



The World's Sixth Sense®

# THERMAL VISION FOR RECREATIONAL BOATERS



# CUTTING-EDGE THERMAL TECHNOLOGY

## WHY THERMAL IS BETTER

Thermal imaging cameras detect and display images based on tiny differences in heat, not light. No matter how much light is available—from pitch black to moonlight to severe midday glare—FLIR detectors capture the thermal energy emitted or reflected by everything, even ice.

FLIR cameras then convert changes in temperature into crisp infrared video images, allowing you to see at night and navigate in total darkness.

## NIGHTTIME ON THE WATER MADE SAFER— WITH FLIR

FLIR maritime thermal imaging systems turn night into day, keeping you safe and secure on the water, and letting you boat with confidence.





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**FROM KAYAKS TO BASS BOATS,  
SAILBOATS TO YACHTS, FLIR OFFERS  
CUTTING-EDGE SOLUTIONS THAT ARE  
RUGGED, RELIABLE, AND SIMPLE TO USE.**



## THERMAL IMAGING BASICS

### SAFETY AND SECURITY

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.

### ENHANCED AWARENESS

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

### SEARCH AND RESCUE

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

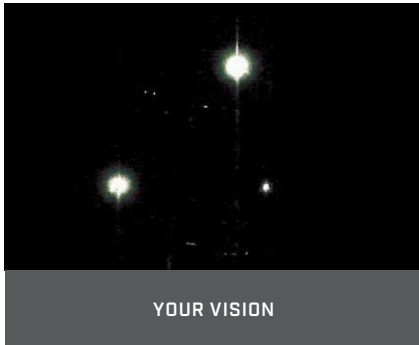
### EASY TO USE

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

## VISION IN TOTAL DARKNESS

Daylight cameras, image intensified night vision (I<sup>2</sup>), and the human eye all create images from reflected 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.



## 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.





## HANDHELD THERMAL CAMERA

The FLIR Ocean Scout TK is a marine thermal camera that extends your vision on the water, day or night, for greater awareness and safety. It creates images based on heat, not visible light, so other vessels, buoys, obstacles, and people in the water can appear clearly in all lighting conditions - from pitch darkness to blinding sun glare. The Ocean Scout TK is an affordable way to enjoy your time on the water and explore your world with thermal vision.



Compact, lightweight



Easy-to-use 4-button design



Download pictures and video to your computer with provided USB cable



White Hot, Black Hot and InstAlert™ detection palettes



Store up to 1000 thermal snapshots. Record thermal video

## ENHANCED AWARENESS

- See marine traffic and navigational aids at night.
- Quickly scan your surroundings for other vessels.
- Easily recognize buoys in river channels or open water.
- Detect key landmarks like islands or docks.

## STEER CLEAR

- Navigate with confidence day or night.
- Avoid obstacles, such as exposed rocks, floating logs, ice, and other debris.
- Be aware of kayakers, personal watercraft, and small boats without lights.
- Detect marine mammals on the surface of the water.

## STAY SAFE

- A lifesaving tool for a "man overboard" emergency
- Helps locate the body heat of people in the water
- InstAlert™ mode highlights the hottest objects in red

For technical specifications, turn to page 24

FLIR



IDENTIFY OTHER VESSELS



FIND PEOPLE OVERBOARD FASTER  
WITH INSTALERT™



SEE SMALL, UNLIT VESSELS THAT ARE VERY  
DIFFICULT TO SPOT WITH THE NAKED EYE.

[www.flir.com](http://www.flir.com)

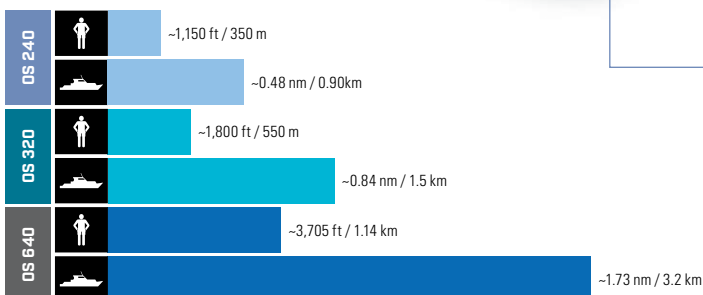
Specifications subject to change without prior notice. Images for reference purposes only

## HANDHELD THERMAL CAMERA

Ocean Scout is a rugged, compact thermal night vision camera that reveals other vessels, landmarks, buoys, and floating debris day or night. Now with a high resolution LCD display and FLIR's industry-leading sensor technology, Ocean Scout puts enhanced situational awareness in your hand at a moment's notice.



### DETECTION RANGES\*



\*Actual range may vary depending on camera set-up, environmental conditions, and user experience.



