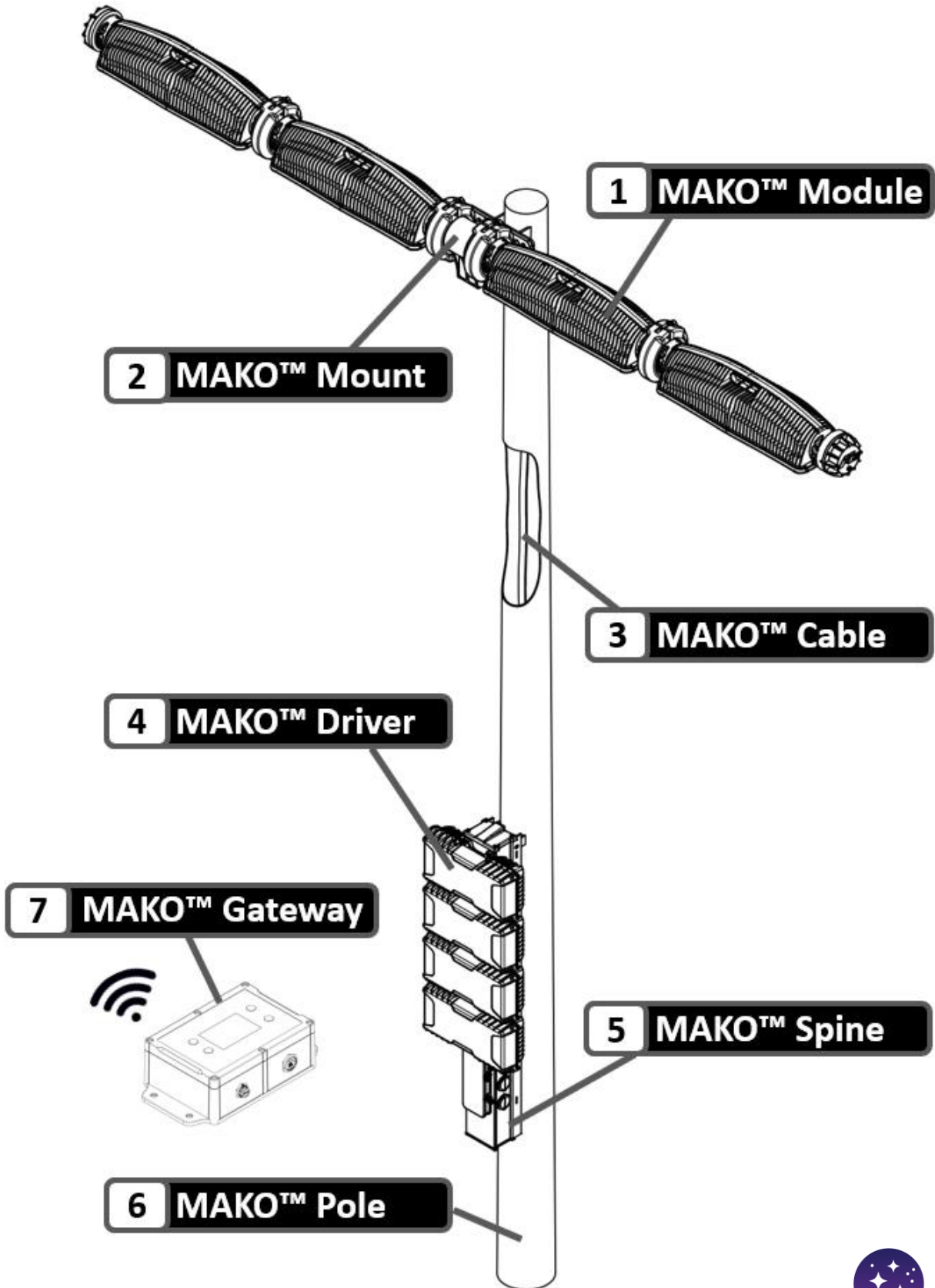


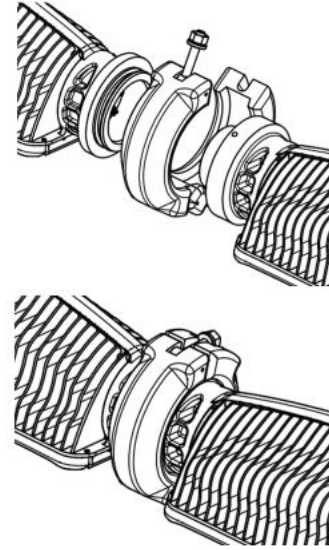
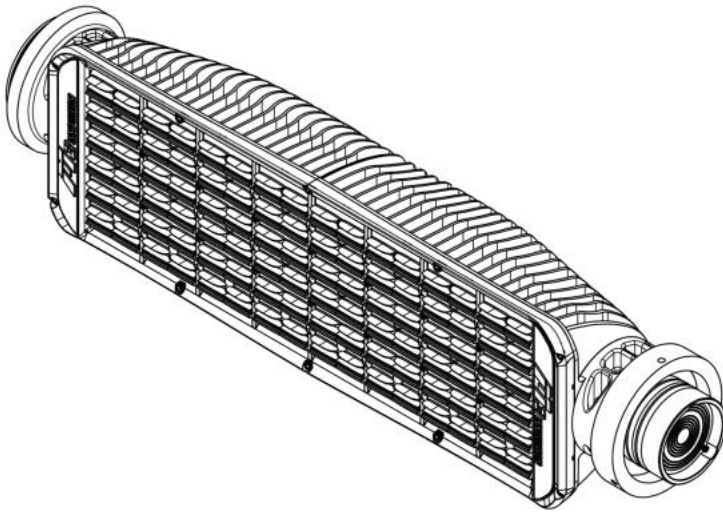
MAKO System

M3K-001-1000WD



MAKO Module

M3K-010



Product Features

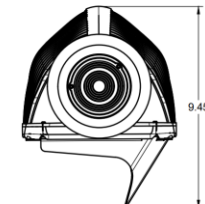
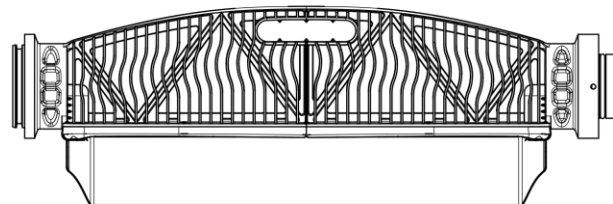
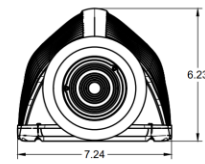
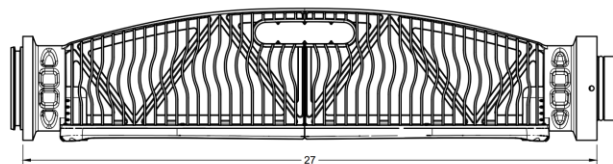
- Up to 150,000 lumens of white light weighting 25.5 lbs
- 96,000 lumens of modular and quickly interchangeable RGB Light
- Quick installation – No complicated wiring or aiming required
- Extremely Low On-Field Glare Rating – Less than 200,000 peak candela at any point on field
- Sleek and structural design; 2x stronger, ½ the weight, and ¼ the EPA of traditional LED sports lighting products
- Eliminates the cost of bulky cross-arms and unreliable wiring connections
- Ultra-corrosion resistant alloy – less than 0.03% Cu with Electrophoresis Coating

Product Performance

	M3K-010-5K	M3K-010-3K	M3K-010-RGB
Lumen Output	Up to 150,000	Up to 144,000	Up to 96,000
Nominal Power	1000W		
CCT	5000K	3000K	N/A
CRI	70		N/A
Optical Distributions	L,R,UW		
Operating Temperature Range	-40C to +45C		
L70 (IESNA TM-21-11)	>130,000		
Electrical Certifications	UL8750, UL1598, DLC		
Environmental Certifications	IP66, NEMA 4x, ANSI C136.31 3G		
Effective Projected Area (EPA)	1.2 (sq. ft)		
Weight	25.5lbs (11.57kg)		
Shield Available	Yes		

