

# Gemini 1200ik Dual Frequency Multibeam Sonar



## Product Manual

Document No-0746-SOM-00002-01

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First please read this manual thoroughly (particularly the Troubleshooting section, if present). If a warranty is applicable, further details can be found in the Warranty Statement, 0080- STF-00139, available upon request.

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Prior to contacting Tritech International Ltd please ensure that the following information 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 information 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.moog.com/tritech](http://www.moog.com/tritech)

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.

## **Copyright Notice.**

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# 1. Introduction

The Gemini 1200ik is a dual frequency 2D imaging sonar offering the opportunity to choose the benefit of either longer acoustic ranges or higher resolution imagery between the Lower & Higher frequency channels. It is a multibeam sonar, offering a 120° field of view on both the Low frequency and High frequency channels with update rates of up to 65Hz (30Hz typical - range dependant) giving rapid feedback to the user. The system consists of the Gemini sonar head(s) with Genesis control and display software.

Communication is 100Mbit-s-1 Ethernet. When using an Ethernet connection it should be noted that the Gemini Sonar can fully utilise a 100Mbit-s-1 link while returning the sonar data. If the Gemini Sonar is to share an Ethernet link with other high bandwidth devices, such as video cameras, it is recommended that the 100Mbit-s-1 devices share a gigabit (or faster) link to the surface to reduce possible network congestion.

The sonar can be supplied as 'Single Port' or 'Dual Port' models. The 'Dual' Port option connects and runs in the same way as a 'Single Port' unit but has a secondary 'Aux Port' connection which allows additional RS232 sensors to be connected and the option of a TTL IN synchronisation signal.

## **Operating Depth**

**350m**

## **Range**

**120m**

## **Range Resolution**

**2.4mm**

### **Features**

- Real-time updates for video-like imagery
- 120° field of view
- CHIRP processing
- Integrated velocimeter for accurate ranging
- Software development kit available

### **Benefits**

- Switch between 720kHz and 1200kHz
- Long range object detection
- Short range detailed imaging
- Compact and easy to install

### **Applications**

- ROV/AUV navigation
- Obstacle avoidance
- Detailed object imaging
- Diver Mounted Display
- Subsea monitoring and inspection

