Auburn FilterSense

Particulate Sensor
Model PS 10

INSTALLATION & HARDWARE MANUAL

T: (978) 927-4304 | 800 Cummings Center, 355W Beverly, MA 01915 USA | www.auburnfiltersense.com

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1 Notifications

1.1 Technical Support Contact

Auburn FilterSense provides industry-leading Engineering and Technical Support for all product lines. The Technical Support department is staffed with a team of engineering professionals. Areas of assistance provided by the Technical Support department include:

- Pre-Installation Site Analysis
- Product Installation
- General Operation
- Application-Specific Review
- Routine Calibration
- EPA Compliance
- Performance Upgrades and Add-On Features
-

To assure the best and most efficient technical support, please be prepared with the following information prior to contacting Auburn FilterSense. If it is determined that the component must be returned for evaluation/repair, a Return Material Authorization (RMA) number will be issued. You must include the RMA number on the packing slip and mark the outside of the shipping container.

- Company Name_____
- Product Model Number_____
- Product Serial Number_____
- Date of Installation_____
- Reason for Return_____

Auburn FilterSense Technical Support may be reached by:

Phone: (978) 927-4304

Fax: (978) 927-4329

E-Mail: info@auburnfiltersense.com

Address: AUBURN FILTERSENSE
800 Cummings Center, 355W
Beverly, MA 01915, USA

Hours of Operation: 8:00AM – 5:00PM U.S. Eastern Time

- Any control unit or particulate sensor that was exposed to hazardous materials in a process must be properly cleaned in accordance with OSHA standards, and a Material Safety Data Sheet (MSDS) must be completed before it is returned to the factory.
- All shipments returned to the factory must be sent by prepaid transportation.
- All shipments will be returned F.O.B. factory.
- **Returns will not be accepted without an RMA number.**

1.2 Disclaimer

This document contains important information necessary for proper operation of the product. It is strongly urged that all users of the product read this manual in its entirety. All instructions should be followed properly and any questions that arise should be discussed with Auburn FilterSense LLC.

Any use or distribution of this document without the express consent of Auburn FilterSense LLC is strictly prohibited. Any reproduction is prohibited without written permission.

In no event will Auburn FilterSense LLC be liable for any mistake, including lost profits, lost savings, environmental compliance costs, or other incidental or consequential damages or injury arising out of the use or inability to use this manual, even if advised of the possibility of such damages, or any claim by any other party. Terms and conditions supplied with each order contain additional liability limitations related to this product.

1.3 Symbols and Conventions

WARNING

Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.
Warning statements help you to:

- Identify a hazard.
- Avoid a hazard.
- Recognize the consequences.

Identifie les informations sur les pratiques ou les circonstances qui peuvent entraîner des blessures corporelles ou la mort, des dommages matériels ou des pertes économiques.

Les avertissements vous aident à:

- Identifier un danger
- Évitez un danger
- Reconnaître les conséquences

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

Identifies information, sections, or statements in this manual that apply to approved hazardous area systems, regulations, or installation.

Identifie les informations, sections ou déclarations de ce manuel qui s'appliquent aux systèmes, réglementations ou installations approuvés pour zones dangereuses.

1.4 Safety

WARNING

AREA CLASSIFICATION (CLASSIFICATION DE ZONE)

Before installing any device, confirm area classification requirements as specified on the product label. Do not install any device that is not tagged as suitable for the required area classification.

Avant d'installer un appareil, confirmez les exigences de classification de zone telles que spécifiées sur l'étiquette du produit. N'installez aucun appareil qui n'est pas étiqueté comme adapté à la classification de zone requise.

ENVIRONMENT (ENVIRONNEMENT)

Before installing any device, confirm ambient temperature, process temperature, and process pressure requirements. Do not install any device that is not tagged as suitable for the required temperatures and pressures.

Avant d'installer un appareil, vérifiez les exigences de température ambiante, de température de processus et de pression de processus. N'installez aucun appareil qui n'est pas étiqueté comme adapté aux températures et pressions requises.

