

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 Hammond Control Transformer which best meets your application.

The Hammond PT 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 Hammond PT 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,

Hammond is recommending that a value of 40% power factor be utilized. Although some other control transformer manufacturers still recommend a power factor of only 20%, Hammond, 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 (6) 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. Now 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 do however 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.

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 3.
- B) with a maximum inrush VA equal to or greater than the value obtained in Step 5.

To determine the correct Hammond Transformer and its Catalog Number, just refer to the tables in this catalog for the voltage ratings, frequency and corresponding VA required.

**“PT” TRANSFORMERS
REGULATION DATA TABLE**

Continuous VA Transformer Nameplate Rating	Inrush VA @ 40% Power Factor		
	85% Secondary Voltage	90% Secondary Voltage	95% Secondary Voltage
25	160	130	95
50	270	210	160
75	435	365	255
100	655	520	370
150	1300	1010	700
200	1975	1500	1020
250	2680	2030	1340
350	3665	2820	1895
500	6300	5035	3305
750	10555	7920	5050
1000	15225	11160	6000

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.

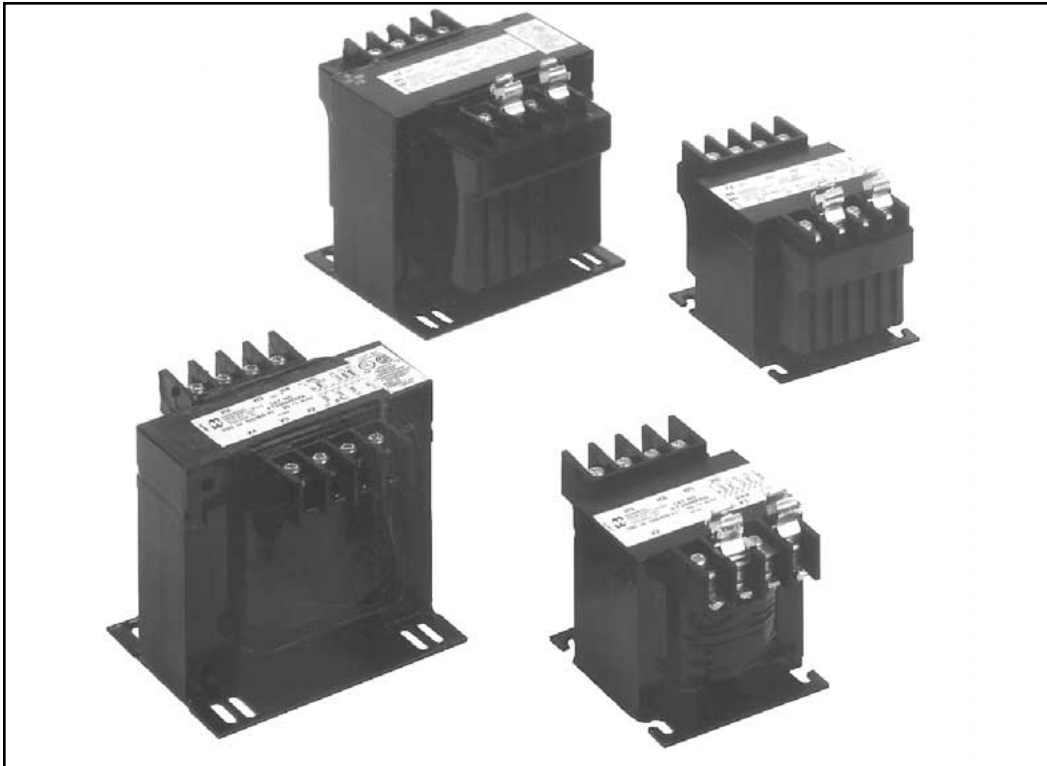


PT Series Control Transformer - Applications



The Hammond "PT" series of machine tool transformers, now 'CE Marked', 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 Hammond "PT" series transformers maximize inrush capability and output voltage regulation when electromagnetic devices are initially energized.

SECTION 1



STANDARDS		
Hammond Industrial and Machine Tool Control and Instrument Transformers meet or exceeds the standards established by UL, CSA, IRC, ANSI, NEMA.		
Standard	File #	VA Size
UL (ANSI/UL 506)	E50394	All PT
CSA (C22-2 No. 66)	LR3902	All PT
IEC 989		All Molded PT's
NEMA (ST-1)		All PT

At HAMMOND, 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.





Features

CORE & COILS

- High quality, high permeability silicon steel laminations.
- All-welded construction.
- Computer designed copper wound coils with optimum turns ratio.

