# OPERATION & INSTALLATION MANUAL

**Basic description and operation
of the**

## VA-2000

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**VA-2000**

● ALERT

TORNADO ALERT
SEEK SHELTER

**WHELEN** ©

CLEAR     DISPLAY     TEST
BACKLIGHT

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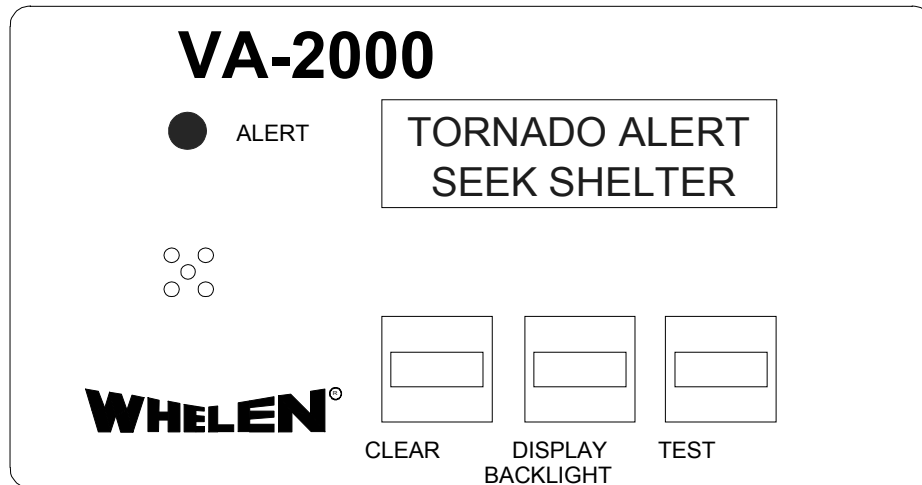
PIONEERS IN WARNING SIGNALS

**WHELEN** ®

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**WHELEN ENGINEERING COMPANY, Inc.**

**VA-2000**
**ALERT MONITOR and MESSAGE DISPLAY**

**OPERATION & INSTALLATION MANUAL**

The purpose of this manual is to provide operation and installation information about the use of a Whelen Engineering Company, Inc. Model VA-2000, Alert Monitor and Message Display.

Prior to reading this manual or using this product you should be familiar with Whelen Engineering's family of High Power Voice and Siren Systems.

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## Introduction

The VA-2000 is a receive only Warning System Alert Monitor and Message Display. The VA-2000 is designed to follow Whelen's High Power Voice and Siren System activation command sequences, as well as other DTMF protocols. The Programming section goes into more detail about other protocols.

All Whelen DTMF format command sequences are decoded by each VA-2000 in a system. The VA-2000 reacts to particular decoded commands by sounding a warning alert tone, flashing an alert indicator and displaying one of 60 preprogrammed messages, on a 32 character display. In addition, options are available which include a relay output, an audio output path and an internal audio speaker.
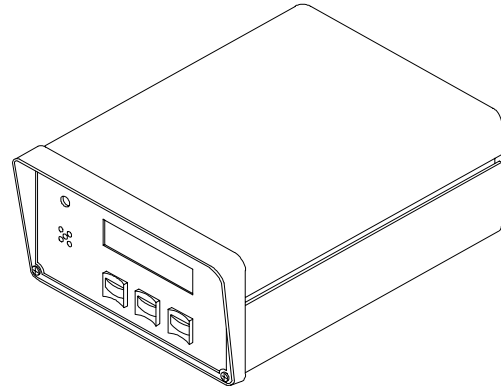
The VA-2000 is a stand-alone desk top unit. It operates from a nominal 12 volt DC. A UL listed wall mount transformer is supplied for primary power. Optionally, an internal battery backup may be installed. A VA-2000 must be ordered with a radio receiver and antenna. Four different versions are offered, as follows:

| VA-2000H | VHF high-band, | 132-174 MHz |
| VA-2000U | UHF, | 403-430, 450-470 MHz |
| VA-2000M8 | 800 MHz, | 806-824, 851-869 MHz |
| VA-2000M9 | 900 MHz, | 928-929, 952-960 MHz |

