			Approx. Weight (Lbs.)	Mtg Type W - Wall	Wiring Diagram (Page 240)
			Width	Depth	Height			
50	<b>QC05PRCB</b>	NQ0	3.69	5.06	7.19	6	W	SCD 4
100	<b>QC10PRCB</b>	NQ0	3.69	5.06	7.19	7	W	SCD 4
150	<b>QC15PRCB</b>	NQ0	3.69	5.06	7.19	8	W	SCD 4
200	<b>QC20PRCB</b>	NQ1	4.31	5.56	7.19	11	W	SCD 4
250	<b>QC25PRCB</b>	NQ1	4.31	5.56	7.19	13	W	SCD 4
350	<b>QC35PRCB</b>	NQ1	4.31	5.56	7.19	14	W	SCD 4
500	<b>QC50PRCB</b>	NQ2	5.06	4.56	9.30	15	W	SCD 4
750	<b>QC75PRCB</b>	NQ2	5.06	4.56	9.30	18	W	SCD 4
1000	<b>Q1C0PRCB</b>	NQ3	5.88	5.19	10.56	25	W	SCD 4
1500	<b>Q1C5PRCF</b>	NQ4	7.06	6.25	11.75	36	W	SCD 4
2000	<b>Q002PRCF</b>	NQ4	7.06	6.25	11.75	46	W	SCD 4
3000	<b>Q003PRCF</b>	NQ4	7.06	6.25	11.75	65	W	SCD 4
5000	<b>Q005PRCF</b>	NQ5	10.00	7.75	17.25	105	W	SCD 4

SECTION 1



# HPS Imperator - Wiring Schematic Drawings

## Group A



### PH\*\*\*AJ Schematic for 50, 75 and 100VA Units

#### High Voltage (HV) (Primary Volts)

600	575	550
600	575	550

#### Install Supplied Jumpers/ Links Between Terminals

None
None

#### Supply Lines Connect To

1, 4
6, 7

#### Install Fuse Clips To

Unfused
1-5, 4-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

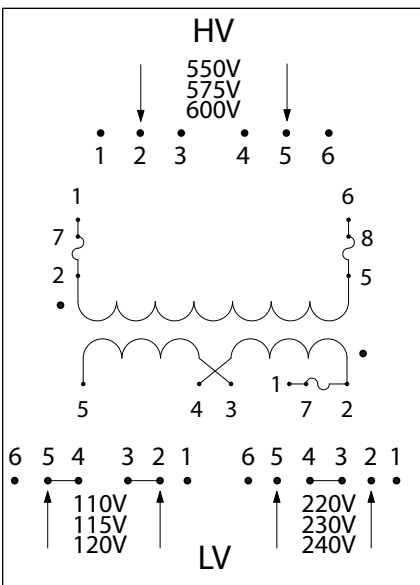
3-4, 1-2
2-3
3-4, 1-2
2-3

#### Load Lines Connect To

1, 4
1, 4
4, 6
4, 6

#### Install Fuse Clips To

Unfused
Unfused
1-5
1-5



### PH\*\*\*AJ Schematic for 150VA to 1500VA Units

#### High Voltage (HV) (Primary Volts)

600	575	550
600	575	550

#### Install Supplied Jumpers/ Links Between Terminals

None
None

#### Supply Lines Connect To

2, 5
1, 6

#### Install Fuse Clips To

Unfused
2-7, 5-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

4-5, 2-3
3-4
4-5, 2-3
3-4

#### Load Lines Connect To

2, 5
2, 5
1, 5
1, 5

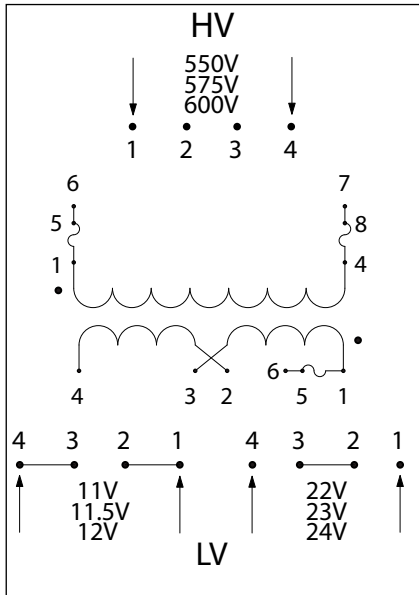
#### Install Fuse Clips To

Unfused
Unfused
2-7
2-7

## HPS Imperator - Wiring Schematic Drawings continued

### Group B

SECTION 1

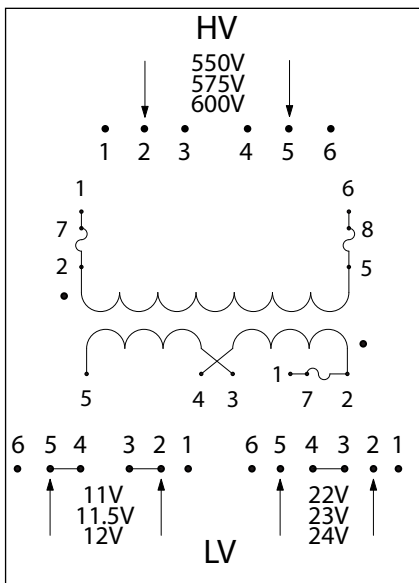


**PH\*\*\*AR Schematic for 50, 75 and 100VA Units**

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers/ Links Between Terminals	Supply Lines Connect To	Install Fuse Clips To
600 575 550	None	1, 4	Unfused
600 575 550	None	6, 7	1-5, 4-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
12 11.5 11	3-4, 1-2	1, 4	Unfused
24 23 22	2-3	1, 4	Unfused
12 11.5 11	3-4, 1-2	4, 6	1-5
24 23 22	2-3	4, 6	1-5



**PH\*\*\*AR Schematic for 150VA to 500VA Units**

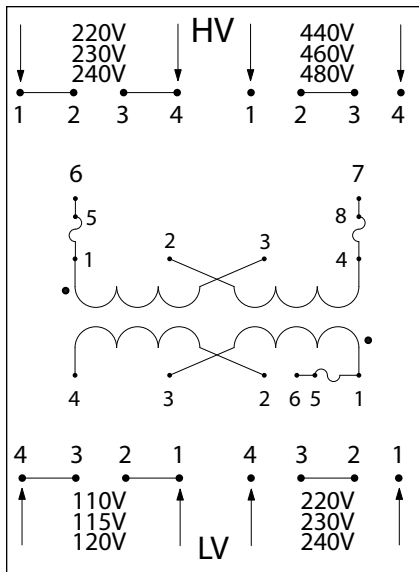
High Voltage (HV) (Primary Volts)	Install Supplied Jumpers/ Links Between Terminals	Supply Lines Connect To	Install Fuse Clips To
600 575 550	None	2, 5	Unfused
600 575 550	None	1, 6	2-7, 5-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
12 11.5 11	4-5, 2-3	2, 5	Unfused
24 23 22	3-4	2, 5	Unfused
12 11.5 11	4-5, 2-3	1, 5	2-7
24 23 22	3-4	1, 5	2-7

## HPS Imperator - Wiring Schematic Drawings continued

### Group C



### PH\*\*\*MQMJ Schematic for 50, 75 and 100VA Units

#### High Voltage (HV) (Primary Volts)

240	230	220
480	460	440
240	230	220
480	460	440

#### Install Supplied Links Between Terminals

1-2, 3-4
2-3
1-2, 3-4
2-3

#### Supply Lines Connect To

1, 4
1, 4
6, 7
6, 7

#### Install Fuse Clips To

Unfused
Unfused
1-5, 4-8
1-5, 4-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

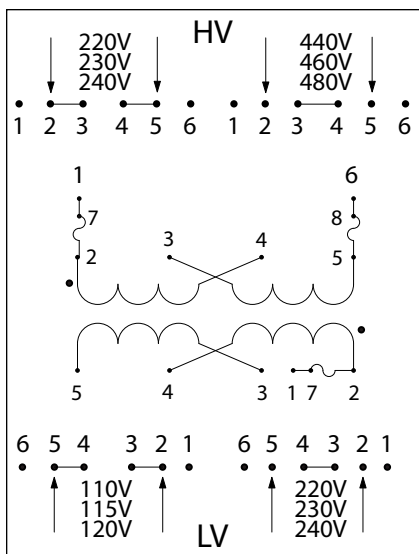
3-4, 1-2
2-3
3-4, 1-2
2-3

#### Load Lines Connect To

1, 4
1, 4
4, 6
4, 6

#### Install Fuse Clips To

Unfused
Unfused
1-5
1-5



### PH\*\*\*MQMJ Schematic for 150VA to 1500VA Units

#### High Voltage (HV) (Primary Volts)

240	230	220
480	460	440
240	230	220
480	460	440

#### Install Supplied Links Between Terminals

2-3, 4-5
3-4
2-3, 4-5
3-4

#### Supply Lines Connect To

2, 5
2, 5
1, 6
1, 6

#### Install Fuse Clips To

Unfused
Unfused
2-7, 5-8
2-7, 5-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

4-5, 2-3
3-4
4-5, 2-3
3-4

#### Load Lines Connect To

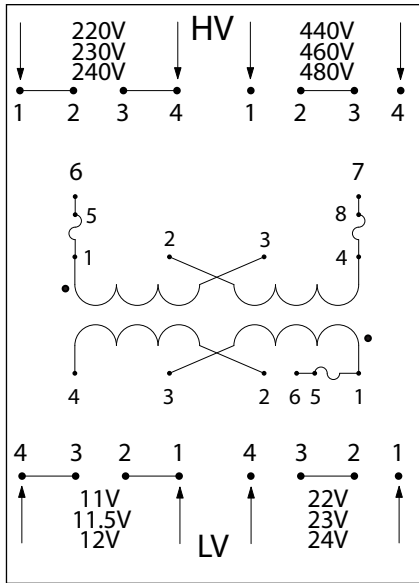
2, 5
2, 5
1, 5
1, 5

#### Install Fuse Clips To

Unfused
Unfused
2-7
2-7

## HPS Imperator - Wiring Schematic Drawings continued

### Group D



### PH\*\*\*QR Schematic for 50, 75 and 100VA Units

#### High Voltage (HV) (Primary Volts)

240	230	220
480	460	440
240	230	220
480	460	440

#### Install Supplied Links Between Terminals

1-2, 3-4
2-3
1-2, 3-4
2-3

#### Supply Lines Connect To

1, 4
1, 4
6, 7
6, 7

#### Install Fuse Clips To

Unfused
Unfused
1-5, 4-8
1-5, 4-8

#### Low Voltage (LV) (Secondary Volts)

12	11.5	11
24	23	22
12	11.5	11
24	23	22

#### Install Supplied Links Between Terminals

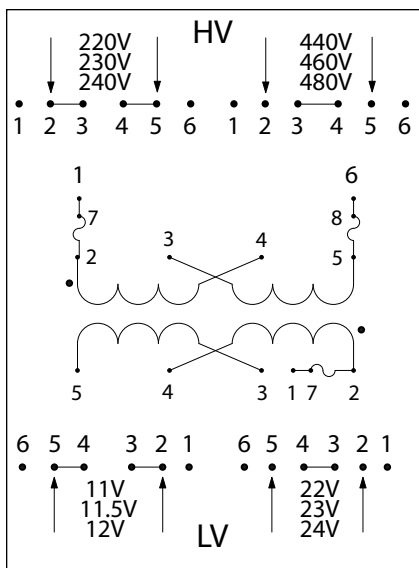
3-4, 1-2
2-3
3-4, 1-2
2-3

#### Load Lines Connect To

1, 4
1, 4
4, 6
4, 6

#### Install Fuse Clips To

Unfused
Unfused
1-5
1-5



### PH\*\*\*QR Schematic for 150VA to 500VA Units

#### High Voltage (HV) (Primary Volts)

240	230	220
480	460	440
240	230	220
480	460	440

#### Install Supplied Links Between Terminals

2-3, 4-5
3-4
2-3, 4-5
3-4

#### Supply Lines Connect To

2, 5
2, 5
1, 6
1, 6

#### Install Fuse Clips To

Unfused
Unfused
2-7, 5-8
2-7, 5-8

#### Low Voltage (LV) (Secondary Volts)

12	11.5	11
24	23	22
12	11.5	11
24	23	22

#### Install Supplied Links Between Terminals

4-5, 2-3
3-4
4-5, 2-3
3-4

#### Load Lines Connect To

2, 5
2, 5
1, 5
1, 5

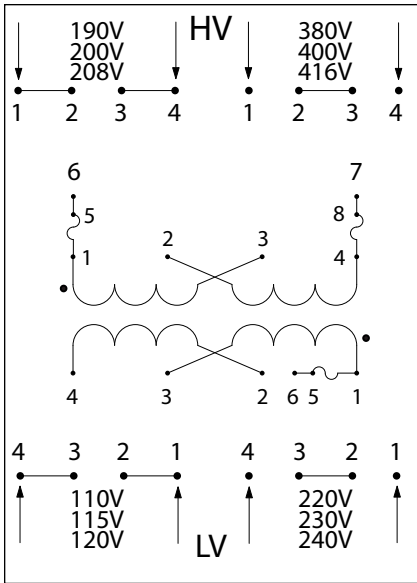
#### Install Fuse Clips To

Unfused
Unfused
2-7
2-7



## HPS Imperator - Wiring Schematic Drawings continued

### Group E



### PH\*\*\*SP Schematic for 50, 75 and 100VA Units

#### High Voltage (HV) (Primary Volts)

208	200	190
416	400	380
208	200	190
416	400	380

#### Install Supplied Links Between Terminals

1-2, 3-4
2-3
1-2, 3-4
2-3

#### Supply Lines Connect To

1, 4
1, 4
6, 7
6, 7

#### Install Fuse Clips To

Unfused
Unfused
1-5, 4-8
1-5, 4-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

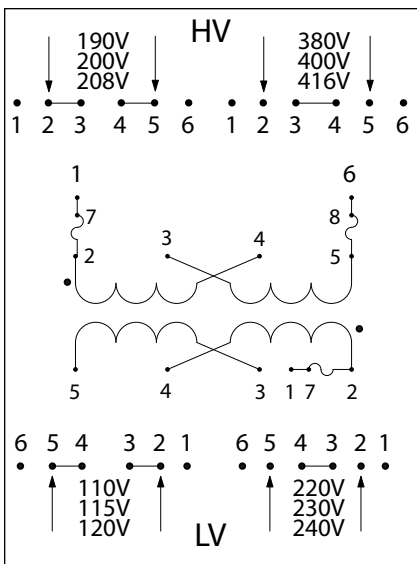
3-4, 1-2
2-3
3-4, 1-2
2-3

#### Load Lines Connect To

1, 4
1, 4
4, 6
4, 6

#### Install Fuse Clips To

Unfused
Unfused
1-5
1-5



### PH\*\*\*SP Schematic for 150VA to 1000VA Units

#### High Voltage (HV) (Primary Volts)

208	200	190
416	400	380
208	200	190
416	400	380

#### Install Supplied Links Between Terminals

2-3, 4-5
3-4
2-3, 4-5
3-4

#### Supply Lines Connect To

2, 5
2, 5
1, 6
1, 6

#### Install Fuse Clips To

Unfused
Unfused
2-7, 5-8
2-7, 5-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

4-5, 2-3
3-4
4-5, 2-3
3-4

#### Load Lines Connect To

2, 5
2, 5
1, 5
1, 5

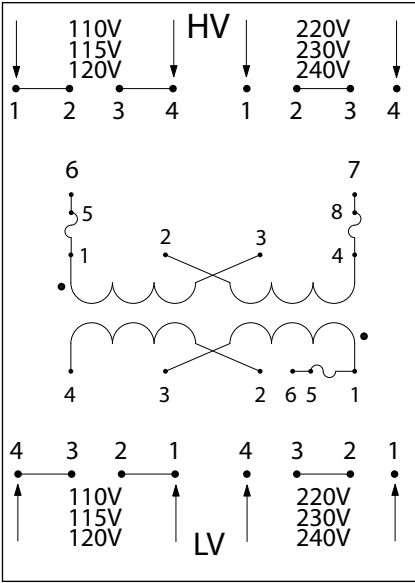
#### Install Fuse Clips To

Unfused
Unfused
2-7
2-7

## HPS Imperator - Wiring Schematic Drawings continued

### Group F

SECTION 1



### PH\*\*\*PP Schematic for 50, 75 and 100VA Units

#### High Voltage (HV) (Primary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

1-2, 3-4
2-3
1-2, 3-4
2-3

#### Supply Lines Connect To

1, 4
1, 4
6, 7
6, 7

#### Install Fuse Clips To

Unfused
Unfused
1-5, 4-8
1-5, 4-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

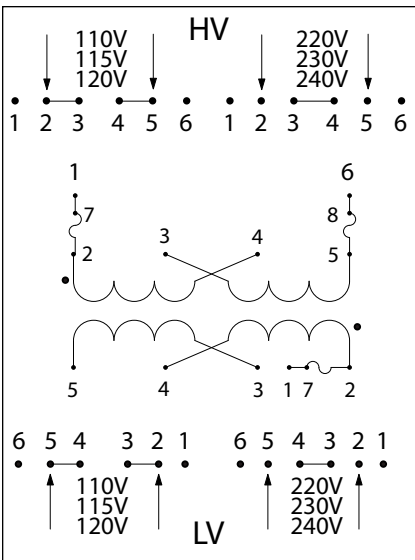
3-4, 1-2
2-3
3-4, 1-2
2-3

#### Load Lines Connect To

1, 4
1, 4
4, 6
4, 6

#### Install Fuse Clips To

Unfused
Unfused
1-5
1-5



### PH\*\*\*PP Schematic for 150VA to 1500VA Units

#### High Voltage (HV) (Primary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

2-3, 4-5
3-4
2-3, 4-5
3-4

#### Supply Lines Connect To

2, 5
2, 5
1, 6
1, 6

#### Install Fuse Clips To

Unfused
Unfused
2-7, 5-8
2-7, 5-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

4-5, 2-3
3-4
4-5, 2-3
3-4

#### Load Lines Connect To

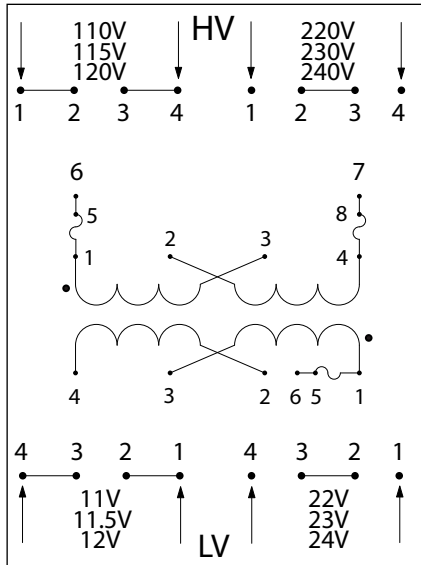
2, 5
2, 5
1, 5
1, 5

#### Install Fuse Clips To

Unfused
Unfused
2-7
2-7

## HPS Imperator - Wiring Schematic Drawings continued

### Group G



**PH\*\*PG Schematic for 50, 75 and 100VA Units**

**High Voltage (HV)  
(Primary Volts)**

120	115	110
240	230	220
120	115	110
240	230	220

**Install Supplied Links  
Between Terminals**

1-2, 3-4
2-3
1-2, 3-4
2-3

**Supply Lines  
Connect To**

1, 4
1, 4
6, 7
6, 7

**Install Fuse  
Clips To**

Unfused
Unfused
1-5, 4-8
1-5, 4-8

**Low Voltage (LV)  
(Secondary Volts)**

12	11.5	11
24	23	22
12	11.5	11
24	23	22

**Install Supplied Links  
Between Terminals**

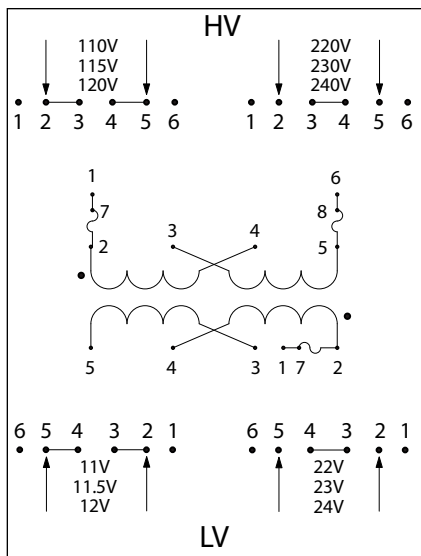
3-4, 1-2
2-3
3-4, 1-2
2-3

**Load Lines  
Connect To**

1, 4
1, 4
4, 6
4, 6

**Install Fuse  
Clips To**

Unfused
Unfused
1-5
1-5



**PH\*\*PG Schematic for 150VA to 500VA Units**

**High Voltage (HV)  
(Primary Volts)**

120	115	110
240	230	220
120	115	110
240	230	220

**Install Supplied Links  
Between Terminals**

2-3, 4-5
3-4
2-3, 4-5
3-4

**Supply Lines  
Connect To**

2, 5
2, 5
1, 6
1, 6

**Install Fuse  
Clips To**

Unfused
Unfused
2-7, 5-8
2-7, 5-8

**Low Voltage (LV)  
(Secondary Volts)**

12	11.5	11
24	23	22
12	11.5	11
24	23	22

**Install Supplied Links  
Between Terminals**

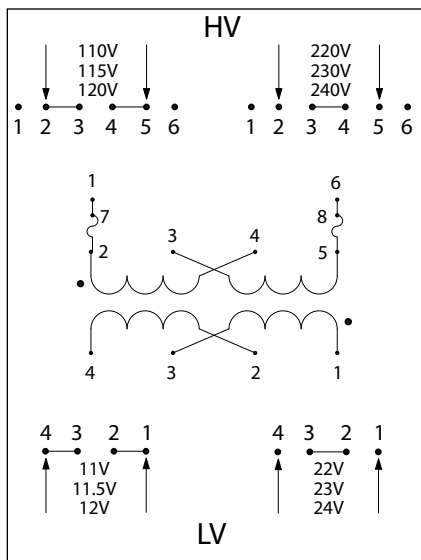
4-5, 2-3
3-4
4-5, 2-3
3-4

**Load Lines  
Connect To**

2, 5
2, 5
1, 5
1, 5

**Install Fuse  
Clips To**

Unfused
Unfused
2-7
2-7



**PH\*\*PG Schematic for 750VA and 1000VA Units**

**High Voltage (HV)  
(Primary Volts)**

120	115	110
240	230	220
120	115	110
240	230	220

**Install Supplied Links  
Between Terminals**

2-3, 4-5
3-4
2-3, 4-5
3-4

**Supply Lines  
Connect To**

2, 5
2, 5
1, 6
1, 6

**Install Fuse  
Clips To**

Unfused
Unfused
2-7, 5-8
2-7, 5-8

**Low Voltage (LV)  
(Secondary Volts)**

12	11.5	11
24	23	22

**Install Supplied Links  
Between Terminals**

3-4, 1-2
2-3

**Load Lines  
Connect To**

1, 4
1, 4

**Install Fuse  
Clips To**

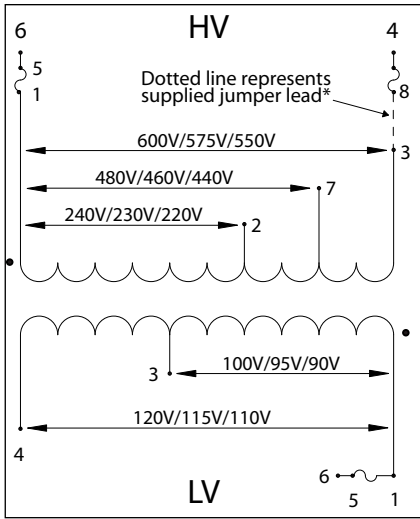
Unfused
Unfused

Note: secondary fuse clips not available on PH750PG or PH1000PG.

## HPS Imperator - Wiring Schematic Drawings continued

### Group H

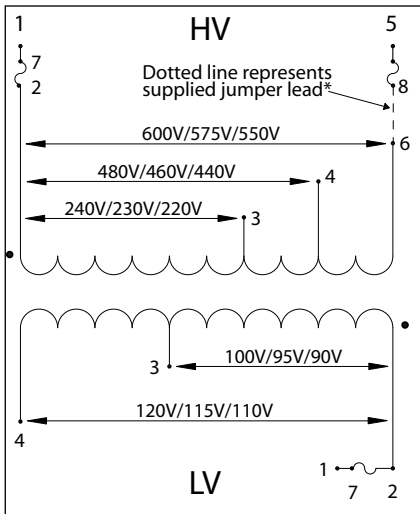
SECTION 1



**PH\*\*\*MBMH Schematic for 50 and 75VA Units**

High Voltage (HV) (Primary Volts)			Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
600	575	550	None	1, 3	Unfused
480	460	440	None	1, 7	Unfused
240	230	220	None	1, 2	Unfused
600	575	550	3-8	6, 4	1-5, 4-8
480	460	440	8-7	6, 4	1-5, 4-8
240	230	220	2-8	6, 4	1-5, 4-8
Low Voltage (LV) (Secondary Volts)			Install Supplied Jumpers/ Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
120	115	110	None	1, 4	Unfused
100	95	90	None	1, 3	Unfused
120	115	110	None	4, 6	1-5
100	95	90	None	3, 6	1-5

\*This primary fuse jumper is supplied with the primary fuse kit only.



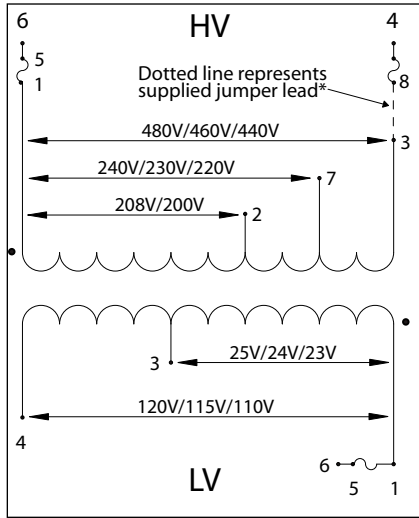
**PH\*\*\*MBMH Schematic for 100VA to 1500VA Units**

High Voltage (HV) (Primary Volts)			Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
600	575	550	None	2, 6	Unfused
480	460	440	None	2, 4	Unfused
240	230	220	None	2, 3	Unfused
600	575	550	8-6	1, 5	2-7, 5-8
480	460	440	4-8	1, 5	2-7, 5-8
240	230	220	3-8	1, 5	2-7, 5-8
Low Voltage (LV) (Secondary Volts)			Install Supplied Jumpers/ Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
120	115	110	None	2, 4	Unfused
100	95	90	None	2, 3	Unfused
120	115	110	None	1, 4	2-7
100	95	90	None	1, 3	2-7

\*This primary fuse jumper is supplied with the primary fuse kit only.