## ENHANCED AWARENESS

- See marine traffic and navigational aids at night.
- Quickly scan your surroundings for other vessels.
- Easily recognize buoys in river channels or open water.
- Detect key landmarks like islands or docks.

## STEER CLEAR

- Navigate with confidence day or night.
- Avoid obstacles, such as exposed rocks, floating logs, ice, and other debris.
- Be aware of kayakers, personal watercraft, and small boats without lights.
- Detect marine mammals on the surface of the water.

## STAY SAFE

- A lifesaving tool for a "man overboard" emergency.
- Locate the body heat of anyone in the water.
- Quickly recognize people and pets overboard.
- InstAlert™ mode highlights the hottest objects in red.

For technical specifications, turn to page 24



IDENTIFY OTHER VESSELS



FIND PEOPLE OVERBOARD FASTER  
WITH INSTALERT™



USE OCEAN SCOUT OFF THE WATER  
IN THE OUTDOORS



[www.flir.com](http://www.flir.com)

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## FIXED MOUNT MARINE THERMAL VISION

This affordable, fixed-mount thermal night vision system helps you steer around obstacles, avoid collisions, and find people in the water, day or night. The MD camera body is simple to mount and easy to integrate into existing electronics. Mount the display separately on your helm, or view the video feed using existing multifunction navigation displays from leading manufacturers, including Raymarine®, Garmin, Furuno, and Simrad.



320 x 240 or 640 x 480 resolutions produces clear, detailed images



2x and 4x e-Zoom for extended range performance



Automatic window heaters keep optics free of ice

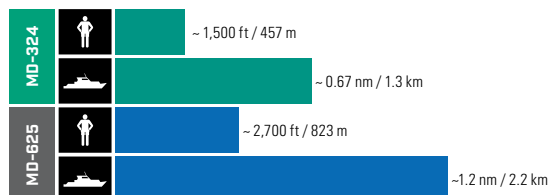


Ethernet-enabled for simple integration into your current electronics



Slim profile (7" high and only 1.36 kg/3 lbs) for an unobtrusive mount

### DETECTION RANGES



MD Series can be installed ball down or ball up



## HIGH RESOLUTION THERMAL VISION

- Available in 320 x 240 / 640 x 480 resolutions
- 2x E-Zoom standard; 4x E-Zoom (MD-625)
- Detects small vessels up to 1.2 nm away

## COMPACT, UNOBTRUSIVE MOUNTING

- Only 7" high and weighs 1.36 kg (3 lbs).
- All-weather, waterproof enclosure
- Ball-up or ball-down mounting options

## INTEGRATES WITH EXISTING ELECTRONICS

- Ethernet-enabled, connects to most popular MFDs
- Optional control using iOS device via onboard Wi-Fi network
- Analog video output for easy connection to onboard monitors, recorders, or DVR systems.

*For technical specifications, turn to page 25*



EASILY SEE NAVIGATION AIDS MASKED BY BRIGHT URBAN BACKGROUND LIGHTING



SPOT CROSSING TRAFFIC, OBSTACLES AND HAZARDS



DETECT SMALL CRAFT, KAYAKERS AND OTHER UNLIT VESSELS

[www.flir.com](http://www.flir.com)

Specifications subject to change without prior notice. Images for reference purposes only



## MARINE THERMAL VISION CAMERAS

The M100 and M200 marine thermal night vision cameras from FLIR take affordability and easy integration to a whole new level. Packing 320x240 thermal resolution, video over IP, and digital zoom into FLIR's smallest, camera housing, the M100 and M200 enhance awareness and make navigation safer on any vessel.

**NEW FOR 2017**



320x240 resolution for clear, detailed images



2x e-Zoom for extended range performance



Ethernet-enabled for simple integration with your other electronics



M100 with adjustable tilt  
M200 with Pan and Tilt



ClearCruise™ IR Analytics



### ENHANCED THERMAL AWARENESS

When connected to Raymarine's newest generation Axiom™ displays, the new M100 and M200 get an additional layer advanced safety features, including ClearCruise™ IR Analytics. These new technologies keep an unwavering eye on the path ahead – even when you're not using the camera – and automatically alert you to possible hazards that lie ahead.

### DETECTION RANGES

M100-200		~ 1,500 ft / 457 m
		~ 0.67 nm / 1.3 km

## THE POWER OF THERMAL VISION

- See bridges, docks, buoys, and debris in the water for improved navigation and safety
- Thermal vision helps you see other vessels, avoid collisions, and verify radar returns
- Helps boaters find people in the water faster than with spotlights and radar alone

## MORE THERMAL CAPABILITY FOR LESS

- Full 320x240 resolution for optimal image detail
- The M200 is equipped with a pan/tilt housing for horizon-to-horizon viewing
- 2X digital zoom for longer range performance

## EASY INSTALLATION ON ANY VESSEL

- IP video for easier integration on multiple MFDs
- Smaller size and lighter weight make mounting easy
- M100's tilt option lets you position the camera for optimum visibility, whether you're running fast or slow

For technical specifications, turn to page 25



VIDEO ANALYTICS AID IN DETECTION



PASSENGERS CLEARLY VISIBLE ON THE DECK OF THE FERRY (CAPTION NEEDED?)



