THERMAL VISION
FOR PROFESSIONAL
MARINERS

THERMAL IMAGING BASICS

Thermal imaging works night and day, in total darkness or bright sunlight, through smoke, dust, and even light fog to keep your passengers and crew safe from hazards and threats.

See natural and man-made hazards, such as floating debris, rocks, ice, land, bridge abutments, and other vessels.

Thermal night vision helps you find a person in the water faster than any other night vision technology.

FLIR cameras and thermal video are incredibly intuitive and easy to understand. Quite simply, what you see is what you get.

Daylight cameras, image intensified night vision (I^2), and the human eye all create images from reflected visible light. Traditional night vision scopes and goggles all take in small amounts of visible light and magnify it. However, traditional imagers have the same limitations as the human eye: if there isn't enough light available, they don't work well. Plus, during daylight and twilight hours, they aren't useful either because there is too much light for them to work effectively.

FLIR thermal cameras work both day and night, regardless of light. They're totally immune to the effects of darkness, glare, or even direct sunlight.

YOUR VISION

TRADITIONAL GEN3 IMAGE INTENSIFIED NIGHT VISION

FLIR THERMAL IMAGE

RESOLUTION, DETAIL, AND RANGE
FLIR offers a range of thermal imaging cameras with varying levels of image resolution. Much like a digital camera, FLIR cameras with higher pixel counts offer more detail, clarity, and range than models with less resolution. FLIR also offers models with advanced optics for extreme long-range performance.

LOWER RESOLUTION IMAGERS PROVIDE GOOD, BASIC TARGET DETECTION

HIGHER RESOLUTION THERMAL IMAGERS OFFER INCREASED LEVELS OF DETAIL AND LONG-RANGE PERFORMANCE

FLIR | The World's Sixth Sense®

FLIR FOR COMMERCIAL MARINERS

THE SEA CAN BE A DANGEROUS PLACE, ESPECIALLY AT NIGHT

But professional mariners can't call it a day when the weather turns foul. FLIR thermal imagers offer an "early warning system" against common hazards so mariners can sail with confidence, whatever the conditions. FLIR maritime thermal imagers display the invisible heat energy from a myriad of potential hazards, including floating debris, shipping lane traffic, vessels riding at anchor, and small boats. FLIR imagers can also reveal man-made structures, such as buoys, bridge abutments, docks and piers. They can even spot icebergs and surfacing whales.

FLIR FOR FIRST RESPONDERS

THERMAL VISION: THE 24/7 TACTICAL ADVANTAGE

First responders gain critical tactical awareness using FLIR thermal cameras, day or night, in good weather and bad. With FLIR thermal vision you can observe suspicious activity in total darkness, quickly locate people in the water, and avoid obstacles while going full throttle in response to emergencies. From border patrols to port security, search and rescue to drug interdiction, FLIR thermal imaging cameras can greatly enhance critical mission success.

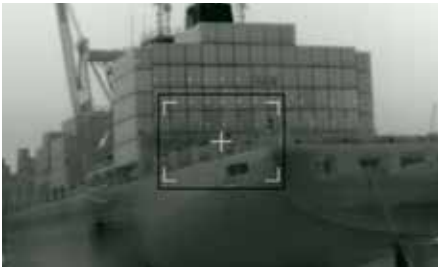| MONITOR CREW ON DECK	TRACK POTENTIALLY THREATENING VESSELS	LOCATE ICEBERGS

SEE SUSPECTS IN THE DARK	GAIN SITUATIONAL AWARENESS WHEN APPROACHING VESSELS	OBSERVE LATE NIGHT ACTIVITY ON SHORE

RECOMMENDED COMMERCIAL SYSTEMS:

MD Series	M100/200	M-Series	M400	M500

RECOMMENDED FIRST RESPONDER SYSTEMS:

Ocean Scout	LS-Series	BHM-Series	MD Series	M-Series	M400

M-SERIES NEXT GENERATION MARINE THERMAL VISION CAMERAS

HIGH PERFORMANCE THERMAL VISION- NOW EVEN BETTER

The next generation M-Series takes everything that has made M-Series the most popular line of marine thermal night vision cameras in the world and makes it even better. Updated with improved thermal imaging cores and optics for next-level performance, a better daylight/lowlight camera option, and gyro-stabilization as a standard feature across the entire line, M-Series has made the best even better.

