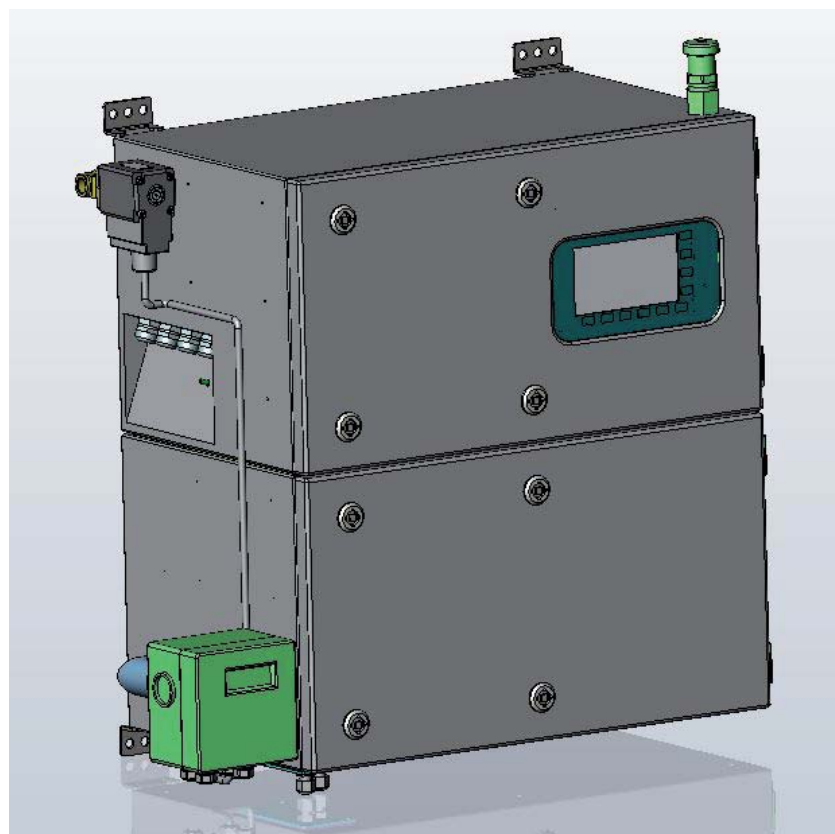


## **MLT 2 CEMS Ex p**

Manual Addendum for Pressurized Analyzers  
intended to be used in Hazardous Areas Zone 2



# ESSENTIAL INSTRUCTIONS

## READ THIS PAGE BEFORE PROCEEDING!

Emerson Process Management (Rosemount Analytical) designs, manufactures and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you **MUST properly install, use, and maintain them** to ensure they continue to operate within their normal specifications. The following instructions **MUST be adhered to** and integrated into your safety program when installing, using and maintaining Emerson Process Management (Rosemount Analytical) products. Failure to follow the proper instructions may cause any one of the following situations to occur: Loss of life; personal injury; property damage; damage to this instrument; and 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 Process Management (Rosemount Analytical) 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 Instruction Manual and per 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 Process Management (Rosemount Analytical). 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.
- **Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.**

The information contained in this document is subject to change without notice.

10<sup>th</sup> edition 2015-10

**Original Instruction Manual for the purpose  
of the European Directive 94/9/EC.**

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## MLT 2 CEMS Ex p

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## **PREAMBLE**

This instruction manual provides additional information about installing, operating and maintaining/servicing pressurized MLT 2 series gas analyzers for zone 2 in hazardous (classified) areas.

Operators must be familiar with operating these analyzers, before startup.

This instruction manual covers MLT 2 series gas analyzers variations and therefore may describe configurations and/or options not part of your specific analyzer.

This ATEX instruction manual is an addendum to the basic instruction manual and covers aspects of explosion protection and safety equipment only! To safely operate these instruments, you have to read and understand all associated manuals, including those of additional components!

If specifications or data provided by this manual differ from those given in the associated manuals, latter are superseded by this manual.

**Safety Instructions**

## **ADDITIONAL LITERATURE**

**This manual covers aspects specific for using pressurized MLT 2 series gas analyzers analyzers in hazardous (classified) areas, only.**

**To install, start-up, operate and maintain/service the instrument in a safe manner it is MANDATORY to read all additional instruction manuals shipped together with the instrument!**

**The following instruction manuals are available and/or referenced within this manual at hand and, depending on your system's configuration, shipped with your analyzer:**

<b>90002929</b>	<b>MLT Hardware instruction manual</b>
<b>HAS3xE-IM-SW39</b>	<b>MLT Software instruction manual (rev. 3.9.x or later)</b>
<b>User's Manual F 840</b>	<b>Pressurized Enclosure System F840, Revision 2, 2012 or Revision 0, 2015</b>

### **SAVE ALL INSTRUCTIONS FOR FUTURE USE!**

**Contact your local service center or sales office when missing documents.**

## DEFINITIONS

The following definitions apply to WARNINGS, CAUTIONS and NOTES found throughout this publication.

### **WARNING**

Highlights an operation or maintenance procedure, practice, condition, statement, etc. which, if not strictly observed, could result in injury, death, or long-term health hazards of personnel.

### **CAUTION**

Highlights an operation or maintenance procedure, practice, condition, statement, etc. which, if not strictly observed, could result in minor or moderate injury or damage to or destruction of equipment, or loss of effectiveness.



### **REMARK**

Highlights an essential operating procedure, condition or statement





### **NOTE**

*Highlights an important statement.*

## SYMBOLS USED ON AND INSIDE THE UNIT

Wherever one or more of the following symbols appear on or inside the instrument, be careful and read the instructions given in the accompanying manuals!

**Follow these warnings and notes carefully to minimize risks.**

This symbol at the instrument ...	... indicates
	<b>dangerous voltages</b> may be accessible. Removing covers is permitted only, if the instrument is disconnected from power - and even in this case by qualified personnel only!
	<b>hot surfaces</b> may be accessible. Removing covers by qualified personnel is permitted only, if the instrument is disconnected from power. Nevertheless several surfaces may remain hot for a limited time.
	<b>more detailed information available:</b> see instruction manual before proceeding!
	<b>more detailed information available:</b> see instruction manual before proceeding!

## SYMBOLS USED IN THIS MANUAL

Wherever one or more of the following symbols are used in this instruction manual, read the accompanying information and instructions carefully.

**Follow these warnings and notes carefully  
to minimize risk.**

This symbol used in the manual ...

... means



**dangerous voltages** may be exposed



**hot surfaces** may be exposed



possible **danger of explosion**



**toxic substances** may be present



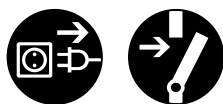
**substances harmful to health** may be present



indicates notes relating to **heavy instruments**



electrical components may be destroyed by **electrostatic discharges**



units must be **disconnected from the power source**



indicates special instructions or information for operation at **low temperatures**.



indicates basic conditions or procedures are being described.

This symbol may also indicate information important for achieving accurate measurements.



## TERMS USED IN THIS MANUAL

### ATEX

Directive 94/9/EC, (respectively directive 2014/34/EU, valid from 20.04.2016) commonly called the ATEX („Atmosphères Explosibles“) products directive.

### Area Classification

#### Zone 1

Where ignitable concentrations of flammable gases can exist some of the time under normal operating conditions.

Equipment to be used in Zone 1 has to be classified Category 2.

#### Zone 2

Where ignitable concentrations of flammable gases are not likely to exist under normal operating conditions.

Equipment to be used in Zone 2 has to be classified Category 3.

### Explosive Gas(es)

Flammable gases and gas mixtures of a concentration within the explosion limits and present in mixture with air.

### Flammable Gas(es)

Gases, vapors or mixtures thereof that are capable of being ignited

### Containment System

part of the analyzer containing the flammable substance that may constitute an internal source of release

### Pressurization

technique of guarding against the ingress of the external atmosphere into an enclosure by maintaining a protective gas therein at a pressure above that of the external atmosphere.