## HPS Imperator - Wiring Schematic Drawings continued

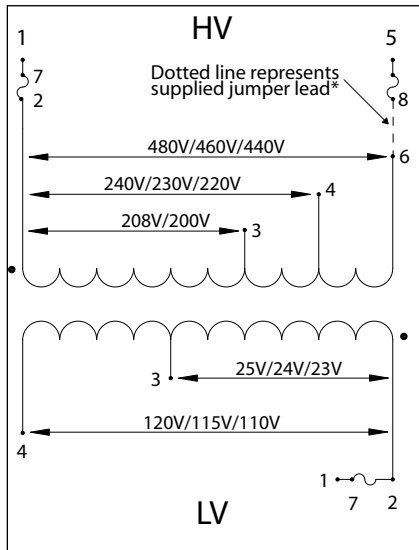
### Group I



\*This primary fuse jumper is supplied with the primary fuse kit only.

### PH\*\*\*MLI Schematic for 50, 75 and 100VA Units

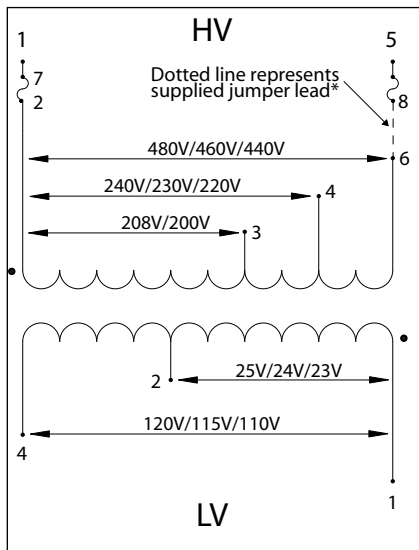
High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
480 460 440	None	1, 3	Unfused
240 230 220	None	1, 7	Unfused
208 200	None	1, 2	Unfused
480 460 440	3-8	6, 4	1-5, 4-8
240 230 220	8-7	6, 4	1-5, 4-8
208 200	2-8	6, 4	1-5, 4-8
Low Voltage (LV) (Secondary Volts)	Install Supplied Jumpers Between Terminals	Load Lines Connect To	Install Fuse Clips To
120 115 110	None	1, 4	Unfused
25 24 23	None	1, 3	Unfused
120 115 110	None	4, 6	1-5
25 24 23	None	3, 6	1-5



\*This primary fuse jumper is supplied with the primary fuse kit only.

### PH\*\*\*MLI Schematic for 150VA to 500VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
480 460 440	None	2, 6	Unfused
240 230 220	None	2, 4	Unfused
208 200	None	2, 3	Unfused
480 460 440	8-6	1, 5	2-7, 5-8
240 230 220	4-8	1, 5	2-7, 5-8
208 200	3-8	1, 5	2-7, 5-8
Low Voltage (LV) (Secondary Volts)	Install Supplied Jumpers Between Terminals	Load Lines Connect To	Install Fuse Clips To
120 115 110	None	2, 4	Unfused
25 24 23	None	2, 3	Unfused
120 115 110	None	1, 4	2-7
25 24 23	None	1, 3	2-7



\*This primary fuse jumper is supplied with the primary fuse kit only.

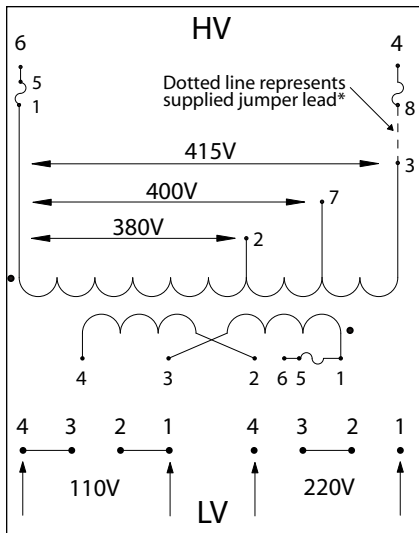
### PH\*\*\*MLI Schematic for 750VA and 1000VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
480 460 440	None	2, 6	Unfused
240 230 220	None	2, 4	Unfused
208 200	None	2, 3	Unfused
480 460 440	8-6	1, 5	2-7, 5-8
240 230 220	4-8	1, 5	2-7, 5-8
208 200	3-8	1, 5	2-7, 5-8
Low Voltage (LV) (Secondary Volts)	Install Supplied Jumpers Between Terminals	Load Lines Connect To	Install Fuse Clips To
120 115 110	None	1, 4	Unfused
25 24 23	None	1, 2	Unfused

Note: secondary fuse clips for 24V tap not available on the PH750MLI or PH1000MLI units.

## HPS Imperator - Wiring Schematic Drawings continued

### Group J



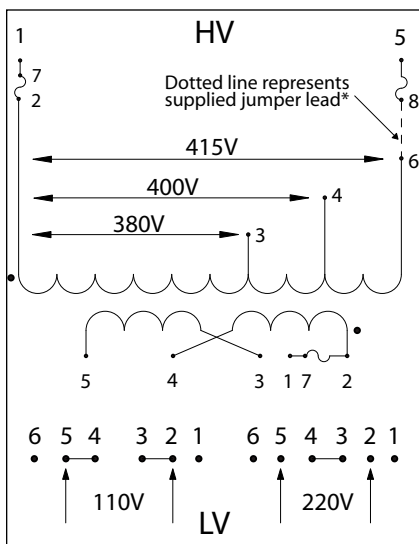
### PH\*\*\*MEMX Schematic for 50, 75 and 100VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
415	None	1, 3	Unfused
400	None	1, 7	Unfused
380	None	1, 2	Unfused
415	3-8	6, 4	1-5, 4-8
400	8-7	6, 4	1-5, 4-8
380	2-8	6, 4	1-5, 4-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
110	3-4, 1-2	1, 4	Unfused
220	2-3	1, 4	Unfused
110	3-4, 1-2	4, 6	1-5
220	2-3	4, 6	1-5

\*This primary fuse jumper is supplied with the primary fuse kit only.



### PH\*\*\*MEMX Schematic for 150VA to 1000VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
415	None	2, 6	Unfused
400	None	2, 4	Unfused
380	None	2, 3	Unfused
415	8-6	1, 5	2-7, 5-8
400	4-8	1, 5	2-7, 5-8
380	3-8	1, 5	2-7, 5-8

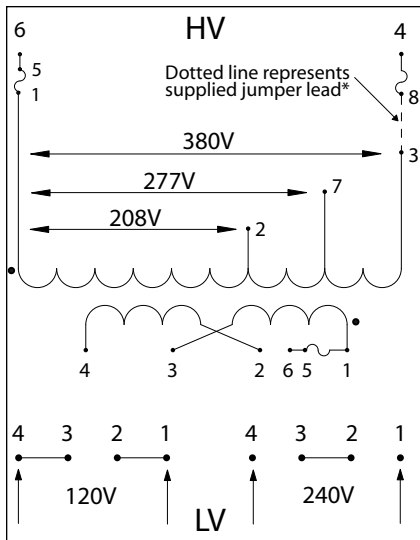
  

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
110	4-5, 2-3	2, 5	Unfused
220	3-4	2, 5	Unfused
110	4-5, 2-3	1, 5	2-7
220	3-4	1, 5	2-7

\*This primary fuse jumper is supplied with the primary fuse kit only.

## HPS Imperator - Wiring Schematic Drawings continued

### Group K



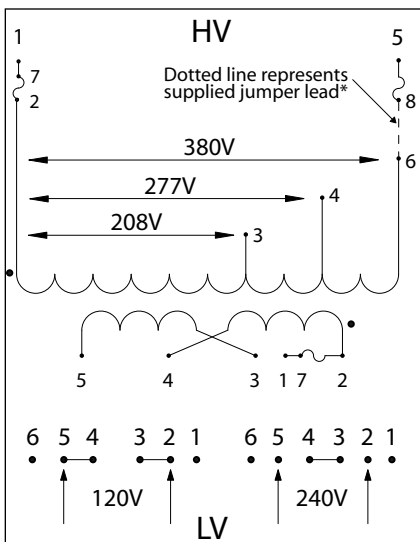
**PH\*\*\*MGJ Schematic for 50, 75 and 100VA Units**

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
380	None	1, 3	Unfused
277	None	1, 7	Unfused
208	None	1, 2	Unfused
380	3-8	6, 4	1-5, 4-8
277	8-7	6, 4	1-5, 4-8
208	2-8	6, 4	1-5, 4-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
120	3-4, 1-2	1, 4	Unfused
240	2-3	1, 4	Unfused
120	3-4, 1-2	4, 6	1-5
240	2-3	4, 6	1-5

\*This primary fuse jumper is supplied with the primary fuse kit only.



**PH\*\*\*MGJ Schematic for 150VA to 1000VA Units**

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
380	None	2, 6	Unfused
277	None	2, 4	Unfused
208	None	2, 3	Unfused
380	8-6	1, 5	2-7, 5-8
277	4-8	1, 5	2-7, 5-8
208	3-8	1, 5	2-7, 5-8

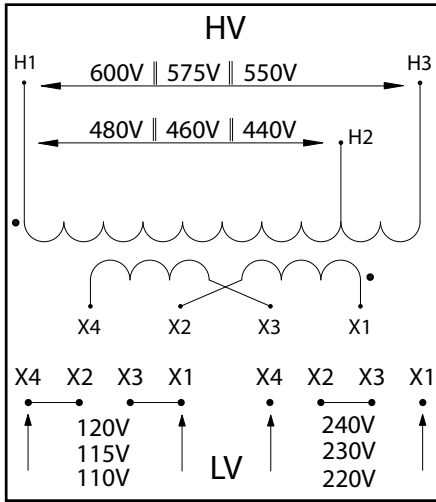
  

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
120	4-5, 2-3	2, 5	Unfused
240	3-4	2, 5	Unfused
120	4-5, 2-3	1, 5	2-7
240	3-4	1, 5	2-7

\*This primary fuse jumper is supplied with the primary fuse kit only.

## HPS Spartan and HPS Fusion - Wiring Schematic Drawings

### Group A



**SP\*\*\*ACP Schematic Connections for 600/480 to 120 X 240**

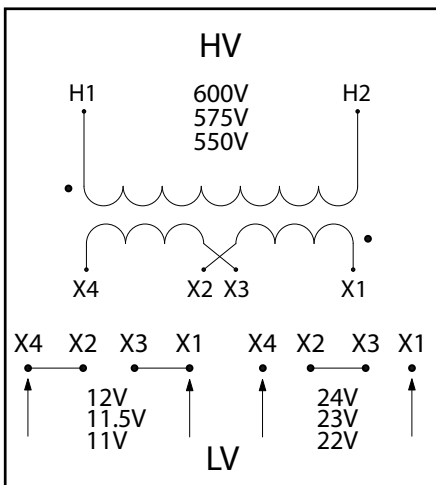
**FS\*\*\*ACP Schematic Connections for 600/480 to 120 X 240**

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
600 575 550	None	H1, H3
480 460 440	None	H1, H2

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
120 115 110	X1-X3, X2-X4	X1, X4
240 230 220	X2-X3	X1, X4

### Group B



**SP\*\*\*AR Schematic Connections for 600/480 to 12 X 24**

**FS\*\*\*AR Schematic Connections for 600/480 to 12 X 24**

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
600 575 550	None	H1, H2

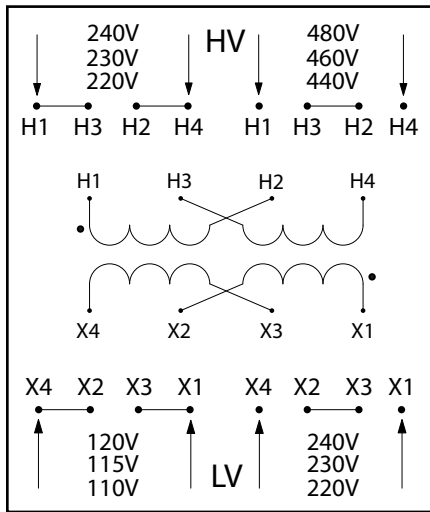
  

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
12 11.5 11	X1-X3, X2-X4	X1, X4
24 23 22	X2-X3	X1, X4



## HPS Fusion and HPS Spartan - Wiring Schematic Drawings continued

### Group C



#### SP\*\*\*MQMJ Schematic Connections for 240 X 480 to 120 X 240

#### FS\*\*\*MQMJ Schematic Connections for 240 X 480 to 120 X 240

High Voltage (HV) (Primary Volts)		
240	230	220
480	460	440

#### Install Supplied Jumpers Between Terminals

H1-H3, H2-H4  
H2-H3

#### Supply Lines Connect To

H1, H4  
H1, H4

Low Voltage (LV) (Secondary Volts)		
120	115	110
240	230	220

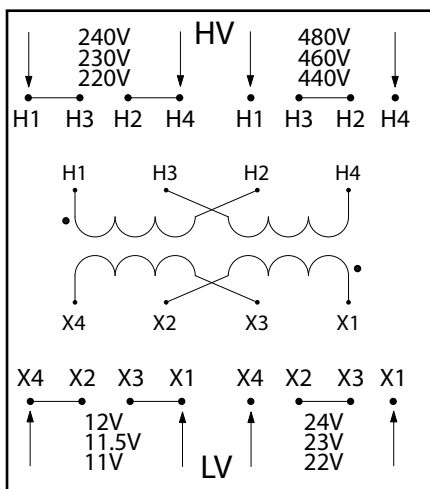
#### Install Supplied Links Between Terminals

X1-X3, X2-X4  
X2-X3

#### Load Lines Connect To

X1, X4  
X1, X4

### Group D



#### SP\*\*\*QR Schematic Connections for 240 X 480 to 12 X 24

#### FS\*\*\*QR Schematic Connections for 240 X 480 to 12 X 24

High Voltage (HV) (Primary Volts)		
240	230	220
480	460	440

#### Install Supplied Jumpers Between Terminals

H1-H3, H2-H4  
H2-H3

#### Supply Lines Connect To

H1, H4  
H1, H4

Low Voltage (LV) (Secondary Volts)		
12	11.5	11
24	23	22

#### Install Supplied Links Between Terminals

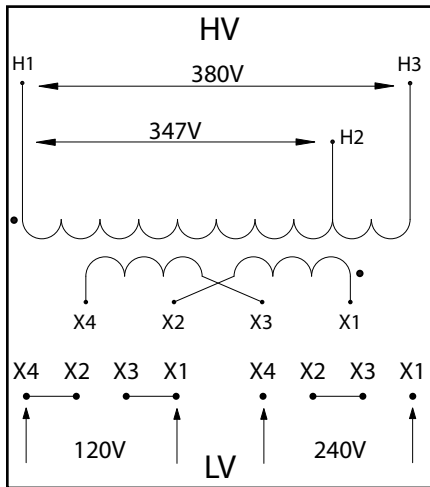
X1-X3, X2-X4  
X2-X3

#### Load Lines Connect To

X1, X4  
X1, X4

## HPS Fusion and HPS Spartan - Wiring Schematic Drawings continued

### Group E

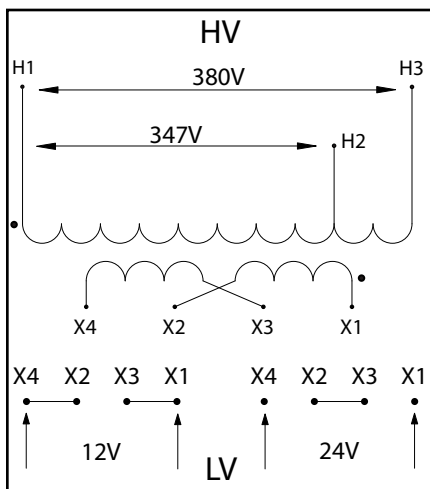


#### SP\*\*\*KHP Schematic Connections for 380/347 to 120 X 240

#### FS\*\*\*KHP Schematic Connections for 380/347 to 120 X 240

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
380	None	H1, H3
347	None	H1, H2
Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
120	X1-X3, X2-X4	X1, X4
240	X2-X3	X1, X4

### Group F



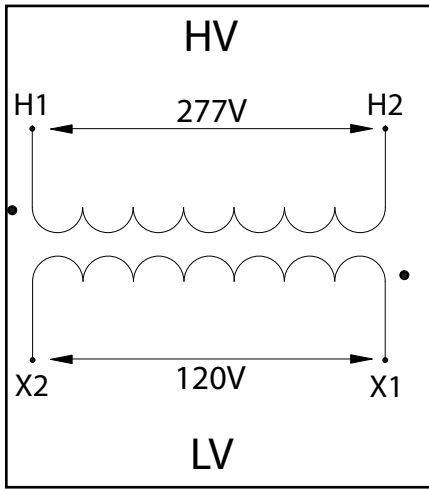
#### SP\*\*\*KHR Schematic Connections for 380/347 to 12 X 24

#### FS\*\*\*KHR Schematic Connections for 380/347 to 12 X 24

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
380	None	H1, H3
347	None	H1, H2
Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
12	X1-X3, X2-X4	X1, X4
24	X2-X3	X1, X4

## HPS Spartan and HPS Fusion - Wiring Schematic Drawings continued

### Group G

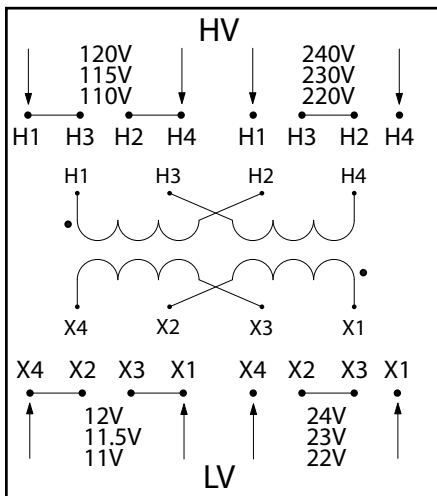


#### SP\*\*\*NJ Schematic Connections for 277 to 120

#### FS\*\*\*NJ Schematic Connections for 277 to 120

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
277	None	H1, H2
Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
120	None	X1, X2

### Group H



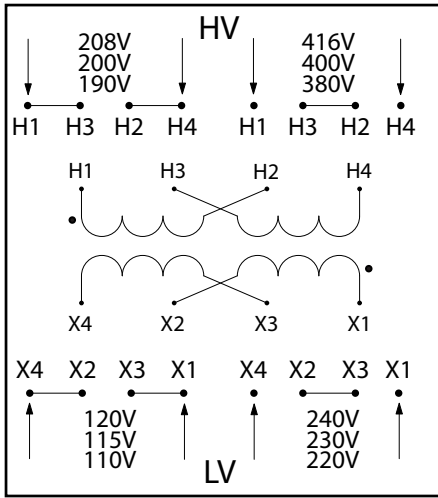
#### SP\*\*\*PR Schematic Connections for 120 X 240 to 12 X 24

#### FS\*\*\*PR Schematic Connections for 120 X 240 to 12 X 24

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
120 115 110	H1-H3, H2-H4	H1, H4
240 230 220	H2-H3	H1, H4
Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
12 11.5 11	X1-X3, X2-X4	X1, X4
24 23 22	X2-X3	X1, X4

## HPS Spartan and HPS Fusion - Wiring Schematic Drawings continued

### Group I

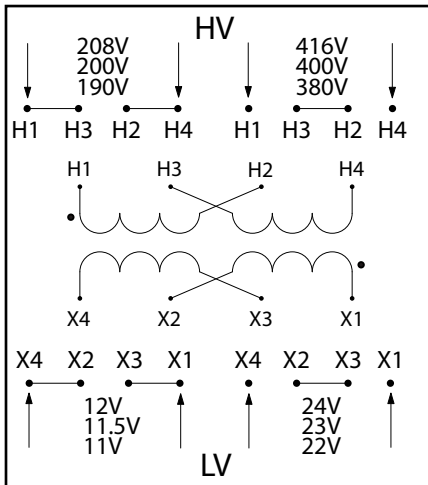


#### SP\*\*\*SP Schematic Connections for 208 X 416 to 120 X 240

#### FS\*\*\*SP Schematic Connections for 208 X 416 to 120 X 240

High Voltage (HV) (Primary Volts)			Install Supplied Jumpers Between Terminals	Supply Lines Connect To
208	200	190	H1-H3, H2-H4	H1, H4
416	400	380	H2-H3	H1, H4
Low Voltage (LV) (Secondary Volts)			Install Supplied Links Between Terminals	Load Lines Connect To
120	115	110	X1-X3, X2-X4	X1, X4
240	230	220	X2-X3	X1, X4

### Group J



#### SP\*\*\*SR Schematic Connections for 208 X 416 to 12 X 24

#### FS\*\*\*SR Schematic Connections for 208 X 416 to 12 X 24

High Voltage (HV) (Primary Volts)			Install Supplied Jumpers Between Terminals	Supply Lines Connect To
208	200	190	H1-H3, H2-H4	H1, H4
416	400	380	H2-H3	H1, H4
Low Voltage (LV) (Secondary Volts)			Install Supplied Links Between Terminals	Load Lines Connect To
12	11.5	11	X1-X3, X2-X4	X1, X4
24	23	22	X2-X3	X1, X4



## SECTION 1

# INDUSTRIAL CONTROL AND GENERAL PURPOSE ENCLOSED TRANSFORMERS

## **HPS Imperator<sup>®</sup>, HPS Spartan<sup>®</sup>, HPS Fusion<sup>™</sup> and Q Series Transformers**

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# SECTION 1

## TRANSFORMER QUICK SELECTION CHARTS

### HPS Imperator®

Pri. Volts	Sec. Volts	Group	Part No.	Page
600, 575, 550	120 x 240, 115 x 230, 110 x 220	A	PH***AJ	36
600, 575, 550	12 x 24, 11.5 x 23, 11 x 22	B	PH***AR	36
240 x 480, 230 x 460, 220 x 440	120 x 240, 115 x 230, 110 x 220	C	PH***MQMJ	37
240 x 480, 230 x 460, 220 x 440	12 x 24, 11.5 x 23, 11 x 22	D	PH***QR	37
208 x 416, 200 x 400, 190 x 380	120 x 240, 115 x 230, 110 x 220	E	PH***SP	38
120 x 240, 115 x 230, 110 x 220	120 x 240, 115 x 230, 110 x 220	F	PH***PP	38
120 x 240, 115 x 230, 110 x 220	12 x 24, 11.5 x 23, 11 x 22	G	PH***PG	39
600/480/240, 575/460/230, 550/440/220	120/100, 115/95, 110/90	H	PH***MBMH	39
480/240, 460/230/208, 440/220/200	120/25, 115/24, 110/23	I	PH***MLI	40
415/400/380	110 x 220	J	PH***MEMX	40
380/277/208	120 x 240	K	PH***MGJ	41

### HPS Spartan®

Pri. Volts	Sec. Volts	Group	Part No.	Page
600/480, 575/460, 550/440	120 x 240, 115 x 230, 110 x 220	A	SP***ACP	47
600, 575, 550	12 x 24, 11.5 x 23, 11 x 22	B	SP***AR	47
240 x 480, 230 x 460, 220 x 440	120 x 240, 115 x 230, 110 x 220	C	SP***MQMJ	48
240 x 480, 230 x 460, 220 x 440	12 x 24, 11.5 x 23, 11 x 22	D	SP***QR	48
347/380	120 x 240	E	SP***KHP	49
347/380	12 x 24	F	SP***KHR	49
277	120	G	SP***NJ	50
120 x 240, 115 x 230, 110 x 220	12 x 24, 11.5 x 23, 11 x 22	H	SP***PR	50
208 x 416, 200 x 400, 190 x 380	120 x 240, 115 x 230, 110 x 220	I	SP***SP	51
208 x 416, 200 x 400, 190 x 380	12 x 24, 11.5 x 23, 11 x 22	J	SP***SR	51

### HPS Fusion™

Pri. Volts	Sec. Volts	Group	Part No.	Page
600/480, 575/460, 550/440	120 x 240, 115 x 230, 110 x 220	A	FS***ACP	55
600, 575, 550	12 x 24, 11.5 x 23, 11 x 22	B	FS***AR	55
240 x 480, 230 x 460, 220 x 440	120 x 240, 115 x 230, 110 x 220	C	FS***MQMJ	56
240 x 480, 230 x 460, 220 x 440	12 x 24, 11.5 x 23, 11 x 22	D	FS***QR	56
347/380	120 x 240	E	FS***KHP	57
347/380	12 x 24	F	FS***KHR	57
277	120	G	FS***NJ	58
120 x 240, 115 x 230, 110 x 220	12 x 24, 11.5 x 23, 11 x 22	H	FS***PR	58
208 x 416, 200 x 400, 190 x 380	120 x 240, 115 x 230, 110 x 220	I	FS***SP	59
208 x 416, 200 x 400, 190 x 380	12 x 24, 11.5 x 23, 11 x 22	J	FS***SR	59

### Q Series

Pri. Volts	Sec. Volts	Part No.	Page
600	12/24	Q***PRC*	62



## WHAT IS A CONTROL TRANSFORMER?

### What is a Control Transformer?

A control transformer is an isolation transformer designed to provide a high degree of secondary voltage stability (regulation during a brief period of overload condition (also referred to as “inrush current”)). Control transformers are also known as Machine Tool Transformers, Industrial Control Transformers or Control Power Transformers.

### When you calculate the VA requirement of a Transformer, do you use the Primary or the Secondary Voltage?

When selecting the VA requirement, you use the Secondary Voltage.

### Can you use a Control Transformer connected in reverse?

HPS strongly discourages back-feeding Industrial Control transformers. Due to the use of compensated windings in these products the resulting voltage will vary from the rating with as much as 10%.

