

# GMG - Grace Mobile Gateway

## User Information



Grace Mobile Gateway (GMG) is a wireless bridge that manages the data signaling between Grace Lone Worker safety Pendants and the Grace Connected Safety™ Cloud Monitoring Portal. GMG contains a wireless signaling link to a Worker's safety Pendant such as WorkForce®, Super-CELL®, and TPASS® and contains a satellite and/or cellular connection for data signaling with the Cloud Monitoring Portal.

## IMPORTANT: Please Read All User Information Before Use

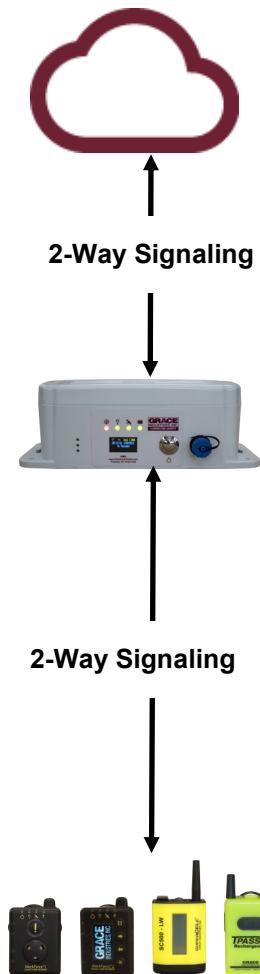
- Always test Grace Mobile Gateway (GMG) prior to use in accordance with the user information.
- GMG requires a cellular and/or satellite connection plus an active Grace Connected Safety™ account. Set up your account at [www.GraceConnectedSafety.com](http://www.GraceConnectedSafety.com).
- Grace Mobile Gateway is powered by an internal, rechargeable battery.

### Fully CHARGE GMG Before First Use

- Only charge GMG at an ambient temperature range of 32-140°F (0-60°C).

## Grace Connected Safety™ System Overview

GMG is part of the **Grace Connected Safety™** system which includes worker-worn **Pendants**, fixed or mobile **Gateways**, and **Grace Cloud Connect™** Portal dashboard.



### Grace Cloud Connect™ Cloud-based Monitoring and Alerting Portal

- Send worker-safety alerts by SMS text message and/or email.
- Configurable for customer specific standard operating procedures (SOP), customer-defined Worker Check-in schedule.
- Accessible from any device (PC, tablet, smartphone) having an internet connection and web browser.
- Locate and verify worker-safety status, send and receive user-defined messages.
- Event data-logging and Pendant location mapping supported.

### Mobile Gateway GMG Grace Mobile Gateway Features

- Connects to the Grace Cloud Connect™ Portal dashboard using satellite and/or cellular connection; incorporates 128-bit AES security.
- LED status indicators and an OLED display provide real-time connectivity status and various messages related to the system.
- Powered using a vehicle's battery or by an internal, rechargeable battery.
- GMG model ordered with -F suffix has two electrically-isolated inputs and two relay outputs available for special customer applications.
- GMG model ordered with -P suffix has a power-only external power cable connection.
- Other Grace Gateways include Grace Fixed Gateway, Portable Worksite Alarm and MS3000.

### Pendants

Grace Pendants are designed to operate with GMG and other Grace Gateways **WorkForce® WF1 and WF2, SuperCELL® SC500, TPASS®3**

- Worker-worn safety Pendant with 2-way RF signaling to Gateway, incorporates motion-sensing, fall-detection, and various signaling modes depending on model.
- Audible, visual, and optional vibrating alerts.
- WorkForce® WF2, SuperCELL® SC500 include alphanumeric graphic display.
- Rechargeable lithium battery powered, **intrinsically-safe** models available.
- Interoperable with legacy Grace RadioH products and systems.

### SALTi™

- SALTi™ is the System Access Loop Test indicator, a feature that verifies the connection integrity of a user's Pendant and the cloud Monitoring and Alerting Portal, as part of the Grace Industries cloud-based Grace Connected Safety™ system. This feature provides Pendant users with a piece-of-mind and confidence in the system.

