

# Model 241CE II Hydrocarbon Dewpoint Analyzer

## Essential Health & Safety Requirements

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This document contains Essential Health & Safety information for the use of the Model 241CE II Hydrocarbon Dewpoint Analyzer. Data herein has been verified and validated and is believed adequate for the intended use of this instrument. If the instrument or procedures are used for purposes over and above the capabilities specified herein, confirmation of their validity and suitability should be obtained; otherwise, AMETEK does not guarantee results and assumes no obligation or liability. This publication is not a license to operate under, or a recommendation to infringe upon, any process patents.

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## Important Safety Information

Before working on the Model 241CE II Analyzer, read and understand the following Warnings and Cautions, which contain important safety and general information that applies to all aspects of working on the analyzer.

Additional Notes, Warnings, and Cautions are included in individual procedures in this document (and in the analyzer *User Manual*) to indicate special conditions to consider during installation, before opening its covers or doors, and while working on the analyzer.



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*All covers must be tightly fastened with all screws and the Measuring Cell Assembly must remain in place while the circuits are live.*

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*Always disconnect main AC power and/or alternate power sources (if used, i.e., for relay contacts) to the analyzer before opening any covers or doors on the analyzer and before removing any components from the analyzer.*

*If it is necessary to open the Ex d Electronics Enclosure while the circuits are live, first test the area for flammable gases (and proceed only when the area is safe). When the Electronics Enclosure is open, take appropriate precautions to avoid electrical shock. Hazardous voltages are present inside.*

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*All electrical connections, adjustments, or servicing of the analyzer should be performed only by properly trained and qualified personnel.*

*All electrical connections, materials, and methods (plus all safety policies and procedures) must be made in compliance with local wiring regulations and electrical codes for the hazardous area, as specified by the Owner Company, local electrical-inspection authority, and National/EU regulations.*

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***Special Conditions for Safe Use***

*During use, the Cooler Housing section of the Measuring Cell Assembly can functionally be purged with a dry gas such as air or nitrogen. The pressure of this gas at the upstream end of the breathing and draining device may not exceed atmospheric pressure by more than 70 mBAR (1 PSIG).*

*The sample gas must be above the upper explosion limit and may have a maximum pressure of 138 BAR, at a temperature of +40° C (+104° F).*

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*For electrical-shock protection, the analyzer must be operated from a grounded power source that has a securely connected protective-ground contact.*

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## About This Document

This document primarily describes the essential health and safety requirements for the Model 241CE II Hydrocarbon Dewpoint Analyzer intended for use in explosive atmosphere locations.

The procedures discussed in this document include only abbreviated steps to install, operate, and perform maintenance on the analyzer. They do, however, include all relevant safety warnings and cautions to ensure the safety of personnel and the analyzer in explosive atmosphere locations.

[For detailed descriptions of the procedures discussed in this guide, refer to the analyzer *User Manual*.]

## About the Model 241CE II Dewpoint Analyzer

The Model 241CE II Analyzer is intended for applications that require hydrocarbon dewpoint (HCDP) temperature measurements of natural gas. The analyzer can also be configured to accept an optional, external water signal to provide external water dewpoint (WDP) and water content (WCT) measurement outputs. The measurements for the HCDP and the external WDP/WCT are displayed on the analyzer's User Interface Panel.

[For detailed information about the applications suited for this analyzer, refer to the analyzer *User Manual*.]

## Specifications

Refer to the Model 241CE II Analyzer label (Figure 1) – which also indicates its ATEX certification – for electrical specifications.

[For a complete listing of all specifications, refer to Chapter 2 in the analyzer *User Manual*.]

