AMEC

WideLink R150GE
AIS Network Receiver

USER MANUAL

Automatic Identification System

General Information

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ii.   Disclaimer

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iii. Product Category

This product is categorized as "protected" in accordance with the requirements as defined in IEC 60945.

iv.   Disposal Instruction

Do not dispose of this device with unsorted waste.
Improper disposal may be harmful to the environment and human health. Please refer to your local waste authority for information on return and collection systems in your area.

WARNING!

WARNING: The AIS receiver must be installed and configured in conformity with the provided instructions in the manual in order to maximize the device performance.

WARNING: Please bear in mind that not all vessels are equipped with AIS transponders and therefore may not be visible to this receiver. Likewise, in the event of overcrowded port traffic, vessels equipped with AIS transponder may not be visible to this receiver.

WARNING: DO NOT DISASSEMBLE OR MODIFY THE EQUIPMENT. Improper disassembly or modification could cause personal injury and will invalidate the guarantee.

WARNING: While most of the installation can be performed by the owner or the crew, a final commissioning can be done by your local agent/dealer when needed or required. AMEC and the local agent/dealer will not bear any responsibilities over any damages resulted from an improper installation by unauthorized agent/dealer.

FOREWORD

AMEC thanks you for the purchase of your new WideLink R150GE Automatic Identification System (hereinafter called "AIS") network receiver which is designed with an emphasis on coastal monitoring uses.

WideLink R150GE is strictly tested to meet the rigorous demands of industrial marine environment. With proper installation and use, the equipment will serve loyally and reliably at its optimum.

For sales, services, and technical supports, please contact your local AMEC representatives or Alltek Marine Electronics Corp at sales@alltekmarine.com or service@alltekmarine.com. You are always welcome to visit our website at www.alltekmarine.com for new product status and company update.

Thank you again. Be safe.

Table of Content

1 AN OVERVIEW OF WideLink R150GE

1.1 Product Description

The AMEC WideLink R150GE Network AIS Receiver is developed with a strong emphasis on coastal monitoring applications of AIS equipped vessels and buoys.

The user such as authorities or marine industry specialists can easily deploy the WideLink R150GE as a cost effective AIS receiving station for coastal monitoring uses. WideLink 150GE can be installed at a remote location to send received AIS messages within VHF range to a fixed server IP via TCP/IP and UDP/IP protocol. It´s also possible to display received AIS targets locally on a screen or PC. WideLink R150GE has NMEA 0183, RS-232, Ethernet and USB interfaces which make it compatible with almost all display terminals.

WideLink R150GE has 2 parallel AIS receivers to ensure optimized receiving sensitivity. Its robust enclosure is compliant with marine grade environmental standard. The full-featured AIS network receiver from AMEC fulfills all requirements of collision avoidance and coastal monitoring for deployment both on shore and on a vessel.

1.2 Equipment in the Box
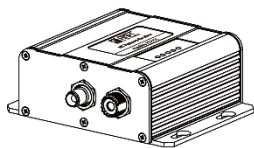
AIS Network Receiver
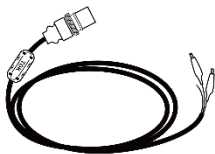
3pin Power Cable
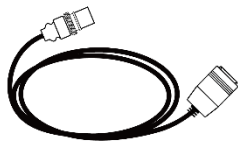
5-pin Ethernet Cable
(RJ-45 Female)
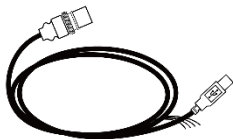
8-pin USB and NMEA Cable

Ethernet cable
(RJ-45 Male / RJ-45 Male)
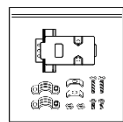
DB9 male connector

TP3x3/4 Screws

User Manual

Optional Accessory
Power Adaptor and Cable
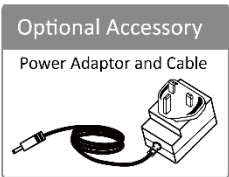
Please contact your supplier immediately if there is any item missing.

Power Adapter is an OPTIONAL item.

1.3   External Connections

VHF Antenna

GNSS Antenna

Receiver Unit

LED Indicators

12/24 V DC
Power Supply

Network (RJ-45)

USB 2.0

RS-232

PC or Laptop

NMEA 0183
Chartplotter

1.4　What is AIS?

The Automatic Identification System (AIS) is a Very High Frequency (VHF) radio broadcasting system that transfers packets of data over the VHF data link (VDL) and enables AIS equipped vessels and shore-based stations to exchange identification information and navigational data. Ships with AIS transponders continually transmit their ID, position, course, speed and other data to all nearby ships and shore stations. Such information can aid greatly in situational awareness and provide a means to assist in collision avoidance.

AIS equipment is standardized by ITU, IEC, IALA and IMO and is subject to approval by a certification body. The following AIS devices have been developed for variant applications.