## Operation

In normal operation, a VA-2000 receives and decodes a DTMF data string and produces an alerting tone for about 5 seconds. At the same time, the LCD display and backlight activates and displays the preprogrammed message. The red LED on the front of the VA-2000 also starts to flash. If the audio option is installed, the audio monitoring path to the speaker is turned on, the output relay is activated and audio is switched on at the audio output connector at the rear of the VA-2000. The display, LED and relay (if installed) remain active until one of the following occur:

1. The CLEAR pushbutton switch on the front panel is pressed.
2. A Clear (or Cancel) command is received and decoded.
3. A three minute time out occurs. (Refer to Internal Dip Switches 2 and 3)

Note:  Clear (or Cancel) commands 00,10 and 30 will clear all siren system activity and return the VA-2000 to Stand-by Mode. Clear command 20 will only clear siren system activity. It will not clear VA-2000 activity.

During the 5 second alert period, the VA-2000 will respond to a new received command. If the received DTMF string is decoded as a valid command, the VA-2000 starts a new 5 second alert period and displays the new message.

**Audio Output Option**

The Audio Output option consists of a relay, an audio output path and an internal speaker. The relay consists of a common pin, a Normally Open contact and a Normally Closed contact. The contacts are rated at 1 Amp. Refer to the Specifications for details. The audio output path consists of a 600 transformer coupled output, with rear panel level setting. In addition, a 1 watt internal speaker is installed, for live audio, with a rear panel volume setting.

**Battery Option**

Full battery operation is an optional feature of a VA-2000. The unit may be equipped with an internal Gel-type, maintenance free, sealed battery. Typically, there is sufficient battery capacity for 30 minutes of warning at the end of a 24 hour AC power interruption. Dip Switches 2 and 3 may be used to conserve battery capacity, to further ensure warning capability during AC power interruptions. The battery option includes a higher voltage wall mount transformer, to insure proper charging levels.

**Display**

The VA-2000 includes a low power, 32 character, Liquid Crystal Display (LCD), with LED backlighting. The backlight improves the display viewing angle during normal ambient lighting conditions and allows for viewing when there is no ambient light available. During normal standby conditions, the display reads "STAND BY MODE" and the backlight is off.

However, if the internal battery backup option is installed, the standby message may be different. The "BATTERY IS IN GOOD CONDITION" message will be displayed if the wall mount transformer is plugged in to an active 115 VAC outlet, the battery is in good condition and the rear panel battery switch is in the ON position.

If the battery is properly charged and the rear panel battery switch is ON, but the wall mount transformer is disconnected, or the AC outlet is off, the display will read " STAND BY MODE " .

If the battery is properly charged and the wall mount transformer is plugged in to an active AC outlet, but the rear panel battery switch is OFF, the display will read " BATTERY SWITCH IS TURNED OFF" .

Upon receipt of a valid command, the LED backlight is turned on and the appropriate message appears. A message may be up to 96 characters long. Messages with more than 32 characters are displayed in a paged mode, where each 32 character page is displayed for approximately 3 seconds.

A four position Dip Switch is located inside the VA-2000. Switches 2 and 3 are used to control the backlighting and optional output for power conservation purposes. Dip Switch functions are explained in a later section.

A red LED alert indicator flashes upon receipt of a valid command, and remains flashing until the Clear button is pressed or a Cancel command is decoded.

**Front Panel Controls**

There are three pushbutton switches on the front panel of the VA-2000, The switch functions are shown in the following table:

| SWITCH | FUNCTION |
|---|---|
| CLEAR | Pressing this pushbutton will clear the active message on the display, turn off the flashing LED and silence the alert tone. If the audio option is installed, the speaker and audio output are turned off and the relay output is deactivated. |
| DISPLAY BACKLIGHT | Pressing this pushbutton activates or deactivates the backlight for the LCD display. This allows the user to view a message if e the backlighting has timed out and turned off after three minutes, because of the Dip Switch setting.<br><br>(Refer to Internal Controls for Dip Switch descriptions) |
| TEST | Pressing this pushbutton will cause the VA-2000 to enter into a Test Mode. The VA-2000 will emit a 5 second alert tone, flash the LED, turn on the backlight and display the area code and address code, and the wildcard settings of the unit. If installed, the optional relay, speaker and audio output are also activated for approximately 5 seconds. |

## Getting Started

Read this section to become familiar with the installation and set-up requirements of the VA-2000. Some of the discussion pertains to options that may not be installed, therefore these sections may be skipped.

