

# Rosemount™ CT5800

## Continuous Gas Analyzer





## Important information

### NOTICE

This section is in accordance with IEC 60079-0: 2011 Clause 30. This section must not be changed, amended, or removed.

#### Important

Users must read, understand, and comply with the following information before proceeding.

All users, installers, operators, and maintainers must be familiar with operating the analyzer. To install, start up, operate, maintain, and service the analyzer in a safe manner, it is MANDATORY to read all additional instruction manuals shipped with the analyzer. The following instruction manual(s) are available and/or referenced within this manual:

Rosemount CT5800 Continuous Gas Analyzer [Reference Manual](#), 00809-0100-5800, Rev AA

#### User information

### NOTICE

This section is in accordance with IEC 60079-0: 2011 Clause 30. This section must not be changed, amended, or removed.

#### Important

All users must read this page before proceeding!

Emerson (Rosemount) designs, manufactures, and tests its products to meet many national and international standards. The Rosemount CT5800 is a sophisticated technical product, and to ensure it continues to operate as designed and within normal specifications, it MUST be installed, used, and maintained correctly. The following instructions MUST be adhered to and integrated into your safety program when installing, using, and maintaining Emerson (Rosemount) products.

- Failure to follow the proper instructions may cause:
  - Loss of life
  - Personal injury
  - Damage to property
  - Damage to this instrument
  - Warranty invalidation
- Read all instructions prior to installing, operating, and servicing the product.
- If you do not understand any of the instructions, contact your Emerson (Rosemount) representative for clarification.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.
- Install your equipment as specified in the installation instructions of the appropriate manual and in accordance with applicable local and national codes.
- Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program, and maintain the product.

- When replacement parts are required, ensure that qualified people use replacement parts specified by Emerson (Rosemount).
- Unauthorized parts and procedures can affect the product's performance, place the safe operation of your process at risk, and VOID YOUR WARRANTY. Look-alike substitutions may result in fire, electrical hazards, or improper operation.
- To prevent electrical shock and personal injury, all equipment doors must be closed and protective covers in place, except when maintenance is being performed by qualified personnel.
- The information contained in this document is subject to change without notice.

**General safety notice/residual risk**

Installation, operation, and maintenance of the analyzer must be in accordance with these instructions.

When operated as intended and all applicable safety instructions are observed, an element of risk will remain, including, but not limited to, the following:

- Explosion protection measures may become ineffective on the occurrence of one failure (for Category 3 instruments).
- The emission of gases hazardous to health may be possible when all gas connections have been correctly made.

To avoid exposure to the dangers of residual risks, take particular care when installing, operating, maintaining, and servicing the analyzer.

**Authorized personnel****NOTICE**

This section is in accordance with IEC 60079-0: 2011 Clause 30. This section must not be changed, amended, or removed.

In-depth specialist knowledge is an absolute requirement for working with and on the analyzer. Personnel installing, operating, servicing, and maintaining the analyzer must be instructed, trained, qualified, and authorized for hazardous areas with the operating company and the manufacturer. It is the operating company's responsibility to:

- Train staff
- Observe safety regulations
- Follow the safety instructions and procedures in the product manual

Operators must:

- Be trained
- Read and understand all relevant sections of the product manual before commencing work
- Know the safety mechanisms and regulations

**⚠ WARNING**

To avoid explosions, loss of life, personal injury, and damage to this equipment and on-site property, do not install, operate, maintain, or service this instrument before reading and understanding this instruction manual and receiving appropriate training.

## Regulations and standards

Regulations / Standards	Description
2014/35/EU	The Low Voltage Directive
94/9/EC (until April 19, 2016) <sup>(1)</sup>	The ATEX Directive
2014/34/EU (from April 20, 2016) <sup>(2)</sup>	
2014/30/EU	The Electromagnetic Compatibility Directive
2012/19/EU	Waste Electrical and Electronic Equipment (WEEE) Directive
USA 21 CFR 1040.1	Laser products
NEC 505	National Electrical Code (issued by ANSI: American National Standards Institute and NFPA 70: National Fire Protection Association)
EN 6223: 2008	EMC Safety Standard
IEC 60529:1992 + A2 2013	Ingress protection
BS EN 60825-1:2007	Safety of laser products. Equipment classification and requirements (identical to IEC 608250-1 2007).
BS EN 61010-1 2010 IEC 61010-1 2010	Safety requirements for electrical equipment for measurements, control, and laboratory use. General requirements.
IEC 61241-10: 2004-06	Electrical apparatus for use in the presence of combustible dust. Part 10: Classification of areas where combustible dusts are or may be present.
BS EN 61326-1: 2013	Electrical equipment for measurement, control, and laboratory use. EMC requirements. General requirements.
BS EN60079-0: 2012	Explosive atmospheres - Part 0: Equipment - General requirements
BES EN 60079-1: 2014	Explosive atmospheres. Equipment protection by flameproof enclosures <i>d</i>
IEC 60079-0:2011 Ed 6	Explosive atmospheres - Part 0: Equipment - General requirements
IEC 60079-1:2014 Ed 7	Explosive atmospheres, Part 1: Equipment protection by flameproof enclosures <i>d</i>

- (1) May affect equipment tested prior to April 20, 2016, but shipped at a later date.  
 (2) All equipment tested from April 20, 2016 will be subject to the directive.

### Associated publications

Reference Manual: 00809-0100-5800

### Compliance approvals



This product complies with USA 21 CFR 1040.10.

This product is designed and manufactured under an approved quality management system to ISO 9001: 2015.



Emerson and the Rosemount CT5800 have satisfied the requirements for applying the CE marking to the Rosemount CT5800 Gas Analyzer.

Explosive protection



This equipment meets all requirements of the EMC and Low Voltage directives.

This article is in accordance with IEC 60079-0: 2011 Clause 30.

This article must not be changed, amended, or removed.

Emerson has satisfied the requirements of and complies with ATEX for operation of electrical/electronic equipment in hazardous locations .

**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.

**Safety and information notices**

This article is in accordance with IEC 60079-0: 2011 Clause 30. This article must not be changed amended or removed.

**⚠ DANGER**

**WILL CAUSE DEATH**

Failure to follow this warning will result in death or serious injury to personnel.

**⚠ WARNING**

**DANGER TO PERSONNEL**

Failure to follow this warning may result in serious injury to personnel.

**⚠ CAUTION**

**MAY CAUSE DAMAGE TO EQUIPMENT**

Failure to follow this warning may result in damage to the equipment.

**NOTICE**

Important or tip messages will appear in this format.



## Safety information

All authorized users, including installation, operation, and maintenance personnel, must observe the following safety precautions and warnings.

This article is in accordance with IEC 60079-0: 2011 Clause 30.

This article must not be changed, amended, or removed.

### **⚠ DANGER**

#### **FLAMMABLE SUBSTANCES**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Internal parts of the analyzer may reach temperatures of 150 °F (65 °C) and may present an ignition source. Failure to observe this warning will cause death, personal injury, and/or damage to persons and/or property.

Exercise care when using oil, paint, cleaning rags, and other flammable substances near the analyzer. A fire may result if this precaution is not observed. Always assume that the interior of an analyzer is hot unless it has been switched off and allowed to cool down.

### **⚠ DANGER**

#### **ELECTRIC SHOCK**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Failure to observe this precaution will cause death, personal injury, and/or damage to persons and/or property.

This analyzer operates using mains voltage that is dangerous to life.

Make sure the circuit breakers are set to OFF and tagged off before opening the front cover.

### **⚠ DANGER**

#### **FAILURE TO LOCK-OUT GAS HANDLING SYSTEM MAY CAUSE DEATH.**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Unauthorized operation of the gas handling system when maintenance is being performed on the analyzer or its associated pipes/hoses may result in highly flammable gas being released, causing fire or explosion.

Always lock out the gas handling system when shutting down the analyzer.

### **⚠ DANGER**

#### **FAILURE TO VENT SAMPLE GAS MAY CAUSE DEATH.**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

The sample gas in the system must be vented to prevent fire or explosion during maintenance and to prevent damage to the analyzer during startup.

The sample gas in the pipes leading to the analyzer must be purged to prevent hazards to personnel during maintenance. Purging the sample gas must be done in accordance with the safe working procedures for the site.

Allow the analyzer and system for returning the sample gas to run for five minutes to allow any sample gas in the system to be returned to the exhaust.

**⚠ WARNING****EXPLOSION HAZARD**

The unit described in this manual may not be used in explosive atmospheres without additional safety measures.

**⚠ WARNING****ELECTRICAL SHOCK**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Installation requires access to live parts which can cause death or serious injury.

Do not operate without covers secure.

Do not open while energized.

For safety and proper performance, this instrument must be connected to a properly grounded three-wire source of power.

**⚠ WARNING****TOXIC GASES**

The analyzer's exhaust may contain toxic gases, such as (but not limited to) sulfur dioxide. These gases can cause serious injuries.

Avoid inhaling exhaust gases.

Connect the exhaust pipe to a suitable flue and inspect the pipes regularly for leaks.

Make sure all connections are airtight to avoid leaks.

**⚠ WARNING****GASES HAZARDOUS TO HEALTH**

Follow the safety precautions for all gases (sample and span gases) and gas cylinders.

Before opening the gas lines, purge them with air or neutral gas (N<sub>2</sub>) to avoid danger from escaping toxic, flammable, explosive, or hazardous gases.

**⚠ WARNING****FLAMMABLE OR EXPLOSIVE GASES**

When supplying explosive gases or flammable gases with concentrations of more than 25% of the lower explosion limit, Emerson recommends implementing one or more additional safety measures:

Purging the unit with inert gas

Stainless steel internal pipes

Flame arrestors on gas inlets and outlets

Infallible measuring cells

**⚠ WARNING****CONNECTING UNITS FOR PERMANENT INSTALLATION**

Failure to comply may cause the risk of injury or death and invalidate the analyzer's warranty. Working on units equipped with screw-type terminals for electrical components may result in the exposure of energized components.

Only qualified personnel familiar with possible risks should install the analyzer.

Wall-mounted units have no power switch and are operational when connected to a power supply. The operating company is therefore required to have a power switch or circuit breaker (as per IEC 60947-1/-3) available on the premises. This switch must be installed near the unit, easily accessible to operators, and labeled as a power cut-off for the analyzer.

**⚠ WARNING****EXPLOSION HAZARD**

Exhaust gases may contain hydrocarbons and other toxic gases, such as carbon monoxide. Carbon monoxide is toxic. Faulty gas connections may lead to explosion and death.

Ensure that all gas connections are connected as labeled and airtight.

**⚠ WARNING****EXPLOSION HAZARD**

This article is in accordance with IEC 60079-0: 2011, Clause 30.

Failure to observe this warning and/or follow safety instructions could cause an explosion or potentially hazardous situation, which if not avoided, could result in death or serious injury.

Read all instruction manuals (including versions for auxiliary equipment) before installing this instrument.

**⚠ WARNING****EXPLOSION HAZARD**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Failure to observe this warning and/or follow safety instructions could cause an explosion or potentially hazardous situation which, if not avoided, could result in death or serious injury.

When installing and wiring this equipment, comply with all relevant national legislative requirements and regulations.

Consider all safety instructions within this manual and all associated analyzer manuals.

**⚠ WARNING****EXPLOSION HAZARD**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Failure to observe this warning and/or follow safety instructions could cause an explosion or potentially hazardous situation which, if not avoided, could result in death or serious injury.

When the analyzer is out of order, shut off all inputs and outputs connected to external equipment.

**⚠ WARNING****EXPLOSION HAZARD**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Failure to observe this warning and/or follow safety instructions could cause an explosion or potentially hazardous situation which, if not avoided, could result in death or serious injury.

Only properly trained personnel who understand the content of all applicable manuals and related instructions must conduct the startup procedure.

**⚠ WARNING****EXPLOSION HAZARD**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Failure to observe this warning and/or follow safety instructions could cause an explosion or potentially hazardous situation which, if not avoided, could result in death or serious injury.

Do not open in an explosive atmosphere.