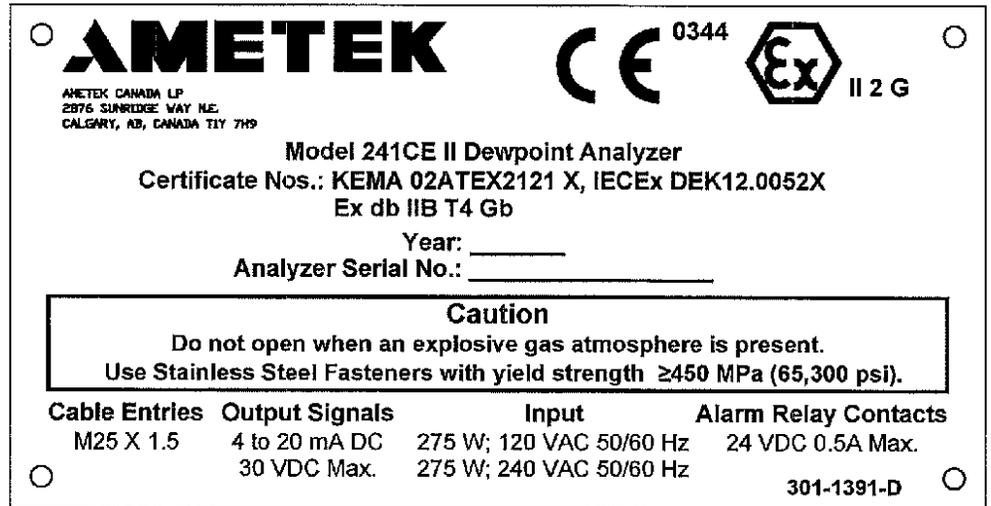


Figure 1.  
 Model 241CE II  
 Analyzer ATEX label.

# Installing the Model 241CE II Analyzer

[For complete installation details, refer to Chapter 3 in the analyzer *User Manual*.]

## AC Power and Signal Connections

The nominal operating voltage is indicated on a metal label on the front of the Ex d Enclosure. Verify that the operating voltage on the label agrees with the operating voltage indicated on the documentation supplied with the analyzer.



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*Each unused cable entry port must be plugged with a certified Ex d (flameproof) plug. The plugs are supplied by AMETEK. Do not replace these plugs with uncertified plugs.*

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### **IMPORTANT**

*Refer to the Electromagnetic Compatibility (EMC) page in the contents section of the analyzer “User Manual” for information that discusses the EMC Directive regarding techniques and wiring practices to be followed.*

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*An explosion-proof power-disconnect switch (breaker) – to be supplied by the customer/end user – rated for at least 250 VAC, 3 A, must be connected to, and mounted near, the analyzer. To satisfy local electrical codes, the switch (supplied by the customer) must be certified by the local authority for the appropriate hazardous area.*

*For safety reasons during maintenance, this switch – external to the analyzer – allows the main AC power to be disconnected from the analyzer prior to performing service on it.*

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## Making AC Power and Input/Output Signal Connections in the Explosion-Proof Electronics Enclosure

The AC electrical-supply cable, and input/output (and alarm relay) signal wires (also contained in a cable), must be approved by local wiring regulations and electrical code for the hazardous area. These cables enter the Electronics Enclosure through the Power Cable Entry and Signal Cable Entry, respectively, on the top of the Electronics Enclosure.

The AC power connections are made to the terminals designated “AC Ground”, “AC Neutral”, and “AC Line” within the explosion-proof Electronics Enclosure, as seen in Figure 2.

The analog input/output (and alarm relay) terminal assignments are also identified in Figure 2.

[For complete wiring details, refer to “Connecting the I/O Signals, Alarm Relay Contacts, and AC Power” in Chapter 3 of the analyzer *User Manual*.]

## Powering Up the Model 241CE II Analyzer

[For detailed power-up information, refer to “Powering Up the Model 241CE II Analyzer” in Chapter 3 of the analyzer *User Manual*.]



