

HORIBA

HORIBA INSTRUMENTS INCORPORATED

1002 Harvest Court, Moon Twp., PA 15108-9015
 Tel.: (724) 457-2424; FAX: (724) 457-2344

To: Department of Administration, Purchasing Division 2019 Washington Street East P.O. Box 50130 Charleston, WV 25305-0130 Attn: Frank Whittaker Tel.: (304) 558-2316 Fax: (304) 558-4115 Cell: (304) XXX-XXXX E-mail: frank.m.whittaker@wv.gov	Date: April 23, 2013 Quotation No.: P11304027; Rev. 0 Quotation Inquiry: DEP16166 Page <u>1</u> of <u>7</u> Please reference quotation number on all correspondence. Re: Ambient SO ₂ Analyzers
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Item	Qty.	Description	Unit Cost	Net Cost
01	4	<p>Horiba Model APSA-370 Ambient SO₂ Analyzer U.S. EPA Reference Equivalency Number: EQSA-0506-159 TUEV Bericht 936/21204643D EN14212 and VDI 4202/4203 Horiba PN APSA-370-8</p> <p><u>Description:</u> The APSA-370 is an ambient analyzer used to measure low-levels of H₂S and SO₂ in ambient air. The analyzer utilizes a ultra violet fluorescence detector to measure SO₂ and H₂S concentrations at ppm levels. The principle of operation relies on the principle that when SO₂ molecules contained in the sample gas are excited by ultraviolet radiation they emit a characteristic fluorescence in the range of 220 to 420 nm.</p> <p>The UV fluorescence method uses the reaction of SO₂ with UV radiation</p> <p style="text-align: center;"> Reaction (1) SO₂ + hv₁ → SO₂ * Reaction (2) SO₂ * → SO₂ + hv₂ Reaction (3) SO₂ * → SO + (O) Reaction (4) SO₂ * + M → SO₂ + M </p> <p>Here, (1) shows the excited state of the SO₂ molecules that have absorbed the amount of energy hv₁ by UV radiation. (2) shows the amount of energy, hv₂ emitted by the excited molecules as they return to ground state. (3) shows the decomposition by the light emitted from the excited molecules. (4) shows the quenching, i.e., the energy lost by the excited molecules colliding with other molecules.</p> <p>The APSA-370 uses a Xe lamp as the light source. The fluorescent chamber has been designed to minimize scattered light. The optical system has been designed with low background interference, which makes it possible to take measurements with a highly stable zero point. A reference detector monitors any fluctuation in the intensity of the light source. This allows the unit to self calibrate automatically, resulting in greater span stability.</p> <p><u>AP-370 Series Ambient Analyzer Features:</u></p> <ul style="list-style-type: none"> • Automatic Calibration Troublesome calibration procedures have been reduced to the push of a function key. At the Auto-Interval Calibration (AIC) menu the user can set the start time, the start range, and the interval for the automatic calibration. The system clock and calendar then assures that calibration instructions are properly executed. To make things even easier, remote auto-calibration can 	\$ 12,149.00	\$48,596.00

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Re: Ambient SO₂ Analyzers

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		<p>also be performed from a remote computer using the analyzer's optional serial RS-232C serial port.</p> <ul style="list-style-type: none"> • Auto-range Function An auto-range function that automatically switches to the range best suited to the gas concentration to be measured for both momentary and average values is included as a standard feature. Optionally, when the analyzer is set to any range within 10 times the range ratio, the auto-range function can still be used. • Selective Data Output For each component measured, the system provides four types of data: momentary values, integrated values, moving averages and simple averages. Any two of these data may be output simultaneously to two different external devices. The time-span for both average and integrated values may be specified. • Data Storage Four different values may be stored in memory: three simple averages and the integrated value. For example: <ul style="list-style-type: none"> - Average Value No. 1: 1,000 3-minute data sets - Average Value No. 2: 1,000 30-minute data sets - Average Value No. 3: 1,000 1-hour data sets - Average Value No. 4: 100 3-hour data sets • Network Communications Option Serial communication is available through a RS-232C serial port located at the rear of the instrument. The serial port makes analyzer data available using Horiba's proprietary serial communication protocol which can then be easily converted to RS-485 transmission for network data collection. Ethernet communication is also available through an optional port utilizing TCP/IP protocol. Also available is a serial protocol option is Modbus® communication. • Data Management Memory Card Option A Compact Flash (CF) card can save average or integrated values, read and collect data for off-line data analysis. Using a compact flash card allows the analyzer to be used conveniently as a stand-alone unit. • Readout Values At the touch of a button located on the front panel the displayed readout can be toggled to display ppb, ppm or mg/m³. Note: For the APHA-370 THC Analyzer, CH₄ values are displayed as ppm NMHC and THC as ppm C. • Pressure Compensation Automatic compensation for ambient pressure assures reliable data regardless of the ambient pressure fluctuations or the analyzer's location. • LCD Touch Panel Display The adoption of full graphic LCD touch screen offers a large, easy-to-use display with user-friendly, interactive operation. The user interface facilitates maintenance with displays such as a graph of light intensity, remaining time before lamp replacement, pumps, valves and converters. The display also guides the user through a series of menus for saving data such as measured values, alarm history and calibration data. • Interference Tolerance The AP-370 Series Analyzers utilize Horiba's innovative detection technology and sampling techniques to provide maximum sensitivity. The interference 		

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		<p>from component is minimized providing accurate results for extended periods.</p> <ul style="list-style-type: none"> I/O Option The AP-370 Analyzers' optional RS-232C serial port can be used to transmit measured values, alarms and other data to remote equipment. Likewise this same serial port may be used to input changes to parameter settings. <p><u>APSA-370 Ambient SO₂ Analyzer Features:</u></p> <ul style="list-style-type: none"> The APSA-370 uses an innovative detector and a new optical system for low background, high sensitivity and improved stability The fluorescent chamber design gives measurements with minimum influence from moisture In comparison with pulsed fluorescence detectors, the APSA-370 design is highly selective for SO₂, requires no supplemental gas and provides a linear output The APSA-370 compensates for the lamp's luminous energy decline guaranteeing prolonged calibration stability <p><u>Proposed APSA-370 Ambient SO₂ Analyzer Specifications:</u></p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td>Model No.:</td> <td>APSA-370</td> </tr> <tr> <td>Manufacturer:</td> <td>Horiba Instruments, Inc.</td> </tr> <tr> <td>Measured Gas:</td> <td>SO₂</td> </tr> <tr> <td>Principle of Operation:</td> <td>UV fluorescence (UVF)</td> </tr> <tr> <td></td> <td>0-0.05/0.10/0.20/0.50 ppm F.S. (standard) 0-1/2/5/10 ppm F.S. (optional) Manual range selectable; capable of remote range switching Optional measureable ranges: 4 ranges selectable from 0-100 ppm within 10 times range ratio</td> </tr> <tr> <td>Lower Detection Limit:</td> <td>0.50 ppb at 3 σ</td> </tr> <tr> <td>Repeatability:</td> <td>\pm1.0% of full scale</td> </tr> <tr> <td>Linearity:</td> <td>\pm1.0% of full scale</td> </tr> <tr> <td>Zero Drift:</td> <td><LDL/day at lowest range <LDL/week at lowest range</td> </tr> <tr> <td>Span Drift:</td> <td><LDL/day at lowest range <LDL/week at lowest range</td> </tr> <tr> <td>Response Time (T₉₀):</td> <td>\leq120 seconds at lowest range</td> </tr> <tr> <td>Sample Gas Flow Rate:</td> <td>\approx0.70 SLPM</td> </tr> <tr> <td>Display:</td> <td>Measured Value, Range, Alarm, Maintenance Screen</td> </tr> <tr> <td>Alarms:</td> <td>During AIC, Zero Calibration Error, Span Calibration Error, Temperature Error in Catalyzer</td> </tr> <tr> <td>Input/Output:</td> <td>0-1V, 0-10V, 4-20mA (to be specified) RS-232C, Contact Input/Output</td> </tr> <tr> <td>Ambient Temp. Range:</td> <td>5°C to 40°C; 41° to 104°F</td> </tr> <tr> <td>Power Requirements:</td> <td>100/110/115/120/220/230/240 VAC at 50/60</td> </tr> </tbody> </table>	Parameter	Specification	Model No.:	APSA-370	Manufacturer:	Horiba Instruments, Inc.	Measured Gas:	SO ₂	Principle of Operation:	UV fluorescence (UVF)		0-0.05/0.10/0.20/0.50 ppm F.S. (standard) 0-1/2/5/10 ppm F.S. (optional) Manual range selectable; capable of remote range switching Optional measureable ranges: 4 ranges selectable from 0-100 ppm within 10 times range ratio	Lower Detection Limit:	0.50 ppb at 3 σ	Repeatability:	\pm 1.0% of full scale	Linearity:	\pm 1.0% of full scale	Zero Drift:	<LDL/day at lowest range <LDL/week at lowest range	Span Drift:	<LDL/day at lowest range <LDL/week at lowest range	Response Time (T ₉₀):	\leq 120 seconds at lowest range	Sample Gas Flow Rate:	\approx 0.70 SLPM	Display:	Measured Value, Range, Alarm, Maintenance Screen	Alarms:	During AIC, Zero Calibration Error, Span Calibration Error, Temperature Error in Catalyzer	Input/Output:	0-1V, 0-10V, 4-20mA (to be specified) RS-232C, Contact Input/Output	Ambient Temp. Range:	5°C to 40°C; 41° to 104°F	Power Requirements:	100/110/115/120/220/230/240 VAC at 50/60		
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Re: Ambient SO₂ Analyzers

