GasGuardian RD Remote Display

Calibration Technologies Inc.

Operating & Installation Manual

Table of Contents

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General Description

The GasGuardian RD (GG-RD) is remote display slave module designed to accept data from the GasGuardian 6 (GG-6) master controller. It provides continuous real-time monitoring of each sensor via Modbus RTU protocol on RS-485 mirroring the GG-6 controller display. The backlit LCD display provides an at-a-glance status of gas concentrations and alarms. An 80 dB buzzer on the front panel provides audible indication of any programmed event.

The GG-RD is assembled into a wall mounted enclosure designed for non-classified locations, and can be installed outdoors and washdown areas.

The only output of this module is the door-mounted buzzer which can be silenced from the keypad on the front of the panel.

Once the Modbus address is set, there are no user configurable settings on the GG-RD, as all other settings are configured on the GG-6 master controller.

The GG-RD is compatible with GG-6 controllers, version 4.00 and higher. Older version controllers can be field-upgraded. Contact Calibration Technologies for details.

There are two versions of the GG-RD: GG-RD1 and GG-RD2. The GG-RD2 models are only used when more than one remote display is required, and are installed in between the GG-6 controller and the end-of-line GG-RD1.

IMPORTANT: Factory default programming of the GG-6 master controller initiates the buzzer during any Warning, Alarm1, Alarm2 or Fault event. Since the GG-RD mimics the GG-6, any changes of the configuration will in turn change the operation of the GG-RD buzzer. Do not disable or overwrite default Actions #1 through #4 of the GG-6 to maintain correct buzzer operation on the GG-RD.

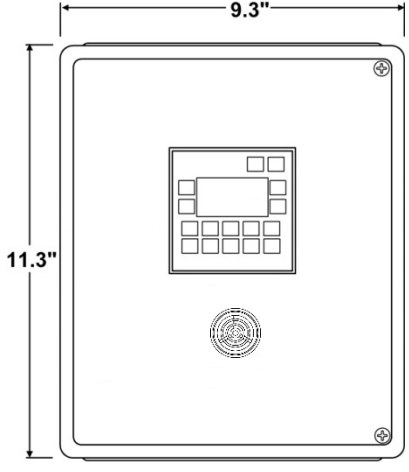
Installation

Locating the GasGuardian RD

An important consideration when installing the GG-RD is that it must be easily viewed and accessible for operating personnel.

Installation Guidelines:

- Mount display on a solid surface with minimal vibration.
- Mount display thru the holes in the mounting flanges of the enclosure.
- Mount display in a general-purpose location only. Do not install in a hazardous environment.
- Mount display away from electromagnetic interference.
- Protect display from physical damage.
- Maximum distance from GG-6 controller is 1,000'.



Wiring
Electrical wiring must comply with all applicable codes.

Wiring Guidelines:
- Always use insulated, stranded, shielded copper cable for all instrumentation cables.
- Do not pull communication wiring with AC power cables as this can cause electrical interference.
- Use only existing conduit holes for wiring connections if possible.
- Utilize included cable tie mounts to secure all cables and wires to the inside of enclosure door for strain-relief and slack for door movement.

Power Wiring:
- 24Vdc and DC ground are sourced from GG-6 controller power supply (see drawing below).
- Use 18/2 stranded cable for distances up to 1,000' (Belden 9318 or equivalent).

Top terminal block of GasGuardian RD operator interface (backside)

