Operating Manual

Galaxy GX2 Automated Test System

Automated Test System

Order No.: 10127150/04

Print Spec: 10000005389 (EO)

CR: 800000054013

⚠ WARNING!

These instructions must be provided to users before use of the product and retained for ready reference by the user. Read this manual carefully before using or maintaining the device. The device will perform as designed only if it is used and maintained in accordance with the manufacturer's instructions. Otherwise, it could fail to perform as designed, and persons who rely on this device could sustain serious injury or death.

The warranties made by MSA with respect to the product are voided if the product is not installed and used in accordance with the instructions in this manual. Please protect yourself and your employees by following the instructions.

Please read and observe the WARNINGS and CAUTIONS inside. For additional information relative to use or repair, call 1-800-MSA-2222 during regular working hours.

⚠ WARNING!

Refer to the applicable gas detector(s) operating manual for proper set-up and operation. Follow all local regulations and internal requirements relating to both the GALAXY GX2 System and the gas detector.

Failure to follow this warning can result in serious personal injury or death.

The Safety Company

1000 Cranberry Woods Drive
Cranberry Township, PA 16066
USA
Phone 1-800-MSA-2222
Fax 1-800-967-0398

For your local MSA contacts, please go to our website www.MSAsafety.com

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1 Safety Regulations

1.1 Correct Use

⚠ WARNING!

Read this manual carefully before using the instrument. The instrument will perform as designed only if it is used and maintained in accordance with the manufacturer's instruction. Otherwise, it could fail to perform as designed and persons who rely on this instrument for their safety could sustain serious personal injury or death.

⚠ WARNING!

Do not use silicone-type lubricants in assembling the GALAXY® GX2 Automated Test System and do not allow silicone vapors to be drawn into the flow system while in operation. Silicone can desensitize the combustible gas sensor, thereby giving erroneously low readings.

Use the GALAXY GX2 System only in non-hazardous environments free of combustible concentrations of gases and vapors. System use with 100% LEL or greater methane is described in chapter 4.7 under Special Conditions for Use with 100% LEL or Greater Methane Calibration Gas.

Use only genuine MSA replacement parts when performing any maintenance procedures on the GALAXY GX2 System. Substitution of components can seriously impair performance.

Failure to follow this warning can result in serious personal injury or death.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTICE

This is a class A product in accordance with CISPR 22. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

FCC Warning Statements

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Industry Canada (IC) Warning Statements

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc.ca/rpb.

1.2 Product Warranty

The warranties made by Mine Safety Appliances Company with respect to the product are voided if the product is not used and serviced in accordance with the instructions in this manual. Protect yourself and others by following them. We

encourage our customers to contact MSA regarding this equipment prior to use or for any additional information relative to use or repairs.

ITEM	WARRANTY PERIOD
GALAXY GX2 Test Stand, Cylinder Holder and Multi Unit Charger	MSA warrants that this product will be free from mechanical defects and faulty workmanship for a period of two (2) years from date the product is first used, provided it is maintained and used in accordance with MSA's instructions and/or recommendations. Warranty shall not exceed two years and six months from the date of manufacture.

This warranty does not cover filters, fuses, etc. Certain other accessories not specifically listed here may have different warranty periods. This warranty is valid only if the product is maintained and used in accordance with Seller's instructions and/or recommendations. The Seller shall be released from all obligations under this warranty in the event repairs or modifications are made by persons other than its own or authorized service personnel or if the warranty claim results from physical abuse or misuse of the product. No agent, employee or representative of the Seller has any authority to bind the Seller to any affirmation, representation or warranty concerning this product. Seller makes no warranty concerning components or accessories not manufactured by the Seller, but will pass on to the Purchaser all warranties of manufacturers of such components.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY, AND IS STRICTLY LIMITED TO THE TERMS HEREOF. SELLER SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

Exclusive Remedy

It is expressly agreed that Purchaser's sole and exclusive remedy for breach of the above warranty, for any tortious conduct of Seller, or for any other cause of action, shall be the replacement at Seller's option, of any equipment or parts thereof, which after examination by Seller is proven to be defective. Replacement equipment and/or parts will be provided at no cost to Purchaser, F.O.B. Seller's Plant. Failure of Seller to successfully replace any nonconforming equipment or parts shall not cause the remedy established hereby to fail of its essential purpose.

Exclusion of Consequential Damage

Purchaser specifically understands and agrees that under no circumstances will seller be liable to purchaser for economic, special, incidental or consequential damages or losses of any kind whatsoever, including but not limited to, loss of anticipated profits and any other loss caused by reason of nonoperation of the goods. This exclusion is applicable to claims for breach of warranty, tortious conduct or any other cause of action against seller.

2 Introduction

Congratulations on purchasing the GALAXY GX2 Automated Test System, the next generation Test Stand and instrument management system from MSA. This system is used exclusively with the ALTAIR® family of gas detectors. This manual uses the terms **instrument** and **gas detector** to represent that entire line of ALTAIR gas detection instruments.

In this manual the user will learn to install and configure the GALAXY GX2 Test Stand and optional attachments, and test gas detectors. Maintenance, Troubleshooting, and Technical Specifications sections are also provided.

The Test Stand uses a sophisticated internal processor and simple to use touch screen display for the configuration of calibration parameters and gas detector settings, and for gathering instrument data.

Each Test Stand and optional attachments can be wall or desk mounted to serve the needs of the user. Constructed of durable composite polymers, this equipment is designed for normal indoor applications and operates within a broad temperature range of 0º to 40ºC in non-condensing humidity atmospheres.

The principal components of the GALAXY GX2 System include the Test Stand and optional electronic or non-electronic Cylinder Holder and Multi-Unit Charger. These components [→ Figure 1] are designed to be attached to avoid accidental separation during operation.

Figure 1 The GALAXY GX2 Automated Test System

The Test Stand is a standalone unit that can accommodate one gas detector of the ALTAIR family. However, each Test Stand contains the plumbing and electronic ports to simultaneously connect a total of **10 Test Stands** and **four Cylinder Holders** (electronic or non-electronic).

For applications where multiple Cylinder Holders are connected, the Test Stand **Expanded Solenoid** option must be ordered. This option allows the Test Stand to open and close up to four Cylinder Holder valves for gas detectors that may

require multiple cylinders for test purposes. For example, an ALTAIR 5/5X with the standard 4 sensors plus a toxic sensor likely requires two gas cylinders.

The electronic Cylinder Holder is designed to read a Radio Frequency Identification (RFID) tag embedded in a plastic ring on MSA test gas cylinders. The RFID tag contains cylinder parameters that are necessary for successful calibration operations, providing the customer with an exceptionally easy setup experience. Gas cylinder information is automatically populated without user intervention when using the RFID-tagged gas cylinders.

If MSA test gas cylinders are not used, the non-electronic version of the Cylinder Holder is available. This configuration [→ Figure 2] requires the user to manually enter cylinder parameters.

Figure 2 Non-electronic Cylinder Holder and Test Stand.

A USB port is provided on the Test Stand that may be used with the GALAXY GX2 USB key to change instrument settings via the touch screen. This function allows for convenient fleet management capabilities.

The primary functions of the Test Stand are to calibrate and bump the ALTAIR family of gas detectors.

A Bump Test (or Function Check) is a qualitative check conducted by applying a known challenge gas to the instrument. The purpose of this check is to confirm sensor functionality and to verify the integrity of the flow path to the sensor(s).

MSA recommends that users perform a bump test prior to each day's use.

A successful calibration consists of the adjustment of the sensor('s) output to match the precise concentration value of a known traceable calibration cylinder. A calibration can be performed at any time to ensure maximum accuracy. A calibration should be performed periodically at regular intervals and immediately if the unit fails a bump test.

See the instrument manual for specific conditions that require a more frequent bump or calibration interval. Also see the instrument manual for information on checking the gas detector alarm functions.

In the following sections of this manual the user will learn how to install the GALAXY GX2 Automated Test System, set up its functionality, and perform instrument tests. The hardware, software, and configuration options anticipate the user's needs and provide superb efficiency in this next generation Automated Test System.

GALAXY GX2 System Features and Options

The GALAXY GX2 System automatically identifies the type of gas detector inserted into the Test Stand. Based on user-defined settings, the Test Stand then performs bump tests and/or calibrates the instrument. The data collected from each test event is stored to a memory card [→ 2.2 The Test Stand].

2.1 Power Supply

The Test Stand supplies power to the attached electronic Cylinder Holders. The Test Stand and Multi-Unit charger are powered individually by one of the following methods:

- Power Module: Input power requirements: 100 - 240 VAC, 47 - 63 Hz
  (Several different prong types are available for world-wide AC sockets).
- Optional Vehicle Module 12/24 VDC (For use in a cigarette lighter socket).

NOTICE

Use of a power supply not specified by MSA will void the instrument warranty and could cause damage to the GALAXY GX2 System.

2.2 The Test Stand

The Test Stand performs the following functions:

- Bump or calibration testing per user setup.
- Records test results to the optional memory card and to an optional networked PC interface.
- Sends gas detector Instrument Periodic and/or Session datalogs to a networked PC interface.
- Provides optional instrument charging capability.
- USB key allows gas detector settings to be changed securely, with the touch of the Test Stand screen.
- Sends e-mail notification of system alerts per user setup.

An LED indicator shows the status of the Test Stand:

- Green light indicates that the Test Stand hardware and software are fully functional.
- Blinking green light indicates that the Test Stand is performing the user specified test or datalog download.
- Blinking yellow light indicates that the Test Stand is in error and cannot be used for gas detector testing. Diagnostic information is available as described on the "GX2 Status" screen on the Test Stand and in the Troubleshooting section of this manual [→ chapter 6 Troubleshooting].
- Red light indicates that the last calibration or bump test failed.

Figure 3 Test Stand Physical Features

1	*Touch Screen Display*	*4*	*SD Card Port*
2	*Status LED*	*5*	*USB Port*
3	*Test Stand to Test Stand connector*	*6*	*Gas plugs*

SD or SDHC Memory Card Slot

A memory card port is provided on the Test Stand for calibration and bump record storage. Only one SD card is needed per bank and must be inserted in the Master Test Stand. An SD or SDHC memory card with 4-32 GB of memory can be purchased from MSA (preferred) or from the following manufacturers:

- Kingston
- SanDisk
- Lexar
- Wintec

The data on an SD or SDHC memory card is encoded for use with your MSA Grid account. There is also an application available on the MSA website to create a printable version of the SD card records (MSA GALAXY GX2 SD Card Reader.exe). The type and amount of datarecorded to the memory card is contingent on whether the Test Stand is networked.

Test Stand Networked to a PC

If the network connection is lost, only calibration and bump records are saved to the memory card. If connected to a MSA Grid account, the Test Stand will generate an email alert once the memory card reaches 90% and again at 99% capacity.

Test Stand is Stand-Alone

If the GALAXY GX2 Test Stand is not networked to a MSA Grid account, the memory card will save each calibration and bump test record. Incomplete records will not be saved. Once a memory card reaches full capacity, the Test Stand will be in fault and prohibit any unit from performing tests in that bank, until corrected. The Test Stand can be configured to erase the memory card, or the user can insert a replacement.

The memory card should only be removed when no test activity is occurring. Events that occur while no memory card is installed will not be stored in the Test Stand.

If no memory card is used, only the most recent bump or calibration record is stored to the Test Stand internal memory.

An optional end cap [→ Figure 4] can be placed over the port to protect the memory card and all external connections.

Figure 4 Optional End Cap

USB Drives

A USB key is available for purchase with the GALAXY GX2 Automated Test System:

- **GALAXY GX2 USB Key:** This key is inserted in the USB port on the Test Stand in order to change gas detector settings. The key ensures only authorized users can change settings on ALTAIR gas detectors; a security step in addition to the four-digit password.

2.3 Ethernet Interface

Two Ethernet Interfaces are provided on the rear of the GALAXY GX2 Test Stand [→ Figure 5]. The ports allow for the connection and communication distribution between multiple Test Stands. If networking to a computer, one Ethernet port on the Master Test Stand is used to communicate with your MSA Grid account.

Figure 5 Test Stand Ethernet jacks

2.4 Software Options

The GALAXY GX2 System functions as a standalone system, but an MSA Grid account provides a best-in-class user interface and data analysis toolset to quickly identify issues or concerns thatrequire user action.

Users may use the free MSA Link software application and an IR dongle [→ chapter 7.2] to communicate directly with their gas detector. MSA Link software allows a user to upload and download instrument settings, and download datalogs.

To learn more about a MSA Grid account, visit MSAsafety.com.

2.5 Cylinder Holder (electronic)

The electronic Cylinder Holder can accommodate one test gas cylinder and includes:

Figure 6 Cylinder Holder Physical Features

1	*Light Band*	*2*	*RFID Tag*	*3*	*Internal Pressure Regulator & Sensor*

Multi-Color Light Band	RFID Tag Gas Identification	Pressure Regulator & Sensor
Indicates gas bottle functionality. • Green indicates a bottle is completely functional, and gas parameters are within pressure and expiration date limits. • Yellow indicates low calibration gas, or gas is nearing its expiration date. • A blinking yellow light band indicates a hardware problem with the cylinder holder. • Red indicates an empty calibration gas bottle, or that gas has expired.	Reads the RFID tag of the MSA test gas cylinder and transmits: • the gas type • gas concentration • expiration date • lot number • cylinder part number to the Test Stand. The RFID tag is only available on MSA-branded test gas cylinders shown in the Maintenance section [→ chapter 7].	Reads the pressure of the gas cylinder and transmits that information to the Test Stand. • When gas pressure drops to approximately 99 psi (6.89 bar) a warning will display and the display numbers appear yellow. • Once pressure drops to approximately 49 psi (3.45 bar) the display numbers appear red. • Once pressure drops to less than 10 psi (0.69 bar) the Test Stand will prohibit testing with that cylinder.

2.6 Optional Multi-Unit Charger

There are two configurations of the optional Multi-Unit Charger (MUC). The ALTAIR 4/4X MUC can simultaneously charge up to four ALTAIR 4/4X gas detectors. Similarly the ALTAIR 5/5X MUC can charge four 5/5X gas detectors. Each Multi-Unit Charger contains its own power supply and does not connect electrically to the Test Stand. The housing is designed to physically connect to each other, whether bench-top or wall-mounted (if desired).

The light indicators on the Multi-Unit Charger are defined as follows:

- **Red** indicates that the unit is charging
- **Green** indicates that the unit is fully charged or no unit is inserted.

Verify the Multi-Unit Charger indicator lights red when an instrument is inserted. A fully charged instrument will momentarily flash red and the indicator will light green. If the red light does not engage the instrument may not be seated properly on the charging prong.

Instruments whose battery is **completely discharged** will need to be trickle-charge -prior to normal charging operations. Such instruments will show a green LED during the trickle-charge period until normal charging is initiated, at which time the red LED will be active.

There can be as much as a 10 minute window between when the instrument battery indicator shows charged and the Multi-Unit charger status indicator changes. The instrument indicator is the most accurate and will indicate the true charge state of the battery.

Figure 7 Multi-Unit Charger (Altair 4/4X and 5/5X only)

2.7 Special Conditions for Use with Reactive Gases

If using a Test Stand and Cylinder Holder for calibrating or bump testing a gas detector **configured with a chlorine, ammonia sensor**:

- Place the chlorine or ammonia gas cylinder in the Cylinder Holder closest to the Test Stand.
- Only one reactive gas Test Stand is allowed in a bank.
- If connecting other Test Stands to the right of the reactive stand, plug the reactive gas outlet port with a white gas plug before mating the next Test Stand. Otherwise, inaccurate calibration could result on the reactive sensor.
- **Before the first use with reactive toxic gas, condition the regulator and Test Stand with the gas, by running the calibration twice in sequence. If using chlorine, perform this procedure daily before use.**

If *not* using GALAXY GX2 Cylinder Holders:

- Use a dedicated pressure regulator on the reactive toxic gas cylinder (for chlorine or ammonia, use P/N 10034391). Label the pressure regulator **"FOR CHLORINE USE ONLY"** or **"FOR AMMONIA USE ONLY"**, as applicable (label stickers are provided with regulator).

