THE

MG 2000

Operation & Installation Manual

The MG2000 has evolved because of a growing desire for protection of boats. The system is completely false alarm free, even easier to install than before, simple to use, reliable, and convenient. It is comprised of only the features people have expressed a desire for. The MG2000 will provide detection of unauthorized persons, provide protection for doors and/or hatches, provide an audible siren output for alarm, provide an output for lights, and provide an electronic chime annunciation of guests.

The Marine Guard 2000 Security System is 9 ½" Tall, 5 ½" Wide, and 3 ¼" Deep. It is designed to operate directly off the boats 12 VDC power supply. The system has a low overall current draw (25mA while armed and idle) so it can operate for extended periods of time without taxing the power supply. The MG2000 security system operates with the simplicity of a car alarm *without* using a car alarm. The control panel is designed exclusively for use with this system.

Sure Action is always searching for ways to improve our products. We encourage you to contact us with any comments and suggestions. It is your recommendations that keep **Sure Action Incorporated** the leader in personal marine security systems. Our goal is customer satisfaction.

By customer request, the latest update to the system is the addition of screw terminal connections for wiring the system.

Each system is hand built and double tested prior to shipment. Not a single system has been returned to us due to an unsatisfied customer. **If you are not satisfied with your system for any reason, you may return it to us within 45 days of purchase for a refund.** If you ever have any questions or trouble with your system please call us at 1-800-296-3910 or E-mail us at **sales@absoluteautomation.com.**

System Components

(1) Single zone Pulsor processor or *(1) Three zone processor with three zone system*
(1) Control Panel
(1) 4-channel RF Receiver
(1) SU-MGPKIT or *(2) SU-MGPKIT with three zone system* *

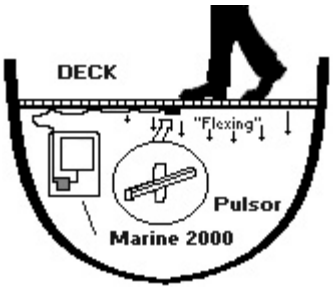
* Item # SU-MGPKIT contains:

(2) 4-Wire Pulsors (2) Epoxy (8) Epoxy filled crimps
(2) Mixing sticks (1) Hand cleaner

(2) Contacts with magnets
(1) Status L.E.D
(2) Keychain Transmitters
(1) Siren
(1) Chimeplate with on/off toggle switch
(1) 100' spool 24/4 AWM wire

The Pulsor

The Pulsor motion detector is the basis of the system. Pulsors are perfect for open cockpits because they will not detect birds and they are not affected by sunlight. In addition, they are unaffected by wind, noise, the rocking of the boat or normal boat vibration. The weight of an intruder causes a unique flexing along the deck. This is interpreted by the processor, which triggers the alarm. Pulsors have been time tested for nearly 30 years. They are installed on all kinds of boats including megayachts that have utilized up to 200 sensors per boat. The Pulsors are temperature compensating, hermetically sealed, and have 22 AWM marine grade wire leads. Sensitivity is fully adjustable at the control panel.



The Basics of Installation

Plan the system before beginning installation:

1. Determine location of Pulsors
2. Determine location of siren
3. Determine if you will be using 12 VDC Lighting
4. Determine if you will be using the contacts for doors or hatches.
5. Determine if you will be using the electronic chime for visitor annunciation
6. Determine how wiring is to be accomplished. Make sure you know the correct wiring requirements for the boat. Use at least 24/4 AWM for the Pulsors and 18 AWM for power connections.

Recommended Sequence of Installation

1. Mount Pulsors
2. Mount control panel
3. Run wire
4. Attach wires to control panel
5. Power system
6. Walk-Test

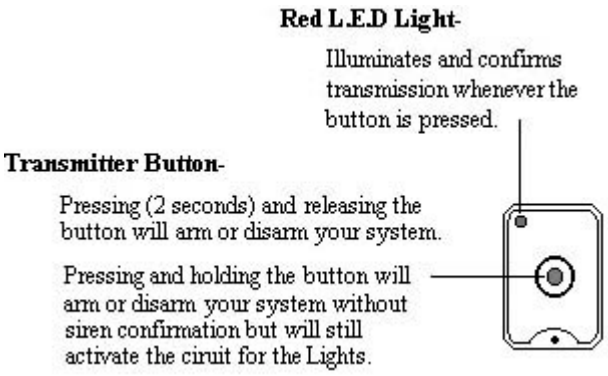
Daily Operation

Arming and Disarming

The primary means of arming and disarming the MG2000 are the two keychain transmitters. Momentarily pressing and releasing the button will arm and disarm the system. The siren will confirm arming with a single short blast. Disarming will be confirmed by two blasts. The circuit for the lights will follow the siren for arming and disarming. The lights will flash once to confirm arming and twice for disarming.