**AVERTISSEMENT**

**Ne pas ouvrir si une atmosphère explosive gazeuse est présente.**

**⚠ WARNING**

Do not open when energized

**AVERTISSEMENT**

**Ne pas ouvrir sous tension.**

**⚠ WARNING****EXPLOSION HAZARD**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Failure to comply will void certification and may cause explosions. Failure to observe this warning and/or follow safety instructions could cause an explosion or potentially hazardous situation which, if not avoided, could result in death or serious injury.

Use only replacement parts and components authorized by Emerson. All replacement parts and components must be suitable Ex-certified components for use in hazardous areas.

**⚠ WARNING****EXPLOSION HAZARD BY BATTERY**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Failure to observe this warning and/or follow safety instructions could cause an explosion or potentially hazardous situation which, if not avoided, could result in death or serious injury.

The Rosemount CT5800 contains a low voltage battery for data backup purposes on the CPU. Under normal operating conditions, there is no need to replace the battery during the analyzer lifetime. However, if you do replace it, make sure to only use the same type and model.

**⚠ WARNING**

**OPTICAL RADIATION EXPOSURE HAZARD**

The analyzer contains lasers. Opening the analyzer and attempting to perform adjustments or procedures other than those specified in this manual may result in hazardous optical radiation exposure.

Failure to follow the correct procedures may cause damage to the eye.

The Rosemount CT5800 is Class 1. The beams are fully enclosed, and there is no access to the laser beams while the product is in operation or during maintenance. Do not look at the lasers with any kind of magnifier or optical measuring device.

The use of control or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

In accordance with USA 21 CFR 1040, the Rosemount CT5800 has warning labels at appropriate positions.

**Classification**

There are three types of lasers that may be included in the Rosemount CT5800: Quantum Cascade Lasers (QCLs), Interband Cascade Lasers (ICLs), and Tunable Diode Lasers (TDLs). The characteristics of the lasers contained within are given in the table below.

Parameter	QCL	ICL	TDL	Comments
Operation mode	Pulsed	Pulsed	Pulsed	
Lasers per system	1 - 6	1 - 6	1 - 6	Maximum of 6 lasers per system
Wavelength	4 - 10 μm	2 - 5 μm	760 nm	
Power	< 5 mW	< 5 mW	< 5 mW	
Pulse duration	< 1 μs	1 μs	< 5 μs	
Pulse repetition frequency	< 100 kHz	< 100 kHz	< 100 kHz	
Duty cycle	< 5%	< 5%	< 5%	

**⚠ WARNING****HAZARDOUS SUBSTANCES**

Gas handling components within the analyzer will contain particulate matter residue from the sample gases. Over the life of the analyzer, the concentration of the particulate matter will become enriched within the gas handling components.

When performing repairs or maintenance on the analyzer:

Handle used gas handling components with extreme caution.

Avoid direct skin contact with used gas handling components.

Do not smoke, drink, or eat in the work area.

Wear goggles or eye shields.

Wear a suitable face mask to protect against inhalation of particulate matter.

Do not wet fingers, eyes, or any exposed skin.

Pack used gas handling components for disposal in sealed packaging and label them *Contaminated*.

Dispose of contaminated items as hazardous material according to the applicable local, national, or international health and safety regulations and pollution regulations.

**⚠ WARNING****EXPLOSION HAZARD**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Unauthorized operation of the gas handling system when maintenance is being performed on the analyzer or its associated pipes/hoses may release highly flammable gas, causing fire or explosion.

Always lock-out tag-out the gas handling system when shutting down the analyzer.

**⚠ WARNING****HEAVY ITEM**

Handle the analyzer with caution during unpacking, installing, maintaining, and transporting to prevent crushing of hands, feet, or other body parts.

The analyzer weighs 176.4 lb. (80 kg). Always use suitable lifting/moving equipment when moving the analyzer.

Wear suitable protective gloves and protective footwear.

When preparing the analyzer for transport by air, road, or rail, safeguard the analyzer against movement or break-away during transport by securely strapping it in place.

**⚠ WARNING****HEAVY INSTRUMENT**

Failure to observe this warning and/or follow safety instructions could result in death or serious injury.

The analyzer weighs 176.4 lb. (80 kg) and must be wall or frame mounted.

Emerson recommends that a minimum of two people move and lift the analyzer using suitable lifting and transportation equipment.

Use suitable fasteners for weight of the analyzer.

Make sure the wall or stand the analyzer is mounted on is solid, stable, and of suitable material to hold the analyzer.

Do not mount the analyzer on stud or partition walls.

**⚠ WARNING****HAZARDOUS GAS**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

The product stream that the analyzer is examining may be hazardous even at low concentrations.

Therefore, take special care to ensure that the sample gas return port either returns the sample gas to the product stream or discharges the sample gas to a location that will not cause a hazard.

**⚠ WARNING****ELECTROSTATIC CHARGING HAZARD**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

The keypad is non-conducting and may generate an ignition capable level of electrostatic charges under certain extreme conditions.

Ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high pressure steam) which might cause a build-up of electrostatic charges on non-conducting surfaces. Only clean equipment with a damp cloth.

**AVERTISSEMENT**

**Danger potentiel de charges électrostatiques – voir instructions.**

**⚠ WARNING****HIGH PRESSURE GAS AND AIR**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

The calibration gas supply and compressed air supply operate at a pressure that can cause injury, e.g., damage to eyes and skin punctures from debris blown by the high pressure gas or compressed air.

Always lock off or tag off the calibration gas supply and compressed air supply when shutting down the analyzer.

**⚠ WARNING****BURNS**

Some parts of the analyzer may be heated to 150 °F (65 °C). Failure to allow sufficient cooling may cause serious burn injury to personnel.

Do not touch any part of the analyzer.

Assume all parts of the analyzer are hot unless it has been switched off and allowed to cool down.

Always wear proper protective equipment when handling the analyzer.

Switch off the analyzer and allow it to cool for at least two hours before fitting, removing, or performing any maintenance.

The analysis cell is insulated against heat loss. Allow the analyzer to cool for at least 12 hours before performing any maintenance on, or in the vicinity of, the analysis cell.

**⚠ WARNING****CRUSHING HAZARD**

Take care not to crush hands when closing the front door of analyzer field housings.  
Keep out of the closing area between the enclosure cover and base.

**⚠ WARNING****EXPLOSION**

Danger of explosion if battery is incorrectly replaced.  
Replace with only the same or equivalent type of battery.

**AVERTISSEMENT**

**Risque d'explosion si la pile n'est pas remplacée correctement. Remplacer uniquement par une pile de type identique ou équivalent.**

**⚠ 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.

**⚠ CAUTION****EQUIPMENT DAMAGE**

Failure to follow the startup procedure may result in damage to the analyzer.  
Always follow the startup procedure.

**⚠ CAUTION****EQUIPMENT DAMAGE**

Failure to follow the shutdown procedure may result in damage to the analyzer.  
Always follow the shutdown procedure.

**⚠ CAUTION****EMC**

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case you may be required to take adequate measures.



**⚠ CAUTION**

**EQUIPMENT DAMAGE**

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

**⚠ CAUTION**

**EQUIPMENT DAMAGE**

Ensure that the local power voltage where the unit is to be installed corresponds to the unit’s nominal voltage as given on the name plate label.

**⚠ CAUTION**

**EQUIPMENT DAMAGE**

Do not power up or try to operate the analyzer unless it is physically secure and all electrical and pneumatic connections to the analyzer are in place.

Before commencing the start-up process, it is important to ensure that electrical power, sample gas handling facilities, and any calibration gases that are required are available to the analyzer.

**⚠ CAUTION**

**EQUIPMENT DAMAGE**

Additional notes for units with screw-type terminals:

Cables for external data processing must be double-insulated against mains power.

If this is not possible, cables must be laid in such a way as to guarantee a clearance of at least 0.2 in. (5 mm) from power cables. This clearance must be permanently secured (e.g., with cable ties).

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# 1 Plan

## 1.1 Unpacking the analyzer

### **⚠ WARNING**

#### **HEAVY ITEM**

In accordance with IEC 60079-0: 2011 Clause 30.

Failure to properly handle the analyzer may cause injury to personnel.

Make sure the wall the analyzer is mounted on is solid, stable, and of suitable material to hold the weight of the analyzer.

Handle the analyzer with caution during unpacking, installing, maintaining, and transporting to prevent crushing of hands, feet, or other body parts.

The analyzer weighs 176.4 lb. (80 kg).

Emerson recommends that a minimum of two people move and lift the analyzer.

Wear suitable protective gloves and protective footwear.

### **⚠ WARNING**

#### **EXPLOSION HAZARD**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Failure to observe this warning and/or follow safety instructions could result in an explosion or potentially hazardous situation which, if not avoided, could result in death or serious injury.

Comply with all relevant national legislative requirements and regulations when installing and wiring this analyzer.

Consider all safety instructions within this manual and all associated instruction manuals.

### **⚠ WARNING**

#### **EXPLOSION HAZARD**

Installing the instrument requires opening the enclosure and working at the open instrument. This is permitted only when both no hazardous atmosphere is present and the instrument and connected external circuitry are de-energized.

Depending on the local regulations, this may require a competent hot work supervisor to issue a hot work permit.

**⚠ CAUTION****SHOCK AND VIBRATION**

Failure to follow this caution may result in damage to the analyzer.

The Rosemount CT5800 contains sensitive electronic equipment.  
Do not subject it to any shock or vibration.

**Procedure**

1. On receipt of goods, look for any visible damage to the analyzer and verify that all items noted to be shipped were received. Record on the goods receipt note any damage or missing items, noting both the item(s) and the quantity missing.
2. Visually inspect the exterior of the analyzer for signs of damage, corrosion, gas leaks, or signs of previously overheating.
3. Use safety approved and tested lifting equipment to remove the analyzer from the shipping container.
4. Place the analyzer on a solid, level surface and prepare to wall mount the analyzer.
5. Make sure that the analyzer is stored in its protective plastic cover until installation.

## 1.2 Installing and connecting the unit

The following notices should be followed to ensure compliance with the low voltage directive (Europe) and other applicable regulations.

- Suitably ground all connectors provided for this purpose.
- Properly reinstate all safety covers and grounding connections after maintenance work or troubleshooting.
- Provide a fuse at the installation site which will completely disconnect the analyzer in case of failure. Installing an isolating switch may also be beneficial. In either case, these components must be constructed to conform to recognized norms.

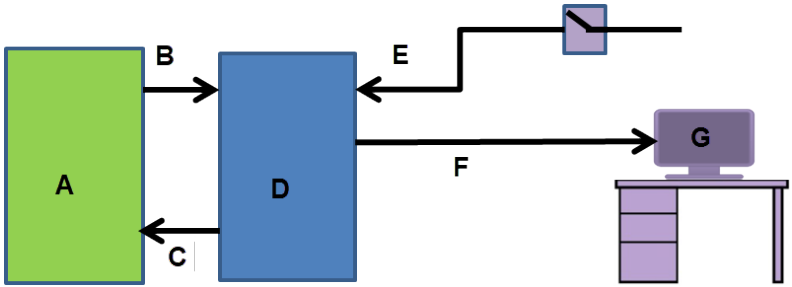
## 1.3 System overview

A complete Rosemount CT5800 system consists of a gas handling system, the analyzer, and the associated interconnecting wiring and gas piping.

The Rosemount CT5800 is supplied by Emerson. The gas handling system may be provided by either you or Emerson, depending upon the specific installation. The circuit breakers used to control the application of electrical power to the analyzer, the interconnecting wires, and gas piping are

provided by you. In [Figure 1-1](#), the items supplied by Emerson are colored blue, customer-supplied items are colored purple, and items that can be supplied by either Emerson or you are green. [Table 1-1](#) lists the main items of the system.

