

GG-RD REMOTE DISPLAY



Installation and Operation Manual

Warning

**Use this product only in the manner described in this manual.
If the equipment is used in a manner not specified by Calibration Technologies, the protection provided by the equipment may be impaired.**

This equipment should be installed by qualified personnel.



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General Description

The GG-RD is a remote display slave module designed to accept data from the 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 and settings are 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 5.01 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.

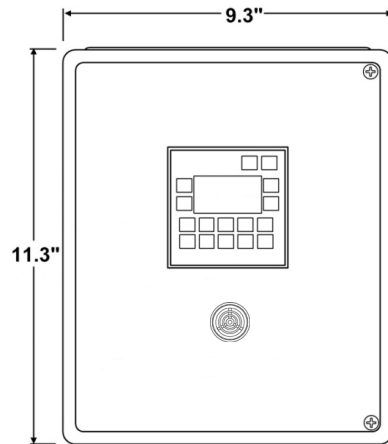
Installation

Locating the GG-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'.
- If mounting on a wall with studs, the mounting screws should be screwed into the studs.



Wiring

Electrical wiring must comply with all applicable codes.

Wiring Guidelines:

- Use stranded, copper wire/cable with a minimum of 75°C rating (167°F).
- 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.
- Bonding between metallic conduit connections is no automatic with the non-conductive enclosure. Separate bonding must be provided.

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 GG-RD operator interface (backside).

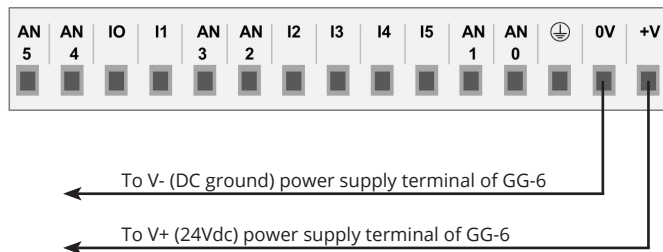
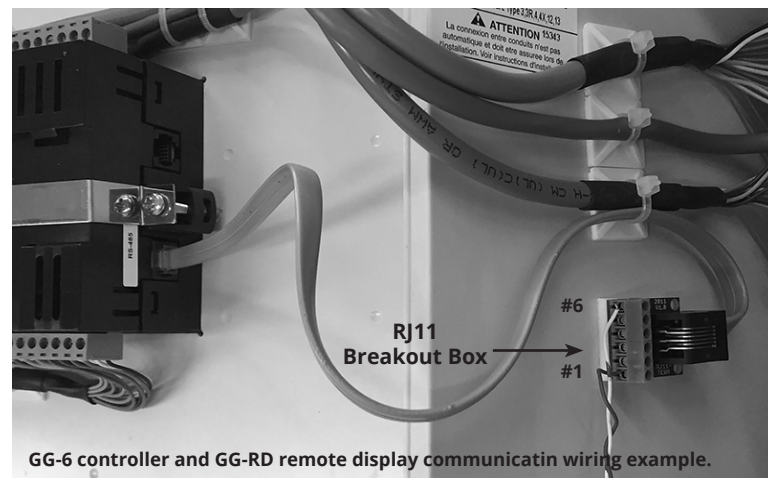


Figure 1

Communication Wiring: (at GG-6)

- It is recommended that RS-485 compliant cable be used (Belden 3106A or equivalent), 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 that if cable is terminated on both ends with RJ11 connectors, the breakout boxes can be bypassed to plug cable directly into Port 2 of the GG-6 and GG-RD.

