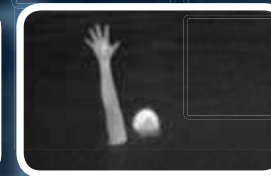




Raymarine

T H E R M A L N I G H T V I S I O N C A M E R A S



P R E V I E W



HOW THERMAL NIGHT VISION CAMERAS HELP KEEP YOU SAFE

What Raymarine Thermal Night Vision Cameras can do for you...

- Safer navigation
- Life-saving potential in man-overboard situations
- Enhanced visibility and situational awareness at night
- Easy docking in low light
- Iceberg detection and avoidance
- Boat security and surveillance

Navigation and Collision Avoidance. Thermal night vision cameras make navigation safer with clear video that helps you to see hazards like buoys, floating debris, rocks, land, bridges, and other vessels night and day.

Man Overboard. Thermal night vision cameras can help you to find a person in the water faster than any other night vision technology. Thermal cameras are used by Coast Guards, Police Agencies, Search and Rescue teams and Militaries around the world.

Easy to Use. Thermal night vision cameras from Raymarine are easy to use, and require no training. The images you get from thermal night vision cameras are intuitive and instantly easy to understand. If you can watch TV, you can use a Raymarine thermal night vision camera.

Complements other On-board Electronics. Raymarine's thermal night vision cameras completes your electronics suite like nothing you could imagine: GPS and chart plotters tell you where you are and where you going; radars alert you to nearby vessels; but nothing lets you see what's out there like a Raymarine thermal night vision camera.



Low-light video



Red hot Fusion Rainbow



Black hot mode



White hot mode

P R E V I E W



Thermal night vision cameras are an asset on board every sailing yacht, powerboat and commercial vessel.

PHOTO: © JOE MCCARTHY

RAYMARINE'S THERMAL NIGHT VISION CAMERAS

Standard Thermal Night Vision Camera Features

- Rugged, fully marinized construction to withstand harsh conditions
- Window de-ice heaters for clear vision even in ice and snow
- Proprietary, patent-pending image enhancement algorithms; Digital Detail Enhancement (DDE) to bring out faint image details that you might otherwise miss
- Standard NTSC video outputs that can be viewed on any monitor with an auxiliary video input
- Pre-set gain adjustments for optimal image quality in various conditions
- On-screen icons show what the camera's doing and where it's pointing

Raymarine T Series Cameras

- Short to medium range
- Full 360° pan and ± 90° tilt capability
- Thermal only (T300 and T350 Series) or thermal/lowlight (T400 and T450 Series) multi-sensor configurations
- Standard and high-resolution thermal night vision camera options
- Network ready



On screen icons include:
night mode; day mode; night docking
and man overboard



PREMIUM MARITIME THERMAL NIGHT VISION CAMERA SYSTEMS FROM RAYMARINE

PHOTO: © JOE MCCARTHY



PHOTO: COURTESY TARGA

Powerful, flexible, and built to last, T Series is Raymarine's premium line of maritime thermal night vision cameras.

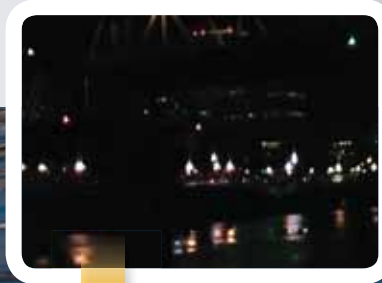
Available with a variety of sensors and resolutions to meet a wide range of maritime navigation, collision avoidance, security, and search and rescue needs, T Series thermal night vision cameras are easy to install, integrate, and operate.

T Series thermal night vision camera systems use cutting-edge Ethernet connectivity for easy installation, control, and interface with other on-board electronics. The rugged, waterproof gimbal enclosure provides a continuous 360° pan and $\pm 90^\circ$ tilt for an all round view.