- Use the shortest possible tubing running from the reactive toxic gas pressure regulator to the Test Stand's "CYLINDER 1" **port**.
- **Before the first use with reactive toxic gas, condition the regulator and Test Stand with the gas by running the calibration twice sequentially; for chlorine, perform this procedure daily before use.**
- Many gases have a cross-sensitivity to other gases. **Ensure that test cylinder gases do not contain other interfering gases.**

The GALAXY GX2 System **does not support** the calibration or bump testing of **chlorine dioxide (ClO_2) sensors** due to the reactive nature of the gas. If calibrating an Altair Pro ClO_2, use the QuickCheck.

3 Installation

The GALAXY GX2 System is a simple to install system that can be desktop or wall mounted. Setup requires simple tools and just a few minutes of time.

Carton Contents

The GALAXY GX2 System will be shipped with the following:

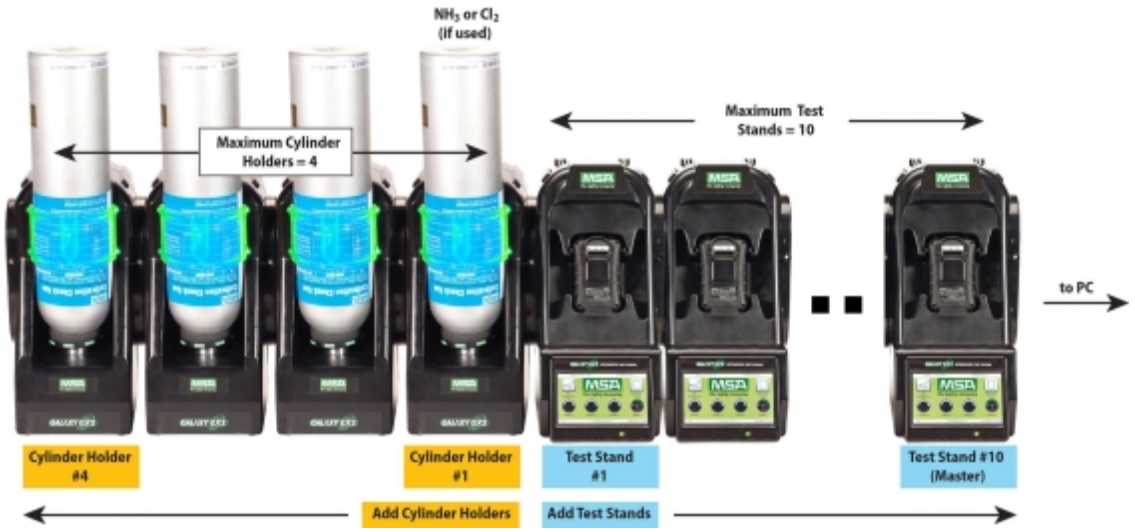
- Test Stand (including gas plugs, barbs and fresh air filter)
- Power Supply (if ordered)
- Spare Parts Kit (gas tubing barbs and plugs)
- Ethernet Cable (short cable for connection between Test Stands)
- Product CD
- Quick Start Guide
- Screen Protector (installed on the display screen)
- DIN Rail clip kit

Tools Needed

- Phillips head (cross-head) screwdriver.

As stated in the Introduction, the GALAXY GX2 System is designed for the connection of up to 10 Test Stands and four Cylinder Holders [→ Figure 8]. Test Stands must be assembled sequentially on the right-hand side of the first. Cylinder Holder(s) must be installed on the left-hand side of the first Test Stand.

Figure 8 Test Stands and Cylinder Holders properly installed in a bank



Test gas cylinders containing Chlorine or Ammonia must be installed according to the directions in the Special Conditions for Use with Reactive Gases section [→ chapter 2.7].

When installing the GALAXY GX2 System, please consider the environmental needs of your facility. If the customer desires, the GALAXY GX2 System can be used in a ventilated area to assist in disbursing the test gas exhaust.

WARNING!

- Ensure a clear path above the gas cylinder when installing or removing it. Do not place head, hands or other body parts above the gas cylinder when installing or removing it.
- Do not allow the gas cylinder to thread out of the gas cylinder valve when removing it from the io Dock. If the gas cylinder threads out of the gas cylinder valve, it can become a projectile.
- Do not overtighten the cylinder when installing. This can contribute to the gas cylinder unthreading from the gas cylinder valve when removing it.

Failure to follow these warnings can result in serious personal injury or death.

This manual provides steps for desktop and wall mounting. The following sections describe the proper installation for various GALAXY GX2 configurations:

- Connect Units in a Bank (Test Stands and Cylinder Holders) [→ chapter 3.1]
- Connect a Test Gas Source Without a Cylinder Holder (optional) [→ chapter 3.2]
- Network Test Stands (optional) [→ chapter 3.3]
- Removing Gas Seal for Certain ALTAIR and ALTAIR Pro Instruments [→ chapter 3.4]
- Desktop Mounting [→ chapter 3.5]
- Wall Mounting [→ chapter 3.6]
- SD or SDHC Memory Card Option [→ chapter 3.7]

3.1 Connect Units in a Bank

1. On the left-hand side of the Test Stand, ensure all five barb fittings are in place and straightened before connecting a Cylinder Holder or another Test Stand.

2. Once the barb fittings and connectors are fully aligned, firmly push the two units together until the screw holes in the flange align.

3. Insert one of the supplied screws into the front and two screws into the back of the flange.

4. If connecting multiple Test Stands, remove the white gas plugs [→ Figure 3] from all units except the farthest right Test Stand. If using ammonia or chlorine test gas, read the restriction found under chapter 2.7 Special Conditions for Use with Reactive Gases regarding the white plugs.
5. Continue adding Test Stands to the right and Cylinder Holders to the left [→ Figure 8].

When connecting two or more Test Stands ensure the white plugs are secured on the right side of the farthest right unit to prevent gas leakage.

3.2 Connect a Test Gas Source Without a Cylinder Holder

If high-pressure, high-capacity test gas cylinders are preferred, an optional demand regulator (p\n 710289) is available for cylinders with pressure less than (<) 3000 psi. Testing from an independent gas source will require additional setup effort, as described in the Cylinder Configuration section [→ chapter 4.7].

1. On the left-hand side of the Test Stand, ensure all five barb fittings are in place and straightened.
2. Place the user-supplied regulator onto the gas cylinder and secure a length of tubing onto its outlet.
3. Securely fit the end of the tubing over the appropriate barb fitting on the GALAXY GX2 Cylinder Holder.

3.3 Network Test Stands

Test Stands that are banked together should be connected through the provided Ethernet cable. The Master Test Stand is the one located on the furthest right of the bank.

1. Insert the short Ethernet cable into the left side jack of each Test Stand (1) and connect it to the right side jack of the neighboring unit (2) [→ Figure 9].

   One interconnect Ethernet cable is included with each Test Stand.

Figure 9 Test Stand Ethernet connections

1 Master Test Stand
2 MSA Grid account networking port
3 Test Stand to Test Stand port

2. If connecting the bank to your MSA Grid account, use a customer--supplied Ethernet cable and connect via the Master Test Stand Ethernet port #1 shown above.
3. If not connecting to either a network connection or a PC the interconnecting Ethernet cable must be inserted into port 1 on the Master Test Stand.

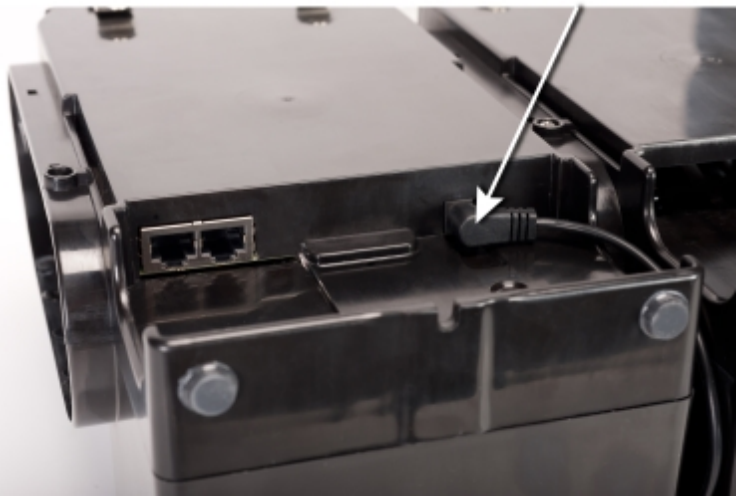
3.4 Removing Gas Seal for Certain ALTAIR and ALTAIR Pro Instruments

All ALTAIR/ALTAIR Pro Test Stands will be shipped with a black rubber base seal and a green rubber gas seal. **The green seal is used only for ALTAIR H_2S and ALTAIR CO instruments.** The seal should be removed and stored for ALTAIR O_2 and all ALTAIR Pro instruments.

Figure 10 Altair and Altair Pro Inlet Seals

3.5 Desktop Mounting

1. Place the GALAXY GX2 System on a flat, stable surface.
2. Insert the power supply into the power jack [see chapter 4.1 for first-time power up initialization].



The Test Stand display pivots for ease of viewing.

3. If using the Electronic Cylinder Holder the clear light band should illuminate once step 2 is complete. If illumination does not occur firmly push the units together to ensure the connectors are fully seated.
4. If using MSA Cylinder Holders, the left most **Cylinder Holder** should have a fresh air filter attached to the top port.

5. If not using MSA Cylinder Holders, the left most **Test Stand** should have a fresh air filter -attached to the top port.

6. Ensure the white plugs are inserted into the five gas connection fittings on the right side of the farthest right test stand.

3.6 Wall Mounting

When wall mounting the Test Stand (and applicable Cylinder Holder), MSA recommends steps 1-5 from the Desktop Mounting section [→ chapter 3.5] above be completed prior to installing on the DIN Rail. For a large configuration of Test Stands and Cylinder Holders, MSA recommends several people be used for installing or uninstalling from the DIN rail.

1. Complete steps 1-5.
2. Secure the optional DIN rail Clips to the rear of the GALAXY GX2 System, using the included screws.

3. Mount the DIN rail (Type DIN EN 50 022 Rail 1m x 35mm x 7.5mm) to the wall by securing it with wall anchors or other suitable fasteners.
4. Align the bottom of the DIN rail clips on the lower edge of the wall-mounted DIN rail and snap the upper part of the clip into place.
5. To remove from the DIN rail, pull the top of the clip forward to release from the top rail and push down on the unit to remove from the lower edge of the rail.

3.7 SD or SDHC Memory Card Option

The Test Stand can accommodate an SD or SDHC memory card, inserted in the port on the right hand side of the farthest right Test Stand.

Only one memory card can be used in a bank.

To install the memory card:

1. Ensure that memory card is not write-protected or locked.
2. Insert the memory card into the port, located on the right side of the Test Stand [→ Figure 11].
3. Place the optional end cap over the port to protect the memory card.
4. To remove the memory card push the card to eject it from the port.

The memory card should not be removed when testing or datalog downloads are in process. The Test Stand will not store events that occur while a memory card is removed.

Figure 11 SD or SDHC Memory Card Installation

4 Setting Up the GALAXY GX2 System

The GALAXY GX2 Automated Test System is shipped with the most common default options and therefore requires minimal set up. A table of all default settings is provided in the GALAXY GX2 Default Parameters section [→ chapter 9] at the end of this manual. Configuration settings are described in this chapter and can be changed to meet your individual needs via the touch screen display.

The touch screen is intended for interaction with the user's bare finger. Gloves may interfere with screen operation. The attached touch screen protector inhibits damage and should not be removed. Replacement screen protectors can be purchased from MSA.

NOTICE

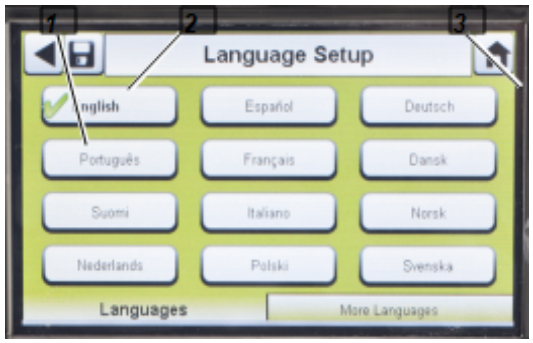
Use of sharp objects on the touch screen could cause damage.

4.1 Initial Setup

The first time the Test Stand is powered on an initial set of screens will appear for system configuration. The GALAXY GX2 logo momentarily displays and then the unit's version number. This is followed by the first of three required screens.

Language Setup

The Language Setup screen automatically displays.



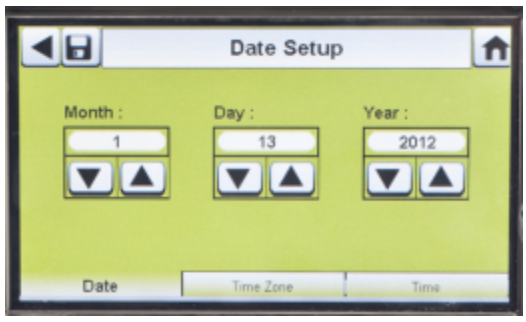
1. Select your language from the list.

   The language selection determines the date format, either MM/DD/YYYY or DD/MM/YYYY.
2. Select **Save**.
3. Select **Home**.

Changes must be saved on all screens by selecting the Save icon (shown above). If the user selects the **Back Arrow** (◀) without saving, a prompt will display. Select **Yes** to save or **No** to discard changes.

Set Time and Date

There are 3 tabs at the bottom of the screen - Date, Time Zone and Time. The user will need to configure each tab. The Date Setup screen automatically displays.

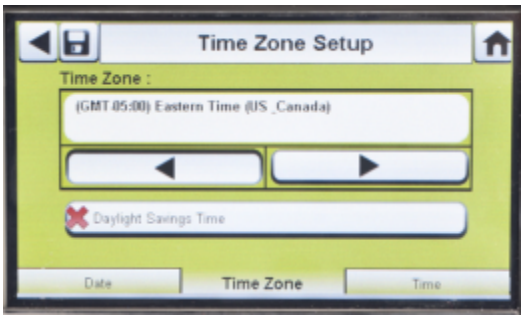


1. Enter the current month, day and year.

The time setting is used on all calibration and bump test records.

Test Stand time and date must be maintained for accurate record keeping.

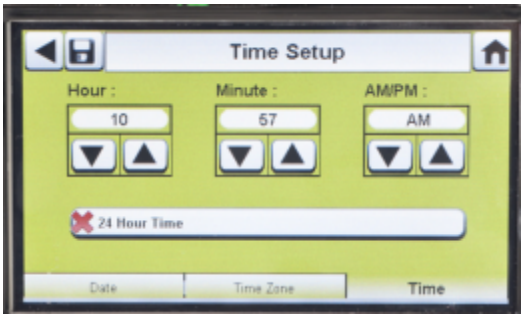
If the Test Stand is connected to an MSA Grid account, the time is automatically synchronized to the PC. The gas detector is automatically synchronized to the Test Stand each time it is inserted.



2. Select the Time Zone tab and then select your time zone.

   The time zone application is defined by the standard Microsoft® operating system.