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04	16	APSA-370 Band-pass Filter Same as Horiba Air Filter PN352653 in Annual Spare Parts Kit	NA	NA																											
05	4	Extended Warranty Horiba PN 256814-1 The standard warranty that Horiba offers on all of its analyzers is for twelve (12) months from the date of initial start-up or eighteen (18) months from date of shipment, whichever date occurs first. The extended warranty option extends the warranty from the standard length to for twenty-four (24) months from the date of initial start-up or thirty (30) months from date of shipment, whichever date occurs first.	\$1,214.90	\$ 4859.60																											
06	1	Shipping Horiba PN 256814-2 UPS ground shipping with insurance for a single shipment of all proposed items from Horiba Instruments, Inc., 9755 Research Drive, Irvine, CA 92618 to WV Division of Air Quality DEP, 601 57th Street S.E., Charleston, WV 25304	\$620.00	\$620.00																											

<p>Proposal valid for 30 days from submittal date.</p> <p>Terms: Net 30 days pending credit approval. Shipment: 6 to 9 weeks ARO F.O.B.: Irvine, CA 92618 via UPS ground delivery service on a pre-pay and add basis.</p>	<p>HORIBA INSTRUMENTS</p> <p>Signed: <u>J. David Vojtko</u></p> <p>J. David Vojtko Sales Manager Tel.: (724) 457-2424; Fax: (724) 457-2344</p>
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e-mail: dave.vojtko@horiba.com.com

Exceptions and Clarifications

Section	Comment
3.1.2	Horiba Instruments, Inc. is proposing its Model APSA-370 Ambient SO ₂ Analyzer for this bid. This analyzer retains U.S. EPA Reference Equivalency No. EQSA-0506-159, TUEV Bericht 936/21204643D, EN 4212 and VDI 4202/4203 certifications.
3.1.2.3	The Horiba Model APSA-370 Ambient SO ₂ Analyzer has four standard switch selectable measurement ranges of 0-.05/0.10/0.20/0.50 ppm F.S. The analyzer can also be configured with four switch selectable ranges for 0-10 ppm with a 10:1 range ratio.
3.1.2.7	The Horiba Model APSA-370 Ambient SO ₂ Analyzer is equipped with a RS-232C serial port but does not have USB com ports.
3.1.2.8	The Horiba Model APSA-370 Ambient SO ₂ Analyzer is not equipped with USB connections but has I/O consisting of 0-1 VDC, 0-10 VDC, 4-20mA and serial I/O. Serial communication is available through RS-232C serial port connected on the rear of the analyzer. This serial port makes analyzer data available and can be easily converted to RS-485 for network data collection. Ethernet communication is available through an optional port using TCP/IP protocol. Modbus® is also available as a serial protocol option.
3.1.2.9	The Horiba Model APSA-370 Ambient SO ₂ Analyzer has a built-in aromatic hydrocarbon cutter that employs a selective transmission membrane. This reduces or eliminates the influence of interfering components. When coupled with the unique flow design, the analyzer is capable of eliminating effects of variation in sample flow.
3.1.1.11	The Horiba Model APSA-370 Ambient SO ₂ Analyzer is capable of storing four different values in memory, three simple averages and also the integrated value. For example; 1,000 data sets of 3-minute averages, 1,000 data sets of 30-minute averages, 1,000 data sets of 1-hour averages and 100 data sets of 3-hour averages can be stored within the analyzer.
3.1.2.13	The APSA-370 Ambient SO ₂ Analyzer is equipped with a variety of menu screens to allow the operator to view data and error messages.
3.1.2.15	The zero noise for the APSA-370 is less than 0.5 ppb at 3 σ confidence level.
3.1.2.17	The APSA-370 lower limit of detection is 0.50 ppb at 3 σ confidence level.
3.1.2.21	The response time (T ₉₀) is \leq 120 seconds
3.1.2.25	The APSA-370 analog outputs are 0-1 VDC, 0-10 VDC, 4-20mA.
3.1.2.27	The APSA-370 employs a 54 mm diameter filter.

General Notes

1. Shipping estimates are subject to stock availability at the time of order placement.
2. Payment terms are subject to credit approval.
3. All prices shown are in United States currency, (USD).
4. All sales are subject to taxes unless a tax-exempt certificate has been supplied.
5. Horiba standard terms and conditions apply.
6. Instruments are shipped F.O.B. Irvine, CA 92614 via UPS ground delivery service fully insured then invoiced on a pre-pay and add basis unless agreed to otherwise in writing between the customer and Horiba Instruments, Inc.
7. Systems are shipped F.O.B. Irvine, CA 92614 air-ride van service insured to one hundred percent of the contract price and invoiced on a pre-pay and add basis unless agreed to otherwise in writing between the customer and Horiba Instruments, Inc.
8. Projects placed on hold for reasons other than for clarification of technical data are subject to cancellation penalties if project delays not the fault of Horiba and exceed ten (10) working days.
9. This quotation is limited to the terms and conditions on the face and the attached document. Any additional or different terms proposed by buyer in any purchase order or other document are deemed to be material alterations and notice of objection to

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them is hereby given. Any such proposed terms shall be void and the terms herein shall constitute the complete and exclusive statement of the terms and conditions of the contract between the parties. Neither seller's acknowledgement of a purchase order nor seller's failure to object to conflicting, different, or additional terms and conditions in a purchase order shall be deemed an acceptance of such terms and conditions or a waiver of the provisions thereof.

10. Purchase orders should be forwarded to Horiba Instruments, Inc., 1002 Harvest Court, Moon Township, PA 15108-9015. Submitting orders to alternate Horiba locations will result in processing of the order and delay delivery.

Horiba Instruments, Inc. Terms and Condition of Sale

PRICES

The prices set forth are based upon the quantity and type ordered and are subject to revision when interruptions, engineering changes, or changes in quantity are caused or requested by the customer or when events which are beyond the control of the Company occur, including but not limited to increases resulting from legislation, government regulations, costs, duties, tariffs, insurance, and freight. The amount of increase as computed by the Company shall be binding on the Buyer except for clerical and mathematical errors. The Company may modify deliveries to the extent necessitated by governmental action.

SPECIFICATIONS

Weights and dimensions set forth in sales literature are not guaranteed unless previously certified. The Company may, without affecting the obligations under this contract, make normal and customer variations in specifications.

TERMS OF PAYMENT

Terms of payment on any approved order are net 30 days from date of the invoice unless otherwise specifically stated herein. (The invoice is payable at par. Bills shall be payable on due date a place of collection designated by seller in funds bankable at par.) All purchase orders are accepted subject to and the obligation of the Company to make deliveries is subject to the right of the Company to require of the purchaser payment of all or any part of the purchase price in advance of delivery or to make shipments C.O.D. If the purchaser fails to make advance payment when requested by the Company, or if the purchase is or becomes delinquent in the payment of any sum due the Company (whether or not arising out of this sales order) or refuses to accept C.O.D. shipments, then the Company shall have the right, in addition to any other remedy to which it may be entitled in law or in equity, to cancel the sales order, refuse to make further deliveries, and declare immediately due and payable all unpaid amounts for goods previously delivered to the purchaser. Each shipment shall be considered a separate and independent transaction and payment thereof shall be made accordingly. The Buyer shall be liable for interest at the rate of seven percent (7%) on all overdue bills.

SHIPMENTS

All shipments are made F.O.B. point of shipment unless otherwise stated in this proposal. The cost of packaging for domestic shipment is included in the quoted price. Where special domestic or export packing is specified involving greater expense, a charge will be made to cover such extra expense. All shipments shall be insured, unless the purchaser made a specific request to the contrary, and the purchaser shall pay this insurance expense. All claims for breakage and damage should be made to the carrier, but the Company will render all possible assistance in securing satisfactory adjustment of such claims. The Company assumes no responsibility for delay, breakage, or damage after having made delivery in good order to the carrier. Shipments shall be made in the manner and by the carrier requested by the purchaser but where questions arise concerning stability of carriers for handling specific instruments, the decision of the Company must be accepted. Shipments invoiced but held upon purchaser's request at any place, for whatever reason, shall be at the purchaser's sole risk and account, including payment by purchaser of all storage and interest charges. Each shipment shall be considered a separate sale.