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*Prior to power-up, all local electrical codes must be followed for installing and starting up electrical equipment in hazardous locations.*

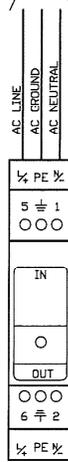
*Before powering up the analyzer, test the area for flammable gases. If an explosive gas atmosphere is present, do not apply power to the analyzer.*

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NOTE:  
CAN BE USED AS SPARE ANALOG IN or  
AS REMOTE START OPTION or AS  
EXTERNAL WATER SIGNAL OPTION

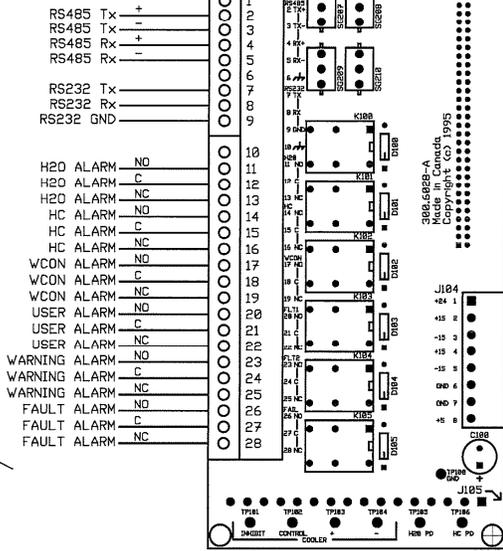
**ANALOG CUSTOMER CONNECTIONS**

**AC POWER SUPPLY MAINS**



FUSE RATINGS			
DEVICE	FUSE	120 VAC	240 VAC
SOL	FUSE F1	1A	1A
LOGIC P.C.	FUSE F2	2A	2A
COOLER P.C.	FUSE F3	6.3A	6.3A

**DIGITAL CUSTOMER CONNECTIONS**

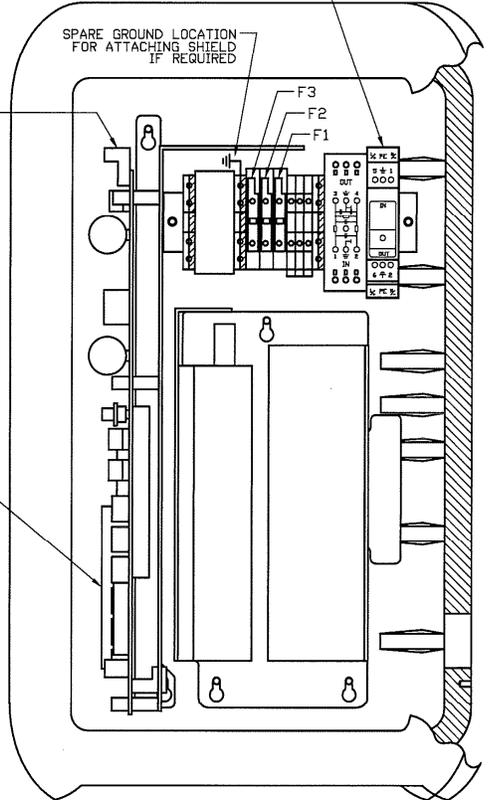


**AC POWER CUSTOMER CONNECTIONS (SEE DETAIL)**

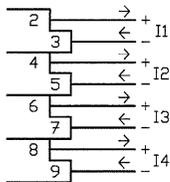
SPARE GROUND LOCATION FOR ATTACHING SHIELD IF REQUIRED

ANALOG CUSTOMER CONNECTIONS (SEE DETAIL)

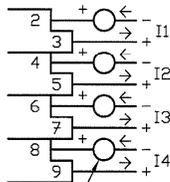
DIGITAL CUSTOMER CONNECTIONS (SEE DETAIL)



**SELF-POWERED**



**LOOP POWERED**



REFERENCE: CERTIFICATION NO:  
CSA CERTIFICATE: 1108925 (LR 48179-30)  
KEMA 02ATEX2121 X

**Figure 2.  
Customer Connections.**

## Maintenance and Troubleshooting

Follow the “Preventive Maintenance Schedule” [in Chapter 6 of the analyzer *User Manual*] to ensure continued and proper operation of the analyzer. This section/chapter [in the analyzer *User Manual*] also describes parts that require replacing, the frequency in which they should be replaced, and how to replace them.



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*Before proceeding, test the area around the analyzer for hazardous gases and proceed only when the area is found to be safe.*

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### Preventive Maintenance

Typical preventive maintenance consists of cleaning the Measuring Cell and replacing its o-ring (see Figure 3), and cleaning the Electronics Enclosure flamepath and checking it for damage (scratches, indents, etc.).

