**Quick Start Guide**
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# Rosemount 470XA Gas Chromatograph


ROSEMOUNT

EMERSON

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## Safety messages

Observe all environmental and personal safety messages described in this document, warning labels on the device, and your company's operational safety requirements.

### ⚠ WARNING

**Safety compliance**

The seller does not accept any responsibility for installations of this device or any attached equipment in which the installation or operation thereof has been performed in a manner that is negligent and/or non-compliant with applicable safety requirements.

Install and operate all equipment as designed and comply with all safety requirements.

If the device is not operated in a manner recommended by the manufacturer, the overall safety could be impaired.

### ⚠ WARNING

**Supply mains connection**

Qualified personnel must connect the device to supply mains in accordance with local and national codes.

### ⚠ WARNING

**Explosion**

Do not open when energized or when an explosive atmosphere is present.

Keep cover tight while circuits are live.

Use cables or wires suitable for the marked "T" ratings.

Cover joints must be cleaned before replacing the cover.

Ensure that conduit runs have a sealing fitting adjacent to the enclosure.

Use supply cables or wires suitable for at least 176 °F (80 °C).

### ⚠ WARNING

**Electric shock**

Provide a suitable approved switch and fuse or circuit breaker between the power supply and the gas chromatograph (GC). Use the switch to disconnect power before performing maintenance on the equipment.

## ⚠ WARNING

**Ventilation**

Use the device in a well-ventilated area.

If you plan to place the device in a sealed shelter, always vent it to atmosphere with 0.25-in. tubing or larger. This will prevent the build up of $H_2$ and sample gas.

## ⚠ WARNING

**Leak testing**

Leak test each gas connection at installation.

## ⚠ WARNING

**Toxic vapors**

Exit ports may discharge dangerous levels of toxic vapors.

Use proper protection equipment and a suitable exhaust device.

## ⚠ WARNING

**Burns**

To prevent burns, do not touch any of the hot parts. All parts of an analyzer are always hot unless it has been switched off and allowed to cool down.

Before fitting, removing, or performing any maintenance on the analyzer, make sure that it has been switched off and allowed to cool for at least two hours.

When handling the analyzer, always use suitable protective gloves.

These precautions are particularly important when working at heights.

If burned, seek medical treatment immediately.

## ⚠ WARNING

Substitution of components may impair suitability for Class I, Division 1 and 2.

## ⚠ WARNING

**Safe atmosphere**

Only use service connections when the atmosphere is known to be safe.

## ⚠ WARNING

**This device is heavy equipment. Two people are required to move the device.**

Failure to observe this warning may cause serious injury to personnel.

Observe all proper lifting methods as defined by your site operating procedures.

## ⚠ WARNING

Before converting carrier gas to hydrogen, review your local hazardous area requirements to ensure compliance.

## ⚠ WARNING

**Physical access**

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

## NOTICE

The analyzer electronics and oven assembly, when housed inside a purged enclosure, meet the certifications and classifications identified in the Specifications section of the Product Data Sheet, which is located on the Emerson website: Emerson.com.

### Waste disposal

Do not dispose of measuring tools into household waste.

Only for EC countries:

In accordance with European Directive 2012/19/EU for Waste Electrical and Electronic Equipment and its implementation into national right, measuring tools that are no longer usable must be collected separately and disposed of in an environmentally correct manner.

## Contents

# 1 Cybersecurity recommendations for Rosemount XA gas chromatograph (GC) and MON2020 users

### Install XA GC in a secure environment with physical protection

- Install the XA GC in a secure environment with physical protection.
- Scan the USB shipped with the XA GC with anti-virus software before use.
- Store all the GC related files including application files, drawings, and documents, in a secure network/drive with restricted access.

### Install MON2020 on a secure personal computer (PC)

- Access to PC should be protected by adequate username/password.
- With restricted admin privileges on PC - operating system (OS) configuration, install software, etc.
- Restrict network ports and connection of mass storage devices/removable media.
- Resides on a private local area network (LAN) with firewall and network access control list configured for blocking illegitimate access.
- With anti-virus software kept current on PC.
- With Microsoft® Windows automatic updates enabled on PC.
- PC updated with Windows security patches.
- With physical access controls - locked room, key-card entry, etc.

### Use XA GCs in secure network

This product is designed to be used in an industrial environment with appropriate defense-in-depth security measures and compensating controls effective against cyber-attacks. This product is not designed to be connected directly to the Internet or Internet facing networks. Security measures should include, but are not limited to:

- Ethernet should be set up in a private LAN with firewall and network access control list configured for blocking illegitimate access.
- Network devices stored with physical access controls - physical locks, ID verification, etc.

- Network devices updated with all available security patches.
- Anti-virus software kept current on all computers in the network.
- Other industry best practices for secure network.

### Control access to XA GC using password of sufficient complexity

- The password length should be at least eight alphanumeric characters.
- All default users should be removed after XA GC commissioning or password upgrade to comply with the password complexity guidelines.
- Password policy level should be set after GC commissioning by accessing **Tools** → **Users** → **User Administration**.
- Use a unique password for each user.
- Avoid sharing passwords with other users.

### Control access to user profile for XA GC using admin password of sufficient complexity

- The admin password length should be at least 10 alphanumeric characters.
- The admin password should include at least one number, mix of upper/lower case characters, and at least one special character (!@#$%^&*_-+=:?)
- The default admin password should be changed after GC commissioning by using the password complexity guidelines.
- Avoid sharing the password with non-admin users.

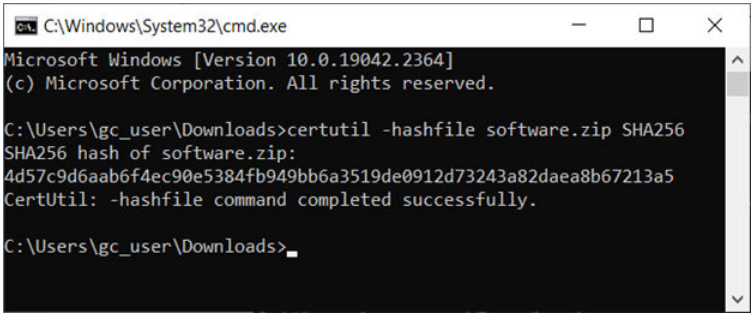
### Upload/download files of the approved types to/from XA GC

- Upload/download files of the approved types to/from XA GC.
- The approved files of type include .xls, .xlsx, .pdf, .tif/.tiff, .xrted (XA trend file), .xcgm (XA chromatogram file), and .xcmp (XA comparison file).
- Scan the mass storage device with the latest anti-virus software before uploading any files to GC.

### Check integrity for distributed binaries

- A hash value will be provided for some software/firmware files distributed by Emerson GC, so that the user can verify the integrity of the file.
- The hashing algorithm SHA-256 is used for calculating the hash value of the binary file.

- There are many programs for calculating the SHA-256 hash including Windows Command Prompt, Windows PowerShell, and third-party software (such as Hash Tool). The user can use a program of choice to calculate the SHA-256 hash value of the downloaded file and compare it to the value specified on the download page.
- The following is an example of using Windows Command Prompt to calculate the SHA-256 hash value:
  - In a command line, run the command:
    - `certutil -hashfile [filename] SHA256`
  - For example:



# 2 Installation

## 2.1 Site requirements

Consider the following when choosing an installation site for the gas chromatograph (GC):

- This GC is designed to operate at temperatures between -4 and +140 °F (-20 and +60 °C).
- Install the GC as close as possible to the sample point, but allow for adequate access for maintenance tasks and adjustments. Also, install the GC in a way that allows easy access and viewing of the local operator interface (LOI).
- Allow at least 10 in. (254 mm) on the right and left sides of the GC to permit access to the side portal holes where the field terminations are made.
- Allow a minimum of 10 in. (254 mm) above the top of the dome to facilitate access to the analytical module.

## 2.2 Actions upon receiving the gas chromatograph (GC)

### 2.2.1 Unpacking

**⚠ WARNING**

**This device is heavy equipment. Two people are required to move the device.**

Failure to observe this warning may cause serious injury to personnel.

Observe all proper lifting methods as defined by your site operating procedures.

The device weighs 50 lb. (23 kg) without the sample system. Carefully open and remove the device from the packing crate. If necessary, ask for assistance.

**Figure 2-1: Rosemount 470XA**


*A. Not a lift point*

## NOTICE

Equipment damage
Lifting the device by the flow panel may cause damage to the equipment.

### 2.2.2 Inspect and verify received equipment

Check the equipment against the packing slip to see if the shipment is complete.

Inspect the equipment for damage that may have been incurred during shipment. If any parts or assemblies appear to have been damaged:

**Procedure**

1. File a claim with the carrier.
2. Take photos of the damaged area(s).
3. Contact your local Emerson sales representative.

## 2.3 Mounting the gas chromatograph (GC)

You can install the Rosemount 470XA using one of the following options:

- Wall mount
- Pole mount

**Note**
Remove the caps from the atmospheric vent before mounting the GC.

Check the packing slip or the GC's sales order to learn which mounting hardware was selected for it.

**Note**
All options require the same mounting bracket, but use different hardware to mount it.

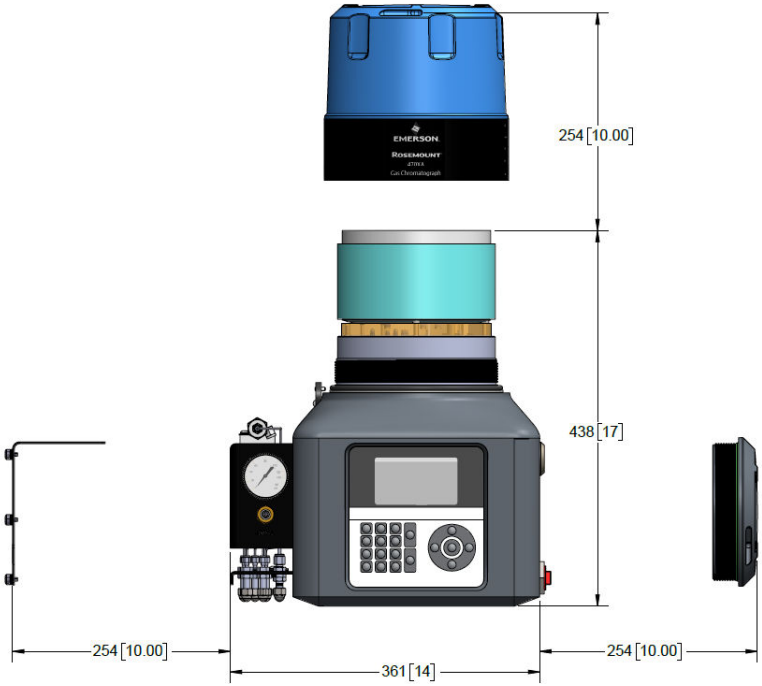
The pole or wall must be able to support at least 50 lb (23 kg) and withstand the forces applied when performing routine maintenance, such as removing the oven enclosure dome.

