

# EG-400-5™ Fire Detection Monitor

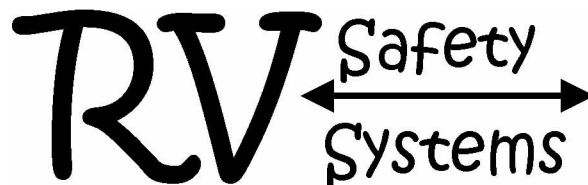
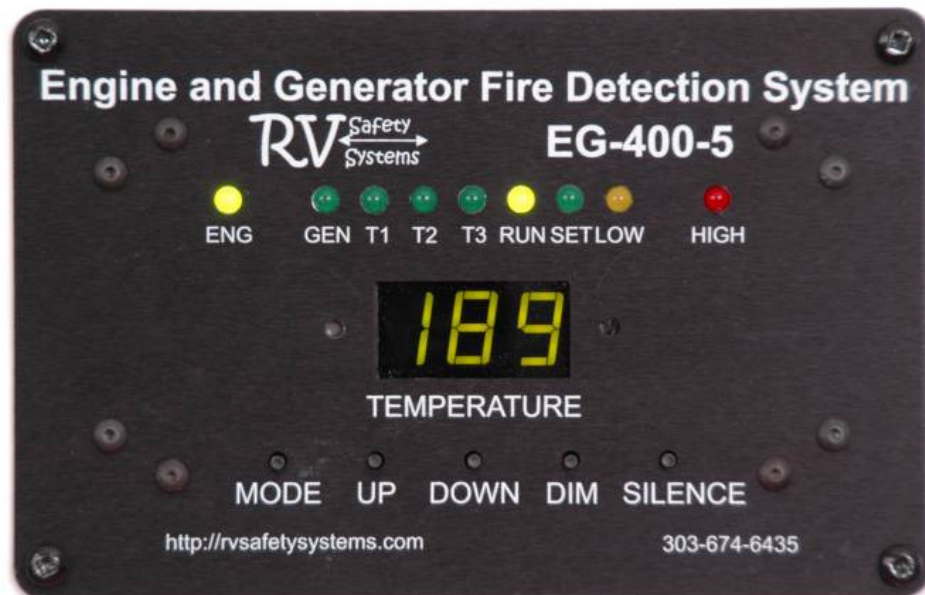
For Engine and Generator compartments

PLUS three additional, owner selected, locations

## Owner's Manual

## With installation instructions

Revision 2.1 (2/1/10)



Our Business is Your Safety and Peace of Mind!

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## Product description

The EG-400-5™ Fire Detection Monitor measures and displays the temperature of engine and generator compartments. In addition, it has three extra channels for monitoring the temperature of owner selected locations. For the engine and generator channels, it has two levels of alarms to warn the driver that an over-temperature condition exists or that a strong indication of a fire has been detected. The three additional channels allow the owner to monitor temperatures of selected locations. The three additional channels are informational only and do not trigger the fire suppression relay (\*).

The monitor prioritizes the engine and generator compartments. The microprocessor cycles through the sensors so that the engine and generator sensors are checked every two seconds, while the other channels are checked at approximately 10 second intervals.

While the primary function of this unit is intended to be the detection of a severe mechanical/electrical problem or a fire in the engine and generator compartments, the ability to monitor temperatures at various locations is a strong benefit.

The faceplate is 7 inches by 4 1/2 inches. It is attached to a box that contains the circuit board and electronic components. The faceplate is designed to be mounted in the dash or a control panel beside or above the driver. An optional bracket is available for non-surface mounting applications. All components are made of black anodized aluminum.

There are nine LEDs which show the system status, a digital temperature readout, and five pushbutton switches which control the operation of the unit.

The unit contains a dry contact relay which is activated if a “high” alarm is triggered. This relay is designed to trigger the RValve™ and the fire suppression system.

Provision is made for two separate power supplies. The main power can be a switched 12V (or 24V) supply for the condition when the engine is running. The second power source is optional and is intended for a power source that allows the unit to be powered when the vehicle is parked and the generator is operating.

