

MODEL 555 AUXILIARY ALARM MONITOR 24V MANUAL



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PURPOSE

The purpose of the model 555 Auxiliary Alarm Monitor is to provide a simple cost-effective means to accept signals from up to six switch-type sensors with delayed and latched indications for the status of each. A common alarm output is produced on an exclusive or a multi-trip basis that can be used with its own annunciator, or can be used as an auxiliary input to other systems such as the Engine Saver.

APPLICATION

The Model 555 is used in conjunction with engine protection installations that include a Model 550 Engine Saver, Model 565 Engine Controller, Model 995 Marine Engine Monitor, or other equipment requiring additional auxiliary alarm inputs. The 555 may be thought of as an auxiliary channel “expansion box”. For example, the 555 permits the Engine Saver’s single AUX 2 input to handle up to six switch-type sensors or voltage inputs. A unique programming feature on each of the six channels allows any type of switch arrangement to be used. The 555 may also be used as a low-cost stand-alone alarm monitor for pressure, temperature, level, etc. If more than six channels are needed, multiple 555’s may be connected together with a common alarm output.

DESCRIPTION OF FEATURES

The Model 555 consists of six identical channels that accept a switch closure or a voltage from various sensing devices to represent an alarm condition. The switch may be normally open or normally closed. It may switch to ground (battery negative) or to +24 VDC. Each of the six channels may be programmed independently to meet the needs of each individual sensing device. Each channel has an 8-9 second time delay to prevent false tripping from noise or a momentary false signal. Faults are latched (remembered) and displayed on six red LED indicators, which remain illuminated until the unit is reset. Reset is accomplished by simply re-cycling power.

The unit may be programmed for “multi-trip” or “exclusive-trip” modes of operation. In the multi-trip mode, more than one fault may be latched and displayed, for up to a total of six. It doesn’t matter in what order the faults occurred. This option is normally used if the alarm is advisory only and the engine is not to be shut down. In the exclusive trip mode, only the first fault is latched and displayed. Other faults that occur later are ignored. This option is normally used if the engine is to be shut down on alarm. An indication of the cause of the original fault then remains without the possible confusion from other faults that may occur after the engine stops. This is especially important when the engine is essentially unattended. Fault monitoring may be continuous, or enabled by an external ENABLE signal. Green LED status indicators are provided for POWER and ENABLED. Connections are made directly to a 14-pin plug with binding screws. No special tools are required.

This version of the Model 555 operates from 24-28 VDC power. A 12-volt version is also available.

SUMMARY OF FEATURES

- **Programmable inputs accept any type of switch-type sensor.**
- **Six identical channels with individual red fault indicators.**
- **Time delays to prevent false tripping.**
- **Latched alarms “remember” the fault until the unit is reset.**
- **Multi-trip or exclusive trip modes of operation.**
- **Fault monitoring may be externally enabled.**
- **Separate green “Power” and “Enabled” status indicators.**
- **Alarm output feeds Engine Saver or remote annunciator.**
- **Removable 14-pin connector accepts wires directly.**
- **Multiple 555’s may be “chained” to obtain more channels.**
- **Rugged black anodized aluminum case.**
- **Space provided on case labels for user’s data.**

INSTALLATION

Refer to the Wiring Diagram, Figure C, on page 7. Since the length of the wiring to and from the Model 555 is not critical, the unit may be mounted in any convenient location away from direct engine or exhaust system heat. Wiring should be #18 for durability. Shielding is not necessary. Fault sensor switches are connected to pins 1 through 6 corresponding to channels 1 through 6.

The Model 555 is powered by 24 VDC (pin 10) from the Engine Saver (refer to Fig. F on Pg. 8) or from a separate circuit. The enable signal, if used, may be supplied from the Engine Saver or from another source. The enable input (pin 7) requires the equivalent of a switch closure to ground (battery negative) to enable the unit. An open circuit or a voltage level disables the unit. Notice that more than one Model 555 can be connected to obtain additional channels. In a multiple-unit installation, the alarm outputs (pin 8) are bussed together to form a common alarm output. If it is desired to enable more than one Model 555 at once with the same signal, the enable inputs (pin 7) may also be connected in common. Refer to the Wiring Diagram for Multiple Units, Figure E, on page 8.