### **Related Products**



**PA500/6 Altimeter**



**Super Seaking V7 Sonar**

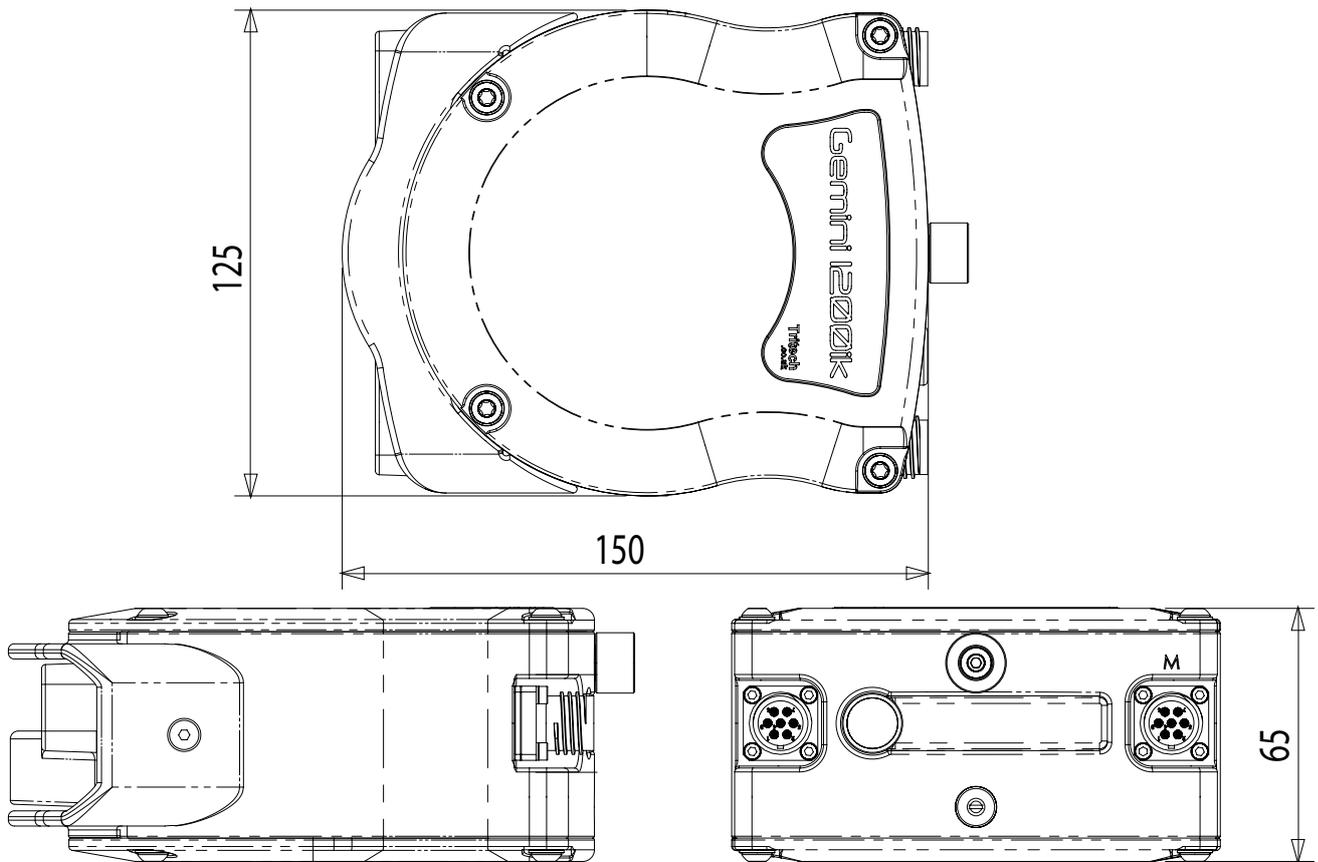


**Seaking Side Scan**



**Diver Mounted systems**

## 1.1 Technical Specifications



Physical Specifications	Gemini 1200ik
Depth rating	350m
Weight in air	1.46kg
Weight in water	0.44kg
Operating Temperature	-10°C to 35°C
Storage Temperature	-20°C to 50°C

<b>Acoustic Specifications</b>		
Operating frequency	720kHz	1200kHz
Angular resolution	1.0° acoustic, 0.25° effective	0.6° acoustic, 0.12° effective
Range	0.1 m – 120 m	0.1 m – 50 m
Number of beams	512	1024
Horizontal Beam Aperture	120°	Fwd 65° or 120°
Vertical Beam Aperture	20° (+/-10° about horizontal)	12° (+/-6° about horizontal)
Update rate	5-65 Hz (mode & range dependant)	
Range resolution	4mm	2.4mm
CHIRP support	Yes	
Speed of sound	Integrated VoS sensor	

	<p><b>Note</b></p> <p>In high frequency (1200kHz) mode, the user has the option of switching to using a 65° sector which will double the update rate compared to the full 120° sector scan</p>
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<b>Electrical and Communication</b>	
Supply voltage	19V to 74V DC
Standby Power Consumption	9.5W
Operational Power Consumption	15W – 27W(range dependent)
Main port protocol	Ethernet
Aux port (optional)	RS232,TTL in, pass-through power
Connector type	Impulse MKS(W)-307-FCR

The power consumption range quoted is accurate for a standalone unit and does not include cable losses.

## 2. Installation

### 2.1 Hardware Installation

The sonar is typically mounted with the receiver element on the top. The transmit and receive elements are arranged such that they are angled at  $\pm 10^\circ$  about the horizontal axis which should be taken into account when mounting the Sonar.

Any metallic clamps should be electrically insulated from the sonar body by either rubber or plastic strips or mounting brackets of at least 3 mm thickness and extending at least 3mm beyond the clamp boundary to reduce any galvanic corrosion effect. Non-metallic clamps are preferable; if metallic clamps are used (especially if they are different in composition to the material used by the sonar) they should be painted or lacquered with at least three coatings. The body of the Gemini 1200ik is made from aluminium, alloys containing copper such as brasses or bronze should be avoided.

#### CAUTION



Although the sonar head is rugged, it should be handled with care. This is particularly important in the area of the transmitter and receiver elements on the front face, and the electrical connectors on the back face. The plastic guard fitted to the front face of the unit will not protect the sonar against significant impacts or erosion damage.

