# FTPA2000-400 Series Process FT-IR Spectrometers
## Manual For Safe Use

***This manual contains:*** *Safety information for installation and maintenance of the FTPA2000-400 Series Process FT-IR Spectrometers.*


IMZ9183
Revision 1-1 March 2003

**WARNING!** **All servicing of the equipment is to be performed by Qualified Service Personnel only.**

**No user/operator adjustments inside the equipment are necessary or recommended by the manufacturer.**

## Copyright



## Disclaimer

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Analytical and Advanced Solutions
585, boul. Charest Est, suite 300
Québec, QC G1K 9H4
CANADA

Phone.: 418-877-2944
North America: 800-858-3847
France: 0810 020 000
Fax: 418- 877-2834
E-mail: bomem_service@ca.abb.com

***Important:*** *Please be prepared to provide the serial numbers of all units.*

You can also visit ABB's web site at **www.abb.com/analytical**

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# ABOUT THIS MANUAL

## Audience and purpose

This manual is written to provide experienced analytical technicians with the requirements necessary for safe installation and maintenance of the FTPA2000-400 Series Process FT-IR Spectrometers.

A basic understanding of safety concepts applied to hazardous locations such as pressurization, flame proofed and intrinsically safe design is required for the audience of this manual.

| For information on: | Refer to chapter(s): |
|---|---|
| Description of the FTPA2000-400 Series Process FT-IR Spectrometers and of the pressurization system | 1. Introduction |
| Overriding the purge protection system<br>Sample/Optics compartment temperature control<br>Other precautions | 2. Safe use of the Analyzer |
| Conditions for safe installation and use of the Automatic Purge Unit | 3. Safe use of the Automatic Purge Unit |

## Conventions used in ABB manuals

*Dialog box names* are shown in italics.

This symbol refers you to another manual or document.

***Note:*** *Supplemental information to help the reader.*

***Important:*** *Information that is important, but that does not concern the safe use of the equipment.*

**This symbol shows that Caution is required. Follow the instructions carefully to avoid damage to the equipment.**

**WARNING! Failure to comply with warnings can result in serious injury or loss of life.**

# INTRODUCTION

**WARNING! Be sure to obey all warning labels on and inside the analyzer.**

## 1.1 The FTPA2000-400 Series Process FT-IR Spectrometer

The FTPA2000-400 Series Process FT-IR Spectrometer has three separate compartments and has an external Analyzer Purge Unit (APU) as shown in Figure 1-1 below. The compartments are:

- the Electronic Enclosure (EE)
- the Data Processor (DP) compartment, containing:
  - the FT-IR spectrometer
  - the data processor (a computer running Windows® 2000)
  - the power supplies
- the Sample/Optics compartment, containing:
  - the sample cell and optics
  - the fluid switching kit

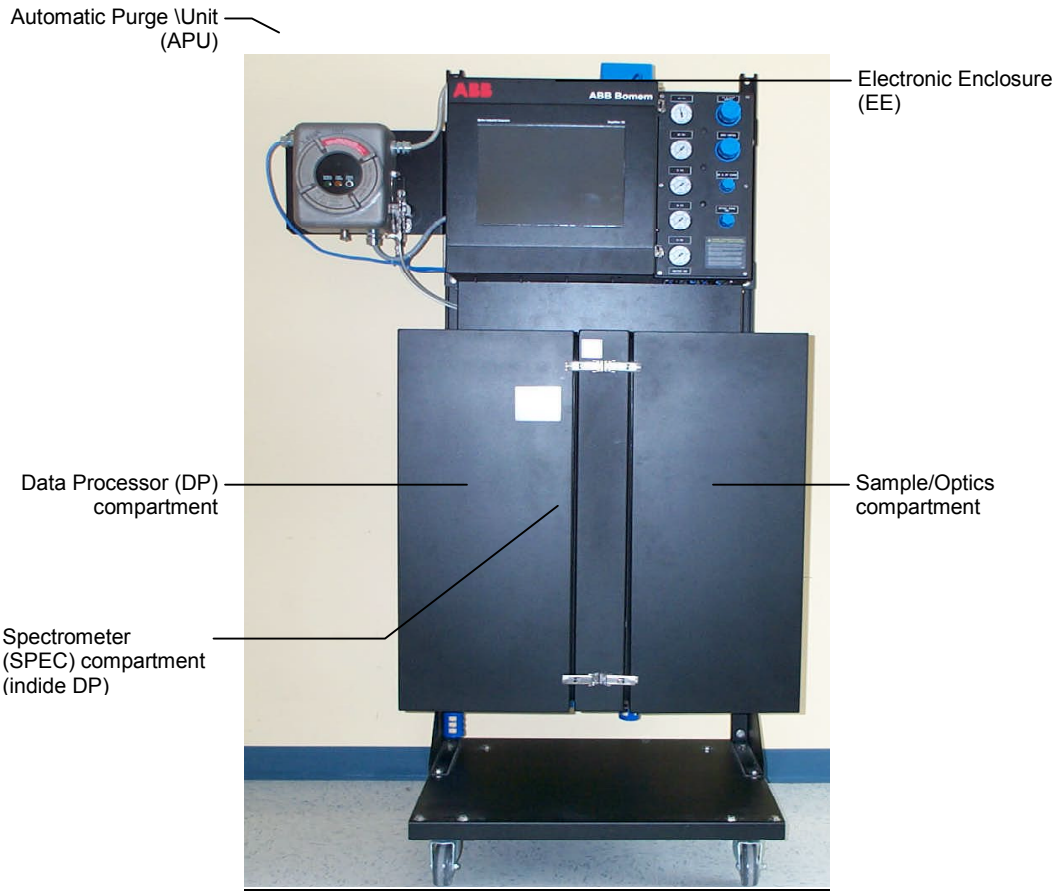



**Figure 1-1. FTPA2000-400 Series Process FT-IR Spectrometers with Automatic Purge Unit (APU)**

## 1.2 Pressurization

The Electronic Enclosure (EE), the Data Processor (DP) compartment, and the spectrometer compartment (SPEC) are purged to protect against potentially explosive atmospheres (see Table 1-1). The SPEC compartment is purged at a higher pressure than the DP compartment in which it is located. The Sample/Optics compartment is not purged.

| Compartment | Purge gas |
|---|---|
| Electronic Enclosure and Data Processor | Instrument air (clean, oil free, dry air, – 20°C dew point) |
| Spectrometer cabinet | FT-IR air (clean, oil free , dry $N_2$ or air, – 40°C dew point) |

**Table 1-1. Purge gas**

Pressurization is monitored by three differential pressure switches in the EE (see Figure 1-2 below).

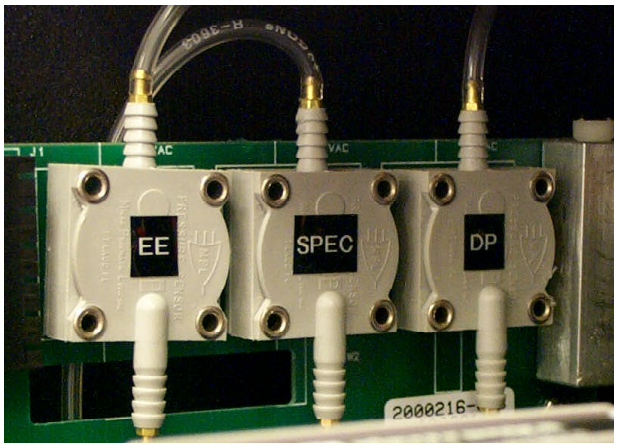



**Figure 1-2. Purge pressure switches (inside the EE)**

## 1.3 X-purge

The Anlayzer is equiped with a X-purge pressurization system, designed for a potentially explosive environment. In case of a loss of purge pressure in any of the Electronic Enclosure, the Data Processor compartment, or the spectrometer compartment, the APU cuts the power to the FTPA200-400 Series Process FT-IR Spectrometers.

