



INTEGRITY 150

/ User Manual



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Contents

INTEGRITY 150 BASICS 4

 OVERVIEW 4

 MODES OF OPERATION 4

 STANDARD MESSAGING 4

 SOLAR PRODUCT PRECAUTIONS 6

 BLUETOOTH INTERFACE 6

 SATELLITE COMMUNICATIONS 7

 GLOBALSTAR SATELLITE NETWORK 8

GETTING STARTED 9

 THE Integrity 150 DEVICE 9

 BATTERY PACK 9

 TURNING ON AND OFF 9

 COMMISSIONING 9

 INSTALLATION 9

 MOUNTING METHODS 10

ST CONFIGURATION 11

MESSAGES 11

 GLOBAL MESSAGE TYPE 11

APPENDIX A – GLOSSARY OF TERMS 12

APPENDIX B – TECHNICAL SUPPORT 15

APPENDIX C – RF RADIATION EXPOSURE STATEMENT 16

APPENDIX D – REGULATORY NOTICES 17

APPENDIX E – GENERAL WARNINGS 20

APPENDIX F – SPECIFICATIONS & STANDARDS 21

APPENDIX G – DEVICE POWERED LIMITATIONS 22

 TYPICAL USAGE LIFE 22

INTEGRITY 150 BASICS

OVERVIEW

The Integrity 150 is Globalstar's next-generation solar-powered satellite tracking and smart data management device. Engineered with open-source common architecture, the Integrity 150 offers a simplified design with the newest hardware and software capabilities and an abundant amount of storage to support the most demanding development requirements.

The core functionality of the Integrity 150 is to process GPS satellite signals to obtain its position in terms of longitude & latitude and transmit this information over Globalstar's Satellite Network via a maintenance free, self-charging solar device. In addition to the standard capabilities found in most Globalstar tracking products, the Integrity 150 has fixed or interval location reporting, change of location and motion alerts, reduced messaging and theft alert, and raw payloads. The Integrity 150 can be configured for your custom applications assuring that your critical information is captured and transmitted over the Globalstar network. Using built-in components, or external BLE sensors, allows ultimate control of the information you need to meet your specific needs.

The Integrity 150 is configured via a profile over the Bluetooth® interface. The profile contains all the configurable parameters needed to perform the desired functions that compose the transmitted messages. The profiles can be created and edited via the Globalstar portal.



MODES OF OPERATION

The Integrity 150 can be configured to operate in one of four different tracking modes:

- Standard Messaging
- Reduced Messaging (Change of Location)
- Theft Alert
- Geofence

STANDARD MESSAGING

In Standard Messaging Mode, the Integrity 150 reports its position at regular time intervals that are programmed during the configuration process. Standard Messaging Mode can also be configured to utilize the Integrity 150's internal motion/vibration sensor. If enabled, the Integrity 150 will transmit its position at independently configured regular time intervals when the device is In Motion.

Location messages can be programmed to be constant (Interval Messaging) or the device may be configured to send messages at specific times up to 10 different intervals in sequence (Time(s) of Day Messaging). Message intervals can range from 35 minutes to 45 days, with one-minute resolution.

- **Example of Message Interval:** The Integrity 150 is configured to report once every 24 hours when not In Motion and every two hours when In Motion. If the Integrity 150 went into motion at any time of day the Message Interval while In Motion would be every two hours beginning when the Integrity 150 started moving.

- **Example of Message-Time(s) of Day:** The Integrity 150 is configured with a message time of day of 9:00 AM, a second message time of day of 12:00 noon, a third message time of day of 8:00 PM and once per hour when In Motion. The Integrity 150 would transmit three messages a day at the same configured times every day. If the Integrity 150 went In Motion, it would transmit its location message every hour.
- **Usage Example:** A Company is required to report the GPS locations of their hazardous chemical containers twice a day. Based on this requirement, the Company has two options: set a message interval of every 12 hours (the 12 hour interval begins when the device is powered up) or when the configured message times of day are 12:00 noon and 12:00 midnight.