■ **AIS Class A:**

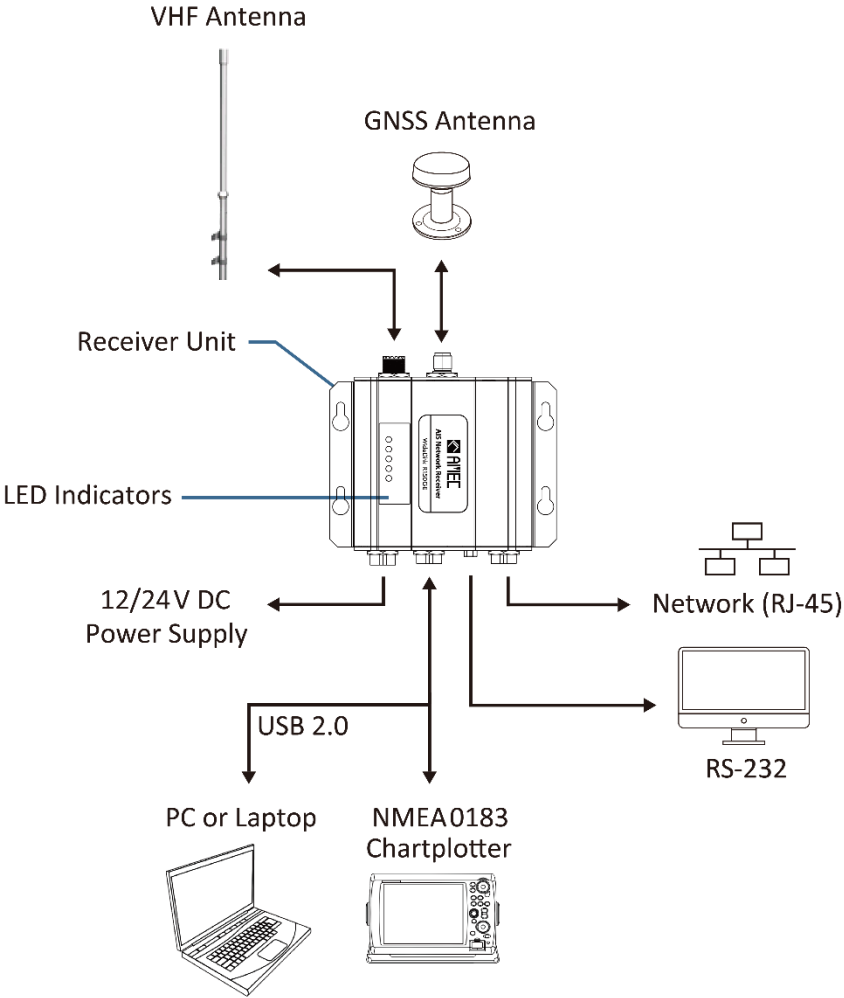mandated by the IMO for vessels of 300 gross tonnages and upwards engaged on international voyages, cargo ships of 500 gross tonnages and upwards, as well as passenger ships. It transmits typically on 12.5-watt output power.

■ **AIS Class B:**

provides limited functionality and is intended for non-SOLAS commercial vessels and recreational vessels. It transmits typically on 2-watt output power.

■ **AIS Receiver:**

only receives AIS signal and it does not have a transmitter to send out AIS signal. Suitable for a recreational vessel that does not want to send out its vessel information.

■ **AIS Base Station:**

is provided by aids-to-navigation authorities to enable the ship to shore/shore to ship transmission of information. Networked AIS Base Stations can assist in providing overall maritime domain awareness.

■ **AIS AtoN (Aids to Navigation):**

provides an opportunity to transmit position and status of buoys and lights through the same VDL, which can then show up on AIS-ready devices within the range.

■ **AIS SART:**

Search and Rescue Transmitter using AIS can be used to assist in determining the location of a vessel in distress. It is typically used on life rafts.

■ **AIS on Search and Rescue (SAR) Aircraft:**

used on airplanes and helicopters to assist search and rescue operation.

1.5   AIS Message Type

The WideLink R150GE can receive AIS messages from both Class A and Class B AIS transponders as well as from AIS Base Station, AIS AtoN, and AIS SART/MOB. The message types are listed as below table. The messages in gray color are transmitted only from class A AIS device.

Type of Message	Data Details
Static Data	Maritime Mobile Service Identity (MMSI) number IMO number Call sign and name Type of ship Length and beam GPS Antenna location
Voyage Related Data	Draught of the ship Cargo information Destination Estimated Time of Arrival (ETA)
Dynamic Data	Position of the vessel Coordinated Universal Time (UTC) Course Over Ground (COG) Speed Over Ground (SOG) Heading Rate of turn Navigational status
SRM	Safety Related Message

2 INSTALLATION

Please note the following guidelines for selecting a suitable installation location for WideLink R150GE.

- The surrounding temperature should be maintained between -15 °C ~ +55 °C.

- The receiver must be installed at least 0.5m away from a compass.

   The device is not designed to be fully waterproof. Therefore, is not recommended installing the device in a location that will be subject to spray or water submersion.

- The device should not be installed inflammable or hazardous locations such as near a fuel tank.

- The device should be installed in a location where the LED indicators are easily visible as these provides important information about the status of the receiver.

- For safety reason, it's recommended to mount the device not higher than 2m (78.74") above floor-level.

