O P E R A T I N G M A N U A L

2020ppbPRO™

Portable Photoionization Monitor

IPN ISP-074-576-P1D
Rev D 8/2/12

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Warning: Limitation of Liability

The ultimate responsibility of the consequences of use of toxic compounds rests with the user. INFICON's role is as a supplier of instrumentation to assist in the early detection of hazardous conditions involving such compounds.

It is vitally important to ensure that the 2020ppbPRO is maintained in accordance with INFICON's instructions and that proper calibration is regularly performed.

As with any complex device, the 2020ppbPRO is subject to failure and, while INFICON has taken, and continues to take, all possible precautions to (a) reduce the possibility of failure, and (b) warn the user in the event of failure, circumstances may occasionally occur in which there is a failure despite such precautions on INFICON's part. INFICON regrets that it cannot accept liability for damages of any kind caused as a result of either failure of the user to follow instructions or of the 2020ppbPRO to perform.

Customer Support
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reachus@inficon.com

Notices
The information contained in this manual is believed to be accurate and reliable. However, INFICON assumes no responsibility for its use and shall not be liable for any special, incidental, or consequential damages related to the use of this product.

Due to our continuing program of product improvements, specifications are subject to change without notice.

Copyright Information

Trademarks
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FCC Warning

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Subpart B, Class B of Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense.

The 2020ppbPRO Intrinsic Safety (I/S) Notice

THE 2020ppbPRO IS CLASSIFIED FOR USE IN CLASS I, DIVISION 1, GROUPS A, B, C, D HAZARDOUS LOCATIONS. T4 (135°C) RATING.

It has been listed by MET Laboratories, Inc., to comply with Underwriters Laboratories® Inc. UL® 913 *Standard for Intrinsically Safe Apparatus and Associated Apparatus for use in Class I, Division 1, Groups A, B, C, D Hazardous (Classified) Locations*, Sixth Edition when powered by MX700010 or MX700011 Battery Pack. THE 2020ppbPRO IS NOT INTENDED TO DETECT COMBUSTIBLE LEVELS OF GASES. THE 2020ppbPRO IS CLASSIFIED FOR USE IN ATMOSPHERES CONTAINING COMBUSTIBLE LEVELS OF GASES.

These accessories are for use with the 2020ppbPRO in a hazardous location:

MX350006	Calibration Regulator
MX350007	Wrist Strap
MX750011	Belt-Clip Holster
MX700260	Carrying Case
M1760148	User's Reference Card
MX380305	Long Sample Probe
MX395001	Short Sample Probe
A1790500	Tube Holder
F1760160	Dräger Tube, Carbon filter
F1760162	Dräger Tube, Intake sample conditioner

Do not use any other accessories with the 2020ppbPRO in a hazardous location. Substitution of components may affect safety rating.

Do not use any other accessories with the 2020ppbPRO in a hazardous location.

Substitution of components may affect safety rating.

WARNING	*To reduce the risk of fire or injury to persons, read and follow these instructions:* 1. *All calibration, maintenance and servicing of this device, including battery charging, must be performed in a safe area away from hazardous locations. Disconnect all power before servicing.* 2. *There are no **operator replaceable** parts inside the 2020ppbPRO except the battery pack, UV lamp and sample inlet filter.* 3. *There are no **operator serviceable** parts inside the 2020ppbPRO.*

CAUTION

1. *For replacement battery pack use only Part No. MX700010 or MX700011.*

2. *Do not dispose of the battery pack in a fire. The cells may explode. The battery pack must be disposed of properly. Check with local codes for possible special disposal instructions.*

3. *Do not open or mutilate the battery pack. If the 2020ppbPRO is used in a manner not specified, the protection provided by the 2020ppbPRO may be impaired.*

4. *Exercise care in handling battery packs in order not to short the terminals with conducting materials such as rings, bracelets and keys. The battery or conductor may overheat and cause burns.*

5. *Do not defeat proper polarity orientation between the battery pack and battery charger.*

6. *Charging the battery is only to be done in a non-hazardous area.*

7. *Charge the battery pack using the AC adapter provided with or identified for use with this product only in accordance with the instructions and limitations specified in this manual. For AC adapter use only Part No. MX350002 (115 Volts AC), MX396013 (220 Volts AC). When using the AC adapter do not block access to AC outlet in use with adapter.* ***AC adapter is not to be used in a hazardous area.***

ATTENTION

2020ppbPRO EST CLASSIFIÉ POUR USAGE DANS LES EMPLACEMENTS DANGEREUX DE CLASSE I, DIVISION 1, GROUPES A, B, C, D. ÉVALUATION T4 (135ºC).

2020ppbPRO est conforme à la norme des Underwriters Laboratories Inc. UL 913 *Standard for Intrinsically Safe Apparatus and Associated Apparatus for use in Class I, Division 1, Groups A, B, C, D Hazardous (Classified) Locations*. Quatrième édition.

2020ppbPRO est conforme à la norme de *CSA E79-0:1995 & CAS E79-11:1995: Intrinsically Safe Equipment.*

2020ppbPRO EST NE PAS INTENDER POUR DÉTECTER DES NIVEAUX DE COMBUSTION DES GAZ. CET APPAREIL EST CLASSIFIÉ POUR USAGE DANS DES ATMOSPHÈRES CONTENANT DES NIVEAUX DE COMBUSTION DES GAZ.

Les accessoires suivants peuvent également être utilisés avec l'appareil dans un emplacement dangereux:

MX350006	Régulateur de calibration
MX350007	Sangle de poignet
MX750011	Étui de ceinture
MX700260	Étui de transport
M1760148	Carte de référence
MX380305	Gamme d'échantillons
MX395001	Petite Gamme d'échantillons
A1790500	Tube Holder
F1760160	Dräger Tube, Carbon filter
F1760162	Dräger Tube, Intake sample conditioner

Ne pas utiliser d'autres accessoires avec cet appareil dans un emplacement dangereux. La substitution des composantes peut nuire à la sécurité d'emploi.

ATTENTION

Pour réduire le risque de feu ou blessures, lisez attentivement ces directive:

1. *Tout étalonnage et entretien, incluant le chargement de la batterie, doit être fait dans un endroit sécuritaire et non-explosif. L'alimentation électrique doit être mis hors-service.*
2. *Aucune pièce ne peut être changée par l'utilisateur à part la batterie.*
3. *Aucun entretien ne peut être fait par l'utilisateur.*

ATTENTION

1. *Utilisez seulement des batteries rechargeables de type nickel cadmium avec un chargeur 12 Volts DC (Pièce # MX700010 ou MX700011).*

2. *Ne jetez pas les batteries dans le feu. Elles pourraient exploser Vérifiez avec la réglementation locale avant d'en disposer.*

3. *Ne pas ouvrir ou briser la batterie. La protection offerte par le 2020ppbPRO sera alors inutile.*

4. *La manutention de la batterie nécessite d'éviter les produits conducteurs comme des anneaux, bracelets ou clés pour éviter tout court- circuit La batterie pourrait surchauffer et causer des brûlures.*

6. *Ne pas modifier la polarité entre la batterie et le chargeur.*

7. *Utilisez seulement l'adaptateur AC spécifié dans le manuel. (Pièces # MX350002 (115 Volts AC), MX396013 (220 Volts AC)). Ne pas bloquer la sortie de l'adaptateur AC.*

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ATEX Directive and EMC Directive

We	**INFICON, Inc.** **2 Technology Place** **East Syracuse, NY 13057 USA**
declare that: Equipment:	**Photoionization Monitor**
Model names:	**2020PRO, 2020PROPlus, 2020ppbPRO, 2020gasPRO**, and **2020*Combo*PRO**

In accordance with the following directives:

94/9/EEC:	**ATEX Directive**
2006/95/EC:	**Low Voltage Directive**
2004/108/EC:	**The Electromagnetic Compatibility Directive**

Has been designed and manufactured to the following standards:

Safety:	**EN61010-1:2004**	
EMC:	**EN61326-1:2006**	
Explosive Atmosphere:	**EN50014:1997/A2:1999**	**EN50020:2002**

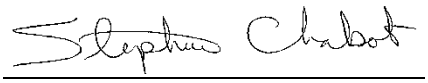
EC Type Examination Certificate #: TRL03ATEX21022X

II 2G EEx ib IIC T4, Tamb= 0ºC to +40ºC

ATEX Certified by TRaC Global Ltd. of Unit 1, Pendle Place, Skelmersdale, West Lancashire, WN8 9PN, UK

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced standards and all essential requirements of the Directives.

Signed by:



Name:	Stephen Chabot
Title:	Vice President of Operations and Quality
Done at	East Syracuse, NY USA
On	1 May 2012

WARNING

1. *All calibration, maintenance and servicing of this device, including battery charging, must be performed in a safe area away from hazardous locations.*
2. *Disconnect all power before servicing.*
3. *Do not open UV Lamp Cap when unit is energized.*
4. *Only use the AC Adapter in a safe area away from hazardous locations*
5. *Only use the Serial Port in a safe area away from hazardous locations.*

CAUTION

To reduce the risk of fire or injury to persons, read and follow these instructions:

1. *There are no operator replaceable parts inside the 2020ppbPRO except the battery pack, UV lamp and sample inlet filter.*
2. *For replacement battery pack use only Part No. MX700010 or MX700011.*
3. *There are no operator serviceable parts inside the 2020ppbPRO.*
4. *Do not dispose of the battery pack in a fire. The cells may explode. The battery pack must be disposed of properly. Check with local codes for possible special disposal instructions.*
5. *Do not open or mutilate the battery pack. If the 2020ppbPRO is used in a manner not specified, the protection provided by the 2020ppbPRO may be impaired.*
6. *Exercise care in handling battery packs in order not to short the terminals with conducting materials such as rings, bracelets and keys. The battery or conductor may overheat and cause burns.*
7. *Do not defeat proper polarity orientation between the battery pack and battery charger.*
8. *Charge the battery pack using the AC adapter provided with or identified for use with this product only in accordance with the instructions and limitations specified in this manual. For AC adapter use only Part No. MX350002 (115 Volts AC), MX396013 (220 Volts AC). When using the AC adapter do not block access to AC outlet in use with adapter. AC adapter is not to be used in a hazardous area.*

These optional accessories may be used with the 2020ppbPRO in a hazardous location:

MX350006	Calibration Regulator
MX350007	Wrist Strap
MX750011	Belt-Clip Holster
MX700260	Carrying Case
M1760148	User's Reference Card
MX380305	Long Sample Probe
MX395001	Short Sample Probe
A1790500	Tube Holder
F1760160	Dräger Tube, Carbon filter
F1760162	Dräger Tube, Intake sample conditioner

Do not use any other accessories with the 2020ppbPRO in a hazardous location.

EM Warnhinweis

Dieses Gerät wurde geprüft und die Einhaltung der Grenzwerte hinsichtlich der Aussendung von elektromagnetischen Wellen für ein digitales Gerät der Klasse B nach Subpart B, Klasse B von Teil 15 der EMV Richtlinie bestätigt. Diese Grenzwerte sind so festgelegt, dass bei Verwendung des Geräts in einer Industrie-Umgebung Störungen weitestgehend ausgeschlossen sein sollten. Dieses Gerät erzeugt und arbeitet mit Radiowellen und kann diese auch emittieren und somit Störungen des Funkverkehrs hervorrufen, wenn es nicht gemäß der Betriebsanleitung eingebaut und verwendet wird. In Wohngebieten können jedoch Störungen durch den Betrieb dieses Gerätes nicht ausgeschlossen werden. In diesem Fall liegt es in der Verantwortung des Anwenders diese Störungen auf seine Kosten zu beseitigen.

Hinweis zur Eigensicherheit (I/S) des 2020ppbPRO

Das 2020ppbPRO IST KLASSIFIZIERT ZUR VERWENDUNG IN ARBEITSBEREICHEN MIT EXPLOSIBLER ATMOSPHÄRE (=EX-ZONEN) DER KLASSE I, ABSCHNITT 1, GRUPPEN A, B, C, D KlasseT4 (Zündtemperatur bis 135°C).

Es entspricht der Norm für zugelassene Geräte zur Verwendung in Ex-Zonen der Klasse 1, Abschnitt 1, Gruppen A, B, C, D (*Standard for Intrinsically Safe Apparatus and Associated Apparatus for use in Class I, Division 1, Groups A, B, C, D Hazardous (Classified) Locations)* der Underwriters Laboratories® Inc. UL® 913, 6. Ausgabe.

Das 2020ppbPRO IST NICHT ZUR MESSUNG VON BRENNBAREN GASEN VORGESEHEN, SONDERN FÜR DEN EINSATZ IN UMGEBUNGEN, DIE BRENN-BARE GASE ENTHALTEN KÖNNEN.

Das nachfolgend aufgeführte Zubehör kann für das 2020ppbPRO in explosionsgefährdeten Bereichen (Ex-Zonen) verwendet werden:

MX350006	Kalibriergasdruckminderer (Kalibriergasregler)
MX350007	Handgelenksschlaufe
MX700260	Gürtelholster
MX700260	Gerätetragekoffer
M1760148	Karte mit Kurzbedienungsanleitung
MX395001	Probenahmesonde

In explosionsgefährdeten Bereichen (Ex-Zonen) **darf keinesfalls** anderes Zubehör des 2020ppbPRO eingesetzt werden.

Der Austausch von Bauteilen kann Ihre Sicherheit beeinträchtigen.

VORSICHT *Um das Brandrisiko oder das Verletzungsrisiko für Personen zu verringern, sind die folgenden Anweisungen aufmerksam zu lesen und zu befolgen:*

1. *Jede Kalibrierung, Wartung und Instandhaltung dieses Geräts, sowie das Laden des Akkus muss an einem sicheren Ort außerhalb von explosionsgefährdeten Bereichen (Ex-Zonen) ausgeführt werden. Vor und während einer Wartung ist die Verbindung des Gerätes zur Stromversorgung zu unterbrechen.*

2. *Die vom Anwender des 2020ppbPRO auszutauschenden Teile beschränken sich auf:*
   - den Akku, - die UV-Lampe und
   - das Probenahmefilterplättchen.

3. *Im Inneren 2020ppbPRO befinden sich keine Teile, die vom Endanwender zu warten sind..*

WARNUNG

1. *Als Ersatz-Akku nur das Originalersatzteil (Ni/Cd- Akku mit der Teile-Nr. MX700010 oder MX700011) verwenden.*

2. *Den Akku nicht in offenes Feuer werfen. Die Zelle kann explodieren. Der Akku muss ordnungsgemäß entsorgt werden. Vor Ort nach den Regelungen zur Entsorgung erkundigen*

3. *Den Akkupack nicht öffnen und nicht verändern. Manipulationen am Akku haben den Verlust der Ex-Zulassung und erhebliche Sicherheits-Risiken zur Folge.*

4. *Vorsichtig mit dem Akku umgehen und sicherstellen, dass die Batteriekontakte nicht mit leitenden Materialien wie Ringen, Armbändern oder Schlüsseln in Berührung kommen. Der Akku kann überhitzen und Verbrennungen verursachen.*

6. *Auf richtige Zuordnung der Polarität zwischen Akku und Ladegerät achten.*

7. *Den Akku mit dem mitgelieferten Netzgerät nur gemäß den in dieser Betriebsanleitung spezifizierten Anweisungen und Einschränkungen laden. Nur Original-Netzgerät (Teile-Nr:MX396013) verwenden. Bei Verwendung des Netzgeräts, den Zugang zur Wechselstrom-steckdose nicht versperren.*

8. *Der Akku darf nur außerhalb von explosionsgefährdeten Bereichen geladen werden.*

WARNUNG

1. *Jede Kalibrierung, Wartung und Instandhaltung dieses Geräts, sowie das Laden des Akkus muss an einem sicheren Ort außerhalb von explosionsgefährdeten Bereichen (Ex-Zonen) ausgeführt werden.*

Vor der Wartung sind alle elektrischen Verbindungen zu trennen.

Keinesfalls den Zugang zur UV Lampe öffnen, während das Gerät aufgeladen wird.

Das Netzgerät nur außerhalb von explosionsgefährdeten Bereichen (Ex-Zonen) einsetzen.

2. *Die serielle Schnittstelle (RS232C) nur außerhalb von explosionsgefährdeten Bereichen (Ex-Zonen) verwenden.*

VORSICHT *Um die Gefahr eines Brandes oder die Verletzung von Personen zu reduzieren, lesen und befolgen Sie die folgenden Anweisungen:*

1. *Die vom Anwender des 2020ppbPRO auszutauschenden Teile beschränken sich auf:*
   - den Akku, - die UV-Lampe und
   - das Probenahmefilterplättchen.
2. *Als Ersatz-Akku nur das Originalersatzteil (Ni/Cd- Akku mit der Teile-Nr. MX700010 oder MX700011) verwenden*
3. *Den Akku nicht in offenes Feuer werfen. Die Zelle kann explodieren. Der Akku muss ordnungsgemäß entsorgt werden. Vor Ort nach den Regelungen zur Entsorgung erkundigen*
4. *Den Akkupack nicht öffnen und nicht verändern. Manipulationen am Akku haben den Verlust der Ex-Zulassung und erhebliche Sicherheits-Risiken zur Folge.*
5. *Vorsichtig mit dem Akku umgehen und sicherstellen, dass die Batteriekontakte nicht mit leitenden Materialien wie Ringen, Armbändern oder Schlüsseln in Berührung kommen. Der Akku kann überhitzen und Verbrennungen verursachen.*
6. *Auf richtige Zuordnung der Polarität zwischen Akku und Ladegerät achten.*
7. *Den Akku mit dem mitgelieferten Netzgerät nur gemäß den in dieser Betriebsanleitung spezifizierten Anweisungen und Einschränkungen laden. Nur Original-Netzgerät (Teile-Nr. MX396013) verwenden. Bei Verwendung des Netzgeräts, den Zugang zur Wechselstromsteckdose nicht versperren.*

Das nachfolgend aufgeführte Zubehör für das 2020ppbPRO kann in explosionsgefährdeten Bereichen (Ex-Zonen) verwendet werden

MX350006	Kalibriergasdruckminderer (Kalibriergasregler)
MX350007	Handgelenksschlaufe
MX700260	Gürtelholster
MX700260	Gerätekoffer
M1760148	Karte mit Kurzbedienungsanleitung
MX395001	Probenahmesonde
MX395001	Probenahmeschlauch

Verwenden Sie für das 2020ppbPRO kein anderes Zubehör in explosions gefährdeten Bereichen.