NOT A SAFETY RATED DEVICE (PAS UN DISPOSITIF DE SÉCURITÉ ÉVALUÉ)

This model must not be used independently for safety or as a critical input signal to a safety system. This model is designated for general process control, diagnostics, and environmental monitoring. Safety must be addressed with the detailed engineering, redundancy, and safety certified components where applicable. Consult factory for critical safety applications.

Ce modèle ne doit pas être utilisé indépendamment pour la sécurité ou comme signal d'entrée critique vers un système de sécurité. Ce modèle est conçu pour le contrôle général des processus, les diagnostics et la surveillance environnementale. La sécurité doit être abordée avec l'ingénierie détaillée, la redondance et les composants certifiés de sécurité, le cas échéant. Consultez l'usine pour les applications de sécurité critiques.

WARNING

GROUNDING (MISE À LA TERRE)

Before turning on the instrument, you must connect the protective earth terminal of the instrument to a proper earth ground. Grounding to the neutral conductor of a single-phase circuit is not sufficient protection.

Avant de mettre l'instrument sous tension, vous devez connecter la borne de terre de protection de l'instrument à une prise de terre appropriée. La mise à la terre du conducteur neutre d'un circuit monophasé ne constitue pas une protection suffisante.

INSTALLATION AND SERVICE PERSONNEL (PERSONNEL D'INSTALLATION ET DE SERVICE)

Only appropriately licensed professionals should install this product. Always disconnect power before servicing. Personnel must be familiar with operational hazards, such as those caused by hot, pressurized, or toxic gases, liquids, or particulates. This device does not contain any field serviceable components. Only factory personnel should perform service on this equipment. **DO NOT REMOVE THE INTERNAL PRINTED CIRCUIT BOARD.**

Seuls les professionnels agréés doivent installer ce produit. Débranchez toujours l'alimentation avant de procéder à l'entretien.

Le personnel doit être familiarisé avec les dangers opérationnels, tels que ceux causés par des gaz, des liquides ou des particules chauds, sous pression ou toxiques.

Cet appareil ne contient aucun composant réparable sur site. Seul le personnel de l'usine doit effectuer la maintenance de cet équipement. **NE RETIREZ PAS LA CARTE DE CIRCUIT INTERNE IMPRIMÉE.**

2 Associated Documentation

This manual is to be referenced in conjunction with the following Auburn FilterSense documentation:

Product Information

Publication Number	Title
228-1036	Auburn FilterSense PM 1 PRO Manual
225-1084	Control Drawing, PS10 Hazardous Area Wiring Using PM 1
EXXXX	Project Specific Drawings if Applicable

Specific Conditions of Use:

1. When the manufacturer of the equipment has not identified the type of protection to be used for installation on the label, the user shall, on installation, mark the label with the type of protection used. Once the type of protection has been marked it shall not be changed.
2. NEMA 4X and IP66 ratings only apply to the probe assembly when installed per drawing 225-1084.
3. To prevent the risk of electrostatic sparking the painted surface of the enclosure should only be cleaned with a damp cloth.

Conditions particulières d'utilisation:

1. Lorsque le fabricant de l'équipement n'a pas identifié le type de protection à utiliser pour l'installation sur l'étiquette, l'utilisateur doit, lors de l'installation, marquer l'étiquette avec le type de protection utilisé. Une fois que le type de protection a été marqué, il ne doit pas être modifié.
2. Les indices NEMA 4X et IP66 s'appliquent uniquement à l'ensemble de sonde lorsqu'il est installé conformément au schéma 225-1084.
3. Pour éviter le risque d'étincelles électrostatiques, la surface peinte du boîtier ne doit être nettoyée qu'avec un chiffon humide.

3 Introduction

3.1 PS 10 Overview

The PS 10 particulate sensors are passive sensors that connect to a Control Unit for particulate monitoring and baghouse controls systems.
This manual covers installation and maintenance of the PS 10 particulate sensors only. Refer to the Control Unit Operating Manual or Applications Manual for more detailed instructions for system operation and set-up.