2.1 WideLink R150GE Connection Interface
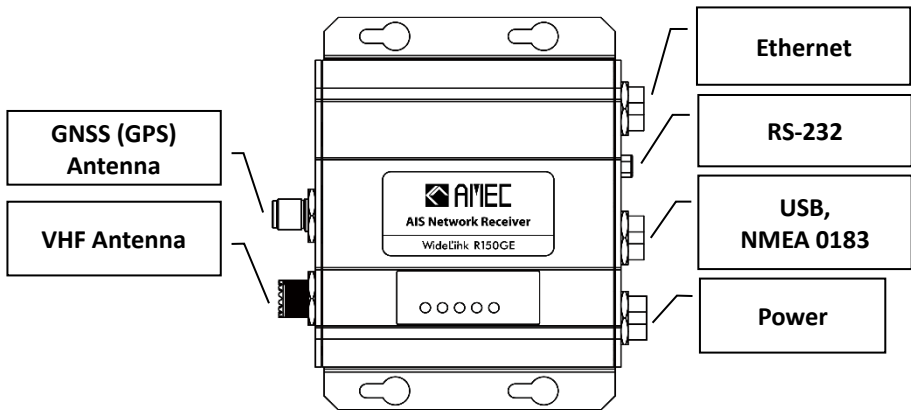

Figure 1   WideLink R150GE Connection Interface

2.2 Mounting Instructions

Platform Mounting

Wall Mounting
(flat surface)
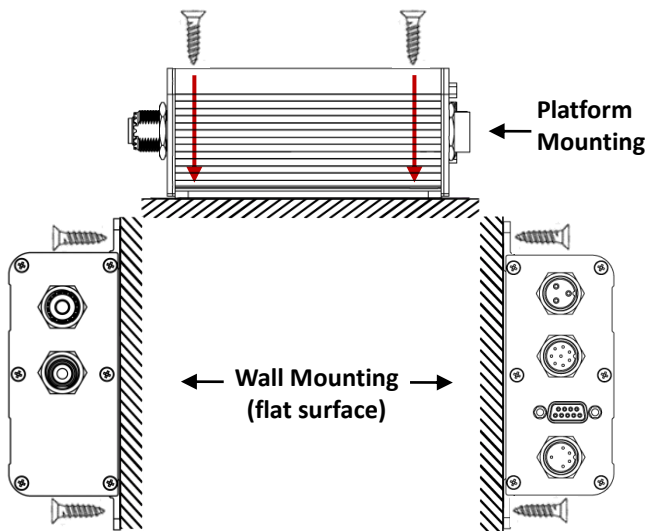
Figure 2   Mounting Instructions (1)
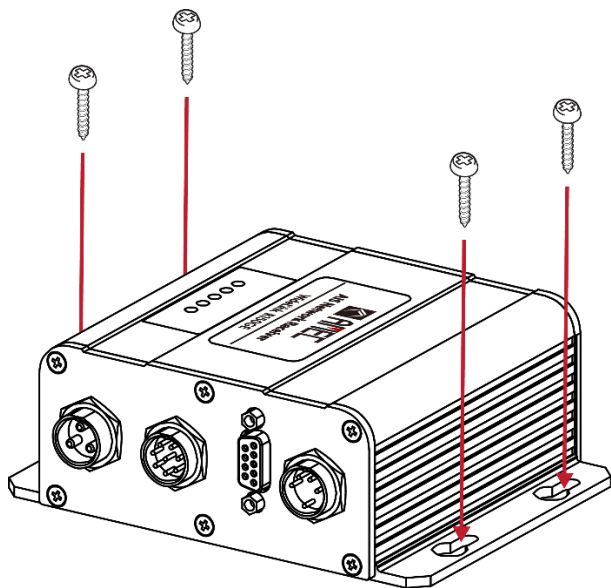
Figure 3   Mounting Instructions (2)

2.3   VHF Antenna Installation

The quality and positioning of the antenna are the most important factors dictating AIS performance. It is recommended that a VHF antenna with omnidirectional vertical polarization be specifically tuned for AIS operation band. Since the range of VHF signals is largely decided by line of sight distance, the VHF antenna should be placed as high as possible and at least 5 meters away from any constructions made of conductive materials.

VHF Antenna

2 m

Other VHF Antenna

10 m   Another transmitting antenna

The recommended vertical distance between antennas is 2 m.

The recommended horizontal distance between antennas is 10 m.
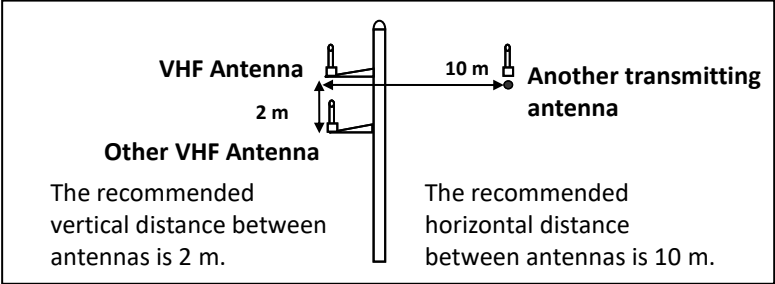
Figure 4   VHF Antenna Locations

The VHF antenna connector type on WideLink 150GE is SO239 which is designed to work with a PL259 connector.

2.4 GNSS (GPS) Antenna Installation

Install the GNSS (GPS) antenna where it has a clear view of the sky, so that it may access the horizon freely with 360°.

5°

Ensure a free 360° horizon with a vertical observation of 5°.

3 m

The recommended horizontal distance between GNSS (GPS) antennas and other antennas is 3 m.

Figure 5   GNSS (GPS) Antenna Locations

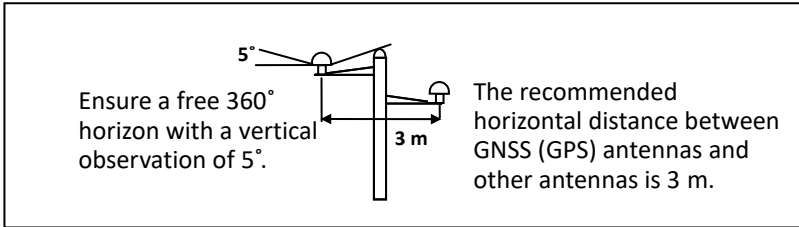It is recommended to keep the GNSS (GPS) antenna out of the transmitting beam of high-power transmitters such as Inmarsat devices and radar.

When connecting the cables, take note of the following precautions.

- Bending cables may cause damages to the inner wires and impair overall the performances.
- Each coaxial cable should be set up separately and can only be set up in a single cable tube.
- Insulation on connector port of the coaxial cable should be considered.

WideLink R150GE is tested with the GNSS antenna GA-25. It's recommended to use GA-25 with WideLink R150GE series to ensure the optimal reliability of your AIS system.

For pole mounting the GA-25, a 1 inch 14 TPI thread pole will be required.
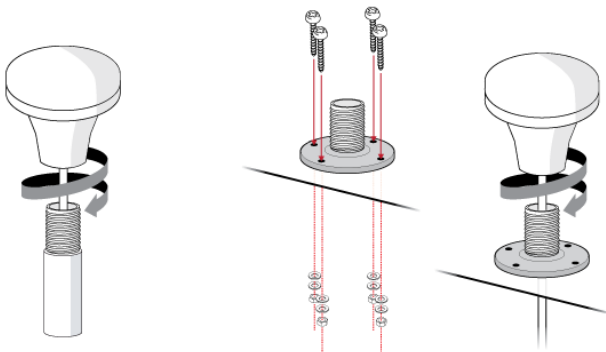
Figure 6   Mounting GNSS (GPS) Antenna

2.5   Connecting to NMEA 0183 devices

WideLink R150GE is typically connected to an external chartplotter via NMEA 0183 output. The below two illustrations will give you an overview of how to connect WideLink R150GE to an NMEA 0183 device.

WideLink R150GE supports three baud rates: 4800, 9600, and 38400. The default baud rate is 38400. Use the provided configuration utility to change the baud rates.