### Can a Control Transformer regulate the output voltage?

A control transformer will not regulate the voltage. Output voltage is a function of the coil's turn ratio only, times the input voltage.

### What is the benefit of “Vacuum Impregnation” on a Transformer?

All HPS Control Transformers are vacuum impregnated with “VT Polyester Resin” and oven cured which seals the surface and eliminates moisture. Impregnating the entire unit provides a strong mechanical bond and offers protection from environmental conditions.

### Explain the “VA” or “Volt Ampere Output” Rating?

The VA or volt ampere output rating designates the output which a transformer can deliver for a specified time at its rated secondary voltage and rated frequency, without exceeding its specified temperature rise.

### Insulating Materials; what are they made of and what is their purpose?

Hammond Power Solutions utilizes Mylar, Nomex and other high quality insulating materials. Insulation is used to electrically insulate turn-to-turn windings, layer-to-layer windings, primary to secondary windings and ground.

### What is the effect of “Overload”?

When a transformer is continually overloaded, excessive heat develops and the insulation system will begin to breakdown. As a result, the life expectancy of the transformer is shortened due to the heat exceeding the rating of the insulation system.

## Recommendations For Overcurrent Protection

SECTION 1

### UL AND CSA (NORTH AMERICAN) STANDARDS

North American standards, including UL 508, National Electric Code 450 and the Canadian Electrical Code Part I, require overcurrent protection on all control circuit transformers. There are two options for overcurrent protection:

#### Option 1

Provide an overcurrent device in the primary circuit rated to the current of the transformer. The overcurrent limits are as follows:

Primary 9 amps or more:	no more than 125% of rated current.
Primary 2 to 9 amps:	no more than 167% of rated current.
Primary less than 2 amps:	no more than 300% of rated current for power circuits. no more than 500% of rated current for control circuits.

This method is considered less desirable as start-up inrush to the transformer can frequently surpass the current rating of the device and result in nuisance interruptions.

#### Option 2

The second option is to install overcurrent devices in both the primary and secondary circuits of the transformer. In this option, the secondary device must be rated no more than 125% of rated current of the transformer and the primary no more than 250%. CEC permits 300% overcurrent on the primary for this option.

In both options listed, it is recommended that **time delay** fuses be considered to avoid unnecessary interruptions.

### Secondary

The overcurrent protection listed below, in amperes, is 125% of the rated current of the transformer. Choose the next higher fuse rating if these numbers do not correspond with standard fuse selections.

Sec. Voltage	VA Rating															
	25	50	75	100	150	200	250	300	350	500	750	1000	1500	2000	3000	5000
<b>12</b>	2.7	5.3	7.9	11	16	21	27	-	-	-	-	-	-	-	-	-
<b>24</b>	1.4	2.7	4.0	5.3	7.9	11	14	16	19	27	-	-	-	-	-	-
<b>90</b>	0.4	0.7	1.1	1.4	2.1	2.8	3.5	4.2	4.9	7.0	11	14	21	28	-	-
<b>95</b>	0.4	0.7	1.0	1.4	2.0	2.7	3.3	4.0	4.7	6.6	9.9	14	20	27	-	-
<b>100</b>	0.4	0.7	1.0	1.3	1.9	2.5	3.2	3.8	4.4	6.3	9.4	13	19	25	-	-
<b>110</b>	0.3	0.6	0.9	1.2	1.8	2.3	2.9	3.5	4.0	5.7	8.6	12	18	23	-	-
<b>115</b>	0.3	0.6	0.9	1.1	1.7	2.2	2.8	3.3	3.9	5.5	8.2	11	17	22	-	-
<b>120</b>	0.3	0.6	0.8	1.1	1.6	2.1	2.7	3.2	3.7	5.3	7.9	11	16	21	-	-
<b>220</b>	0.15	0.3	0.5	0.6	0.9	1.2	1.5	1.8	2.0	2.9	4.3	5.7	8.6	12	18	29
<b>230</b>	0.14	0.3	0.5	0.6	0.9	1.1	1.4	1.7	2.0	2.8	4.1	5.5	8.2	11	17	28
<b>240</b>	0.14	0.3	0.4	0.6	0.8	1.1	1.4	1.6	1.9	2.7	4.0	5.3	7.9	11	16	27



## Recommendations for Overcurrent Protection

### Primary (UL and CSA)

To assist in the selection of fuses, the following chart recommends the maximum primary fuse rating in amperes. The first number shown is the maximum overcurrent protection when the primary current is less than 2 amps and the overcurrent protection device is rated for 300%. The second number shown (*italic*) is recommended when the primary is less than 2 amps and the overcurrent device is to be rated at 500% of rated current. Where only one number is indicated, the primary is 2 amps or more and one rating of over current protection is shown as optimal. Choose the next higher fuse rating if these numbers do not correspond with standard fuse selections.

Pri.	VA Rating																
	25	50	75	100	150	200	250	300	350	500	750	1000	1500	2000	3000	5000	7500
115	0.6	1.25	1.8	2.5	3.5	5	4	5	5	8	10	15	20	25	-	-	-
	<i>1</i>	<i>2</i>	<i>3.2</i>	<i>4</i>	<i>6.25</i>	<i>8</i>											
120	0.6	1.25	1.8	2.25	3.5	5	4	5	5	8	10	15	15	20	-	-	-
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>6.25</i>	<i>8</i>											
200	0.3	0.75	1.125	1.5	2.25	3	3.5	4.5	5	4.5	7	9	15	15	20	-	-
	<i>0.6</i>	<i>1.25</i>	<i>1.8</i>	<i>2.5</i>	<i>3.5</i>	<i>5</i>	<i>6.25</i>	<i>7.5</i>	<i>8</i>								
208	0.3	0.6	1	1.4	2	2.8	3.5	4	5	4	6	8	12	15	20	30	-
	<i>0.6</i>	<i>1.125</i>	<i>1.8</i>	<i>2.25</i>	<i>3.5</i>	<i>4.5</i>	<i>6</i>	<i>7</i>	<i>8</i>								
220	0.3	0.6	1	1.25	2	2.5	3.2	4	4.5	4	6	8	12	15	20	30	-
	<i>0.5</i>	<i>1.125</i>	<i>1.6</i>	<i>2.25</i>	<i>3.2</i>	<i>4.5</i>	<i>5.6</i>	<i>6.25</i>	<i>7.5</i>								
230	0.3	0.6	0.8	1.25	1.8	2.5	3.2	3.5	4.5	4	6	8	10	15	20	30	-
	<i>0.5</i>	<i>1</i>	<i>1.6</i>	<i>2</i>	<i>3.2</i>	<i>4</i>	<i>5</i>	<i>6.25</i>	<i>7.5</i>								
240	0.3	0.6	0.8	1.25	1.8	2.25	3	3.5	4	3.5	5	7	10	15	15	30	-
	<i>0.5</i>	<i>1</i>	<i>1.5</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6.25</i>	<i>7</i>								
277	0.25	0.5	0.8	1	1.6	2	2.5	3.2	3.5	5	5	6	9	12	15	25	-
	<i>0.4</i>	<i>0.8</i>	<i>1.25</i>	<i>1.8</i>	<i>1.5</i>	<i>3.5</i>	<i>4.5</i>	<i>5</i>	<i>6.25</i>	<i>9</i>							
347	0.25	0.5	0.8	1	1.6	2	2.5	3.2	3.5	5	6.25	5	7.5	10	15	20	30
	<i>0.4</i>	<i>0.8</i>	<i>1.25</i>	<i>1.8</i>	<i>2.5</i>	<i>3.5</i>	<i>4.5</i>	<i>5</i>	<i>6.25</i>	<i>9</i>							
380	0.1875	0.3	0.5	0.75	1.125	1.5	1.8	2.25	2.5	3.5	5.6	4.5	6.25	9	15	20	25
	<i>0.3</i>	<i>0.6</i>	<i>0.8</i>	<i>1.25</i>	<i>1.8</i>	<i>2.5</i>	<i>3.2</i>	<i>3.5</i>	<i>4.5</i>	<i>6.25</i>	<i>9</i>						
400	0.1875	0.3	0.5	0.75	1.125	1.5	1.8	2.25	2.5	3.5	5.6	4.5	6.25	9	12	15	20
	<i>0.3</i>	<i>0.6</i>	<i>0.8</i>	<i>1.25</i>	<i>1.8</i>	<i>2.5</i>	<i>3</i>	<i>3.5</i>	<i>4</i>	<i>6.25</i>	<i>9</i>						
416	0.15	0.3	0.5	0.6	1	1.4	1.8	2	2.5	3.5	5	4	6	8	12	15	20
	<i>0.3</i>	<i>0.6</i>	<i>0.8</i>	<i>1.125</i>	<i>1.8</i>	<i>2.25</i>	<i>3</i>	<i>3.5</i>	<i>4</i>	<i>6</i>	<i>9</i>						
440	0.15	0.3	0.5	0.6	1	1.25	1.6	2	2.25	3.2	5	4	6	8	12	15	20
	<i>0.25</i>	<i>0.5</i>	<i>0.8</i>	<i>1.125</i>	<i>1.6</i>	<i>2.25</i>	<i>2.8</i>	<i>3.2</i>	<i>3.5</i>	<i>5.6</i>	<i>8</i>						
460	0.15	0.3	0.4	0.6	0.8	1.25	1.6	1.8	2.25	3.2	4.5	3.5	6	8	12	15	20
	<i>0.25</i>	<i>0.5</i>	<i>0.8</i>	<i>1</i>	<i>1.6</i>	<i>2</i>	<i>2.5</i>	<i>3.2</i>	<i>3.5</i>	<i>5</i>	<i>8</i>						
480	0.15	0.3	0.4	0.6	0.8	1.25	1.5	1.8	2	3	4.5	3.5	5	7	10	15	20
	<i>0.25</i>	<i>0.5</i>	<i>0.75</i>	<i>1</i>	<i>1.5</i>	<i>2</i>	<i>2.5</i>	<i>3</i>	<i>3.5</i>	<i>5</i>	<i>7.5</i>						
550	0.125	0.25	0.4	0.5	0.8	1	1.25	1.6	1.8	2.5	4	5	4.5	6	9	15	15
	<i>0.2</i>	<i>0.4</i>	<i>0.6</i>	<i>0.8</i>	<i>1.25</i>	<i>1.8</i>	<i>2.25</i>	<i>2.5</i>	<i>3</i>	<i>4.5</i>	<i>6.25</i>						
575	0.125	0.25	0.3	0.5	0.75	1	1.25	1.5	1.8	2.5	3.5	5	4.5	6	9	15	15
	<i>0.2</i>	<i>0.4</i>	<i>0.6</i>	<i>0.8</i>	<i>1.25</i>	<i>1.6</i>	<i>2</i>	<i>2.5</i>	<i>3</i>	<i>4</i>	<i>6.25</i>						
600	0.125	0.2	0.3	0.5	0.75	0.8	1.25	1.5	1.6	2.25	3.5	5	4	6	9	15	15
	<i>0.2</i>	<i>0.4</i>	<i>0.6</i>	<i>0.8</i>	<i>1.25</i>	<i>1.6</i>	<i>2</i>	<i>2.5</i>	<i>2.8</i>	<i>4</i>	<i>6.25</i>						

References: UL 508, 32.7  
 UL 845, 11.16 and 11.17  
 NEC 430-72 (c) exception #2  
 NEC 450-3 (b) 1 and 2  
 CEC Part I, 26-256



## HPS Imperator® Machine Tool Industrial Control Transformer

### The Perfect Solution

The HPS Imperator line of machine tool industrial control transformers are specifically designed to meet the high inrush industrial applications where electromagnetic components such as relays, solenoids etc. are used.

- 11 standard voltage groups
- VA range from 50VA to 1500VA
- Available with standard secondary and optional primary fuse kits
- Optional finger safe terminal covers
- Patented unique terminal block design
- Innovative fusing method
- Lifetime warranty (limited)

The HPS Imperator provides the perfect solution for any applications.

### Superior Quality and Value

The HPS Imperator design, utilizing superior insulation systems and being constructed with high quality silicon steel laminations for optimum performance, will meet or exceed UL and CE standards.

Backed by an industry leading LIFETIME warranty, the HPS Imperator industrial control transformer line offers superior performance, quality and value.



### STANDARDS

HPS Imperator Series Control Transformers meet or exceed the standards established by UL, IEC, and NEMA.

<b>Standard</b>	<b>File #</b>	<b>VA Size</b>
UL (ANSI/UL 506)	E50394	All
IEC 61558		All (excluding PH***AJ & PH***AR)
NEMA (ST-1)		All



At HPS, we rate the VA capacity of our transformers at the output ..... where it counts. Other transformer manufacturers rate their capacity on the input side of the transformer, which can result in a 5% to 20% lower actual VA at the output.

## MACHINE TOOL INDUSTRIAL CONTROL TRANSFORMER SELECTION

Selecting a control transformer requires that you have first hand knowledge of the application for the transformer and that you understand some basic terms related to the selection process. By using the following information, you will be sure to select the HPS Imperator® control transformer which best meets your application.

The HPS Imperator® series machine tool control transformers are specifically designed for high inrush applications requiring reliable output voltage stability. Designed to meet industrial applications where electromagnetic devices such as relays, solenoids, etc. are used, the HPS Imperator series transformers maximize inrush capability and output voltage regulation when electromagnetic devices are initially energized.

To select the proper transformer, three characteristics of the load circuit must first be determined. They are total steady-state (sealed) VA, total inrush VA, and inrush load power factor.

**(A) The total steady state “sealed” VA is the amount of VA that the transformer must supply to the load circuit for an extended length of time.** Simply add the total steady-state VA of all devices in your control circuit. The operating VA data of these components is available from the manufacturers.

**(B) The total inrush VA is the amount of VA that the transformer must supply for all components in the control circuit which are energized together.** Some consideration to the start-up sequence may be required. Inrush VA should be obtained from the device manufacturer.

**(C) The inrush load power factor is difficult to determine without detailed vector analysis of all the control circuit components.** Such information is not generally available. Therefore, HPS is recommending that a 40% power factor be utilized. Although some other control transformer manufacturers still recommend a power factor of only 20%, HPS, through recent tests conducted on many popular brands of control devices, has determined that the 40% power factor value is more accurate.

Once the above circuit variables have

been determined, transformer selection is a six step process.

### SIX EASY STEPS

1. Determine what your Primary (supply) and Secondary (output) voltage requirements are, as well as your required frequency (i.e. 60 Hz)
2. Calculate the Total Sealed VA of your circuit. (See Step A)
3. Calculate the Inrush VA by adding the inrush VA of all components being energized together. Remember to add the sealed VA of all components that do not have inrush VA, (lamps, timers etc.) as they present a load to the transformer during maximum inrush. If the inrush for the components in your circuit are not known, assume a 40% Inrush Power Factor.
4. Calculate the Total Inrush VA using one of the two methods:

A. 
$$\text{Total Inrush VA} = \sqrt{(\text{VA sealed})^2 + (\text{VA inrush})^2}$$

**OR**

B. 
$$\text{Total Inrush VA} = \text{VA Sealed} + \text{VA Inrush}$$

Note: method B will result in a slightly larger transformer being selected.

For VA sealed definition please refer to 1 (A).  
For VA inrush definition please refer to 1 (B).

5. If the nominal supply voltage does not fluctuate more than 5%, then reference the 90% secondary voltage column in the Regulation Data Table for the correct VA rating.

If the supply voltage varies upwards of 10%, the 95% secondary voltage column should be used to size the transformer.

Current standards require electromagnetic devices to operate reliably at a minimum of 85% of their rated voltage. However, contact life may be affected with continuous start-ups at that voltage level. Therefore, the minimum 85% secondary voltage column should only be used as a reference.

6. Using the regulation data tables below, select the appropriate VA rated transformer:

A) With a continuous VA rating that is equal to or greater than the value in Step 2.

B) With a maximum inrush VA equal to or greater than the value obtained in Step 4.

To determine the correct HPS transformer and its catalog part number, just refer to the tables in this catalog for the voltage ratings, frequency and corresponding VA required.

**HPS IMPERATOR® TRANSFORMERS  
REGULATION DATA TABLE**

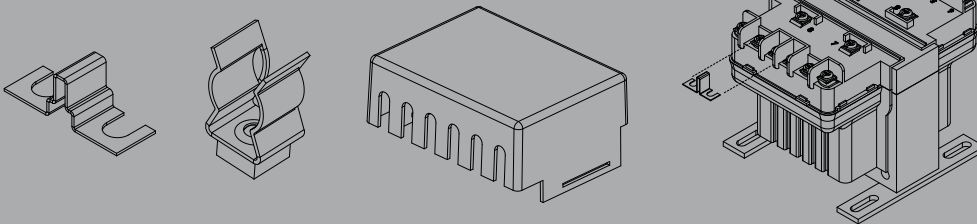
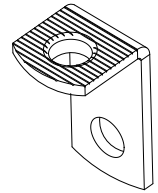
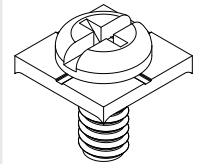
Continuous VA Transformer Nameplate Rating	Inrush VA @ 40% Power Factor		
	85% Secondary Voltage	90% Secondary Voltage	95% Secondary Voltage
50	330	259	192
75	350	258	170
100	620	467	321
150	895	699	512
250	1596	1229	880
350	2464	1889	1345
500	3939	2854	1819
750	6422	4778	3228
1000	9842	7102	4530
1500	12797	9018	5489

It is recommended that a control transformer be sized at a 40% Power Factor. Some components in a circuit, such as electromagnetic devices, typically operate at that level due to their inherently lower power factor. Selecting a transformer at 40% Power Factor will more than adequately size the unit for all the various loads in the circuit.



## FEATURES & BENEFITS

- 600V class, machine tool rated industrial control transformers
- Multi-voltage primary and secondary models increase range of application per unit
- 50/60 Hertz (60Hz on PH\*\*\*AJ & PH\*\*\*AR)
- Termination: standard combination screw connection (including SEMS washers)
- Constructed with high quality silicon steel laminations that provide optimum performance and reliability
- Encapsulated copper wound coils encased in a custom injection molded cover, protects coils and terminations from moisture, dirt and other industrial airborne contaminants
- Mounting Feet: made of heavy steel and welded or bolted to the core, these mounting feet provide superior strength in a compact design.
- Superior insulating materials:
  - 105°C (55°C rise) 50 VA to 150 VA
  - 130°C (80°C rise) 250 VA to 1500 VA
 (Note: Temperature rise based on 25°C ambient)
- Seismically certified in accordance with IBC 2009; Section 1613 Earthquake Loads, for  $S_{Ds} \leq 2.00g$ ,  $z/h = 1.0$ , and  $I_p = 1.5$
- Standard secondary fuse kits - utilizing 13/32" x 1 1/2" midget/type CC fuse clips
- Optional primary fuse kits available utilizing 13/32" x 1 1/2" midget/type CC fuse clips
- Optional finger safe terminal covers available on all units
- UL Listed (approved for U.S. and Canada)
- CE Mark standard on all units (excluding PH\*AR and PH\*AJ)
- RoHS Compliant
- **LIFETIME Warranty (Limited)**

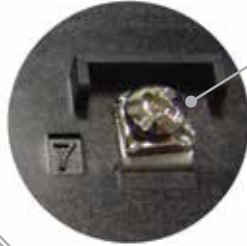


Warranty

Lifetime

## FEATURES & BENEFITS CONTINUED

Terminal connection numbers molded into the terminal block and correspond to the nameplate and wiring diagrams, make connecting the HPS Imperator quick and simple.



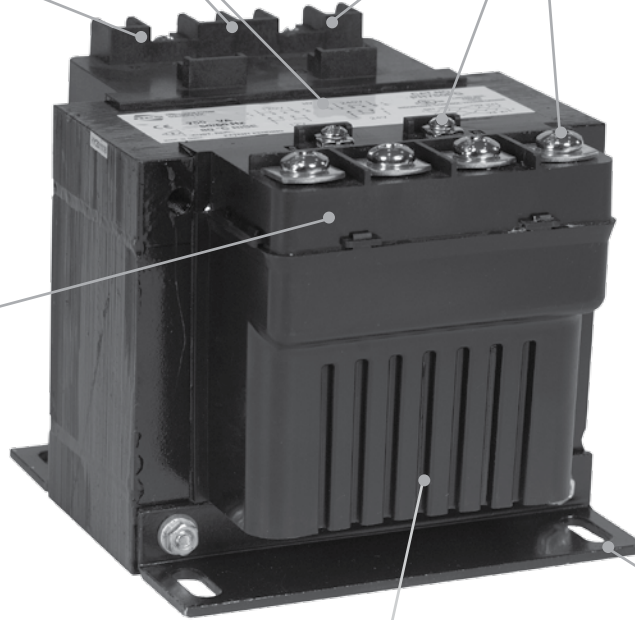
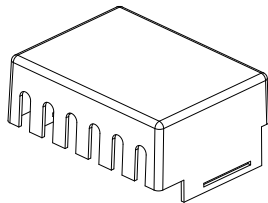
SEMS washer allows for easy connection of supply or load wires with or without terminal connectors.

Standard secondary and optional primary fuse kits utilizing 13/32" x 1 1/2" midget/type CC fuse clips provide an economical solution to your fusing requirements (fuses not available).



Innovative terminal block design provides for easy hook-up and installation of fuse clips.

Optional removable finger safe terminal covers available on all units.



Made of heavy steel and welded or bolted to the core, these mounting feet provide superior strength in a compact design.

Custom injection molded coil cover with its unique "fin shaped" design combines superior cooling properties with a clean, bold look.

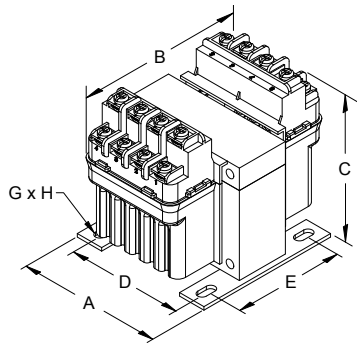


FIGURE A

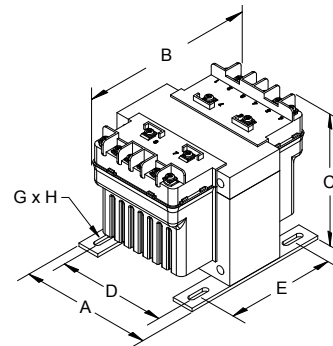



FIGURE B

## Group A

Primary Voltage: **600** || 575 || 550  **60 Hertz**  
 Secondary Voltage: **120 X 240** || 115 X 230 || 110 X 220

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50AJ	A	0.42/0.21	3.00	3.81	3.19	2.50	2.25	0.22 x 0.44	4.00	5.25	2.70	PFK1	FG1*/FGF1
75	PH75AJ	A	0.63/0.31	3.25	3.69	3.56	2.63	2.50	0.22 x 0.44	4.37	5.13	2.80	PFK1	FG2*/FGF2
100	PH100AJ	A	0.83/0.42	3.25	4.06	3.63	2.63	2.63	0.22 x 0.44	4.44	5.50	4.10	PFK1	FG2*/FGF2
150	PH150AJ	B	1.25/0.63	4.00	4.63	3.81	3.38	2.75	0.22 x 0.75	4.50	6.13	4.90	PFK2	FG3
250	PH250AJ	B	2.08/1.04	4.50	5.25	3.81	3.75	3.13	0.22 x 0.75	4.50	6.75	6.97	PFK2	FG3
350	PH350AJ	B	2.92/1.46	4.50	4.88	4.44	3.75	3.75	0.22 x 0.75	5.18	6.38	8.30	PFK3	FG4
500	PH500AJ	B	4.17/2.08	4.75	5.56	4.31	4.06	3.44	0.31 x 0.94	5.13	7.06	11.6	PFK3	FG4
750	PH750AJ	B	6.25/3.13	5.13	6.38	4.31	4.38	4.00	0.31 x 0.81	5.13	8.13	16.6	PFK3	FG4
1000	PH1000AJ	B	8.33/4.17	5.25	6.50	4.94	4.50	4.09	0.31 x 0.81	5.56	8.00	21.0	PFK3	FG5
1500	PH1500AJ	B	12.5/6.25	5.25	7.56	4.94	4.50	5.44	0.38 x 1.00	5.56	9.06	30.0	PFK3	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers. All dimensions in inches  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 63 for wiring schematic drawing. Custom voltage and VA sizes available upon request.

## Group B

Primary Voltage: **600** || 575 || 550  **60 Hertz**  
 Secondary Voltage: **12 X 24** || 11.5 X 23 || 11 X 22

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50AR	A	4.17/2.08	3.00	3.81	3.19	2.50	2.25	0.22 x 0.44	4.00	5.25	2.70	PFK1	FG1*/FGF1
75	PH75AR	A	6.25/3.13	3.25	3.69	3.56	2.63	2.50	0.22 x 0.44	4.37	5.13	2.80	PFK1	FG2*/FGF2
100	PH100AR	A	8.33/4.17	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150AR	B	12.5/6.25	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250AR	B	20.8/10.4	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350AR	B	29.2/14.6	4.50	4.88	4.44	3.75	3.75	0.22 x 0.75	5.18	6.38	8.30	PFK3	FG4
500	PH500AR	B	41.7/20.8	4.75	5.56	4.31	4.06	3.44	0.31 x 0.94	5.13	7.06	11.6	PFK3	FG4

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied with transformers. All dimensions in inches  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 64 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

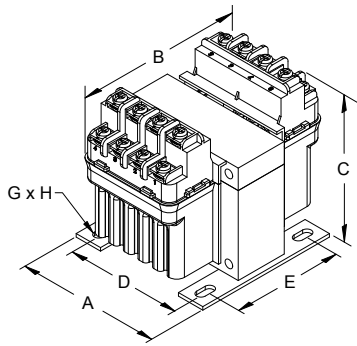


FIGURE A

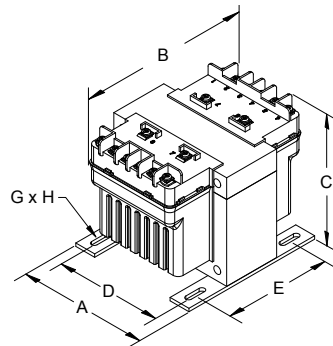


FIGURE B

## Group C

**Primary Voltage:** 240 X 480 || 230 X 460 || 220 X 440  
**Secondary Voltage:** 120 X 240 || 115 X 230 || 110 X 220



50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50MQMJ	A	0.42/0.21	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK1	FG1*/FGF1
75	PH75MQMJ	A	0.63/0.31	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK1	FG2*/FGF2
100	PH100MQMJ	A	0.83/0.42	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150MQMJ	B	1.25/0.63	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250MQMJ	B	2.08/1.04	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350MQMJ	B	2.92/1.46	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK3	FG4
500	PH500MQMJ	B	4.17/2.08	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK3	FG4
750	PH750MQMJ	B	6.25/3.13	5.13	6.69	4.31	4.38	4.31	0.31 x 0.81	5.13	8.19	16.6	PFK3	FG4
1000	PH1000MQMJ	B	8.33/4.17	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK3	FG5
1500	PH1500MQMJ	B	12.5/6.25	5.25	8.19	4.94	4.50	6.06	0.38 x 1.00	5.56	9.69	32.0	PFK3	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers.