To clean and replace parts in the Measuring Cell:

1. Bleed down the sampling system and power down the analyzer.

After the sampling system has depressurized, disconnect main AC power to the analyzer by opening the explosion-proof power-disconnect switch (external to the analyzer).

[For complete details, refer to “Cleaning the Measuring Cell and Replacing its O-Ring” in Chapter 6 of the analyzer *User Manual*.]

2. Continue with the remaining procedures to disassemble, clean, replace parts in, and reassemble the sampling system components and all associated sampling system tubing:

- **Measuring Cell Assembly**

[For information about how to determine if parts in this assembly require cleaning and/or replacement, refer to “Cleaning the Measuring Cell and Replacing its O-Ring” in Chapter 6 of the analyzer *User Manual*.]



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*Shut down main AC power to the analyzer before disassembling the Measuring Cell Assembly or removing the entire Cooler Housing/Heatsink/Measuring Cell Assemblies. The joining surfaces of these assemblies are flamepaths.*

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*The Cooler Housing-to-Seal (on the Electronics Enclosure) and Heatsink Mounting Sleeve are flamepath areas. Take special care to avoid scratching, indenting, or otherwise damaging these joining surfaces. If unsure about the integrity of these flamepaths, refer to “Examining and Caring For the Flamepaths,” later in this document.*

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*The Measuring Cell Assembly contains integral flame arrestors on the bottom of the cell. Do not replace these flame arrestors with standard fittings.*

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- **Peltier Cooler** (if the Peltier Cooler and/or RTD fail)  
If the analyzer displays warning or fault messages that may indicate a faulty Peltier Cooler or RTD, AMETEK suggests returning the assembly to the factory for repair.  
[For information about alarms, refer to “Troubleshooting and Diagnostics” in Chapter 6 of the analyzer *User Manual*.]

3. Perform a leak (pressure) check on the sampling system fittings that were disconnected/reconnected.

[Refer to “Pressure Leak Check” in Chapter 3 of the analyzer *User Manual*.]

If a gas leak is detected, perform the appropriate repair procedures and retest the fittings until all leaks have been eliminated.