### 2.2 Mounting Options

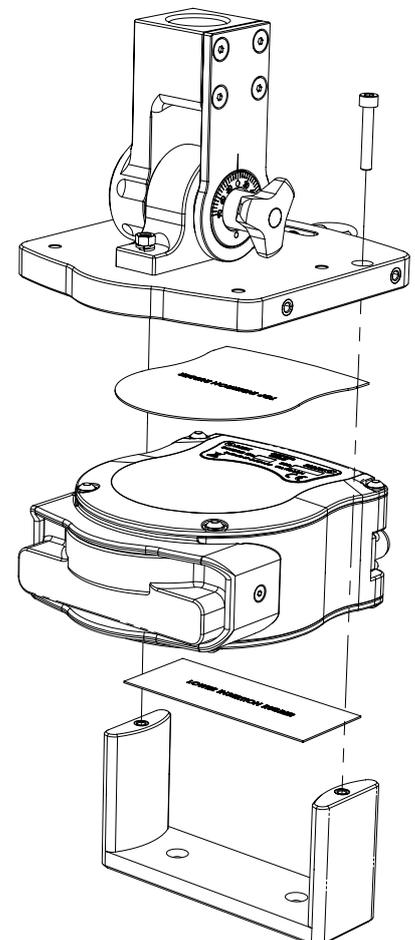
The sonar must be held in place securely when fitted on a vehicle. Standard orientation is top & bottom however the sonar image can be flipped within software should the sonar be mounted inverted.

The Gemini 720/1200ik Sonar Mount Assembly shown here can be purchased as a mounting accessory kit from Trittech.

Associated part numbers and descriptions are given in the table below:

Gemini 720/1200ik Sonar Mount Assembly S11935			
ITEM NO	QTY	PART NUMBER	DESCRIPTION
1	2	S06272	M5x30 Skt Head Capscrew
2	1	S11736	Sonar Mount – Top Plate
3	2	ZNI	Insertion Rubber Kit
4	1	S11737	Sonar Mount - Brace
5	1	S11745	Optional pivot pole mount assy

The Optional pivot pole mount assembly is available as an easy to deploy, lightweight variable attitude mounting option for rapid imaging results.



## 2.3 Diver Mask & Helmet Mounting Option

The 1200ik can also be mounted on a variety of diver helmets and masks with the use of our sonar mounting kits which are available for purchase.

Examples of some of those covered are: Kirby Morgan, Gorski, OTS & Interspiro.

Should you require this option please contact Trittech for further information.



Trittech DMD system with Gemini 1200ik and display eyepiece

## 2.4 Diver Mount Display (DMD)



The Diver Mounted Display together with the Gemini 1200ik multibeam imaging sonar, provides divers with a crisp acoustic image in low or zero-visibility conditions.

The signal from the compact and lightweight diver-mounted sonar is sent to the surface support dive team over the umbilical, who are then also able to provide an extra set of eyes and assist the diver in identifying targets of interest.

By using the INODIVE mounting system the sonar can be positioned and relocated quickly and easily. This allows the sonar to be removed from the helmet or face mask easily for hand-held use in difficult to access situations, or where a lower viewing angle is required.

# 3. Electrical Installation

## 3.1 Power Supply Requirements

The sonar requires a regulated and smoothed DC power supply between 19V and 74V. Power is normally supplied via the vehicle while in service or can be supplied via an external PSU as part of a deck test kit.

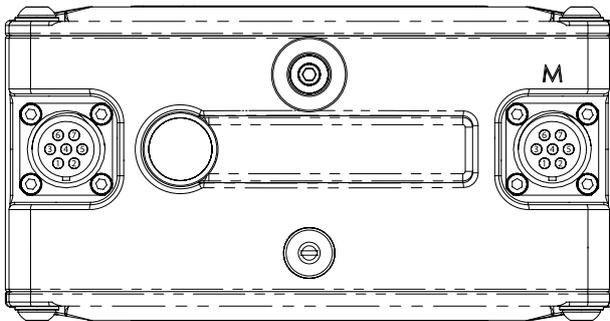


### WARNING

Power should only be supplied to the Gemini through the MAIN port. The AUX port power is supplied via pass through from the MAIN port.

Never try to make the Gemini work down a long cable by increasing the PSU output voltage above 74V DC.