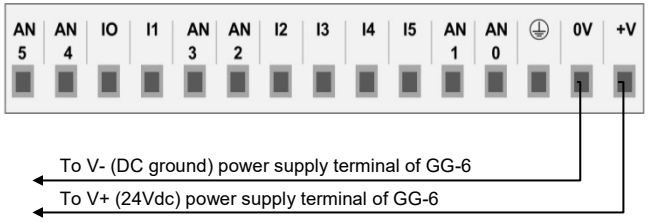
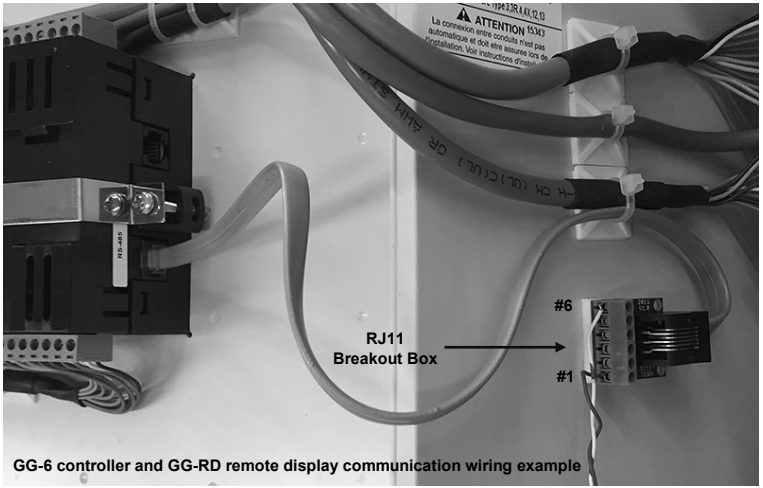


Figure 1.

Communication Wiring: (at GG-6)
- It is recommended that RS-485 compliant cable be used, but if the total length of the wire run from GG-6 to the GG-RD1 is less than 1000', one pair of low-capacitive, shielded CAT5 (or better) cable can be used.
- Land (1) shield wire at GG-6 controller to earth ground (no connection at GG-RD).
- Terminate both ends of the cable into the supplied RJ11 Breakout Boards (BB), using only the #1 and #6 positions as shown in Figure 2 below.

Note: GG-RD wiring shown on page 6



GG-6 controller and GG-RD remote display communication wiring example

Figure 2.

Communication Wiring (continued)
A GG-6 can connect to one or many GG-RDs.

For a single remote display
Connect the GG-6 to a GG-RD1 as follows:

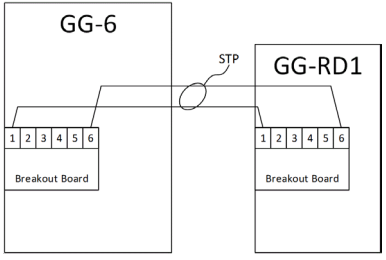


Figure 3.

Connect pin 1 on the GG-6 BB to pin 1 of the GG-RD1 BB. Connect pin 6 to pin 6. Use a Shielded Twisted Pair (STP) of wire to make the connection.

It is recommended that RS-485 compliant cable be used, but if the total length of the wire run from GG-6 to the GG-RD1 is less than 1000', one pair of a shielded CAT5 (or better) cable can be used.

For a multiple remote displays
Connect the GG-6 to one or more GG-RD2s and a GG-RD1 as follows:

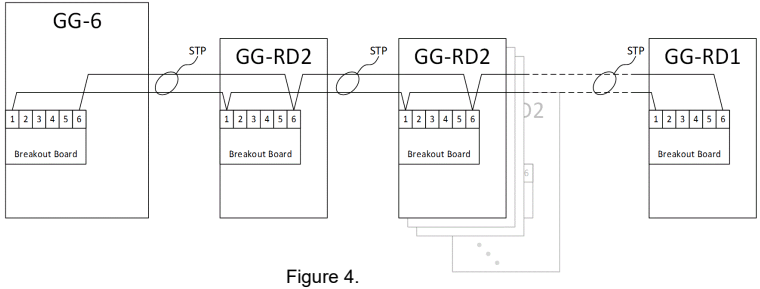


Figure 4.

Connect pin 1 on the GG-6 BB to pin 1 of the first GG-RD2 BB. Connect pin 6 to pin 6. Continue connecting pin 1 to pin 1 and pin 6 to pin 6 on each of the subsequent GG-RD2's, ending with a GG-RD1. On all of the GG-RD2s, wire will have to be doubled up in the BBs. Twist shields together at all GG-RD2's.