CHANGE OF LOCATION (REDUCED MESSAGING)

Change of Location Mode allows for devices to be monitored less aggressively when they remain at the same location. Messages are sent at a minimal message interval when the asset is in a defined area and transmits at a higher message interval when the asset is changing locations. These message intervals are set as part of the configuration process based on the concept that repeated reporting information of the same location, when an asset has not moved from its defined area, is redundant and doesn't provide additional usable information about its current location.

By comparing current and prior position information, the Integrity 150 determines if its location is changing. The definable area in which the device should remain in Reduced Messaging Mode at rest is called the Change of Location Area and is a circle (100 meters by default).

When the Integrity 150 goes outside of the circle, in motion, its location is considered to be changing or relocating. Once a device has two consecutive track points that indicate it has remained in the radius of the configured circle, it will re-center the change of location to its current location and resume transmitting at the "at rest" rate.

- **Usage Example:** A fleet operator owns 1,000 trailers. When the trailer(s) are sitting at a depot they want a location message once a day. They also want a message notification within one hour when a trailer has left a depot. Lastly, they want a location message every three hours when a trailer is moving between depots. Based on this requirement, the fleet operator will need to set the Change of Location Area (size of the depots where the trailers will visit), the message interval while the trailers are inside the Change of Location Area (one per day), the interval at which the Integrity 150 will check its location while in a State of Vibration and inside the Change of Location Area (one per hour), set the number of messages when the trailer leaves the Change of Location Area (one Change of Location Area Alert Message) and the message interval while the trailers are in transit between depots (every three hours).

THEFT ALERT

When the Integrity 150 is configured to operate in the Theft Alert Mode, it differentiates between authorized and unauthorized movement of an asset. When the Integrity 150 obtains a position from GPS satellites, the position is used to set the center of the defined Change of Location Area in Theft Alert Mode. While the Integrity 150 is at rest within the defined radius, by default 100 meters, all movement of the asset is considered authorized. Once the Integrity 150's position is outside of the Change of Location Area, it alerts as an unauthorized movement and immediately sends a location message (Change of Location Alert Message). The Integrity 150 continues to send location messages at a message interval set during the configuration process until the power is turned off or the battery is dead.

- **Usage Example:** A construction company is working on a job site for one year and wants to ensure that their generators and other heavy equipment on site aren't stolen. The company wants to check the location of their equipment 12 times a day, every 2 hours, to confirm the asset hasn't been stolen, but only wants a transmitted location message once per day. Based on this requirement, the construction company will need to set the Change of Location Area (size of the job site), the message interval while inside the Change of Location Area (one per day), the interval at which the Integrity 150 will check its location while in a State of Vibration and within the Change of Location Area (every two hours) and the message interval if the asset is outside the Change of Location Area.

GEOFENCE

To operate the Integrity 150 with a Geofence, the size, shape, and location of the area is defined in its configuration. While the unit remains in the defined area, it will transmit its location at the at rest rate. When the unit is moved outside the defined Geofence area, the unit will transmit at the in-motion rate. The unit will continue to transmit at the in-motion rate until it returns to the defined Geofence area. Once back in the Geofence, the unit will transmit at the at rest rate.

- **Usage Example:** A rental equipment company needs to monitor assets as they leave the property until they return. The company needs to know what is on the property twice a day. Once an asset has been rented, the company wants to know its location every hour. This allows them to monitor how far they are travelling as well as if it is lost or stolen.

SOLAR PRODUCT PRECAUTIONS

The Integrity 150 uses a built-in solar panel to recharge its internal batteries. To maximize the recharging capability of the Integrity 150 it is important to keep in mind the following:

- The clear plastic above the solar panel on the Integrity 150 should be kept clean and free of soil, paint, or debris to maximize battery charging capability.
- Solar panels produce the most electricity when they are perpendicular to the sun.
- Shading and weather conditions may negatively affect the charging of the batteries from the solar panels.
- If the batteries of the Integrity 150 are depleted, it is recommended to allow the Integrity 150 to receive a full day (6+ hours) of adequate sunlight to fully charge the batteries.
- If the clear plastic panel covering the solar panel becomes cracked, the Integrity 150 should be replaced.