** M3K-010-3K 3000K CCT option required for DarkSky approval **

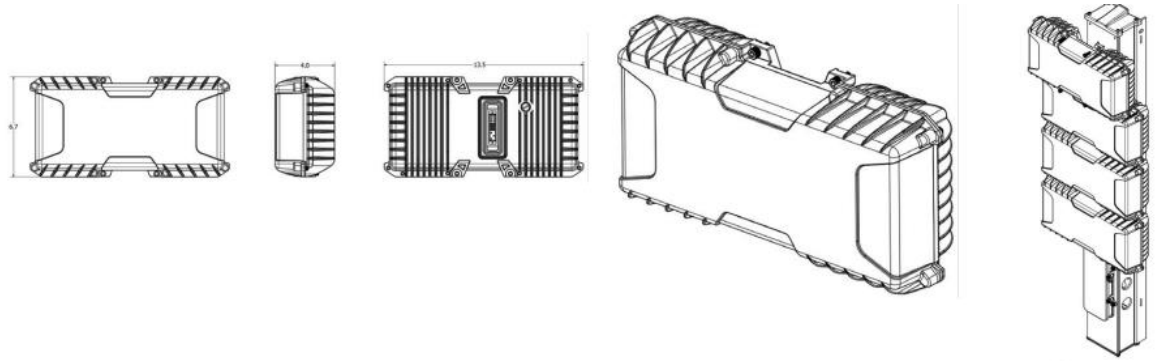
Dimensional Details



* Product shall be installed +/- 10° from parallel. DarkSky approved only when fixed in the downward position (0 degrees) *

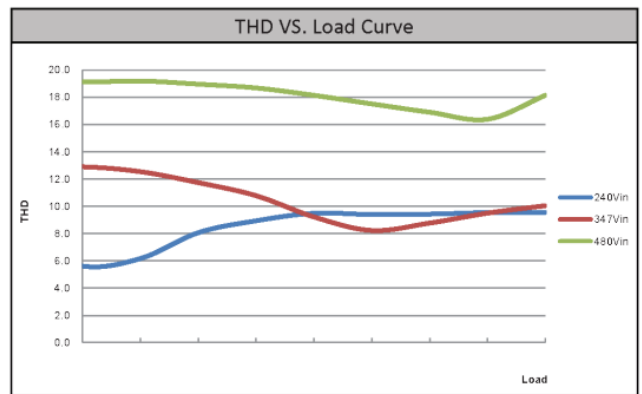
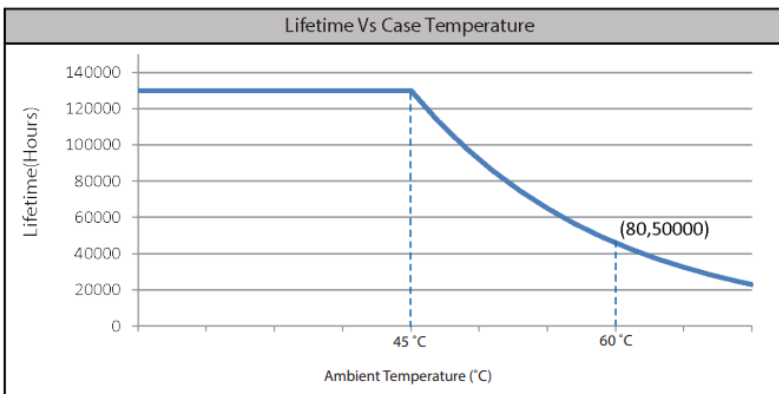
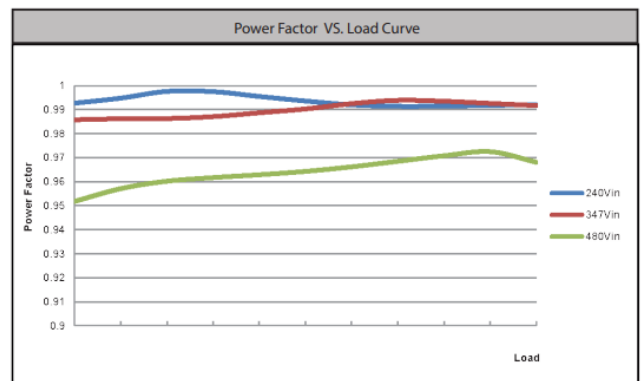
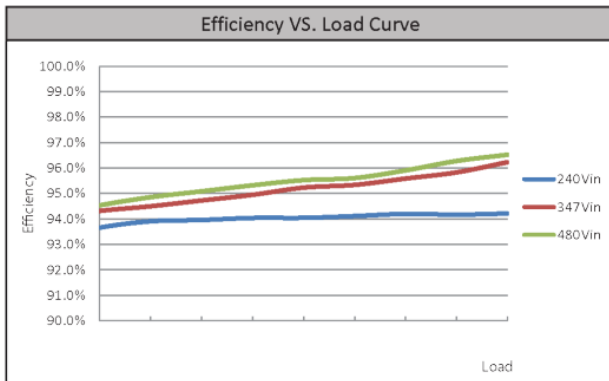
MAKO Driver