Use STP to make the connection. It is recommended that RS-485 compliant cable be used, but if the total length of the wire run from GG-6 to the GG-RD1 is less than 1000', one pair of a shielded CAT5 (or better) cable can be used.

Operation

Start-up

Because of the distance between gas detection components, the test time required and accuracy of the response checks will be improved if two people perform the start-up procedures and use radio contact.

Start-Up Test of the GasGuardian RD:

1) One person exposes each sensor to target gas.
2) The second person confirms that the remote display(s), when exposed to target gas, displays a proper change in value along with the correct room location or zone.
3) The onboard panel buzzer should activate during each event. The buzzer can be silenced by pressing the Silence button on the operator interface. The buzzer will then remain silent until the next event.
4) Pushing the silence or reset button on the GG-RD only silences or resets at the GG-RD.

Operation

Since the GG-RD is identical in operation to the GG-6 controller, refer to the GG-6 controller manual for operation details.

Some of the sub-menus on the GG-RD are disabled. If the setting is disabled, message “Not allowed on Remote Display, see Main Controller” will appear when the setting is selected.

For single GG-RD1 remote display installation

The GG-RD1 ID must match the Remote Display ID on the GG-6 (typically 65) and must be configured as a Slave and a Remote before the GG-6 is configured. When the GG-6 is configured and saved, it pushes (via MODBUS) it's configuration to the GG-RD1.

For multiple remote display installation

The GG-6 remote display configuration feature can only connect to one GG-RD at a time, but the GG-6 can be configured to broadcast to more than one GG-RD at once. When multiple GG-RD’s are connected, the configurations take a few additional steps to synchronize all of the displays.

Each GG-RD must have a unique Modbus address. By default, the GG-6 is set to 64 and the GG-RDs are set to 65. Configure the **GG-6** Modbus as follows:

MODBUS CONFIG Mode

ID (64 to 127):	64
Master/Slave:	Master
Display:	Main
Remote Display ID:	0

Assign each of the GG-RDs a new address in the range 65 to 127 (65, 66, 67, etc.). Configure the Modbus on the GG-RD as follows:

MODBUS CONFIG Mode

ID (64 to 127):	65, 66, 67, etc
Master/Slave:	Slave
Display:	Remote
Remote Display ID:	*same as ID*

On the GG-6, configure the Sensors, Groups, Actions, Relay and System. When the GG-6 is fully configured, exit and save the configuration. To push the configuration out to each of the GG-RDs, enter the Modbus Config Mode screen, set the Remote Display ID to the address of the first GG-RD, exit and save. Wait for the first GG-RD to begin displaying the same info as the GG-6. This could take several minutes. Once the GG-RD begins displaying the same info as the GG-6, repeat for all of the other GG-RD addresses.

Multiple remote display installation (continued)

Once all GG-RDs have been configured, re-enter the Modbus configuration screen, set the Remote Display ID to 0 (broadcast mode), exit and save the configuration.

Once these steps are complete, all of the remote displays should show the same information, and none of them should be showing a communication fault (a bold C in the upper left corner of the display).

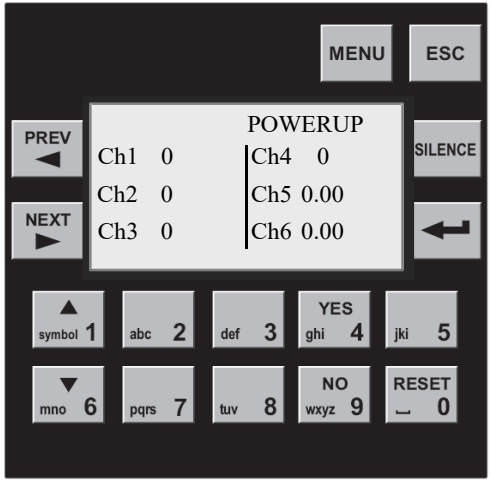
> **For example**: If the system has four GG-RDs and they were numbered up above as 65, 66, 67 and 68. Enter the Modbus Config Mode screen, set the Remote Display ID to 65, exit and save. Wait for the GG-RD to refresh. Repeat for 66, 67 and 68. Re-enter the Modbus Config Mode screen, return the Remote Display ID to 0, exit and save.