BLUETOOTH INTERFACE

The Integrity 150 uses its built-in Bluetooth interface to advertise itself and for programming configuration settings as well as updating firmware. The ST Configuration Software may be used to read and/or alter the Integrity 150's programmed configuration. The method to perform this function is described in the ST Configuration Software section.

The Integrity 150 may also be configured to advertise its specific data, such as its UID and Firmware Version, over its Bluetooth interface. This periodic advertisement allows a user to use a Bluetooth scanning program to read the advertisement data generated by the Integrity 150. Globalstar does not supply nor support any Bluetooth scanning programs.

For detailed protocol of the Bluetooth advertisement please refer to the 8550-0004-01 Globalstar ST150 BLE Reference Guide . This manual may be found on the Globalstar Partner Support website <https://partner.globalstar.com>.

Further details of the Bluetooth Sensors can be obtained in the 8550-0008-01 Globalstar SmartOne Sensors BLE Specification. This manual may be found on the Globalstar Partner Support website at <https://partner.globalstar.com>.

SATELLITE COMMUNICATIONS

The Integrity 150 communicates with both the GPS satellite network and the Globalstar Satellite Network. All GPS locations are pulled from the GPS network and all transmissions are sent via the Globalstar Satellite Network.



The Integrity 150 has the unique ability to check its GPS coordinates at a programmable rate while it is inside of the Change of Location Area without sending a message over the Globalstar Satellite Network.

For a Location Message, the Integrity 150 will wake up at a scheduled interval or time of day and begin to acquire a GPS fix. Once it receives its GPS fix, the Integrity 150 will transmit its location to the Globalstar Satellite Network.

GLOBALSTAR SATELLITE NETWORK

The Globalstar Satellite Network consists of Low Earth Orbiting (LEO) satellites that are constantly orbiting the earth and each satellite completes its orbit in less than two hours. Because of this, the Integrity 150 will be in contact with at least one of the satellites during each scheduled transmission.

In LEO communication networks, the satellites are constantly changing their positions in the sky relative to the transmitter on earth. This minimizes the shading effects seen in geostationary satellite systems where the mobile device must be pointed toward a specific direction in the sky. Geostationary satellites also orbit at a much higher altitude and move along the equator.

Messages are transmitted from the Integrity 150 via the Globalstar Satellite Network using an uplink-only connection (one-way data transmission) and received by a Globalstar Ground Station. The messages are then sent via an HTTP, HTTPS, or FTP server to the internet and received by the customer's back-office application and converted into actionable data.



GETTING STARTED

THE Integrity 150 DEVICE

BATTERY PACK

The Integrity 150 is powered by an internal Lithium-ion (Li-ion) battery pack. The battery pack is not accessible to the user and is not replaceable. The Integrity 150 is designed for the solar panels to recharge the battery pack.

A user may realize up to 10 years of maintenance-free operation based on adequate sun exposure to recharge the battery pack.

TURNING ON AND OFF

The Integrity 150 ships powered off in an opaque container. Once the solar panel is exposed to sufficient light, the unit will power on. A flashlight or the camera light on a mobile device is sufficient to turn on an Integrity 150. Upon initial power up, the unit will go into a Factory Power State. In this state the unit will behave just as it is in a normal mode except that it will automatically enter the full off state if there has been no solar input for 4 hours. Once a configuration profile is applied to the Integrity 150 via the mobile application, it will follow its power management state to normal operation and will never enter the Factory power mode again.

Once a unit has been configured by applying a profile from the mobile application, it will remain on indefinitely. The unit can be turned off through the mobile app via the "Power Off" button found at the top of the Scan screen. If storage is necessary, it should be packaged in an opaque container and powered off. The recommended storage temperature is ideally between -40°C and 85°C. The shelf life of the Integrity 150 is 1 year and the maximum storage period is 5 years.

COMMISSIONING

Before installing the Integrity 150, record the Unique Identifier (UID) and identify the asset to which it will be mounted. The UID is etched on the top mounting surface of the Integrity 150, such that it will be visible after installation. There is also a bar code that contains the UID on the device.

