GRACE INDUSTRIES, INC.
LONE WORKER SAFETY

MS2000X

User Information

The MS2000X is an Emergency Signaling Monitoring System for Grace's worker safety products including SuperCELL®, LTX200, and TPASS®, WorkForce® and others. The MS2000X has several enhanced features including a simple interface to existing security and alarm systems. The MX2000X contains an optional audible horn and strobe light, activated upon receiving emergency alarm signals from Grace worker-safety devices.

The MS2000X must be mounted in an area where there is a clear, unobstructed path to the environment where worker-worn devices such as SuperCELL® or TPASS® may be used. A typical location for the MS2000X would be near an unobstructed office window or mounted just outside an office.

The MS2000X should also be located as far away as possible from other radio equipment antennas to minimize any interference. This includes cell phone boosters, wifi, and other 2-way radio equipment antennas. It is also recommended to keep the MS2000X a minimum of six inches away from metal surfaces.

A System Check of the MS2000X can be done by viewing the Receive LED located on the bottom surface of the MS2000X. When a SuperCELL® or TPASS® is turned On, Off, or by activating the Alarm, the radio signal will cause the Red Receive LED to flash several times - indicating signals are successfully being received by the MS2000X.

Once the MS2000X has been prepared for AC power, the unit may be plugged in. AC power connector is a screwless terminal rated for solid or stranded wire from 14-22AWG. Wire should be stripped at a 1/2". Wires should be inserted by using a small screwdriver to depress the lever and then inserting the wire.

When the unit is plugged in to AC Power, the Power Indicator LED glows (or flashes) Green - indicating the system has AC Power and is ready for operation. With loss of power, the Power Indicator glows (or flashes) Red - indicating the optional Backup-Battery System has been automatically activated, keeping the MS2000X ON and ready for operation.

POWER INDICATOR LED

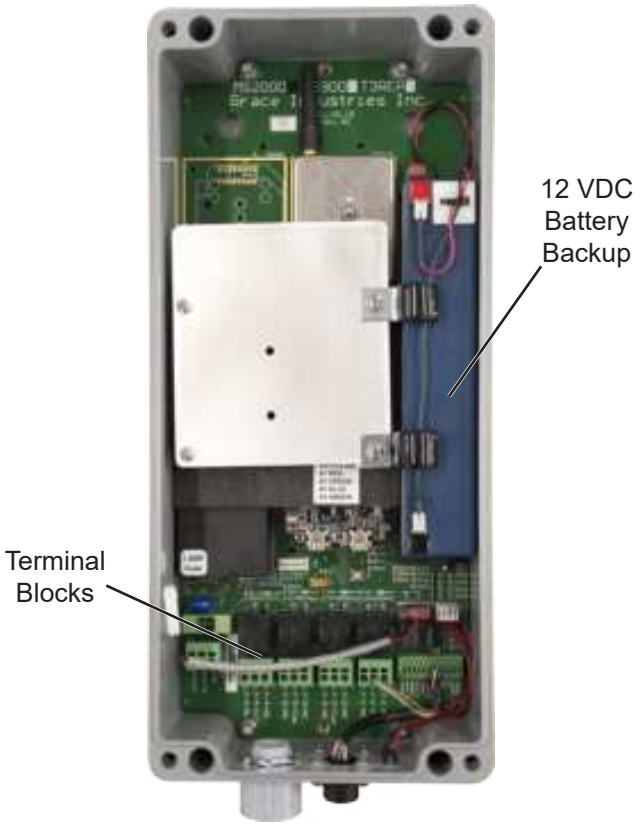
- **Green Steady Glow:** AC Power, and battery is fully charged.
- **Optional Battery -B** *(see options list, pg. 5)*
  - **Red Steady Glow:** Running on battery backup
  - **Red Flashing:** Running on Low Battery.
  - **Red/Green Alternate Flashing:** Battery fault detected. Battery is either extremely discharged, open or shorted.
    If fault occurs at power-up, the indicators should clear in 4 - 6hrs. If fault continues after 12 hrs, the battery is failed (Open or Shorted).