***Note:*** *To open the purged compartments for maintenance purposes while the analyzer continues operation, refer to Section 2.1 on page 9.*

The pressurization system has a purge failure, fast purge and normal purge mode. At startup of the analyzer, the APU switches the Electronic Enclosure, the Data Processor compartment, and the spectrometer compartment into the fast purge mode. After a delay of minumal 7 minutes, which is sufficient to change the volume of air inside the analyzer 7 times, the APU switches into the normal purge mode.

The Analyzer Purge Unit serves as the customer connection point for power in to the FTPA2000-400 Series Process FT-IR Spectrometers and provides 11 signal isolation relays that can be used for isolation of signals in purge failure condition. Figure 1-3 on

page 4 shows the wiring details. Figure 1-4 on page 5 and Figure 1-5 on page 6 show the functional flow chart of the Automatic Purge Unit.

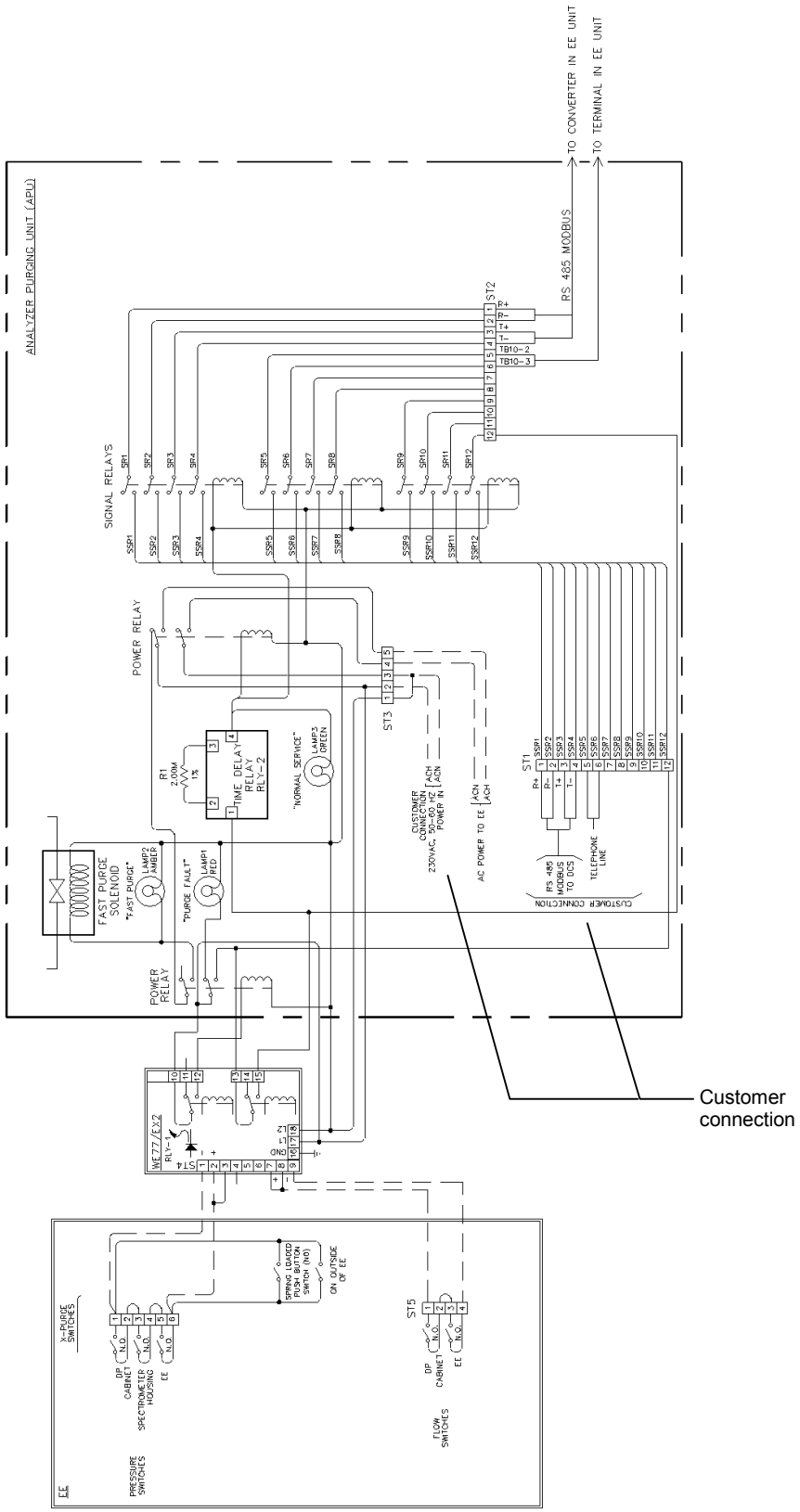



**Figure 1-3. EE and APU wiring diagram showing customer connection points (example)**

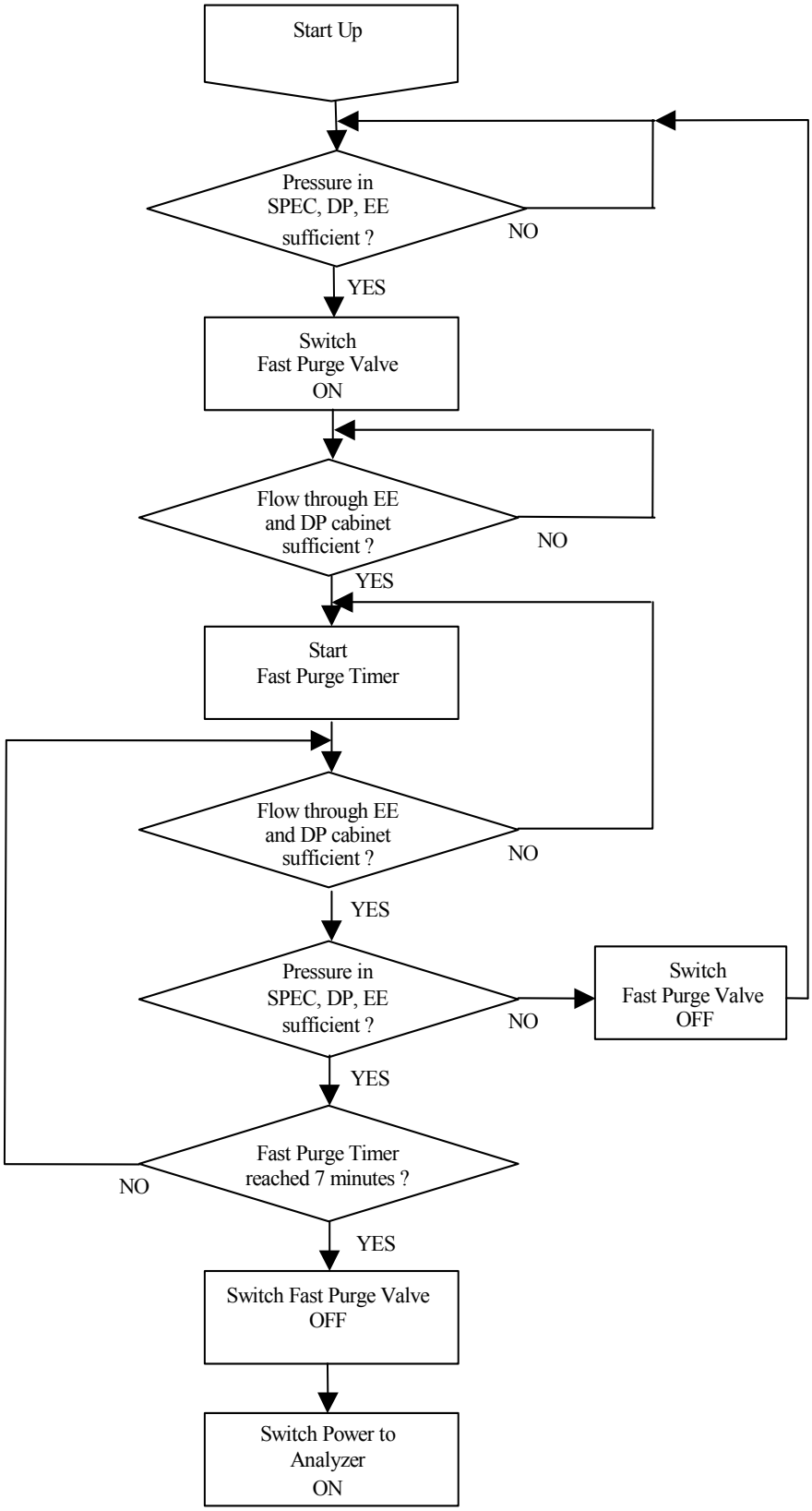



**Figure 1-4. APU Start up sequence**

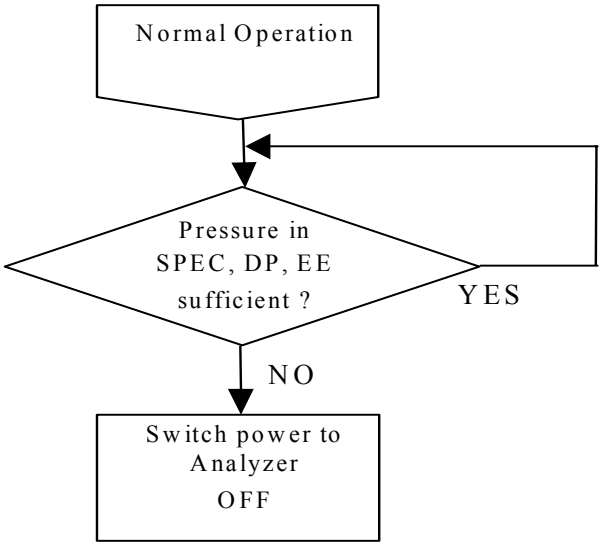
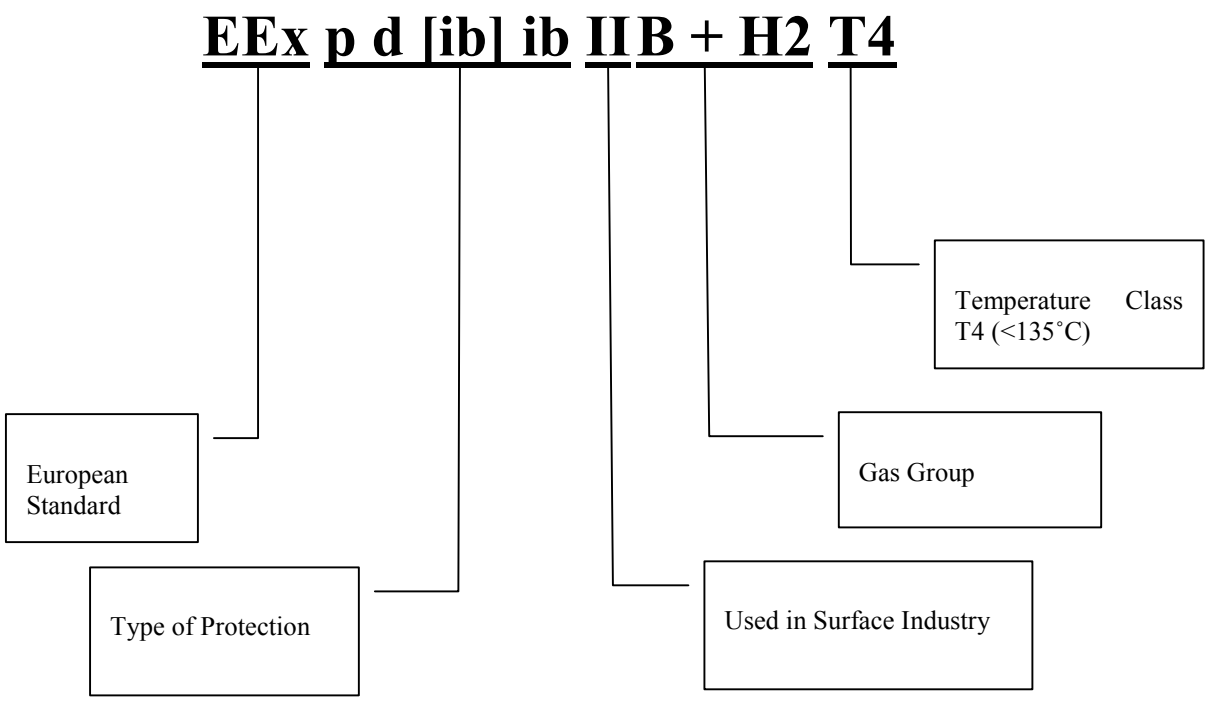



**Figure 1-5. APU normal operation**

## 1.4 Marking

The Analyzer is marked in accordance with the EN50014 standards. The marking code is as followed:




For more details and the correct interpretation of the marking please refer to the following European standards:

| | | | |
|---|---|---|---|
| EN50014 | or | IEC79-0 | General Rules |
| EN50016 | or | IEC79-2 | Pressurized apparatus |