If the monitor is used in connection with the fire suppression system, it is strongly recommended that the main power supplied to the monitor be from a non interrupted source, so that the monitor is working at all times. In lieu of an un-interrupted power source, it is mandatory that the system be wired so that the monitor has power any time the engine, and/or the generator is operating.

There are failsafe features designed into the monitor. If one of the sensors or sensor wires short out, the device will activate the “low level” (yellow) alarm for the affected circuit and display “SHO”. If one of the sensors has an open circuit (broken wire or sensor failure), the display will read “OPE” and will sound a low-level alarm. **Please note.** If you plan to monitor only one compartment, you will still need to wire the second sensor into the system to avoid a false “OPE” alarm.

### The unit is shipped with the following components:

- EG-400-5™ Monitor.
- Five temperature transducers with approximately three feet of twisted high temperature wire.
- Owner/Installation Manual

Note (\*): On 12/1/09 we introduced a five active sensor version of the EG-400-5. For this version, all five sensors can trigger the fire suppression relay if a fire in that area is detected. The cycle time for the microprocessor to poll all sensors is approximately 2 seconds (each sensor is polled at least once in a two second period).

## Operation of the EG-400-5™

The functions of the EG-400-5™ switches are described below:

- The mode switch allows the user to:
  - select temperature measurement in degrees F or C
  - select the temperature for the "low" warning alarm for each compartment within a selected range. This allows the unit to be tailored for each application. The low-warning alarm is an indicator that the compartment has exceeded the default or owner's pre-set value and that further monitoring is suggested. Whichever compartment triggers the low alarm will be shown on the LED bank and the digital temperature readout will be switched to the compartment triggering the alarm.
  - Return to the run, or monitor, operation
- The Up and Down switches are used to make changes in the values during the **setting** mode and to switch between engine, generator and auxiliary temperatures in the **run** mode. When the digital readout is selected for the engine compartment, the engine LED will be lit. When the up or down switch is activated again (in the run mode), the unit will cycle through the other channels, displaying the led of the channel selected and the temperature for that channel.
- The dim switch will allow the owner to dim the brightness of the display for night driving.
- The silence switch can be used to silence a "low" alarm for a short period of time to allow the owner to monitor the situation without the disturbance of the alarm. The alarm will again sound after a pre-set time. The silence switch will not work for the pre-set "high" alarm. The high alarm is triggered by a temperature which is sufficiently high to indicate a very high probability of a serious operation problem or fire.

The operation of the EG-400-5™ is very straight forward. The unit will come pre-set with default values considered to be acceptable for the majority of owners (250 degrees F/120 degrees C). Provisions are made to allow the user to tailor the unit to specific conditions for each application. Once the unit is adjusted for the specific motorhome conditions, no other adjustment is needed. The owner can quickly select the channel to monitor. If an abnormal condition develops in any channel, the owner will be given preliminary warning via the "low" (operator selected value) warning alarm. The unit will immediately switch to monitor that compartment. The unit will be locked on that compartment until the abnormal condition is resolved (or until an alarm is detected on a higher priority channel). By locking on the compartment with the abnormal condition, the owner can monitor the temperature to determine if inspection is needed. The owner can silence the alarm for short periods of time while evaluating the situation.

It is strongly recommended that the owner set the "low" alarm trigger temperatures for his unique application. The process involves observing the temperature for each compartment under conditions that would produce high operating temperature. For the generator compartment this would be during high ambient temperature and high output. For the engine this would again be high ambient temperature and high HP demand on the engine. Once the maximum temperatures are observed, the "low" alarm triggering temperature can be set using the calibration mode. It is suggested that the triggering temperatures be set only slightly above the highest observed temperature. This will give the earliest possible warning of a problem. If the "low" alarm activates frequently for a compartment, the triggering temperature can be adjusted in the calibration mode. The "low" alarm trigger temperature for the three additional channels are set with the same thought process.

If the temperature increases to a pre-set "high" temperature in the engine or generator compartment, a very abnormal condition is indicated and the owner must inspect the compartment immediately, as the possibility of a very serious problem is strongly indicated. In this condition, the silence switch will not function, since the situation is considered critical. The high alarm is reserved for the engine and generator compartments and does not function for the other channels. The three additional channels will not trigger a "high" temperature alarm, as they are informational only.