NEW FOR 2017

Active gyro-stabilization automatically keeps the image steady in rough seas

High resolution color camera system with 36x Optical Zoom and low-light mode

Automatic window heaters keep optics free of ice

2× and 4× E-Zoom functions

Ethernet control link for easy networking to FLIR joysticks or multifunction displays

Standard analog video signal displays on any monitor with an auxiliary video input

Rugged, waterproof gimbal enclosure with automatic window heaters for ice management.

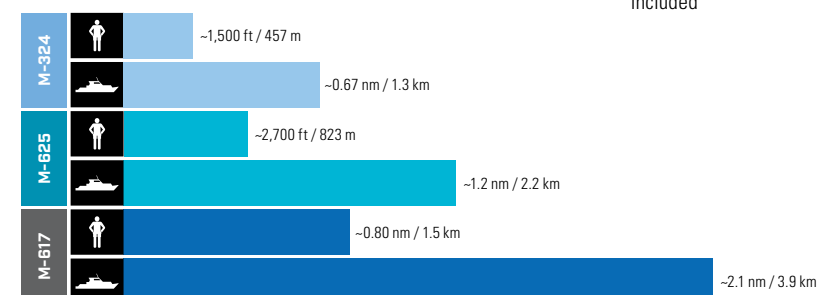M-Series thermal cameras can be installed ball down or ball up

Joystick controller included

Compatible with multifunction navigation displays from Raymarine, Garmin, Furuno and Simrad or display on any onboard screen or monitor with an analog video input.

DETECTION RANGES

Model		Range
M-324	🚶	~1,500 ft / 457 m
M-324	🚢	~0.67 nm / 1.3 km
M-625	🚶	~2,700 ft / 823 m
M-625	🚢	~1.2 nm / 2.2 km
M-617	🚶	~0.80 nm / 1.5 km
M-617	🚢	~2.1 nm / 3.9 km

ENHANCED AWARENESS IN ALL CONDITIONS

- Improved rough weather performance using active gyro stabilization
- Dual Payload models combine a thermal camera with 36x zoom low-light color camera for enhanced awareness in all conditions
- Latest generation FLIR thermal core technology detects other hazards— day or night—through darkness, glare, dust and light fog

EASY TO INTEGRATE

- Integrates seamlessly with existing electronics including select multifunction displays from Raymarine®, Furuno, Garmin, and Simrad
- Slew-to-Cue and ARPA radar target tracking from compatible radar, AIS and chart systems
- Simple joystick control of pan, tilt and zoom and composite video output for easy connection to MFDs and monitors

WEATHERPROOF, CONTROLLABLE PAN & TILT SYSTEM

- Engineered especially for harsh marine environments
- Color symbology on-screen gives instant access to system status, position, and configuration
- 360° Continuous Pan, +/-90° Tilt with joystick control