Every time the system is disarmed, the circuit for the lights will flash and then remain activated for one minute. After one minute the circuit returns to normal. This feature allows for visibility when leaving or returning to the boat after dark.

Any zone that is violated will prevent the system from arming.



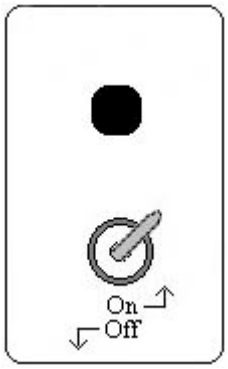
It is also recommended that a manual override switch be installed in a suitable location. A slot is allocated for this in the wiring block. The switch should be a marine grade Normally Open momentary. In the event the transmitter ceases to function, the switch allows for manual disarming of the system.

Silent arming and disarming

The system can be armed and disarmed without siren confirmation. Pressing and holding the transmitter button for approximately two seconds will arm or disarm the system without siren confirmation. The circuit for the lights will still activate as normal.

Home Mode

The MG2000 is active as long as is has constant power. The system is supplied with a pleasant sounding electronic chime. The chime will activate every time a Pulsor zone is violated. This feature allows for a person to be in the cabin or working below deck yet still be alerted that someone has boarded. The switch will shut off the chime feature only. Whether or not it is on or off will have no effect on system operation. The plate is mounted so the chime is above the switch.



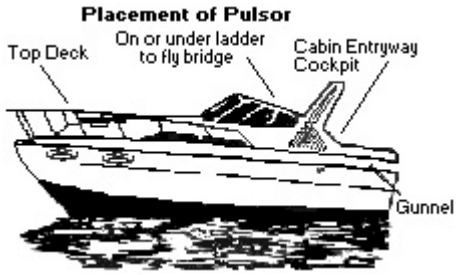
Away Mode

While the system is armed, any violation of a Pulsor zone or contacted hatch will cause the system to instantly alarm. During alarm condition the siren will sound and the lights will turn on. After one minute, the system will return to an armed condition and await another violation to repeat the cycle.

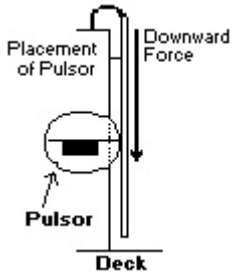
Placing the Pulsors

The Pulsor is a movement-sensing device that is epoxied to the bottom of a support joist or deck plate. Each sensor is hard-wired (home-run) directly to the control panel. The sensing element is a high-tech crystal that stretches and compresses when the deck bends. The resulting change in the thickness of the sensor changes its resistance. The processor analyzes this change and triggers the alarm. The system ignores normal boat vibration, shock, temperature, and environmental conditions.

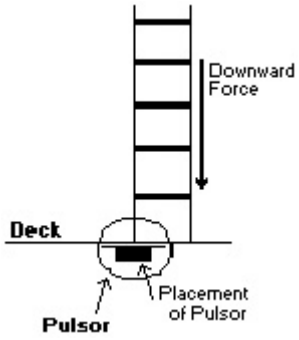
Each Pulsor can be compared to a miniature land mine. They should then be placed in areas where traffic is most likely to pass. When an intruder steps into the sensing area the alarm will trigger. Gunwales, cockpits, and cabin entryways are effective and popular traps.



Another popular place to mounts sensors is either on or under the ladder leading to a fly bridge.



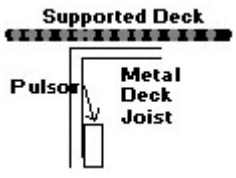
If you have a ladder that is not bolted to the lower deck, but instead, is supported by angle irons, then the sensors should be epoxied to the bottom of the supporting angle iron.



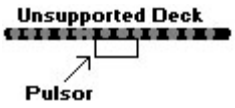
If your ladder is bolted to the lower deck, you should epoxy the sensors beneath the point the ladder meets the deck.

The size of the protected area will vary depending on the construction of the boat and the placement of the pulsor. If you are mounting the sensor on a support joist, the area of detection will be larger than if the sensor is mounted directly to the deck plate.

When mounted to a support joist, the average oval of detection is roughly an oval that is 4 to 5 feet *along* the joist and 2 to 3 feet *across* the joist.



When mounted directly to the deck, the area of detection will be closer to a circle with a 2-3 foot diameter. This provides ideal spot protection (cabin entry, ladders, gunwales, etc.).



Red L.E.D Status Light

The L.E.D Status Light is a visual indicator of what state the security system is in at any given time. It is normally positioned in a location that is easily observed by the captain. Mount the Red L.E.D Status Light in a location where it can easily be seen from outside, as the L.E.D Status Light provides a level of visual deterrence. Fit L.E.D to a ¼" mounting hole.