### Pressurization system

grouping of safety devices and other components used to pressurize and monitor or control a pressurized enclosure.

### Purging

in a pressurized enclosure, the operation of passing a quantity of protective gas through the enclosure and ducts, so that the concentration of the explosive gas atmosphere is brought to a safe level.

### Purge mode „Leakage Compensation“

In Ex p „leakage compensation mode“ just as much protective gas is used to hold an overpressure of  $\geq 1$  mbar compared to atmospheric.

---

**Terms used in this manual**

---

**Lower Explosion Limit (LEL)**

Volume ratio of flammable gas in air below which an explosive gas atmosphere will not be formed.

**Upper Explosion Limit (UEL)**

Volume ratio of flammable gas in air above which an explosive gas atmosphere will not be formed: the mixture of gas and air is too rich in fuel (deficient in oxygen) to burn.

**Protective Gas**

Air or inert gas used for purging and maintaining an overpressure and, if required, dilution and purging.

**Overpressure**

pressure above ambient pressure within a pressurized enclosure.

## **SAFETY INSTRUCTIONS**

### **INTENDED USE STATEMENT**

**MLT 2 series gas analyzers are intended to be used as analyzers for industrial purposes. They must not be used in medical, diagnostic or life support applications nor as safety devices.**

**Using MLT 2 analyzers as safety devices, requiring redundant design or SIL classification, is also not permitted.**

**No independent agency certifications or approvals are to be implied as covering such applications!**

### **GENERAL SAFETY NOTICE / RESIDUAL RISK**

**If this equipment is used in a manner not specified in these instructions, protective systems may be impaired or hazards can arise, resulting in explosion, loss of life, personal injury and damage to this equipment and on-site property.**

**Despite of incoming goods inspections, production control, routine tests and application of state-of-the-art measuring and test methods, an element of risk remains when operating a gas analyzer!**

**Even when operated as intended and observing all applicable safety instructions some residual risks remain, including, but not limited to, the following:**

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

**Avoid exposure to the dangers of these residual risks by taking particular care when installing, operating, maintaining and servicing the analyzer.**

---

**Safety Instructions**

---

**AUTHORIZED PERSONNEL**

In-depth specialist knowledge is an absolutely necessary condition for working with and on the analyzer.

Authorized personnel for installing, operating, servicing and maintaining the analyzer are instructed and trained qualified personnel of the operating company and the manufacturer.

It is the responsibility of the operating company to

- train staff,
- observe safety regulations,
- follow the instruction manual.

Operators must

- have been trained,
- have read and understood all relevant sections of the instruction manual before commencing work,
- know the safety mechanisms and regulations.

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.

Safety Instructions

**WARNING**

**EXPLOSION HAZARD**



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

Violating safety instruction can cause explosion and/or injury, death, or long-term health hazards of personnel!

**WARNING**

**EXPLOSION HAZARD WHEN OPEN**



Do not open while explosive atmosphere may be present!

**WARNING**

**EXPLOSION HAZARD**



Products covered by this manual are intended to be installed and operated in hazardous areas. This is permitted only, considering all relevant national legislative requirements and regulations, not listed within this manual.

Make sure, that all safety devices and the pressurization unit are working properly, to ensure safe operation of the analyzer!

Violating may cause explosions!

**WARNING**

**EXPLOSION HAZARD**



Installing and wiring this instrument must comply with all relevant national legislative requirements and regulations.

Consider all safety instructions within this on hand manual and all associated analyzer instruction manuals!

## Safety Instructions

**WARNING****EXPLOSION HAZARD WHEN SHUT OFF / BATTERY**

When the analyzer is out of order or if the pressurization unit shuts off due to a failure, all inputs and outputs connected to external equipment **MUST** be shut off too!

This ensures that no hazardous voltages are present within the analyzer enclosure, when not pressurized. Note that for data backup purposes some circuitry on the CPU board continuously is powered by a battery!

**WARNING****EXPLOSION HAZARD DURING MAINTENANCE**

Disconnect the system from voltage before open the doors. Don't open the analyzer when explosive atmosphere can be present

**WARNING****EXPLOSION HAZARD BY MODIFICATION**

Any addition, substitution, or replacement of components installed on or in this device, must be certified to meet the hazardous area classification that the device was certified to prior to any such component addition, substitution, or replacement. In addition, the installation of such device or devices must meet the requirements specified and defined by the hazardous area classification of the unmodified device.

Any modifications to the device not meeting these requirements, will void the product certification(s).

Contact Emerson Process Management's customer service center for return authorization.

Safety Instructions

**WARNING**

**HEAVY INSTRUMENT**



The analyzer to which this manual relates, intended to be wall mounted and/or outdoor installed, weighs up to approx. 40 kg, depending on included options!

Use two people and/or suitable tools for transportation and lifting these instruments!

Take care to use anchors and bolts specified to be used for the weight of the units!

Take care the wall or stand the unit is intended to be installed at is solid and stable to hold the units!

Don't use the attached pressurization unit's components as a transportation handle, otherwise parts may detach or damaged, therefore affecting the safety of the equipment!

**WARNING**

**ELECTRICAL SHOCK HAZARD**



Installation and connecting power and signal cables are subject to qualified personnel only taking into account all applicable standards and legislative requirements!

Failure to follow may cause warranty invalidation, property damage and/or personal injury or death!

Installation of these instruments is subject to qualified personnel only, familiar with the resulting potential risks! Instruments providing screw terminals for electrical connections may require working near live part!

Pressurization systems described in this manual do not provide a power switch and are operable when connected to power!

A power switch or circuit breaker (complying with IEC 60947-1/-3) has to be provided in the building installation. This switch has to be installed near by analyzer, must be easily operator accessible and has to be assigned as disconnecter for the analyzer.

## MLT 2 CEMS Ex p

## Safety Instructions

**CAUTION****HIGH PRESSURE HAZARD**

The maximum inlet purge gas pressure at the inlet valve must not exceed 690 kPa (6,9 bar)!

Higher pressure may damage the analyzer enclosure in case of failure of the inlet valve!

**WARNING****EXPLOSIONS HAZARD DUE TO ELECTROSTATIC DISCHARGE**

In the event of a sudden discharge from electrostatically charged devices or individuals, there is a risk of an explosion.

Take suitable measures to ensure that no electrostatic discharge can build up in the explosions risk area.

Clean the device surface by gently wiping it with a damp or antistatic cloth only.

**WARNING****EXPLOSION HAZARD**

Power shall not be restored after enclosure has been opened until enclosure has been purged for 12 min 36s at a flow rate of 1,5 l/s (minimum 2 bar pressure for purging air)

**WARNING****POSSIBLE EXPLOSION HAZARD**

Do NOT operate the instrument with doors or covers open! This is permitted only when no hazardous atmosphere is present!



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



## **CHAPTER 1**

### **Technical Description**

#### **1.1 Application and Principle of Operation**

The gas analyzers of type MLT 2 CEMS Ex p are intended to measure gas components within non-flammable gas mixtures. In combination with an appropriate certified pressurization system (protection method „Pressurized Enclosure“ Ex p) they can be installed and operated in hazardous areas of Zone 2.

Pressurization acts as external explosion protection and prevents external explosive atmosphere to penetrate into the analyzer by holding the enclosure at an overpressure compared to the surrounding.

The analyzer with Ex pz equipment relize a stabel overpressure inside the enclsoure of the MLT 2 to gurantee a non hazardous area inside the enclosure.

Due to this safety concept only nonflammable samples gases and gas mixtures below 25% LEL are allowed to be measured.

The MLT 2 CEMS Ex p includes the purging unit. The measurement system of this analyzer is able to measure with maximum 2 IR benches, 2 UV benches, one system for pO<sub>2</sub> measurement for maxium 21% O<sub>2</sub> and additional 2 flow measurements.