These steps must be repeated any time a configuration parameter is change in the GG-6.

LCD Operator Interface

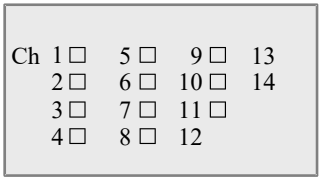
Key Functions: Below is a list of the common key functions used for the LCD operations:

MENU	to enter main menu
ESC	to go back to previous menu/sub-menu
ENTER ⏎	to modify the programming fields
PREV ◄	to go back to previous screen
NEXT ►	to advance to next screen
YES/NO	when prompted and to accept configuration changes
Alphanumeric	for menu selections and to enter values and text
Up/Down ▲▼	to navigate drop-down lists during configuration

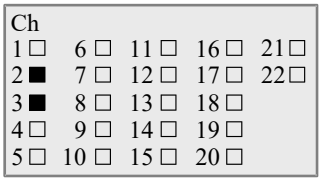


Operation

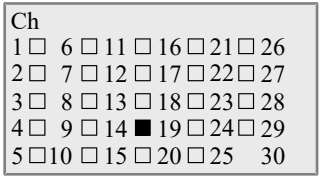
Alternate System Display Screens
Below are three alternate system display screens, depending on the number of expansion modules connected at the GG-6 controller. Inactive channels are displayed without a square. Action events (fault, warning or alarm) are displayed by a flashing solid black square next to channel number.



Sensor channels 1 through 11 active.
System normal – no action events.



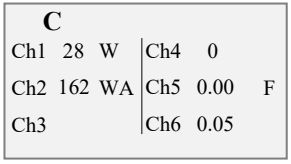
Sensor channels 1 through 22 active.
Action event on channels 2 and 3.



Sensor channels 1 through 24 active.
Action event on channel 14.

System display screens

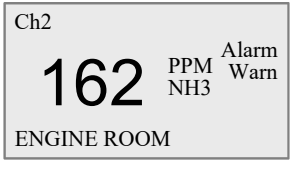
After system power-up, the normal operating screen will be displayed. It provides at-a-glance system status, showing real-time gas concentrations. Warn, Alarm and Fault indications (W, A and F) will flash until the conditions are cleared.
In the example screen on the right:
Channel 1 gas concentration has exceeded the warn setpoint.
Channel 2 has exceeded the warn and alarm setpoints.
Channel 3 has been set to inactive; therefore, the channel is turned off.
Channel 5 indicates a fault due to faulty wiring or a sensor signal less than 1 mA.
A communication error is indicated by the letter “C” in the top left section of the display.



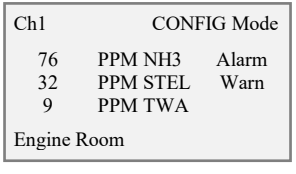
PREV or **NEXT** to go to Channel View screens. **MENU** to go to main menu screen.

Channel view

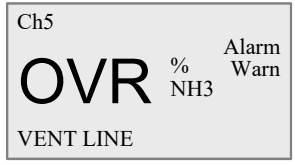
Channel view shows only the status of the channel being viewed, along with room/zone location. Warn, Alarm and Fault indications will flash until the conditions are cleared.