CONTINUOUS OPTICAL ZOOM AND GYRO-STABILIZATION FOR SUPERIOR LONG-RANGE PERFORMANCE (CAPTION NEEDED?)

[www.flir.com](http://www.flir.com)

Specifications subject to change without prior notice. Images for reference purposes only



## NEXT GENERATION MARINE THERMAL VISION CAMERAS

The M-Series pan/tilt re-defines maritime multi-sensor system design, drawing on FLIR's 25 years of experience in building combat-proven airborne and maritime thermal imagers for militarys, coast guards, and governmental agencies around the world. With up to 640 x 480 thermal imaging, M-Series cameras let you see more — and see farther — than ever before. Even in the dead of night.

*NEW FOR 2017*



Gyro-stabilization — now standard across the entire M-Series line



Latest generation thermal detector — for sharper details and better image quality



Enhanced color lowlight camera — gives you even better daylight and lowlight viewing

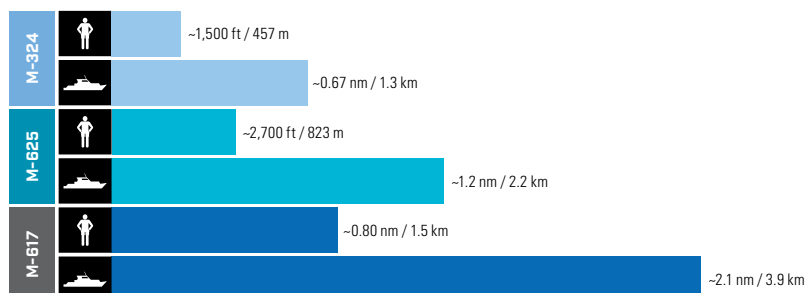


Continuous E-Zoom.



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



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



## STEER CLEAR OF DANGER

- Advanced features improve situational awareness
- Detects other vessels, small craft, floating objects, and hazards—day or night—through darkness, glare, dust and light fog
- Display on any marine monitor, or integrate M-Series thermal imaging right on your marine multifunction display alongside charting and radar
- Simple joystick control of pan, tilt and zoom. Optional advanced touchscreen control from select marine multifunction displays

## SIMPLE TO INSTALL

- Integrates seamlessly with existing electronics including select multifunction displays from Raymarine, Furuno, Garmin, and Simrad
- Slew-to-Cue target tracking from compatible radar, AIS and chart systems
- 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

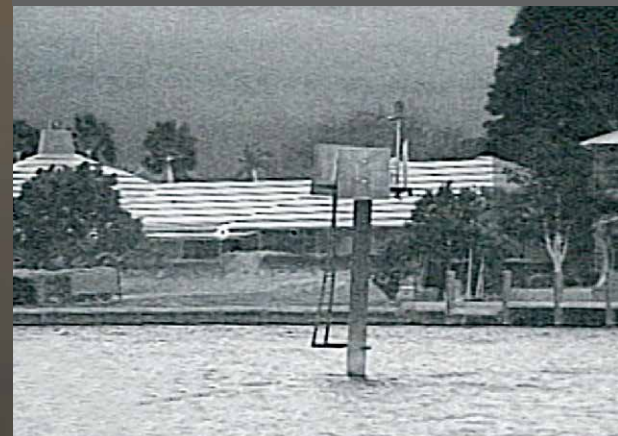
*For technical specifications, turn to page 26*



SEE RIVER TRAFFIC WITHOUT BEING BLINDED BY SUN GLARE



MANEUVER BETWEEN DOCKS AT NIGHT



REMAIN AWARE OF CHANNEL LANDMARKS

[www.flir.com](http://www.flir.com)

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# MULTI-SENSOR MARINE CAMERA SYSTEM

The M400's advanced 640 x 480 sensor delivers crisp thermal video images in total darkness and lowlight conditions. An integrated HD Color visible camera and tight-beam LED spotlight augment target identification for added safety. M400 has a continuous optical thermal zoom lens (up to 4x) that allows operators to see other vessels and targets at longer ranges. Active gyro-stabilization ensures a steady image, plus radar tracking keeps potentially dangerous targets in view at all times.