4 Technical Data

Enclosure	-N4X	Type NEMA 4X/IP 66 Aluminum, Anodized
Area Classification	-G -H1 -H2	Ordinary/General Purpose Only: CE, UL, CSA Hazardous Location, Class I, II, Division 2, Groups A-G, T4; Zone 21,21 (tb, tc). (UL, CSA, ATEX, IECEx) Hazardous Locations: Class I, II, III Division 1,2 Groups A-G, T4; Zone 0, 1, 2, 20, 21, 22 (ia, ib, ic)

Parameter	Detail/Code	Specifications	Notes
Mounting	-N05 -N15 -G05 -G15 -R05 -R15 -Q15 -Q20 -F20 -F50 -FAXXY -FDXXY -AP	NPT Male, 0.5 in., 316L NPT Male, 1.5 in, 316L BSPP (G thread) Male, 0.5 in., 316L BSPP Male, 1.5 in, 316L BSPT (R thread) Male, 0.5 in., 316L BSPT (R) Male, 1.5 in, 316L Quick Clamp, 1.5 in, 316L Quick Clamp, 2.0 in, 316L Flange, ANSI, 2.0 in, 150#, 316L Flange, DIN 50, PN 10, 316L ANSI Flange, X.X in, 316L DIN Flange, DN XX , 316L -Advance Internal Air Purge	XX – Size (1.5" to 72". For longer or shorter sizes consult factory) Y – Pressure Rating (Bar) **Availability of Mounting Types depends on PS 10 Model**
Probe Type	B C T	Bare, 316L Stainless Steel (Hastelloy C276 and C22 Available) Fully Insulated Probe (Teflon), 316L Fully Insulated, Teflon Layer, 316L	**Layered only valid for temperatures <450F.** **Coated & Layered CANNOT be used for H2 or H1** **Availability of Probe Types depends on PS 10 Model**
Process Temperature Operating Rang	-T25 -T45 -T50 -T80 -T120 -T165	-40 °F to +250 °F (-40 °C to +121 °C) Max. -40 °F to +450 °F (-40 °C to +232 °C) Max. -40 °F to 500 °F (-40 °C to 260 °C) Max. -40 °F to +800 °F (-40 °C to +426 °C) Max. -40 °F to 1200 °F (-40 °C to 649 °C) Max. -40 °F to 1650 °F (-40 °C to 898 °C) Max.	**500F Not Available for Layered Sensors** **H2 or H1 Requires T25** **Availability of Process Temperature Rating depends on PS 10 Model**
Process Pressure Operating Range	-P0 -P1 -Px	Full Vacuum to 10PSI (0.69 Bar) Max. Full Vacuum to 100PSI (6.9 Bar) Max. Special - Custom Pressure	**Px is for H1 ONLY** **Availability of Process Pressure Rating depends on PS 10 Model**
NOTES: 1. Maximum allowable ambient temperature at PS 10 Sensor Housing is 85°C.			

2. The actual process operating temperature and pressure must fall within the PS 10 Operating Ranges					
Application Ranges					
Parameter	Control Unit detection Level	Min	Max	Units	Notes
Particulate Velocity		150 (45.7)		ft/min (m/min)	
Particulate Size		0.3		micron	< 10 microns, 0.5 pA or 0.1pA detection level required
Particulate Concentration	5.0pA Standard	5.0 (0.002)	5000 (2.0)	mg/m3 (gr/ft^3)	Barely visible to visible > 5% opacity Moderate to dilute flow
	0.5pA Optional	0.5 (0.0002)	5000 (2.0)	mg/m3 (gr/ft^3)	Invisible to barely visible, <5% opacity Light dilute flow
	0.1pA Optional	0.1 (0.00004)	5000 (2.0)	mg/m3 (gr/ft^3)	Invisible, <1% opacity ultra-dilute flow

Sensor Cable			
Parameter	**Detail**	**Specification**	**Notes**
Type		High Quality Coaxial	
Temperature Range	Operating	-40°F to +392°F (-40°C to +200°C)	
Maximum Length		300 ft.	