**Figure 1-1: Complete Rosemount CT5800 Gas Analysis System**



- A. Gas handling system
- B. Sample supply line
- C. Sample EXTER (exhaust) line
- D. Rosemount CT5800 gas analyzer
- E. Electrical power
- F. Measurement data
- G. Control center

Emerson has designed the analyzer for industrial process applications requiring ATEX Zone 1 hazardous area certification; the analyzer has an Ex d flameproof enclosure. It contains an optical system with multiple lasers and a series of optical components that provide an optical path, a heated multi-pass analysis cell, and sample and outlet ports that can be connected to a gas handling system and control and analysis electronics. The number of lasers installed depends upon customer requirements. The complete system operates Vac from a 110/240 Vac 50/60 Hz supply.

The analyzer uses mid-infrared optical absorption spectroscopy to measure gas concentrations. The light sources are lasers, which are operated to produce wavelength sweeps that cover the absorption lines of the gases. The light from each laser is routed through an optical path to the analysis cell, which provides measurement of low concentrations of the subject gases. An external sample handling system conditions the sample gas and draws it through the analysis cell. The light exits the multi-pass analysis cell and is directed to a receiver in the analyzer. The variation in the intensity of light in the vicinity of the absorption lines is measured, and the concentration is determined using a comprehensive spectral fitting routine.

**Table 1-1: Main Items of the Rosemount CT5800 System**

Item	Name or description	Supplied by	Part number	Quantity	Notes
1	Rosemount CT5800	Emerson		1	N/A
2	Rosemount CT5800 software package, version 5.x.x	Emerson	N/A	1	Software is embedded in PC board. Version described in manual
3	Gas handling system	Customer (optionally by Emerson)		1	Optional supply by Emerson
4	Heated gas sample line hose	Customer/ Emerson	Customer choice	1	Optional supply by Emerson
5	Exhaust line hose (for sample gas)	Customer	Customer choice	1	Optional supply by Emerson
6	Reference gas cylinders (instrument gas) for calibration purposes	Customer	Customer choice	Dependent upon number of gases being measured	N/A
7	Pressure regulator	Customer	Customer choice	1 per gas cylinder	N/A
8	Pneumatic T-piece	Customer	Customer choice	1	N/A
9	Excess flow line	Customer	Customer choice	1	Required for calibration
10	240 Vac power cable	Customer	Customer	1	Connect Rosemount CT5800 to mains power supply
11	Cable from analyzer to control center	Customer	Customer choice	1	N/A
12	Main circuit breaker	Customer	Customer choice	1	N/A

## 1.4 Equipment purpose and role

The analyzer is a gas sensor system that can be configured to measure the concentrations of multiple small molecules in a gas sample that is provided to the analyzer via a sample line.

The types of molecules that are measured depend on the system configuration.

**Figure 1-2: Rosemount CT5800**



The analyzer can be configured to detect and measure up to twelve different gases, depending on the combination of laser modules fitted.

## 1.5 Detailed system specifications

**Table 1-2: General Characteristics**

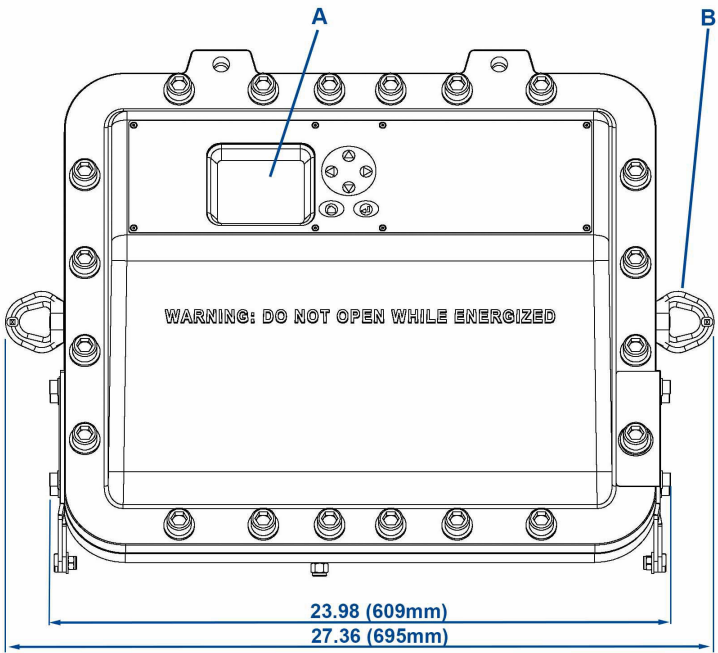
Rosemount CT5800	Value	Comment
Voltage	220/240 ± 10% Vac 110/120 ± 10% Vac	50 Hz ± 5% (factory set) 60 Hz ± 5% (factory set)
Peak power consumption	1100 W	Max consumption per gas analyzer
Continuous steady-state power consumption	800 W	N/A

**Table 1-2: General Characteristics (continued)**

<b>Rosemount CT5800</b>	<b>Value</b>	<b>Comment</b>
Electrical compartment enclosure	N/A	Aluminum
Optical compartment enclosure	N/A	Aluminum
Measurement technique	N/A	Mid IR absorption spectroscopy
Mid IR source	N/A	Quantum Cascade™ Laser
Near IR source	N/A	Interband Cascade Laser Tunable diode laser
Laser classification	Class 1	BS EN 60825-1: 2007 safety of laser products. Equipment classification and requirements (identical to IEC 60825-1 2007)
Inlet gas port connector	¼ in. 6 mm	Swagelok® type, factory-configured, specify on order
Outlet (exhaust) gas port connector	¼ in. 6 mm	Swagelok type, factory-configured, specify on order
Measurement result signals	4 to 20 mA	4 or 8 channel outputs, specify on order
Warm-up time	90 minutes	N/A

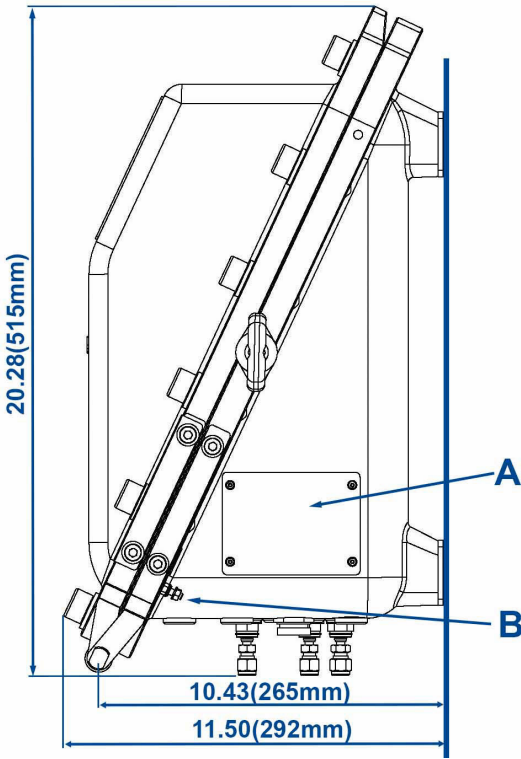


**Figure 1-3: Rosemount CT5800 Dimensions: Front View**



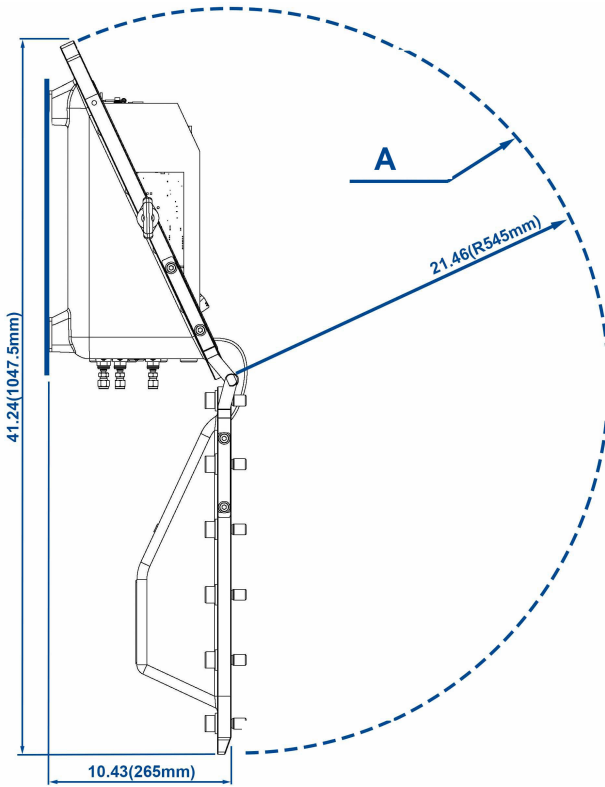
- A. User interface
- B. 2 off lifting eyelets

**Figure 1-4: Rosemount CT5800 Dimensions: Side View**



- A. Rating plate
- B. External earth point

**Figure 1-5: Rosemount CT5800 Radius for Opening**



A. Opening arc

**Table 1-3: Environmental Characteristics**

Environmental characteristic	Value	Comment
Operating temperature range	-4 to 131 °F (-20 to 55 °C)	Ambient temperature
Sample gas temperature range (condition for safe use Europe)	39 to 140 °F (4 to 60 °C)	Factory set, specify on order
Sample gas temperature range (condition for safe use North America)	122 to 176 °F (50 to 80 °C)	Factory set, specify on order
Sample gas moisture content	8%	Maximum
Sample gas particulate density	5 mg/m <sup>3</sup>	Maximum

**Table 1-3: Environmental Characteristics (continued)**

Environmental characteristic	Value	Comment
Sample gas particulate size	10 $\mu\text{m}$	Maximum
IP code	66	IP to IEC 60529
Sensor humidity range	10 to 95%	Relative humidity (non-condensing) at 113 °F (45 °C)

### 1.5.1 Optical description

The laser modules are located in the core of the analyzer. Each laser module produces a separate light beam, and these beams are combined linearly as the modules are aligned in the system. The combined beams are closely coupled, parallel, and coaxial about a virtual line. The laser light beams pass through an optical steering assembly, which directs the laser beam through the sample cell.

The sample cell contains a set of mirrors to create a path through the sample gas that is between 0.7 ft. (0.2 m) and 49.2 ft. (15 m) through multiple reflections along the length of the cell. The laser beams exit the cell at the opposite end from where they entered and are directed using a second optical block to a receiver.

By measuring and analyzing the light detected by the receiver unit, it is possible to accurately determine the concentrations of the target molecules within the gas sample cell.

## 2 Install

This section describes the correct installation procedure for the analyzer.

### NOTICE

This section is in accordance with IEC 60079-0: 2011 Clause 30. This section must not be changed, amended, or removed.

---

### 2.1 Site requirements

Select an appropriate site for installing the analyzer.

### NOTICE

This section is in accordance with IEC 60079-0: 2011 Clause 30. This section must not be changed, amended, or removed.

---

### ⚠ WARNING

#### INSTALLATION REQUIREMENTS

The place of installation must be clean, dry, and protected against strong vibrations and frost.

Observe the advisable operating temperatures given in [Detailed system specifications](#).

Do not subject analyzer to direct sunlight or heat sources.

For outdoor installation, Emerson recommends installing the analyzer in a cabinet. At a minimum, protect it against rainfall.

---

### ⚠ WARNING

#### FIRE AND EXPLOSION

In accordance with IEC 60079-0: 2011 Clause 30.

Failure to ensure the area is safe or leaving the device powered on can cause an explosion or fire and seriously injure personnel.

Do not open the Ex d enclosure unless the area is known to be free of flammable materials or unless all devices are switched off.

---

**⚠ DANGER****ELECTRIC SHOCK**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

Failure to observe this precaution may cause death, injury, and/or damage to persons and/or property.

The analyzer operates using mains voltage that is dangerous to life.

Make sure that the circuit breakers are set to OFF and tagged off before opening the front cover.

---

In accordance with IEC 60079-0:2011 Clause 30, install the analyzer in a suitable position with shading to protect it from the elements. The displays and control panel on the front of the housing must not be exposed to direct UV light sources or direct sunlight.

**⚠ WARNING****POTENTIAL ELECTROSTATIC CHARGING HAZARD**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

The keypad is non-conducting and may generate an ignition capable of electrostatic charges under certain extreme conditions.

Ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high pressure steam), which might cause a build-up of electrostatic charges on non-conducting surfaces.