M3K-015



Product Features

- High Power - 1200W, 3-Channel Output
- Light Weight - 8.6lbs
- High Efficiency - >95%
- Universal Input - 190-528VAC
- Field Replaceable - Easy installation and quick disconnect at base of pole - No Electrician Needed
- Reliable -
 - 130,000hr lifetime at 45C ambient temperature
 - Dynamic power factor correction detects, corrects, and runs through dirty power or power pollution
- Redundant - System failure detection and automatic correction with 50% Power Reserve
- Intelligent - System monitoring and dimming over custom protocol provides automated alerts for preventative maintenance



MAKO Driver

M3K-015

Description

The MAKO "M3K-015" Driver is custom designed and optimized to be the most efficient and reliable driver in the Sports Lighting Industry. Built from the ground up using mission-critical military power supply design methodology, the MAKO Driver offers many technology innovations to enhance system lifetime. Reliability, redundancy, system health monitoring, and ease of replacement ensure the MAKO sports lighting system remains at peak performance for the lifetime of your project.

Main Characteristics

- Input voltage range: 190-528VAC.
- Built-in active PFC function.
- Three channel outputs independent control.
- Max Output Power 400W per channel. Total 1200W(240-528Vac), 1000W(190-240Vac)
- Output Current, ranging from 180-1800mA.
- Output Voltage, ranging from 150-215Vdc.
- Dimming Control method: RS485
- High efficiency: 95% Typ.
- Output voltage, output current, output power sensing
- Output short circuit protection, overvoltage protection
- Surge level 4kV common mode and 6kV differential mode with external SPD.
- Non Isolated, Class I.

Electrical Input

Efficiency (Typ.) Note.1:	95% @ 240-480VAC
Voltage Range(Vac) Note.2:	190~528Vac
Frequency Range:	47~63 Hz
Power Factor:	>0.9 at 240~480Vac input with 75%-100% load conditions
THD:	<20% at 240~480Vac input, with 100% load conditions
AC Current:	6.5A MAX at 240Vac, 3.0A Max at 480Vac
Turn-On Time:	<1s Goal
Leakage Current:	<5mA

Electrical Output

Output Channel:	Three independent Channel output
Current Adjustment Range:	Dim to Off, 10%-100%
Output Voltage Range(Vdc):	150Vdc~215Vdc (Three channels are all the same.)
Rated Current (mA):	1800mA (Three channels are all the same.)
Rated Current (mA) Fault Mode:	2700mA (The rest two channels are available)
Output Current Range (mA):	180mA - 1800mA
Output Current Range (mA) Fault Mode:	270mA~2700mA (the rest two channels are available)
Output Current Tolerance:	150mA
Rated Power (W):	400W per channel, 1200W total (240-528Vac), 1000W total (190-240Vac)
Turn on Delay Time:	settable from 2.5s at 240Vac
Output Ripple Current:	16.6% of I_{o_max} . ((PKK-AV)/AV) with LED default mode an full load, <4% @ frequency <10kHz
Dimming Range:	0%, 3%-100%
Efficiency:	Up to 97%

Protection

Overload Voltage (V)(Typ.):	250V(Max), Protection type: Transfer to Fault Mode: 528VAC Disable
Under Voltage Short Circuit:	150VDC, 180VAC Disable Protection type: Transfer to Fault Mode
Over Temperature:	Protection type: Shut down at $T_c=100^{\circ}C$; Recovery at $T_c=95^{\circ}C$
Short Circuit:	Output Auto-Recovery, when fault is removed
Overpower:	Maintained power output Operation
Redundancy:	N+1 Redundancy
Ingress Protection:	IP66