5 Installation

- Only trained professionals should install/maintain this product.
- Shutdown processes that include high temperatures, high pressures, toxic gases, hazardous particulate, or explosion risks prior to installing or removing equipment.

- Seuls des professionnels qualifiés doivent installer / entretenir ce produit.
- Arrêtez les processus qui incluent des températures élevées, des pressions élevées, des gaz toxiques, des particules dangereuses ou des risques d'explosion avant d'installer ou de retirer l'équipement.

5.1 Sensor Location and Example Drawings

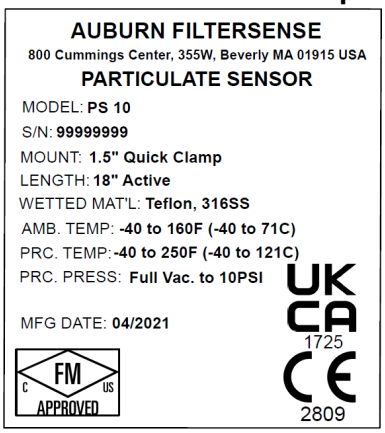
Area Classification

- Do not install any device that is not tagged as suitable for the required area classification.
- Check label for the following:
  - Area classification
  - Certification numbers as required.
    - FM20NUS0012
    - FM20NCA0006
    - FM20ATEX0034X
    - FM22UKEX0094X
    - FM20ATEX0033X
    - FM22UKEX0093X
    - FM20US0127X
    - FM20CA0064X
    - IECEXFMG20.0035X

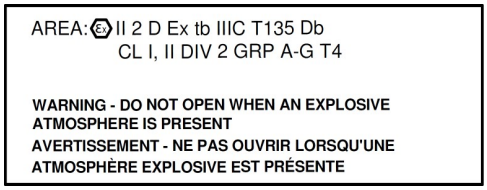
Temperature and Pressure

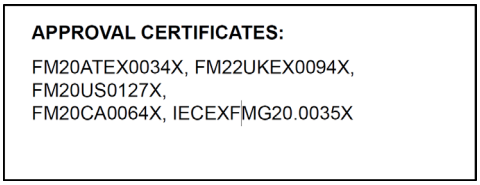
- Confirm compatibility of pressure and temperature ratings with process and installation area.
- Check label for the following:
  - Process temperature rating
  - Process pressure rating

Hazardous Area Label Example

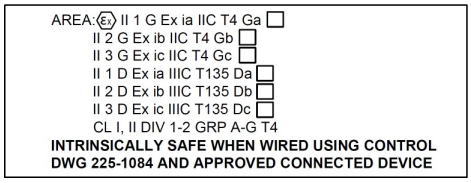


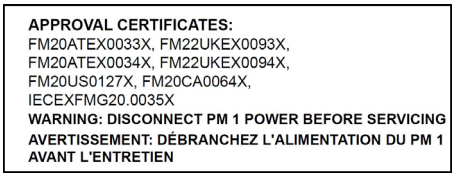
Hazardous Area Side Label Examples





Intrinsically Safe Side Label Examples





The following factors should be considered:

