The UL 508A Standard for Industrial Control Panels, Third Edition, dated April 24, 2018 and how it relates to MTE product short circuit current ratings (SCCR).

MTE products are manufactured and certified to the UL 508 standard.

Reactors and DC Chokes:

Reactors and DC chokes are exempt from UL 508A short circuit current ratings (SCCR) per UL 508A Clause SB4.2.1 Exception No. 1.

SB4.2.1 All power circuit components, including disconnect switches, branch circuit protective devices, branch circuit fuse holders, load controllers, motor overload relays, terminal blocks, bus bars, and line filters, such as electromagnetic interference (EMI), or radio frequency interference (RFI) filters, or active or passive harmonic filters shall have a short circuit current rating expressed in amperes or kiloamperes and voltage.

Exception No. 1: Power transformers, **reactors**, current transformers, dry-type capacitors, resistors, one-port SPDs, and voltmeters are not required to have a short circuit current rating.

Drive Output Devices (dV/dt filters, sine filters and high frequency sine filters):

Drive output devices such as dV/dt filters, sine filters and high frequency sine filters are exempt from UL 508A short circuit current ratings (SCCR) per UL 508A Clause SB4.2.1 Exception No. 5.

UL 508A Clause SB4.2.1 Exception No. 5: **Components installed on the load side of a variable-speed drive** where the variable speed drive has built-in electronic short circuit protection, are not required to have a short circuit current rating.

Harmonic Filters

MTE enclosed harmonic filters are not affected by the new UL 508A standard. They are manufactured and certified at our factory per the UL 508 standard.

For UL 508A Panel builders, open panel harmonic filters are no longer exempt from SCCR ratings per UL 508A Clause SB4.2.1 Exception No. 1.

SB4.2.1 All power circuit components, including disconnect switches, branch circuit protective devices, branch circuit fuse holders, load controllers, motor overload relays, terminal blocks, bus bars, and line

filters, such as electromagnetic interference (EMI), or radio frequency interference (RFI) filters, or active or passive harmonic filters shall have a short circuit current rating expressed in amperes or kiloamperes and voltage.

Exception No. 1: Power transformers, reactors, current transformers, dry-type capacitors, resistors, one-port SPDs, and voltmeters are not required to have a short circuit current rating.

What choices does a UL 508A Panel builder have if they want to quantify the harmonic filter SCCR rating?

UL 508A Panel builders now have three choices regarding open panel harmonic filter SCCR ratings.

1. Accept the manufacturers tested and certified open panel harmonic filter SCCR rating.
2. Accept the UL 508A default open panel harmonic filter SCCR rating.
3. Fuse the open panel harmonic filter shunt circuit with the appropriate UL Class T Type JJS fuse. This will often enable the panel builder to increase the passive harmonic filter SCCR rating.

Open Panel Harmonic Filter UL 508A Default Short Circuit SCCR Ratings

Open Panel Harmonic Filter UL 508A default short circuit SCCR ratings can be obtained from the table below.

UL 508A Table SB4.1

Component	Default Short circuit current rating in kA
Passive harmonic filter rated in HP (kW)	
a. 0 — 50HP (0 — 37.3)kW	5
b. 51 — 200HP (38 —149)kW	10
c. 201 — 400HP (150 — 298)kW	18
d. 401 — 600 HP(299 — 447)kW	30
e. 601 — 900HP (448 — 671)kW	42
f. 901 —1600HP (672 —1193)kW	85

Table 1 - UL 508A Table SB4.1

How does a Panel builder properly fuse the open panel harmonic filter shunt circuit with the appropriate UL Class T Type JJS fuse?

First, we need to evaluate the Class T, Type JJS fuse Peak-let-through current Ip.

Peak-let-through current I_p

Fuses are assigned what is known as a certain peak-let-through current Ip.

This is the maximum current the fuse will allow to pass on a fault condition.

UL 508A Table SB4.2 outlined below lists these Ip values.