Aux Output

Aux Output Voltage:	12VDC typ.
Aux Output Voltage Range:	10.5VDC-13.5VDC
Aux Output Current:	1000mA max
Protection:	Short-circuit protected

Environment

Operating Temperature:	-40~+45°C, refer to the derating curve for detail
Operating Humidity:	5~95%RH, non-condensing
Storage Temperature & Humidity:	-40~+90°C, 5%-95%RH
Temperature Coefficient:	0.03%/°C (0~55°C)
Vibration:	IEC 60068-2-6, Random: 5Hz or 500Hz(2.09G); 20min per axis for all X,Y,Z direction
Operation Altitude:	0 to 5,000 Meters (16,400ft)
Tc max:	90°C

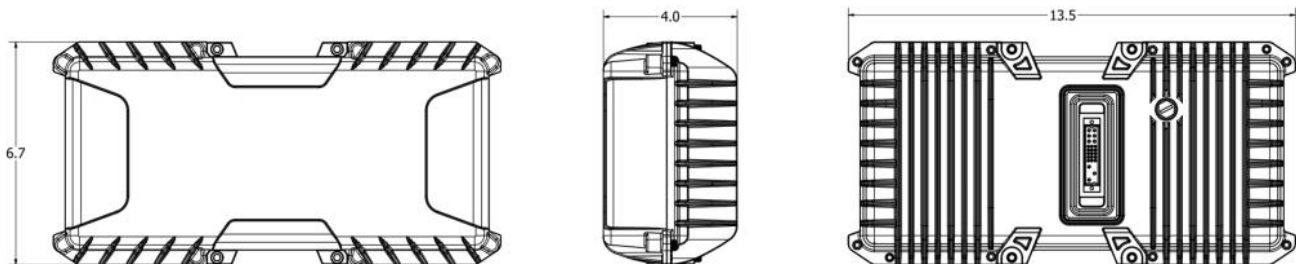
Safety & EMC

Safety Standard	UL8750
Withstand Voltage	Mains VS Output: Non isolated; Mains VS 485 Double isolated; Mains vs Housing: Basic isolated Output VS 485: Double isolated; Output VS Housing: Basic Isolated I/P-FG, O/P-FG: 100M Ohms/500VDC/ 25°C/70%RH
Isolation Resistance	EN55011
EMC Emission	Compliance to EN61000-4-2,3,4,5,6,8,11, EN61547, light industry level (surge: L--N: ±6KV, L, N--FG: ±6KV)
EMC Immunity	

Others

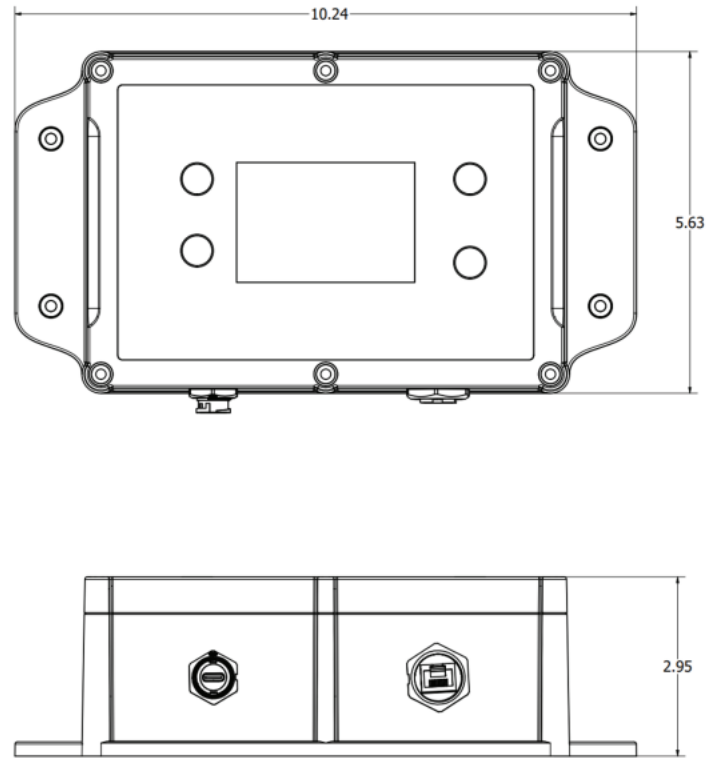
MTBF	250,000 hours, measured at full load, 25°C ambient temperature
Dimension (L*W*H)	MIL-HDBK-217F(25°C) 250K Hours Estimated
Weight	342.9mm*169.9mm*103mm 3.9kg