SEE RIVER TRAFFIC WITHOUT BEING BLINDED BY SUN GLARE
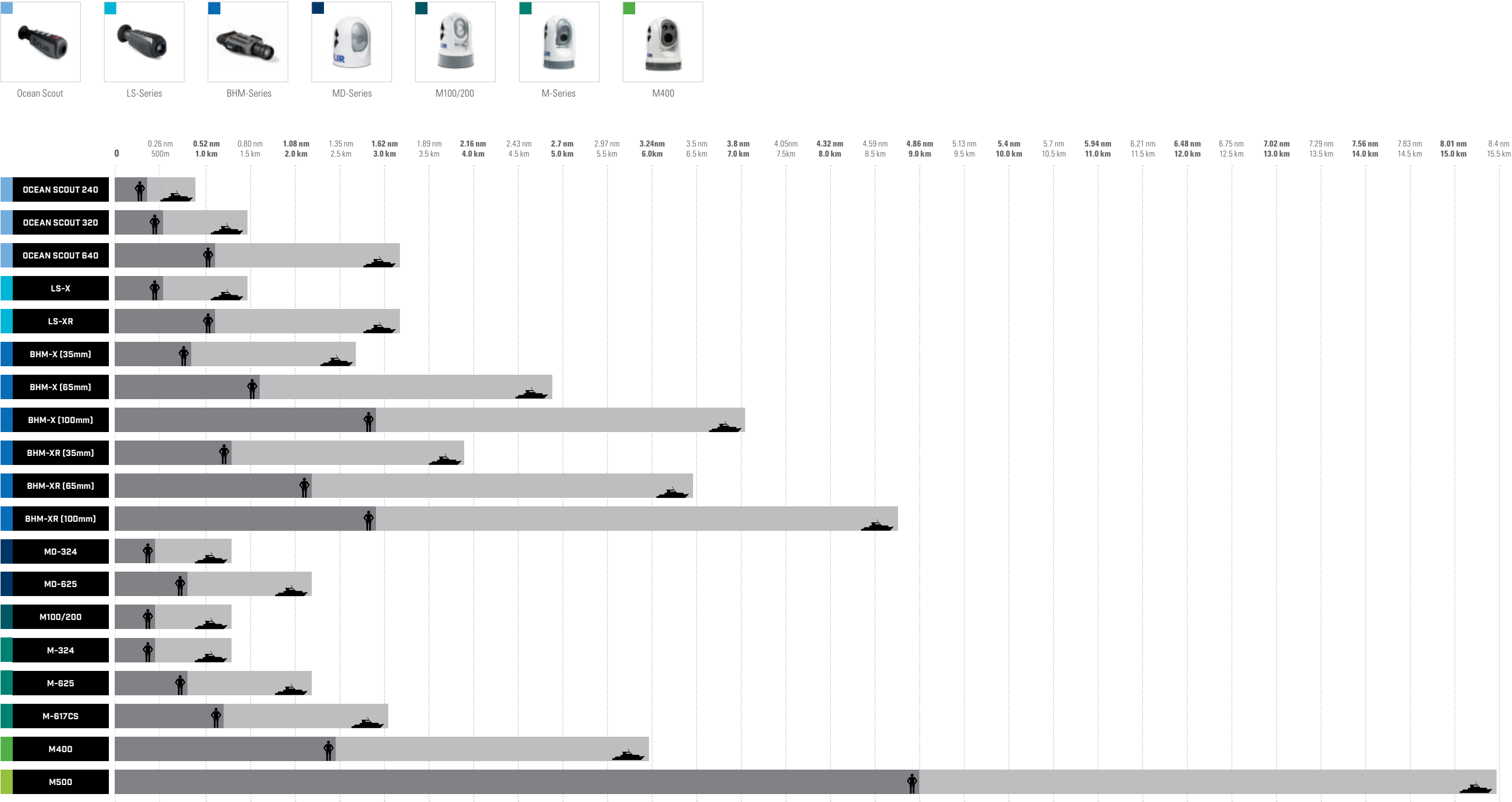
MANEUVER BETWEEN DOCKS AT NIGHT

REMAIN AWARE OF CHANNEL LANDMARKS

www.flir.com

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RANGE COMPARISON CHART

The following chart compares the man-overboard and small vessel detection distances for the FLIR range of thermal cameras.

Ocean Scout LS-Series BHM-Series MD-Series M100/200 M-Series M400

Scale		
0	0.26 nm / 500m	0.52 nm / 1.0 km
0.80 nm / 1.5 km	1.08 nm / 2.0 km	1.35 nm / 2.5 km
1.62 nm / 3.0 km	1.89 nm / 3.5 km	2.16 nm / 4.0 km
2.43 nm / 4.5 km	2.7 nm / 5.0 km	2.97 nm / 5.5 km
3.24 nm / 6.0 km	3.5 nm / 6.5 km	3.8 nm / 7.0 km
4.05 nm / 7.5km	4.32 nm / 8.0 km	4.59 nm / 8.5 km
4.86 nm / 9.0 km	5.13 nm / 9.5 km	5.4 nm / 10.0 km
5.7 nm / 10.5 km	5.94 nm / 11.0 km	6.21 nm / 11.5 km
6.48 nm / 12.0 km	6.75 nm / 12.5 km	7.02 nm / 13.0 km
7.29 nm / 13.5 km	7.56 nm / 14.0 km	7.83 nm / 14.5 km
8.01 nm / 15.0 km	8.4 nm / 15.5 km	

Models:
- OCEAN SCOUT 240
- OCEAN SCOUT 320
- OCEAN SCOUT 640
- LS-X
- LS-XR
- BHM-X (35mm)
- BHM-X (65mm)
- BHM-X (100mm)
- BHM-XR (35mm)
- BHM-XR (65mm)
- BHM-XR (100mm)
- MD-324
- MD-625
- M100/200
- M-324
- M-625
- M-617CS
- M400
- M500

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IMAGE RESOLUTION AND SAMPLE IMAGES

M100/M200 SERIES MARINE THERMAL VISION CAMERAS

Get the clear vision you need to navigate around obstacles, avoid collisions, and find people in the water at night. M232 provides full pan/tilt for horizon-to-horizon vision, while the M132 allows for tilt position to compensate for changes in deck angle.