UL 508A Table SB4.2

Fuse type	Fuse rating (A)	100 kA	
600V Class T		$I^2t \times 10^3$	$I_p \times 10^3$
	1	0.8	1
	3	1.2	1.5
	6	2	2.3
	10	3	3.3
	15	4	4
	20	5	5
	25	5.5	6
	30	7	7.5
	35	12	7.5
	40	17	8
	45	18	8.5
	50	22	9
	60	30	10
	70	50	11.5
	80	60	12.5
	90	75	13.5
	100	80	14
	110	100	14.5
	125	150	15.5
	150	175	17
	175	225	18.5
	200	300	20
	225	350	22.5

Fuse type	Fuse rating (A)	100 kA	
	250	450	24
	300	600	26
	350	800	29
	400	1100	30
	450	1500	36
	500	2000	42
	600	2500	45
	700	3500	50
	800	4000	55
	1000	8000	65
	1200	10000	70

Table 2 - UL 508A Table SB4.2

480V 60Hz Open Panel Harmonic Filter Recommended Fusing Table:

To increase the open panel harmonic filter SCCR rating to 100kAIC, the selected fuse must have a peak-let-through current that is less or equal to the default SCCR rating which UL assigns to the filter. (Ip <= SCCR).

Table 3 below shows the 480V filter shunt fuses required to increase the short circuit current rating to 100kAIC.

480V 60Hz Open Panel Harmonic Filter Recommended Fusing Table

Part Number	HP	I/O Circuit Current (A)	Shunt Circuit Current (A)	Default SCCR (508A) [kA]	Fuse Rating (A)	Peak Let Through Current I_p [kA]
MAPP0006D	3	6	2	5	20	5
MAPP0008D	5	8	2.6	5	20	5
MAPP0011D	7.5	11	3.7	5	20	5
MAPP0014D	10	14	4.6	5	20	5
MAPP0021D	15	21	6.9	5	20	5
MAPP0027D	20	27	9.2	5	20	5
MAPP0034D	25	34	11.8	5	20	5
MAPP0044D	30	44	14.5	5	20	5
MAPP0052D	40	52	17.2	5	20	5
MAPP0066D	50	66	22.2	5	30	7.5[1]
MAPP0083D	60	83	29.2	10	60	10
MAPP0103D	75	103	34.7	10	60	10
MAPP0128D	100	128	39.8	10	60	10
MAPP0165D	125	165	53.2	10	80	14[1]
MAPP0208D	150	208	64.8	10	100	14.5[1]
MAPP0240D	200	240	72.7	10	150	15.5[1]
MAPP0320D	250	320	94.5	18	150	17
MAPP0403D	300	403	132.3	18	175	18.5[1]
MAPP0482D	400	482	141.8	18	225	22.5[1]
MAPP0636D	500	636	195.6	30	300	26
MAPP0786D	600	786	245.0	30	350	29
MAPP0850D	700	850	265.9	42	400	30
MAPP1000D	900	1000	308.6	42	450	36

Part Number	HP	I/O Circuit Current (A)	Shunt Circuit Current (A)	Default SCCR (508A) [kA]	Fuse Rating (A)	Peak Let Through Current I_p [kA]
MAPP1200D	1000	1200	355.2	85	600	45
MAPP1600D	1300	1600	496.5	85	800	55
MAPP2000D	1500	2000	696.5	85	1000	65
MAPP2300D	1850	2300	710.0	85	1000	65

Table 3 - 480V 60Hz Open Panel Harmonic Filter Recommended Fusing Table

As one can see from the 480V table above, **if (Ip > SCCR)**, the harmonic filter SCCR rating **may not** be increased to 100kAIC, even with the addition of Class T Type JJS fusing in the harmonic filter shunt circuit. These instances are highlighted in red text above.

Note1 – contact MTE Application Engineering for additional assistance.

600V 60Hz Open Panel Harmonic Filter Recommended Fusing Table:

To increase the open panel harmonic filter SCCR rating to 100kAIC, the selected fuse must have a peak-let-through current that is less or equal to the default SCCR rating which UL assigns to the filter. (Ip <= SCCR).

Table 3 below shows the 480V filter shunt fuses required to increase the short circuit current rating to 100kAIC.

600V 60Hz Open Panel Harmonic Filter Recommended Fusing Table

Part Number	HP	I/O Circuit Current (A)	Shunt Circuit Current (A)	Default SCCR (508A) [kA]	Fuse Rating (A)	Peak Let Through Current I_p [kA]
MAPP0006E	5	6	2.0	5	20	5
MAPP0008E	7	8	2.6	5	20	5
MAPP0011E	10	11	3.7	5	20	5
MAPP0014E	12	14	4.6	5	20	5
MAPP0021E	15	21	6.9	5	20	5
MAPP0027E	25	27	9.2	5	20	5
MAPP0034E	30	34	11.8	5	20	5
MAPP0044E	40	44	14.5	5	20	5
MAPP0052E	50	52	17.2	5	20	5
MAPP0066E	60	66	22.2	10	30	7.5
MAPP0083E	75	83	29.2	10	60	10
MAPP0103E	100	103	34.7	10	60	10
MAPP0128E	125	128	39.8	10	60	10
MAPP0165E	150	165	53.2	10	80	14[1]
MAPP0208E	200	208	64.8	10	100	14.5[1]
MAPP0240E	250	240	72.7	18	150	15.5
MAPP0320E	300	320	94.5	18	150	17
MAPP0403E	400	403	132.3	18	175	18.5[1]
MAPP0482E	500	482	141.8	30	225	22.5
MAPP0636E	600	636	195.6	30	300	26
MAPP0786E	800	786	245.0	42	350	29