All dimensions in inches

\*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.

Refer to page 65 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

\*\*\* Available with FACTORY INSTALLED Primary and Secondary Fuse Kits up to 1500VA. To order, add the suffix "-FK" to the above part number. Refer to page 42 for details. \*\*\*

## Group D

**Primary Voltage:** 240 X 480 || 230 X 460 || 220 X 440  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22



50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50QR	A	4.17/2.08	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK1	FG1*/FGF1
75	PH75QR	A	6.25/3.13	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK1	FG2*/FGF2
100	PH100QR	A	8.33/4.17	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150QR	B	12.5/6.25	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250QR	B	20.8/10.4	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350QR	B	29.2/14.6	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK3	FG4
500	PH500QR	B	41.7/20.8	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK3	FG4

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers.

All dimensions in inches

\*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.

Refer to page 66 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

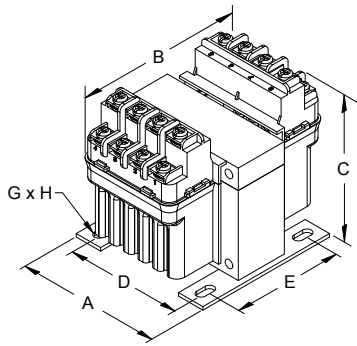


FIGURE A

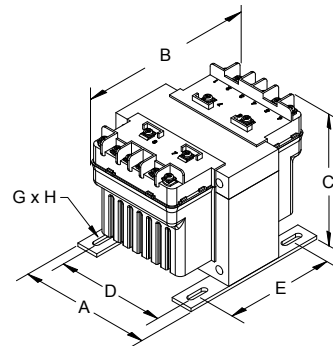


FIGURE B

## Group E

Primary Voltage: **208 X 416** || 200 X 400 || 190 X 380  
 Secondary Voltage: **120 X 240** || 115 X 230 || 110 X 220



50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E	G X H					
50	PH50SP	A	0.42/0.21	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK1	FG1*/FGF1
75	PH75SP	A	0.63/0.31	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK1	FG2*/FGF2
100	PH100SP	A	0.83/0.42	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150SP	B	1.25/0.63	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250SP	B	2.08/1.04	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350SP	B	2.92/1.46	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK3	FG4
500	PH500SP	B	4.17/2.08	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK3	FG4
750	PH750SP	B	6.25/3.13	5.13	6.69	4.31	4.38	4.31	0.31 x 0.81	5.13	8.19	16.6	PFK3	FG4
1000	PH1000SP	B	8.33/4.17	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK3	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers.  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 67 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group F

Primary Voltage: **120 X 240** || 115 X 230 || 110 X 220  
 Secondary Voltage: **120 X 240** || 115 X 230 || 110 X 220



50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E	G X H					
50	PH50PP	A	0.42/0.21	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK1	FG1*/FGF1
75	PH75PP	A	0.63/0.31	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK1	FG2*/FGF2
100	PH100PP	A	0.83/0.42	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150PP	B	1.25/0.63	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250PP	B	2.08/1.04	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350PP	B	2.92/1.46	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK3	FG4
500	PH500PP	B	4.17/2.08	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK3	FG4
750	PH750PP	B	6.25/3.13	5.13	6.69	4.31	4.38	4.31	0.31 x 0.81	5.13	8.19	16.6	PFK3	FG4
1000	PH1000PP	B	8.33/4.17	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK3	FG5
1500	PH1500PP	B	12.5/6.25	5.25	8.19	4.94	4.50	6.06	0.38 x 1.0	5.56	9.69	32.0	PFK3	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers.  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 68 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches





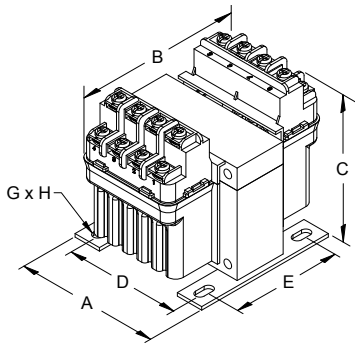


FIGURE A

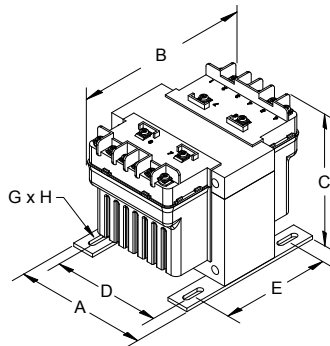


FIGURE B

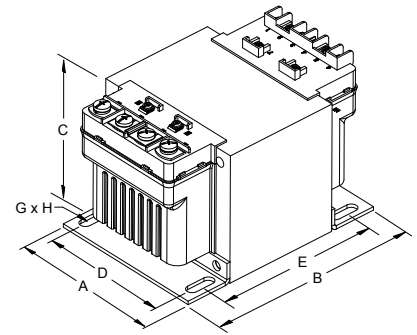


FIGURE C

## Group G

Primary Voltage: 120 X 240 || 115 X 230 || 110 X 220  
 Secondary Voltage: 12 X 24 || 11.5 X 23 || 11 X 22

50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E	G X H					
50	PH50PG	A	4.17/2.08	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK1	FG1*/FGF1
75	PH75PG	A	6.25/3.13	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK1	FG2*/FGF2
100	PH100PG	A	8.33/4.17	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK1	FG2*/FGF2
150	PH150PG	B	12.5/6.25	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK2	FG3
250	PH250PG	B	20.8/10.4	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK2	FG3
350	PH350PG	B	29.2/14.6	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK3	FG4
500	PH500PG	B	41.7/20.8	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK3	FG4
750	PH750PG	C	62.5/31.3	5.25	6.25	4.94	4.38	4.31	0.31 x 0.81	5.56	7.88	16.6	PFK3	FG5
1000	PH1000PG	C	83.3/41.7	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK3	FG5

Secondary fuse clips and fuse clip mounting screws supplied standard with transformers up to and including 500VA. Primary and Secondary voltage links/jumpers supplied standard with transformers. All dimensions in inches

\*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.

Refer to page 69 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

\*\*\* Available with FACTORY INSTALLED Primary and Secondary Fuse Kits up to 1000VA. To order, add the suffix "-FK" to the above part number. Refer to page 42 for details. \*\*\*

## Group H

Primary Voltage: 600/480/240 || 575/460/230 || 550/440/220  
 Secondary Voltage: 120/100 || 115/95 || 110/90

50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E	G X H					
50	PH50MBMH	A	0.43	3.25	4.06	3.63	2.63	2.63	0.22 x 0.44	4.50	5.50	4.10	PFK5	FG2*/FGF2
75	PH75MBMH	A	0.65	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.50	5.63	4.50	PFK5	FG2*/FGF2
100	PH100MBMH	B	0.87	4.00	4.63	3.81	3.38	2.75	0.22 x 0.75	4.50	6.25	4.90	PFK6	FG3
150	PH150MBMH	B	1.30	4.00	5.44	3.81	3.38	2.75	0.22 x 0.75	4.50	6.94	7.60	PFK6	FG3
250	PH250MBMH	B	2.17	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK6	FG4
350	PH350MBMH	B	3.04	4.50	5.56	4.44	3.75	3.75	0.22 x 0.75	5.18	7.06	11.0	PFK7	FG4
500	PH500MBMH	B	4.35	4.75	6.69	4.31	4.06	4.50	0.31 x 0.94	5.13	8.19	16.3	PFK7	FG4
750	PH750MBMH	B	6.52	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK7	FG5
1000	PH1000MBMH	B	8.70	5.25	8.19	4.94	4.50	5.81	0.31 x 0.81	5.56	9.69	31.2	PFK7	FG5
1500	PH1500MBMH	B	13.0	5.25	8.19	4.94	4.50	6.06	0.38 x 1.0	5.56	9.69	32.0	PFK7	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers. All dimensions in inches

\*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.

Refer to page 70 for wiring schematic drawing. Custom voltage and VA sizes available upon request.

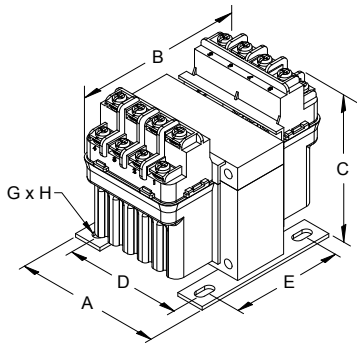


FIGURE A

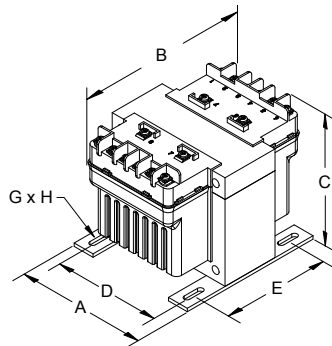


FIGURE B

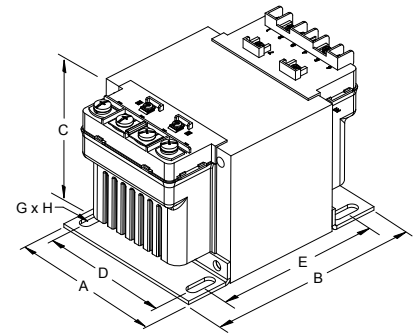


FIGURE C

## Group I

Primary Voltage: 480/240 || **460/230/208** || 440/220/200  
 Secondary Voltage: 120/25 || **115/24** || 110/23

50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50MLI	A	0.43/2.08	3.25	4.06	3.56	2.63	2.50	0.22 x 0.44	4.37	5.50	4.00	PFK5	FG2*/FGF2
75	PH75MLI	A	0.65/3.13	3.25	4.25	3.56	2.63	2.50	0.22 x 0.44	4.37	5.63	4.60	PFK5	FG2*/FGF2
100	PH100MLI	A	0.87/4.17	3.25	4.69	3.63	2.63	2.63	0.22 x 0.44	4.50	6.25	5.20	PFK5	FG2*/FGF2
150	PH150MLI	B	1.30/6.25	4.00	5.44	3.81	3.38	2.75	0.22 x 0.75	4.50	6.94	7.60	PFK6	FG3
250	PH250MLI	B	2.17/10.42	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK6	FG4
350	PH350MLI	B	3.04/14.58	4.50	5.56	4.44	3.75	3.75	0.22 x 0.75	5.18	7.06	11.0	PFK7	FG4
500	PH500MLI	B	4.35/20.83	4.75	6.69	4.31	4.06	4.50	0.31 x 0.94	5.13	8.19	16.3	PFK7	FG4
750	PH750MLI	C	6.52/31.25	5.25	6.50	4.94	4.50	4.13	0.31 x 0.81	5.56	8.31	21.0	PFK7	FG5
1000	PH1000MLI	C	8.70/41.67	5.25	8.19	4.94	4.50	5.81	0.31 x 0.81	5.56	9.69	31.2	PFK7	FG5

Secondary fuse clips and fuse clip mounting screws supplied standard with transformers up to and including 500VA. All dimensions in inches  
 Primary and Secondary voltage links/jumpers supplied standard with transformers up to and including 1000VA.  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 71 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
 \*\*\* Available with FACTORY INSTALLED Primary and Secondary Fuse Kits up to 1000VA. To order, add the suffix "-FK" to the above part number. Refer to page 42 for details. \*\*\*

## Group J

Primary Voltage: 415/400/380  
 Secondary Voltage: 110 X 220

50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50MEMX	A	0.45/0.23	3.00	4.38	3.19	2.50	2.25	0.22 x 0.44	4.00	5.82	3.50	PFK4	FG1*/FGF1
75	PH75MEMX	A	0.68/0.34	3.25	4.06	3.63	2.63	2.63	0.22 x 0.44	4.44	5.50	4.10	PFK5	FG2*/FGF2
100	PH100MEMX	A	0.91/0.45	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.44	5.63	4.50	PFK5	FG2*/FGF2
150	PH150MEMX	B	1.36/0.68	4.00	4.94	3.81	3.38	2.75	0.22 x 0.75	4.50	6.44	5.70	PFK6	FG3
250	PH250MEMX	B	2.27/1.14	4.50	5.44	3.81	3.75	3.13	0.22 x 0.75	4.50	6.94	7.50	PFK6	FG3
350	PH350MEMX	B	3.18/1.59	4.50	5.19	4.44	3.75	3.75	0.22 x 0.75	5.18	6.69	10.1	PFK7	FG4
500	PH500MEMX	B	4.55/2.27	4.75	5.94	4.31	4.06	3.81	0.31 x 0.94	5.13	7.44	14.2	PFK7	FG4
750	PH750MEMX	B	6.82/3.41	5.25	6.50	4.94	4.50	4.13	0.31 x 0.81	5.56	8.00	21.0	PFK7	FG5
1000	PH1000MEMX	B	9.09/4.55	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK7	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers. All dimensions in inches  
 \*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43.  
 Refer to page 72 for wiring schematic drawing. Custom voltages and VA sizes available upon request.



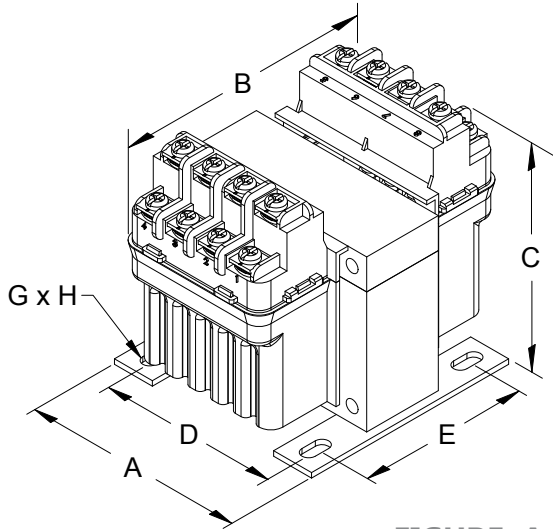


FIGURE A

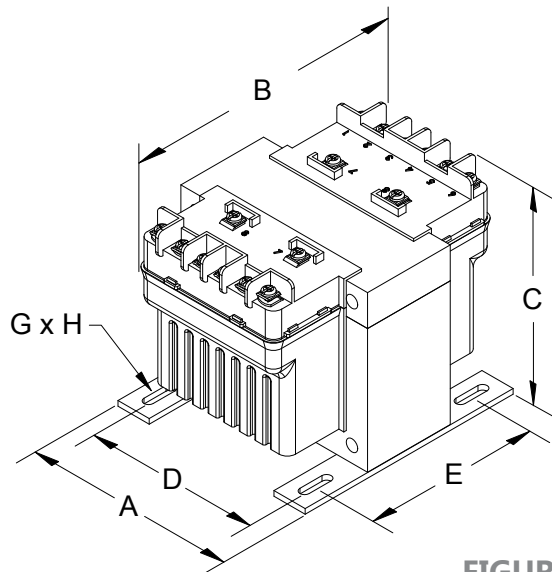


FIGURE B

## Group K

Primary Voltage: 380/277/208

Secondary Voltage: 120 X 240



50/60 Hertz

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Depth with Finger Guard	Approx. Ship Weight Lbs.	Optional Primary Fuse Kit P/N	Optional Unfused and Fused Finger Guard Kit P/N
				A	B	C	D	E						
50	PH50MGJ	A	0.42/0.21	3.25	3.88	3.56	2.63	2.50	0.22 x 0.44	4.37	5.32	3.54	PFK5	FG2*/FGF2
75	PH75MGJ	A	0.63/0.31	3.25	4.19	3.63	2.63	2.63	0.22 x 0.44	4.44	5.63	4.50	PFK5	FG2*/FGF2
100	PH100MGJ	A	0.83/0.42	3.25	4.69	3.63	2.63	2.63	0.22 x 0.44	4.50	6.13	5.20	PFK5	FG2*/FGF2
150	PH150MGJ	B	1.25/0.63	4.00	5.44	3.81	3.38	2.75	0.22 x 0.75	4.50	6.94	7.60	PFK6	FG3
250	PH250MGJ	B	2.08/1.04	4.50	4.88	4.44	3.75	3.75	0.22 x 0.75	5.18	6.38	8.30	PFK6	FG4
350	PH350MGJ	B	2.92/1.46	4.50	5.56	4.44	3.75	3.75	0.22 x 0.75	5.18	7.06	11.0	PFK7	FG4
500	PH500MGJ	B	4.17/2.08	4.75	6.69	4.31	4.06	4.50	0.31 x 0.94	5.13	8.19	16.3	PFK7	FG4
750	PH750MGJ	B	6.25/3.13	5.25	6.81	4.94	4.50	4.44	0.31 x 0.81	5.56	8.31	23.6	PFK7	FG5
1000	PH1000MGJ	B	8.33/4.17	5.25	7.25	4.94	4.50	4.83	0.31 x 0.81	5.56	9.69	25.5	PFK7	FG5

Secondary fuse clips, fuse clip mounting screws and primary and secondary voltage links/jumpers supplied standard with transformers.

All dimensions in inches

\*Note: Unfused finger guard kits are marked with an asterisk, for more information refer to page 43. Refer to page 73 for wiring schematic drawings. Custom voltages and VA sizes available upon request.

## Field Installed Fuse Kits

### Standard Secondary Fuse Kits (Field Installed)

All HPS Imperator control transformers are supplied with standard secondary fuse kits which include: 13/32" x 1 1/2" midget/ type CC fuse clips, fuse clip mounting screws, primary and secondary voltage links and the PHAK1 instruction sheet (note: secondary fuse clips and fuse clip mounting screws are not supplied on the PH750PG, PH1000PG, PH750MLI, and PH1000MLI).

### Optional Primary Fuse Kits (Field Installed)

All HPS Imperator series machine tool industrial control transformers up to and including 1500VA are available with the following optional primary fuse kits:

Kit Part Number	Applicable Transformer Part Number Suffix's	Applicable VA Sizes	Parts Included in Kit
PFK1	Refer to Specification Tables on Pages 36 to 41 for Optional Primary Fuse Kit P/N		4 fuse clips, 4 mtg. screws, PHAK1 instruction sheet
PFK2			4 fuse clips, 4 mtg. screws, PHAK1 instruction sheet
PFK3			4 fuse clips, 4 mtg. screws, PHAK1 instruction sheet
PFK4			4 fuse clips, 4 mtg. screws, 1 jumper, 1 finger guard, PHAK1 instruction sheet
PFK5			4 fuse clips, 4 mtg. screws, 1 jumper, 1 finger guard, PHAK1 instruction sheet
PFK6			4 fuse clips, 4 mtg. screws, 1 jumper wire, PHAK1 instruction sheet
PFK7			4 fuse clips, 4 mtg. screws, 1 jumper wire, PHAK1 instruction sheet

**Note:** Maximum allowable current rating on all primary and secondary fuse kits is 30 amps.

## Factory Installed Fuse Kits

### Factory Installed Primary and Secondary Fuse Kits

HPS now stocks some HPS Imperator series voltage groups with FACTORY INSTALLED primary and secondary fuse clips. To order, just add the suffix "-FK" to the end of the standard part number.

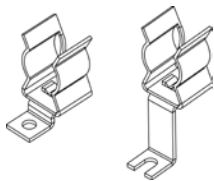
Factory installed fusing only available on units up to 1500VA. The voltage groups that are stocked are:

**Group C (p/n: PH\*\*\*MQMJ-FK) | Group G (p/n: PH\*\*\*PG-FK) | Group I (p/n: PH\*\*\*MLI-FK)**

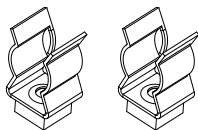
On PH750PG-FK, PH1000PG-FK, PH750MLI-FK, and PH1000MLI-FK, only primary fuse clips are included on factory installed units. Secondary fuse clips are not included or available on these units.

Other voltage groups available with factory installed fuse kits. Please contact your HPS sales or customer service representative for details.

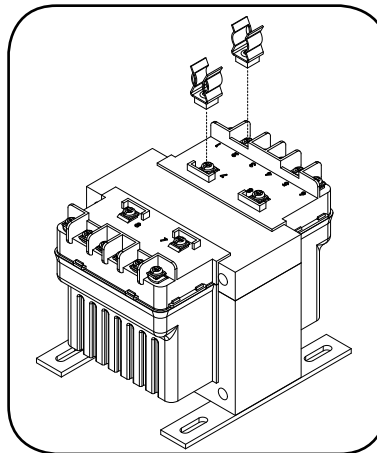
**Note:** All factory installed fuse kits are pre-wired at the transformers highest primary voltage and the lowest secondary voltage. To hook up at a different primary or secondary voltage, please refer to the wiring instruction sheet included with the transformer.



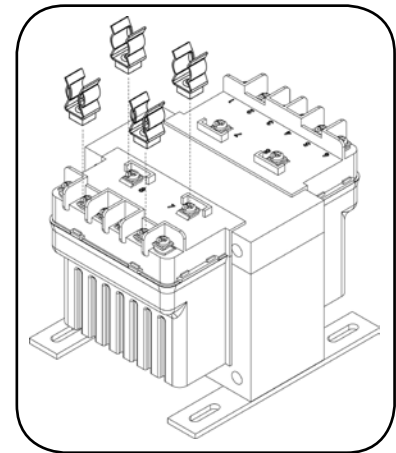
**Sample Accessory Drawing  
for Fuse Clips**  
(for 50, 75 and 100VA)



**Sample Accessory Drawing  
for Fuse Clips**  
(for 150VA to 1500VA)



**Sample Assembly Drawing  
for Secondary Fuse Clip  
Installation**  
(For 150VA to 1500VA)



**Sample Assembly Drawing  
for Primary Fuse Clip  
Installation**  
(For 150VA to 1500VA)

**Note:** HPS Imperator primary and secondary fuse kits are not suitable for branch circuit applications!

## Optional Accessories

### Finger Guards

The HPS Imperator line of machine tool industrial molded control transformers are available with the following optional finger guard kits:

#### Optional Unfused Finger Guard Kits

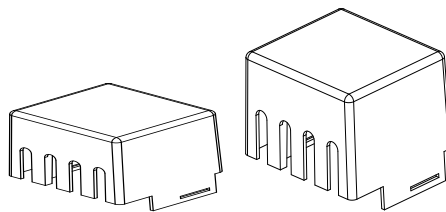
Kit Part Number	Applicable Transformer Part Number Suffixes	Applicable VA Sizes
<b>FG1</b>	AJ, AR, MQMJ, MEMX, QR, SP, PG, PP	50
<b>FG2</b>	MBMH, MGJ, MLI	50
<b>FG2</b>	All	75
<b>FG2</b>	All (excluding PH100MBMH) Refer to FG3, FG4 or FG5 below	100 150 to 1500

**Note:** Each finger guard kit supplies either the primary or secondary side.  
Included in the kit: 1 finger guard (unfused) and PHAK1 instruction sheet

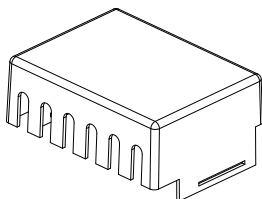
#### Optional Fused Finger Guard Kits

Kit Part Number	Applicable Transformer Part Number Suffixes	Applicable VA Sizes	Parts Included in Kit
<b>FGF1</b>	AJ, AR, MQMJ, MEMX, QR, SP, PG, PP	50	1 finger guard (fused), PHAK1 instruction sheet
<b>FGF2</b>	MBMH, MGJ, MLI	50	1 finger guard (fused), PHAK1 instruction sheet
<b>FGF2</b>	All	75	1 finger guard (fused), PHAK1 instruction sheet
<b>FGF2</b>	All (excluding PH100MBMH)	100	1 finger guard (fused), PHAK1 instruction sheet
<b>FG3</b>	MBMH	100	1 finger guard, PHAK1 instruction sheet
<b>FG3</b>	All	150	1 finger guard, PHAK1 instruction sheet
<b>FG3</b>	AJ, AR, MQMJ, MEMX, QR, SP, PG, PP	250	1 finger guard, PHAK1 instruction sheet
<b>FG4</b>	MBMH, MGJ, MLI	250	1 finger guard, PHAK1 instruction sheet
<b>FG4</b>	All	350, 500	1 finger guard, PHAK1 instruction sheet
<b>FG4</b>	AJ, AR, MQMJ, QR, SP, PP	750	1 finger guard, PHAK1 instruction sheet
<b>FG5</b>	MBMH, MEMX, MGJ, MLI, PG	750	1 finger guard, PHAK1 instruction sheet
<b>FG5</b>	All	1000, 1500	1 finger guard, PHAK1 instruction sheet

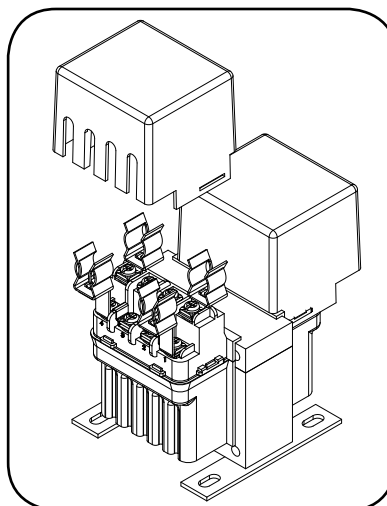
**Note:** Each finger guard kit supplies either the primary or secondary side.