Only clean the analyzer with a damp cloth.

---

The analyzer has a T4 temperature classification which specifies the maximum surface temperature of the instrument, under a fault condition, is 275 °F (135 °C). You must ensure that no combustible gas concentrations are present, whether on a continual or occasional basis, which have an ignition temperature below the T classification of the unit.

**⚠ WARNING****FIRE AND EXPLOSION**

Failure to observe this precaution may cause death, personal injury, and/or damage to equipment.

Do not open the Ex d enclosure of the analyzer unless the atmosphere of the area is known to be below the ignitable concentration of combustible gases or materials.

---

In accordance with IEC 60079-0: 2011 Clause 30, install the analyzer in a suitable position with shading to protect it from the elements. Do not expose the displays and control panel on the front of the housing to direct UV light sources or direct sunlight.

Provide a fuse at the installation site which will completely disconnect the analyzer in case of failure. Installing an isolating switch may also be beneficial. In either case, these components must be constructed to conform to recognized norms.

In accordance with IEC 60664-1, install the analyzer in an area of not more than Pollution Degree 2.

Provide sufficient space around the analyzer to allow maintenance and servicing of this unit.

## 2.2 Mounting

This procedure requires a minimum of two people to safely move and mount the analyzer.

[Detailed system specifications](#) shows outline dimensional drawings of the analyzer.

### NOTICE

In accordance with IEC 60079-0: 2011 Clause 30, [Figure 2-4](#) shows the positions of the glands for the three electrical conduits. Do not redesign or reposition these glands without consulting Emerson.

### ⚠ WARNING

#### HEAVY ITEM

In accordance with IEC 60079-0: 2011 Clause 30.

Failure to properly handle the analyzer may cause injury to personnel.

Make sure the wall the analyzer is mounted on is solid, stable, and of a suitable material to hold the weight of the analyzer.

Handle the analyzer with caution during unpacking, installing, maintaining, and transporting to prevent crushing of hands, feet, or other body parts.

The analyzer weighs 176.4 lb. (80 kg).

Emerson recommends that a minimum of two people move and lift the analyzer.

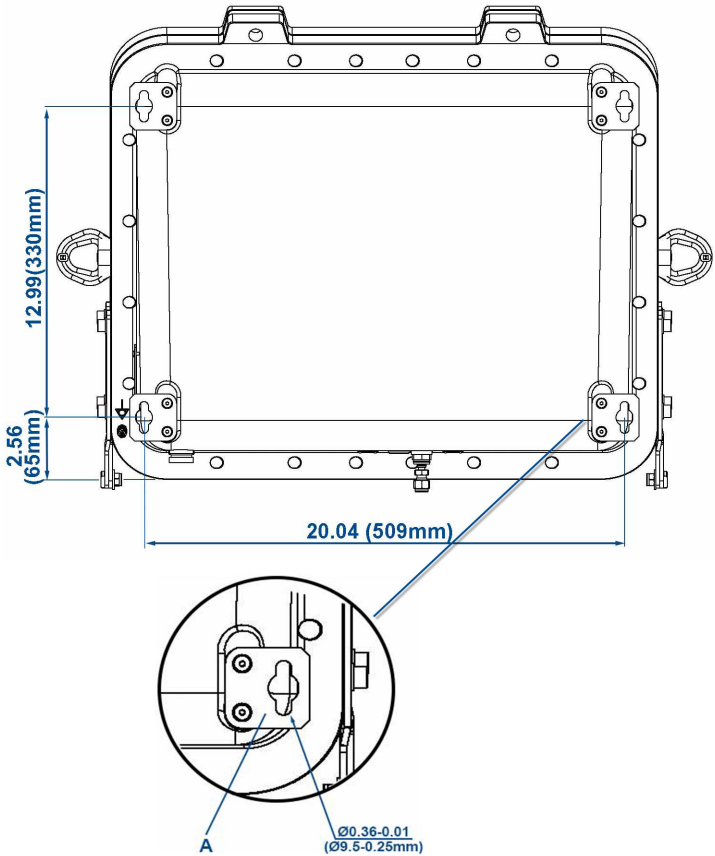
Wear suitable protective gloves and protective footwear.

Make sure that the wall fixing points are capable of supporting a load of 176.4 lb. (80 kg) each; this includes a x2 safety factor. All mounting points are 0.6 in. (15 mm) diameter holes.

### Procedure

1. Use safety approved equipment to lift the analyzer from the stable platform. One person guides the unit into position as the other person carefully operates the lifting equipment.
2. Mount the analyzer using the factory fitted and pre-drilled wall mounting brackets (Figure 2-1) using four M8 x 1.25 (5/16 - 18 UNC) A2/A4 grade 70 bolts.

**Figure 2-1: Mounting Details**



A. Wall mounting bracket

Mounting brackets are 1/16-in. (4 mm) thick stainless steel. Position the bolts in such a way to allow maximum use of all thread length. Make sure that the fasteners used are suitable for the load and surface the analyzer is mounted on.



Emerson recommends installing the analyzer in an upright (vertical) position; other orientations may affect the measuring results.

3. If you want to increase security on the installation of the analyzer by thread-locking the fittings, only do this with compounds compatible with the hazardous area zone classification of the installation location.
4. Make sure the bolts are secure. Apply maximum torque permissible for the material combination of the supporting structure.
5. Remove the lifting eyes and retain them for future use. Protect the threads with plastic grommets and a suitable grease.

### Postrequisites

Do not place any additional load on the analyzer.

## 2.3 Connecting the system

### 2.3.1 Opening the enclosure

Use these procedures to make the electrical, power, and gas line connections.

#### Procedure

1. Make sure that the hinges are securely connected to the enclosure.

#### **⚠ WARNING**

#### **HEAVY FRONT HOUSING**

Failure to properly support the lid may cause injury to personnel.

The analyzer's front housing is heavy, 68.1 lb. (30 kg).

After removing the captive bolts, provide support when opening the lid.

#### **⚠ CAUTION**

#### **EQUIPMENT HAZARD**

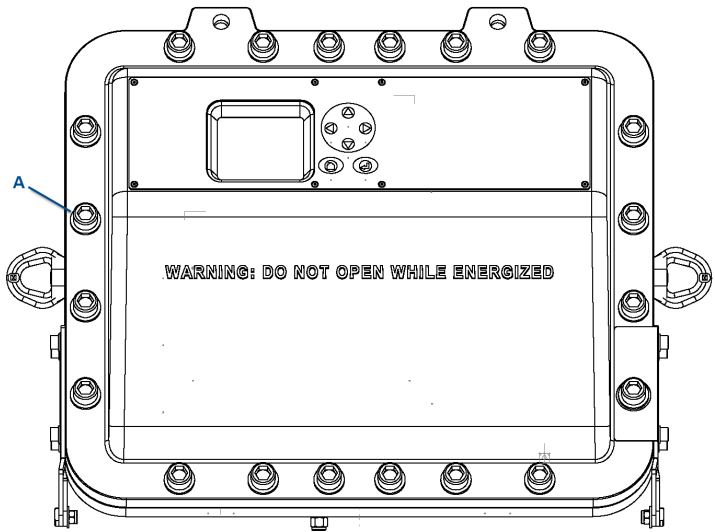
Inspect the hinges for damage before removing the M16 x 45 captive bolts to open the housing.

Make sure no obstructions are in the opening radius when the front housing is opened.

Make sure no obstructions are in the opening radius when the front housing is opened.

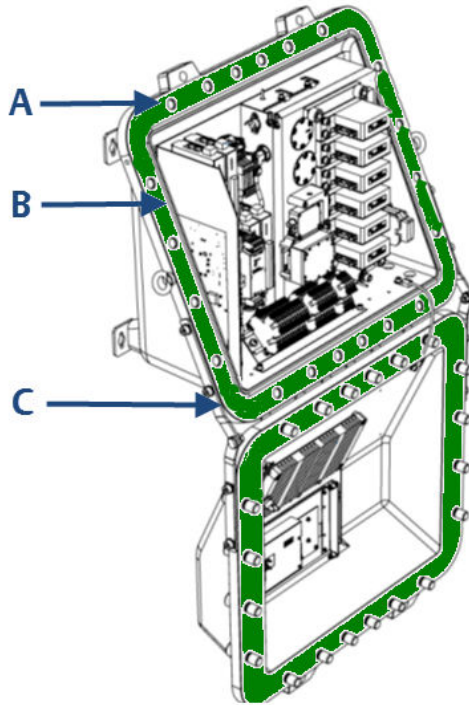
2. Unscrew the 20 off M16 x 1.5 inch captive bolts holding the front and rear housings of the enclosure together.

**Figure 2-2: Rosemount CT5800 Housing**



A. 20 off M16 captive bolts

3. Carefully lower the front enclosure to the fully open position.

**Figure 2-3: Enclosure Open**

- A. Flamepath (green highlight)
- B. Seal
- C. Flanges

4. Apply masking tape to the flanges, seal, and flamepath to protect them from scratches, chipping, and other forms of damage or deformation.

### **⚠ CAUTION**

#### **PROTECT FLAMEPATH**

Any damage to the flamepath will invalidate certification.  
Protect the flamepath with masking tape.

5. Continue the installation with the power and signal cables.

See [AC power safety information](#).

### 2.3.2 AC power safety information

#### NOTICE

This section is in accordance with IEC 60079-0:2011 Clause 30.

This section must not be changed, amended, or removed.

#### **⚠ WARNING**

##### **ELECTRIC SHOCK**

Failure to follow instructions may cause personal injury or death.

Only qualified personnel, taking into account all applicable standards and legislative requirements, should install the analyzer and connect the power and signal cables.

Instruments providing screw terminals for electrical connections may require working near live parts.

The analyzer does not have power switches and is operable when connected to power.

A customer-supplied power switch or circuit breaker (complying with IEC 60947-1/ -3) must be in the building installation. The switch has to be installed near the analyzer, must be easily accessible, and has to be assigned as a disconnect for the analyzer.

Disconnect instruments with screw terminals from power when working at power terminals (pull power plug or operate power switch / circuit breaker in building installation).

The analyzer provides a protective earth terminal. To prevent electrical shock hazards, connect the instruments to a protective earth. The instruments must be connected to power with a three wire power cable with earth conductor. Any interruption of the earth connector inside or outside the instrument or disconnecting the earth terminal may cause potential electrical shock hazard.

## ⚠ WARNING

### EXPLOSION HAZARD

In accordance with IEC 60079-0: 2011 Clause 30.

Failure to observe this warning could cause an explosion or potentially hazardous situation which, if not avoided, may cause death or personal injury.

Only enable the purge controller bypass function during setup or maintenance and only when the area is known to be non-hazardous.

The customer supplied circuit breaker must be in accordance with ATEX / IECEx / North American protection concepts. The main power isolator controls the application of electrical power to the analyzer.

Electrical protection for the instrumentation circuitry of the analyzer is provided by fuses F1 and F2 located inside the analyzer.

**Table 2-1: Electrical power requirements**

Electrical supply	Power consumption	Voltage	Fuse
Instrumentation supply voltage	500 W (peak) 300 W (usual)	110 to 240 Vac, 50/60 Hz $\pm$ 10%	3.15 A internal fuses F1 and F2. See <a href="#">Connecting the signal cables</a> .
Purge supply voltage	10 W	110 to 240 Vac, 50/60 Hz $\pm$ 10%	1 A (located in secondary circuit breaker)

For the electrical power wiring, use 16 AWG stranded, 3 conductor copper or tin plated copper power wire, rated for at least 250 Vac, of the required length.