**NOTICE**

When putting a GC into its final position, be careful to avoid damaging any of the external components or their attachments. Also, make sure you understand the installation procedure before handling the GC and collect the appropriate tools beforehand.

### 2.3.1 Dimensions

**Figure 2-2: Rosemount 470XA dimensions**




Dimensions are in millimeters with inches in brackets.

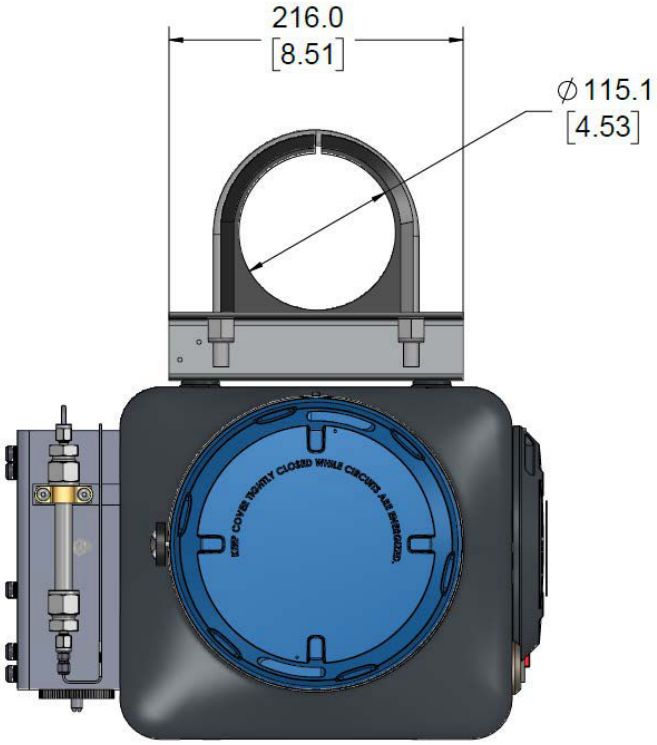
**Figure 2-3: 470XA dimensions collapsed**


Dimensions are in millimeters with inches in brackets.

### 2.3.2 Pole mounting

The pole mount arrangement uses a pair of U-shaped pipe clamps and a mounting bracket to attach the gas chromatograph (GC) to a pole that is 4 in. (101.6 mm) in diameter.

**Figure 2-4: Pole and floor stand mounting dimensions**



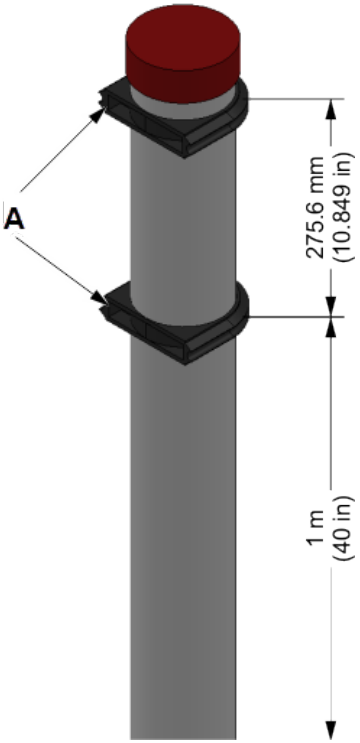

Dimensions are in millimeters with inches in brackets..

#### Mount the gas chromatograph (GC) to a pole

**Procedure**

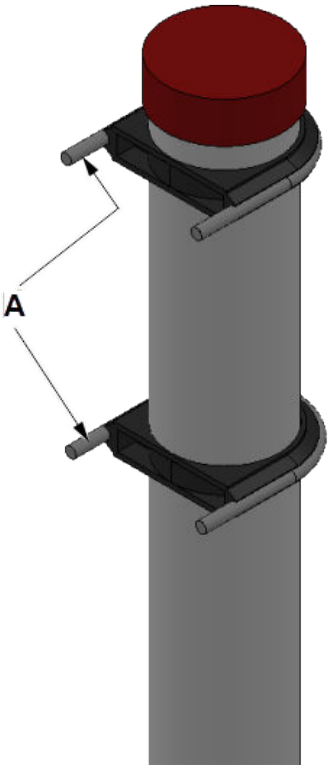
1. Anchor the pole mount base to the foundation with a 4½-in. or ¾-in. cement anchor.

2. Slide the U-bolt plastic inserts onto the pole and place the lower clamp approximately 40 in. (1 m) from the ground and the upper clamp 10¾-in. (275.6 mm) above the lower clamp.



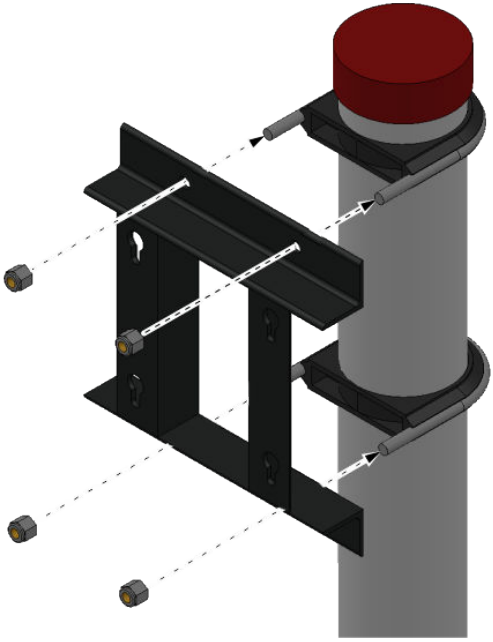

*A. U-bolt plastic inserts*

3. Slide the two U-bolts into the plastic inserts.




*A. U-bolts*

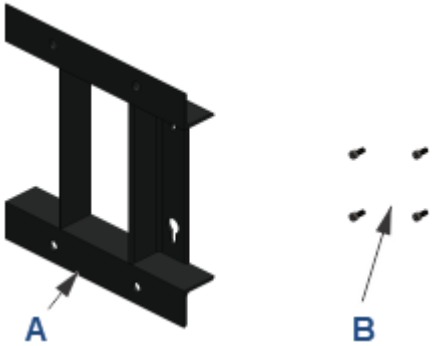
4. Attach the mounting bracket to the pole by matching the bracket's mounting holes to the prongs of the pipe clamps.



5. Tighten the nuts onto the prongs.
   The mounting bracket should be firmly attached to the pole.

### 2.3.3 Wall mounting

**Figure 2-5: Wall mount bracket parts**

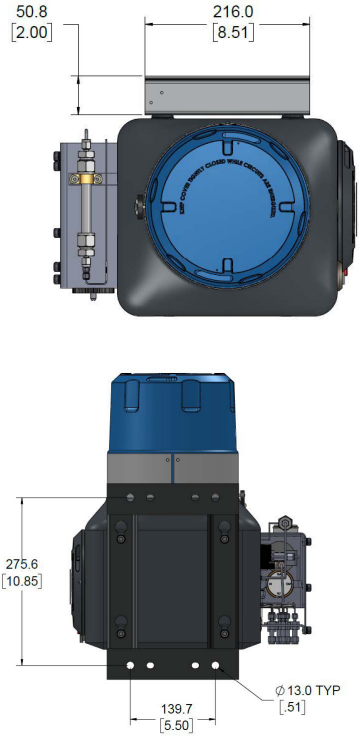



*A. Mounting bracket*
*B. Four M8 x 1.25 x 18 mounting bolts with washers*

**Note**

You will also need four ⅜-in. (10 mm) threaded wall anchors that are capable of supporting at least 50 lb. (23 kg). Wall anchors are not included in the mounting kit.

**Figure 2-6: Wall mounting dimensions**




Dimensions are in millimeters with inches in brackets.

## Mount the bracket to a wall

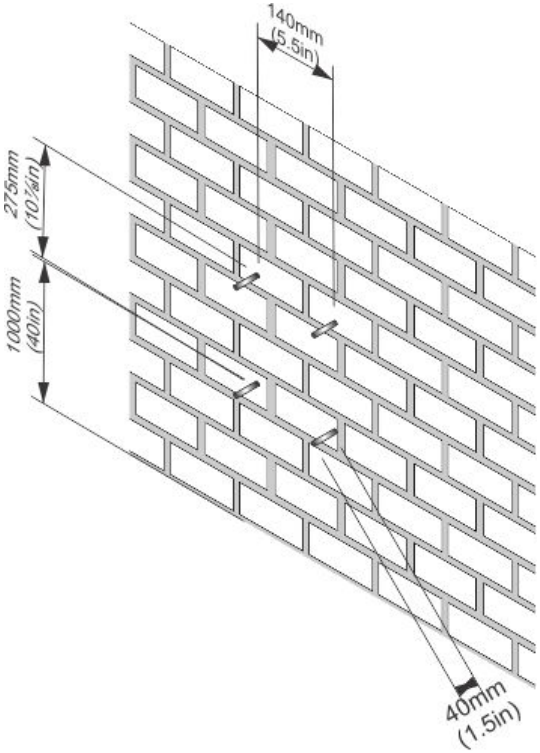
### Prerequisites

The wall must be able to hold approximately 50 lb. (23 kg).

### Procedure

1. Install four threaded wall anchors according to the dimensions of the gas chromatograph (GC). Use the bracket as a guide to locate the anchors correctly before drilling the holes.

   The threads of the anchors should protrude from the wall by 1½ in. (40 mm).




2. Place the mounting bracket on to the wall anchors and tighten the mounting nuts. Ensure that the bracket is attached firmly to the wall.

## 2.4 Mounting the sample conditioning system (SCS)

There are several sample conditioning systems (SCS) available for the 470XA Gas Chromatograph (GC).

For multiple stream applications, several plate-mounted options are available that can be mounted to a pole or wall.