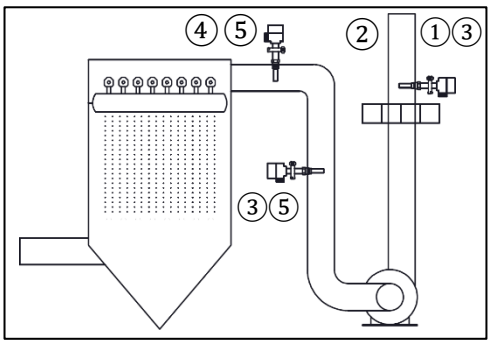
- Confirm compatibility of all sensor ratings with process and installation area.
- Check label for the following:
  - Wetted materials
  - Enclosure rating
- High levels of vibration should be avoided.
- Flow conditions
- Access for installation and service
- The particulate sensor must be installed in a position where the flow is reasonably consistent. The ideal position is where the pipe/duct is straight and free of items such as valves, dampers, or other flow obstructions for a length of 3 diameters or longer. Horizontal or vertical sections are acceptable.
- For basic flow/no flow detection it is not necessary to select a location with a longer straight section if access must be sacrificed dramatically. For trending and measurement, the need for a straight section increases. The particulate sensor should be positioned with approximately two thirds of the straight section upstream of the sensor and one third downstream. Ideally, locate the particulate sensor in the center of the pipe/duct.
- For emissions and filter leak detection applications such as baghouses or cartridge collectors, good locations are generally found upstream of the blower. The particulate sensor can be located downstream of the blower but not too close to the stack outlet. There must be sufficient duct downstream of the sensor to provide adequate electrical and atmospheric shielding.

ATMOSPHERIC AND ELECTRICAL SHIELDING OF SENSOR

- It is essential for the pipe/duct to provide an electrical (Faraday) shield for the sensor. The pipe/duct or stack should be metal with a high-quality earth ground. Consult the factory for non-conductive pipes/ducts such as plastic or fiberglass. (Small in-line sensors for small tubing provide their own section of metal pipe, which also must be grounded).
- When the sensor is placed in a stack/duct choose a location away from atmosphere so wind driven atmospheric particulate or rain does not flow over the sensor and so external electrical noise can-not affect operation.
- Do not place the sensor where the pipe/duct is corroded or cracked which may allow water droplets to create signals as they flow by.

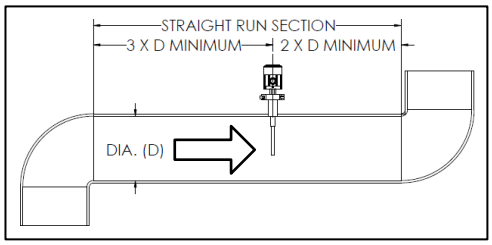
Filter Outlet Locations

① Ensure good access.
② Avoid locating within one pipe diameter or 36 inches of vertical stack exit to protect against weather. Horizontal exits allow for closer placement to open weather.
③ Straight runs and laminar flow best for measurement.
④ Short straight runs are acceptable for basic monitoring.
⑤ Accessible negative pressure locations may be preferred to prevent exposure to toxic gases and particulate.



Straight Run Considerations

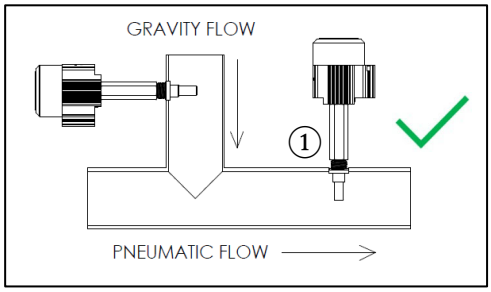
- Straight runs meeting the following criteria are preferred but not required for basic monitoring.
- Three (3) duct diameters upstream.
- Two (2) duct diameters downstream.
- Straight run can be horizontal or vertically downward (as shown in illustration).



Powder Flow Locations

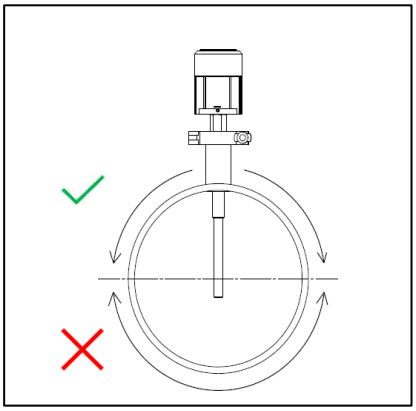
① Best installed in pneumatic section (positive or negative pressure).
② For gravity feed, consult factory.

- Grounded metal duct required.
  - Consult factory for nonmetallic duct/ pipe solutions.
- Follow **straight run considerations**.