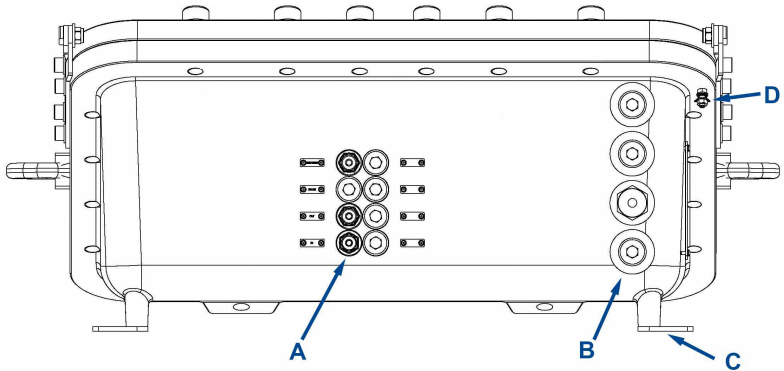
Cables must be rated for operation in ambient temperatures greater than 176 °F (80 °C).

Cables must be terminated in accordance with local electrical codes.

A switching system is not supplied with this equipment. You must supply a suitably rated switch or circuit breaker to be included with this installation. Check the installation of the switch for conformity in accordance with national/local regulations and standards by inspection.

The switch or circuit breaker must be suitably located, easily reached, and identified as the disconnection device for the analyzer.

**Figure 2-4: Rosemount CT5800 Bottom View: Gas Connectors and Cable Glands**



- A. Gas connections (flame arrestor) (M18 x 1.5)
- B. Conduit / cable entry apertures (M20 x 1.5)
- C. Wall fixing line
- D. Earth (ground) bond

The customer supplied circuit breaker must be in accordance with suitably certified hazardous area Ex protection concepts. The main power isolator controls the application of electrical power to the analyzer.

## **⚠ WARNING**

### **EXPLOSION**

Do not open the instrument when it is energized.

Ensure that external circuitry is disconnected or de-energized before opening the instrument.

All cables (power and signal) must end (be connected) in either a safe (nonhazardous) area or in a protecting enclosure (e.g., explosion-proof junction box).

**⚠ WARNING****INSTALLATION USING CONDUITS**

The analyzer has metric threads for installing cable entries. Installing conduits requires metric to national pipe thread (NPT) adapters.

To be compliant with North American ordinary location (Ordloc) and hazardous area (Hazloc) certification, use stainless steel with captive O-ring seals.

Select a type of conduit and seals in accordance with local codes and suitable for the site of installation.

For North American sites, do not fit seals more than 2 in. (50 mm) from the Ex d entry point.

Unused entries are provided with plugs, secured in place with thread locking compound.

**AVERTISSEMENT**

**Un scellement doit être installé à moins de 50 mm du boîtier.**

**⚠ WARNING****INSTALLATION USING CABLE GLANDS**

All cable glands must be suitable certified for use in area of application (Zone/Class/Division).

When installing the analyzer in a hydrogen environment and/or applying hydrogen to the analyzer, do not use the standard compression type cable glands. Use suitable compound barrier cable glands to stay compliant to EN 60079-14.

When selecting cable glands, make sure the correct diameter is selected to ensure correct cable fit.

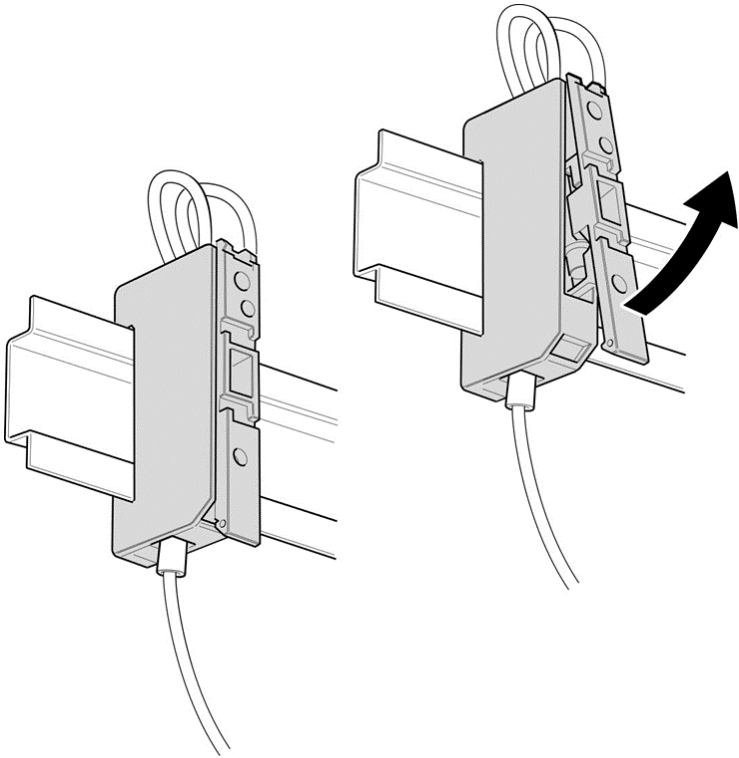
**⚠ CAUTION****SELECT THE CORRECT TYPE OF CABLE ENTRY.**

Before starting to install the analyzer, verify what type of cable entry is required at your site of installation.

Rosemount CT5800 gas analyzers may be equipped with cable glands (e.g., regulated for installations covered by ATEX/IEC/Ex) or may be installed with conduits (e.g., in North America).

Electrical protection for the instrumentation circuitry of the analyzer is provided by fuses F1 and F2 located inside the analyzer.

**Figure 2-5: Fuses**



Connect power to the system through the power gland on the base of the analyzer (Figure 2-4).

### 2.3.3 Earthing/grounding the analyzer

The system must be suitably earthed / grounded using the M5 stud bonded to the rear of the system and the connector inside with cable between 1.5 and 4 mm square.

## NOTICE

This section is in accordance with IEC 60079: 2011 Clause 30. This article must not be changed, amended, or removed.



**⚠ WARNING**

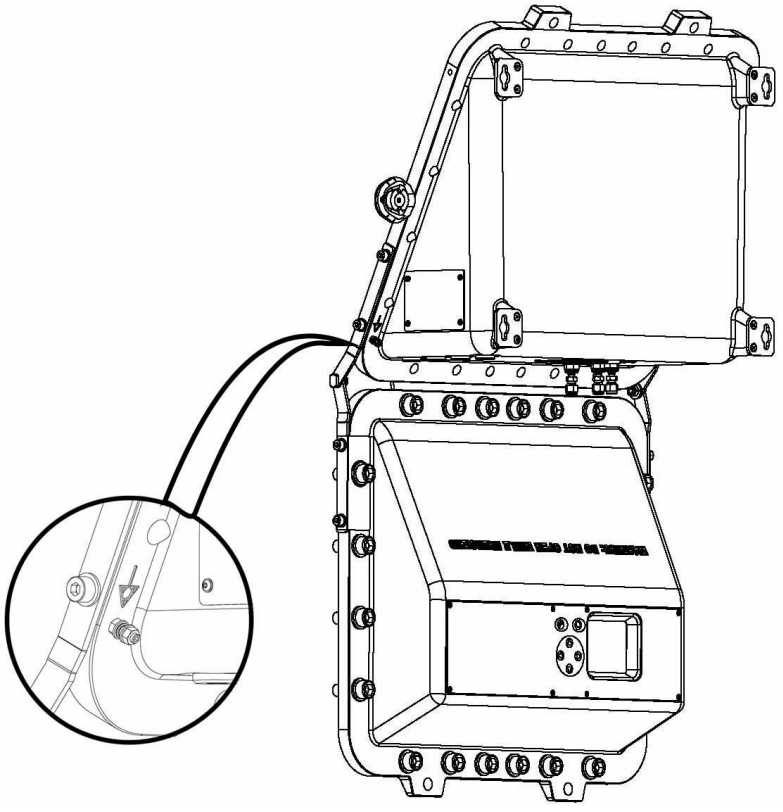
**ELECTRIC SHOCK**

In accordance with IEC 60079-0: 2011 Clause 30.

Failure to observe this warning may cause death or personal injury.

The analyzer must be earthed/grounded in accordance with national/local regulations.

**Figure 2-6: Earth Bond**



### 2.3.4 Connecting the signal cables

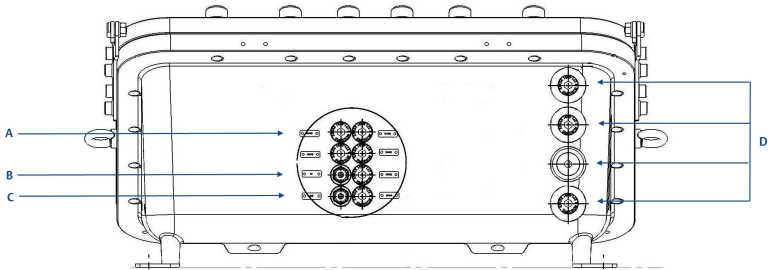
Connect the signal cables through conduit outlets 2 and 3 as shown in the figures below.

#### NOTICE

This section is in accordance with IEC 60079-0: 2011 Clause 30. This section must not be changed, amended, or removed.

The signal cables are connected to the system through conduit outlets 2 and 3 as shown in [Figure 2-7](#) and [Figure 2-9](#). All signal cables are to be minimum 20 AWG tri-rated switchgear cables. Customer supplied conduit and cables must be terminated in the conduit outlets in accordance with local electrical codes.

**Figure 2-7: Cable Glands, Conduits, and Gas Line Connections**



- A. Breather
- B. Gas connection out (flame arrester) (M18 x 1.5)
- C. Gas connection in (flame arrester) (M18 x 1.5)
- D. Conduit / cable entry apertures (M20 x 1.5)

Figure 2-8: Signal Connections

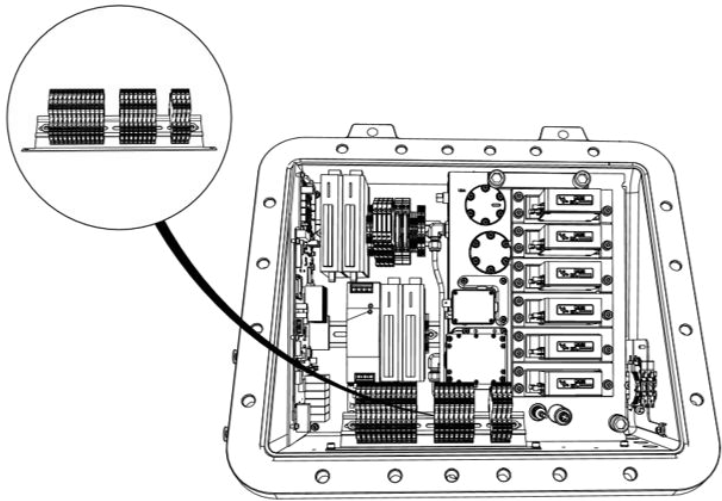


Figure 2-9: Signal Cable Connections

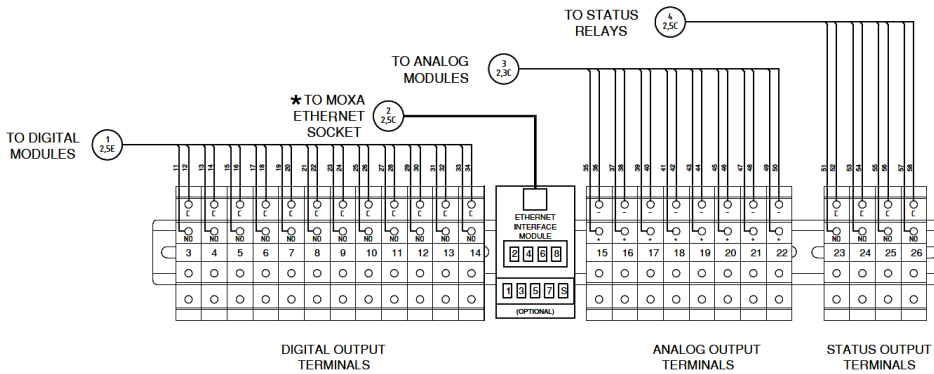


Table 2-2: Power, Digital, and Analog Connections

Terminal	Function
1	System supply (L)
2	System supply (N)
3	Digital output 1
4	Digital output 2

**Table 2-2: Power, Digital, and Analog Connections (continued)**

Terminal	Function
5	Digital output 3
6	Digital output 4
7	Digital output 5
8	Digital output 6
9	Digital output 7
10	Digital output 8
11	Digital output 9
12	Digital output 10
13	Digital output 11
14	Digital output 12
15	Analog output 1
16	Analog output 2
17	Analog output 3
18	Analog output 4
19	Analog output 5
20	Analog output 6
21	Analog output 7
22	Analog output 8
23	Status output 1 (check function)
24	Status output 2 (maintenance required)
25	Status output 3 (out of specification)
26	Status output 4 (failed)

**Table 2-3: Ethernet Interface Module wiring to MOXA Ethernet Socket**

Terminal	Designation	Color coding
1	Tx+	Orange / White
2	Tx	Orange
3	Rx+	Green / White
4	Not used	Blue
5	Not used	Blue / White

**Table 2-3: Ethernet Interface Module wiring to MOXA Ethernet Socket**  
(continued)

Terminal	Designation	Color coding
6	Rx-	Green
7	Not used	Brown / White
8	Not used	Brown

### 2.3.5 Connecting the sample supply and return lines

Sample gas supply and sample return connections are from ¼-in. (6 mm) Swagelok® type fittings.