DELIVERY

The scheduled shipping or delivery date is our best estimate of the time the order will be shipped and we assume no liability for loss, damage, or consequential damages due to delays. In the event that delivery under this contract is prevented or delayed by strikes, lockouts, embargoes, lack of shipping facilities, or any cause or circumstances of whatever kind or nature not limited to the above beyond the Company's control, the Company's time for performance shall be extended by the

WARRANTY

The items offered for sale will be under the following warranty. HORIBA Instruments, Inc. as manufacturer, warrants each instrument to be free from defects in material and workmanship under normal use and service for a period of one year after delivery to the original purchaser, the manufacturer's obligation under this warranty being limited to repairing or replacing, at its option, any part or parts thereof which shall, within one year after delivery of such unit to its original purchaser, be returned by the original purchaser to the manufacturer at its factory or authorized repair center, transportation charges prepaid, and which, upon examination by the manufacturer, shall be determined to the manufacturer's satisfaction to be defective. The warranty shall cover all parts and labor necessary to make repair for the first ninety days after delivery, and thereafter parts only for a period of one year. The warranty shall be limited to the original purchaser.

The provisions of this warranty shall not apply to any unit that has been subject to misuse, negligence, or accident in installation or operation, that has been repaired, altered, or serviced in any manner, or that has not been operated by the original purchaser in a manner specified by the manufacturer so as, in the manufacturer's judgment, to adversely affect its operation. The original purchaser shall, upon request of manufacturer, furnish manufacturer reasonable evidence that the defect arose from causes placing a liability upon manufacturer. If the warranty shall not apply, the original purchaser shall pay all repair and replacement costs and all costs of manufacturer in returning the part to the original purchaser. This warranty is expressly in lieu of any other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular purpose, and of any other obligations on the part of the manufacturer. In no event shall manufacturer be liable for any consequential damages. Components manufactured by other bear the warranty of their manufacturer.

HORIBA Instruments, Inc. reserves the right to make changes in the design and price of its equipment at any time and to exclude certain components from this warranty without prior notice.

SPECIAL WARRANTY

If a Special Warranty (covering a designated item or items) is attached hereto, the terms and conditions specified therein are incorporated herein by reference and shall supplement this warranty. In the event of a conflict between the terms and/or conditions specified herein and those specified in such Special Warranty, the terms and/or conditions of the Special Warranty shall control.

Representations and warranties made by any person, including dealers and representatives of HORIBA, that are inconsistent or in conflict with the terms of this warranty (including but not limited to the limitations of the liability of HORIBA as set forth above) shall not be binding upon HORIBA unless reduced to writing and approved by an expressly authorized representative of HORIBA.

GENERAL

This sales agreement is made and entered into in the State of California and shall be governed by its laws. This sales agreement supersedes any purchase order or contract and contains the entire agreement between the parties. This agreement may not be altered, amended or modified by the purchaser except by written consent of the Company. Waiver by the Company of a breach by the purchaser or any provision of this agreement shall not be deemed a waiver of future compliance therewith, and such provision as well as other provisions hereunder shall remain in full force and effect. If any provision of this agreement shall be held invalid or unenforceable under any applicable law, rule, or regulation, such invalidity or unenforceability shall not affect any other provision of this agreement that can be given effect without the invalid provision. In the event that

To: Department of Administration, Purchasing Division
2019 Washington Street East
P.O. Box 50130
Charleston, WV 25305-0130

Date: April 23, 2013
Quotation No.: P11304027; Rev. 0
Quotation Inquiry: DEP16166

Attn: Frank Whittaker
Tel.: (304) 558-2316
Fax: (304) 558-4115
Cell: (304) XXX-XXXX

Page 7 of 7

Please reference quotation number on all correspondence.

E-mail: frank.m.whittaker@wv.gov

Re: Ambient SO₂ Analyzers

Horiba Instruments, Inc. Terms and Condition of Sale

period of such delay.

TAXES

Federal, state, or local excise, sales, or use taxes shall be paid by the customer.

any action at law or suit in equity is necessary to enforce any of the terms and conditions of this agreement, the prevailing party shall be paid promptly by the party prevailed against, all costs and reasonable attorneys' fees.

cc: Dan Rice
Rice Associates, Inc.
P.O. Box 127
Allison Park, PA 15101

Tel.: (412) 487-5530
Fax: (412) 487-5531
Cell: (412) 952-3193
E-mail: riceassociates@earthlink.com

* SEE ATTACHED JURAT

RFQ No. DEP 16166

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

MANDATE: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: HORIBA Instruments, Inc.

Authorized Signature: [Signature] Date: 4/22/2013

State of _____

County of _____, to-wit:

Taken, subscribed, and sworn to before me this _____ day of _____, 20____.

My Commission expires _____, 20____.

AFFIX SEAL HERE

NOTARY PUBLIC _____

Continuous Sulfur Dioxide Analyzers

DEP16166

Bid Schedule

Vendors Name: HORIBA Instruments, Inc. Quote # P11304027

The DEP reserves the right to request additional information and supporting documentation regarding unit prices when the unit price appears to be unreasonable.

ITEM NO.	QUANTITY	DESCRIPTION	UNIT	AMOUNT
1.0	4	Continuous Sulfur Dioxide (SO2) Analyzers, Teledyne Advanced Pollution Instrumentation model T100 or equivalent.	LS	\$ 63,099
2.0	1	Freight/Shipping	LS	\$ 620
				\$
		TOTAL		\$ 63,719

Signature: 

Date: 4/22/2013

CALIFORNIA JURAT WITH AFFIANT STATEMENT

- See Attached Document (Notary to cross out lines 1-6 below)
 See Statement Below (Lines 1-5 to be completed only by document signer[s], *not* Notary)



Signature of Document Signer No. 1

Signature of Document Signer No. 2 (if any)

State of California

County of Orange

Subscribed and sworn to (or affirmed) before me on this

22 day of April, 2013, by
Date Month Year

(1) Peter A. DePaul
Name of Signer

proved to me on the basis of satisfactory evidence to be the person who appeared before me (.) (.)

(and

(2) _____
Name of Signer

proved to me on the basis of satisfactory evidence to be the person who appeared before me.)

Signature Sandra Rojo
Signature of Notary Public



Place Notary Seal Above

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Further Description of Any Attached Document

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____



Rev. 07/12

State of West Virginia

VENDOR PREFERENCE CERTIFICATE

Certification and application* is hereby made for Preference in accordance with West Virginia Code, §5A-3-37. (Does not apply to construction contracts). West Virginia Code, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the West Virginia Code. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Resident Vendor Preference, if applicable.

- 1. Application is made for 2.5% resident vendor preference for the reason checked: Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; or, Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or, Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; or,
2. Application is made for 2.5% resident vendor preference for the reason checked: Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,
3. Application is made for 2.5% resident vendor preference for the reason checked: Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,
4. Application is made for 5% resident vendor preference for the reason checked: Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; or,
5. Application is made for 3.5% resident vendor preference who is a veteran for the reason checked: Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; or,
6. Application is made for 3.5% resident vendor preference who is a veteran for the reason checked: Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.
7. Application is made for preference as a non-resident small, women- and minority-owned business, in accordance with West Virginia Code §5A-3-59 and West Virginia Code of State Rules. Bidder has been or expects to be approved prior to contract award by the Purchasing Division as a certified small, women- and minority-owned business.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) reject the bid; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

Under penalty of law for false swearing (West Virginia Code, §61-5-3), Bidder hereby certifies that this certificate is true and accurate in all respects, and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.

Bidder: _____ Signed: _____

Date: _____ Title: _____


NOT APPLICABLE

CERTIFICATION AND SIGNATURE PAGE

By signing below, I certify that I have reviewed this Solicitation in its entirety; understand the requirements, terms and conditions, and other information contained herein; that I am submitting this bid or proposal for review and consideration; that I am authorized by the bidder to execute this bid or any documents related thereto on bidder's behalf; that I am authorized to bind the bidder in a contractual relationship; and that to the best of my knowledge, the bidder has properly registered with any State agency that may require registration.

HORIBA Instruments, Inc.