The unit may be mounted in any position, however it should be oriented so that the indicators can be seen easily. Make sure that there is enough clearance to slide the PC assembly out of the case to access the programming switches. If the 555 is to be used with the Engine Saver, a location nearby may be preferred so that all indicators may be observed at once. Avoid locations that would subject the unit to direct engine or exhaust system heat. Mounting is by means of the 4 holes provided in the case flanges.

A space has been provided on the unit for user identification of the function or parameter being monitored on each of the six channels. These white spaces may be written on, or printed labels may be affixed.

PROGRAMMING

Sensor/Switch Type Selection

The Model 555 may be programmed by means of internal DIP switches to accept signals from a variety of switch-type sensor situations. Switches SW1 through SW6 correspond to channels 1 through 6.

The installation and operation of the 555 is basically simple and straightforward. If you have a problem on the initial installation, it will most likely be caused by an improper setting of the programming switches for the situation that you have. Make sure that you know how each sensor switch or signal acts when a fault condition is present. If you are uncertain about how the sensor switch in question works, actuate it to a fault condition and check at its terminals with a meter or continuity tester.

Confusion can arise from the terms “normally open” and “normally closed”. For example, a normally open pressure switch might be held closed by pressure in the normal range but opens if the pressure falls below the normal range, representing a fault. While this switch is closed under normal conditions it would be described as “open-on-fault”. You can now see how this could be confusing. In order to prevent such confusion and eliminate ambiguity, sensor switches will be designated as simply “open-on-fault” or “close-on-fault”.

The 6 identical channels correspond to pins 1 through 6 on the connector, and each one is programmed separately to meet the needs of the sensor/switch being used. Locate your sensor situation on *Chart 1 - Input Contact Type Programming*, pg. 4) or illustrations and set the appropriate DIP switch, SW1 through SW6, accordingly. Switch SW1 is for Channel 1, switch SW2 is for Channel 2, and so on. Each switch has three rockers, designated ROCKER 1, ROCKER 2 and ROCKER 3. A certain combination of these rockers will configure the channel for the type of sensor or signal you are connecting. These inputs can also accept a voltage level if it is in the range of 10 to 28 volts (refer to *Chart 2 - Input Signal Type Programming*, pg. 4). Proper operation is easily verified. No damage will be done if the switches are improperly set, however wrong settings may produce some strange or unpredictable results.

For those that are interested in what the channel programming switches actually do electrically, the following explanation is offered. Closing rocker 1 provides a pull-up of 4.7K to 12 volts. Closing rocker 2 provides a pull-down of 4.7K to ground. Rocker 3 determines the logic sense of the channel. Closing rocker 3 defines a voltage (10-28V) to represent a fault. Opening rocker 3 defines no voltage (0V) to represent a fault.

Enable Mode Selection

The unit will only respond to a fault condition on any of its inputs if it is *enabled*. Switch SW7-ROCKER 1 programs the enable mode. If it is desired to enable the unit using an external signal, such as from the Engine Saver, set SW 7-ROCKER 1 to the OPEN position. If it is desired to have the unit enabled all the time, set SW 7-ROCKER 1 to the CLOSED position. Connecting pin 7 to pin 9 has the same effect. Refer to the charts and illustrations on pages 4 and 5.

Trip Mode Selection

The trip mode determines how the unit responds to and displays a fault condition on any of its six channels. The trip mode selected will apply to all channels. The multi-trip mode allows more than one fault to be latched and displayed regardless of the order in which they occurred. To select the multi-trip mode, set SW 7-ROCKER 2 to the OPEN position. The exclusive-trip mode will latch and display only the *first* fault, and will ignore any other faults that may occur later. To select the exclusive-trip mode, set SW 7-ROCKER 2 to the CLOSED position. Refer to the charts below and illustrations on the following page.