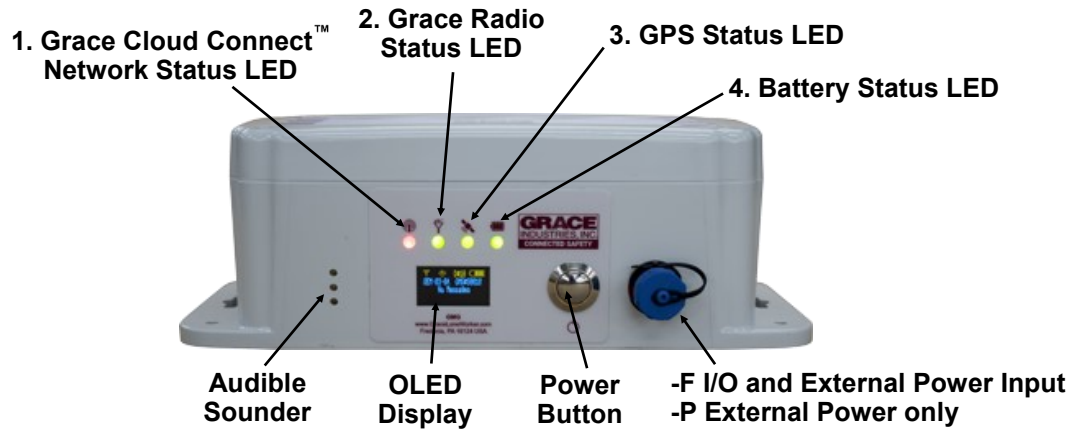
GMG Grace Mobile Gateway Specifications	
Model	GMG
Enclosure	Polycarbonate Resin, Flame Retardant, UV Stabilized
IP Rating	IP67
Size	7.63 x 4.63 x 3.09 in. (193.8 x 117.6 x 78.5 mm)
Weight	2.2 lb. (1kg)
Mounting Options	Magnetic mount (standard); Grace universal mounting bracket (optional) For optimum performance, mount the GMG at least 6 feet above ground level.
Magnetic Mount	294 lbs. (133 kg) of mounting force
Power	Mobile battery powered. Fixed mount with internal battery backup. Threaded connector for secure connection to GMG.
Internal Battery	11.1V nominal, 2500 mAh, lithium-ion rechargeable
Device Operating Time	Approximately 25 hours continuous use. 20 hours in Alarm mode.
Active Pendants Monitoring	Alarm Detection (Gateway Alarm Flag): up to 500 Pendants Pendant Tracking, SALTi operation: up to 40
Low Battery Alert	Audible alert. Low Battery Alert is transmitted to display-equipped Pendants and Grace Cloud Connect™ Portal. Alerts can be configured from Grace Cloud Connect™ Portal.
Battery Charger	120 VAC, or optional 12VDC vehicle charger
Battery Charge Time	Approximately 4 to 6 hours
Status LED Indicators (four)	Grace Cloud Connect™ Network Status, Grace Radio, GPS, Power/Battery
SALTi™	System Access Loop Test indicator, a feature that verifies the connection integrity of a user's Pendant and the cloud Monitoring and Alerting Portal
Display Screen	Two color OLED
Audible Alert	Approximately 82 dBA
Radio Frequency	902-928 MHz license-free FHSS North America ISM, other frequencies/ countries supported
Compatibility	Grace Telemetry Systems using RadioH platform including - WorkForce®, SuperCELL®, TPASS®, Micro TPASS® Repeater, T3 Repeater, and others.
Environment	Storage Temperature: -40°F to 158°F (-40°C to 70°C) Operating Temperature: -22°F to 140°F (-30°C to 60°C) Charging Temperature: 32°F to 140°F (-0°C to 60°C)
Radio Certifications	FCC ID: Contains J5XMXHEM, Q639603N, MCQ-XB3M1. Meets FCC Part 15 IC: Contains 5916A-MXHEM, 4629A-9603N, 1846A-XB3M1. Complies with Canadian ICES-003 Australia / New Zealand: Compliant to ACMA AS/NZS CISPR32:2015 + A1:2020, Class A Digital Apparatus   AS/NZS 4268:2017 for Intentional Radiators EMC93142C-ACMA EMC93142C-AS/NZS 4268



## NOTICE:

GMG is equipped with powerful magnets located on the bottom surface of its enclosure. These magnets can quickly attract the GMG to any magnetic surface. Care must be taken to avoid injury when mounting the GMG to a magnetic surface. Due to the strong magnetic field, keep the GMG away from electronic devices susceptible to magnetic disturbance. Devices such as ID or credit cards with magnetic strips can be affected. Persons with a pacemaker should avoid close proximity or contact with the GMG magnetic surface.

# GMG Components and Status LED Indicators



## 1. Grace Cloud Connect™ Network Status LED

	<b>Solid Green</b>	GMG connected to Grace Cloud Connect™ Network
	<b>Solid Green with Red Flash</b>	Weak GMG connection to Grace Cloud Connect™ Network; potential for signaling delays
	<b>Solid Red</b>	No GMG connection to Grace Cloud Connect™ Network
	<b>Red Flash Cycle</b>	Gateway fault detected. OLED display will show the fault; see Appendix A on page 11 for list of fault code flash patterns.