Horizontal Pipes/Ducts

- Side or top mount recommended.
- Bottom mount not recommended.
- Proper mount and installation location will prevent buildup.
- For further installation advice please contact sales@AuburnFiltersense.com



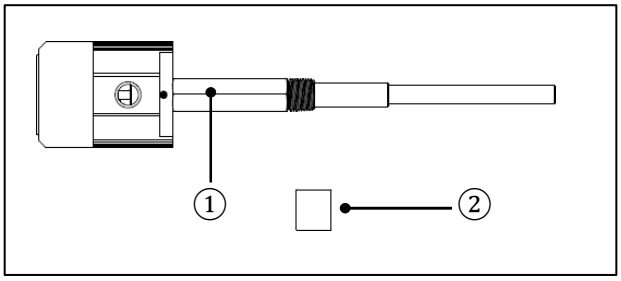
5.2 Process Mounts

The following types of process mounts are available:

Threaded

- NPT Standard
- BSPP (G) and BSPT (R) Optional

① Threaded Nipple
② Threaded Half-Coupling Process Mount

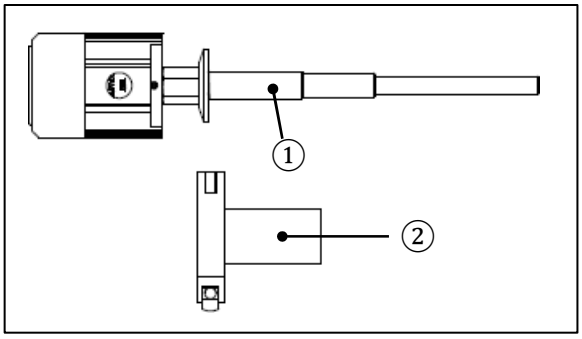


Quick Clamp

- Quick Clamp Standard
- Allows quick and easy removal from process
- Allows rotation to easily align