The unit also provides a dry contact relay which is designed to trigger the RValve™ of the fire suppression system. The relay only activates on the "high" (critical) alarm. The dry contact relay is designed to handle 0.7A. If additional current capacity is needed, refer to the wiring diagrams in the fire suppression system installation manual.

**Warning:** it is very important that the owner periodically check the digital readout and LEDs to make sure the unit is working properly and that no error codes exist. When power is first applied to the unit, the LED's should light and the "speaker" should sound a quick alarm. Failure to verify that the unit has power, the unit is monitoring the compartment temperatures, and that the speaker is working could result in a situation where the unit does not detect or notify the owner that a fire exists in the engine or generator compartment.

**Warning:** this unit has failsafe displays warning of open or shorted conditions in the sensor circuits. Failure to determine the cause of the problem and immediately repair the situation will render the EG-400-5™ useless and prevent detection of a fire in the compartment affected by the wiring problem.

**Warning:** as soon as a low-level temperature alarm is activated, it is imperative that you monitor that channel to determine if the temperature is continuing to climb. If the temperature continues to climb, that is strong evidence that a fire potential exists. The high-level alarm is set to activate at 400 degrees F, but temperatures in the 300 degree F range are abnormal and demand immediate inspection of the indicated compartment.

**Warranty:** This unit is warranted for a period of one year from the date of purchase. The warranty covers parts and workmanship. The warranty does not cover damage occurring from improper use/handling or incorrect installation. The owner must contact RV safety systems for approval to return the defective unit.

## Installation

### Mounting the monitor

The design of the faceplate and enclosure facilitates flush mounting into the dash area. The faceplate is 7.0 inches by 4.5 inches. The enclosure is 6.0 by 4.0 inches. If the unit is flush mounted into the dash, the opening should be slightly larger than the enclosure.

We also offer a bracket which will permit easy mounting below the dash or below an overhead compartment. The bracket is designed so that the faceplate mounting holes coincide with the holes in the bracket. The bracket has a mounting surface at right angles to the faceplate with two pre-drilled holes to make mounting easy.

While it is easy to mount the unit on top of the dash, we need to express a concern that exposure to the direct sun could raise the temperature of the unit. The faceplate and enclosure are designed to withstand high temperatures, but electronic component life can be reduced when subject to very high temperatures.

The unit should be mounted in a location where it can be monitored easily. This assures that the owner can see that the unit is functioning properly and can quickly determine the channel causing an alarm. It also permits operation of the switches.

### Wiring installation

Listed on the last page of this manual are the wiring connection instructions.

Wire for the power supply connections should be at least 22 ga. Wire for connecting the sensors to the monitor should be at least 22 ga. twisted pair "communication cable" or "sound and security cable" wire. The sensors are supplied with special high temperature wire. The connections to the high temperature wire should be made outside of the compartment, if possible. This will assure that only high temperature wire is exposed to the temperatures of the engine or generator compartment.

Normal wiring practice should be followed. Care should be exercised not to run the twisted pair wire parallel with 120 volt wiring for distances over four feet, since the alternating frequency could affect the temperature reading.

Electrical connections should be made consistent with acceptable wiring practice. Soldering or crimped connectors are the desired methods, along with good closure of the connection with heat shrink tubing or good electrical tape. If the sensor connections are not correct, the internal failsafe software will indicate which set of connections have a problem and if the problem is a short or open circuit.

The EG-400-5™ is a very low current device. It has a ½ amp internal fuse in its system, and thus, does not require that a fuse be installed in the power supply wiring. If the owner does choose to install a fuse, it should have a capacity of 2 amps or less.

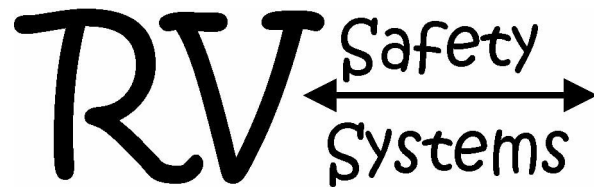
The three additional sensors can be mounted in any location that does not normally see temperatures above 400 degrees F. The sensors can be adhered with epoxy to various surfaces to measure surface temperature (e.g. rear end housing, inverter, etc) or suspended to measure air temperatures in various areas.

