Recommendations for Overcurrent Protection UL and CSA (North American) Standards

UL and CSA (North American) Standards

North American standards, including UL 508, National Electric Code 450, and the Canadian Electrical Code, Part 1, require overcurrent protection on all control circuit transformers. There are two options for overcurrent protection:

Option 1 (Primary only Protection)

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

Note: 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 (Primary and Secondary Protection)

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%. The Canadian Electrical Code 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.

REFERENCES:
UL 508
UL 845
NEC 430-72
NEC 450-3
CEC Part 1, 26-256

Recommendations for Overcurrent Protection UL and CSA (North American) Standards, continued

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 in brackets) 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 overcurrent protection is shown as optimal. Choose the next higher fuse rating if these numbers do not correspond with standard fuse selections.

HCTR Current Limiting Class CC Fuses

Part Number	AMP Rating	Pcs/Pkg	Weight	Price
HCTR-25	0.25	10/1	0.2 lb	$;00efk:
HCTR-5	0.5	10/1	0.2 lb	$;;00eft:
HCTR-75	0.75	10/1	0.2 lb	$;00efv:
HCTR1	1	10/1	0.2 lb	$;00efc:
HCTR1-25	1.25	10/1	0.2 lb	$;00efe:
HCTR1-5	1.5	10/1	0.2 lb	$;00efg:
HCTR2	2	10/1	0.2 lb	$;00efh:
HCTR2-5	2.5	10/1	0.2 lb	$;-00efl:
HCTR3	3	10/1	0.2 lb	$;00efn:
HCTR3-5	3.5	10/1	0.2 lb	$;00efp:
HCTR4	4	10/1	0.2 lb	$;00efq:
HCTR5	5	10/1	0.2 lb	$;00efs:
HCTR6	6	10/1	0.2 lb	$;00efu:
HCTR7-5	7.5	10/1	0.2 lb	$;00efx:
HCTR8	8	10/1	0.2 lb	$;00efy:
HCTR10	10	10/1	0.2 lb	$;00efd:
HCTR15	15	10/1	0.2 lb	$;;00eff:
HCTR20	20	10/1	0.2 lb	$;-00efi:
HCTR25	25	10/1	0.2 lb	$;-00efj:
HCTR30	30	10/1	0.2 lb	$;00efo:

Note: See HCTR fuse catalog page for characteristic curves.

Recommended Maximum Primary Fuse Ratings in Amps Where Primary Current is less than 2 Amps.

Primary Voltage	Overload Protection	Hammond Transformers VA RATING												
		50	75	100	150	250	350	500	750	1000	1500	2000	3000	5000
115	300%	1.25	1.8	2.5	3.5	4.0	5.0	8.0	10.0	15.0	20.0	25.0	–	–
	500%	[2.0]	[3.2]	[4.0]	[6.5]	–	–	–	–	–	–	–	–	–
120	300%	1.25	1.8	2.25	3.5	4.0	5.0	8.0	10.0	15.0	15.0	20.0	–	–
	500%	[2.0]	[3.2]	[4.0]	[6.5]	–	–	–	–	–	–	–	–	–
220	300%	0.6	1 .0	1.25	2 .0	3.2	4.5	4.0	6.0	8.0	12.0	15.0	20.0	30.0
	500%	[1.125]	[1.6]	[2.25]	[3.2]	[5.6]	[7.5]	–	–	–	–	–	–	–
208	300%	0.6	1.0	1.4	2.0	3.5	5.0	4.0	6.0	8.0	12.0	15.0	20.0	30.0
	500%	[1.125]	[1.8]	[2.25]	[3.5]	[6.0]	[8.0]	–	–	–	–	–	–	–
230	300%	0.6	0.8	1.25	1.8	3. 2	4.5	4.0	6.0	8.0	10.0	15.0	20.0	30.0
	500%	[1.0]	[1.6]	[2.0]	[3.2]	[5.0]	[7.5]	–	–	–	–	–	–	–
240	300%	0.6	0.8	1.25	1.8	3.0	4.0	3.5	5.0	7.0	10.0	15.0	15.0	30.0
	500%	[1.0]	[1.5]	[2.0]	[3.0]	[5.0]	[7.0]	–	–	–	–	–	–	–
277	300%	0.5	0.8	1.0	1.6	2.5	3.5	5.0	5.0	6.0	9.0	12.0	15.0	25.0
	500%	[0.8]	[1.25]	[1.8]	[4.5]	[6.25]	[9.0]	–	–	–	–	–	–	–
380	300%	0.3	0.5	0.75	1.125	1.8	2.5	3.5	5.6	4.5	6.25	9.0	15.0	20.0
	500%	[0.6]	[0.8]	[1.25]	[1.8]	[3.2]	[4.5]	[6.25]	[9.0]	–	–	–	–	–
440	300%	0.3	0.5	0.6	1 .0	1.6	2.25	3.2	5.0	4.0	6.0	8.0	12.0	15.0
	500%	[0.5]	[0.8]	[1.125]	[1.6]	[2.8]	[3.5]	[5.6]	[8.0]	–	–	–	–	–
460	300%	0.3	0.4	0.6	0.8	1.6	2.25	3.2	4.5	3.5	6.0	8.0	12.0	15.0
	500%	[0.5]	[0.8]	[1.0]	[1.6]	[2.5]	[3.5]	[5.0]	[8.0]	–	–	–	–	–
480	300%	0.3	0.4	0.6	0.8	1.5	2.0	3.0	4.5	3.5	5.0	7.0	10.0	15.0
	500%	[0.5]	[0.75]	[1.0]	[1.5]	[2.5]	[3.5]	[5.0]	[7.5]	–	–	–	–	–