| EN50018 | or | IEC79-1 | Flameproof Enclosures |
| EN50020 | or | IEC79-11 | Intrinsic safety |

# SAFE USE OF THE ANALYZER

## 2.1 Overriding the purge protection system

**WARNING!** **Only authorized personnel are permitted to use the purge override mechanisms.**

**During the period of overriding, the appropriate work permits and the plant authorizations are required. Ambient monitoring tools should be used to insure detection of hazardous conditions during the override period.**

As stated in Section 1.3 on page 3, in case of a loss of pressure in any of the Electronic Enclosure, the Data Processor compartment, or the spectrometer, the APU cuts the power to the FTPA2000-400 Series Process FT-IR Spectrometers.

For maintenance purposes, however, it may be necessary to open the Electronic Enclosure (EE), Data Processor (DP) compartment or Spectrometer (SPEC) compartment while the FTPA2000-400 Series Process FT-IR Spectrometers is maintained in operation. For this purpose, the analyzer has a system override mechanisms:

- The Purge Override button on the EE
- The Purge Override plug (inside the EE)

### *2.1.1 Opening the Analyzer*

To override the purge protection system in order to open the analyzer while the analyzer continues operation, use the following procedure:

1. Press and hold the Purge Override button on the EE (the button accessible from the outside of the EE on the right hand side)

2. Open the EE door.

3. Unplug the Purge Override plug (inside the EE) from its normal position and plug it into its override position (see Figure 2-1 below).