### Mounting and locating of the sensors

The sensors should be mounted as high as possible in the compartment. It is best to have the sensor mounted in a “dead air space”. While there is probably not a true dead air space in the compartment, it is best to mount the sensor where it is shielded from significant air flow - especially air flow from the radiator fan. Placing the sensor in a high air flow area will significantly delay detection of a raising temperature condition caused by a fire in the compartment. It is also important to have the sensor as far away as possible from high heat sources such as exhaust manifolds and turbo housings so that false alarms are avoided.

The sensors can be mounted using any device which will not cause damage to the sensor or the wire. As is the case with any wire mounting, the cable should be well supported and protected from damage - this is especially important with our RVs because of the constant movement and vibration while we are driving. Typical mounting methods include: tie/cable wraps and wire/cable clamps. Consideration should be given to avoiding a mounting failure in the event of a fire. All of the components in the sensor/sensor wiring leads are rated for 400 degrees F and as noted above, connections to this high temperature wire should be made outside the engine or generator compartment.

The actual sensor is at the end of the twisted high temperature wire and is very small in size. At first glance, it looks like the wire is simply joined together. It is best not to cover the sensor during the mounting process. Any material on the outside of the sensor will insulate it from the heat and delay its reaction to temperature changes. Conversely, it is not necessary to mount it on any type of temperature “gathering” surface. It works best if it is separated from direct contact of any material so that it can detect air temperature rather than surface temperature.



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## Wiring information and color codes for EG-400-5™ wire cable

Red:	12/24 volt positive (*)
Black:	12/24 volt negative (*)
Orange:	12/24 volt positive (*)
Brown:	12/24 volt negative (*)
Green:	Engine compartment temperature sensor (**)
White:	Engine compartment temperature sensor (**)
Blue:	Generator compartment temperature sensor (**)
Gray:	Generator compartment temperature sensor (**)
Yellow:	Alarm “signal” relay (positive from power supply) (***)
Purple:	Alarm “signal” relay (output power from relay)(***)

### 6 Wire Cable

Blue:	T1 temperature sensor (**)
Brown:	T1 temperature sensor (**)
Green:	T2 temperature sensor (**)
White:	T2 temperature sensor (**)
Red:	T3 temperature sensor (**)
Black:	T3 temperature sensor (**)

(\*) Two power supply circuits (red/black and orange/brown) are provided. One is for a switched power supply (for when the engine is running). The second power supply circuit is optional and is intended for possible use when the engine is not running, but the generator is operating. Only one power supply is needed. It does not matter which set of input wires is hooked to either supply. However, the input is *polarity sensitive*. Input can be 12 or 24 volts. The wiring does not need to be fused as the unit has an internal fuse.

**Please note:** If this monitor is used in conjunction with the fire suppression system, the power to the monitor **MUST** always be on any time the engine, and/or the generator is operating. The best option is to have the monitor powered at all times.

(\*\*) These connections are not polarity sensitive. The temperature sensors must be connected to the EG-400-5™ with the twisted pair communication wire. The wire we offer on our web site is Carol C6348, but any twisted pair “communication” or “sound and security” wire is acceptable. Any conventional connection method is acceptable. Connection to the sensors should be made outside the compartment if possible, as the sensor wire is a special high temperature wire intended to withstand possible extreme temperatures.

(\*\*\*) This is a dry contact relay. The relay is rated at 0.7 A and is designed to have sufficient capacity to trigger the RValve™ and fire suppression system or a Bosch type relay for controlling other systems in addition to the fire suppression system. For more information on the wiring of the RValve™, please refer to the installation wiring diagrams in the installation manual for the RValve™ and fire suppression system.

#### **Notes:**

1. All wire should be at least 22 ga.
2. Any acceptable connection can be used, but soldering or crimping is preferred.
3. Wiring for the RValve™ and fire suppression system is detailed in a separate manual.