Select **Daylight Savings Time** to enable automatic time adjustment when Daylight Savings Time occurs.



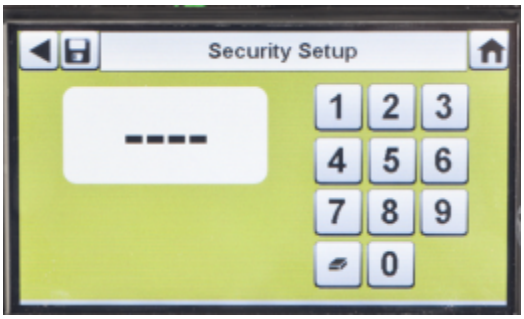
3. Select the **Time** tab and enter the **current time**.
4. Select **Save**.
5. Select **Home**.

The time and date is used for calibration and bump recordkeeping of the instrument.

24-hour or 12-hour time may be chosen.

4.2 dana.Security Setup

The Security Setup is the last screen to automatically display. Setting a numeric password -prohibits unauthorized changes to the GALAXY GX2 Test Stand. A notification will be sent to MSA Grid each time a password is entered on a networked bank.



If no password is desired, enter "0000" to disable the password feature. **The Test Stand is shipped with the password disabled.**

1. Enter a **four-digit password** for the GALAXY GX2 System.
2. Select **Save**.

   Retain a copy of the password for your records.
3. Select **Home**.
4. The GALAXY GX2 Home screen - displays [→ Figure 12].

The GALAXY GX2 security password can be remotely changed using MSA Grid. Knowledge of the current password is required before a new password can be entered.

To change the password, return to the Security Setup screen, enter a new password and select **Save**.

If your password has been misplaced, call MSA Customer Service for reset instructions.

4.3 Home Screen

The Home Screen displays the relevant parameters for the Test Stand and electronic Cylinder Holders.

Figure 12 Test Stand Home Screen

1	*Test Mode*	*3*	*Gas Cylinder Pressure Gauge*
2	*Gas Detector Datalog Download Mode*	*4*	*Gas Detector Charging status*

Test Mode

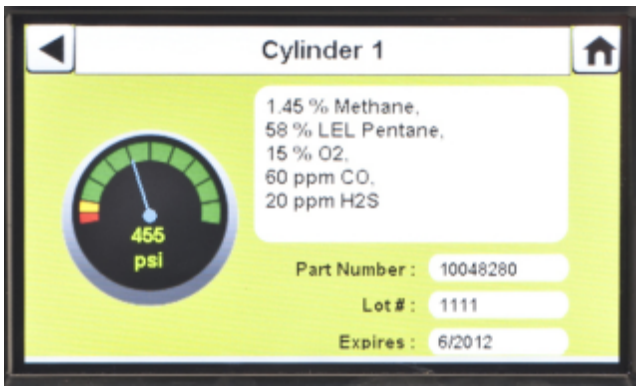
There are multiple test modes available on the Test Stand. The mode is selected and described in the Test Setup section [→ chapter 4.5] of this manual.

Gas Detector Datalog Download

Download On or Off is shown in the top right portion of the Home screen. This setting is described in the GALAXY GX2 Setup, Datalog section [→ chapter 4.5] of this manual. If not connected to MSA Grid, disable the datalog download sequence. This is only for downloading.

Pressure Gauges

Display test gas cylinder pressure **from the electronic Cylinder Holder only**. Selecting a pressure gauge displays gas cylinder details.



Charging Status

If gas detector charging is installed the battery symbol will display in the lower left corner of the screen. When the gas detector is charging, the battery symbol will cycle. When the instrument is either fully charged or not present, the battery symbol will be solid green.

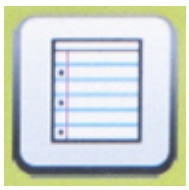
There can be as much as a 10-minute window between when the instrument battery indicator shows charged and the Test Stand battery symbol shows solid green. The instrument indicator is the most accurate and will indicate the true charge state of the battery.

A fully-drained or powered-off gas detector will begin to charge approximately 4 minutes after insertion into the Test Stand. A powered-on gas detector will begin to charge approximately 15 minutes after gas testing and datalog downloads are complete.

GX2 Configuration

Provides access to GALAXY GX2 settings. (Password screen will display if configured.) Steps are found under GALAXY GX2 Setup section [→ chapter 4.2] of this manual.

Instrument Records



Provides the most recent calibration and/or bump record for each instrument in the Test Stand bank. **This button is only active on the Master Test Stand and only if an SD card is inserted.** All other Test Stands will report their data to the Master Test Stand for display. Each record uses 1 kB of memory. The number of records that can be stored depends on the SD card size.

4.4 General Setup

The following settings can be changed from their default values after entering the password. Select **GX2 Configuration** from the Home screen. The Administrator screen displays.

Figure 13 Administrator screen

1 *GX2 configuration for Test Stand [→ chapter 4.5]*
2 *Instrument configuration [→ chapter 4.6]*
3 *Test gas cylinder configuration [→ chapter 4.6]*
4 *GX2 Status selection*
5 *Export Data selection*

The Administrator screen provides configuration options for the Test Stand (1), instrument (2) and test gas cylinders (3).

The GX2 Status selection (4) provides detailed information about the Test Stand that can be used to troubleshoot identified errors.

The Export Data selection (5) is used to export the test records located on the SD card to a USB key if inserted.

4.5 GX2 Configuration

To configure the settings for the GALAXY GX2 System select **GX2 Configuration** [→ Figure 13] on the Administrator screen.

Figure 14 GX2 Configuration

1 *Network Setup [→ chapter 4.5]*
2 *Time/Date Setup [→ chapter 4.1]*
3 *Test Setup [→ chapter 4.5]*
4 *Security Setup [→ chapter 4.2]*
5 *GX2 Setup [→ chapter 4.5]*
6 *Backlight/Volume Setup [→ chapter 4.5]*
7 *Languages [→ chapter 4.1]*

The Time/Date Setup, Security Setup, and Languages Setup have been described in the Initial Setup section [→ chapters 4.1 and 4.2].

Backlight/Volume Setup

Select **Backlight/Volume Setup** on the GALAXY GX2 Configuration screen [→ Figure 14] to access the Backlight/Volume screens.

Volume Tab

The user can set the volume for audio indicators.

1. Set the **volume** by selecting either the **left or right arrows** on the volume screen.

   The default volume level is set to Medium.

2. Select **Save**.

Backlight Tab

The user can set the backlight intensity of the display screen.

1. Set the **backlight** by selecting either the **left or right arrows** on the backlight screen.

   The default backlight level is set to Medium.

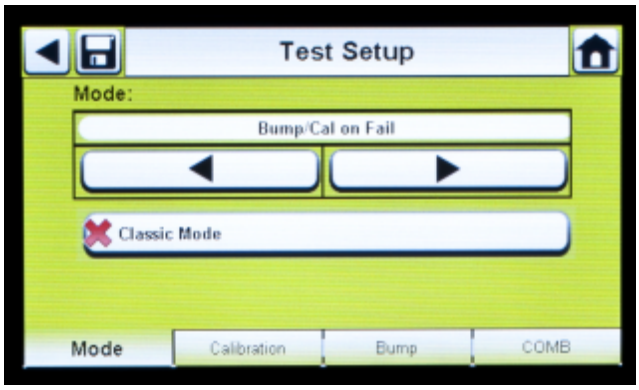
2. Select **Save**.

To return to the GX2 Configuration screen, select the back arrow ◀ on the top left corner of the screen.

The GALAXY GX2 System will reduce the backlight intensity automatically after a period of inactivity. Either select a button or insert an instrument to return the intensity to the user selected level.

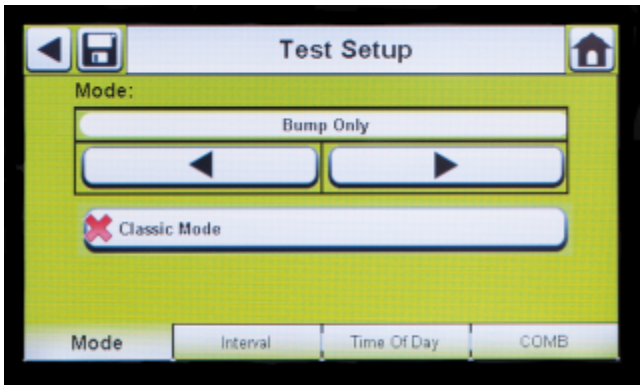
Test Setup (Applicable for GX2 Application V1.06.0072 or lower)

Select **Test Setup** on the GALAXY GX2 Configuration screen [→ Figure 14] to access the Test Setup screens. There are 4 tabs that can be selected under Test Setup: Mode, Calibration, Bump and COMB.



Test Setup (Applicable for GX2 Application V1.07 or higher)

Select **Test Setup** on the GALAXY GX2 Configuration screen [→ Figure 14] to access the Test Setup screens. There are 4 tabs that can be selected under Test Setup: Mode, Interval, Time of Day and COMB.



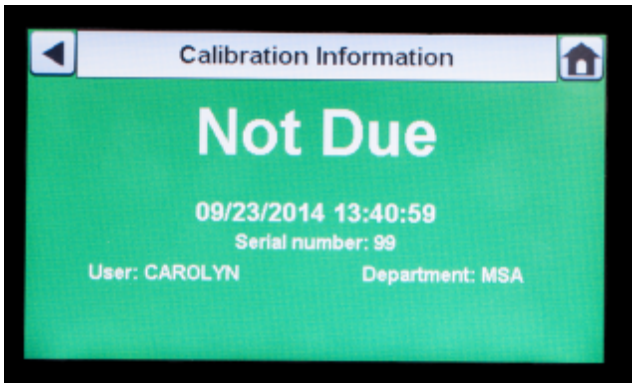
Mode Tab

Select the Mode tab. Using the left and right arrow keys, the user can select Bump Only, Calibration Only, Bump/Cal on Fail, Cal Check/Cal on Fail, Triple Test, or Triple>Cal>Triple.

- Bump Only setting bumps an instrument and reports a pass or fail status.
- Calibration Only performs a full calibration on an instrument every time it is docked.
- Bump/Cal on Fail (default setting) will bump an instrument. If it fails the bump, the Test Stand automatically performs a full calibration.
- The Calibration Check/Cal on Fail function will display "Pass" when the measured gas response for each sensor is within 10% of the applied span gas and when calibration is not due. If it fails the Calibration Check, the Test Stand automatically performs a full calibration.

- Triple Test and Triple>Cal>Triple are special test modes for users in Brazil.
- Classic Mode (✓= enabled) initiates the user-selected test mode each time an instrument is inserted in the Test Stand. The Classic Mode feature means, "always test".

Disabling Classic Mode (✗ = disabled) sets the Test Stand to calibrate or bump an instrument only if the due date approaches. The Test Stand will read the last calibration date and add the GX2 Calibration (or Bump) Interval. If the setting is within 5-days of the calibration due date, the Test Stand will begin the test. If the calibration due date is not within 5-days, no test will initiate, the screen will display "Not Due" and the instrument will be turned off after 5 minutes.



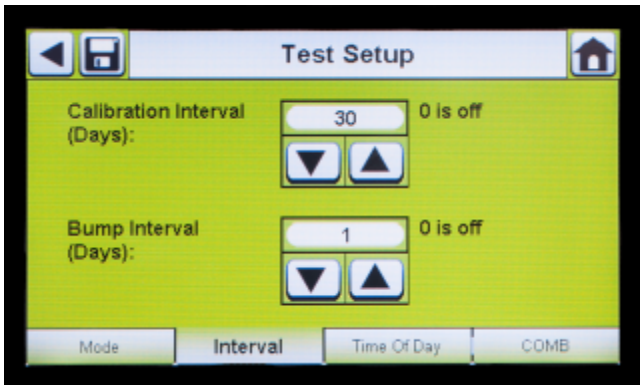
A memory card must be used if Bump Only test is enabled and Classic Mode is disabled. Otherwise, the Test Stand will bump the instrument each time it's inserted.

The bump test quickly confirms that the gas sensors are functioning. Perform a calibration periodically to ensure accuracy. Perform a calibration immediately if the instrument fails a Bump Only test.

Interval Tab

The Interval tab allows the user to determine when a gas monitor is due for testing if the GX2 is **not** in Classic Mode. This interval MUST match the set interval in the gas detector for proper operation.

The gas detector interval can be checked using MSA Link Pro or on the Instrument Setup page of the GALAXY GX2. If the Mode = Bump Only or Bump/Cal on Fail, a SD memory card must be used in the GALAXY GX2 for proper Bump Overdue handling.



3. Select the up and down arrows to set the Calibration Interval from 0 to 180 days.
4. Select the up and down arrows to set the Bump Interval from 0 to 180 days.
5. Select **Save**.

Setting the Calibration Interval (or Bump Interval) to 0 will disable the Cal Due (or Bump Due) feature. Automated gas testing is prohibited in this configuration.

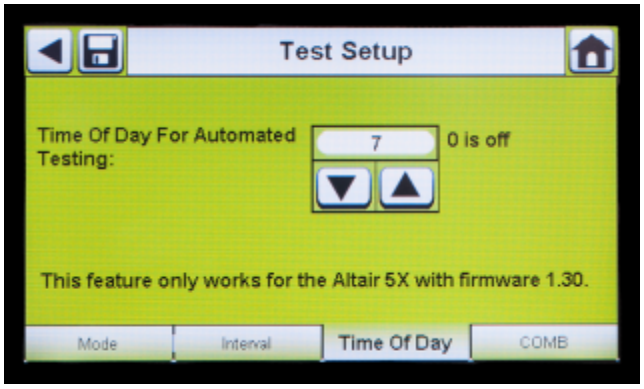
Interval settings on the Test Stand must be in sync with the interval settings on the gas monitor. If the intervals are not in sync, the Test Stand will not always test at the specified instrument Calibration Due (or Bump Due) time.

Time of Day Tab

The Time of Day feature is only supported under the following conditions:

- The GALAXY GX2 is a charging version
- The GALAXY GX2 has software version 1.07 or higher
- The instrument supports Time of Day and is running the correct firmware
- The Interval must be non-zero on both gas detector and GALAXY GX2
- All gases must be present for the sensors under test
- The time on the instrument must be the same as the GALAXY GX2 time

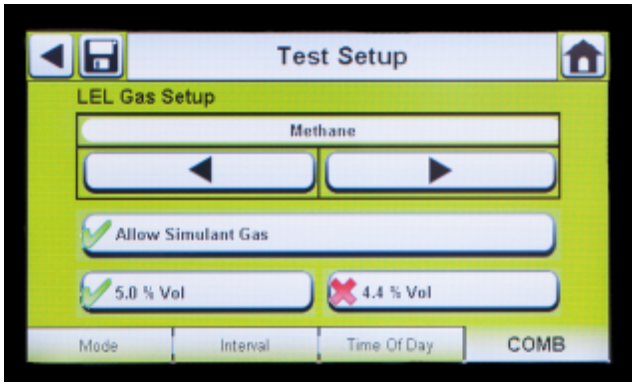
The user can choose the hour of the day to Calibrate or Bump an instrument that's inserted into the Test Stand. The type of test performed at the specified time of day is selected on the Mode tab of the Test Setup page.



1. Select the up and down arrow keys to set the time of day on the 24 hour clock. Selecting 0 turns the feature off. Selecting 24 will initiate testing at midnight.
2. Select **Save**.

COMB Tab

In the Combustible tab the user can set special conditions for the combustible sensor.



1. If the gas detector contains a combustible (COMB) sensor, select the %volume to 100%LEL conversion for each gas type. This conversion factor is determined by regional regulations.