INSTALLATION

The Integrity 150 must be mounted on the asset with a clear view of the sun and sky. The device requires a minimum flat surface area of 24.4 cm x 8.61 cm (10.39" x 3.38"). The ideal configuration is facing up on a flat horizontal surface.

The Integrity 150 can also be mounted on a flat vertical surface but this may reduce the communication reliability, decrease the maximum sustainable messaging rate, affect the charging capability of the device, and may reduce the GPS location accuracy. If the device must be mounted vertically, it is recommended to point the device with the solar panel end upward towards the sky. This allows the messages to be transmitted best in a vertical mount application as the batteries are located opposite the Solar panel which reduces internal obstructions.

MOUNTING METHODS

Use the following recommended procedures to mount the Integrity 150.

Mounting with the VHB tape:

The VHB tape is provided along with the Integrity 150 device. Please clean and dry the flat mounting surface before installation.

- Peel off the protective cover from one side of the VHB tape. Please pay attention to the orientation of the tape to match the device orientation. Stick the VHB tape to the cleaned surface and gently press it to ensure it stays secure.
- Peel off the protective cover from the other side of the VHB tape.
- Stick the magnetic puck assembly to the VHB tape dedicated circular cutout. Please make sure the magnetic side is facing up and the puck stays within the cutout.
- Stick the Integrity 150 device to the VHB tape and gently press it down to ensure it stays secure.

Mounting with the stainless-steel sled (Optional):

The stainless-steel sled must be ordered separately from Globalstar.

- The stainless-steel plate has four reserved mounting holes for customers' needs. The hole patterns and size are shown below in Figure 1, Mounting Plate Hole Pattern and Dimensions. Mount the stainless-steel sled to the asset with four screws of customer's choice. The customer can choose their own screws to meet the mounting hole specs on the asset.

NOTE: The customer mounting screw head needs to be under the diameter of 9.3 mm (0.366") and under the height of 3.0 mm (0.118").

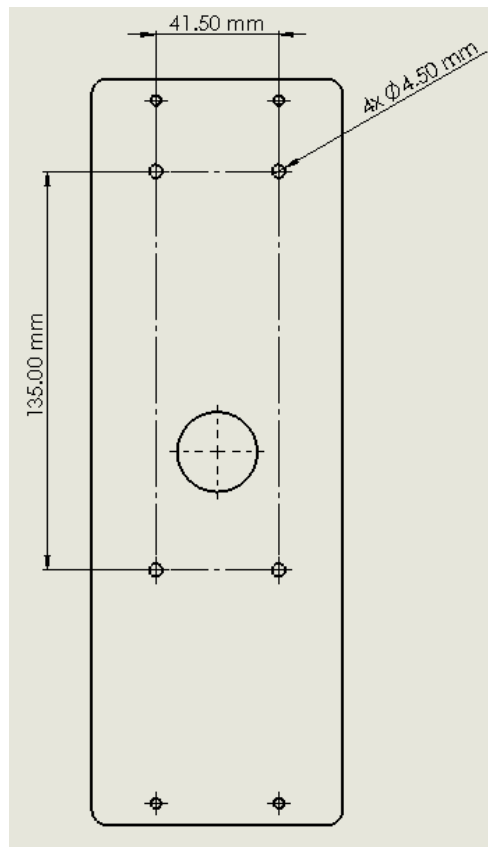


Figure 1: Mounting Plate Hole Pattern and Dimensions

- B. Put the magnetic puck assembly to the stainless-steel sled dedicated circular cutout in the center of the plate, making sure the magnetic side is facing up.
- C. Install the Integrity 150 device to the sled using the four M4x12 screws that are provided with the sled. Hand tighten the screws with a 3 mm hex Allen key. Please do not overtighten the screws.

ST CONFIGURATION

The Integrity 150 can be configured via the My IoTAccount Portal for general features. The application is primarily used to sync profiles from the back office into the application so that they can be applied to a unit.

Refer to 9150-0127-01 Globalstar ST Configuration App User Manual for detailed examples of firmware updating and management of your devices.