High intensity LED spot-beam can highlight targets of interest, while preserving the night vision of on-deck personnel



HD Color lowlight camera with 30x optical zoom



Gyro stabilized to ensure steady viewing in heavy sea conditions



High resolution 640 x 480 thermal sensor, optical zoom 18° to 6° horizontal field of view



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



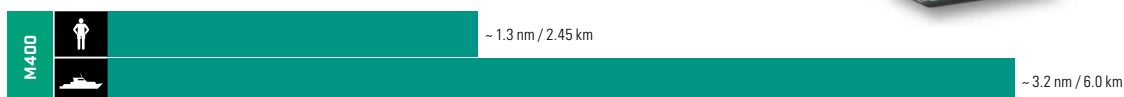
360° pan and +/-90° tilt capability



IP Video, HD-SDI, and Analog video outputs. Raymarine MFD integration



## DETECTION RANGES





## SHORT AND LONG-RANGE DETECTION

- Recognize marine traffic and key landmarks at night
- Continuous variable zoom allows you to easily identify vessels or navigation aids in the distance
- Quickly recognize nearby buoys in channels or open water
- Detect key landmarks, such as islands or docks

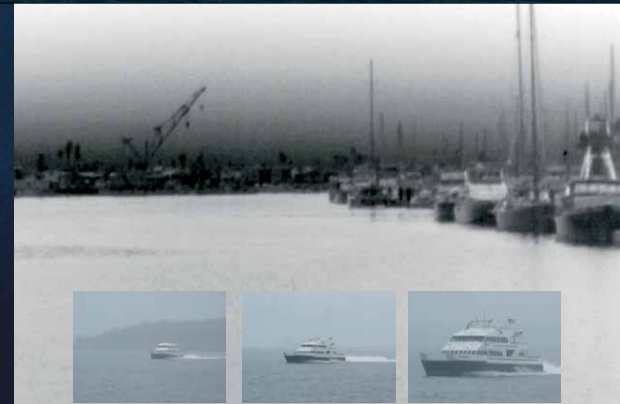
## THERMAL AND VISIBLE-LIGHT PAYLOADS

- Combination thermal detection and visible identification
- Up to 3× optical thermal zoom for 18° to 6° HFOV
- HD Color 30× Zoom provides 64° to 2.3° HFOV
- Illuminate and identify nearby targets with powerful LED beam

## ENHANCED TARGET IDENTIFICATION

- InstAlert™ mode depicts the hottest object in shades of red and orange for easy identification
- IceAlert™ – helps identify floating ice by depicting the coolest objects in shades of blue and green
- Radar integration lets the M400 follow specific radar targets.
- Intuitive, easy-to-use joystick for effortless operation

*For technical specifications, turn to page 27*



6° TO 18° THERMAL  
HORIZONTAL FIELD OF VIEW



PASSENGERS CLEARLY VISIBLE  
ON THE DECK OF THE FERRY



CONTINUOUS OPTICAL ZOOM AND  
GYRO-STABILIZATION FOR SUPERIOR  
LONG-RANGE PERFORMANCE

[www.flir.com](http://www.flir.com)

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# MULTI-SENSOR MARINE CAMERA SYSTEM

The M400XR incorporates all the features of the M400 but adds integrated video tracking – lock on and automatically follow objects as long as they’re in view of camera – and a firefighting mode.



IP Video, HD-SDI, and Analog video outputs. Raymarine MFD integration



Video tracking: follow objects in the camera's view



Firefighting mode optimizes the color palette to see hot spots and take temperature measurements on scene

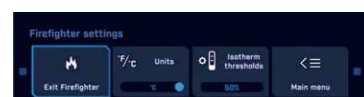
## ENHANCED VISUAL NAVIGATION

The M400's thermal and visual cameras with optical zoom provide exceptional long range performance, giving captains the ability to visually confirm distant targets with greater clarity.



## ENHANCED USER INTERFACE

The M400's enhanced user interface simplifies camera operation and configuration.



Typical screen showing on-screen menu bar



## JOYSTICK CONTROL

The joystick is the primary control for the M400. It is used to wake the system or put it in standby, operate the pan and tilt movement, zoom the camera, control cameras modes and features, and configure system settings by means of OSD menus.

## DETECTION RANGES

M400XR



~ 1.3 nm / 2.45 km

~ 3.2 nm / 6.0 km



### FIREFIGHTING MODE

The M400XR's firefighting mode provides enhanced awareness with a target temperature meter and isotherm displays.



### ICEALERT™ MODE

In IceAlert™ mode the coldest temperatures in the image are highlighted in Blue-Green shades, while warmer temperatures are all in shades of gray. Especially useful for locating ice in the dark.

For technical specifications, turn to page 27



SMALL CRUISE SHIP AT DUSK VIEWED WITH THE LOW-LIGHT VIDEO CAMERA. TRACKING MODE ENGAGED TO FOLLOW THE SHIP.