The analyzer has one gas input and one gas output, which are located on the base of the analyzer (Figure 2-7).

The gas sample that is to be measured for impurities enters the instrument through the sample gas input port.

Once the sample gas has been examined for impurities, it is expelled from the instrument through the sample gas return port.

#### NOTICE

Remove the breather blanking cap and never connect anything to this port.

To avoid the risk of gas leaks, make sure that these connections are made correctly and tightly. Both the sample gas supply pipe and the sample return pipe should be thermal insulated.

#### NOTICE

The Swagelok recommendation for pipe fittings of this size is to tighten the nut finger tight and then tighten an additional one and a quarter (1 and ¼) turns with a spanner.

The maximum gas supply pressure is 1 BarG.

The sample supply line must be heated all the way to the sample gas input port on the analyzer to prevent condensation forming at any point in the sample supply line.

**⚠ WARNING****HAZARDOUS GAS**

This article is in accordance with IEC 60079-0: 2011 Clause 30.

The product stream that the analyzer is examining may be hazardous even at low concentrations.

Take special care to ensure that the sample gas return port either returns the sample gas to the product stream or discharges the sample gas to a location that will not cause a hazard.

**⚠ WARNING****MAINS SUPPLY CABLE**

Failure to follow this warning may result in personal injury.

Make sure that the mains supply cable used is of a suitable rating for the analyzer's power requirements.

The Ethernet connector provides an Ethernet output from the analyzer that may be used for downloading data for failure diagnostic purposes.

The analyzer outputs the results of the gas analysis through the 4-20 mA analog outputs and sends them to your process control center.

The status outputs provide fault indications to your process control center. Each digital output is connected to a normally closed relay, located inside the analyzer, which will open in response to the detection of a specific fault. The possible causes of a fault indication are:

- The sample gas concentration is outside of specification (i.e., the sample gas concentration has exceeded the measurement range of the instrument).
- The analyzer is out of specification or has developed a fault.

**⚠ WARNING****HIGH VOLTAGE**

Failure to obey the wiring regulations may result in serious injury to personnel.

Voltages up to 250 Vac, 50 Hz may be present on the digital output terminals.

Install external circuits in accordance with national wiring regulations.

**⚠ WARNING****ELECTRIC SHOCK**

Attaching cables and wiring harnesses longer than 9.8 ft. (3 m) may cause injury to personnel.

The analyzer passed electromagnetic compatibility (EMC) tests based on all electrical cables and harnesses attached to it being 9.8 ft. (3 m) long.

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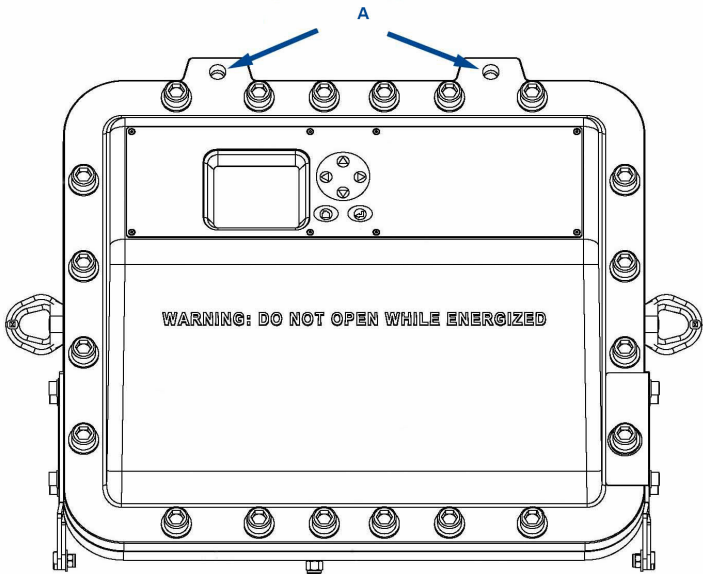
### 2.3.6 Closing the housing

After all internal connections have been made and proved/tested, close the enclosure and secure the 20 off M16 x 45 captive screws and form A washers in accordance with the torque sequence.

See [Figure 2-11](#).

**Procedure**

1. Remove all protective covering from the flamepath and enclosure sealing gasket.
2. Inspect the seal.  
If any damage is detected, stop the process immediately and report to maintenance.
3. Clean the seal to remove any adhesive from the protective cover.
4. Inspect the flanges/flamepath for damage (i.e., scratches, chipping, and/or other form of damage/deformation).  
If any damage is detected, stop the process immediately and report to maintenance.
5. Carefully lift the housing up and align with the rear housing.
6. Make sure that all holes are aligned. If necessary, use the two holes ([Figure 2-10](#)) to assist alignment.

**Figure 2-10: Alignment holes***A. Alignment holes*

7. Insert the captive M16 bolt and engage the threads on the rear housing.
8. Refer to the torque sequence ([Figure 2-11](#)) and tighten all bolts.

### **⚠ WARNING**

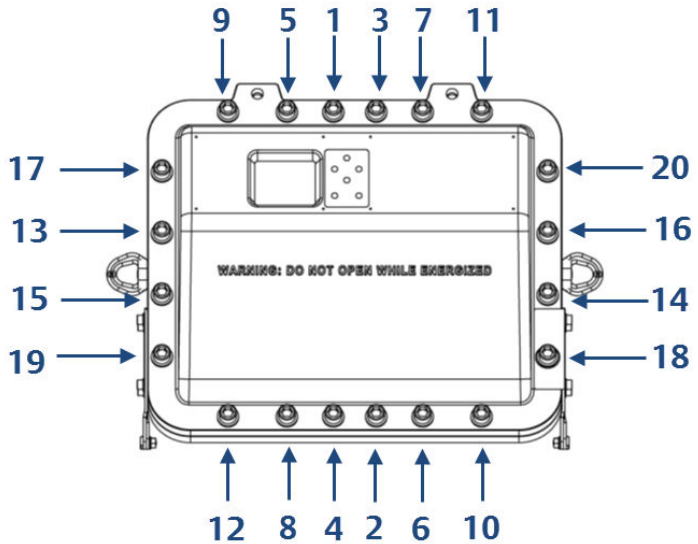
#### **HAZARDOUS AREA PROTECTION**

Failure to follow the warning will invalidate hazardous area Ex d protection.

Always use captive M16 x 45 screws and form A washers to secure the enclosure shut.



**Figure 2-11: Torque sequence**



Tighten all bolts in sequence to a torque value of 18.44 ft.-lb. (25 Nm).

## 2.4 Test connections

Before sealing the cable glands, it is vital to test the new connections in order that any faults can be remedied before the cables are permanently sealed.

### **⚠ WARNING**

#### **EXPLOSION HAZARD**

In accordance with IEC 60079-0: 2011 Clause 30.

Failure to observe this warning could cause an explosion or potentially hazardous situation which, if not avoided, may cause death or personal injury.

The cable glands used in this analyzer are only suitable for use in areas with a low risk of mechanical damage. Protect the cable glands suitably.

Temporarily seal the cable glands with a suitable sealant to allow testing.

The tests described below are a basic check to prove function, rather than a test of sensor capability.

To start the analyzer, follow the steps in [Start-up procedure](#).

## **⚠ WARNING**

### **INSTALLER RESPONSIBILITY**

In accordance with IEC 60079-0: 2011 Clause 30

Failure to observe this warning could cause a potentially hazardous situation which, if not avoided, may cause death or personal injury.

It is the installer's responsibility to connect the analyzer to a suitable alarm or shutdown facility.

## 2.4.1 Testing power input cables and circuit breakers

The power input cables and circuit breakers can be tested as follows.

### **NOTICE**

This section is in accordance with IEC 60079-0: 2011 Clause 30. This section must not be changed, amended, or removed.

#### **Procedure**

1. Set the main circuit breaker to *ON*.
2. Check that the display controller lights up.  
The instrument begins to power up.

## 2.4.2 Testing temperature sensor and cell heater

The sample cell is controlled to operate at a pre-set temperature. This involves a heater and a temperature sensor.

### **NOTICE**

This section is in accordance with IEC 60079-0: 2011 Clause 30. This section must not be changed, amended, or removed.

#### **Procedure**

1. Check that a temperature reading is displayed against *Temperature* on the display controller as described in [Operating the analyzer](#).
2. Leave the analyzer operating and confirm that the temperature rises until the analysis cell reaches the pre-set operating temperature around 122 °F (50 °C).  
This takes approximately 90 minutes.

### 2.4.3 Pressure sensor

The pressure sensor monitors the pressure in the analysis cell.

#### NOTICE

This section is in accordance with IEC 60079-0: 2011 Clause 30. This section must not be changed, amended, or removed.

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#### Procedure

1. Check that a pressure reading is displayed under *Pressure* on the display controller.

The reading is approximately 760 Torr at atmospheric pressure.

#### NOTICE

A Torr is a non SI unit of pressure, defined as  $1/760$  of standard atmospheric pressure, and is equal to the fluid pressure of 1 mm of mercury.

---

2. If desired, cap off the gas inlet and use an external pump to evacuate the cell.

Make sure the pressure drops as expected.

## 2.4.4 Testing analog output cables

### Prerequisites

In order to generate a 4-20 mA output, let the analyzer warm up for 90 minutes and make sure the analysis cell is at the correct pressure.

The 4-20 mA outputs operate when the analysis cell is between 104 and 140 °F (40 and 60 °C) and the pressure is between 180 and 220 Torr. It is not essential to flow sample gas through the system; nitrogen or atmospheric air is adequate for this test.

### Procedure

With the analyzer at operating temperature and pressure, ensure that a current between 4 mA and 20 mA is generated on each 4-20 mA output, as listed in [Connecting the signal cables](#).

Use a multimeter to measure the current.

## 2.4.5 Testing the measurement valid flag

The measurement flag is normally open contact. It is simplest to test this with a multimeter.

With the analyzer closed and compressed air applied as described in the startup procedure ([Startup procedure](#)) when the system is operating correctly, an open contact is created between the two contact wires (white).

### Procedure

To test the *Error* state, shut off the sample gas and allow the pump to reduce the cell pressure below 180 Torr.

At this point, the contact should close and there should be no resistance between the two white wires.

## **⚠ WARNING**

### **FIRE AND EXPLOSION**

In accordance with IEC 60079-0: 2011 Clause 30.

Failure to ensure the area is safe or leaving the device powered on can cause an explosion or fire and serious injury to personnel.

Do not open the Ex d enclosure unless the area is known to be free of flammable materials or unless all devices are switched off.

## 2.5 Commissioning

Once the sensor is fully installed as described above, commission it according to the commissioning plan agreed on between you and Emerson.

## 3 Start-up procedure

### 3.1 Introduction

#### **⚠ CAUTION**

##### **EQUIPMENT DAMAGE**

Damage to the analyzer may result from a failure to follow this procedure.

Always follow the start-up procedure.

---

The analyzer normally operates continuously. It should only be necessary to start up the analyzer under the following circumstances:

- When the analyzer is first switched on following installation.
- Following repair or maintenance.
- When the analyzer has been switched off as part of a plant shutdown or maintenance.

