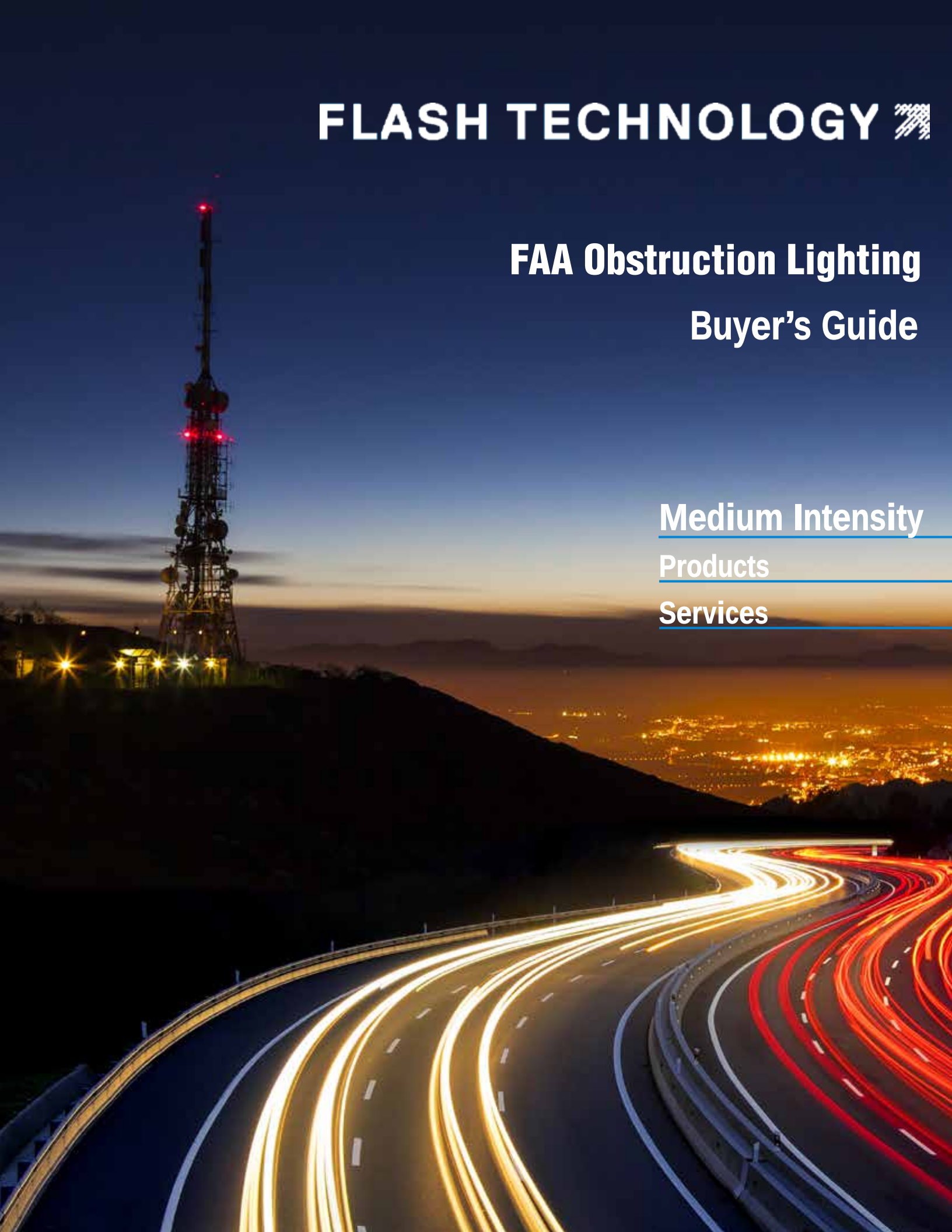
FLASH TECHNOLOGY

FAA Obstruction Lighting Buyer's Guide

Medium Intensity

Products

Services



Welcome to Flash Technology

Founded in 1969, Flash Technology has developed many innovative designs which positively influenced both the aviation obstruction lighting industry and associated monitoring solutions. From xenon to LED lighting systems for towers of every type, Flash Technology continues to provide products that suit a variety of needs.

We are proud to highlight those products in the Flash Technology Buyer's Guide. The Buyer's Guide is a culmination of our product offerings for the medium intensity telecom and utilities markets. All systems are made with the highest quality components, certified by ETL and approved by the FAA.

Thank you for your interest in our products and services.

Flash Technology is ISO 9001:2008 certified.

Contact Information

General Information

Flash Technology
332 Nichol Mill Lane
Franklin, TN 37067

Phone: 615-503-2000
Toll free: 888-313-5274
Fax: 615-261-2600

Customer and Technical Support

NOC (National Operations Center):	1-800-821-5825
Technical Support:	Mon-Fri, 7 AM-7 PM (CST)
Monitoring and all other Call Services:	24/7/365

Email

Information:	flashinfo@spx.com
Sales:	flashsales@spx.com
Parts:	flashparts@spx.com
NOC:	flashNOC@spx.com

Contents

The information contained in this catalog is intended to assist customers in selecting the appropriate Flash Technology product for specific applications. The information, drawings, images, etc are not intended to be substituted for assembly drawings provided with a Flash Technology product. Dimensions and weights provided in this catalog are nominal. Refer to our website www.flashtechnology.com for additional information and products. Due to continuous product improvement, all specifications and data are subject to change without notice or obligation.

Dual - Red/White

	Xenon	LED
	FTB 324	**FTS 370d Vanguard**
Base Model Monitoring	(3) Dry Contacts	(7) Dry Contacts
Internal Monitoring Options	Advanced Relay Monitoring (ARM) (8) Dry Contacts, POTS Modem	SMART: Ethernet or Cellular (Page 45)
External Monitoring Options	FTW 175 or FTM 190 (Page 40-41)	None
L-810 LED Marker	AC (Page 36)	DC (Page 36)
Installation Hardware	Guyed, Self-Support, Monopole (Page 52-59)	Guyed, Self-Support, Monopole (Page 52-59)
Power Consumption	130 W White Day 145 W Red Night	80 W White Day 40 W Red Night
Warranty	2-year	5-year

White

	Xenon	LED
	FTB 310	**FTS 370w Vanguard**
Base Model Monitoring	(3) Dry Contacts	(7) Dry Contacts
Internal Monitoring Options	Advanced Relay Monitoring (ARM) (6) Dry Contacts	SMART: Ethernet or Cellular (Page 45)
External Monitoring Options	FTW 175 or FTM 190 (Page 40-41)	None
Power Consumption	130 W White Day 55 W White Night	80 W White Day 40 W White Night
Warranty	2-year	5-year

Red

	LED	LED	LED	LED
	FTC 2201	**FTC 2301**	**FTS 361x**	**FTS 370r Vanguard**
Input Power (AC or DC)	120 VAC or 240 VAC	12-24 VDC	100-240 VAC	120-240 VAC or 24-48 VDC
Base Model Monitoring	(1) Dry Contact	(1) Dry Contact	(5) Dry Contacts (A0-A1)	(7) Dry Contacts
Monitoring Options	FTW 175 or FTM 190 (Page 40-41)	FTW 175 or FTM 190 (Page 40-41)	Advanced Relay Monitoring, FTW 175 or FTM 190	SMART: Ethernet or Cellular (Page 45)
Power Consumption	14 W Flashhead 2.7 W Per Marker 4 W Controller	15 W Flashhead 2.0 W Per Marker 4 W Controller	12 W Flashhead 2.7 W Per Marker 12 W Controller	40 W Flashhead/ Controller 2.0 W Per Marker
Warranty	2-year	2-year	2-year	5-year

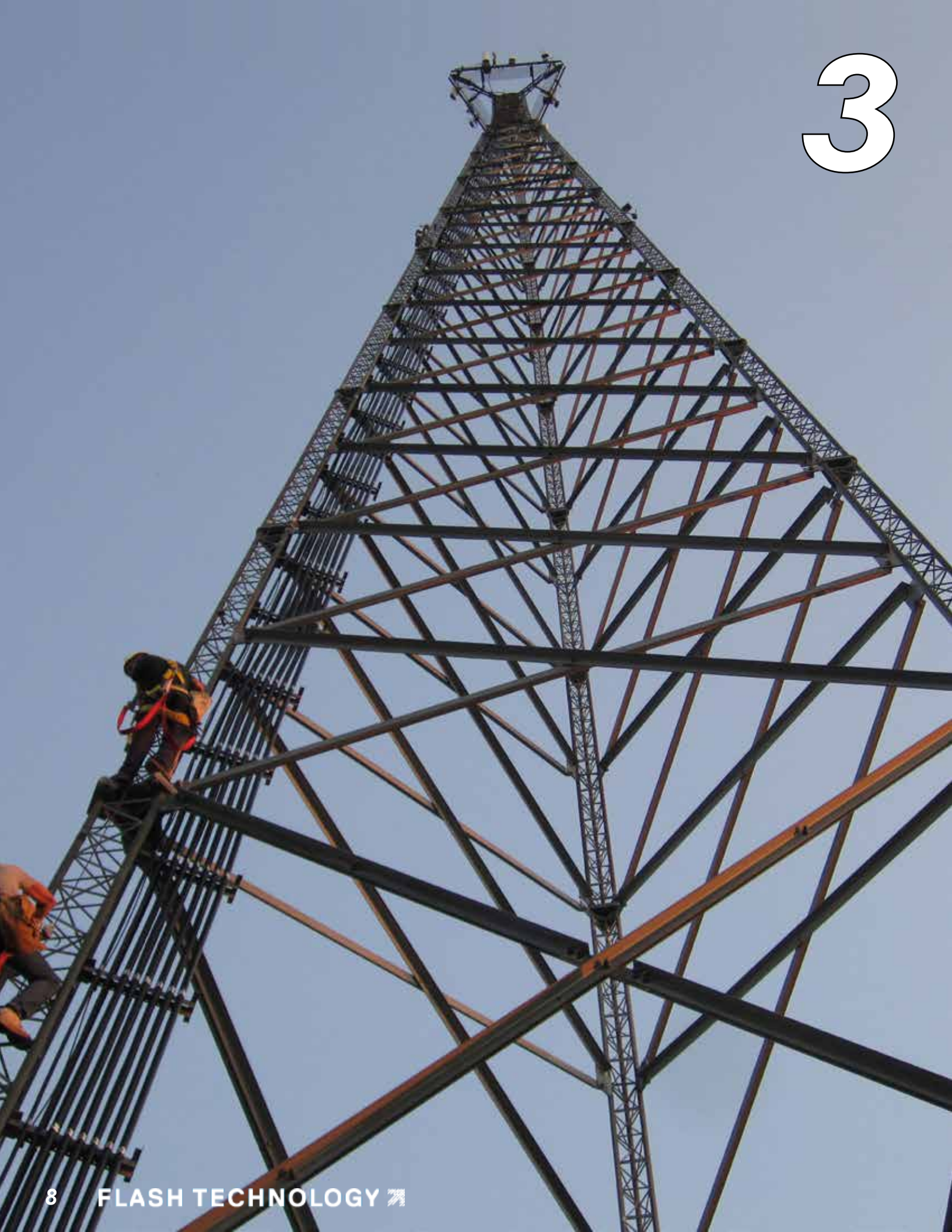
Lighting System Options

	Xenon	LED	Xenon	LED	LED	LED	LED	LED
	Dual – White/Red		White		Red			
	FTB 324	**FTS 370d**	**FTB 310**	**FTS370w**	**FTC 2201**	**FTC 2301**	**FTS 361x-5**	**FTS 370r**
SMART Card		x		x				x
Wi-Fi		x		x				x
Avian		x	x	x	x	x	x	x
NVG Option*	x	x		x	x	x	x	x
DC Input**	x	x	x	x		x		x
Catenary	x	x	x	x			x	x

*-Xenon systems use IR markers **-Xenon systems require Flash Technology inverter

Monitoring

	FTW 175	FTM 190
Base Communication Method	Cellular	Ethernet
Monitoring Type	Dry Contact, Eagle	Dry Contact, Eagle, SNMP
Monitoring Providers	Flash Technology	Flash Technology or 3rd Party
Web Interface	No	Yes
Input Power	120 VAC or 12 VDC	120-240 VAC or 12 VDC
Xenon Compatible	Yes	Yes
LED Compatible	Yes	Yes



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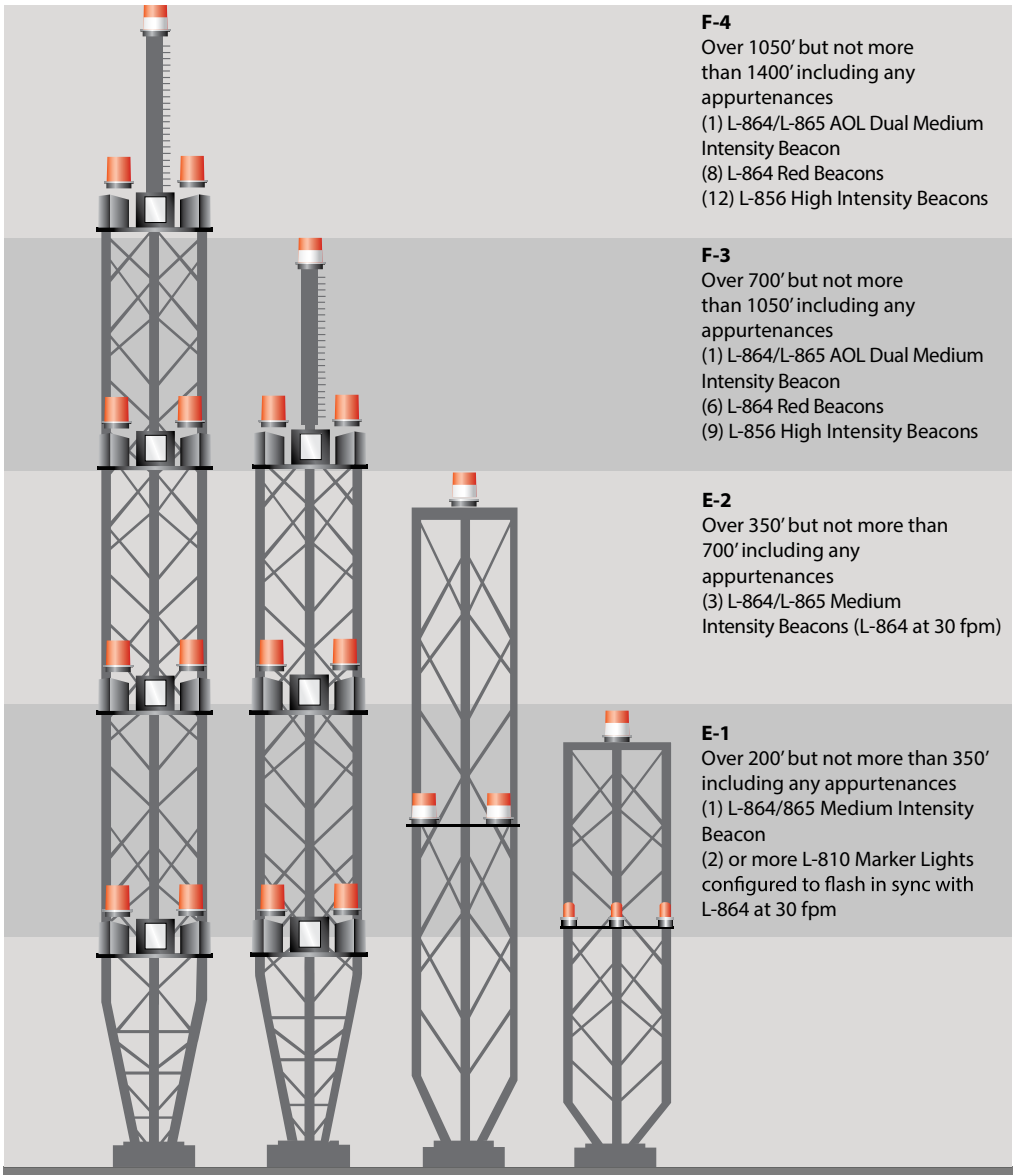
Dual - Red /White - L-864/L-865

DUAL LIGHTING

Towers marked with white lights for day and red lights for night.

AC 70/7460-1L



F-4
Over 1050' but not more than 1400' including any appurtenances
(1) L-864/L-865 AOL Dual Medium Intensity Beacon
(8) L-864 Red Beacons
(12) L-856 High Intensity Beacons

F-3
Over 700' but not more than 1050' including any appurtenances
(1) L-864/L-865 AOL Dual Medium Intensity Beacon
(6) L-864 Red Beacons
(9) L-856 High Intensity Beacons

E-2
Over 350' but not more than 700' including any appurtenances
(3) L-864/L-865 Medium Intensity Beacons (L-864 at 30 fpm)

E-1
Over 200' but not more than 350' including any appurtenances
(1) L-864/865 Medium Intensity Beacon
(2) or more L-810 Marker Lights configured to flash in sync with L-864 at 30 fpm

"G" TOWERS HAVE NO APPURTENANCES GREATER THAN 40' THEREFORE NO REQUIREMENT FOR AOL BEACON

For Dual (red and white) L-864/L-865 lighting systems, go to page 12.

Please refer to FAA Advisory Circular AC 70-7460-1L Obstruction Marking and Lighting for lighting requirements.

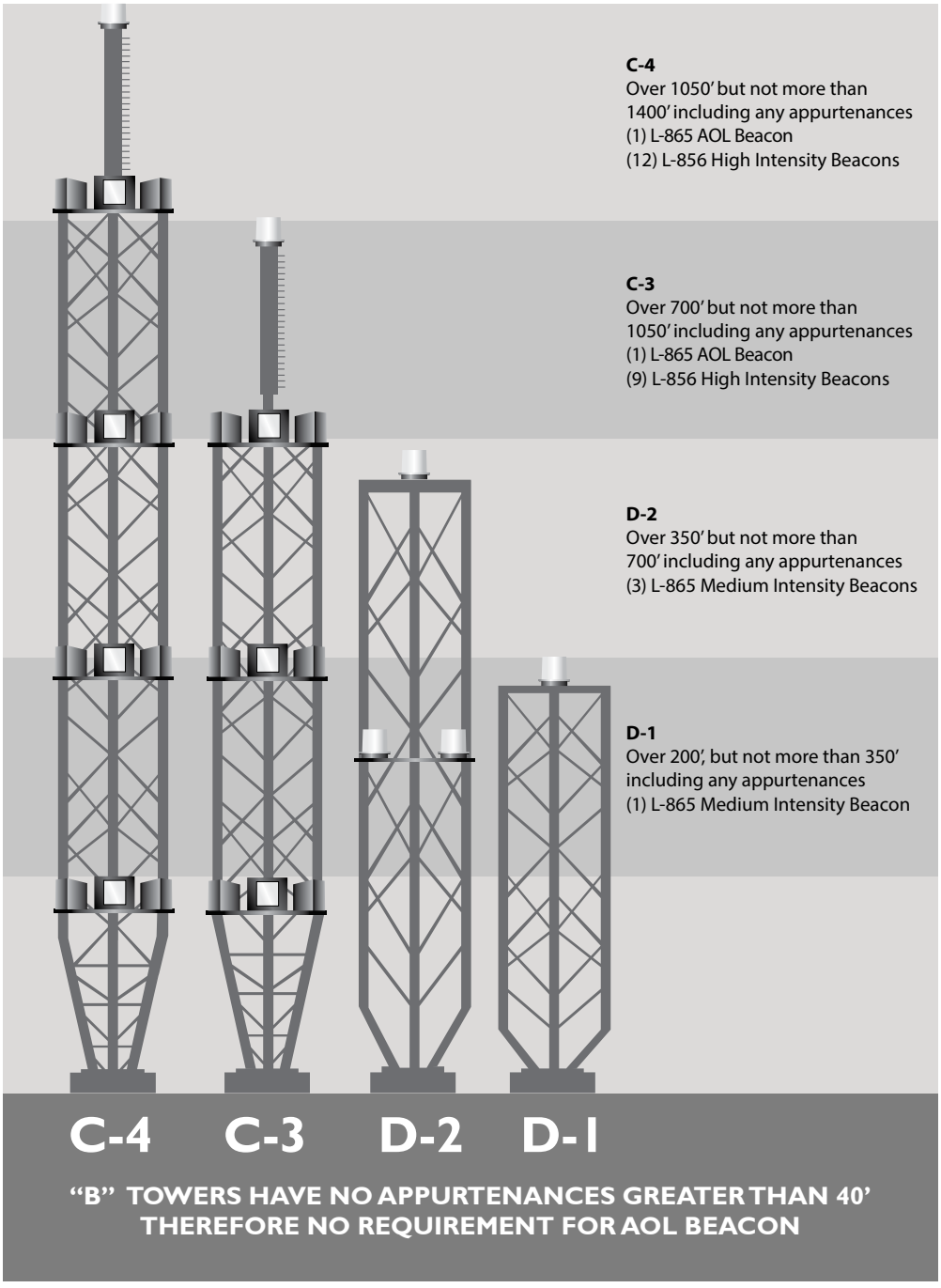
This guide is to serve as a reference only.