Recommendations for Overcurrent Protection UL and CSA (North American) Standards, continued

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.

MEN General Purpose Midget Class Fuses				
Part Number	*AMP Rating*	*Pcs/Pkg*	*Weight*	*Price*
MEN-5	0.5	10/1	0.2 lb	$0eg7:
MEN-6	0.6	10/1	0.2 lb	$0eg9:
MEN1	1	10/1	0.2 lb	$;0efz:
MEN1-4	1.4	10/1	0.2 lb	$;00ef_:
MEN1-5	1.5	10/1	0.2 lb	$;;00ef!:
MEN2	2	10/1	0.2 lb	$;0ef?:
MEN2-5	2.5	10/1	0.2 lb	$0eg1:
MEN3	3	10/1	0.2 lb	$0eg2:
MEN3-5	3.5	10/1	0.2 lb	$0eg4:
MEN4	4	10/1	0.2 lb	$0eg5:
MEN5	5	10/1	0.2 lb	$0eg6:
MEN6	6	10/1	0.2 lb	$0eg8:
MEN7	7	10/1	0.2 lb	$0ega:
MEN8	8	10/1	0.2 lb	$0egb:
MEN10	10	10/1	0.2 lb	$;;0ef]:
MEN12	12	10/1	0.2 lb	$;;0ef[:
MEN15	15	10/1	0.2 lb	$;0ef#:
MEN20	20	10/1	0.2 lb	$;;0ef,:
MEN25	25	10/1	0.2 lb	$0eg0:
MEN30	30	10/1	0.2 lb	$0eg3:

Note: See MEN fuse catalog page for characteristic curves.

Recommended Maximum Secondary Fuse Ratings in Amps.

Secondary Voltage	Overload Protection	Hammond Transformers VA RATING												
		50	*75*	*100*	*150*	*250*	*350*	*500*	*750*	*1000*	*1500*	*2000*	*3000*	*5000*
12	125%	5.3	7.9	11.0	16.0	27.0	–	–	–	–	–	–	–	–
24	125%	2.7	4.0	5.3	7.9	14.0	19.0	27.0	–	–	–	–	–	–
110	125%	0.6	0.9	1.2	1.8	2.9	4.0	5.7	8.6	12.0	18.0	23.0	–	–
115	125%	0.6	0.9	1.1	1.7	2.8	3.9	5.5	8.2	11.0	17.0	22.0	–	–
120	125%	0.6	0.8	1.1	1.6	2.7	3.7	5.3	7.9	11.0	16.0	21.0	–	–
220	125%	0.3	0.5	0.6	0.9	1.5	2.0	2.9	4.3	5.7	8.6	12.0	18.0	29.0
230	125%	0.3	0.5	0.6	0.9	1.4	2.0	2.8	4.1	5.5	8.2	11.0	17.0	28.0