4. Close all doors and covers and secure them with their screws.



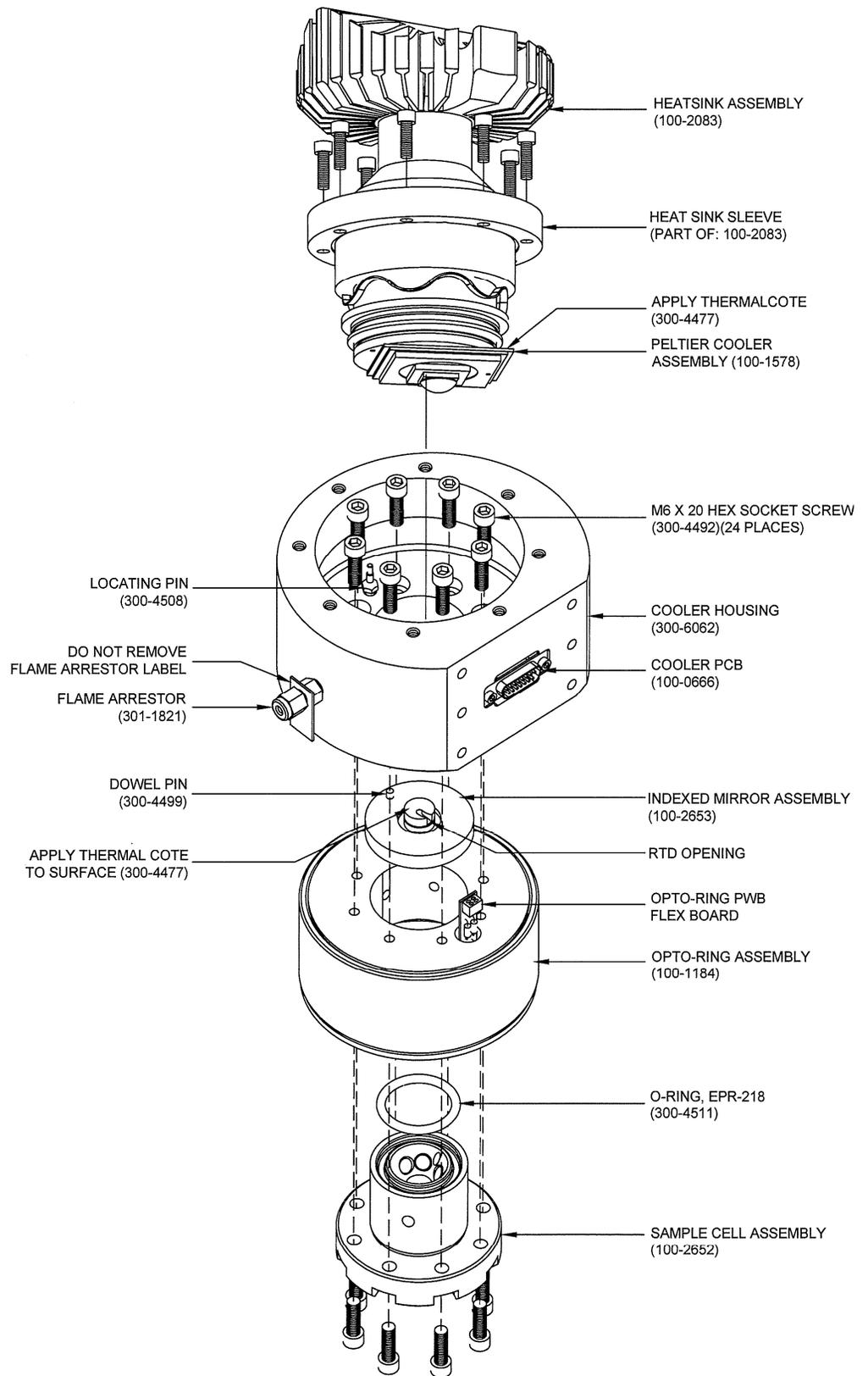
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*The torque needed to fasten M10 screws on the Ex d Enclosure is 9.0 Nm,  $\pm 0.7$  Nm (80 in.-lb,  $\pm 9$  in.-lb).*

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5. Restore AC power to the analyzer and prepare the analyzer for operation.

[Power-up instructions are described under “Cleaning the Measuring Cell and Replacing its O-Ring” in Chapter 6 of the analyzer *User Manual*.]



**Figure 3.**  
**Measuring Cell Assembly.**

## Examining and Caring For the Flamepaths

The analyzer is designed with flamepaths that will prevent flame propagation from within the analyzer's Ex d Enclosure to the outside, should an internal explosion occur.

The flamepaths on the analyzer consist of:

- The Electronics Enclosure joining surfaces (flange on enclosure/ enclosure door).

**During each analyzer maintenance, use a feeler gauge to check the flamepath gap of the Electronics Enclosure flanges (enclosure door and housing joining surfaces). The surfaces of the flanges must be flat (0.05 mm or better) and the minimum flamepath must be at least 38 mm. When the bolts are tightened, the flamepath gap must not exceed 0.08 mm. Use stainless steel fasteners with yield stress  $\geq 450$  MPa (65,300 PSI). See Warning below.**

- The User Interface Panel push-buttons and Window Housing assembly (Figure 4).

**Examine the push-buttons on the User Interface Panel for signs of wear or damage (color loss or scratches on the cylindrical portion of the push-buttons). See Warning below.**

- All separable joints in the Heatsink/Measuring Cell assemblies (Figure 3).

**If the Heatsink/Measuring Cell assemblies are separated as part of analyzer maintenance, examine the surfaces of the flanges for scratches or indentation, or other damage. See Warning below.**



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*Do not apply AC power to the analyzer if any of its flamepaths appear to be scratched, indented, or worn. Applying power to an analyzer with a damaged flamepath is dangerous and could result in serious injury or death to personnel and/or serious damage to equipment.*

*Replace the parts immediately if damage or wear is apparent. Contact AMETEK immediately if there is any doubt about the integrity of any flamepath.*

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## Electronics Enclosure Flamepaths (Joining Surfaces)

Any time the Ex d Enclosure is opened for maintenance, inspect the flamepath (joining surfaces) for scratches, indentations, or other damage. Carefully clean the flamepath with a soft, non-abrasive cloth just prior to closing it.



