Tornado Low Light Camera

Product Manual

0691-SOM-00006, Issue: 01

Outstanding Performance in Underwater Technology

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Help & Support

First please read this manual thoroughly (particularly the Troubleshooting section, if present). If a warranty is applicable, further details can be found in a Warranty Statement at the end of the manual.

Tritech International Ltd can be contacted as follows:

	Mail	*Tritech International Ltd* Peregrine Road Westhill Business Park Westhill, Aberdeenshire AB32 6JL, UK
	Telephone	+44 (0)1224 744111
	Email	support@tritech.co.uk
	Website	www.tritech.co.uk

Prior to contacting *Tritech International Ltd* please ensure that the following is available:

1. The Serial Numbers of the product and any *Tritech International Ltd* equipment connected directly or indirectly to it.
2. Software or firmware revision numbers.
3. A clear fault description.
4. Details of any remedial action implemented.

Contamination

If the product has been used in a contaminated or hazardous environment you *must* de-contaminate the product and report any hazards *prior* to returning the unit for repair. *Under no circumstances should a product be returned that is contaminated with radioactive material.*

The name of the organisation which purchased the system is held on record at *Tritech International Ltd* and details of new software or hardware packages will be announced at regular intervals. This manual may not detail every aspect of operation and for the latest revision of the manual please refer to www.tritech.co.uk

Tritech International Ltd can only undertake to provide software support of systems loaded with the software in accordance with the instructions given in this manual. It is the customer's responsibility to ensure the compatibility of any other package they choose to use.

Warning Symbols

Throughout this manual the following symbols may be used where applicable to denote any particular hazards or areas which should be given special attention:

Note

This symbol highlights anything which would be of particular interest to the reader or provides extra information outside of the current topic.

Important

When this is shown there is potential to cause harm to the device due to static discharge. The components should not be handled without appropriate protection to prevent such a discharge occurring.

Caution

This highlights areas where extra care is needed to ensure that certain delicate components are not damaged.

Warning

DANGER OF INJURY TO SELF OR OTHERS

Where this symbol is present there is a serious risk of injury or loss of life. Care should be taken to follow the instructions correctly and also conduct a separate Risk Assessment prior to commencing work.

1. Introduction

The Tritech Tornado is an underwater video camera specifically designed to work in low light conditions. The Tornado is robust, low light, high resolution and monochrome CCD camera.

The camera offers a near SIT performance and high quality images and is supplied with either an NTSC or PAL module.

2. Specification

Physical

Weight in air	Stainless steel: 2.8kg, Titanium: 1.8kg
Weight in water	Stainless steel: 1.8kg, Titanium: 0.8kg
Diameter	78mm
Length	172mm
Depth rating	4000m
Materials	Stainless steel (titanium alloy optional)
Connector options	Tritech, Subconn BH/MCBH, Burton/Seaconn 5506, Schilling SeaNet
Shock	*DEF STAN 00-35 Part 3, chapter 2-03* $30g_n$ for 6ms in each axis (while operating)
Vibration	*DEF STAN 00-35 Part 3, chapter 2-01* Sinusoidal sweep & dwell in each axis from 5 to 150Hz at $10g_n$
Temperature rating	-10 to 40°C in operation (-30 to 70°C in storage)

Camera Module

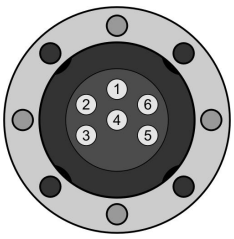
Minimum illumination	0.0003 lux at faceplate
Gamma characteristic	y=0.45, y=0.6, y=1
Resolution	>570 TV lines
Video output	1V (peak to peak) 75Ω
Pick-up element	½" Interline transfer CCD image sensor
Scanning system	2:1 Interlace
Signal to noise ratio	>50dB (AGC off)
Power requirement	12 to 39V DC

Lens

Focal length	4mm
Aperture	F1.2
Angle of view	D72°, H39°, V41°
Object distance	0.1m - infinity

Standard Connector Pin-Out

The standard connector fitted to the Tornado camera is the *Tritech International Ltd* 6-pin 4000m water block. Other connectors are available and for alternative connectors please refer to the original purchase order for the camera (or contact *Tritech International Ltd* Technical Support).



Tritech Waterblock

Pin	Function
1	not connected
2	not connected
3	+DC Power
4	-DC Power
5	Video Out
6	not connected

3. Installation

3.1. General Guidelines

Caution

Although the camera is rugged, it should be handled with care, particularly the connector and transducer.

The camera should be secured by clamping on the cylindrical body section such that the lens is unimpeded and not shielded. A guard can be fitted around the head to protect from impact damage but this must obstruct the field of view.

Caution

It is important that no clamping force is applied to the lens end cap.

The clamp should be applied centrally to the body tube and should not be over-tightened. Any metallic clamps should be electrically insulated from the body by means of rubber or plastic strips or mount brackets of at least 3mm thickness and extending at least 3mm beyond the clamp boundary to reduce any galvanic corrosion effect. Non-metallic clamps are preferable and if metallic clamps are used they should be painted or lacquered with at least two or three coatings.

It may not be possible to determine the orientation prior to installation so it is advisable to install the camera in such a way that rotation of the unit is possible to correct for any mis-alignment of the displayed image.

Caution

Ensure the correct polarity of the power supply cable prior to connecting the lead. Incorrect polarity may cause damage to the internal electronics.

Before attaching the connector to the camera ensure that the 'O' ring gasket is in position and lightly smeared with lubricant (Dow Corning #111 or equivalent is recommended).

3.2. Test Cable Wiring

To connect the camera to a computer for testing or operation it will be necessary to construct an appropriate test cable. The pin-out diagram for units fitted with the Tritech 6 pin standard water block is shown in the specification section, for any other connectors it will be necessary to refer to the documentation that was provided with the camera to establish the correct wiring scheme.

To connect to a computer it will be necessary to provide the camera a minimum of three connections:

1. DC Power
2. DC Ground
3. The video capture output.

4. Operating Conditions

The camera is compatible with any video recorders or monitors working with the PAL standard.

Caution

The camera is designed for use underwater. Water has a cooling effect which means that it will become hot when operated in air.

It is not recommended that the camera be left to operate in air for extended periods.

5. Maintenance

There are no user serviceable parts within the camera and no reason to dismantle it.

Routine maintenance should be restricted to rinsing with clean water after periods of submersion.

Visually inspect the camera for any signs of damage and contact *Tritech International Ltd* if any part requires replacement.

Glossary

CCD	Charge-coupled device - an electronic light sensor used in digital cameras.
DC	Direct Current
NTSC	National Television System Committee - an analogue television standard used in most of North America.
PAL	Phase Alternating Line - an analogue television colour encoding system.
Tritech waterblock	The 4000m depth rated connector developed by *Tritech International Ltd* for their subsea equipment.

