

Greentrol Automation, Inc.

Installation, Operation and Maintenance Technical Manual

GA-100

Analog Input Alarm Device with Local/Remote Alarms

Document Name: *TM_GA-100_R1C*



Part Number: 960-0000

LIST OF EFFECTIVE AND CHANGED PAGES

Insert latest changed pages (**in bold text**); remove and dispose of superseded pages.
Total number of pages in this manual is **10**.

Page No	Revision *	Description of Change	Date
1 - 4; 9	R1C	Removed OEM references; updated to R1C	11/23/2011
8	R1B	Corrected location of LED PWR jumper	08/02/2010
1 through 10	R1A	Initial document release.	06/24/2010

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OVERVIEW

GreenTrol model GA-100 is a high quality, economical alarm solution designed for installation in critical applications where alarm features are necessary. The GA-100 can be configured to accept 0-10VDC, 0-5VDC or 4-20 mA signals. Local alarm status is provided by a front panel indicator. The remote alarm output can be set up as dry relay contacts (normally open, close on alarm, rated 30VDC/24VAC @ 3amperes maximum) or as an external LED driver (15mA typical). The alarm threshold is fixed at 3.0VDC (0-5/0-10VDC inputs), or 6mA (4-20mA input). The GA-100 analog input interface allows an alarm feature to be added to virtually any analog output device that is not alarm capable. The GA-100 processes the raw analog signal and provides versatile alarm options for local LED, remote LED drive, and normally open relay dry contacts.



Figure 1. GA-100 Analog Alarm Device

SPECIFICATIONS

System

Alarm Modes:	Local and remote analog alarm active when alarm threshold is exceeded
Local Alarm:	Front panel Alarm indicator
Remote Alarm Output:	N.O. Dry Relay Contacts
Operating Temperature:	-20 to 120°F [-28.9 to 48.9°C]
Operating Humidity:	0 to 99% non-condensing; Instrument must be protected from exposure to precipitation
Power Requirements:	22.8-26.4VAC, 2VA maximum

Input/Output Interface

Analog Input:	Selectable 0-10VDC, 0-5VDC or 4-20mA
Alarm Threshold:	Active alarm when analog input is greater than 3.0 VDC / 6.0mA
Alarm Types:	1. N.O. relay contacts, 30VDC/24VAC @ 3amps max. or as direct LED drive (15 mA typ) 2. Front panel red LED indicator indicating alarm activity
Wiring Interface:	Rugged insulated plug-in terminal blocks for simple field wiring

Power Supply

Power Supply:	Internal high efficiency switching power supply with integral short circuit and thermal overload protection
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Enclosure

Enclosure Material:	Durable electronic housing with removable cover
Enclosure Rating:	UL94-5VA
Enclosure Dimensions:	3.355 x 3.355 x 1.357 in (HxWxD) [85.22 x 85.22 x 34.47 mm], with two integral 0.4475 [11.37 mm] mounting flanges. Overall width with flanges 4.25 [107.95 mm]
Mounting:	Two 0.190 in [4.83 mm] diameter holes on left/right mounting flanges

Warranty	12 months from shipment.
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GA-100 FEATURES

