Ballasts

The National Electrical Code® requires integral thermal protection for ballasts in 410.73(E), except for egress lighting.

Testing agencies list ballasts for general use in lighting fixtures which pass specific thermal and short circuit tests. The ballast must incorporate a thermal protector to sense certain over-temperature conditions and must also be able to withstand 200A of short-circuit current when tested with a 20A fuse. See the figure at right for a typical test for ballasts.

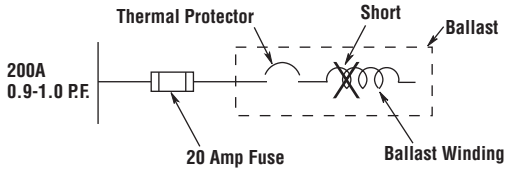
Most systems today will deliver more than 200A of short-circuit current to a row of fixtures. Based upon the last sentence of NEC® 110.10, it is imperative that the ballasts be applied in accordance with their listing and therefore the fixtures must be specified to incorporate individual ballast fusing within the fixture and external to the ballast.

Fusing each fixture will also provide isolation of the faulted ballast and reduce costly and dangerous blackouts. When a ballast does fail, only the fuse protecting that individual fixture opens - the remaining fixtures continue in normal operation. Without this individual ballast protection, a faulted ballast could cause the branch circuit protective device to open, thereby shutting off all the lights. With individual fusing, the maintenance electrician can trouble shoot the problem much more quickly because only one fixture is "out." And this trouble shooting can be performed as part of a scheduled maintenance procedure. It doesn't have to become an "emergency" because employees are left in the dark.

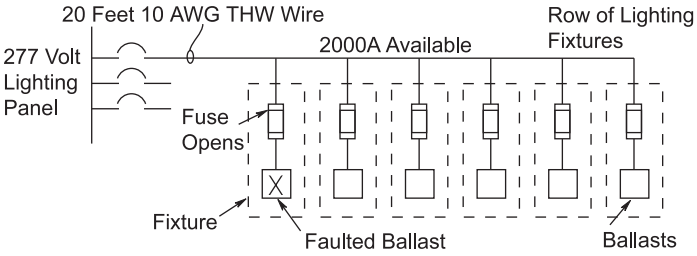
There is a reference in NFPA 70B (Electrical Equipment Maintenance), in the second paragraph of 15.5.1, which states "In line fuse holders and fuses sized to lighting fixture manufacturers' recommendations will provide supplementary ballast protection and branch circuit selectivity."

Note: Refer to fixture manufacturer for recommended fuse size. Cooper Bussmann has in-line holder/fuses specifically for light fixtures.

UL Short-Circuit Test for Ballast Protectors



Fusing Fixture Ballasts to Provide Short-Circuit Protection and Isolation of Faulted Ballast. Good Ballasts Remain on the Line



Ballasts

Indoor → Fluorescent → Consult fixture manufacturer for size and type.

Fuse & Holder Recommendations

Fuse	Holder(s)	Fuse	Holder(s)
GLR	HLR	GLQ	HLQ
GMF		GMQ	
GRF			

Indoor → All Other (Mercury, Sodium, etc.) → Consult fixture manufacturer for size and type.

Fuse & Holder Recommendations

Fuse	Holder(s)	Fuse	Holder(s)	Fuse	Holder(s)
BAF	HPF	KTK-R	HPS-RR	SC 0-15	HPF-EE
BAN	HPS	FNQ-R	HPF-RR		HPS-EE
KTK		LP-CC		SC 20	HPF-JJ
FNM					HPS-JJ
FNQ		KTQ	HPS-L	SC 25-30	HPF-FF
FNW		BBS	HPF-L		HPS-FF

Outdoor → Mercury, Sodium, etc. → Consult fixture manufacturer for size and type.

Fuse & Holder Recommendations

Fuse	Holder(s)	Fuse	Holder(s)
BAF	HEB	KTK-R	HEY
BAN	HEX	FNQ-R	
KTK	HPC-D	LP-CC	
FNM			
FNQ			
FNW			

Capacitors (NEC® 460)

Protected by Time-Delay Fuses. → 150% to 175% of Full Load Current

Fuse Recommendations

Volts	Fuse(s)
0-250	LPN-RK_SP, FRN-R
0-600	LPS-RK_SP, FRS-R
0-600	LPJ_SP, LP-CC, FNQ-R, TCF

Protected by Non-Time-Delay Fuses. → 250% to 300% of Full Load Current.

Fuse Recommendations

Volts	Fuse(s)
0-250	KTN-R, NON
0-300	JJN
0-600	KTS-R, NOS
0-600	JKS, KTK-R
0-600	JJS

On Load Side of Motor Running Overcurrent Device. → Protection recommended as shown, but not required.