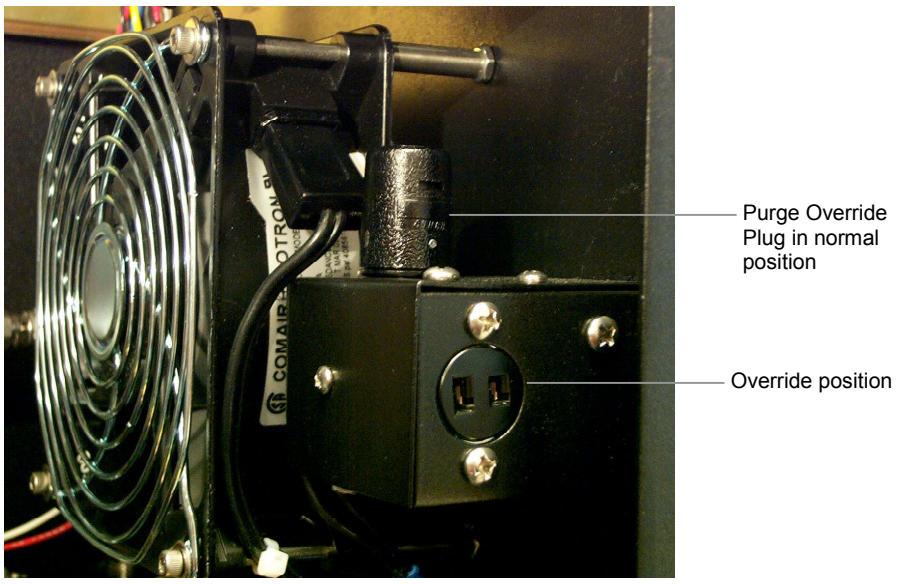



**Figure 2-1. Purge Override Plug**

4. Release the Purge Override button on the EE.

In case access to the Data Processor compartment or to the Spectrometer compartment is required the doors can now be opened.

To reactivate the purge protection system, use the following procedure:

1. Close SPEC and DP doors.
2. Press and hold the Purge Override button on the EE.
3. Unplug the Purge Override plug (inside the EE) from its override position and plug it into its normal position (see Figure 2-1 on page 9).
4. Close the EE door and wait a minimum of 30 seconds so that the pressure in the enclosures can be built up.
5. Release the Purge Override button on the EE.

## 2.2 Sample/Optics compartment temperature control

***Important:*** *Proper operation of the following safety features is essential to the safe operation of the FTPA2000-400 Series Process FT-IR Spectrometer.*

**WARNING!** **Only authorized personnel trained by ABB are permitted to carry out the installation, replacement, or modification of safety relevant parts.**

**Proper operation of the following safety features is essential to the safe operation of the FTPA2000-400 Series Process FT-IR Spectrometer and needs to be verified on a routine base.**

An Air Bath heater is used in the Sample/Optics compartment to insure proper temperature control of the sample and sampling cell. The Air Bath heater is protected against excessive surface temperature by temperature sensors located at the inside of the heater outlet. These sensors are connected to two temperature switches (relays) in the EE: the Over Temperature Limit (OTL) switch and the Over Temperature Shutoff (OTS) switch.

If the temperature is high enough to trigger the OTL switch, the power to the Air Bath heater is switched off and the yellow OTL LED lights (see Figure 2-2 on page 11). The OTL switch resets automatically when the temperature in the Air Bath heater has decreased to a lower limit.

If the OTL switch fails to trigger and the temperature continues to increase, the OTS switch will switch off the power to the Air Bath heater before the surface temperature of

the heater exceeds the allowed limit for the hazardous area (T4 rating). The red OTS LED will light to indicate this condition. The OTS switch must be reset manually using the RESET button (see Figure 2-2 below).

In addition to the two temperature switches there is a pressure switch that switches off the Air Bath heater if there is not enough airflow through it. The yellow PRES SW LED will light to indicate this condition (see Figure 2-2 below). The pressure switch resets automatically when the pressure in the Air Bath heater has been restored.

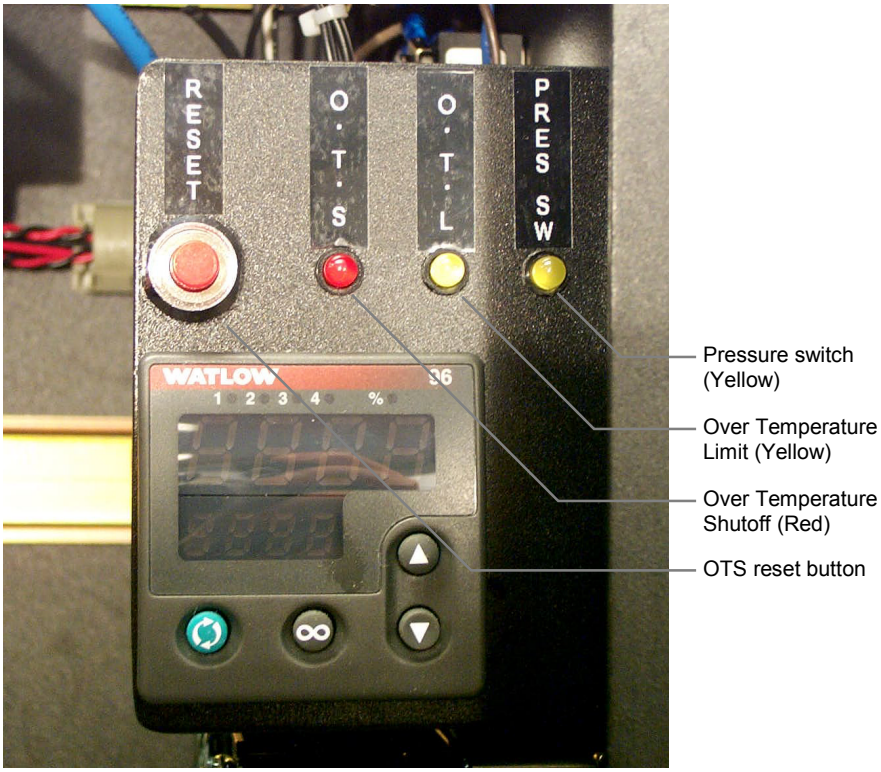



**Figure 2-2. Temperature and pressure indicator LEDs**

## 2.3 Solenoid Valves

Solenoid Valves are mounted in the inside of the Electronic Enclosure (EE). Those solenoid valves are used for operating pneumatic activated valves inside the analyzer sample compartment or externally to the analyzer for e.g. auto collect function or stream selection at secondary sample systems. In case of an improper operating valve sample may enter the air activation line and reach the solenoid valve. A leakage of the Solenoid valve may result in sample entering the Electronic Enclosure.

**WARNING! Proper maintenance of the pneumatic operated valves is essential to the safe operation of the FTPA2000-400 Series Process FT-IR Spectrometer and needs to be verified on a routine base.**

## 2.4 Barrier Windows

Barrier Windows are used to separate the spectrometer compartment from the sample compartment. They are hold in place by window holders. In case of a broken or leaking

barrier window sample may enter the spectrometer cabinet if a sample Cell window is broken or if sample is leaking into the optical conduits.