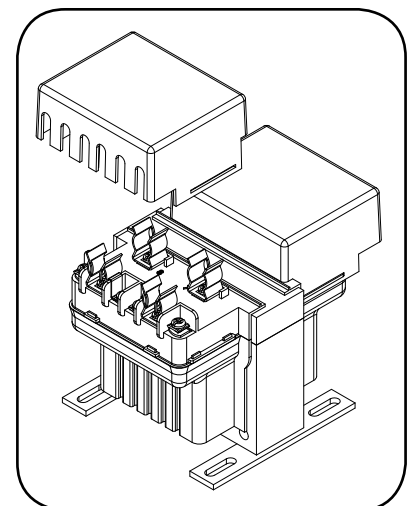
**Sample Accessory Drawing  
for Fused & Unfused  
Finger Guards**  
(for 50, 75 and 100VA)



**Sample Accessory Drawing  
for Finger Guards**  
(for 150VA and 1500VA)



**Sample Assembly Drawing  
for Finger Guard Installation**  
(For 50, 75 and 100VA)



**Sample Assembly Drawing  
for Finger Guard Installation**  
(For 150VA to 1500VA)

## HPS Spartan® Industrial Open-Style Control Transformer

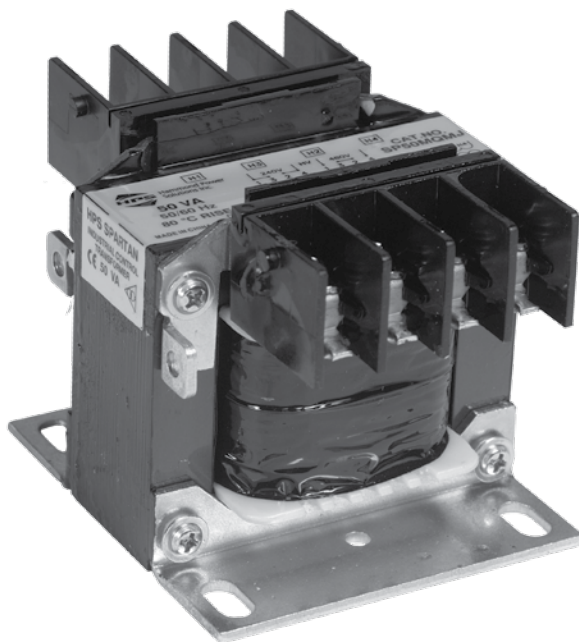
### The Economical Solution

The HPS Spartan® line of industrial control transformers are ideally suited for general purpose, industrial and light duty loads. Designed for applications where high inrush or machine tool duty are not necessary, the HPS Spartan industrial open-style control transformer offers an efficient and economical solution. These units are well suited for HVAC applications, signal and alarm systems, motor control circuits, lighting and circuit isolation.

The HPS Spartan control transformer is an open style unit with molded terminal blocks up to 3000 VA or 30 amps. Optional Finger guards and a fuse block adapter kit are available upon request.

For an economical approach to control transformers, the HPS Spartan is the transformer of choice.

SECTION 1



#### STANDARDS

The HPS Spartan Control Transformers meet or exceed the standards established by UL, CSA, IEC and NEMA.

Standard	File #	VA Size
UL (ANSI/UL506)	E50394	All
CSA	LR3902	All
IEC 61558		All
NEMA (ST-1)		All



## INDUSTRIAL OPEN-STYLE CONTROL TRANSFORMER SELECTION

Selecting a control transformer requires that you have first hand knowledge of the application for the transformer and that you understand some basic terms related to the selection process. By using the following information, you will be sure to select the HPS Spartan® control transformer which best meets your application.

The HPS Spartan line of industrial control transformers are ideally suited for general purpose, industrial and light duty loads. Designed for applications where inrush requirements are not as high.

To select the proper transformer, three characteristics of the load circuit must first be determined. They are total steady-state (sealed) VA, total inrush VA, and inrush load power factor.

**(A) The total steady state “sealed” VA is the amount of VA that the transformer must supply to the load circuit for an extended length of time.** Simply add the total steady-state VA of all devices in your control circuit. The operating VA data of these components is available from the manufacturers.

**(B) The total inrush VA is the amount of VA that the transformer must supply for all components in the control circuit which are energized together.** Some consideration to the start-up sequence may be required. Inrush VA should be obtained from the device manufacturer.

**(C) The inrush load power factor is difficult to determine without detailed vector analysis of all the control circuit components.** Such information is not generally available. Therefore, HPS is recommending that a 40% power factor be utilized. Although some other control transformer manufacturers still recommend a power factor of only 20%, HPS, through recent tests conducted on many popular brands of control devices, has determined that the 40% power factor value is more accurate.

Once the above circuit variables have been determined, transformer selection is a six step process.

### SIX EASY STEPS

1. Determine what your Primary (supply) and Secondary (output) voltage requirements are, as well as your required frequency (i.e. 60 Hz)
2. Calculate the Total Sealed VA of your circuit. (See Step A)
3. Calculate the Inrush VA by adding the inrush VA of all components being energized together. Remember to add the sealed VA of all components that do not have inrush VA, (lamps, timers etc.) as they present a load to the transformer during maximum inrush. If the inrush for the components in your circuit are not known, assume a 40% Inrush Power Factor.
4. Calculate the Total Inrush VA using one of the two methods:

A. 
$$\frac{\text{Total Inrush VA} = (\text{VA sealed})^2 + (\text{VA inrush})^2}{\sqrt{\quad}}$$

**OR**

B. 
$$\text{Total Inrush VA} = \text{VA Sealed} + \text{VA Inrush}$$

Note: method B will result in a slightly larger transformer being selected.

For VA sealed definition please refer to 1 (A).  
For VA inrush definition please refer to 1 (B).

5. If the nominal supply voltage does not fluctuate more than 5%, then reference the 90% secondary voltage column in the Regulation Data Table for the correct VA rating.

If the supply voltage varies upwards of 10%, the 95% secondary voltage column should be used to size the transformer.

Current standards require electromagnetic devices to operate reliably at a minimum of 85% of their rated voltage. However, contact life may be affected with continuous start-ups at that voltage level. Therefore, the minimum 85% secondary voltage column should only be used as a reference.

6. Using the regulation data tables below, select the appropriate VA rated transformer:

A) With a continuous VA rating that is equal to or greater than the value in Step 2.

B) With a maximum inrush VA equal to or greater than the value obtained in Step 4.

To determine the correct HPS transformer and its catalog part number, just refer to the tables in this catalog for the voltage ratings, frequency and corresponding VA required.

**HPS SPARTAN® TRANSFORMERS  
REGULATION DATA TABLE**

Continuous VA Transformer Nameplate Rating	Inrush VA @ 40% Power Factor		
	85% Secondary Voltage	90% Secondary Voltage	95% Secondary Voltage
50	177	139	102
100	350	275	203
150	715	554	400
250	1653	1264	895
350	2604	1947	1321
500	4004	3023	2090
750	6933	5088	3352
1000	10087	7340	4764
1500	14178	10232	6508
2000	17604	12669	8080
3000	39213	27539	16780
5000	68344	47498	28803

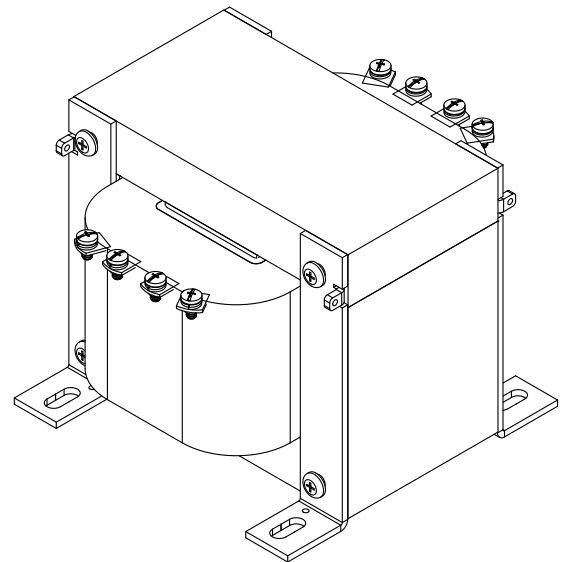
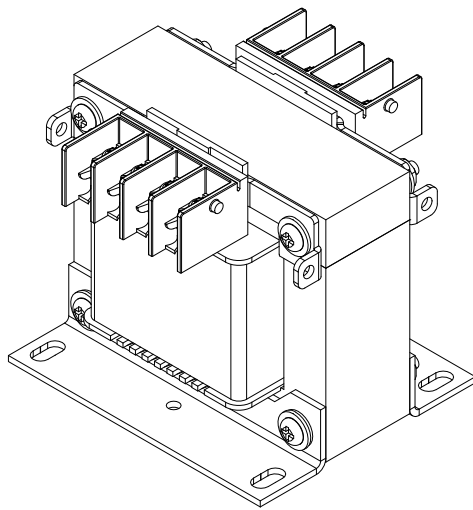
It is recommended that a control transformer be sized at a 40% Power Factor. Some components in a circuit, such as electromagnetic devices, typically operate at that level due to their inherently lower power factor. Selecting a transformer at 40% Power Factor will more than adequately size the unit for all the various loads in the circuit.



## Features and Benefits

- Multi-voltage primary and secondary models increase range of application per unit
- Standard molded terminal blocks or primary and secondary up to 3000VA (30A) units
- Solid terminal block with standard combination screw connection
- 50/60 Hz (60 Hz on SP\*\*\*ACP and SP\*\*\*AR)
- Copper wound coils with high dielectric strength insulation
- Bolted core construction
- Bolt-on mounting brackets
- Vacuum Impregnated with Polyester Resin and oven cured
- Seismically certified in accordance with IBC 2009; Section 1613 Earthquake Loads, for  $S_{DS} \leq 2.00g$ ,  $z/h = 1.0$ , and  $I_p = 1.5$
- Superior insulating materials. The HPS Spartan series transformers offer the following insulation systems:
  - 130°C (80°C rise) up to 1500 VA
  - 180°C (115°C rise) 2000 VA to 5000 VA
- All units supplied with primary and secondary voltage links/jumpers
- Optional finger guards available<sup>1</sup>
- Optional fuse block adapter kit available<sup>1</sup>
- Supplied with trilingual installation and wiring instruction sheets
- "Premium Packaging"<sup>1</sup> which feature:
  - Premium fluted cartons
  - Custom molded foam inserts
  - Easy removal and repacking
  - Industry's best box label
- **15 year warranty**

<sup>1</sup> up to and including 3000VA or 30 amps





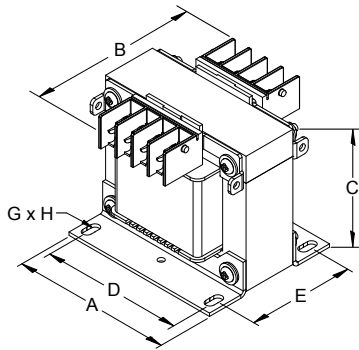


FIGURE A

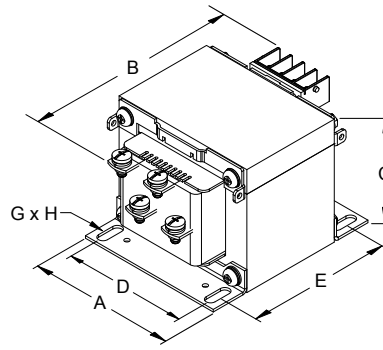


FIGURE B

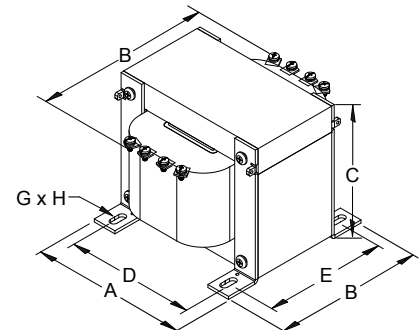


FIGURE C

## Group A

Primary Voltage: 600/480 || 575/460 || 550/440  
 Secondary Voltage: 120 X 240 || 115 X 230 || 110 X 220



60 Hertz

VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E				
50	50	SP50ACP	A	0.42/0.21	2.60	3.82	2.60	2.13	2.64	0.22 x 0.44	2.98	2.79	2.2
100	100	SP100ACP	A	0.83/0.42	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3.3
150	150	SP150ACP	A	1.25/0.63	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.4
250	160	SP250ACP	A	2.08/1.04	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.4
350	250	SP350ACP	A	2.92/1.46	3.78	4.49	3.40	3.31	3.39	0.22 x 0.44	3.78	3.59	7.5
500	300	SP500ACP	A	4.17/2.08	4.49	4.69	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11
750	500	SP750ACP	A	6.25/3.13	5.25	5.08 <sup>1</sup>	4.37	4.50	4.06	0.31 x 0.81	4.75	4.56	18
1000	650	SP1000ACP	A	8.33/4.17	5.25	5.47 <sup>1</sup>	4.37	4.50	4.45	0.31 x 0.81	4.75	4.56	21
1500	1000	SP1500ACP	A	12.5/6.25	5.25	6.85 <sup>1</sup>	4.37	4.50	5.83	0.31 x 0.81	4.56	4.37	28
2000	1300	SP2000ACP	A	16.7/8.33	6.38	5.87 <sup>1</sup>	5.31	5.75	4.84	0.31 x 0.81	5.69	5.50	34
3000	2000	SP3000ACP	A	25.0/12.5	7.50	7.50	6.50	6.30	6.85	0.44 x 1.00	6.50	6.50	60
5000	3000	SP5000ACP	C	41.7/20.8	8.98	9.88	7.76	7.40	7.13	0.44 x 1.00	N/A	N/A	93

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 74 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
<sup>1</sup> Note: For 750 through 2000 VA units actual overall depth is 0.24" plus the value in column B.

All dimensions in inches

## Group B

Primary Voltage: 600 || 575 || 550  
 Secondary Voltage: 12 X 24 || 11.5 X 23 || 11 X 22



60 Hertz

VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E				
50	50	SP50AR	A	4.17/2.08	2.60	3.23	2.60	2.13	2.05	0.22 x 0.44	2.98	2.79	1.5
100	100	SP100AR	A	8.33/4.17	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3.3
150	150	SP150AR	A	12.5/6.25	2.99	4.09	2.85	2.52	2.95	0.22 x 0.44	3.23	3.04	3.9
250	160	SP250AR	A	20.8/10.4	3.78	3.70	3.40	3.31	2.60	0.22 x 0.44	3.78	3.59	5.2
350	250	SP350AR	A	29.2/14.6	3.78	4.29	3.40	3.31	3.19	0.22 x 0.44	3.78	3.59	7.1
500	300	SP500AR	B	41.7/20.8	4.49	5.08	3.78	3.78	3.27	0.31 x 0.81	4.16	3.97	9.9

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 74 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches



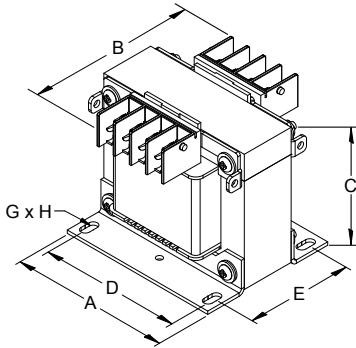


FIGURE A

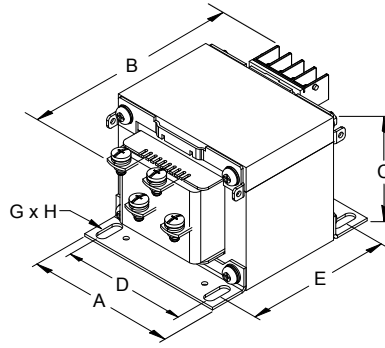


FIGURE B

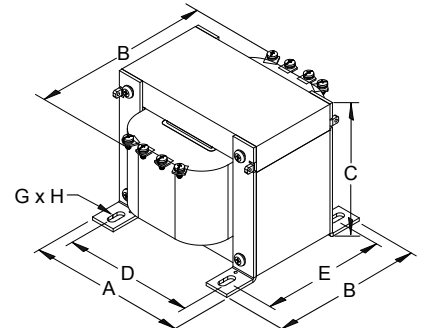


FIGURE C

## Group C

Primary Voltage: 240 X 480 || 230 X 460 || 220 X 440  
 Secondary Voltage: 120 X 240 || 115 X 230 || 110 X 220



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E				
50	50	SP50MQMJ	A	0.42/0.21	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.7
100	100	SP100MQMJ	A	0.83/0.42	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3
150	150	SP150MQMJ	A	1.25/0.63	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.3
250	160	SP250MQMJ	A	2.08/1.04	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.5
350	250	SP350MQMJ	A	2.92/1.46	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.2
500	300	SP500MQMJ	A	4.17/2.08	4.49	4.69	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11
750	500	SP750MQMJ	A	6.25/3.13	5.25	4.69 <sup>1</sup>	4.37	4.50	3.66	0.31 x 0.81	4.75	4.56	16
1000	650	SP1000MQMJ	A	8.33/4.17	5.25	5.47 <sup>1</sup>	4.37	4.50	4.45	0.31 x 0.81	4.75	4.56	21
1500	1000	SP1500MQMJ	A	12.5/6.25	5.25	6.85 <sup>1</sup>	4.37	4.50	5.83	0.31 x 0.81	4.75	4.56	28
2000	1300	SP2000MQMJ	A	16.7/8.33	6.38	5.87 <sup>1</sup>	5.31	5.75	4.84	0.31 x 0.81	5.50	5.31	35
3000	2000	SP3000MQMJ	A	25.0/12.5	7.50	7.50	6.50	6.30	7.28	0.44 x 1.00	6.50	6.50	64
5000	3000	SP5000MQMJ	C	41.7/20.8	8.98	9.88	7.76	7.40	7.28	0.44 x 1.00	N/A	N/A	97

Primary and Secondary voltage links/jumpers supplied standard with all transformers. All dimensions in inches  
 Refer to page 75 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
<sup>1</sup> Note: For 750 through 2000 VA units actual overall depth is 0.24" plus the value in column B.

## Group D

Primary Voltage: 240 X 480 || 230 X 460 || 220 X 440  
 Secondary Voltage: 12 X 24 || 11.5 X 23 || 11 X 22



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot G X H	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E				
50	50	SP50QR	A	4.17/2.08	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.7
100	100	SP100QR	A	8.33/4.17	2.99	3.54	2.85	2.52	2.40	0.22 x 0.44	3.23	3.04	3
150	150	SP150QR	A	12.5/6.25	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.3
250	160	SP250QR	A	20.8/10.4	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.5
350	250	SP350QR	A	29.2/14.6	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.3
500	300	SP500QR	B	41.7/20.8	4.49	5.47	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11

Primary and Secondary voltage links/jumpers supplied standard with all transformers. All dimensions in inches  
 Refer to page 75 for wiring schematic drawing. Custom voltages and VA sizes available upon request.



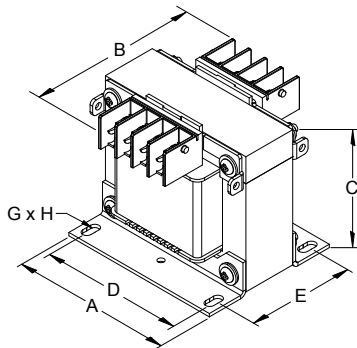


FIGURE A

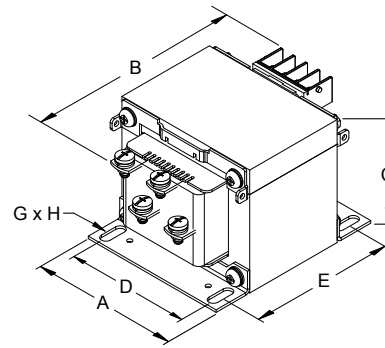


FIGURE B

## Group E

**Primary Voltage:** 380/347  
**Secondary Voltage:** 120 X 240



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50KHP	A	0.42/0.21	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.7
100	100	SP100KHP	A	0.83/0.42	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3.4
150	150	SP150KHP	A	1.25/0.63	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.4
250	160	SP250KHP	A	2.08/1.04	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.7
350	250	SP350KHP	A	2.92/1.46	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.4
500	300	SP500KHP	A	4.17/2.08	4.49	4.69	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	12
750	500	SP750KHP	A	6.25/3.13	5.25	4.69 <sup>1</sup>	4.37	4.50	3.66	0.31 x 0.81	4.75	4.56	17
1000	650	SP1000KHP	A	8.33/4.17	5.25	5.47 <sup>1</sup>	4.37	4.50	4.45	0.31 x 0.81	4.75	4.56	21
1500	1000	SP1500KHP	A	12.5/6.25	6.38	4.88 <sup>1</sup>	5.31	5.75	3.86	0.31 x 0.81	5.69	5.31	29

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 76 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
<sup>1</sup> Note: For 750 through 1500 VA units actual overall depth is 0.24" plus the value in column B.

All dimensions in inches

## Group F

**Primary Voltage:** 380/347  
**Secondary Voltage:** 12 X 24



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50KHR	A	4.17/2.08	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.7
100	100	SP100KHR	A	8.33/4.17	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3.3
150	150	SP150KHR	A	12.5/6.25	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.4
250	160	SP250KHR	A	20.8/10.4	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.4
350	250	SP350KHR	A	29.2/14.6	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.1
500	300	SP500KHR	B	41.7/20.8	4.49	5.47	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 76 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

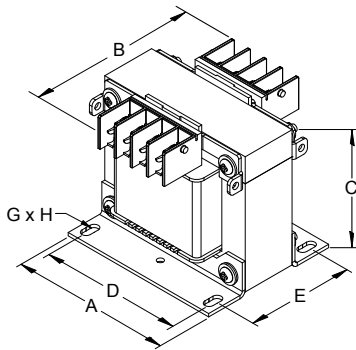


FIGURE A

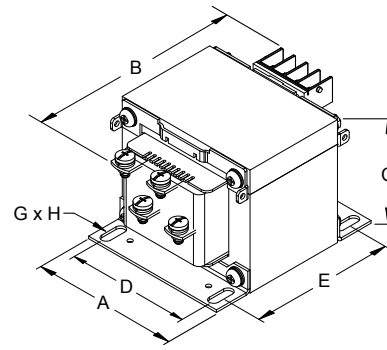


FIGURE B

## Group G

**Primary Voltage:** 277  
**Secondary Voltage:** 120




**50/60 Hertz**

VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50NJ	A	0.42	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.6
100	100	SP100NJ	A	0.83	2.99	3.54	2.85	2.52	2.40	0.22 x 0.44	3.23	3.04	3.2
150	150	SP150NJ	A	1.25	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.3
250	160	SP250NJ	A	2.08	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.4
350	250	SP350NJ	A	2.92	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.1
500	300	SP500NJ	A	4.17	4.49	4.69	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11
750	500	SP750NJ	A	6.25	5.25	5.08 <sup>1</sup>	4.37	4.50	4.06	0.31 x 0.81	4.75	4.56	18
1000	650	SP1000NJ	A	8.33	5.25	5.47 <sup>1</sup>	4.37	4.50	4.45	0.31 x 0.81	4.75	4.56	20
1500	1000	SP1500NJ	A	12.50	5.25	6.85 <sup>1</sup>	4.37	4.50	5.83	0.31 x 0.81	4.75	4.56	29

Primary and Secondary voltage links/jumpers supplied standard with all transformers. All dimensions in inches  
 Refer to page 77 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
<sup>1</sup> Note: For 750 through 1500 VA units actual overall depth is 0.24" plus the value in column B.

## Group H

**Primary Voltage:** 120 X 240 || 115 X 230 || 110 X 220  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22




**50/60 Hertz**

VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50PR	A	4.17/2.08	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.7
100	100	SP100PR	A	8.33/4.17	2.99	3.74	2.85	2.52	2.60	0.22 x 0.44	3.23	3.04	3
150	150	SP150PR	A	12.5/6.25	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.3
250	160	SP250PR	A	20.8/10.4	3.78	3.90	3.40	3.31	2.80	0.22 x 0.44	3.78	3.59	5.9
350	250	SP350PR	A	29.2/14.6	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.2
500	300	SP500PR	B	41.7/20.8	4.49	5.47	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11

Primary and Secondary voltage links/jumpers supplied standard with all transformers. All dimensions in inches  
 Refer to page 77 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

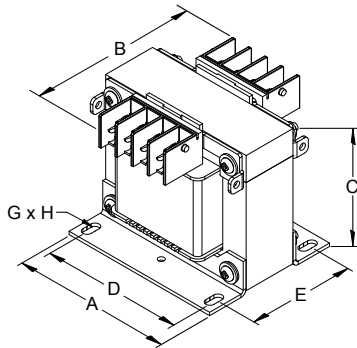


FIGURE A

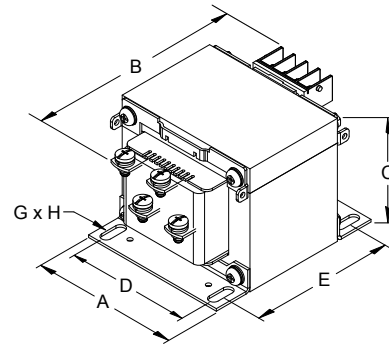


FIGURE B

## Group I

Primary Voltage: **208 X 416** || 200 X 400 || 190 X 380  
 Secondary Voltage: **120 X 240** || 115 X 230 || 110 X 220



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50SP	A	0.42/0.21	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.60	1.6
100	100	SP100SP	A	0.83/0.42	2.99	3.54	2.85	2.52	2.40	0.22 x 0.44	3.23	2.85	3
150	150	SP150SP	A	1.25/0.63	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	2.85	4.3
250	160	SP250SP	A	2.08/1.04	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.40	6.5
350	250	SP350SP	A	2.92/1.46	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.40	8.3
500	300	SP500SP	A	4.17/2.08	4.49	4.69	3.78	3.78	3.66	0.31 x 0.81	4.16	3.78	11
750	500	SP750SP	A	6.25/3.13	5.25	4.69 <sup>1</sup>	4.37	4.50	3.66	0.31 x 0.81	4.75	4.75	16
1000	650	SP1000SP	A	8.33/4.17	5.25	5.47 <sup>1</sup>	4.37	4.50	4.45	0.31 x 0.81	4.75	4.75	20
1500	1000	SP1500SP	A	12.5/6.25	6.38	4.88 <sup>1</sup>	5.31	5.75	3.86	0.31 x 0.81	4.75	5.69	27

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 78 for wiring schematic drawing. Custom voltages and VA sizes available upon request.  
<sup>1</sup> Note: For 750 through 1500 VA units actual overall depth is 0.24" plus the value in column B.