The 2020ppbPRO Intrinsic Safety (I/S) Notice

THE 2020ppbPRO IS CLASSIFIED FOR USE IN CLASS I, DIVISION 1, GROUPS A, B, C, D HAZARDOUS LOCATIONS. T4 (135°C) RATING.

It has been listed by MET® to comply with Underwriters Laboratories® Inc. UL® 913 *Standard for Intrinsically Safe Apparatus and Associated Apparatus for use in Class I, Division 1, Groups A, B, C, D Hazardous (Classified) Locations*, Sixth Edition when powered by MX700010 or MX700011 Battery Pack. THE 2020ppbPRO IS NOT INTENDED TO DETECT COMBUSTIBLE LEVELS OF GASES. THE 2020ppbPRO IS CLASSIFIED FOR USE IN ATMOSPHERES CONTAINING COMBUSTIBLE LEVELS OF GASES.

Dette tilbehør må anvendes med 2020ppbPRO i EX- klassificeret område i henhold til ovenfor beskrevet:

MX350006	Kalibreringsgas Regulator
MX350007	Håndrem
MX700260	Bæltetaske
MX700260	Field kit taske.
M1760148	Bruger reference kort
MX395001	Kort sampleprobe

Anvend ikke andet tilbehør til 2020ppbPRO i EX-klassificeret område. Anvendes ikke originale komponenter kan det påvirke sikkerhedsklassificeringen.

BEMÆRK *For minimering af risiko for brand samt skade på personer læs og følg denne instruktion:*

1. *Kalibrering, vedligeholdelse, service, batteriskift og opladning af batterier må ikke foretages i EX-klassificeret område.*
2. *Det er kun batteripakke, UV lampe og sample filter, som skiftes af burger.*
3. *Der er indvendig i 2020ppbPRO ikke udskiftelige servicedele for bruger.*

ADVARSEL

1. *For erstatnings batteripakke anvend kun Part Nr. MX700010 eller MX700011*
2. *Følge den lokale ordning for afskaffelse af batterier. Batterier kan eksplodere ved brand.*
3. *Åben eller beskadig ikke batteripakken. Hvis 2020ppbPRO ikke anvendes som specificeret bliver sikkerheden forringet.*
4. *Udøv forsigtighed med batteripakken. Pas på med ringe, armbånd, nøgler m.m. disse ting kan kortslutte batteripakken og overophede denne, således den bryder i brand.*
5. *Forhindre ikke korrekt polarisering mellem batteripakken og oplader.*
6. *Opladning må ikke ske i Ex-klassificeret område.*
7. *Opladning af instruments batteripakke eller brug af 220V AC oplader skal ske i overensstemmelse med instruktion og begrænsninger, som beskrevet i denne manual. Anvend kun oplader MX396013 (220V AC). Oplader må ikke anvendes i Ex-klassificeret område.*

ADVARSEL

1. *Al kalibrering, vedligeholdelse og service af instrument, dette inkludere opladning, må ske i ikke Ex-klassificeret område.*
2. *Service må ikke foretages under opladning eller med startet/tændt instrument.*
3. *Fjern ikke dæksel til uV-lampe mens denne er tændt.*
4. *Opladning må kun ske udenfor Ex-klassificeret område..*
5. *Anvend kun instruments serielle udgang udenfor Ex-klassificeret område.*

BEMÆRK

For minimering af risiko for brand samt skade på personer læs og følg denne instruktion:

1. *Det er kun batteripakke, UV lampe og sample filter, som skiftes af burger.*
2. *For erstatnings batteripakke anvend kun Part Nr. MX700010 eller MX700011*
3. *Der er indvendig i 2020ppbPRO s ikke udskiftelige servicedele for bruger.*

4. Følge den lokale ordning for afskaffelse af batterier. Batterier kan eksplodere ved brand.

5. Åben eller beskadig ikke batteripakken. Hvis 2020ppbPRO ikke anvendes som specificeret bliver sikkerheden forringet.

6. Udøv forsigtighed med batteripakken. Pas på med ringe, armbånd, nøgler m.m. disse ting kan kortslutte batteripakken og overophede denne, således den bryder i brand.

7. Forhindre ikke korrekt polarisering mellem batteripakken og oplader

8. Opladning af instruments batteripakke eller brug af 220V AC oplader skal ske i overensstemmelse med instruktion og begrænsninger, som beskrevet i denne manual. Anvend kun oplader MX396013 (220V AC). Oplader må ikke anvendes i Ex-klassificeret områd.e

Dette tilbehør må anvendes med 2020ppbPRO i EX- klassificeret område i henhold til ovenfor beskrevet:

MX350006	Kalibrerings Regulator
MX350007	Håndrem
MX700260	Bæltetaske
MX700260	Field kit taske.
M1760148	Bruger reference kort
MX395001	Kort sampleprobe

FCC Waarschuwing

Deze apparatuur is getest en er is geconcludeerd dat deze voldoet aan de grenswaarden voor een Class B Digital Device, conform Subpart B, Class B van Part 15 van de FCC regels. Deze grenswaarden zijn bedoeld om een redelijke bescherming te bieden tegen schadelijke interferentie wanneer deze apparatuur wordt gebruikt in een commerciële omgeving. Deze apparatuur, genereert, gebruikt en kan radiofrequentie-energie uitstralen. Indien niet juist geïnstalleerd en gebruikt in overeenstemming met de gebruikershandleiding, kan dit leiden tot schadelijke interferentie met radiocommunicatie. Bediening van deze apparatuur in een woonwijk kan leiden tot schadelijke interferentie, in welk geval de gebruiker de interferentie op eigen kosten moet verhelpen.

De 2020ppbPRO intrinsiekveilig (I/S) mededeling

DE 2020ppbPRO IS GOEDGEKEURD VOOR GEBRUIK IN CLASS I, DIVISION 1, GROUPS A, B, C, D EXPLOSIEGEVAARLIJKE GEBIEDEN. T4 (135°C) CLASSIFICATIE. Het is geregistreerd door MET® als instrument dat voldoet aan de *Standard for Intrinsically Safe Apparatus and Associated Apparatus for use in Class I, Division 1, Groups A, B, C, D Hazardous (Classified) Locations*, Sixth Edition van Underwriters Laboratories® Inc. UL® 913 indien gevoed door een MX700010 or MX700011 batterij-pack. DE 2020ppbPRO IS NIET BEDOELD VOOR DETECTIE VAN ONTBRANDBARE GASNIVEAUS.DE 2020ppbPRO IS GECLASSIFICEERD VOOR GEBRUIK IN ATMOSFEREN DIE ONTBRANDBARE GASNIVEAUS BEVATTEN.

Deze accessoires zijn bedoeld voor gebruik met de 2020ppbPRO in een explosiegevaarlijk gebied::

MX350006	Kalibratieregelaar
MX350007	Polsband
MX700260	Riem clip-holster
MX700260	Draagkoffer
M1760148	Gebruikers referentiekaart
MX395001	Korte monsternameslang

Gebruik geen andere accessoires in combinatie met de 2020ppbPRO in een explosiegevaarlijke locatie. Vervanging van componenten kan invloed hebben op de veiligheidsclassificatie.

VOORZICHTIG *Lees en volg deze instructies op om het risico op brand of verwonding van personen te reduceren: 1. Alle kalibratie, onderhoud en servicewerkzaamheden aan dit apparaat, inclusief het opladen van de batterij, moet altijd plaats vinden in een veilige zone, uit de buurt van explosiegevaarlijke gebieden. Ontkoppel alle voeding voordat u servicewerkzaamheden uitvoert. 2. Er zijn geen onderdelen in de* 2020ppbPRO *die door de operator vervangen kunnen worden, behalve het batterij*

WAAR-SCHUWING

1. Gebruik als vervangend batterij-pack uitsluitend artikelnr.Part No. MX700010 of MX700011.

2. *Gooi het batterij-pack niet in een vuur. De cellen kunnen exploderen. Het batterij-pack moet correct worden afgevoerd. Verifieer de lokale regelgeving voor instructies voor de afvoer van dergelijk afval.*

3. *Open of beschadig het batterij-pack niet. Wanneer de* 2020ppbPRO *wordt gebruikt op een wijze die niet is gespecificeerd, dan kan de bescherming die wordt geboden door de* 2020ppbPRO *gevaar lopen.*

4. *Wees voorzichtig met het omgaan met batterij-pack. Let er op dat de contacten niet kortsluiten met geleidende materialen zoals ringen, armbanden en sleutels. De batterij of geleider kan oververhit raken en brandwonden veroorzaken.*

5. *Let op de juiste polariteit tussen het batterij-pack en de lader.*

6. *De batterij mag uitsluitend worden geladen in een niet explosiegevaarlijk gebied.*

7. Laad het batterij-pack met de meegeleverde AC-adapter, of speciaal voor dit product aangewezen adapter, uitsluitend conform de instructies en beperkingen die worden gespecificeerd in deze handleiding. Gebruik voor AC-adapter uitsluitend artikelnr.. MX396013 (220 Volt AC). *bij het gebruik van de AC-adapter niet de toegang tot de AC wandcontactdoos die wordt gebruikt voor de adapter. De AC-adapter mag niet worden gebruikt in een explosiegevaarlijk gebied.*

Waarschuwing

1. Alle kalibratie, onderhoud en servicewerkzaamheden aan dit apparaat, inclusief het opladen van de batterij, moet altijd plaats vinden in een veilige zone, uit de buurt van explosiegevaarlijke gebieden.

2. Ontkoppel alle voeding voordat u servicewerkzaamheden uitvoert.

3. Open de UV Lamp kap niet wanneer de eenheid is ingeschakeld.

4. Gebruik de AC-adapter uitsluitend in een veilig gebied, uit de buurt van explosiegevaarlijke gebieden.

5. Gebruik de Seriële poort uitsluitend in een veilig gebied, uit de buurt van explosiegevaarlijke gebieden.

Voorzichtig

Lees en volg deze instructies op om het risico op brand of verwonding van personen te reduceren:

1. Er zijn geen onderdelen in de 2020ppbPRO *die door de operator vervangen kunnen worden, behalve het batterij-pack, de UV lamp en monsterinlaatfilter.*

Gebruik als vervangend batterij-pack uitsluitend artikelnr. MX700010 of MX700011.

2. *Er zijn geen onderdelen binnenin de* 2020ppbPRO *s die door de operator kunnen worden onderhouden.*

3. *Gooi het batterij-pack niet in een vuur. De cellen kunnen exploderen. Het batterij-pack moet correct worden afgevoerd. Verificeer de lokale regelgeving voor instructies voor de afvoer van dergelijk afval.*

4. *Open of beschadig het batterij-pack niet. Wanneer de* 2020ppbPRO *wordt gebruikt op een wijze die niet is gespecificeerd, kan de bescherming die wordt geboden door de* 2020ppbPRO *gevaar lopen.*

5. *Wees voorzichtig met het omgaan met batterij-pack. Let er op dat de contacten niet kortsluiten met geleidende materialen zoals ringen, armbanden en sleutels. De batterij of geleider kan oververhit raken en brandwonden veroorzaken.*

6. *Let op de juiste polariteit tussen het batterij-pack en de lader.*

7. *Laad het batterij-pack met de meegeleverde AC-adapter, of speciaal voor dit product aangewezen adapter, uitsluitend conform de instructies en beperkingen die worden gespecificeerd in deze handleiding. Gebruik voor AC-adapter uitsluitend artikelnr,* MX396013 (220 Volt AC). *Blokkeer, bij het gebruik van de AC-adapter niet de toegang tot de AC wandcontactdoos die wordt gebruikt voor de adapter. De AC-adapter mag niet worden gebruikt in een explosiegevaarlijk gebied.*

Deze accessoires zijn bedoeld voor gebruik met de 2020ppbPRO in een explosiegevaarlijk gebied::

MX350006	Kalibratieregelaar
MX350007	Polsband
MX700260	Riem clip-holster
MX700260	Draagkoffer
M1760148	Gebruikers referentiekaart
MX395001	Korte monsternameslang

Gebruik geen andere accessoires in combinatie met de 2020ppbPRO in een explosiegevaarlijke locatie. Vervanging van componenten kan invloed hebben op de veiligheidsclassificatie.

Avertissement Compatibilité électromagnétique

Cet équipement a été testé et reconnu conforme aux limitations de la Classe B des équipements numériques, conformément au sous-paragraphe B, Classe B du paragraphe 15 des règles FCC. Ces limites sont conçues pour fournir une protection raisonnable à l'encontre des interférences nuisibles lorsque l'équipement est utilisé dans un environnement industriel.

Cet équipement génère, utilise et peut émettre de l'énergie sous forme de fréquences radio et, si non installé et utilisé en conformité avec les instructions de ce manuel, peut entraîner des interférences nuisibles aux communications radio. L'utilisation de cet appareil dans une zone résidentielle peut entraîner des interférences nuisibles auquel cas, l'utilisateur sera obligé de corriger les interférences à ses propres frais.

2020ppbPRO - Note de sécurité intrinsèque

LE 2020ppbPRO EST CLASSIFIE POUR UN USAGE EN ZONES DANGEREUSES DE CLASSE I, DIVISION I, GROUPES A, B, C, D. T4 EVALUTATION (135 °C).

Le 2020ppbPRO est conforme à la norme des Underwriters Laboratories Inc. UL 913 *Standard for Intrinsically Safe Apparatus and Associated for use in Class I, Division I, Groups A, B, C, D Hazardous (Classified) Locations*. Quatrième édition.

Le 2020ppbPRO est conforme à la norme *CSA E79-0:1995 & CAS E79-11:1995: Intrinsically Safe Equipment*.

LE 2020ppbPRO N'EST PAS PREVU POUR DETECTER DES NIVEAUX DE COMBUSTION DE GAZ. LE 2020ppbPRO EST CLASSE POUR ETRE UTILISE EN ATMOSPHERES CONTENANT DES NIVEAUX DE COMBUSTION DE GAZ.

Les accessoires suivants peuvent également être utilisés avec le 2020ppbPRO en zone dangereuse :

MX350006	Régulateur d'étalonnage.
MX350007	Dragonne.
MX700260	Etui de ceinture
MX700260	Valise de transport
M1760148	Carte de référence utilisateur
MX395001	Sonde d'échantillonnage courte

N'utilisez aucun autre accessoire avec le 2020ppbPRO en zone dangereuse. L'échange de composants peut altérer le niveau de sécurité.

AVERTISSEMENT

Pour réduire le risque d'incendie ou de blessure aux personnes, lisez et suivez les instructions ci-dessous.

1. Tout étalonnage, maintenance ou entretien de cet équipement, y compris la recharge des batteries, doit être réalisé dans une zone de sécurité et éloignée de toutes zones dangereuses. Déconnecter toute source d'alimentation avant toute intervention de maintenance.
2. Exceptés la batterie, la lampe UV et le filtre d'entrée d'échantillonnage, aucune autre pièce du 2020ppbPRO ne peut être remplacée par l'opérateur.
3. Le2020ppbPRO ne contient aucune pièce réparable par l'utilisateur.

ATTENTION

1. Pour le remplacement de la batterie, n'utilisez que la batterie référence MX700010 ou MX700011.
2. Ne jetez pas le bloc batterie au feu. Les cellules peuvent exploser. Le bloc batterie doit être jeté conformément à la réglementation locale. Vérifiez la présence de contraintes locales spécifiques éventuelles.
3. N'ouvrez ni ne désagrégez la batterie. Si le 2020ppbPRO est utilisé d'une façon non prévue, la protection fournie par le2020ppbPRO peut être altérée.
4. Soyez prudent lors de la manipulation des blocs batterie de manière à ne pas court-circuiter les bornes avec des objets tels que bague, bracelets ou clefs. La batterie ou le conducteur peut surchauffer et engendrer des brûlures.
5. Ne pas inverser les polarités entre la batterie et son chargeur.
6. La recharge de la batterie ne devra être effectuée que dans une zone non dangereuse.
7. Chargez le bloc batterie en utilisant l'adaptateur pour courant alternatif fourni ou identifié pour l'utilisation pour ce produit uniquement, en conformité avec les instructions et limitations spécifiées dans ce manuel. Pour l'adaptateur pour courant alternatif, n'utiliser que le produit référencé MX396013 (220 V AC). Lors de l'utilisation de l'adaptateur pour courant alternatif, ne pas bloquer l'accès à la sortie alternative en utilisation avec l'adaptateur. L'adaptateur pour courant alternatif ne peut pas être utilisé dans une zone dangereuse.

ATTENTION

1. Tout étalonnage, maintenance et entretien de cet équipement, y compris la recharge du bloc batterie, doit être réalisé dans une zone de sécurité éloignée de toutes zones dangereuses.
2. Déconnecter toute source d'alimentation avant d'effectuer l'entretien.
3. Ne pas ouvrir le cache de la lampe UV avant d'avoir débrancher l'appareil.
4. N'utiliser un adaptateur pour courant alternatif que dans une zone de sécurité éloignée de toutes zones dangereuses.
5. N'utiliser le port série que dans une zone de sécurité éloignée de toutes zones dangereuses.

ATTENTION 2020ppbPRO EST CLASSIFIÉ POUR USAGE DANS LES EMPLACEMENTS DANGEREUX DE CLASSE I, DIVISION 1, GROUPES A, B, C, D. ÉVALUATION T4 (135ºC).

2020ppbPRO est conforme à la norme des Underwriters Laboratories Inc. UL 913 *Standard for Intrinsically Safe Apparatus and Associated Apparatus for use in Class I, Division 1, Groups A, B, C, D Hazardous (Classified) Locations*. Quatrième édition.

2020ppbPRO est conforme à la norme de *CSA E79-0:1995 & CAS E79-11:1995: Intrinsically Safe Equipment.*

2020ppbPRO EST NE PAS INTENDER POUR DÉTECTER DES NIVEAUX DE COMBUSTION DES GAZ. CET APPAREIL EST CLASSIFIÉ POUR USAGE DANS DES ATMOSPHÈRES CONTENANT DES NIVEAUX DE COMBUSTION DES GAZ.

Les accessoires suivants peuvent également être utilisés avec l'appareil dans un emplacement dangereux:

MX350006	Régulateur de calibration
MX350007	Sangle de poignet
MX700260	Étui de ceinture
MX700260	Étui de transport
M1760148	Carte de référence
MX395001	Petite Gamme d'échantillons

Ne pas utiliser d'autres accessoires avec cet appareil dans un emplacement dangereux.

La substitution des composantes peut nuire à la sécurité d'emploi.