(Company)



(Authorized Signature)

Peter DeBarber, Director, P&E Division

(Representative Name, Title)

949-250-4811 949-250-0924

(Phone Number) (Fax Number)

4/22/2013

(Date)

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: DEP16166

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received: None Issued
(Check the box next to each addendum received)

- | | |
|---|--|
| <input type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

HORIBA Instruments, Inc.
Company

[Signature]
Authorized Signature

4/22/2013
Date

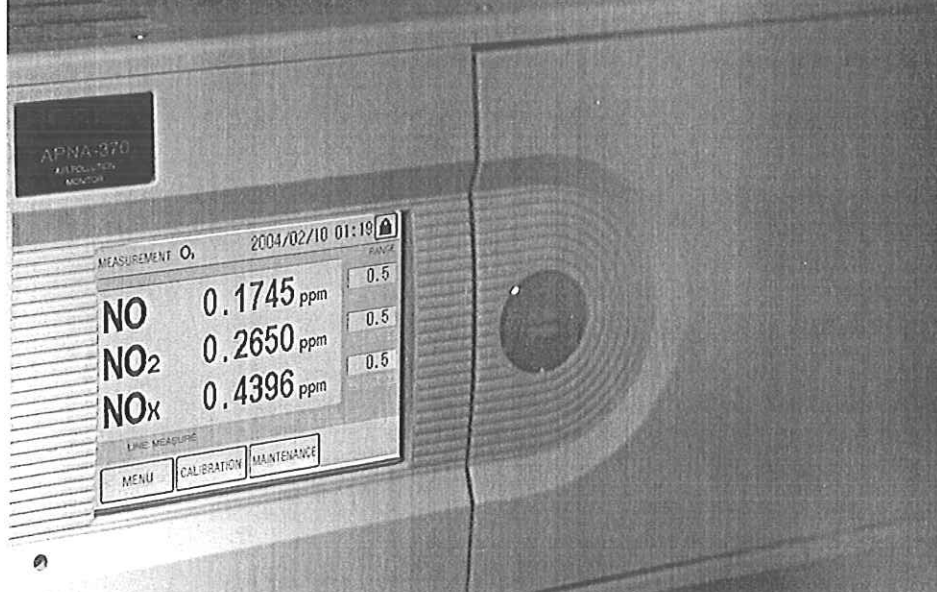
NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

HORIBA

Explore the future

AIR POLLUTION MONITOR **AP-370 Series**

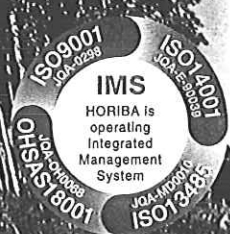
Type approved by European agencies and US.EPA



MEASUREMENT	01	2004/02/10 01:19	RANGE
NO	0.1745 ppm		0.5
NO ₂	0.2650 ppm		0.5
NO _x	0.4396 ppm		0.5

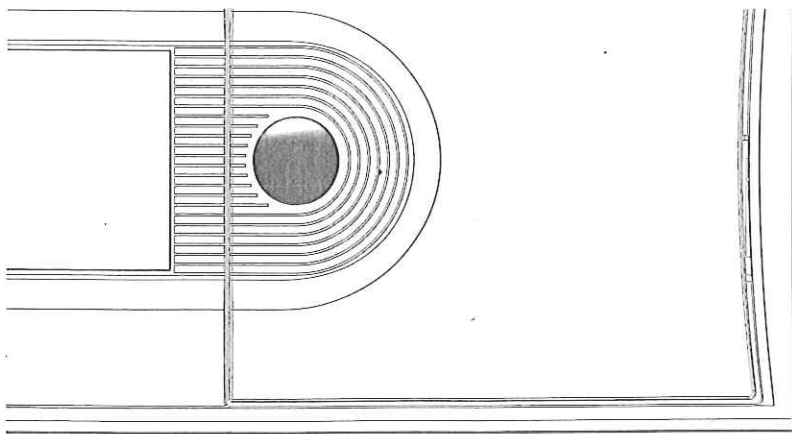
LINE MEASURE

MENU CALIBRATION MAINTENANCE



Explore the future

HORIBA



These highly sensitive
give precise, reliable m
surprisingly easy to m

■ Features ■ ■ ■

■ Automatic calibration

Troublesome calibration procedures have been reduced to the push of a function key. At the Auto-Interval Calibration (AIC) menu you can set the start time, the start range, and the interval for the automatic calibration. The system clock and calendar then assure that your calibration instructions are executed precisely. To make things even easier, remote auto-calibration can also be done from your own computer, via the monitor's RS-232C serial port (optional).

■ Auto-range function

An auto-range function that automatically switches to the range best suited to the object gas concentration for both momentary and average values is included as a standard feature. As an option, even when randomly set to any range (within 10 times the range ratio), the auto-range function can still be used. Switching over from auto-range to manual-range is a simple task.

■ Selective data output

For each component measured, the system provides four types of data: momentary values, integrated values, moving averages, and simple averages. Any two these data may be output. Simultaneously to any two external devices (e.g., PC, printer). The time-span for both average and integrated values may be specified (i.e., when the momentary value has not been selected). With the simple average values, three different timesettings can be specified.

■ Storing data in memory

Four different values may be stored in memory: three simple averages and the integrated value.

For example:

- ▶ Average value #1 (3 min) → 1,000 data sets
- ▶ Average value #2 (30 min) → 1,000 data sets
- ▶ Average value #3 (3 h) → 100 data sets
- ▶ Integrated value (1 h) → 1,000 data sets

■ Network Communications (option)

Serial communication is available through RS-232C serial port connected on the rear panel. The serial port makes analyzer data available using HORIBA's proprietary serial communication protocol, and can be easily converted to RS-485 for network data collection. Ethernet communication is available through an optional port using TCP/IP protocol. Modbus(R) is also available as a serial protocol option.

ambient air pollution monitors
measurements, yet they are
maintain.

AIR POLLUTION MONITOR
AP-370 Series

- **Memory card for data management** (option)

An available Compact Flash(CF) can save average or integrated value, and read and collect data for off-line analysis.
With the CF it is possible to conveniently use the analyzer in a stand-alone mode.
- **Readout toggles to mg/m^3 , $\mu\text{g}/\text{m}^3$**

A touch of a button on the front panel is all that is needed to toggle the readout from ppm or ppb to mg/m^3 .
(Not available on Model APHA-360, where CH_4 values are displayed as ppm, NMHC and THC as ppmC.)
- **Pressure-compensation**

Automatic compensation for ambient pressure assures reliable data regardless of the weather or the monitor's location.
- **Easy-to-read, 326×240 dot LCD display with touch panel screen.**

The adoption of full graphic LCD for the touch screen offers a large, easy-to-use display and user friendly, interactive operation. This user interface facilitates maintenance with displays such as the graph of intensity, remaining time before replacement of pumps, valves, source lamp and converters. It also allows you to save average value, data, integrated value alarm history and calibration history.
- **Minimal influence from interference components and ambient temperature**

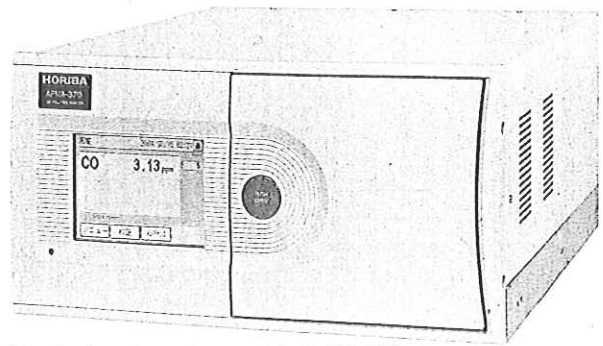
These monitors use Horiba's innovative detection technology and sampling method for outstanding sensitivity. The influence from interference components is minimal and results are very stable over long periods of measurement.
- **Input/output via RS-232C port** (option)

The system's RS-232C serial port can be used to transmit measured values, alarms, and other data to remote equipment. It can also be used to input changes to parameter settings and other data. A hard-copy printout of measured values can be produced by attaching a recorder to the RS-232C port.
- **At last—a small, compact system**

A small, light-weight unit for each component to be measured fits neatly into a 19inch rack. This makes it easy to upgrade your system in the future. This new design offers great savings in valuable lab space.



Ambient CO Monitor APMA-370



According to EN14626 and VDI 4202/4203
TUEV Bericht 936/21204643B 05. Jan. 2006 U. S. EPA REFERENCE Equivalent Number RFCA-0506-158

Features

The cross flow modulation type, infrared-absorption technology eliminates the need for adjusting optical alignment. For the user, this means very stable and sensitive (5 ppm F.S.) measurements.

The APMA-370 uses an AS-type interference-compensating detector, and a purified reference gas. The reference gas is generated by purging the sample through an oxidation process, where an oxidizing catalyst burns the CO to CO₂. These features eliminate interference from other elements, resulting in highly accurate measurements.

The APMA-370 does not use such components as reflecting mirrors, that attract foreign matter. This means the optical bench stays clean assuring you of stable results over long periods of time.