This offers the opportunity to measure continuous emmissions in zone 2.

## MLT 2 CEMS Ex p

## 1.1 Application and Principle of Operation

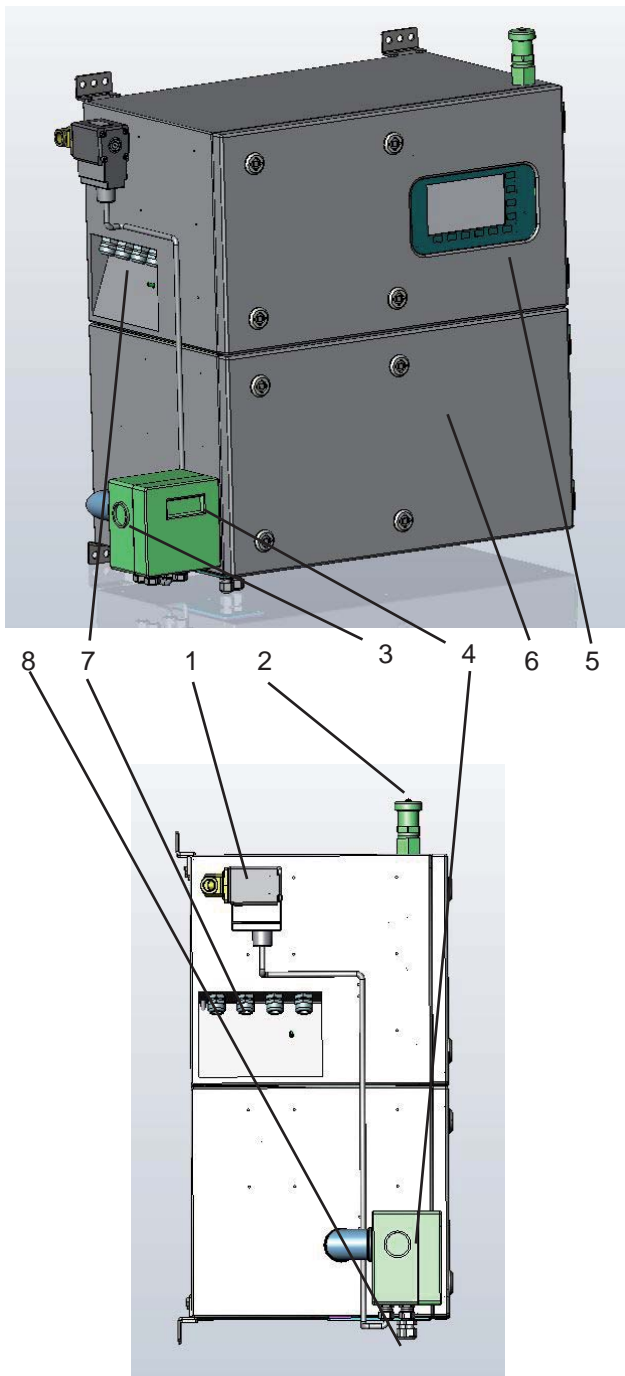


Fig. 1-1: Analyzer with Category 3 Pressurization System

**1.2 Description of Pressurization System**

**1.2 Description of Pressurization System**

The intention of a pressurized analyzer is to keep out of the instrument a surrounding potentially explosive atmosphere by providing an internal overpressure. The pressurization system consists of a gas inlet valve, control unit and a bypass. The control unit shows the relevant parameters (duration of the pre-purge phase, internal overpressure and more) and ensures safe operation.

The Category 3 pressurization unit for Zone 2 installation does not control the analyzer's power supply (e.g. in case of a failure the analyzer is not disconnected) but shows an alarm in case of low pressure inside the enclosure.

The pre-purging for zone 2 is optional but the MLT 2 with FS840 starts the pre purging phase automatically. The power supply should be only connected after the purging. The user can use the MLT2 without the pre-purging if he can proof that inside the enclosure no hazardous gas is available.

The pressurization system provides an internal overpressure of 7 mbar during the purging. Under normal conditions 2 mbar over pressure is held. The acceptable sample gas pressure complies with the specifications of an analyzer for non-hazardous (general purpose) areas.

The standard purge medium is dry air.

<b>Application</b>	<b>Mode of Operation</b>	<b>Dual Enclosure (Volume: approx. 112 l)</b>
<b>Measurement of non-flammable gases</b>	<b>Pre-purging</b>	
	Duration:	12,6 min
	minium Pressure of the purging gas:	2 bar
	maxiumum Pressure of the purging gas:	4 bar
	Resulting in a mimium gas flow of:	1,48 l/min
	Internal overpressure (purging starts only with a pressure of):	7 mbar
	<b>Measuring</b>	
	Internal overpressure:	ca. 2 mbar
	Gas flow (leakage rate):	<= 4 l/min
	minium overpressure :	1 mbar
Maximum internal overpressure	25 mbar	
maximum sample gas pressure:	see standard manual	

## MLT 2 CEMS Ex p

## 1.3 Technical Data

## 1.3 Technical Data

## 1.3.1 Installation Site

Hazardous area:	Zone 2
Permissible ambient temperature range:	-20 °C to +40 °C
Permissible ambient storage temperature range:	-20 °C to +60 °C
Humidity (non condensing):	< 90 % r. h. at +20 °C < 70 % r. h. at +40 °C
Pollution degree:	2
Installation category:	II
Altitude:	0 to 2000 m above sea level
Surrounding atmosphere	Analyzers must not be operated in corrosive atmosphere.

## 1.3.2 Explosion Protection

**Concepts:**

Category 3: Pressurized enclosure (Ex pzc) using simplified purge with leakage compensation mode

**Temperature class:** T4

**Analyzer markings:** II 3G Ex pz IIC T4 Gc

**Approval:** BVS 15 ATEX E 124 X

**Special conditions of use:**

- Risk of electrostatic discharge - only clean with wet cloth
- only connect the power supply if the inner of the enclosure is free of hazardous atmosphere
- Do not open when an explosive atmosphere is present - batteries are located inside this enclosure
- MLT2 CEMS Ex p shall not be used for flammable sample gas
- MLT2 CEMS Ex p is not approved for safety measurement for hazardous areas

**Applicable Standards:**

Cat. 3: DIN EN 60079-0 (2012),  
DIN EN 60079-2 (2007)

**1.3 Technical Data**

**1.3.3 Electrical and Mechanical Data**

For data not listed see the separate analyzer's instruction manual.

**WARNING**

**HAZARD BY WRONG INPUT VOLTAGE !**



**Applying a rated voltage other than specified on the analyzer's nameplate label may cause an explosion, injury or damage to the installation.**

**Pressurized analyzers for hazardous locations do NOT provide wide range power supplies! This type of analyzers is always setup for a specific rated input voltage, see nameplate label!**

**Ensure the voltage at site of installation meets the rated analyzer input voltage!**

**Power Supply**

Rated input voltage:	230 V~, 48 ... 62 Hz
Rated power:	700 VA max
Cable:	Diameter 7 ...12 mm, shielded
Crosssection for each cable core:	max. 2,5 mm <sup>2</sup>

**Housing**

Weight: (depending on analyzer configuration)	approx. up to 40 kg
Protection class:	IP 54 (EN 60529) for outdoor installation Analyzer must not be exposed to direct sun light
Gas fittings, except of the pressurization unit:	quantity: max. 8 specification: 6/4 mm or 1/4", stainless steel

## MLT 2 CEMS Ex p

## 1.3 Technical Data

**Pressurization Unit Specific Data FS840**

For details see separate instruction manual of FS840, 2012 "manual\_f840\_z22\_v1.0.6\_2012 Revision 2" respectively "manual\_f840\_z22\_v1.1\_2015 Revision 0"

**Power Supply FS840**

Rated input voltage:	230 V~, 48 ... 62 Hz
Rated power:	2 VA without solenoid valve
Cable diameter for cable glands:	6 - 12 mm
Cross section for each cable core:	max. 2,5 mm <sup>2</sup>
Min. and max. clamping torque:	min. 0,3 Nm, max: 0,4 Nm

**Housing FS840**


Protection class:	IP 65 (EN 60529)
Gas fittings of the pressurization unit:	max. 8

**1.3.4 Purge Gas Conditions**

Purge gas: Air (from an ex-free area)  
 Temperature: As ambient, but **min. +20 °C to +40 °C.**



**Medium has to be dry and free from dust, oil, corrosive or aggressive components!**

Rated input pressure at inlet of Ex p device:	200 to 400 kPa (2 to 4 bar)
Maximum input pressure at inlet of Ex p device:	690 kPa (6.9 bar)
For more operation data:	 table on page 1-3

**1.3 Technical Data**

**1.3.5 Overpressure relief valve**

Pressurized analyzers feature a overpressure relief valve (👉 figure to the right). This ensures, the internal overpressure is limited to a safe value, in case of failure of the pressurization unit.