It is also possible to use a third-party SCS. A third-party SCS must contain the following functional components:

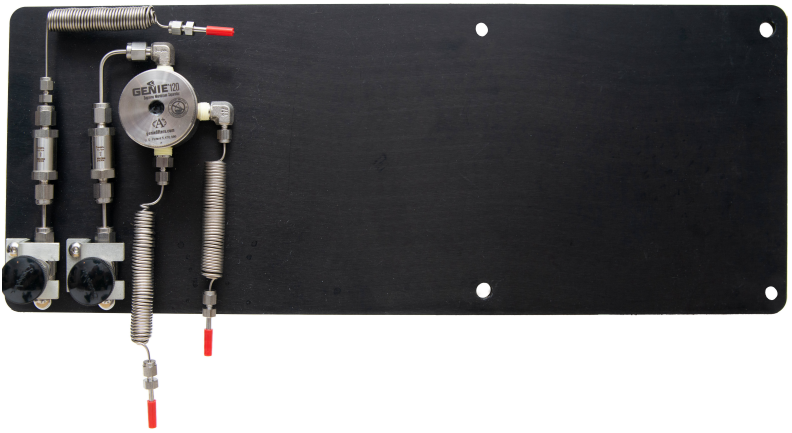
- 2-micron or better particulate filter

- Liquid filter/shut-off
- Flow control to limit the sample flow to between 20 and 50 cc/min

### 2.4.1 Mount a single stream sample conditioning system (SCS) to the gas chromatograph (GC)

**Note**
Mount the SCS to the GC before mounting the GC to a wall or pole.

**Figure 2-7: Sample conditioning system**



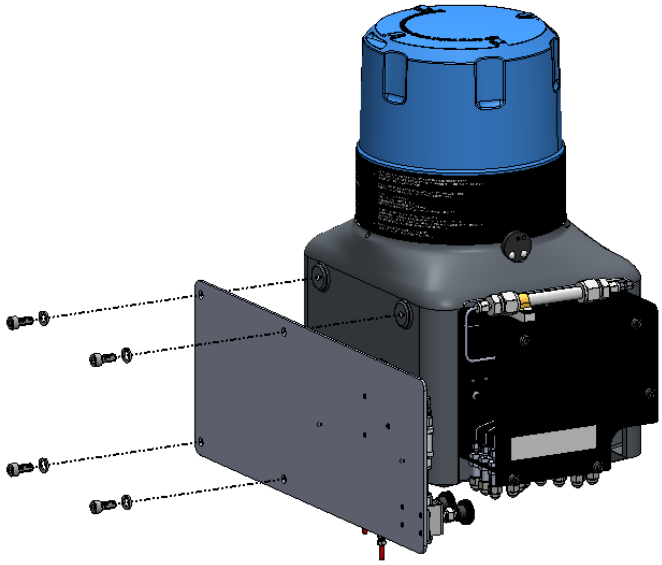
#### Prerequisites

Make sure the mounting bracket is mounted to the wall or pole before beginning this procedure.

### Procedure

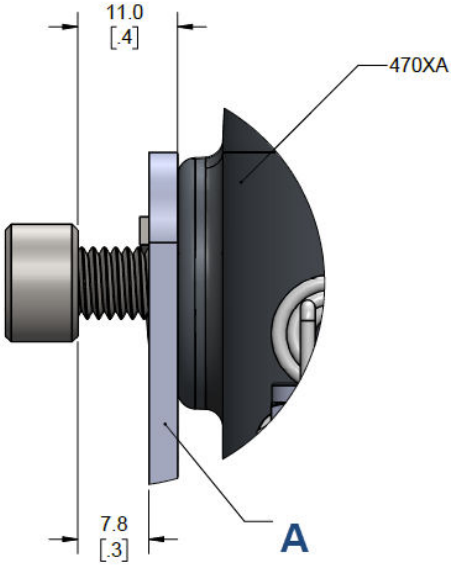
1. Use the four M8 x 1.25 x 18 mounting bolts (included with the SCS) to secure the SCS to the back of the GC.

**Figure 2-8: Securing SCS to GC**



Leave about .3 in. (7.8 mm) between the SCS and each washer.

**Figure 2-9: Mounting bolt dimensions**




Dimensions are in millimeters with inches in brackets.

*A. SCS*

2. Mount the GC to the bracket, so that the SCS is between the back of the GC and the bracket.

**Figure 2-10: SCS mounted to the GC and bracket**

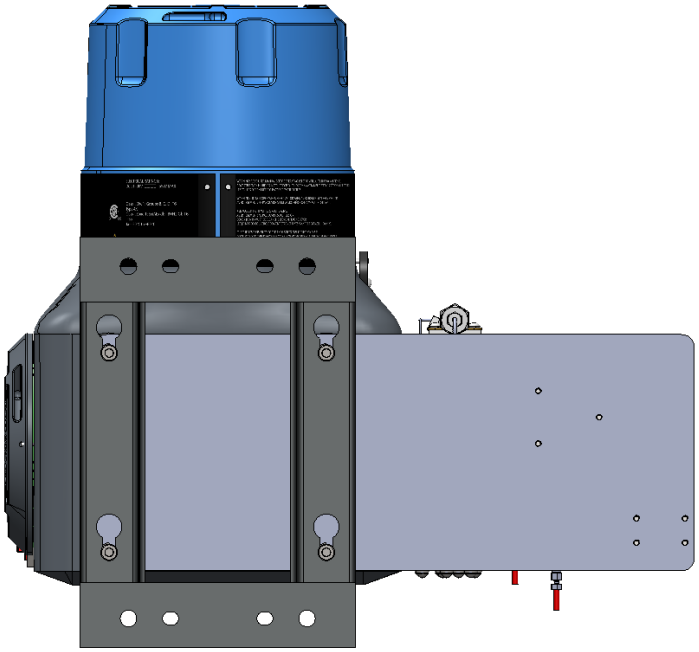


**Figure 2-11: SCS mounted to the side of the GC**

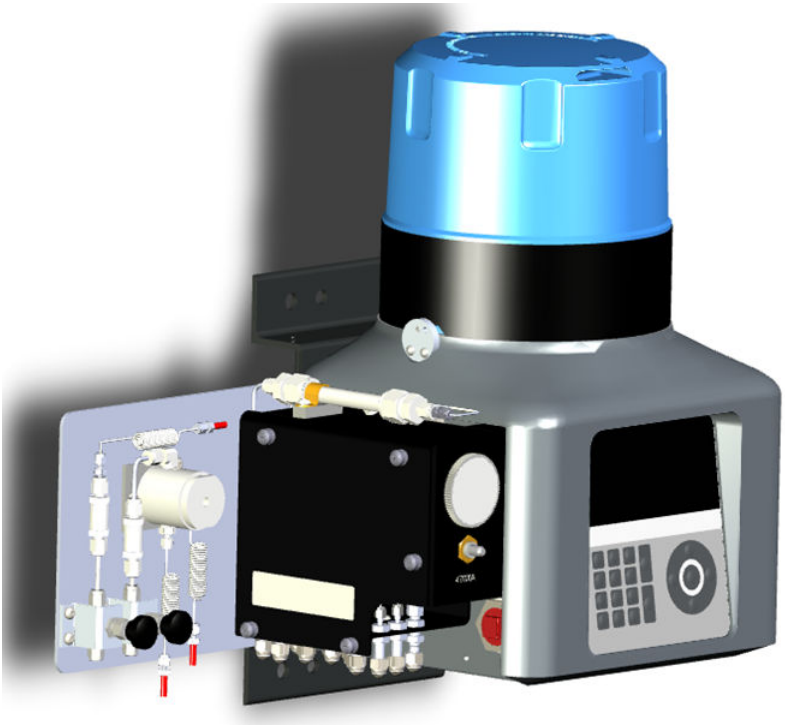
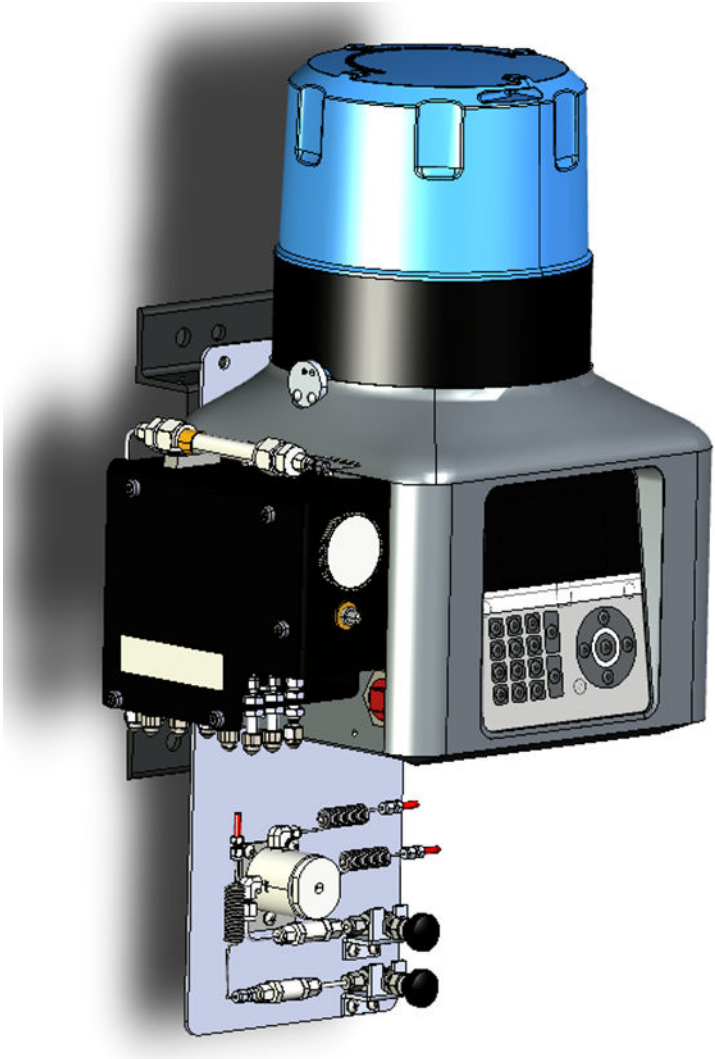


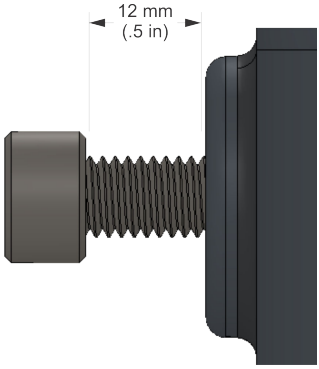
**Figure 2-12: SCS mounted to the bottom of the GC**



## 2.5 Secure the gas chromatograph (GC) to the mounting bracket

### Procedure

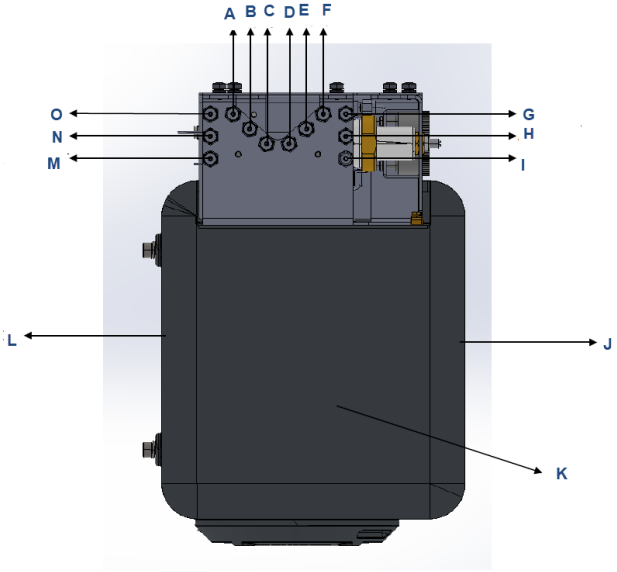
1. Screw two bolts, without the washers, into the top mounting holes on the back of the GC, leaving ½ in. (12 mm) of the thread exposed.