Principle

Cross flow modulation, infrared (NDIR) absorption technology

Conventional technology uses an optical chopper to obtain modulation signals. Instead, the APMA-370 uses solenoid valve cross flow modulation. Fixed amounts of the sample gas and the reference gas are injected alternately into the measurement cell. With the cross flow-modulation method, if the same gas is used for both the sample gas and the reference gas (e.g., zero gas could be used for both), no modulation signal will be generated. This has the great advantage that, in principle, when analyzing minute amounts of gas there is no generation of zero-drift. An additional advantage is that the elimination of rotary sectors precludes the need for optical adjustment. These features assure greatly improved stability over long periods of measurement. A further improvement is that in the front chamber of the detector, the measurable components, including interference components, are detected; in the rear chamber, only interference components are detected. By means of subtraction processing, the actual signal obtained is one that has very little interference.

Specifications

Principle: Cross flow modulation, non-dispersive infrared (NDIR) absorption technology

Application: CO in ambient air

Range: Standard ranges: 0-10/20/50/100 ppm; 0-5/10/20/50 ppm; auto range ~ manual range selectable; can be operated by remote switching.
Optional (measurable) ranges: 4 ranges selectable from 0-100 ppm, within 10 times range ratio; auto range ~ manual range selectable; can be operated by remote switching.

Lower detectable limit: 0.02 ppm (3 sigma)

Repeatability: ±1.0% of F.S.

Linearity: ±1.0% of F.S.

Zero drift: <LDL/day at lowest range
<0.2 ppm/week at lowest range

Span drift: <LDL/day at lowest range
±1.0% F.S./week

Response time (T₉₀): Within 50 sec at lowest range

Sample gas flow rate: Approx. 1.5L/min

Indication: Measured value, range, alarm, maintenance screen

Alarms: During AIC, zero calibration error, span calibration error, temperature error in catalyzer, etc.

On-screen messages are available in four languages: English, German, French, and Japanese.

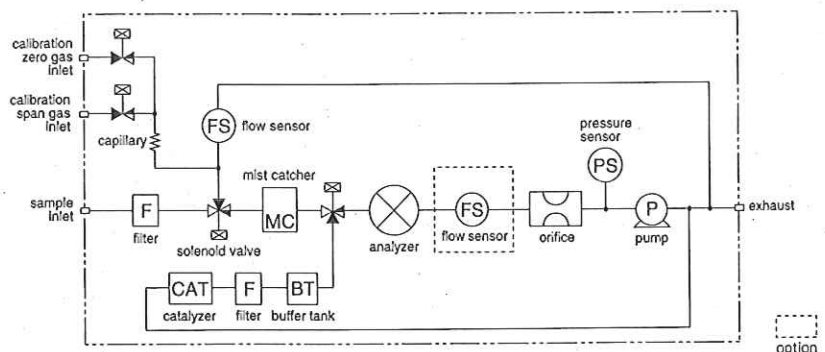
Input/output: • 0-1 V/0-10 V/4-20 mA, to be specified (2 systems: either (1) momentary value and integrated or (2) moving average value) • Contact input/output • RS-232C

Ambient temperature: 5-40 °C

Power: 100/110/115/120/220/230/240 VAC, 50/60 Hz (to be specified)

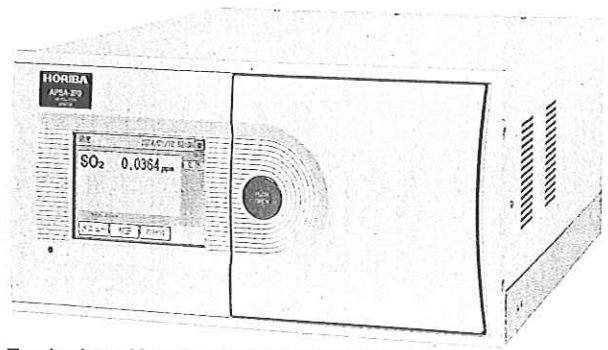
Dimensions: 430(W)×550(D)×221(H) mm

Mass: Approx. 16 kg,





Ambient SO₂ Monitor APSA-370



According to EN14212 and VDI 4202/4203

TUEV Bericht 936/21204643D 07. Jul. 2006 U. S. EPA REFERENCE Equivalent Number EQSA-0506-159

Features

The APSA-370 uses an innovative detector and a new optical system for low background, high sensitivity (0.05 ppm F.S.), and greatly improved stability.

The fluorescent chamber design gives measurements with minimum influence from moisture.

The unit has built-in aromatic hydrocarbon cutter with a selective transmission membrane. This reduces the influence of interference components. Coupled with Horiba's unique flow-path, it also makes it possible to extend the working life of the cutter and to take measurements effects of sample flow variations.

In comparison with the FPD method, the APSA-370 design is (1) highly selective for SO₂, (2) requires no supplemental gas, and (3) gives linear output.

Compensation for the lamp's luminous energy decline guarantees prolonged calibration stability.

The sample inlet has a built-in Teflon filter.

Principle

UV fluorescence

The UV fluorescence method operates on the principle that when the SO₂ molecules contained in the sample gas are excited by ultraviolet radiation they emit a characteristic fluorescence in the range of 220-420 nm. This fluorescence is measured and the SO₂ concentration is obtained from changes in the intensity of the fluorescence.

The reactive mechanism is

- (1) $SO_2 + h\nu_1 \rightarrow SO_2^*$
- (2) $SO_2^* \rightarrow SO_2 + h\nu_2$
- (3) $SO_2^* \rightarrow SO + (O)$
- (4) $SO_2^* + M \rightarrow SO_2 + M$

Here, (1) shows the excited state of the SO₂ molecules that have absorbed the amount of energy $h\nu_1$ by ultraviolet radiation. (2) shows the amount of energy, $h\nu_2$ emitted by the excited molecules as they return to the ground state. (3) shows the decomposition by the light emitted from the excited molecules. (4) shows the quenching, i.e., the energy lost by the excited molecules colliding with other molecules. The APSA-370 uses an Xe lamp as the light source, and the fluorescent chamber design minimizes scattered light. The optical system has been carefully designed with low background light, making it possible to take measurements with a highly stable zero point. In addition, a reference detector monitors any fluctuation in the intensity of the light source. This allows the unit to calibrate itself automatically for sensitivity, resulting in greater span stability.

Specifications

Principle: UV fluorescence (UVF)

Application: SO₂ in ambient air

Range: Standard ranges: 0-0.05/0.1/0.2/0.5 ppm; auto range ~ manual range selectable; can be operated by remote switching.

Optional (measurable) ranges: 4 ranges selectable from 0-10 ppm, within 10 times range ratio; auto range ~ manual range selectable; can be operated by remote switching.

Lower detectable limit: 0.5 ppb(3 sigma)

Repeatability: $\pm 1.0\%$ of F.S.

Linearity: $\pm 1.0\%$ of F.S.

Zero drift: <LDL/day at lowest range
<LDL/week at lowest range

Span drift: <LDL/day at lowest range
<LDL/week at lowest range

Response time (T₉₀): Within 120 sec at lowest range

Sample gas flow rate: Approx. 0.7L/min

Indication: Measured value, range, alarm, maintenance screen

Alarms: During AIC, zero calibration error, span calibration error, temperature error in catalyzer, etc.

On-screen messages are available in four languages: English, German, French, and Japanese.

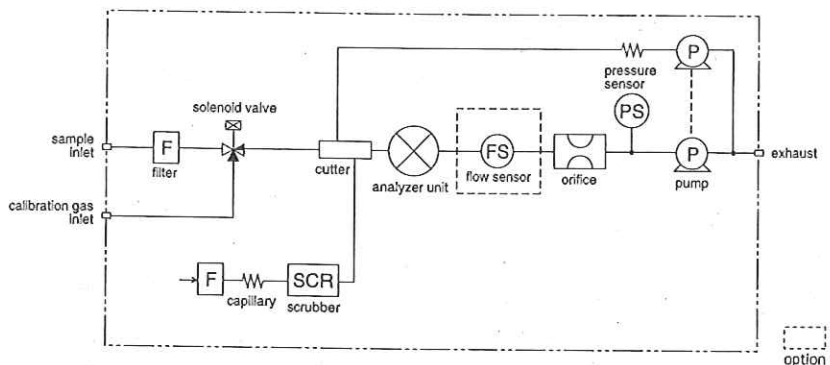
Input/output: • 0-1 V/0-10 V/4-20 mA, to be specified (2 systems: either (1) momentary value and integrated or (2) moving average value) • Contact input/output • RS-232C

Ambient temperature: 5-40 °C

Power: 100/110/115/120/220/230/240 VAC, 50/60 Hz (to be specified)

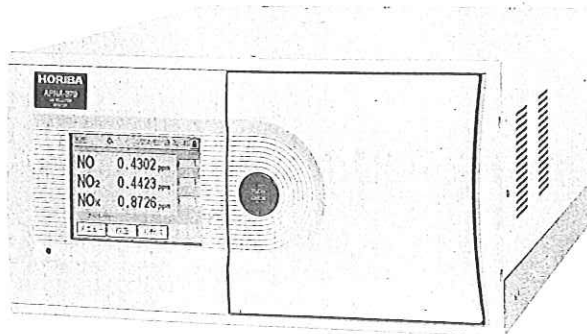
Dimensions: 430(W)X550(D)X221(H) mm

Mass: Approx. 19 kg,





Ambient NOx Monitor APNA-370



According to EN14211 and VDI 4202/4203

TUEV Bericht 936/21204643C 07. Jul. 2006 U. S. EPA REFERENCE Equivalent Number RFNA-0506-157

Features

The APNA-370 uses a combination of the dual cross flow modulation type chemiluminescence principle and the referential calculation method.