The figure below describes how to wire your AIS receiver with NMEA 0183 device.
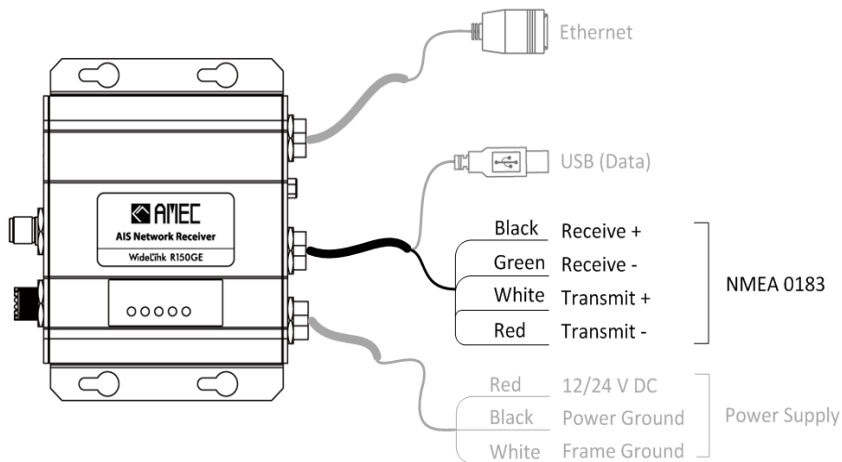
Figure 7   NMEA 0183 Wiring Instruction
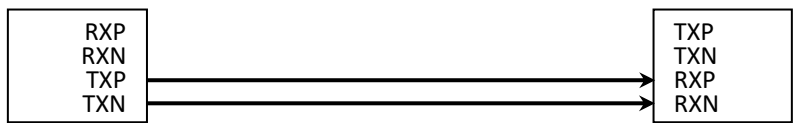
Figure 8   NMEA 0183 Connection Diagram

WideLink R150GE Wire Color	NMEA 0183 Signal	WideLink R150GE Signal Direction	External NMEA 0183 Device
Black	Receive + (RXP)	Input	n/a
Green	Receive – (RXN)	Input	n/a
White	Transmit + (TXP)	Output	Data Input + (RXP)
Red	Transmit – (TXN)	Output	Data Input – (RXN)

2.6 Connecting to RS-232 devices

The RS-232 serial port connector allows you to connect WideLink R150GE to devices such as industrial machines and scientific instruments.

WideLink R150GE RS-232 is a standard female connector and the pin definition is defined in below table.
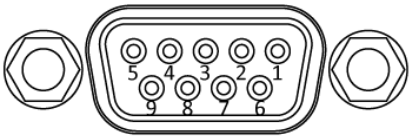
Figure 9   RS-232 Connector Pin Definition

NO.	Name	Function
1	--	--
2	TX	Transmit Data, Output
3	RX	Receive Data, Input
4	--	--
5	GND	Ground
6	--	--
7	--	--
8	--	--
9	--	--

2.7   Connecting to Power Supply

WideLink R150GE is designed with no physical On/Off switch and the Receiver will automatically power up once connected to a power source.

The AIS Receiver requires a 12 V or 24 V DC power supply. The red wire, the black and the white wires on the 3-pin cable are used to connect the power supply's positive, negative terminals and ground.
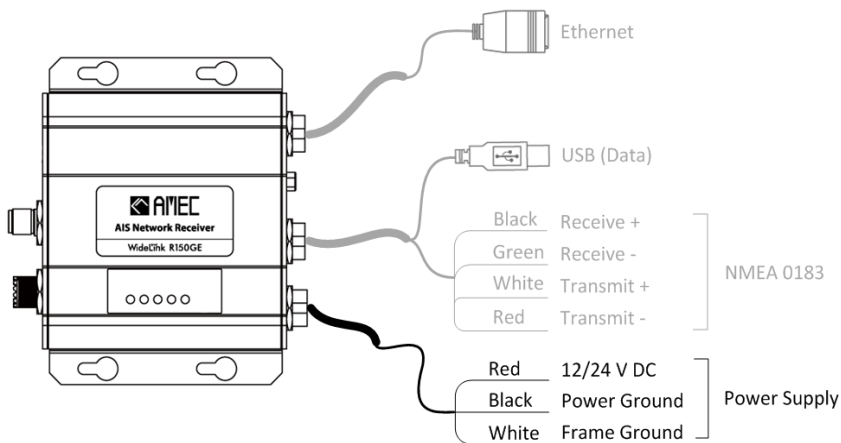
Figure 10   Power Supply Connection

2.8   Configuration Software Installation

Install the AMEC WideLink R150GE Configuration Software by following the on-screen instructions in next Chapter.

3 CONFIGURATION SETTINGS

3.1 Connecting the Receiver to your PC

To setup the R150GE, connect the device with the provided USB cable to the PC by following below steps:

- Select the Interface and Port from the drop-down list.
- Click connect.
- Once connected you may perform the following settings:

  Configuration:

  - Baud Rate: RS-232 and NMEA Baud Rate settings.
  - Internal GNSS: internal GNSS settings.
  - Network: Network configuration (for additional details see Chapter 3.4).
  - Restore: Restore the device to factory default settings.

  Diagnostics:

  - System Check: an overview on the Receiver version such as firmware and others.
  - Data Log: display and store all Data created by the Receiver.
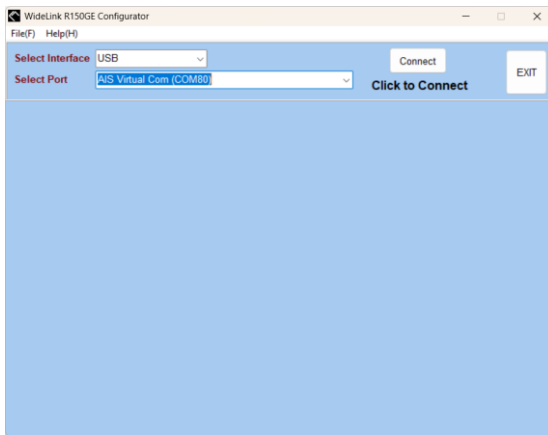
Figure 11   Select Device to Connect to WideLink R150GE

3.2   Baud Rate Setting:

WideLink R150GE RS-232 and NMEA port baud rate is user selectable.