2. Maneuver the GC to insert the two top bolts into the eyelets of the mounting bracket and allow the bolts to drop down and hold the GC loosely on the bracket.
3. Screw in the two bottom bolts through the mounting bracket with the washers on. The flat washer should be against the bracket, and the spring washer between the flat washer and the bolt head. Tighten these two bolts by hand so that they secure the GC in place.
4. One at a time, remove the top bolts, put on the washers, and screw the bolts into the back of the GC and hand tighten.

## 2.6 Connect tubing

**Figure 2-13: Tubing and vents**




*A. Measure vent*
*B. Sample vent*
*C. Actuation vent*
*D. Sample 1*
*E. Sample 2*
*F. Sample 3*
*G. Calibration/sample gas connection*
*H. Actuation gas connection*
*I. Carrier gas connection*
*J. Front*
*K. Bottom*
*L. Back*
*M. Atmospheric vent*
*N. Vent 2*
*O. Vent 1*

### Procedure

1. Remove the side cover of the flow panel by loosening the five captive screws.

2. Connect the sample stream(s) and the carrier, actuation, and calibration gases to the gas chromatograph's (GC's) bulkhead fittings.
3. Connect the atmospheric vents to a vent line of at least ⅜-in. (9.3 mm) diameter, which will route the gas to the atmosphere in a safe area to ensure there is no back-pressure on the vents.

## 2.7 Connect to the carrier gas

**Table 2-1: Carrier gas specifications**

| Carrier gas | Helium or hydrogen |
|---|---|
| Purity | 99.995% (zero-grade) |
| Moisture content | Less than 10 ppm |
| Hydrocarbon content | Less than 0.5 ppm |
| Carrier supply pressure | 90 psig (6.2 barg) for helium<br>30 psig (2.1 barg) for hydrogen |
| Carrier gas flow | Approx. 10 cc/min |

### Procedure

1. To ensure the continuous operation of the analyzer, install two high pressure carrier gas cylinders and connect them to the gas chromatograph (GC) through a manifold arrangement that permits the replacement of empty cylinders without disrupting the operation of the analyzer.

   The manifold arrangement can be a manual valve arrangement or a commercially available auto switch-over dual regulator assembly.

2. Using a two-stage bottle regulator with stainless steel diaphragms, regulate the carrier gas from the bottle pressure.

   **⚠ WARNING**

   High pressures may damage the analyzer and cause an unsafe environment.

   If using helium, regulate the carrier gas to 90 psig (6.2 barg).

   If using hydrogen, regulate the carrier gas to 60 psig (4.1 barg).

Use a dual-stage regulator to ensure the outlet pressure will not change with changes in the bottle pressure. Use stainless steel diaphragms to avoid contaminating the analytical oven.

3. Use ⅛-in. stainless steel tubing that is clean and free of grease to connect from the carrier gas bottle manifold to the side sample panel carrier input fitting.
4. Before making the final connection to the sample system, blow through the external lines with helium for 30 seconds to remove any contamination, such as water or metal shavings, from cutting the tube.

**NOTICE**

Only blow out the external lines on the sample handling system.
Blowing out the interior GC lines may damage equipment.

## 2.8 Connect to actuation gas

The analytical valves require actuation gas to operate. When helium is used as a carrier gas, the default configuration is to also use helium as the actuation gas.

**Table 2-2: Actuation gas specifications**

| | |
|---|---|
| Moisture content | Less than 10 ppm |
| Particulate | Less than 2 microns |
| Supply pressure | 90 psig (6.2 barg) |

**NOTICE**

If you intend to use locally generated instrument air, ensure that the pressure is sufficient and use filters and dryers to ensure the actuation gas will meet the preceding specifications in order to avoid excessive maintenance.

### 2.8.1 Helium actuation gas

When using the carrier gas as the actuation gas, tee the actuation gas supply connection from the helium supply after the carrier drier.

### 2.8.2 Alternative actuation gas

If a gas other than the carrier gas is to be used as the actuation gas, connect the supply directly to the actuation gas port on the gas chromatograph's (GC's) gas manifold.

Use nitrogen, dry air, or some other non-hazardous gas as the actuation gas.

**⚠ WARNING**

Do not use hydrogen as actuation gas.

## 2.9 Connect to the calibration gas

The gas chromatograph (GC) requires a high quality, certified calibration gas to ensure accurate analysis. Although the Rosemount 470XA is typically set for an automatic daily calibration run in custody transfer applications, you can use MON2020 to configure calibrations for any time frequency or set it to manual calibration only.

**Prerequisites**

The calibration gas must contain each component that you want to measure, ideally near the center of the expected range of the sample gas component.. To ensure that all of the components in the calibration gas remain in the gas phase and that the composition remains consistent, install a calibration bottle heater blanket and use insulated or heat-traced stainless steel tubing between the calibration gas and the GC.

Table 2-3 lists the recommended ideal component concentrations for a calibration gas that can be used with most common natural gas applications.

**Table 2-3: Ideal calibration gas component concentrations**

| Component | Recommended concentration |
|---|---|
| Methane | 89.57% |
| Ethane | 5.0% |
| Propane | 1.0% |
| i-butane | 0.3% |

**Table 2-3: Ideal calibration gas component concentrations *(continued)***

| Component | Recommended concentration |
|---|---|
| n-butane | 0.3% |
| 2.2 dimethyl butane | 0.015% |
| neo-pentane | 0.1% |
| iso-pentane | 0.1% |
| n-pentane | 0.1% |
| n-hexane | 0.015% |
| Nitrogen | 2.5% |
| Carbon dioxide | 1.0% |

When dimethyl butane (2.2 concentration) is present, add it to the n-hexane concentration in the C6+ calibration concentration.

### Procedure

1. Regulate the calibration gas from bottle pressure to 20 psig (1.4 barg) using a two-stage bottle regulator with stainless steel diaphragms.

   Use a dual-stage regulator to ensure the outlet pressure will not change with changes in the bottle pressure. Use stainless steel diaphragms to avoid contamination.

2. Use ⅛-in. stainless steel tubing that is clean and free of grease to connect from the calibration gas bottle regulator to the calibration gas inlet connection on the sample conditioning system (SCS).
3. Before making the final connection to the SCS, blow through the lines for 30 seconds to remove any contamination, such as water or metal shavings, from cutting the tube.

**⚠ WARNING**

**High pressure**

High pressure may damage the analyzer and cause an unsafe condition.

Do not allow the calibration gas pressure to rise above 30 psig (2.1 barg).

**NOTICE**

Only blow out the external lines on the sample handling system.
Blowing out the interior GC lines may damage equipment.

## 2.10 Connect to the sample gas

The sample conditioning system controls how the gas sample is extracted, conditioned, and transported to the analyzer and is critical to the accurate and reliable performance of any gas chromatograph (GC).

The basic principles of sample conditioning are as follows:

- Take a representative vapor sample.
- Control the pressure and temperature without causing components to condense.
- Remove particulate and liquid contaminates.
- Transport the sample to the GC while maintaining the composition.

In the typical natural gas application, any liquid or solid contamination in the gas tends to accumulate on the inside pipe walls, even if it is clean and dry gas.

Observe the following guidelines for installing sample lines:

- Line length
  If possible, avoid long sample lines. In case of a long sample line, you can increase flow velocity by increasing the sample pressure and by using bypass flow via a speed loop.
- Sample line tubing material
  Ensure tubing is clean and free of grease.
- Dryers and filters
  - Use small sizes to minimize time lag and prevent back diffusion.
  - Install a minimum of one filter to remove solid particles. Most applications require fine-element filters upstream of the GC. The recommended sampling system includes a 2-micron filter.
  - Use ceramic or porous metallic type filters. Do not use cork or felt filters.

**Note**
Install the probe/regulator first, immediately followed by the coalescing filter and then the membrane filter.

- Pressure regulators and flow controllers
  - Use stainless steel wetted materials.
  - Make sure regulators and controllers are rated for sample pressure and temperature.
- Pipe threads and dressings
  Use PTFE tape. Do not use pipe thread compounds (dope).
- Valving
  - Install a block valve downstream of sample takeoff point for maintenance and shutdown.
  - The block valve should be needle valve or cock valve type, of proper material and packing, and rated for process line pressure.

### Procedure

1. To take a representative sample of the flowing gas, insert a sample probe into the center third of the pipeline.

   A major flow disturbance in the pipe, such as an elbow fitting or an orifice fitting, causes the contaminants to be temporarily mixed with the flowing gas stream; therefore, if practical, place the probe greater than five pipe diameters from such a flow disturbance to reduce the amount of contaminants that may be extracted with the gas sample.

2. Once the sample is extracted, pass the gas through both particulate and liquid filters to remove any remaining contaminants before it enters the GC.

3. The sample pressure entering the GC's sample conditioning system should be between 15 and 30 psig (1 and 2.1 barg). If the pressure in the pipeline is higher than this, regulate the sample pressure to this pressure with a dual stage regulator. Regulate pressure immediately after the probe or combine it with the probe (a regulator probe), because any extended lengths of sample line before the pressure regulator add significant lag time, which is the time taken for the sample entering the probe to reach the analyzer oven.

   **Note**
   When the pressure of a gas is reduced, the temperature of the gas decreases. If you reduce the temperature below the sample's hydrocarbon dew point, the heavier hydrocarbons

begin to condense and be removed from the gas phase, which changes the composition of the gas. The analyzed sample no longer accurately represents the flowing gas stream.

4. To avoid this hydrocarbon condensation, heat the regulator and sample lines to the GC to at least 30 °F (17 °C) above the expected temperature of the flowing gas stream.
5. Use stainless steel tubing and fittings for all of the sample lines.

   Use PTFE tape when making threaded connections in the sample system. Do not use pipe thread compounds.
6. Once the sample is extracted, pass the gas through both a 2-micron particulate filter and a liquid filter/shut-off to remove any remaining contaminants before it enters the GC.

**NOTICE**

Equipment damage
If the sample system does not contain a 2-micron filter and a liquid filter/shut-off, the GC's warranty may be void if it is determined the failure is due to contamination.

All sample conditioning systems sold with the Rosemount 470XA include a 2-
micron filter for each stream; customers can also purchase a liquid filter/shut-off separately for each stream.

## 2.11 Electrical connections

The Rosemount 470XA has three cable entries for wiring.

**⚠ WARNING**

**Wiring**

It is the customer's responsibility to ensure that all wiring conforms to the local electrical codes or regulations.

If you intend to run the power and through a single entry, the lower left entry is the most convenient. If you intend to run the power and communication cables separately, the lower left entry is most convenient for the power wiring, and the lower right entry is most convenient for the communication wiring. You can use the upper right cable entry if there is not enough space to run all of the wiring through the two lower cable entries.