This gives it the advantages of the single-detector method plus the ability to do continuous measurements of NOx, NO, and NO₂. The design gives great stability and extremely high sensitivity (0.1 ppm F.S.)

Standard equipment includes a drier unit with an automatic recycle function to provide dry ambient air as the ozone source. This makes long-term continuous measurements possible.

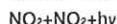
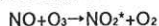
The detector uses a silicon photodiode sensor to reduce size and prolong working life.

All the necessary features are built right into a single rack-sized unit, including a reference-gas generator, an ozone-source drier unit, an ozone decomposer, and a sampling pump. No supplemental gas is required.

Principle

Cross flow modulation type, reduced pressure chemiluminescence (CLD)

The chemiluminescence method uses the reaction of NO with O₃



A portion of the NO₂ generated as the result of this reaction becomes NO₂^{*}. As these excited molecules return to the ground state, chemiluminescence is generated in the range of 600 nm to 3,000 nm. The light intensity is in proportion to the concentration of NO molecules and by measuring it we obtain the NO concentration of the sample. A deoxidation converter changes the NO₂ to NO, which is measured. In other words, the NO₂ concentration can be obtained by the difference between (1) the NOx concentration measured when the sample gas is directed through a converter and (2) the NO concentration measured when the gas is not run through the converter.

Specifications

Principle: Cross flow modulation type, reduced pressure chemiluminescence (CLD)

Application: NO₂, NO and NOx in ambient air

Range: Standard ranges: 0-0.1/0.2/0.5/1.0 ppm; auto range ~ manual range selectable; can be operated by remote switching.

Optional (measurable) ranges: 4 ranges selectable from 0-10 ppm, within 10 times range ratio; auto range ~ manual range selectable; can be operated by remote switching.

Lower detectable limit: 0.5 ppb(3 sigma)

Repeatability: ±1.0% of F.S.

Linearity: ±1.0% of F.S.

Zero drift: <LDL/day, at lowest range
±1.0 ppb/week at lowest range

Span drift: <LDL/day at lowest range
±1.5 % of F.S./week

Response time (T₉₀): Within 90 sec at lowest range

Sample gas flow rate: Approx. 0.8L/min

Indication: Measured value, range, alarm, maintenance screen

Alarms: During AIC, zero calibration error, span calibration error, temperature error in converter, etc.

On-screen messages are available in four languages: English, German, French, and Japanese.

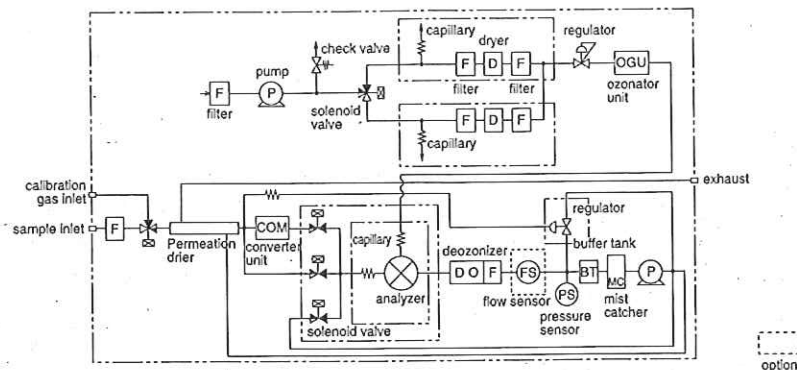
Input/output: 0-1 V/0-10 V/4-20 mA, to be specified (2 systems: either (1) momentary value and integrated or (2) moving average value) • Contact input/output • RS-232C

Ambient temperature: 5-40 °C

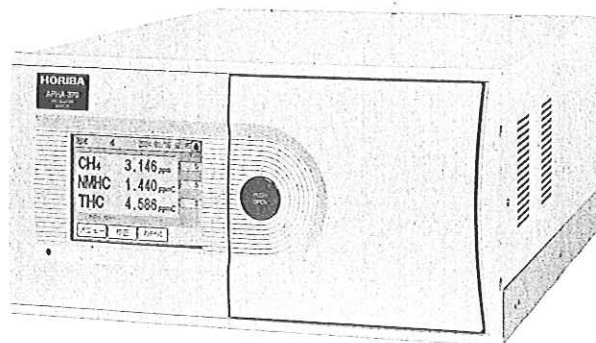
Power: 100/110/115/120/220/230/240 VAC, 50/60 Hz (to be specified)

Dimensions: 430(W)×550(D)×221(H) mm

Mass: Approx. 21 kg,



THC Ambient THC Monitor APHA-370



Features

The APHA-370 uses a combination of the flame ionization detection method and selective-combustion. This gives it the advantage of the single-detector method plus the ability to perform continuous measurements, free of zero-drift, for THC, NMHC, and CH₄. The design gives great stability and high sensitivity (0-5 ppm F.S.)

The APHA-370 has a relative-sensitivity correction function for CH₄ and NMHC.

All the necessary features are built right into a single rack-sized instrument, including a catalytic unit for selective combustion (i.e., an NMHC cutter); a catalytic unit for generating reference gas and auxiliary combustion air (standard); and a sampling pump. The only supplemental gas required is H₂.

Principle

Flame ionization detection method (FID) with selective-combustion

The flame ionization detection method (FID) — used in combination with the selective-combustion system — utilizes the ionization that occurs as the result of the high-temperature energy from combustion at the tip of the burner jet when organic carbon compounds are introduced into the hydrogen flame. The hydrogen flame is located between two electrodes.

When an electrical voltage is applied across these electrodes a minute ion current proportional to the hydrocarbon concentration is produced. This current is monitored by a low leakage amplifier, giving a voltage readout for THC. To measure CH₄ the sample gas is passed through the selective catalytic combustion unit (the NMHC cutter), which oxidizes NMHC without oxidizing CH₄. This is shown as *A* below. *B* represents the THC concentration measured without passing the gas through the NMHC cutter. Thus *B - A* will give the concentration of NMHC. The final concentration value is calculated using a relative-sensitivity correction coefficient, *k*, as shown below.

CH₄ Concentration *A*

NMHC Concentration *k(B - A)*

THC Concentration *A + k(B - A)*

Specifications

Principle: Flame ionization detection (FID) with selective combustion

Application: THC, NMHC, and CH₄ in ambient air

Range: Standard ranges: 0-5/10/20/50 ppmC; auto range ~ manual range selectable; can be operated by remote switching.

Optional (measurable) ranges: 4 ranges selectable from 0-100 ppmC, within 10 times range ratio; auto range ~ manual range selectable; can be operated by remote switching.

Lower detectable limit: 0.022 ppmC(3 sigma)

Repeatability: ±1.0% of F.S.

Linearity: ±1.0% of F.S.

Zero drift: <LDL/day at lowest range
±0.05 ppmC/week at lowest range

Span drift: <LDL/day at lowest range
±0.5 % F.S./week

Response time (T₉₀): Within 60 sec at lowest range

Sample gas flow rate: Approx. 0.9 L/min

Indication: Measured value, range, alarm, maintenance screen

Alarms: During AIC, zero calibration error, span calibration error, temperature error in zero gas purifier, ignition failure error, etc.

On-screen messages are available in four languages: English, German, French, and Japanese.