## 2. Grace Radio Status LED - GMG to Pendant Transmit/Receive

	<b>Solid Green</b>	Secured radio connection
	<b>Flashing Green</b>	GMG receiving RF signal from Pendant
	<b>Flashing Red</b>	GMG transmitting RF signal to Pendant
	<b>Solid Red</b>	No communication between GMG and Pendant

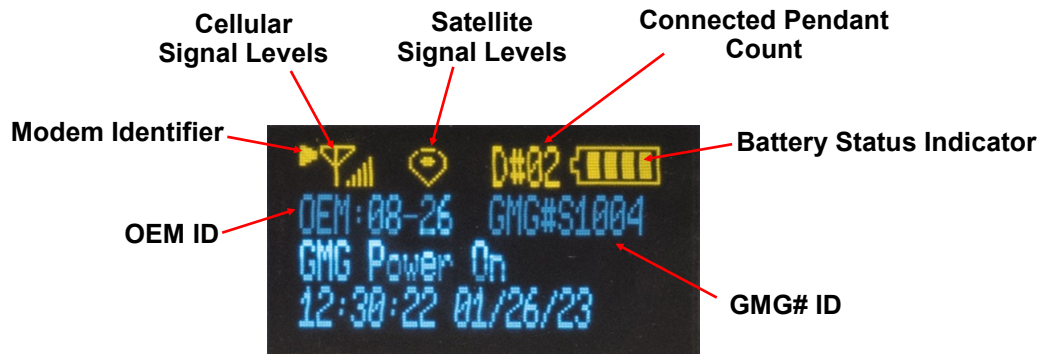
## 3. GPS Status LED

	<b>Solid Green</b>	GPS location detected and locked
	<b>Solid Amber</b>	Weak GPS location signal detected and locked
	<b>Flashing Red</b>	GPS signal detected, attempting location lock
	<b>Solid Red</b>	NO GPS signal detected

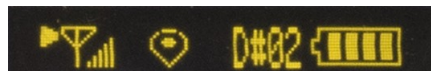
## 4. Battery Status LED

	<b>Solid Green</b>	Battery level above 50%
	<b>Solid Amber</b>	Battery level 20% - 50%
	<b>Solid Red</b>	Battery level below 20%
	<b>Flashing Green</b>	Charging - Battery level above 50%
	<b>Flashing Amber</b>	Charging - Battery level 20% - 50%
	<b>Flashing Red</b>	Charging - Battery level below 20%

## GMG Main Screen



## GMG Status Bar



**Cellular Signal Indicator:** This symbol indicates cellular signal strength in increments of 0-5 bars. It is recommended to have at least 2 bars of signal when operating the GMG for best performance.



**Satellite Signal Indicator:** If the GMG is equipped with an Iridium satellite modem, this symbol indicates signal strength 0-5 bars of Signal. It is recommended to have at least 2 bars of signal when operating the GMG for best performance. GMG model with -S suffix is equipped with satellite modem.



**Modem in Use Identifier:** This indicates which modem (cellular or satellite ) is currently in use.

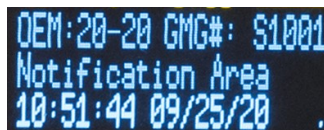


**Connected Pendant Count:** Indicates the number of pendants connected to the GMG. GMG can operate with up to 40 Pendants connected.



**Battery Status Indicator:** Indicates battery capacity remaining from 0-100% in 4 levels.

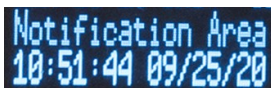
## GMG Information and Alert Notifications



**Device OEM:** The OEM ID links the GMG to all Pendants having the same OEM ID.



**GMG Device ID:** This is the unique ID for the GMG.



**Notification Area with Time/Date Stamp:** The most recent Alert Notification event or message will be displayed here until a new alert is received or GMG is Turned OFF. Note: GMG stores the last 10 notifications. Notification history can be viewed from the Notification Pages.

**Events that trigger a notification are:** Pendant Alarm, Canned Message Received, or a Message from the Grace Cloud Connect™ Monitoring Portal.



# GMG Menu

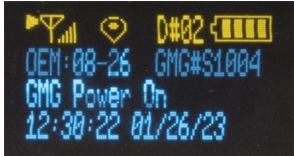
**GMG has four Main Menu Pages: Main Page, Notification Page, Connected Users, GMG Configuration.**

Press and release the Power button to index through the GMG Menu.

Press and hold Power button for 3 seconds to index through additional Notifications, Connected Users, and GMG Configurations.