M132	M232
320 x 240 pxl	320 x 240 pxl

VIDEO ANALYTICS: BOAT

VIDEO ANALYTICS: MAN OVERBOARD

M-SERIES: NEXT GENERATION MULTI-SENSOR THERMAL NIGHT VISION

The M-Series creates thermal images with tremendous detail for such an affordable night vision system. You will see more—and see farther—even in the dead of night. An optional lowlight TV camera provides enhanced navigational abilities during twilight hours. And M-Series cameras also feature detailed, color on-screen symbology for instant access to system status, position, and configuration. Resolution (320 x 240 or 640 x 480 pixels) is model dependent.

M-324	M-625
320 x 240 pxl	640 x 480 pxl

VESSEL & CREW – WHITE HOT MODE

FREIGHTER – BLACK HOT MODE
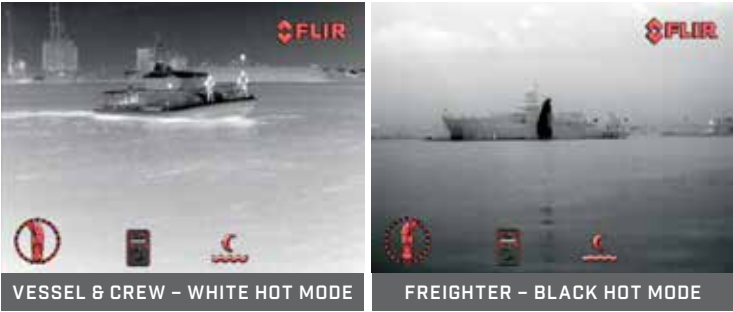
M400 & M400XR: ADVANCED MULTI-SENSOR THERMAL NIGHT VISION

The FLIR M400's advanced 640x480 sensor delivers crisp thermal video images in total darkness and low-light conditions. An integrated HD color visible camera and narrow-beam LED spotlight augment target identification for added safety.

M400	M400-XR
640 x 480 pxl	640 x 480 pxl

FIREFIGHTING MODE

FERRY AND PASSENGERS

SMALL BOAT – VISIBLE CAMERA

SMALL BOAT – THERMAL IMAGE

M500: HIGH-PERFORMANCE MARINE MULTI-SENSOR CAMERA SYSTEM

The FLIR M500's advanced 640x512 sensor delivers crisp thermal video images in total darkness and low-light conditions. An integrated HD color visible camera augments target identification for added safety.