## 3.2 Electrical Connections



Connection to the sonar main and auxiliary ports are via the Impulse MKS(W)-307-FCR bulkhead connectors on the back of the sonar as shown in the picture opposite.

Note the key way on the sonar connector is in the downward position.

A subsea cable whip supporting Ethernet communications can be supplied by Trittech.

The tail end of this whip cable should be terminated with a cable connection or penetration suitable for the end user application.

Cable Connector View	Sonar Bulkhead View	Main Port		Aux Port	
		Pin	Function	Pin	Function
		1.	0 VDC	1.	0 VDC
		2.	+ V	2.	+ V
		3.	Chassis / Earth	3.	Chassis / Earth
		4.	Ethernet RX +	4.	TTL IN
		5.	Ethernet RX -	5.	RS232 GND / TTL GND
		6.	Ethernet TX +	6.	RS232 TX
		7.	Ethernet TX -	7.	RS232 RX



### Warning

Application of excessive or reverse supply voltage to the unit or supply voltage across any of the communication connections may lead to equipment damage not covered under the warranty conditions.

### 3.3 Connector Maintenance Guidelines

Mating surfaces should be lubricated with 3M Silicone Spray or equivalent, DO NOT GREASE. Connectors must be lubricated on a regular basis.

Clean plugs and receptacles with soap and fresh water. If using alcohol or IPA to clean out the connector take care that it does not come into contact with any other part of the sonar.

When attaching a connector make sure that both connector and socket are completely dry. Any water trapped in the connection could result in an electrical short and permanent damage to the sonar

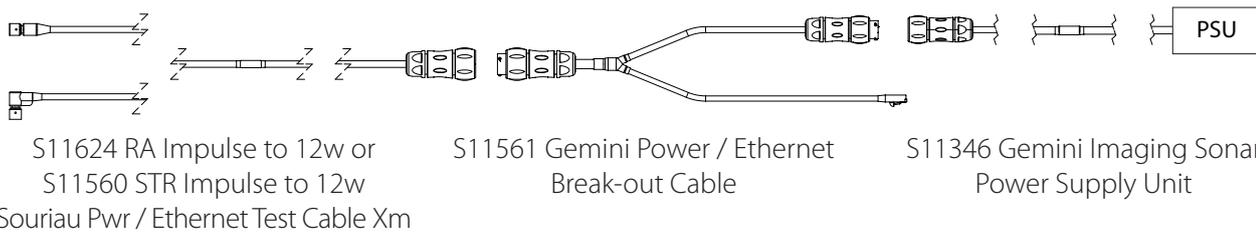
If the Gemini has two ports then any unused bulkhead connector must have a blanking cap fitted prior to immersing in water. Failure to do this will permanently damage the sonar.

### 3.4 Ground Fault Monitoring

The power supply within the Gemini includes an electrically isolated DC-DC converter front-end. There is a small capacitive connection between the isolated ground and the sonar chassis which should not noticeably affect any impressed current ground fault indicator (GFI) equipment.

### 3.5 Test Cables and Accessories

Deck test cables are available to aid with the setup and configuration of the sonar while on or off the vehicle. Trittech recommend the use of the deck test cables (below) as the first step in any diagnostic or fault finding activities.



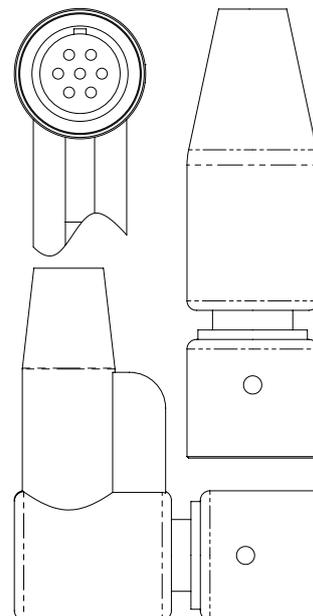


**WARNING** The Gemini PSU that is supplied with the Gemini system is intended for INDOOR USE ONLY and should not be placed in a position where it could get wet.