TRANSMIT / RECEIVE LED

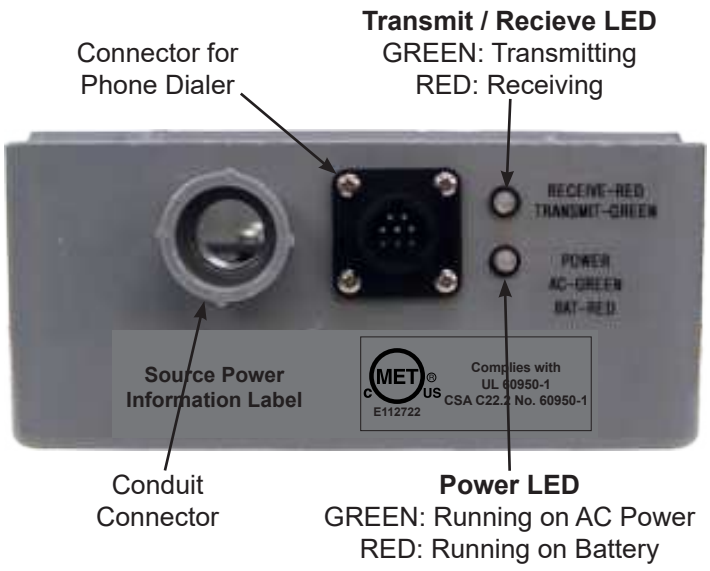
- **Green Flashing:** when MS2000X is transmitting a triggered message, Reset Acknowledgment, or repeating a signal.
- **Red Flashing:** when MS2000X is receiving a triggered message, Reset Acknowledgment, or repeating a signal.

IMPORTANT:

Always test MS2000X and worker-worn devices in area of planned use prior to implementation.



Inside View of MS2000X



Terminal Block Labeling and Configuration

A. Inputs and Power:

1- 12-15VDC – In
2- +12VDC – Out
3- GND
4- GND
5- INPUT#1
6- Input Common
7- INPUT#2
8- Input Common
9- INPUT#3
10- Input Common
11- INPUT#4
12- Input Common

B. Power Terminals:

Line
Neutral
GND

C. Relay Terminals:

(4 Sets; Numbered 1 - 4)
Normally Open
Common
Normally Closed

MS2000X Factory Default Input Setting

Input #	Trigger	Repeat Time
1	Transmit Alarm	6 Seconds
2	Transmit Global Evac	6 Seconds
3	Transmit Canned Message (Message#) **	1 Hour
4	Transmit Free Form Message (“Input#4-MS2000”) **	1 Hour
Loss of AC	Transmit Free Form Message (“AC LOSS-MS2000”) **	1 Hour
Low Battery	Transmit Free Form Message (“Low Bat-MS2000”) **	1 Hour

MS2000X Factory Default Relay Setting

Relay #	Trigger	Hold/Activation Time*
1	User Alarm or Input #1 Active (Transmit Alarm)	20 Seconds
2	Global Evac or Input #2 Active (Transmit Global Evac)	20 Seconds
3	Input #3 Active (Transmit Canned Message) **	3 Seconds
4	Loss of AC Detected	3 Seconds

**** Hold/Activation Time: How long relay contact will be maintained after last trigger message is received.***

***** Canned and Free Form Messages will only be displayed on GraceWatch®, SuperCELL® SC500 Product Line, and WorkForce® WF2.***

Inside View of MS2000X with -AC, -B, and -LS Options Installed

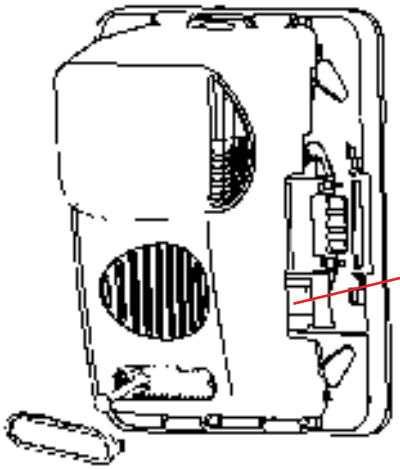
Additional Notes:

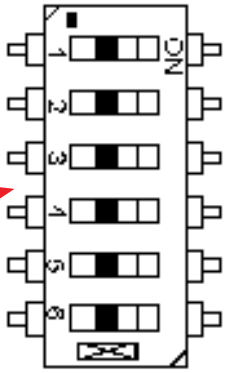
- Except for the battery, all parts of the MS2000X are attached to the PCB.
- Connect the AC Power cable to the Line, Neutral, and Ground positions.
- When setting case lid in place, make sure the light siren cable is NOT pinched.
  To securely seal MS2000X from intrusion of contaminants, secure the case lid by tightening all four (4) lid bolts until snug.
- Once Installation and Field Testing is complete, the MS2000X is ready for use.