The GALAXY GX2 System has the following %volume to 100%LEL conversions:

Methane	5.0%v/v	or	4.4%v/v

Propane	2.1%v/v	or	1.7%v/v
Pentane	1.5%v/v	or	1.1%v/v
Butane	1.5%v/v	or	1.4%v/v

The default selections are in the left column.

2. Select **Allow Simulant Gas** to turn simulant gas on or off.

   The only approved simulant gas for the ALTAIR gas detectors is Methane as a pentane simulant, which is contained in most MSA 4 or 5 gas cylinders.

If this selection is turned off (×), the exact target gas must be used for the combustible sensor. The Test Stand will check that the exact target gas is available. If it is not, testing will be prohibited and a message will display to indicate the error.

3. Select **Save**.

GALAXY GX2 Setup

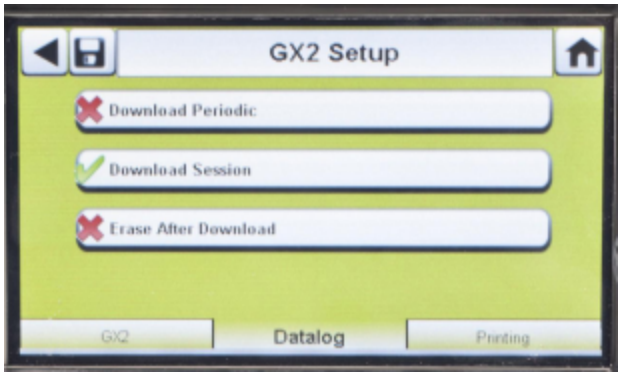
To access GALAXY GX2 Setup, select **GX2 Setup** on the GALAXY GX2 Configuration screen [→ Figure 14].

GALAXY GX2 Tab

The following options are available on this screen:

- USB Drive Enable setting allows the user to gather data from the Memory card with a USB drive that can be inserted in the port on the right side of the unit. The default setting is Off (×).
- Display psi or bar options display the units of pressure on the gauges on the home screen and pressure screen. Selecting one of these options (✓) will disable the other option. The default setting is psi.
- Erase GALAXY GX2 Memory erases all data on the memory card. The user will be prompted to confirm the action before erasure occurs.

Datalog Tab



If test stand is not networked with MSA Link Pro, Disable all datalog downloads. Bump and Calibration data will still be downloaded to the memory card if present.

The following options are available on this screen:

- Download Periodic setting will download the Periodic Datalog from the instrument following the specified calibration or bump test. Downloading can be enabled or disabled. The default setting is disabled (✗).
- Download Session will download the Session Datalog from the instrument following the specified calibration or bump test. It contains the date and time stamp of instrument events, such as turn on/off, alarms, and calibrations. The default setting is disabled (✗).
- Erase After Download erases all current and past data once downloaded and verified by your MSA Grid account. The default setting is enabled (✓).

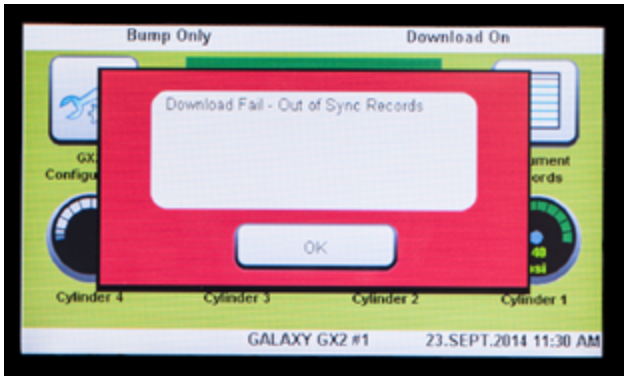
Datalogs are not written to the memory card because of potentially large file sizes. If the unit is not networked to an MSA Grid account, instrument datalogs are downloaded, but not stored. In this situation the user can use the MSA IR dongle and the free MSA Link application to download datalogs from the instrument.

In order to effectively manage the time required to download datalogs, it is recommended that datalogs be downloaded and erased after each test. This will result in storage of only the most recent information in the instrument datalog, minimizing time to download the information.

Datalog Download Failure

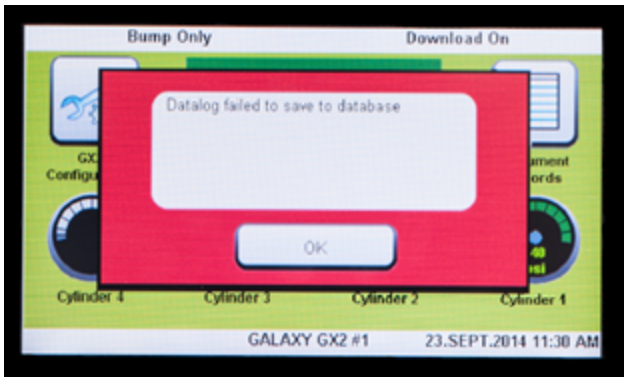
The Test Stand will monitor the success or failure of the gas monitor datalog download. Successful downloads are not indicated on the Test Stand. If the Test Stand is networked to a MSA Grid account, the user is alerted if the download experiences one of two possible failures:

Download Fail - Out of Sync Records



If the Out of Sync Records error is received on the test stand, see the "Out of Sync White Paper" located on the GALAXY GX2 product page on www.MSAsafety.com.

Datalog failed to save to database



If the datalog does not save to the database, check your network connection to the GX2 Connect service.

Datalog Download Sequence

The following flowchart shows the sequence of events for a datalog download:

If either the Session or Periodic datalogs are Enabled for downloading, the test status of the calibration or bump will not display until **AFTER** the datalog download is complete.

Print Tab

Select the Print tab to print a calibration sticker or receipt [available from MSA,→ Figure 8]. The sticker or receipt will print in the language setting of the Master Test Stand.

- **Print Sticker** setting will print a calibration or bump sticker each time the GALAXY GX2 System -successfully calibrates or bumps an instrument. A sticker will not print if the instrument fails the test.
- **Print Receipt** will print a receipt and embedded calibration sticker after calibration, or receipt only after a bump. The receipt will print whether the instrument passes or fails, the calibration sticker will only print with a passed calibration.

GX2 Gas Setup

The GALAXY GX2 Test Stand can accept test cylinder gas from the optional Cylinder Holders (electronic and non-electronic) or from a user provided regulated gas source. Cylinder data can be set for up to six gas types per cylinder. The following are the maximum number of gases each instrument can process:

- ALTAIR and ALTAIR Pro: 1 gas
- ALTAIR 2X: 2 gases (typically 1 cylinder with quad gas)
- ALTAIR 4/4X: 4 gases (typically 1 cylinder with quad gas)
- ALTAIR 5/5X: 5 gases (typically quad gas + 1 toxic gas)
- ALTAIR 5IR/5XIR/5X PID: 6 gases

When configuring a single-gas test stand in the same bank as a multi-gas test stand, the following rules must be followed:

- If using two gas cylinders that contain the same type of gas, place the single gas cylinder -closest to the Test Stands.

  Example: if 40 ppm H_2S is required for a single-gas instrument and quad gas (with 20 ppm H_2S) is required for a multi-gas instrument, place the 40 ppm cylinder closer to the test stand to ensure the single-gas instrument uses the 40 ppm H_2S gas.

- If two gas cylinders have the same gas the Test Stand will always pull from the closest cylinder that has the minimum number of gases for the instrument.

  Example: if a 60 ppm CO cylinder and a quad gas cylinder (with 60 ppm CO) are connected, a single-gas instrument will receive gas from the 60 ppm cylinder as long as it is closer to the Test Stand. The Test Stand will use the quad gas for multi-gas instruments because it matches the number of gases with the number of installed sensors.

For instruments that require more than one gas cylinder for testing, the test order is determined by the cylinder with the maximum number of gases.

The Altair CO and H_2S single gas monitors cannot be tested with a multi-gas cylinder. Use only single gas cylinders with these types of Altair monitors.

The GALAXY GX2 System processes gas cylinder information and instrument readings in ppm, %(-volume) or %LEL. If using certified gas cylinders with the content specified in ppm, the most accurate gas readings from the instrument will be obtained with the instrument set to ppm.

Conversions between ppm and mg/m^3 are completed at standard pressure and temperature values. If the gas detector is set to display the readings in mg/m^3, note that differences in the following environmental conditions will cause the readings to be affected:

- Standard temperature: 20 ºC (68 ºF)
- Standard pressure: 101 kPa (760 torr)

An instrument can be set up with Comb EX as its combustible gas. Comb EX is combustible gas that is not in the GALAXY GX2 database and must be manually entered. Hexane is an example of a Comb EX gas that can be used for calibration, but is not listed in the database. Not all combustible gases can be used to calibrate the ALTAIR family of gas detectors. If the Comb EX selection is used, contact MSA to confirm your selected combustible calibration gas is compatible with the instrument and GALAXY GX2 System.

To access all functionality of the GALAXY GX2 cylinder configuration capabilities, an electronic Cylinder Holder must be connected to the GALAXY GX2 System.

If the Test Stand is NOT using Cylinder Holders, the gas connections on the left-most GALAXY GX2 Test Stand [→ Figure 15] are as follows from top:

- Fresh Air
- Cylinder 1
- Cylinder 2
- Cylinder 3
- Cylinder 4

Figure 15 Gas inlets on the Test Stand

If the Test Stand is using Cylinder Holders [→ Figure 8], they are set up as follows from right to left:

- Cylinder 1 is the closest to the Test Stand.
- Cylinder 2 is to the left of Cylinder 1.
- Cylinder 3 is to the left of Cylinder 2.
- Cylinder 4 is to the left of Cylinder 3.

Fresh Air is the top port on the last installed (left-most) Cylinder Holder.

Changing Cylinders

WARNING!

- Ensure a clear path above the gas cylinder when installing or removing it. Do not place head, hands or other body parts above the gas cylinder when installing or removing it.
- Do not allow the gas cylinder to thread out of the gas cylinder valve when removing it from the io Dock. If the gas cylinder threads out of the gas cylinder valve, it can become a projectile.
- Do not overtighten the cylinder when installing. This can contribute to the gas cylinder unthreading from the gas cylinder valve when removing it.

Failure to follow these warnings can result in serious personal injury or death.

Changing test cylinders in the Cylinder Holders is a simple procedure.

To change an RFID tagged test gas cylinder, using an **electronic Cylinder Holder**:

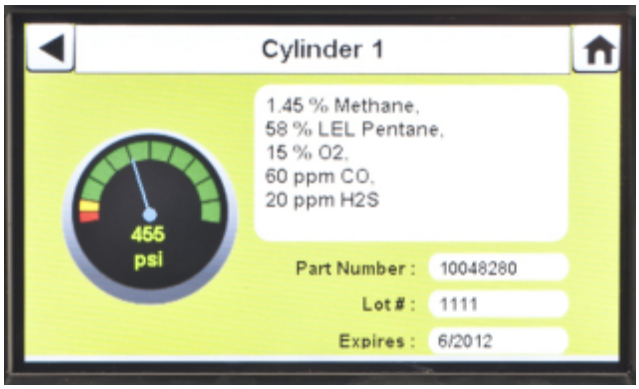
1. Unscrew and remove a cylinder with its attached RFID tag from the Cylinder Holder.
2. Screw a new test gas cylinder into the Cylinder Holder.

The new cylinder's RFID tag will automatically populate the cylinder data fields on the Cylinder Setup screens.

The Multi-Color Light Band will indicate test gas cylinder functionality as described in the System Features—Cylinder Holder section [→ chapter 2.5].

3. Navigate to the **Home screen** and select the appropriate **cylinder pressure gauge** from the touch screen.

   The selected Cylinder screen will appear, as shown.



Ensure the GX2 is reading the pressure and gas type.

To change a test gas cylinder, using a **non-electronic Cylinder Holder**:

1. Remove the test gas cylinder from the Cylinder Holder.
2. Unscrew the pressure regulator.
3. Reattach the pressure regulator to the new test gas cylinder.
4. Insert it into the Cylinder Holder.

If a new gas type is used, the user must manually enter the cylinder data fields on the Cylinder Setup screens, as described in the Cylinder Configuration section [→ chapter 4.7].

5. Navigate to the **Home screen** [→ Figure 21] and select the cylinder gauge to ensure the GALAXY GX2 System is reading the gas type.

If background gases could be present, use a Zero Air Cylinder. Use a demand flow regulator and connect to the fresh air port (top inlet) OR configure the cylinder holder manually (see step 4 above) and use any port/ cylinder holder location. MSA provides an RFID-tagged Air cylinder for this purpose. This requires a calibration station with expanded solenoid capacity. Refer to the Introduction section [→ chapter 2] for more information about the expanded solenoid option.

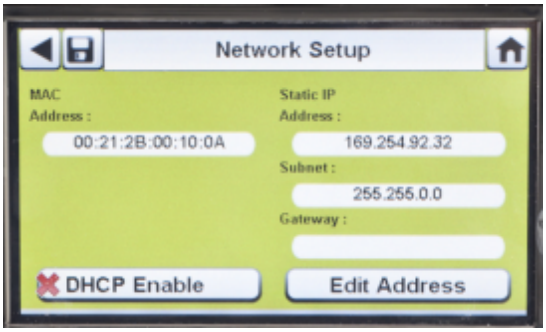
Network Setup (Optional)

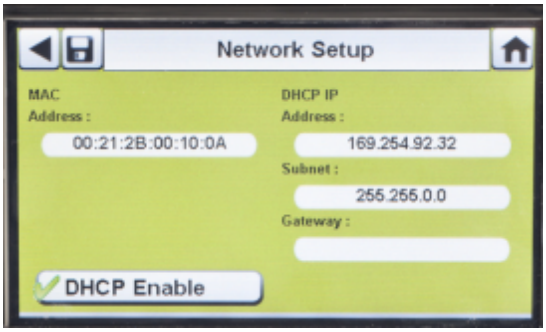
The GALAXY GX2 Test Stand can be networked to an MSA Grid account. Networking (single or multiple connected units) allows the user to remotely gather and analyze data, monitor performance, and configure the Test Stand.

An Ethernet cable supporting 10/100 Mb must be connected to the farthest right Ethernet jack when facing the front of the unit, (shown in Figure 5) and connected to the PC or network router.

To configure the network setup, navigate to the **GX2 Configuration** screen and then select Network Setup. The **Network Setup** screen displays. It is recommended to use a Static IP address between the Master Test Stand and the MSA Grid account.

The Time Server Config. button (not shown) is only necessary if a NPT server is available on the company network. Your IT department should be able to assist with this issue.



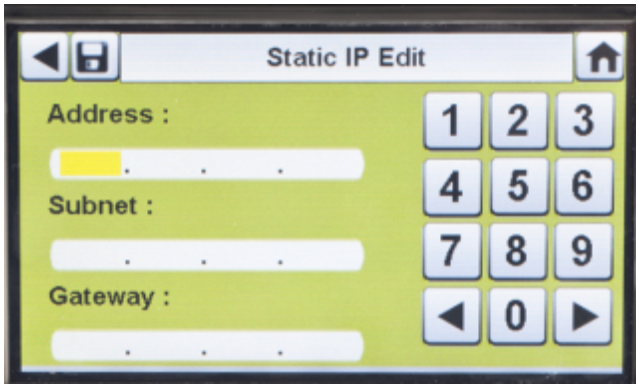


Selecting **DHCP Enable** (✓) allows the GALAXY GX2 System to automatically receive an IP address from the network. It is recommended that the DHCP server always assign the same IP address to the Test Stand to maintain communications with your MSA Grid account.