To adjust the values, set the desired baud rates for the RS-232 and NMEA and then click on "Program Device" to apply the new the setting. The default are set at 38400 bauds.
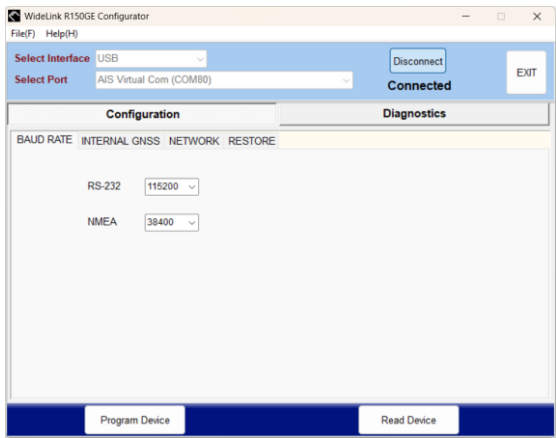
Figure 12   Baud Rate

3.3   GNSS Setting

An integrated GNSS receiver is also built-in into WideLink R150GE. The integrated GNSS receiver allows positional data and AIS data to be output together. The GNSS receiver is enabled by default and it can be easily disabled by unchecking the "Enable Internal GNSS Module."

Figure 13   Internal GNSS

3.4 Network

WideLink R150GE can be connected to a PC, MAC, Network Routers or Switch. For complete Network Settings please see chapter 4 "WideLink R150GE Network Settings."

On this tab, the Network module version and WideLink R150GE IP Address is also shown for diagnostic and configuration purposes. To configure WideLink R150GE network properties, click on the link "Go to Network Configuration.

Figure 14   Network

3.5 Restore

Check the boxes for the items you want to return to the system default. Select the settings you want to restore then click on "Program Device" to return to factory default.
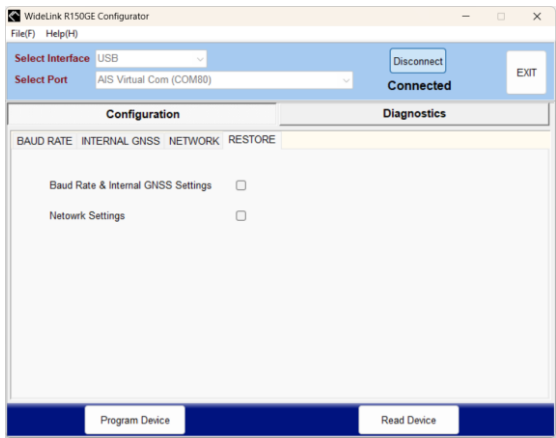
Figure 15   Restore

4 NETWORK SETTINGS

WideLink R150GE network settings can only be configured via Ethernet. Connect WideLink R150GE via wired (RJ-45) to your PC, MAC or Linux by following the below steps:
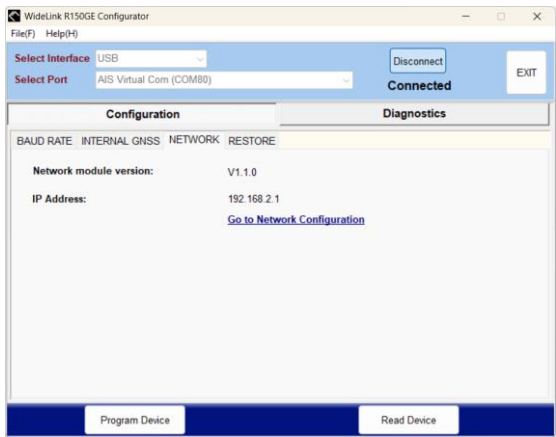
Connect to WideLink R150GE via Ethernet

Ensure WideLink R150GE is powered up.

Connect WideLink R150GE to your PC via a network cable. The corresponding Ethernet LED indicators should flash steadily, indicating that data is being transmitted.

Note: RJ-45 network cable not included

Once connected via wired launch your favorite web browser and enter http://192.168.2.1 into the address bar. Fill in the information to each respective field and click login (case sensitive):

Username : admin
Password: admin

Note: AMEC WideLink R150GE Configuration software cannot be used to configure the network settings of the AIS receiving unit. WideLink R150GE network settings can only be performed through a web browser.

Note: For product models with Wi-Fi functionality, the username and password are as follows:

Username: Admin
Password: AIS

4.1   Network (System) Status

The System Status provides a summary of WideLink R150GE Network parameters that are currently configured into the unit.

Figure 16   System Status

4.2 Network (System) Configuration

This is the page that you use to configure the Network properties of WideLink R150GE.

4.2.1 Current Status

This is a status display page for WideLink R150GE, showing the network configuration and connection information.
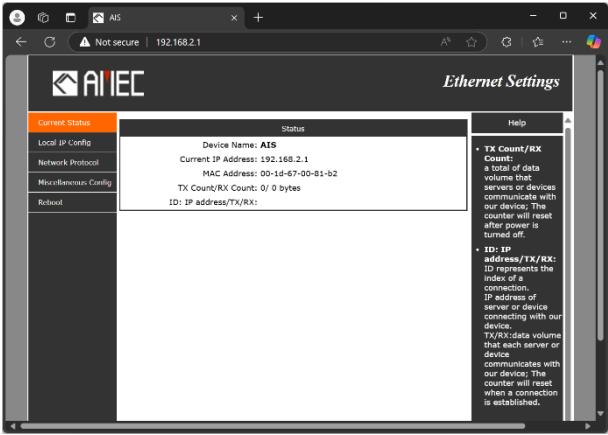
Figure 17   Current Status

4.2.2   Miscellaneous Config

Use this page to configure R150GE module's device name and administrator account and password.

- **Device Name:** type a new name for the device or leave as it is to accept the default name. The device name identifies the WideLink R150GE unit among other network devices in the area.
- **Webserver Port:** 80
- **Username:** type a new account name that you will use to log in to the configuration web interface.
- **Password:** type a new password to replace the old one.
- **Max Clients Connect to TCP Server:** When device is TCP Server, the max number of TCP clients allowed to connect.
- **Network Restart Timeout:** When the device does not receive any data from the network interface, the device will timeout and restart. If set to 0 seconds, this feature is disabled. The default is 3600.