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:

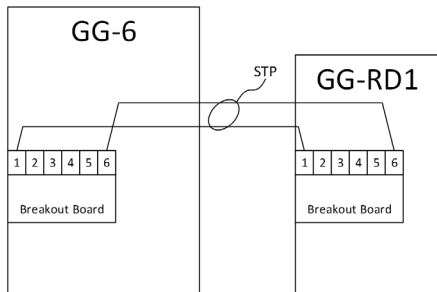


Figure 3

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:

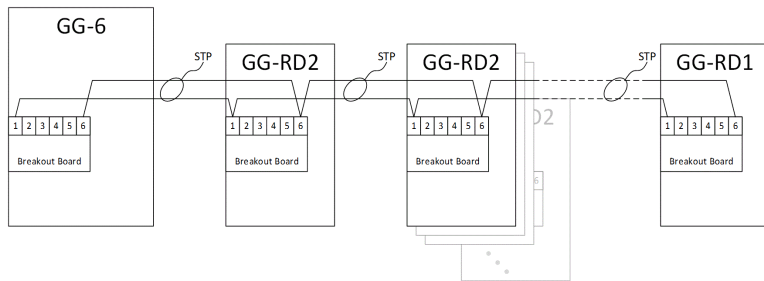


Figure 4

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

Programming

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. Configuring the GG-RD1 is done locally in Menu > (4) Config Mode > Password: 5861 > (6) MODBUS:

| MODBUS | CONFIG Mode |
|------------------------------|-------------|
| ID (64-127): 65, 66, 67, etc | |
| Master/Slave: Slave | |
| Display: Remote | |

Next, on the GG-6, configure: Sensors, Groups, Actions, Relays, System: Menu > MODBUS: Menu > (4) Config Mode > Password: 5861

| MODBUS | CONFIG Mode |
|----------------------|-------------|
| ID (64-127): 64 | |
| Master/Slave: Master | |
| Display: Main | |
| Remote Display: 65 | |

Once the GG-6 is fully configured, ESC > Yes to Save and Exit the configuration. Check that the GG-RD1 main screen reflects the newly setup main screen of the GG-6 controller. There might be a slight refresh delay before the "pushed" configuration is displayed.

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

For multiple remote display installations with GG-RD2 and GG-RD1

Prior to configuring, ensure that part# GG-RD1 is installed at the End Of the Line in relation to part#'s GG-6 and GG-RD2 (**see Figure 4**).

Each of the GG-RD's must be configured as a Slave and a Remote before the GG-6 is configured. Assign each of the GG-RD's a new address in the range 65 to 126 (65, 66, 67, etc.). Configuring the GG-RD is done locally in Menu > (4) Config Mode > Password: 5861 > MODBUS:

| MODBUS | CONFIG Mode |
|------------------------------|-------------|
| ID (64-127): 65, 66, 67, etc | |
| Master/Slave: Slave | |
| Display: Remote | |

On the GG-6, configure: Sensors, Groups, Actions, Relays, System: Menu > (4) Config Mode > Password: 5861. Configure the MODBUS Remote Display address to 0. When the GG-6 is fully configured, ESC > Yes to Save and Exit the configuration.

| MODBUS | CONFIG Mode |
|----------------------|-------------|
| ID (64-127): 64 | |
| Master/Slave: Master | |
| Display: Main | |
| Remote Display: 0 | |

When multiple GG-RDs are connected, the configurations take a few additional steps to synchronize all of the displays. Follow these two steps to synchronize all displays:

Multiple remote display installation (continued)

Step 1: *When configuring the GG-6 controller for multiple GG-RD, each unit must have the configuration pushed (via MODBUS) individually until all units have received their configuration. This is due to the GG-6 only being able to configure one GG-RD at a time.

To push the configuration from the GG-6 out to each of the GG-RDs, enter the MODBUS Config Mode screen on the GG-6, set the Remote Display ID to the address of the first GG-RD, ESC > Yes to Save and Exit the configuration.

| MODBUS | CONFIG Mode |
|---------------------------------|-------------|
| ID (64-127): 64 | |
| Master/Slave: Master | |
| Display: Main | |
| Remote Display: 65, 66, 67, etc | |

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 MODBUS addresses.

For example: If the system has four GG-RDs and they were assigned MODBUS addresses 65, 66, 67 and 68, then enter the Modbus Config Mode screen on the GG-6, set the Remote Display ID to 65, exit and save. Wait for the GG-RD with address 65 to refresh. Repeat for 66, 67 and 68.

During step 1, there will be a communication fault (a bold C in the upper left corner of the display) on the GG-RD's that are not being addressed.