If using an MSA Grid account, a unique IP address must be given to all Test Stands, including master and slave stands. Failure to assign unique IP addresses to each Test Stand will result in datalog download failures or network connection errors.

1. If DHCP is disabled (✗), select **Edit Address** on the Network Setup screen.

   *The **Static IP Edit** screen displays.*



Corporate networks may require the involvement of an IT department for setup.

2. Enter the Static IP **Address** on the **number keypad**.

   The first entry of the IP Address must be <233. The 4th entry is prohibited from being 0 or 255.

   The yellow highlighted cursor then moves to the Subnet field.

3. Enter the **Subnet** on the **number keypad**.

   The yellow highlighted cursor then moves to the Gateway field.

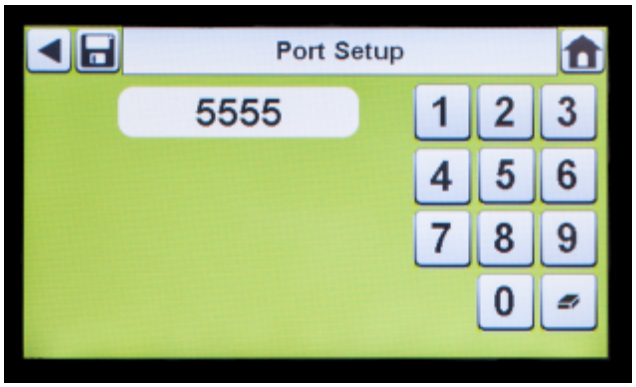
4. Enter the **Gateway** on the **number keypad**.

   The yellow highlighted cursor then moves to the Subnet field.

5. Select **Save**.

Port Setup (Optional)

Port setup links the GALAXY GX2 Test Stand to GX2 Connect for the communication of calibrations, bumps, datalogs, and configurations, only if using an MSA Grid account. The default port: 5555 is also the default port for GX2 Connect. Both can be changed for your facility's network. This screen may also display a field called GX2 Connect Address. This will automatically populate when the customer is connected, otherwise the IP address will have to be manually entered.



4.6 Instrument Configuration

The GALAXY GX2 Automated Test System allows the user to configure a limited set of gas detector settings at the Test Stand, as defined below:

Gas Detector Settings Configurable at the Test Stand

- Time & Date (automatically set to the Test Stand time & date)
- 24-Hour Time
- Cal Gas Value
- Company Name
- Company Department Name
- User Name
- Exposure Warning
- Exposure Alarm
- TWA
- STEL
- Deficiency Warning
- Deficiency Alarm
- Alarm Set-point
- Latching Enabled
- Vibration Motor On/Off
- LED On/Off
- Horn Enable
- Man Down (if applicable)
- Enable/Disable Sensor Channel
- Cal Due On/Off
- Cal Due Interval
- Average Enabled
- Peak Enabled
- Datalog Interval

The user can save those settings to a reusable file for later use [◊ Save Settings]. The settings are stored on the GALAXY GX2 USB key. No instrument setting files are stored locally.

All settings entered in Instrument Configuration must be saved on the respective screens. **To apply settings to the instrument, the user must select Update Settings before removing the instrument.**

The Instrument Configuration screens are accessed **only when an instrument is -inserted in the Test Stand**.

To configure an instrument, insert the GALAXY GX2 USB key and navigate to the Administrator page. Select **GX2 Configuration** screen [→ Figure 21] and then **Instrument Configuration**. The Instrument Configuration screen displays provided that a powered-on instrument is inserted.

Figure 16 Instrument Configuration

Instrument Setup

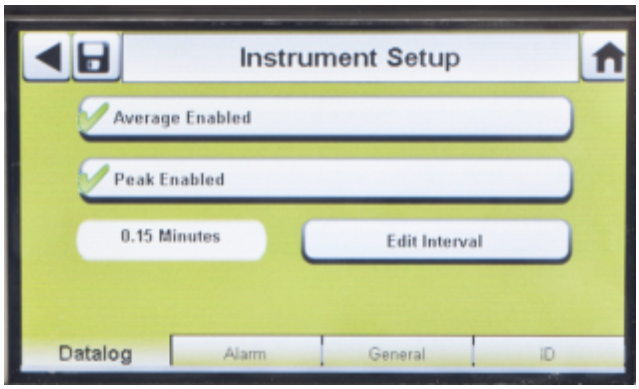
The user can set the instrument's datalog gathering functionality, alarms, calibration intervals, and identification through the 4 tabs on the Instrument Setup page.

1. Select Instrument Setup [→ Figure 16] from the Instrument Configuration screen.

Datalog Tab

Select the Datalog tab to set how the instrument compiles sensor reading data during a set interval.

Figure 17 Instrument Setup - Datalog

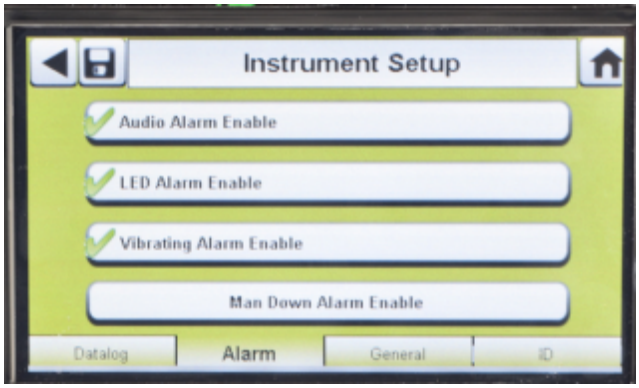


- Average Enabled (✓) compiles an average of the sensor readings during the set interval time.
- Peak Enabled (✓) records the highest reading during the set interval time.
- Edit Interval allows the user to set a specific interval time frame for the recording of instrument data to its datalog. The smaller this interval, the more frequent the data will be stored to the datalog. Large datalogs will require longer download times.

Alarms Tab

Select the Alarm tab to set the instrument alarm functionality.

Figure 18 Instrument Setup - Alarm

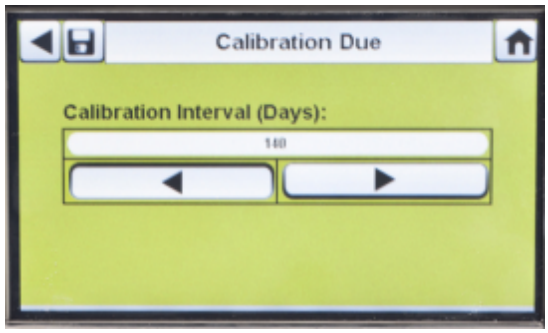


- Audio Alarm Enable (✓) sets the instrument to emit a beeping sound in an alarm condition.
- LED Alarm Enable (✓) sets the instrument to flash its LEDs in an alarm condition.
- Vibrating Alarm Enable (✓) sets the instrument to a vibrating alarm in an appropriate condition.
- Man Down Alarm Enable (if applicable) will activate the Audio and LED alarms if the instrument does not detect motion for 30 seconds (select gas detectors equipped with this feature).

General Tab

Select the General tab to set the instrument calibration interval. The user can select a 24-hour Time or 12-hour Time standard.

Figure 19 Instrument Setup - General



1. Select **24-Hour Time** to set that standard. If not selected the instrument will function in the default 12-Hour Time standard.
2. Select **Calibration (or Bump) Due** to set calibration interval for the instrument.

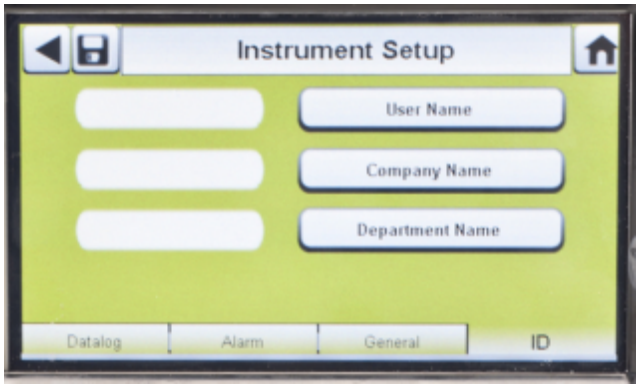
   The Calibration (or Bump) Interval screen displays.
3. Set the **Calibration (or Bump) Interval (Days)**.
4. Select **Save**.

For proper operation, ensure the GALAXY GX2 and instrument Calibration Due intervals are the same value.

ID Tab

Select the ID tab to set the instrument name, company, and department.

Figure 20 Instrument Setup - ID



1. Select **User Name** to assign a designation.
2. Enter the **name** on the **keypad**.
3. Select **Save** and then select the **back arrow**.
4. Select **Company Name**.
5. Enter the **name** on the **keypad**.
6. Select **Save** and then select the **back arrow**.
7. Select **Department Name**.
8. Enter the **name** on the **keypad**.
9. Select **Save**.

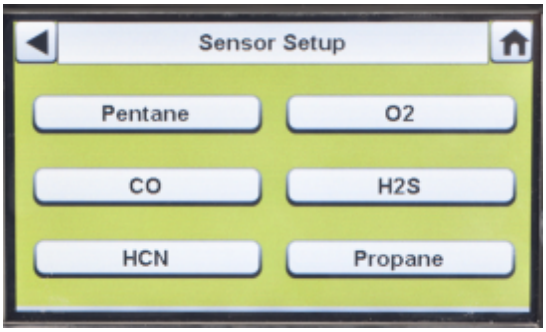
To apply settings to the instrument select **Update Settings** on the Instrument Configuration screen [→ Figure 16], before removing the instrument from the GALAXY GX2 Test Stand.

An external software application is available on www.msasafety.com that allows for User/Department/Company updates using an external IR dongle. This firmware application is called ALTAIR FAMILY FLEET UPDATER.

This external application allows for intuitive and rapid updating of these parameters in all Altair instruments.

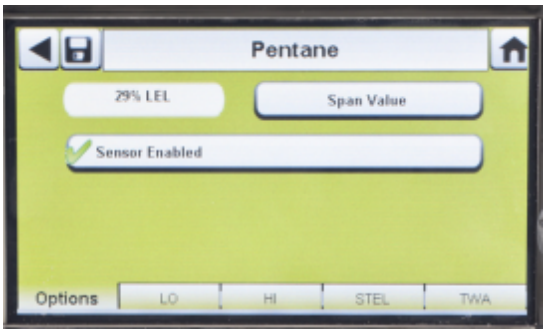
Sensor Setup

The GALAXY GX2 System displays the gas types the instrument is programmed to detect. The user can enable or disable sensor settings, change span value, enable or disable alarms, and set alarm latching. Adding new sensors or changing sensor types cannot be done in the GALAXY GX2 System. These tasks must be completed at an MSA-authorized service center.



1. Select **Sensor Setup** from the Instrument Configuration screen [→ Figure 16].

   This screen displays the sensors currently installed in the instrument.



2. Select the **sensor** that you wish to configure on the Sensor Setup screen.

Options Tab

Select the Options tab to set Span Value and enable or disable the sensor for that gas type.

1. Select **Span Value** to enter the calibration and bump span value. Check the instrument's product user manual for recommended span value of each sensor.

   The GALAXY GX2 Test Stand will prohibit entering span values outside the instrument range. The instrument will transmit its range to the Test Stand.

⚠ WARNING!

Using an incorrect span value can seriously impair the gas detector's ability to warn the user of dangerous conditions.

Failure to follow this warning can result in serious personal injury or death.

2. Enter the **Span Value** on the number keypad.
3. Select **Save** and then select the **back arrow**.

Alarm Setpoint Tabs

Select the LO, HI, STEL, and TWA tabs to enable each alarm, determine setpoints, or enable latching for each sensor.

⚠ WARNING!

Using an incorrect alarm setting can seriously impair the gas detector's ability to warn the user of dangerous conditions. Extreme caution must be used when changing alarm levels. Ensure alarm changes are properly set prior to instrument use.

Failure to follow this warning can result in serious personal injury or death.

The GALAXY GX2 System will read alarm limits from the instrument and prevent entered values from exceeding those limits.

- LO is a warning alarm that indicates the instrument is exposed to a gas level above the first alarm level. For an oxygen sensor, this alarm level can also be less than 20.7 %Vol.
- HI is a warning alarm that indicates the instrument is exposed to a gas level above the second alarm level. For an oxygen sensor, this alarm level can also be less than 20.7 %Vol.
- STEL is the Short Term Exposure Limit warning alarm that indicates the instrument is exposed to a higher than acceptable gas threshold for 15 minutes.
- TWA is the Time Waited Average that projects the current gas readings over an 8-hour period. The warning alarm indicates if projections reach a higher than acceptable threshold.

To change the Alarm Setpoint:

1. Select **Alarm Setpoint** from the LO, HI, STEL, or TWA tabbed screens.
2. Enter the **setpoint** on the number keypad.
3. Select **Save**.

Save Settings

Once the instrument settings are configured, these settings can be saved to a USB drive for future application onto another instrument.

1. Select **Save Settings** (🖫) from the Instrument Configuration screen.
2. Enter a **file name** for the settings on the keypad.

> The file name is limited to 24 Western language characters. It is recommended that a detailed description of changed settings for each file be kept in a secure location to ensure proper gas detector configuration.

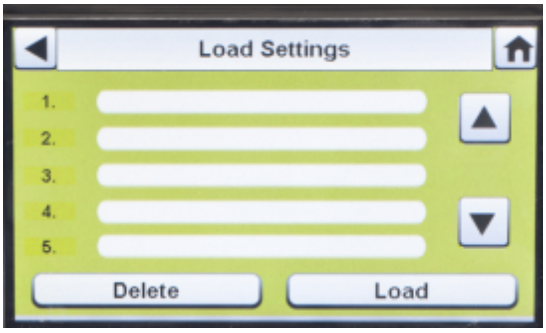
3. Select **Save**.

Load/Delete Settings

Configured instrument settings can be loaded into the GALAXY GX2 Test Stand and applied to an instrument, provided the GALAXY GX2 USB key is inserted into the Master Test Stand as described in the **USB Drives** section [→ chapter 2.2] of the System Features section.

This feature is particularly useful when configuring a large number of instruments. Unused settings may be permanently deleted from the Test Stand. Pre-defined settings from a USB drive can be efficiently transferred.

To load or delete settings:



1. Insert a **USB drive** with the Saved settings into the port, under the memory card port on the right side of the Test Stand.
2. Select **Instrument Configuration** on the Home screen.
3. Select **Load Settings** on the Instrument Configuration screen.

> Saved settings on the GALAXY GX2 USB key display.

4. Select the **up or down arrows** to indicate the file name of the setting to apply.
5. Select **Load** to apply the setting to the -instrument.
   Select **Delete** to permanently remove the setting from the USB drive.
6. Select the **Back Arrow** on the top left of the screen to navigate to the Instrument Configuration screen.

Update Settings

Select **Update Settings** to save or delete the settings on the instrument.

> **Repeat** the Load Settings and Update Settings **steps for each new instrument** that is to be changed.

4.7 daCylinder Configuration

The user can configure the GALAXY GX2 System to change assigned gases in each cylinder holder attached to the Test Stand(s).

1. To access Cylinder Configuration, navigate to the **Administrator** screen:

Figure 21 Administrator screen

1 Icon - Cylinder Configuration *2 Icon - Home Screen*

2. Select **Cylinder Configuration**.

   The Cylinder screen displays.

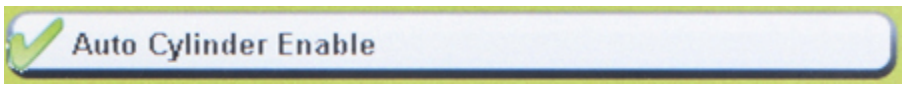
Cylinder Setup

1. Select **Cylinder Setup**.

   The Cylinder Setup screen displays for Cylinder 1, which is the cylinder closest to the Test Stand.