Dimension Details



MAKO Gateway

M3K-GTW



Features

- Only All-encompassing exclusive Sports Lighting Control System on the market
- Intuitive Control of MAKO M3 Sports Entertainment Solution and IoT devices
- Cellular connectivity included for 24/7 monitoring and system updates

The Mako SES Control System allows for dynamic wireless communication to form a local mesh network. The primary function of the Mako SES Control System is to create multiple zones, dynamic behaviors, events, and schedules. The Mako SES Control System has built in Wi-Fi for local wireless communication. The system comes equipped with an LCD screen and simple push button for easy end user interface.

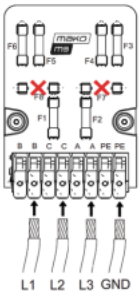
- IP65 rated with built in surge protection
- Programmable push buttons for manual control
- Multiple Zones, Behaviors, Events, and schedules
- Built in Wi-Fi for local wireless access
- Ethernet port and cellular for network connectivity
- AES 128-bit encryption
- BMS and other system integration options
- Optional Cloud and Remote Access services available

Description:	T30-4G Cellular connected gateway
Input Power:	USB-C Universal Input
Operating Environment:	Outdoor Rated at -40C to 55C, IP65 (when latched)
Cellular:	4G CAT 1 cellular module
Wi-Fi:	Built in Wireless Access
Radio:	ESP32 Wi-Fi+SOC
Certifications:	FCC/IC UL CSA ROHS

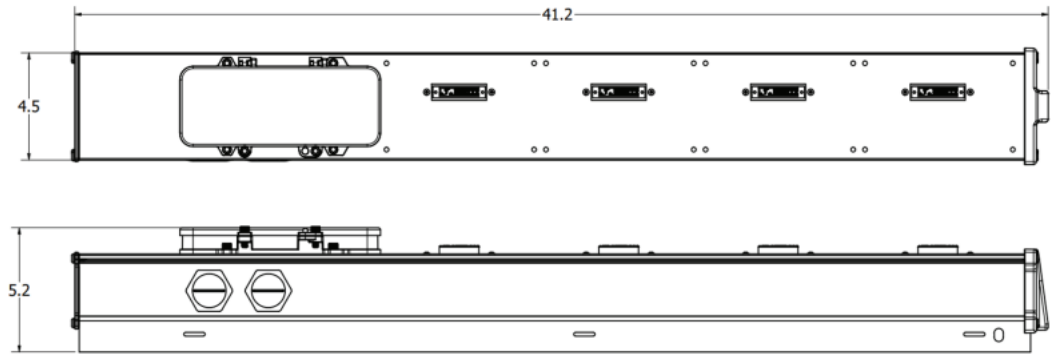
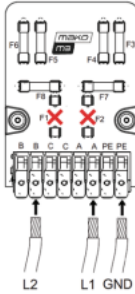
MAKO Spine

M3K-024

3-Phase Power Input
L-L = 208-480 Vac



1-Phase Power Input
L-L = 208-480 Vac



MAKO Spine

- Rugged solid-state mission critical defense system backplane for power and communication
- Fast connect and disconnect of MAKO Driver without need of electrician
- Integrated 100kA surge protection
- battery backup on board to support control use, egress lighting, and security cameras in loss of power events
- Integrated Junction Box
- Sealed and lockable access point for installation and maintenance
- Eliminates cumbersome and costly external fuse enclosures
- Patented MST Field-Adapt quickly converts from 1-phase to 3-phase in seconds
- Universal input voltage of 208VAC to 480VAC
- Easy Tool-Free connection to existing power at base of pole

MAKO SES Control System

- Only All-encompassing exclusive Sports Lighting Control System on the market
- Intuitive control of MAKO Sports Entertainment Solution and IoT devices
- Cellular connectivity included for 24/7 monitoring and system updates

Expandable Sensor and Auxiliary Power

- Low voltage quick access expansion port for IoT sensors
- Simple, quick, and low-cost snap-in camera module for streaming video capability
- 2-hour emergency lighting module with up to 2500 lumen output