The cable entries are M32-threaded connections. If your gas chromatograph (GC) is CSA-certified, then Emerson will ship a certified M32-to-¾-in. conduit adapter and ¾-in. certified plugs with your GC. If your GC is ATEX/IECeX-certified, then Emerson will ship M32-certified plugs with your GC.

The maximum wire size for all of the GC's terminals is 12 AWG or 4 $mm^2$. You can unplug the terminals from the backplane to make the connection and then plug them back into place.

**⚠ WARNING**

**Electrical hazard**

Shock, fire, or explosion may occur where electricity is the source of ignition in a potentially flammable or explosive atmosphere. Failure to de-energize the GC and not using proper personal protective equipment (PPE) may cause injury to personnel or damage equipment.

Make all electrical connections with no power applied.

To enable servicing in a potentially flammable or explosive atmosphere, install a customer-provided electrical power cut-off on the GC power connection outside of the hazardous area.

### 2.11.1 Terminal wiring

**Table 2-4: Terminal boards**

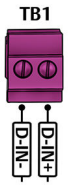
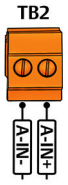
| Terminal block number | Connects to | Image |
|---|---|---|
| TB1 | Discrete input |   |
| TB2 | Analog input |   |

**Table 2-4: Terminal boards *(continued)***

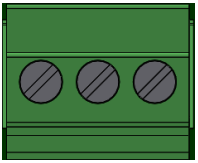
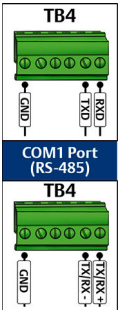
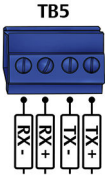
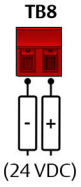
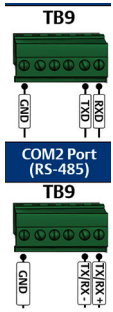
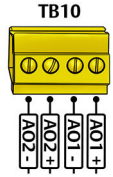
| Terminal block number | Connects to | Image |
|---|---|---|
| TB3 | Discrete output |  |
| TB4 | COM1 port (RS-232) |  |
| TB5 | Ethernet 2 |  |
| TB8 | Power |  |

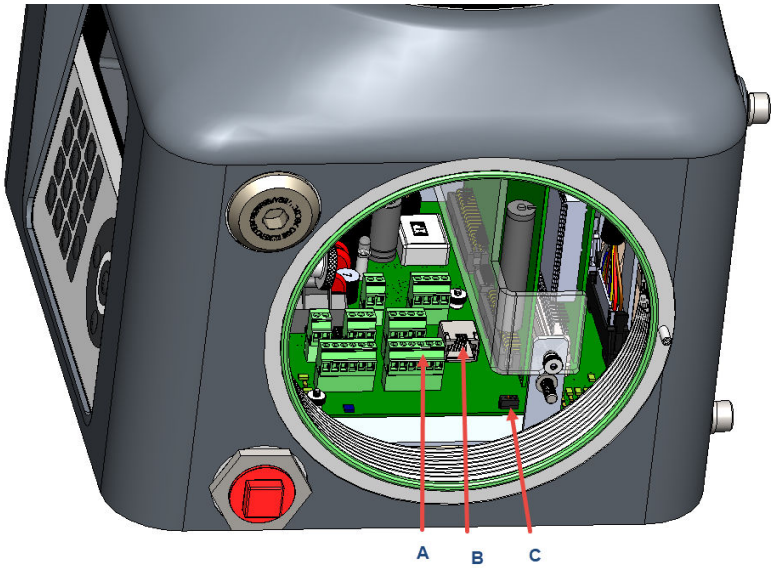
**Table 2-4: Terminal boards *(continued)***

| Terminal block number | Connects to | Image |
|---|---|---|
| TB9 | COM2 port (RS-232) |  |
| TB10 | Analog outputs (2) |  |

## 2.12 Connecting to Ethernet ports

The Rosemount 470XA has two Ethernet ports that can be configured with unique Internet protocol (IP) addresses, subnet masks, and gateway addresses.

**Figure 2-14: Ethernet ports on the backplane**




*A. Ethernet 2*
- *Backplane location: TB5*
- *Terminal type: Wired*

*B. Ethernet 1*
- *Backplane location: J9*
- *Terminal type: RJ-45, dynamic host configuration protocol (DHCP)-enabled*

*C. DHCP switch*
- *Backplane location: SW1*

- Ethernet port 1 is an RJ-45 connector designed to accept common Ethernet cable connections found on computers and other Ethernet enabled devices and is primarily intended for local connection to a computer, but can also be permanently connected to other Ethernet devices.

- Ethernet port 2 is a field terminated port primarily intended for connection to supervisory systems or other Ethernet enabled devices.
- Both ports can be used for Modbus® TCP communication and communication to the MON2020 configuration and diagnostics software.

**Note**
You can establish up to ten simultaneous Modbus TCP connections from the Modbus master. Connections attempts made after the tenth connection result in a `No Response` error.

### 2.12.1 Ethernet 1 port

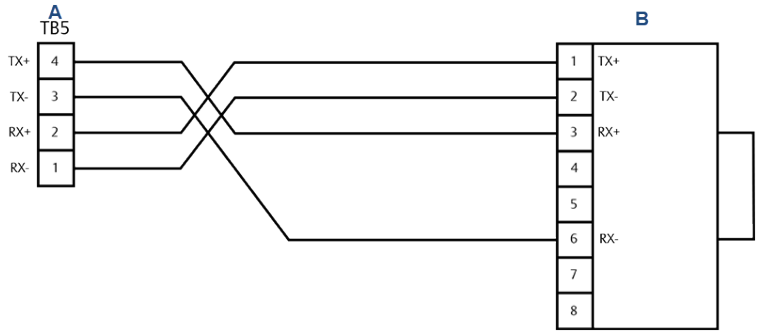
Ethernet 1 was designed primarily for local connection to a computer, such as a technician's laptop, for occasional maintenance and diagnostic purposes. The connector is the same RJ-45 Ethernet connector commonly found on most Internet-capable devices.

**Note**
If your computer is not configured to automatically configure Ethernet settings, contact your information technology (IT) department for instructions on how to change your Internet protocol (IP) settings to an address in the same range as the Ethernet subnet on the gas chromatograph (GC) or to obtain an IP address and subnet for the GC that will work with your computer's settings.

If wiring Ethernet 1 to other Ethernet-enabled devices, such as a router, hub, or local area network, then set the DHCP server switch to OFF to ensure that the operation of the network is not affected.

## 2.12.2 Ethernet 2 port

**Figure 2-15: Ethernet 2 port on the backplane**




*A. Ethernet port 2*
*B. Ethernet device*

The second Ethernet port is intended to be connected to an Ethernet-enabled supervisory network such as a flow computer, supervisory control and data acquisition (SCADA) system, or distributed control system (DCS). You can also use this port to permanently connect to a maintenance network with Rosemount MON2020.

As this port is intended for connection to hard-wired Ethernet networks, you must configure the subnet and the gateway address appropriately for the network connection. Consult with your network administrator for the required settings.

## 2.12.3 Connect directly to a personal computer (PC) using the gas chromatograph's (GC's) Ethernet port

The GC's DHCP server feature and its Ethernet port on the backplane at **J22** allow you to connect directly to the GC. This is a useful feature for GCs that are not connected to a local area network (LAN); all that is needed is a PC and a CAT 5 Ethernet cable.

### Prerequisites

**Note**
The PC must have an Ethernet network interface card (NIC) that supports the automatic medium-dependent interface crossover (Auto-MDIX) technology and either an Ethernet cable of at least CAT 5 or an Ethernet Crossover Cable of at least CAT 5.

**Note**
The GC can be connected (or remain connected) to the local network on **TB11** on the backplane while the DHCP feature is being used.

### Procedure

1. Plug one end of the Ethernet cable into the PC's Ethernet port and the other end into the GC's **RJ-45** socket on **J22** on the backplane.
2. Locate the set of switches at **SW1**, directly beneath the Ethernet port on the back plane. Flip the switch that is labeled **1** to ON. This starts the GC's DHCP server feature.

   **NOTICE**

   Although it is possible to use the Ethernet cable to connect the GC, by way of the **RJ-45** socket, to the local network, do not do so if the **SW1** switch has been turned on. Setting the **SW1** switch to ON puts the GC in server mode, and doing so while the GC is plugged into the LAN will disrupt the local network's functioning.

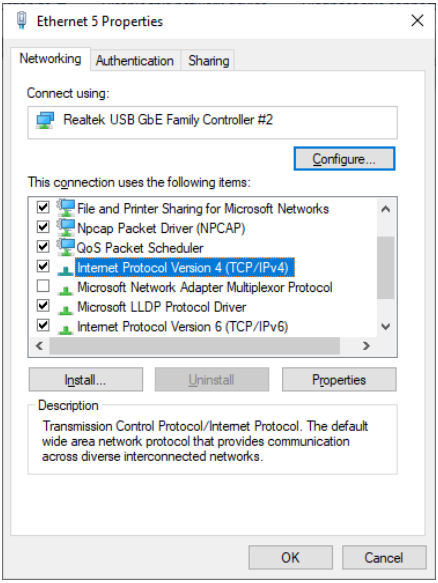
   The GC's DHCP server feature starts. The server takes approximately 20 seconds to initialize and start up.
3. Wait for 20 seconds and then do the following to ensure that the server has provided an Internet protocol (IP) address to the PC:
   a) From the PC's desktop, go to **Start** → **menu** → **Control Panel** → **Network and Sharing Center**.
   The ***Network Connections*** screen lists all Dial-up and LAN / High-Speed Internet connections installed on the PC.

   b) In the list of LAN / High Speed Internet connections, find the icon that corresponds to the PC-to-GC connection and check the status that displays beneath the LAN.
   It should show the status as Connected. The PC is now capable of connecting to the GC. If the status is Disconnected, the PC may not be configured to accept IP addresses. Continue to Step 4.
4. Configure the PC to accept IP addresses.
   a) Go to **Start** → **Control Panel** → **Network and Sharing Center**.