Siren Settings - Tone Selection and Volume Level

(-LS Option)

Clear Bezel





6 Position Switch

The Siren alarm tone and alarm volume can be selected via the 6 position switch found under the clear bezel. To adjust the settings, remove the bezel by loosening the four screws and lifting the bezel off of the Light Siren. To select an Alarm Tone and volume level, set the switch positions as defined by the tables below.

NOTE: Ensure switch positions one and two are both in the ON position.

Volume Level

High dBa	Switch Position 6-ON
Low dBa	Switch Position 6-OFF

Tone Selection

Tone	Switch Position		
Mechanical - Temporal 3	3-ON	4-ON	5-ON
Mechanical - Continuous	3-OFF	4-ON	5-ON
2400Hz - Temporal 3	3-ON	4-OFF	5-ON
2400Hz- Continuous	3-OFF	4-OFF	5-ON
Chime - Temporal 3	3-ON	4-ON	5-OFF
Chime - Continuous	3-OFF	4-ON	5-OFF
Whoop	3-ON	4-OFF	5-OFF
Whoop	3-OFF	4-OFF	5-OFF

MS2000X
AC Powered Micro Receiver System Specifications
(With Battery Backup)

Case: Rugged fiberglass

Dimensions: 6-1/2” wide by 15” high by 6-1/2” deep

Weight: 10 lb. (with battery backup and light-siren)

Power Input Requirement:

AC Models: 85-264 VAC 50/60 Hz Single Phase 1Amp

DC Models: 12-15 VDC ONLY, 0.5 Amp

Complies with: UL 60950-1, CSA C22.2 No. 60950-1

Battery (Option): 12 VDC, 2.9 Amp. Hr. (provides emergency, backup power for up to 24 hours)

Alarm Siren Audio Output (-LS Option): Adjustable volume. Maximum audio output of 92 dBA at 3 meters

Environmental Range: -40°C to +55°C (Heated system option recommended for environments below 32°F / 0°C)

Frequency Range: 902-928 MHz (frequency hopping spread spectrum)

FCC ID: J5MXHEM -- Meets FCC Part 15

IC: 5916A-MXHEM -- Complies with Canadian ICES-003

For Use With: Grace Telemetry Systems using the RadioH platform (SuperCELL®, LTX200, TPASS®, WorkForce®, and Micro Repeater).

Relay Closure: 4 form-c contact ratings 6A @ 28VDC, 6A @ 125VAC.

Cleaning / Decontamination: Units contaminated by chemical or radioactive materials must be disposed of or decontaminated in accordance with all applicable regulatory standards. DO NOT mark or apply paint to MS2000.

MS2000X BASE PACKAGE:

MS2000-H-X:

- 2-Way Micro-Transceiver System, two way signaling
- Indoor coverage of 200k Sq. Feet and 1 mile outdoor clear line of site.
  Indoor performance is subject to effects of building construction and RF noise.
- 4 Opto-Isolated 12VDC inputs (See Page 3 for default configuration)
- 4 Form C Relays (See Page 3 for default configuration)

OPTION LIST:

-CA

- AC powered models shipping to Canada require Canadian Electrical Inspection.

-DC

- 12-15VDC model (0.5 Amps).

-AC

- 85-264VAC 50/60Hz (1 Amps).

-B (Not Available on -DC models unless suppling +15VDC).

- Includes 12VDC, 2.9AH battery backup (Up to 24 hours).

-LS

- Includes Case mounted Adjustable Strobe with Light Siren (See Page 4 for LS setting).