CHART 1 - INPUT CONTACT TYPE PROGRAMMING

Sensor Contact Action on Fault	Switches SW 1 – SW 6 for Channels 1 – 6		
	Rocker 1	Rocker 2	Rocker 3
Close to GROUND on Fault	CLOSED	OPEN	OPEN
Close to POSITIVE on Fault	OPEN	CLOSED	CLOSED
Open from GROUND on Fault	CLOSED	OPEN	CLOSED
Open from POSITIVE on Fault	OPEN	CLOSED	OPEN

In some cases, the fault signal may not come from a sensor-switch but instead from another system in the form of a voltage. It doesn't matter how the signal is generated by that system as long as it is understood what the signal does when it is representing a fault. The chart below shows two possible scenarios. The first shows a fault condition as being represented by a voltage in the range of 10 volts to 28 volts. When there is not a fault, this voltage is zero or close to zero. The second scenario shows just the opposite. That is, the voltage is there when there is no fault, and goes away when there is a fault. Determine which situation you have and set the rocker switches accordingly.

CHART 2 - INPUT SIGNAL TYPE PROGRAMMING

Input Signal Action On Fault	Switches SW 1 – SW 6 for Channels 1 – 6		
	Rocker 1	Rocker 2	Rocker 3
Signal = 10V to 28V on fault, = 0V on no-fault.	OPEN	CLOSED	CLOSED
Signal = 0V on fault, = 10V to 28V on no-fault.	OPEN	CLOSED	OPEN

CHART 3 - ENABLE MODE PROGRAMMING

Enable Mode	SW 7 – Rocker 1
Externally Enabled	OPEN
Always Enabled	CLOSED

CHART 4 - TRIP MODE PROGRAMMING

Trip Mode	SW 7 – Rocker 2
Multi-Trip	OPEN
Exclusive Trip	CLOSED

FIG. A - PROGRAMMING SWITCH LOCATIONS

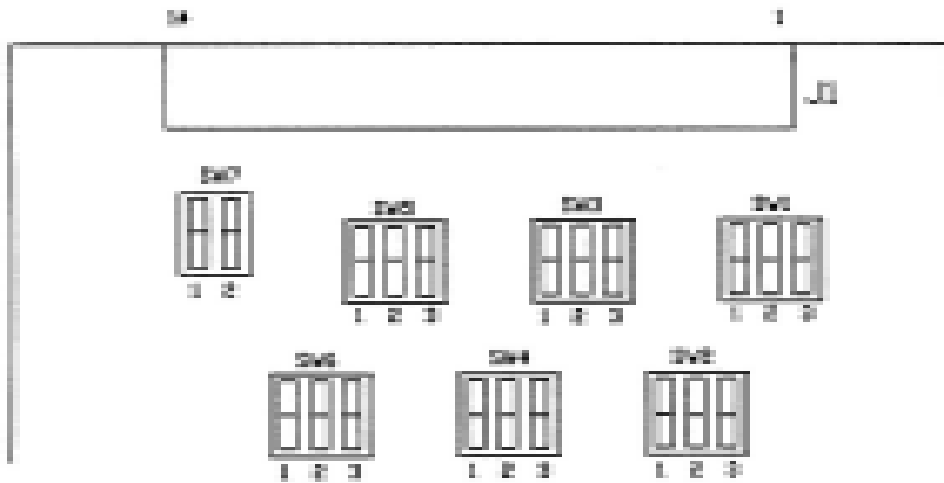
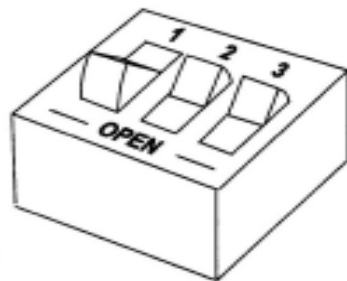


FIG. B - PROGRAMMING SWITCH POSITIONS



ILLUSTRATED:

ROCKER 1 - CLOSED

ROCKER 2 - OPEN

ROCKER 3 - OPEN

OPERATION

The unit is designed to monitor up to six switch-type sensor inputs. Each channel is configured to match the type of sensor or signal being used. All inputs are time delayed and latched. Multi-trip or exclusive-trip modes of operation can be selected. The unit can be enabled all the time or by means of an external enable signal. Refer to "Programming" to make these selections. The following assumes that these selections have been made properly.