Cylinder Tabs

Cylinder data will populate automatically when using the electronic cylinder holder and a test gas cylinder with RFID tag. This feature is enabled when this button appears as shown:

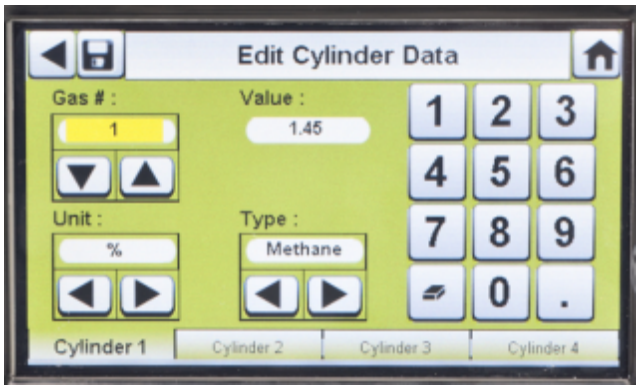


The **Lot #** and **Expires** fields **cannot be manually entered on the Test Stand**. They are populated only when using an electronic cylinder holder or from your MSA Grid account.

To enter cylinder data, if not using an electronic cylinder holder:

1. Select "✕" on the Auto Cylinder Enable button for manual entry.
2. Select **Edit** on the Cylinder Setup screen.
3. The user will be prompted to Save Changes? Select **Yes**.

   The Edit Cylinder Data screen displays.



4. Set the **Gas #** by selecting either the **up or down arrows**. If there is one gas in the cylinder, select 1. **For additional gases in the same cylinder (gases 2-6)**, enter the gas parameters.

Example: if Cylinder 1 contains quad gas, four sets of gas parameters should be entered (gases 1, 2, 3, and 4). To remove a gas from the list, set the **Value** to zero (0), **Units** and **Type** to None, and then select **Save**.

If using an MSA quad gas cylinder with Pentane, enter 5 gases (58% LEL Pentane and 1.45%vol Methane plus the O_2, CO and H_2S gases).

5. Set the Unit by selecting either the **left or right arrows**.
6. Set the Value by entering the correct value on the **number keypad**.
7. Set the Type by selecting either the **left or right arrows**.
8. Repeat steps 1 through 6 for each gas within that cylinder.
9. Select **Save**.

⚠ WARNING!

Proper setup of non-RFID tagged gas cylinders is critical. Accurate calibration may not occur if improper cylinder values are entered. The user must also confirm the cylinder gas concentration is compatible with the respective instruments that are to be calibrated.

Failure to follow this warning can result in serious personal injury or death.

The GALAXY GX2 System will prohibit entering gas values greater than 85%LEL for any combustible gases with the exception of methane. See special use conditions below for use of methane above 100%LEL.

Expiration Setup

When using the electronic Cylinder Holder, the gas cylinder expiration date is automatically read from the RFID tag. The GALAXY GX2 System can send an email notification (if configured using MSA Grid) of the pending expiration prior to the expiration date. The user must define **how many weeks in advance the notification is sent**. This time period is suggested to be the lead-time to replace/reorder the cylinder.

Select **Expiration Setup** on the Cylinder screen to access the cylinder Expiration Setup screens.

1. Set the **Notice weeks to expiration** by selecting either the up or down arrows.

   The default value is 4 weeks.
2. Select **Save**.
3. Repeat steps 1 and 2 for each cylinder.

This feature is only available for electronic Cylinder Holders with RFID tagged test gas cylinders.

Special Conditions for Use with 100% LEL or Greater Methane Calibration Gas

The GALAXY GX2 can be used to calibrate or bump test ALTAIR 5X IR instruments with the 100% Vol Methane IR sensor. The allowable range of Methane to be used for the IR sensor is between 15% Vol to 50% Vol. MSA brand calibration gas PN 10075804, 50% Vol methane, is provided with an RFID tag for fully automated set-up.

The following conditions must be met in order to safely use this gas:

GALAXY GX2 test stand bank(s) must be placed in an operating fume hood, with the sash closed during instrument calibration or bump testing. The fume hood must have a draw of at least 80 ft/min and MSA recommends that this fume hood be tied to a back-up power source to ensure operation.

This feature has been approved for use with 15% Vol to 50% Vol methane. Use of propane, butane or any other heavier than air combustible gases equal to or greater than 75% LEL are blocked and not permitted within the GALAXY GX2 automated test system.

WARNING!

Failure to follow these special conditions can result in property damage, serious personal injury, or death.

5 Using the GALAXY GX2 System

Once the GALAXY GX2 System is set up and configured to accept a gas detector, the user must complete the following steps to perform instrument tests.

5.1 Turning on the System

The system is turned on when the AC Power Module or Vehicle Power Adapter is plugged into the unit and a reliable power supply is provided. The GALAXY GX2 System does not have an on/off button and is designed to remain powered on.

5.2 Inserting the Instrument

The GALAXY GX2 Test Stand includes one of three instrument cradles to accommodate the ALTAIR family of gas detectors.

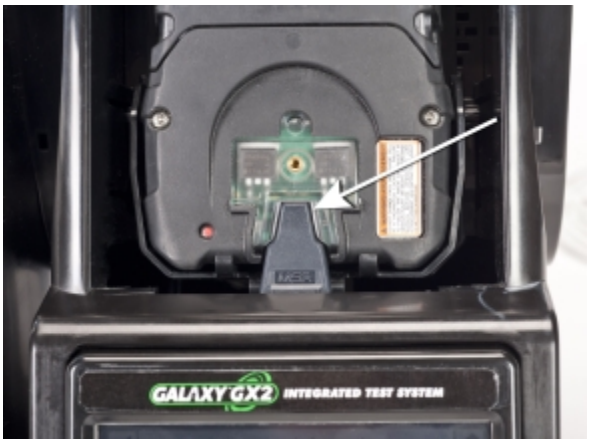
To insert all instruments, except the ALTAIR 5/5X Instrument:

1. Insert the bottom of the instrument into the cradle and push the top until it snaps into place.

There is a several second delay between the insertion of the instrument and start of gas testing while communications are established. A Progress screen displays when gas testing starts.

2. If using the charging option on the ALTAIR 4/4X instrument ensure the Test Stand charging connector at the bottom of the cradle makes contact with the instrument contact.

To insert the ALTAIR 5/5X Instrument:



1. Insert the instrument into the cradle, sliding the bottom over the charging connector.

   If your Test Stand has the optional charging feature, ensure the charging connector at the bottom of the cradle makes contact with the instrument contact.

2. Pivot the instrument in the cradle upwards, into the gas inlet sleeve (see arrow). The instrument will lock into place, once properly positioned.
3. Ensure the red LEDs on the instrument flash when communicating with the Test Stand.

There is a several second delay between the insertion of the instrument and start of gas testing while communications are established. A Progress screen displays when gas testing starts.

5.3 Running a Test

Complete the following steps to run an instrument test:

1. Turn on the gas detector and allow it to warm up per the appropriate instrument manual.

⚠ WARNING!

Instrument must warm up per the instrument manual before attempting calibration; failing to allow unit to warm up can cause erroneous test results, which can cause inaccurate calibrations.

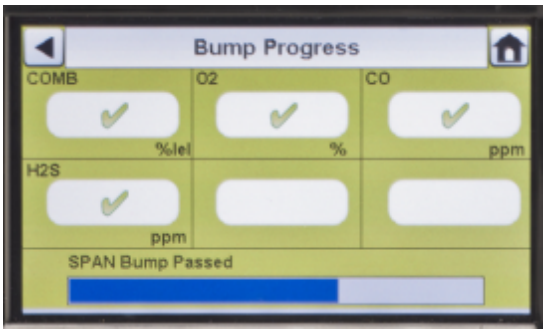
Failure to follow this warning can result in serious personal injury or death.

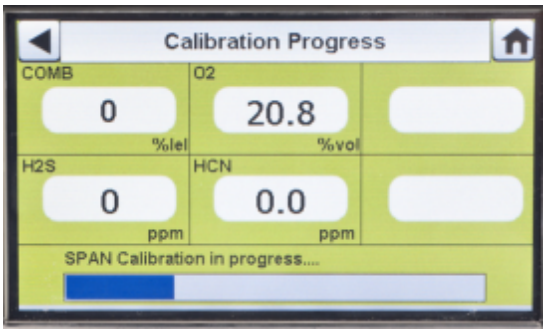
2. Ensure the test gas cylinder tubing is properly attached to the barb fitting of the gas inlet, or that the cylinder(s) are properly screwed into the Cylinder Holder(s) and contain gas.
3. Verify the selected test mode, indicated in the top left corner of the Home screen. (Calibration Only, Bump Only, or Bump/Cal on Fail.) Triple test modes are used for Brazil customers only.

If the desired test mode is not set, refer to the GALAXY GX2 Setup section [→ chapter 4.5] of this manual.

Before inserting an ALTAIR, ALTAIR 2X or ALTAIR Pro Instrument into the Test Stand, press the Instrument Test button and then insert it into the Test Stand.

4. The GALAXY GX2 System will read the instrument configuration via the IR link up to 10 seconds. If the LED lights on the instrument flash red do not remove the instrument. This indicates that IR communications are in progress.
5. After the initial IR communications, the bump or calibration progress screen displays that includes up to six gas types and a progress bar.





For the Bump Progress screen, an hourglass symbol will display in each sensor box until that sensor's bump is complete. A green checkmark (✓) or red X (✗) will display for each sensor when the Bump test is complete.

If the Test Stand is configured to download the session log and/or periodic log from the instrument, the download will occur after the calibration or bump test. Refer to the GALAXY GX2 Setup section [→ chapter 4.5] to configure this feature.

Reminder: Instrument datalogs can only be downloaded to your MSA Grid account when an Ethernet connection is active or via an IR Dongle using MSA Link.

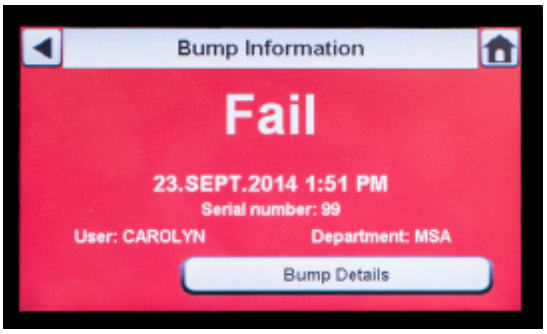
If the instrument is removed while the Test Stand is performing a calibration or bump the instrument will default to the last valid and retained calibration parameters. For gas detectors with multiple sensors, any green colored calibration progress values are considered a valid calibration.

Helpful Hint: Instrument Periodic datalogs can grow large and create lengthy download times, particularly for the ALTAIR 5/5X Instrument. MSA recommends downloading and then erasing Periodic datalogs after every test. Erase Datalog is the default setting.

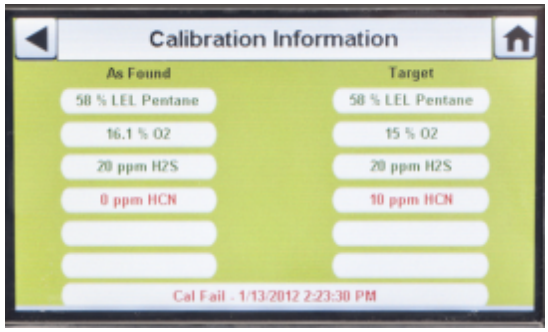
The GALAXY GX2 System will only erase instrument datalogs after receiving confirmation from your MSA Grid account that data is successfully stored.

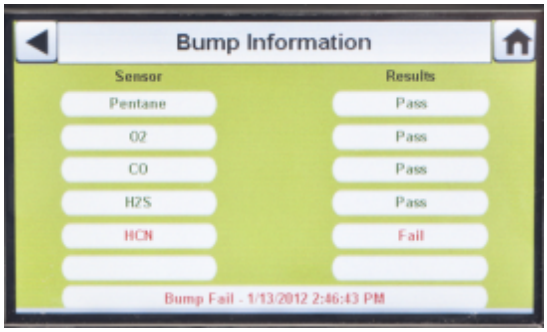
If the software application is inactive the Test Stand displays a message stating datalogs cannot be downloaded.

6. The instrument Pass or Fail screen displays. This screen displays until a new instrument is inserted or the user makes another selection on the touch screen. If datalog downloads are enabled, the screen will indicate the status of the download (Successful or Failed) at the completion of the data transfer.



- If the instrument passes the test, remove it or select **Home**.
- If the instrument fails the test, select **Calibration Details** or **Bump Details** for sensor failure information.





If the instrument fails the bump test while the mode is set to **Bump/Cal on Fail** the Test Stand will automatically calibrate the instrument.

The Calibration Information screen displays two columns for the sensors: As Found and Target. As Found is what the Test Stand detected prior to calibration. The Target column specifies the span gas value that is being applied. If the sensor passes calibration, the Target value becomes the new calibration point.

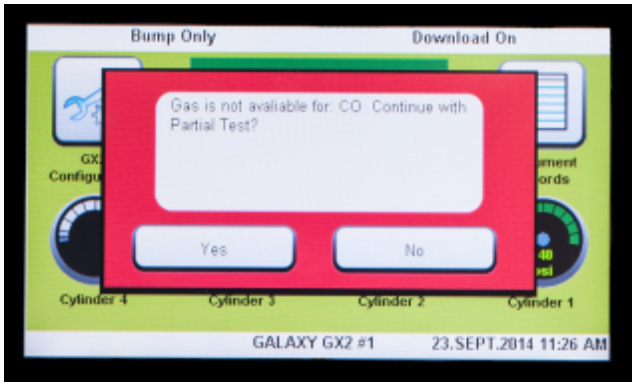
- If a sensor failed during a bump, attempt to calibrate the instrument. Refer to calibrate an instrument in this manual.
- If the unit fails the calibration, review the troubleshooting section [→ chapter 6] of this manual.

If using the ALTAIR 4/4X or 5/5X unit the instrument will shut off if not removed from the Test Stand within 15 minutes after test completion. If the GALAXY GX2 System is equipped with the charging option the instrument will begin charging after shutoff.

If Cylinder is Configured Incorrectly or Gas is Not Available

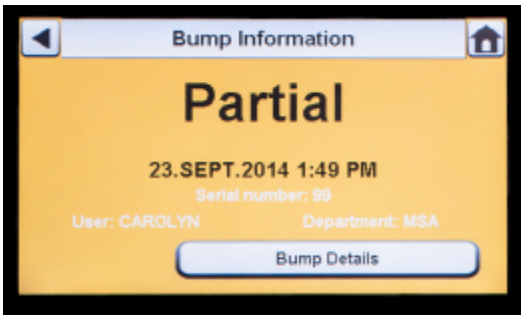
The Test Stand will verify the instrument sensors are compatible with the gases in the cylinder(s). If not, the GALAXY GX2 System will:

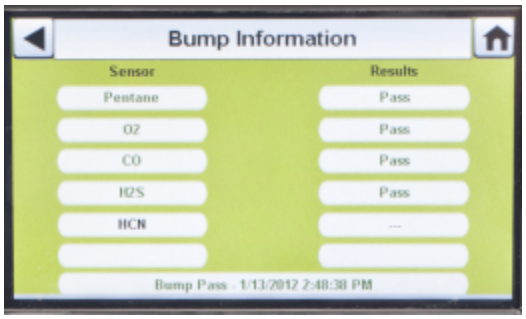
1. Prompt the user to run a partial bump or calibration.