-HT (Not Available on DC models)

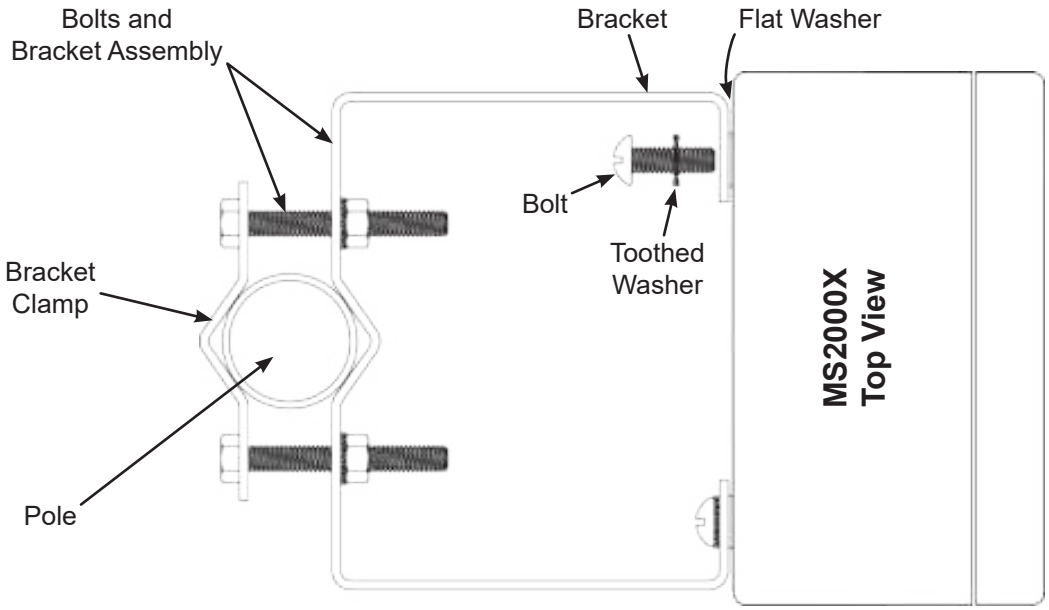
- Heated system for use in environments below 32°F / 0°C.