ATTENTION

Pour réduire le risque de feu ou blessures, lisez attentivement ces directive:

1. *Tout étalonnage et entretien, incluant le chargement de la batterie, doit être fait dans un endroit sécuritaire et non-explosif. L'alimentation électrique doit être mis hors-service.*

2. *Aucune pièce ne peut être changée par l'utilisateur à part la batterie.*

3. *Aucun entretien ne peut être fait par l'utilisateur.*

ATTENTION

1. *Utilisez seulement des batteries rechargeables de type nickel cadmium avec un chargeur 12 Volts DC (Pièce # MX700010 ou MX700011).*

2. *Ne jetez pas les batteries dans le feu. Elles pourraient exploser Vérifiez avec la réglementation locale avant d'en disposer.*

3. *Ne pas ouvrir ou briser la batterie. La protection offerte par le 2020ppbPRO sera alors inutile.*

4. *La manutention de la batterie nécessite d'éviter les produits conducteurs comme des anneaux, bracelets ou clés pour éviter tout court- circuit La batterie pourrait surchauffer et causer des brûlures.*

5. *Ne pas modifier la polarité entre la batterie et le chargeur.*

6. *Utilisez seulement l'adaptateur AC spécifié dans le manuel. (Pièces # MX396013 (220 Volts AC)). Ne pas bloquer la sortie de l'adaptateur AC.*

Advertencia FCC

Este equipo ha sido probado y se ha comprobado que cumple con los límites para la clase B de los equipos digitales, en conformidad con la sub-parte B, clase B de la parte 15 de las reglas FCC. Estos límites han sido determinados para proveer una protección razonable contra interferencias cuando el equipo es operado en una zona comercial. Este equipo genera, usa y puede radiar energía de radio frecuencia y si no es usado de acuerdo con las instrucciones de este manual puede causar interferencia para una radio de comunicación. La operación de este equipo en una zona residencial probablemente causará interferencias que deben ser eliminadas por cuenta del usuario.

Información sobre la seguridad intrínseca (I/S) del 2020ppbPRO

El 2020ppbPRO 2 ESTA CLASIFICADO PARA SER USADO EN ZONAS PELIGROSAS DE LA CLASE I, DIVISIÓN 1, GRUPOS A, B, C, D. CLASE T4 (135°C).

Ha sido probado por MET® para cumplir con los estándares de seguridad de Underwriters Laboratories® Inc. UL® 913 *para aparatos intrínsicamente seguros y aparatos asociados para su utilización en zonas (clasificadas) de peligro en la clase I, División 1, Grupos A, B, C, D,* Sexta Edición cuando sea alimentado por un paquete de baterías MX700010 o MX700011. EL 2020ppbPRO NO ESTA DISEÑADO PARA DETECTAR NIVELES COMBUSTIBLES DE GASES. EL 2020ppbPRO ESTA CLASIFICADO PARA UTILIZARLO EN ATMÓSFERAS QUE CONTENGA NIVELES COMBUSTIBLES DE GASES.

Los siguientes accesorios son utilizados con el 2020ppbPRO en zonas clasificadas:

MX350006	Regulador de calibración
MX350007	Correa de mano
MX700260	Funda con clip para correa
MX700260	Maleta
M1760148	Tarjeta de referencia del usuario
MX395001	Sonda de toma de muestras.

No usar otros accesorios con el 2020ppbPRO en zonas peligrosas
La sustitución de componentes puede afectar el grado de seguridad.

CUIDADO

Para reducir el riesgo de incendios y daños personales, leer y seguir las siguientes instrucciones:

1. *La calibración, mantenimiento y servicio de este aparato, incluyendo el cambio de baterías deben ser realizados en un área segura lejos de la zona de peligro. Desconectar la alimentación de energía antes de empezar con los trabajos de mantenimiento.*

2. *El 2020ppbPRO no cuenta con partes que deben ser reemplazadas por el operador a excepción del paquete de baterías, la lámpara UV y el filtro de entrada de la muestra.*

3. *El 2020ppbPRO 2 no cuenta con partes que deben ser mantenidas directamente por el operador.*

ADVERTENCIA

1. Para reemplazar el paquete de baterías usar sólo la pieza nº. MX700010 o MX700011.

2. No tirar el paquete de baterías en el fuego. Estas pueden explotar. El paquete de baterías debe ser desechado adecuadamente. Averiguar si existen instrucciones locales especiales como residuos.

3. No abrir o mutilar el paquete de baterías. Si el 2020ppbPRO se utiliza de una manera no especificada, puede afectar la protección provista para el 2020ppbPRO.

4. Manipular el paquete de baterías con cuidado y asegúrese que los terminales de ésta no entren en contacto con materiales conductores tales como anillos, brazaletes y llaves. La batería o el conductor se pueden sobrecalentar y causar un incendio.

5. No confundir la polaridad apropiada entre el paquete de baterías y el cargador.

6. La carga de la batería sólo debe realizarse en un área no peligrosa.

7. *Cargar el paquete de baterías usando el adaptador AC suministrado o señalado para ser usado sólo con este producto de acuerdo con las instrucciones y limitaciones especificadas en este manual. Para el adaptador AC usar sólo la pieza Nº. MX396013 (220 Voltios AC). Cuando se use el adaptador AC no bloquear el acceso de la salida AC en uso con el adaptador. No usar el adaptador AC en áreas peligrosas.*

ADVERTENCIA

8. *La calibración, mantenimiento y servicio de este aparato incluyendo el cambio de baterías deben ser realizados en un área segura lejos de la zona de peligro.*
9. *Desconectar la alimentación de energía antes de empezar con los trabajos de mantenimiento.No abrir la cubierta de la lámpara UV cuando la unidad está conectada a la alimentación de energía.*
10. *Utilizar el adaptador AC sólo en una zona segura lejos de zona peligrosas.*
11. *Utilizar el puerto serie sólo en una zona segura lejos de zonas peligrosas.*

CUIDADO

Para reducir el riesgo de incendios y daños personales, leer y seguir las siguientes instrucciones:

12. El 2020ppbPRO no cuenta con partes que puedan ser reemplazadas por el operador a excepción del paquete de baterías, la lámpara UV y el filtro de entrada de muestras.

13. Para reemplazar el paquete de baterías usar sólo la pieza original nº. MX700010 o MX700011.

14. El 2020ppbPRO no cuenta con partes que deben ser reparadas directamente por el operador.

15. No colocar el paquete de baterías en el fuego. Estas pueden explotar. El paquete de baterías debe ser desechado adecuadamente. Averiguar si existen instrucciones locales especiales como residuos.

16. ***No abrir o mutilar el paquete de baterías. Si el 2020ppbPRO s es utilizado de una manera no especificada la protección provista para el 2020ppbPRO puede dañarse.***
17. ***Manipular el paquete de baterías con cuidado y asegúrese que los terminales de ésta no entren en contacto con materiales conductores tales como anillos, brazaletes y llaves. La batería o el conductor se puede sobrecalentar y causar un incendio.***
18. ***No confundir la polaridad apropiada entre el paquete de baterías y el cargador. Cargar el paquete de baterías usando el adaptador AC suministrado o señalado para ser usado sólo con este producto de acuerdo con las instrucciones y limitaciones especificadas en este manual. Para el adaptador AC usar sólo la pieza Nº. MX396013 (220 Voltios AC). Cuando se use el adaptador AC no bloquear el acceso de la salida AC en uso con el adaptador. No usar el adaptador AC en áreas peligrosas.***

Los siguientes accesorios son utilizados con el 2020ppbPRO en zonas clasificadas:

MX350006	Regulador de calibración
MX350007	Correa de mano
MX700260	Funda con clip para correa
MX700260	Maleta
M1760148	Tarjeta de referencia del usuario
MX395001	Sonda de toma de muestras.

No usar otros accesorios con el 2020ppbPRO en zonas peligrosas

La sustitución de componentes puede afectar el grado de seguridad.

FCC Avvertenze

FCC avverte che questa apparecchiatura è stata esaminata ed è idonea per aderire ai limiti per un dispositivo del codice categoria B Digital, conforme a Subpart B, codice categoria B della parte 15 delle regole del FCC. Questi limiti sono destinati ad assicurare la protezione minima contro interferenza nociva quando l'apparecchiatura è utilizzata in un ambiente commerciale. Questa apparecchiatura genera, e può irradiare energia di frequenza radiofonica e se non usata in conformità con il manuale d'istruzione, può causare interferenze alle comunicazioni radio. L'impiego di queste attrezzature in una zona residenziale può causare interferenze ed i relativi danni causati saranno totalmente a carico dell'utilizzatore .

The 2020ppbPRO Intrinsic Safety (I/S) Notice

Il 2020ppbPRO è certificato per usi in classe I, divisione 1, gruppi A, B, C, D luoghi con rischio di esplosione . T4 (135°C).

È stato elencato da MET® per aderire al campione dei Underwriters Laboratories® Inc. UL® 913 per l'apparecchio di per sè sicuro e l'apparecchio associato per uso nel codice categoria I, divisione 1, gruppi A, B, C, posizioni (classificate) pericolose di D, sesta edizione una volta alimentato dal pacco batteria.

IL 2020ppbPRO NON È INTESO PER RILEVARE I LIVELLI COMBUSTIBILI DEI GAS.

IL 2020ppbPRO È CLASSIFICATO PER USO IN ATMOSFERA CHE CONTENGONO I LIVELLI COMBUSTIBILI DEI GAS.

Questi accessori possono essere usati con il 2020ppbPRO in zona pericolosa:

MX350006	Adattatore di calibrazione
MX350007	Wrist Strap
MX700260	Cinghia - Clip
MX700260	Valigetta di trasporto
M1760148	Reference Card
MX395001	Sonda di campionamento

Non usare altri accessori con il 2020ppbPRO in zone pericolose . La sostituzione dei componenti può avere effetti negativi sull'utilizzo dello stesso in completa sicurezza.

CAUTELA

Per ridurre il rischio di infortuni e incidenti , leggere e seguire le seguenti istruzioni:

1. Tutti le calibrazioni, mantenimento ed assistenza di questo dispositivo, compreso la verifica della batteria carica/ scarica , devono essere effettuati in una zona sicura. Durante qualsiasi manutenzione lo strumento non deve essere alimentato.

2. Non ci sono parti sostituibili dell'operatore all'interno del 2020ppbPRO tranne il pacchetto della batteria, la lampada UV ed il filtro all'ingresso del campione.

3. Non ci sono parti utili dell'operatore all'interno del 2020ppbPRO.

Avvertenze

1. Per cambiare il pacco batteria usare solo il part number MX700010 o MX700011.

2. Non mettere il pacco batteria sul fuoco. Le celle possono esplodere. Le batterie devono essere rottamate . Controllare I codici locali di rottamazione per possible speciali istruzioni.

3. Non aprire o mutilare il pacco batteria . Un uso non corretto può alterare la sicurezza dello strumento.

4. Prestare attenzione nel maneggiare la batteria al fine di non mettere in corto i contatti . La batteria può scaldarsi toccare con cautela.

5. Non invertire le polarità della batteria .

6. Caricare le batterie solo in zone sicure .

7. Caricare la batteria solo con l'alimentatore in dotazione o utilizzare alimentatori che rispettino i dati indicati sul manuale d'istruzione. Usare part number MX396013 (220 Volts AC). L'alimentatore non deve essere usate in zone pericolose.

Introduction 2

About this Manual

This manual provides detailed instructions for setup, operation and maintenance of the 2020ppbPRO Portable Photoionization Monitor.

Before unpacking the instrument, please read *Warnings and Safety Practices* on pages 4 and 5. This section describes possible hazards that might injure the user, damage the instrument or compromise its operation. Some general safety information is also provided.

To help you learn to use the 2020ppbPRO quickly, this manual is organized by tasks beginning with:

Using the 2020ppbPRO in Chapter 3

Calibrating the 2020ppbPRO in Chapter 4

Accessories are covered in Chapter 5

Routine maintenance is covered in Chapter 6

Troubleshooting techniques are covered in Chapter 7

The 2020ppbPRO manual uses a few conventions for key names on the keypad and for text that is shown on the display.

UPPERCASE Fixed key names are denoted by uppercase text.

"Display Text" Text that appears on the 2020ppbPRO status display is in quotation marks.

Soft key names are also shown in quotation marks.

In the text you will find various warnings and notes.

A warning indicates an operation that could cause personal injury if precautions are not followed.

WARNING

A caution indicates an operation that could cause instrument damage if precautions are not followed.

CAUTION

NOTE: *A note indicates significant information.*

Warnings and Safety Practices

Please read the Notices and Warnings section of this user's manual before operating the 2020ppbPRO.

Approved Models of the 2020ppbPRO

This manual provides operational information for all models of the 2020ppbPRO. The 2020ppbPRO is intrinsically safe and approved for use in hazardous locations. Refer to the Notices and Warnings section of this manual for details of each approval.

Throughout the manual, notes are provided to inform you of any limitations of usage for the 2020ppbPRO models.

If the 2020ppbPRO you are using is not specifically identified as intrinsically safe with a label on the 2020ppbPRO, do not use it in a location where flammable concentrations of gases and vapors may exist.

WARNING

Excessive Heat and Cold

Do not expose the instrument to intense sunlight for prolonged periods.

Exposure to excessive heat or cold may result in erroneous readings.

2020ppbPRO Overview

Figure 1. The 2020ppbPRO Instrument

The 2020ppbPRO measures the concentration of airborne gases and vapors that can be ionized by a photoionization detector. The 2020ppbPRO automatically displays and can record these concentrations. **The 2020ppbPRO does not distinguish between individual compounds.** The reading displayed represents the total concentration of all photoionizable chemicals present in the sample. The 2020ppbPRO displays concentrations in units of ppb as well as ppm and Mg/M^3.

The 2020ppbPRO operates automatically. The 2020ppbPRO display updates itself once per second. You can read concentrations directly from the display.

The 2020ppbPRO will perform short-term exposure limit (STEL), time-weighted average (TWA) and PEAK calculations when it is in INTERVAL mode. You can view any of these results in INTERVAL mode.

The 2020ppbPRO has two datalogging options, Tag and Interval mode. Tag mode allows the user to manually tag and store readings during a walkthrough. Interval mode allows the user to datalog at selectable intervals of 1 second to 999 seconds. In Interval mode, the STEL, PEAK and TWA are calculated. If you select Interval mode, these values are automatically recorded in the 2020ppbPRO's memory. The 2020ppbPRO can log up to 12,000 entries.

In Tag mode operation, the 2020ppbPRO prompts you to locate a site and then to record a background and sample readings for the site. You can record up to 12,000 manual entries. There is no averaging of data in Tag mode.

Recorded data can be reviewed on the display or downloaded to a computer. Data are recorded by date and time.

The 2020ppbPRO has 5 keys for instrument operation. The keys are used to set up and calibrate the 2020ppbPRO. All information entered with the keys and stored in the 2020ppbPRO's memory is retained when the instrument is switched off. The clock and calendar continue to operate and do not need to be reset when the 2020ppbPRO is turned on.

General Operation

The 2020ppbPRO is a microprocessor-controlled air monitor for measuring the presence of photoionizable compounds in air at parts-per-billion levels. The block diagram in *Figure 2* shows the main components of the 2020ppbPRO.

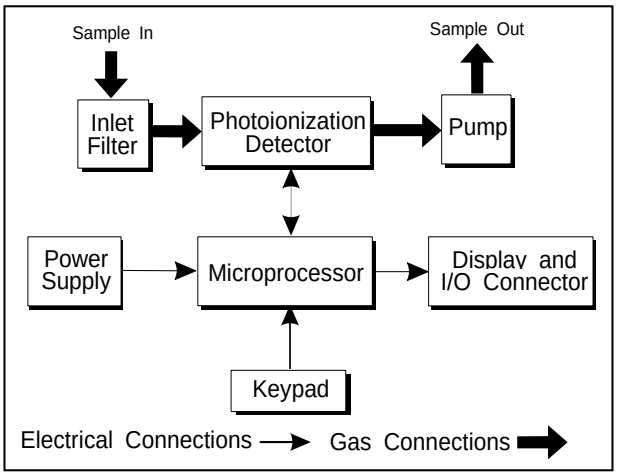


Figure 2. The 2020ppbPRO Block Diagram

The microprocessor controls the components of the instrument and interprets and records the signal generated by the photoionization detector (PID). Recorded data and setup information entered into the microprocessor's memory are retained when the 2020ppbPRO is turned off.

A pump continuously pulls the air under test through the 2020ppbPRO's PID. The PID converts the concentration of photoionizable compounds in the sample into an electrical signal. The microprocessor subtracts any background from the signal and divides this signal by a sensitivity obtained by calibrating with a standard gas of known concentration. This concentration appears on the 2020ppbPRO's display and, depending on the values entered through the 2020ppbPRO's keypad, an alarm status may be displayed and an audio signal may be heard.

The 2020ppbPRO can detect thousands of different types of airborne gases and vapors and its response depends on the characteristics as well as the concentration of each compound.

The 2020ppbPRO does not distinguish one type of compound from another, but displays a number indicating the total concentration of all photoionizable compounds in the sample.

A standard of isobutylene at a known concentration may be used for setting the sensitivity. If the 2020ppbPRO is calibrated with isobutylene, it displays concentrations in units equivalent to ppm of isobutylene. If isobutylene were the only photoionizable chemical in the sample, then the 2020ppbPRO would display its concentration directly.

The 2020ppbPRO responds more or less readily to other chemicals than it does to isobutylene. Because it has a medium sensitivity to isobutylene, this gas has been chosen as a reliable means of reporting an average concentration of total ionizable compounds present.

Gases other than isobutylene can be used to calibrate the 2020ppbPRO. However, all response factors are based on an isobutylene calibration.

Photoionization Detector

The 2020ppbPRO's PID is shown in *Figure 3*. The PID measures the concentration of photoionizable chemicals in the gas stream from the sample inlet and produces an electrical signal for the microprocessor.

A UV lamp generates photons which ionize specific molecules in the gas stream. The permanent air gases (argon, carbon dioxide, nitrogen, oxygen, water vapor, etc.) require a relatively high energy for ionization, and are not ionized by the UV photons. Many of the compounds considered pollutants, including most hydrocarbons, are ionized.

The gas stream is directed into the PID through a small port at the center of the UV lamp window and through a series of larger ports around the perimeter of the lamp window. This arrangement permits a high sample flow rate and short response time.