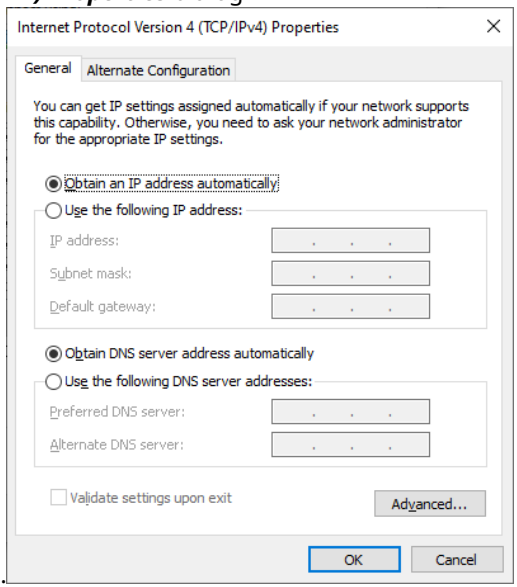
   b) Select **Change adapter settings**.

   c) Right-click **Local Area Connection** and select Properties.
   The ***Local Area Connection Properties*** dialog opens.

d) In the ***Connection*** list box, select Internet Protocol (TCP/IPv4).




e) Click **Properties**.
The ***Internet Protocol Version 4 (TCP/IP) Properties*** dialog opens.



f) To configure the PC to accept IP addresses issued from the GC, select the **Obtain an IP address automatically** and **Obtain DNS server address automatically** radio buttons.

g) Click **OK** to save the changes and to close the ***Internet Protocol Version 4 (TCP/IP) Properties*** dialog.

h) Click **OK** to close the ***Local Area Connection Properties*** screen.

i) Return to the ***Network Connections*** screen and confirm that the appropriate icon's status reads Connected.

5. Connect to the GC.
   a) Do one of the following:
      - Open the ***GC Directory*** screen and click **Insert** to create a new GC entry with an IP address of `192.168.135.100`.
      - Select an existing GC entry for direct DHCP connection. Click **Ethernet 1** to open the ***Ethernet 1 Connection Properties*** screen. Edit the IP address to `192.168.135.100`.

   b) Close the ***GC Directory*** screen.

   c) In Rosemount MON2020, go to **Chromatograph** → **Connect**.

   d) On the ***Connect to GC*** screen, click the **Ethernet 1** button next to the appropriate entry for direct DHCP connection.

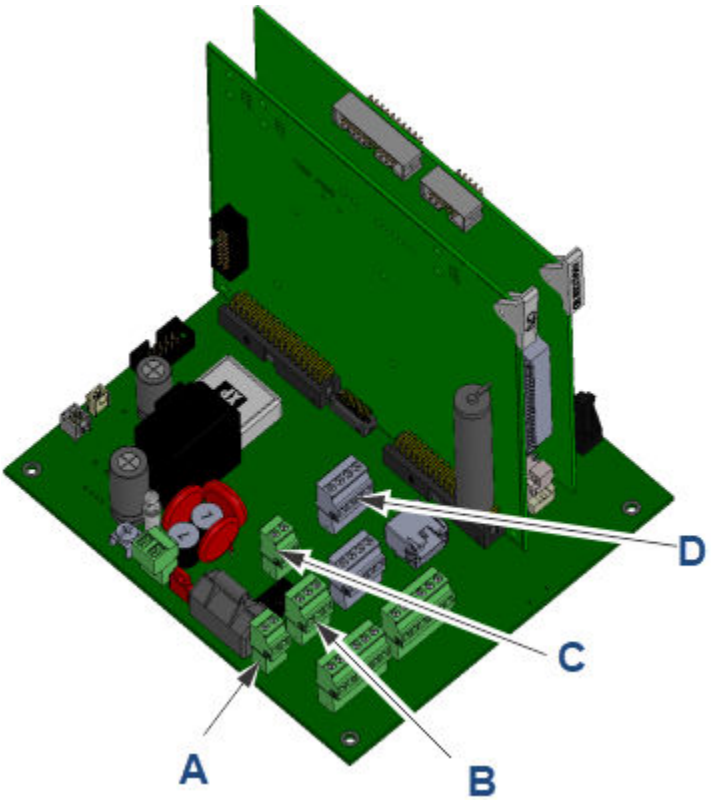
### Postrequisites

**NOTICE**

If you power cycle the GC, you will lose connectivity.

## 2.13 Connecting to external devices

**Figure 2-16: Digital and analog device connections**

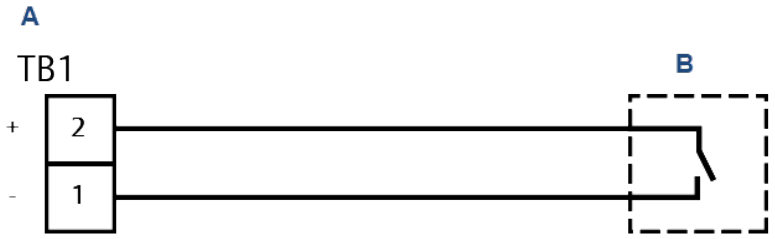



*A. Digital input: terminal block (TB)1*
*B. Digital output (TB3)*
*C. Analog input (TB2)*
*D. Two analog outputs (TB10)*

### 2.13.1 Digital inputs

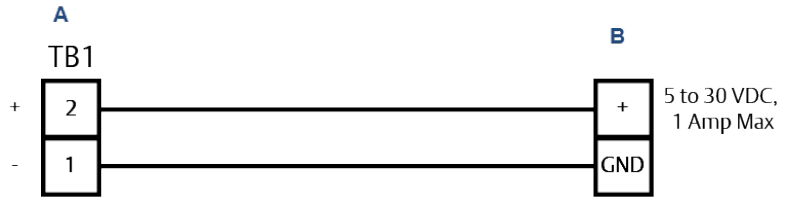
You can configure the discrete digital input to trigger alarms, change the stream sequence, or perform other functions. The input is optically isolated and can accept either a contact closure such as a pressure switch or a DC voltage signal between 5 and 30 Vdc at 1 Amp.

**Figure 2-17: Wiring for a digital input connected to a contact closure device**




*A. 470XA digital input*
*B. External device contact closure*

**Figure 2-18: Wiring for a digital input connected to a voltage output device such as a flow computer**



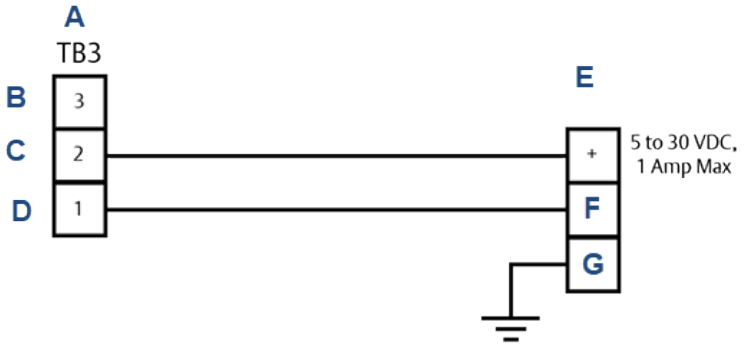

*A. 470XA digital input*
*B. External device voltage output*

### 2.13.2 Digital output

The digital output is a Form C dry contact relay output with normally open and normally closed contacts. The output is typically configured as an alarm output, but can be configured for other purposes.

When using the digital output as an alarm output, it is important to configure the circuit for fail-safe operation. To do this, use and configure the normally open contact so that a power failure will raise an alarm in the connected device.

**Figure 2-19: Wiring for a digital output for a fail-safe mode**

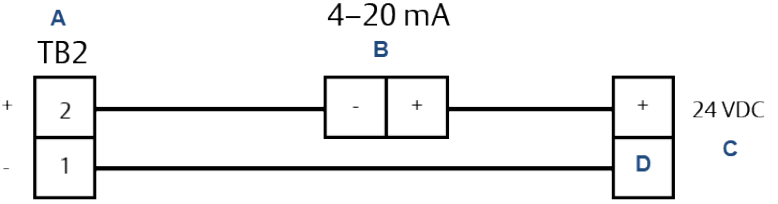



*A. Digital output*
*B. Normally closed*
*C. Common*
*D. Normally open*
*E. External device voltage output*
*F. Digital input*
*G. Ground*

### 2.13.3 Analog input

You can use the analog input to monitor and generate an alarm from an external signal, such as a pressure transmitter on the carrier gas bottles, or as a composition component input from another analyzer, such as a moisture or $H_2S$ analyzer. The analog input is optically isolated and requires external loop power.

**Figure 2-20: Analog input wiring with an external power supply and a loop-powered transmitter**

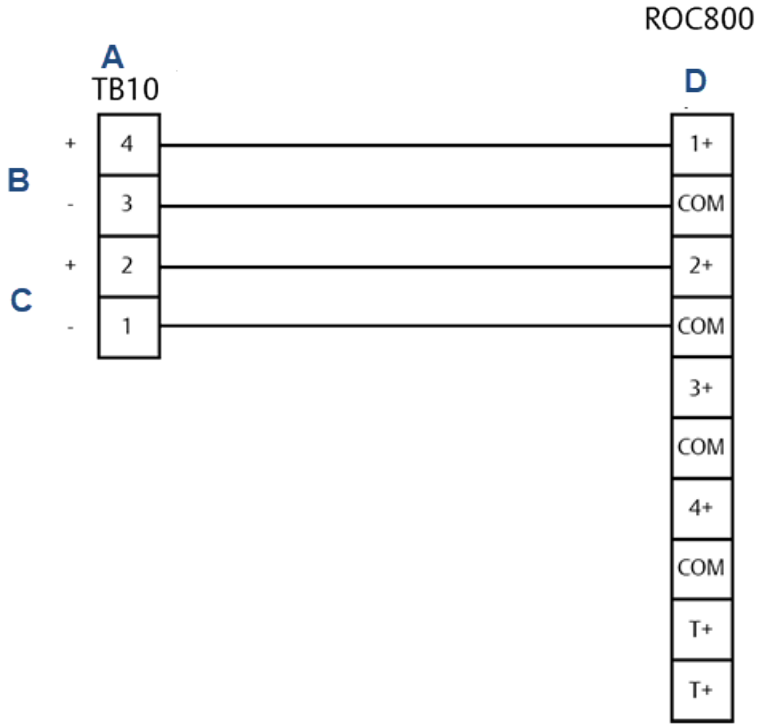



*A. Analog input*
*B. Transmitter*
*C. Power supply*
*D. Ground*

### 2.13.4 Analog outputs

The Rosemount 470XA has two analog outputs. Each analog output can be used to transmit a gas chromatograph (GC) variable, such as an energy value or a component concentration, as a 4 to 20 mA signal. The outputs are self-powered and require a loop resistance of less than 500 ohms.