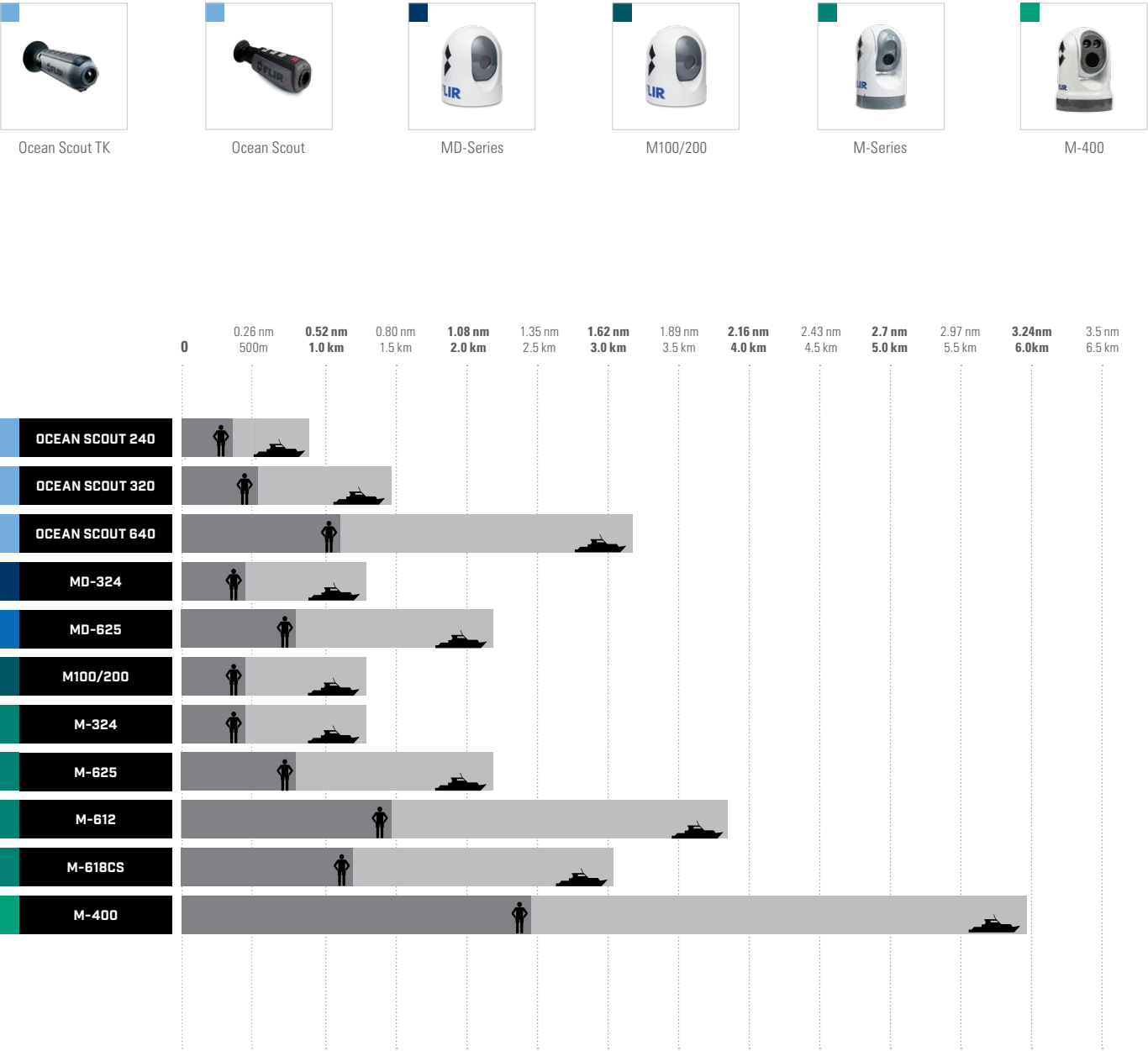
PARTY VESSEL AT NIGHT WITH THE LOW-LIGHT VIDEO CAMERA. TRACKING MODE FOLLOWS THE VESSEL IN THE HARBOR.



SMALL FERRY LEAVING PORT WITH AIRCRAFT ON FINAL APPROACH AT NEARBY AIRPORT.

# RANGE COMPARISON CHART

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



Specifications subject to change without prior notice. Images for reference purposes only.



# IMAGE RESOLUTION AND SAMPLE IMAGES

## OCEAN SCOUT TK – HANDHELD

The Ocean Scout TK is an affordable way to enjoy your time on the water and explore your world with thermal vision. With thermal vision, you can peer into darkness and see objects and your surroundings as clear as day, keeping you safer, and making your time on the water more relaxing.



OS-TK
160 x 120 pxl



MAN IN CANOE – WHITE HOT MODE



MAN OVERBOARD – INSTALERT™



SMALL BOAT – WHITE HOT MODE



SAILBOAT – WHITE HOT MODE

## OCEAN SCOUT – HANDHELD

The FLIR Ocean Scout puts advanced thermal imaging in the palm of your hand. With thermal vision, you can peer into darkness and see objects and your surroundings as clear as day, keeping you safer, and making your time on the water more relaxing. Resolutions range from 280 x 180 to 640 x 512 pixels, depending upon the model.