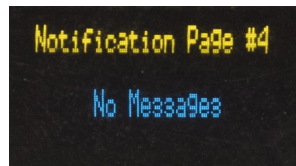
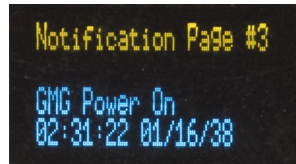
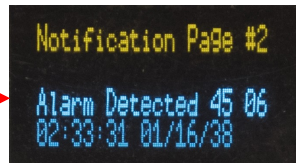
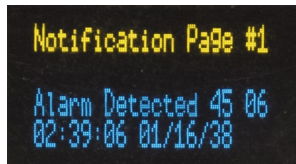
## Main Page

- Displays GMG Status Bar
- GMG Information
- Most Recent Alert Notifications



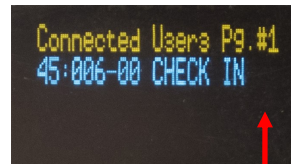
## Notification Pages

- Displays the last received notification
- **No Messages** shown if none received
- Shows up to the last 10 notifications
- Press and hold Power Button 3 sec. to move to next notification page



## Connected Pendant Users

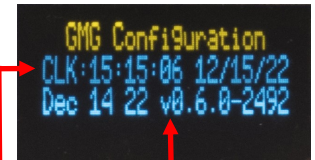
- List of all Pendants connected to GMG
- 3 Pendants per page
- SYS ID: User ID - Status Code Status Text
- Press and hold Power Button 3 seconds to move to next page of Connected Users



## GMG Configuration

- Four pages of GMG configuration data
- Press and hold Power Button 3 seconds to move to next page

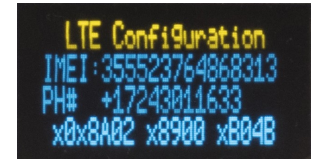
### 1. GMG Configuration



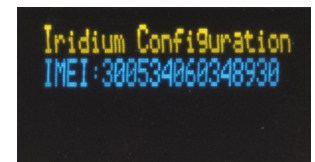
GMG firmware version

CLK: is current time/date

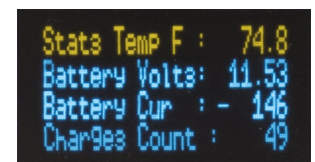
### 2. Cellular Configuration



### 3. Satellite Configuration



### 4. Stats Temp F



## Notification Page

### Received Notifications:

- GMG Power ON
- GMG Shutdown
- Pendant Alarm Detected ID 45 06 shown in this example
- No Messages
- Settings Update
- **Low Battery Notifications**
- Low Battery
- Very Low Battery (less than 2 hrs. battery capacity remaining)
- Critical Low Bat (less than 1 hr. remaining)
- Low Bat Shutdown (GMG is shutting down)

### FAULT - Detected Fault F-CLR - Fault Cleared

### Detected Fault:

- Cellular Modem
- Iridium Modem
- Grace Radio
- GPS Sensor
- System Configuration
- Data Bus

## Connected Pendant Users

### Status Text:

- Fall Alarm
- Panic Alarm
- Man Down Alarm
- Signal Loss
- Off
- Withdraw
- Low Battery
- Checkin

# GMG Installation Instructions

## STEP 1: Grace Cloud Connect™ Portal Access:

- Access the website link Grace Industries has provided (by email) to your Master Administrator.
- Login using the provided credentials.
- Continue with configuration and setup of Pendant Monitoring and Alerting.