The valve automatically opens at a pressure of about 5.5 kPa. The resulting loss of pressure will force the pressurization unit to trigger an alarm. The analyzer then must be disconnected manually!

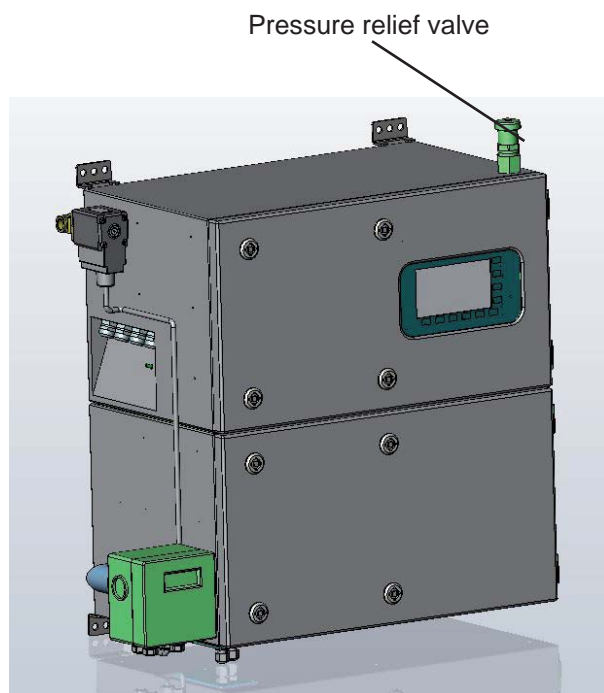


Fig. 1-2: Position of pressure relief valve (example)

**1.3.6 Sample gas specifications**

**Note!**

*The term 'sample gas' and data referring to it, always applies to ALL GASES applied to the analyzer's containment*

Gases:	Non flammable gases, or gas mixtures of concentrations always below 25 % LEL
Maximum sample gas pressure:	atmospheric, or < 150 kPa at normal ambient pressure, depending on the measuring principle installed
Maximum sample gas flow:	depending on the measuring principle installed, 👉 separate analyzer instruction manual
Gas temperature:	< 60°C

MLT 2 CEMS Exp

1.4 Nameplate Label

1.4 Nameplate Label

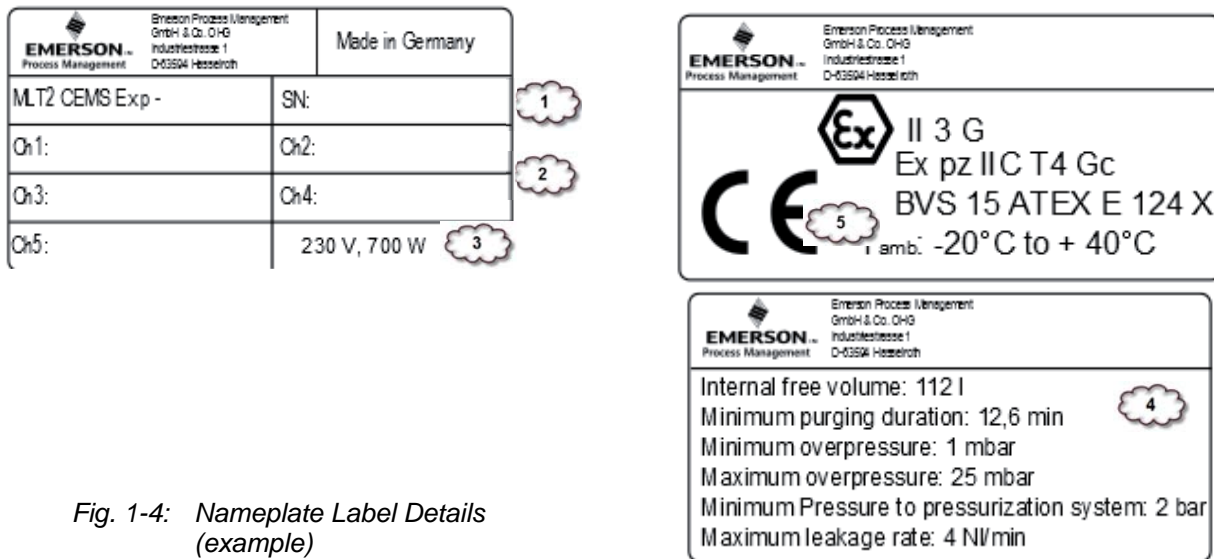


Fig. 1-4: Nameplate Label Details (example)

Area	Description	Area	Description						
1	The serial number and date of manufacturing	2	The measuring channel data (components & ranges)						
3	The analyzer's electrical data	4	The purge medium data to be observed to comply with the certificate, the maximum leakage flow rate and the volume of the enclosure						
5	Manufacturer address, CE mark and certification data: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="2">Zone 2</th> </tr> </thead> <tbody> <tr> <td><b>Area classification</b></td> <td><b>II</b> other than mines <b>3</b> Category 3 Equipment (Zone 2) <b>G</b> for explosive Gas atmosphere</td> </tr> <tr> <td><b>Protection concepts</b></td> <td><b>Ex</b> Explosion protected <b>pz</b> Zone 2 pressurization system <b>nA</b> Related to internal backup battery <b>IIC</b> Group II, Gas Group C <b>T4</b> Temperature Class (135 °C) <b>Gc</b> Equipment protection level Gas c</td> </tr> </tbody> </table>			Zone 2		<b>Area classification</b>	<b>II</b> other than mines <b>3</b> Category 3 Equipment (Zone 2) <b>G</b> for explosive Gas atmosphere	<b>Protection concepts</b>	<b>Ex</b> Explosion protected <b>pz</b> Zone 2 pressurization system <b>nA</b> Related to internal backup battery <b>IIC</b> Group II, Gas Group C <b>T4</b> Temperature Class (135 °C) <b>Gc</b> Equipment protection level Gas c
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## CHAPTER 2 Installation

### **WARNING**

#### **EXPLOSION HAZARD**



Read all instruction manuals (including versions for auxiliary equipment) before installing this instrument! (see S-1)

Violating safety instruction can cause explosion and/or injury, death, or long-term health hazards of personnel!

### **WARNING**

#### **EXPLOSION HAZARD WHEN OPEN**



Do not open while explosive atmosphere may be present!

### **WARNING**

#### **HEAVY INSTRUMENT**



The analyzer to which this manual relates, intended to be wall mounted and/or outdoor installed, weighs up to approx. 40 kg, depending on included options!

Use two people and/or suitable tools for transportation and lifting these instruments!

Take care to use anchors and bolts specified to be used for the weight of the units!

Take care the wall or stand the unit is intended to be installed at is solid and stable to hold the units!