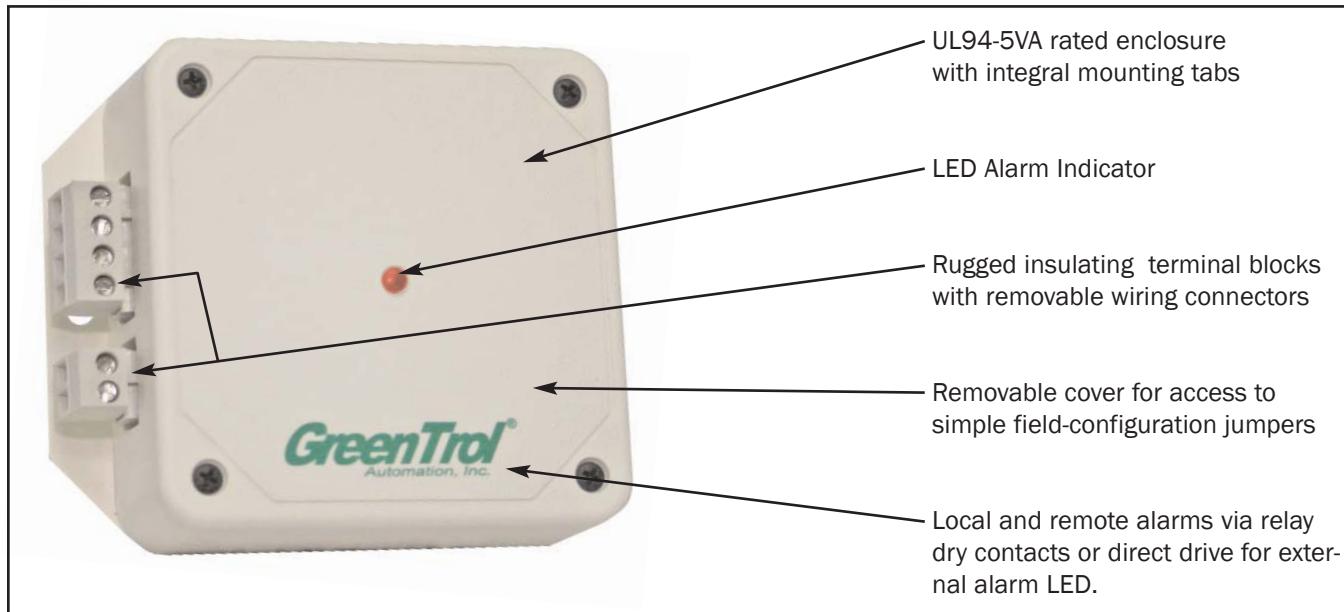


Figure 2. GA-100 Features

GA-100 INSTALLATION

The GA-100 is designed for use in an environment between -20° F to 120° F (-28.8° C to 48.8° C) where it will not be exposed to precipitation. A NEMA-4 enclosure must be provided to protect the GA-100 in locations where precipitation may be encountered.

The GA-100 must be installed in a field accessible location with sufficient service clearance to permit cover removal. The enclosure accepts signal and power wiring at the bottom of the enclosure. Ensure that the planned location will allow the signal and power wiring to reach the wiring terminal blocks at the bottom of the GA-100 enclosure.

CAUTION

In locations exposed to precipitation, the GA-100 must be enclosed in a NEMA4 enclosure.

Provide sufficient clearance around the GA-100 to permit cover removal.

Locate the GA-100 in a location that can be reached by the connecting signal and power cables.

Do not drill into the GA-100 enclosure since doing so may damage the electronics.

1. Carefully unpack the GA-100 and inspect for damage. If damage is noted, immediately file a claim with carrier.
2. Using the engineer's plans, locate where the GA-100 will be installed.
3. Remove the two wiring connectors from the GA-100 terminal blocks and mark the two mounting holes located on each of the enclosure side flanges as shown in Figure 3.
4. Drill two holes suitable for the hardware that will be used to secure the GA-100.
5. Secure the GA-100 in two places using suitable hardware.
6. Using the wiring connectors that were removed in step 3, connect signal and power cabling to the GA-100 wiring connectors as outlined in the following GA-100 WIRING procedure.

POWER TRANSFORMER CONSIDERATIONS

Select a 24 VAC transformer based on the maximum power requirements of the GA-100 (3.5 VA) to ensure that the operating supply voltage to the GA-100 (when powered "ON") is not less than 22.8 VAC or greater than 26.4 VAC.