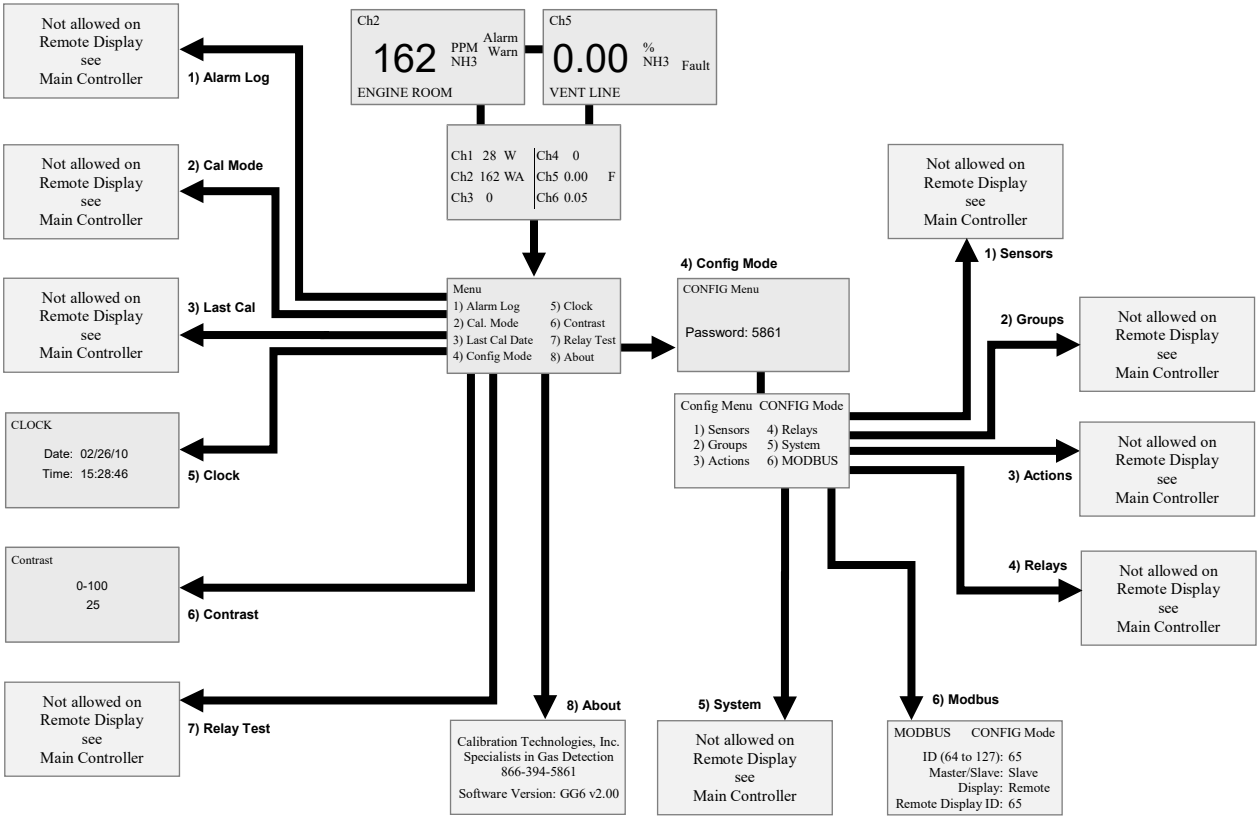
If the STEL-TWA function is set to Active, the real-time value is displayed, along with the time-weighted average values for the 15-minute short term exposure limit (STEL) and 8-hour time weighted average (TWA). Alarm conditions will also flash to indicate that those programmed values have been exceeded.



An over-range condition is indicated by flashing of the full-scale reading, followed by the message “OVR”. This also indicates that the sensor output is over 20 mA.