### 3.2 Preparation for use

The analyzer must be installed and fully commissioned prior to startup.

#### **⚠ WARNING**

##### **BURNS**

Failure to allow sufficient cooling may cause serious burn injury to personnel.

Do not touch any part of the analyzer.

Assume all parts of the analyzer are hot unless it has been switched off and allowed to cool down.

Some parts of the analyzer may be heated to 150 °F (65 °C).

Always wear proper protective equipment when handling the analyzer. Switch off the analyzer and allow it to cool for at least two hours before fitting, removing, or performing any maintenance.

The analysis cell is insulated against heat loss. Allow the analyzer to cool for at least twelve hours before performing any maintenance on, or in the vicinity of, the analysis cell.

---

## 3.3 Startup procedure

### NOTICE

The gases shown in the screenshots and the measurements thereof may be different from those shown in your particular analyzer. They indicate the functionality of the software, which is the same regardless of the gases being measured.

### NOTICE

To stop the startup procedure at any time, set the main circuit breaker to *OFF*.

To start up the analyzer, perform the following steps:

#### Procedure

1. Visually inspect the exterior of the analyzer for signs of damage, corrosion, gas leaks, or overheating. Report anything found to the hazardous area Ex maintenance organization.
2. Make sure that the analyzer has been correctly installed.  
See [Install](#).
3. Make sure that the enclosure is closed and all bolts are correctly torqued.  
If the enclosure cannot be closed and locked, report it to the maintenance organization and do not proceed further until the door has been repaired.
4. Make sure that the gas handling system is turned OFF.
5. Make sure that the external circuit breaker is set to OFF.
6. Visually examine the gas ports to make sure that the sample supply line and the sample return line are correctly attached to the analyzer.
7. Visually check that the electrical connections have been made to the instrument.
8. Set the main circuit breaker to ON, which applies main power to the instrument.  
The analyzer begins its automatic startup. The control PC that forms part of the instrument is configured to automatically load the necessary gas sensor software and configuration files. The startup sequence commences automatically under software control.

At the end of the startup procedure, the gas measurements initially appear as 0.00 ppm until the first readings are taken. After a few seconds, the initial gas concentrations will be displayed.

## 4 Operating the analyzer

### 4.1 Introduction

This chapter describes the controls, displays, and indicators on the Rosemount CT5800 and how to use the display controller located on the front panel of the instrument.

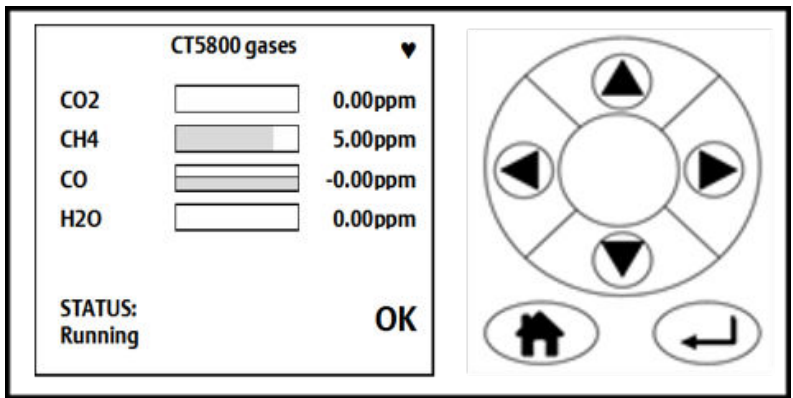
#### NOTICE

The gases shown in the screenshots and the measurements may be different from those shown in your particular analyzer. They indicate the functionality of the software, which is the same regardless of the gases or gas concentrations being measured.

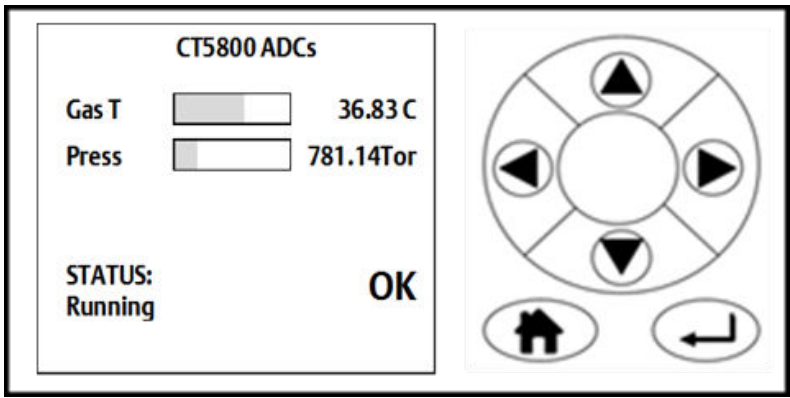
### 4.2 Normal operation

The analyzer is designed for long term continuous operation, and therefore its normal state is to be switched on and performing gas measurements. The analyzer is usually only switched off for maintenance.

Figure 4-1: Gas Sensor Main Screen



**Figure 4-2: Pressure and Temperature Screen**

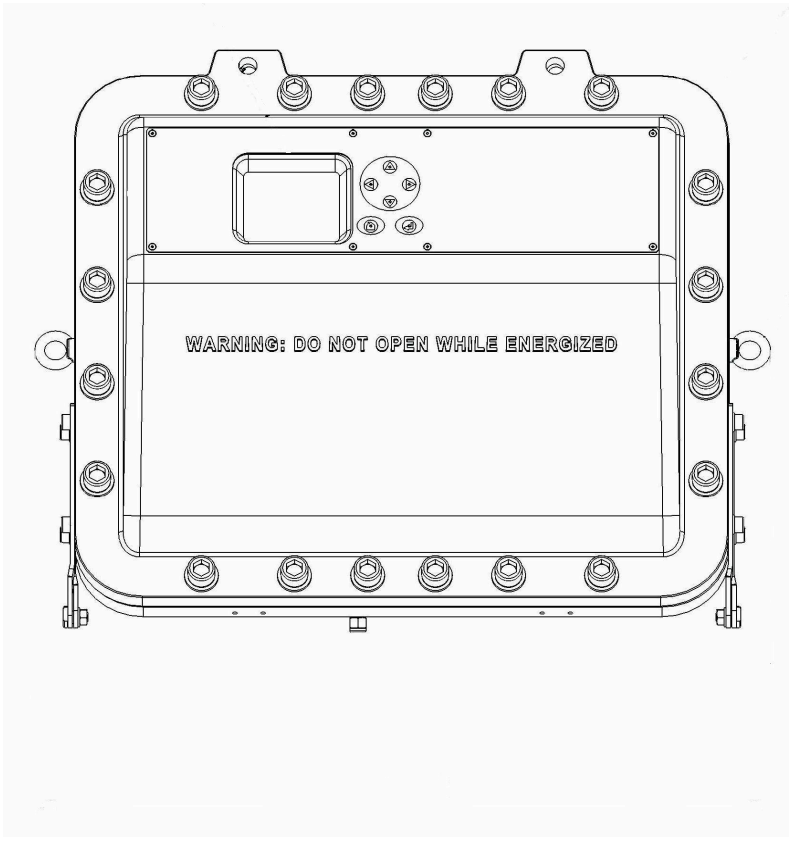


### 4.3 Front panel controls and indicators

The analyzer is configured from the display controller located on the front panel.

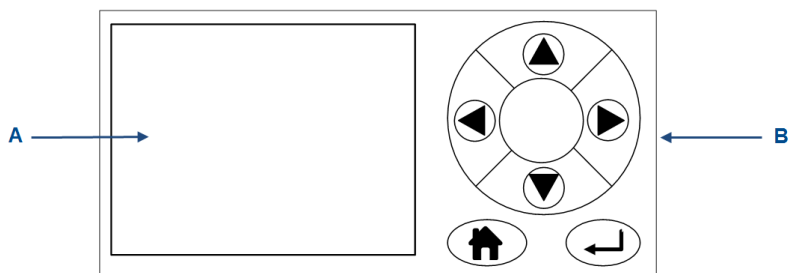


**Figure 4-3: Front Panel Display Controller**



## 4.4 Display controller

**Figure 4-4: Front Panel Display Controller**



A. LCD display

B. Navigation buttons

You can control the analyzer through six navigation buttons (Figure 4-4, B) on the display controller.

The LCD display (A) can be used to display:

- Gas concentration measurements obtained
- Operating temperature and pressure
- Help screens
- Step-by-step calibration
- Diagnostics

The navigation buttons (B) are configured to perform different functions according to which software screen is shown on the LCD display.

## 4.5 Gas Sensor Main screen

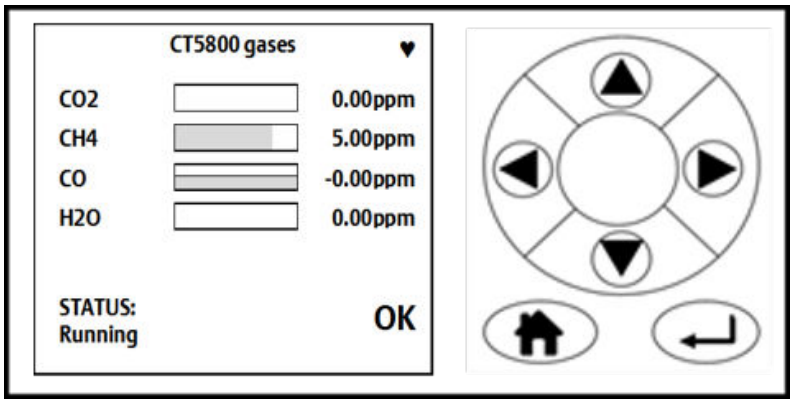
When the analyzer is switched on, at the end of the start-up procedure, the **Gas Sensor Main** screen (Figure 4-5) appears.

The **Gas Sensor Main** screen is the screen that is normally displayed.

### NOTICE


The gas concentrations shown in the following screenshots may be different from those shown in your particular analyzer. The screenshots indicate the functionality of the software, which is the same regardless of the gases or gas concentrations being measured.

**Figure 4-5: Gas Sensor Main Screen**





At the end of the start-up procedure, the gas measurements initially appear as 0.00 ppm until the first readings are taken. After a few seconds, the initial gas concentrations are displayed.



The *Gas Sensor Main* screen also shows the status of the analyzer. In the example shown in the analyzer is *Running* and *OK* (i.e., no faults have been identified).

If a fault is identified, ? is displayed; if maintenance is required,  is displayed.

To access other screens through the *Main menu*, press . (Refer to ).

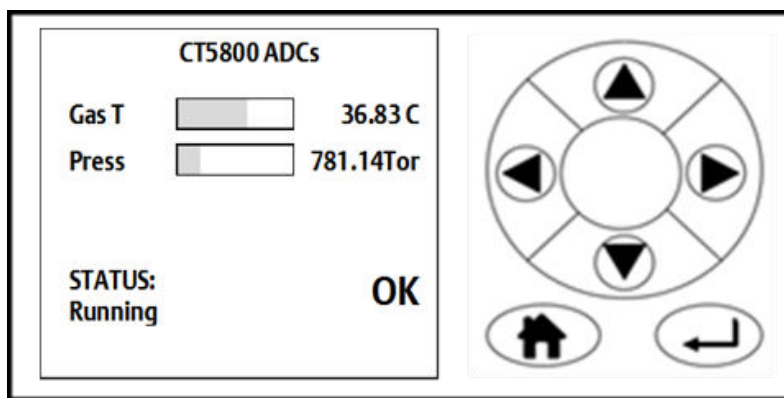
 is a link between the *Gas Sensor Main* screen ( ) and the *Pressure and Temperature* screen (Figure 4-6). Press  to toggle between the two screens.

 is a link to the Help system. Press  to go to a *Help* screen (described in [Help system](#)).

On the *Gas Sensor Main* screen,  has no function when the analyzer is operating correctly. If, however, the software detects a fault, an error message is displayed. Press  to get further information on the error.

## 4.6 Pressure and Temperature screen


The *Pressure and Temperature* screen (Figure 4-6) shows pressure and temperature measurements taken inside the analyzer.