Power to the unit is indicated by the green POWER status LED.

The unit ignores faults on all channels until it is enabled. When enabled, the green ENABLED status LED will be illuminated. When enabled, all channels are continuously monitored. When a fault condition appears on a channel, an 8 to 9 second time delay is started. If the fault condition goes away at any time during this delay period, the timer is automatically reset. If the fault condition remains beyond the time delay period, the fault is latched and the corresponding red LED fault indicator is illuminated. At the same time, the alarm output is activated.

The fault indication and alarm will remain until the unit is reset, even if the fault condition goes away. If the unit has been programmed for multi-trip, additional faults may be latched and indicated in the same way. If the unit has been programmed for exclusive trip, additional faults that occur at any time after the first fault will be ignored. The fault indication and alarm will remain until the unit is reset, even if the fault condition goes away. Once a fault is latched, the enable signal has no effect on that channel. If the enable signal goes away, no additional faults will be latched, regardless of the trip mode selected. If the enable signal goes away while a fault condition is present on one of the channels, but the time delay has not expired, the timer will be reset and the fault will not be latched or indicated regardless of the trip mode selected.

TROUBLESHOOTING

The installation and operation of the 555 is basically simple and straightforward. If you have a problem on the initial installation, it is most likely caused by an improper setting of the programming switches for the situation that you have. Make sure that you know how each sensor switch or signal acts when a fault condition is present. Confusion can arise from the terms “normally open” and “normally closed”. For example, a normally open pressure switch might be held closed by pressure in the normal range but opens if the pressure falls below the normal range, representing a fault. While this switch is *closed* under *normal* conditions it would be described as “open-on-fault”. You can now see how confusion could arise. In order to prevent such confusion and eliminate ambiguity, sensor switches will be designated as simply “open-on-fault” or “close-on-fault”. If you are uncertain about how the sensor switch in question works, actuate it to a fault condition and check at its terminals with a meter or continuity tester.

Since the unit has six identical channels, it is possible to swap channels for the purpose of isolating a problem to a particular channel or sensor switch. If channels are swapped for troubleshooting purposes, make sure that the channels are programmed the same and properly. If the problem “follows” the sensor over to the new channel, it is likely to be caused by a misunderstanding of how the sensor works (hence improper programming) and/or a wiring problem. If the sensor works properly when moved to a new channel that is programmed the same, the problem is likely with the 555 unit. Refer to Troubleshooting Chart below.

CHART 5 - TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	SOLUTION
POWER LED does not light	Connector not properly seated	Seat connector firmly
	Loose or wrong connections	Check connections
	Fuse or circuit breaker open	Check for 24V at pin 10
ENABLE LED does not light	Loose or wrong connection at pin 7	Check connection at pin 7
	Enable signal not going to ground	Check voltage on pin 7
	Not always enabled as desired	Check 555 J-Boxer I
Never alarms	Not enabled	See above
	Defective 555 unit	Repair I replace 555 unit
Alarms with no fault present	Channels improperly programmed	Check programming
	Sensor switch works in reverse	Check sensor switch
	Sensor switch wired wrong	Check sensor switch wiring
	Open/short/loose connection	Check wiring
	Defective 555 unit	Repair I replace 555 unit
No alarm with any fault	Channels improperly programmed	Check programming
	Sensor switch works in reverse	Check sensor switch
	Sensor switch wired wrong	Check sensor switch wiring
	Open/short/loose connection	Check wiring
	Defective 555 unit	Repair I replace 555 unit
Alarms when not enabled	Defective 555 unit	Repair I replace 555 unit
Alarms without any time delay	Defective 555 unit	Repair I replace 555 unit