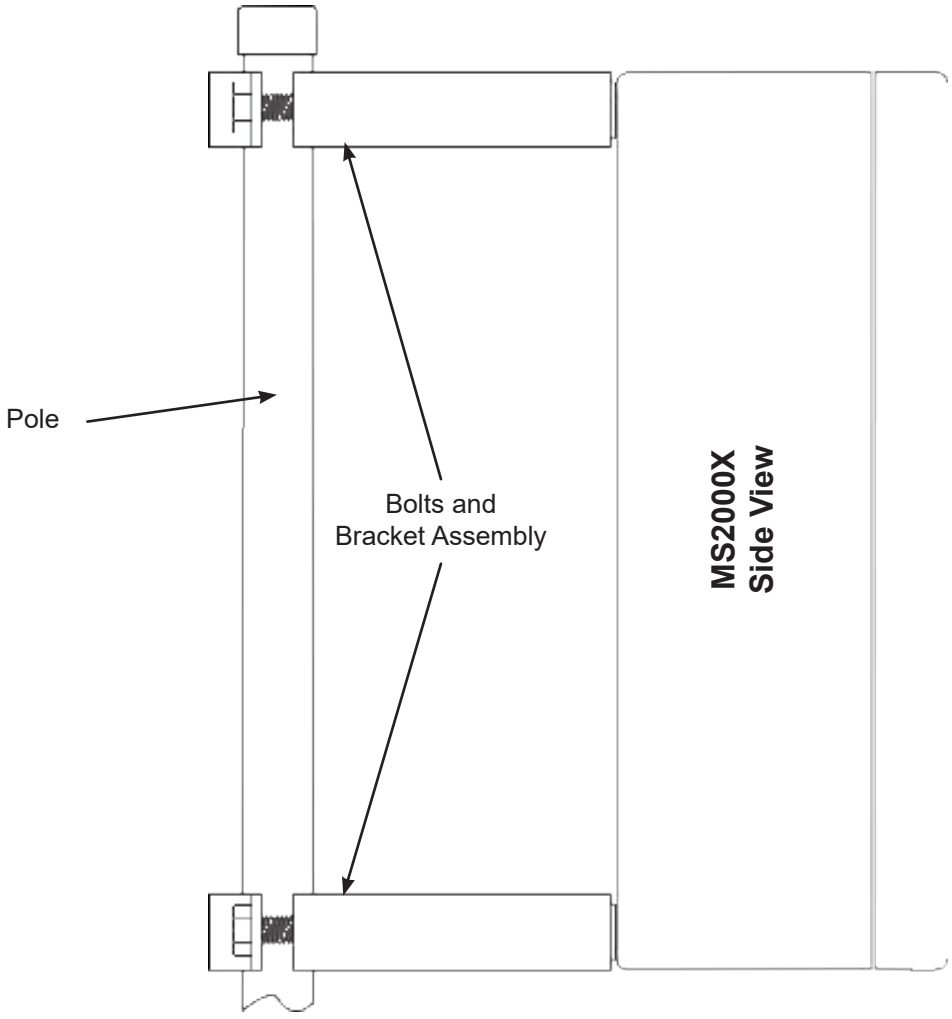
-SP

- Custom I/O programming as requested at time of order.
- One or more of the Inputs or Outputs will be set other than at Factory Default values found on Page #3.

OPTIONAL EQUIPMENT

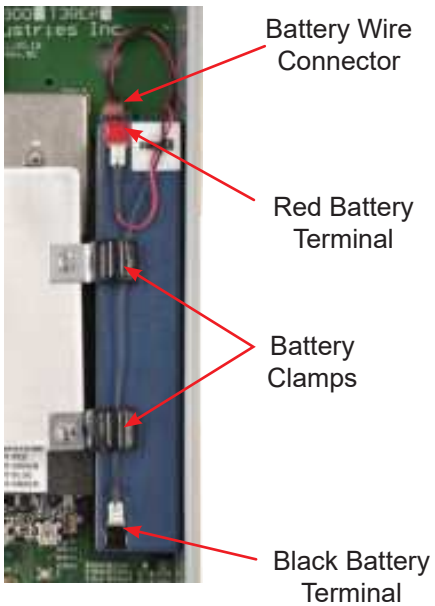
- PM2040 Mounting Assembly - Pole Mounted with 'C' Brackets -





Improper Installation May Degrade Performance

BATTERY REPLACEMENT



WARNING: Disconnect Power Supply before servicing MS2000.

To change battery, begin by disconnecting the external power supply.

Loosen the four lid screws and remove the lid.

Unhook battery wire from the battery terminals. Unhook battery wire connector from the board and set the battery wire aside.

Loosen the battery clamps enough to allow them to swing freely. **Do not completely remove them**. Rotate the clamps clear of the battery and remove the expired battery.

Carefully set the new battery in place. Rotate the battery clamps over the new battery and tighten them down until snug.

Connect the red wire to red battery terminal.

Thread the black wire through the battery clamps and connect the black wire to black battery terminal.

Attach the battery wire connector to the board.

Replace the lid and tighten all four screws until snug.

Reconnect power supply and test system for proper operation before field use.

OPTIONAL 10 Foot Cable with Connector p/n: MS-CA-10

Wiring

Pin 1	**GREEN**	**Normally Open**
PIn 2	WHITE	Contact Com.
Pin 3	**RED**	**+12VDC**
Pin 4	Blue	Input #1
Pin 5	**ORANGE**	**Normally Closed**
Pin 6	White/Black	Input Common
Pin 7	**BLACK**	**GND**
Pin 8	Red/Black	Input #2

OPTIONAL PHONE DIALER p/n: ATD

MS2000X with phone dialer has 8 pin connector to supply relay contact trigger and power to the external phone dialer.

CAUTION: To avoid damaging mating pins, carefully match up connector keyways when attaching phone dialer connector.

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 Code or Number from Grace Industries corporate headquarters by calling phone number 724-962-9231, or by email correspondence to 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 states the date and location of purchase to: Grace Industries, Inc., Repair Department, 305 Bend Hill Road, Fredonia, PA 16124, USA. Customer is responsible for all shipping costs, return shipping costs, handling, or any other fees associated with a warranty claim.

FCC Statements

Changes or modifi cations 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 user will be required to correct the interference at his own expense.

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.
LONE WORKER SAFETY

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