P R E V I E W



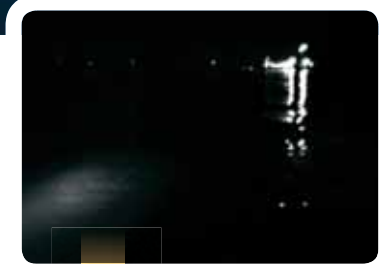
PHOTO: COURTESY WINDY PHOTO: © JOE MCCARTHY



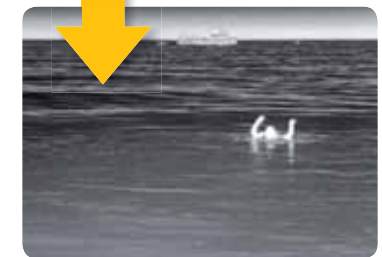
Your vision



Raymarine thermal night vision image



Your vision



Raymarine thermal night vision image

Raymarine T Series thermal night vision cameras are available with a variety of resolution and performance options:

- Thermal night vision cameras come in either 320 x 240 standard resolution, or 640 x 480 high-resolution format; higher resolution provides improved image detail and range performance.
- All T Series thermal night vision cameras come with a 2x zoom function that lets you see further at night; the high-resolution option provides an additional 4x zoom for even greater reach.
- Installers can mount all T Series gimbals in either camera up or camera down orientation.
- T400 and T450 versions incorporate an extreme lowlight micro-lux TV camera for improved visibility during twilight hours, and when operating in areas with some ambient light, such as coastal waterways and harbour entrances.



Lowlight capability of the T400 and T450 thermal night vision cameras.

RANGE PERFORMANCE OF THERMAL NIGHT VISION CAMERAS



Range and detection

The range at which Raymarine thermal night vision cameras detect objects is shown in the graphic (above). However, actual object detection range performance may vary depending on camera set-up, environmental conditions, user experience and the type of display used.

Raymarine T Series thermal night vision cameras create pictures by detecting and displaying small changes in heat, not light.

Even the heat left by a person's hand on a wall has enough thermal energy to show up clearly on a Raymarine thermal night vision camera.

Everything generates thermal energy, even ice! And although this energy is invisible to the naked eye, Raymarine thermal night vision cameras detect it and turn it into video that is easy to understand, allowing you to see more and see further than you could with your eyes.



PHOTO: COURTESY TURBINE TRANSFERS

P R E V I E W

RAYMARINE T SERIES THERMAL NIGHT VISION CAMERA COMPARISON GUIDE

The following table provides a quick comparison guide to the primary Raymarine T Series features. For further product specification information, go to page 11.



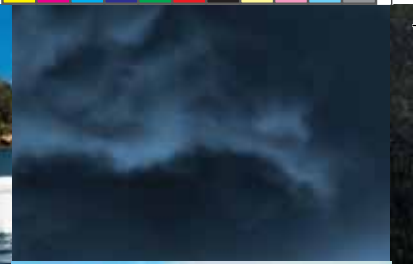
	T300 SERIES		T400 SERIES	
	T300	T350	T400	T450
Thermal video	●	●	●	●
Lowlight video			●	●
Video resolution	320 x 240 (QVGA)	640 x 480 (VGA)	320 x 240 (QVGA)	640 x 480 (VGA)
Frame refresh rates	9Hz	9Hz	9Hz	9Hz
Freeze frame, rear view	●	●	●	●
Field of view	24°	25°	24°	25°
Digital zoom	2x	2x and 4x	2x	2x and 4x
Focal length	19mm	25mm	19mm	25mm
Part Number	E32125	E32126	E32127	E32129



PHOTO: COURTESY SUNSEEKER INT.