## STEP 2: GMG Location Setup:

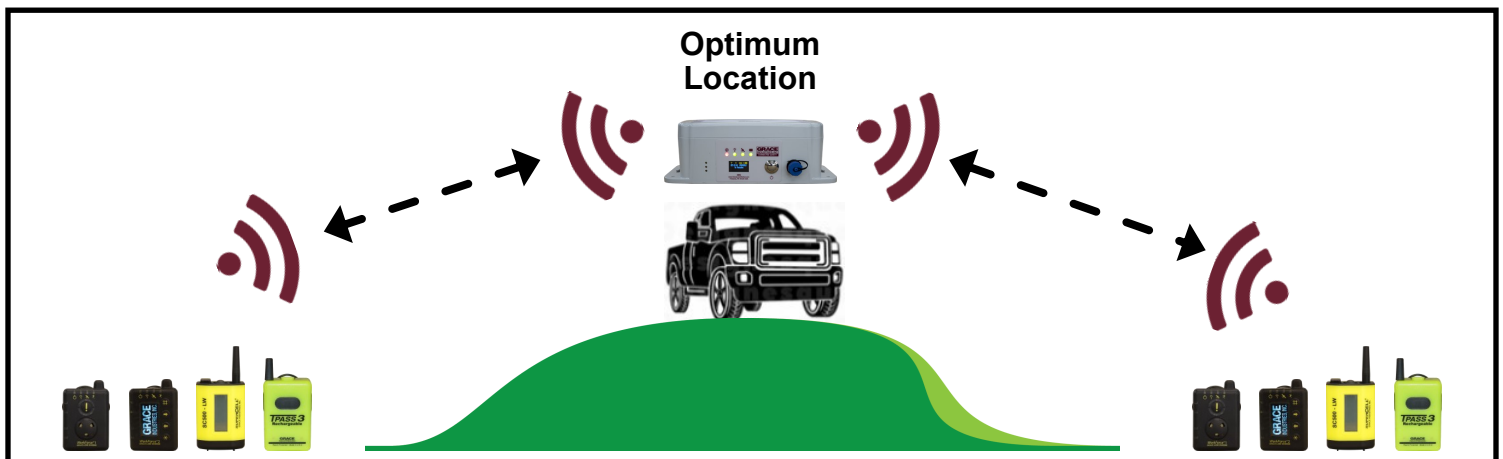
### Satellite Connectivity

- For optimal performance using the satellite connection, place the GMG with the top label surface facing an unobstructed view of the open sky.
- Tall urban structures have the potential to obstruct the connection of GMG to satellites. GMG should always be located outside and, when possible, away from shadows cast by tall structures.

### Cellular Connectivity

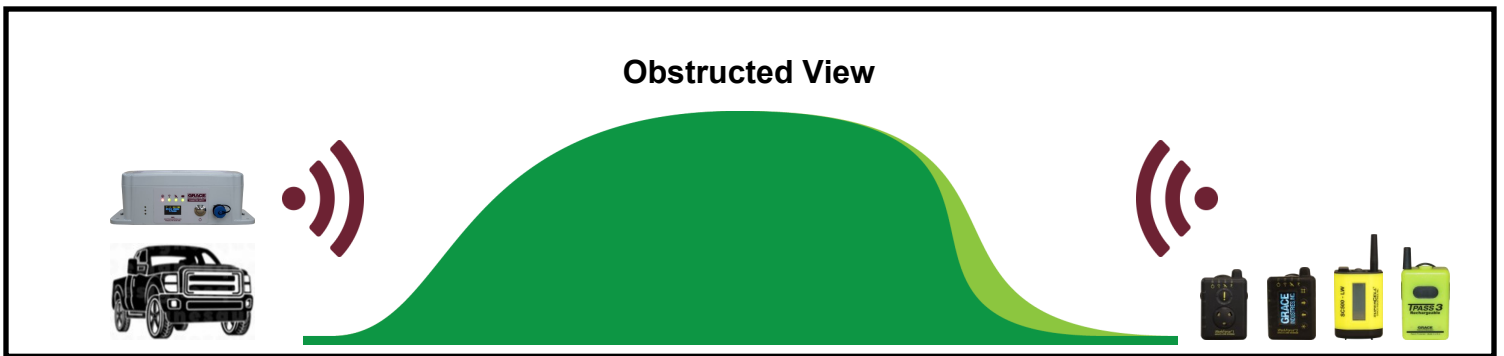
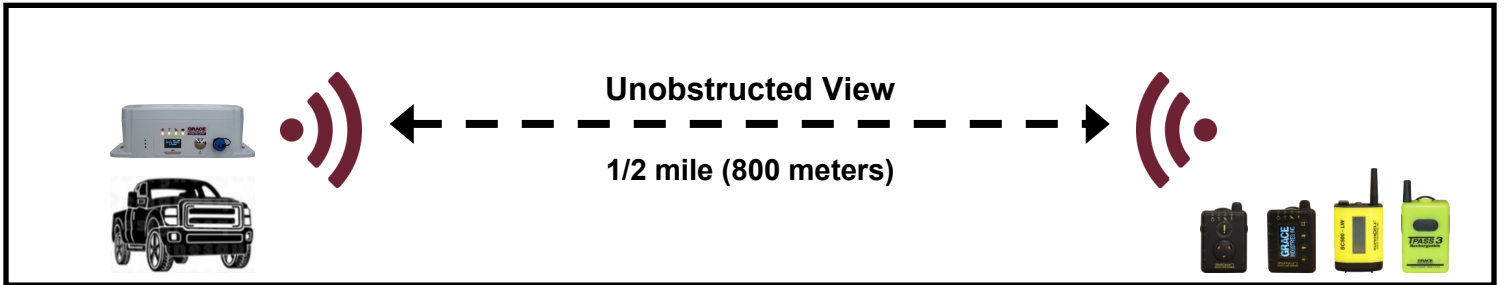
- GMG models include cellular connectivity and can be used wherever cellular service is available. Performance similar to consumer cellular products can be expected.
- Highest performance of Pendant-to-GMG and GMG-to-Pendant signal coverage occurs when the GMG is positioned at a high elevation above ground to provide a clear view of Pendant users.
- GMG-to-Pendant signaling range varies depending on the terrain where the system is used.
- For optimum performance, place the GMG a minimum of 6 feet above ground level and away from any object which might obstruct RF signal.
- When using a vehicle mounted GMG, the typical mounting position is on vehicle's roof. Park the vehicle in a location with the best vantage point to achieve line-of-site with the Pendant device.