White - L-865

WHITE LIGHTING

Towers marked with white lights for day and white lights for night.

AC 70/7460-1L



For white L-865 lighting systems, go to page 18.

Please refer to FAA Advisory Circular AC 70/7460-1L Obstruction Marking and Lighting for lighting requirements.

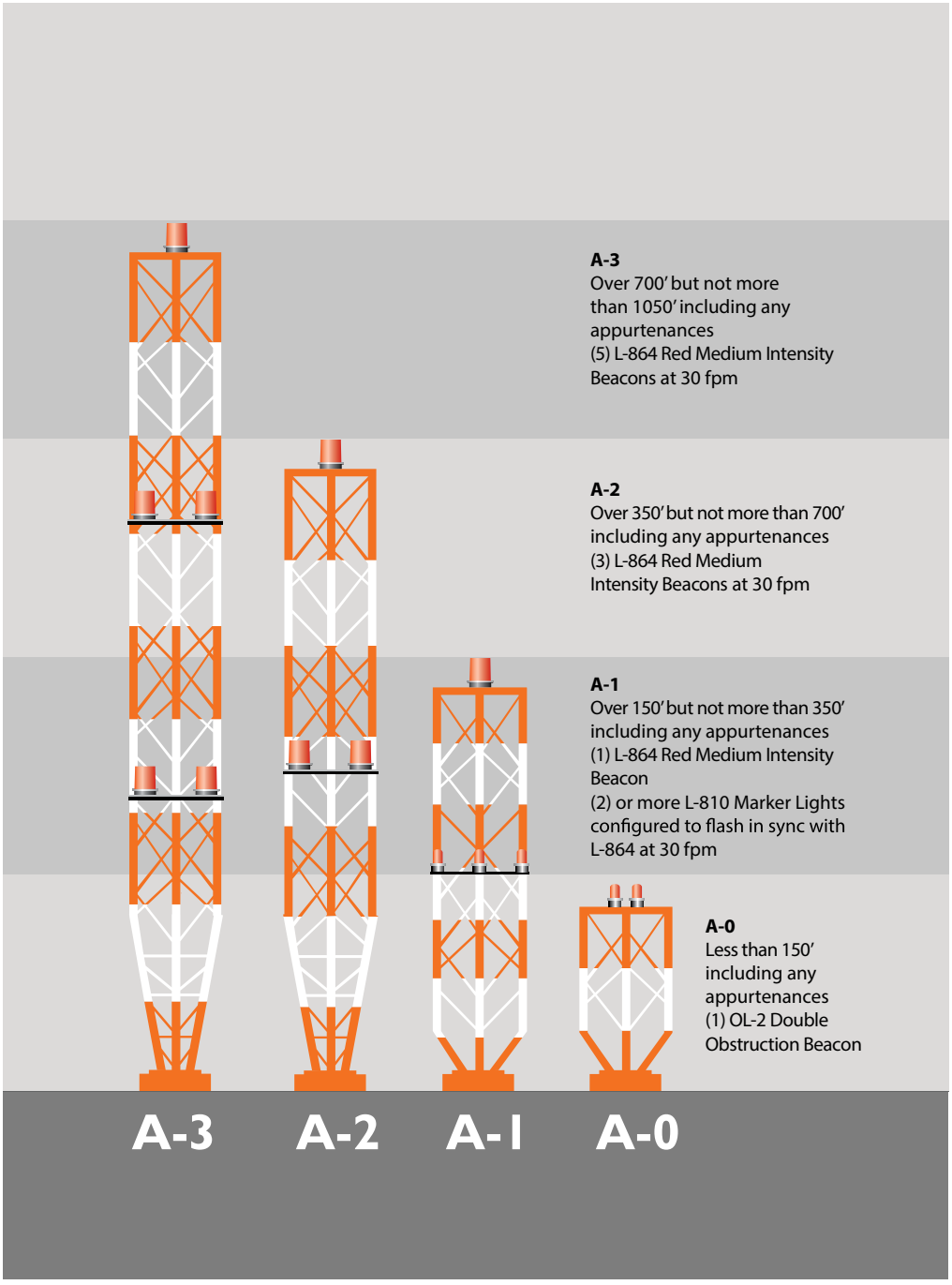
This guide is to serve as a reference only.

Red - L-864

PAINT AND RED LIGHTING

Towers marked with paint for day and red lights for night.

AC 70/7460-1L



For red L-864 / A0-A2 lighting systems, go to page 24.

Please refer to FAA Advisory Circular 70/7460-1L Obstruction Marking and Lighting for lighting requirements.

This guide is to serve as a reference only.

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Dual – Red & White
L-864/L-865

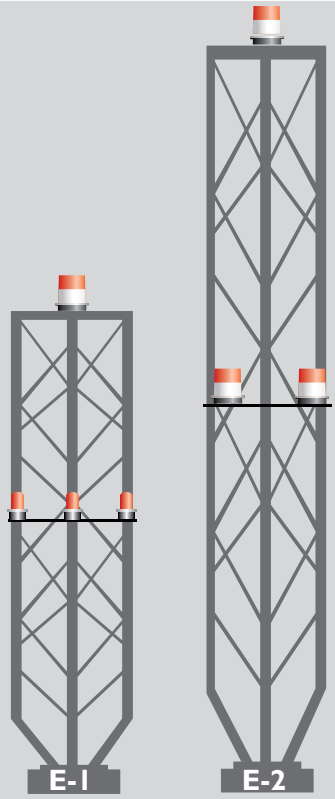
FTB 324 - Xenon

FTS 370d - LED

LED & Xenon Lighting Systems

Red and white tower lighting is commonly referred to as dual, or by FAA nomenclature, as an E-type tower. Medium Intensity red FAA lights at night are designated as L-864 and white FAA lights during the day are designated as L-865. Dual medium intensity lighting systems are approved for use on towers above 200' and not more than 700'.

Flash Technology offers dual systems for E-1 and E-2 towers in either xenon or LED configuration.
The following pages list our xenon and LED products by tower type for easy reference and quotes.



E-1
Over 200' but not more than 350' including any appurtenances
(1) L-864/865 Medium Intensity Beacon
(2) or more L-810 Marker Lights configured to flash in sync with L-864 at 30 fpm

E-2
Over 350' but not more than 700' including any appurtenances
(3) L-864/L-865 Medium Intensity Beacons at 30 fpm

Medium Intensity Dual Xenon

FTB 324

E-Type Towers

Meets Advisory Circular 70/7460-1K

Application

The FTB 324 is a dual (red and white) FAA L-865/L-864 system that includes a white xenon flashing strobe for day, a red xenon flashing strobe for night and (3) L-810 LED markers to create an E-type tower lighting system for structures between 200' and 500' AGL.

Features

- Automatic fail safe to day mode and notification if system has not changed states in 19 hours
- (3) dry contact data points
- Fresnel optics minimizes light scatter
- (12) LED indicators to convey operating status
- (2) year parts warranty on all components including tubes
- L-810 marker kit design eliminates conduit
- NEMA 4X outdoor rated stainless steel enclosure
- Accommodates 120-240 VAC 50/60 Hz

Additional Options

Advanced Relay Monitoring (ARM™) is available. Providing (8) dry contact monitoring data points with an Eagle port versus the standard (3) dry contacts. Eagle™ is a Flash Technology developed proprietary monitoring protocol. It can be used to directly communicate with the Flash Technology NOC or used for onsite diagnostic information.

An Infrared (IR) option for better visibility to night vision goggles (NVG) and NVIS is available. Our NVG compatible design combines red (620nm) and IR (850nm) LEDs to ensure visibility to pilots in all circumstances.

GPS wireless synchronization can be provided by adding the FTW 170 GPS Wireless Synchronization Unit.

Specifications

Beacon Power Consumption:	White Day 130 Watts Red Night 145 Watts
Beacon Photometrics:	
White Day at 40 fpm:	20,000 ± 25% ECD
Red Night at 20 fpm:	2,000 ± 25% ECD
White Backup at 40 fpm:	2,000 ± 25% ECD
Marker Power Consumption:	2.7 Watts Per Marker
Input Voltage:	120-240 VAC
Frequency:	50-60 Hz
FH Dimensions:	18.25" dia. x 29.5"
FH Weight:	28. lbs. (12.7 kg)
FH Aerodynamic Wind Area:	2.59 ft^2
Controller Dimensions:	14." x 16.75" x 8.44"
Controller Weight:	51 lbs. (23 kg)
Protection Rating:	IP 65, NEMA 4X

System Includes

E-1 System

- (1) FH 324 red & white xenon flashhead - twin tube
- (1) PC 324 power converter - PEC 510 photocell with 20' pigtail - manual & drawings
- (3) MKR370 LED markers
- (3) dry contact monitoring data points
- (1) 350' spool #6340 Xenon flashhead cable - additional cable sold in 50' increments
- 200' spool marker cable - additional cable sold in 50' increments
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

E-2 System

- (3) FH 324 red & white xenon flashhead - twin tube
- (3) PC 324 power converter
- (1) PEC 510 photocell with 20' pigtail - manual & drawings
- (6) MKR370 LED markers
- (9) dry contact monitoring data points
- (1) 550' & (2) 300' spool #6340 xenon flashhead cables - additional cable sold in 50' increments
- (1) 200' spool marker cable - additional cable sold in 50' increments
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

Options

Infrared (IR) L-810 markers

GPS wireless synchronization

System Marker Installation Hardware

Self-Supported Hardware

Guyed Tower Hardware

Monopole (Chain) Hardware

Monopole (Strap/Band) Hardware

Angle Bracket (1 per marker)

Monitoring Options

Advanced Relay Monitoring ARM™ - (8) Dry contact monitoring data points with Eagle Port

FTW 175 Dry Contact

FTW 175 Eagle

FTM 190 Dry Contact

FTM 190 Eagle

FTM 190 SNMP

Medium Intensity Dual LED

Vanguard II FTS 370d

E-Type Towers

Meets Advisory Circular 70/7460-1L

FAA type E1 or E2 200'-700'AGL

Advanced Technology Comes Standard

The FTS 370d Vanguard II is a dual (red and white) FAA L-864/L-865 medium intensity LED aviation obstruction lighting system. With a separate flash head and system controller it is considered a split system. Along with (3) LED L-810 markers, it creates an E-type tower lighting system for structures between 200' and 700' AGL.

Vanguard Standard Features	Why are they important to you?
Single cable run to both marker junction box and Flash head	Power and communication in one cable, simplifies installation.
LED by-pass circuitry	Extends functional life and reduces tower climbs by generating an alarm only after 25% of all LEDs have failed rather then the single LED threshold commonly employed.
Single enclosure with no interlock switch	One enclosure for power, control and monitoring that technicians can access without resetting alarms.
Upgradeable firmware	Accommodates future regulatory changes through software updates.
Dry-contacts	Provides 6 alarm points and a dedicated mode change relay.
Fresnel optics	Provides minimal light to the ground making it community friendly.
Automatic failsafe	Switches to day mode for FAA compliance after 19 hours of no mode change.
Unique 4-line backlit display	Visible system detail in any lighting conditions.
Radar interface	To activate light only when no aircraft are present.
Avian compliance	Programming allows the lighting system to be converted to avian settings at installation or in the future to meet AC70/7460-1L

Additional Options

Monitoring is available through SNMP v2c, v3, Modbus and Eagle protocols via ethernet or cellular connectivity when equipped with a SMART™ card. When monitored by Flash Technology the system qualifies for annual lighting inspections rather than quarterly.

Available Wi-Fi access lets users with Wi-Fi enabled devices to fully control the system from inside a truck during bad weather. This allows quick web access for performing inspections, diagnostics and troubleshooting.

Optional avian compliance provides configurations that, according to some FAA studies, have been shown to lower migratory bird fatalities and lower expenses on certain tower types.

An infrared (IR) option for better visibility to night vision goggles (NVG) and NVIS is available. Our FTS 370 NVG compatible design combines red (620nm) and IR (850nm) LEDs to ensure visibility to pilots in all circumstances.

Specifications

Power Consumption:	White Day 80 Watts Red Night 40 Watts
Beacon Photometrics:	
White Day at 40 fpm:	20,000 ± 25% ECD
Red Night at 20/30/40 fpm:	2,000 ± 25% ECD
White Backup at 40 fpm:	2,000 ± 25% ECD
Marker Power Consumption:	2.0 Watts Per Marker
Input Voltage:	120-240 VAC ±24 or ±48 VDC (option)

Frequency:	50-60 Hz
FH Dimensions:	15.75" dia. x 7.31"
FH Weight:	26.3 lbs. (11.92 kg)
FH Aerodynamic Wind Area:	99.125 in^2
Controller Dimensions:	23." x 17.13" x 6.44"
Controller Weight:	44 lbs. (20 kg)
Protection Rating:	IP 65, NEMA 4X

System Includes

E-1 System

- (1) 370d dual LED flashhead
- (1) 370d dual LED system controller 120-240 VAC, 50/60HZ, PHD 512 photodiode w/ 20' pigtail
- (7) dry contact monitoring data points
- (3) MKR370 LED markers
- 350' LED system cable 8AWG/2C*
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

E-2 System

- (3) 370d Dual LED flashhead
- (3) 370d Dual LED system controller 120-240 VAC, 50/60HZ, PHD 512 photodiode w/ 20' pigtail
- (7 or 21) dry contact monitoring data points
- (6) MKR370 LED markers
- (1) 550' & (2) 300' LED system cables 8AWG/2C*
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

*Additional cable sold in 25' increments.
10AWG/2C sold up to 375'
8AWG/2C sold for 375' to 600'
6AWG/2C sold for 600' to 850'

Options

SMART
SMART with GPS Synchronization
Wi-Fi
Avian Compliant Option
Infrared / Night Vision Goggle Compatible
DC Input
Catenary
Optional Stainless Steel System Enclosure

System Marker Installation Hardware

Self-Supported Hardware
Guyed Tower Hardware
Monopole (Chain) Hardware
Monopole (Band) Hardware
Angle Bracket (1 per marker)

Monitoring Options (requires SMART Card)

Eagle
Modbus
SNMP
Ethernet
Cellular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Flash Technology
Vanguard™ LED series

White
L-865

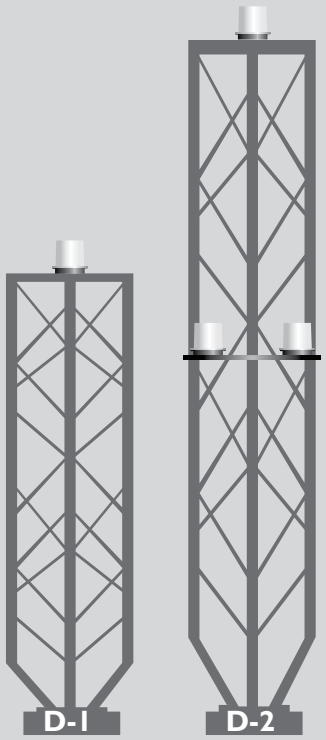
FTB 310 White - Xenon

FTS 370w White - LED

LED & Xenon Lighting Systems

White tower lighting is referred to by the FAA nomenclature as a D-type tower. White medium intensity lighting systems utilize white lighting in day and night mode. White lighting systems are approved for use on towers above 200' and not more than 700'.

Flash Technology offers a white system for D-1 and D-2 towers in either xenon or LED configuration. The following pages list our xenon and LED products by tower type for easy reference and quotes.



D-1
Over 200', but not more than 350' including any appurtenances
(1) L-865 Medium Intensity Beacon

D-2
Over 350' but not more than 700' including any appurtenances
(3) L-865 Medium Intensity Beacons

Medium Intensity White Xenon

FTB 310

D-Type Towers

Meets Advisory Circular 70/7460-1L

Application

The FTB 310 is a white FAA L-865 system that includes a white xenon flashing strobe for day and night to create an FAA tower type D1 or D2 for structures between 200' and 500' AGL.

Features

- Automatic fail safe to day mode and notification if system has not changed states in 19 hours
- (3) dry contact data points
- Fresnel optics minimizes light scatter
- (12) LED indicators to convey operating status
- (2) year parts warranty on all components including tubes
- NEMA 4X outdoor rated stainless steel enclosure
- Accommodates 120-240 VAC 50/60 Hz

Additional Options

Advanced Relay Monitoring (ARM™) is available. Providing (8) dry contact monitoring data points with an Eagle Port versus the standard (3) dry contacts. Eagle™ is a Flash Technology developed proprietary monitoring protocol. It can be used to directly communicate with the Flash Technology NOC or used for onsite diagnostic information.

GPS Wireless Synchronization can be provided by adding the FTW 170 GPS Wireless Synchronization Unit.

Specifications

Beacon Power Consumption:	White Day 130 Watts White Night 75 Watts
Beacon Photometrics:	
White Day at 40 fpm:	20,000 ± 25% ECD
White Night at 40 fpm:	2,000 ± 25% ECD
Input Voltage:	120-240 VAC
Frequency:	50-60 Hz
FH Dimensions:	17" x 18.25"
FH Weight:	17. lbs. (7.7 kg)
FH Aerodynamic Wind Area:	0.93 ft^2
Controller Dimensions:	14" x 16.75" x 8.44"
Controller Weight:	51 lbs. (23 kg)
Protection Rating:	IP 65, NEMA 4X

System Includes

D-1 System

- (1) FH 308 White Xenon flashhead
- (1) PC 310 Power converter
- (1) PEC 510 photocell with 20' pigtail - manual & drawings
- (3) Dry contact monitoring data points
- (1) 350' spool #6340 Xenon flashhead cable - additional cable sold in 50' increments
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

D-2 System

- (3) FH 308 White Xenon flashhead
- (3) PC 310 Power converter
- (1) PEC 510 photocell with 20' pigtail - manual & drawings
- (9) Dry contact monitoring data points
- (1) 550' & (2) 300' spool #6340 Xenon flashhead cable - additional cable sold in 50' increments
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

Options

GPS Wireless Synchronization

Monitoring Options

Advanced Relay Monitoring ARM™ - (6) Dry contact monitoring data points with Eagle Port

FTW 175 Dry Contact

FTW 175 Eagle

FTM 190 Dry Contact

FTM 190 Eagle

FTM 190 SNMP

Medium Intensity White LED

Vanguard II FTS 370w

D-Type Towers

Meets Advisory Circular 70/7460-1L

FAA type D1 or D2 200'-700'AGL

Advanced Technology Comes Standard

The FTS 370w Vanguard II is a white FAA L-865 medium intensity LED aviation obstruction lighting system. With a separate flash head and system controller it is considered a split system. It creates an D-type tower lighting system for structures between 200' and 700' AGL.

Vanguard Standard Features	Why are they important to you?
Single cable run to flashhead	Power and communication in one cable, simplifies installation
LED by-pass circuitry	Extends functional life and reduces tower climbs by generating an alarm only after 25% of all LEDs have failed rather then the single LED threshold commonly employed.
Single enclosure with no interlock switch	One enclosure for power, control and monitoring that technicians can access without resetting alarms.
Upgradeable firmware	Accommodates future regulatory changes through software updates.
Dry-contacts	Provides 6 alarm points and a dedicated mode change relay.
Fresnel optics	Provides minimal light to the ground making it community friendly.
Automatic failsafe	Switches to day mode for FAA compliance after 19 hours of no mode change.
Unique 4-line backlit display	Visible system detail in any lighting conditions.
Radar interface	To activate light only when no aircraft are present.

Additional Options

Monitoring is available through SNMP v2c, v3, Modbus and Eagle protocols via ethernet or cellular connectivity when equipped with a SMART™ card. When monitored by Flash Technology the system qualifies for annual lighting inspections rather than quarterly.

Wi-Fi access lets users with Wi-Fi enabled devices to fully control the system from inside a truck during bad weather. This allows quick web access for performing inspections, diagnostics and troubleshooting.

An infrared (IR) option for better visibility to night vision goggles (NVG) and NVIS is available. Our FTS 370 NVG compatible design combines red (620nm) and IR (850nm) LEDs to ensure visibility to pilots in all circumstance.