Input/output: • 0-1 V/0-10 V/4-20 mA, to be specified (2 systems: either (1) momentary value and integrated or (2) moving average value) • Contact input/output • RS-232C

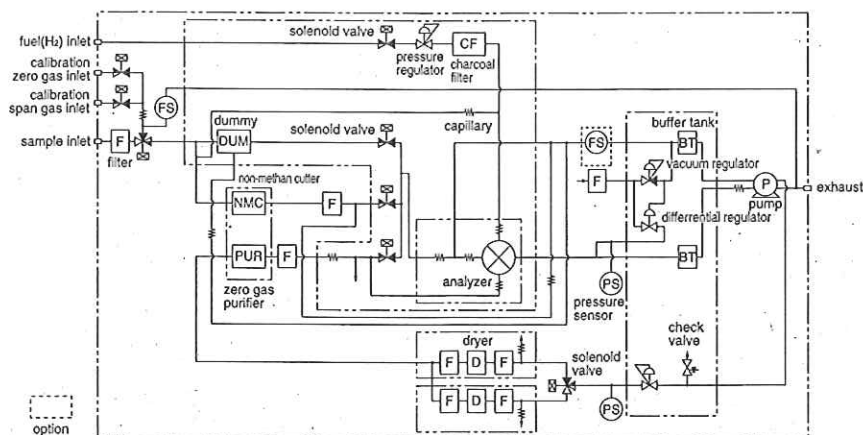
Ambient temperature: 5-40 °C

Power: 100/110/115/120/220/230/240 VAC, 50/60 Hz (to be specified)

Dimensions: 430(W)×550(D)×221(H) mm

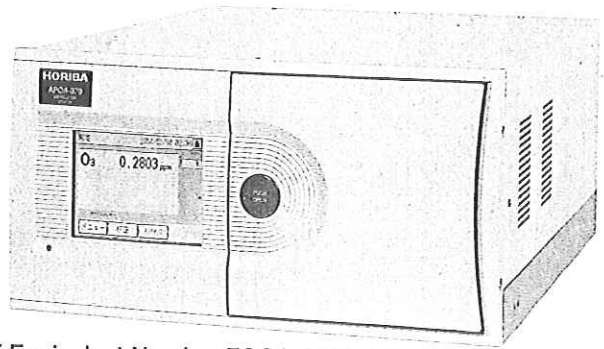
Mass: Approx. 33 kg,

Notes: ppmC is shown as symbol, not as unit.





Ambient O₃ Monitor APOA-370



According to EN14625 and VDI 4202/4203

TUEV Bericht 936/21204643A 05. Jan. 2006 U. S. EPA REFERENCE Equivalent Number EQOA-0506-160

Features

The APOA-370 uses the cross flow modulation type, ultra-violet absorption method in conjunction with the comparative calculation method.

This permits continuous measurement with great stability and high sensitivity (0.1 ppm F.S.)

HORIBA's innovative heated deozoneator provides reference gas by decomposing the O₃ found in the sample gas. This has the advantages of (1) reducing the influence from interference, (2) making the monitor insensitive to great changes in moisture content, and (3) prolonging the working life of the monitor.

All gas connections are either Teflon or glass.

Principle

Non dispersive ultra-violet absorption method (NDUV)

The ultra-violet absorption method works on the principle that ozone absorbs ultra-violet rays in the area of 254 nm. Measurements are taken from continuous, alternate injections of the sample gas and the reference gas into the measurement cell, controlled by a long-life solenoid valve. The cross flow modulation method is characteristically zero-drift free. A comparative calculation circuit automatically compensates for all fluctuations in the mercury vapor light source and in the detector. This means that, in principle, the APOA-370 makes it possible to carry out zero-span drift free, continuous measurements. In addition, HORIBA'S unique deozoneator for the comparison gas line is unaffected by interference elements or moisture retention, prolonged, stable measurement is possible.

Specifications

Principle: Ultra-violet-absorption method (NDUV)

Application: O₃ in ambient air

Range: Standard ranges: 0-0.1/0.2/0.5/1.0 ppm; auto range ~ manual range selectable; can be operated by remote switching.

Optional (measurable) ranges: 4 ranges selectable from 0-10 ppm, within 10 times range ratio; auto range ~ manual range selectable; can be operated by remote switching.

Lower detectable limit: 0.5 ppb(3 sigma)

Repeatability: ±1.0% of F.S.

Linearity: ±1.0% of F.S.

Zero drift: <LDL/day at lowest range
<LDL/week at lowest range

Span drift: <LDL/day at lowest range
<LDL/week at lowest range

Response time (T₉₀): Within 75 sec at lowest range

Sample gas flow rate: Approx. 0.7 L/min

Indication: Measured value, range, alarm, maintenance screen

Alarms: During AIC, zero calibration error, span calibration error, temperature error in ozone separator, light intensity error, etc.

On-screen messages are available in four languages: English, German, French, and Japanese.

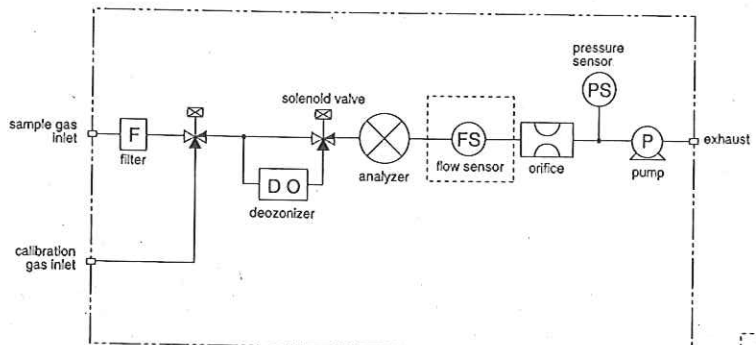
Input/output: • 0-1 V/0-10 V/4-20 mA, to be specified (2 systems: either (1) momentary value and integrated or (2) moving average value) • Contact input/output • RS-232C

Ambient temperature: 5-40 °C

Power: 100/110/115/120/220/230/240 VAC, 50/60 Hz (to be specified)

Dimensions: 430(W)×550(D)×221(H) mm

Mass: Approx. 20 kg,



H₂S/TRS Measurement

Features • Principle

Combined use of the H₂S converter unit and the APSA: SO₂ Monitor makes H₂S measurement possible. The H₂S converter unit contains two types of catalyst: SO_x scrubber and H₂S converter. SO_x is removed by the SO_x scrubber, and then the H₂S that has passed through is converted into SO₂ by the H₂S converter. This SO₂ is then measured by the APSA: SO₂ Monitor for display as H₂S concentration.

Specifications

Range: 0.1-0.1/0.2/0.5/1.0 ppm

Power: 100/110/115/120/220/230/240 VAC, 50/60 Hz

Dimensions: CU-1: 430(W)×550(D)×221(H) mm

APSA: 430(W)×550(D)×221(H) mm

Mass: CU-1: Approx. 10 kg

APSA: Approx. 25 kg

Calibration Equipment

HORIBA offers various calibration products for optional use with the AP-370. HORIBA's calibration equipment support mainly the following methods:

Option	APMA	APSA	APNA	APHA	APOA
Internal or external permeation device for SO ₂ , H ₂ S, BTX, NO ₂ and many more		●	●		
External gas phase titration for NO/NO ₂			●		
Ozone generation with an internal or external O ₃ generator based on UV radiation					●

All calibrators can be equipped with thermal mass flow controllers or pressure regulators and capillaries depending on the precision requirements. Stationary and portable single components as well as multi-component calibrators are available upon client's specification. Corresponding interfaces as well as calibration and QC protocols can also be supplied.

NH₃ Measurement

Features • Principle

Combined use of the NH₃ converter unit and the APNA: NO_x Monitor makes NH₃ measurement possible. The NH₃ converter unit contains two types of catalyst tubes: one which converts NH₃ into NO_x, and one which allows the NO_x in the ambient air to pass through directly. The difference in NO_x value between the two is measured by the APNA: NO_x Monitor for display as NH₃ concentration.

Specifications

Range: 0-1/2/5-10 ppm

Power: 100/110/115/120/220/230/240 VAC, 50/60 Hz

Dimensions: CU-2: 430(W)×550(D)×310(H) mm

APNA: 430(W)×550(D)×221(H) mm

Mass: CU-2: Approx. 20 kg

APNA: Approx. 26 kg

Digital Calibrator

Features

HORIBA's MCC-1000 is designed to calibrate gas analyzers manually, remotely controlled or automatically, installed in air pollution monitoring stations, for quality assurance in the laboratory and also for the production of gas analyzers.

A special feature of HORIBA's MCC-1000 is the easily-to-read touch screen panel, for ease of operation. Characteristic of operation of HORIBA's MCC-1000 is the intuitive, simple and user friendly menu. (Flow rate, mg/m³, ppb/ppm, automatic cycles etc.) Via the touch screen, it is possible to enter span gas concentrations or to start automatic routines like multi point calibration cycles.