FIG. C - WIRING DIAGRAM FOR STAND ALONE MODEL 555

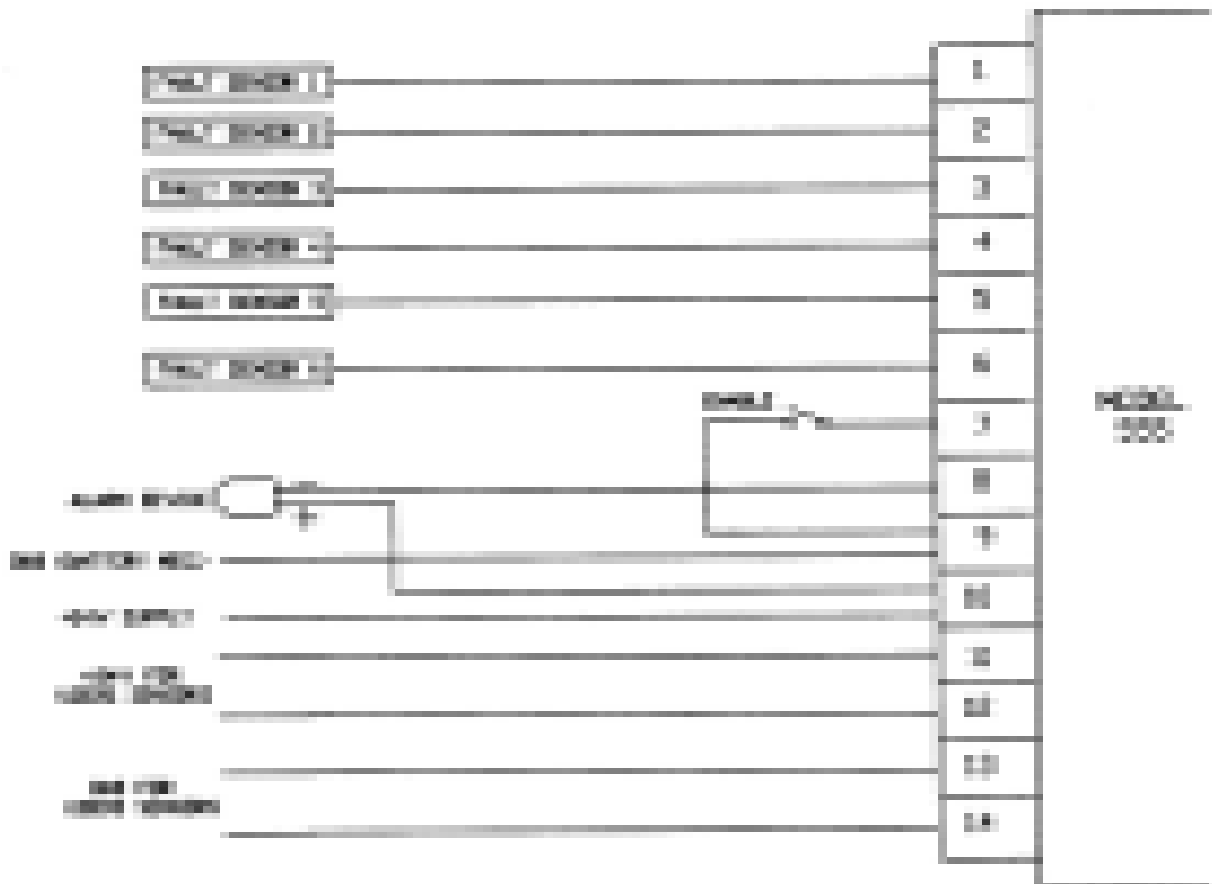


FIG. D - WIRING DIAGRAM