INSULATION

- Mylar, Nomex and other insulating materials are used for phase to phase and layer to layer insulation.
- The “PT” series transformers have the following insulation systems:
 - Up to 200 VA ; class A, 55°C rise, 105°C class.
 - 250 to 1000 VA ; class B, 80°C rise, 150°C class.
 - 1500 VA and up ; class F, 115°C rise, 180°C class.

VACUUM IMPREGNATION

- All Hammond Control Transformers are Vacuum Impregnated with “VT” (vinyl-toluene) Polyester Resin”.
- Oven cured after vacuum impregnating.

MOLDED CONSTRUCTION

- All PT series transformers, up to 1000 VA, are molded in a UL 94 flame retardant polyester compound.
- These units have a thermal plastic, injection molded cover with distinctive cooling fins.

TERMINAL BLOCKS

- Fabricated from molded “high-impact” resin, finished in black.
- Combination Phillips (#2) and Robertson (# 2) Red terminal screws with #9 head, 8-32 UNF threads.
- Terminals are tinned brass and chrome plated, and all connections are soldered.
- Terminals are torque tested with automatic drivers.

NAMEPLATE

- Black letters on white background including terminal markings, schematic and CE mark..
- Polyester, nonconductive material.

MOUNTING PLATE

- Offers an unique Universal Mounting Plate made of heavy steel, welded to the core.

FINGER SAFE TERMINAL COVERS

- Finger safe terminal covers for both fused and unfused terminals, in a clear, see through finish, are available for all molded PT series units.

STANDARD SECONDARY FUSE CLIPS

- Each “PT” series transformer, that has a single secondary, comes with a factory installed secondary fuse kit (fuses not included).

Benefits

CORE & COILS

- Provides optimum performance and reliability.
- Rugged one-piece assembly with low noise.
- Enhanced voltage regulation with excellent thermal characteristics.

INSULATION

- Provides the best insulated control transformer in the industry.
- Insulation materials are of the highest rating available for the temperature class.
- Assures long life and reliable performance.

VACUUM IMPREGNATION

- Impregnating the entire unit provides a strong mechanical bond and offers protection against environmental conditions.
- Seals the surface and eliminates moisture.

MOLDED CONSTRUCTION

- Completes the protection process by sealing the core and coils against moisture, dirt and other airborne contaminants.
- Strong and durable, yet still dissipates heat quickly and efficiently.

TERMINAL BLOCKS

- Easy access to terminals while separation barriers prevent unintentional contact.
- Versatile screw head with optimum torque and retention ability.
- Assures integrity and strength of connections and terminals
- Withstands any manual installation method.

NAMEPLATE

- Ease of readability results in easier installation.
- Safe for other conductors, even in close proximity.

MOUNTING PLATE

- Provides direct interchangeability with many other popular control transformers.

FINGER SAFE TERMINAL COVERS

- This ensures your protection against electric shock or accidental contact of any kind, and complies with IEC and CE requirements.

STANDARD SECONDARY FUSE CLIPS

- Accommodates 13/32” X 1 1/2” Midget Fuse.





Group EE

Primary Voltage	480
Secondary Voltage	240
50/60 Hertz	

SCHEMATIC		CONNECTIONS		
	480V	Primary Volts	Supply Lines Connect To	Install Jumpers Between Lines
		480	H1, H2	
	240V	Sec. Volts	Load Lines Connect To	Install Jumpers Between Lines
		240	X2, XF	

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		"F"	Mtg. Slot "G X H"	Shipping Wt/Lbs
				"A"	"B"	"C"	"D"	"E"			
25	PT25CM	A	0.10	3.00	3.25	2.75	2.50	1.75	2.50	.22 X .44	2.35
50	PT50CM	A	0.21	3.00	3.75	2.75	2.50	2.25	3.41	.22 X .75	3.60
75	PT75CM	A	0.31	3.00	4.00	2.75	2.50	2.44	3.31	.22 X .50	4.35
100	PT100CM	A	0.42	3.00	4.50	2.75	2.50	2.63	3.50	.22 X .50	5.15
150	PT150CM	A	0.63	4.25	4.00	3.25	3.13/3.75	2.75	3.63	.22 X .75	6.15
200	PT200CM	A	0.83	4.25	4.00	3.25	3.13/3.75	2.75	3.63	.22 X .75	7.75
250	PT250CM	A	1.04	4.50	5.00	3.85	3.13/3.75	3.00	4.00	.22 X .75	9.50
350	PT350CM	A	1.46	5.00	5.00	3.85	3.75/4.38	3.56	4.56	.22 X .75	11.75
500	PT500CM	A	2.08	5.25	5.00	3.85	3.75/4.38	4.00	5.00	.31 X .75	14.75
750	PT750CM	A	3.13	5.63	5.88	4.50	4.38/5.31	5.00	6.50	.31 X 1.13	21.75
1000	PT1000CM	A	4.17	5.63	6.38	4.50	4.38/5.31	5.00	6.50	.31 X 1.13	29.95

Height dimension (C) does not include secondary fuse clip.
 Secondary fuse clips for 13/32" X 1 1/2" fuse are included. Primary jumpers not applicable.