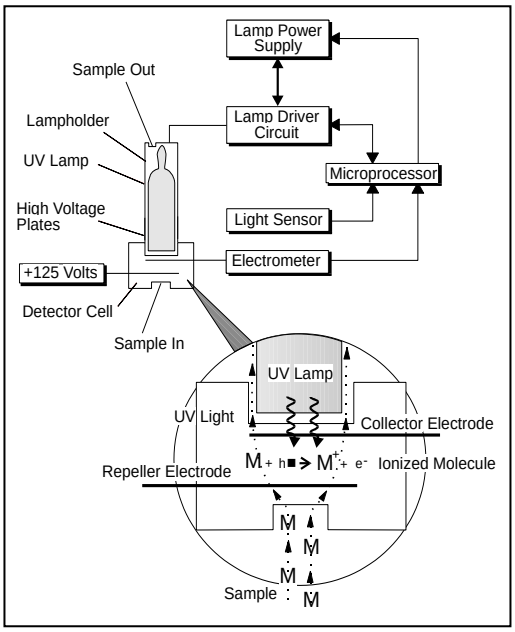


Figure 3. Photoionization Detector

The ionized molecules in the detector cell are subjected to a continuous electric field between the repeller electrode and the collector electrode. The ions move in the electric field, generating a current which is proportional to the concentration of the

ionized molecules in the detector cell. An electrometer circuit converts the current to a voltage which is then fed to the microprocessor.

The UV lamp is operated by a high voltage lamp driver circuit which delivers high voltage energy to the lamp through plates in the lamp holder. The lamp driver power supply is controlled by the microprocessor based on a feedback signal from a light sensor on the driver circuit board.

Unpacking Instrument

Remove the 2020ppbPRO from its shipping box. The following accessories are included with the 2020ppbPRO:

1. Sample Probe
2. Instrument Manual (on CD)
3. Multi-Tool
4. AC Adapter or AC Adapter with AC Line Cord
5. Replacement Sample Inlet Filters (10 pieces)
6. Reference Card
7. Water-trap Filter
8. INFICON filter tube holder
9. Intake sample conditioner tubes

Ensure that all of these accessories have been included with the instrument. If any items are missing or damaged, contact INFICON immediately.

Support Equipment and Consumables

Calibration

For normal operation these items are required:

1. Calibration Gas Regulator (Part No. MX350006).

2. Calibration gas containing 10 ppm isobutylene (Part No. MX350025). Other concentrations of the calibration gas may be required. This will depend on your application.

3. Zero air (clean dry air without any organic impurities)

   There are several alternatives for clean or zero air calibration: you can use a bottle of clean air (certified as having not more than 0.1 ppm total hydrocarbons) connected directly to the instrument; the clean air can be transferred to a Tedlar bag which can then be connected to the instrument; clean, ambient air without detectable contamination; or, ambient air run through the charcoal filter (F1760160).
   If you will be using large tanks of gas, specify a single stage, high purity regulator with a CGA 590 connection at the inlet. The regulator should also have a 1/8” parallel, compression fitting with which to connect the regulator to the gas bag adapter. The delivery pressure must be adjustable to between 5 psig (34.5 kPa). You may require a gas bag and gas bag adapter (Part No. MX380014).

4. If compound threshold limit values (TLVs) are exceeded, you should use a gas bag for sampling and calibration.

   To determine the TLV of the compounds contained in the calibration gas, refer to the Material Safety Data Sheet (MSDS) supplied with your calibration gas cylinder.

   If you will be using a gas bag for calibration, see Calibration Using a Gas Bag on page 63 for instructions.

Field Operation

For field operation, the 2020PRO series Field Kit (Part No. MX750080) is available. The field kit includes a cable kit, a carrying case and a calibration regulator, and a spare battery pack.

Refer to the check list in on page 65 to ensure you have all the necessary accessories and equipment before beginning field operation.

Computer

The 2020ppbPRO may also be connected to a computer. The computer must be a Windows-based PC. Use the cable kit (Part No. MX750120) to connect the 2020ppbPRO to the computer.

NOTE: *The 2020ppbPRO is not classified for use in hazardous locations when connected to a computer.*

3 Using the 2020ppbPRO

Battery Charging

Before beginning operation of the 2020ppbPRO, the battery pack must be charged. You can also remove the battery pack and replace it with a fully charged spare battery pack (Part No. MX700010 or MX700011).

NOTE: *You must use the 220 V battery charger (Part No. MX396013) in order to comply with the requirements of the applicable Council Directives.*

Removing and Replacing the Battery Pack

NOTE: *Do not remove or recharge the battery pack in a hazardous location.*

To remove the battery pack:

1. If the 2020ppbPRO has been turned on, turn it off by pressing the ON/OFF key for five seconds and then releasing it.

NOTE: *If you do not turn the 2020ppbPRO off before removing the battery pack, you will reset the instrument and you will lose all logged data and setup parameters.*

2. Locate the battery hatch on the back of the instrument. See *Figure 4*.
3. Loosen the two Phillips screws in the top of the battery hatch.
4. The battery hatch can now be removed.
5. Lift the battery pack out of the case and carefully disconnect the battery pack connector from the 2020ppbPRO.
6. Attach the connector from the charged battery pack to the 2020ppbPRO.

NOTE: *The connector is polarized. It will only fit one way. Do not force the connection.*

7. Place the battery pack in the 2020ppbPRO case. Ensure the battery wires are not pinched or strained.
8. Ensure the wrist strap ring is in proper position. This ring holds the wrist strap in place.
9. Replace the battery hatch and then replace the two screws. Do not over-tighten the screws as you will damage the case.

Charging the Battery Pack

NOTE: *Only use the AC adapter specified for use with the 2020ppbPRO. Using another AC adapter will result in damage to the battery pack, the 2020ppbPRO or the adapter itself.*

To charge the battery pack:

1. Plug the AC adapter into the jack located on the bottom of the 2020ppbPRO.

2. Plug the AC adapter into an AC outlet. If you are using the European AC adapter, ensure the correct plug is installed on the line cord . If it is not correct for the wall outlet in your area, then it must be replaced.

3. The Charge LED on the 2020ppbPRO indicates the charge state. Red indicates the battery is being charged. Green indicates the battery is fully charged and ready for use.

   It is normal for a fully charged battery to indicate it is charging (red light) when first plugged in. The Charge LED will turn green within a few minutes to indicate the battery is fully charged.

4. When the battery pack is fully charged, remove the AC adapter first from the wall outlet and then from the 2020ppbPRO.

Figure 4. Battery Pack Removal and Replacement

Charging a fully discharged battery pack will take approximately 4 hours.

Optionally you can use the off line charger (Part No. MX350019) to charge the battery pack when not installed in the 2020ppbPRO.

If you are charging the battery pack in the instrument you can use all the features of the 2020ppbPRO while the battery pack is being charged.

Leaving the AC adapter connected to the 2020ppbPRO will not harm the battery or the AC adapter in any way. If the 2020ppbPRO is to be left unused for an extended period of time, leave it connected to the AC adapter so that the battery will be fully charged and ready for operation.

On average a fully charged battery pack will provide 6 hours of continuous operation. Battery life is shorter if the instrument is turned off and then on again repeatedly, or if the backlighting is turned on.

Sample Intake Conditioner Tube

The 2020ppbPRO is an extremely sensitive instrument designed to measure very low concentrations of VOCs. The instrument anticipates that the user will be measuring VOCs principally in the range of 10ppb to 10ppm, with single ppb precision.

To achieve this critical sensitivity the instrument utilizes INFICON's Gas Analysis System developed in partnership with Dräger Safety AG & Co. All intake to the instrument is passed through a sample intake conditioner tube (F1760162) which is attached to the instrument with the INFICON Tube Holder (A1790500).

The tube provides a filtered dry sample which supports stability and precision of detector response during calibration and sampling.

Display

The 2020ppbPRO has a graphic display for reporting detected concentration and to guide you through configuration options. All functions of the 2020ppbPRO will be reported on the display.

Graphic Display

The 2020ppbPRO uses an 8 line graphic display. The display will always be used for reporting detected concentration. The 2020ppbPRO will display readings in parts per billion (ppb) ranging from 10ppb to 40000 ppb with a resolution of 1 ppb.

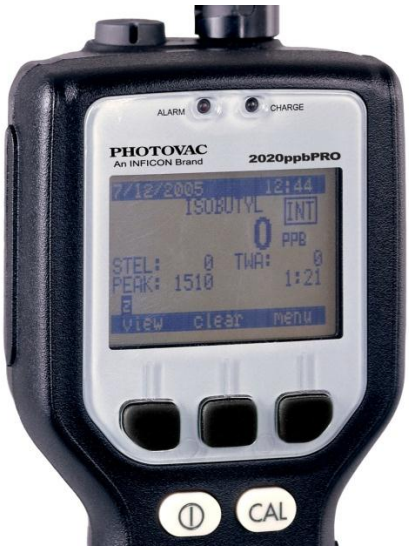


Figure 5. The 2020ppbPRO Display

The display reports instantaneous concentration at all times when the pump is on. In Interval mode, the display will report instantaneous concentrations as well as PEAK, STEL or TWA.

The 2020ppbPRO is designed for ease of use with a logically organized internal menu structure/user interface.
The 2020ppbPRO User Menu is shown in *Figures 6, 7, and 8.*

The 2020ppbPRO has three soft keys under the graphic LCD display, which always show the available functions of the soft keys in any screen.

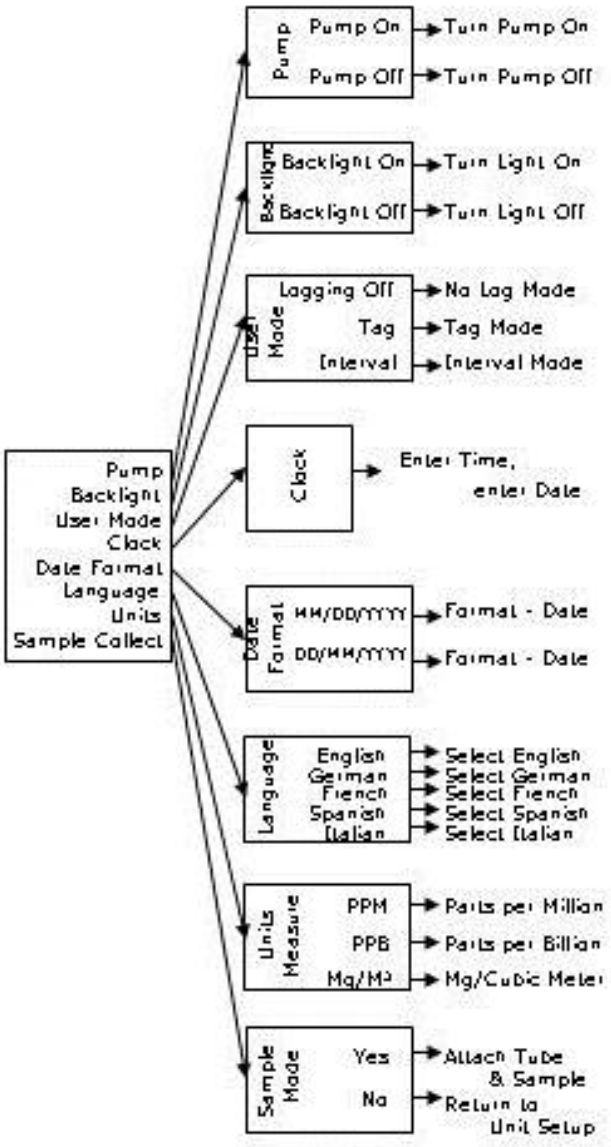


Figure 6. User Menu – Unit Setup

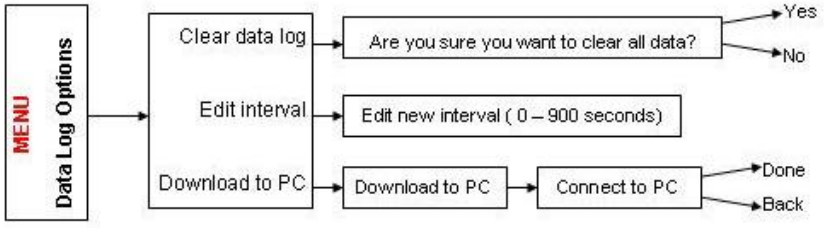


Figure 7. User Menu – Data Log Options

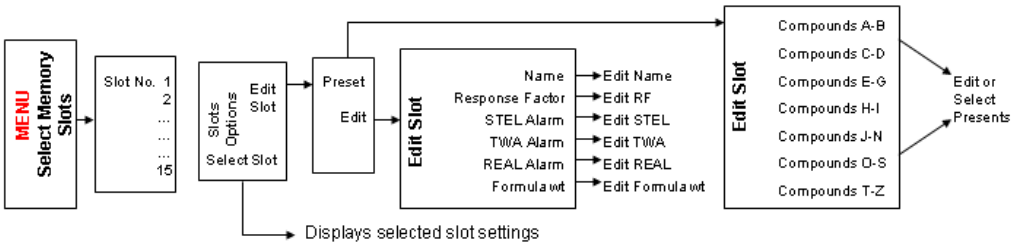


Figure 8. User Menu – Memory Slots

Keys

Fixed Keys

The 2020ppbPRO has two fixed keys. The first fixed key is the ON/OFF key. The second fixed key is the dedicated calibration key. Pressing the CAL key will start calibration in almost any mode.

The ON/OFF key is used to both turn power on to the 2020ppbPRO as well as the turn the power off. To turn on the 2020ppbPRO, press the ON/OFF key. To turn the power off, press the ON/OFF key and hold it down for 5 seconds, and then release it. This is done to prevent accidental power off.

Soft Keys

The three soft keys on the 2020ppbPRO are located directly below the display. Each key has varying functions for configuring the 2020ppbPRO, editing the data, and controlling the display. Since only three soft keys are available, each function is broken down into a path. Maps, showing each path and the resulting functions, are shown in *Figures 6, 7,* and *8*.

Beginning Operation

Turning the 2020ppbPRO On

1. Turn the 2020ppbPRO on by pressing the ON/OFF key. See *Figure 1* for the location of the ON/OFF key.

2. The 2020ppbPRO will display the instrument's software version number. Next the 2020ppbPRO will proceed to the mode display.

3. The 2020ppbPRO has an instant-on lamp. For maximum accuracy and stability, allow the 2020ppbPRO to warm-up for 10 minutes prior to calibration.

Operational Displays

When the instrument is turned on the display shows the last mode the 2020ppbPRO used. The display can show readings either in ppb, ppm, or Mg/M3 units of

measure. The resolution is 10ppb. The meter will display concentrations from 10 ppb up to 40,000 ppb.

The 2020ppbPRO can power up in Logging Off, Tag, or Interval mode depending on the mode that was set by the previous user. The current mode is shown in the upper right-hand corner of the display.

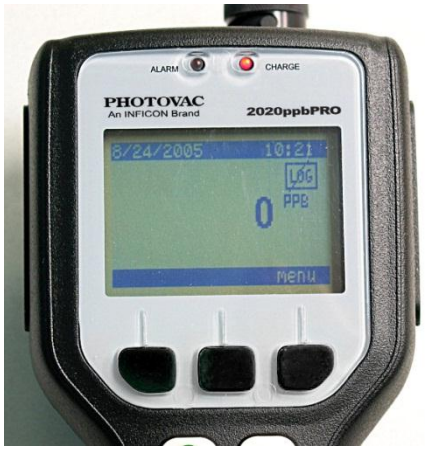


Figure 9. Logging Off Mode Display

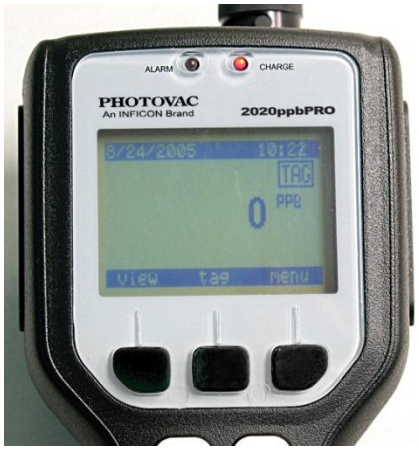


Figure 10. Tag Mode Display

Figure 11. Interval Mode Display

Tube Life Time Display

Also, when the instrument is turned on the Tube Life Time status will be displayed in the lower right portion of the display screen. If the time status is greater than zero, the instrument is ready for use. If the time status is equal to zero, a prompt will be displayed requesting the user to replace the expired sample intake conditioner tube with a fresh tube (F1760162) and select the operating range for the instrument (e.g., High, Medium, or Low depending on ambient humidity).

NOTE: *Following the selection of the operating range, the instrument will monitor the amount of time the instrument has been in use and will prompt the user to replace the tube when the time limit has been reached..*

Numeric Value, Duration, Time and Date Entry

In cases where the system requires the user to enter a number, duration, time, or date, the following mechanism is used. The number of digits to be entered depends on the type of value being entered. Upon entering a value entry screen, a bar icon below the left most digit highlights it as the active digit. The up (middle soft button) and down (left soft button) arrows are used to increase/ decrease the digit. The bar icon is moved to the next digit to the right using the right soft button. Once the user has finished entering the value they use the right soft button to move the bar icon to the far right to highlight the check mark. When the bar is under the check mark, the left soft button changes to ‘done’. The user is then able to input the value. Pressing the right soft button while the check mark is highlighted will return the bar icon to the left most digit.

In some cases, units may be specified (e.g., ppm or hh:mm); in others there may be no units.

No cancel option is available to the user. A value must be input.

Instrument Status

The instrument status is shown on the left of the first line of the status display. Each status has a priority assigned to it. If more than one status is in effect, then the status with the highest priority is displayed until the condition is corrected or until the option is turned off. *Table 1* is a list of the possible system alerts.

Table 1. System Alerts

2020ppbPRO Display	**Description**
Zero Air Error	Zero gas too high
Span Gas Error	Span gas too low
Pump Error	Pump fault
UV Lamp Error	UV lamp fault
Blocked Filter	Blocked sample inlet filter
Low Battery Icon	Low battery
Data Log Full	Data memory full
The Unit is Communicating with the PC	Instrument communicating with PC
Instrument Over Range	Sample concentration over instrument operating range
Alarm + R Icon	Real time concentration alarm
Alarm + T Icon	TWA concentration alarm
Alarm + S Icon	STEL concentration alarm

System Alerts and Alarms

While operating the instrument, system alerts can occur. To accurately identify the source of the alarm, each type of alarm has been given a unique status.