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*If it is necessary to use a cleaning agent, make sure the AC power to the analyzer is off. Also, the agent must be non-abrasive and must not attack aluminum (example, a suitable agent is Isopropanol). Following any maintenance and/or cleaning – and after the cleaning fluid has evaporated completely – immediately close the Ex d Enclosure.*

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*When the Ex d Enclosure is opened for maintenance or repair, take extreme care to avoid scratching or damaging its flamepaths.*

*Always close the enclosure door and secure it with one screw whenever service or maintenance is not being performed on the internal components of the Ex d Enclosure. This will reduce the risk of inadvertently scratching or damaging the flamepath.*

*Before closing the door, gently clean the flamepath (joining surfaces) with a soft, non-abrasive cloth and make sure the surfaces are free of debris.*

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*When performing equipment maintenance in hazardous areas, all safety standards and procedures must be followed, as specified by the Owner Company, local electrical-inspection authority, and National/EU regulations.*

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## Push-Button and Window Housing Flamepaths

The push-buttons and their holes in the Window Housing (on the User Interface Panel) are subject to very low rates of wear if they are used under reasonably clean conditions. However, if the analyzer is exposed to excessive dust, dirt, or other abrasive conditions, it is possible that the debris may eventually enlarge the flamepath gap between the push-buttons and their holes in the Window Housing. See Figure 4.

The push-buttons are constructed of aluminum with a blue anodized finish. The Window Housing is constructed of aluminum with a black anodized finish. Periodically, examine the push-buttons and the holes in the Window Housing for any visible signs of wear, such as color loss on the cylindrical portion of the push-buttons. **If the push-buttons show signs of wear or become damaged, contact your AMETEK Service Representative.**



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*If the push-buttons become stuck, do not attempt to dislodge them using pliers or any other tools. Do not use any force to dislodge them; doing so may scratch, bend, or otherwise damage the push-buttons, causing damage to their flamepaths. If this happens, they must be replaced.*

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Refer to Figure 4 while disassembling and reassembling the Window Housing and push-buttons.

To examine the push-buttons, their holes, and the Window Housing assembly for damage and signs of wear, and to change out damaged or worn parts:

1. Take appropriate safety precautions to safely power down the analyzer.

[For complete details about replacing the push-buttons and Window Housing Assembly, refer to “Push-Button and Window Housing Flamepaths” in Chapter 6 of the analyzer *User Manual*.]



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*Before opening the Ex d Enclosure, follow all necessary safety procedures to ensure the area is non-hazardous (main AC power to the analyzer is off, explosive gas atmosphere is not present, etc.).*

*Before performing maintenance on the analyzer, shut off main AC power and all alternate power supplies (if used) to the analyzer.*

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- Using a 5 mm ball driver, remove the twelve M6 x 16 mm hex-socket cap screws that secure the Window Housing to the enclosure door. Carefully remove the Window Housing assembly and avoid scratching or nicking it or the window.



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*If the Window Housing is stuck, do not attempt to dislodge it using any tools that can scratch, nick, or otherwise damage it or the window. Do not use any force to dislodge it.*

*If necessary, use a lubricant suitable for the hazardous area to assist in the removal of the Window Housing but ensure it is cleaned off before reassembling the Window Housing.*

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- Carefully clean the push-buttons and carefully remove any debris or other substances from around their holes. The push-buttons should freely return to their normal positions. At all times, be careful not to damage their surfaces.