Specifications

Power Consumption:	White Day 80 Watts White Night 40 Watts	Frequency:	50-60 Hz
		FH Dimensions:	15.75" dia. x 7.31"
Beacon Photometrics:		FH Weight:	26.3 lbs. (11.92 kg)
White Day at 40 fpm:	20,000 ± 25% ECD	FH Aerodynamic Wind Area:	99.125 in^2
White Night at 40 fpm:	2,000 ± 25% ECD	Controller Dimensions:	21.75" x 16.75" x 6.44"
Input Voltage:	120-240 VAC ± 24 or ±48 VDC (option)	Controller Weight:	44 lbs. (20 kg)
		Protection Rating:	IP 65, NEMA 4X

System Includes

D-1 System

- (1) 370w white LED flashhead
- (1) 370w white LED system controller 120-240 VAC 50/60HZ, PHD 512 photodiode w/ 20' pigtail
- (7) dry contact monitoring data points
- 350' LED system cable 8AWG/2C*
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

D-2 System

- (1) 370w white LED flashhead
- (1) 370w white LED system controller 120-240 VAC 50/60HZ, PHD 512 photodiode w/ 20' pigtail
- (7 or 21) dry contact monitoring data points
- (1) 550' & (2) 300' LED System Cable 8AWG/2C*
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

* Additional cable sold in 25' increments.
10AWG/2C sold up to 375'
8AWG/2C sold for 375' to 600'
6AWG/2C sold for 600' to 850'

Options

SMART
SMART with GPS Synchronization
Wi-Fi
Infrared / Night Vision Goggle Compatible
DC Input
Catenary
Optional Stainless Steel System Enclosure

Monitoring Options (requires SMART Card)

Eagle
Modbus
SNMP
Ethernet
Cellular

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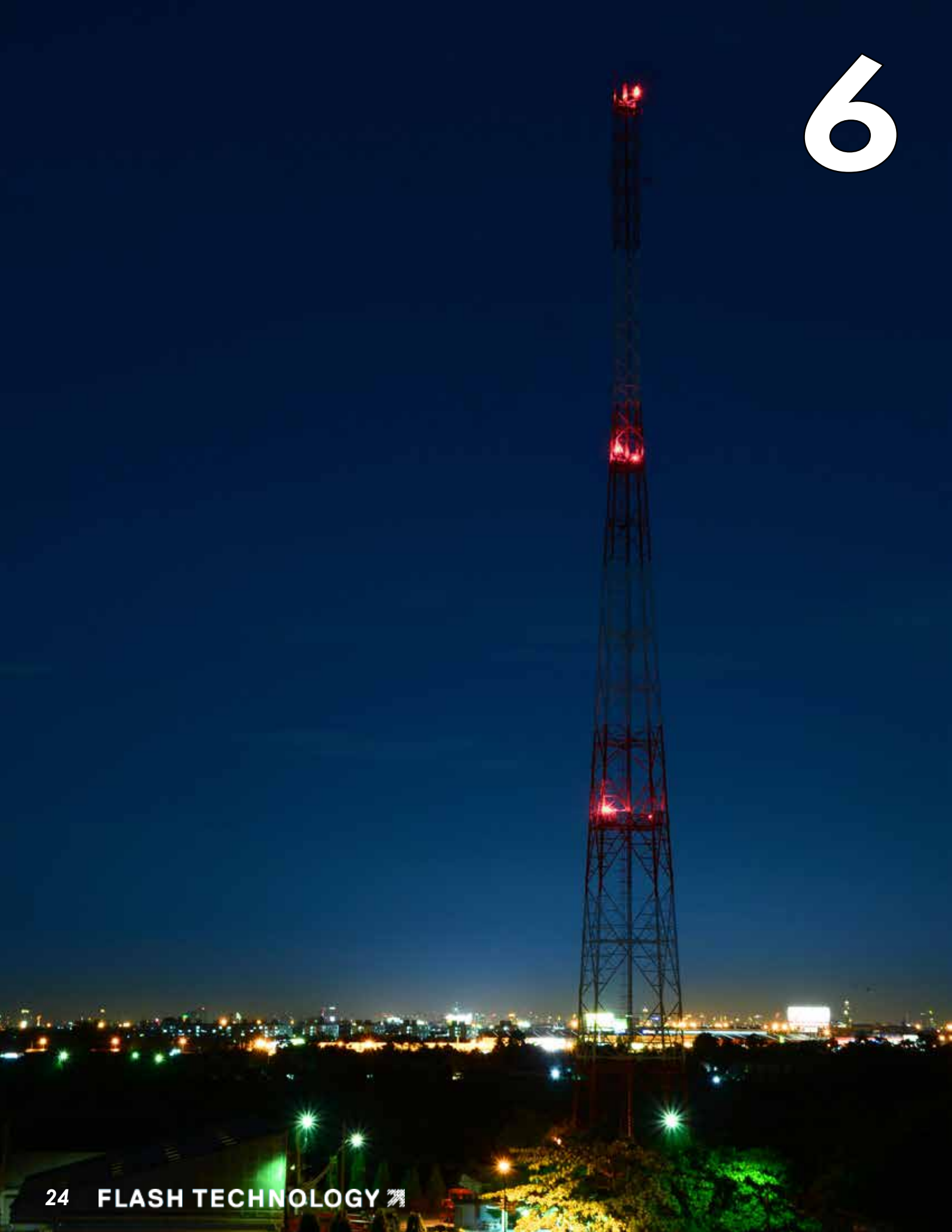


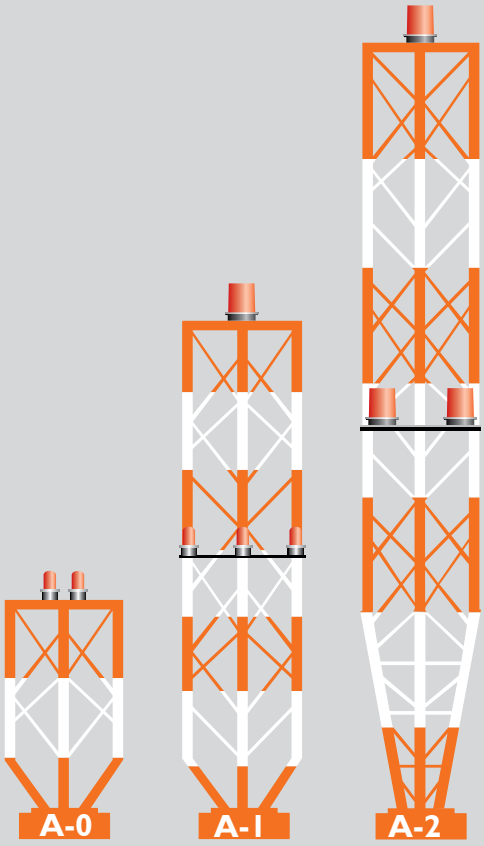
Red
L-864 / A0-A2

FTC 2201 Red - LED

FTC 2301 Red - LED

FTS 361x Red - LED

FTS 370r Red - LED



A-0
Less than 150'
including any appurtenances
(1) OL-2 Double Obstruction Beacon

A-1
Over 150' but not more than 350'
including any appurtenances
(1) L-864 Red Medium Intensity Beacon
(2) or more L-810 Marker Lights
configured to flash in sync with L-864

A-2
Over 350' but not more than 700'
including any appurtenances
(3) L-864 Red Medium
Intensity Beacons

LED Lighting Systems

Red tower lighting is referred to in FAA nomenclature as an A-type tower lighting system and is used only at night on towers up to 2200' (A6). Most common tower heights can be satisfied with A0-A2 tower lighting types ranging from below 150' to not more than 700'. Red lights are approved for use on towers up to 1750'. Depending on the tower height the tower may be an A-0 tower which is less than 150', or an A-1 tower which is above 150' and not more than 350', or an A-2 tower which is above 350' and not more than 700'., A-0, A-1 and A-2 tower types are the more common tower heights requiring red lighting systems.

Flash Technology offers a red system for A-0 towers up to A-6 towers in either xenon or LED configuration. The following pages list our xenon and LED products by tower type for easy reference and quotes.

Low Intensity Red LED

FTC 2201

A-Type Towers

Meets Advisory Circular 70/7460-1L

Application

The FTS 2201-2 LED is a red FAA OL2 (L-810) system that includes red steady burning lights for night to create an FAA tower type A-0 for structures less than 150' AGL.

Features

- Automatic fail safe to day mode and notification if system has not changed states in 19 hours
- (1) dry contact alarm point
- No EMI or RF
- Manual "ON–Auto–OFF" switch
- Photocell mode control with status indicators
- (5) year parts warranty
- Lockable weatherproof enclosure
- Variable nominal supply voltage 120 VAC or 240 VAC

Additional Options

GPS wireless synchronization can be ordered as an option that is integrated into the system controller.

A-1 system

Specifications

Beacon Power Consumption:	Red Night 14 Watts
A-1 Beacon Photometrics:	
Red Night at 20 fpm:	2,000 ± 25% ECD
Marker Power Consumption:	2.7 Watts Per Marker
A-0 OL2 Photometrics:	
Red Night Steady:	32.5 ± 25% ECD
Input Voltage:	120 VAC

Frequency:	50-60 Hz
FH Dimensions:	7.5" dia. x 15.75"
FH Weight:	26.3 lbs. (11.9 kg)
FH Aerodynamic Wind Area:	.68 ft^2
Controller Dimensions:	9.62" x 7.5" x 4.74"
Controller Weight:	4 lbs. (1.81 kg)
Controller Power Consumption:	4 Watts
Protection Rating:	IP 65, NEMA 4X

System Includes

A-0 System

- (1) Double obstruction red MKR370 OL2 LED marker fixture
- (1) FTC 2201 - red light controller - non-flashing PEC 510 photocell with 20' pigtail - manual & drawings
- (1) dry contact monitoring data points
- (1) 200' power cable - additional cable sold in 50' increments
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

A-1 System*

- (1) Double obstruction red MKR370 OL2 LED marker fixture
- (1) FTC 2201 - red light controller PEC 510 photocell with 20' pigtail - manual & drawings
- (1) dry contact monitoring data points
- (3) MKR370 LED markers
- (1) 350' spool flashhead cable - additional cable sold in 50' increments
- (1) 200' spool marker cable - additional cable sold in 50' increments
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

* - Meets Advisory Circular 70/7460-1K due to no flashing markers

Options

GPS Wireless Synchronization
FTW 175 Dry Contact
FTW 175 Eagle
FTM 190 Dry Contact
FTM 190 Eagle
FTM 190 SNMP

System Marker Installation Hardware

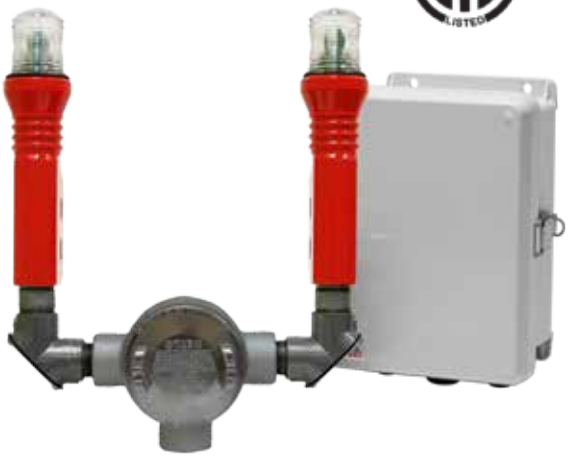
Self-Supported Hardware
Guyed Tower Hardware
Monopole (Chain) Hardware
Monopole (Band) Hardware

Low Intensity Red LED

FTC 2301 DC

A-Type Towers

Meets Advisory Circular 70/7460-1L



Application

The FTS 2301 is a DC-powered red FAA OL2 (L-810) system that includes LED steady burn markers to create FAA tower type A-0 for structures up to 150' AGL.

Features

- Automatic fail safe to day mode and notification if system has not changed states in 19 hours
- (3) dry contact monitoring alarm points
- Ability to operate markers as flashing or steady burn
- Causes no EMI or RF noise
- Manual "ON–Auto–OFF" switch
- Photocell mode control with status indicators
- (5) year parts warranty
- NEMA 4X outdoor rated enclosure

Additional Options

GPS wireless synchronization can be provided by adding the FTW 170 GPS Wireless Synchronization Unit.

A-1 System shown here

Specifications

Beacon Power Consumption:	Red Night 15 Watts
A-1 Beacon Photometrics:	
Red Night at 20/30 fpm:	2,000 ± 25% ECD
Marker Power Consumption:	2 Watts Per Marker
A-0 OL2 Photometrics:	
Red Night Steady:	32.5 ± 25% ECD
Input Voltage:	24 VDC

Frequency:	50-60 Hz
FH Dimensions:	7.5" dia. x 15.75"
FH Weight:	26.3 lbs. (11.9 kg)
FH Aerodynamic Wind Area:	.68 ft^2
Controller Dimensions:	9.51" x 7.32" x 4.92"
Controller Weight:	4 lbs. (1.81 kg)
Controller Power Consumption:	4W
Protection Rating:	IP 65, NEMA 4X

System Includes

A-0 System

- (1) Double obstruction red MKR370 OL2 LED marker fixture
- (1) FTC 2301 - red light controller - non-flashing PEC 510 photocell with 20' pigtail - manual & drawings
- (1) dry contact monitoring data points
- (1) 200' power cable - additional cable sold in 50' increments
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

A-1 System

- (1) flashhead 370r red LED flashhead
- (1) FTC 2301 - Red light controller PEC 510 photocell with 20' pigtail - manual & drawings
- (3) dry contact monitoring data points
- (3) MKR370 LED markers
- (1) 350' spool flashhead cable - additional cable sold in 50' increments
- (1) 200' spool marker cable - additional cable sold in 50' increments
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

Options

GPS Wireless Synchronization
FTW 175 Dry Contact
FTW 175 Eagle
FTM 190 Dry Contact
FTM 190 Eagle
FTM 190 SNMP

System Marker Installation Hardware

Self-Supported Hardware
Guyed Tower Hardware
Monopole (Chain) Hardware
Monopole (Band) Hardware

Medium Intensity Red LED

FTS 361x-5

A-Type Towers

Meets Advisory Circular 70/7460-1L

Patent Pending

Application

The FTS 361x-5 series is an LED red FAA L-864 system that includes the AC FH 370r for night and AC markers to create FAA tower types A-1 to A-6 for structures taller than 150' AGL.

Features

- Automatic fail safe to day mode and notification if system has not changed states in 19 hours
- (3) dry contact monitoring alarm points
- Fresnel optics minimize ground scatter
- Causes no EMI or RF noise
- L-810 LED marker kit design eliminates conduit
- 24/7/365 monitoring & call center services
- (5) year parts warranty, 10 year life expectancy
- NEMA 4X outdoor rated enclosure

Additional Options

GPS wireless synchronization can be provided by adding the FTW 170 GPS Wireless Synchronization Unit.

Specifications

Beacon Power Consumption:	Red Night 7 Watts
Beacon Photometrics:	
Red Night at 20/30 fpm:	2,000 ± 25% ECD
Marker Power Consumption:	2.7 Watts Per Marker
Input Voltage:	120 VAC
Frequency:	60 Hz

FH Dimensions:	15.75" dia. x 7.31"
FH Weight:	26.3 lbs. (11.9 kg)
FH Aerodynamic Wind Area:	.68 ft^2
Controller Dimensions:	19.31" x 17.32" x 9.58"
Controller Weight:	22 lbs. (10.8 kg)
Controller Power Consumption:	12W
Protection Rating:	IP 65, NEMA 4X

System Includes

Each System Includes

- 350' spool flashhead cable - additional cable sold in 50' increments
- 200' spool marker cable - additional cable sold in 50' increments
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

A-0 System

- (1) FLC 3611 Controller - PEC 510 photocell with 20' pigtail - manual & drawings
- (5) dry contact monitoring data points
- (3) MKR370 LED markers

A-1 System

- (1) flashhead 370r Red LED flashhead
- (1) FLC 3611 Controller - PEC 510 photocell with 20' pigtail - manual & drawings
- (5) dry contact monitoring data points
- (3) MKR370 LED markers

A-2 System

- (1) flashhead 370r Red LED flashhead
- (1) FLC 3611 Controller - PEC 510 photocell with 20' pigtail - manual & drawings
- (8) dry contact monitoring data points
- (3) MKR370 LED markers

Interface

All FTS 361x series systems include a display used for onsite:

- Alarm Notification
- Diagnostics
- Configuration
- Lighting Inspections

Options

Eagle
Modbus
GPS Wireless Synchronization

System Marker Installation Hardware

Self-Supported Hardware
Guyed Tower Hardware
Monopole (Chain) Hardware
Monopole (Band) Hardware
Angle Bracket (1 per marker)

Monitoring Options

FTW 175 Dry Contact
FTW 175 Eagle
FTM 190 Dry Contact
FTM 190 Eagle
FTM 190 SNMP

Medium Intensity Red LED

Vanguard II FTS 370r

A-Type Towers

Meets Advisory Circular 70/7460-1L

FAA type A1 or A2 150'-700'AGL

Advanced Technology Comes Standard

The FTS 370r Vanguard II is a red FAA L-864 medium intensity LED aviation obstruction lighting system. With a separate flashhead and system controller it is considered a split system. Designed to operate on A-1 through A-2 FAA tower types.

Vanguard Standard Features	Why are they important to you?
Single cable run to both marker junction box and flash head	Power and communication in one cable, simplifies installation
LED by-pass circuitry	Extends functional life and reduces tower climbs by generating an alarm only after 25% of all LEDs have failed rather then the single LED threshold commonly employed.
Single enclosure with no interlock switch	One enclosure for power, control and monitoring that technicians can access without resetting alarms.
Upgradeable firmware	Accommodates future regulatory changes through software updates.
Dry contacts	Provides 6 alarm points and a dedicated mode change relay.
Fresnel optics	Provides minimal light to the ground making it community friendly.
Automatic failsafe	Switches to day mode for FAA compliance after 19 hours of no mode change.
Unique 4-line backlit display	Visible system detail in any lighting conditions.
Radar interface	To activate light only when no aircraft are present.
Avian compliance	Programming allows the lighting system to be converted to avian compliance at installation or in the future for avian compliance.

Additional Options

Monitoring is available through SNMP v2c, v3, Modbus and Eagle protocols via ethernet or cellular connectivity when equipped with a SMART™ card. When monitored by Flash Technology the system qualifies for annual lighting inspections rather than quarterly.

Wi-Fi access lets users with Wi-Fi enabled devices to fully control the system from inside a truck during bad weather. This allows quick web access for performing inspections, diagnostics and troubleshooting.

Optional avian compliance provides configurations that, according to some FAA studies, have been shown to lower migratory bird fatalities and lower expenses on certain tower types.

An infrared (IR) option for better visibility to night vision goggles (NVG) and NVIS is available. Our FTS 370 NVG compatible design combines red (620nm) and IR (850nm) LEDs to ensure visibility to pilots in all circumstances

Specifications

Power Consumption:	Red Night 40 Watts
Beacon Photometrics:	
Red Night at 20/30/40 fpm	2,000 ± 25% ECD
Marker Power Consumption:	2.0 Watts Per Marker
Input Voltage:	120-240 VAC ±24 VDC (optional) ±48 VDC (optional)
Frequency:	50-60 Hz
FH Dimensions:	15.75" dia. x 7.31"
FH Weight:	26.3 lbs. (11.92 kg)
FH Aerodynamic Wind Area:	99.125 in^2
Controller Dimensions:	23." x 17.13" x 6.44"
Controller Weight:	44 lbs. (20 kg)
Protection Rating:	IP 65, NEMA 4X

System Includes

A-1 System

- (1) flashhead 370r red LED
- (1) 370r red LED system controller 120-240VAC, 50/60HZ, PHD 512 photodiode w/ 20' pigtail
- (7) dry contact monitoring data points
- (3) MKR370 LED markers
- 350' spool #3700 LED system cable 8AWG/2C*
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

A-2 System

- (3) flashhead 370r red LED
- (3) 370r red LED system controller 120-240VAC, 50/60HZ, PHD 512 photodiode w/ 20' pigtail
- (7 or 21) dry contact monitoring data points
- (6) MKR370 LED markers
- 550' spool #3700 LED system cable 8AWG/2C*
- 3M™ 1" Scotch® Commercial Filament Tape and 2" Scotchrap™ All-Weather Corrosion Protection Tape

*Additional cable sold in 25' increments.
10AWG/2C sold up to 375'
8AWG/2C sold for 375' to 600'
6AWG/2C sold for 600' to 850'

Options

- SMART
- SMART with GPS Synchronization
- Wi-Fi
- Avian Compliant Option
- Infrared / Night Vision Goggle Compatible
- DC Input
- Catenary

System Marker Installation Hardware

- Self-Supported Hardware
- Guyed Tower Hardware
- Monopole (Chain) Hardware
- Monopole (Band) Hardware
- Angle Bracket (1 per marker)

Monitoring Options (requires SMART Card)

- Modbus
- SNMP
- Ethernet

7

Markers
L-810

LED Markers
Upgrade Conversion Kit

LED Lighting Systems

The FAA refers to marker lights as an L-810. Marker lights are required on all dual and red medium intensity lighting systems unless the tower is over 350' and has been filed as avian compliant or filed to meet FAA Advisory Circular 70/7460-1L.