All dimensions in inches

## Group J

Primary Voltage: **208 X 416** || 200 X 400 || 190 X 380  
 Secondary Voltage: **12 X 24** || 11.5 X 23 || 11 X 22



VA Rating	CE VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Height with Finger Guard	Height with Fuse Block Adapter	Approx. Ship Weight Lbs.
					A	B	C	D	E	G X H			
50	50	SP50SR	A	4.17/2.08	2.60	3.35	2.60	2.13	2.17	0.22 x 0.44	2.98	2.79	1.6
100	100	SP100SR	A	8.33/4.17	2.99	3.54	2.85	2.52	2.40	0.22 x 0.44	3.23	3.04	3.1
150	150	SP150SR	A	12.5/6.25	2.99	4.29	2.85	2.52	3.15	0.22 x 0.44	3.23	3.04	4.3
250	160	SP250SR	A	20.8/10.4	3.78	4.09	3.40	3.31	2.99	0.22 x 0.44	3.78	3.59	6.5
350	250	SP350SR	A	29.2/14.6	3.78	4.69	3.40	3.31	3.58	0.22 x 0.44	3.78	3.59	8.3
500	300	SP500SR	B	41.7/20.8	4.49	5.47	3.78	3.78	3.66	0.31 x 0.81	4.16	3.97	11

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 78 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

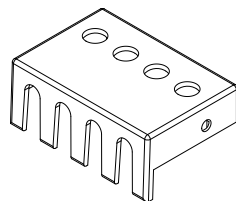
## Optional Accessories

### Finger Guards

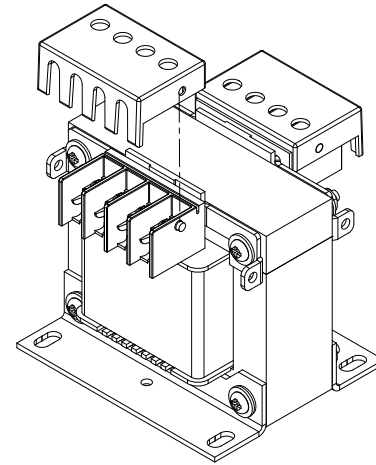
HPS Spartan industrial control transformers up to and including 3000VA or 30 amps are available with optional finger guards.

Part Number	Applicable Transformer Part Number Suffixes	Applicable VA Sizes
SPFG1	AR, QR, PR, KHR, SR	50 to 350
SPFG1	KHP, SP, NJ	50 to 1500
SPFG1	ACP, MQMJ	50 to 3000

Note: Each finger guard supplies either the primary or secondary side. Finger guard option not available on SP5000ACP and SP5000MQMJ standard units. Add 0.38" per finger guard to overall depth (column B) on units from 50 VA to 500 VA and 0.31" to units from 750 VA to 2000 VA when finger guard has been installed. For custom units, optional finger guards are only available on units up to 3000VA or 30 amps.



**Finger Guard**  
(Optional)



**Sample Assembly Drawing for Optional Finger Guard Installation**  
(Only available for units supplied with either a primary or secondary molded terminal block)

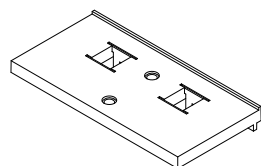
### Fuse Block Adapter Kit

HPS Spartan industrial control transformers up to and including 3000VA or 30 amps are available with optional fuse block adapter kits. The Fuse Block Adapter Kit is designed to allow for the installation of any third party after market fuse block assembly onto the industrial control transformer. The transformer must be a unit that incorporates a molded terminal block on either the primary or secondary side.

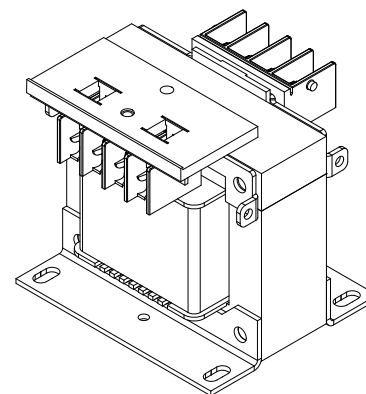
**Note: HPS does not provide any jumpers or appropriate fuses for any after market fuse block you install on the HPS Spartan industrial control transformer. The HPS fuse block adapter kit provides only the mechanical means of attaching a third party after market fuse block. HPS does not recommend any specific fuse block or fuse supplier. For a recommended size of fuse, please see page # 30.**

Kit Part Number	Applicable Transformer Part Number Suffixes	Applicable VA Sizes
SPFBAK1	AR, QR, PR, KHR, SR	50 to 500
SPFBAK1	KHP, SP, NJ	50 to 1500
SPFBAK1	ACP, MQMJ	50 to 3000

Note: Only 1 fuse block adapter kit is required per transformer. Fuse block adapter kit not available on SP5000ACP and SP5000MQMJ standard units. Add 0.38" per fuse block adapter to overall depth (column B) on units from 750 VA to 3000 VA when optional fuse block adapter is installed. For custom units, optional fuse block adapter kit is only available on units up to 3000VA or 30 amps.



**Fuse Block Adapter Kit**  
(Optional)



**Sample Assembly Drawing for Optional Fuse Block Adapter Installation**

For detailed installation instructions of HPS Spartan transformers or the optional finger guards and fuse block adapter kits, please visit our website under Products - Product Links - Instruction Sheets. Or go to the following link: <http://www.hammondpowersolutions.com/instruction-sheets/>

## HPS Fusion™ General Purpose Enclosed Transformer

### The Ideal Solution

The HPS Fusion™ line of single phase, general purpose enclosed transformers are ideally suited for general purpose, industrial and light duty loads. They have been designed for indoor applications and offer an efficient and economical solution. These units are well suited for HVAC applications, signal and alarm systems, motor control circuits, lighting and circuit isolation. The HPS Fusion control transformer is an enclosed style unit with either molded terminal blocks (on units up to 3000 VA or 30 amps) or coil face termination. Optional Finger guards and a fuse block adapter kit are available upon request. For an economical approach to general purpose loads, the HPS Fusion is the transformer of choice.

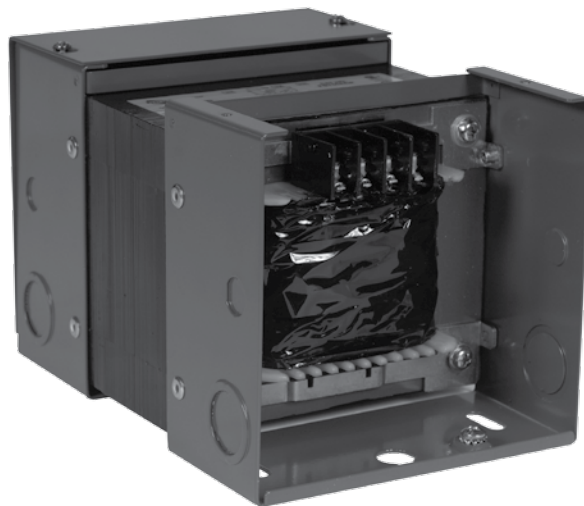


STANDARDS		
The HPS Fusion Control Transformers meet or exceed the standards established by UL, CSA, IEC and NEMA.		
Standard	File #	VA Size
UL (ANSI/UL506)	E50394	All
CSA	LR3902	All
IEC 61558		All
NEMA (ST-1)		All



## Features and Benefits

- Multi-voltage primary and secondary models increase range of applications per unit.
- Standard molded terminal blocks on primary and secondary up to 3000 VA (30A) units.
- Solid terminal block with standard combination screw connections.
- 50/60 Hz (60 Hz on FS\*\*\*ACP and FS\*\*\*AR).
- Copper wound coils with high dielectric strength insulation.
- Bolted core construction.
- Vacuum Impregnated with Polyester Resin and oven cured.
- Superior insulating materials:
  - 130°C (95°C rise) 50 VA to 1500 VA
  - 180°C (115°C rise) 2000 VA to 5000 VA  
(Note: Temperature rise based on 25°C ambient)
- All units supplied with primary and secondary voltage links/jumpers.
- Rugged TYPE 1 enclosure with split side covers provides easy access to wiring compartment.
- Finish - green powder coat.
- Primary and secondary ground lug.
- Four (0.88") wiring knockouts and four (0.50") accessory knockouts.
- Optional panel mount fuse holder.
- Easy mounting and installation via four mounting slots and two keyhole slots.
- Most HPS Fusion units incorporate "Premium Packaging" which feature:
  - Premium fluted cartons
  - Custom molded foam inserts
  - Easy removal and repacking
  - Industry's best box label
  - Environmentally neutral
- **15 Year Warranty.**

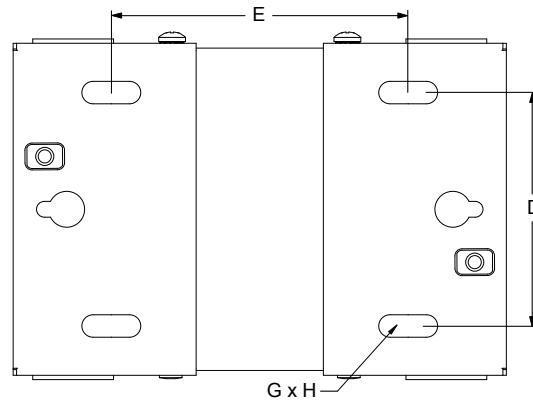
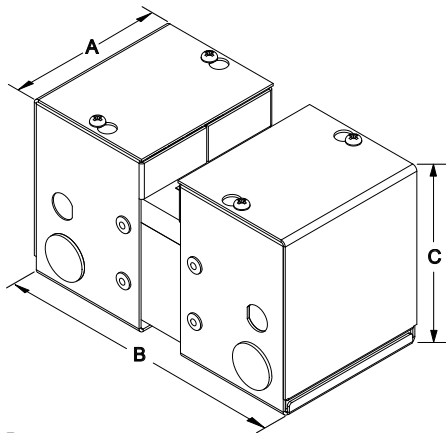




# SECTION 1

# GENERAL PURPOSE ENCLOSED

SECTION 1



## Group A

**Primary Voltage:** 600/480 || 575/460 || 550/440  
**Secondary Voltage:** 120 X 240 || 115 X 230 || 110 X 220



60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50ACP	0.42/0.21	2.7	6.4	3.33	1.66	4.16	0.22 x 0.44	3.0
100	100	FS100ACP	0.83/0.42	3.09	6.3	3.6	2.05	3.5	0.22 x 0.44	4.2
150	150	FS150ACP	1.25/0.63	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.3
250	160	FS250ACP	2.08/1.04	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.6
350	250	FS350ACP	2.92/1.46	3.9	7	4.3	2.52	4.3	0.22 x 0.44	8.7
500	300	FS500ACP	4.17/2.08	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.3
750	500	FS750ACP	6.25/3.13	5.6	7.6	5.1	4	4.9	0.31 x 0.81	20.3
1000	650	FS1000ACP	8.33/4.17	5.6	8	5.1	4	5.3	0.31 x 0.81	22.9
1500	1000	FS1500ACP	12.5/6.25	5.6	9.4	5.1	4	6.7	0.31 x 0.81	30.3
2000	1300	FS2000ACP	16.7/8.33	6.6	9.1	6	5.1	5.7	0.31 x 0.81	37.1
3000	2000	FS3000ACP	25.0/12.5	7.8	11.3	6.7	6.3	6.9	0.31 x 0.81	64.0
5000	3000	FS5000ACP	41.7/20.8	9.3	14.9	8	7.1	7.3	0.31 x 0.81	99.7

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 74 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group B

**Primary Voltage:** 600 || 575 || 550  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22



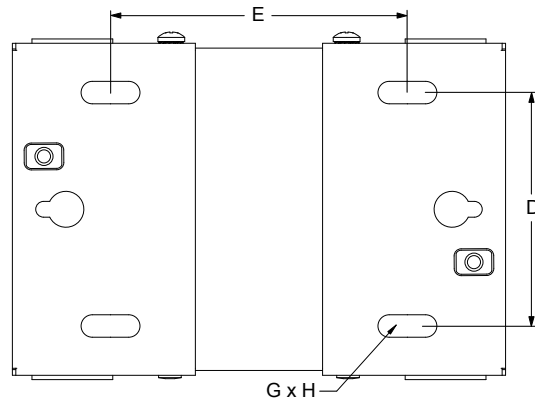
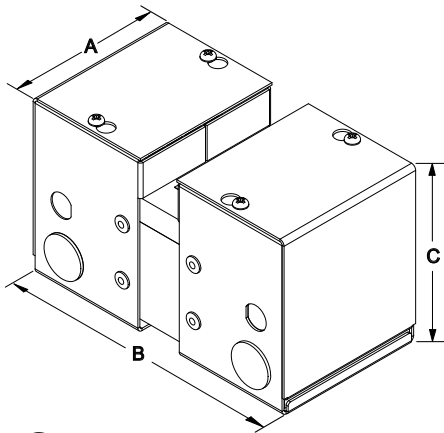
60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50AR	4.17/2.08	2.7	5.8	3.33	1.66	3.58	0.22 x 0.44	2.3
100	100	FS100AR	8.33/4.17	3.09	6.3	3.6	2.05	3.5	0.22 x 0.44	4.2
150	150	FS150AR	12.5/6.25	3.09	6.7	3.6	2.05	3.9	0.22 x 0.44	4.8
250	160	FS250AR	20.8/10.4	3.9	6.2	4.3	2.52	3.5	0.22 x 0.44	6.4
350	250	FS350AR	29.2/14.6	3.9	6.8	4.3	2.52	4.1	0.22 x 0.44	8.3
500	300	FS500AR	41.7/20.8	4.6	6.8	4.1	3.3	4.5	0.31 x 0.81	11.8

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 74 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches





SECTION 1

## Group C

**Primary Voltage:** 240 X 480 || 230 X 460 || 220 X 440  
**Secondary Voltage:** 120 X 240 || 115 X 230 || 110 X 220




**50/60 Hertz**

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50MQMJ	0.42/0.21	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.5
100	100	FS100MQMJ	0.83/0.42	3.09	6.3	3.6	2.05	3.5	0.22 x 0.44	3.9
150	150	FS150MQMJ	1.25/0.63	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250MQMJ	2.08/1.04	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.7
350	250	FS350MQMJ	2.92/1.46	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.4
500	300	FS500MQMJ	4.17/2.08	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.2
750	500	FS750MQMJ	6.25/3.13	5.6	7.2	5.1	4	4.5	0.31 x 0.81	18.0
1000	650	FS1000MQMJ	8.33/4.17	5.6	8	5.1	4	5.3	0.31 x 0.81	22.8
1500	1000	FS1500MQMJ	12.5/6.25	6.6	8.5	6	5.1	5.1	0.31 x 0.81	31.1
2000	1300	FS2000MQMJ	16.7/8.33	6.6	9.1	6	5.1	5.7	0.31 x 0.81	38.1
3000	2000	FS3000MQMJ	25.0/12.5	7.8	11.7	6.7	6.3	7.3	0.31 x 0.81	68.5
5000	3000	FS5000MQMJ	41.7/20.8	9.3	15.1	8	7.4	7.3	0.31 x 0.81	104.2

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 75 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group D

**Primary Voltage:** 240 X 480 || 230 X 460 || 220 X 440  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22



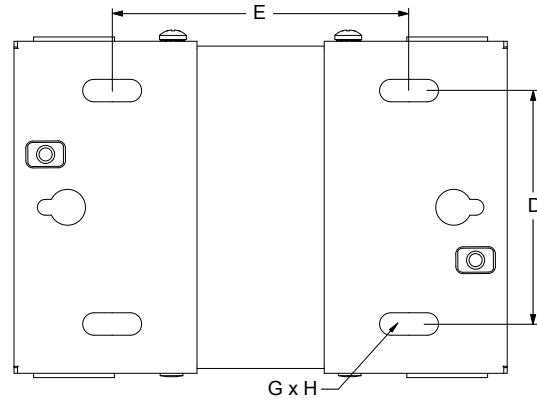
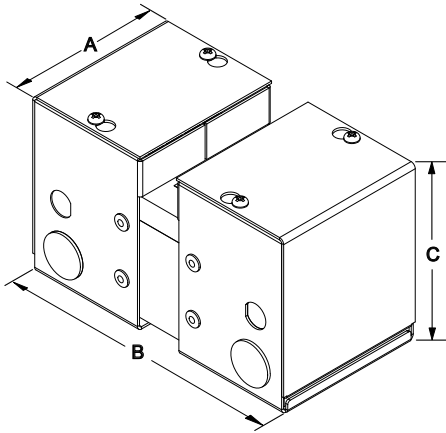

**50/60 Hertz**

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50QR	4.17/2.08	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.5
100	100	FS100QR	8.33/4.17	3.09	6.1	3.6	2.05	3.35	0.22 x 0.44	3.9
150	150	FS150QR	12.5/6.25	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250QR	20.8/10.4	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.7
350	250	FS350QR	29.2/14.6	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.5
500	300	FS500QR	41.7/20.8	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.4

Primary and Secondary voltage links/jumpers supplied standard with all transformers.  
 Refer to page 75 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches





## Group E

**Primary Voltage:** 380/347  
**Secondary Voltage:** 120 X 240




 50/60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50KHP	0.42/0.21	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.5
100	100	FS100KHP	0.83/0.42	3.09	6.3	3.6	2.05	3.5	0.22 x 0.44	4.3
150	150	FS150KHP	1.25/0.63	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.3
250	160	FS250KHP	2.08/1.04	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.9
350	250	FS350KHP	2.92/1.46	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.6
500	300	FS500KHP	4.17/2.08	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.6
750	500	FS750KHP	6.25/3.13	5.6	7.2	5.1	4	4.5	0.31 x 0.81	19
1000	650	FS1000KHP	8.33/4.17	5.6	8	5.1	4	5.3	0.31 x 0.81	23.5
1500	1000	FS1500KHP	12.5/6.25	6.6	8.5	6	5.1	5.1	0.31 x 0.81	31.6

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 76 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group F

**Primary Voltage:** 380/347  
**Secondary Voltage:** 12 X 24

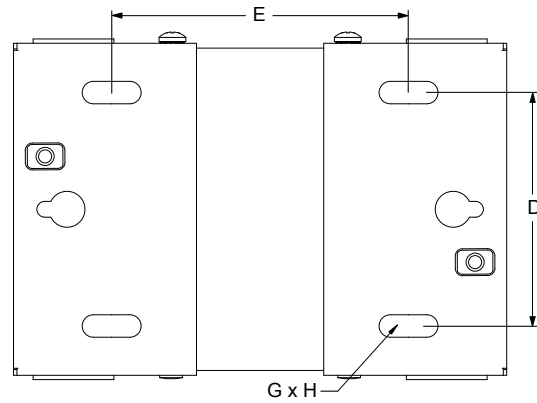
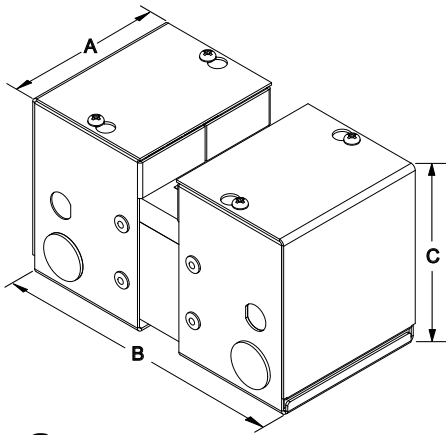



 50/60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50KHR	4.17/2.08	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.5
100	100	FS100KHR	8.33/4.17	3.09	6.3	3.6	2.05	3.5	0.22 x 0.44	4.2
150	150	FS150KHR	12.5/6.25	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.3
250	160	FS250KHR	20.8/10.4	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.6
350	250	FS350KHR	29.2/14.6	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.3
500	300	FS500KHR	41.7/20.8	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.2

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 76 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches



SECTION 1

## Group G

**Primary Voltage:** 277  
**Secondary Voltage:** 120




**50/60 Hertz**

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50NJ	0.42	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.4
100	100	FS100NJ	0.83	3.09	6.1	3.6	2.05	3.35	0.22 x 0.44	4.1
150	150	FS150NJ	1.25	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250NJ	2.08	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.6
350	250	FS350NJ	2.92	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.3
500	300	FS500NJ	4.17	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.3
750	500	FS750NJ	6.25	5.6	7.6	5.1	4	4.9	0.31 x 0.81	20.1
1000	650	FS1000NJ	8.33	5.6	8	5.1	4	5.3	0.31 x 0.81	22.8
1500	1000	FS1500NJ	12.50	5.6	9.4	5.1	4	6.7	0.31 x 0.81	31.1

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 77 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group H

**Primary Voltage:** 120 X 240 || 115 X 230 || 110 X 220  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22



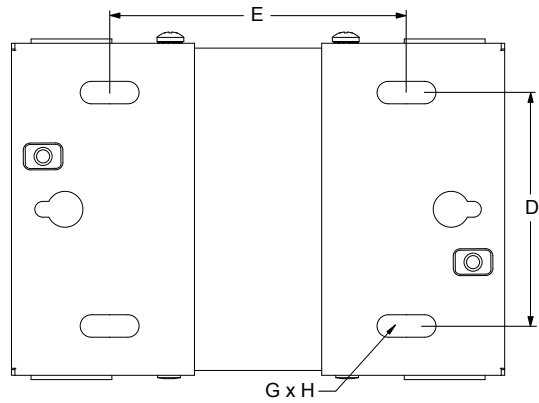
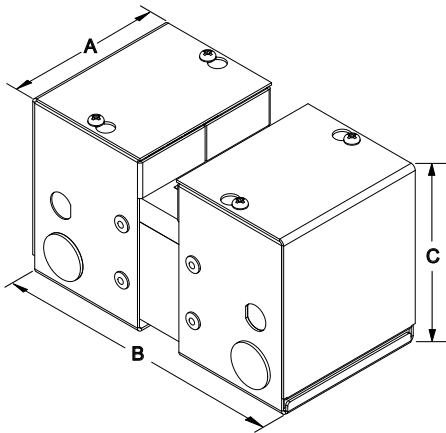

**50/60 Hertz**

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50PR	4.17/2.08	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.5
100	100	FS100PR	8.33/4.17	3.09	6.1	3.6	2.05	3.35	0.22 x 0.44	3.9
150	150	FS150PR	12.5/6.25	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250PR	20.8/10.4	3.9	6.4	4.3	2.52	3.7	0.22 x 0.44	7.1
350	250	FS350PR	29.2/14.6	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.4
500	300	FS500PR	41.7/20.8	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.2

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 77 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches





## Group I

**Primary Voltage:** 208 X 416 || 200 X 400 || 190 X 380  
**Secondary Voltage:** 120 X 240 || 115 X 230 || 110 X 220



50/60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50SP	0.42/0.21	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.4
100	100	FS100SP	0.83/0.42	3.09	6.1	3.6	2.05	3.35	0.22 x 0.44	3.9
150	150	FS150SP	1.25/0.63	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250SP	2.08/1.04	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.7
350	250	FS350SP	2.92/1.46	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.5
500	300	FS500SP	4.17/2.08	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.3
750	500	FS750SP	6.25/3.13	5.6	7.2	5.1	4	4.5	0.31 x 0.81	18.2
1000	650	FS1000SP	8.33/4.17	5.6	8	5.1	4	5.3	0.31 x 0.81	22.5
1500	1000	FS1500SP	12.5/6.25	6.6	8.5	6	5.1	5.1	0.31 x 0.81	30.1

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 78 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

All dimensions in inches

## Group J

**Primary Voltage:** 208 X 416 || 200 X 400 || 190 X 380  
**Secondary Voltage:** 12 X 24 || 11.5 X 23 || 11 X 22



50/60 Hertz

VA Rating	CE VA Rating	Catalog Number	Output Amps	Overall Dimensions			Mounting Centers		Mounting Slot	Approx. Ship Weight Lbs.
				A	B	C	D	E	G X H	
50	50	FS50SR	4.17/2.08	2.7	5.9	3.33	1.66	3.69	0.22 x 0.44	2.4
100	100	FS100SR	8.33/4.17	3.09	6.1	3.6	2.05	3.35	0.22 x 0.44	4
150	150	FS150SR	12.5/6.25	3.09	6.9	3.6	2.05	4.1	0.22 x 0.44	5.2
250	160	FS250SR	20.8/10.4	3.9	6.6	4.3	2.52	3.9	0.22 x 0.44	7.7
350	250	FS350SR	29.2/14.6	3.9	7.2	4.3	2.52	4.9	0.22 x 0.44	9.5
500	300	FS500SR	41.7/20.8	4.6	7.2	4.6	3.3	4.5	0.31 x 0.81	13.3

Primary and Secondary voltage links/jumpers supplied standard with all transformers. Refer to page 78 for wiring schematic drawing. Custom voltages and VA sizes available upon request.

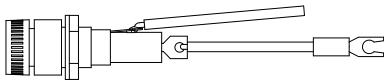
All dimensions in inches

## Optional Accessories

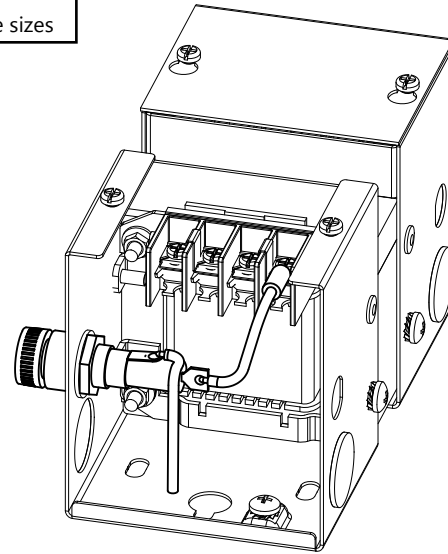
### Fuse Holder Kit

- Optional fuse kit specifically designed up to 250 V (25A) units
- Supplied with leads for easy hook-up/installation
- Fuses NOT included in the kit (must be purchased)
- Fuses should be selected in accordance with CSA, UL and local electrical code

Part Number	Applicable Transformer Part Number Suffixes	Applicable Specifications
<b>FSFH1</b>	All	Up to 20 amps and 250V Designed to accept ¼" x 1 ¼" fuse sizes



**Fuse Kit**  
(Optional)



**Sample Assembly Drawing for  
Optional Fuse Kit Installation**

(Only available for units supplied with either a primary or secondary molded terminal block)

For detailed installation instructions of HPS Fusion transformers or the optional fuse kits, please visit our website under Products - Product Links - Instruction Sheets.