In addition to the status, the 2020ppbPRO also has an audio alarm and an alarm LED. To conserve power, the 2020ppbPRO alternates between the LED and audio. Different alarms are identified by the frequency at which the 2020ppbPRO alternates between the audio and LED; Peak alarm is 5 times per second, STEL alarm is 2.5 times per second, and TWA alarm is 1.25 times per second.

A soft key is used for acknowledging alarms and is named “Accept”. If no alarm exists, then the “Accept” key is not shown. To clear the alarm, press the “Accept” key. Once acknowledged, the alarm indicators are cleared. The alarm status will remain until the alarm condition clears.

The 2020ppbPRO updates the instantaneous concentration once every second. Following every update, the instantaneous concentration is compared to the peak alarm level, and if exceeded, an alarm is triggered.

In Interval mode, if a 15-minute average exceeds the STEL, a STEL alarm is generated. The TWA alarm is generated when the current average of concentration, since the TWA was last cleared, has exceeded the TWA exposure limit.

During calibration, all alarms are disabled. Once the calibration is complete, the alarms are re-enabled.

User Interface – Basic Menu

The 2020ppbPRO is designed for ease of use with a logically organized internal menu structure/user interface. The 2020ppbPRO User Menu is shown in *Figures 6, 7, and 8*.

The 2020ppbPRO has three soft keys under the graphic LCD display which always show the available functions of the soft keys in any screen.

Operation Modes

Logging Off Mode

Logging Off mode is identified by the word “**LOG**” with a diagonal line through the word “LOG” in the upper right corner of the 2020ppbPRO display. Logging Off will continuously display the concentration of total volatile compounds present that the 2020ppbPRO can ionize. The reading is updated approximately once per second. In Logging Off mode, the only soft key displayed is MENU.

MENU selects the 2020ppbPRO’s internal menu for the instrument setup by the user.

Tag Mode

Tag mode is identified by the word “**TAG**” in the upper right-hand corner of the 2020ppbPRO display. Tag mode will continuously display the instantaneous concentration of total volatile compounds. Tag mode also allows the user to manually tag and datalog readings. Tag mode allows the user to datalog a background reading, a sample reading and assign Site Codes to readings. Site Codes are set using the 2020ppbPRO Comm software. See Chapter 4, Connecting Accessories, for more information on how to use the 2020ppbPRO Comm software. In Tag mode, the soft keys are VIEW, TAG and MENU.

VIEW selects datalogger review.

TAG selects “No Label”, “Background”, or “Sample”.

MENU selects the 2020ppbPRO’s internal menu for the 2020ppbPRO setup by the user.

Interval Mode

Interval displays the instantaneous readings as well as STEL, TWA, and PEAK readings. Interval mode is identified by the letters “**INT**” in the upper right-hand corner of the 2020ppbPRO display. Interval automatically calculates and updates STEL, TWA, and PEAK readings. Interval mode also automatically stores these readings in the 2020ppbPRO’s memory at a preset interval selected by the user. In Interval mode, the soft keys are VIEW, CLEAR and MENU.

VIEW selects datalogger review.

CLEAR selects clearing the values for “TWA”, “PEAK”, “ALL”.

MENU selects the2020ppbPRO’s internal menu for the 2020ppbPRO setup by the user.

Short-Term Exposure Limit (STEL) Mode

The Short-Term Exposure Limit (STEL) mode displays the concentration as a 15-minute moving average. The 2020ppbPRO maintains 15 samples, each representing a one-minute averaging interval.

Once every minute, the oldest of the 15 samples is replaced with a new one-minute average. This moving average provides a 15-minute average of the last 15 minutes with a one-minute update rate. Since the average is calculated using 15 one-minute averages, the meter display will only update once every minute.

STEL is set to zero each time the instrument is turned on. Since STEL is a 15-minute moving average, there is no need to clear or reset the STEL.

STEL calculations are always being performed by the 2020ppbPRO. You can display the results of the calculations by selecting Interval Mode.

Time-Weighted Average (TWA) Mode

The TWA accumulator sums concentrations every second until 8 hours of data have been combined. If this value exceeds the TWA alarm setting, a TWA alarm is generated. The TWA is not calculated using a moving average. Once 8 hours of data have been summed, the accumulation stops. In order to reset the TWA accumulator, press the “Clear” key, then select “TWA” using the “Down Arrow” key, then press “Clear”.

This sum will only be complete after 8 hours, so the meter displays the current sum divided by 8 hours.

TWA calculations are always being performed by the 2020ppbPRO. You can display the results of the calculations by selecting Interval mode.

PEAK Mode

The PEAK mode displays the current detected concentration. The reading is updated once a second. In the background, the 2020ppbPRO datalogger is sampling the concentration and measuring minimum, maximum, and average concentrations for the selected averaging interval. At the end of every interval, one entry is placed in the datalogger until the datalogger is full.

In order to reset the PEAK reading, press the “Clear” key then select “PEAK” using the “Down Arrow” key then press “Clear”.

Datalogger

Interval Operation

The microprocessor accumulates all readings in an averaging interval that you select, and determines the minimum, average and maximum readings. It stores these numbers along with the highest priority instrument status and the most recent time and date.

These recorded data can now be reviewed and edited. Recorded data can also be printed using the PC. For each averaging interval, the 2020ppbPRO prints the minimum of all the minima, the average of all the readings for the interval and the maximum of all the maxima.

In PEAK mode, the reading is updated once a second. In the background, the 2020ppbPRO datalogger is sampling the concentration and measuring min, max, and average concentrations for the selected averaging interval. At the end of every interval, one entry is placed in the datalogger until the datalogger is full.

In STEL mode, 15 samples are combined to form a 15-minute average. Once every minute, the oldest of the 15 samples is replaced with a new one-minute average. This moving average provides a 15-minute average with a one-minute update rate so the meter display will only update once every minute. STEL is set to zero each time the instrument is turned on.

STEL calculations are always being performed by the 2020ppbPRO. You can display the results of the calculations by selecting STEL as the Display mode.

TWA mode sums concentrations every second until 8 hours of data have been accumulated. Once 8 hours of data have been summed, the accumulation stops.

This sum will only be complete after 8 hours, so the meter displays the current sum divided by 8 hours. While you are in TWA mode, the time on the status display will show the number of minutes and hours of data that TWA has accumulated. When this reaches 8 hours, the 2020ppbPRO stops accumulating data and the TWA is complete.

TWA calculations are always being performed by the 2020ppbPRO. You can display the results of the calculations by selecting TWA as the Display mode.

Interval mode logs readings at user-selected intervals of 1 second to 999 seconds.

Figure 12. Interval time adjustment

Interval simultaneously displays the STEL, TWA, and PEAK reading along with the instantaneous reading. The 2020ppbPRO's datalogger can store up to 200 hours of 1 minute sample entries. The interval you select will determine the period of operation. At the end of the period, the datalogger will be full and you will see the "Data Log Full" status.

Table 2. Averaging Intervals and Period
STEL, TWA, and PEAK Operation

Averaging Interval (example)	Hours of Operation to Fill the Datalogger
15 s	50
1 m	200
2 m	400
5 m	1000
15 m	3000

The 2020ppbPRO's display can show four values in Interval mode: STEL, TWA, and PEAK, plus the instantaneous reading.

Erasing or Downloading Data

There are two options for data manipulation under the "Erase/Download" Data selection.

"Clear Data Log" deletes all readings in the 2020ppbPRO memory.

NOTE: *Deleted information cannot be recovered. You should play back and print or download the contents of the datalogger before deleting any information.*

To empty the data logger in the 2020ppbPRO:

1. Press the MENU key.

2. Use the DOWN ARROW key to choose “Data Logger Options”, and then press the SELECT key.

3. Choose “Clear Data Log”, and then press the SELECT key.

4. Press either the YES or NO key in response to “Are you sure you want to clear all data?”.

“Download to PC” begins download of stored data from the 2020ppbPRO to the PC. The 2020ppbPRO computer cable, MX750120, must be connected between the 2020ppbPRO and the PC before beginning the data download. The 2020ppbPRO software package, the 2020ppbPRO Comm, must be installed and running on the PC prior to download.

To download data:

1. Press the MENU key.

2. Use the DOWN ARROW key to choose “Data Log Options” the press the SELECT key.

3. Use the DOWN ARROW key to choose “Download to PC”, then press the SELECT key.

4. Press the NEXT key at the “Connect Instrument to PC” prompt.

5. The display will show “Downloading Data” and data will now download to the PC. Press the DONE key to stop the download at any time.

Unit Setup Functions

Unit setup functions are used to select the 2020ppbPRO features. There are nine functions which can be set on the 2020ppbPRO; **Pump, Backlight, User Mode, Clock, Date Format, Language, Units of Measure, and Sample Mode.** *Figure 13* shows a menu detailing the User Setup functions. Press the MENU key in any operating mode to access “Unit Setup”.

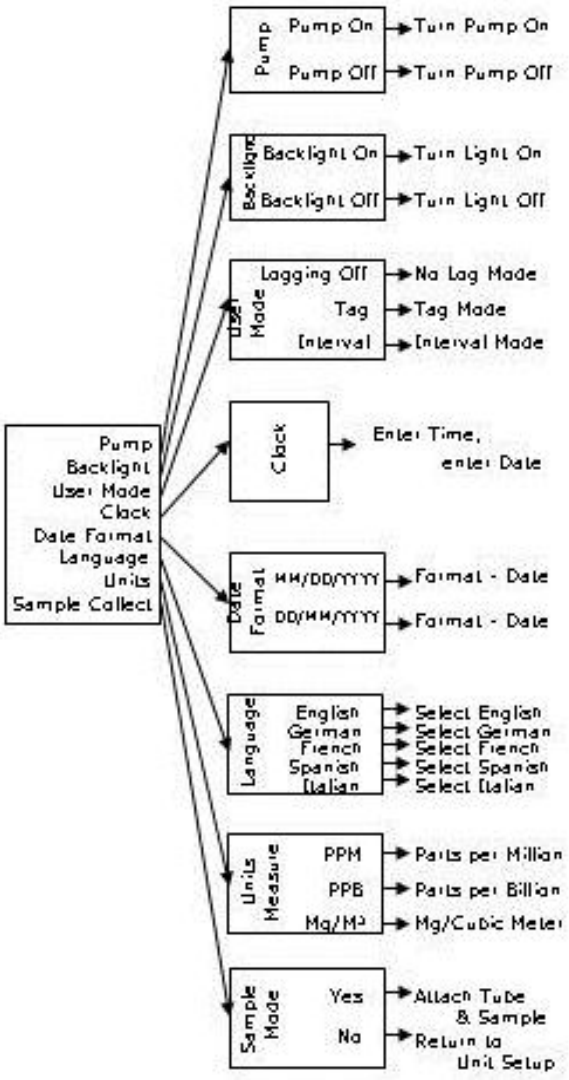


Figure 13. Unit Setup Map

Pump

The Pump function turns the pump on and off.

The detector is turned off when you turn the pump off. This prevents the detector from being damaged when there is no sample flowing through the detector.

When the pump and the detector are off, the meter display will continue to read normally but the instantaneous reading is at 0.0. Turn the pump and detector off when concentration measurements are not necessary, and the 2020ppbPRO will only be used for setup or reviewing data. By operating the instrument with the pump and detector off when you do not need them, you will conserve the battery and ultraviolet (UV) lamp.

To turn the pump on:

1. Press the MENU soft key, “Unit Setup”, press SELECT, “Pump”, press SELECT, “On”, then press SELECT.

To turn the pump off:

2. Press the MENU soft key, “Unit Setup”, press SELECT, “Pump”, press SELECT, “Off”, then press SELECT.

Backlight

The backlight function is used to switch the backlighting on and off when there is insufficient light to read the display.

To switch the backlighting on and off:

1. Press the MENU soft key and select “Unit Setup”.

2. Select BACKLIGHT and then press the SELECT soft key. Press the DOWN ARROW soft key to either turn the backlight on or off.

3. Press SELECT soft key to return to the main display.

To extend the operating life of the battery pack, turn the backlighting off when it is not required.

User Mode

User mode selects one of the three logging modes. The three logging modes are Logging Off, Tag and Interval mode.

Logging Off mode displays instantaneous readings only. The display is updated continuously and readings are not datalogged.

Tag mode displays instantaneous readings. The user has the option to manually store the instantaneous reading as either a data point without a tag, a background reading, or a sample reading.

Interval mode displays the instantaneous reading, STEL, TWA and PEAK readings. In interval mode data is logged at a user selected interval value between 1 second and 999 seconds.

Clock

The Clock function is used to set both the current date and time.

Entering Numbers with the Soft Keys to Set the Clock

For all information that you must enter, the left, center and right soft keys correspond to the up, down, and right arrow. See *Figure 14*.
The up and down arrows are used to change the character highlighted by the cursor. The right arrow is used to advance the cursor to the next character on the right. When the cursor is advanced past the right most character or symbol □, it wraps around to the first character again. To accept the changes, press the DONE soft key when the checkmark is highlighted.

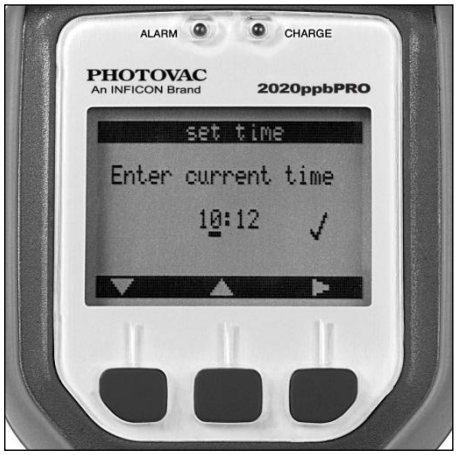


Figure 14. Setting the Time

The soft keys are defined on the bottom line of the display.

To set the time and date:

1. Press the MENU soft key.

2. With “Unit Setup” highlighted, press the SELECT soft key.

3. Using the DOWN ARROW soft key, highlight “Clock”. Press the SELECT soft key.

   The up and down arrow soft keys are used to change the character underlined by the cursor. The right arrow is used to advance the cursor to the next character on the right. When the cursor is advanced past the right most character, it wraps around to the first character again.

   Formatting characters, such as the colon (:) in the time, the decimal (.) in a concentration, and the slash (/) in date are skipped when advancing the cursor.

4. Use the “arrow keys” to enter the correct time. The time is formatted as Hour:Minute.

5. Use the RIGHT ARROW soft key until the “Checkmark” on the display is highlighted. Press the DONE soft key to confirm the time and move to the date option.

6. When setting the date, the 2020ppbPRO prompts you for the current date formatted as Month/Day/Year. Use the ARROW KEYS to enter the correct date.

7. Press the DONE soft key to confirm the date and the display will return to the main screen.

Date Format

The date format can be expressed either as **MM/DD/YYYY**, or as **DD/MM/YYYY**. Choose either option via the SELECT soft key.

Language

The information on the 2020ppbPRO display screen can be presented in five languages: **English**, **French**, **German**, **Spanish**, and/or **Italian**. On selecting Language from the MENU, the five languages will appear as a list. Using the center soft key, highlight the desired language and use the SELECT soft key to set the language.

Units

The 2020ppbPRO can display readings in three units of measure: PPM (parts per million), PPB (parts per billion), or mg/M^3 (milligrams per cubic meter). On selecting Units from the MENU, the three choices will appear as a list. Using the center soft key, highlight the desired Units of Measure and use the SELECT soft key to set the choice.

NOTE: *To utilize the mg/M^3 unit of measure, the instrument must be configured and operated with a compound chosen from the 2020ppbPRO's Preset RF library because a molecular weight value is needed for the mg/M^3 calculation. If you wish to use the mg/M^3 unit of measure while doing TVOC work, you should use a memory slot with Isobutylene selected from the Preset RF library. Refer to Section: Response Factors and Memory Slots for further information.*

Sample Collection Mode

The 2020ppbPRO can be used to collect samples for further analysis at another location with another instrument (e.g., back at a laboratory using a GC). Sample collection is conducted utilizing the optional INFICON Tube Holder (A1790500) and sample collection tubes. On selection of SAMPLE MODE from the UNIT SET UP menu, the pump will shut off and the user will be instructed to attach the TUBE HOLDER and fresh SAMPLE TUBE. The SAMPLE soft key will activate the pump for a short period of time drawing ambient air into the SAMPLE TUBE. When finished, the user will be prompted to either continue sampling or return the 2020ppbPRO to normal operating mode.

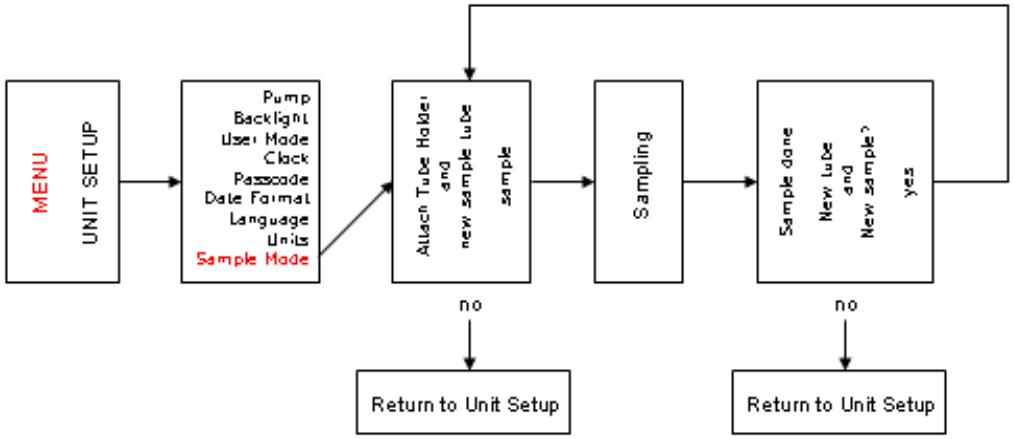


Figure 15. Sample Collection Mode

Response Factor Library

The response of a PID to a compound is dependent on its ionization potential. In certain situations when the user is confident that only a **single specific compound** exists, they can set up the 2020ppbPRO using an isobutylene calibration to mimic the 2020ppbPRO response as if the 2020ppbPRO was calibrated using that specific single compound.

General Information

In situations where only a single pure compound is present in air, the 2020ppbPRO should be calibrated with a standard of that specific compound as span gas. The 2020ppbPRO's 15 memory slots can be used to store calibration information for 15 different span gases.

The 2020ppbPRO will always detect all ionizable compounds present in a sample regardless of the response factor (RF) selected.