FOR STAND ALONE MODEL 555 WITH OPTIONAL SHUTDOWN RELAY

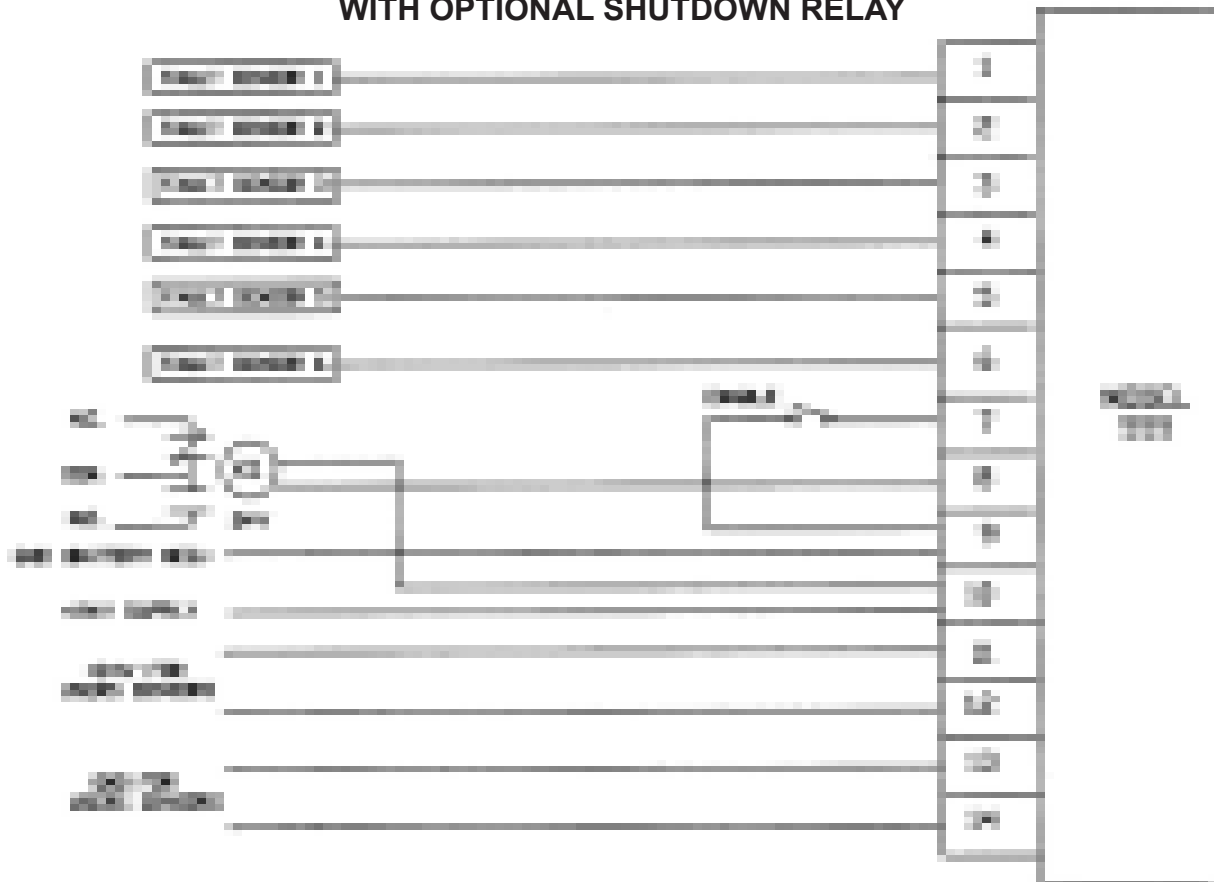


FIG. E - WIRING