**Figure 4-6: Pressure and Temperature Screen**

## NOTICE

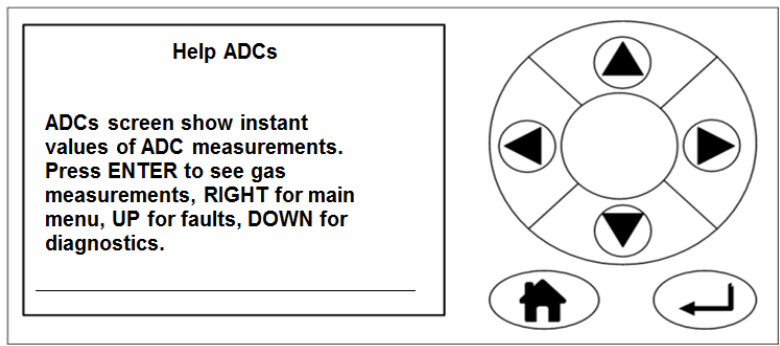
A Torr is a non-SI unit of pressure defined as 1/760 of standard atmospheric pressure and is equal to the fluid pressure of 1 mm of mercury.

## 4.7 Help system

The analyzer software includes a context-sensitive help system. Press , which is available on most of the software screens, to open the help system.

The help system contains a number of different **Help** screens, each conveying a different message. As the help system is context-sensitive, the **Help** screen that appears is the one that is most appropriate to the software function engaged when  was pressed. [Figure 4-7](#) shows an example of a **Help** screen.

**Figure 4-7: Example of a Help Screen**





## 4.8 Main menu

To access the *Main menu*, press  on either the *Gas Sensor Main* screen (Figure 4-5) or the *Pressure and Temperature* screen (Figure 4-6). The *Main menu* ( ) options are:

- **DIAGNOSTICS:** Displays various parameters used in the internal calculations and compares desired and actual parameters, for example, the analysis cell pressure and temperature. The diagnostics routines and screens are used to perform fault diagnosis.
- **FAULTS:** Takes you to a screen that lists any faults affecting the analyzer. This option is used as part of the failure diagnosis procedures.
- **GAS SERVICE:** Allows you to check the sensor readings against a known gas source (verification) or, if necessary, to calibrate the analyzer against that known gas source (calibration).
- **DATA SERVICE:** Takes you to a screen that allows data to be downloaded from the instrument. The downloaded data is used to diagnose faults.
- **SYSTEM:** Takes you to a screen that allows the analyzer to be shut down or displays the software versions.

## 4.9 BACK button

On most of the software screens, the top left-hand button  is configured as a **BACK** button. Press **BACK**  to return to the previous screen.

## A Spare parts list

Rosemount part number	Description
P-6001-00012	Remote Ethernet I/O 2-port Etnet switch, 6 DIs and 6 relay
P-6001-00013	ioLogik remote Ethernet I/O 4AO, 2-port Switch
E-4004-6303	Tested TEC 3 board
E-4004-8001	Tested TC5000 motherboard
E-4004-6201	Tested peripheral board with XStream display interface
P-6001-00027	Cartridge fuse, F, 5A
P-6001-00032	CTE8000 series 0-2 bar A, 0-5 V output, G $\frac{1}{8}$ in. BSP male
P-6001-00036	Crydom SPST-NO solid state relay DIN rail mount, zero cross, 5 A rms, 15 V
P-6001-00030	1 output switch mode DIN rail panel mount power supply, 12 Vdc, 10 A
P-6001-00037	PT100 lead assembly, 6 mm dia x 50 long
P-6001-00040	O <sub>2</sub> detector
P-6001-00052	Detector
P-6001-00038	110 V Watlow cartridge $\frac{1}{4}$ -in. (6.4 mm) OD x 7.5-in. (190.5 mm) x 200 W
P-6001-00031	Hasselroth XSTREAM display screen
P-6000-00034	Enclosure sealing gasket (cut to length)
P-6000-00112	Hasselroth enclosure flame arrestor



## B Engineering drawings

### B.1 List of engineering drawings

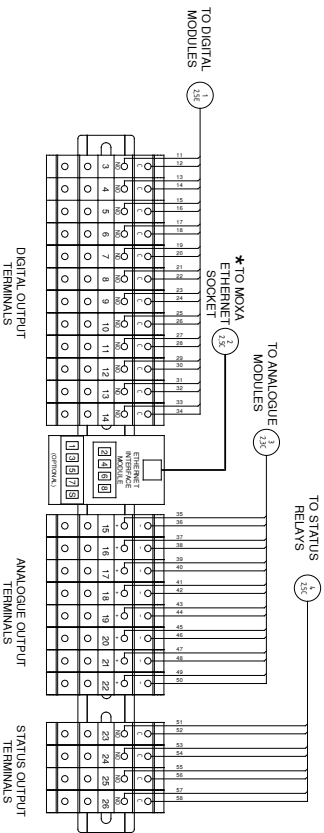
Drawing number	Description
W-2000-0038 (Sheets 1-5)	Rosemount CT5800 Gas Analyzer



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TERMINAL	DESCRIPTION	CONDUIT CODE/NO
1	20.0	Common/White
2	20.0	Common/White
3	20.0	Common/White
4	20.0	Blue
5	20.0	Blue/White
6	20.0	Green
7	20.0	Green/White
8	20.0	Green

NOTES:-  
 1. To Connect to ethnetel signal using microwave cable (ask connect the 2. To connect to ethnetel network using an RJ45 connector unplug the ethnetel cable, 'mark' \*, that goes from the ethnetel interface module to the Max module within Max module and plug in the external RJ45 connector to the Max port



TERMINAL	WIRE CONNECTIONS	FUNCTION
1	20.0	COMMON/WHITE
2	20.0	COMMON/WHITE
3	20.0	COMMON/WHITE
4	20.0	Blue
5	20.0	Blue/White
6	20.0	Green
7	20.0	Green/White
8	20.0	Green
9	20.0	Common/White
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13	20.0	Common/White
14	20.0	Common/White
15	20.0	Common/White
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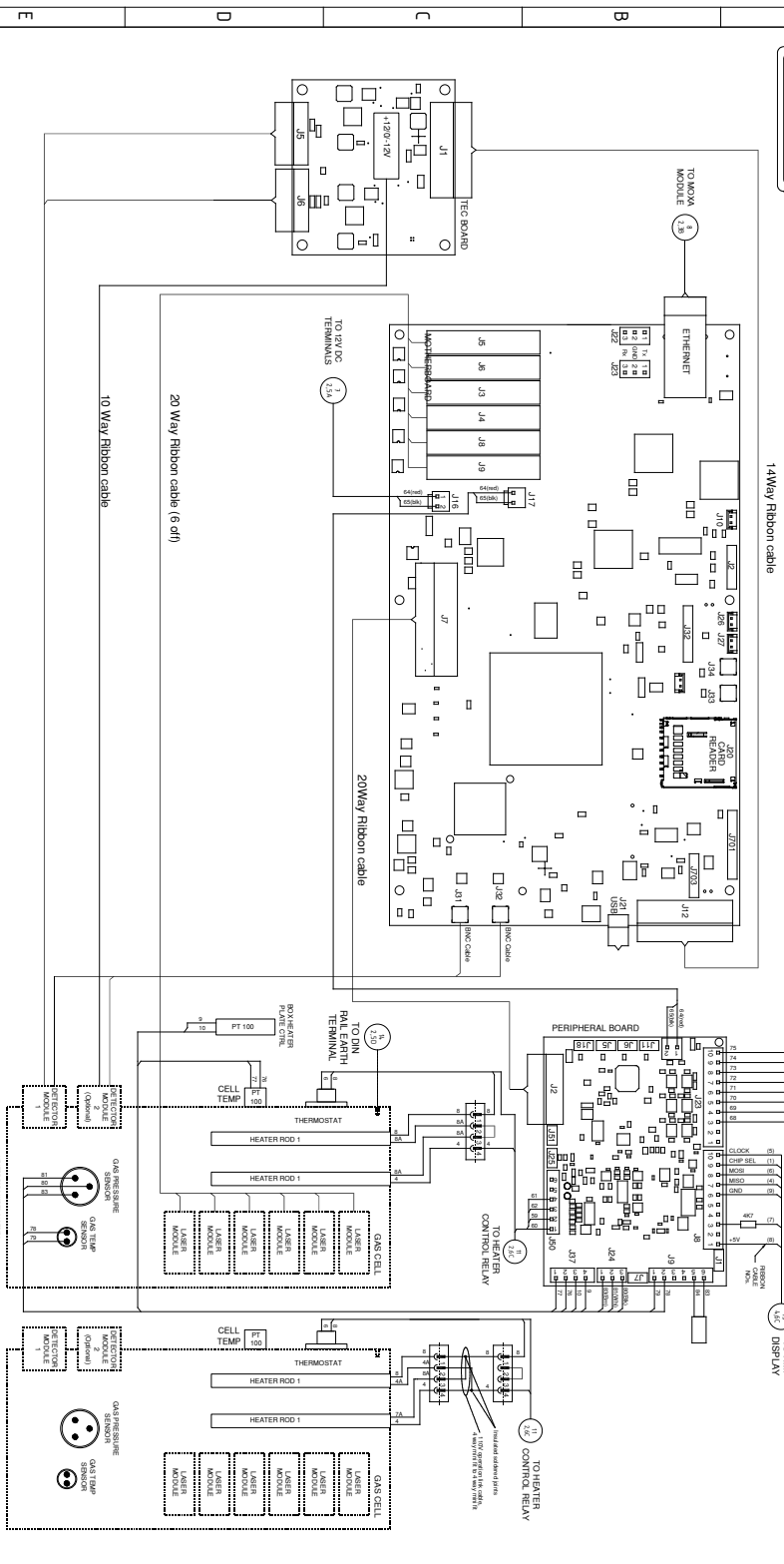
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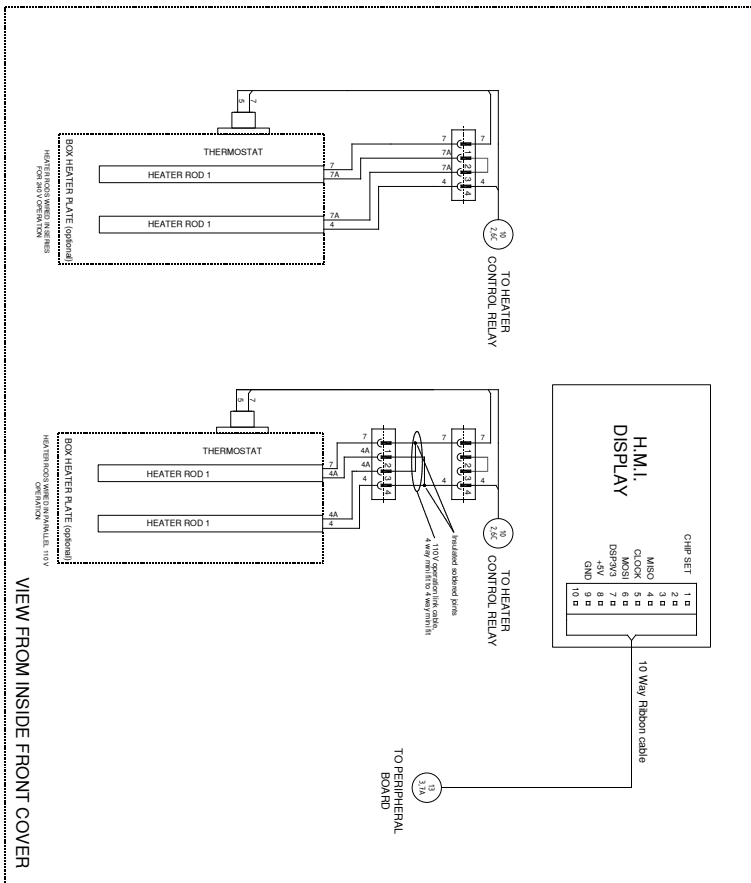
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