MESSAGES

The Integrity 150 produces on-air messages conforming to the Globalstar specified format. Refer to 8550-0002-01 Globalstar Unified API document for detailed examples of various message decoding.

The data being communicated to the end user is contained entirely in the 72-bit (9-byte) field. This section will describe the use of the 9-byte user information segment for communicating the range of information that the Integrity 150 is able to convey to the user.

NOTE: User information is also referred to as the Message Payload.

GLOBAL MESSAGE TYPE

Bits 0 and 1 in the first byte of the user data defines the Global Message Type; there are four total global types. Types 0 and 3 are applicable to the function and features of the Integrity 150, Type 1 and 2 are user defined message types.

- Type 0 - Standard Message: All the various message types that contain Latitude and Longitude data that are transmitted by the Integrity 150 will be of this type.
- Type 1 - Truncated Message: This message type provides for up to 2 bytes plus 6 bits of user data to be appended to the status byte and GPS location information.
- Type 2 - Raw Message: This message type provides for up to 8 bytes plus 6 bits of user data.
- Type 3 - Non-Standard Message: The Integrity 150 will use this message type for modular messages, as well as health check message. The modular messages are recommended for new designs. Legacy message sub types include Accumulate/Count messages, Contact Service Provider messages and Low Battery messages.

Globalstar messages can send up to 144 bytes of data per transmission, broken into 9-byte packets. Transmissions can consist of up to 16 9-byte packets sent sequentially. The packet is the lowest discreet data element that can be sent. Messages that do not utilize the max possible length will be automatically interleaved with other messages in the transmit queue, for better throughput and lower latency.

Interleaving example: M1 is a 9-byte message queued for dispatch. By default, every message is retried 2 times. M2 is queued for dispatch after M1 has initially been transmitted. Review below how messages will be transmitted based on defined retry intervals:

At T0, M1 transmitted
 At T1, M2 transmitted, M1 first retry
 At T2, M2 first retry, M1 second retry
 At T3, M2 second retry
 At T4, no transmission, queue is empty

Up to ten 9-byte messages can be sent in a transmission.

APPENDIX A - GLOSSARY OF TERMS

A

Accelerometer – A sensor used for detecting and measuring vibration.

Accumulate Hours – The activity time accumulated in the Inputs of the device while the Input is in the user defined state.

Activation – The activation of a UID (Unique Identifier) on the Globalstar satellite network. The process consists of programming a start and an end date for the use of the UID and the payment of certain fees to Globalstar. Sometimes referred to as “provisioning.”

At Rest – A tracker is considered to be at rest when the comparison of a new GPS reading to a previous GPS reading indicates the tracker has not changed location by more than a specified minimum distance. The specified minimum time and the specified minimum distance are both configuration parameters.

C

Configuration – The collection of variables that control the operating performance of a device.

Configure (configuring) – Programming (setting) the variables that control the operation performance of a tracker.

Count Events – The accumulated number of state changes in the Inputs of the device.

D

Delay to Start – Specific delay in time following the programming of the device to commence operation.

Desired State – The state of the Input in normal condition defined by the user.

E

ESN – Electronic Serial Number is a unique number assigned to each Integrity 150. The ESN is used by Globalstar Satellite Network to identify messages from the devices in the field.

F

Failed GPS reading – A GPS reading could not be processed from available GPS satellite signals.

FW Ver – Firmware version is the existing software loaded in the device main processor.

G

GPS – The GPS (Global Positioning System) is a “constellation” of 24 well-spaced satellites that orbit the Earth and make it possible for people with ground receivers to pinpoint their geographic location.

GPS reading – The longitude, latitude, time, and date information obtained from processing the signals from the GPS satellites.

I

In Motion – The unit is considered to be In Motion when there is a State of Vibration – and – the accelerometer status indicates there is motion.

Inaccurate GPS Reading – The longitude and latitude information obtained from processing the signals from the GPS satellites when a tracker cannot observe an adequate number of satellites; the GPS signals were jammed by electronic interference; the GPS signals were reflected from objects creating multi-path conditions; or weather conditions distorted the GPS signals. An inaccurate GPS reading may have longitude and latitude errors of a mile or more.