Don't use the attached pressurization unit's components as a transportation handle!

# MLT 2 CEMS Ex p

## 2.1 General

### 2.1 General

Proper function of the instrument requires proper installation.

Take care to follow all instructions given in this chapter as well as given in the accompanying manuals of the safety devices and the MLT 2!

For installation of the MLT 2 CEMS Ex p DIN EN 60079-14 has to be taken into account.

### 2.2 Installing the Instrument

Install the instrument as described in the basic analyzer instruction manual: Pay attention to the revised dimensions, due to the attached pressurization equipment, as shown in figure 2-2.

Ensure there is enough space to install the equipment.

The analyzer has to be installed wall mounted .

All not used openings, for example not used cable connections or process gas connections have to be sealed. To guarantee the purging function for the equipment minimum IP4x has to be realized. The enclosure in the factory is tested to realize 25mbar overpressure with a flow of 0,4 NI/min with all openings closed (including the purging unit).



**To test the valve's operation, after installation of the analyzer gently lift the vent flapper open, ensuring that the valve opens freely. This has to be repeated on a regular basis when performing maintenance procedures.**

In case of doubt about proper functioning of the valve, perform the test described in section 4.4.4, or contact your Emerson Service Center.

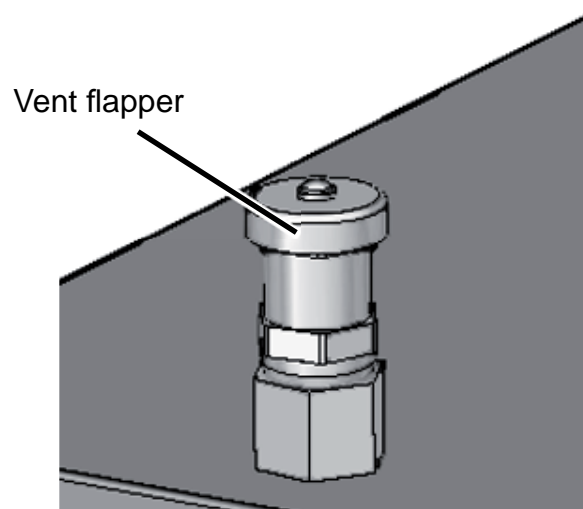


Fig. 2-1 Relief valve's vent flapper

2.3 Dimensions

2.3 Dimensions

Basic enclosure

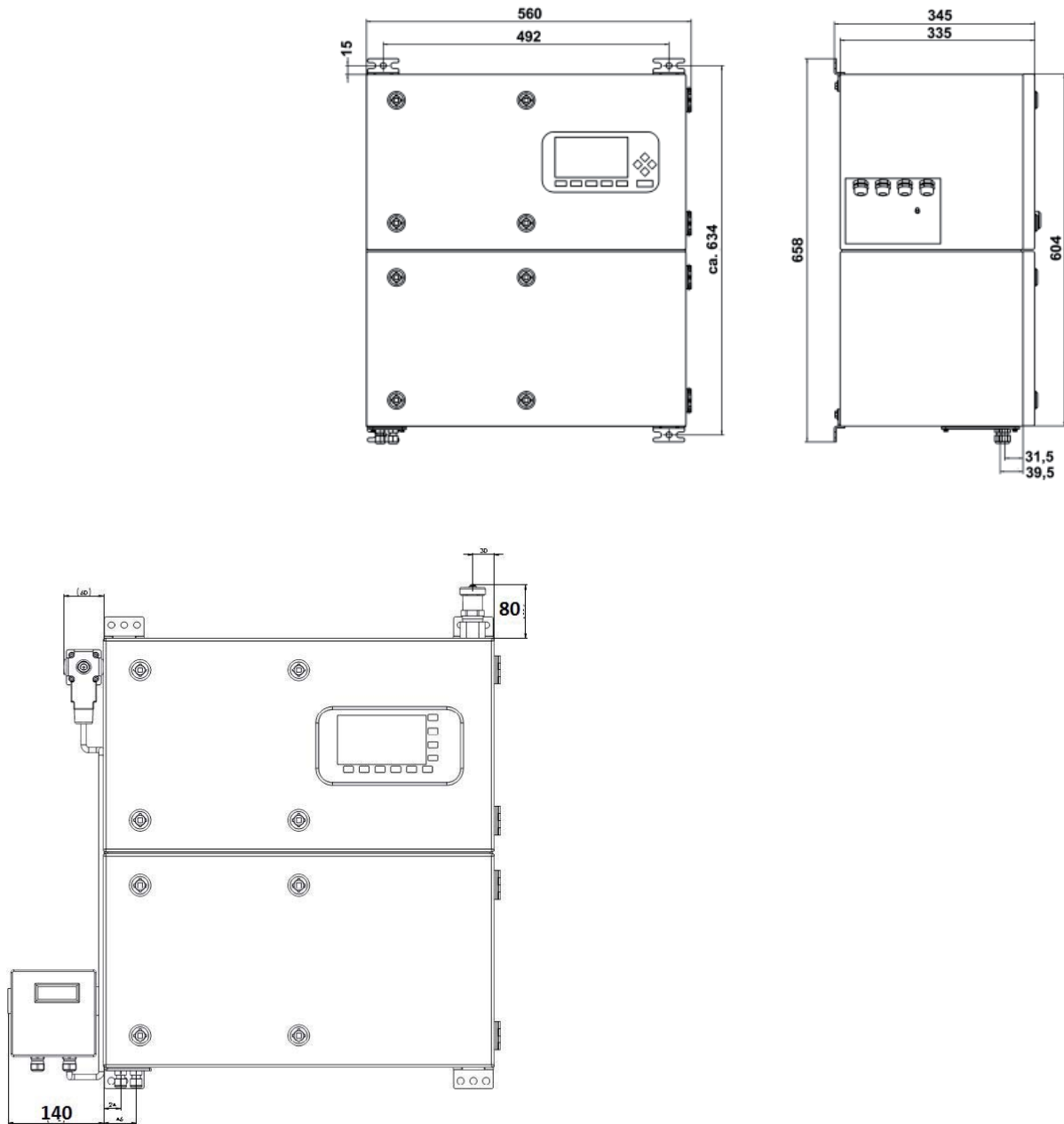


Fig. 2-2: Cat. 3 Dual Enclosure Analyzer (Dimensions in mm)

# MLT 2 CEMS Exp

## 2.4 Connecting Sample and Protective Gases

### 2.4 Connecting Sample and Protective Gases

After having installed the instrument, connect the sample gas and protective gas supply lines according to fig. 2-3.

To ensure faultless operation the following conditions apply:

- For the pressurization system a minimum protective gas pressure of **200 to 400 kPa** (2...4 bar) has to be provided at the purge gas inlet.