**WARNING!** **The barrier windows have an essential safety function in a case of a broken or leaking sample cell window since they prevent sample from entering the spectrometer compartment.**

**The barrier windows and o-rings holding the barrier windows in place need to be checked for damage and the air tightness needs to be verified on a routine base.**

## 2.5 LCD Screen

The LCD screen is a sensitive device. Be sure to observe the following precautions

**WARNING!** **Cleaning the LCD screen can create electrostatic discharge. To prevent this, clean the screen with a dry cloth only.**

**The screen must be protected against mechanical shocks above 2 Joules.**

# SAFE USE OF THE AUTOMATIC PURGE UNIT

**WARNING!** **Only authorized personnel trained by ABB are permitted to carry out the installation, replacement, or modification of safety relevant parts.**

**WARNING!** **Make sure the following conditions are respected.**

## 3.1 Mechanical protection

The APU must be protected against mechanical shocks above 2 Joules.

## 3.2 Atmospheric conditions

The APU must not be used above a pressure of 1.14 times the atmospheric pressure.

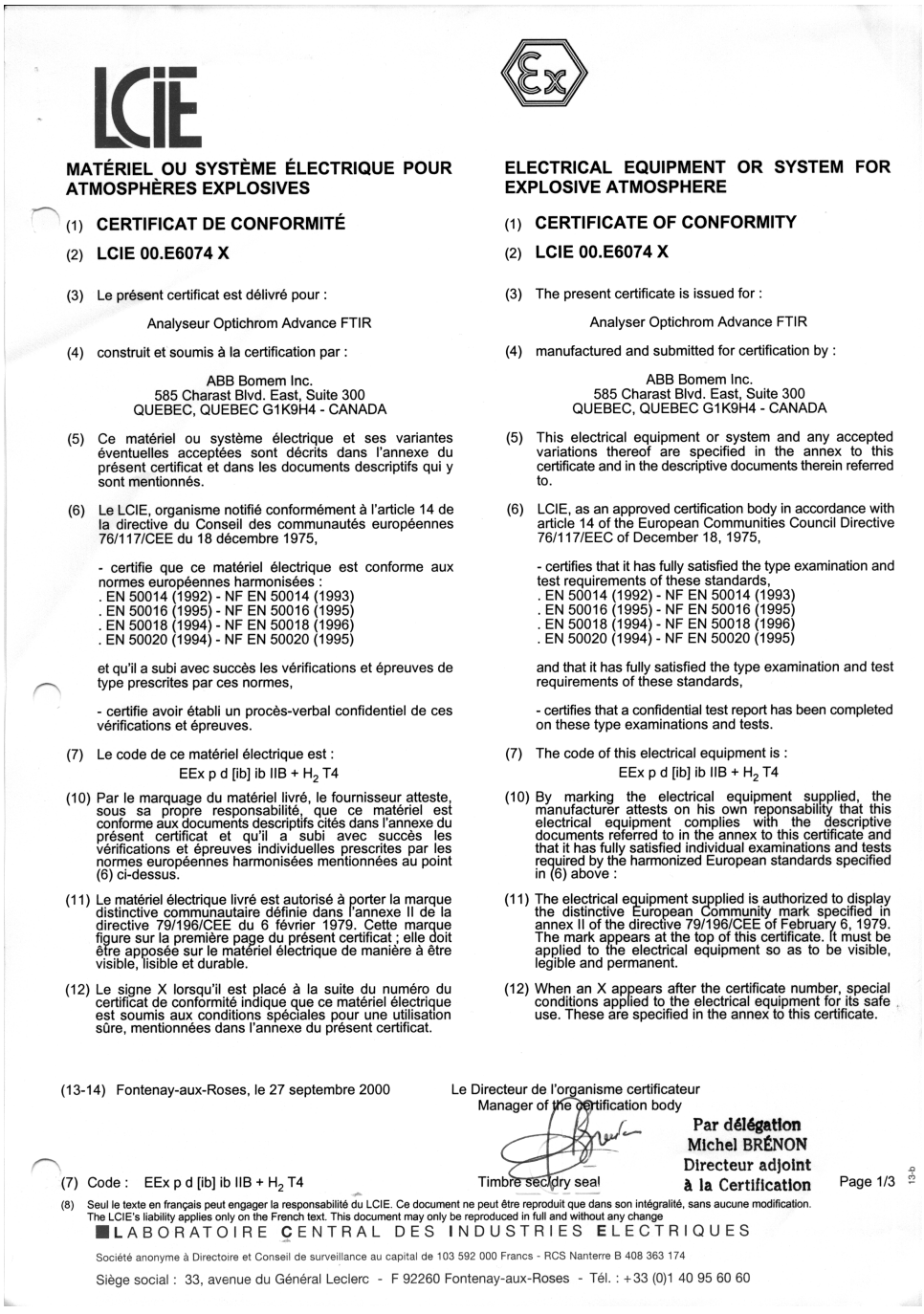
## 3.3 Installation

Certified flameproof cable entries or threaded metal conduits may be connected to the APU enclosure. These accessories must be screwed in with at least 5 threads engaged on a length of engaged threads of at least 8 mm. Unused threaded holes must be plugged with certified threaded plugs only.

Refer to Figure 1-3 on page 4 for wiring details.

# CERTIFICATIONS

## 4.1 Certificate of Conformity



**MATÉRIEL OU SYSTÈME ÉLECTRIQUE POUR ATMOSPHÈRES EXPLOSIVES**

(1) **CERTIFICAT DE CONFORMITÉ**

(2) **LCIE 00.E6074 X**

(3) Le présent certificat est délivré pour :

Analyseur Optichrom Advance FTIR

(4) construit et soumis à la certification par :

ABB Bomem Inc.
585 Charast Blvd. East, Suite 300
QUEBEC, QUEBEC G1K9H4 - CANADA

(5) Ce matériel ou système électrique et ses variantes éventuelles acceptées sont décrits dans l'annexe du présent certificat et dans les documents descriptifs qui y sont mentionnés.

(6) Le LCIE, organisme notifié conformément à l'article 14 de la directive du Conseil des communautés européennes 76/117/CEE du 18 décembre 1975,

- certifie que ce matériel électrique est conforme aux normes européennes harmonisées :
. EN 50014 (1992) - NF EN 50014 (1993)
. EN 50016 (1995) - NF EN 50016 (1995)
. EN 50018 (1994) - NF EN 50018 (1996)
. EN 50020 (1994) - NF EN 50020 (1995)

et qu'il a subi avec succès les vérifications et épreuves de type prescrites par ces normes,

- certifie avoir établi un procès-verbal confidentiel de ces vérifications et épreuves.

(7) Le code de ce matériel électrique est :

EEx p d [ib] ib IIB + $H_2$ T4

(10) Par le marquage du matériel livré, le fournisseur atteste, sous sa propre responsabilité, que ce matériel est conforme aux documents descriptifs cités dans l'annexe du présent certificat et qu'il a subi avec succès les vérifications et épreuves individuelles prescrites par les normes européennes harmonisées mentionnées au point (6) ci-dessus.

(11) Le matériel électrique livré est autorisé à porter la marque distinctive communautaire définie dans l'annexe II de la directive 79/196/CEE du 6 février 1979. Cette marque figure sur la première page du présent certificat ; elle doit être apposée sur le matériel électrique de manière à être visible, lisible et durable.