Input – Mapped events in the Integrity 150 that monitors state changes. The Tamper switch is the only physical device input, ON/ OFF.

M

Message – A collection of information that is transmitted in a group over the satellite network.

Message Interval – The message interval indicates the amount of time specified by the user between Location Messages.

The Integrity 150 transmits a Location Message once the Message Interval has elapsed. The internal clock on the device is reset to the interval time after each transmission. The Integrity 150 is in low power consumption mode during the interval to preserve battery life.

Message Time(s) of Day – The specific time of day in military format for the Integrity 150 to transmit Location Messages. The Integrity 150 is in low power consumption mode between the specific times of day to preserve battery life.

Message Transmission – The process of sending a message over the satellite network. This includes sending a message multiple times to improve the transmission success rate.

N

Number of message repeats – The number of times a message is sent for a message transmitted with the same Unique Message Number (UMN). The number of message repeats is configurable during the tracker set up process. Globalstar only counts repeated messages as one message if it is received three times or less. If the same message is received more than three times, Globalstar may count the message as more than one message for billing purposes.

P

PV – Photovoltaic cells; the name of the cells contained in the Device panel.

S

Self Test – An internal unit test that is performed by the processor, checking for the proper operation of unit functions.

State of Lacking Vibration (SOLV) – The motion sensor is indicating a cease of vibration when the number of vibration pulses per minute is lower than the Level of Sensitivity for Vibration Sensor number for the time required to determine if a State of Vibration has ceased. The motion sensor is indicating that the vibration pulses per minute is lower than the Level of Sensitivity for Vibration Sensor for the configured period of time.

State of Vibration (SOV) – The motion sensor is triggered when the number of vibration pulses per minute is above the Level of Sensitivity for Vibration Sensor. The motion sensor is triggered when the vibration pulses per minute is above the Level of Sensitivity for Vibration Sensor for the configured period of time.

T

Time to be in a State of Lacking Vibration – A configurable parameter that sets the period of time vibration has to be absent to determine if a State of Vibration has ceased.

Time to be in a State of Vibration – A configurable parameter that sets the period of time used to determine if a State of Vibration exists.

U

Undesired State Message – The Integrity 150 sends this message at a user defined interval while any of its Inputs are in the undesired state selected by the user, either closed or opened.

APPENDIX B - TECHNICAL SUPPORT

We suggest VARs and Partners reference our online content at our Globalstar Partners Support website, <https://partner.globalstar.com>. This content should address most activation/provisioning inquiries and frequently asked questions concerning business account management functions.

For VARs, please create an account by accessing the Globalstar Partners Support website and clicking on [Sign Up For Access](#) at the bottom of the page.

For all other support issues, please contact Globalstar, Inc. at our corporate headquarters:

Email: varsupport@globalstar.com

Phone: 1 (877) 452-5782 or 1 (985) 327-7500

Address: Globalstar, Inc.
1351 Holiday Square Blvd.
Covington, LA 70433

APPENDIX C - RF RADIATION EXPOSURE STATEMENT

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

NOTE: The Integrity 150 antenna is located under the embossed label that states "This side towards sky."

RAPPORT D'EXPOSITION DE RAYONNEMENT DE LA FCC RF Cet equipment est conforme aux limites d'exposition de rayonnement de la FCC RF determinees pour un environnement non controle. Cet equipment devrait etre installe et actionne avec une distance minimum de 20 cm entre le radiateur et votre corps.

APPENDIX D - REGULATORY NOTICES

FCC/IC NOTICES

This device complies with Part 15 of the FCC Rules. Contains FCC ID: L2V-ST150M. Contains IC ID: 3989A-ST150M. 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. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a [Class B digital device](#), pursuant to 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 or more 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.

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAN ICES-3 (B)/NMB-3(B) – This Class B Digital Apparatus Complies with Canadian ICES-003.

Cet Appareil numérique de la classe (B) est conforme à la norme NMB-003 du Canada.

This device complies with the requirements for Radio Astronomy Site avoidance as specified by the Globalstar National Science Foundation agreement of 2001. It is compliant with CFR25.213.