### Rear Panel

All VA-2000 models are equipped with an "ANTENNA'' connector, a wall mount transformer "POWER" connector and a two position "SERIAL IN" connector. The "SERIAL IN" connector is used for programming the VA-2000, as described in a later section.
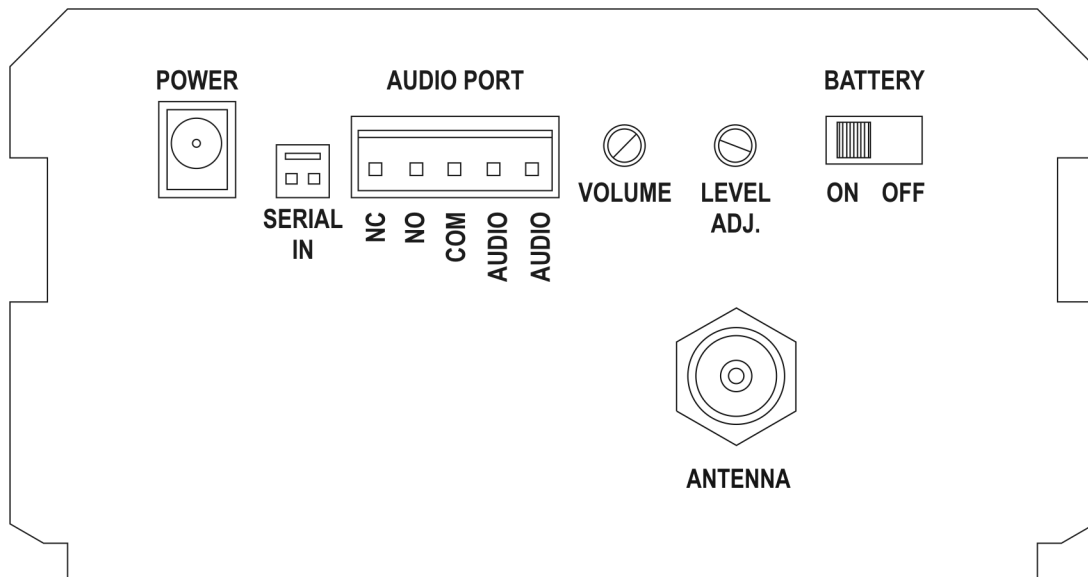


In addition, a number of optional features may be present. These include a relay closure and an audio output path through a five position "AUDIO" connector, as part of the Audio Output option, plus "LEVEL" and "VOL." controls for audio. For the Battery Back-up option, a "BATTERY ON OFF" switch and a "CHARGER POWER" connector are included.

### Installation

Select a location for the VA-2000 where it can be seen and heard. Be sure that the LCD display is readable. A 115 volt AC outlet is required. It is important to have room for the antenna and clearance around the antenna of at least one foot, to avoid any problems with reception.

Connect the antenna to the ANTENNA connector on the rear panel. Connect the standard wall mount transformer to the POWER connector, in the upper left of the rear panel. If the Battery option is installed, then connect the wall mount transformer at the CHARGER POWER connector in the lower right of the rear panel.

**Audio Option**

The optional relay output consists of a Normally-Open 1 Amp contact closure and a Normally-Closed 1 Amp contact closure. The list gives the connector pinouts.

| Function | Pin Number |
|---|---|
| Relay Common | Pin 3 |
| Relay N.C. | Pin 1 |
| Relay N.O. | Pin 2 |

As previously described, the relay activates when the VA-2000 receives a valid command, and remains active until one of the following occur:

1. The CLEAR pushbutton switch is pressed.
2. A Clear (or Cancel) command is received and decoded.
3. A three minute time out occurs (if DS 3 = On).

The optional audio output connection provides a path for the audio information received via the radio receiver. The audio output is essentially the same as the audio at the internal speaker, except that each has its own rear panel level adjustment. A small screwdriver may be used to adjust the audio path level at the recessed potentiometer labeled "LEVEL" or the internal speaker volume at the potentiometer labeled "VOL.". The audio output path is supplied through a 600 ohm audio transformer. The connector pinout is below.

| Function | Pin Number |
|---|---|
| Audio | Pin 5 |
| Audio Return | Pin 4 |

The audio output remains active until:

1. The CLEAR pushbutton switch is pressed.
2. A Clear (or Cancel) command is received and decoded.
3. A three minute time out occurs (if Dip Switch 3 = On).