2. If a partial bump or calibration is acceptable, select **Yes**.
   If not, select **Home** to navigate to the administrator screen.

   If a partial bump or calibration is performed the test results screen displays.
   Dashes (---) under the results column indicate unavailable gases for the test.





If performing a manual bump or calibration on an individual sensor in a multi-gas detector, always perform the manual test after the GALAXY GX2 test is complete.

If using an MSA Grid account, partial bump tests will result in the instrument being listed as "Overdue" for bump testing since not all sensors were tested.

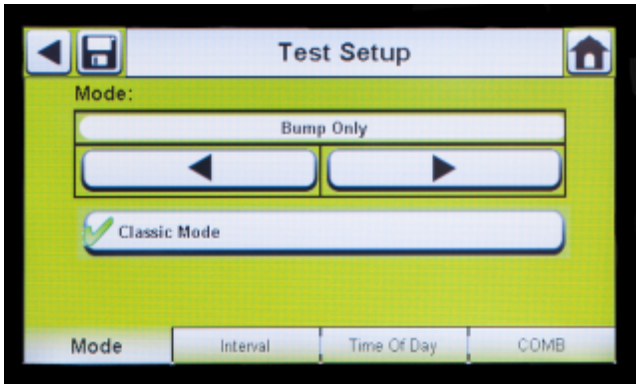
After Setup is complete:

After initial installation and setup are complete, confirm the GALAXY GX2 System is properly configured. Perform manual calibrations on several instruments and then repeat the calibration using the GALAXY GX2 System. Confirm the calibration results are equivalent.

5.4 Classic Mode

If the Classic Mode button is enabled (✓), every time a gas detector is inserted in the Test Stand it will be tested according to the user-selected Mode. This feature ignores the Calibration and Bump Interval.

Figure 22 Test Setup



If the user disables the Classic Mode (✗) and datalog downloading is enabled, the Test Stand will determine if testing is due based on the last test date and the interval. If not, the Test Stand downloads the datalogs.

A memory card must be used if Bump Only test is enabled and Classic Mode is disabled. Otherwise, the Test Stand will bump the instrument each time it's inserted.

5.5 Automated Testing Features

Depending on the gas detector and the GALAXY GX2 firmware version, there are two methods of automated testing:

- The Always Ready feature will calibrate Altair 4X and Altair 5X instruments (as defined in section “GALAXY GX2 Always Ready Feature”) 24 hours after the previous calibration.
- The Time of Day feature will allow calibration or bump testing on Altair 5X v1.30 or higher (as defined in section “Time of Day Automated Testing”) instruments based on a user-selected time.

Carefully review the table and sections below to determine the automated testing method for your gas detector.

	Altair, AltairPro, Altair2X	Altair4X	Altair5X
Always Ready	Not supported	Supported	Supported for v1.11,1.17,1.27
Time of Day	Not supported	Not supported	Supported for v1.30

GALAXY GX2 Always Ready Feature

The Always Ready feature is a capability of the ALTAIR 4X and ALTAIR 5X Instruments with the following software versions:

- ALTAIR 4X: v2.03 and higher
- ALTAIR 5X: v1.11, v1.17 and v1.27

The feature permits the gas detector to be automatically calibrated on a user-defined interval. The most common use of this feature allows the user to configure the GALAXY GX2 System to automatically calibrate an instrument prior to the start of work-shift.

The following configurations must be set to allow the Always Ready feature to be active:

Instrument	GALAXY GX2 Test Stand
• Calibration Due Interval = any interval [→ chapter 4.6]. Ensure that this interval is the same as on the Test Stand. • Valid calibration at the desired time of day	• Charging version of the Test Stand • Calibration Due Interval = any interval [→ chapter 4.6]. Ensure that this interval is the same as on the gas detector. • Test Mode = Calibration

When these conditions are met, every hour the instrument will internally check its clock and last calibration time and date. If the next calibration is due to occur within the hour, the gas detector powers itself on and the Test Stand will initiate the calibration. Following calibration, the Test Stand will power off the instrument and begin charging. The sequence repeats based on the Calibration Due Interval.

The Always Ready feature is solely based on Calibration Due Interval, not on time of day. Each subsequent calibration starts within the same hour of the day as the previous calibration.

If for some reason the instrument fails calibration two times in a row, the Always Ready feature will be disabled in the instrument to prevent calibration gas from being unnecessarily consumed. The user must diagnose the cause of the failed calibrations and initiate a valid calibration at the desired time of day.

Time of Day Automated Testing

The following configurations must be set to activate the Time of Day feature:

Instrument	GALAXY GX2 Test Stand
• Altair5X with firmware version 1.30 or higher • The Interval must be the same and non-zero on both gas detector and GALAXY GX2 • The time on the Altair 5X must be the same as the GALAXY GX2 time	• GALAXY GX2 has software version 1.07 or higher • The Interval must be the same and non-zero on both gas detector and GALAXY GX2 • Charging version of the Test Stand • All gases must be present for the sensors under test

The GALAXY GX2 will perform automated testing (Bump Only, Bump/Cal on Fail or Calibration Only) depending on the test type selected under the Mode tab of Test Setup. Review Troubleshooting section [→ chapter 6.8] if testing does not start at the anticipated time.

If the gas detector turns on and fails the selected test the GALAXY GX2 will wake up the gas monitor at the following hour and try again. If the gas monitor fails the second test, the test stand will try once more at the following hour. If the gas monitor fails again, the test stand will stop testing. To recover from this mode, the gas detector must be turned on and off, and the situation that caused the test failure must be corrected.

5.6 Email Notification

If a network connection is active and email notification is configured via the your MSA Grid account, the Master Test Stand will send emails as they occur based on the events shown in the table below.

NOTE: "EO" = Each Occurrence and "FO" = First Occurrence.

Frequency	Condition for Email	Email is Sent When
FO	Low Calibration Gas	Gas cylinder pressure ≤ 99 psi
FO	Empty Calibration Gas	Gas cylinder pressure ≤ 49 psi
FO	Calibration Gas Nearing Expiration Date	User configurable (default = 4 weeks)
FO	Calibration Gas Expired	Day of expiration
FO	GX2 Faults/Errors	As they occur
FO	SD Memory Card Nearing Full	90% Full
FO	SD Memory Card Full	99% Full
EO	Security Accessed	After password is entered
EO	Bump Overdue	User configurable (default = 1 day)
EO	Calibration Overdue	User configurable (default = 30 days)
EO	Bump Failed	As they occur
EO	Calibration Failed	As they occur
EO	X-Cell Sensor Status	Reported after 2 successive failed calibrations

E-mails are sent from the test stand in the language that is currently used on the test stand display.

5.7 Overdue Calibration and Bump Notification

The Test Stand will determine that gas detectors are overdue for a bump or calibration and send notification per the table above. Gas detectors are flagged as overdue on the day following the due date.

The test stand will only send Bump Overdue or Calibration Overdue emails if there is an SD card in the Master test stand.

6 Troubleshooting

Use the following information to diagnose abnormal conditions.

6.1 Instrument Will Not Initiate a Bump or Calibration

1. Ensure the instrument is turned on and errors are not displayed.
2. If using an ALTAIR or ALTAIR Pro Instrument, press the button and then insert it into the Test Stand.
3. Ensure the instrument is seated securely in the Test Stand cradle.
4. If using the ALTAIR 5 or 5X Instrument, ensure the instrument pump inlet is seated securely in the Test Stand gas inlet sleeve.

5. Verify errors are not displayed from the electronic Cylinder Holder. If using the non-electronic Cylinder Holder, ensure adequate connections are made and verify cylinder pressure.
6. If using a GALAXY GX2 System with the charging option for the ALTAIR 4/4X or 5/5X Instrument ensure the charging connection fits securely to the instrument. This properly aligns the instrument in the test stand.
7. Ensure the GALAXY GX2 System is set in the desired test mode. Refer to the GALAXY GX2 -Configuration [→ chapter 4.5] in the Setup section of this manual.
8. The Test Stand display is showing the Home Screen.

6.2 Instrument Fails Zero Calibration or Bump

1. Check the Fresh Air filter and replace if contaminated.
2. Ensure that the atmosphere is free of any interfering gas.
3. If connecting test gas without a Cylinder Holder, ensure the gas tubing line is not connected to the top fresh air port on the left side of the farthest left unit.

Some sensors may experience cross-sensitivity to other gases being used to test. Failing a Zero Test could be an indication that cross-sensitivity is occurring.

6.3 Instrument Fails Span Calibration or Bump

1. Verify the instrument span setting is the same value as the test gas.
2. For ALTAIR H_2S and ALTAIR CO instruments, ensure that the green gas seal is inserted in the Test Stand.
3. For ALTAIR 5/5X instruments, verify that the gas inlet on the instrument is fully inside the inlet nozzle on the Test Stand. Verify that the Test Stand inlet nozzle is not damaged or torn.
4. Check the right side of the farthest right unit to ensure the white plugs are secure over the gas outlet connections.
5. Check the sides of each unit to ensure the gas line barb fittings are in place and aligned -between the Test Stands and Cylinder Holders. Misaligned barbs lead to gas leakage.
6. Ensure the cylinder configuration is correct. Refer to the Cylinder Configuration information in the Setup section [→ chapter 4.7] of this manual.

7. Use the Details screen to identify failing sensor(s). If repeated failures occur, replace sensor per instrument manual instructions.

Occasionally, in normal use conditions, electrochemical sensors can be exposed to -either very high levels of the target gas or to an interferent gas, which can saturate the sensor electrolyte or filter. If this type of saturation occurs, it may affect the sensors performance and ability to zero or span calibrate. This is typically a temporary effect and the sensor will self-recover if left in fresh air. The recovery time is dependent on the -saturation gas and the level of exposure, but is less than 24 hours in almost all cases. Recovery should be attempted prior to sensor replacement.

6.4 Instrument Records Do Not Display

Instrument records only display in the farthest right Test Stand. Check the memory card port in the right side port of the farthest right Test Stand. If the optional SD or SDHC memory card is not installed, the instrument cal and bump records will not display.

6.5 Test Records Not Saved to Memory Card

Most likely caused by a corrupted memory card or new card that is write protected. In the case of a write protected memory card, slide the switch on the side of the card to set it to accept data.

6.6 Cylinder Data Does Not Display

If using an electronic Cylinder Holder with RFID-tagged MSA gas cylinders, the general cylinder parameters automatically populate. If using a non-electronic Cylinder Holder or test gas from an independent source the user must manually enter cylinder data. Gas cylinder pressure will ONLY display with an electronic Cylinder Holder.

The cylinder gauges on the Home screen and the subsequent cylinder screens only display pressure, Part Number, Lot Number, and Expiration fields if using an electronic Cylinder Holder.

Cylinder Data Does Not Display:

1. If using an electronic Cylinder Holder, verify the pressure is displayed on the Home screen. If not displayed, the Cylinder Holder and Test Stand may not be communicating via the connector. Remove the flange screws and push the two stands together. If a valid pressure reading displays re-insert the flange screws.
2. If using an electronic Cylinder Holder, ensure the test gas cylinder is properly screwed into the base.
3. If not using an RFID-tagged gas cylinder or an Electronic Cylinder Holder, verify that cylinder parameters have been entered [→ GX2 Gas Setup].
4. Using an independent regulator, ensure the test cylinder(s) contain test gas.

6.7 Test Stand Yellow LED

The Test Stand provides a comprehensive status of hardware and firmware components through the GX2 Status screen, accessed on the Administrator screen [→ Figure 21] by selecting the **GX2 Status button**. The table below shows the information reported for each Test Stand and Cylinder Holder in a bank. If one of these components is in Fault, a red message displays, indicating the error.

To try to clear the error push the Eraser button on the GX2 Status page.

If the error condition clears the Test Stand LED will return to green.

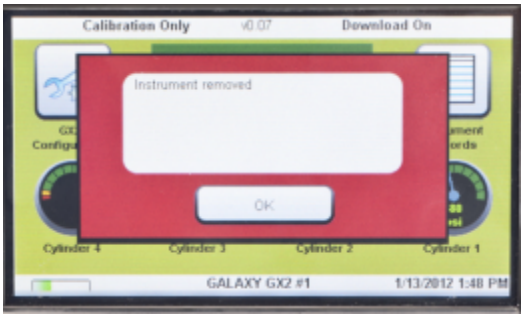
Cylinder Holder (number)	If Status is Fail, then:
-Cylinder Gas	Indicates a fault condition with the cylinder (expired or empty)
-Flash Memory	Return to an Authorized MSA Service Center for repair
-RAM Memory	Return to an Authorized MSA Service Center for repair
-Power Supply 12V	Return to an Authorized MSA Service Center for repair

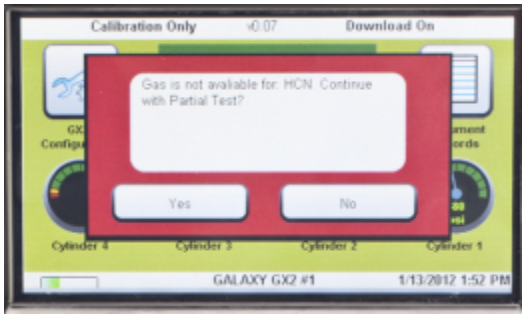
Cylinder Holder (number)	If Status is Fail, then:
-Power Supply 6V	If GX2 6V power supply shows failed, try reconnecting. Otherwise, return to an Authorized MSA Service Center for repair
-RFID Tag	Return to an Authorized MSA Service Center for repair
-Communications	Return to an Authorized MSA Service Center for repair
- RFID Read	Corrupt RFID tag. Enter cylinder information via manual setup screens.
-Data	Corrupt RFID tag. Enter cylinder information via manual setup screens.
-CRC	Corrupt RFID tag. Enter cylinder information via manual setup screens.
-Identifier	

Test Stand (number)	If Status is Fail, then:
-IR	Cycle power to the Test Stand. Ensure there is no dirt on the gas detector blocking the IR interface. If the problem persists, return to an Authorized MSA Service Center for repair.
-Pump	→ chapter 6 , under Pump Fault or Flow Fault
-Flow	→ chapter 6 , under Pump Fault or Flow Fault
-SD Card 90% Full	Replace SD card or delete files.
-SD Card 100% Full	Replace SD card or delete files.
-Power Supply 6V	If another GX2 power supply is available, try exchanging power supplies. Otherwise, return to an Authorized MSA Service Center for repair.
-Power Supply 1.8	Return to an Authorized MSA Service Center for repair
-Data	A setting was corrupted and factory defaults have been restored for all settings. Verify all GX2 settings are correct for your application.
-CRC	A setting was corrupted and factory defaults have been restored for all settings. Verify all GX2 settings are correct for your application.
-Configuration Reset	This occurs when a Data or CRC fault is detected. This means that factory defaults have been restored. If this error returns while - making setting changes, return to an Authorized MSA Service Center for repair.
-Cylinder Comm	Communications between the Test Stand and the Cylinder Holder is disrupted. Verify Cylinder Holder LED status shows green; push units together to ensure good connection; if problem persists, return to an Authorized MSA Service Center for repair.
-Pump Failure	1. Check the white plugs, make sure they are tight. 2. Check the barb connections between the GX2 and cylinder holder, make sure connection is good. 3. Take the back off of the GX2 and make sure the tubing inside is in place.

6.8 System Error Messages

The GALAXY GX2 System can display a number of system errors that display on the Test Stand screen with a red error box. The error message must be acknowledged for Test Stand operations to resume.





Memory Card Write Protect

Occurs if the memory card cannot accept data. Ensure the switch on the side of the memory card is unlocked so it can accept data.