Step 2: Once all GG-RDs have been configured, re-enter the MODBUS configuration screen of the GG-6 controller. Set the Remote Display ID to 0 (broadcast mode). Then 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).

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

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 GG-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 and has no effect on the GG-6 controller.

For optimum functionality, the GG-6 and GG-RD units must have software version 5.01 or higher.






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.

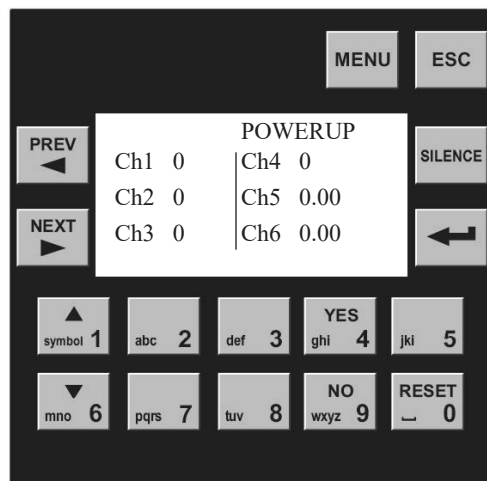
Each GG-RD must have a unique Modbus address. By default, the GG-6 is set to 64 and the GG-RD's are set to 65.

Refer to the GG-6 controller manual for additional operation and setup details.

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 |



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.

| | | | | |
|----|----|----|-----|----|
| Ch | 1□ | 5□ | 9□ | 13 |
| | 2□ | 6□ | 10□ | 14 |
| | 3□ | 7□ | 11□ | |
| | 4□ | 8□ | 12 | |

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

| | | | | | |
|----|----|-----|-----|-----|-----|
| Ch | 1□ | 6□ | 11□ | 16□ | 21□ |
| | 2■ | 7□ | 12□ | 17□ | 22□ |
| | 3■ | 8□ | 13□ | 18□ | |
| | 4□ | 9□ | 14□ | 19□ | |
| | 5□ | 10□ | 15□ | 20□ | |

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

| | | | | | | |
|----|----|-----|-----|-----|-----|----|
| Ch | 1□ | 6□ | 11□ | 16□ | 21□ | 26 |
| | 2□ | 7□ | 12□ | 17□ | 22□ | 27 |
| | 3□ | 8□ | 13□ | 18□ | 23□ | 28 |
| | 4□ | 9□ | 14■ | 19□ | 24□ | 29 |
| | 5□ | 10□ | 15□ | 20□ | 25 | 30 |

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.

During a communication fault, a bold C will be displayed in the upper left corner of the display, all configured channels will read zero and indicate faults (F).

| | | | | | |
|-----|-----|----|-----|------|---|
| Ch1 | 28 | W | Ch4 | 0 | |
| Ch2 | 162 | WA | Ch5 | 0.00 | F |
| Ch3 | | | Ch6 | 0.05 | |

| | | | | | |
|----------|---|---|-----|------|---|
| C | | | | | |
| Ch1 | 0 | F | Ch4 | 0 | F |
| Ch2 | 0 | F | Ch5 | 0.00 | F |
| Ch3 | | | Ch6 | 0.00 | F |

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.