LED conversion kits are available for incandescent markers and come in AC and DC input power capabilities. An infrared (IR) option for better visibility to night vision goggles (NVG) and NVIS is also available.

For mounting hardware ,go to page 46.

LED Marker

L-810

Application

The L-810 marker design is an LED based marker that is extremely easy to install. Its compact size, weight and extremely low power usage make it a desirable choice in marker replacement.

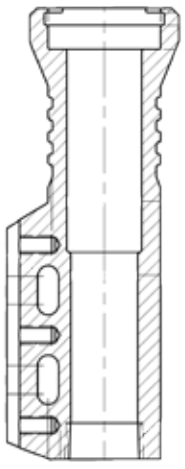
Features / Benefits

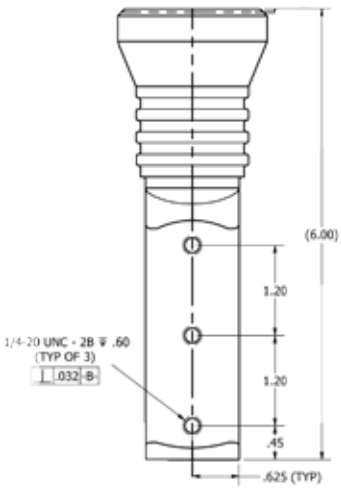
- Easy installation
- Minimal mounting hardware required
- Lightweight
- Compact design
- Versatile mounting options

Specifications

Material:	
	Base—Aluminum (cast)
	Lens—Acrylic
Bottom Hub:	3/4" NPT
Power:	1.7 W
Weight:	1 lb
Height:	8"
Max Width:	2"
Min Width:	1.2"
Marker Photometrics:	
Red Night Steady:	32.5 ± 25% ECD
Beam Spread:	Horizontal: 360°
	Vertical: 10°

Model	Input Voltage	Power
MKR 370 AC	120-240 VAC	2.7W
MKR 370 AC IR	120-240 VAC	4.6W
MKR 370 DC	24 VDC	2.0W
MKR 370 DC IR	24 VDC	3.6W





Upgrade/Conversion Kits

LED Marker Upgrade

LED Marker Upgrade

The LED marker conversion kit converts incandescent markers on FTB 324 & FTB 314 xenon lighting systems to Vanguard LED. The new red light module provides adjustment for proper alarming.

Features / Benefits

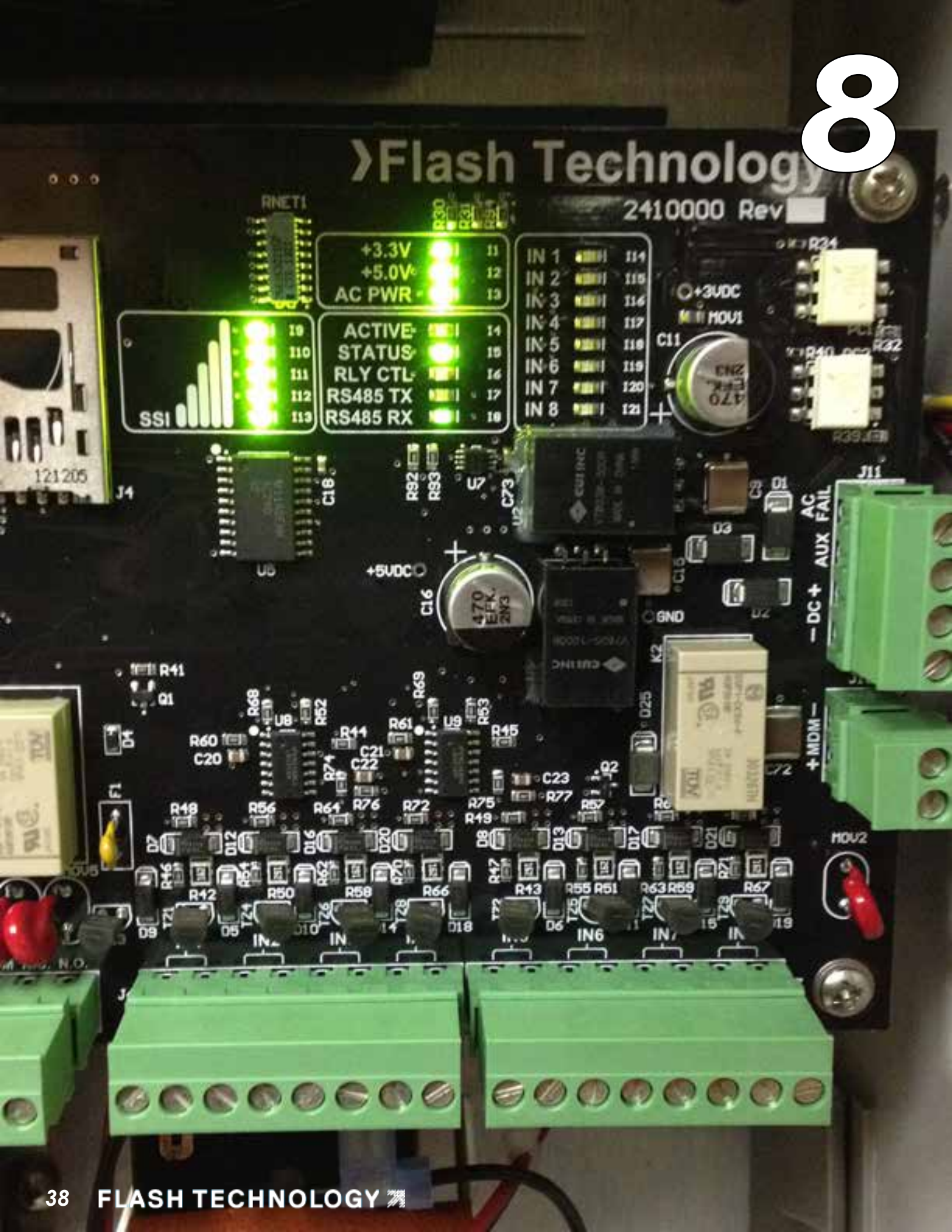
- For Flash FTB 324, FTB 311 and FTB 314 systems only
- (5) year warranty on LED markers
- Reduce tower climbs with long lasting LED
- Power consumption reduced from 116w to 2.7w / marker

312 to 324 Conversion

The 312 conversion kit converts an FTB 312 to an FTB 324. The new FH 324 is complete with new xenon tubes and carries a full (2) year warranty. This kit can be used in conjunction with the LED marker kit featured above.

Features / Benefits

- (2) year warranty on new xenon flashhead including tubes
- Friction fit flashtube mounting for easier maintenance


8
Flash Technology
2410000 Rev
+3.3V
+5.0V
AC PWR
ACTIVE
STATUS
RLY CTL
RS485 TX
RS485 RX
SSI
IN 1
IN 2
IN 3
IN 4
IN 5
IN 6
IN 7
IN 8
+3VDC
MOV1
+5VDC
GND
AC FAIL
AUX
DC +
DC −
+MDM−
MOV2
IN6

Monitoring

Devices

Eagle Cellular Monitoring

SNMP Monitoring

Monitoring Options

Modbus

SNMP

Eagle

Dry Contact

Ethernet

Cellular

As instructed by the FAA Advisory Circular 70/7460-1L, and FCC Title 47 Code of Federal Regulations, the owner of any antenna structure is required to visually inspect the antenna structure's lights every 24 hours to ensure that all lights are functioning properly, or by providing and properly maintaining an automatic alarm system designed to detect any failure of such lights and to provide indication of such failure to the owner.

Flash Technology offers a choice of external monitoring systems in conjunction with a selection of monitoring protocols to suit the location of the planned installation. All that is required is the availability of ethernet or cellular connectivity.

Eagle Cellular Monitoring

Xenon/LED Lighting Systems

FTW 175

Application

The FTW 175 is a cellular-based Eagle monitoring unit. This unit is designed to utilize the 3G network of either AT&T or Verizon with 2G fallback compatibility.

Features / Benefits

- 24-hour positive communication and operational status confirmation to satisfy FCC CFR 17.47
- Data delivery assurance and encryption
- Onboard signal strength indicator
- (4) dry contact monitoring data points
- External antenna with 12' extension
- Data uploaded to Flash Technology web portal for monitoring data, reporting and remote diagnostics
- Eagle interface with Flash Technology equipment for compliance with FCC Quarterly Lighting Inspection (QLI) waiver
- Battery back-up ensures alarm notification during power outages
- Built-in AC power monitor
- LED status indicators
- (1) year warranty

Specifications

Dimensions:	13.33h x 11.30w x 7d"
Weight:	11 lbs
AC Voltage:	120 VAC, 60 Hz
Power:	7W

Integrated modem reset board to re-establish connectivity to the network if interrupted.

SNMP Monitoring

Xenon/LED Lighting Systems

FTM 190

Application

The FTM 190 is an ethernet-based SNMP monitoring unit that can be monitored by a third party NOC. Also available with an AT&T or Verizon cellular modem to provide a modem for third party monitoring or an Eagle interface for Flash Technology NOC monitoring.

Features / Benefits

- SNMP v2c, v3 through ethernet
- Remote monitoring, control, programming and diagnostics
- Adds a web interface to configure and control the lighting system remotely or onsite with optional Wi-Fi.
- (8) dry contact monitoring data points
- Available with cellular modem (AT&T or Verizon)
- Data uploaded to Flash Technology web portal for monitoring data, reporting and remote diagnostics
- Eagle interface with Flash Technology equipment for compliance with FCC Quarterly Lighting Inspection (QLI) waiver
- Battery back-up ensures alarm notification during power outages
- Built-in AC power monitor
- LED status indicators
- (1) year warranty

Specifications

Dimensions:	7.75h x 13.5w x 6d”
Weight:	15 lbs
AC Voltage:	120/240 VAC, 60 Hz
DC Voltage:	12VDC

Onsite or remote web interface provides the following capabilities:

- Lighting system status and diagnostics
- The ability to configure and change mode
- Perform lighting inspections

Monitoring Options

Modbus

Modbus is a serial communications protocol for use with programmable logic controllers (PLCs). Simple and robust, it has since become a de facto standard communication protocol and it is now a commonly available means of connecting industrial electronic devices. The main reasons for the use of Modbus in the industrial environment are:

- Developed with industrial applications in mind
- Openly published and royalty-free
- Easy to deploy and maintain
- Moves raw bits or words without placing many restrictions on vendors

Modbus enables communication between many (approximately 240) devices connected to the same network, for example a system that measures temperature and humidity and communicates the results to a computer. Modbus is often used to connect a supervisory computer with a remote terminal unit (RTU) in supervisory control and data acquisition (SCADA) systems.

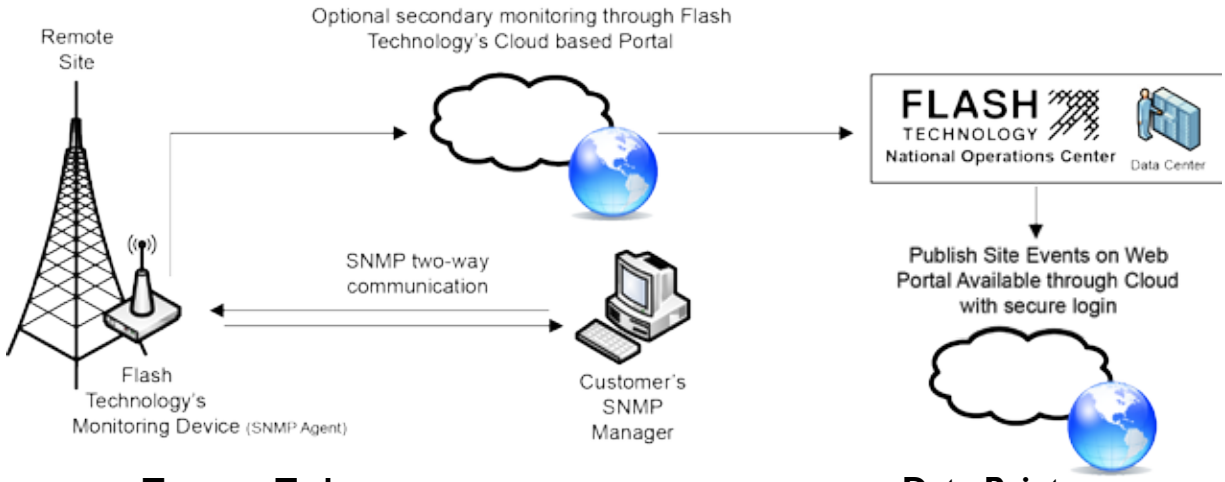
Modbus RTU or TCP over serial or ethernet are available options for Vanguard and the FTM 190. Examples of how this could be used would be to combine the monitoring of generators, power meters and lighting equipment with one monitoring device.

Monitoring Options

SNMP (Simple Network Messaging Protocols)

The Flash Technology Vanguard LED series and FTM 190 use SNMP v2c, v3 UDP protocols. The SNMP protocol uses two-way communication to monitor and program multiple assets remotely. SNMP informs are used for continuous notifications until the required acknowledgement is received from the customer SNMP management software ensuring alerts are captured.

The SNMP destination endpoints are configurable through both a local user interface and remotely through an SNMP Manager. Custom MIBs (Management Information Base) are available for customer's SNMP management software setup.



Two-way Tasks

SNMP Gets/Sets (communications to and from):

- Initiate a lighting inspection
- Configure tower type, beacons and marker settings
- Informs can be masked (diagnostic data is binded to informs)
- Diagnostic data can be requested (gets)
- Configurable Inform label and severity
- Configurable site name and ID
- Initiate a mode override

Data Points

Lighting system notifications from the site:

Industry Standard Alerts
- Beacon day alarm
- Beacon red night alarm
- Marker alarm

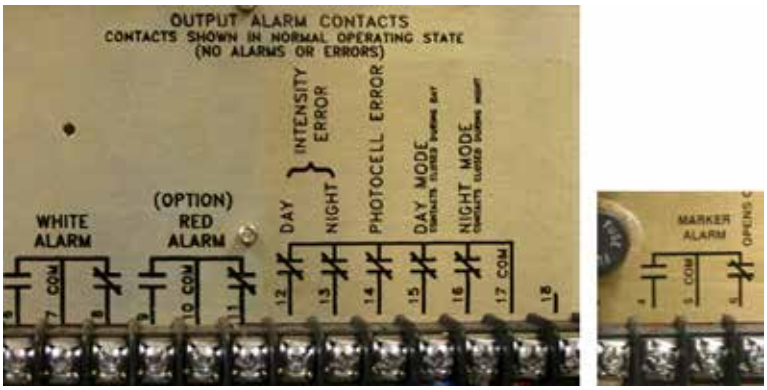
Flash Technology Additional Alerts
- Beacon white night alarm
- Beacon comm alarm
- Marker comm alarm
- System comm alarm
- System power up
- Lighting inspection active
- Site override active
- Site mode change alarm
- Site mode change event
- Site binding alarm
- Site beacon synchronization alarm
- GPS synchronization alarm
- Automatic update event

Monitoring Options

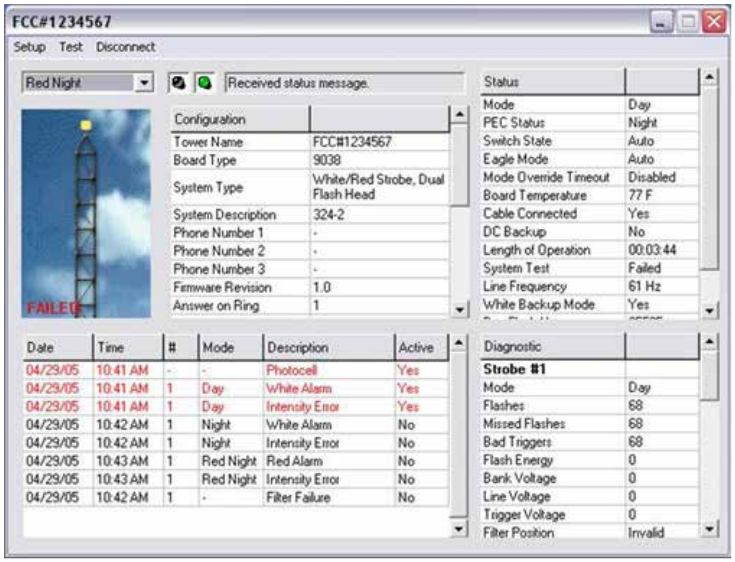
Eagle™

Eagle™ is a Flash Technology developed proprietary monitoring protocol. It can be used to directly communicate with the Flash Technology NOC or used for onsite diagnostic information.

Eagle™ features Advanced Relay Monitoring (ARM) which adds 5 dry contacts to standard 3 for a total of 8 dry contacts. Eagle™ also provides a serial port that interfaces with the FTW 175 or FTM 190 that can be used by third party NOC's to monitor certain xenon lighting systems.



Tech Eagle™ is a laptop application that is used for configuring and diagnosing certain xenon equipment in the field (requires serial cable). Utilizing Tech Eagle™ allows the user to see alarms, outputs, and diagnostics on the system. It also allows for safe quarterly lighting inspections (QLI) by providing the test parameters required without having to remove wires and manually trip alarms.



Monitoring Options

Dry Contact

Xenon Standard Dry Contacts

Normally Open or Closed
- White alarm
- Red alarm (optional)
- Marker alarm (optional)

Xenon Advance Relay Monitoring

Normally closed
- Day intensity alarm
- Night Intensity alarm
- Photocell alarm (19 hour timer)
- Day mode
- Night mode

Normally Open or Closed
- White alarm
- Red alarm (option)
- Marker alarm (option)

Vanguard

Normally Open or Closed
- Photodiode alarm (19 hour timer)
- Day intensity alarm
- Night intensity alarm
- Mode change status
- GPS synchronization alarm
- Marker alarm
- Communication (comm) alarm

Ethernet

Ethernet connectivity only available on Vanguard and FTM 190.
Ethernet port can be used for direct LAN connectivity, or with ethernet modems (cellular or satellite). Setup procedures will be required through your IT department.

Cellular

Cellular connectivity available in several options from providers: AT&T 2G (EDGE GPRS) /3G (HSPA) and Verizon 2G (1xRTT) /3G (EVDO).

9

Mounting Hardware

Flashhead Extension Brackets

Junction / Support Boxes

Angle Bracket

Monopole Chain Mounting Kit

Monopole Band Mounting Kit

Self Support Mounting Kit

Guyed Mounting Kit

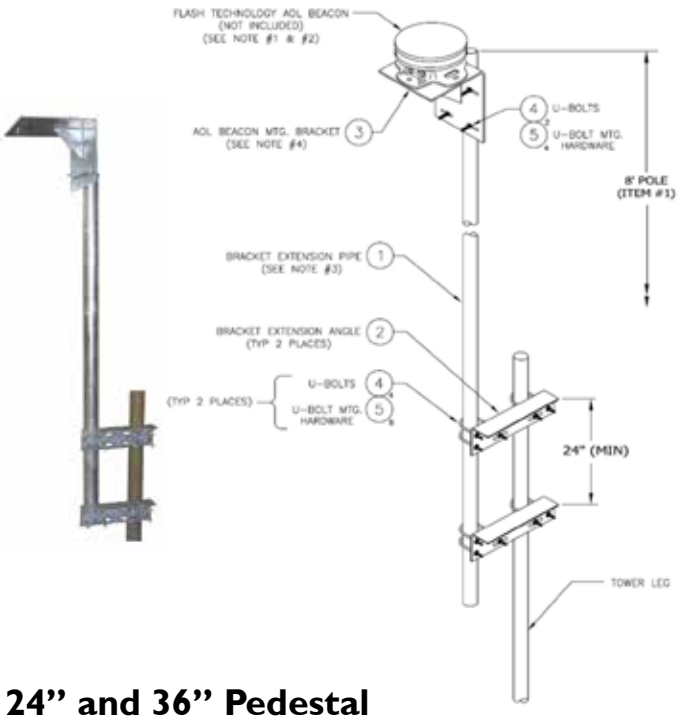
Flash Technology provides solutions for varying mounting needs. You will find our more commonly found products in the following pages. If you do not find the hardware you require, please contact Flash Technology for assistance.