PHOTO: © DEE MCCARTHY

CAMERA CONTROL VIA E SERIES WIDESCREEN HYBRIDTOUCH AND G SERIES KEYPADS



RANGE KEY



The T Series thermal night vision cameras are designed to seamlessly integrate with E Series Widescreen Multi Function Displays (MFD) and G Series Command Centre navigation systems. Using SeaTalk^{HS} networking, the camera's pan, tilt and zoom controls can be actuated by touch screen (E Series Widescreen) or using the MFD's keypad and rotary controls (E Series Widescreen or G Series.) A convenient thermal camera application is available right from the MFD's home screen. The application can be displayed full-screen, or in a window alongside other navigation data such as

electronic charts or radar. Best of all, the camera system's controls are available at any E Series Widescreen or G Series display on the boat, giving skippers the ability to navigate with thermal imagery from the main helm or a remote navigation station. The T Series thermal cameras pan, tilt and zoom controls are also compatible with the E Series Widescreen HybridTouch user interface. Boaters can enjoy the convenience of touch screen, panning and tilting the camera effortlessly with a simple touch of the display. Thanks to HybridTouch technology boaters can also control the camera with the button keys when seas are rough.



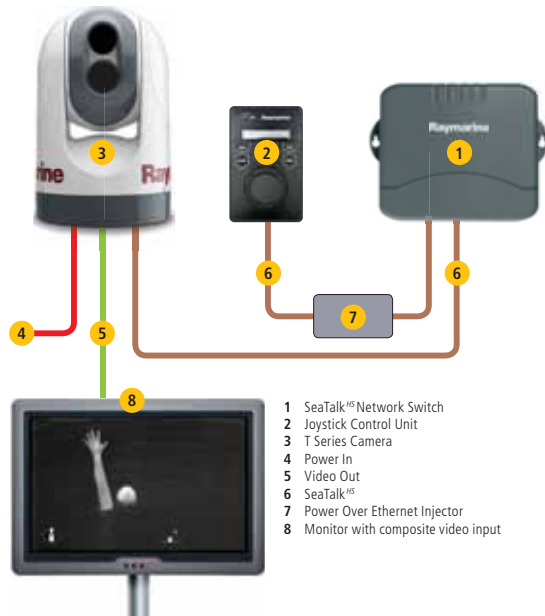
G Series Glass Bridge with Command Centre Keyboard



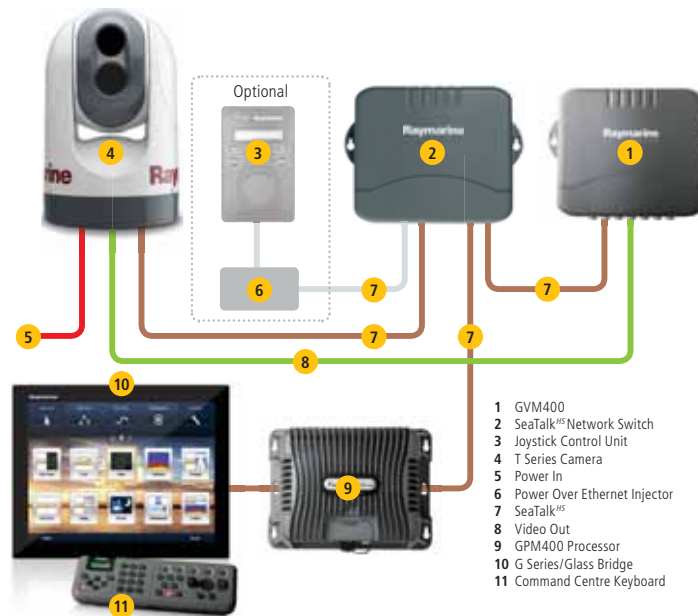
P R E V I E W



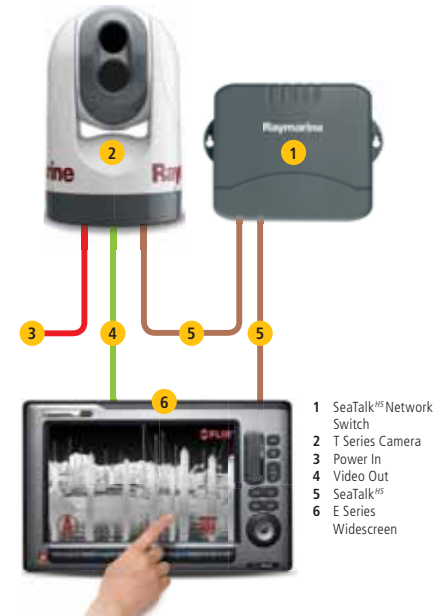
VIDEO MONITOR



G SERIES/GLASS BRIDGE



E SERIES WIDESCREEN



P R E V I E W

RAYMARINE T SERIES JOYSTICK CONTROL UNIT

The ergonomic controller provides ready access to all critical system functions and smooth, effortless control, even in rough seas.