OS-240	OS-320	OS-640
240 x 180 pxl	336 x 256 pxl	640 x 512 pxl



MAN IN CANOE – BLACK HOT MODE



MAN IN CANOE – WHITE HOT MODE



MAN OVERBOARD – WHITE HOT MODE



MAN OVERBOARD – INSTALERT™

## IMAGE RESOLUTION AND SAMPLE IMAGES

### MD-SERIES – COMPACT THERMAL NIGHT VISION CAMERAS

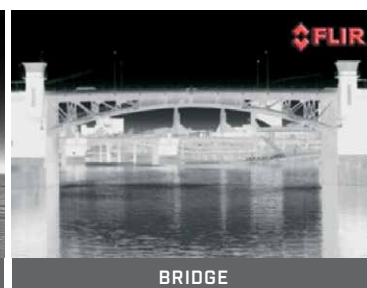
These fixed-mount thermal night vision cameras help with steering around obstacles, collision avoidance and finding people in the water at night. There are two models to choose from: MD-324 (320 x 240 pixels) and the MD-625 (640 x 480 pixels).



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



JETTY & BUOY – WHITE HOT MODE



BRIDGE

### M100/200 MARINE THERMAL VISION CAMERAS

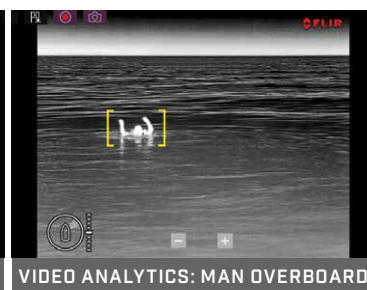
Get the clear vision you need to navigate around obstacles, avoid collisions, and find people in the water at night. M200 provides full pan/tilt for horizon-to-horizon vision, while the M100 allows for tilt position to compensate for changes in deck angle.



M100	M200
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.



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

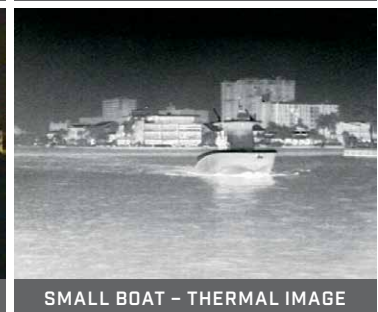
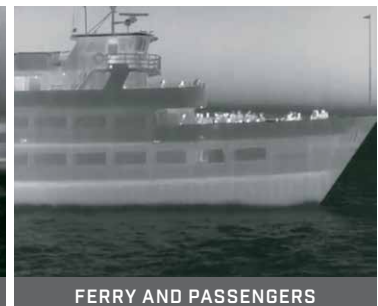
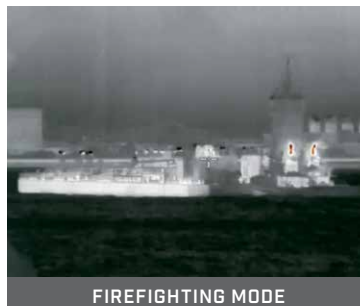


## M400 & M400XR: ADVANCED MULTI-SENSOR THERMAL NIGHT VISION

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 tight-beam LED spotlight augment target identification for added safety.

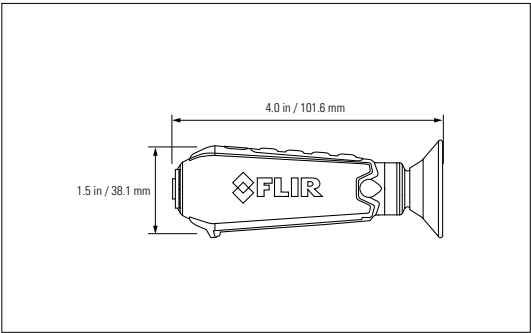


M400	M400-XR
640 x 480 pxl	640 x 480 pxl



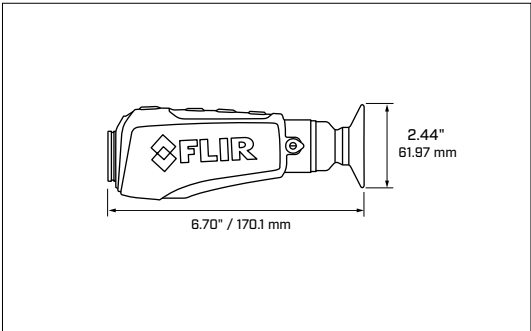
### OCEAN SCOUT TK SPECIFICATIONS

OCEAN SCOUT TK	
	
<b>GENERAL</b>	
Detector Resolution	160 x 120
Refresh Rate	9 Hz
Field of View	24° x 16°
Zoom	NA
Color Palettes	Black Hot, White Hot, InstAlert™ Rainbow, Iron, Lava, Arctic & Graded Fire
Battery	Internal Lithium Ion rechargeable
Waterproofing	IP-67 Submersible to 1 Meter
Weight	6 oz (170 g)