M500
640 x 512 pxl

PORT SECURITY AT NIGHT

HIGH CONTRAST IMAGES

BRIDGE AND WATERWAYS

LOW LIGHT VISIBLE CAMERA

Images for illustrative purposes only

Images for illustrative purposes only

FLIR | The World's Sixth Sense®

M-SERIES NEXT GENERATION SPECIFICATIONS

	M-324S	M-324CS	M-625S	M-625CS	M-617CS
MAIN THERMAL CAMERA					
Detector Type	336 x 256 VOx Microbolometer	336 x 256 VOx Microbolometer	640 x 512 VOx Microbolometer	640 x 512 VOx Microbolometer	640 x 512 VOx Microbolometer
Video Refresh Rate	< 9 Hz or 30 Hz (NTSC)	< 9 Hz or 30 Hz (NTSC)	< 9 Hz or 30 Hz (NTSC)	< 9 Hz or 30 Hz (NTSC)	< 9 Hz or 30 Hz (NTSC)
Field of View	24° × 18°	24° × 18°	25° × 20°	25° × 20°	17° × 14°
Focal Length	13 mm	13 mm	25 mm	25 mm	35 mm
Focus	Fixed 14 ft (4.4 m) to infinity	Fixed 14 ft (4.4 m) to infinity	Fixed 69 ft (21 m) to infinity	Fixed 69 ft (21 m) to infinity	Fixed 69 ft (21 m) to infinity
Continuous E-Zoom	4×	4×	4×	4×	4×
Image Processing	FLIR Proprietary Digital Detail Enhancement			FLIR Proprietary Digital Detail Enhancement	
MAIN VISIBLE CAMERA					
Detector Type	N/A	1/2" Interline Transfer Lowlight CCD	N/A	1/2" Interline Transfer Lowlight CCD	1/2" Interline Transfer Lowlight CCD
Lines of Resolution	N/A	530	N/A	530	530
Minimum Illumination	N/A	1.4 Lux	N/A	1.4 Lux	1.4 Lux
Optical Zoom	N/A	36×	N/A	36×	36×
E-Zoom	N/A	12×	N/A	12×	12×
SYSTEM SPECIFICATIONS					
Video Tracking	No	No	No	No	No
Firefighter Mode	TCP/IP, RS-422	No	No	No	No
Pan/Tilt Adjustment Range	360° Continuous Pan, +/-90° Tilt	360° Continuous Pan, +/-90° Tilt	360° Continuous Pan, +/-90° Tilt	360° Continuous Pan, +/-90° Tilt	360° Continuous Pan, +/-90° Tilt
Analog Video Output	NTSC, 30Hz or <9Hz	NTSC, 30Hz or <9Hz	NTSC, 30 Hz or <9 Hz	NTSC, 30 Hz or <9 Hz	NTSC, 30 Hz or <9 Hz
Analog Video Connector Types	F-type BNC with BNC-to-RCA adapter included for video out			F-type BNC with BNC-to-RCA adapter included for video out	
Network Video Output	No	No	No	No	No
HD-SDI Lossless Video Output	No	No	No	No	No
Power Requirements	12-24 V DC	12-24 V DC	12-24 V DC	12-24 V DC	12-24 V DC
Power Consumption	25 W nominal; 50 W max	25 W nominal; 50 W max	25 W nominal; 50 W max	25 W nominal; 50 W max	25 W nominal; 50 W max
ENVIRONMENTAL					
Operating Temperature Range	-13°F to +131°F (-25°C to +55°C)	-13°F to +131°F (-25°C to +55°C)	-13°F to +131°F (-25°C to +55°C)	-13°F to +131°F (-25°C to +55°C)	-13°F to +131°F (-25°C to +55°C)
Storage Temperature Range	-40°F to +185°F (-40°C to +85°C)	-40°F to +185°F (-40°C to +85°C)	-40°F to +185°F (-40°C to +85°C)	-40°F to +185°F (-40°C to +85°C)	-40°F to +185°F (-40°C to +85°C)
Automatic Window Defrost	Standard at Power-Up	Standard at Power-Up	Standard at Power-Up	Standard at Power-Up	Standard at Power-Up
Sand/Dust Ingress	Mil-Std-810E	Mil-Std-810E	Mil-Std-810E	Mil-Std-810E	Mil-Std-810E
Water Ingress	IPX 6 (heavy seas, powerful jets of water)			IPX 6 (heavy seas, powerful jets of water)	
Shock	15 g vertical, 9 g horizontal	15 g vertical, 9 g horizontal	15 g vertical, 9 g horizontal	15 g vertical, 9 g horizontal	15 g vertical, 9 g horizontal
Vibration	IEC 60945; MIL-STD-810E	IEC 60945; MIL-STD-810E	IEC 60945; MIL-STD-810E	IEC 60945; MIL-STD-810E	IEC 60945; MIL-STD-810E
Lightning Protection	Standard	Standard	Standard	Standard	Standard
Salt Mist	IEC60945	IEC60945	IEC60945	IEC60945	IEC60945
Wind	100 knot (115.2 mph)	100 knot (115.2 mph)	100 knot (115.2 mph)	100 knot (115.2 mph)	100 knot (115.2 mph)
EMI	IEC 60945	IEC 60945	IEC 60945	IEC 60945	IEC 60945
PHYSICAL					
Weight	~ 9 lbs (4 kg)	~ 9 lbs (4 kg)	~ 9 lbs (4 kg)	~ 9 lbs (4 kg)	~ 9 lbs (4 kg)
Size	7" (177.8 mm) dia. × 11.2" (284.4 mm) ht.	7" (177.8 mm) dia. × 11.2" (284.4 mm) ht.	7" (177.8 mm) dia. × 11.2" (284.4 mm) ht.	7" (177.8 mm) dia. × 11.2" (284.4 mm) ht.	7" (177.8 mm) dia. × 11.2" (284.4 mm) ht.
RANGE PERFORMANCE					
Person in the Water	1,500 ft (457 m)	1,500 ft (457 m)	2,700 ft (823 m)	2,700 ft (823 m)	4,900 ft (1,494 m)
Small Vessel	4,200 ft (1,280 m)	4,200 ft (1,280 m)	1.2 nm (2.2 km)	1.2 nm (2.2 km)	2.1 nm (3.9 km)
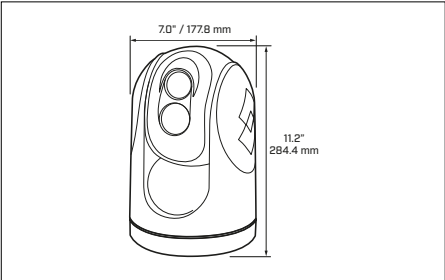
7.0" / 177.8 mm
11.2" / 284.4 mm