This device automatically adjusts its transmission frequency according to its location and is compliant with international regulatory requirements.

CE NOTICES

DECLARATION OF CONFORMITY FOR EUROPEAN CUSTOMERS

Hereby, Globalstar declares that this Integrity 150 is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

The declaration of conformity may be consulted at Globalstar.com/Regulatory.

Integrity 150™ Transmit Frequencies: 1611.25 Mhz - 1618.75 Mhz (4 Channels)

Integrity 150™ Max Power Out: 23.50 dBm EIRP

Integrity 150™ Rated Voltage and Rated Maximum Current: Batteries are rated 4.1 V, 400 mA discharge and 240 mA charge.

The Integrity 150 has been so constructed that the product complies with the requirement of Article 10(2) as it can be operated in at least one Member State as examined and the product is compliant with Article 10(10) as it has no restrictions on being put into service in all of the EU except Ireland. The Integrity 150 cannot be marketed in Ireland.



 Not to be Marketed in the Republic of Ireland

Anatel Certification stamp for operation in Brazil:  Modelo: ST-150 15954-22-05243	
Portuguese	Produto não acabado, de uso interno, cuja integração em outros equipamentos pode requerer nova certificação Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.
English	Unfinished product, for internal use, the integration of which into other equipment may require further certification. This equipment is not entitled to protection against harmful interference and may not cause interference to properly authorized systems.
Australia/New Zealand RCM: 	

APPENDIX E - GENERAL WARNINGS



Warning - Modifications: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



Warning – Driving: Always follow safe driving practices and local rules and regulations regarding the use of wireless devices while driving. Do not drive when programming or servicing the Integrity 150.



Warning - Installation and Service: Allow only authorized personnel to install or service the Integrity 150 and accessories. Faulty installation or service can be dangerous and can void the warranty.



Warning – Mounting: Using any other mounting bracket than the optional metal mounting bracket to secure the Integrity 150 will void all warranties and Intrinsically Safe certifications.



Warning - Pacemakers: The Health Industry Manufacturers Association (HIMA USA) recommends that a minimum separation of six (6") inches be maintained between the Integrity 150 and a pacemaker to avoid potential interference with the pacemaker.



Warning – Tightening Cover Screws: Upon replacing the Configuration Cable Cover, tighten the screws according to specification (Section 2 of this manual); otherwise, the unit may no longer retain its water-tight capability.



Caution - Battery Pack: The Integrity 150 internal Lithium-ion (Li-ion) battery pack is not designed to be replaced by the end user. User replacement of the battery pack voids the warranty and improper replacement may result in damage or fire. Please recycle the entire device.

APPENDIX F - SPECIFICATIONS & STANDARDS

SPECIFICATIONS	
DIMENSIONS	10.39" (L) x 3.38" (W) x 1" (H)
	264 mm (L) x 86.1 mm (W) x 26.6 mm (H)
WEIGHT	14.2 oz / 402 g
	With optional mounting bracket 32.02 oz / 908 g
OPERATING/STORAGE TEMPERATURE RANGE	-40° F to 185° F (-40° C to +85° C)
	-40° F to 185° F (-40° C to +85° C)
INPUT VOLTAGE	Solar powered
BATTERY TYPE	Built in rechargeable Li-Ion

STANDARDS		
CONTINUOUS WATER IMMERSION	IEC 60945	.
WATER & DUST INGRESS	IP68/69K	Ingress Protection (Dust & Waterproofing)
MILITARY STANDARDS	MIL-STD-810G	High and Low Temperature Immersion Dust Water spray Thermal Shock Mechanical Shock Rail Impact Vibration (Rail, Truck)

APPENDIX G - DEVICE POWERED LIMITATIONS

TYPICAL USAGE LIFE

Battery life is dependent on several factors:

- View of the sky (optimal is no blockage of Device panel, no clouds, sun 90° overhead)
- Ambient temperature
- How often the device is transmitting
- Age of batteries
- Frequency of, and success of obtaining, GPS fixes

Typically, the Integrity 150 batteries will have a lifetime of up to 10 years.