**Battery Option**

A small battery disconnect slide switch is provided at the rear panel. This switch provides a means of completely disconnecting the battery from the circuit to conserve battery capacity, typically during shipping or storage. This switch is intended for factory use or trained service personnel only. This switch is not to be used as an On/Off switch.

**Note**: The normal standby display message is "BATTERY IS IN GOOD CONDITION". If this message does not appear, the battery is either charging ,there is no AC power or there is a problem with the VA-2000. If the battery is charging, the message will be " STAND BY MODE ".

**The "BATTERY  ON  OFF" slide switch must be in the On position during operation of the VA-2000.**

**Programming**

The following VA-2000 parameters are programmable:

> Numbers of digits to decode
> Digits per second
> Address
> Substitute numbers (wild cards)
> Messages

The VA-2000 is programmed through a two position connector, on the rear panel. The unit is programmed via an RS-232 receive signal, using standard ASCII data from a personal computer. The PC is used in a simple communication protocol. A programming cable kit, Model VA2PKIT, part # 46-0945805-00, is available to simplify the PC to VA-2000 wiring.

To start programming the VA-2000:

1. Connect the PC to the VA-2000.
2. Turn on the PC and VA-2000.
3. Enter a communication program.
4. Program the following parameters.

In general, each entry starts with an upper-case letter that designates a function, followed by an equals sign, then an entry and finally the ENTER key.

Note that the character before the equal sign <u>must</u> be upper-case.

**Number of Digits**

The total number of digits to decode may be from 3 to 8 for touch-tone data, Whelen 8 digit or Whelen 10 digit. In the case of touch-tone data and Whelen 8 digit data, the leading digits are the address and the last digit is the command. For example, in a 6 digit data string, the first 5 digits are the address. In Whelen 10 digit data, the first 7 digits are area code and address.

To program the number of digits to decode, enter one of the following:

> C=T3      for touch-tone 3 digits.
> C=T4      for touch-tone 4 digits.
> C=T5      for touch-tone 5 digits.
> C=T6      for touch-tone 6 digits.
> C=T7      for touch-tone 7 digits.
> C=T8      for touch-tone 8 digits.
> C=8       for Whelen 8 digits.
> C=10      for Whelen 10 digits.

*Remember to use upper-case letters.*

The number of digits default setting, in the VA-2000, is Whelen 10 digit protocol.

**Digits per Second**

The number of digits per second defines the timing of the data string. The digits per second may be from 1 to 15. For example, assume a digit on time of 125 ms and digit off time of 125 ms for a total digit time of 250 ms. Therefore, the number of digits per second equals 4.

To program the number of digits per second, type D=n, where n = 1 to 9, A, B, C, D, E or F. Characters A through F are hexadecimal values representing 10 through 15;  for example, A = 10, B = 11, etc.

For example, for 10 digits per second, type D=A and press ENTER.

The digits per second default in the VA-2000 is for Whelen 10 digit protocol.

**Address**

The address may be programmed to any of the 16 DTMF pairs. The address may be factory programmed, if the appropriate information is supplied with the order.

To program the address, type A=address, where address = 2 to 7 characters.

Whelen 10 digit example:
    If the area code = 123 and the address = 4567, type A=1234567 and press ENTER.

Touch-tone 5 digit example:
    If the address = 9876, type A=9876 and press ENTER.

The default setting is 1234567.

**Substitute Numbers**

The VA-2000 may be programmed to respond to group calls by programming the unit to respond to a substitute number, or a "wild card". A substitute number may be programmed into any or all positions of the address. The # symbol is used to represent a substitute number.

To program a substitute number, type W=98## and press ENTER.

For example, assume a Whelen 10 digit protocol, and the VA-2000 is to respond to all addresses. Also assume an area code of 123. The entry would be W=123#### and press ENTER.

The number of characters after the equal sign must be the same as the number of Address digits (ie. 2 to 7).

The default is no wildcards. Note: the display only displays 0's and #'s.