Flashhead Extension Brackets

Universal Hole Pattern

Application

Flashhead Extension Brackets are designed to elevate the flashhead above appurtenances providing 360-degree visibility ensuring an unobstructed view per FAA AC70/7460, A1-3. Universal bolt hole pattern utilizes industry standard dimensions for flashhead mounting. All Flash Technology brackets and mounting hardware are hot dip galvanized to provide years of service and have all been certified to meet **TIA-222-G standards**.



Universal 60" Extension Bracket

- Adjustable to a maximum of 5' positioning the flashhead at a serviceable height for maintenance.
- Designed for fast and easy installation
- Rugged design for life long performance
- Schedule-40, 3" diameter steel
- Universal bolt hole pattern utilizes industry standard dimensions, allowing use with any manufacturer's lighting

24" and 36" Pedestal

- Designed for fast and easy installation
- Rugged design for life long performance
- One piece welded structure
- Schedule-40, 3" diameter steel

Junction/Support Boxes

Junction Boxes

Application

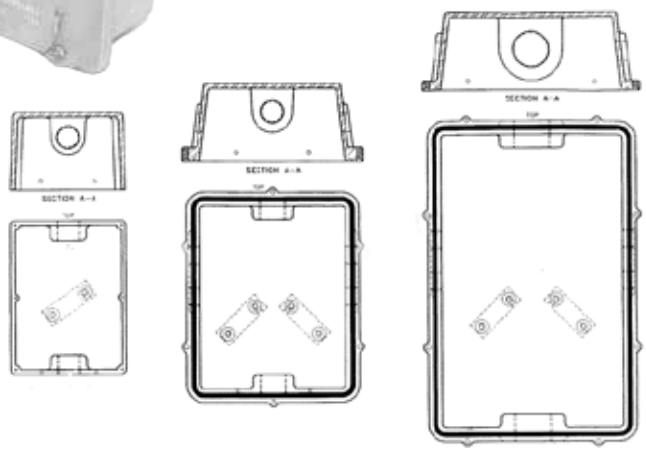
Flash Technology junction/support boxes provide field-proven and water-tight enclosures for conduit runs and vertical wire support. Each cast aluminum box is seam free to minimize corrosion, prevent leakage and offers maximum protection. Since the insulated wire supports are factory installed, no additional wire support fittings or devices are needed to meet the requirements of the National Electrical Code for individual wire sizes #6 gauge and smaller. Interior conduit entry bushings prevent damage to wiring due to chaffing during installation or natural vibration. Oil resistant gaskets and adhesives are utilized to provide superior protection in all outdoor areas where wind driven or freezing rain, salt air, dust and dirt problems are prevalent. Stainless steel bolts are evenly spaced on all (4) sides of the cover to ensure an unbreakable, watertight seal. A multitude of conduit sizes from 1/2" to 2" NPT can be accommodated.

Features/Benefits

- 40 years of field-proven reliability
- Removable covers for ease of maintenance
- Drain holes in bottom of box
- Molded cast aluminum enclosure
- Oil resistant gasket & adhesives
- Factory installed insulated wire supports
- Optional: duplex GFCI receptacle with weather resistant cover, 15 or 20 amp
- Optional: strain reliefs for cable and wire sizes #4 AWG and larger

Dimensions

- Small Box 8h x 6w x 4d in
- Medium Box 10h x 8w x 4d in
- Large Box 16h x 10w x 4d in



Junction/Support Boxes

Junction Box

Configuration Identification

Standard hub sizes:

Small Box 1" top and bottom (no side hubs)

Medium Box 1.25" top and bottom, 1" side hubs (four side hubs)

Large Box 2" top and bottom, 1" side hubs (four side hubs)

Reducers and plugs used for smaller sizes and blanks

Configuration Legend

Conduit Size	.50"	.75"	1"	1.25"	1.5"	2"
Corresponding Number	1	2	3	4	5	6

Hub Labeling Order

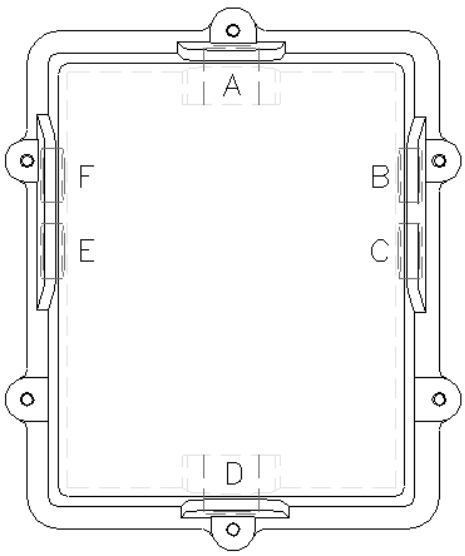
Hub sizes for A, B, C, D, E and F are given first, followed by the box size:

S: for Small J-box

M: for Medium J-box

L: for Large J-box

Example: Medium Junction box sized for a main riser of 1.25" conduit with a .50" side hub at position B and a 1" side hub at position F = 410403M.

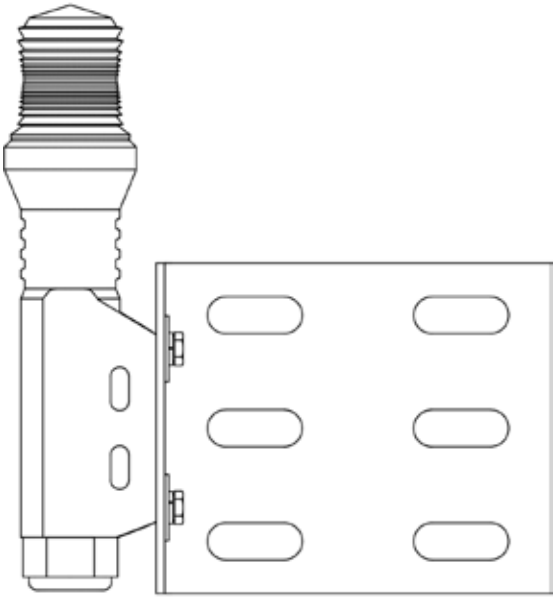


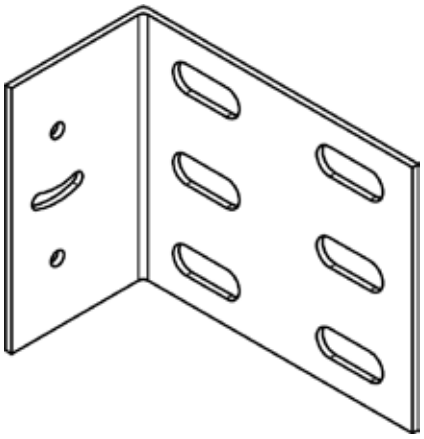
Angle Bracket

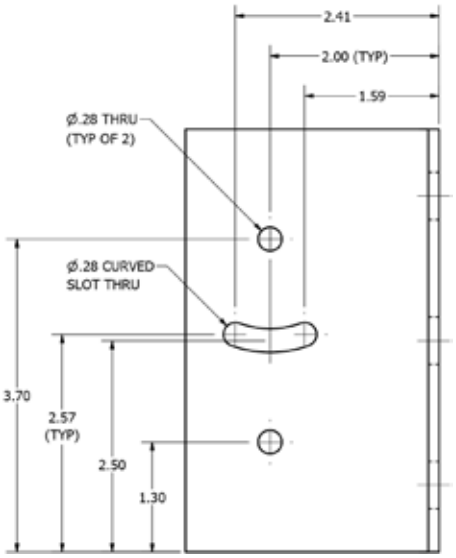
Application

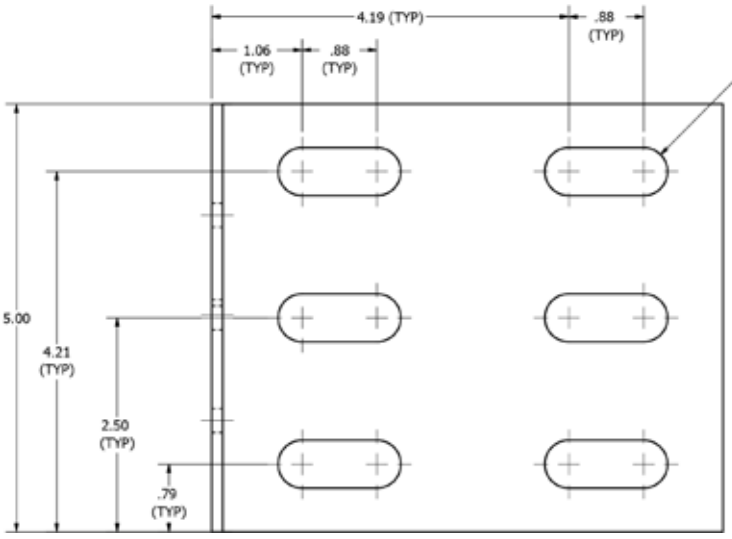
Angle brackets are designed to be used as an alternate method for mounting the L-810 marker. Purchased individually, they can be used in conjunction with the L-810 marker bands or as a substitute for the bands.

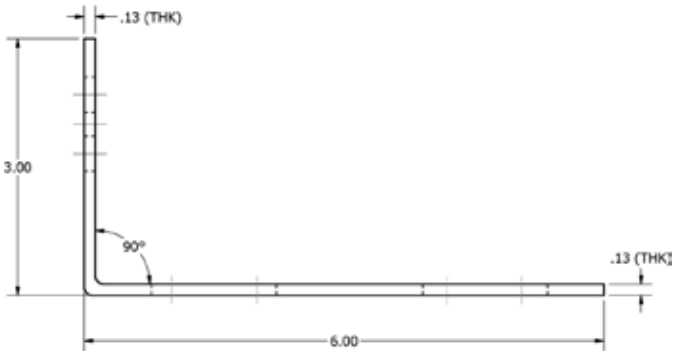
*Monopole banding kits come with the angle bracket standard











Monopole Chain Mounting Kit

BILL OF MATERIAL				COMPONENT QTY		
ITEM	P/N	DESCRIPTION		2 MKR	3 MKR	UNITS
A	F1119000	MARKER L810 LED 2.0W MKR 370 DC 24V		2	3	EA
B1	F1903911	MKR 370 MARKER INTERFACE ENCLOSURE PAINTED (SEE NOTE 1)		1	1	EA
B2	F1903910	MKR 370 MARKER INTERFACE ENCLOSURE STAINLESS STEEL (SEE NOTE 1)		1	1	EA
C	F4900156	CORD CONNECTOR 3/4" BLACK PLASTIC		2	3	EA
D	F3990810	BRACKET, ADJUSTABLE MOUNTING		2	2	EA
G	F4902571	CONN WIRE NUT BLUE		6	9	EA
H1	F5991717	MARKER BOX MOUNTING ASSEMBLY HARDWARE		1	1	EA
	INCLUDED IN ASSEMBLY HARDWARE	F5900759	SCREW HEX HEAD, 1/4-20 X 1" SS	4	4	EA
		F5901101	FLATWASHER, 1/4 SS	8	8	EA
		F5998337	FLATWASHER, HOT DIPPED GALVANIZED, 1/2"	8	8	EA
		F5900011	LOCKWASHER, 1/4 SS	4	4	EA
		F5900444	NUT HEX 1/4-20 SS	4	4	EA
H2	F5991790	HARDWARE MOUNTING ASSY 1/2" (MARKER BRACKET)		2	2	EA
	INCLUDED IN ASSEMBLY HARDWARE	F5998335	NUT HEX, HOT DIPPED GALVANIZED, 1/2"	4	4	EA
		F5998336	LOCKWASHER, HOT DIPPED GALVANIZED, 1/2"	4	4	EA
		F5998337	FLATWASHER, HOT DIPPED GALVANIZED, 1/2"	4	4	EA
H3	F5370989	CHAIN MOUNT SUPPORT ASSEMBLY WITH HARDWARE		1	1	EA
	INCLUDED IN ASSEMBLY HARDWARE	F3991260	CHAIN MOUNT ANGLE BRACKET	4	4	EA
		F5380010	CHAIN MOUNT CHAIN LOCK	2	2	EA
		F5380020	CHAIN MOUNT CHAIN 1/4"	2	2	EA
		F5998337	FLATWASHER, HOT DIPPED GALVANIZED, 1/2"	4	4	EA
		F5998336	LOCKWASHER, HOT DIPPED GALVANIZED, 1/2"	4	4	EA
		F5998335	NUT HEX, HOT DIPPED GALVANIZED, 1/2"	4	4	EA
		F5998333	HEX BOLT 1/2 X 1 3/4 HEX HDG	4	4	EA
H4	F5991797	HARDWARE MOUNTING ASSEMBLY 1/4 MARKER		2	3	EA
	INCLUDED IN ASSEMBLY HARDWARE	F5900759	SCREW 1/4-20 X 1" HEX-HEAD SS	4	6	EA
		F5990011	LOCKWASHER 1/4 SS	4	6	EA
		F5901101	FLATWASHER 1/4 SS	4	6	EA
J1	F5991728	TAPE, 0.75" BLACK ELECTRIC		1	1	EA
J2	F5900905	TAPE, ELECTRIC, 2"		1	1	EA
J3	F5900906	TAPE, FILAMENT, 1"		1	1	EA
K	F4218000	CABLE, TRAY RATED 18AWG/2C		60	60	FT

INSTALLATION NOTES

1. MARKER INTERFACE ENCLOSURE INSTALLATION :
LOCATE AND INSTALL MARKER INTERFACE ENCLOSURE (B) TO ADJUSTABLE MOUNTING BRACKET (D).

2. INSTALLING MARKER FIXTURE:
EVERY EFFORT SHOULD BE MADE TO INSTALL MARKER (A) VERTICAL.

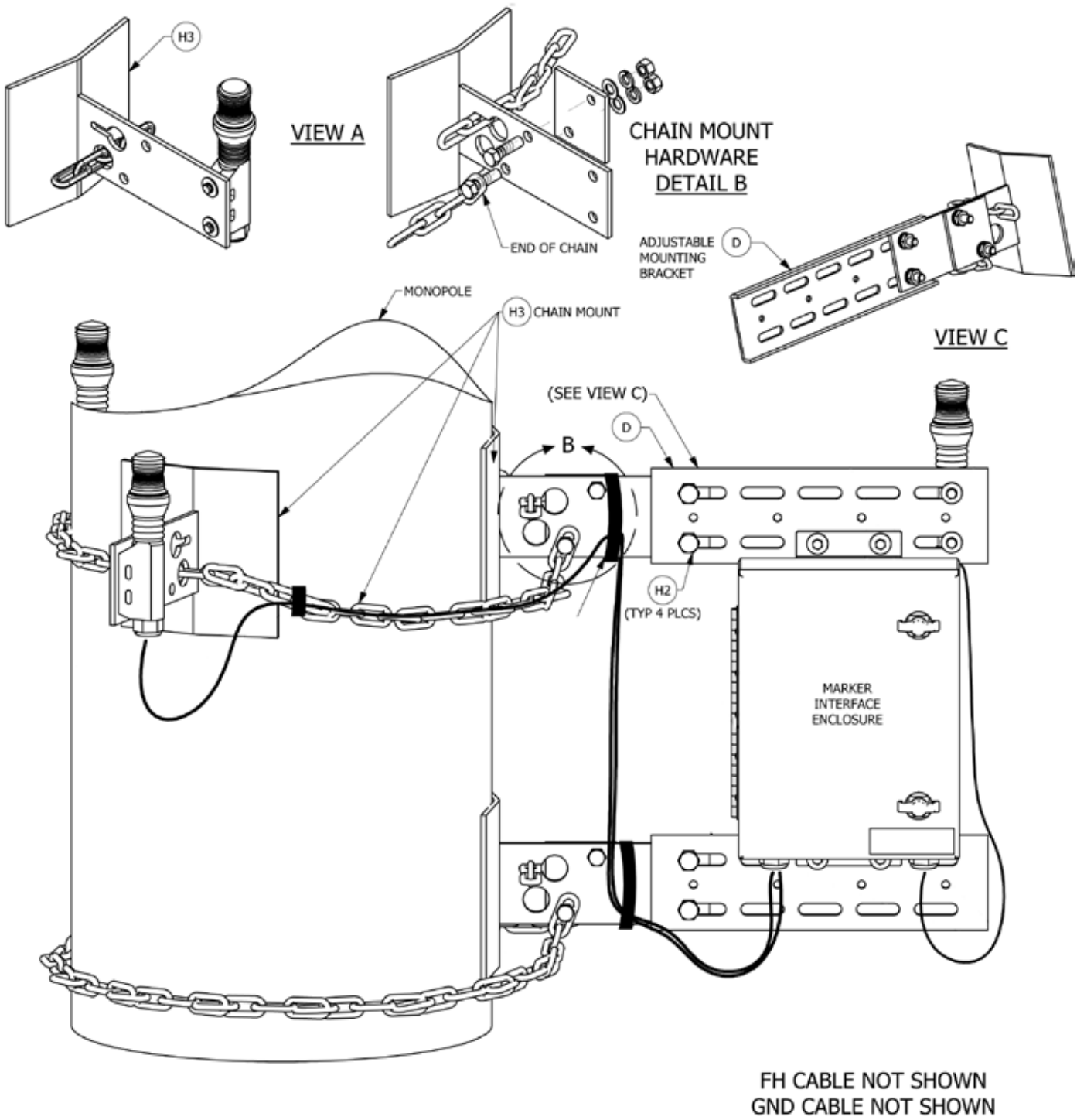
3. INSTALLING THROUGH CORD GRIPS:
A) INSERTING CABLE (K) THROUGH CORD GRIP, LEAVING ENOUGH CABLE LENGTH TO MAKE ELECTRICAL CONNECTIONS.
B) FROM THE OUTSIDE OF THE MARKER INTERFACE ENCLOSURE, TIGHTEN CORD GRIP TO SECURE CABLE (K).

4. INSTALLING CABLE (K) AND ELECTRICAL CONNECTIONS :
A) DIRECT ALL CONNECTING CABLES DOWN AND AWAY FROM MARKER INTERFACE ENCLOSURE TO PREVENT MOISTURE FROM ENTERING THE BOX.
B) SECURE ALL CABLES USING THE STANDARD 2-3-4 TAPING METHOD (J2 & J3) AS DIRECTED IN EQUIPMENT MANUAL.
C) USE WIRE NUTS (E) FOR ELECTRICAL CONNECTIONS.
D) WRAP WIRE NUTS TIGHTLY WITH AT LEAST (6) LAYERS OF ELECTRICAL TAPE (J1).
E) INSTALL A DRIP LOOP, FOR CABLE, NEAR THE MARKER INTERFACE ENCLOSURE AND AT EACH MARKER FIXTURE.
F) FLASHHEAD AND GROUND CABLES TO BE INSTALLED PER MANUAL.

5. MARKER INTERFACE ENCLOSURE BOX (B1 OR B2)-INFORMATION CARD:
A) INFORMATION HEREIN ARE SUBJECT TO CHANGE WITHOUT NOTICE.
B) PLEASE REFER TO (P/N 3370150) INFORMATION CARD INSIDE MARKER INTERFACE ENCLOSURE

6. TECHNICAL SUPPORT:
FOR TECHNICAL SUPPORT CALL "NOC" (1-800-821-5825).

Monopole Chain Mounting Kit



DC MARKER INSTALLATION
MONOPOLE CHAIN MOUNT
(3 MARKERS SHOWN)

Monopole Band Mounting Kit

BILL OF MATERIAL				COMPONENT QTY		
ITEM	P/N	DESCRIPTION		2 MKR	3 MKR	UNITS
A	F1119000	MARKER L810 LED 2.0W MKR 370 DC 24V		2	3	EA
B1	F1903911	MKR 370 MARKER INTERFACE ENCLOSURE PAINTED (SEE NOTE 2A)		1	1	EA
B2	F1903910	MKR 370 MARKER INTERFACE ENCLOSURE STAINLESS STEEL (SEE NOTE 2A)		1	1	EA
C	F4900156	CORD CONNECTOR 3/4" BLACK PLASTIC		2	3	EA
G	F4902571	CONN WIRE NUT BLUE		6	9	EA
J1	F5991728	TAPE, 0.75" BLACK ELECTRIC		1	1	EA
J2	F5900905	TAPE, ELECTRIC, 2"		1	1	EA
J3	F5900906	TAPE, FILAMENT, 1"		1	1	EA
K	F4218000	CABLE, TC RATED 18AWG/2C		60	60	FT
L	F1903130	MARKER ANGLE MOUNTING KIT		2	3	EA
	INCLUDED IN ASSEMBLLY HARDWARE	F3991370	BRACKET MARKER 370	2	3	EA
		F5900759	SCREW HEX HEAD, 1/4-20 X 1" SS	4	6	EA
		F5990011	LOCKWASHER, 1/4 SS	4	6	EA
		F5901101	FLATWASHER, 1/4"	4	6	EA
M	F5991774	CONDUIT HANGER WITH BOLT 1/2 - 4 IN		4	6	EA
N	F5991776	BRACKET BAND FLARED LEG WITH BOLT 1/2 IN		4	4	EA

INSTALLATION NOTES

1. BANDING MOUNT INSTALLATION :
CUSTOMER TO PROVIDE MONOPOLE BANDING AND HARDWARE.

2. MARKER INTERFACE ENCLOSURE INSTALLATION :
A) LOCATE AND INSTALL MARKER INTERFACE ENCLOSURE (B) TO BRACKET BAND FLARED LEG (N) APPROPRIATELY.
B) LOCATE AND INSTALL MONOPOLE BANDING (NOT PROVIDED BY FLASH TECHNOLOGY) THROUGH CENTER SLOTS ON BRACKET BAND FLARED LEG (N).