DIAGRAM FOR MULTIPLE MODEL 555 UNITS

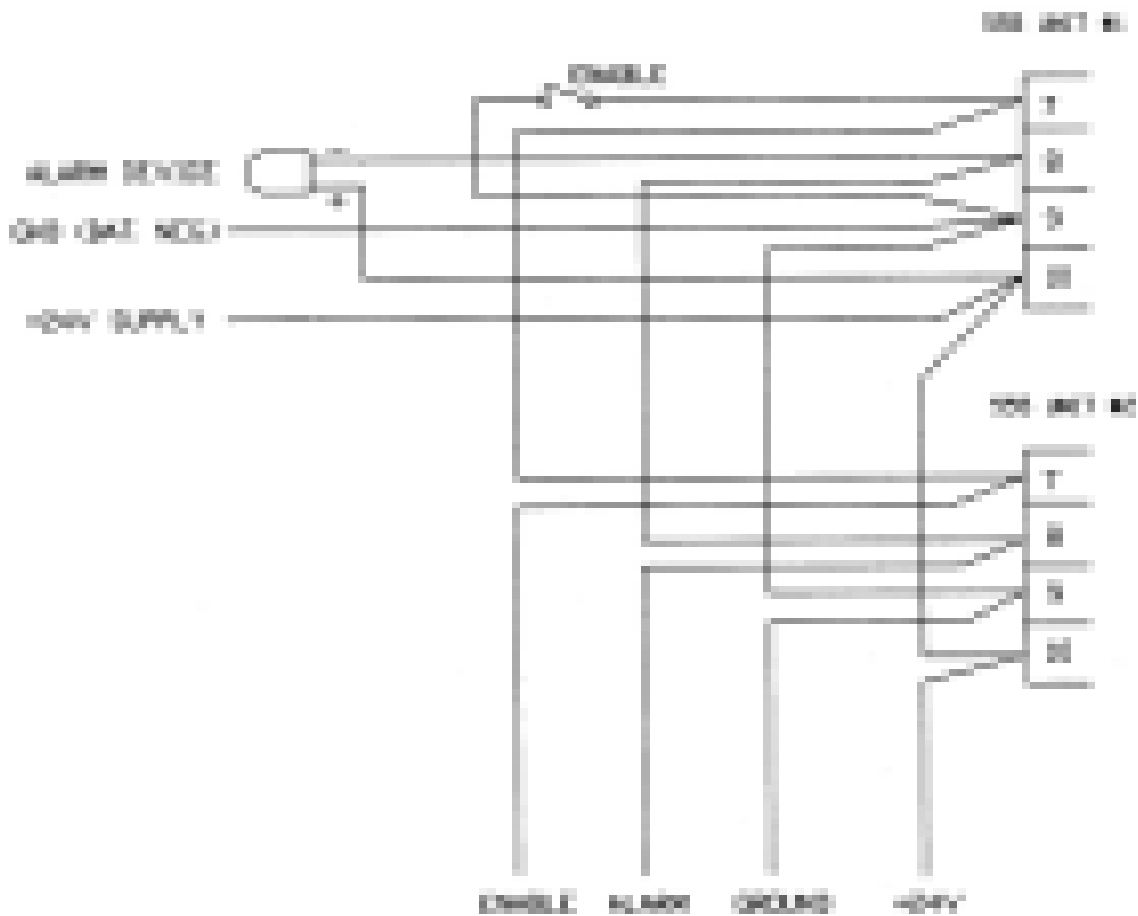
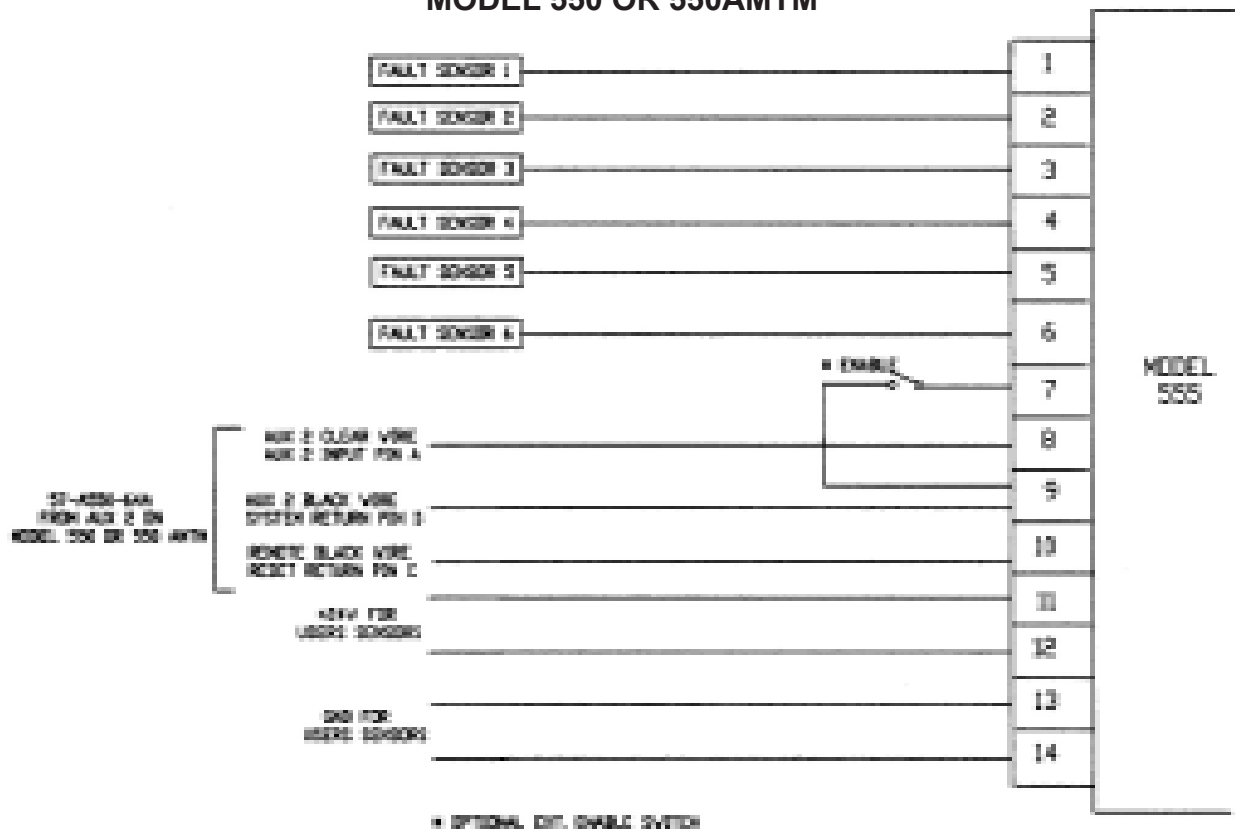