(12) Le signe X lorsqu'il est placé à la suite du numéro du certificat de conformité indique que ce matériel électrique est soumis aux conditions spéciales pour une utilisation sûre, mentionnées dans l'annexe du présent certificat.

**ELECTRICAL EQUIPMENT OR SYSTEM FOR EXPLOSIVE ATMOSPHERE**

(1) **CERTIFICATE OF CONFORMITY**

(2) **LCIE 00.E6074 X**

(3) The present certificate is issued for :

Analyser Optichrom Advance FTIR

(4) manufactured and submitted for certification by :

ABB Bomem Inc.
585 Charast Blvd. East, Suite 300
QUEBEC, QUEBEC G1K9H4 - CANADA

(5) This electrical equipment or system and any accepted variations thereof are specified in the annex to this certificate and in the descriptive documents therein referred to.

(6) LCIE, as an approved certification body in accordance with article 14 of the European Communities Council Directive 76/117/EEC of December 18, 1975,

- certifies that it has fully satisfied the type examination and test requirements of these standards,
. EN 50014 (1992) - NF EN 50014 (1993)
. EN 50016 (1995) - NF EN 50016 (1995)
. EN 50018 (1994) - NF EN 50018 (1996)
. EN 50020 (1994) - NF EN 50020 (1995)

and that it has fully satisfied the type examination and test requirements of these standards,

- certifies that a confidential test report has been completed on these type examinations and tests.

(7) The code of this electrical equipment is :

EEx p d [ib] ib IIB + $H_2$ T4

(10) By marking the electrical equipment supplied, the manufacturer attests on his own reponsability that this electrical equipment complies with the descriptive documents referred to in the annex to this certificate and that it has fully satisfied individual examinations and tests required by the harmonized European standards specified in (6) above :

(11) The electrical equipment supplied is authorized to display the distinctive European Community mark specified in annex II of the directive 79/196/CEE of February 6, 1979. The mark appears at the top of this certificate. It must be applied to the electrical equipment so as to be visible, legible and permanent.

(12) When an X appears after the certificate number, special conditions applied to the electrical equipment for its safe use. These are specified in the annex to this certificate.

(13-14) Fontenay-aux-Roses, le 27 septembre 2000

Le Directeur de l'organisme certificateur
Manager of the certification body

Par délégation
Michel BRÉNON
Directeur adjoint
à la Certification

(7) Code : EEx p d [ib] ib IIB + $H_2$ T4

Timbre sec/dry seal

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Siège social : 33, avenue du Général Leclerc - F 92260 Fontenay-aux-Roses - Tél. : +33 (0)1 40 95 60 60

LCIE

(9) **CERTIFICAT DE CONFORMITÉ**
**LCIE 00.E6074 X**

**ANNEXE**

(A1) DÉSIGNATION DU MATÉRIEL OU SYSTÈME ÉLECTRIQUE CERTIFIÉ :

Analyseur
Type : Optichrom Advance FTIR

(A2) DESCRIPTION DU MATÉRIEL OU SYSTÈME ÉLECTRIQUE CERTIFIÉ :

L'Opticrom Advance FTIR Analyseur est composé de cinq parties principales :
1) Sample/Optics
2) Régulateur Electronique (EC)
3) Traitement de données/Alimentation (DP/PS)
4) Spectromètre
5) Unité de pressurisation automatique (APU)

(A3) DOCUMENTS DESCRIPTIFS :

Dossier de certification N° AS190900-001 du 19/09/2000.
Ce dossier comprend 16 rubriques (31 pages).

(A4) PARAMÈTRES SPÉCIFIQUES DU OU DES MODES DE PROTECTION CONCERNÉS :

Les caractéristiques électriques des câbles entre la barrière Zener WE77/Ex2 (placée dans l'unité de pressurisation) et les deux Flow switches DW812 (situés sur l'enveloppe du FTIR) ne doivent pas excéder les valeurs suivantes :
$L \leq 31$ mH  $C \leq 609$ nF

(A5) MARQUAGE DU MATÉRIEL CERTIFIÉ :

Le marquage doit être visible, lisible et durable ; il doit comporter le marquage réduit suivant :

ABB Bomen Inc.
Type : Optichrom Advance FTIR
N° de fabrication : ...
LCIE 00.E6074 X
EEx p d [ib] ib IIB + $H_2$ T4
Volume interne libre : EC = 76 $dm^3$
Interféromètre = 55 $dm^3$ PS/DP = 156 $dm^3$
Gaz de protection : Air ou Azote
Débit minimal de gaz de protection : 114 l/min
Durée minimale de balayage : 7 min
Surpression minimale : EC = 0,8 mbar
Interféromètre = 0,8 mbar PS/DP = 0,8 mbar
Surpression maximale : EC = 7 mbar
Interféromètre = 9 mbar PS/DP = 7 mbar
Débit maximal de fuite : EC = 8 l/min
Interféromètre = 12 l/min PS/DP = 24 l/min
ATTENTION AUX RISQUES D'ASPHYXIE

Le matériel devra également comporter le marquage normalement prévu par les normes de construction du matériel électrique concerné.

(9) **CERTIFICATE OF CONFORMITY**
**LCIE 00.E6074 X**

**SCHEDULE**

(A1) NAME OF THE CERTIFIED ELECTRICAL EQUIPMENT OR SYSTEM :

Analyser
Type : Optichrom Advance FTIR

(A2) DESCRIPTION OF THE CERTIFIED ELECTRICAL EQUIPMENT OR SYSTEM :

The Opticrom Adavance FTIR Analyser consists of five major parts :
1) Sample/Optics
2) Electronic Controller (EC)
3) Data Processor/Power supply (DP/PS)
4) Spectrometer
5) Automatic Purge Unit (APU)

(A3) DESCRIPTIVE DOCUMENTS :

Certification file N° AS190900-001 dated 19/09/2000.
This file includes 16 items (31 pages).

(A4) SPECIFIC PARAMETERS OF THE MODE(S) OF PROTECTION CONCERNED :

The electrical characteristics of the cables between the Zener WE77/Ex2 (mounted in the pressurization unit) and the two Flow switches DW812 (situated on the FTIR enclosure) shall not exceed the following values :
$L \leq 31$ mH  $C \leq 609$ nF

(A5) MARKING OF THE CERTIFIED EQUIPMENT :

The marking must be visible, legible and permanent, and must include the following shortened marking :

ABB Bomen Inc.
Type : Optichrom Advance FTIR
Serial number : ...
LCIE 00.E6074 X
EEx p d [ib] ib IIB + $H_2$ T4
Internal free volume : EC = 76 $dm^3$
Interferometer = 55 $dm^3$ PS/DP = 156 $dm^3$
Protection gas : Air or Nitrogen
Protection gas minimum flow rate : 114 l/min
Minimum purging time : 7 min
Minimum pressure : EC = 0,8 mbar
Interferometer = 0,8 mbar PS/DP = 0,8 mbar
Maximum pressure : EC = 7 mbar
Interferometer = 9 mbar PS/DP = 7 mbar
Maximum leackage flow rate : EC = 8 l/min
Interferometer = 12 l/min PS/DP = 24 l/min
ATTENTION : ASPHYXIATION RISKS

The equipment must also carry the usual marking required by the manufacturing standards applying to such equipments.