① Quick Clamp Nipple
② Quick Clamp Process Mount Kit

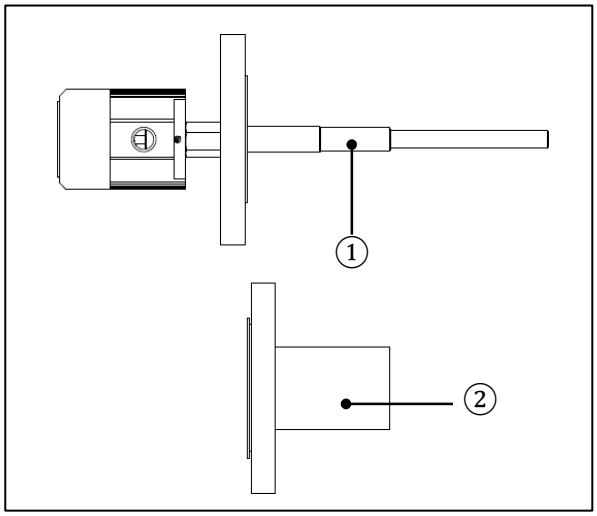
- Ferrule
- Tri-Clamp
- Gasket



Flange

- ANSI Standard
- DIN Optional

① Flange Nipple
② Flange Process Mount



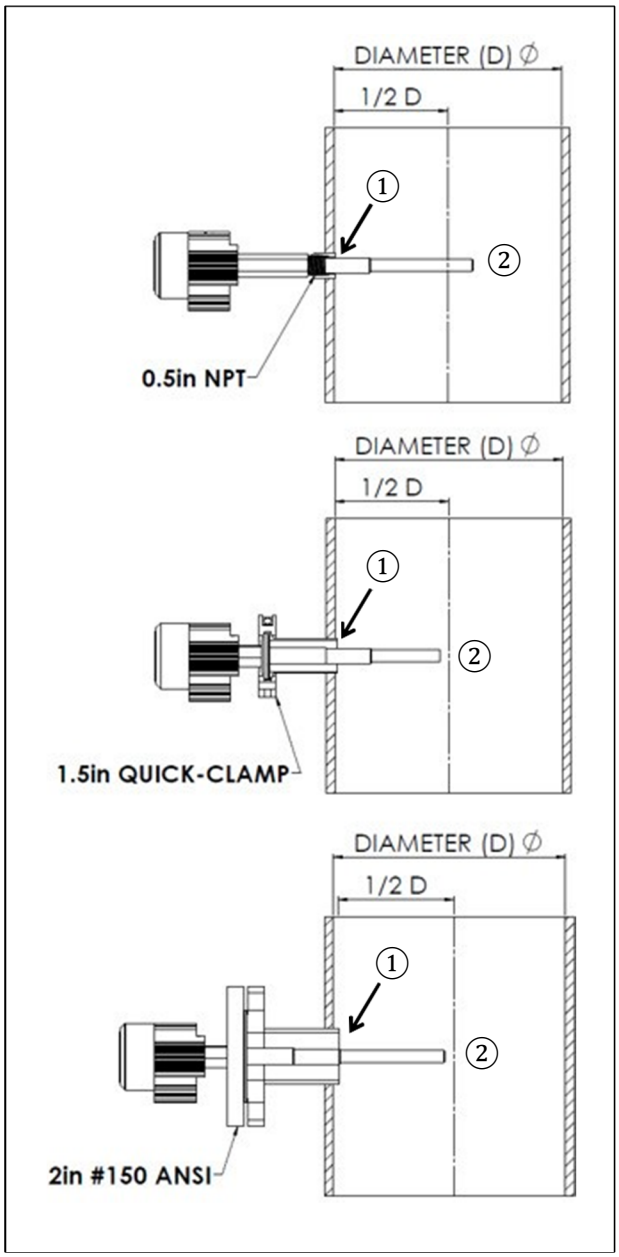
5.3 Sensor Mounting

Sensor Mounting Considerations

① Process mount should protrude into process 0.125 in (3.175 mm) to 0.5 in (12.7 mm).

② Sensor probe should extend approximately the duct diameter for stacks and filter ducts an 1/2 of the pipe diameter for powder flow appli

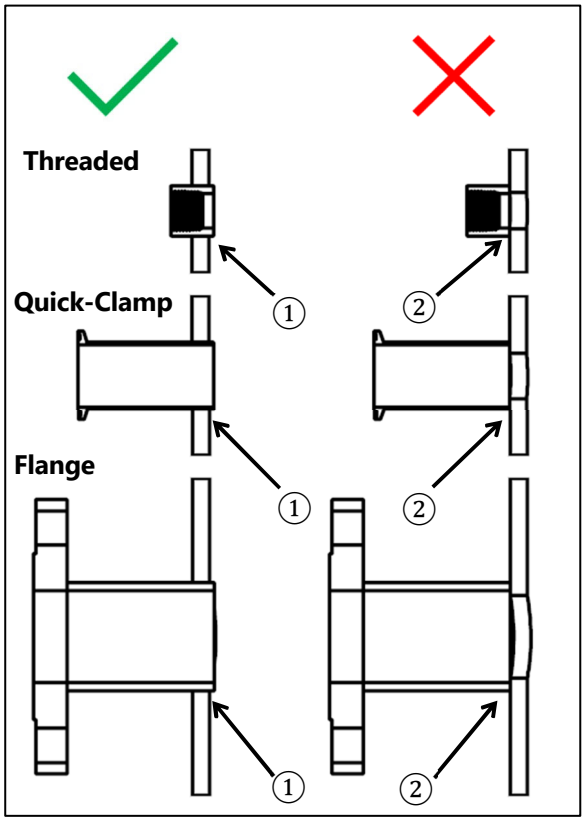
- In very large stacks/ducts, two sensors in a daisy chain configuration can be considered.
- In smaller pipes, the probe should be at least 1 in (25.4 mm) minimum away from the opposite side.
- High levels of vibration should be avoided.



Welding and Clearance

① "Through weld" half coupling, quick clamp mount, or flange mount to ensure proper clearance and to prevent particulate buildup in mount. Process mount should protrude into process 0.125 in (3.175 mm) to 0.5 in (12.7mm).
② Do not face weld.