GA-100 MECHANICAL DETAIL

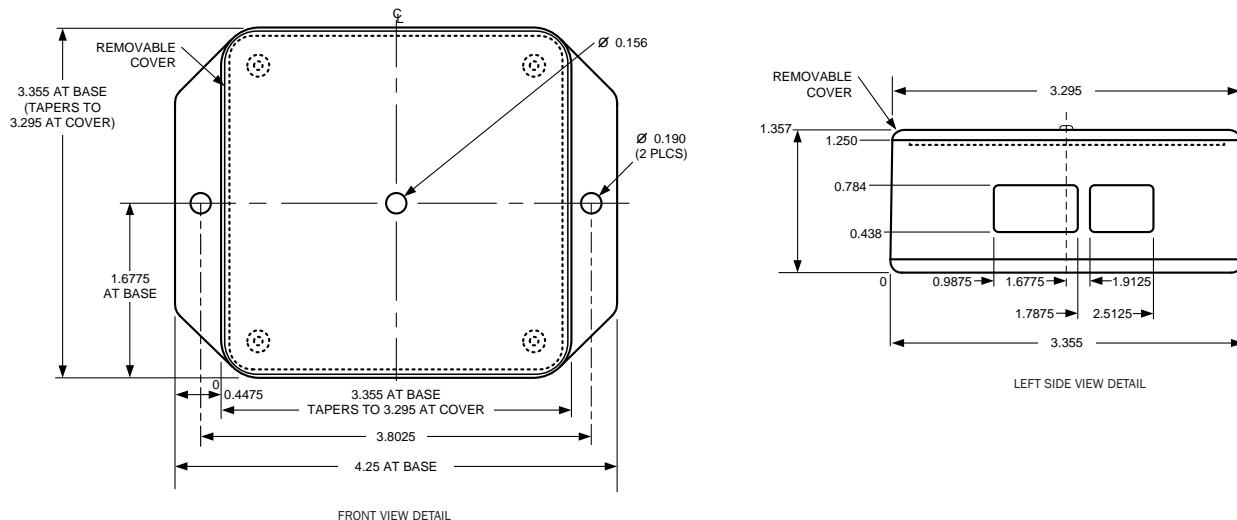


Figure 3. GA-100 Mechanical Detail Drawing

GA-100 WIRING

GA-100 wiring consists of connecting 24VAC input power and the optional alarm output at the GA-100. Refer to Figures 4 and 5 for additional detail. Following installation, review the GA-100 START UP Procedure.

Wiring connections to the GA-100 are accomplished at three removable screw-type terminal block connectors for TB1 and TB2 at the left side of the instrument as shown in Figure 4. The connectors are keyed to prevent improper hookup to the instrument.

TB2 - POWER CONNECTIONS

1. Remove 2 terminal wiring connector TB2.
2. Connect 24 VAC power to TB2 terminal 1, and the 24V ground to TB2 terminal 2 as shown in Figures 4 and 5, observing the following wiring precautions.

CAUTION



To prevent damage to the GA-100, deactivate 24 VAC power source until all connections to the instrument are complete.



The 24 VAC input ground (GND) connection at TB2 terminal 2 is shared with the analog input signal ground at TB1 terminal 2. If isolation is required, a dedicated isolation transformer must be provided to power the GA-100.



The GA-100 is a non-isolated device with a half-wave rectifier on the 24VAC power input terminal at TB2-1. Therefore, to prevent equipment damage, multiple devices that are powered by a common 24VAC transformer with the GA-100 must use common device power connections (e.g. TB2-1 24VAC input power to other device power inputs, and TB2-2 ground to other device grounds), or independent isolation transformers must be provided for each non-isolated device.



The GA-100 24VAC ground and analog input signal returns are common. Therefore it is recommended that the analog input be connected using TWO separate twisted shielded pairs in order to eliminate potential voltage drop on the common (from the 24VAC return) that would otherwise cause inaccurate readings.



To prevent any potential water runoff into the GA-100, form "drip loops" with interconnecting wires to the GA-100.



Check the physical installation, power connections and wiring prior to application of power to the instrument.

ANALOG INPUT CONNECTIONS

The GA-100 accepts an analog input signal of 0-10VDC, 0-5VDC or 4-20mA. The 24VAC return ground connection is shared with the analog input signal ground (GND). If the analog input must be isolated from the 24VAC return, a dedicated isolation transformer must be provided to power the GA-100.

1. Remove the 4 terminal wiring connector TB1.
2. Connect the analog input signal wire at TB1-1, and the signal ground at TB1-2 as shown in Figures 4 and 5 while observing the previous wiring precautions.