FIG. F - WIRING DIAGRAM - MODEL 555 CONNECTED TO MODEL 550 OR 550AMTM



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The Model 555 is fully rebuildable. Service, Parts and Technical Support can be obtained throughout the world from our PA Manufacturing Facility.

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WARRANTY INFORMATION

The MODEL 555 AUXILIARY ALARM MONITOR is warranted to be free from defects in materials and workmanship for a period of two years from the date of shipment, or the date it is first put into service, if the latter is documented by completing and returning a copy of the WARRANTY REGISTRATION (On the following page) within 10 DAYS OF INSTALLATION.

FLIGHT SYSTEMS' liability is limited to the repair or replacement of defective product within the warranty period, and does not cover installation or removal costs incurred or possible damage to other equipment (including engines or parts thereof) as a result of a malfunction of the AUXILIARY ALARM MONITOR.

If, in the opinion of FLIGHT SYSTEMS (or its authorized agent) the malfunction of the AUXILIARY ALARM MONITOR was caused by abuse, misuse or improper installation, the warranty claim will be disallowed and established repair rates shall apply.

Units should be shipped, freight charges prepaid, directly to FLIGHT SYSTEMS, 207 Hempt Rd Mechanicsburg, PA 17050, USA.

NOTICE:

IN ORDER TO ACTIVATE YOUR WARRANTY, FILL OUT AND RETURN THE AUXILIARY ALARM MONITOR WARRANTY REGISTRATION ON THE NEXT PAGE.

AUXILIARY ALARM MONITOR WARRANTY REGISTRATION

Please fill out the information below and Fax or Mail to:
Flight Systems 207 Hempt Rd Mechanicsburg, PA 17050 USA

PLEASE PRINT CLEARLY

COMPANY _____

ADDRESS _____

CITY _____ STATE ____ ZIP _____ COUNTRY _____

PHONE _____ FAX _____

CONTACT NAME _____ TITLE _____

E-MAIL _____

APPLICATION INFORMATION

DATE OF INSTALLATION _____

APPLICATION _____

ENGINE _____ CONDITION _____ HOURS _____

ENGINE IS MAIN OTHER _____

INSTALLATION

INSTALLED BY: OEM DEALER FS AGENT/DIST OWNER/USER

COMMENTS:

Fax to 717 590 7327