Or go to the following link: <http://www.hammondpowersolutions.com/instruction-sheets/>

## SINGLE PHASE ENCLOSED ENCAPSULATED CONTROL TRANSFORMER FEATURES

For applications where a cost effective approach to general purpose loads indoor or outdoor is required, consider the 'Q' series, single phase encapsulated control transformer. These units are specifically designed for the following applications;

- General purpose enclosed control applications used to adjust a supply voltage to match a load requirement.
- Supplying machine tool circuits.
- Actuating relays, bells, signal and alarm systems.
- Operating small motors, valves and dampers.
- Industrial lighting and circuit isolation.

50 to 5000VA



## SINGLE PHASE ENCLOSED ENCAPSULATED CONTROL STANDARD SPECIFICATIONS

	50 to 5000VA	Benefits
<b>UL Listed</b>	File: E50394	Assures long life and reliable performance.  Rugged one-piece assembly with low noise provides optimum performance and reliability.  Provides enhanced voltage regulation, excellent thermal characteristics and compliments modern winding techniques.  Completely encloses the core and coil to seal out moisture, airborne contaminants and eliminates corrosion & insulation deterioration.  Meets the heavy industrial trade requirements for indoor/outdoor enclosed transformers.  Ample space for transformer connection for primary and secondary terminations.  Facilitates any installation requirement.
<b>CSA Certified</b>	File: LR3902	
<b>Frequency</b>	60 Hertz	
<b>Insulation System</b>	130°C (80°C rise) up to 1 kVA 180°C (115°C rise) 1.5 kVA to 5kVA	
<b>Standard Design</b>	Single Phase, all welded core construction made with high quality, high permeability silicon steel laminations. Computer designed coils, accurately wound with optimum mean turns made from high quality magnetic wire with insulation film.	
<b>Encapsulation</b>	All units from 50VA to 5kVA are encapsulated with electrical grade silica sand and resin compounds.	
<b>Enclosure Type</b>	Heavy Duty Type 3R (conduit knockouts on sides and rear)	
<b>Termination</b>	Front accessible wiring compartment with high and low voltage copper lead wires or tabs.	
<b>Mounting</b>	Designed for vertical or horizontal mounting.	

## SINGLE PHASE, NEMA 3R STYLE ENCLOSURE



**600 Primary Volts**

**12/24 Secondary Volts**

**60 Hz**

VA Rating	Catalog Number	Case Style (Page 228)	Approx. Dimensions (Inches)			Approx. Weight (Lbs.)	Mtg Type W - Wall	Wiring Diagram (Page 240)
			Width	Depth	Height			
50	<b>QC05PRCB</b>	NQ0	3.69	5.06	7.19	6	W	SCD 4
100	<b>QC10PRCB</b>	NQ0	3.69	5.06	7.19	7	W	SCD 4
150	<b>QC15PRCB</b>	NQ0	3.69	5.06	7.19	8	W	SCD 4
200	<b>QC20PRCB</b>	NQ1	4.31	5.56	7.19	11	W	SCD 4
250	<b>QC25PRCB</b>	NQ1	4.31	5.56	7.19	13	W	SCD 4
350	<b>QC35PRCB</b>	NQ1	4.31	5.56	7.19	14	W	SCD 4
500	<b>QC50PRCB</b>	NQ2	5.06	4.56	9.30	15	W	SCD 4
750	<b>QC75PRCB</b>	NQ2	5.06	4.56	9.30	18	W	SCD 4
1000	<b>Q1C0PRCB</b>	NQ3	5.88	5.19	10.56	25	W	SCD 4
1500	<b>Q1C5PRCF</b>	NQ4	7.06	6.25	11.75	36	W	SCD 4
2000	<b>Q002PRCF</b>	NQ4	7.06	6.25	11.75	46	W	SCD 4
3000	<b>Q003PRCF</b>	NQ4	7.06	6.25	11.75	65	W	SCD 4
5000	<b>Q005PRCF</b>	NQ5	10.00	7.75	17.25	105	W	SCD 4

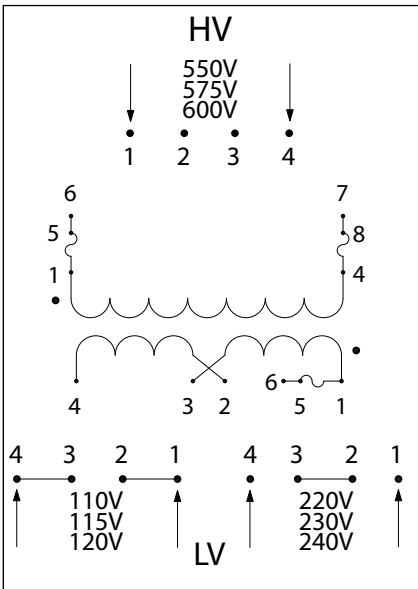
SECTION 1





# HPS Imperator - Wiring Schematic Drawings

## Group A



**PH\*\*\*AJ Schematic for 50, 75 and 100VA Units**

**High Voltage (HV)  
(Primary Volts)**

600	575	550
600	575	550

**Install Supplied Jumpers/  
Links Between Terminals**

None
None

**Supply Lines  
Connect To**

1, 4
6, 7

**Install Fuse  
Clips To**

Unfused
1-5, 4-8

**Low Voltage (LV)  
(Secondary Volts)**

120	115	110
240	230	220
120	115	110
240	230	220

**Install Supplied Links  
Between Terminals**

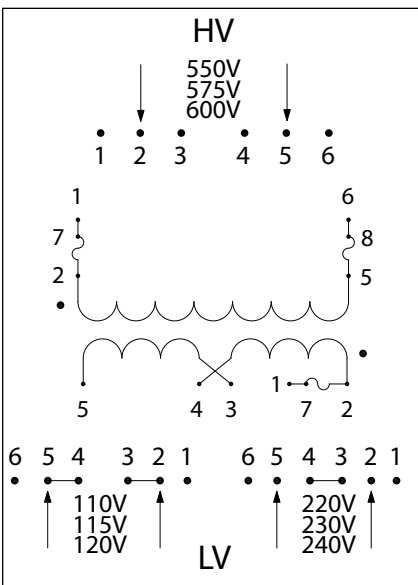
3-4, 1-2
2-3
3-4, 1-2
2-3

**Load Lines  
Connect To**

1, 4
1, 4
4, 6
4, 6

**Install Fuse  
Clips To**

Unfused
Unfused
1-5
1-5



**PH\*\*\*AJ Schematic for 150VA to 1500VA Units**

**High Voltage (HV)  
(Primary Volts)**

600	575	550
600	575	550

**Install Supplied Jumpers/  
Links Between Terminals**

None
None

**Supply Lines  
Connect To**

2, 5
1, 6

**Install Fuse  
Clips To**

Unfused
2-7, 5-8

**Low Voltage (LV)  
(Secondary Volts)**

120	115	110
240	230	220
120	115	110
240	230	220

**Install Supplied Links  
Between Terminals**

4-5, 2-3
3-4
4-5, 2-3
3-4

**Load Lines  
Connect To**

2, 5
2, 5
1, 5
1, 5

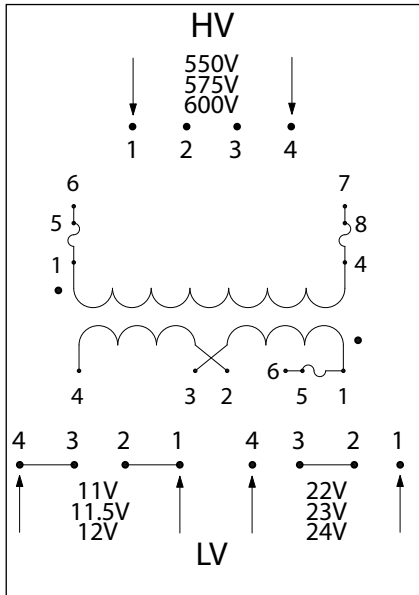
**Install Fuse  
Clips To**

Unfused
Unfused
2-7
2-7

## HPS Imperator - Wiring Schematic Drawings continued

### Group B

SECTION 1

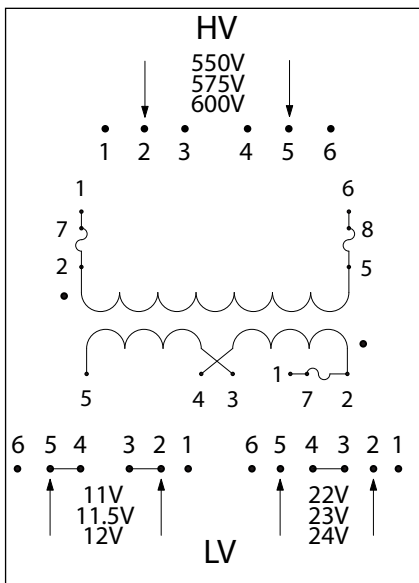


**PH\*\*\*AR Schematic for 50, 75 and 100VA Units**

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers/ Links Between Terminals	Supply Lines Connect To	Install Fuse Clips To
600 575 550	None	1, 4	Unfused
600 575 550	None	6, 7	1-5, 4-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
12 11.5 11	3-4, 1-2	1, 4	Unfused
24 23 22	2-3	1, 4	Unfused
12 11.5 11	3-4, 1-2	4, 6	1-5
24 23 22	2-3	4, 6	1-5



**PH\*\*\*AR Schematic for 150VA to 500VA Units**

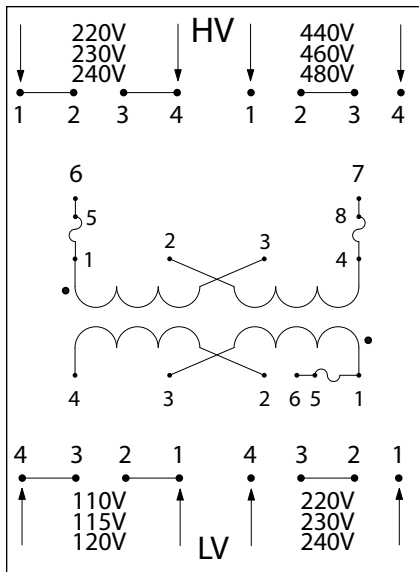
High Voltage (HV) (Primary Volts)	Install Supplied Jumpers/ Links Between Terminals	Supply Lines Connect To	Install Fuse Clips To
600 575 550	None	2, 5	Unfused
600 575 550	None	1, 6	2-7, 5-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
12 11.5 11	4-5, 2-3	2, 5	Unfused
24 23 22	3-4	2, 5	Unfused
12 11.5 11	4-5, 2-3	1, 5	2-7
24 23 22	3-4	1, 5	2-7

## HPS Imperator - Wiring Schematic Drawings continued

### Group C



### PH\*\*\*MQMJ Schematic for 50, 75 and 100VA Units

#### High Voltage (HV) (Primary Volts)

240	230	220
480	460	440
240	230	220
480	460	440

#### Install Supplied Links Between Terminals

1-2, 3-4
2-3
1-2, 3-4
2-3

#### Supply Lines Connect To

1, 4
1, 4
6, 7
6, 7

#### Install Fuse Clips To

Unfused
Unfused
1-5, 4-8
1-5, 4-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

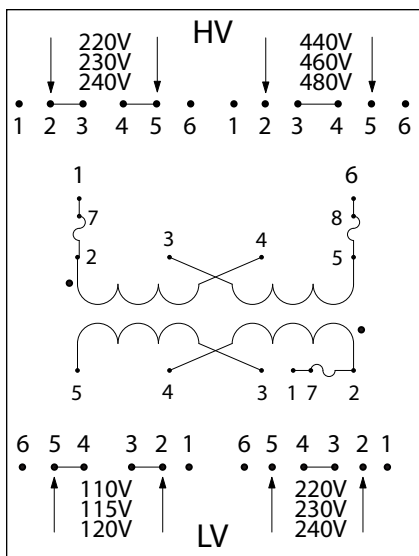
3-4, 1-2
2-3
3-4, 1-2
2-3

#### Load Lines Connect To

1, 4
1, 4
4, 6
4, 6

#### Install Fuse Clips To

Unfused
Unfused
1-5
1-5



### PH\*\*\*MQMJ Schematic for 150VA to 1500VA Units

#### High Voltage (HV) (Primary Volts)

240	230	220
480	460	440
240	230	220
480	460	440

#### Install Supplied Links Between Terminals

2-3, 4-5
3-4
2-3, 4-5
3-4

#### Supply Lines Connect To

2, 5
2, 5
1, 6
1, 6

#### Install Fuse Clips To

Unfused
Unfused
2-7, 5-8
2-7, 5-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

4-5, 2-3
3-4
4-5, 2-3
3-4

#### Load Lines Connect To

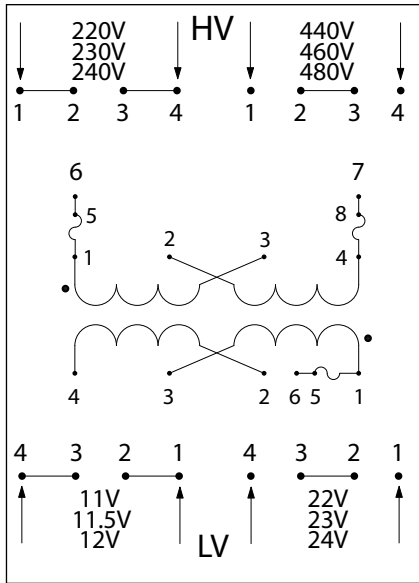
2, 5
2, 5
1, 5
1, 5

#### Install Fuse Clips To

Unfused
Unfused
2-7
2-7

## HPS Imperator - Wiring Schematic Drawings continued

### Group D



### PH\*\*\*QR Schematic for 50, 75 and 100VA Units

#### High Voltage (HV) (Primary Volts)

240	230	220
480	460	440
240	230	220
480	460	440

#### Install Supplied Links Between Terminals

1-2, 3-4
2-3
1-2, 3-4
2-3

#### Supply Lines Connect To

1, 4
1, 4
6, 7
6, 7

#### Install Fuse Clips To

Unfused
Unfused
1-5, 4-8
1-5, 4-8

#### Low Voltage (LV) (Secondary Volts)

12	11.5	11
24	23	22
12	11.5	11
24	23	22

#### Install Supplied Links Between Terminals

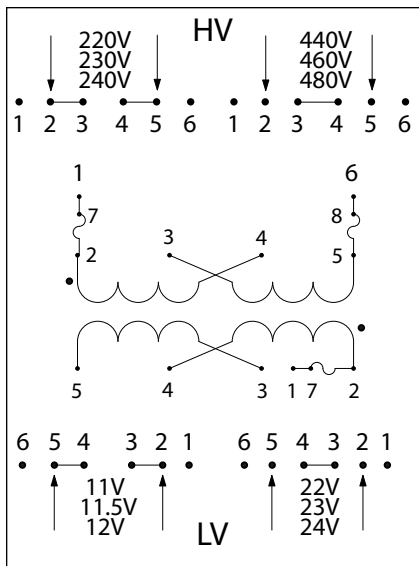
3-4, 1-2
2-3
3-4, 1-2
2-3

#### Load Lines Connect To

1, 4
1, 4
4, 6
4, 6

#### Install Fuse Clips To

Unfused
Unfused
1-5
1-5



### PH\*\*\*QR Schematic for 150VA to 500VA Units

#### High Voltage (HV) (Primary Volts)

240	230	220
480	460	440
240	230	220
480	460	440

#### Install Supplied Links Between Terminals

2-3, 4-5
3-4
2-3, 4-5
3-4

#### Supply Lines Connect To

2, 5
2, 5
1, 6
1, 6

#### Install Fuse Clips To

Unfused
Unfused
2-7, 5-8
2-7, 5-8

#### Low Voltage (LV) (Secondary Volts)

12	11.5	11
24	23	22
12	11.5	11
24	23	22

#### Install Supplied Links Between Terminals

4-5, 2-3
3-4
4-5, 2-3
3-4

#### Load Lines Connect To

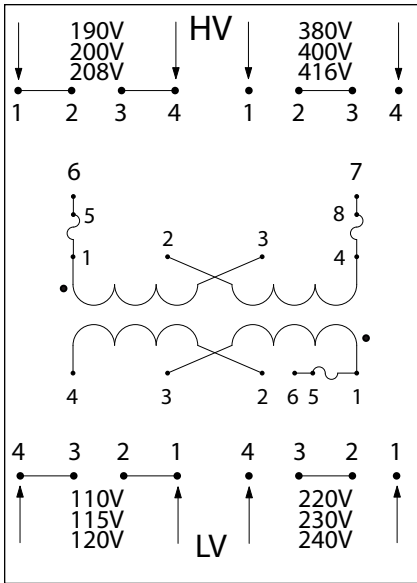
2, 5
2, 5
1, 5
1, 5

#### Install Fuse Clips To

Unfused
Unfused
2-7
2-7

## HPS Imperator - Wiring Schematic Drawings continued

### Group E



### PH\*\*\*SP Schematic for 50, 75 and 100VA Units

#### High Voltage (HV) (Primary Volts)

208	200	190
416	400	380
208	200	190
416	400	380

#### Install Supplied Links Between Terminals

1-2, 3-4
2-3
1-2, 3-4
2-3

#### Supply Lines Connect To

1, 4
1, 4
6, 7
6, 7

#### Install Fuse Clips To

Unfused
Unfused
1-5, 4-8
1-5, 4-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

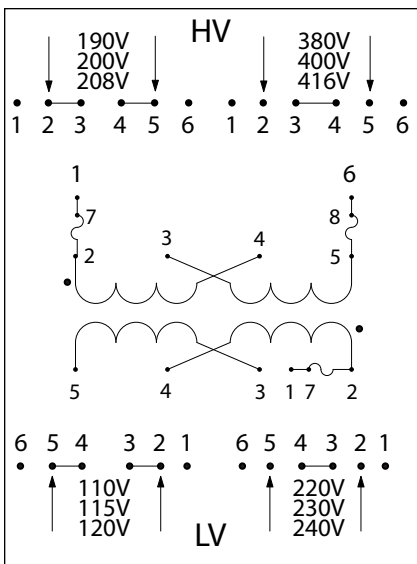
3-4, 1-2
2-3
3-4, 1-2
2-3

#### Load Lines Connect To

1, 4
1, 4
4, 6
4, 6

#### Install Fuse Clips To

Unfused
Unfused
1-5
1-5



### PH\*\*\*SP Schematic for 150VA to 1000VA Units

#### High Voltage (HV) (Primary Volts)

208	200	190
416	400	380
208	200	190
416	400	380

#### Install Supplied Links Between Terminals

2-3, 4-5
3-4
2-3, 4-5
3-4

#### Supply Lines Connect To

2, 5
2, 5
1, 6
1, 6

#### Install Fuse Clips To

Unfused
Unfused
2-7, 5-8
2-7, 5-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

4-5, 2-3
3-4
4-5, 2-3
3-4

#### Load Lines Connect To

2, 5
2, 5
1, 5
1, 5

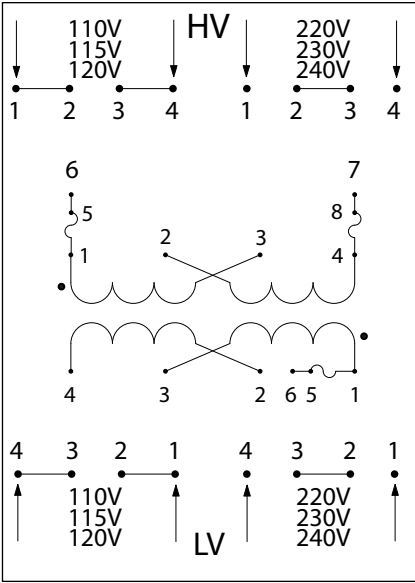
#### Install Fuse Clips To

Unfused
Unfused
2-7
2-7

## HPS Imperator - Wiring Schematic Drawings continued

### Group F

SECTION 1



### PH\*\*\*PP Schematic for 50, 75 and 100VA Units

#### High Voltage (HV) (Primary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

1-2, 3-4
2-3
1-2, 3-4
2-3

#### Supply Lines Connect To

1, 4
1, 4
6, 7
6, 7

#### Install Fuse Clips To

Unfused
Unfused
1-5, 4-8
1-5, 4-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

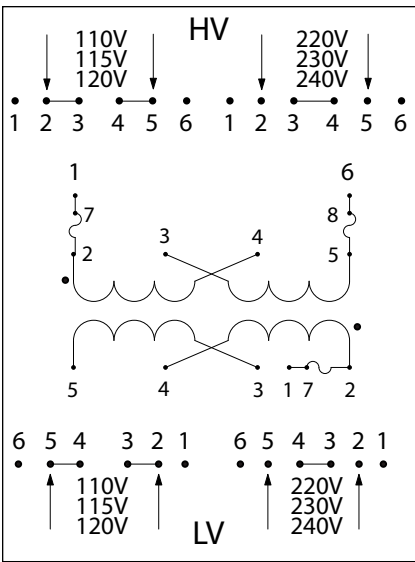
3-4, 1-2
2-3
3-4, 1-2
2-3

#### Load Lines Connect To

1, 4
1, 4
4, 6
4, 6

#### Install Fuse Clips To

Unfused
Unfused
1-5
1-5



### PH\*\*\*PP Schematic for 150VA to 1500VA Units

#### High Voltage (HV) (Primary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

2-3, 4-5
3-4
2-3, 4-5
3-4

#### Supply Lines Connect To

2, 5
2, 5
1, 6
1, 6

#### Install Fuse Clips To

Unfused
Unfused
2-7, 5-8
2-7, 5-8

#### Low Voltage (LV) (Secondary Volts)

120	115	110
240	230	220
120	115	110
240	230	220

#### Install Supplied Links Between Terminals

4-5, 2-3
3-4
4-5, 2-3
3-4

#### Load Lines Connect To

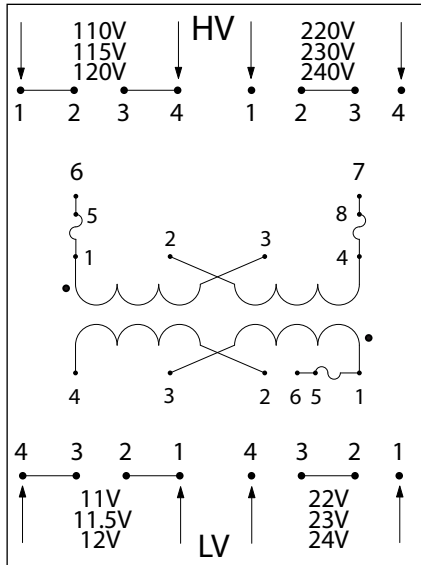
2, 5
2, 5
1, 5
1, 5

#### Install Fuse Clips To

Unfused
Unfused
2-7
2-7

## HPS Imperator - Wiring Schematic Drawings continued

### Group G



**PH\*\*PG Schematic for 50, 75 and 100VA Units**

**High Voltage (HV)  
(Primary Volts)**

120	115	110
240	230	220
120	115	110
240	230	220

**Install Supplied Links  
Between Terminals**

1-2, 3-4
2-3
1-2, 3-4
2-3

**Supply Lines  
Connect To**

1, 4
1, 4
6, 7
6, 7

**Install Fuse  
Clips To**

Unfused
Unfused
1-5, 4-8
1-5, 4-8

**Low Voltage (LV)  
(Secondary Volts)**

12	11.5	11
24	23	22
12	11.5	11
24	23	22

**Install Supplied Links  
Between Terminals**

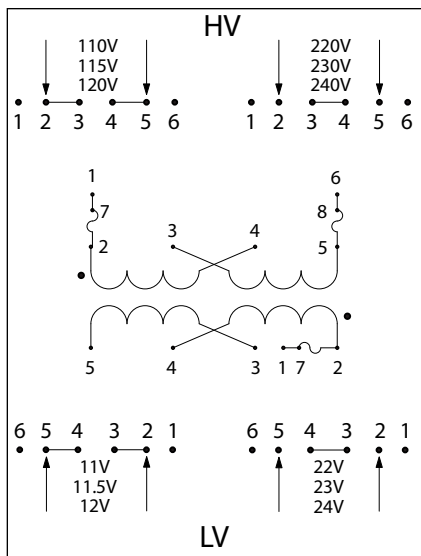
3-4, 1-2
2-3
3-4, 1-2
2-3

**Load Lines  
Connect To**

1, 4
1, 4
4, 6
4, 6

**Install Fuse  
Clips To**

Unfused
Unfused
1-5
1-5



**PH\*\*PG Schematic for 150VA to 500VA Units**

**High Voltage (HV)  
(Primary Volts)**

120	115	110
240	230	220
120	115	110
240	230	220

**Install Supplied Links  
Between Terminals**

2-3, 4-5
3-4
2-3, 4-5
3-4

**Supply Lines  
Connect To**

2, 5
2, 5
1, 6
1, 6

**Install Fuse  
Clips To**

Unfused
Unfused
2-7, 5-8
2-7, 5-8

**Low Voltage (LV)  
(Secondary Volts)**

12	11.5	11
24	23	22
12	11.5	11
24	23	22

**Install Supplied Links  
Between Terminals**

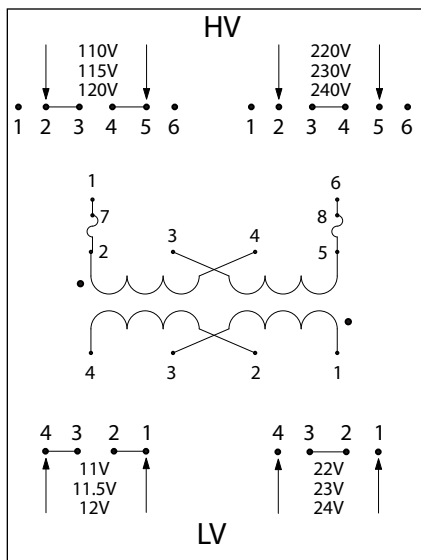
4-5, 2-3
3-4
4-5, 2-3
3-4

**Load Lines  
Connect To**

2, 5
2, 5
1, 5
1, 5

**Install Fuse  
Clips To**

Unfused
Unfused
2-7
2-7



**PH\*\*PG Schematic for 750VA and 1000VA Units**

**High Voltage (HV)  
(Primary Volts)**

120	115	110
240	230	220
120	115	110
240	230	220

**Install Supplied Links  
Between Terminals**

2-3, 4-5
3-4
2-3, 4-5
3-4

**Supply Lines  
Connect To**

2, 5
2, 5
1, 6
1, 6

**Install Fuse  
Clips To**

Unfused
Unfused
2-7, 5-8
2-7, 5-8

**Low Voltage (LV)  
(Secondary Volts)**

12	11.5	11
24	23	22

**Install Supplied Links  
Between Terminals**

3-4, 1-2
2-3

**Load Lines  
Connect To**

1, 4
1, 4

**Install Fuse  
Clips To**

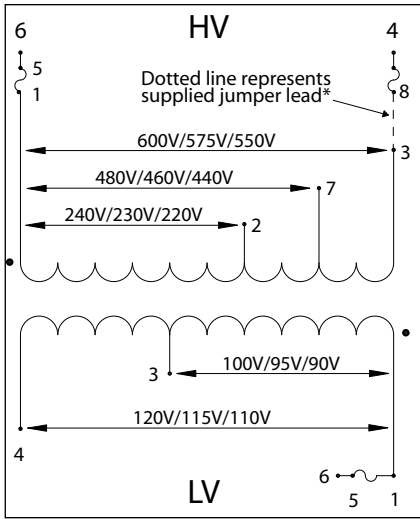
Unfused
Unfused

Note: secondary fuse clips not available on PH750PG or PH1000PG.