Menu Tree


Not allowed on Remote Display see Main Controller
1) Alarm Log
Ch2
162 PPM NH3
Alarm Warn
ENGINE ROOM
Ch5
0.00 % NH3
Fault
VENT LINE
Ch1 28 W
Ch2 162 WA
Ch3 0
Ch4 0
Ch5 0.00 F
Ch6 0.05
2) Cal Mode
Not allowed on Remote Display see Main Controller
3) Last Cal
Not allowed on Remote Display see Main Controller
Menu
1) Alarm Log
2) Cal. Mode
3) Last Cal Date
4) Config Mode
5) Clock
6) Contrast
7) Relay Test
8) About
4) Config Mode
CONFIG Menu
Password: 5861
Not allowed on Remote Display see Main Controller
1) Sensors
2) Groups
Not allowed on Remote Display see Main Controller
CLOCK
Date: 02/26/10
Time: 15:28:46
5) Clock
Config Menu CONFIG Mode
1) Sensors 4) Relays
2) Groups 5) System
3) Actions 6) MODBUS
3) Actions
Not allowed on Remote Display see Main Controller
Contrast
0-100
25
6) Contrast
4) Relays
Not allowed on Remote Display see Main Controller
Not allowed on Remote Display see Main Controller
7) Relay Test
8) About
Calibration Technologies, Inc.
Specialists in Gas Detection
866-394-5861
Software Version: GG6 v2.00
5) System
Not allowed on Remote Display see Main Controller
6) Modbus
MODBUS CONFIG Mode
ID (64 to 127): 65
Master/Slave: Slave
Display: Remote
Remote Display ID: 65

Maintenance

All gas detection systems should be calibrated with certified calibration gas once every six months. At this interval, all alarm functions and outputs should be tested, verified and documented. Keep an operation log of all maintenance, calibrations and alarm events.

To clean the controller, use a mild cleaning solution and soft cloth.

Specifications

Input Power Requirements:
24 VDC, 0.250A (21 Vdc to 27 Vdc)
Dimensions: 11.3” high x 9.3” wide x 7” deep
Weight: 5 lbs
Enclosure: Fiberglass Reinforced Polyester NEMA 4X, IP 65, with neoprene gasket. Continuous stainless steel hinge. Captive screws in lid. For non-classified areas.
Temperature Range: 0°F to +122°F
Humidity Range: 0-95% RH condensing (100% intermittent), with proper conduit seals.
Wiring Connections:
RS-485: RJ11 breakout board
Power: Terminal block plug
Terminal Block Plugs (Field Wiring):
12-26 AWG, torque 4 lbs-in.
Buzzer:
80 dB, with volume attenuator shutter. Silenceable from keypad on front panel.
User Interface:
LCD illuminated screen. Graphic display screen: 128 x 64 pixels. 8 lines x 22 characters. Sealed membrane switches.

Limited Warranty & Limitation of Liability

Calibration Technologies, Inc. (CTI) warrants this product to be free from defects in material and workmanship under normal use and service for a period of two years, beginning on the date of shipment to the buyer. This warranty extends only to the sale of new and unused products to the original buyer. CTI's warranty obligation is limited, at CTI's option, to refund of the purchase price, repair, or replacement of a defective product that is returned to a CTI authorized service center within the warranty period. In no event shall CTI's liability hereunder exceed the purchase price actually paid by the buyer for the Product.

This warranty does not include:

a) routine replacement of parts due to the normal wear and tear of the product arising from use;
b) any product which in CTI's opinion, has been misused, altered, neglected or damaged by accident or abnormal conditions of operation, handling or use;
c) any damage or defects attributable to repair of the product by any person other than an authorized dealer or contractor, or the installation of unapproved parts on the product

The obligations set forth in this warranty are conditional on:

a) proper storage, installation, calibration, use, maintenance and compliance with the product manual instructions and any other applicable recommendations of CTI;
b) the buyer promptly notifying CTI of any defect and, if required, promptly making the product available for correction. No goods shall be returned to CTI until receipt by the buyer of shipping instructions from CTI; and
c) the right of CTI to require that the buyer provide proof of purchase such as the original invoice, bill of sale or packing slip to establish that the product is within the warranty period.

THE BUYER AGREES THAT THIS WARRANTY IS THE BUYER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CTI SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, WHETHER ARISING FROM BREACH OF WARRANTY OR BASED ON CONTRACT, TORT OR RELIANCE OR ANY OTHER THEORY.

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SPECIALISTS IN CALIBRATION

GG-RD
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