Off = Disarmed with violated circuit *OR* There is no power to the system
On Constant = Alarm condition is occurring or has occurred.
Flashing Slow (On $^1/_2$ second & Off $^1/_2$ second) = Disarmed with normal circuit.
Flashing Fast (On $^1/_{10}$ second & Off $^1/_{10}$ second) = Armed with normal circuit

Installing the Pulsor

Note: Install the Pulsors first. This gives the epoxy time to cure while you complete the remainder of the installation.

Note: Avoid installing Pulsors too close to deck cleats and tuna towers.

- ✓ The area the Pulsor is to be mounted should be clean of any dirt or oil. You want to epoxy to clean, solid material.

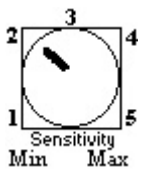
- ✓ Warm and thoroughly mix the epoxy. The epoxy should be approximately 70 degrees F., and should be mixed for around 15 seconds.
  TIP: Many people find it convenient to place the epoxy packets in their pocket while they determine how they want to lay out the system.

- ✓ Use one package of epoxy per sensor. Place a generous layer of epoxy onto the substrate of the sensor and touch the sensor into place. Hold the sensor in place with 3-inch tape while the epoxy sets. (*Do not clamp the sensor too tightly. You do not want to squeeze out all the epoxy*). The tape can be removed after one hour.

The epoxy has a five-minute work time before it sets. It then will cure for up to 24 hours. When fully cured the epoxy should be rock hard. After approximately four hours it will be hard enough for you to walk test and set the sensitivity. Sensitivity will not change appreciably during the remaining cure time (*This is why we recommend that the Pulsors be mounted before starting the rest of the installation. You can still walk over protected areas while the epoxy cures.)*

Walk Testing

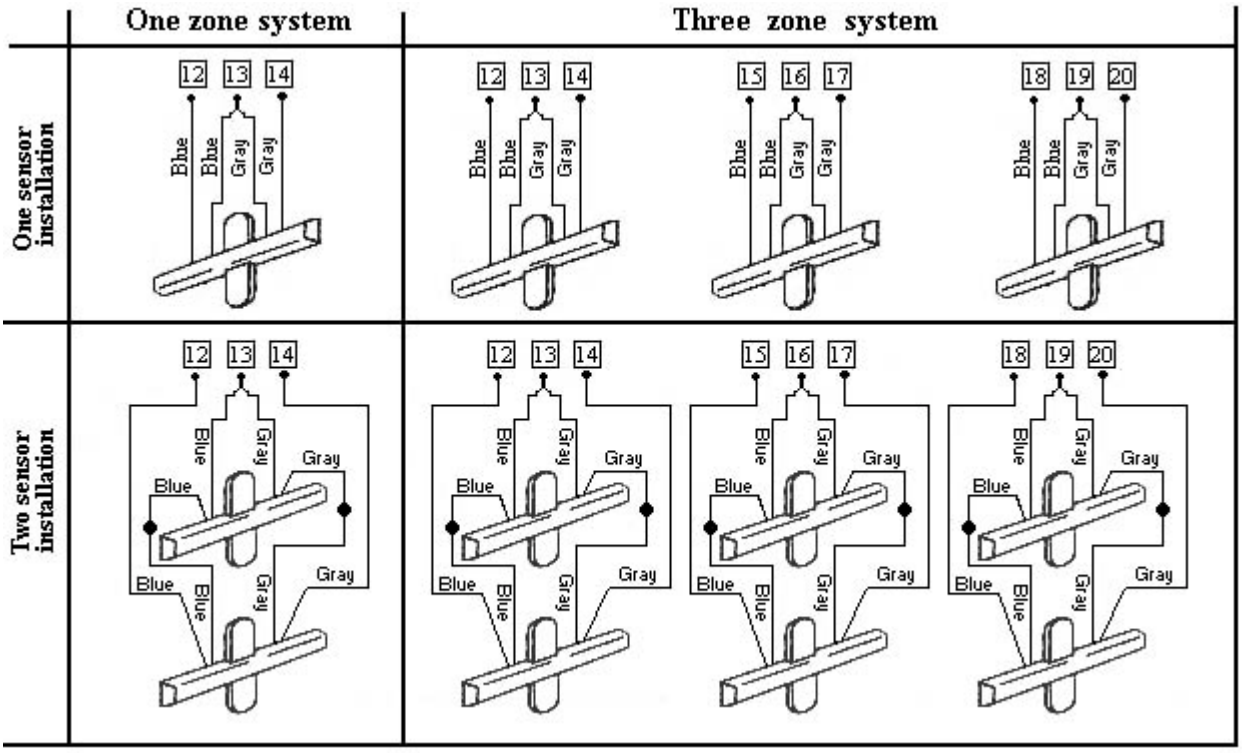
Walk-testing must be performed at each Pulsor location. Its purpose is to demonstrate that each Pulsor has enough sensitivity to protect its targeted area. Walk over the protected area to see if the system responds as expected. Make small adjustments until the sensitivity is at the desired level. Always use the minimum setting required to protect the target area. When a Pulsor is activated the system status led will go out and the chimes will sound.