All dimensions in inches unless otherwise specified.



Group FF

Primary Voltage	460, 230, 208
Secondary Voltage	115
50/60 Hertz	

SCHEMATIC		CONNECTIONS		
	460V	Primary Volts	Supply Lines Connect To	Install Jumpers Between Lines
	230V	460	H1, H4	
	208V	230	H1, H3	
		208	H1, H2	
	115V	Sec. Volts	Load Lines Connect To	Install Jumpers Between Lines
		115	X2, XF	

VA Rating	Catalog Number	Mtg. Fig.	Output Amps	Overall Dimensions			Mounting Centers		"F"	Mtg. Slot "G X H"	Shipping Wt/Lbs
				"A"	"B"	"C"	"D"	"E"			
25	PT25MLI	A	0.22	3.00	3.25	2.75	2.50	1.75	2.50	.22 X .44	2.35
50	PT50MLI	A	0.43	3.00	3.75	2.75	2.50	2.25	3.41	.22 X .75	3.60
75	PT75MLI	A	0.65	3.00	4.00	2.75	2.50	2.44	3.31	.22 X .50	4.35
100	PT100MLI	A	0.87	3.00	4.50	2.75	2.50	2.63	3.50	.22 X .50	5.15
150	PT150MLI	A	1.30	4.25	4.00	3.25	3.13/3.75	2.75	3.63	.22 X .75	6.15
200	PT200MLI	A	1.74	4.50	4.00	3.85	3.13/3.75	2.75	3.63	.22 X .75	7.75
250	PT250MLI	A	2.17	4.50	4.75	3.85	3.13/3.75	3.00	4.00	.22 X .75	9.50
300	PT300MLI	A	2.61	4.50	4.75	3.85	3.13/3.75	3.00	4.00	.22 X .75	10.75
350	PT350MLI	A	3.04	5.00	5.00	3.85	3.75/4.38	3.56	4.56	.22 X .75	11.75
500	PT500MLI	A	4.35	5.25	5.00	4.50	3.75/4.38	4.00	5.00	.31 X .75	14.75
750	PT750MLI	A	6.52	5.63	6.38	4.50	4.38/5.31	5.00	6.50	.31 X 1.13	21.75
1000	PT1000MLI	A	8.70	6.00	6.38	5.07	4.38/5.31	5.00	6.50	.31 X 1.13	28.95

Height dimension (C) does not include secondary fuse clip.
 Secondary fuse clips for 13/32" X 1 1/2" fuse are included. Primary jumpers not applicable.