### OCEAN SCOUT SPECIFICATIONS



	OCEAN SCOUT 240	OCEAN SCOUT 320	OCEAN SCOUT 640
			
GENERAL			
Detector Resolution	240 x 180	336 x 256	640 x 512
Refresh Rate	9 Hz		
Field of View	24° x 18°	17° x 13°	18° x 14°
Zoom	NA	2x E-Zoom	2x, 4x, and E-Zoom
Color Palettes	White Hot / Black Hot / InstAlert™		
Battery	Internal Lithium Ion rechargeable (5-hour typical life)		
Waterproofing	IP-67 Submersible to 1 Meter		
Weight	0.75lb (0.34 kg)		
RANGE PERFORMANCE			
Man	1,150 ft (350 m)	1,800 ft (550 m)	3,705ft (1.14 km)
Vehicle/vessel	0.48 nm (0.90 km)	0.84 nm (1.5 km)	1.73 nm (3.2 km)

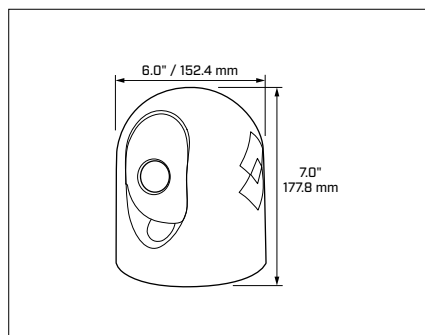


Specifications subject to change without prior notice. Images for reference purposes only.




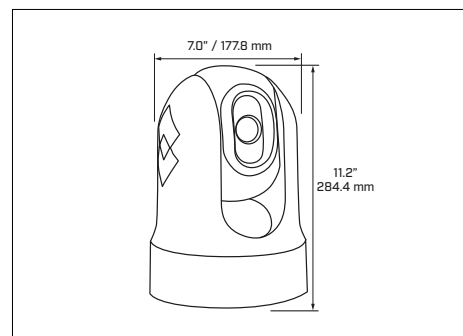
## MD-SERIES SPECIFICATIONS

	MD-324	MD-625
		
<b>MAIN THERMAL CAMERA</b>		
Detector Type	320 x 240 VOx Microbolometer	640 x 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	24° x 18° (NTSC)	25° x 20° (NTSC)
Focal Length	19 mm	25 mm
Focus	Fixed 12ft (3.6m) to infinity	Fixed 12ft (3.6m) to infinity
Optical Zoom	N/A	N/A
E-Zoom	2x	2x, 4x
Image Processing	FLIR Proprietary Digital Detail Enhancement	FLIR Proprietary Digital Detail Enhancement
<b>SYSTEM SPECIFICATIONS</b>		
Video Tracking	No	No
Firefighter Mode	No	No
Pan/Tilt Adjustment Range	Pan: ±30° per key, Tilt: +34°, -27° (Locked in at Installation)	Pan: ±30° per key, Tilt: +34°, -27° (Locked in at Installation)
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	No	No
HD-SDI Lossless Video Output	No	No
Power Requirements	12-24 V DC via included PoE injector	12-24 V DC via included PoE injector
Power Consumption	4.8 W nominal; 12.5 W max	4.8 W nominal; 12.5 W max
<b>ENVIRONMENTAL</b>		
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	-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
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
<b>PHYSICAL</b>		
Weight	~ 3 lbs (1.36 kg)	~ 3 lbs (1.36 kg)
Size	6" (152.4 mm) dia. x 7" (177.8 mm) ht.	6" (152.4 mm) dia. x 7" (177.8 mm) ht.
<b>RANGE PERFORMANCE</b>		
Person in the Water	1,500 ft (457 m)	2,700 ft (823 m)
Small Vessel	4,200 ft (1280 m)	1.2 nm (2.2 km)