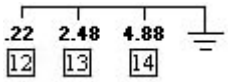
The white wheel in the potting material is the sensitivity adjustment for the Pulsors. It is set at Position "2" default from the factory. Sensitivity increases as you turn the wheel Clockwise. There is a red L.E.D for each Pulsor zone in the main control unit. The L.E.D will be lit if the zone is in alarm condition. If all zones are wired correctly, the light(s) should extinguish within 1 minute of power up.

Pulsor Configuration

NOTE: When you receive your system there will be resistor attached to the Pulsor circuit(s). ***These resistors were necessary for final testing and should be removed before wiring the Pulsors.***



The readings in the Pulsor configuration are in DC volts and are positive reading in relation to Negative of the power supply. (The voltage readings at Terms.12 & 14 may be reversed.)



Note: If wired correctly, the voltage at the center terminal will be close to 2.48 VDC.

- ✓ Measure each Pulsor with a digital ohmmeter before installation. Each should read 1000 Ohms ± 30%.
- ✓ Measure and record each Pulsor wired to control box after minimum 4 hours cure.

Keep a record in the control box. These values will not change appreciably over time.

The leads on the Pulsor may not be exactly as shown in the diagram. What side of the Pulsors the leads come out on does not matter. Wire the Pulsors according to the color codes and not what side of the sensor the wires protrude from.

System Wiring **(This system is customized, system notes apply)**

Terminal 1 & 2 (Aux. *Ground*)
Terminal 3 (*System Ground*)
Terminal 4 (*System Positive*)
Terminal 5 & 6 *(15 Amp @ 12 VDC Circuit for lights)*
Terminal 7 *(+12VDC 5 Amp Output for Siren)*
Terminal 8 (*Ground Output to Red L.E.D*)
Terminal 9 (*Ground Output to Chime*)
Terminal 10 (Aux. *Manual Override / Ground Input*)
Terminal 11 (*Ground Input from Hatch Contacts*)
Terminals 12-14 *(Pulsor Circuits)* *[+ Terms.* 15-17 : 18-20 for Three zone system]

Terminals 1 & 2 (Aux. *Ground*)

CONNECTION: These two terminals are additional ground terminals. The negative leads of devices such as the siren and contacts can be connected to ground at these terminals.

Terminal 3 (*System Ground*)

CONNECTION: System Ground. Negative of 12 VDC power supply.

Terminal 4 (*System Positive*)

CONNECTION: System Positive. Positive of 12 VDC power supply.

Terminals 5 & 6 *(15 Amp @ 12 VDC circuit for lights* [Common & Normally Open] *)*

This is a 15 amp @ 12 VDC form "C" relay for exterior flashing light confirmation of arming /disarming and to attract attention to the boat if the alarm is triggered. Also, upon disarming, this circuit will flash twice to confirm disarming then stay on for 60 seconds to illuminate the way to the boat during night entry.

CONNECTION: This circuit is normally open. When activated it will close. The power that is applied to one terminal will pass to the other terminal when the circuit is active.

Terminal 7 *(+12VDC Output for Siren)*

CONNECTION: Positive lead of siren. Red = yelp : Yellow = steady. The siren is a 320mA siren. The black lead will be put to a Ground terminal.

Terminal 8 *(Ground Output to Red L.E.D)*

CONNECTION: White lead of Red status L.E.D. The Red lead will be put to +12VDC.

Terminal 9 *(Ground Output to Chime)*

CONNECTION: Blue (trigger) lead of chime. The Black lead will go to constant Ground and the Red lead will go to constant +12 VDC.

Terminal 10 (Aux. *Manual Override / Ground Input*)

CONNECTION: This terminal is for a Normally Open momentary switch. This will function as a manual override if the transmitters are lost, damaged, or have weak batteries. If this wire is momentarily grounded when the system is armed, it will disarm the system. If this wire is momentarily grounded while the system is disarmed, it will arm the system. One lead of a Normally open Momentary button or Keyswitch is connected to this terminal. The other lead from the button or switch is connected to a negative Ground terminal.

Terminal 11 (*Ground Input from Hatch Contacts*)

CONNECTION: One lead of any used contact. The other lead will be connected to a Ground terminal. Multiple devices must be wired in parallel.

Terminals 12-14 *(Pulsor Circuit)* ***[Plus Terms.* 15-17 : 18-20 for Three zone system]**

CONNECTION: Wire Pulsors as shown in Pulsor Configuration.

System Notes (When applicable)