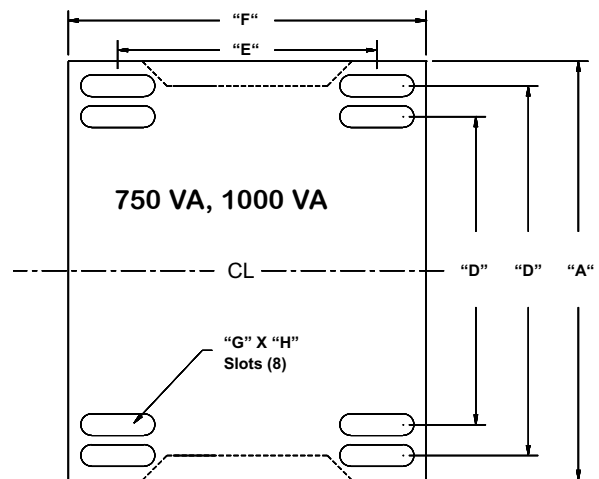
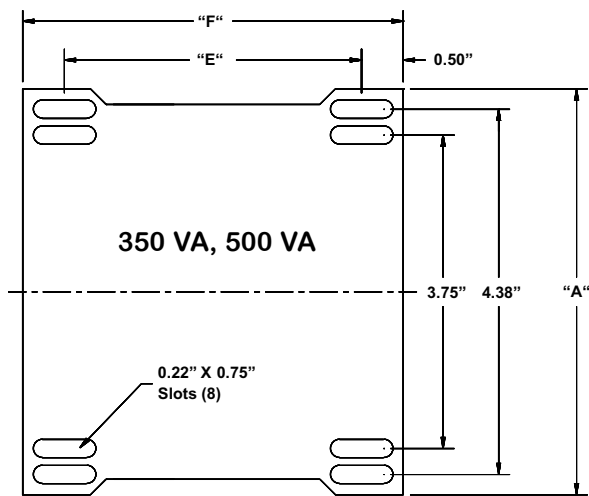
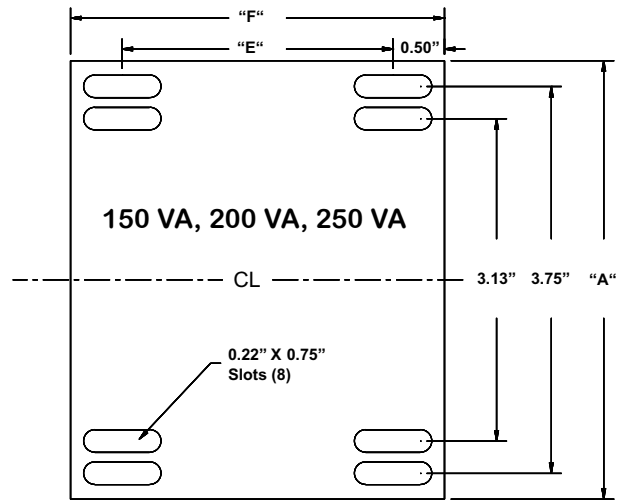
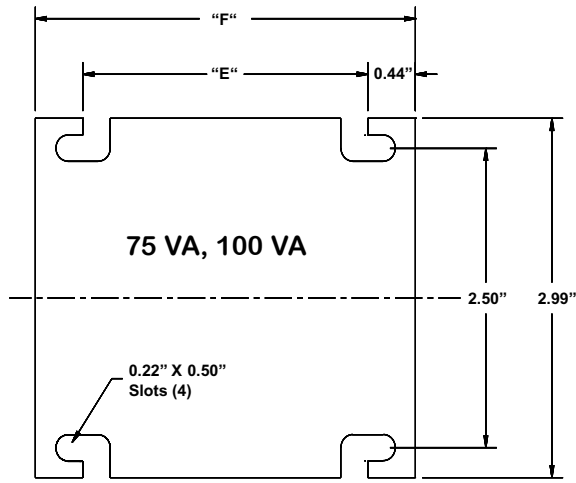
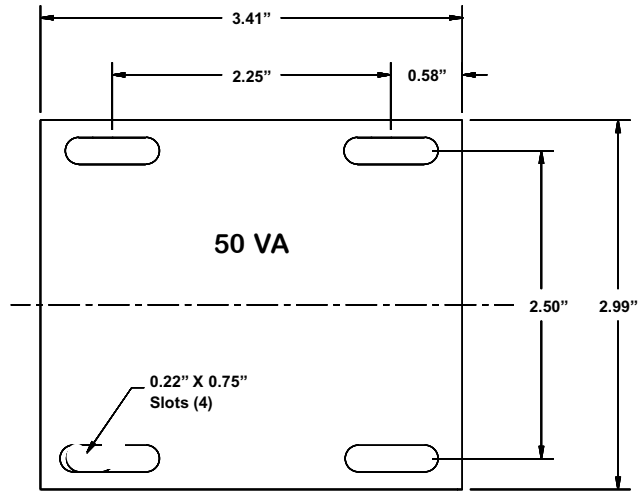
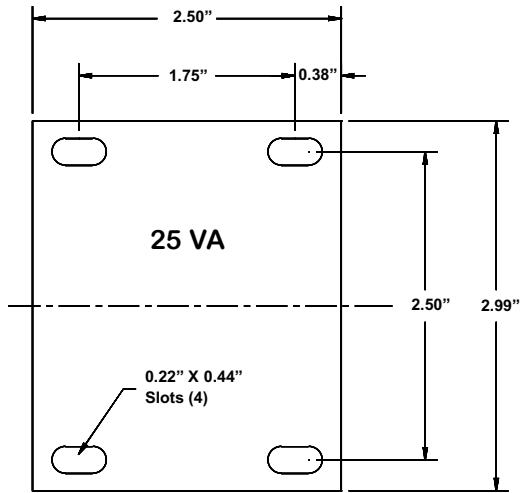
All dimensions in inches unless otherwise specified.



Detailed Mounting Dimensions



SECTION 1



Mounting plates for units larger than 1000VA are not illustrated. Please consult customer service for any information you require.

All dimensions in inches unless otherwise specified.