### 3.6 Subsea Cable Whips & Test Leads

Subsea cable tails (Whips) are available with both straight and right angle connectors suitable for the main and auxiliary ports of the 1200ik Sonar:

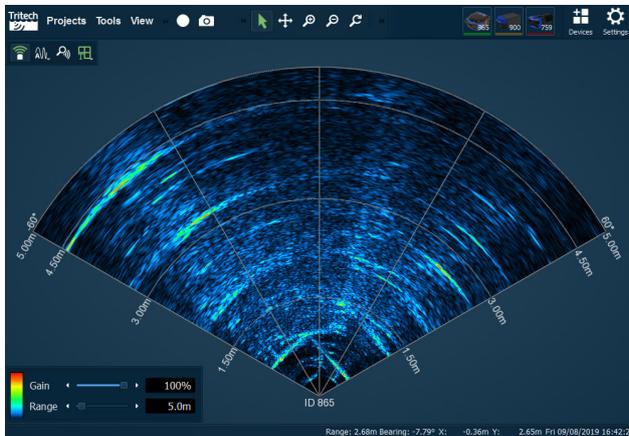
Part Number	Description
S11583 XM	Impulse MKS(W)-307-CCP Right Angle Power & Comms Whip, X metres
S11584 XM	Impulse MKS(W)-307-CCP Straight Power & Comms Whip, X metres
S11624 XM	Impulse MKS(W)-307-CCP-RA to 12w Souriau Test Cable, X metres
S12042	Impulse MKS-300-FCR Blanking Plug



# 4. Genesis Comms Setup

The Genesis software package from Tritech allows the control, configuration and display of Tritech imaging and survey sensor data from within a single software environment. The Following section will guide you through the process of setting up your system to communicate with your chosen devices.

## 4.1 Main GUI window



Devices are automatically added into Genesis as they are connected to the system via the Ethernet or Tritech USB Adapter (720im).

A Tritech SCU (Surface Control Unit) or a Tritech Seahub is required when connecting devices using the ARCNET communications protocol.

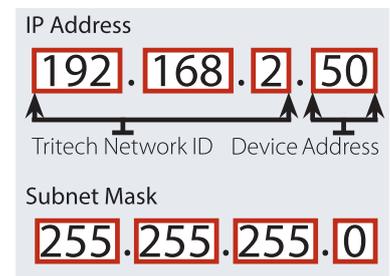
The main window area displays the default output configuration for the devices you have connected.

The image to the left shows the default device window layout for a Gemini 1200ik sonar which is similar for the other Gemini devices.

## 4.2 Ethernet Protocol Settings

As standard all Ethernet enabled Tritech Sensors are set in the IP range of 192.168.2.XX with a subnet mask of 255.255.255.0. It is therefore necessary to configure the host network to the same IP address range as the sensors being connected. This can be setup in the following way.

- Open the network and sharing centre in Windows.
- Double click on Ethernet connection.
- Choose properties in the pop-up dialogue.
- Double click the text that says "TCP/IPv4".
- Check "Use the following IP address".
- Set the IP address to 192.168.2.50
- Set the subnet mask to 255.255.255.0

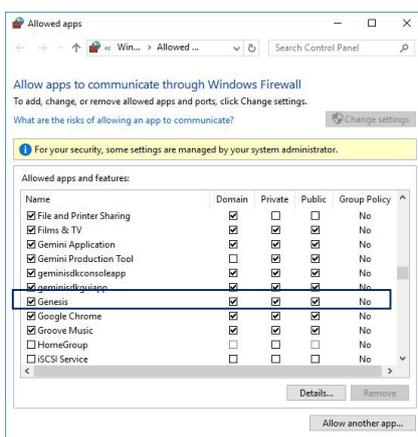


To Avoid IP conflict and issues, make sure that each device on the network has a unique IP address. The addresses xxx.2.16, xxx.2.17, xxx.2.200, xxx.2.201 are reserved by the system so do not set to these. Make sure the option to "Obtain an IP address automatically" is disabled.

## 4.3 Windows Firewall Settings

Check your anti-virus settings. Firewalls may see the data from the network and prevent the broadcast message.

Occasionally a firewall may allow the broadcast message but stops the high data rate from the sensor believing it to be a denial of service attack. If this is the case, navigate to "Allowed Apps" in windows and add permissions to the firewall settings for Genesis Software.



### Note

The factory default IP Address of the 1200ik sonar is set to 192.168.2.201, Subnet mask 255,255,255,0

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