If external piping is connected to the purge gas outlet, take care to not limit the gas flow by additional flow resistance: If too high, the unit will not work properly (👉 section 4.5).

purge gas connection: inner diameter: 6 mm

outer diameter: 8 mm

optional connection of purge gas outlet: G 3/4"

Process gas connections: depends on the ordering options: 6 mm or 1/4"

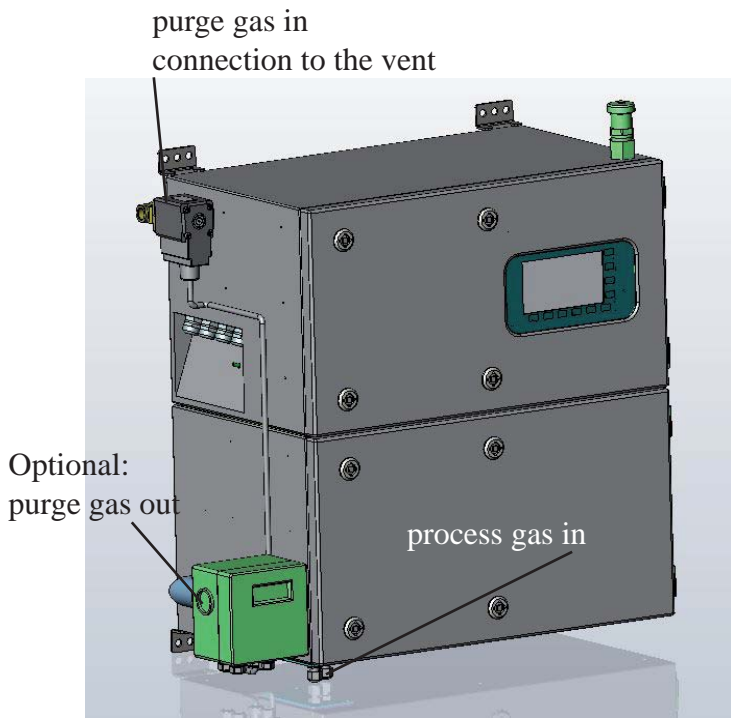


Fig. 2-3: Overview for connecting the MLT2

## 2.5 Electrical Connections

## 2.5 Electrical Connections

**WARNING****EXPLOSION HAZARD / ELECTRICAL SHOCK HAZARD**

Installation and connecting power and signal cables are subject to qualified personnel only taking into account all legislative requirements and applicable standards, e.g. EN 60079-14 (*Europe*), National Electrical Code (*NEC-NFPA 70; USA*), Canadian Electrical Code (*CEC; Kanada*), IEC 60079-14 (*International*).



Failure to follow may cause explosion, death, personal injury, property damage and warranty invalidation!

Installation of these instruments is subject to qualified personnel only, familiar with the resulting potential risks! Opening the instruments is permitted only, if itself and all connected power and signal lines are de-energized! Instruments providing screw terminals for electrical connections may require working near live part!



Analyzers described in this manual do not provide a power switch!



A power switch or circuit breaker (to comply with IEC 60947-1/-3, respectively DIN EN 60079-14) has to be provided in the building installation. This switch has to be installed near by analyzer, must be easily operator accessible and has to be assigned as disconnecter 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 analyzers provide a protective earth terminal. To prevent electrical shock hazards the instruments must be connected to a protective earth. Therefore the instruments must be connected to power by using 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!

The analyzers do not provide a power switch and are operable when connected to power.

## MLT 2 CEMS Ex p

## 2.5.1 Cable Gland Assembly Instruction for Shielded Cables

## 2.5.1 Cable Gland Assembly Instruction for Shielded Cables

The MLT 2 is delivered with 4 certified cable glands. These cable glands are suitable for shielded cables with diameter of 7 ... 12 mm. This cable glands have to be used for the power supply cable for the MLT 2 CEMS Ex p and the data cables. Not used cable glands have to be removed and certified blind plugs have to be used for the not used openings.

The MLT 2 Cems analyzer have to be power-on separately to the purging unit FS840 and after the purging, if it is necessary. Therefore the analyzer has to be connected with separate switchable power cables.

The shielded cables have to be fixed with the cable glands in the following way:



1. Strip the cable insulation
2. Uncover the shielding



3. Feed cable through gland nut and into fixing element
4. Put the shielding net over the element the way that it covers the o-ring 2 mm (0.08 in).



5. Stick the fixing element into the neck and fix the gland

- Cable glands are designed to fix cables with outer diameters of 7 ... 12 mm (0.28 ... 0.47 in). Special inserts are available to fix thinner or several cables at a time in one gland.
- Not used cable glands have to be removed and the opening have to be closed gas tight.

**WARNING****EXPLOSION HAZARD**

**When the analyzer is out of order or if the pressurization unit shuts off due to a failure, all inputs and outputs connected to external equipment MUST be shut off too!**

**This ensures that no hazardous voltages are present within the analyzer enclosure when not pressurized.**

**2.5.2 Category 3 Equipment Power Connection**

**2.5.2 Power Connection**

**2.5.2.1 Analyzer**

We recommend to supply analyzer and pressurization control unit with separate power cables.

This enables to supply the control unit independently, if for special applications pre-purging the analyzer is required.

The power connection for the analyzer should be connected via a switch to guarantee a fast shut off in case of a failure in the purging system and to start the system after the purging.

The enclosure of the analyzer has to be connected to earth.

Cable inside the enclosure should be as short as possible.

The enclosure has to be connected to earth. The explanation how to connect the analyzer can be found in the MLT 2 hardware manual.

**Installation instructions for power terminals:**

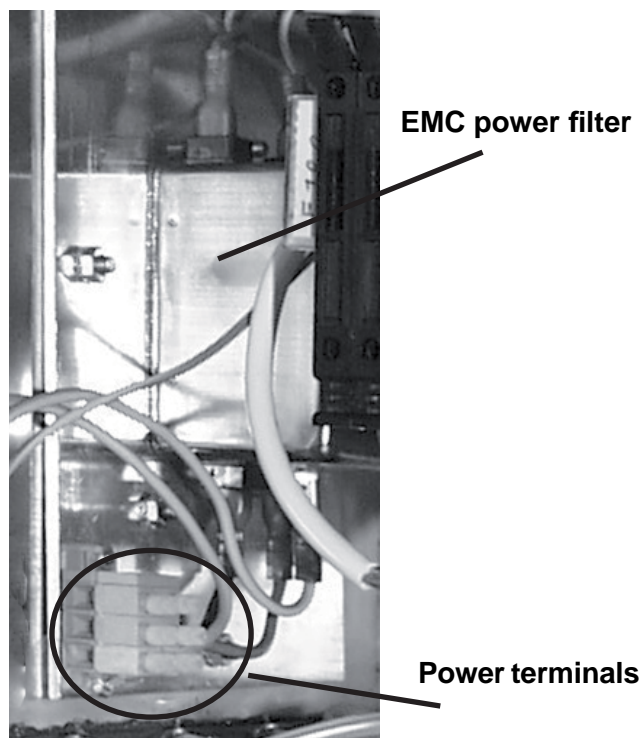
Strip the cable 8 - 9 mm, press the pushbutton, insert the cable and release the pushbutton.



**Verify that the power voltage at the point of installation meets the analyzer's nominal voltage!**

Take care of the following limit:

Max. cross sections	2.5 mm <sup>2</sup>
---------------------	---------------------



*Fig. 2-6 Power Terminals Inside Analyzer*

## MLT 2 CEMS Ex p

## 2.7.2 Category 3 Equipment Power Connection

## 2.7.2.2 Pressurization Control Unit

Remove the control unit's cover to connect the power cable:

- Line to terminal 9
- Neutral to terminal 7
- Protective Earth (PE) to the terminal at the internal rear side of the housing.