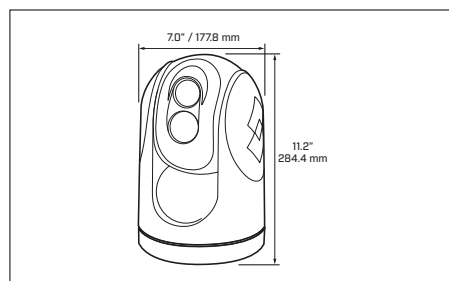
## M100/200 SPECIFICATIONS

	M100/M200
	
Detector Type	320 x 240 VOx Microbolometer
Video Refresh Rate	9 Hz or 30 Hz
Field of View	24° x 18°
Focal Length	19 mm
E-Zoom	2x
Image Processing	FLIR Proprietary Digital Detail Enhancement
<b>SYSTEM SPECIFICATIONS</b>	
Pan/Tilt Range	M100 – Tilt: +110°, -90° M200 – Pan: 360° (continuous), Tilt: +110°, -90°
Video Output	H264 IP Video stream
Power Requirements	12 or 24 VDC
Power Consumption	15 W (typical) 18 W (max)
<b>ENVIRONMENTAL</b>	
Operating Temperature Range	-13°F to +131°F (-25°C to +55°C)
Storage Temperature Range	-30°F to +158°F (-30°C to +70°C)
Relative Humidity	95% max
Vibration	IEC 60945; MIL-STD-810E
Salt Mist	IEC 60945
Wind	100 mph (161 kph)
EMI	IEC 60945
<b>PHYSICAL</b>	
Weight	6.0 lb (2.7 kg) w/o top-down riser 6.6 lb (3.0 kg) w/ top-down riser
Size	6.34" (dia. @ base) x 9.03" (ht.) 161.1 (dia.) x 229.3 (ht.) mm
<b>RANGE PERFORMANCE</b>	
Person in the Water	~1,500 ft (457 m)
Small Vessel	~0.67 nm (1.3 km)



## M-SERIES NEXT GENERATION SPECIFICATIONS

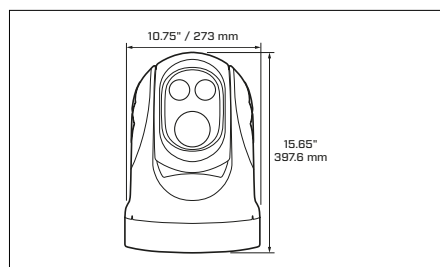
	M-324S	M-324CS	M-625S	M-625CS	M-617CS
					
MAIN THERMAL CAMERA					
Detector Type	320 × 240 VOx Microbolometer	320 × 240 VOx Microbolometer	640 × 480 VOx Microbolometer	640 × 480 VOx Microbolometer	640 × 480 VOx Microbolometer
Video Refresh Rate	< 9 Hz or 30 Hz (NTSC and PAL)	< 9 Hz or 30 Hz (NTSC and PAL)	< 9 Hz or 30 Hz (NTSC and PAL)	< 9 Hz or 30 Hz (NTSC and PAL)	< 9 Hz or 30 Hz (NTSC and PAL)
Field of View	24° × 18°	24° × 18°	25° × 20°	25° × 20°	17° × 14°
Focal Length	19 mm	19 mm	25 mm	25 mm	35 mm
Focus	Fixed 12ft (3.6m) to infinity	Fixed 12ft (3.6m) to infinity	Fixed 12ft (3.6m) to infinity	Fixed 12ft (3.6m) to infinity	Fixed 12ft (3.6m) to infinity
Continuous E-Zoom	2×	2×	2×, 4×	2×, 4×	2×, 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	No	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 or PAL, 30 Hz or <9 Hz	NTSC or PAL, 30 Hz or <9 Hz	NTSC or PAL, 30 Hz or <9 Hz	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	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)





## M-400 SPECIFICATIONS

	M400	M400XR
		
<b>MAIN THERMAL CAMERA</b>		
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
<b>MAIN VISIBLE CAMERA</b>		
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
<b>SPOTLIGHT SPECIFICATIONS</b>		
Type, Lumens, Beam°	LED, 580 Lumens, 5° Divergence Angle	LED, 580 Lumens, 5° Divergence Angle
<b>SYSTEM SPECIFICATIONS</b>		
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
<b>ENVIRONMENTAL</b>		
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
<b>PHYSICAL</b>		
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	
<b>RANGE PERFORMANCE</b>		
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)



Specifications subject to change without prior notice. Images for reference purposes only.

## CAMERA FORMAT AND EXPORT NOTES

FLIR thermal cameras come standard in NTSC video format for US domestic customers. PAL versions are also available. EXPORT REQUIREMENT: 9Hz versions are available and required for products being exported outside of the US and Canada. Add an "S" to the end of the product part number on your order to indicate 9 Hz versions. For more information please see your authorized FLIR Maritime dealer or representative.

## 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](http://www.flir.com/productreg), the 2-Year Standard Limited Warranty is upgraded and replaced by the 3-Year Extended Limited Warranty for FREE.

In North America, FLIR also offers On-Board Repair Service, a Warranty Service Program and Advance Warranty Replacement for some products. These programs and services, when available, are designed to help minimize the down - time of products that may require warranty repair.

For complete details on FLIR's industry-leading warranty please visit  
[www.flir.com/maritime](http://www.flir.com/maritime).

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