Serial Number Required

Occurs when the instrument is missing its serial number. Use the free MSA Link software application and an IR dongle to assign a serial number to the instrument. A unique non-zero serial number is required for each gas detector model.

Pump Fault or Flow Fault

Occurs if pump(s) is blocked during a test, the test cylinder(s) read empty, the fresh air filter is clogged, or an internal flow error occurs. Visually inspect the air filter for contamination and replace as needed. Refer to the Instrument Will Not Initiate a Bump or Calibration section [→ chapter 6.1] of this manual.

Partial Test

The test system lacks gases for a full test. Ensure the cylinder(s) configuration is set up correctly and that adequate gas is present in the cylinder(s). Refer to Cylinder Configuration section [→ chapter 4.7] of this manual.

USB Drive Failure

Occurs if the user's flash drive cannot accept data. Ensure the flash drive is functioning properly. If the USB Drive is full, delete unneeded data or replace with a new USB Drive. Check the USB Drive Enable setting in the GALAXY GX2 Setup section [→ chapter 4] of this manual.

Network Connection Lost

Occurs if the optional network set up malfunctions. Ensure the Ethernet cables are secure -between Test Stands, from the master unit to the PC, and that they are type 10/100 Mbps. Additional information on network connections can be found in the MSA Grid technical implementation guide.

6.9 Automated Testing Does Not Occur

There are several methods to verify if the selected test occurred.

- A checkmark should appear on your gas detector display if the test was successfully executed.
- The GALAXY GX2 screen should say PASS.
- If an SD memory card is inserted, the GALAXY GX2 Instrument Records page should show that the test occurred.
- If connected to your MSA Grid account, a search on the Calibration report page should show the selected date and time of the test.

Follow the steps below to troubleshoot.

Time of Day is set on the GALAXY GX2 but no test occured

Verify ALL conditions below are met.

Instrument	GALAXY GX2 Test Stand
• Altair5X with firmware version 1.30 or higher • The Interval must be the same and non-zero on both gas detector and GALAXY GX2 • The time on the Altair 5X must be the same as the GALAXY GX2 time	• GALAXY GX2 has software version 1.07 or higher • The Interval must be the same and non-zero on both gas detector and GALAXY GX2 • Charging version of the Test Stand • All gases must be present for the sensors under test

If yes, verify that:

1. Adequate gas cylinder pressure is available.
2. Verify that the instrument was in the GALAXY GX2, powered off and the charging LED was either green or red at the time specified for testing.
3. Verify that the GALAXY GX2 green status LED is lit. Otherwise see chapter 6.7 .
4. Turn the gas detector on and insert into the GALAXY GX2 with Classic Mode set to enabled. Verify that a test occurs. If the test doesn't run use the GX2 Status button or the error messages on the screen to diagnose the problem.

My Always Ready Instrument didn’t calibrate when it was supposed to

Verify ALL conditions below are met.

Instrument	GALAXY GX2 Test Stand
• Calibration Due Interval = any interval. Ensure that this interval is the same as on the Test Stand. • Valid calibration at the desired time of day	• Charging version of the Test Stand • Calibration Due Interval = any interval. Ensure that this interval is the same as on the gas detector. • Test Mode = Calibration

If yes, verify that:

1. Adequate gas cylinder pressure is available.
2. Verify that the instrument was in the GALAXY GX2, powered off and the charging LED was either green or red 24 hours after the previous calibration.
3. The GALAXY GX2 is in Calibration Only mode.
4. Verify that the GALAXY GX2 green status LED is lit. Otherwise, see chapter 6.7 .
5. Use MSA Link and an IR dongle to download the Calibration log from the gas detector.
    a. Determine the previous successful calibration entry. This is the hour that the next calibration test will be attempted.

7 Maintenance (Cleaning and Part Replacement)

7.1 Corrective Maintenance

See the listing below for common replacement parts associated with the GALAXY GX2 System. If you have any questions regarding the equipment, any procedure in this manual, or the location of the nearest MSA Repair Center and source of replacement parts, please call MSA Customer Service.

⚠ WARNING!

Repair or alteration of the GALAXY GX2 System beyond the scope of these instructions by anyone other than personnel authorized by MSA can endanger persons who rely on this equipment for their safety or health and may void all warranties and approvals. Use only genuine MSA replacement parts.

Failure to follow this warning can result in serious personal injury or death.

7.2 Replacement Parts and Accessories

Corrective Maintenance Items	Part Number
AC Power supply, Global	10124286
Fresh Air Filter	10050789
Fresh Air Filter, High Capacity	10062363
Spare Parts Kit (feet, barb fittings, plugs, cylinder holder O-ring)	10127020
Electronic Cylinder Holder	10105756
Non-electronic Cylinder Holder	10125135
Inlet Seal Replacement Kit (ALTAIR 5/5X Instrument)	10094844
ALTAIR Seal (pack of 1)	10125136-SP
Screen protector (pack of 5)	10125289-SP5
North American power cord	10127146
European power cord	10127145
United Kingdom power cord	10127144
Australian power cord	10127143

Accessories	Part Number
4GB SD Card	10127111
GALAXY GX2 USB Key	10123937
End Cap	10125907
ALTAIR 4/4X Multi-Unit Charger	10105727
ALTAIR 5/5X Multi-Unit Charger	10105728
12" Ethernet cable for Test Stand to Test Stand connection	10127518
DIN rail clip kit (2 clips & screws per kit)	10126657
USB IR Dongle (for use with MSA Link)	10082834
Demand Regulator for Cl_2 and NH_3	10034391
Large Capacity (<3000psi) Demand Regulator	710289

GALAXY GX2 CALIBRATION CYLINDERS WITH RFID TAGS

Type	Gas Content	Size	Part Number	
			N.A.	EU
Quad	1.45% Methane, 15.0% O_2, 60ppm CO, 20ppm H_2S	ECONO-CAL	10048280	10128160
Quad	1.45% Methane, 15.0% O_2, 60ppm CO, 20ppm H_2S	RP CYLINDER	10045035	10053022
Quad	2.50% Methane, 15.0% O_2, 60ppm CO, 20ppm H_2S	ECONO-CAL	10048981	
Quad	2.50% Methane, 15.0% O_2, 60ppm CO, 20ppm H_2S	RP CYLINDER	10048890	
Quad CO_2	1.45% Methane, 15.0% O_2, 60ppm CO, 20ppm H_2S, 2.50% CO_2	RP CYLINDER	10103262	10102853
Quad SO_2	1.45% Methane, 15.0% O_2, 60ppm CO, 20ppm H_2S, 10ppm SO_2	ECONO-CAL	10098855	10122425
Quad SO_2	1.45% Methane, 15.0% O_2, 60ppm CO, 20ppm H_2S, 10ppm SO_2	RP CYLINDER	10117738	10122426
Quad + CO_2	1.45% CH_4, 20 H_2S, 60 CO, 15% O_2, 2.5% CO_2	ECONO-CAL		10128181
3-GAS	2.50% Methane, 15.0% O_2, 20ppm H_2S	ECONO-CAL	10048888	
3-GAS	2.50% Methane, 15.0% O_2, 20ppm H_2S	RP CYLINDER	10048889	
3 + NO_2	1.45% Methane, 15.0% O_2, 60ppm CO, 10 ppm NO_2	ECONO-CAL	10058036	10143308
3 + NO_2	1.45% Methane, 15.0% O_2, 60ppm CO, 10 ppm NO_2	RP CYLINDER	10058034	
3 + NO_2	2.50% Methane, 15.0% O_2, 60ppm CO, 10 ppm NO_2	ECONO-CAL	10058172	
3 + NO_2	2.50% Methane, 15.0% O_2, 60ppm CO, 10 ppm NO_2	RP CYLINDER	10058171	
NO_2	10 ppm	ECONO-CAL	711068	10029521
NO_2	10 ppm	RP CYLINDER	808977	
SO_2	10 ppm	ECONO-CAL	711070	10079806
SO_2	10 ppm	RP CYLINDER	808978	
NH_3	25 ppm	ECONO-CAL	711078	10079807
NH_3	25 ppm	RP CYLINDER	814866	
CL_2	10 ppm	ECONO-CAL	711066	10011939
CL_2	10 ppm	RP CYLINDER	806740	
CL_2	2 ppm	ECONO-CAL	711082	
CL_2	2 ppm	RP CYLINDER	10028080	
HCN	10 ppm	ECONO-CAL	711072	
HCN	10 ppm	RP CYLINDER	809351	
PH_3	0.5 ppm	ECONO-CAL	711088	10029522
PH_3	0.5 ppm	RP CYLINDER	710533	

Type	Gas Content	Size	Part Number	
			N.A.	EU
CO	60 ppm	100L	710882	
H_2S	40 ppm	ECONO-CAL	711062	10011727
H_2S	40 ppm	RP CYLINDER	467897	
O_2	20.80%	100L	479857	
Air Zero THC <1 ppm		100L	801050	
NO	50 ppm	RP CYLINDER	812144	
NO	50 ppm	ECONO-CAL	711074	10126429
CH_4	0.625% Methane, 15.0% O_2, 60ppm CO	RP CYLINDER	10125948	
C_5H_{12}	0.375% Pentane, 15.0% O_2, 60ppm CO	RP CYLINDER	10125947	
CH_4	0.625% Methane, 15.0% O_2, 60ppm CO, 20ppm H_2S	RP CYLINDER	10125695	
C_5H_{12}	0.375% Pentane, 15.0% O_2, 60ppm CO, 20ppm H_2S	RP CYLINDER	10125708	
2-Gas	1.45% CH_4, 15% O_2	ECONO-CAL		10128182
Propane Quad	0.4% C_3H_8, 20 H_2S, 60 CO, 15% O_2	RP CYLINDER		10086549
Propane 2-Gas	0.4% C_3H_8, 15% O_2	RP CYLINDER		10128184
CO	60ppm CO in SL	ECONO-CAL		10073231
O_2	5 Vol% O_2 in N_2	ECONO-CAL		10081672

7.3 Fresh Air Filter Replacement

The disposable fresh air filter is located on the tubing attached to the upper port on the left side of the farthest left unit. The filter requires periodic replacement, based on the unit's frequency of use and environmental cleanliness. Visual inspection of the fresh air filter will indicate contamination. Replace as needed.

Figure 23 Fresh air filter

Pump Alarms may indicate the need to replace the fresh air filter.

NOTICE

Do not run the unit without the filter in place (even if using a zero-air cylinder in your installation); otherwise, the valves and pumps may be damaged.

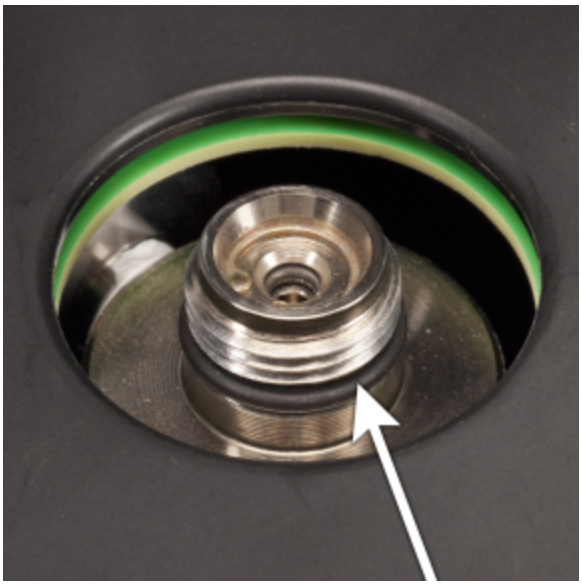
To Replace the Filter:

1. Remove the filter and tubing from the barb fitting in the fresh air port on the left side of the farthest left unit.
2. Dispose of the old filter.
3. Insert the new filter and tube onto the same barb fitting of the fresh air port.

If the system consists of four or more Test Stands, use the high capacity filter and ensure the flow arrow indicator points toward the unit.

7.4 O-Ring Seal Replacement (Cylinder Holder)

Each month, visually inspect the O-ring on the fitting and clean if necessary. Replace if any damage is found.



1. Remove the damaged O-ring.
2. Clean the fitting with a water-dampened cloth and apply a light film of mineral oil to the new O-ring.

   NOTICE

   Do not use a silicone-based lubricant on this O-ring.

3. Place the new O-ring onto the fitting.

7.5 Inlet Seal Replacement (ALTAIR 5/5X Gas Detector)

Flow Errors and Calibration Failures may indicate a damaged inlet seal. MSA recommends annual seal replacement.

Replace the seal:

1. Remove the stainless steel eyelet (collar).
2. The rubber inlet seal can now be removed from the fitting.
3. Place the wider (flared) end of a new inlet seal over the fitting.
4. Replace the stainless steel eyelet (collar) and ensure it is seated at the top.

Figure 24

Figure 25

Figure 26

7.6 Rubber Insert Replacement (ALTAIR Gas Detector)

The rubber inserts may degrade in the GALAXY GX2 System over time. Pull the degraded insert from the Test Stand. Replace the insert and ensure that it is firmly seated.

Figure 27

Figure 28

8 Technical Specifications

Specification	Part	Range
Operating Temperature	Test Stand and Cylinder Holder	0-40°C
	Multi-Unit Charger	10-35°C
Power Input	Power Module	100 - 240 VAC, 47 - 63 Hz
	Optional Vehicle Module	9-32 VDC
Power Consumption (nominal value)	Test Stand only	< 7.0 W
	Cylinder Holder	< 1.0 W
	Multi-Unit Charger	< 13.0 W
Physical Characteristics	Test Stand	Height: 11.80" (299.72 mm)
		Width: 6.50" (165.10 mm)
		Depth: 7.90" (200.66 mm)
		Material: Acrylonitrile Butadiene ABS
	Cylinder Holder	Height: 11.80" (299.72 mm)
		Width: 6.50" (165.10 mm)
		Depth: 6.10" (154.94 mm)
		Material: Acrylonitrile Butadiene ABS
	Multi-Unit Charger	Height: 11.80" (299.72 mm)
		Width: 6.50" (165.10 mm)
		Depth: 6.44" (163.58 mm)
		Material: Acrylonitrile Butadiene ABS

9 GALAXY GX2 Default Parameters

Refer to the listing below for the default settings for each display screen for configuring the GALAXY GX2 System. The settings can be changed for optimal performance in the user's facility.

Screen Name	Parameter	Default Setting
Date Setup	Date	Current date set during assembly
Time Zone Setup	Time Zone	Eastern Time (US_ Canada)
Time Setup	Time	Current time set during assembly
	24 Hour Time	off
Test Setup	Allow Simulant Gas	yes for all
	%volume to 100%LEL	US setting for all
Test Setup - Mode	Bump Only	off
	Calibration Only	off
	Bump/Cal on Fail	on
	Classic Mode	off
Test Setup - Calibration	Calibration Interval (days)	30
Test Setup - Bump	Bump Interval (days)	1
Security Setup	Password	0000 (off)
GX2 Setup - GX2	USB Drive Enable	on
	Display PSI	on
	Display bar	off
GX2 Setup - Datalog	Download Periodic	off
	Download Session	off
	Erase After Download	off
GX2 Setup - Printing	Print Calibration Sticker	off
	Print Receipt	off
Volume Setup	Volume	Medium
Backlight Setup	Intensity	Very High
USB Drive	Enabled	On
Language Setup	Language	English
Cylinder Setup 1-4	Auto Cylinder Enable	all on
Expiration Setup 1-4	Weeks to Expiration	4 weeks
LEL Setup	%volume setting	All combustible gas 100%LEL volumes set to ANSI standards
Network Setup	DHCP Enable	Enabled