3. INSTALLING MARKER FIXTURE:
A) EVERY EFFORT SHOULD BE MADE TO INSTALL MARKER (A) VERTICAL HOWEVER PERMISSIBLE MARKER ANGLE IS UP TO 5°.
B) LOCATE AND INSTALL MARKER BRACKET (L) AT CENTER SLOT LOCATION ONTO MONOPOLE BANDING (NOT PROVIDED BY FLASH TECHNOLOGY).

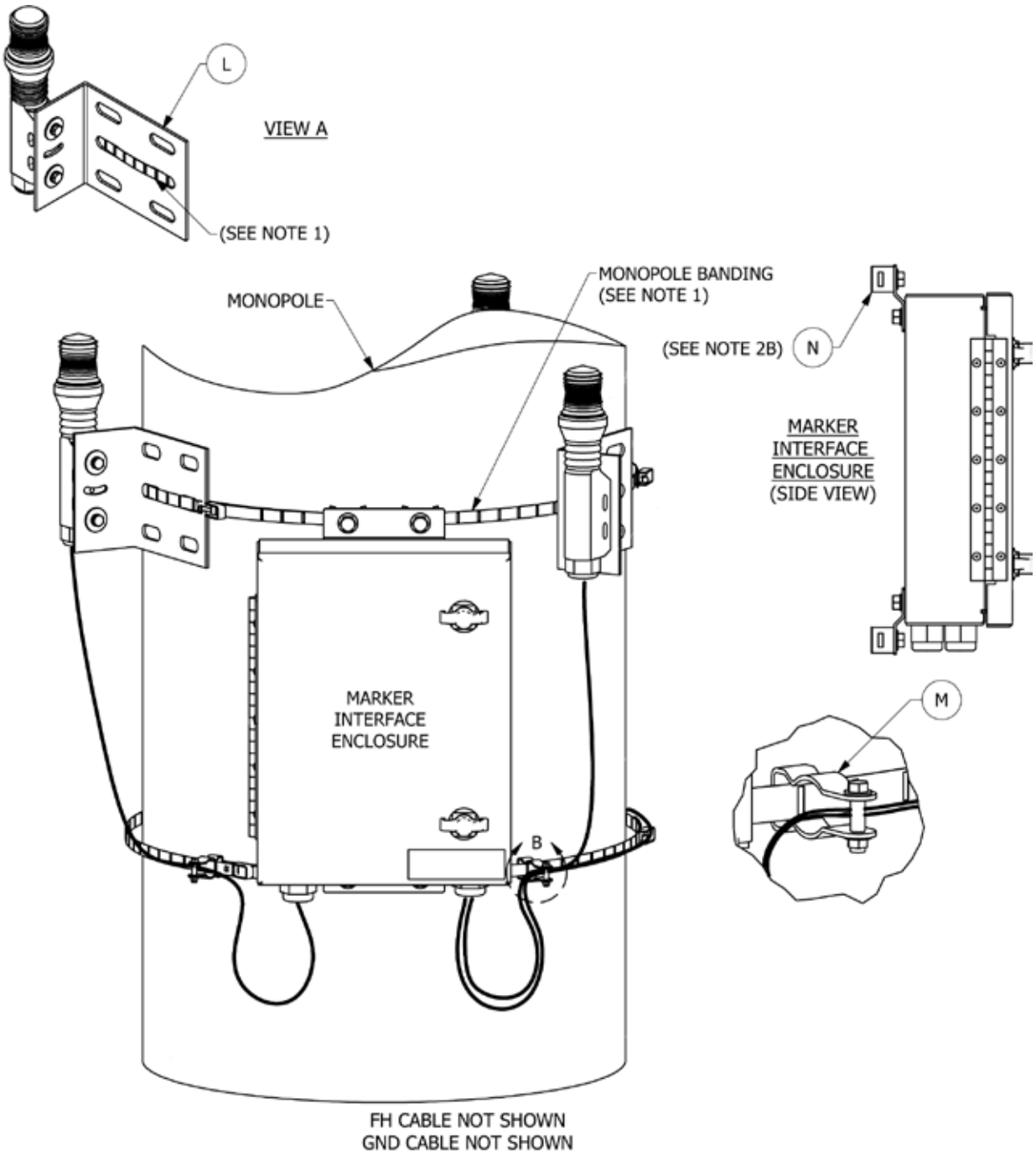
4. INSTALLING THROUGH CORD GRIPS:
A) INSERTING CABLE (K) THROUGH CORD GRIP, LEAVING ENOUGH CABLE LENGTH TO MAKE ELECTRICAL CONNECTIONS.
B) FROM THE OUTSIDE OF THE MARKER INTERFACE ENCLOSURE, TIGHTEN CORD GRIP TO SECURE CABLE (K),

5. INSTALLING CABLE (K) AND ELECTRICAL CONNECTIONS :
A) DIRECT ALL CONNECTING CABLES DOWN AND AWAY FROM MARKER INTERFACE ENCLOSURE, TO PREVENT MOISTURE FROM ENTERING THE BOX.
B) SECURE ALL CABLES USING THE STANDARD 2-3-4 TAPING METHOD (J2 & J3) AS DIRECTED IN EQUIPMENT MANUAL.
C) USE WIRE NUTS (E) FOR ELECTRICAL CONNECTIONS.
D) WRAP WIRE NUTS (E) TIGHTLY WITH AT LEAST (6) LAYERS OF ELECTRICAL TAPE (J1).
E) INSTALL A DRIP LOOP, FOR CABLE, NEAR THE MARKER INTERFACE ENCLOSURE AND AT EACH MARKER FIXTURE.
F) FLASHHEAD AND GROUND CABLES TO BE INSTALLED PER MANUAL.

6. MARKER INTERFACE ENCLOSURE BOX (B1 OR B2)-INFORMATION CARD:
A) INFORMATION HEREIN ARE SUBJECT TO CHANGE WITHOUT NOTICE.
B) PLEASE REFER TO (P/N 3370150) INFORMATION CARD INSIDE MARKER INTERFACE ENCLOSURE

7. TECHNICAL SUPPORT:
FOR TECHNICAL SUPPORT CALL "NOC" (1-800-821-5825).

Monopole Band Mounting Kit



DC MARKER INSTALLATION
MONOPOLE BANDING
(3 MARKERS SHOWN)

Self Support Mounting Kit

BILL OF MATERIAL				COMPONENT QTY			
ITEM	P/N	DESCRIPTION		2 MKR	3 MKR	4 MKR	UNITS
A	F1119000	MARKER L810 LED 2.0W MKR 370 DC 24V		2	3	4	EA
B1	F1903911	MKR 370 MARKER INTERFACE ENCLOSURE PAINTED (SEE NOTE 1A)		1	1	1	EA
B2	F1903910	MKR 370 MARKER INTERFACE ENCLOSURE STAINLESS STEEL (SEE NOTE 1A)		1	1	1	EA
C	F4900156	CORD CONNECTOR 3/4" BLACK PLASTIC		2	3	4	EA
D	F3990810	BRACKET, ADJUSTABLE MOUNTING		4	4	4	EA
E	F5990119	CARRIAGE BOLT - 0.5"-13 X 12" LONG (HOT DIPPED GALVANIZED)		4	4	4	EA
F	F5990252	CLAMP ADJUSTABLE 2"-10"		4	6	8	EA
G	F4902571	CONN WIRE NUT BLUE		6	9	12	EA
H1	F5991717	MARKER BOX MOUNTING ASSEMBLY HARDWARE		1	1	1	EA
	INCLUDED IN ASSEMBLY HARDWARE	F5900759	SCREW HEX HEAD, 1/4-20 X 1" SS	4	4	4	EA
		F5901101	FLATWASHER, 1/4"	8	8	8	EA
		F5998337	FLATWASHER, HOT DIPPED GALVANIZED, 1/2"	8	8	8	EA
		F5900011	LOCKWASHER, 1/4 SS	4	4	4	EA
		F5900444	NUT HEX 1/4-20 SS	4	4	4	EA
H2	F5991790	HARDWARE MOUNTING ASSY 1/2" (CARRIAGE BOLT)		2	2	2	EA
	INCLUDED IN ASSEMBLY HARDWARE	F5998335	NUT HEX, HOT DIPPED GALVANIZED, 1/2"	4	4	4	EA
		F5998336	LOCKWASHER, HOT DIPPED GALVANIZED, 1/2"	4	4	4	EA
		F5998337	FLATWASHER, HOT DIPPED GALVANIZED, 1/2"	4	4	4	EA
J1	F5991728	TAPE, 0.75" BLACK ELECTRIC		1	1	1	EA
J2	F5900905	TAPE, ELECTRIC, 2"		1	1	1	EA
J3	F5900906	TAPE, FILAMENT, 1"		1	1	1	EA
K	F4218000	CABLE, TRAY RATED 18AWG/2C		175	175	175	FT
L	F1903130	MARKER ANGLE MOUNTING KIT **(OPTIONAL)**		2	3	4	EA

INSTALLATION NOTES

1. MARKER INTERFACE ENCLOSURE AND CARRIAGE BOLT INSTALLATION :
A) LOCATE AND INSTALL MARKER INTERFACE ENCLOSURE (B) TO ADJUSTABLE MOUNTING BRACKET (D) APPROPRIATELY.
B) TRIM CARRIAGE BOLT (E) IF PERMISSIBLE, TO AVOID ANY INTERFERENCE.

2. INSTALLING MARKER FIXTURE:
PERMISSIBLE MARKER ANGLE IS UP TO 5° FROM VERTICAL WITHOUT OPTIONAL ANGLE MOUNTING KIT (L).

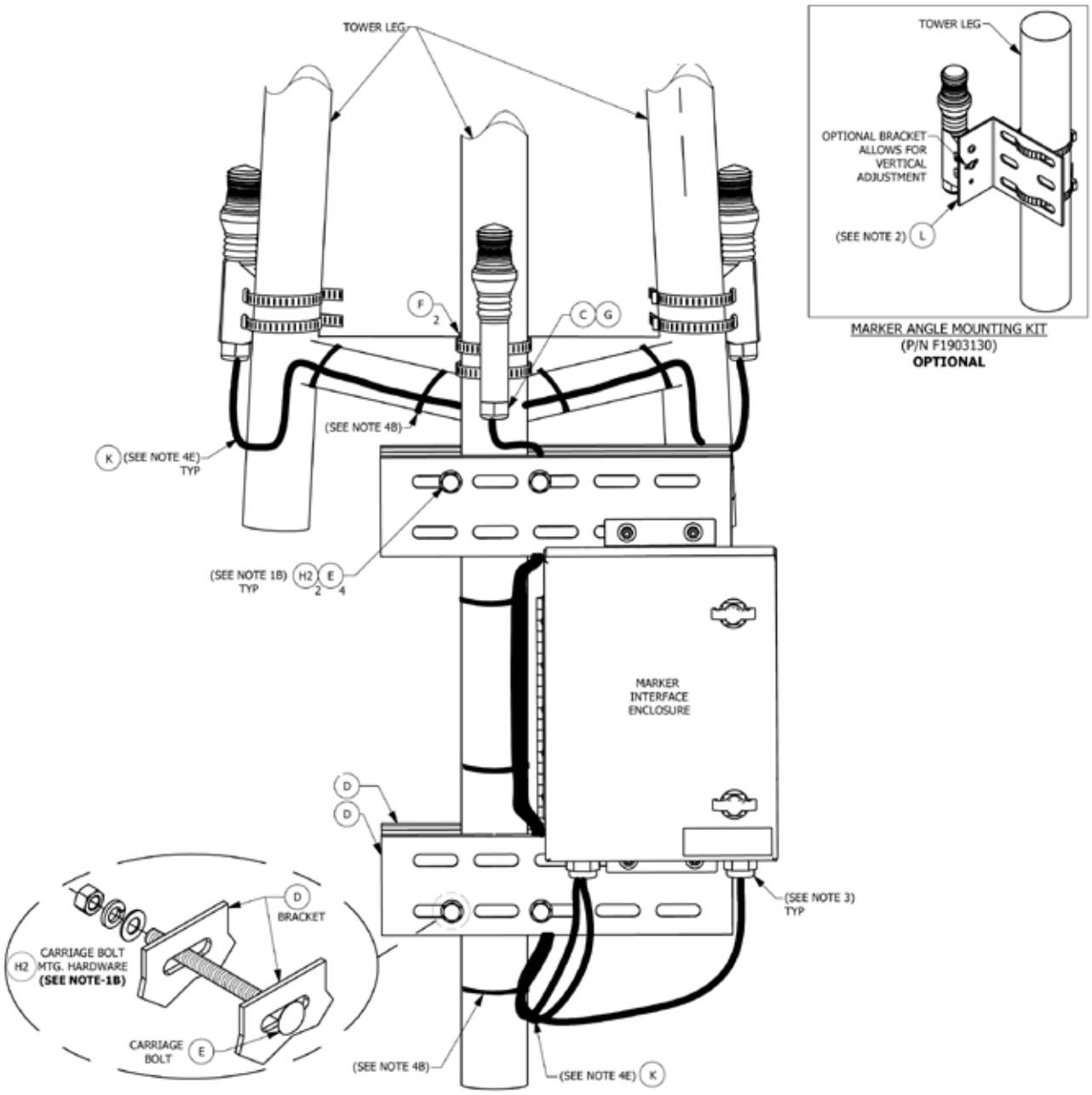
3. INSTALLING THROUGH CORD GRIPS:
A) INSERT CABLE (K) THROUGH CORD GRIP, LEAVING ENOUGH CABLE LENGTH TO MAKE ELECTRICAL CONNECTIONS.
B) FROM THE OUTSIDE OF THE MARKER INTERFACE ENCLOSURE, TIGHTEN CORD GRIP TO SECURE CABLE (K).

4. INSTALLING CABLE (K) AND ELECTRICAL CONNECTIONS :
A) DIRECT ALL CONNECTING CABLES DOWN AND AWAY FROM MARKER INTERFACE ENCLOSURE, TO PREVENT MOISTURE FROM ENTERING THE BOX.
B) SECURE ALL CABLES USING THE STANDARD 2-3-4 TAPING METHOD (J2 & J3) AS DIRECTED IN EQUIPMENT MANUAL.
C) USE WIRE NUTS (G) FOR ELECTRICAL CONNECTIONS.
D) WRAP WIRE NUTS TIGHTLY WITH AT LEAST (6) LAYERS OF ELECTRICAL TAPE (J1).
E) INSTALL A DRIP LOOP, FOR CABLE, NEAR THE MARKER INTERFACE ENCLOSURE AND AT EACH MARKER FIXTURE.
F) FLASHHEAD AND GROUNDING CABLES TO BE INSTALLED PER MANUAL.

5. MARKER INTERFACE ENCLOSURE BOX (B1 OR B2)-INFORMATION CARD:
A) INFORMATION HEREIN ARE SUBJECT TO CHANGE WITHOUT NOTICE.
B) PLEASE REFER TO (P/N 3370150) INFORMATION CARD INSIDE MARKER INTERFACE ENCLOSURE

6. TECHNICAL SUPPORT:
FOR TECHNICAL SUPPORT CALL "NOC" (1-800-821-5825).

Self Support Mounting Kit



DC MARKER INSTALLATION
SELF SUPPORT
(3 MARKERS SHOWN)

Guyed Mounting Kit

BILL OF MATERIAL				COMPONENT QTY			
ITEM	P/N	DESCRIPTION		2 MKR	3 MKR	4 MKR	UNITS
A	F1119000	MARKER L810 LED 2.0W MKR 370 DC 24V		2	3	4	EA
B1	F1903911	MKR 370 MARKER INTERFACE ENCLOSURE PAINTED (SEE NOTE 1A)		1	1	1	EA
B2	F1903910	MKR 370 MARKER INTERFACE ENCLOSURE STAINLESS STEEL (SEE NOTE 1A)		1	1	1	EA
C	F4900156	CORD CONNECTOR 3/4" BLACK PLASTIC		2	3	4	EA
D	F3990810	BRACKET, ADJUSTABLE MOUNTING		2	2	2	EA
E	F5998351	U-BOLT HDG 1/2 X 3 X 5 CUSTOM THREAD		2	2	2	EA
F	F5990252	CLAMP ADJUSTABLE 2"-10"		4	6	8	EA
G	F4902571	CONN WIRE NUT BLUE		6	9	12	EA
H1	F5991717	MARKER BOX MOUNTING ASSEMBLY HARDWARE		1	1	1	EA
	INCLUDED IN ASSEMBLY HARDWARE	F5900759	SCREW HEX HEAD, 1/4-20 X 1" SS	4	4	4	EA
		F5901101	FLATWASHER, 1/4"	8	8	8	EA
		F5998337	FLATWASHER, HOT DIPPED GALVANIZED, 1/2"	8	8	8	EA
		F5900011	LOCKWASHER, 1/4 SS	4	4	4	EA
		F5900444	NUT HEX 1/4-20 SS	4	4	4	EA
H2	F5991790	HARDWARE MOUNTING ASSY 1/2" (U-BOLT)		2	2	2	EA
	INCLUDED IN ASSEMBLY HARDWARE	F5998335	NUT HEX, HOT DIPPED GALVANIZED, 1/2"	4	4	4	EA
		F5998336	LOCKWASHER, HOT DIPPED GALVANIZED, 1/2"	4	4	4	EA
		F5998337	FLATWASHER, HOT DIPPED GALVANIZED, 1/2"	4	4	4	EA
J1	F5991728	TAPE, 0.75" BLACK ELECTRIC		1	1	1	EA
J2	F5900905	TAPE, ELECTRIC, 2"		1	1	1	EA
J3	F5900906	TAPE, FILAMENT, 1"		1	1	1	EA
K	F4218000	CABLE, TRAY RATED 18AWG/2C		60	60	60	FT
L	F1903130	MARKER ANGLE MOUNTING KIT **(OPTIONAL)**		2	3	4	EA

INSTALLATION NOTES

1. MARKER INTERFACE ENCLOSURE AND U-BOLT INSTALLATION :
A) LOCATE AND INSTALL MARKER INTERFACE ENCLOSURE (B) TO ADJUSTABLE MOUNTING BRACKET (D) APPROPRIATELY.
B) TRIM U-BOLT (E) IF PERMISSIBLE, TO AVOID ANY INTERFERENCE.

2. INSTALLING MARKER FIXTURE:
PERMISSIBILE MARKER ANGLE IS UP TO 5° FROM VERTICAL WITHOUT OPTIONAL ANGLE MOUNTING KIT (L).