## GMG Location Setup

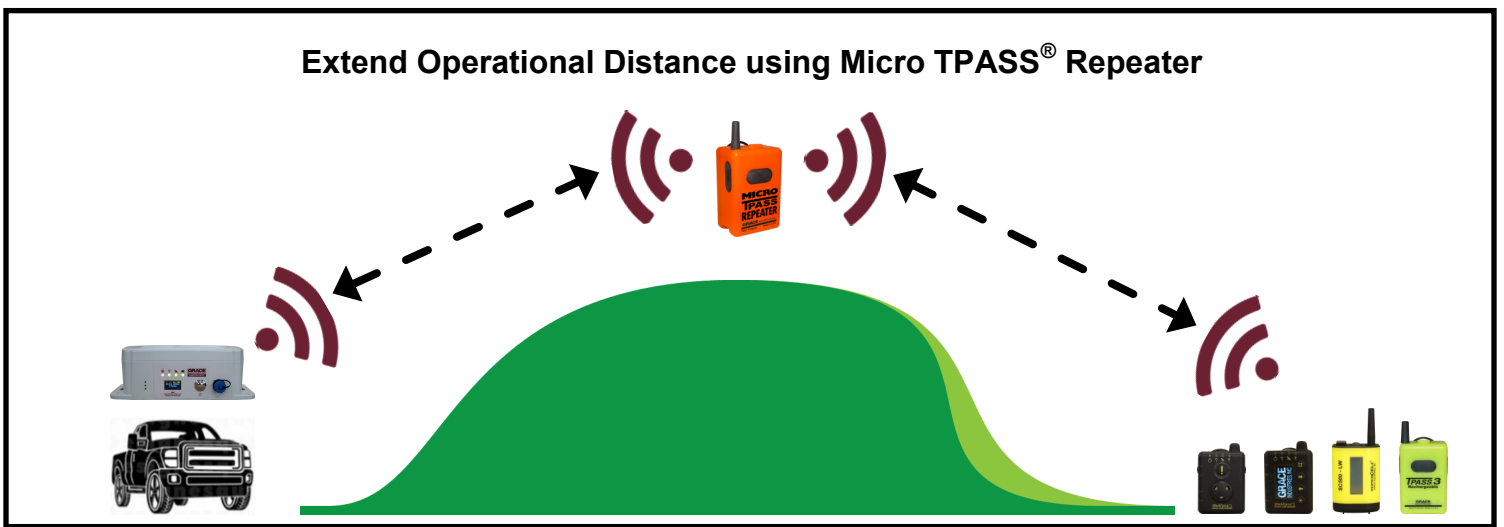


## GMG Location Setup

- Unobstructed line-of-sight operational distance between GMG and Pendant is a key factor in system performance.
- The system operates best over flat terrain with minimal foliage up to a minimum of 1/2 mile (800 meters).
- For optimum performance, place the GMG at least 6 feet above ground or on vehicle roof top.



- An optional, portable Micro TPASS® Repeater can be used to extend operational distance. Locating a Micro TPASS® Repeater at the first loss of line-of-sight area will extend coverage.
- For optimum performance, place the Micro TPASS® Repeater at least 6 feet above ground.



**For optimum performance, place the GMG and Micro TPASS® Repeater at least 6 feet above ground**



# GMG Operating Instructions



## STEP 1: GMG - Power ON

**IMPORTANT: DO NOT Power ON or activate any Pendant device before Powering ON and activating the GMG. Verify all Pendants are turned off.**

- **Power ON:** Press and release Power Button on front of the GMG.
- *The GMG is connected to Grace Cloud Connect™ when the Grace Cloud Connect™ Network Status LED is solid Green.*
- If the Network Status LED is Green with a Red flash, this indicates a weak connection. If the Network Status LED is not solid Green after 2 minutes, it is recommended to relocate GMG until a solid Green LED is achieved.

## STEP 2: Pendants - Power ON

**IMPORTANT: DO NOT Power ON or activate any Pendant device before Powering ON and activating the GMG.**

- **Power ON:** Consult Pendant user manual for instruction to Power ON or Power OFF.
- Grace Pendants are configured to automatically connect to the GMG when Powered ON. Always ensure the GMG is Powered ON first, then Power ON the Pendant.