**Messages**

For Whelen 10 digit protocol, one to sixty messages may be programmed. For all other protocols, up to 15 messages may programmed. An individual message may be up to 96 characters, however, the total number

of characters must not exceed 1500. The display consists of 32 positions, therefore, messages greater 32 characters require a second or third "page".

Messages may be upper or lower case characters. Consideration must be should be given to the final position of the characters on the screen, to minimize splitting of words between lines or pages. A "Message Display Work Sheet" is included to help with message layout.

For 3 to 8 digit protocols, Message 1 will be displayed when a DTMF 1 is decoded in the command position, Message 2 will be displayed when a DTMF 2 is decoded in the command position, etc.

For Whelen 10 digit protocol, refer to the Table on the next page, for a breakdown of message numbers versus commands.

To program a message, type Mn=The message and press ENTER, where n = 1 to 15 (or 1 to 60, for 10 digit protocol).

For example, M1=`This is a test of the` and `only a test` and press ENTER.

There are additional functions that may be performed through the PC. These are:

> View a Message
> Erase a Message
> Reset to Defaults

**View**

To view a message, on the PC, simply type Vn= and press ENTER, where n is the desired message number.

**Erase**

To erase a message, in the VA-2000, simply type En= and press ENTER, where n is the desired message number.

**Reset**

Typing R= and pressing ENTER will cause a VA-2000 programming parameter reset. This function resets the VA-2000 to the default conditions and it clears all programmed messages. Following this command the programming parameters are:

> Number of Digits = 10
> Digits per Second = F
> Address = 1234567
> Substitute Numbers = none
> Messages = all messages are cleared

**Important: The reset process takes about 25 seconds. Do not press any Front Panel Controls during this time.**

# COMMAND NUMBER TABLES

The following tables show the relationship between Whelen Siren System commands and VA2000 messages. For instance, if a DTMF command of 01 is received by a VA-2000, then M1 (message 1) is displayed. At the same time, a remote siren will receive and decode the DTMF command of 01 as the Wail Tone. Therefore, it would be logical to make sure that message 1 relates to the Wail Tone. Another example are the Digital Voice Messages. From the table, notice that Digital Voice Message 1 and M49 correspond to DTMF command 31. In this case it would be logical to relate message 49 to Digital Voice Message 1.

For Whelen 10 digit protocol -

| Message # | Siren System Command | Command # |
|---|---|---|
| M1 | Wail | 01 |
| M2 | Attack | 02 |
| M3 | Alert | 03 |
| M4 | Public Address | 04 |
| M5 | Air-Horn | 05 |
| M6 | Hi-Lo | 06 |
| M7 | Whoop | 07 |
| M8 | Noon Test | 08 |
| M9 | North | 09 |
| M10 | East | 0A |
| M11 | South | 0B |
| M12 | West | 0C |
| M13 | Clockwise | 0D |
| M14 | Counter Clockwise | 0E |
| M15 | Silent Test | 0F |
| M17 | Digital Voice Message 13 | 11 |
| M18 | Digital Voice Message 14 | 12 |
| M19 | Digital Voice Message 15 | 13 |
| M20 | Digital Voice Message 16 | 14 |
| M21 | Rotor Position | 15 |
| M22 | Counter | 16 |
| M23 | Clear Counter | 17 |
| M24 | Arm System | 18 |
| M25 | Dis-arm System | 19 |
| M26 | Siren On | 1A |
| M27 | Siren Off | 1B |
| M28 | Signal/Noise Request | 1C |
| M29 | Signal/Noise Status | 1D |
| M30 | Test Clear | 1E |
| M31 | Status Request | 1F |
| M33 | Battery/AC | 21 |
| M34 | Battery/Temperature | 22 |
| M35 | Instant Status | 23 |
| M36 | Transmit Off | 24 |