Table 4 - 600V 60Hz Open Panel Harmonic Filter Recommended Fusing Table

As one can see from the 600V table above**, if (Ip > SCCR)**, the harmonic filter SCCR rating **may not** be increased to 100kAIC, even with the addition of Class T Type JJS fusing in the harmonic filter shunt circuit. These instances are highlighted in red text above.

Note[1] – contact MTE Application Engineering for additional assistance. **Open Panel Harmonic Filter Schematic with the Shunt Circuit Properly Fused** Schematic of the open panel harmonic filter with the shunt circuit properly fused.

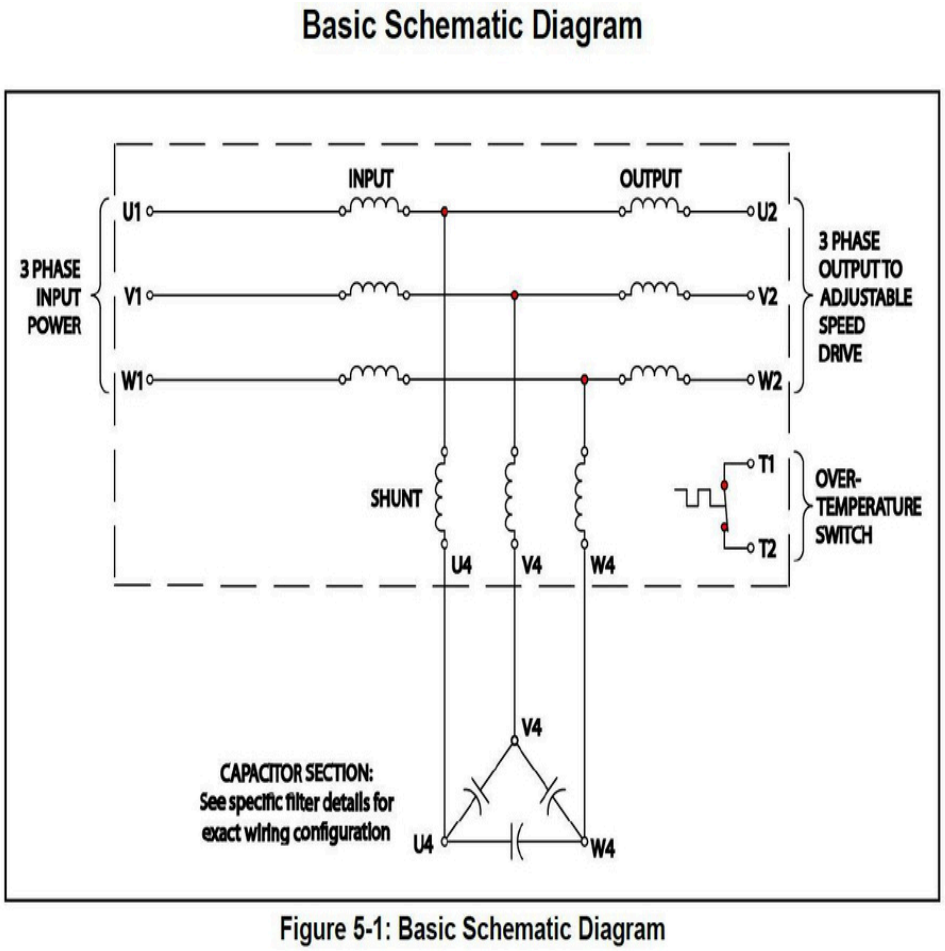

Figure 5-1: Basic Schematic Diagram

Figure 1: Open Panel Harmonic filter schematic with the shunt circuit properly fused.

***** Note to Engineering: Please modify the circuit diagram above to show the shunt circuit properly fused *****

240V 60HZ open panel harmonic filters are not included in this application note.

Additional Support?

Contact MTE Applications at appengrg@mtecorp.com or 262-946-2818