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LCIE

(9) **CERTIFICAT DE CONFORMITÉ**
**LCIE 00.E6074 X**

**ANNEXE (suite)**

(A6) VÉRIFICATIONS ET ÉPREUVES INDIVIDUELLES :

- Le fabricant doit effectuer les essais et vérifications assurant que l'appareil produit est conforme à celui testé par le laboratoire d'essai notifié (§ 23 de l'EN 50014).

- Sur l'APU, essai de surpression : 14 bars minimum doivent être appliqués à l'enveloppe "d" du système de pressurisation (APU), selon le paragraphe 16 de l'EN 50018.

- Sur le système FTIR (EC, Interféromètre et DP/PS) :
  . Essai de surpression selon le paragraphe 15.1 de l'EN 50016.
  . Essai de fuite selon le paragraphe 15.2 de l'EN 50016.

- Pour les produits PIBB, chaque transformateur doit être soumis au test diélectrique du paragraphe 11 de l'EN 50020.

(A7) CONDITIONS SPÉCIALES POUR UNE UTILISATION SÛRE :

- Le "jumper" ne peut être utilisé que par des personnes compétentes et en l'absence d'atmosphère explosible.

- Pour le PSP et PIBB :
  . La cartouche d'application AC doit être rechargée dans une zone non dangereuse.
  . Le PIBB doit être placé dans une zone non dangereuse ou dans une enveloppe pressurisée ou antidéflagrante.

- L'unité de pressurisation :
Cet équipement ne peut être utilisé qu'à une pression maximum inférieure à 1.14 x P atmosphérique.

- L'équipement doit être protégé contre les chocs mécaniques supérieurs à 2 Joules.

- Les conditions additionnelles et les prescriptions particulières des certificats 92.C101.175 X, 93C103.1113 X, 93C.103.1114 X, 93C.103.1124 U, 93C.103.1108 U, 92C.1031017 X, 93C.103.1122 U et 93C.103.1116 X établis par l'ISSEP restent d'application.

(9) **CERTIFICATE OF CONFORMITY**
**LCIE 00.E6074 X**

**SCHEDULE (continued)**

(A6) INDIVIDUAL EXAMINATIONS AND TESTS :

- The manufacturer shall make the routine verifications and tests necessary to ensure that the electrical apparatus producted complies with the one tested by the notified body (§ 23 of EN 50014 standard).

- On the APU, overpressure test at 14 bars minimum on the "d" enclosure according to the paragraph 16 of EN 50018.

- On the FTIR System (EC, Interferometer and DP/PS) :
  . Overpressure test according to the paragraph 15.1 of EN 50016.
  . Leackage test according to the paragraph 15.2 of EN 50016.

- For the PIBB product, each transformer shall be submitted to the voltage test of § 11 (according to EN 50020).

(A7) SPECIAL CONDITIONS FOR SAFE USE :

- The "jumper" may only be used by authorized persons and in non hazardous area.

- PSP and PIBB equipments :
  . The application cartridge AC must be recharged in a non hazardous area.
  . The PIBB has to be situated in a non hazardous area or in a flameproof enclosure or in a pressurized enclosure.

- APU :
This apparatus shall be used at an absolute maximum presse equal to 1.14 times the atmospheric pressure.

- The equipment shall be protected against mechanical shocks above 2 Joules.

- The additional conditions and the particular prescriptions of the certificates 92.C101.175 X, 93C103.1113 X, 93C.103.1114 X, 93C.103.1124 U, 93C.103.1108 U, 92C.1031017 X, 93C.103.1122 U and 93C.103.1116 X established by ISSEP are still relevant for this equipment.

05.01



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## 4.2 Variation

(9) **CERTIFICAT DE CONFORMITÉ**
**LCIE 00.E6074 X du 27/09/00**

**AVENANT 00.E6074 X/01**

(A1) DÉSIGNATION DU MATÉRIEL OU SYSTÈME ÉLECTRIQUE CERTIFIÉ :

Analyseur Optichrom Advance
Type : FTIR
Fabriqué par : ABB Bomen

(A2) OBJET DE L'AVENANT, DESCRIPTION DU MATÉRIEL OU SYSTÈME ÉLECTRIQUE CERTIFIÉ :

- Modification de l'unité de pressurisation.
- Modification de la barrière WE77/EX2.
- Modification de la partie "four".

(A3) DOCUMENTS DESCRIPTIFS :

Dossier technique n° AS101201-001 rév. 1.0 du 10/12/01.
Ce dossier comprend 20 rubriques (31 pages).

(A4) PARAMÈTRES SPÉCIFIQUES DU OU DES MODES DE PROTECTION CONCERNÉS :

Les caractéristiques des câbles entre la barrière KF A5 (6) - SR2 - EX2 et les 2 Flow Switches ne doivent pas dépasser :

$L \leq 97$ mH $\quad C \leq 1{,}71\ \mu F$

(A5) MARQUAGE DU MATÉRIEL CERTIFIÉ :

Marquage complémentaire à côté de l'écran LCD :

- NETTOYER AVEC UN CHIFFON HUMIDE
- DOIT ETRE PROTEGE CONTRE LES CHOCS MECANIQUES SUPERIEURS A 2 JOULES.

(A6) VÉRIFICATIONS ET ÉPREUVES INDIVIDUELLES :

Inchangées.

(A7) CONDITIONS SPÉCIALES POUR UNE UTILISATION SÛRE :

Inchangées.

(13-14) Fontenay-aux-Roses, le 4 avril 2002

(9) **CERTIFICATE OF CONFORMITY**
**LCIE 00.E6074 X dated 09/27/00**

**VARIATION 00.E6074 X/01**

(A1) NAME OF THE CERTIFIED ELECTRICAL EQUIPMENT OR SYSTEM :

Optichrom Advance analyser
Type : FTIR
Manufactured by : ABB Bomen

(A2) SUBJECT OF THE VARIATION, DESCRIPTION OF THE CERTIFIED ELECTRICAL EQUIPMENT OR SYSTEM :

- Modification of the pressurisation unit.
- Modification of the barrier WE77/EX2.
- Modification of the "Air bath heater"

(A3) DESCRIPTIVE DOCUMENTS :

Technical file n° AS101201-001 rev. 1.0 dated 10/12/01.
This file includes 20 items (31 pages).

(A4) SPECIFIC PARAMETERS OF THE MODE(S) OF PROTECTION CONCERNED :

The parameters of the interconnecting cables between the barrier KF A5 (6) - SR2 - EX2 and the 2 Flow Switches shall not exceed :
$L \leq 97$ mH $\quad C \leq 1{,}71\ \mu F$

(A5) MARKING OF THE CERTIFIED EQUIPMENT :

Additional marking next to LCD display :

- CLEAN WITH DAMP CLOTHES ONLY
- SHALL BE PROTECTED AGAINST MECHANICAL SHOCKS ABOVE 2 JOULES.

(A6) INDIVIDUAL EXAMINATIONS AND TESTS :

Unchanged.

(A7) SPECIAL CONDITIONS FOR SAFE USE :

Unchanged.