Click Save button to confirm the new settings, or Cancel button to abort the settings.

Figure 18   System Configuration

4.2.3 IP Settings

The IP Settings section displays the information on the WideLink R150GE network settings, including current WideLink R150GE's IP address, subnet mask, gateway, and the method of obtaining the IP address (DHCP or fixed IP).
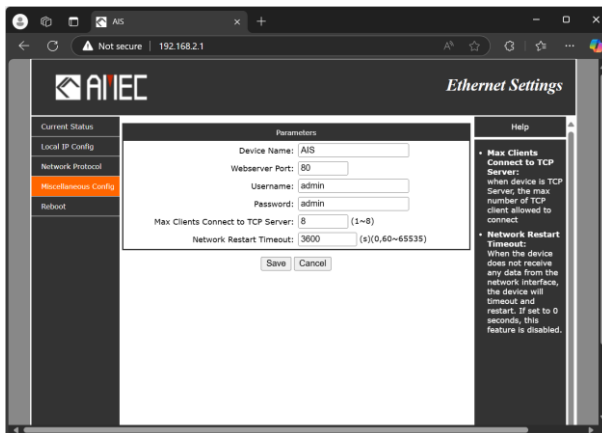
By default, the device is configured to assign the static IP address 192.168.2.1. You can change the IP address by specifying the other static IP address for your network deployment or obtaining an IP address from DHCP server on the network.

To review and configure the IP Settings:
1) Go to Local IP Config. The IP Settings page appears.
2) Verify that the IP Network Setting is to obtain the IP address from DHCP server or set to static IP address.
3) When the Specify and IP address is selected, you can change the following settings:
   - **IP type:** DCHP or Static IP
   - **DNS type:** Auto or Manual
   - **Static IP:** Assign an IP address for the device.
   - **Submask:** Specify the subnet mask for your network segment deployment.
   - **Gateway:** This is the gateway IP address of the internet interface.
   - **DNS Server:** The IP address of the primary Domain Name System (DNS) server.
4) Click Save button to take effect the new settings, or Cancel button to revert to the original settings.
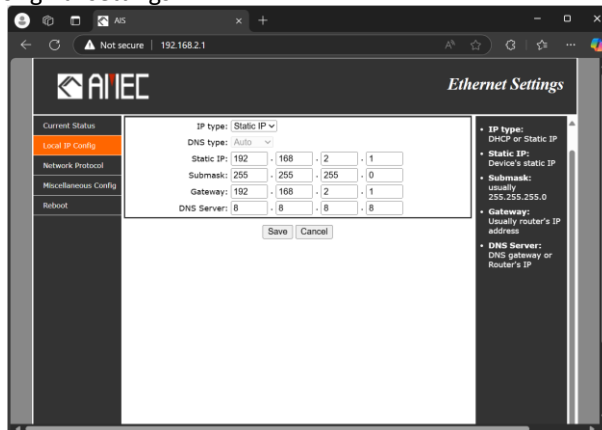
Figure 19   IP Settings

4.2.4 Network Protocol

WideLink R150GE can also be setup as a server or client network device by relying on TCP and UDP network protocols.

Setting	Description
Work Mode	Establish yours prefer network protocol by choosing TCP or UDP connection. **Server**: is a listening port when is set to server mode. **Client**: is a send port when is set to client mode.
Local Port Number	The Local Port Number is the port number on the Ethernet device that is used for communication within the local network. This port number is used to uniquely identify an application or process on the device.
Remote Port Number	The Remote Port Number is the port number on the remote device or server that is used for communication over the network. It helps in directing the data to the correct application or service on the remote device.
Remote IP Address	The Remote IP Address is the Internet Protocol (IP) address of the remote device or server. This address is used to identify and locate the device on the network for data transmission.
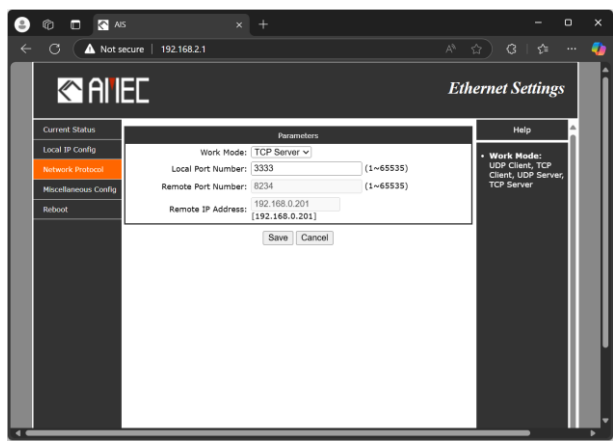
Figure 20   Network Protocol

4.2.5 Reboot

After the settings have been saved, it need to restart the device for the settings to take effect. Therefore, simply press "Restart Device" to complete all the configurations.
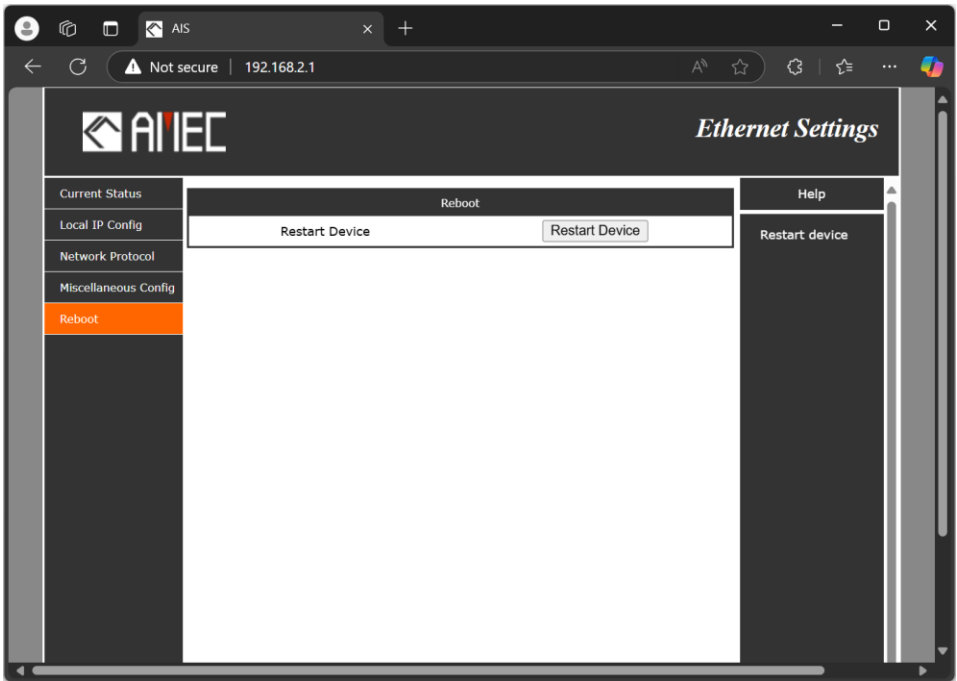
Figure 21   Reboot