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M400 SPECIFICATIONS

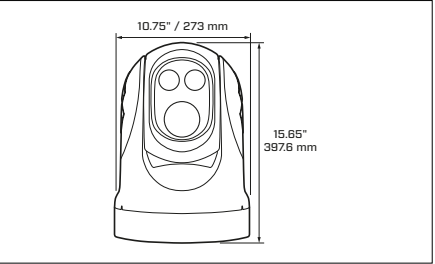|	M400	M400XR
MAIN THERMAL CAMERA		
Detector Type	640 × 480 VOx Microbolometer	640 × 480 VOx Microbolometer
Video Refresh Rate	<9 Hz or 30 Hz (NTSC and PAL)	<9 Hz or 30 Hz (NTSC and PAL)
Field of View	18° to 6° HFOV / 1.5° HFOV with E-Zoom	18° to 6° HFOV / 1.5° HFOV with E-Zoom
Focal Length	35 mm (Wide) to 105 mm (Narrow)	35 mm (Wide) to 105 mm (Narrow)
Optical Zoom	1× to 4×	1× to 4×
E-Zoom	1× to 4×	1× to 4×
Image Processing	FLIR Proprietary Digital Detail Enhancement	FLIR Proprietary Digital Detail Enhancement
MAIN VISIBLE CAMERA		
Detector Type	Long-range color daylight and low-light viewing	Long-range color daylight and low-light viewing
Lines of Resolution	High Definition up to 1080/30p	High Definition up to 1080/30p
Minimum Illumination	>0.5 lux at 50 IRE / .05 lux in ICR Mode (B/W)	>0.5 lux at 50 IRE / .05 Lux in ICR Mode (B/W)
Zoom	30× Optical Zoom	30× Optical Zoom
Focal Length	129 mm to 4.3 mm	129 mm to 4.3 mm
Field of View	64° to 2.3° Optical HFOV / 0.2 NFOV E-Zoom	64° to 2.3° Optical HFOV / 0.2 NFOV E-Zoom
SPOTLIGHT SPECIFICATIONS		
Type, Lumens, Beam°	LED, 580 Lumens, 5° Divergence Angle	LED, 580 Lumens, 5° Divergence Angle
SYSTEM SPECIFICATIONS		
Video Tracking	No	Yes
Radar Target Tracking	Yes	Yes
Firefighter Mode	No	Yes
Pan/Tilt Adjustment Range	360° Continuous Pan, +/-90° Tilt	360° Continuous Pan, +/-90° Tilt
Analog Video Output	NTSC or PAL, 30 Hz or <9 Hz	NTSC or PAL, 30 Hz or <9 Hz
Analog Video Connector Types	F-type BNC with BNC-to-RCA adapter included for video out	F-type BNC with BNC-to-RCA adapter included for video out
Network Video Output	Dual, Independent H.264 Network Video Streams	Dual, Independent H.264 Network Video Streams
HD-SDI Lossless Video Output	Yes	Yes
Power Requirements	24V DC	24V DC
Power Consumption	<50 W nominal; 130 W peak, 270 W 2/heaters	<50 W nominal; 130 W peak, 270 W 2/heaters
ENVIRONMENTAL		
Operating Temperature Range	-13°F to +131°F (-25°C to +55°C)	-13°F to +131°F (-25°C to +55°C)
Storage Temperature Range	-56° F to + 176°F (-50°C to +80°C)	-56° F to + 176°F (-50°C to +80°C)
Automatic Window Defrost	Standard at Power-Up	Standard at Power-Up
Sand/Dust Ingress	Mil-Std-810E	Mil-Std-810E
Water Ingress	IPX 6 (heavy seas, powerful jets of water)	IPX 6 (heavy seas, powerful jets of water)
Shock	15 g vertical, 9 g horizontal	15 g vertical, 9 g horizontal
Vibration	IEC 60945; MIL-STD-810E	IEC 60945; MIL-STD-810E
Lightning Protection	Standard	Standard
Salt Mist	IEC60945	IEC60945
Wind	100 knot (115.2 mph)	100 knot (115.2 mph)
EMI	IEC 60945	IEC 60945
PHYSICAL		
Weight	28 lbs (12.7 kg)	28 lbs (12.7 kg)
Size	10.75" (273.1 mm) x 15.65" (397.6 mm) – 18.05" (458.7mm) high with top down riser	
RANGE PERFORMANCE		
Person in the Water	1.3 nm (2.45 km)	1.3 nm (2.45 km)
Small Vessel	3.2 nm (6.0 km)	3.2 nm (6.0 km)
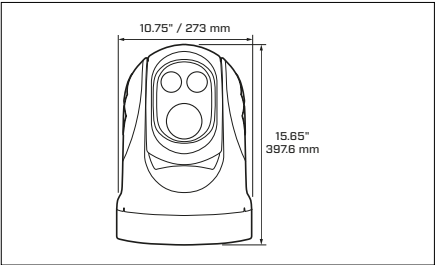
10.75" / 273 mm
15.65" 397.6 mm