Selecting the analog input type (voltage or current) using the 4-20mA Jumper

1. Remove the four cover retaining screws at each corner of the transmitter cover in order to gain access to the transmitter Wiring Terminal Block on the main circuit board shown in Figure 4.
2. Remove cover from the enclosure.
- 3a. For 0-5VDC and 0-10VDC analog input, remove the jumper across the 4-20mA terminals (or place it on only one of the two pins);
OR
- 3b. For 4-20mA analog input, install the jumper across the 4-20mA terminals.

OPTIONAL ALARM OUTPUT CONNECTIONS

In addition to the front panel LED alarm indicator, the GA-100 can be configured to provide an alarm output as relay dry contacts, or as direct drive (15 mA typical) for an external LED indicator. The alarm output type is set using the LED PWR jumper on the GA-100 main circuit board as shown in Figure 4. With the LED PWR jumper on, the alarm output is set to produce LED drive (15 mA typical) to an external LED at TB1 terminal 4, with the LED cathode return at TB2-2. With the LED PWR jumper OFF, the alarm output is configured as dry relay contacts (normally open) to close on alarm between TB1-3 and TB1-4. Contacts are rated at 30VDC/24VAC 3 amps maximum.

Selecting the optional Alarm output type using the LED PWR Jumper

1. Remove the four cover retaining screws at each corner of the transmitter cover in order to gain access to the transmitter Wiring Terminal Block on the main circuit board shown in Figure 4.
2. Remove cover from the enclosure.
- 3a. For external LED drive alarm output, install LED PWR jumper, and connect LED anode (+) to TB1 terminal 4, and cathode (-) at Power Connector TB2 terminal 2.
OR
- 3b. For relay dry contact alarm output, remove the jumper across the LED PWR terminals (or place it on only one of the two pins), and connect the alarm wires to TB1 terminals 3 and 4. Contact rating is 30VDC/24VAC at 3 amps maximum.

GA-100 START UP

General

To ensure successful start-up, verify that the GA-100 has been installed and wired in accordance with the previous installation and network setup instructions.

Upon application of 24VAC power, the GA-100 is ready for normal operation. Verify initial operation as follows:

1. Activate 24VAC power to the GA-100.
2. Verify that with an analog input of greater than 3.0VDC or 6mA, the front panel alarm LED (and remote alarm output) is activated. If alarm is not active, remove power to the GA-100 and re-check all wiring connections.
3. Verify that with an analog input of less than 3.0VDC or 6mA, that the front panel alarm LED (and remote alarm output) remain inactive (LED is OFF). If alarm is active, remove power to the GA-100 and re-check all wiring connections to the device.
4. The GA-100 is now ready for normal operation.