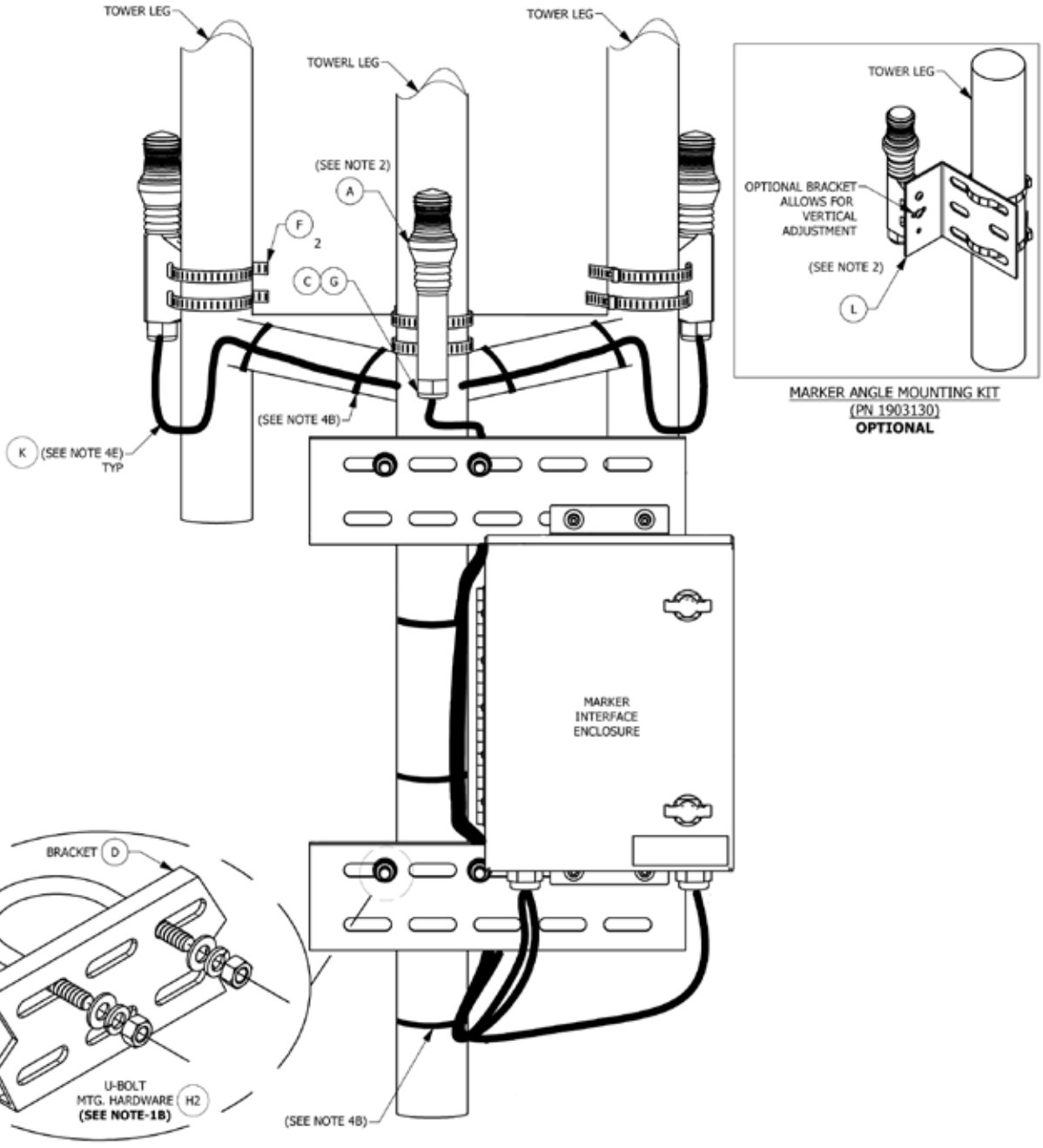
3. INSTALLING THROUGH CORD GRIPS:
A) INSERT CABLE (K) THROUGH CORD GRIP, LEAVING ENOUGH CABLE LENGTH TO MAKE ELECTRICAL CONNECTIONS.
B) FROM THE OUTSIDE OF THE MARKER INTERFACE ENCLOSURE, TIGHTEN CORD GRIP TO SECURE CABLE (K).

4. INSTALLING CABLE (K) AND ELECTRICAL CONNECTIONS :
A) DIRECT ALL CONNECTING CABLES DOWN AND AWAY FROM MARKER INTERFACE ENCLOSURE, TO PREVENT MOISTURE FROM ENTERING THE BOX.
B) SECURE ALL CABLES USING THE STANDARD 2-3-4 TAPING METHOD (J2 & J3) AS DIRECTED IN EQUIPMENT MANUAL.
C) USE WIRE NUTS (G) FOR ELECTRICAL CONNECTIONS.
D) WRAP WIRE NUTS TIGHTLY WITH AT LEAST (6) LAYERS OF ELECTRICAL TAPE (J1).
E) INSTALL A DRIP LOOP, FOR CABLE, NEAR THE MARKER INTERFACE ENCLOSURE AND AT EACH MARKER FIXTURE.
F) FLASHEAD AND GROUNDING CABLED TO BE INSTALL PER MANUAL.

5. MARKER INTERFACE ENCLOSURE BOX (B1 OR B2)-INFORMATION CARD:
A) INFORMATION HEREIN ARE SUBJECT TO CHANGE WITHOUT NOTICE.
B) PLEASE REFER TO (P/N 3370150) INFORMATION CARD INSIDE MARKER INTERFACE ENCLOSURE

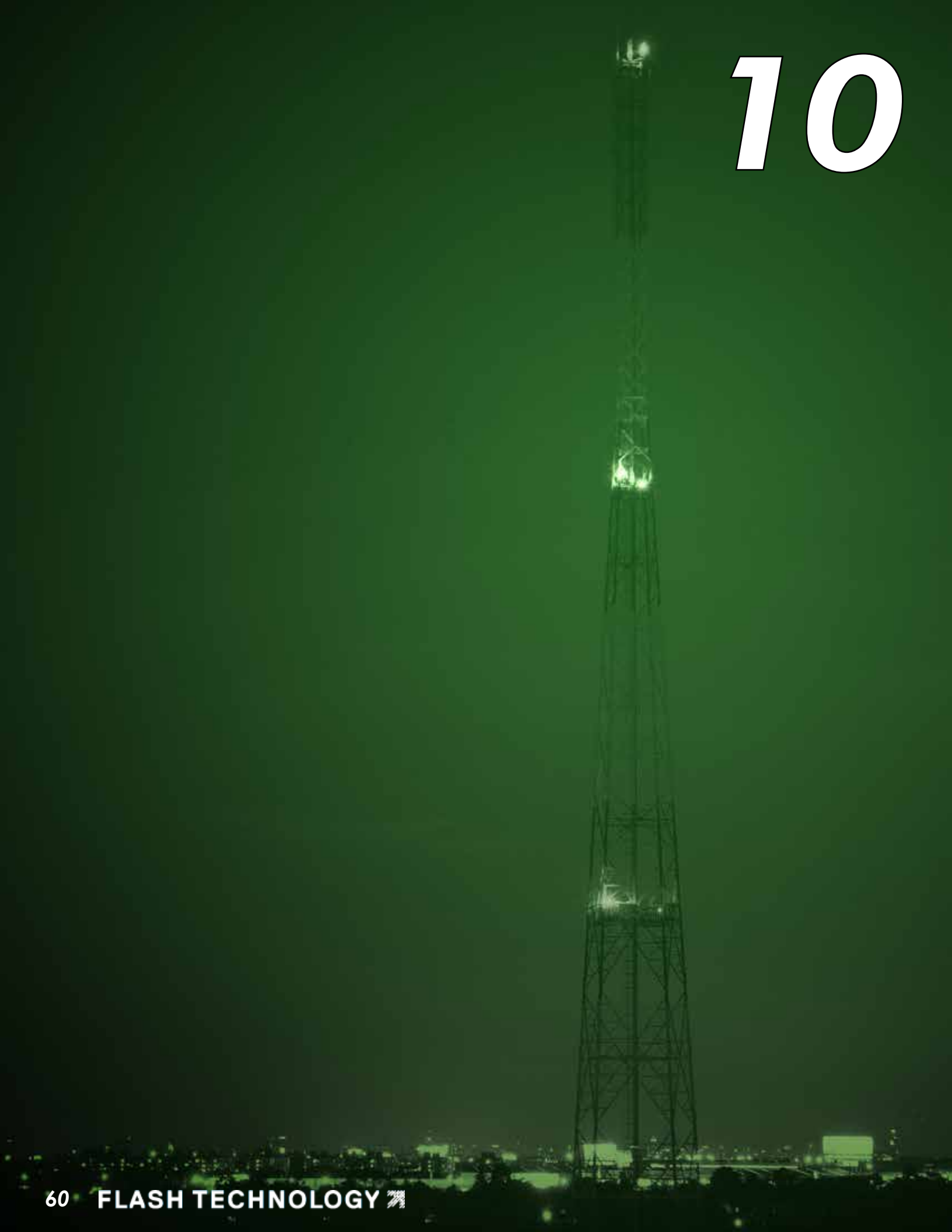
6. TECHNICAL SUPPORT:
FOR TECHNICAL SUPPORT CALL "NOC" (1-800-821-5825).

Guyed Mounting Kit



FH CABLE NOT SHOWN
GND CABLE NOT SHOWN

DC MARKER INSTALLATION
GUYED TOWER
(3 MARKERS SHOWN)



10

Lighting System Options

SMART Card

Wi-Fi

Avian Compliance

IR Systems

Catenary

The following pages list details of optional lighting features that may not be available on every system. Please refer to the specific lighting page to review what options are available for the system you require. If there is an option that you feel is important to the product you require, please contact Flash Technology as we may have other solutions to suit your needs.

Lighting System Options

SMART Card

Incorporating the SMART card into the lighting system hardware provides various benefits. For hardware benefits the SMART card adds an ethernet port to the lighting system. In terms of software the SMART card allows for intelligent data monitoring. Data can mean status, configuration, diagnostics, control and mode changes (remote or onsite) and remote firmware updates. Utilizing the SMART card also allows for GPS synchronization. For the Vanguard™ LED series the SMART card is required if Wi-fi is to be installed.

***Must have SMART Card for Wi-Fi**

Wi-Fi Option

The Wi-Fi option is currently only available on the Vanguard LED series. In order to install the Wi-Fi option, the SMART Card must be installed. If monitoring via ethernet or cellular modem on a system with Wi-Fi, an ethernet switch is required and available as an option. The Wi-Fi uses a WPA2 encryption and mounts to the bottom of the enclosure with included hardware.

The Wi-Fi option gives local access to embedded SMART card webpages to monitor alarms, status indicators, run lighting inspections and input mode changes. This does not provide internet access.

The Wi-Fi option can be utilized on smartphones, tablets or laptops with Wi-Fi capabilities.

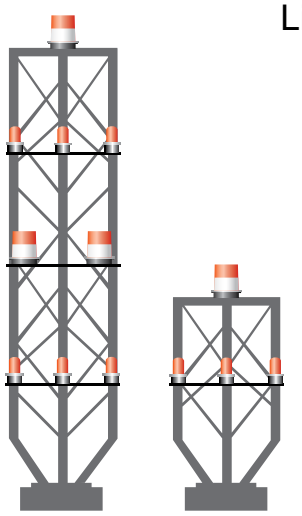
Avian Compliance and FAA Advisory Circular 70/7460-1L

The Federal Aviation Administration has made it possible to submit towers for avian compliance lighting configurations under the new FAA Advisory Circular 70/7460-1L. The requested filing can be used on new or existing structures and towers. Avian compliance lighting is formatted to comply with recommendations to reduce bird strikes with lit obstructions.

Flash Technology's avian compliant lighting option allows tower owners to meet those requirements once the tower is approved for avian compliant lighting systems. Avian compliant lighting systems are determined by the height of the tower whereby the night flash rate for beacon(s) is changed to 30 fpm and the L-810 markers are either eliminated (towers greater 350') or synchronized (towers 150' to 350') to flash at 30 fpm with the beacon(s). SEE TOWER GUIDELINES FOR LIGHTING REFERENCE.

Lighting System Options

Avian Compliance Continued



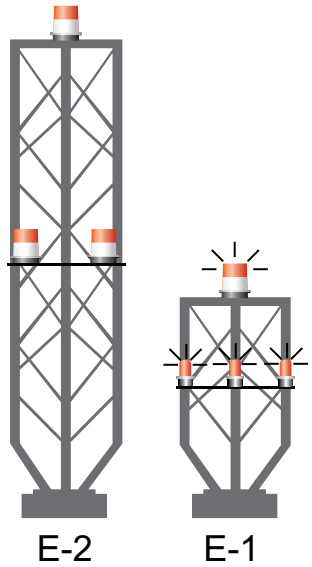
E-2 E-1

Lighting configuration for E-1 and E-2 towers for avian compliance.

Standard (AC 70/7460-1K or Previous)

E-2
Over 350' but not more than 700' including any appurtenances
(3) L-864/L-865 Medium Intensity Beacons
(6) L-810 Marker Lights
(8) L-810 Marker Lights is square

E-1
Over 200' but nor more than 350' including any appurtenances
(1) L-864/L-865 Medium Intensity Beacon
(2) or more L-810 Marker Lights



E-2 E-1

Avian (AC 70/7460-1L)

E-2
Over 350' but not more than 700' including any appurtenances
(3) L-864/L-865 Medium Intensity Beacons
Beacons flashing at 30 flashes per minute (fpm)
No L-810 Marker Lights required

E-1
Over 200' but nor more than 350' including any appurtenances
(1) L-864/L-865 Medium Intensity Beacon
(2) or more flashing L-810 Marker Lights at 30 flashes per minute (fpm)
*Beacons and markers must be synchronized to flash at 30 fpm

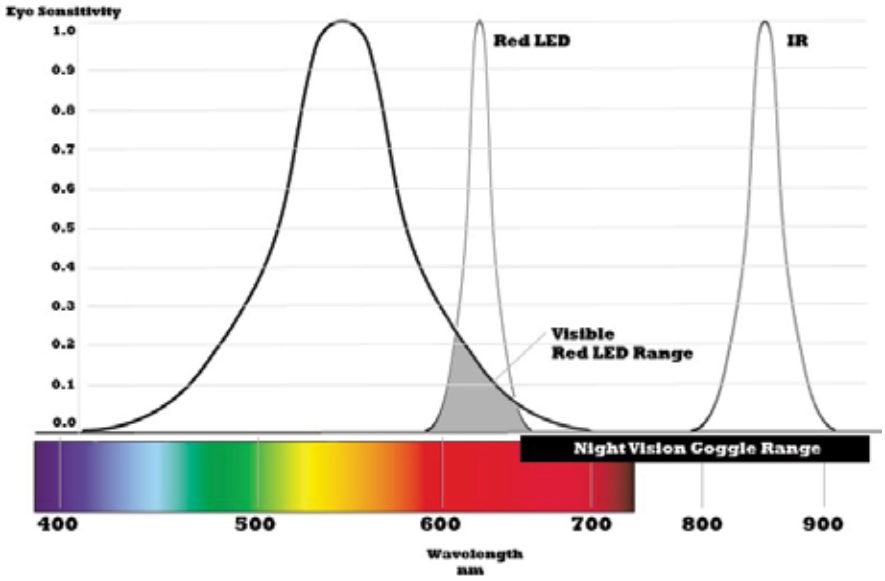
These guidelines are for reference only. Please contact Flash Technology or the Federal Aviation Administration for specific questions regarding obstruction marking. All heights are based on AGL (Above Ground Level) measurements.

Lighting System Options

Vanguard II Infrared (IR) NightVision Goggle Capability

Some NightVision Goggles (NVG) have filters that make LED obstruction lights less conspicuous. Our FTS 370 NVG compatible design combines red (620nm) and IR (850nm) peak intensity LEDs to ensure that our lighting system is visible to pilots when navigating with NVGs.

Visible and Infrared (IR) Spectrum



Aviation red light ranges from about 610 to 700 nanometers (nm) and NVG's approved for civil aviation (having a class B minus blue filter) are only sensitive to energy ranging from 665 to 930 nm.*

With infrared (IR) LED lighting systems the range is extended from 610 nm to 900nm and falls within the lighting spectrum for civil aviation approved NVG's.

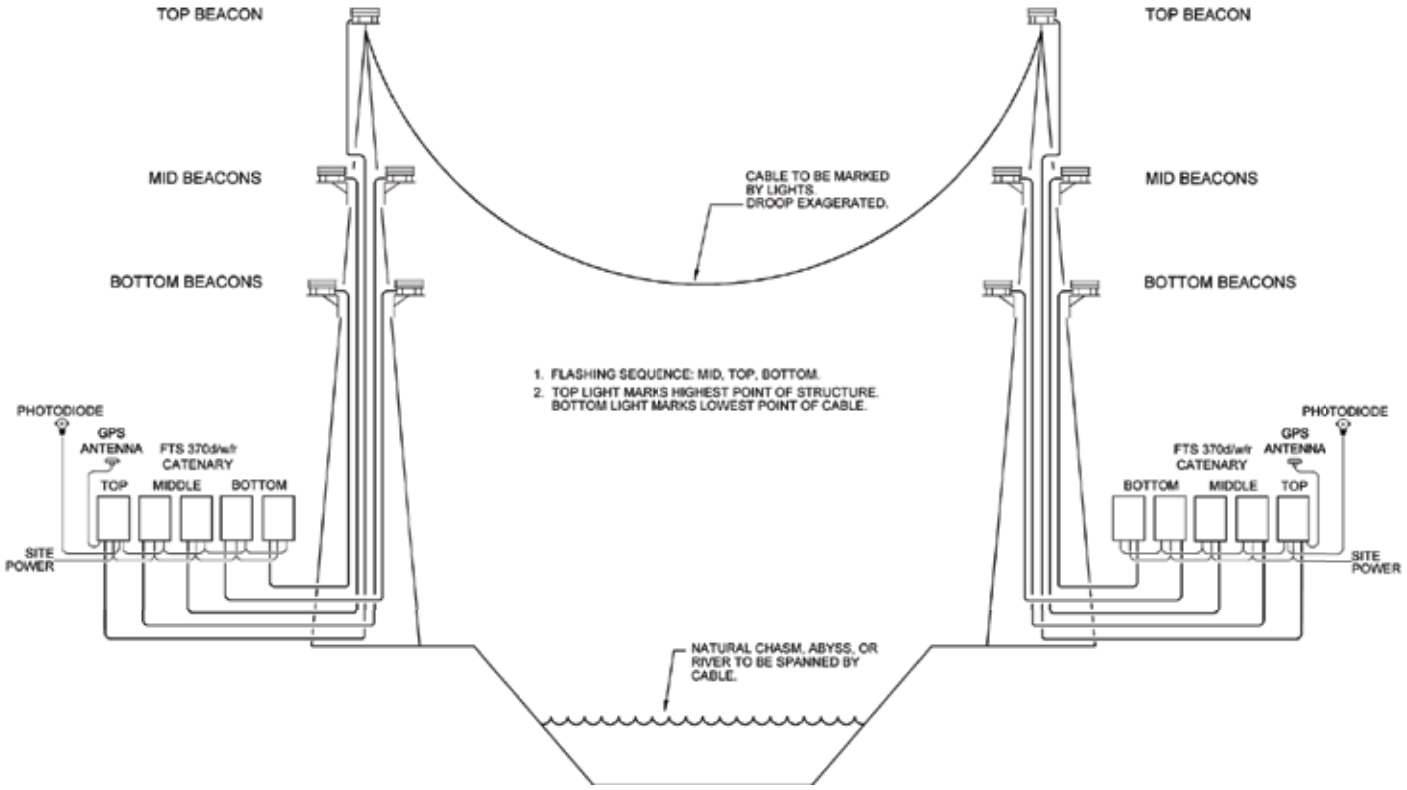
*References: FAA SAFO09007—Transport Canada AL-2009-02

Lighting System Options
Catenary Lighting System

Application

The Vanguard catenary lighting system is available in dual, white or red. Specifically designed for marking structures that support transmission lines that span across low terrain such as waterways, ravines and gorges. The flash sequence is middle–top–bottom at 60 flashes/min.

Diagram in accordance with FAA Advisory Circular AC 70/7460-1L



These guidelines are for reference only. Please contact Flash for specific questions regarding obstruction marking.

11

Services

Tower Monitoring
Flash University Training

Flash Technology has the resources required to provide the mandated 24/7 monitoring of obstruction lighting systems. The Flash Technology National Operations Center (NOC) is one of the largest tower light monitoring companies in the world, managing over 10,000 obstruction lighting systems across North and South America.

Flash University is Flash Technology's component level training course providing detailed instruction on installation, maintenance, repair and compliance guidelines. Classes are held in Franklin, TN or a location of your choice.

Tower Monitoring
Call Center Services

Flash Technology's Tennessee based National Operations Center (NOC) is one of the largest tower light monitoring companies in the world, managing over obstruction lighting systems 24 hours a day, 7 days a week, 365 days a year. Flash has over 15 years experience providing compliance solutions and call center services for critical remote assets.

Flash Technology is the only OEM that designs, manufactures, monitors and services their own equipment. This continuity provides customers with seamless alarm resolution making Flash Technology a single source provider.

Tennessee Based National Operations Center

NOC Infrastructure

Automated Systems - The Eagle™ data platform incorporates an industry leading alarm and trouble ticket management system. Site alarms are immediately transmitted, categorized based upon severity and the appropriate resolution procedures are followed.

Redundancy - All NOC systems are fully redundant to prevent down time

- Natural gas generator for emergency backup power
- Communications via fiber ring utilizing two carrier Central Offices to ensure voice and data connectivity
- Data replicated to offsite disaster recovery location, backed up nightly and stored offsite

Site Details

Internal Development Staff - In house resources for system maintenance and custom development

Robust Data Environment - The NOC manages over 5 million messages from tower sites annually.