M500 SPECIFICATIONS

	M500
THERMAL CAMERA	
Detector Type	Cooled MWIR InSb 640x512 Focal Plane Array
Video Refresh Rate	25 Hz (PAL) / 30 Hz (NTSC)
Field of View Limits	Optical 28° x 21° WFOV to 2° x 1.5° NFOV
Optical Zoom	1x to 14x (continuous)
E-Zoom	4x
NETD	<30 mK
Spectral Response	3-5 µm
COLOR CAMERA	
Visible Sensor	1/2.8" CMOS
Resolution	1920 x 1080
Field of View Limits	Optical 63.7° x 35.8° WFOV to 2.3° x 1.29° NFOV
E- Zoom	12x
SYSTEM SPECIFICATIONS	
Pan/Tilt Range	
Video Interface	Analog video, HD-SDI
Video over Ethernet	2 channels of streaming MPEG-4, H.264, or M-JPEG
NMEA0183	TCP/IP, RS-422, NMEA 0183, Pelco D
Communications	TCP/IP, RS-422, Pelco D
Video Formats	NTSC or PAL NTSC or PAL, 720p30, 1080p30
Power Requirements	12 VDC to 24 VDC (-10%+30% per IEC 60945)
Power Consumption	250 W (max w/heaters)
Output Modes	Black hot, white hot, false color palettes
Contrast Enhancement	AGC or manual, histogram equalization, local contrast enhancement algorithms available
Sharpness Enhancement	Automatic, adjustable Digital Detail Enhancement
Overlays	Integrated graphics overlays to indicate azimuth, AGC, active camera and menu control
ENVIRONMENTAL	
Operating temp	-25°C to +55°C
Storage temp	-50°C to +80°C
PHYSICAL	
Weight	45 lb (20.4 kg)
Size	10.75" (273 mm) dia. x 15.65" (397.5 mm) ht
RANGE PERFORMANCE	
Person in the Water	~4.9 nm (9.0 km)
Small Vessel	~8.3 nm (15.4 km)

10.75" / 273 mm
15.65" 397.6 mm

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WARRANTY

FLIR's service commitment of outstanding warranty and technical support now offers you even more; by registering your system with FLIR at www.flir.com/productreg, the 2-Year Standard Limited Warranty is upgraded and replaced by the 3-Year Extended Limited Warranty for FREE.

For complete details on FLIR's industry-leading warranty please visit **www.flir.com/maritime.**

FLIR MARITIME US INC.
9 TOWNSEND WEST
NASHUA, NH 03063
USA
(603) 324-7900

FLIR SYSTEMS INC.
27700 SW PARKWAY AVE
WILSONVILLE, OR 97070
USA
(503)-498-3547

FLIR BELGIUM BVBA
LUXEMBURGSTRAAT 2, 2321
MEER
BELGIUM
+32 (0)3 287 87 10

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