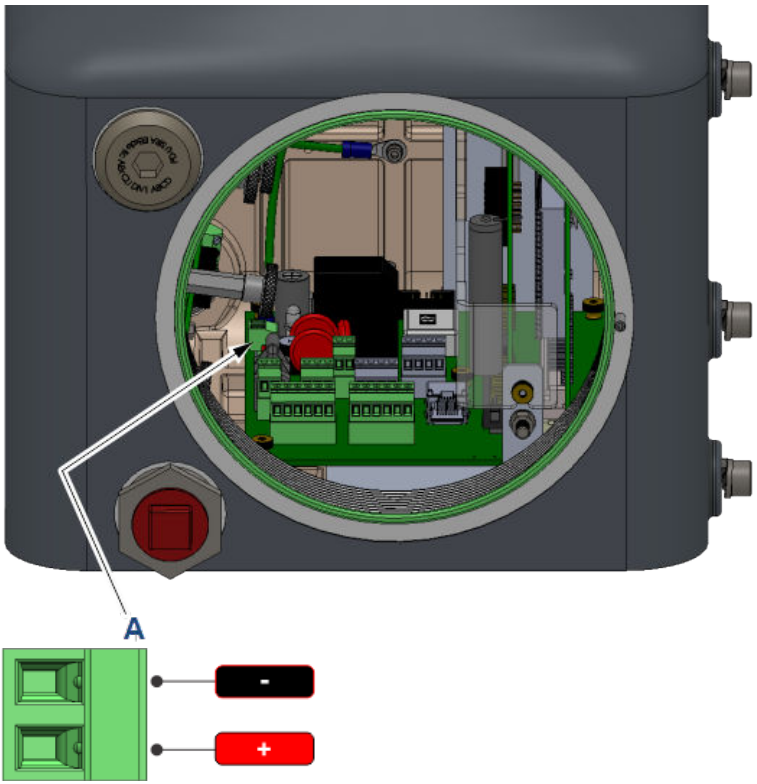
**Figure 2-21: Analog output connected to an ROC800 analog input card**




*A. Analog outputs*
*B. Analog output 1*
*C. Analog output 2*
*D. Analog inputs*

## 2.14 Connecting to power

**Figure 2-22: 24 Vdc power source wiring**




*A. 24 Vdc power wiring input*

### 2.14.1 Wiring power source

- Ensure that all wiring, as well as the customer-provided circuit breaker or power disconnect switch locations, conform to all the standards: national, local, state, and other jurisdictions.
- Provide the gas chromatograph (GC) with a 5-amp circuit breaker for protection.
- The Rosemount 470XA requires at least 21 Vdc at the terminals on the backplane to operate correctly. When wiring for DC power connections, account for the voltage drop due to the cable's resistance.

**⚠ WARNING**

To enable servicing in a potentially flammable or explosive atmosphere, install an electrical power cut-off on the GC power connection outside of the hazardous area.

Table 2-5 and Table 2-6 estimate the voltage drop and the maximum length of cable with a 24 Vdc supply at the maximum power draw (55 W) while the analytical oven heats up during start-up.

**Table 2-5: American wire gauge (AWG)**

| | 12 | 14 | 16 |
|---|---|---|---|
| Resistance per 1000 ft. (in ohms) | 1.62 | 2.58 | 4.08 |
| Voltage drop per 1000 ft. at 2.5 A (in Vdc) | 4.05 | 6.44 | 10.21 |
| Maximum length (3 Vdc power drop) in ft. | 740 | 465 | 293 |

**Table 2-6: Metric wire size**

| | 2.5 | 1.5 |
|---|---|---|
| Resistance per 100 m (in Ohms) | 1.3 | 2.1 |
| Voltage drop at 100 m at 2.5 A (in Vdc) | 3.25 | 5.25 |
| Maximum length (3 Vdc power drop) in meters | 92 | 57 |

### 2.14.2 Grounding precautions

Follow these general precautions for grounding electrical and signal lines:

**NOTICE**

Ground the gas chromatograph (GC) through the ground terminal on the left hand lower side of the lower housing.

- Metal conduit used for process signal wiring must be grounded at conduit support points (intermittent grounding of conduit helps prevent induction of magnetic loops between the conduit and cable shielding).
- A single-point ground must be connected to a copper-clad, 10-ft. long, ¾-in. diameter (3 m long, 19.1 mm diameter) steel rod, which is buried, full-length, vertically into the soil as close to the equipment as is practical.

**NOTICE**

The grounding rod is not furnished.

- Resistance between the copper-clad steel ground rod and the earth ground must not exceed 25 Ohms.
- On ATEX-certified units, the external ground lug must be connected to the customer's protective ground system via 9 AWG (6 $mm^2$) ground wire. After the connection is made, apply a non-acidic grease to the surface of the external ground lug to prevent corrosion.
- The equipment-grounding conductors used between the gas chromatograph (GC) and the copper-clad steel ground rod must be sized according to your local regulations.

# 2.15 Starting up and configuring the gas chromatograph (GC)

## 2.15.1 Applying carrier and actuation gas

**⚠ WARNING**

Do not use hydrogen as actuation gas.

**NOTICE**

Applying carrier gas without actuation gas can result in a direct path of the carrier gas to the vent that rapidly uses up the carrier gas supply.

### Apply carrier and actuation gas from the same line

**Procedure**

1. Back off the bottle regulator so that when you open the bottle valve, there will be no pressure applied.
2. Open the bottle valve.
3. Slowly increase the regulated pressure to 90 psig (6.2 barg).
4. Leak check the lines from the bottle to the gas chromatograph (GC).

### Apply carrier gas and actuation gas separately

**Prerequisites**

If using a separate actuation gas supply, apply pressure and leak check the actuation gas first and then repeat for the carrier gas.

**Procedure**

1. Back off the bottle regulator for the actuation gas, so that when you open the bottle valve no pressure is applied.
2. Open the actuation gas bottle valve.
3. Slowly increase the regulated pressure of the actuation gas to 90 psig (6.2 barg).
4. Leak check the lines from the actuation gas bottle to the gas chromatograph (GC).
5. Back off the bottle regulator for the carrier gas, so that when you open the bottle valve no pressure is applied.
6. Open the carrier gas bottle valve.

7. Slowly increase the regulated pressure.
   - If using helium as carrier gas, increase the pressure to 90 psig (6.2 barg).
   - If using hydrogen as carrier gas, increase the pressure to 60 psig (4.1 barg).
8. Leak check the lines from the carrier gas bottle to the GC.

### 2.15.2 Apply calibration gas

**Procedure**

1. Close the calibration gas isolation valve on the sample handling system.
2. Back off the bottle regulator so that when the bottle valve is opened, there will be no pressure applied.
3. Open the bottle valve.
4. Slowly increase the regulated pressure to 20 psig (1.4 barg).
5. Leak check the lines from the bottle to the gas chromatograph (GC).

**Note**
Do not open the isolation valve to the calibration gas yet. This will be done when you start up the GC.

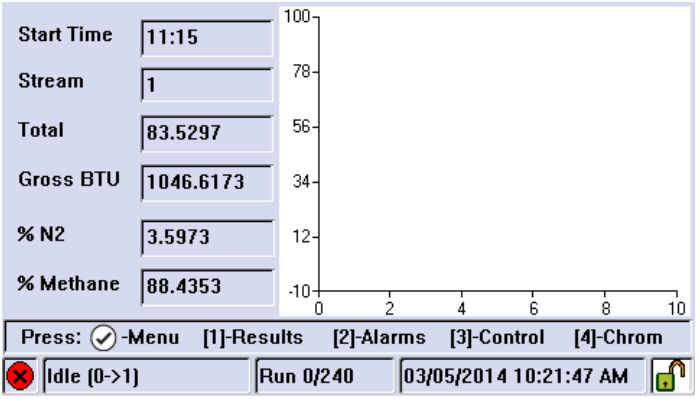
### 2.15.3 Turn on power for the first time

At this point, actuation gas and carrier gas should be flowing through the gas chromatograph (GC). The GC can take up to four hours to heat up to temperature. During this time, you can configure the software and purge the system.

**Procedure**

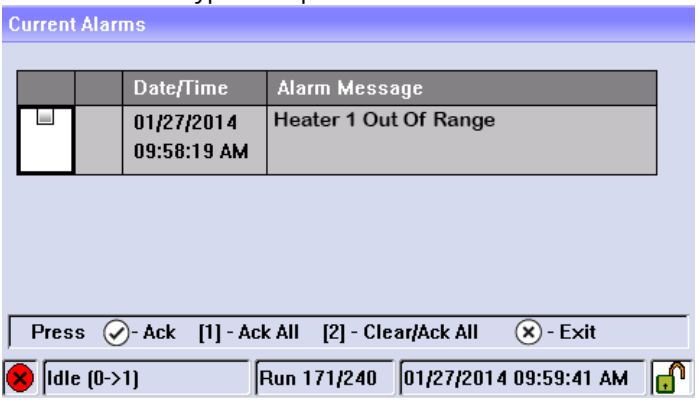
1. Turn on the power supply to the gas chromatograph (GC). The local operator interface (LOI) ***Bootup*** screen displays. The bootup process takes less than three minutes. When the ***Home*** screen displays, bootup is complete.

2. Wait fifteen minutes.




A red alarm icon should be visible in the lower left corner of the ***Home*** screen.

3. Press **2** on the keypad to open the ***Current Alarms*** screen.




**⚠ WARNING**

After you log in for the first time, make sure to change your password.

4. Confirm that the alarm that was triggered was the **Heater 1 Out Of Range** alarm.

   Other possible alarms are the **GC Idle** alarm, **Carrier Pressure Low** alarm, and the **Power Failure** alarm.

**Note**
If the ***Current Alarms*** screen displays the **Carrier Pressure Low** alarm, confirm that the carrier gas supply is on and that the pressure regulator is set to 90 psig (6.2 barg).

If the alarm persists, see Troubleshooting. Because this is the first time that the GC has been turned on, you can ignore the other alarms.

5. Press **2** to acknowledge and clear the alarm.

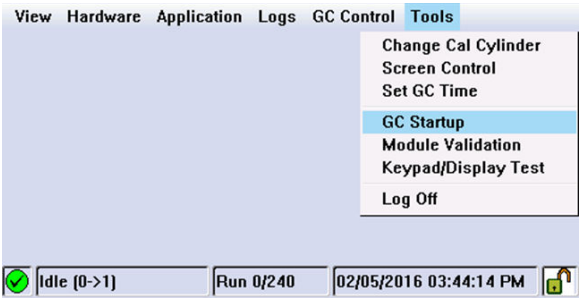
**Note**
The **Heater 1 Out Of Range** alarm will reappear every fifteen minutes until the GC reaches its temperature set point. Continue to press **2** as necessary.

6. Press **Exit** to return to the ***Home*** screen.

## 2.15.4 Run the Startup Assistant

### Procedure

1. Press **Enter** to go to the ***Main Menu***.
2. Press **Right** to move to the ***Tools*** menu.
3. Press **Down** to move to the **GC Startup** command and press **Enter**.




The ***GC Startup*** screen displays.

4. Press **Enter** to continue.
5. To set gas pressures:
   a) Confirm all the gas lines are connected and all valves are open.
   b) Confirm the carrier, actuation, calibration, and sample pressures are set correctly.
   c) Once confirmed, press **Enter** to continue.