(1) Heated LCD Screen. Provides instant display of system status.

(2) User-programmable "hot key". Lets operators have instant access to frequently-used functions.

(3) Colour. Different display settings let the operator choose between two black and white or three colour display schemes that are easy on the eyes and help operators see better.



(4) Scene. Provides a variety of pre-set gain and level adjustments so that operators can get the best image quality possible throughout a wide range of conditions.

(5) Home. A programmable feature that lets operators define a Home position as a reference they can use when navigating for long periods.

(6) Joystick. The sealed 8-way control knob provides precise control even in rough seas.

Ethernet connectivity. Install multiple control stations around your vessel so you can control the T Series thermal night vision cameras from anywhere you want on board.



P R E V I E W

THERMAL NIGHT VISION CAMERAS AND RADAR

You may be asking yourself if a thermal night vision camera can replace or be used instead of radar onboard your vessel?

The answer is that a thermal night vision camera actually complements a radar system rather than acts as a direct replacement.

Both radar and thermal night vision camera systems benefit from use alongside AIS, relevant cartography and other navigation data inputs.

Radar

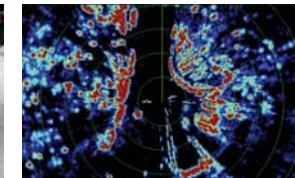
- Advanced warning; 12Nm (nautical miles) and beyond.
- Gives 360° horizontal plane situational awareness and has multi-target tracking capability, primarily for collision avoidance.
- Track and avoid storms – can be adjusted/tuned to 'see' through clutter.
- Often overlaid onto cartography to give a navigational cue.
- Limited detail – requires interpretation.

Thermal cameras

- Short range warning: based on a range of up to 1Nm (T350/T450 models).
- Ideal for Man Overboard (MOB) or Search and Rescue (SAR) situations.
- Similar limited field of view to the human eye; intuitive to use – like a video camera.
- Performance can be affected by weather i.e. fog and rain.
- Doesn't need a navigational cue.
- Greater visual detail – no interpretation necessary.



Typical thermal night vision camera image



Typical HD Digital radar image



	300	350	400	450
THERMAL IMAGING SPECIFICATIONS				
Sensor type	320 x 240 (QVGA)	640 x 480 (VGA)	320 x 240 (QVGA)	640 x 480 (VGA)
Digital zoom	2x	2x and 4x	2x	2x and 4x
Field of view	24°	25°	24°	25°
Focal length	19mm	25mm	19mm	25mm
Image processing	FLIR DDE	FLIR DDE	FLIR DDE	FLIR DDE
DAYLIGHT IMAGING SPECIFICATIONS				
Detector type	1/2" Interline Transfer Low light CCD			
Lines of resolution	768 (H) x 494 (V)			
Minimum illumination	100µlx (@ f/1.4)			
Field of view	Matched to IR			
SYSTEM SPECIFICATIONS				
Size	177.8mm (dia.) x 284.48mm (ht.)			
Weight	~ 4.08kg (9lb)			
Pan/tilt coverage	360° continuous pan, ± 90° tilt			
Video output	NTSC			
Connector types	BNC with BNC to RCA adaptor included for video out			
Power requirements	12 VDC to 24 VDC (-10% / +30%)			
Power consumption	25W nominal; 50W maximum			
ENVIRONMENTAL				
Operating temperature range	-25°C to +55°C			
Storage temperature range	-40°C to +85°C			
Automatic window defrost	•	•	•	•
Sand/dust	MIL-STD-810E			
Water ingress	IPX6			
Shock	15 g vertical, 9 g horizontal			
Vibration	IEC 60945; MIL-STD-810E			
Lightning protection	•	•	•	•
Salt mist	IEC60945			
Wind	100 kts (115.2 mph)			
EMi	IEC 60945			
STANDARD PACKAGE				
WARRANTY				
2 years				
ACCESSORIES				
RANGE PERFORMANCE†				
Detect man (1.8m x 0.5m)	~1,500ft. (450m)	~2,700ft. (820m)	~1,500ft. (450m)	~2,700ft. (820m)
Detect small vessel (2.3m x 2.3m)	~4,200ft. (1,280m)	~1.4miles (2.2km)	~4,200ft. (1,280m)	~1.4miles (2.2km)