## GMG ALARM Indicator

- When an Alarm Signal from a Pendant is received by the GMG, this activates an Alarm notification on the GMG screen and an audible Alarm sound that repeats every 10 seconds. This Alarm Signal is also transmitted from the GMG to the Grace Cloud Connect™ monitoring portal.
- Press and hold the Power On/Off Button for 3 seconds to silence the Alarm sound. The Alarm sound will be re-activated when a new Pendant Alarm signal is received.
- **IMPORTANT NOTE:** When a Gateway receives an Alarm signal from a Pendant, the Gateway will sound its local alarm immediately, however to avoid excessive data usage and nuisance, or unintentional Alarms activating the Grace Cloud Connect™ Alerts, the Gateway uses a purposeful delay before relaying this Alarm to the Grace Cloud Connect™ Portal. If the Pendant's Alarm is cleared or reset before the purposeful delay time, the Alarm will not be transmitted to Grace Cloud Connect™ and the Alerts for this Alarm will not be generated. The default delay time is 10 seconds and can be adjusted. Consult Grace technical support for more options.

## STEP 3: GMG Power OFF

**Ensure all Pendants are OFF before Powering OFF the GMG. If Pendants are left ON, the Grace Cloud Connect™ web Portal will go into Signal-Loss shortly after turning OFF the GMG will cause alerts to be sent out from the Grace Cloud Connect™ monitoring Portal.**

- Press and hold the Power Button for 10 seconds until you hear the Power OFF tones (3 beeps). Release the Power Button and GMG will begin its shutdown procedure.
- Do not remove the GMG until it has completely Powered OFF. Shutdown procedures may take up to 120 seconds and is complete when all LEDs and the display are OFF.

# GMG Status Information

A feature of GMG allows Pendants with an alphanumeric screen (WorkForce® WF2 or SuperCell® SC500) to request the GMG status by transmitting special Preprogrammed-Message #71 (System Status Request). Refer to Pendant user information for instruction on sending preprogrammed messages.

Upon receiving this message, the GMG Gateway will transmit updated status information to the Pendant's alphanumeric screen.

GMG Gateway status information contains the data shown below on these Pendant display screens:

## SuperCELL® SC500 Pendant Screen Showing the GMG Status From Preprogrammed Message #71

**C:5 I:5 G:2 N:c**  
**Sender S:20 U:099**

## WorkForce® WF2 Pendant Screen Showing the GMG Status From Preprogrammed Message #71

**C:5 I:5 G:2 N:c**  
**S1002 D:01 B:4+**  
**Sender S:20 U:099**

Gateway Radio  
Details

**C:0-5 Cellular signal strength in # of bars**  
**C:0** = No signal  
**C:5** = Full signal

**I:0-5 Satellite signal strength in # of bars**  
**I:0** = No signal  
**I:5** = Full signal

**G:0-3 GPS connection status**  
**G:0** = Fault detected  
**G:1** = No GPS Location Lock  
**G:2** = GPS Location Lock

**N:c,I,- Grace Connected Network Status**  
**N:c** = Connected through Cellular  
**N:I** = Connected with Satellite  
**N:-** = No network connection

**C:0-5 Cellular signal strength in # of bars**  
**C:0** = No signal  
**C:5** = Full signal

**I:0-5 Satellite signal strength in # of bars**  
**I:0** = No signal  
**I:5** = Full signal

**G:0-3 GPS connection status**  
**G:0** = Fault detected  
**G:1** = No GPS Location Lock  
**G:2** = GPS Location Lock

**N:c,I,- Grace Connected Network Status**  
**N:c** = Connected through Cellular  
**N:I** = Connected with Satellite  
**N:-** = No network connection

**S: Gateway Network ID.**  
 Example ID **S1002** shown above indicates an GMG with ID of 1002

**D: Displays the number of Pendants currently connected to the Gateway**  
 Example **D:01** shown above indicates one Pendant is connected to the GMG

**B: Battery status of the gateway device.**  
 Example **B:4+** indicates the GMG has 4 bars of battery power remaining and is charging.  
**4** = Full Battery, 4 bars  
**0** = Low Battery, 0 bars  
**+** = Charging  
**-** = Discharging

# GMG Installation Options

User Information Downloads available at: [www.GraceIndustries.com/userinfo](http://www.GraceIndustries.com/userinfo)

## GMG-P: Portable Applications

- Standard Magnetic Mount

### Battery Operation with a Full Charge:

- 25 hours continuous operation; 20 hours in Alarm
- 4-6 hours recharge time



## GMG-F: Fixed Vehicle Applications

- Standard Magnetic Mount with Fixed Mounting Plate

### Power and I/O Cable Capable Supports:

- Two (2) Input Triggers - Opto-Isolated 12VDC or GND inputs
- Two (2) Output Relays Form-C contact ratings 2A@28VDC, 2A@125VAC
- 12-15 VDC power input, 0.5A