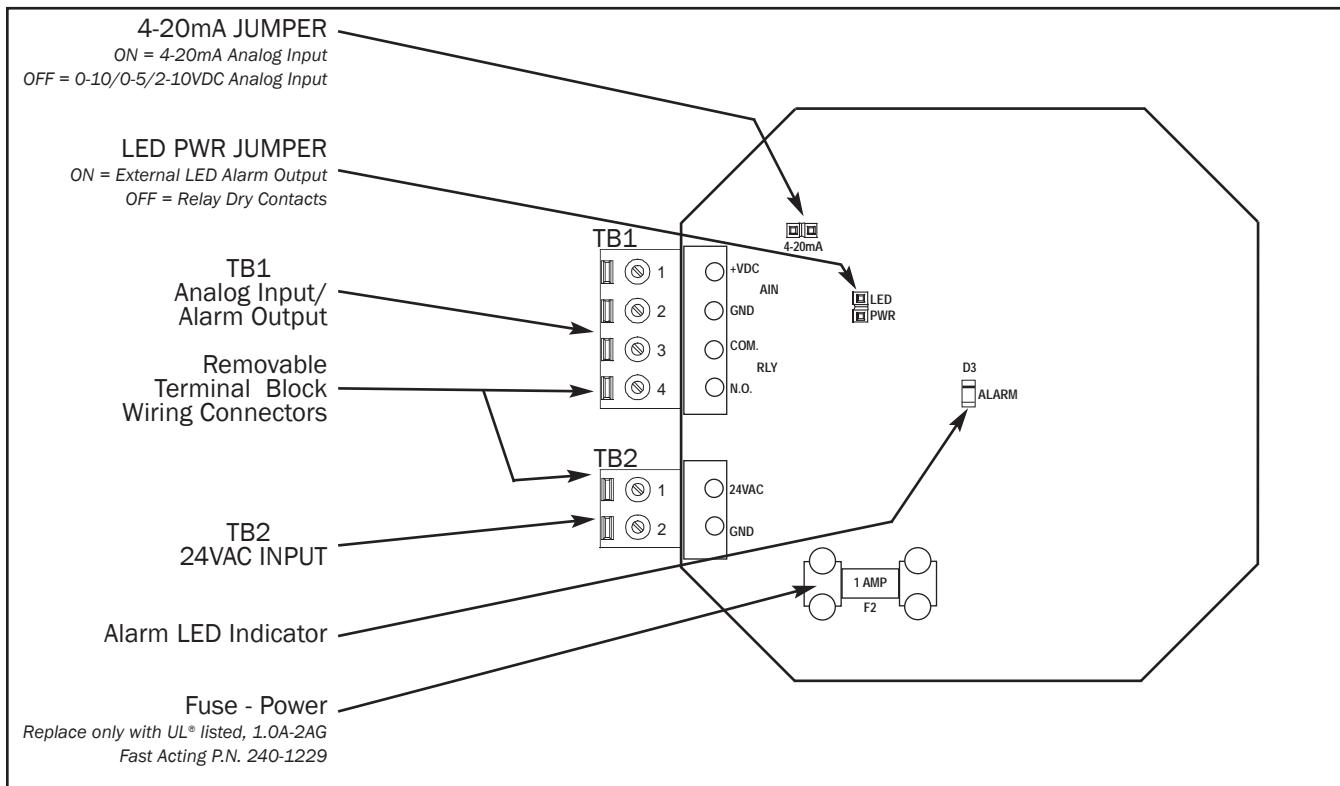


Figure 4. GA-100 Main Circuit Board Detail

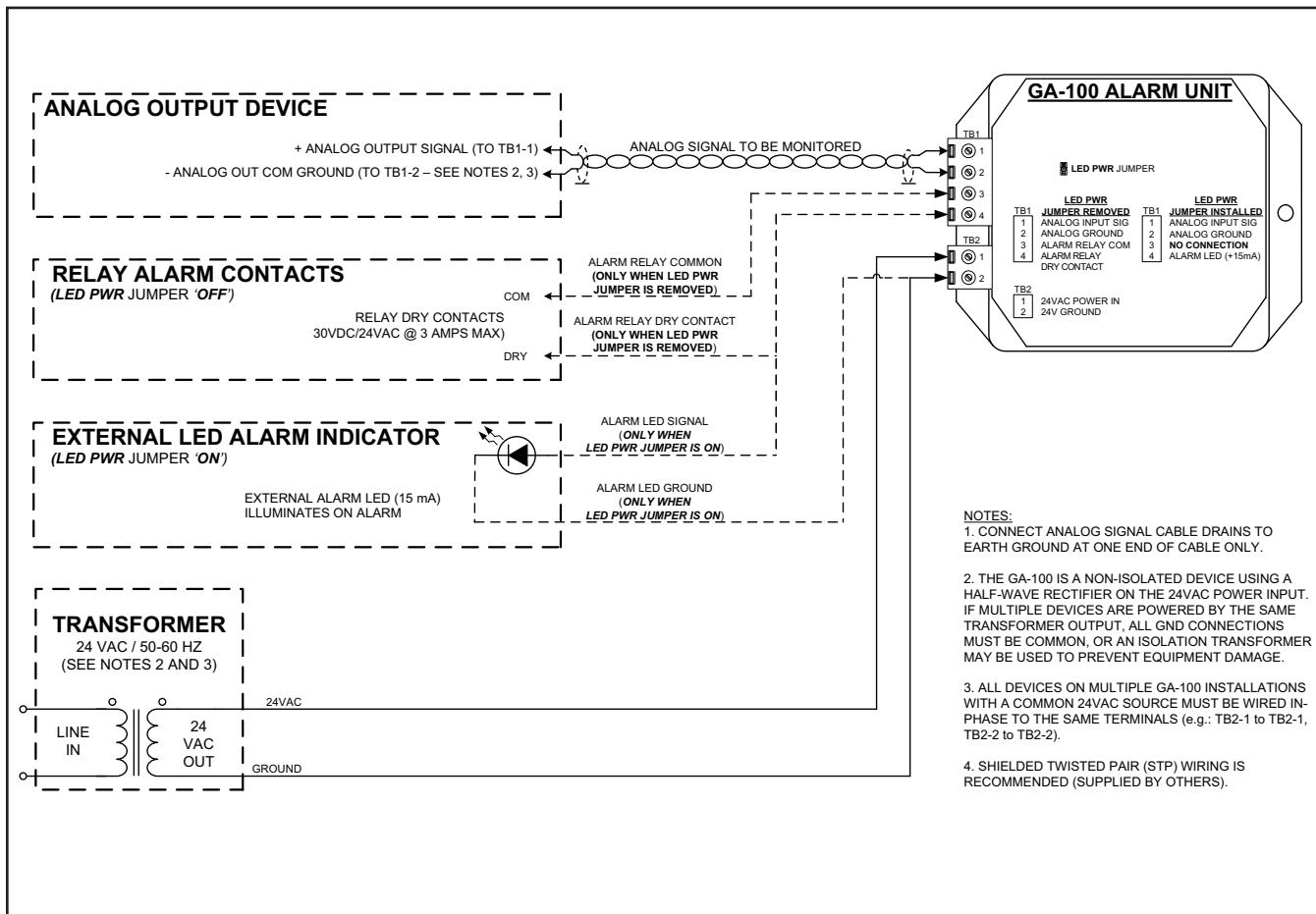


Figure 5. GA-100 Wiring Diagram Detail

MAINTENANCE

When the GA-100 is installed in accordance with recommended guidelines, instrument difficulties are rare. Issues can be easily resolved by proceeding through the troubleshooting guide of Table 1.

Table 1. GA-100 Troubleshooting

Problem	Possible Cause	Remedy
No Alarm output when analog input is greater than 3VDC (or 6mA when using 4-20mA input).	Power is not available at GA-100.	Apply 24VAC power to the GA-100.
	Improper supply voltage to the power input terminal block.	Ensure that 24VAC power is available at TB2 terminal 1 and ground at terminal TB2-2, and that the voltage with power applied to the GA-100 is between 22.8 and 26.4 VAC.
	Blown fuse.	Check power wiring. Ensure that multiple devices wired on a single transformer are wired "in-phase". Replace fuse only with a 1.0 amp, fast-acting fuse after the problem has been identified and corrected.
Alarm output is active when analog input is less than 3VDC (or 6mA when using 4-20mA input).	GA-100 internal malfunction..	Check all cable connections. If connections are OK contact customer service for further assistance.
No analog signal is measured at the GA-100 analog input TB1 terminal 1 (signal +) and terminal 2 (signal ground/return).	Improper input wiring.	Verify that 24VAC power is connected at TB2 pin 1, and ground at pin 2. Verify that all other non-isolated devices that are powered from the same 24VAC power source are correctly wired in-phase (24V power to 24VAC power and ground to ground). The power input of the GA-100 is a half wave rectifier, and requires that all common devices be wired with common power and ground connections.
The analog input signal (TB1-1 and TB1-2) fluctuates while the device being monitored indicates no change.	Electrical interference from other devices is creating noise in the analog signal wires.	The input signal wiring must be shielded. Individually ground one or more of the following points: the signal wire shield at the host device; the signal wire shield at the GA-100, or the power input ground at TB2 terminal 2 of the GA-100.
The Alarm does not occur when expected.	The output from the host device system is incorrect.	Check the analog output from the host device being monitored. GA-100 Alarm output is active whenever the monitored analog signal is greater than 3VDC (or 6mA when 4-20mA input is selected).

GREENTROL STANDARD LIMITED PARTS WARRANTY

Greentrol products are warranted for 12 months from shipment. Product will be repaired/replaced free of charge as described in the Terms and Conditions of Sale.