| | | |
|---|---|---|
| M37 | not used | 25 |
| M38 | not used | 26 |
| M39 | Wind Shift | 27 |
| M40 | Reset wind & temp. | 28 |
| M41 | Reset rainfall | 29 |
| M42 | Weather | 2A |
| M43 | Temperature | 2B |
| M44 | Wind | 2C |
| M45 | Rainfall | 2D |
| M46 | Humidity | 2E |
| M47 | Barometer | 2F |
| M49 | Digital Voice Message 1 | 31 |
| M50 | Digital Voice Message 2 | 32 |
| M51 | Digital Voice Message 3 | 33 |
| M52 | Digital Voice Message 4 | 34 |
| M53 | Digital Voice Message 5 | 35 |
| M54 | Digital Voice Message 6 | 36 |
| M55 | Digital Voice Message 7 | 37 |
| M56 | Digital Voice Message 8 | 38 |
| M57 | Strobe On | 39 |
| M58 | Strobe Off | 3A |
| M59 | Digital Voice Message 9 | 3B |
| M60 | Digital Voice Message 10 | 3C |
| M61 | Digital Voice Message 11 | 3D |
| M62 | Digital Voice Message 12 | 3E |
| M63 | Active Status | 3F |

Note: The Clear (or Cancel) commands 00,10 and 30 will clear all siren system activity and return the VA-2000 to Stand-by Mode. Clear command 20 will only clear siren system activity. It will not clear VA-2000 activity. These commands correspond to M0, M16, M32 and M48.

For Whelen 8 digit protocol -

| Message # | Siren System Command | Command # |
|---|---|---|
| M1 | Wail | 1 |
| M2 | Attack | 2 |
| M3 | Alert | 3 |
| M4 | Public Address | 4 |
| M5 | Air-Horn | 5 |
| M6 | Hi-Lo | 6 |
| M7 | Whoop | 7 |
| M8 | Noon Test | 8 |
| M9 | North | 9 |
| M10 | East | A |
| M11 | South | B |
| M12 | West | C |
| M13 | Clockwise | D |
| M14 | Counter Clockwise | E |
| M15 | Silent Test | F |

For touch-tone protocol -

| Message # | Keypad Character |
|-----------|------------------|
| M1 | 1 |
| M2 | 2 |
| M3 | 3 |
| M4 | 4 |
| M5 | 5 |
| M6 | 6 |
| M7 | 7 |
| M8 | 8 |
| M9 | 9 |
| M10 | A |
| M11 | B |
| M12 | C |
| M13 | D |
| M14 | * |
| M15 | # |
| CANCEL | 0 |

## Internal Controls

The VA-2000 is equipped with a four position Dip Switch for additional control of certain functions. The Dip Switches are intended for factory use or trained service personnel only. The switch functions are defined as follows:

| DIP SWITCH | FUNCTION |
|------------|----------|
| DS 1 | On = Displays all received data. |
| | Off* = Displays only valid messages. |
| DS 2 | On* = Backlighting turns off after 3 minutes. |
| | Off = Backlighting follows normal control. |
| DS 3 | On* = Optional relay, audio path and speaker turn off after 3 minutes. |
| | Off = Optional relay, audio path and speaker follow normal control. |
| DS 4 | On = Battery option installed |
| | Off = Battery option not installed |

\* = default

## VA-2000 SPECIFICATIONS

**GENERAL -**

**Input Power:**   12 volt DC nominal, 40 mA typ., 225 mA max.
        UL listed wall mount transformer.

**Physical:**    Desktop design, driftwood color.
        3.4" H x 5.9" W x 7.6" D.
        3.6 pounds.

**Environmental:**  Operating temperature, 0 to 60 degrees C.
        Humidity, 0-95%, non-condensing.

**Communication:**  Radio receiver and antenna,
        Typical freq. ranges:  132-174 MHz
                 403-430, 450-470 MHz
                 806-824, 851-869 MHz
                 928-929, 952-960 MHz
        DTMF protocol; Whelen 10 digit format or other
        3-8 digit formats. Digit rate programmable from
        1 to 15 digits per second.

**Controls:**    Clear, Display Backlight, Test.

**Indicators:**   Flashing, high intensity red LED.

**Display:**    32 character LCD, 2 line by 16 characters, 5.55 mm high.
        Internal Backlighting.

**Tone alert:**   Piezo, 3.7 KHz tone.
        106 dBa, nominal.

**Message**     1500 total characters.
**Capacity:**    Up to 96 characters per message.
        Page scrolling.

**OPTIONS -**

**Battery:**    12 volt DC battery back up.
        Gel-type, sealed battery.
        Internal battery charger.
        24 hour stand by, followed by 30 minute warning activation.

**Relay:**     2 Form C, NO, NC.
        1 Amp @ 24 VDC or 125 VAC.

# Message Work
## Sheets