† = Actual object detection range performance may vary depending on camera set-up, environmental conditions, user experience, and type of display use. All specifications are subject to change without notice. Visit www.raymarine.com for the most up-to-date specifications.



SAFETY NOTICE

Raymarine products are intended to be used as aids to navigation and must never be used in preference to sound navigational judgement. Their accuracy can be affected by many factors, including environmental conditions, equipment failure or defects, and incorrect installation, handling or use. Only official government charts and notices to mariners contain all the current information needed for safe navigation, and the captain is responsible for their prudent use. It is the user's responsibility to use official government charts, notices to mariners, caution and proper navigational skill when operating any Raymarine product.

The technical and graphical information contained in this brochure, to the best of our knowledge, was correct as it went to press. However, the Raymarine policy of continuous improvement and updating may change product specifications without prior notice. Therefore, unavoidable differences between the product and this brochure may occur from time to time, for which liability cannot be accepted by Raymarine.



PHOTOGRAPHY

Lifestyle photography

Lifestyle photographs used in this brochure are for illustration purposes only – featured product(s) are not necessarily installed or used on these vessels.

Due to usage restrictions, the lifestyle photographs must not be copied, scanned or extracted from this or electronic variants of this brochure and distributed or reproduced in any form, or be used for any other purpose, including advertising, review articles, websites or posters.

Product photography

Product images used in this brochure may be obtained directly from Raymarine.



WEBSITE

Whenever you need information, just visit our website
www.raymarine.com.

This site is constantly updated, so you'll find:

- ▶ the very latest news
- ▶ product information
- ▶ software upgrades
- ▶ owner's manuals
- ▶ Worldwide dealer locations.

HEAD OFFICE (UK)

Raymarine UK Limited
Marine House
5 Harbourgate
Portsmouth
Hampshire PO6 4BQ
United Kingdom
T: +44 (0)23 9271 4700
F: +44 (0)23 9271 4800
www.raymarine.com

USA

Raymarine Inc.
21 Manchester Street
Merrimack
NH 03054
USA
T: 603.881.5200
F: 603.864.4756
www.raymarine.com

DENMARK

Raymarine Danmark
Tigervej 12-14
4600 Køgel
Danmark
T: +45 4371 6464
F: +45 4371 2244
www.raymarine.eu

FRANCE

SD Marine
10-12 rue d'Estienne d'Orves
- B.P. 3778501
Sartrouville Cedex
France
T: +33 01 39 14 68 33
F: +33 01 39 13 30 22
www.raymarine.fr

GERMANY

Eissing GmbH
Borsteler Chaussee 53
22453 Hamburg
Deutschland
T: +49/4921-8008-41
www.raymarine.de

ASIA PACIFIC

Raymarine Asia Pty
Suite 301
2 Minna Close
Belrose
New South Wales
2085 Australia
T: +61 (02) 94 79 4800
F: +61 (02) 94 50 1255
www.raymarine.com.au

ITALY

Deck Marine SpA
Via B. Quaranta, 57
20139 Milano
Italia
T: +39 02 5695906
F: +39 02 5397746
www.raymarine.it

FINLAND

Navsystems Oy
Seisaketie 3
08 680 Lohja
Finland
T: +358 19 33201
F: +358 19 3320 300
www.raymarine.eu

Raymarine®

A FLIR COMPANY

RADAR • NAVIGATION AIDS • INSTRUMENTS • SONAR • AUTOPILOTS • COMMUNICATIONS • THERMAL IMAGING • SOFTWARE • SYSTEMS