NOTE: *Even if the 2020ppbPRO has been calibrated with a specific compound, its response is not specific and the presence of another ionizable impurity may render the numerical result invalid.*

It is often impractical to carry a range of different standards into the field. Approximate results can be obtained by calibrating the 2020ppbPRO with the recommended span gas and entering the appropriate response factor. The response factor is based on the ratio of the response of the specific compound to the response of the span gas. The response factor multiplies the 2020ppbPRO's reading, then displays and records it.

WARNING

*The 2020ppbPRO is a total VOC instrument and will **ALWAYS** respond to all ionizable compounds present in a sample. The 2020ppbPRO will NEVER respond only to a specific compound if an RF is programmed. It is the responsibility of the user to be aware of the limitations of PID instruments.*

Response Factors and Memory Slots

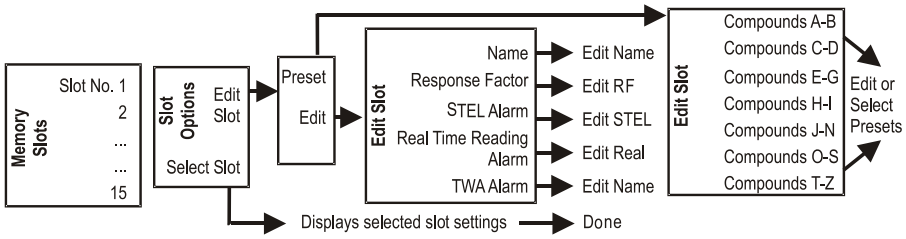


Figure 16. Response Factor and Memory Slots

Response factors built into the 2020ppbPRO are used to correct for the response of the PID to a specific compound. These correction factors are often called response factors (RF). The 2020ppbPRO has 15 memory slots. Each memory slot can store one preset RF. Library/RF selections simplify Memory Slot programming and provide standard response factors for approximately 100 compounds. CHOOSE FROM PRESETS allows you to select an entry from a pre-programmed Library. The name, response factor and three alarm levels are all set from the library.

To select a preset to program the selected Memory Slot:

1. Press MENU, choose “Memory Slots”, and then use the DOWN ARROW soft key to highlight “Memory Slots”, then press the SELECT soft key.

To select a memory slot:

Press the DOWN ARROW key until the memory slot you wish to use is highlighted. Press the SELECT key.

The memory slot compound, RF, TWA, STEL, and Peak alarm value are displayed. Press the DONE key to return to the main menu.

To edit a memory slot:

1. Press MENU, then the DOWN ARROW key to highlight “Memory Slot”, then press SELECT.

2. Press the SELECT key to view the “Memory Slot” content and then press the DONE key to return to the Main Menu.

3. Press the EDIT key to change the value for the Response Factor (RF) or the PEAK, STEL and TWA alarms.

4. Press the EDIT soft key, highlight Name, RF, STEL, TWA, or PEAK using the DOWN ARROW key, then press the SELECT soft key.

5. Use the up, down and right arrows soft keys to enter the desired number.

6. Highlight the ✓ and press the DONE soft key.

7. Press the DONE soft key to return to the main display or press the SELECT soft key to edit another value.

8. To return to the Main Menu, press SELECT then DONE.

To select a pre-programmed compound stored in the 2020ppbPRO's Preset RF library:

1. Press the MENU key.

2. Choose "Memory Slots", then press the SELECT key.

3. Press the EDIT key.

4. Press the PRESET key.

5. Use the DOWN ARROW key to choose the alpha range of the compound of interest, then press the SELECT key.

6. Choose the compound of interest using the DOWN ARROW key and press the SELECT key.

7. Press the SELECT key to accept the choice or press EDIT to modify the preset values for STEL, TWA and PEAK alarm as shown above.

Calibration Technical Description

Periodic calibration is required to compensate for the 2020ppbPRO output changes due to inlet filter restriction, ionization chamber contamination, lamp cleanliness, pump wear and other factors.

During calibration, the 2020ppbPRO is first exposed to zero air. A small (zero) signal is generated. This zero signal is stored by the microprocessor.

The 2020ppbPRO is next exposed to span gas. This span gas signal is stored by the microprocessor. The microprocessor subtracts the zero signal from the span gas signal and divides the difference by the user-entered span gas concentration. The resulting sensitivity is stored in the selected Memory Slots with the zero signal and the alarm levels. This number is then multiplied by the response factor and displayed.

The 2020ppbPRO readings are always relative to the calibration gas. After calibration with isobutylene, the 2020ppbPRO will respond directly in units equivalent to isobutylene. Most volatile organic compounds will be detected by the 2020ppbPRO. It cannot distinguish between isobutylene and other ionizable compounds. A reading of 10 ppm indicates all ionizable compounds that are present have generated an ion current proportional to 10 ppm of isobutylene. The reading is actually 10 ppm isobutylene equivalent units. The 2020ppbPRO readings give an indication of the total ionizables present and their concentration relative to the calibration gas.

Calibrating the 2020ppbPRO 4

Calibration Introduction

The 2020ppbPRO must be calibrated in order to display concentration in ppm units equivalent to the calibration gas. First, zero air, which should not contain any ionizable gases or vapors, is used to set the 2020ppbPRO's zero point. Then, a calibration gas, containing a known concentration of a photoionizable gas or vapor, is used to set the sensitivity.

Due to the 2020ppbPRO's sensitivity, outdoor air is usually unsuitable for calibration unless the intake sample conditioner tube (F1760162) and filter tube holder (A1790500) is used.

NOTE: *Ultra Zero air (99.999 % free of VOCs) may also be used for zero calibration in combination with the intake sample conditioner tube (F1760162) and filter tube holder (A1790500).*

The same tube should be used for conditioning the calibration gas. Once calibration is done, the tube is discarded and a new tube is used for sampling purposes.

If compound threshold limit values (TLVs) are exceeded, you should use a gas bag for sampling and calibration.

To determine the TLV of the compounds contained in the calibration gas, refer to the Material Safety Data Sheet (MSDS) supplied with your calibration gas cylinder.

If you will be using a gas bag for span gas calibration, see Calibration Using a Gas Bag on page 63 for instructions.

NOTE: *Disconnect the 2020ppbPRO from the AC adapter before beginning calibration.*

Compressed Gases

Cylinders of compressed gas, such as calibration gas, must be handled with extreme care. For safety, the calibration gas cylinders must be secured before use. Please observe the following handling procedures:

- Mark each new regulator with its intended gas service and never use a regulator for more than one service. To ensure safety and avoid contamination, regulators should be dedicated to one service. Do not change gas service or adapt equipment without consulting your gas supplier.
- Do not heat or expose cylinders or regulators to temperatures above 52°C (125°F). The cylinders may rupture at high temperatures.
- Use only the specified regulator for the calibration gas. Confirm regulator type and material with your specialty gas supplier.
- Always secure cylinders before removing the cylinder valve protection cap.
- Do not drag or roll cylinders. Large cylinders should only be moved on carts designed for compressed gas cylinders. Do not move cylinders without the valve protection cap in place.
- Wear safety glasses when working with compressed gases.
- Do not store cylinders in a hazardous location. Store cylinders in an upright position away from possible sources of heat or sparks.
- Never plug, obstruct or tamper with safety relief devices.

Regulators for Compressed Gases

When connecting a regulator to a large cylinder:

- Ensure cylinder valve and regulator connection match.
- Ensure regulator construction materials are compatible with the gas, and that the cylinder pressure gauge will withstand the cylinder pressure.
- Never use the regulator as a shut-off valve. Close the cylinder when it is not in use.
- Do not subject the regulator to an inlet pressure greater than recommended.
- Do not move or detach the regulator when it is pressurized or when it is in use.
- Before connection, ensure the gas cylinder valve and the regulator CGA connection are clean.
- Turn the pressure control valve on the cylinder all the way off (close the cylinder). Turn the regulator outlet to off. Open the gas cylinder valve slowly and check for leaks. Adjust the delivery pressure and then open the regulator outlet valve.

Calibration Gas

Adequate ventilation must be provided when the 2020ppbPRO is being calibrated.

If compound threshold limit values (TLV) are exceeded, you should use a gas bag for sampling and calibration.

To determine the TLV of the compounds contained in the calibration gas, refer to the Material Safety Data Sheet (MSDS) supplied with your calibration gas cylinder. See Calibration Using a Gas Bag on page 63 for more details.

Calibration Using the Flow-Match Regulator

Connecting the Flow-Match Regulator to the Cylinder

Observe proper handling procedure for all gases!

WARNING

To connect the flow-match regulator to the gas cylinder:

1. Connect the regulator to the calibration gas cylinder.
2. If you are using a portable tank of calibration gas (Part No. MX350025), connect the regulator (Part No. MX350006) directly to the tank.
3. When the regulator is connected properly, you can read the cylinder contents from the regulator gauge.
4. Connect the adapter tubing to the regulator.

Figure 17. Calibration with Flow-Match

Calibrating the 2020ppbPRO with the Flow-Match Regulator

1. Ensure that the short sample probe is connected to the 2020ppbPRO filter tube holder inlet.

NOTE: *Ensure the sample probe is free of any contamination, as this will affect the calibration.*

2. Press the CAL key.

3. Follow the instructions on the display and connect the intake sample conditioner tube (F1760162) and filter tube holder (A1790500).

NOTE: *If using Ultra Zero air, connect the air tank to the tube holder inlet using a suitable regulator.*

Then press the “Next” key. The 2020ppbPRO will take 60-90 seconds to set the zero point for calibration.

4. The 2020ppbPRO display will show “Zero air calibrated. Continue calibration?” Press the “Next” key.

5. Enter the span gas concentration if the concentration displayed on the 2020ppbPRO is different than the concentration of the span gas cylinder. Press the “New” key and follow the display prompts. For further information, see page 43 for numeric value, duration, time, and date entry. If the span concentration matches the span gas cylinder concentration, press the “Next” key. To exit calibration, press the “Cancel” key.

6. Ensure the calibration gas cylinder is upright and open the regulator by turning the valve counter clockwise. Open the regulator until the ball is 1/8” from its rest position.

7. Connect the span gas to the 2020ppbPRO tube holder inlet.

8. The 2020ppbPRO will take 60-90 seconds to set the span set point. When finished with the calibration, the 2020ppbPRO will display “Calibration complete”.

9. When the calibration procedure is finished, the display will show the lamp condition assessment (i.e., GOOD, REPLACE SOON, BAD).

10. Replace the filter tube used during calibration with a fresh tube and the instrument will be ready for sampling use.

NOTE: *If you are not using the INFICON Flow-Match Regulator, ensure that the inlet pressure is less than 5 psi when calibrating.*

NOTE: *While the Cal status is active, all alarms are deactivated*

Calibration Using a Gas Bag

Preparing the Calibration Gas Bag and the Zero Air Bag

WARNING

Observe proper handling techniques for all gases!

1. Connect the regulator to the calibration gas cylinder.

   If you are using a portable tank of calibration gas, connect the regulator directly to the tank.

   If you are using a large cylinder of calibration gas, you must obtain a high purity regulator. Isobutylene in air is usually supplied with a standard CGA 590 cylinder valve outlet. Obtain a regulator with the matching fitting. Connect the regulator to the tank of calibration gas. Tighten the regulator onto the tank with a wrench. Do not over-tighten.

NOTE: *Do not force the connection.*

Do not use Teflon® tape with CGA fittings. In general, these fittings are designed for metal-to-metal sealing.

Do not use adapters to connect one CGA fitting to another type of CGA fitting. If the regulator does not match the outlet on your calibration tank, contact your specialty gas supplier.

2. Attach the knurled nut on the gas bag adapter to the regulator. Finger-tighten the fitting.

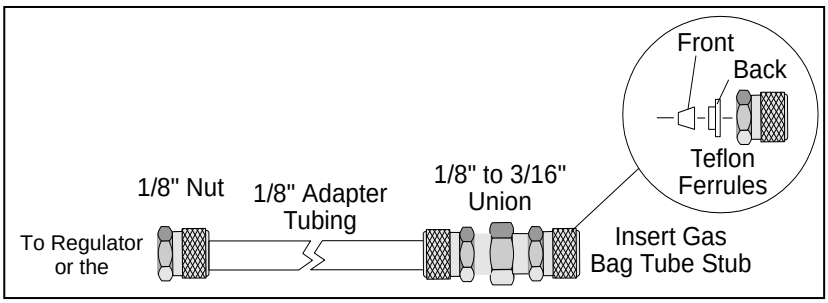


Figure 18. Gas Bag Adapter

3. Loosen the knurled nut on the reducing union of the gas bag adapter.

NOTE: *Do not remove the nut from the union, as the Teflon ferrules contained inside the nut may be lost.*

4. Insert the tube stub from the gas bag into the knurled nut. Tighten the knurled nut and ensure the tube stub is secure. If the gas bag is not secure, ensure you have inserted the tube stub far enough into the knurled nut. Do not over-tighten the fitting.

NOTE: *Over-tightening the Teflon ferrules will result in damage to the ferrules!*

5. The union should be connected to the gas bag adapter. If it is not, then tighten the nut on the adapter tube to the union.

6. Flush and fill the gas bag. Remove the knurled nut on the adapter tube from the regulator.

8. Repeat this procedure, if necessary, to prepare a bag of zero air.

NOTE: *Do not use the same gas bag or for the bag of zero air. You will contaminate the bag of zero air.*

Calibrating the 2020ppbPRO with a Gas Bag

1. Ensure the short sample probe is connected to the 2020ppbPRO tube holder inlet. If you are using the long probe for sampling, then ensure the long probe is connected to the 2020ppbPRO tube holder inlet.

NOTE: *Ensure the sample probe is free of any contamination as this will affect the calibration*

2. Press the CAL key.

3. Follow the instructions on the display connect the intake sample conditioner tube (F1760162) and filter tube holder (A1790500).

NOTE: *If using Ultra Zero air, connect the bag of UZ air to the tube.*

4. Then press the “Next” key. The 2020ppbPRO will take 60-90 seconds to set the zero point for calibration.

5. The 2020ppbPRO display will show “Zero air calibrated. Continue calibration?” Press the “Next” key.

6. Enter the span gas concentration if the concentration displayed on the 2020ppbPRO is different than the concentration of the span gas cylinder. Press the “New” key and follow the display prompts. For further information, see page 45 for numeric value, duration, time, and date entry. If the span concentration matches the span gas cylinder concentration, press the “Next” key.

7. Connect the span gas to the 2020ppbPRO tube holder inlet. The 2020ppbPRO will take 60-90 seconds to set the span set point. When finished with the calibration, the 2020ppbPRO will display “Calibration complete”.

8. When the calibration procedure is finished, the display will show the lamp condition assessment (i.e., GOOD, REPLACE SOON, BAD).

9. Replace the filter tube used during calibration with a fresh tube and the instrument will be ready for sampling use.

NOTE: *While the Cal status is active, all alarms are deactivated.*

Preparing for Field Operation

Field Check List

When using the 2020ppbPRO for field operation, the following items should be carried into the field to reduce or eliminate down time of the instrument.

If you are going to be in the field for a single 8-10 hour day, then you should include the following accessories:

Table 3. Check List for Field Operation

✓	Spare battery pack (Part No. MX700010 or MX700011)
✓	Spare 10.6eV lamp (Part No. F1760150)
✓	2020ppbPRO multi-tool (Part No. MX396012)
✓	Water trap kit (Part No. A1790510)
✓	Short sample probe (Part No. MX395001)
✓	Calibration regulator (Part No. MX35006)
✓	Tank(s) of calibration gas (Part No. MX350025)
✓	Spare inlet filters (Part No. MX750100)
✓	Carrying case (Part No. MX700260)
✓	DC power cord (Part No. MX350004)
✓	A1790500 Tube Holder
✓	F1760162 Dräger Tube, Intake sample conditioner
✓	Quick Reference Guide (M1760148)

If you will be in the field for more than one day, you should include the following additional items:

Table 4. Additional Field Items

- ✓ AC adapter (Part No. MX350002 or MX396013)
- ✓ Cable kit (Part No. MX750120)
- ✓ Computer and associated cables
- ✓ Drager sample collection tubes; e.g., Activated Charcoal Type B (F1760164), Silica Gel Type B (F1760167) or Silica Gel Type G (F1760168)

Operational Check List

Before beginning field work, set up and calibrate the 2020ppbPRO for your particular application.

To ensure the instrument is in working order before heading into the field:

1. Ensure the battery pack is fully charged. If you are unsure about the status of the battery, replace the battery pack with one that is fully charged. See battery charging on page 38.

2. After calibration is complete, sample the calibration gas and the bag of zero air to ensure the 2020ppbPRO has been calibrated correctly.

3. Select the correct operating mode. See Section regarding *Operation Modes* page 47.

Connecting Accessories 5

Computer

The 2020ppbPRO will download information stored in its datalogger to a Windows® based computer. This option may be used if you need to prepare reports based on the 2020ppbPRO's recorded data. This feature may also be used if you need the recorded data in a format that can be imported into a spreadsheet or database for further calculations.

NOTE: *The 2020ppbPRO is not classified for use in hazardous locations when connected to any computer.*

The instructions below will provide you with the basic information for using the 2020ppbPRO with the 2020ppbPRO communications software, the 2020ppbPRO Comm. In order to use these instructions, you must be familiar with Microsoft Windows and it must be installed and running on your computer.

To initiate communications between the 2020ppbPRO and a PC:

1. Turn the 2020ppbPRO off.

NOTE: *You must turn the instrument off before connecting or disconnecting the computer cable.*

2. The 2020ppbPRO must be connected to a serial port. Use the computer cable (Part No. MX750120) to connect the 2020ppbPRO to one of the computer's serial ports. Remember which serial port you are using as you will need this information when you set up the 2020ppbPRO Communications software. Normally you will use Com1 or Com2.

3. If the 2020ppbPROprinter cable plugs directly into the port on the computer without the gender changer or the 9 to 25-pin adapter, you are most probably connected to a parallel port. You will need at least one of the adapter cables to connect the 2020ppbPRO to a serial port. Once all connections have been made, turn on the 2020ppbPRO instrument.

4. Start the 2020ppbPRO Comm software as you would any Windows® program. The 2020ppbPRO Comm splash screen will appear on the PC. Once the 2020ppbPRO Comm software is running, the PC is ready to receive data from the 2020ppbPRO.

5. On the 2020ppbPRO, the number of data bits has been fixed at 8, stop bits has been fixed at 1. Parity has been set at None and the Flow control is Xon/Xoff. These values are set automatically by the 2020ppbPRO Comm software.