Specifications

Principle: Dynamic generation of zero and span gas with mass flow controllers

Mass Flow Controller (MFC): supports multi-point calibration

Power: 230 VAC ±10%, 50 Hz (other on request), 50 VA

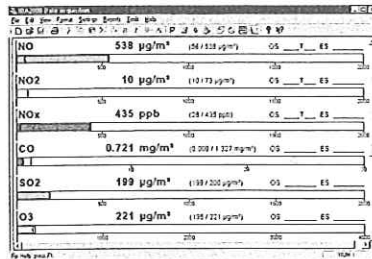
Dimensions: 430(W)×400(D)×120(H) mm (19") with brackets

Mass: Approx. 10 kg

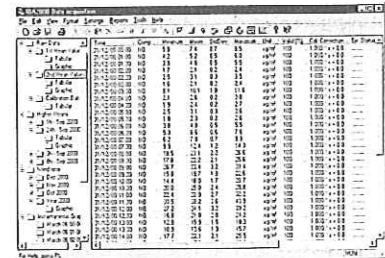
Intelligent Data Acquisition System

HORIBA IDA-2000

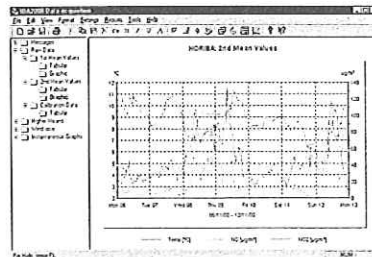
HORIBA's IDA-2000 is an intelligent data acquisition system (DAS) using a desktop or industrial PC, designed for fully automatic monitoring stations. The entire data capture and mean value calculation as well as control of the analyzers is executed by 32 bit multitasking software, running in a state-of-the-art Windows environment. It combines the power of a workstation with the ease of use, compatibility and productivity of a personal computer. The measured values as well as operating and error status messages are gathered in a 5-second interval from the analyzers. They are converted into engineering units, checked for plausibility and synchronously converted into two different averages. Automatic calibration routines in predefined intervals can be started either from the station computer or through a remote host computer. The DAS also supports the manual execution of calibration sequences as well as remote maintenance operations.



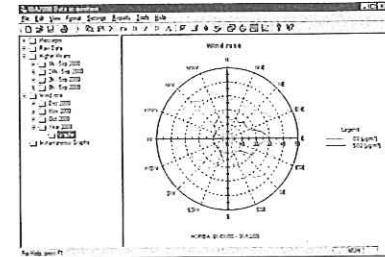
Bar graph of actual values



Tabular report of 2nd mean values



Graphic presentation of 2nd mean values

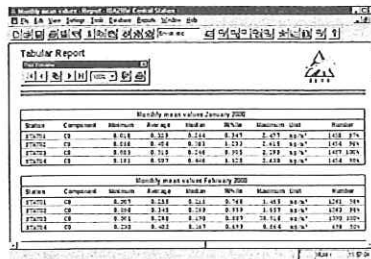


Wind rose

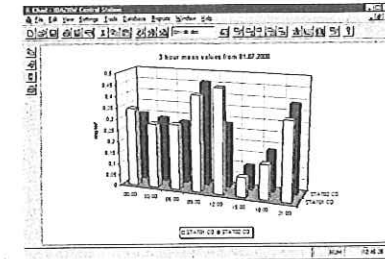
Data Management and Reporting Software

HORIBA IDA-ZRW

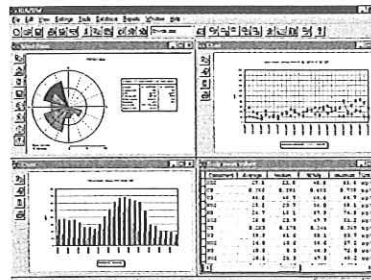
HORIBA's IDA-ZRW is a data management and reporting software for use in Ambient Air Quality and Meteorological monitoring. The software package provides data collection, management, analysis and reporting. Measured data and related information is stored in a high-end relational SQL database. The software can be used stand-alone or run on several machines in a network environment operating in Microsoft Windows environments. Communication between Central & Remote Stations works with a wide variety of communication links, such as direct connections, short-haul modems, telephone (including cellular) and multi-drop. Data can be transferred to and presented in Internet pages according to customers requirements.



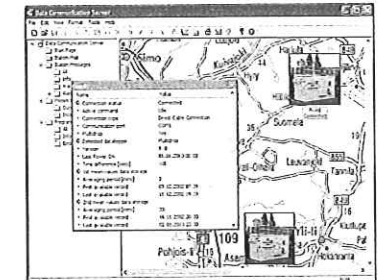
Report preview



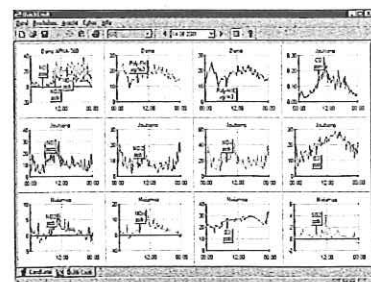
3D-column chart of 3h-means



Example of various reports



DCS main



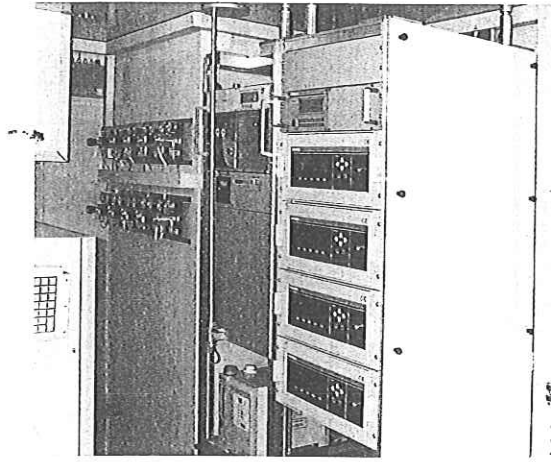
Quick look



Quick look

Complete Integrated System

HORIBA designs, assembles, calibrates and tests complete integrated systems for simultaneously measuring multiple pollutants. A system for monitoring five pollutants can typically fit into one 19-inch rack. Rack-mounted systems can be installed in equipment rooms, stand-alone shelters, trailers, vans, large trucks, or aboard marine vessels. HORIBA can integrate products into existing monitoring systems, or design and build a new system.

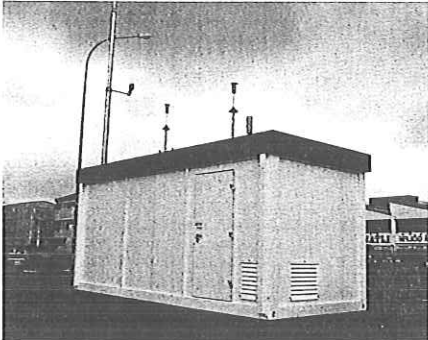


South african bureau of standards

Various Types of Fixed Stations and Mobile Laboratories

HORIBA designs and builds complete solutions precisely tailored to customer's requirements

● Fixed monitoring stations for continuously measuring air pollutants



Reykjavik environment / Iceland



Agency for environmental Federal State of Bavaria
Mobile laboratory with detachable shelter

● Mobile laboratories to investigate the geographic distribution of air pollution



Professional association for civil engineering



These vans and trucks are just some of the projects we've done for customers in Europe

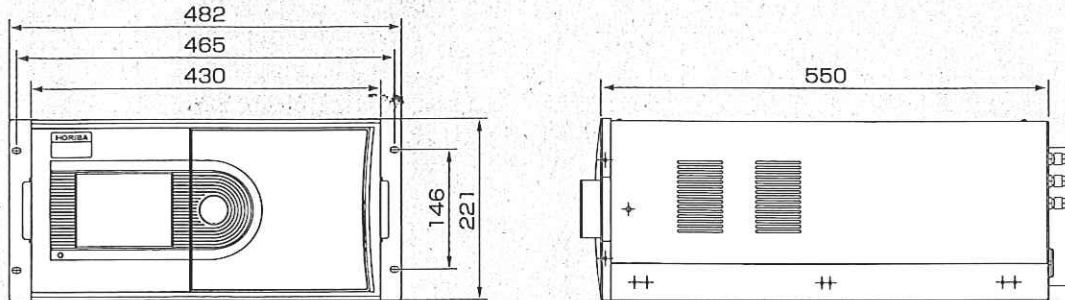


Standard 19-inch Packages

Each HORIBA AP-370 Series Monitor is packaged in a light metal enclosure with sliding chassis suitable for either a table-top set-up in a research laboratory or mounting on a standard 19-inch rack for permanent installation. All the controls and serviceable components are accessible from the front for easy maintenance while the plumbing and cable connections are neatly arranged at the back.

■ Dimensional Outline Unit: mm

APMA-370/APSA-370/APNA-370/APHA-370/APOA-370



Horiba contributes to the preservation of the global environment through analysis and measuring technology.



Please read the operation manual before using this product to assure safe and proper handling of the product.

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