6. To enter analyzer information:
   a) Press **Edit** to activate a field.
   b) Use the numeric keys to enter the analyzer name
   c) Press **Enter** to accept an entry and to deactivate the field.
   d) Use the arrow keys to move to the next field.
   e) Repeat the steps for company name, location, and date and time. Press **Enter** to continue.
   f) If your country employs Daylight Savings Time, use MON2020; go to **Chromatograph** → **View/Set Date Time**, and select the **Day Light Savings** check box, which is unselected by default.
7. To configure communications:
   a) Enter the serial port settings.
   b) Once done, press **Enter** to continue and configure the following:

**Table 2-7: Communication settings**

| Communication type | Configuration description |
|---|---|
| Modbus ID | The address that the host device will use to communicate with the gas chromatograph (GC). For applications where the GC is the only slave device on the network, the Modbus ID is typically set to 1. For multi-dropped applications where the GC is one of several on the serial network, the Modbus ID needs to be unique. Refer to your host device configuration to determine the Modbus ID to be configured on the GC. |
| Baud rate | The baud rate can be set at the standard rates from 1,200 baud up to 57,600. For Modbus® communications, the typical setting is 9,600. |
| Data/stop bits | The number of bits used for communications and to indicate the end of a message. The typical setting for ASCII mode communications is 7. The typical setting for remote terminal unit (RTU) mode communications is 8. Typically, Stop bit is set to 1. |
| Parity | The error checking mode for the parity bit in ASCII mode messages. This can be set to either ODD or EVEN for ASCII mode communications and must match the host device's settings. Set to NONE for RTU mode communications. |

**Table 2-7: Communication settings *(continued)***

| Communication type | Configuration description |
|---|---|
| MAP file | The Modbus address map. By default, this is set to SIM_2251, which is the most common communication mapping for flow computer to GC communications. Refer to the Rosemount MON2020 Software for Gas Chromatographs Manual to learn more about configuring custom maps. |
| Port | The selection between RS-232 and RS-485 physical layer communication protocol. |

**Note**
The 470XA does not have a setting for ASCII or RTU mode. The GC automatically detects the mode during its initial communications with the host device and automatically selects the correct mode.

**Note**
Obtain the required serial port settings from polling devices prior to configuring the settings on the GC.

8. Configure TCP/IP settings. Make a note of the Ethernet settings for both ports.

   Ethernet 1 is the RJ-45 terminal that is commonly used for local computer access. Ethernet 2 is the port that is commonly used for communication with a supervisory system such as a flow computer, RTU, supervisory control and data acquisition (SCADA) system, or distributed control system (DCS).

   a) Enter the Ethernet settings according to the network requirements of your installation. Press **Enter** to continue.

   b) If you intend to use Ethernet 1 for local access only, do not change the settings. Contact your network administrator or the person in charge of configuring your supervisory system network for the setting required to connect the GC to your network.

9. Reset averages time. Enter the day of the month to reset the monthly averages in the Day column.

   a) Enter the time to reset the daily averages in the Reset Time column.

   b) Enter the time to reset the weekly averages in the Weekday column.

c) Press **Enter** to continue.

10. Configure calculations. You can configure the 470XA to perform Gas Processing Association (GPA) calculations, International Organization for Standardization (ISO) calculations, or both. Enter the calculation settings. Once done, press **Enter** to continue.
    a) Calculation Method.
       Options are:
       - GPA
       - ISO
       - GPA & ISO

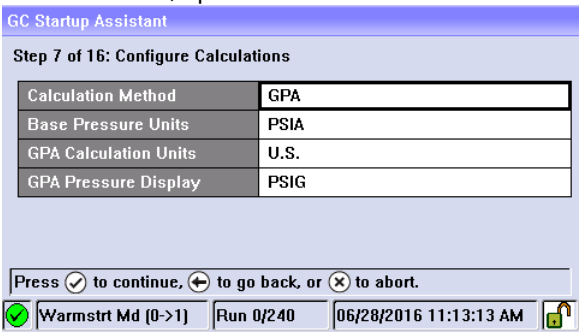
    b) ISO Version (Only if ISO or GPA & ISO was selected as Calculation Method).
       Options are:
       - ISO 6976: 2016
       - ISO 6876: 1995

    c) Base Pressure Units.
       Options are:
       - PSIA
       - BarA
       - kPa

    d) GPA Calculation Units.
       Options are:
       - U.S.
       - S.I.

e) GPA Pressure Display (Only if GPA or GPA & ISO was selected as a Calculation Method).

If you select U.S. units, PSIG is the default unit. If you select S.I. units, options are kPaG or BarG.




f) ISO Pressure Display (Only if ISO or GPA & ISO was selected as Calculation Method).

Options are:

- BarG
- kPaG

g) Primary and Secondary Temperature (Only if ISO or GPA & ISO was selected as calculation method.

Options are:

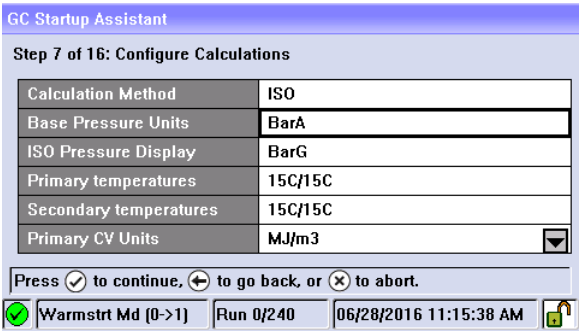
- 0C/0C
- 0C/15C
- 0C/20C
- 15C/0C
- 15C/15C
- 15C/20C
- 20C/0C
- 20C/15C
- 20C/20C
- 25C/0C
- 25C/15C
- 25C/20C
- 0C/15.55C

- 15C/15.55C
- 20C/15.55C
- 25C/15.55C
- 15.55C/0C
- 15.55C/15C
- 15.55C/15.55C
- 15.55C/20C

h) Primary and Secondary CV Units (Only if ISO or GPA & ISO was selected as Calculation Method).

Options are:

- kJ/m3
- kCal/m3
- kWh/m3
- MJ/m3
- MJ
- MJ/mole




11. Configure stream usage. Designate stream 1, 2, 3, and 4 for calibration, analysis, or unused. For calibration and validation parameters, enter total number of runs, runs to be averaged, and starting times. Once done, press **Enter** to continue.

    **Auto**: Check the box to automatically run at designated time. If the box is unchecked, you need to perform a manual calibration or validation. By default, the box is checked for calibration and unchecked for validation.

12. Enter the C6+ splits.

The GC assumes a ratio of heavy hydrocarbon components is used for the C6+ value. By default, there are four pre-defined ratios:

- C6+ 47/35/17
- C6+ GPA 2261-99
- C6+ 57/28/14
- C6+ 50/50/0

There is also a user defined option. Select the desired split and press **Enter** to continue.

13. Purge regulator. Purge the calibration gas regulator five times and then press **Enter** to continue.
14. Enter cal concentration. Enter the concentration values that are written on the calibration gas's certificate into the appropriate fields. Press **Enter** to continue.

    **Note**
    If the **Auto Calculate Methane** check box is selected, the methane value is calculated based on the values entered in the other fields.

15. Enter Uncertainty %. Enter the uncertainty values from the calibration gas's certificate into the appropriate fields. Press **Enter** to continue.

    **Note**
    If the calibration gas certificate does not list the uncertainty percentages, enter the default value of **2**.

16. Enter the cal gas energy value. Enter the calibration gas certificate energy value and the energy deviation limit values from the calibration gas's certificate.

    **Note**
    If the cal gas energy value from the certificate does not match the calculated value on the screen, enter the calculated value in the Cal Gas Energy Value field to ensure the energy value check during the calibration runs will not cause nuisance alarms.

17. Check the carrier pressure.

    If the carrier pressure is not within the set point range, the ***Carrier Pressure*** screen will display `Out of Range` or `Low Pressure`. Adjust the carrier pressure regulator on the side

panel until it reaches the set point and the Carrier Pressure Status is OK.

18. Wait for the temperature to stabilize.
    The Startup Assistant waits until the temperature of the GC to reach the set point. Once this happens, the Startup Assistant automatically moves to the next screen.
19. Run calibration gas analysis.
    The GC analyzes the calibration gas and repeat the analysis until the nitrogen value repeats within the uncertainty value entered. If after five runs, the nitrogen values are within specified limits, the Startup Assistant moves automatically to the next setup screen.
20. Run calibration sequence.
    The GC runs the number of calibration cycles as entered during configure stream usage. If alarms are generated, the Startup Assistant halts until the alarms are cleared.

If no alarms sound, the setup of the 470XA is complete.

# 3 Certifications

### Table 3-1: ATEX certifications

| Certification | Description |
|---|---|
| Manufacturer | Emerson<br>Houston, TX, USA |
| Product | Rosemount 470XA Gas Chromatograph |
| Certificate number | CSACa 23ATEX1001 |
| Certification code | Ex db IIB+H2 T6 Gb |
| Ambient range | Ta = -20 °C to +60 °C |
| Serial number | Device dependent |
| Year of manufacture | Device dependent |
| Other markings | CE 2813 |
| Warnings | As shown on equipment. Also see Safety compliance certifications. |
| Electrical ratings | DC: 21 - 30 V, 55 W maximum |
| Number and size of the conduit entries | 3 conduit entries: M32 X 1.5 |
| EN 60079-0 | Explosive atmospheres - Part 0: Equipment - General requirements |
| EN 60079-1 | Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d" |

### Table 3-2: IECEx equipment for use in explosive atmospheres

| | | | |
|---|---|---|---|
| IECEx | Ex db IIB+H2 T6 Gb<br>Ta = -20 °C to +60 °C | IP65 | IECEx CSA 23.0005 |

### Table 3-3: CSA certifications

| | |
|---|---|
| C SP us | Class I, Div. 1; Groups B, C, and D; T6; Type 4X<br>Class I, Zone 1; Ex/AEx db IIB + H2; T6; IP65<br>Pollution degree: 2<br>Overvoltage category: II<br>Maximum use altitude: 6,561.7 ft. (2000 m) above sea level |

### UKCA certifications for dome name plate

| | |
|---|---|
| UK CA 0518 | CSAE23UKEX1020 |

### Safety compliance certifications

**⚠ WARNING**

**Read manual**

Read Manual before operating.
Refer to Manual for thread connection size.

**⚠ WARNING**

**Explosion**

Do not open when energized or when an explosive atmosphere may be present.
Keep cover tight while circuits are alive.

**⚠ WARNING**

**Clean joints**

Clean cover joints before replacing cover.

**⚠ WARNING**

**Electric shock**

It is the responsibility of the end user to ensure that any cables connected to this device are capable of withstanding a temperature of at least 176 °F (80 °C).

**⚠ WARNING**

**Seal**

Install a seal within 2 in. (51 mm) of the enclosure.

## ⚠ WARNING

**Safety protection**

Failure to follow this warning may compromise the product's safety protection method and void the product certification. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Repairs or alterations are not permitted on any flameproof paths, features, or joints.

**Quick Start Guide**
**MS-00825-0100-0470, Rev. AB**
**November 2023**

For more information: **Emerson.com/global**



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