Le Directeur de l'organisme certificateur
Manager of the certification body

Par délégation
Daniel BRÉNON
Directeur adjoint
de la Certification

Timbre sec/Dry seal

(7) Code : EEx p d [ib] ib IIB + $H_2$ T4

13-c

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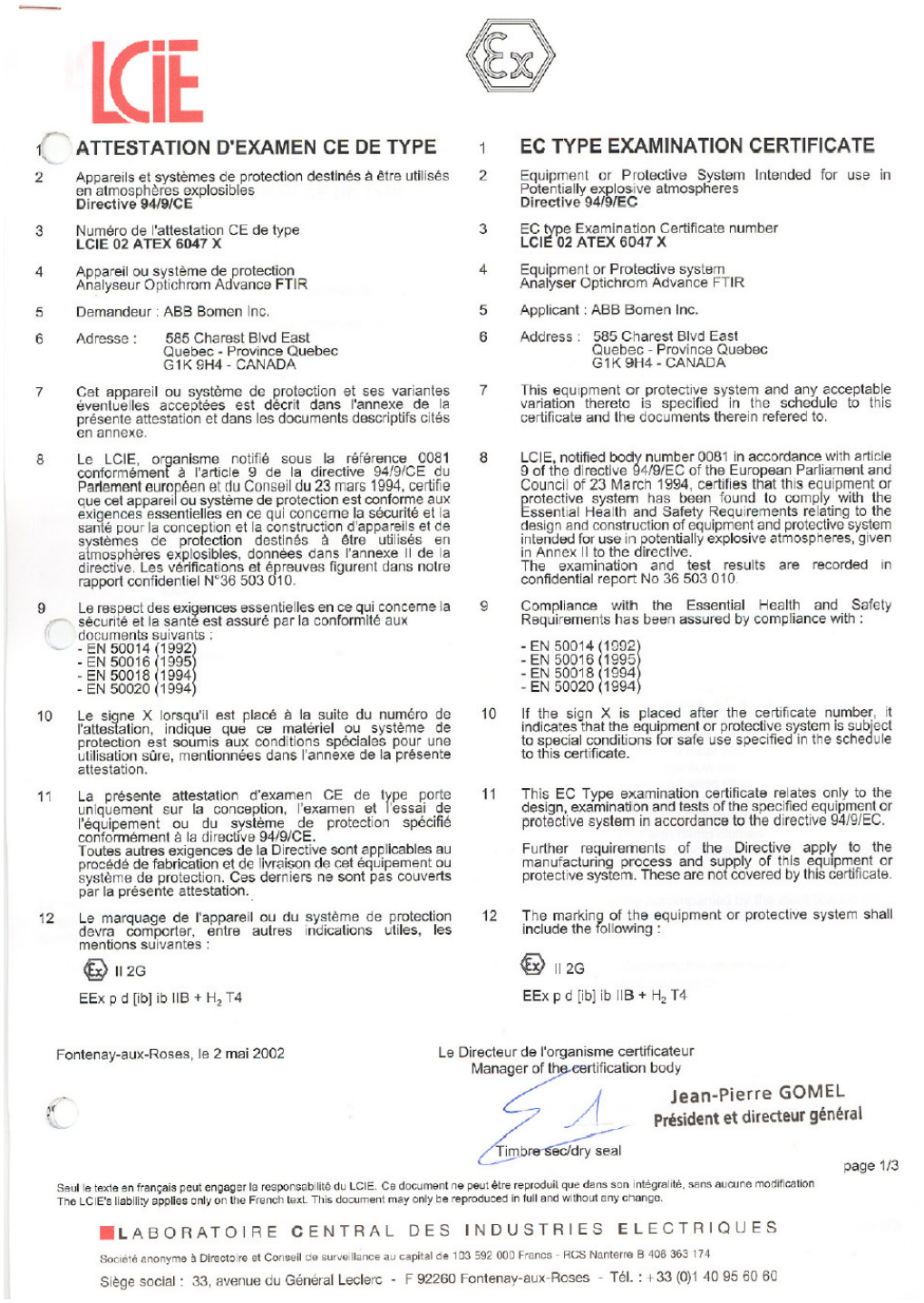
LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES
Société anonyme à Directoire et Conseil de surveillance au capital de 15 745 984 euros - RCS Nanterre B 408 363 174
33, avenue du Général Leclerc - BP n° 8 - F 92266 FONTENAY-AUX-ROSES CEDEX - Tél. : +33 1 40 95 60 60

## 4.3 EC Type Examination Certification



1 **ATTESTATION D'EXAMEN CE DE TYPE**

2 Appareils et systèmes de protection destinés à être utilisés en atmosphères explosibles
**Directive 94/9/CE**

3 Numéro de l'attestation CE de type
**LCIE 02 ATEX 6047 X**

4 Appareil ou système de protection
Analyseur Optichrom Advance **FTIR**

5 Demandeur : ABB Bomen Inc.

6 Adresse : 585 Charest Blvd East
Quebec - Province Quebec
G1K 9H4 - CANADA

7 Cet appareil ou système de protection et ses variantes éventuelles acceptées est décrit dans l'annexe de la présente attestation et dans les documents descriptifs cités en annexe.

8 Le LCIE, organisme notifié sous la référence 0081 conformément à l'article 9 de la directive 94/9/CE du Parlement européen et du Conseil du 23 mars 1994, certifie que cet appareil ou système de protection est conforme aux exigences essentielles en ce qui concerne la sécurité et la santé pour la conception et la construction d'appareils et de systèmes de protection destinés à être utilisés en atmosphères explosibles, données dans l'annexe II de la directive. Les vérifications et épreuves figurent dans notre rapport confidentiel N°36 503 010.

9 Le respect des exigences essentielles en ce qui concerne la sécurité et la santé est assuré par la conformité aux documents suivants :
- EN 50014 (1992)
- EN 50016 (1995)
- EN 50018 (1994)
- EN 50020 (1994)

10 Le signe X lorsqu'il est placé à la suite du numéro de l'attestation, indique que ce matériel ou système de protection est soumis aux conditions spéciales pour une utilisation sûre, mentionnées dans l'annexe de la présente attestation.

11 La présente attestation d'examen CE de type porte uniquement sur la conception, l'examen et l'essai de l'équipement ou du système de protection spécifié conformément à la directive **94/9/CE**.
Toutes autres exigences de la Directive sont applicables au procédé de fabrication et de livraison de cet équipement ou système de protection. Ces derniers ne sont pas couverts par la présente attestation.

12 Le marquage de l'appareil ou du système de protection devra comporter, entre autres indications utiles, les mentions suivantes :

Ex II 2G

EEx p d [ib] ib IIB + $H_2$ T4

Fontenay-aux-Roses, le 2 mai 2002

Le Directeur de l'organisme certificateur
Manager of the certification body

Jean-Pierre GOMEL
Président et directeur général

Timbre sec/dry seal

1 **EC TYPE EXAMINATION CERTIFICATE**

2 Equipment or Protective System Intended for use in Potentially explosive atmospheres
**Directive 94/9/EC**

3 EC type Examination Certificate number
**LCIE 02 ATEX 6047 X**

4 Equipment or Protective system
Analyser Optichrom Advance FTIR

5 Applicant : ABB Bomen Inc.

6 Address : 585 Charest Blvd East
Quebec - Province Quebec
G1K 9H4 - CANADA

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein refered to.

8 LCIE, notified body number 0081 in accordance with article 9 of the directive 94/9/EC of the European Parliament and Council of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective system intended for use in potentially explosive atmospheres, given in Annex II to the directive.
The examination and test results are recorded in confidential report No 36 503 010.

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with :
- EN 50014 (1992)
- EN 50016 (1995)
- EN 50018 (1994)
- EN 50020 (1994)

10 If the sign X is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC Type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC.

Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include the following :

Ex II 2G

EEx p d [ib] ib IIB + $H_2$ T4

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LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES

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