**In case of pressurization failure the analyzer will not be switched off!**



**Automatic switch off in case of pressurization failure requires an external switch (relay), additional wiring and use of alarm contacts!**

**See the associated instruction manual for more information.**

Take care of the following limits:

Cable diameter: 6 ... 12 mm

Min. and max. torques	Min. 0.3 Nm max. 0.4 Nm
Max. cross section	2.5 mm <sup>2</sup>



**Re-install the cover! The FS840 unit is not safe for usage in hazardous areas if the cover is open!**

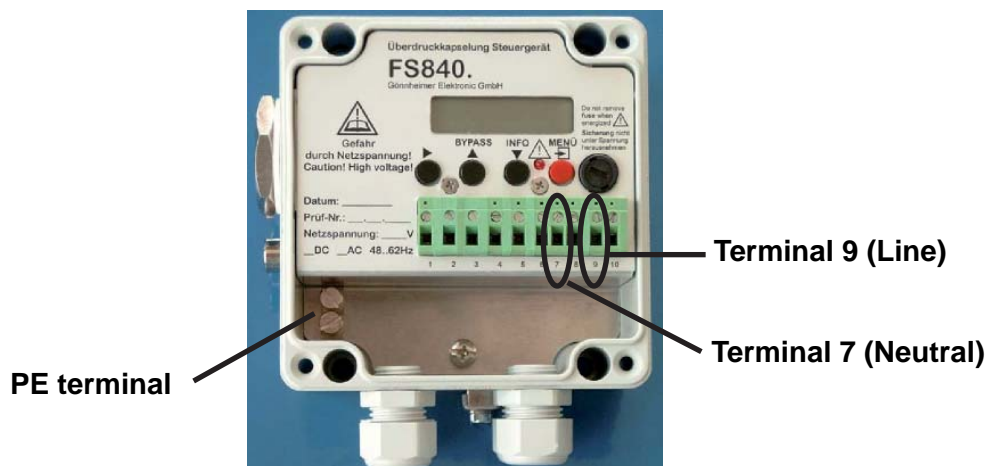


Fig. 2-7 Power Terminals Inside Control Unit



### CHAPTER 3 Startup

## WARNING

### DANGER TO LIFE, EXPLOSION HAZARD



Startup can only be done properly by personnel being familiar with the contents of all applicable manuals and related instructions!

Especially the warnings provided in the documentation have to be observed!

#### 3.1 Final Check

Startup personnel has to make sure that the analyzer and the related pressurization system have been setup as described in chapter 2 and all covers and doors are closed and fixed.

All unused cable glands need to be sealed using approved sealing plug (for example part no. ETC00791; fig. 3-1)

Unused cable gland openings in the enclosure need to be covered using a special screw (part no. ETC 000790; fig. 3-2).



Fig. 3-1:  
Cable gland sealing plug



Fig. 3-2:  
Cable gland hexagon socket screw sealing plug

## WARNING

### EXPLOSION HAZARD



Use only the components listed above as these are ATEX approved for use in hazardous areas!

## MLT 2 CEMS Ex p

## 3.2 Switching On

## 3.2 Switching On

**WARNING****EXPLOSION HAZARD**

During the prepurge phase all inputs and outputs connected to external equipment **MUST** be shut off too!

This ensures that no hazardous voltages are present within the analyzer enclosure when not pressurized.

**Note that the internal backup battery still is connected and associated circuitry remains powered!**

Power supply for control unit and analyzer need to be provided separately:

First switch on the control unit by supplying power and protective gas.

The pre-purge phase start to flush out possibly potential internal atmosphere, while the analyzer electronics remains unpowered (an indicator is the de-activated display). During this phase the analyzer must be switched off!

The control unit's display gives information about the current status.

The purging only starts if the pressure inside the enclosure is higher than 7 mbar. If the purging phase doesn't start, check if the enclosure is tight and if the pressure of the purging gas is high enough.

Once the pre-purge phase has ended the control unit starts into the leakage compensation mode and the analyzer can be switched on, too.

The system is now operable.

Now the analyzer can be started according to the instruction manual for MLT 2 (start with setup the analyzer and do calibration for each channel).

## Chapter 4 Maintenance

### **WARNING**

#### **EXPLOSION HAZARD**



After maintenance or replacement of parts concerning explosion protection an authority on explosion protection has to verify that the analyzer still meets the requirements for explosion protection before it is switched on again.

If parts essential for explosion protection are repaired they have to be routine tested!

The authority has to issue a certificate for this and/or attach a test label to the equipment before startup after maintenance or replacement of parts.

### **WARNING**

#### **EXPLOSION HAZARD**



Defective parts, important for explosion protection, must be replaced by original Emerson Process Management spare parts!

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 explosion, fire, electrical hazards, or improper operation.

### **WARNING**

#### **EXPLOSION HAZARD**



Do not open while explosive atmosphere may be present!

# MLT 2 CEMS Exp

## 4.1 Routine Tests in General

### 4.1 Routine Tests in General

#### 4.1.1 Routine Tests Interval

To ensure the performance and safety of the equipment it has to be checked on a regular basis, at least once a year. Special care has to be taken for the pressurization system and parts ensuring explosion protection (e.g. gaskets).

Routine tests can be differentiated into

#### 4.1.2 Visual Inspections

Visual inspections comprise an external inspection of the equipment to achieve timely information about visual notable defects. Furthermore included is an assessment of defects by means of other sense organs (sense of touch, sense of hearing, sense of smell), e.g. excessive vibration, corrosion, leakage.

#### 4.1.3 Close Examination

A close examination is performed to achieve timely information about defects not directly visible or audible, and is carried out similar to visual inspections, but by means of tools (e.g. ladders). Working inside the equipment (e.g. by opening the enclosure) is usually not required for close examinations.

#### 4.1.4 Detail Examination

Performing detail examinations, in addition to the procedures described above, allows to discover defects, only to be determined by opening of enclosures and/or the use of tools or special examination equipment.



**It is the operators/owners responsibility to extend the maintenance interval with respect to negative influences of gases or environment on materials in contact with the sample gas or ensuring explosion protection (e.g. gaskets).**

Section 4.2 describes routine tests according 4.1.

Section 4.3 describes tests to be performed after maintenance or repair.

**4.2 Routine Tests**

**4.2 Routine Tests**

Based on the information given in section 4.1 the operator has to carry out routine tests on a regular basis, detail examinations at least

**4.2.1 Gasanalyzer, Analytical Function**

Refer to the associated manual for detailed information on maintenance, replacement of parts and how to carry out a containment system leak test.

**4.2.2 Gasanalyzer, Ex Protection**

Ensure

- all gaskets (e.g. doors, gas fittings plate, pressurization system) are in proper conditions,
- the enclosure (including window) does not show corrosion or other mechanical damages (see also section 4.3 on how to test)
- the gas fittings are tightened properly.
- the pressure of the purging gas is > 2bar
- the internal pressure tubings are clean and still fixed in the delivered position

**4.2.3 Pressurization System and other Accessories**

Refer to the associated manuals for detailed information on maintenance and replacement of parts. Also the combination of analyzer and pressurization system has to be subjected to an examination according 4.4.

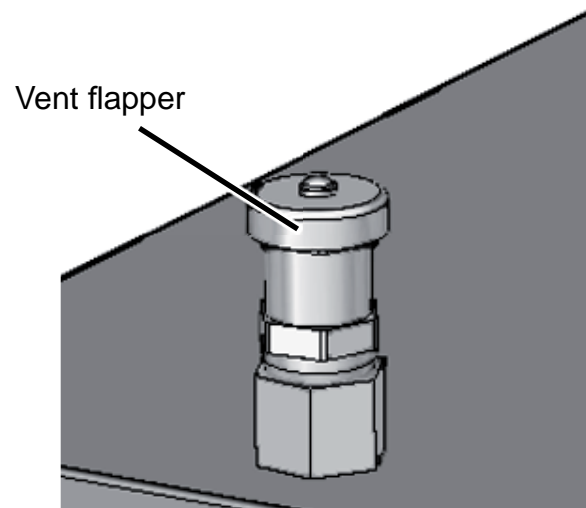
## MLT 2 CEMS Ex p

## 4.2.6 Test the Relief Valve's Operation

## 4.2.4 Test the Relief Valve's Operation

To test the valve's operation, gently lift the vent flapper open, ensuring that the valve works freely.

In case of doubt about proper functioning of the valve, perform the test described in section 4.4.4, or contact your Emerson Service Center.



**Fig. 4-1:** Relief Valve's Vent Flapper

Remove all the modifications described in section 4.2, to set back the analyzer to his original state. Take special care of the gas connections to be tightend!

### 4.3 Tests After Working on the Enclosure

#### 4.3 Tests After Working on the Enclosure

Modifications made to the equipment or the internal electrical apparatus, affecting the integrity of the type of protection or the temperature of the apparatus shall be permitted only, if the modified apparatus is resubmitted to a test institute.