### Battery Operation:

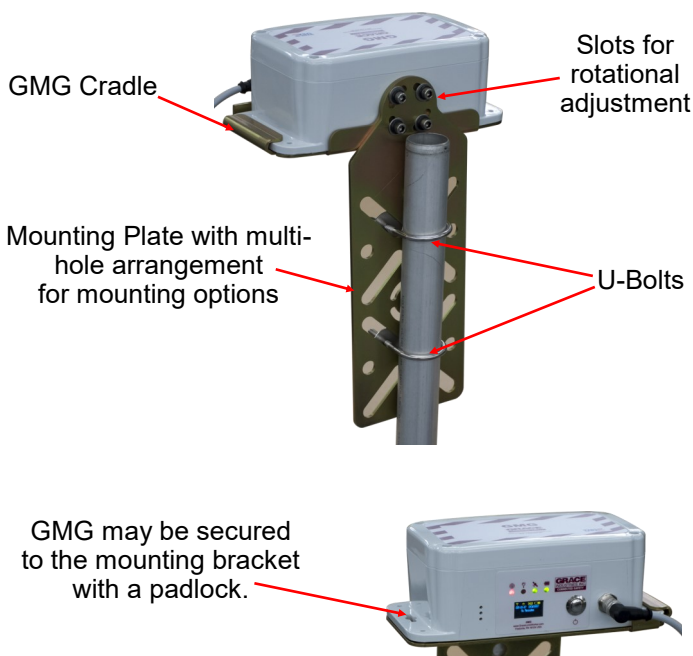
- 25 hours continuous operation on a full charge.



### Wiring Diagram for I/O and Power Cable

Pin 1	Red	External Power 12-15VDC	Pin 7	Yellow	Relay #1 (COM)
Pin 2	Brown	Input #1	Pin 8	Gray	Relay #1 (NO)
Pin 3	Blue	Input #1 Common	Pin 9	Violet	Relay #2 (NC)
Pin 4	White	Input #2	Pin 10	Gray/Pink	Relay #2 (COM)
Pin 5	Green	Input #2 Common	Pin 11	Red/Blue	Relay #2 (NO)
Pin 6	Pink	Relay #1 (NC)	Pin 12	Black	Power Ground

## GMG Universal Mounting Bracket For Fixed Mounted Applications



## APPENDIX A

### GMG

### LED Fault Code Flash Pattern

Gateway Fault Codes are indicated by the Grace Cloud Connect™ LED with a distinct 10-second flash cycle.

Every 10 seconds, the LED flashes from 1 - 6 times as defined below. The flash cycle repeats.

If Fault Codes persist and do not self-clear, consult factory for assistance.

	Flash	OFF
Cellular Modem	1 flash	
Satellite Modem	2 flashes	
Grace Radio	3 flashes	
GPS	4 flashes	
Configuration Storage	5 flashes	
Data Bus Fault	6 flashes	
	[ 10 Second Flash Cycle ]	

## GRACE One (1) Year WARRANTY

Grace Industries Incorporated, of Fredonia PA 16124 USA, warrants products that it manufactures to be free from defects in workmanship and materials for a period of one (1) year from the original date purchase. This warranty does not apply to third party products sold by Grace Industries. Grace Industries will repair or replace, at their sole discretion, defective products free of charge. This warranty applies to products that Grace Industries deems defective in its sole discretion due to defects in material or workmanship under normal use and maintenance and where a defect was not caused by accident, misuse or abuse of the product and that no disassembly, repairs or parts replacement were made or attempted by other than Grace Industries' personnel. **GRACE INDUSTRIES, INCORPORATED SHALL NOT BE LIABLE FOR ANY DIRECT, INCIDENTAL OR CONSEQUENTIAL LOSS OR DAMAGE ARISING OUT OF THE USE OF THE PRODUCT OR FAILURE OF THE PRODUCT TO OPERATE.**

The sole and exclusive remedy under all guarantees or warranties, expressed or implied, is strictly limited to repair or replacement as herein provided. **ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF FITNESS AND MERCHANTABILITY, ARE HEREBY LIMITED IN DURATION TO A PERIOD OF ONE (1) YEAR FROM THE DATE OF ORIGINAL PURCHASE.** The warranty and liability set forth here are in lieu of all other warranties, expressed or implied, in law or in fact, including warranties of merchantability and fitness for a particular purpose.

**Warranty claims process:** 1) Obtain a Return Authorization number from Grace Industries corporate headquarters by calling phone number 724-962-9231, or by email correspondence to [sales@graceindustries.com](mailto:sales@graceindustries.com). 2) The product name, serial number, date and proof of purchase must be provided and 3) Return products including Return Authorization number, prepaid and accompanied by original proof of purchase that

### FCC Statements

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 A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the

### Industry Canada Statements

This Class A digital apparatus complies with Canadian ICES-003.

This device complies with Industry Canada licence-exempt RSS standard(s). 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.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.(select the class for your 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.



Grace Industries, Inc.

724-962-9231

305 Bend Hill Rd

Fredonia, PA 16124

[www.GraceConnectedSafety.com](http://www.GraceConnectedSafety.com)