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*If the push-buttons and/or their holes in the Window Housing are indented, bent, scratched, or the blue anodized finish is worn, immediately replace all of the push-buttons and the Window Housing assembly with new parts. Continue with Step 3.*

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*If the push-buttons are not damaged or worn, you do not have to remove them.*

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## Window (User Interface Panel)

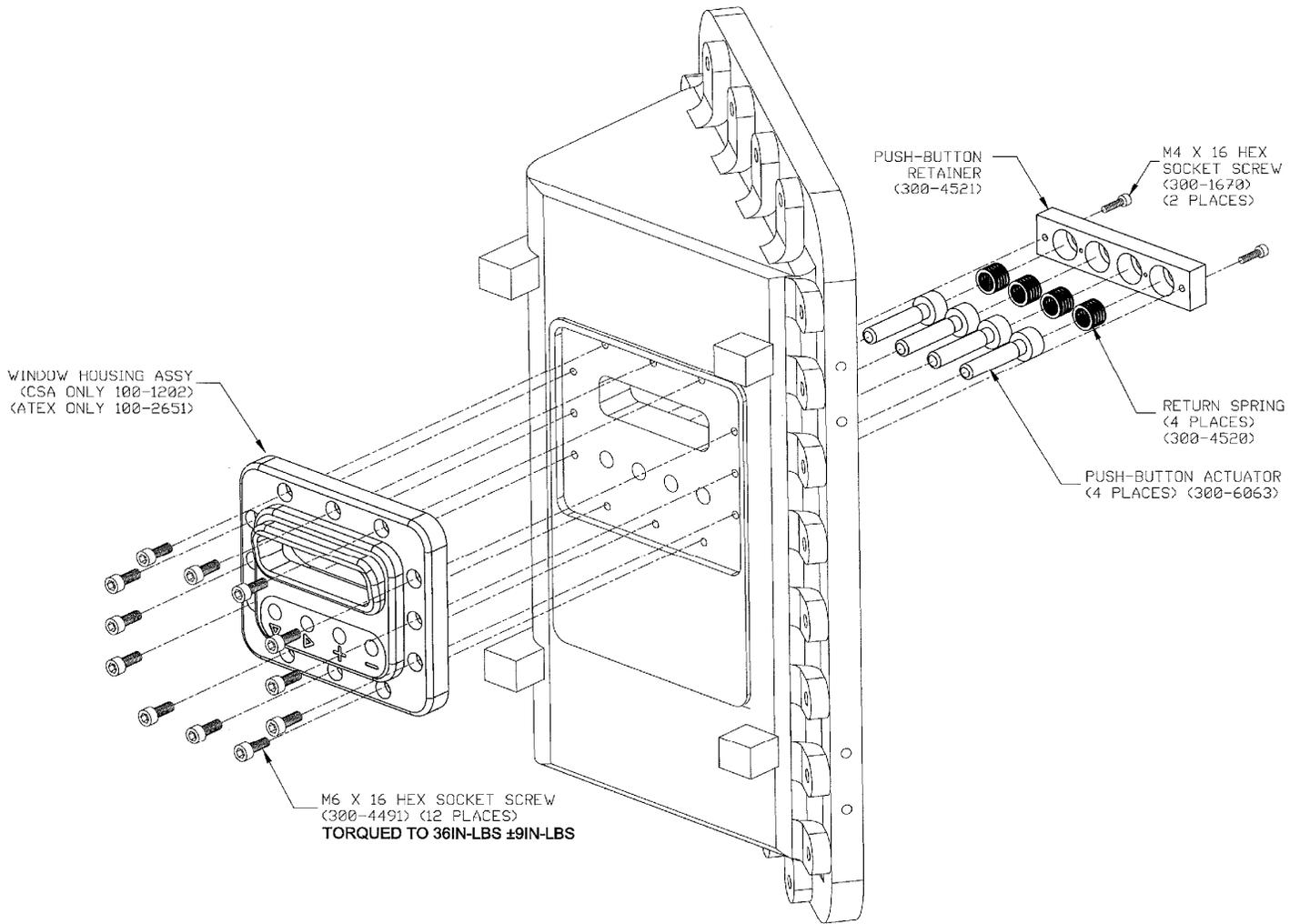
Periodically, examine the window for scratches, chips, or cracks. Replace the Window Housing assembly if it is damaged. Replace the push-buttons at the same time.



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*Be careful not to scratch the window. Scratches will reduce impact resistance.*

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**Figure 4.**  
**Window/Push-button**  
**assembly Details.**

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