The tests described below shall be carried out after repairs or modifications of the enclosure, or if gaskets have been loosened or replaced. In addition the parts which have

been repaired should be subjected to new routine verifications and tests. These tests need not necessarily be carried out by the manufacturer.

##### 4.3.1 Preparation

###### Required Tools:

- Manometer with full scale between 5 and 10 kPa and resolution of 0.01 kPa.
- Flow meter with full scale between 5 and 10 l/min, resolution 0.1 l/min.
- Test gas: Compressed air or Nitrogen, pressure reduced to max. 150 kPa.
- Pressure regulator to reduce the pressure to values of 6.5; 3.75 and 2.5 kPa.
- Equipment for flow regulation
- 1 plug to seal the purge gas outlet (size 1“)

To carry out the routine tests, the following steps have to be performed:

- Disconnect the analyzer and the pressurization unit from power.
  - Seal the purge medium outlet at the pressurization unit (G 3/4“ opening at the left side).
  - Disconnect the containment system gas connectors from the external gas lines.
  - Disconnect one of the containment system gas connectors inside the analyzer and seal the other one to prevent gas from exiting the system.
- (Remark: Now it must be possible set the enclosure under pressure by applying the test gas to the gas connector.)
- Connect an external source of compressed air as described in the drawing on the next page (fig. 4-2).

## MLT 2 CEMS Exp

## 4.3 Tests After Working on the Enclosure

## 4.3.2 Overpressure Test

A pressure of 37.5 mbar (= 1.5 times the maximum overpressure specified) has to be applied to the pressurized enclosure. To do this, the following has to be performed:

- Carefully apply a pressure of 37,5 mbar to the enclosure and hold this pressure for a period of 2 minutes +/- 10 seconds.

The test is considered satisfactory, if no permanent deformation occurs which would invalidate the type of protection.

Keep the modifications to carry out the leak test (sec. 4.3.1.3).

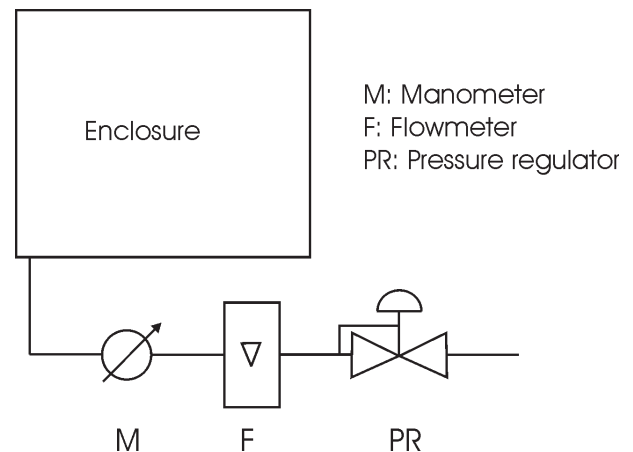


Fig. 4-2: Setup for Enclosure Tests

**WARNING****EXPLOSION HAZARD**

**Do not keep on operating the instrument, if the enclosure shows permanent deformations after performing the overpressure test!**

**Failure to follow can cause explosion, death, personal injury or property damage!**

## 4.3.3 Leak Test

The leakage of the enclosure has to be measured with an overpressure of 2.5 kPa (= max operating pressure) applied to the pressurized enclosure:

- Apply an overpressure of 2,5 kPa to the analyzer enclosure and take the reading of the flow meter.

The test is considered satisfactory, if the measured value does not exceed 1 l/min max for dual enclosures.

**Check all gaskets when measuring higher values than specified!**

**If the fault cannot be identified, it has to be maintained in the short term! In the meantime you may continue to operate the instrument, if the pressurization system can keep up the overpressure!**

**Contact your Emerson Service Center!**





**4.3 Tests After Working on the Enclosure**

**4.3.4 Test the Relief Valve's Operation**

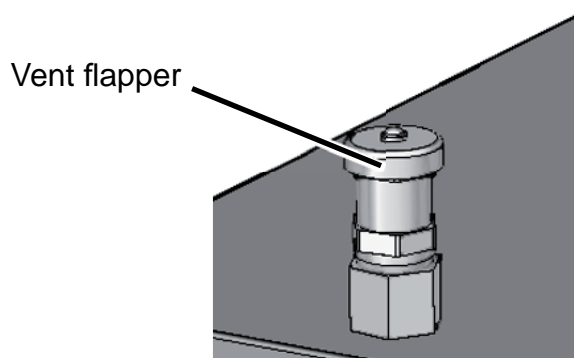
To test the valve's operation, gently increase the enclosure pressure, until the valve opens.



**The pressure required to open the valve shall not be higher than 6,5 kPa!**

If the measured pressure is higher, gently lift the vent flapper open, ensuring that the valve works freely, and adjacent repeat the test.

In case, the pressure again exceeds the given value, the valve has to be replaced! Contact your Emerson Service Center.



**Fig. 4-3:** Relief Valve's Vent Flapper

**4.3.5 Removal of Modifications**

Remove all the modifications described in section 4.3.1, to set back the analyzer to his

**4.3.6 Special Instructions**



**The internal purge gas path must not be modified!**

See the accompanying pressurization instruction manual for detailed instruction on how to operate the unit.

MLT 2 gas analyzers contain a battery for data backup purposes. This battery has been reviewed to comply with the requirements set down in EN 60079-2. Under normal operating

conditions there is no need to replace the battery during the analyzer life time. However, if it is to be replaced use only the same type and model to not void the certification of this instrument!

**WARNING**

**EXPLOSION HAZARD**

**Operating an open instrument or an instrument with disabled pressurization system for maintenance requires a hot work permit to be issued to ensure, the surrounding atmosphere is safe to operate the instrument!**

## MLT 2 CEMS Ex p

## 4.4 Replacements

## 4.4 Replacements

**WARNING****EXPLOSION HAZARD**

For replacements of components use only parts authorized by Emerson Process Management!

Failure to comply voids the certification and may cause explosions!

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

MLT 2 gas analyzers contain a battery for data backup purposes. This battery has been reviewed to comply with the requirements set down in EN 60079-2, 7.13.

Under normal operating conditions there is no need to replace the battery during the analyzer life time. However, if it is to be replaced use only the same type and model to not void the certification of this instrument!

Components important for explosion protection:

Battery	Tadiran Type: SL 760/P	U: 3.6 V Cap: 2.2 Ah System: Li/SOC2
Pressurization Unit	Goennheimer Type: FS840	
Pressure relief valve	Emerson part number ETC02007	55 hPa
Cable gland sealing plug	Emerson part number ETC00791	
Cable gland hexagon socket screw sealing plug	Emerson part number ETC00790	

**4.5 Troubleshooting**

**4.5 Troubleshooting**

For any faults not listed below, see the associated separated instruction manual of the concerned component for troubleshooting information.

If faults cannot be solved, contact your Emerson Service Center!

**4.5.1 Overpressure Is Not Generated**

Failure:

The instrument is not purged after applying power and purge gas supply.

Possible reasons	Recommended actions
Power not present	Check if power is present
Voltage not within limits as given on the nameplate label	Check supply voltage to meet specified rated voltage on the instrument's nameplate label
Purge gas pressure not within specified limits	Check purge gas supply and pressure to be between 200 and 400 kPa

Failure:

After applying power and purge gas supply, the pressurization system starts to increase the internal pressure but then stops

Possible reason	Recommended actions
Enclosure leakage too high	Check if enclosure is installed as described before
	Check all doors and openings to be closed
	Check the relief valve to be closed
	Perform a leakage test as described in section 4.4.3
	Check the pressurization system display for error messages and consult the associated manual for more information
Purge medium flow too low	Check if the purge medium at the control units outlet can exit freely. For test purpose, disconnect any possibly installed piping at the outlet.

**MLT 2 CEMS Exp**

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