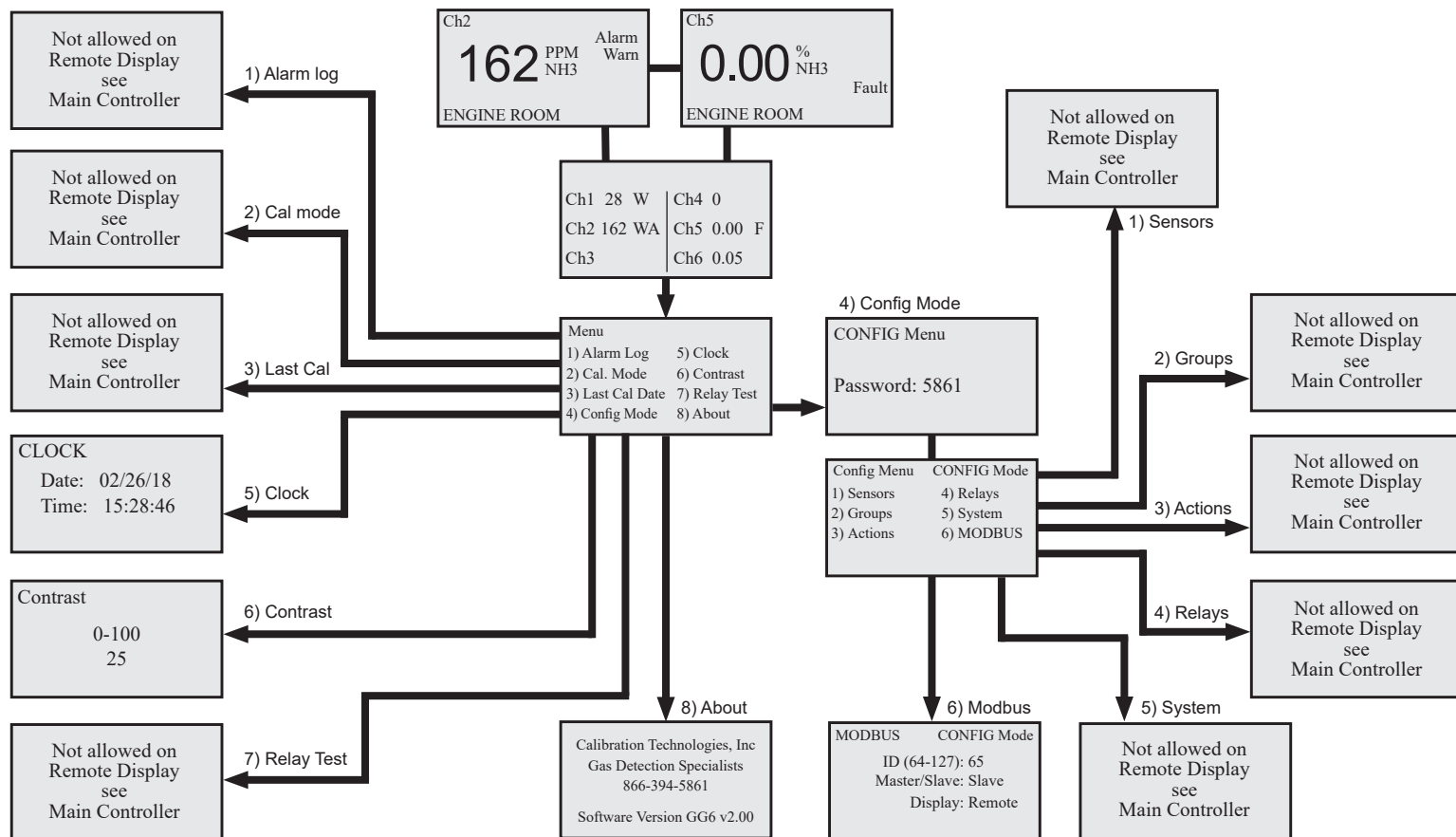
An over-range condition is indicated by flashing of the full-scale reading, followed by the message "OVR". This also indicates that the sensor output is over 20 mA.

| | | | |
|-------------|-----|------|-------|
| Ch2 | | | Alarm |
| 162 | | | |
| | PPM | Warn | |
| | NH3 | | |
| ENGINE ROOM | | | |

| | | | |
|-------------|-------------|-------|--|
| Ch1 | CONFIG Mode | | |
| 76 | PPM NH3 | Alarm | |
| 32 | PPM STEL | Warn | |
| 9 | PPM TWA | | |
| Engine Room | | | |

| | | | |
|------------|-----|------|-------|
| Ch5 | | | Alarm |
| OVR | | | |
| | % | Warn | |
| | NH3 | | |
| VENT LINE | | | |

MENU TREE



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

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 (-18°C to 50°C)

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.

Certification:

SGS Listed: Conforms to UL 61010-1

Certified to CSA C22.2 No. 61010-1

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 2 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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