Customizable Portfolio At-A-Glance

FCC Grants Flash QLI Waiver

Flash Technology was the first obstruction lighting company to be awarded a QLI (quarterly lighting inspection) waiver by the FCC, setting the standard for what a QLI waiver requires. A QLI waiver allows tower owners to reduce the required (4) annual site inspections per the FCC CFR 17.48(b) to (1) annual lighting inspection (ALI). The FCC permits an expedited waiver process to Flash monitoring clients.

Tower Monitoring

Web Portal

- Customer generated ticketing
- Advanced ticket mapping
- Asset tracking and ticket history

Advanced Mapping

Intelligent Rules - False & redundant alarms such as power resets are filtered and verified to eliminate unnecessary truck rolls

24 Hour Status Verification - Automated handshake with lighting system and computer generated log created to satisfy FCC CFR 17.47

Monitoring Status with Eagle Data

NOTAM Process - NOTAM worthy events are electronically processed directly into the FAA's digital NOTAM database

Data Verification - Tower data is scrubbed against FCC data base for discrepancies and provided to customer for resolution

Pre-Site-Visit Diagnostics - Technicians utilize Eagle™ alarm data to determine if NOTAM or truck roll is necessary

Site Visit and QLI/ALI Management - NOC staff verifies repair and/or directs a lighting inspection and records results to satisfy FCC CFR 14.49

Instant Notification - Remedy® ticketing system automatically distributes e-mail notification with alarm status and updates all parties per customer designated escalation chain

Site Equipment List

Call Center - Your FCC emergency phone number can be routed to Flash for personal assistance. Calls are escalated and logged per customer specific procedures at no additional cost for lit sites.

Call Recording - All calls are recorded for quality, compliance, issue resolution, available for customer review and archived onsite for (3) years.

Flash University
Medium Intensity Component Level Training

Flash University is unequaled in the industry offering detailed, component-level, hands-on instruction in a classroom setting. Flash University covers a range of information from component level diagnostics and maintenance to FAA lighting compliance guidelines. The various subjects covered are listed below or call Flash to discuss a class tailored for your specific needs and to meet your schedule.

Classes are held in Franklin, TN (just south of Nashville) or at an offsite location of your choice.

Attendees Receive

- FAA Advisory Circular and FCC Code of Federal Regulations
- FAA Tower Lighting Guidelines
- Technical Bulletins
- Installation Checklist
- Installation Support Tool
- Troubleshooting Guide
- TechEagle™ Direct Connect Cable
- Certificate of Completion with passing grade on exam
- Flash University shirt and hat – items subject to change
- CD with TechEagle™, product manuals and other support and reference materials
- Tour of NOC (National Operations Center) and manufacturing facility

Group rate pricing for up to 15 people

Installation, Diagnostics, Repair & Maintenance

- FAA Lighting Guidelines
- Lighting System Configurations
- Basic Installation Procedures
- System Components
- TechEagle™ Access
- Monitoring options
- ARM - Advanced Relay Monitoring
- NOC utilization
- Advanced Installation Procedures
- TechEagle™ Programming & Diagnostics
- Master/Slave Connections
- Preventative/Routine Maintenance
- Use of Temporary Power (generators)
- Red Light Interface
- M2M Installation Procedures

For more information on Flash University contact Bill Berry at 615-503-2036 or e-mail at william.berry@spx.com.

Terms & Conditions

Terms and Conditions of Sale for Flash Technology Lighting, Monitoring and Related Products Rev S

1. DEFINITIONS.

a) Flash means the Flash Technology LLC.
b) Terms means these Terms and Conditions of Sale for Flash Lighting, Monitoring and Related Products.
c) Proposal means the proposal or quotation document provided to Customer by Flash into which these Terms are incorporated by reference.
d) Customer means the purchaser to whom the Proposal is addressed and to whom these Terms apply, including, where applicable, all individual and/or corporate guarantors.
e) Custom-built means equipment set forth in the Proposal which is built by Flash to Customer's specifications.
f) Product means the applicable lighting, monitoring and related equipment to be sold by Flash to Customer.
g) Price means the price to be paid by Customer for the Products and/or Services listed in the Proposal, including any changes agreed to in writing by the parties.
h) Services means consulting services to be furnished by Flash to Customer as set forth in a Proposal.
i) Rigging means the labor, materials and machinery required to remove or install any Products located on a tower or tall structure.
j) Shipping Date means the shipping date(s) that Flash has communicated to Customer.
k) Xenon Light Source Equipment means any system that uses xenon flashtubes.
l) LED Light Source Equipment means any system comprising light emitting diodes (LEDs).
m) Monitoring Material means a device used to provide remote monitoring of assets, including FTM, FTW Products and / or modem, Wi-Fi, and network switches included in LED Light Source Equipment.
n) Replacement Material means any product shipped as spare parts or replacement.
o) Consumable Material means items that are expected to wear out or be used up under normal use.

2. PROPOSAL, ACCEPTANCE AND GOVERNING PROVISIONS. A Proposal will automatically expire if not accepted by Customer within sixty (60) days from its date or any extension of such date approved in writing by Flash, and Customer's acceptance of the Proposal, by purchase order or signature, shall constitute Customer's offer and will evidence Customer's intent that the sale of the Products shall be governed by the Proposal and the Terms. Flash's acceptance of Customer's offer is conditioned upon Customer's acceptance of the Terms set forth herein and Customer's agreement to be bound by and comply with the Terms. The Terms, the Proposal, and all referenced attachments constitute the entire agreement between Customer and Flash ("Agreement"), and no amendment shall be binding unless in writing and signed by the parties. The failure of Flash to object to provisions contained in any purchase order or other document of Customer's shall not be construed as a waiver by Flash of the Terms or an acceptance of any such provisions. Any conflicting or additional terms or conditions set forth by Customer in a purchase order or other document are not binding upon Flash, and Flash hereby expressly objects thereto. No purchase order shall be binding upon Flash until accepted by a written acknowledgment.

3. PRICES. Prices are subject to adjustment by Flash if: (a) the required down payment has not been made with Customer's acceptance of the Proposal, or (b) shipment is delayed by Customer beyond the estimated delivery date(s). Prices for Products do not include any special packing or crating materials, which may be required for Custom-built equipment or international delivery. All costs of special packing shall be paid by Customer prior to shipment.

4. TAXES. Prices do not include any applicable foreign, federal, state or local taxes. Unless Customer has provided Flash with documentation of exemption, the amount of such taxes payable or paid by or assessed against Flash will be payable by Customer.

Terms & Conditions

5. PAYMENT TERMS. (a) The Price for all Products or Services shall be paid to Flash in accordance with the payment schedule shown in the Proposal. Absent specific agreement to the contrary, all amounts owed to Flash shall be payable within thirty (30) days of shipment, provided, however, that if shipment of the Products or delivery of the Services is delayed beyond the Shipping Date by the action or inaction of Customer, payment will be due thirty (30) days after the Shipping Date. (b) Overdue payments shall accrue interest at the rate of 16% per annum (or the maximum percentage allowed by applicable law, if lower) from the due date. Customer shall also be required to pay Flash any and all collection costs and expenses Flash incurs (including without limitation reasonable attorneys' fees) to collect overdue payments. (c) Flash may make partial shipments of Products, and pro-rata payments shall be due for such partial shipments of Products. Flash May, at its option, decline to deliver Products or Services whenever, for any reason, Flash has concerns about a Customer's financial responsibility. In such event, Flash may require payment in full prior to shipping a Product or providing any Services.

6. DELIVERY. (a) Flash will deliver Products FOB point of shipment, with delivery to the initial carrier constituting delivery to Customer. All transportation charges will be Customer's responsibility; however, upon Customer's request, Flash will prepay transportation charges for which Customer shall reimburse Flash (together with an administrative fee payable to Flash). Customer shall have sole responsibility for filing any claims with any carrier for delay, loss or damage. (b) Any estimated or "firm" delivery dates or periods are predictions made by Flash of the times within which it is likely the Products will be shipped; however, due to the difficulties inherent in predicting future delivery dates or periods, Flash does not promise, guarantee or otherwise obligate itself to have the Products shipped on or before that time. **Flash will endeavor to meet the Shipping Date, but shall not be liable in damages or otherwise, nor shall Customer be relieved of performance, because of failure to meet them.** However, as to Products which, without Customer's fault, have not been shipped to Customer within thirty (30) days after the estimated or "firm" delivery dates or periods applicable to such Products, Customer may, by providing written notice to Flash, delete from this Agreement any such Products that have not been shipped to Customer before Flash receives Customer's written notice of deletion, and the Price shall be proportionately reduced. **The foregoing right is Customer's exclusive remedy for any delays in shipment.**

7. TITLE, INSURANCE AND RISK OF LOSS. Both title to the Products and risk of loss or damage passes to Customer upon delivery to the initial carrier.

8. RETURN OF PRODUCTS. Flash may, in its discretion, accept standard Products returned for credit (shipping prepaid) within sixty (60) days of receipt of such Products. In such instance, Flash shall impose a restocking fee of twenty five (25%) of the sale price. Flash does not accept returns of Custom-built Products.

9. PATENT LIABILITY. Customer agrees that Flash has the right to defend, or at its option to settle, and Flash agrees, at its own expense to defend or, at its option, to settle, any claim, suit or proceeding brought against Customer on the issue of infringement of any United States patent by any Product, or any part thereof, supplied by Flash to Customer under this Agreement. Flash agrees to pay, subject to the limitations hereinafter set forth in this paragraph, any final judgment entered against Customer on such issue in any such suit or proceeding defended by Flash. Customer agrees that Flash at its sole option shall be relieved of the foregoing obligations unless Customer notifies Flash promptly in writing of any such claim, suit or proceeding, and at Flash's expense gives Flash proper and full information and assistance to settle and/or defend any such claim, suit or proceeding. If the Product, or any part thereof furnished by Flash to Customer hereunder becomes, or in the opinion of Flash may become, the subject of any claim, suit or proceeding for the infringement of any United States patent, or in the event of any adjudication that such Product or part infringes any United States patent, or if the use, lease or sale of such Product or part is enjoined, Flash may at its option and its expense: (a) procure for Customer the right under such patent to use, lease or sell, as appropriate, such Product or part, or (b) replace such Product or part, or (c) modify such Product or part, or (d) remove such Product or part and refund the aggregate payments and transportation costs paid therefore by Customer, less a reasonable sum for use, damage and obsolescence. Flash shall not be liable for any costs or expenses incurred without Flash's written authorization. The foregoing constitutes the entire liability of Flash and Customer's sole and exclusive remedy for intellectual property infringement related to the Products. Notwithstanding the foregoing, the remedy described in this paragraph shall not apply to any suit or proceeding alleging infringement resulting from or related to Flash's compliance with Customer's specifications or design or the use of Products in combination with other goods or materials. In no event shall Flash's total liability to Customer under, or as a result of compliance with, the provisions of this section exceed the aggregate sum paid to Flash by Customer for the allegedly infringing Product or part.

Terms & Conditions

10. WARRANTY. Supplier warrants new Materials purchased by the Customer hereunder to be free from defects in material and workmanship, as follows:

- Two (2) years from date of shipment for Xenon Light Source Equipment
- Five (5) years from date of shipment for LED Light Source Equipment.
  (All Light Source Equipment is tested at the factory for compliance with standards set by the FAA, DGAC, or ICAO, and the serial numbers of such Products are recorded in accordance with such standards.)

Monitoring Materials – One (1) year from the date of shipment.

Replacement Materials – Ninety (90) days from the date of shipment.

Consumable Materials – Ninety (90) days from the date of shipment.

Warranty Activation. – Warranty for Light Source Equipment and Monitoring Materials must be activated by calling Flash Technology Customer Support. Call 1 (800) 821-5825. Refer to the warranty activation card supplied with product or system manual for specific instructions.

Warranty Returns – A RMA number must be requested from Flash Technology prior to return or advance of any Product. No returned product will be processed without the RMA number. Failure to follow the full RMA policy may result in additional charges and delays. To initiate a RMA call Flash Technology Technical Support at (800-821-5825).

All Products –
For a period defined above from the date of delivery of Products, Flash warrants to the Customer that the Products manufactured by Flash shall be free from defects in design, material and workmanship and shall be in accordance with the specifications agreed to by the parties. During such period, subject to the right to inspect such Product, Flash agrees to repair or replace, at Flash's sole discretion, such warranted Product as is found to be defective, subject to the conditions of this Agreement. For returns, the warranted Product must be properly authorized for return with a Return Materials Authorization (RMA) and RMA number, packed and returned to Flash, transportation prepaid. For Products that cannot reasonably be returned, the Customer has the obligation to provide photographic or other evidence to document a claim.

If Flash fails to repair or replace any defective Product, the Customer agrees that the exclusive measure of damages shall be the reasonable cost of the repair or replacement of the defective Product at that time. Flash's warranty obligation is conditioned on the Customer's payment of all amounts due under the corresponding purchase terms and the Customer's **compliance with its obligations thereunder.**

Repair or replacement of defective Products does not re-start the warranty periods defined above; it carries the longer of the ninety (90) day spare parts warranty or the remaining warranty of the original serial number of the product replaced, whichever is longer.

The Customer's warranty rights under this Agreement shall apply only if **Flash receives prompt written notice of any alleged defect within the applicable warranty period defined above, the Product has been installed and operated in accordance with Flash's** written instructions, and Flash's examination discloses that such **Product has not been damaged through accident or negligence, misuse, alteration, or improper maintenance, repair, or installation.**
No warranty shall apply: (a) to any Products that have been repaired, worked upon, disassembled or altered by persons not authorized by Flash in such a manner as to injure the stability or reliability of such Products, (b) to any Products that have been subject to misuse, negligence or accident other than by Flash, (c) to any Products that have not been connected, installed, electrically grounded, used, maintained, inspected or adjusted by appropriately qualified personnel in accordance with the written instructions furnished by Flash, (d) with respect to any Product that has had its serial number altered, effaced or removed, (e) to damage resulting from: Force Majeure; intentional acts, such as sabotage, terrorism, or vandalism; accidents; extreme weather (including earthquakes, flooding, high winds, hurricanes, tornados, hail, or lightning strikes); the impact of ambient chemicals; and/or flying objects, or (f) to ordinary wear resulting from use and exposure. Replacement of any original Flash parts with non-Flash parts will take the Products out of compliance and void this warranty.

Terms & Conditions

The foregoing warranties are in lieu of, and Flash expressly disclaims, all other warranties, express or implied in fact or by law, including without limitation all warranties of merchantability or fitness for a particular purpose or otherwise, **and the foregoing warranties state Flash**'s entire and exclusive liability and the Customer's sole and exclusive remedy, in **connection with the sale or furnishing of Services or Products, their design, suitability for use, installation or operation. Without limiting the foregoing, Flash shall in no event be liable for rigging or other labor charges connected with repair or replacement of defective Products or Services covered by these warranties, or for any third party engineering or consulting fees. Equipment furnished by Flash but not bearing its trademark or trade name shall carry no warranties, except those, if any, extended by and enforceable against the manufacturer at the time of delivery to Flash.**

LIMITATION OF LIABILITY. Flash shall not be liable under any theory of relief for: (i) any indirect, incidental, special or consequential damages whatsoever (including without limitation, loss of anticipated value of a business or its reputation) or (ii) any damage or loss in excess of the price actually paid by Customer.

11. FORCE MAJEURE. Flash shall not be liable for delay in performance or failure to perform any of its obligations, if the delay or failure results directly or indirectly from Force Majeure. Force Majeure means any law, order, regulation, direction, request, action or failure to act of Customer or of any government having jurisdiction over Flash, its subcontractors and/or its suppliers; failure or delay of transportation; suspension or cancellation of any required license; insurrection; riots, national emergencies; war; acts of public enemies, strikes or other labor difficulties; inability to obtain necessary labor, manufacturing facilities, materials or components from Flash's usual sources; fires, floods, earthquakes, lightning or other catastrophes; acts of God; extreme weather conditions; or any cause of like or different kind beyond the control of Flash. Flash shall notify Customer in writing if performance of any of its obligations under this Agreement is delayed by reasons of Force Majeure.

12. PROPRIETARY INFORMATION. Flash retains title to and ownership of all engineering and production prints, drawings, technical data, and other information and documents that relate to the Products sold to Customer and any intellectual property rights embodied therein. Unless advised by Flash in writing to the contrary, all such information and documents disclosed or delivered by Flash to Customer are to be deemed proprietary to Flash and shall be used by Customer solely for the purpose of inspection, installation, maintenance and use of the Products purchased hereunder and not used by Customer for any other purpose. Customer shall maintain such proprietary information with a standard of care no less stringent than it uses with its own confidential information.

13. TERMINATION/SUSPENSION. Without prejudice to its other rights, Flash may immediately terminate this Agreement by giving notice to Customer or suspend the performance of Flash's obligations if Customer:

a) Breaches this Agreement and fails to remedy that breach within 14 days of a request by Flash; or
b) Ceases business operations, is unable to pay Customer's debts as they fall due, makes an assignment for the benefit of creditors, commences winding-up, has a receiver or liquidator appointed over any of Customer's assets, or becomes subject to a bankruptcy or insolvency proceeding.

14. OTHER CONDITIONS.

a) Modifications of Products may be made by Flash or its suppliers prior to delivery for reasons such as improvement in performance, simplifications in design, availability of materials, etc., but not to such an extent that the performance will be materially affected.
b) Customer shall not assign this Agreement, or any rights thereunder, without the prior written consent of Flash.
c) Flash shall not be deemed to have waived any term or condition of this Agreement or to have assented to any exception to or modification of such terms and conditions unless such waiver or assent is in writing. Flash's failure at any time to require strict performance by Customer of any provision in this Agreement shall not waive or diminish Flash's right thereafter to demand strict performance therewith or with any other provision. Waiver of any default shall not waive any other default.
d) In the event that any part of this Agreement is or becomes invalid or illegal in whole or in part, such part shall be deemed amended so as to, as nearly as possible, be consistent with the intent expressed in the Agreement. If this is impossible, such part shall be deemed to be deleted, but shall not in any way invalidate any of the remaining provisions of this Agreement.

Terms & Conditions

e) Notices shall be mailed, certified mail, or sent by fax to Customer at the address given on the cover sheet of the Proposal and to Flash, Attention: Director of Finance, Flash Technology, 332 Nichol Mill Lane, Franklin, TN 37067, Fax: 615.261.2600. Notice shall be effective from date of receipt by addressee.

f) This Agreement, including without limitation the Proposal and all schedules attached hereto and/or incorporated herein by reference, conclusively supersedes all prior agreements, writings and negotiations with respect to the subject matter hereof.

g) The rights and duties of the parties to this Agreement shall be governed by and construed in accordance with the laws of the State of Tennessee.

h) All disputes, differences, or questions arising out of or relating to this Agreement, or the validity, interpretation, breach, violation, or termination of this Agreement shall be resolved solely by arbitration through the CPR Institute for Dispute Resolution ("CPR") by a single arbitrator in Nashville, Tennessee. The arbitration proceedings shall be governed by and decided in accordance with the CPR Rules for Non-Administered Arbitration then in effect, unless the parties shall mutually agree otherwise in writing. Any evidentiary rules not expressly provided by the CPR Rules shall be determined in accordance with the Federal Rules of Evidence. Notwithstanding anything to the contrary provided in this Agreement, the arbitration shall be governed by the United States Arbitration Act, 9 U.S.C. § 1, et seq. The arbitration proceeding must be completed through the rendering of the award within six months of the selection of the arbitrator. The award of the arbitrator may be monetary damages, an order requiring performance of obligations under this Agreement or an award of injunctive, declaratory, or equitable relief or any other appropriate award or remedy. However, in no event may the arbitrator issue an award of any form of exemplary or punitive damages, nor may the arbitrator make any ruling, finding or award that does not conform to the terms and conditions of this Agreement. The award rendered by the arbitrator shall be final and binding upon the parties, and judgment may be entered by any competent court having jurisdiction. The award of the arbitrator shall be accompanied by a written explanation of the basis for the award. Notwithstanding anything to the contrary provided in this paragraph and without prejudice to the above procedures, any of the parties may apply to any court of competent jurisdiction for injunctive or other equitable relief if such action is necessary to avoid irreparable damage or to preserve the status quo.

CONSULTING SERVICES. Flash will, on an exception basis and at Customer's request, furnish a representative to consult regarding the installation of the Products. Charges for furnishing such representative shall be at Flash's per diem rate in effect at the time, plus transportation and reasonable living expenses, including standard general and administrative charges. Such consulting service shall not include the furnishing or arranging for the furnishing of any equipment, materials or services required for the actual installation of Products.

FLASH TECHNOLOGY

FAA Obstruction Lighting

Buyer's Guide

Medium Intensity

Products

Services

DBUYG-01 Rev A