6. On the 2020ppbPRO, press the MENU key, choose "Data Log Options", then press the SELECT key.

7. Choose the "Download to PC" option using the DOWN ARROW key and press the SELECT key.

8. Follow the 2020ppbPRO prompts to start the data download.

NOTE: *A DB-25, female connector is sometimes a parallel port. Do not connect the serial port of the converter to a parallel port.*

Pre-filter Tube Holder

INFICON's optional pre-filter Tube Holder (A1790500) is shown in figure 19 below. The holder will accept the sample intake conditioner tube (F1760162), and the optional sample collection tubes (e.g., Activated Charcoal Type B, Silicagel Type B or G).

The tube holder attaches to the 2020ppbPRO on the inlet nozzle replacing the standard inlet nozzle cap. It is a simple twist lock application.

Figure 19. Tube Holder

To insert a pre-filter tube into the tube holder:

1. Unscrew the top part of the tube holder immediately above the tube window.

2. Break off each end of the glass tube by inserting the end into the opening as shown.

3. Insert tube into holder.

4. Re-screw on the top part of the tube holder (note: the tube holder is designed to compensate for any minor irregularities in the tube that result from the breaking off of each end).

To remove a pre-filter tube from the tube holder:

1. Unscrew the top part of the tube holder immediately above the tube window.

2. Lift the pre-filter tube from the tube holder.

3. Either insert another tube or re-attach the top part of the tube holder.

Pre-filters and Sample Collection Tubes

INFICON provides a variety of pre-filter tubes for the2020ppbPRO. The tubes are custom developed for INFICON by Dräger Safety AG & Co., and address clean air calibration and sample intake conditioning to facilitate more accurate sampling.

The optional sample collection tubes are standard Dräger tubes used for collecting VOC samples for analysis later in a lab or other analytic facility.

Figure 20. Dräger Pre-filter Tubes

Sample Line

A 3-meter (9') sample line (Part No. MX380305) may be connected to the 2020ppbPRO for remote sampling. Connect the sample line to the 2020ppbPRO inlet using the fittings supplied with the sample line.

NOTE: *When using the sample line, be especially careful not to aspirate liquids or solids as they will damage the 2020ppbPRO.*

Wrist Strap

To use the wrist strap:

1. Turn off the 2020ppbPRO and then remove the battery cover. See Removing *and Replacing the Battery Pack* on page 39.

2. Place the metal ring of the wrist strap in the circular notch located on the battery door.

3. Replace the battery cover.

4. Adjust the strap length as necessary.

DC Power Cord

The 2020ppbPRO can be connected to a car battery through the cigarette lighter with the DC power cord. While the 2020ppbPRO is connected to the car battery, the 2020ppbPRO battery is being charged.

NOTE: *The 2020ppbPRO is not classified for use in hazardous locations with a DC power cord.*

To connect the 2020ppbPRO to a DC power supply:

1. Turn the instrument off by pressing the ON/OFF key for five seconds.
2. Connect the DC power cord (Part No.MX350004) to the 2020ppbPRO AC adapter jack on the rear of the instrument.
3. Connect the other end of the DC power cord to the cigarette lighter in the car.
4. Turn the instrument on again by pressing the ON/OFF key.

If the vehicle is running, ensure the engine exhaust does not contaminate your samples.

Belt Clip Holster

Use the belt clip holster (Part No. MX750011) to protect the instrument and to mount the instrument to a belt.

11.7 eV UV Lamp

General Information

The 2020ppbPRO is equipped with the standard 10.6 eV high performance UV lamp. An optional 11.7 eV UV lamp (Part No. MX390024) is available for special applications.

Install this lamp as outlined in Removing and Replacing the UV Lamp on page 77. When you install a UV lamp other than the 10.6 eV high performance UV lamp, all the response factors become invalid. You must set the response factor for the current cal memory to 1. Contact INFICON's Applications Department for further information.

Limitations of Lithium Fluoride Lamp Window

This lamp is intended for special applications only. It is not suitable for normal operation, due to limitations of the lamp window material.

The 11.7 eV lamp window material is lithium fluoride (LiF). LiF is composed of two light elements which are easily disrupted within the crystal lattice by the UV light generated by the lamp. This process is called solarization and it is evidenced by the crystal gradually becoming opaque. Lamp performance declines as this happens.

Also, unlike other UV lamp windows, LiF readily absorbs water from atmospheric humidity. When contaminated by moisture, the window loses its ability to transmit UV light.

NOTE: *Do not touch the lamp window or handle it near water.*

Using the 11.7 eV UV Lamp

With an 11.7 eV lamp installed, your instrument functions as a detector responding to compounds which ionize at 11.7 eV or less. The 11.7 eV lamp may be useful for detecting compounds not ionized by the standard 10.6 eV lamp.

Due to the lamp window limitations, the lifetime of the 11.7 eV lamp is restricted and it must be used sparingly according to the following instructions.

To use the 11.7 eV lamp in your the 2020ppbPRO:

1. Remove the 11.7 eV lamp from the supplied desiccant bottle and install the lamp as outlined in Removing and Replacing the UV Lamp on page 7.

NOTE: *Do not remove or replace any detector lamp in a hazardous location.*

2. Turn the instrument on and wait for the ready status. If the lamp cannot be started, contact INFICON's Technical Support Department.

3. Calibrate the 2020ppbPRO. See *Calibration Using the Flow-Match Regulator* on page 61.

4. All response factors are invalid when an 11.7 eV lamp is installed. The response factor must be set to 1.

5. Every hour of operation, switch off the instrument, remove the lamp and examine the window for yellowing. If the window is yellow, then regenerate the window according to the procedure in

6. Cleaning the Lithium Fluoride ***Window*** on page 80.

7. After use, remove the lamp and store it in the supplied desiccant bottle.

Do not leave the 11.7 eV lamp in the instrument when you turn it off. Always remove the 11.7 eV lamp and store it in the supplied desiccant bottle.

Off-Line Charger

General Information

The off-line charger (Part No. MX350019) allows you to charge a battery pack independently of the 2020ppbPRO. To charge a battery pack without removing it from the 2020ppbPRO, see Battery Charging on page 39.

The off-line charger requires one of the following the 2020ppbPRO accessories for operation:

- AC Adapter (Part No. MX350002 - North America)
- AC Adapter (Part No. MX396013 - Europe)
- DC Power Cord (Part No. MX350004)

Use only the AC adapter specified for use with the 2020ppbPRO. Using another AC adapter will result in damage to the battery pack, the off-line charger, or the adapter.

Charging from an AC Source

NOTE: *Do not charge the battery pack in a hazardous location.*

To re-charge your battery pack:

1. Remove the battery pack as outlined in *Battery Charging* on page 38.
2. Attach the connector from the battery pack to the socket on the off line charger.

NOTE: *The connector is polarized. It will only fit one way. Do not force the connection.*

3. Plug the AC adapter into the jack on the opposite face of the off-line charger.
4. Plug the AC adapter into an AC outlet. If you are using the European AC adapter, ensure the correct plug is installed on the line cord. If it is not correct for the wall outlet in your area, then it must be replaced.
5. The LED on the upper face of the off-line charger indicates the charge state of the battery pack. Red indicates the battery is being charged. Green indicates the battery is fully charged.
6. Charging a fully discharged battery pack will take approximately four hours.
7. It is normal for a fully charged battery pack to indicate it is charging (red light) when first plugged in. The LED will turn green within a few minutes to indicate the battery is fully charged.

8. When the battery pack is fully charged, remove the AC adapter, first from the wall outlet, then from the off line charger.
9. Remove the battery pack connector from the socket on the off-line charger.
10. Replace the battery pack in the 2020ppbPRO as outlined in *Removing and Replacing the Battery Pack* on page 38.

You can keep the battery pack fully charged indefinitely, without overcharging it, by leaving it connected to the off-line charger while the charger is operating.

Charging from a DC Source

To re-charge your battery pack:

1. Remove the battery pack as outlined in *Removing and Replacing the Battery Pack* on page 38.
2. Attach the connector from the battery pack to the socket on the off-line charger.

NOTE: *The connector is polarized. It will only fit one way. Do not force the connection.*

3. Plug the DC power cord into the jack on the opposite face of the off-line charger.
4. Plug the DC power cord into a vehicle auxiliary 12 VDC or cigarette lighter socket.
5. The LED on the upper face of the off line charger indicates the charge state of the battery pack. Red indicates the battery is being charged. Green indicates the battery is fully charged.
6. Charging a fully discharged battery pack will take approximately 6 hours.
7. It is normal for a fully charged battery pack to indicate it is charging (red light) when first plugged in. The LED will turn green within a few minutes to indicate the battery is fully charged.
8. When the battery pack is fully charged, remove the DC power cord, first from the vehicle auxiliary 12 VDC or cigarette lighter socket, then from the off-line charger.
9. Remove the battery pack connector from the socket on the off-line charger.
10. Replace the battery pack in the 2020ppbPRO as outlined in *Battery Charging* on page 39.

You can keep the battery pack fully charged indefinitely, without overcharging it, by leaving it connected to the off line charger while the charger is operating.

6 Routine Maintenance

Battery Charging

A fully charged battery pack powers the 2020ppbPRO for approximately 8 hours. If the instrument is to be used for more than 8 hours, carry a spare battery pack (Part No. MX700010 or MX700011). When the first one has been discharged, replace it with the spare.

NOTE: *If you do not turn the 2020ppbPRO off before removing the battery pack, you will reset the instrument and you will lose all logged data and setup parameters.*

When the 2020ppbPRO displays the low battery symbol, the battery pack requires charging. When the low battery symbol is displayed, you have 30 minutes of operation left. The 2020ppbPRO will turn itself off before the battery pack becomes critically low.

Do not remove or recharge the battery pack in a hazardous location.

WARNING

Upon return from field work, charge the battery packs as outlined in *Battery Charging* on page 39. Use only the AC adapter specified for use with the 2020ppbPRO. Optionally you can use the off-line charger to charge the battery pack independently of the instrument. See *Off-Line Charger* on page 73.

NOTE: *You must use the 220 V battery charger (Part No. MX396013) in order to comply with the requirements of the applicable Council Directives.*

If you do not require portable operation, you can use the 2020ppbPRO while it is connected to the AC adapter.

The 2020ppbPRO is not intrinsically safe when connected to an AC adapter.

WARNING

The AC adapter automatically charges at a high charge rate until the battery pack is fully charged. It then maintains the full charge with a low continuous charge rate indefinitely so there is no danger of over-charging.

When the Charge LED on the top of the 2020ppbPRO is red, the battery is charging. When the Charge LED turns green, the battery is fully charged.

Battery Pack Care

Leaving the 2020ppbPRO for more than 3 months without charging the batteries may result in the loss of recorded data and setup parameters. If the 2020ppbPRO is not used for long periods of time, recharge the battery for a few hours every 30 days

to avoid loss of data. See *Battery Charging* on page 38 for instructions on charging the battery.

Please observe the following:

- For replacement battery pack use only Part No. MX700010 or MX700011.
- Do not dispose of the battery pack in a fire. The cell may explode.
- The battery pack is 24% cadmium (Cd) by weight. This battery pack must be disposed of properly. Check with local codes for special disposal instructions.
- Do not open or mutilate the battery pack.
- Exercise care in handling battery packs in order not to short the terminals with conducting materials such as rings, bracelets and keys. The battery or conductor may overheat and cause burns.
- Charge the battery pack using the AC adapter provided with or identified for use with this product only in accordance with the instructions and limitations specified in this manual. For AC adapter use only Part No. MX350002 (North America) or MX396013 (Europe).

Maintenance of the UV Lamp

Removing and Replacing the UV Lamp

NOTE: *Do not remove or replace the UV lamp in a hazardous location.*

To remove the UV lamp from your instrument:

1. Ensure the instrument is turned off.

You must turn the instrument off before removing the lamp cover.

WARNING

2. Remove the lamp housing cover.
3. Tilt the 2020ppbPRO slightly and remove the UV lamp.

Do not touch the wire grid inside the detector cell. Any dust or dirt in the detector cell can be blown out with a gentle jet of compressed air.

Do not insert any object, other than the UV lamp, into the lamp holder.

WARNING

4. Without touching the lamp window, place the new lamp into the 2020ppbPRO lamp holder, window first. See *Figure 21.*

Figure 21. Removing the UV Lamp

NOTE: *Do not force the lamp into the lamp holder.*

5. Replace the lamp housing cover. Tighten the cover down. Do not over tighten.

6. Calibrate the 2020ppbPRO and then continue normal operation.

Cleaning the UV Lamp Window

During the course of normal operation, a film builds up on the window of the UV lamp. The rate at which the film develops depends on the type and concentration of the gases and vapors being sampled and results from the UV light interacting with them.

Hot gases and vapors may contribute to a decrease in sensitivity because they may condense on the lamp window. Condensation may eventually evaporate off the window, but it will usually leave a residue that must be removed by cleaning the lamp window.

Since some UV inhibiting deposits are invisible to the eye, regular cleaning of the lamp window is strongly recommended. Clean the lamp frequently to prevent a heavy buildup of deposits that may be difficult to remove.

Do not remove the UV lamp in a hazardous location.

WARNING

The UV lamp cleaning kit (Part No. MX380336) includes aluminum oxide powder (3.0-micron powder) and cotton swabs. Additionally, you will require approximately 10 mL of methanol. When ordering methanol, specify purge and trap grade.

The instructions provided below are for 10.6 eV lamps. Refer to

Cleaning the Lithium Fluoride ***Window*** for special instructions to clean the 11.7 eV lamp window.

WARNING

Never touch the UV lamp window with your fingers.

To clean the UV lamp:

1. Remove the lamp as outlined in Removing and Replacing the UV Lamp on page 77.
2. Allow the lamp to cool to room temperature to avoid thermal shock, which could crack the window.
3. Dampen a cotton swab in methanol and dab it into the cleaning compound. Allow a small amount of the cleaning compound to adhere to the cotton tip.

WARNING

Do not use methanol to clean the 11.7 eV lamp window.

4. Using small circular motions, rub the cleaning compound onto the lamp window. Do not exert excessive force onto the window, since the window can be permanently damaged by misuse.
5. Continue cleaning for approximately one minute.
6. Dampen a new cotton swab with methanol and remove any trace amounts of the cleaning compound from the lamp window.
7. Wipe the window and the lamp with a dry, lint free tissue to remove any trace amounts of the cleaning compound and methanol. All traces of cleaning compound must be removed.
8. If you removed an O-ring from the lamp, replace it now. Ensure your hands are clean and dry.
9. Without touching the lamp window, replace the lamp as outlined in Removing and Replacing the UV Lamp on page 77.

Cleaning the Lithium Fluoride Window

To clean the 11.7 eV lamp window:

1. Clean the lamp window with dry aluminum oxide powder on a dry cotton swab. Do not use methanol or water.

2. Wipe the window and the lamp with a dry, lint free tissue to remove any trace amounts of the cleaning compound and methanol. All traces of cleaning compound must be removed.

NOTE: *You may not be able to fully clean the 11.7 eV lamp window. The solarizaton effect cannot be cleaned and will require replacement of the lamp (anticipated life is 1 - 3 months depending on amount of use).*

Replacing the Sample Inlet Filter

The 2020ppbPRO is equipped with a combined dust and water filter to reduce detector contamination. As the filter collects dust, the 2020ppbPRO's inlet flow rate and sensitivity decrease. The filter will not allow water to pass through, but the filter will not stop all solvents.

NOTE: *Do not aspirate liquid samples with the 2020ppbPRO!*

Replace the filter on a weekly basis, or more frequently if the 2020ppbPRO is used in a dusty or wet environment. You must replace the filter if the 2020ppbPRO has been exposed to water. If you are sampling hot gases or vapors, condensation in the sample line may also affect the filter.

Do not replace the inlet filter in a hazardous location.

WARNING

To replace the inlet filter:

1. Turn the instrument off. Unscrew the filter housing from the detector housing. Be careful not to lose the O-ring seal.

2. Remove the Teflon/Polypropylene filter and install the new filter (Part No. MX750100). Place the filter so that the Teflon side is facing down in the filter housing and the mesh side is facing the 2020ppbPRO.

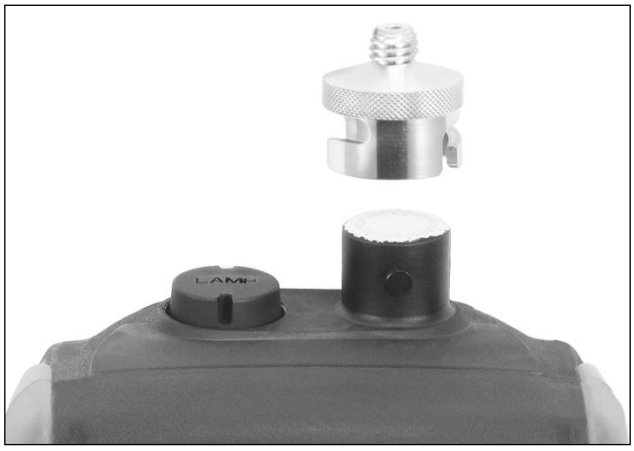


Figure 22. Replacing the Inlet Filter

Handle the filter disk only by the edges. The mesh may be damaged or contaminated by excessive handling. Use forceps if possible.

3. Replace the filter housing.

4. Recalibrate and then continue normal operation.

Troubleshooting 7

General Information

If you have a service-related question about the 2020ppbPRO, consult this manual first. If you cannot find the answer in this documentation, contact INFICON's Technical Support Department.

When you call, please have the following information ready:

1. A description of what happened and what you were doing when the problem occurred.
2. Any corrective action that you have tried.
3. The exact wording of any messages that appeared on the display.

WARNING

Do not service the 2020ppbPRO in a hazardous location.

Troubleshooting

Situation	Cause	Action
Zero Air Error	Contamination of sample lines, sample probe, inlet filter or fittings before the detector	Clean or replace contaminated item
	Span gas and zero air are mixed up.	Ensure that clean air is used to zero the 2020ppbPRO. If you are using gas bags, mark the zero air and span gas bags clearly.
	Ambient air is contaminated.	If you are not sure of the cleanliness of the ambient air, use a commercial zero grade air to zero the 2020ppbPRO.
Span Gas Error	Span gas and zero air are mixed up.	Ensure that clean air is used to zero the 2020ppbPRO. If you are using gas bags, mark the zero air and span gas bags clearly.
	Span gas concentration is too low.	Ensure that cal gas concentration is accurate.