4.3   Connecting your AIS Receiver to Macintosh

The instruction how to connect your AMEC AIS Receiver to your Macintosh (MAC) computer and display the received AIS Targets in OpenCPN can be found at http://www.alltekmarine.com/support.php in the category "FAQ/AIS Receiver: WideLink R150GE".

5   GETTING STARTED

5.1   WideLink R150GE LED Indicators

Power
Error
AIS Rx
GNSS
Ethernet
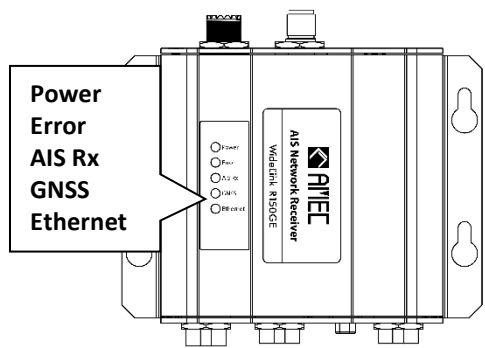
Figure 22   WideLink R150GE LED Indicators

LED INDICATIONS		
Indicator	**Indication**	**Description**
Power	Steady Green	Device in normal operation
	Off	Powered off
Error	Flashing Red	A system error is detected
AIS Rx	Flashing Green	Receiving of AIS message on either AIS Channel 1 or Channel 2
GNSS (GPS)	Steady Green	GNSS (GPS) Satellite has been acquired
Ethernet	Flashing Green	Indicates an active network traffic.

6   SPECIFICICACIONS

6.1   Product Specifications

| APPLICABLE STANDARDS	
ITU-R M.1371	EN 62311: 2008
IEC 60945 Ed.4.0:2002	EN 303 413 V1.1.1
IEC 61162 (applicable parts)	IEC 62287-1 Ed. 2.1:2017 (applicable parts)
EN 62368-1:2014 + A11:2017	EN 301 489-1 V2.1.1 / EN 301 489-19 V2.1.0
AIS RECEIVER	
Number of AIS Receivers	2 channels
CH-1	Default CH 87B (161.975 MHz)
CH-2	Default CH 88B (162.025 MHz)
Channel Bandwidth	25 KHz
Message Format	AIS Class A & B messages
Data Rate	9,600 bps / per channel
AIS Receiver Sensitivity	-112 dBm @ PER ≤ 20%
POWER SUPPLY	
Supply Voltage	12 / 24 V DC
Power Consumption	Greater than 1.5 W, Less than 3 W
LED INDICATION	
WideLink R150GE	Power, Error, AIS Rx, GNSS (GPS), Ethernet
INTERFACE	
GNSS (GPS) Antenna Connector	TNC (Female)
VHF Antenna Connector	SO-239 (Female)
NMEA 0183 (RS-422)	Support one NMEA 0183 interface Baud rate configurable (default 38,400 bps) Standard IEC 61162-1 / IEC 61162-2 sentences
RS-232	Female DB9
USB 2.0	Supported
Ethernet	10/100 Base-T (RJ-45 Female)
ENVIRONMENTAL	
Operating Temperature	-15 °C ~ +55 °C
Storage Temperature	-25 °C ~ +70 °C
Humidity Operation	0 ~ 95% RH at 40 °C
Vibration	IEC 60945
Waterproof	IP54
PHYSICAL	
Size in mm (L)	108 mm (4.25 inch) without connectors
Size in mm (W)	140 mm (5.51 inch)
Size in mm (H)	50 mm (1.96 inch)
Weight	450 g
Cable Length	Power Cable: 1 meter USB/NMEA: 80 centimeters Ethernet: 1 meter

6.2 Dimensions

Applicable to WideLink R150GE model.
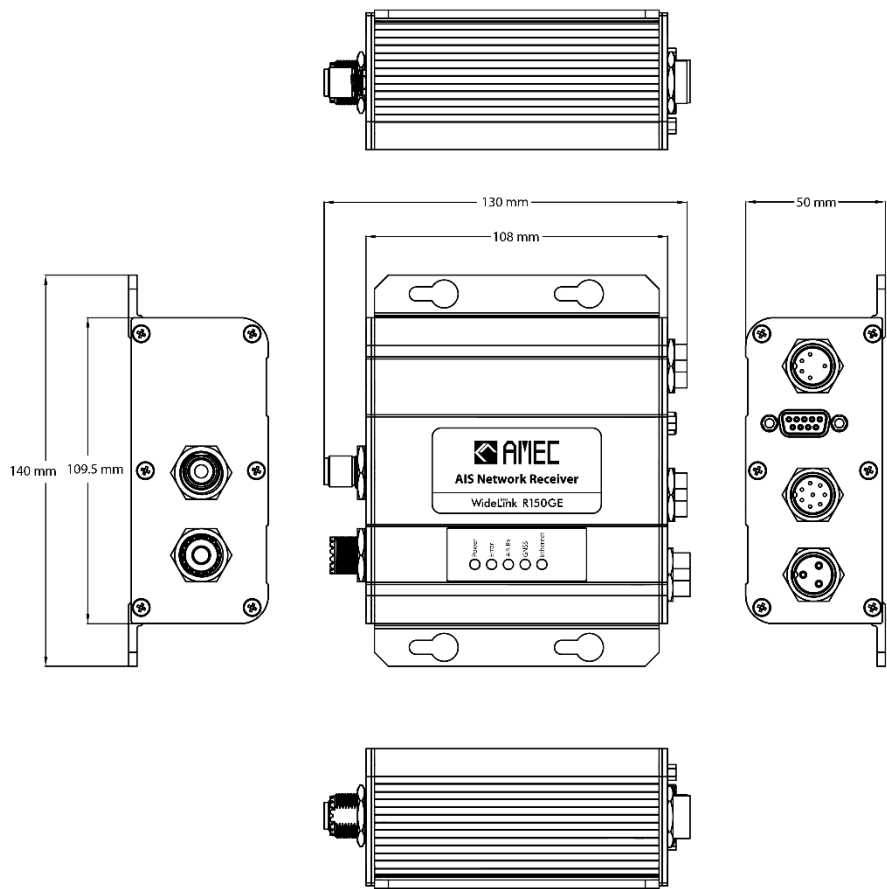
Figure 23   Front, Side, and Lateral View