## HPS Imperator - Wiring Schematic Drawings continued

### Group H

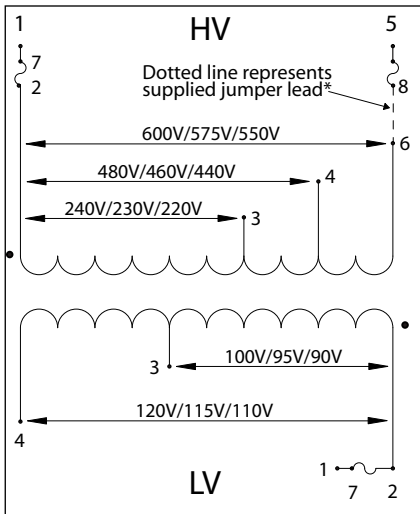
SECTION 1



**PH\*\*\*MBMH Schematic for 50 and 75VA Units**

High Voltage (HV) (Primary Volts)			Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
600	575	550	None	1, 3	Unfused
480	460	440	None	1, 7	Unfused
240	230	220	None	1, 2	Unfused
600	575	550	3-8	6, 4	1-5, 4-8
480	460	440	8-7	6, 4	1-5, 4-8
240	230	220	2-8	6, 4	1-5, 4-8
Low Voltage (LV) (Secondary Volts)			Install Supplied Jumpers/ Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
120	115	110	None	1, 4	Unfused
100	95	90	None	1, 3	Unfused
120	115	110	None	4, 6	1-5
100	95	90	None	3, 6	1-5

\*This primary fuse jumper is supplied with the primary fuse kit only.



**PH\*\*\*MBMH Schematic for 100VA to 1500VA Units**

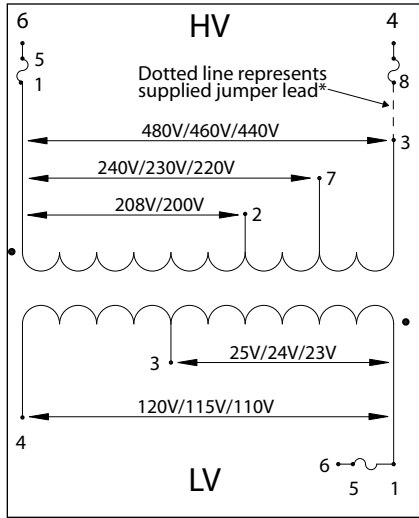
High Voltage (HV) (Primary Volts)			Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
600	575	550	None	2, 6	Unfused
480	460	440	None	2, 4	Unfused
240	230	220	None	2, 3	Unfused
600	575	550	8-6	1, 5	2-7, 5-8
480	460	440	4-8	1, 5	2-7, 5-8
240	230	220	3-8	1, 5	2-7, 5-8
Low Voltage (LV) (Secondary Volts)			Install Supplied Jumpers/ Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
120	115	110	None	2, 4	Unfused
100	95	90	None	2, 3	Unfused
120	115	110	None	1, 4	2-7
100	95	90	None	1, 3	2-7

\*This primary fuse jumper is supplied with the primary fuse kit only.



## HPS Imperator - Wiring Schematic Drawings continued

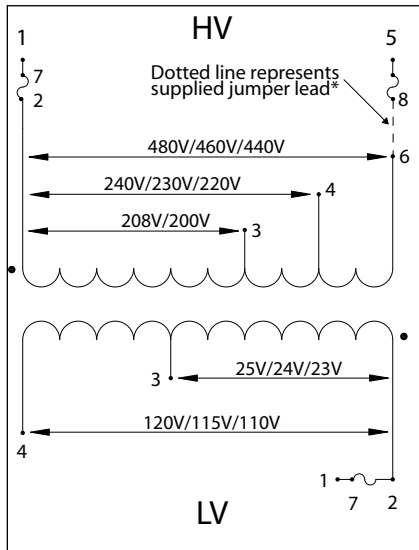
### Group I



\*This primary fuse jumper is supplied with the primary fuse kit only.

### PH\*\*\*MLI Schematic for 50, 75 and 100VA Units

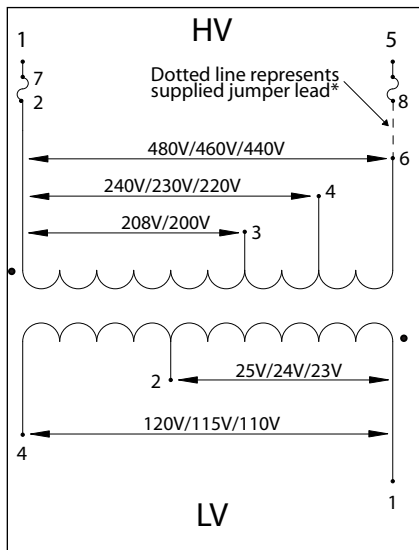
High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
480 460 440	None	1, 3	Unfused
240 230 220	None	1, 7	Unfused
208 200	None	1, 2	Unfused
480 460 440	3-8	6, 4	1-5, 4-8
240 230 220	8-7	6, 4	1-5, 4-8
208 200	2-8	6, 4	1-5, 4-8
Low Voltage (LV) (Secondary Volts)	Install Supplied Jumpers Between Terminals	Load Lines Connect To	Install Fuse Clips To
120 115 110	None	1, 4	Unfused
25 24 23	None	1, 3	Unfused
120 115 110	None	4, 6	1-5
25 24 23	None	3, 6	1-5



\*This primary fuse jumper is supplied with the primary fuse kit only.

### PH\*\*\*MLI Schematic for 150VA to 500VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
480 460 440	None	2, 6	Unfused
240 230 220	None	2, 4	Unfused
208 200	None	2, 3	Unfused
480 460 440	8-6	1, 5	2-7, 5-8
240 230 220	4-8	1, 5	2-7, 5-8
208 200	3-8	1, 5	2-7, 5-8
Low Voltage (LV) (Secondary Volts)	Install Supplied Jumpers Between Terminals	Load Lines Connect To	Install Fuse Clips To
120 115 110	None	2, 4	Unfused
25 24 23	None	2, 3	Unfused
120 115 110	None	1, 4	2-7
25 24 23	None	1, 3	2-7



\*This primary fuse jumper is supplied with the primary fuse kit only.

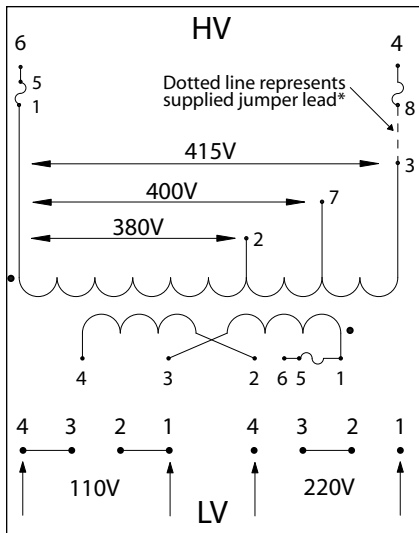
### PH\*\*\*MLI Schematic for 750VA and 1000VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
480 460 440	None	2, 6	Unfused
240 230 220	None	2, 4	Unfused
208 200	None	2, 3	Unfused
480 460 440	8-6	1, 5	2-7, 5-8
240 230 220	4-8	1, 5	2-7, 5-8
208 200	3-8	1, 5	2-7, 5-8
Low Voltage (LV) (Secondary Volts)	Install Supplied Jumpers Between Terminals	Load Lines Connect To	Install Fuse Clips To
120 115 110	None	1, 4	Unfused
25 24 23	None	1, 2	Unfused

Note: secondary fuse clips for 24V tap not available on the PH750MLI or PH1000MLI units.

## HPS Imperator - Wiring Schematic Drawings continued

### Group J



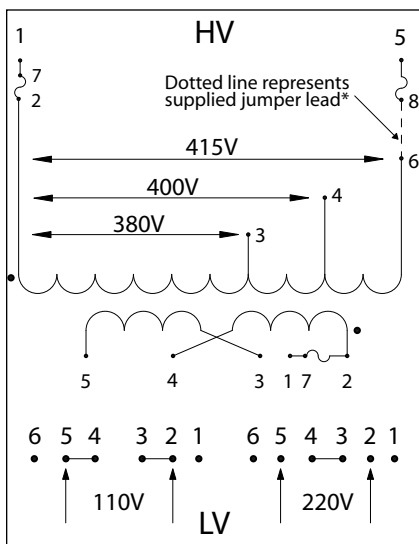
### PH\*\*\*MEMX Schematic for 50, 75 and 100VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
415	None	1, 3	Unfused
400	None	1, 7	Unfused
380	None	1, 2	Unfused
415	3-8	6, 4	1-5, 4-8
400	8-7	6, 4	1-5, 4-8
380	2-8	6, 4	1-5, 4-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
110	3-4, 1-2	1, 4	Unfused
220	2-3	1, 4	Unfused
110	3-4, 1-2	4, 6	1-5
220	2-3	4, 6	1-5

\*This primary fuse jumper is supplied with the primary fuse kit only.



### PH\*\*\*MEMX Schematic for 150VA to 1000VA Units

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
415	None	2, 6	Unfused
400	None	2, 4	Unfused
380	None	2, 3	Unfused
415	8-6	1, 5	2-7, 5-8
400	4-8	1, 5	2-7, 5-8
380	3-8	1, 5	2-7, 5-8

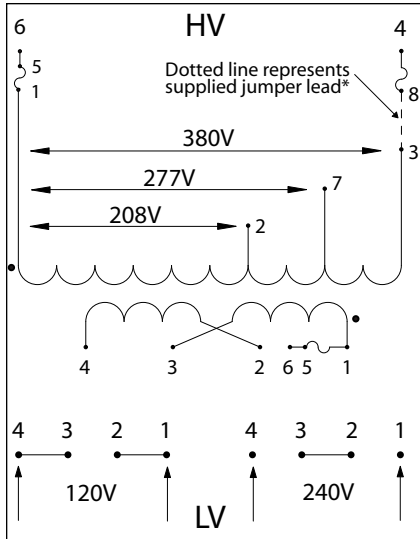
  

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
110	4-5, 2-3	2, 5	Unfused
220	3-4	2, 5	Unfused
110	4-5, 2-3	1, 5	2-7
220	3-4	1, 5	2-7

\*This primary fuse jumper is supplied with the primary fuse kit only.

## HPS Imperator - Wiring Schematic Drawings continued

### Group K



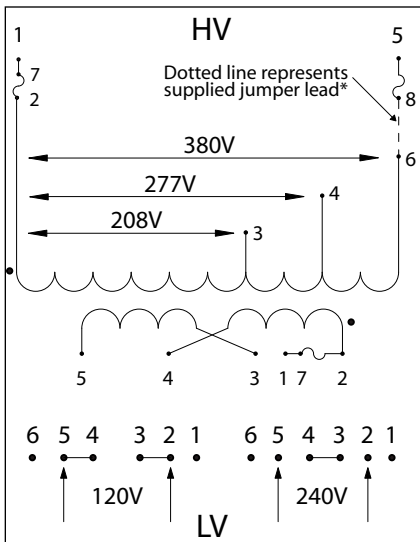
**PH\*\*\*MGJ Schematic for 50, 75 and 100VA Units**

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
380	None	1, 3	Unfused
277	None	1, 7	Unfused
208	None	1, 2	Unfused
380	3-8	6, 4	1-5, 4-8
277	8-7	6, 4	1-5, 4-8
208	2-8	6, 4	1-5, 4-8

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
120	3-4, 1-2	1, 4	Unfused
240	2-3	1, 4	Unfused
120	3-4, 1-2	4, 6	1-5
240	2-3	4, 6	1-5

\*This primary fuse jumper is supplied with the primary fuse kit only.



**PH\*\*\*MGJ Schematic for 150VA to 1000VA Units**

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To	Install Fuse Clips To
380	None	2, 6	Unfused
277	None	2, 4	Unfused
208	None	2, 3	Unfused
380	8-6	1, 5	2-7, 5-8
277	4-8	1, 5	2-7, 5-8
208	3-8	1, 5	2-7, 5-8

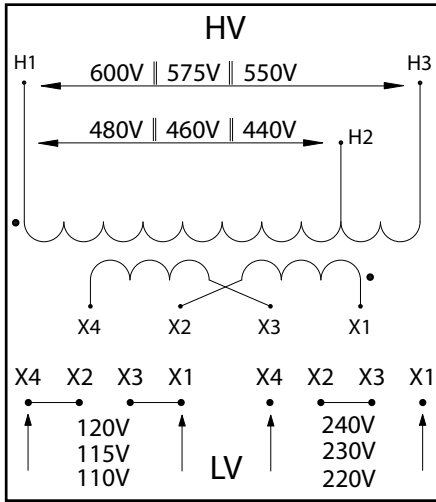
Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To	Install Fuse Clips To
120	4-5, 2-3	2, 5	Unfused
240	3-4	2, 5	Unfused
120	4-5, 2-3	1, 5	2-7
240	3-4	1, 5	2-7

\*This primary fuse jumper is supplied with the primary fuse kit only.

SECTION 1

## HPS Spartan and HPS Fusion - Wiring Schematic Drawings

### Group A



**SP\*\*\*ACP Schematic Connections for 600/480 to 120 X 240**

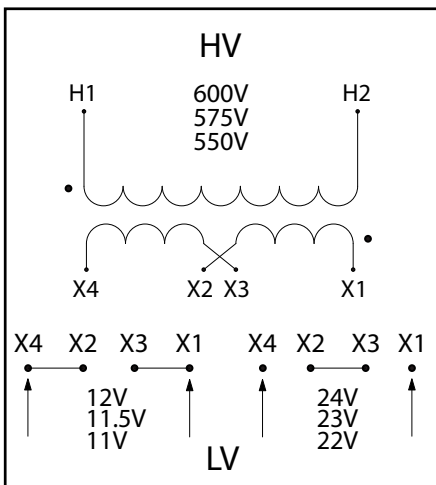
**FS\*\*\*ACP Schematic Connections for 600/480 to 120 X 240**

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
600 575 550	None	H1, H3
480 460 440	None	H1, H2

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
120 115 110	X1-X3, X2-X4	X1, X4
240 230 220	X2-X3	X1, X4

### Group B



**SP\*\*\*AR Schematic Connections for 600/480 to 12 X 24**

**FS\*\*\*AR Schematic Connections for 600/480 to 12 X 24**

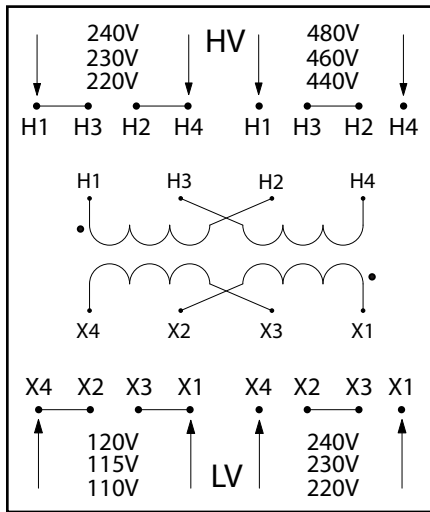
High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
600 575 550	None	H1, H2

Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
12 11.5 11	X1-X3, X2-X4	X1, X4
24 23 22	X2-X3	X1, X4

## HPS Fusion and HPS Spartan - Wiring Schematic Drawings continued

### Group C

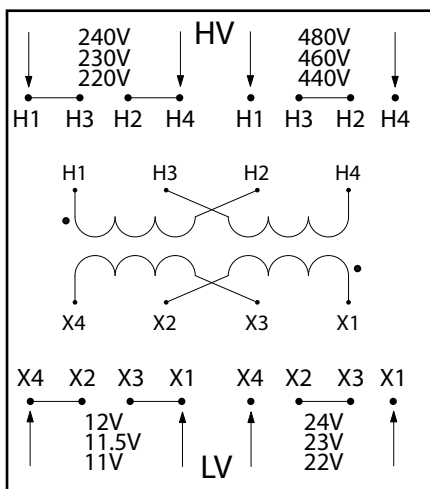


#### SP\*\*\*MQMJ Schematic Connections for 240 X 480 to 120 X 240

#### FS\*\*\*MQMJ Schematic Connections for 240 X 480 to 120 X 240

High Voltage (HV) (Primary Volts)			Install Supplied Jumpers Between Terminals	Supply Lines Connect To
240	230	220	H1-H3, H2-H4	H1, H4
480	460	440	H2-H3	H1, H4
Low Voltage (LV) (Secondary Volts)			Install Supplied Links Between Terminals	Load Lines Connect To
120	115	110	X1-X3, X2-X4	X1, X4
240	230	220	X2-X3	X1, X4

### Group D



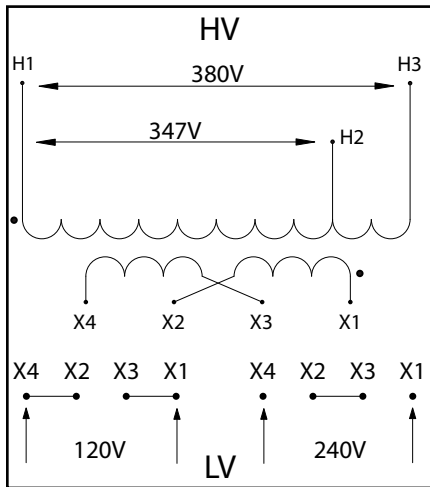
#### SP\*\*\*QR Schematic Connections for 240 X 480 to 12 X 24

#### FS\*\*\*QR Schematic Connections for 240 X 480 to 12 X 24

High Voltage (HV) (Primary Volts)			Install Supplied Jumpers Between Terminals	Supply Lines Connect To
240	230	220	H1-H3, H2-H4	H1, H4
480	460	440	H2-H3	H1, H4
Low Voltage (LV) (Secondary Volts)			Install Supplied Links Between Terminals	Load Lines Connect To
12	11.5	11	X1-X3, X2-X4	X1, X4
24	23	22	X2-X3	X1, X4

## HPS Fusion and HPS Spartan - Wiring Schematic Drawings continued

### Group E

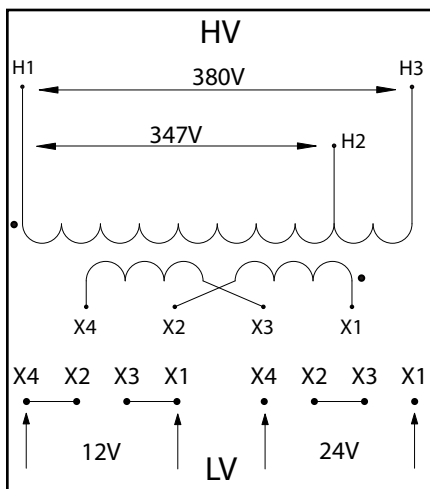


#### SP\*\*\*KHP Schematic Connections for 380/347 to 120 X 240

#### FS\*\*\*KHP Schematic Connections for 380/347 to 120 X 240

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
380	None	H1, H3
347	None	H1, H2
Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
120	X1-X3, X2-X4	X1, X4
240	X2-X3	X1, X4

### Group F



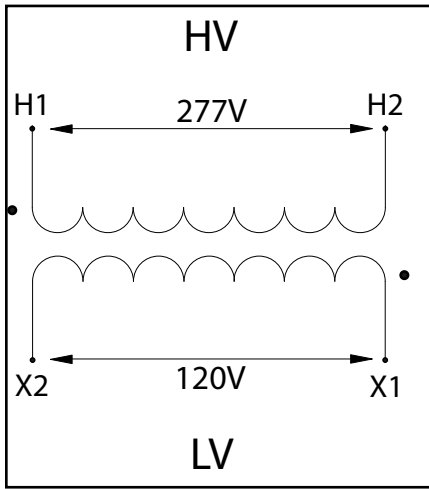
#### SP\*\*\*KHR Schematic Connections for 380/347 to 12 X 24

#### FS\*\*\*KHR Schematic Connections for 380/347 to 12 X 24

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
380	None	H1, H3
347	None	H1, H2
Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
12	X1-X3, X2-X4	X1, X4
24	X2-X3	X1, X4

## HPS Spartan and HPS Fusion - Wiring Schematic Drawings continued

### Group G

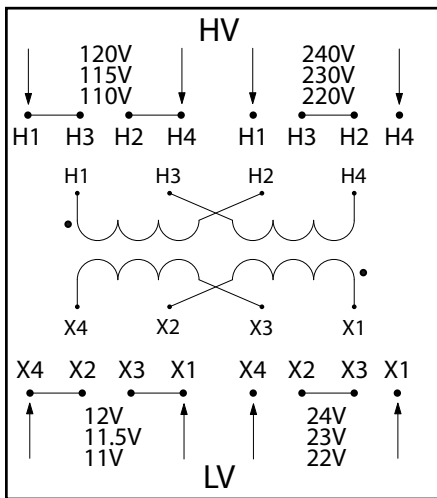


#### SP\*\*\*NJ Schematic Connections for 277 to 120

#### FS\*\*\*NJ Schematic Connections for 277 to 120

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
277	None	H1, H2
Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
120	None	X1, X2

### Group H



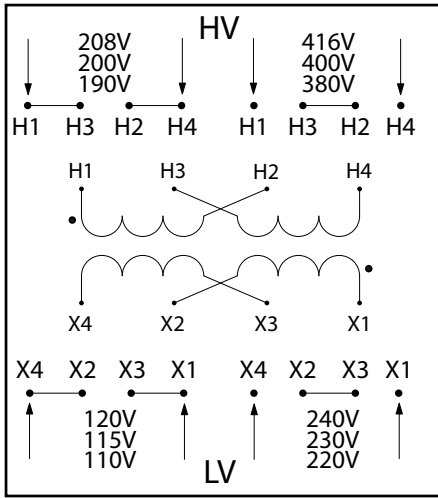
#### SP\*\*\*PR Schematic Connections for 120 X 240 to 12 X 24

#### FS\*\*\*PR Schematic Connections for 120 X 240 to 12 X 24

High Voltage (HV) (Primary Volts)	Install Supplied Jumpers Between Terminals	Supply Lines Connect To
120 115 110	H1-H3, H2-H4	H1, H4
240 230 220	H2-H3	H1, H4
Low Voltage (LV) (Secondary Volts)	Install Supplied Links Between Terminals	Load Lines Connect To
12 11.5 11	X1-X3, X2-X4	X1, X4
24 23 22	X2-X3	X1, X4

## HPS Spartan and HPS Fusion - Wiring Schematic Drawings continued

### Group I

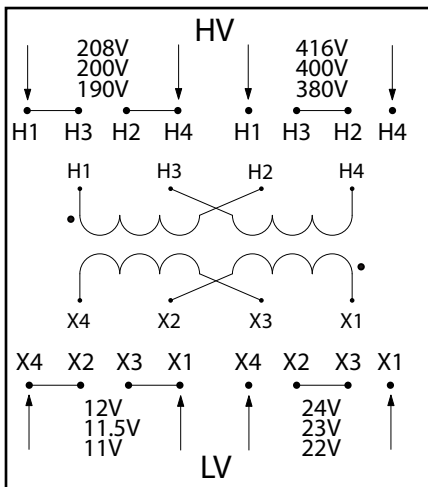


#### SP\*\*\*SP Schematic Connections for 208 X 416 to 120 X 240

#### FS\*\*\*SP Schematic Connections for 208 X 416 to 120 X 240

High Voltage (HV) (Primary Volts)			Install Supplied Jumpers Between Terminals	Supply Lines Connect To
208	200	190	H1-H3, H2-H4	H1, H4
416	400	380	H2-H3	H1, H4
Low Voltage (LV) (Secondary Volts)			Install Supplied Links Between Terminals	Load Lines Connect To
120	115	110	X1-X3, X2-X4	X1, X4
240	230	220	X2-X3	X1, X4

### Group J



#### SP\*\*\*SR Schematic Connections for 208 X 416 to 12 X 24

#### FS\*\*\*SR Schematic Connections for 208 X 416 to 12 X 24

High Voltage (HV) (Primary Volts)			Install Supplied Jumpers Between Terminals	Supply Lines Connect To
208	200	190	H1-H3, H2-H4	H1, H4
416	400	380	H2-H3	H1, H4
Low Voltage (LV) (Secondary Volts)			Install Supplied Links Between Terminals	Load Lines Connect To
12	11.5	11	X1-X3, X2-X4	X1, X4
24	23	22	X2-X3	X1, X4