	UV lamp window is dirty.	Clean the lamp window. See page 80.
	UV lamp is failing.	Install a new lamp. See Removing and Replacing the UV Lamp on page 77.
	The concentration and sample gas are not compatible with the 2020ppbPRO.	Contact INFICON.
UV Lamp Error	UV lamp has not started immediately.	This fault may occur momentarily when the 2020ppbPRO is first turned on. Allow 60 seconds for UV lamp to start and fault to clear.
		Turn the 2020ppbPROoff then on again. Wait 60 seconds for UV lamp to start.
	UV lamp is not installed	Install UV lamp. See Removing and Replacing the UV Lamp on page 77
	Incorrect lamp is installed.	Use only INFICON's high performance 10.6eV lamp (MX1760150)
	Electronic problem	Contact INFICON for assistance.
Pump Error	If the pump sounds labored, the pump is operating outside its normal operating range.	Check for obstructions in the sample line. Verify that the sample line, sample probe and inlet filter are not blocked.
		Ensure that the sample outlet is not blocked.
	The 2020ppbPRO has aspirated a liquid.	Contact INFICON.
	The pump has failed.	Contact INFICON.
Blocked Filter		Replace the inlet filter INFICON Part No. MX750100.

Instrument over range	High concentrations of gases will saturate the detector and electronics.	Wait until the display returns to normal. PIDs are designed to detect relatively low levels of gases.
	The detector has become saturated.	Move the 2020ppbPRO to a location where it can sample clean air. Sample clean air until the readings stabilize at a low level.
	Detector has been short-circuited by foreign matter in the cell.	Contact INFICON.

General Questions

Very low or no instrument response detected, yet compounds are known to be present	The 2020ppbPRO has not been properly calibrated.	Verify the concentration of the span gas. Calibrate the 2020ppbPRO. See page 60.
	Memory slots are not set up correctly.	Program the memory slots. See page 57.
	Response Factor has been set to zero.	Set Response Factor to 1.0 or refer to Table 6 for correct response factor.
	Detector is leaking.	Ensure the UV lamp is correctly installed.
		Ensure the lamp cover is tight. Do not over tighten.
		Ensure the O-ring seal on the lamp cover is positioned correctly.
	UV lamp is the incorrect size.	Use only F1760150
	Sampling environment is extremely humid or it is raining.	Water vapor is not ionized by the PID. Water vapor does scatter and absorb light that causes a higher or lower reading. The 2020ppbPRO has been designed to work in a humid environment but you

		may notice a decreased response.
	UV lamp is failing.	Install a new UV lamp. See page 77.
	High concentrations of non-ionizable compounds.	Chemical compounds with an ionization potential higher than 10.6 eV or 11.7 eV scatter and absorb UV light. Sensitivity may be decreased. Contact INFICON for more information.
Erroneous high readings	Sampling environment is very humid.	Water vapor may contain mineral salts which carry a charge. The water vapor becomes an electrolytic solution which becomes ionized when it enters the detector.
	The 2020ppbPRO is not properly calibrated.	Ensure that the calibration gas is the correct concentration and calibrate the 2020ppbPRO as described on page 59.
	Memory Slots have not been properly programmed.	Program the memory slots. See page 57.
	Detector has been short-circuited by foreign material.	Contact INFICON
Date and time setting are not retained	The battery pack was removed before the 2020ppbPRO was turned off.	Replace the battery pack and reset the time and date. See page 37 & 52.
	The 2020ppbPRO has not been used for 3 months or more.	Connect the 2020ppbPRO to the battery charger and recharge the battery. Reset the date and time.
Display is blank	Battery pack is critically low.	Recharge or replace the battery pack.
	The battery pack is not connected to the 2020ppbPRO properly.	Ensure the battery pack connector is securely attached to the 2020ppbPRO.
Sample flow is less than 300 ml/min/	Inlet filter is plugged.	Replace the inlet filter. See page 80.
	Inlet filter is incorrectly installed.	Ensure the inlet filter is installed correctly.

		See page 78.
	Sample outlet is blocked.	Clear blockage from sample outlet.
	Pump has been damaged.	Contact INFICON.
Liquid has been aspirated.	The 2020ppbPRO has been exposed to a solvent that can pass through the inlet filter.	Contact INFICON.
Very corrosive gases have been sampled.		Contact INFICON.
Cannot download data or communicate with PC.	Cable is not connected.	Connect the 2020ppbPRO to the PC. See page 35.

Appendices 8

Specifications

Size:	9” (228.6 mm) long x 3” (76.2 mm) deep x 4.25” (107.9 mm) wide at display tapering to 2.6” (66.6 mm) at handle
Weight:	1.9 pounds (0.86 kg)
Detector:	Instant on photoionization detector with high performance 10.6eV UV lamp, optional 11.7 eV lamp available
Keypad:	5 keys with tactile feedback.
Display:	8 line LCD display for alphanumeric readouts and soft key display
Datalogger memory:	200 hours at 1 minute sample interval
Serial output:	RS-232, 9600 baud, 8 data bits with no parity, for connection to a Windows compatible computer
Audio output:	85 decibels on Alarm
Inlet connection:	1/8” (3.175 mm) fitting
Battery type:	MX700010: Nickel cadmium rechargeable cell with intelligent charger. The battery pack is 24% cadmium (Cd) by weight. MX700011: NIMH rechargeable cell with intelligent charger. Contains no cadmium.
Charge/discharge time:	4 hr/6 hr
Input Power:	12 VDC, 1.0 A
Battery charger:	Automatically charges and maintains full charge in battery pack. U.S. and Canada – INFICON Part No. MX350002 Input: 120VAC 60 Hz 21W Output: +12VDC 1000mA Regulatory Approvals: CSA, UL All other Countries – INFICON Part No. MX396013 Input: 100-250VAC 50-60 Hz 0.5-0.3A Output: +12VDC 2.08A Regulatory Approvals: ATEX, UL
Materials in sample stream:	Stainless steel, Teflon, Viton®, polypropylene, nitrile-chorobutadiene rubber, nickel.

Inlet filter:	Replaceable Teflon/Polypropylene
Inlet flow rate:	Greater than 300 mL/min
Operating temperature range:	0 to 50°C (32 to 122°F)
I/S Certified Temperature Range:	0 to 40^0C (32 to 105^0F)
Operating humidity range:	0 to 95% relative humidity (non-condensing)
Operating humidity range with optional humidity pre-filter tube	0 to 100% relative humidity (non-condensing)
Operating altitude range:	Up to 10,000 ft (3000 m)
Storage temperature range:	-10 to 65°C (14 to 149°F)
Storage humidity range:	0 to 100% relative humidity (non-condensing)
Storage altitude range:	Up to 15,000 ft (4570 m)
Operating concentration range:	10 ppb to 40 ppm, isobutylene
Accuracy:	+/-10% or +/-2 ppm, whichever is greater
Precision:	1% of calibration (calibrated with 10 ppm isobutylene)
Response time:	Less than 3 seconds to 90%
LDL:	10 ppb isobutylene

NOTE: ***Specifications subject to change without notice.***

Warranty

The 2020ppbPRO has a one year Warranty against defects in materials and workmanship.

INFICON warranties that its manufactured product will be free from defects in materials and workmanship for a period of one (1) year from the date of receipt by the Customer. This may be voided if, in the opinion of INFICON, the product has been abused or treated in a negligent manner so as to cause damage or failure. Negligent use includes, but is not limited to, exposure of the internal parts of the equipment to water. Damage caused thereby is expressly excluded from this Warranty.

Consumable supplies and parts routinely replaced are not included in the warrantee.

INFICON and its vendors disclaim any implied warranty of merchantability or fitness for a particular purpose. INFICON and its vendors will not be liable for any indirect, special, incidental, or consequential damages, irrespective of whether INFICON or the vendor has advance notice of the possibility of such damages.

INFICON's sole liability under this warranty is limited to the repair or replacement of the product at INFICON's discretion at its Service/Repair facility and return to the Customer.

When INFICON is made aware of a problem that would be eligible for remedy under Warranty, it will issue a Return Material Authorization number to the customer. No return will be accepted unless such authorization has been obtained. The customer is responsible for insurance and shipping to the designated INFICON Service/Repair facility.

Contacting INFICON

To place an order, check the status of an order, obtain current pricing and availability	315-434-1100
Service and repair of your instrument	315-434-1100
Technical Support Department	315-434-1100
Customer Service	315-434-1100
Worldwide:	INFICON 2 Technology Place East Syracuse, NY 13057 USA Tel.: 315-434-1100 Fax: 315-437-3803 www.inficon.com mailto:reachus@inficon.com

Table 5. Contact Information

Installing Alternate AC Plug on the Battery Charger

In most cases the 2020ppbPRO will be shipped with an AC line cord that will fit the AC wall outlet in your area. If this cannot be done, you may need to obtain an AC line cord suitable for the AC receptacle in your area.

The AC line cord, attached plug and receptacle must be marked with your country's certification mark and the cord must have a Harmonization (HAR) mark.

The line cord must be rated for either 100 to 120 VAC at 60 Hz or 220 to 240 VAC at 50 Hz. The voltage rating will depend on the voltage in your area.

Contact your INFICON representative to obtain more information.

Calibration Gas Supplier

The recommended span gas is isobutylene in air. 100 ppm isobutylene in air may be obtained from INFICON.

The exact concentration will be determined by your application. Other concentrations and other gases may be obtained from your local gas supplier. If you cannot locate a local gas supplier, contact INFICON's Technical Support Department.

Using the Gas Bag

To fill gas bag:

1. Turn the knurled plastic knob counter clockwise to unlock it. Use the knurled collar on the valve tube to gently push the valve tube down, toward the bag.

2. Turn the knurled plastic knob clockwise to lock the valve tube in place.

3. Turn the regulator knob counter clockwise about half a turn to start the flow of gas. Fill the gas bag about half full and then close the regulator.

4. Open the syringe port and empty the bag. Flush the bag a few times with the calibration gas and then fill it.

5. To close the gas bag valve, turn the knurled plastic knob counter-clockwise to unlock it. Gently pull the valve tube up to close the valve. Turn the knurled plastic knob clockwise to tighten it against the valve tube.

Once the bag has been filled, use the bag and sample as soon as possible.

NOTE: *Do not use gas bags to sample unstable or highly reactive compounds. Do not use Tedlar® bags for storage of hazardous materials.*

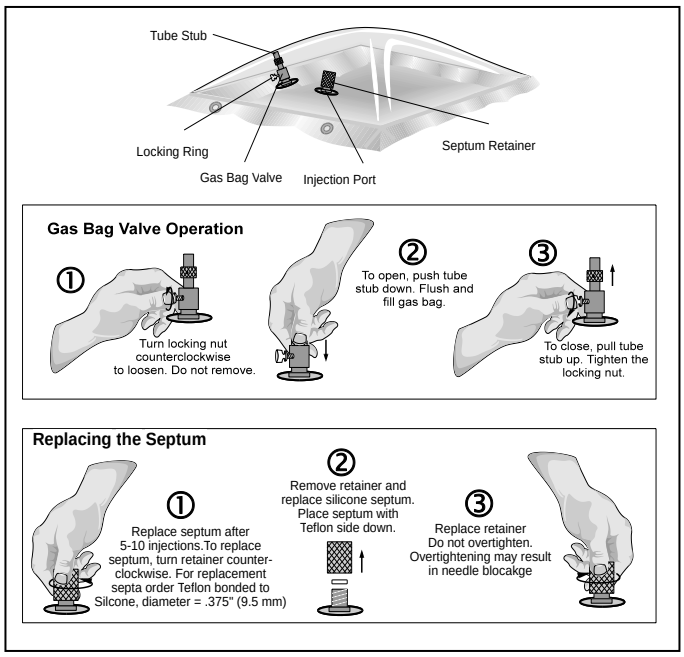


Figure 22. Using the Gas Bag

Presets and Response Factors

Presets simplify Memory Slot programming, and provide standard response factors and alarm levels for approximately 100 compounds. The name, response factor and three alarm levels are all set from the preset.

You can change any of the values entered in the Memory Slots. Changes made to the library information that has been loaded into a Preset will have no effect on the original library entry.

The response factors were determined over the range 5 - 500 ppm, based on a 100-ppm isobutylene calibration. Isobutylene RF = 1.0. The following formula is used for calculation of response factors:

$$\text{Response Factor} = \frac{\text{Actual Concentration}}{\text{2020ppbPRO Response}}$$

A response factor less than 1.0 indicates a compound response better than that of isobutylene. A response factor greater than 1.0 indicates a lower response than that of isobutylene.

NOTE: *It does not matter which response factor is entered. The 2020ppbPRO's response is not specific to any one compound. The displayed reading represents the total concentration of all ionizable compounds in the sample.*

Table 6. Library Entries

Compound	Code	RF
Acetaldehyde	ACETAL	**10.5**
Acetone	ACETONE	**1.2**
Acrolein (2-Propenal) **5**	ACROLEIN	**4.0**
Allyl Chloride (3-Chloro-1-Propene) **5**	ALLCHLOR	**3.9**
Benzene	BENZENE	**0.5**
Bromoform (Tribromomethane) **5**	BROMFORM	**2.0**
1,3-Butadiene	13BUTADI	**0.7**
n-Butanol	nBUTANOL	**3.4**
n-Butyl Acetate	nBUTACET	**2.3**
n-Butyl Acrylate	nBUTACRY	**1.8**
n-Butyl Mercaptan (Butanethiol) **6**	nBUTMERC	**0.6**
Carbon Disulfide	CS2	**1.3**
Chlorobenzene	CHLOBENZ	**0.4**
Crotonaldehyde (2-Butenal)	CROTONAL	**1.2**
Cumene (Isopropylbenzene)	CUMENE	**0.6**
Cyclohexane	CYCHEXAN	**1.3**
Cyclohexanone	CYCHEXON	**0.9**
1,2-Dichlorobenzene (ortho-)	12DCBENZ	**0.5**
cis-1,2-Dichloroethylene	cis12DCE	**0.8**
trans-1,2-Dichloroethylene	trn12DCE	**0.4**
N,N-Dimethylformamide (DMF)	N,N-DMF	**0.8**
1,4-Dioxane	DIOXANE	**1.3**
Epichlorohydrin **5**	EPICLHYD	**6.5**
Ethanol	ETHANOL	**8.8**
Ethyl Acetate	ETHYACET	**3.8**
Ethyl Acrylate	ETHYACRY	**2.3**
Ethylbenzene	ETBENZEN	**0.5**
Ethyl Cellosolve (2-Ethoxyethanol)	ETHCELLO	**1.3**
Ethyl Ether (Diethyl Ether)	ETHETHER	**1.2**
Ethyl Mercaptan (Ethanethiol) **6**	ETHMERC	**0.6**
Ethylene **7**	ETHYLENE	**10.1**
n-Heptane	nHEPTANE	**2.4**
n-Hexane	nHEXANE	**4.7**
Hydrogen Sulfide	H2S	**3.3**
Isoamyl Acetate	IAMYACET	**1.8**
Isobutyl Acetate	IBUTACET	**2.6**
Isobutyraldehyde **6**	IBUTALDE	**1.1**
Isopentane	IPENTANE	**8.2**
Isoprene (2-Methyl-1,3-Butadiene) **8**	ISOPRENE	**0.6**
Isopropanol	IPA	**4.4**

Isopropyl Acetate	IPACETAT	**2.6**
Isopropyl Ether	IPROPETH	**0.8**
Methyl Bromide (Bromomethane)	MeBROM	**1.6**
Methyl Ethyl Ketone	MEK	**0.8**
Methyl Isobutyl Ketone	MIBK	**1.0**
Methyl Mercaptan (Methanethiol) **6**	METHMERC	**0.5**
Methyl Methacrylate	MeMeACRY	**1.4**
Methyl tert-Butyl Ether (MTBE)	MTBE	**0.8**
Monomethylamine	MMeAMINE	**1.3**
n-Nonane	nNONANE	**1.4**
iso-Octane (2,2,4-Trimethylpentane)	IOCTANE	**1.2**
n-Pentane	nPENTANE	**10.4**
n-Propanol	nPA	**5.1**
Propionaldehyde (Propanal) **5**	PROPANAL	**14.8**
n-Propyl Acetate	nPROACET	**3.1**
Propylene **7**	PROPYLEN	**1.2**
Propylene Oxide	PROPOXID	**5.8**
Styrene	STYRENE	**0.4**
Tetrachloroethylene (PCE)	PCE	**0.5**
Tetrahydrofuran	THF	**1.5**
Toluene	TOLUENE	**0.5**
Trichloroethylene	TCE	**0.5**
Trimethylamine	TRMeAMIN	**0.9**
Vinyl Acetate	VINACET	**1.2**
Vinyl Bromide	VINBROM	**0.4**
Vinyl Chloride (Chloroethylene)	VINCHLOR	**1.7**
Vinylidene Chloride (1,1-DCE)	1,1-DCE	**0.8**
meta-Xylene	mXYLENE	**0.5**
ortho-Xylene	oXYLENE	**0.5**
para-Xylene	pXYLENE	**0.5**

NOTES:

1. *Peak alarm levels have been established as the TLV-Ceiling concentration, or the TLV-STEL concentration in those cases where no TLV-Ceiling value exists.*

2. *In those cases where no STEL exists for a compound, the STEL value has been established as equivalent to the TWA value.*

3. *Compound is Not Detectable (ND) by the 2020ppbPRO. Please contact INFICON Applications Department for further details.*

4. *Response factor for this compound using the 10.6 eV lamp is equal to 0.00 because the 11.7 eV lamp is required to ionize and detect this compound. Please contact INFICON Applications Department for further details.*

5. *In cases where recommended exposure limits are below the detection limit for the compound in question, the estimated lower limit of detection has been substituted for those values.*

6. *The 2020ppbPRO is not suitable for monitoring these compounds at ACGIH recommended levels.*

7. *A 1000-ppm TWA has been established for those compounds which are "Simple Asphyxiates" and for which no exposure value exists.*

8. *For those compounds, which lack established exposure levels, an arbitrary value of 200 ppm has been established for the TWA, STEL and PEAK alarms.*

References

1. Maslansky, Carol J. and Steven P. Maslansky. *Air Monitoring Instrumentation.* New York: Van Nostrand Reinhold, 1993.

2. American Conference of Governmental Industrial Hygienists. *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices (1994-1995)*. Reprinted with permission.

NOTE: *The TLV/BEI™ publication is revised annually.*

3. National Institute for Occupational Safety and Health (NIOSH). *Recommendations for Occupational Safety and Health, Compendium of Policy Documents and Statements*, January 1992.

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An INFICON Brand