7 TROUBLESHOOTING

1. **Does WideLink R150GE work with my chartplotter?**

    New chartplotters typically support AIS function. Be sure your chartplotter has the latest firmware update.

    Ensure the baud rate for the inbound NMEA port on the chartplotter is matched.

2. **How do I know the WideLink R150GE working normally?**

    The Power LED indicates in steady Green.

    The AIS Rx LED indicates in flashing Green.

3. **Can WideLink R150GE pass the received AIS information to a PC/MAC?**

    Yes, the unit can pass the AIS message sentences through USB port, Ethernet and RS-232 to PC.

4. **Why does the unit not power up?**

    Check the unit has adequate power (12/24 V DC).

    Be sure that the polarities of the power wires are correct (red is positive, black is negative ground)

5. **What can I do if I forgot my WideLink R150GE Admin Login Password?**

    Launch WideLink R150GE Configurator utility. Go to Configuration → Restore → Check Network Settings → Clink on Program Device. The system will revert to factory default.

8 ABBREVIATIONS

AIS	Automatic Identification System
COG	Course Over Ground
CPA	Distance to Closest Point of Approach
CSTDMA	Carrier-sense time division multiple access
DSC	Digital Selective Calling
ECS	Electronic Chart System
ETA	Estimated Time of Arrival
GPS	Global Positioning System
GNSS	Global Navigation Satellite System
IMO	International Maritime Organization
MMSI	Maritime Mobile Service Identity
SOG	Speed Over Ground
SRM	Safety Related Message
SSID	Service Set Identifier
TCP	Transmission Control Protocol
TCPA	Time to Closest Point of Approach
TDMA	Time Division Multiple Access
UDP	User Datagram Protocol
UTC	Coordinated Universal Time
VHF	Very High Frequency
VTS	Vessel Traffic Service

9   FCC INTERFERENCE STATEMENT

This equipment has been tested and found to comply with part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device complies with Part 15 of the FCC Rules. The operation is subject to the following two conditions: 1) This device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

FCC RF RADIATION EXPOSURE STATEMENT

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

DECLARATION OF CONFORMITY

Hereby, Alltek Marine Electronics Corp. (AMEC) declares that this WideLink R150GE is in compliance with the essential requirements and other relevant provisions of Radio Equipment Directive (RED) 2014/53/EU.

AMEC WORLDWIDE WARRANTY

Limited Warranty

Subject to the terms, conditions and limitations set forth in this Worldwide Limited Warranty (hereinafter the "Warranty"), AMEC warrants that its products, when properly installed and used, will be free from defects in material and workmanship for a period of twelve (12) months, from the date of first purchase (the 'Warranty Period')

For the purposes of this warranty, 'date of first purchase' means the date that the product was purchased by the first retail customer, or by the institutional customer, or in the case of a product installed on a new vessel or any other marine related platform by a certified AMEC original equipment manufacturer (a 'AMEC OEM'), the date that such vessel was purchased by the first retail customer.

AMEC will, at its sole option, repair or replace any defective products or components returned during the Warranty Period in accordance with the terms, conditions, and limitations set forth below. Such repairs or replacement will be the sole remedy of the customer under this Warranty.

Standard Warranty Service

To qualify for standard warranty service the product must be returned to an AMEC-certified service agent (i) within Warranty Period, and (ii) within thirty (30) days of the alleged product failure. Any products returned must be securely packaged and sent.

Standard Warranty Service

To qualify for standard warranty service the product must be returned to an AMEC-certified service agent (i) within the Warranty Period, and (ii) within thirty (30) days of the alleged product failure. Any products returned must be securely packaged and sent pre-paid and insured to AMEC or to an AMEC-certified service agent. All products returned must be accompanied by a copy of the original sales receipt to be eligible for standard warranty service.

Other Conditions

This Warranty is fully transferable provided that you furnish the original proof of purchase to the AMEC -certified service agent. This Warranty is void if the seal label is removed or defaced.

THE LIABILITY OF AMEC TO A CUSTOMER UNDER THIS WARRANTY, WHETHER FOR BREACH OF CONTRACT, TORT, BREACH OF STATUTORY DUTY OR OTHERWISE SHALL IN NO EVENT EXCEED AN AMOUNT EQUAL TO THE TOTAL PURCHASE PRICE OF THE PRODUCT GIVING RISE TO SUCH LIABILITY AND IN NO EVENT SHALL AMEC BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES OR LOST OF GOODWILL, REPUTATION, LOSS OF OPPORTUNITY OR INFORMATION, DATA, SOFTWARE OR APPLICATIONS.

In the event that any term or provision contained in this Warranty is found to be invalid, illegal or unenforceable by a court of competent jurisdiction, then such provision shall be deemed modified to the extent necessary to make such provision enforceable by such court, taking into account the intent of the parties.

All AMEC products sold or provided hereunder are merely aids to navigation. It is the responsibility of the user to exercise discretion and proper navigational skill independent of any AMEC product.

NOTE: