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AVIATION | DIVING | ENGINEERING & DEVELOPMENT | LIFTING & HANDLING | SUBSEA | WORKSHOP

Goblin Shark WA IP Subsea Camera

USER MANUAL

imenco
SMART SOLUTIONS

Revision History

Rev.No	Description	Date of Rev
1.0	Issued for use	09.05.17
1.1	New lens option	30.10.17
1.2	Details on video streaming	04.11.17
1.3	Change in layout	03.02.18
1.4	SmartView details altered	28.09.18
1.5	FoV / Lens data altered	12.11.18

Contents

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Safety information

IMPORTANT! The Imenco Goblin Shark camera is a technically advanced product. Please make sure to read and understand all sections of this manual before installing or operating this product. Installation of this product should only be performed by qualified personnel.

WARNING! This product contains no user serviceable parts. *Do not open, alter or disassemble this product.*

Failure to comply with this warning can result in damage to equipment and void of warranty. The camera is filled with inert gas at manufacture.

WARNING! *The housing is NOT connected to any Protective Earth circuits.*

The metal housing has no electrical contact with any of the circuits inside the camera. This is to isolate the camera housing from other equipment that includes dangerous high voltage and to minimize corrosion that otherwise might be intensified by electrical contact to other nearby metal equipment or structures exposed to the sea water.

Warranty

Be sure to read and comply with **Imenco's Terms & Conditions** that the Goblin Shark Camera was sold under.

1 General Description

1.1 Regarding these Instructions for Use

The intended use of these instructions is to provide and guide the operator / user of the equipment with instructions on the technical specifics of the product, how it functions, the safety aspects of its use, how to prepare, operate and maintain the product.

All information in this document is provided commercial in confidence and shall not be published or disclosed, wholly or in part to any other party without Imenco's written permission.

2 The Goblin Shark camera

The focus settings of this camera are calibrated for under water use and has a limited focus area in air.

Actual camera:

Camera block diagram:

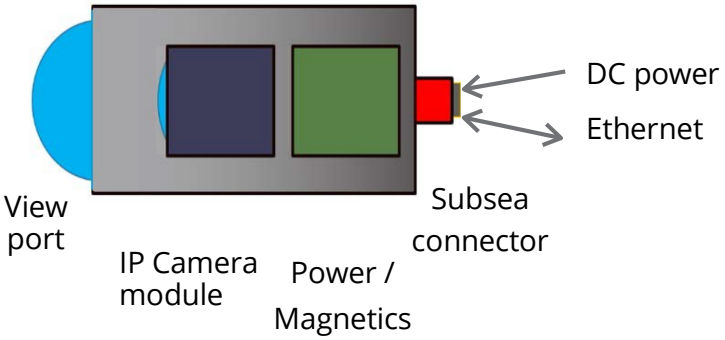


Figure 1, Goblin Shark camera

2.1 Main Features

- HD 1080p/30fps Video Streaming over Ethernet
- Small size / wide angle
- Alternative Field of View
- 6.000 m Titanium Housing
- 24VDC or PoE version

2.2 Typical use case

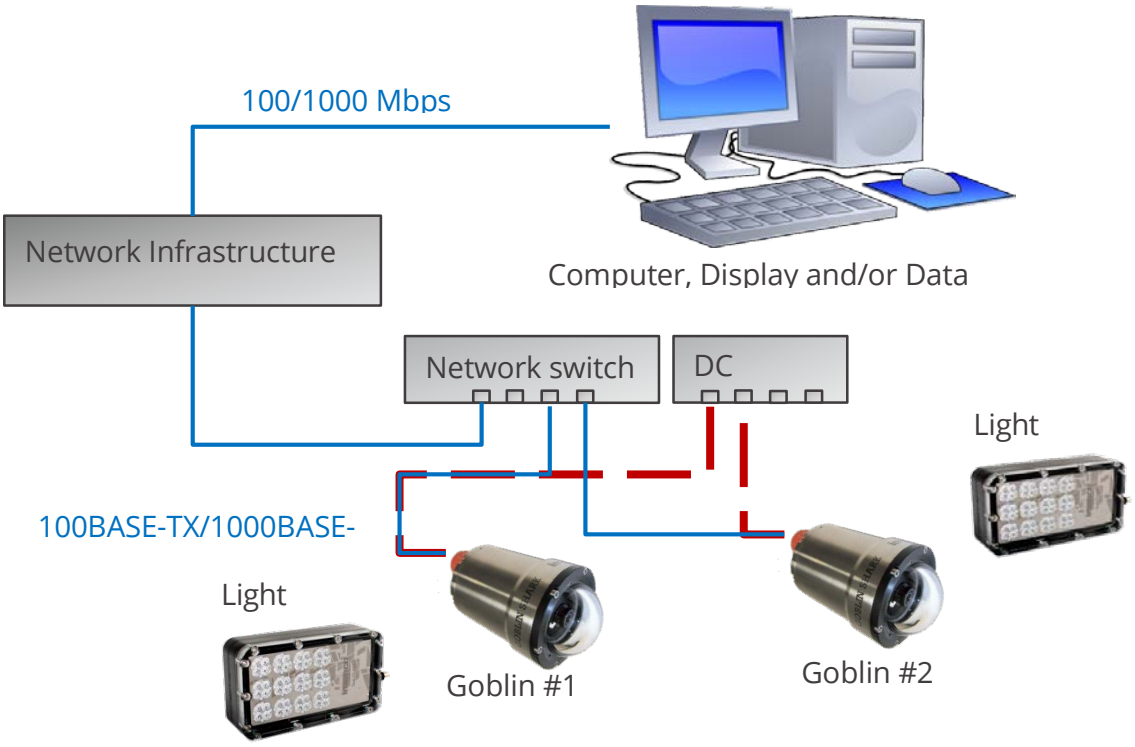


Figure 2, System

Each camera in Figure 2 is connected to the rest of the world, for control and video streaming, through a 1000BASE-T compliant cable. In a minimum system, this cable could go directly to the Network port of a suitable computer that has software (e.g. Imenco SmartView) installed for decoding and using the received video.

The Ethernet communication of the two Goblin in Figure 2 are combined in a Switch and routed through various other Networking hardware before connected to the client computer. Beware that the network infrastructure and other network hosts between the Goblin Shark camera and the Client computer could potentially impose heavy traffic and delays in the video, which is unacceptable for the operator. The installer must take measures to avoid that.

Cameras pinned out with only 2 Ethernet pairs (4 wires) could encounter connection problems when connected to Gigabit Ethernet switches. Appropriate settings must be altered in the switches to accommodate for this.

2.3 Remote display and control station

Video Streaming and User Interface in the camera is realized with Internet protocols over Ethernet.

A computer with sufficient graphics performance and network interface can be used to operate and view / record video from the Goblin Shark camera.
Camera setup can be performed by the built-in web interface.

This Imenco camera can be supplied together with the Imenco SmartView software for viewing, frame snapshots and video recording, please refer to the SmartView User manual for these functions.

3 Technical Specification

Video format	1080p @ 30fps Video Streaming over Ethernet
Communication & video interface	Ethernet 100BASE-TX / 1000BASE-T
Video Compression	H.264 AVC
Video streaming protocol	RTSP
Recommended bitrate	4 Mb/s (max 8Mb/s)
Default IP address	192.168.1.2
Lens system	Fixed aperture / fixed focus
Field of View in seawater – 3,6 Lens	106° dia. / 92° hor.
Field of View in seawater – 2,9 Lens	122° dia. / 115° hor.
Field of View in seawater – 1,8 Lens	142° dia. / 137° hor.
Minimum working distance	0,1 m
Front Port	BK7 Glass Dome
Housing material	Titanium
Depth rating	6.000 m
Body diameter	79 mm / 74 mm
Length (excl. connector)	123 mm
Power requirements	24VDC / 5W or PoE (separate models)
Standard Connector	DBH13 / 5506-1508
Mass in air	1,0 Kg
Mass in seawater	0,5 Kg

4 Functional Description

4.1 Cabling and Networking Hardware

The standard connector on the Goblin camera is a SubConn® Ethernet Series Power / Ethernet Circular 13 pins type.

Imenco offers customer specified (Cat5e approved) connectors and cabling with the Goblin camera. Contact Imenco to work out a solution for other than standard connectors.

The IEEE standards 100BASE-TX and 1000BASE-T defining 100Mb/s and 1000Mb/s data rates over twisted pair copper cables recognize up to 100 m length between nodes. Pay special attention to the choice of connectors, cable and method of wire termination in an actual Goblin installation and make sure it performs to the above standards. Test the solution before committing to work.

The distance from the camera to the network port is usually just a few meters, such as when the camera is installed on an ROV. The equipment behind that network port may include fibre optic sections (through the umbilical of the ROV) that extend to the remote station on surface. Signal transmission and networking hardware after the first network port is outside the scope of this manual. This is left to qualified personnel who are competent to install, configure and diagnose computer networks. Imenco does not support installation of such equipment.

IMPORTANT! *The camera housing is not connected to Protective Earth.*

4.2 Ethernet pin-out

Transceiver ports:		
1000BASE-T	**100BASE-TX**	**Pin no**
BI-DA +	Transmit +	1
BI-DA -	Transmit +	2
BI-DB +	Receive +	3
BI-DC +		4
BI-DC -		5
BI-DB -	Receive -	6
BI-DD +		7
BI-DD -		8

Table 2, Ethernet RJ45 Port

IMPORTANT! The Ethernet wiring must comply with IEEE 1000BASE-T all the way through subsea connectors and cabling to the next network node.

5 Installation Instructions

Make sure that **Imenco's Terms & Conditions** are followed when using this product.

5.1 Unpacking and testing

When having received the camera, do a visual inspection for damage of the packet or any of the parts.

The packet should include:

- Goblin Shark camera
- USB Memory Stick with User Manual and Config Software
- Pressure test certificate
- Quality control certificate

5.2 Function test

A preliminary function test should be performed prior to full scale installation. This is to familiarize the user with the control functions and to verify that the system is fully operational after shipment.

Follow these steps to power up and check the proper functioning of the camera:

1) Acquire a cable that is terminated in one end with a connector compatible with the Goblin camera connector as specified in this document and the other end is split into a Cat5e network cable with RJ45 termination for the computer as well as a DC-power cable.

2) Clear necessary space on your working desk and gather the:

a. Goblin Shark camera
b. Power supply providing DC anywhere between 9V and 36V, minimum 10W or PoE from a switch / inserter (please ensure which model you have)
c. Computer with necessary software installed
d. Test cable

3) Lubricate the subsea connector and mate it properly.

4) Connect the network cable and start the computer.

5) Now turn on the power to the Goblin.

6) Start streaming the video and check its quality and the camera control functions. Understand that view angles / focus area in air are not as in water.

5.3 Mechanical Installation

Installation of this product should only be performed by qualified personnel. Do not open the camera when carrying out the installation. Mount the camera on a secure and vibration free surface and strap the cable for stress relief to the supporting structure.

The camera should be electrically isolated from the mounting base to minimize any corrosion current between the relatively noble Titanium housing of the camera and surrounding metal structures.

5.4 Electrical installation

IMPORTANT!

- Installation of this product should only be performed by qualified personnel.
- Verify that the connector pin assignments match with the system where the camera is being installed. Mind the connector pin numbers and wire colours as necessary.
- Do not connect/disconnect the subsea connector when the power is ON.

5.5 Camera subsea connector

Imenco delivers the camera with a standard connector of type SubConn® DBH13M unless the customer specifies otherwise. A connector & cable that has not been tested before should be verified to meet all system specifications before the camera can be used.

Standard Subsea connector type pin-out:

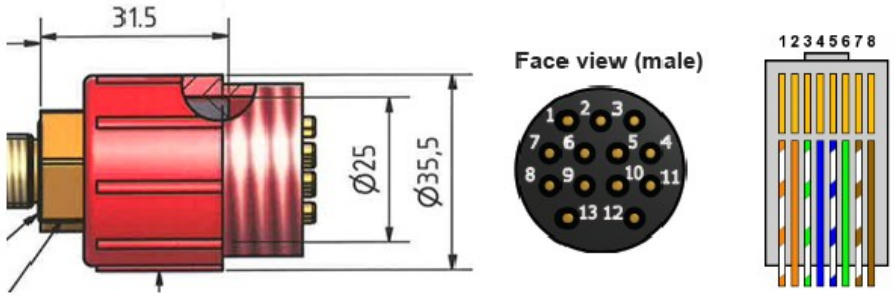


Figure 5, Goblin Shark camera - standard connector and RJ45 plug with T568B colours

The wires from this connector internally in the camera are colour coded and connected to terminals of the camera electronics as indicated in Table 4. The Ethernet twisted pairs are terminated according to T568B as shown with an image of a RJ45 plug in Figure 5 and colour names in Table 4.

Goblin camera					
Internal electronics			SubConn® DBH-13-M:		
Terminal Description	Number		Internal Wire colour	Conductor	
Power in **Minus**			**Black**	**1**	**DC Power**
Not connected			Orange	**2**	
Power in **Plus**			**White**	**3**	
BI-DA + / Transmit +	RJ45-1		White/Orange	**9**	
BI-DA - / Transmit -	RJ45-2		Orange	**8**	**Twisted pairs**
BI-DB + / Receive +	RJ45-3		White/Green	**11**	
BI-DC +	RJ45-4		Blue	**6**	
BI-DC -	RJ45-5		White/Blue	**7**	**T568B colour scheme**
BI-DB - / Receive -	RJ45-6		Green	**10**	
BI-DD +	RJ45-7		White/Brown	**5**	
BI-DD -	RJ45-8		Brown	**4**	
			Red	**12**	**Optional use**
			Green	**13**	

Table 4, Goblin camera standard subsea connector pinout (Ethernet connected as T568B)

5.6 Adding the camera to a computer network

The camera must be connected to a computer that functions as the remote control and video viewing / recording station.

5.7 Network address

The camera can obtain its network address automatically through DHCP, but the client that wants to connect to the camera may have difficulty to find which address the camera was assigned.

If the camera is connected to the DHCP service in a private network, then its host number (xxx, yyy in this table) will be unknown for a potential camera client on the same network:

10.	0-255.	xxx.	yyy
172.	16-31.	xxx.	yyy
192.	168.	xxx.	yyy

The default setting of the camera is therefore a fixed network address selected by the user. The fixed network address configuration of one device is not recommended in a DHCP controlled network since it can cause address conflicts with other devices on the same network.

Running the camera on your office network is not advised because of the large and constant data output. The intended use of the Goblin camera is to assign each camera a fixed network address within a closed network.

4 Operational Instructions

4.1 Hazards and protective measures

The Goblin Shark camera does not generate or use dangerous high electrical voltages. The camera is filled with inert gas at atmospheric pressure. Follow the safety information at the beginning of this manual.

4.2 Over-temperature precautions

The camera is designed for operation in water that will absorb the heat generated by the camera. Imenco acknowledges that the camera must be checked on deck before operation as well as tested and demonstrated in house, but the conditions when operating the camera in air may not provide sufficient cooling. Remember that sunlight and/or high outside temperature will add significant heat to the camera.

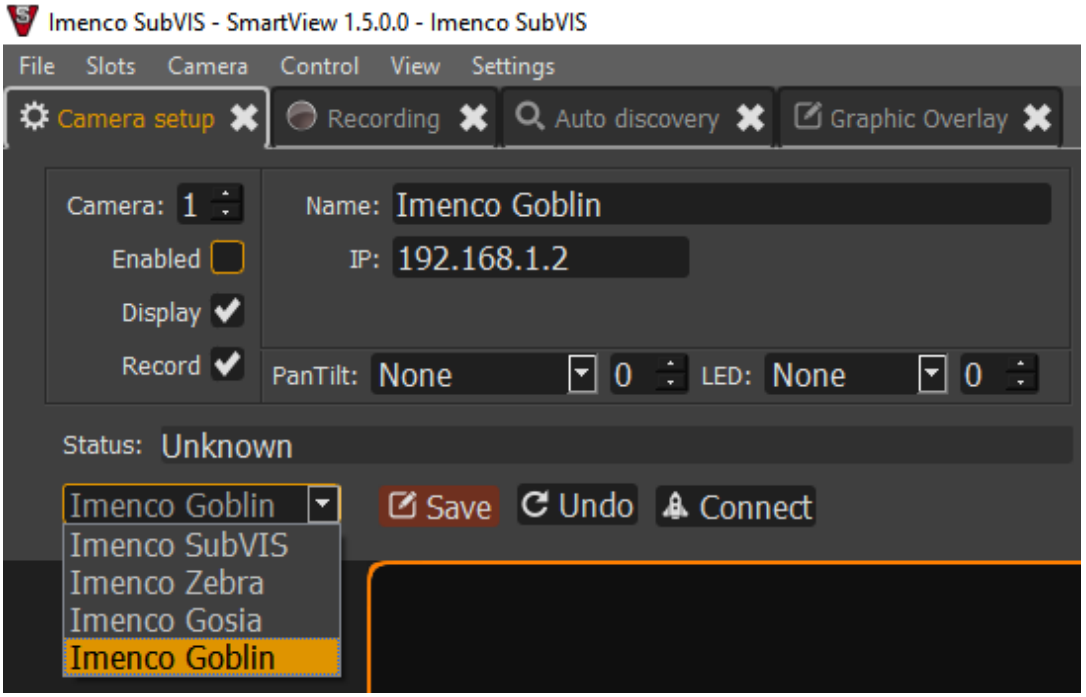
CAUTION:

When operating the camera in air or unusually hot water, apply active cooling to always keep the temperatures below 60°C / 140 °F.

5 Displaying the video stream

5.1 Imenco SubVIS SmartView

If controlled by the Imenco SmartView software, the Goblin Shark camera can be selected form the "Camera setup" tab and necessary configurations for this camera will be set in the viewer. If the IP address of the camera is set to other than default, this must be altered. See the "Imenco SubVIS SmartView User Manual" for more information.



5.2 Media players

To view the video stream from the Goblin Shark Camera in a 3. Party media player like VLC, paste in the following URL: **rtsp://admin:admin@192.169.1.2/stream0**
Please be aware that most standard media players are not optimized for low latency streaming and can add a considerable amount of delay.

5.3 Camera module settings

The camera module settings can be altered via the built in Web Interface of the module. Please see the "IP CAMERA Megapixel Network Camera USER MANUAL" file; "User_Manual-IPSQUARE-001" on the memory stick accompanying the Imenco Goblin Shark Camera.

6 Maintenance

6.1 General maintenance

After use in seawater or other corrosive environments, rinse the unit and cables in fresh water.

Inspect the front port for dirt and dust and remove any surface dirt using compressed air. Clean the front port glass using a mild detergent and a soft cloth. Do not use alcohol or solvent based cleaning solutions because that could damage the pressure seals and glass coating. Avoid circular wiping patterns.

Reapply silicon based lubricant to the connector regularly as needed.

6.2 Service and Repair

This product contains no user serviceable parts. Service and modifications are to be carried out by Imenco personnel or by qualified third party after appointment. Failure to comply may result in personal injury, damage to equipment and loss of warranty.

If the Goblin Shark camera seems to be not working properly, please try to speed up the service that Imenco can provide by describing the problem in specific terms from the person who have first handed observed the fault. Remember if necessary to describe the system where the camera is installed since the root cause sometimes can originate outside a failing part in an advanced system.

7 Packing & Shipping

The packing & shipping of the goods shall generally be according to Imenco's approved procedures.

Warning:

The Goblin Shark camera includes fragile parts which must not be subject to vibrations and shock during transport.

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