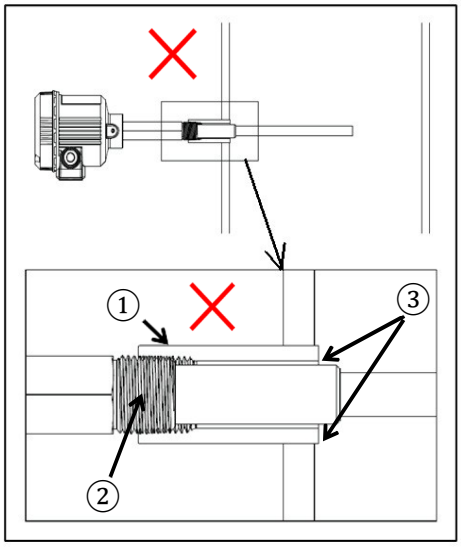
- Weld in center of the duct/pipe, perpendicular to the flow.
- Air and watertight seal.



Improper Extensions

① Do not use an extended or improper mount.
② Longer mounts can cause the nipple not to protrude into the process.
③ Extended mounts can cause particulate buildup on the insulator and sensing probe.

- Contact the factory for custom sensor nipple extensions for proper installation in an existing port.
- Do not use non-stainless steel mounts that may corrode and cause corrosive residue to drip on the sensor.



5.4 Sensor Test Port (Non-Hazardous Areas Only)

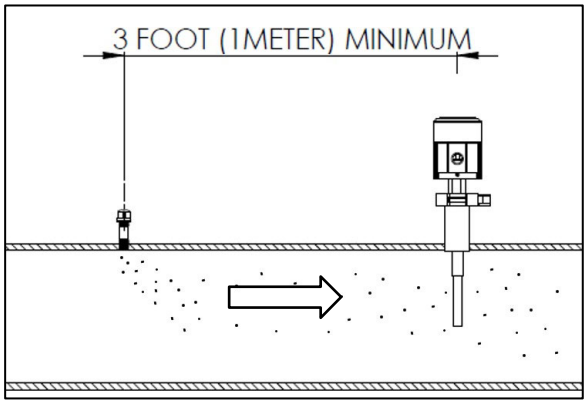
IMPORTANT

TEST PORT INSTALLATION

- Installation of a sensor test port enables checking the response to an actual increase in particulate.
- Installation of a sensor test port is for introducing particulate upstream of the sensor as a method for checking the response to an increase in particulate. Some applications are required by EPA regulations to include a sensor test port for **Response Testing**.

Location and Mounting

- Non-hazardous areas only.
- Negative pressure location.
- Install at least 3 ft upstream of the particulate sensor.
- In line with sensor on the same side of the pipe/duct.
- If possible, locate the test port at ground level and/or a location with easy access.
- If the test port must be located at an inaccessible location, a length of tubing can be used to improve access.
- Typical test port is a 1/8 in NPT x 3 in long nipple with a cap or shutoff valve.



6 Wiring

PS 10 Sensor Coaxial Cable Routing

IMPORTANT **PARTICULATE SENSOR COAXIAL CABLE ROUTING**

- The sensor cable must be installed in conduit that is separate from all other wiring. Multiple sensor cables can be run in the same conduit.
- The cable should be routed from the particulate sensor to the control unit in a path that avoids high vibration, heat over 394°F (200°C) and any strong magnetic or electrical fields.
- The cable should be located at least 18 in (46 cm) away from any power lines (conduit), motors, frequency drives and other sources ofelectrical interference throughout its entire path.
- The cable should be installed in metallic conduit. At the process end, use a section of shielded flex conduit that is 1 to 2 times the probe length to serve as a service loop.
- The coaxial cable is connected to the control unit by a coax connector and is connected to the sensor by two ring terminals. The connectors are normally supplied pre-assembled to the cable.
- Once the cable has been routed, insert the coax connector into the control unit enclosure leaving a very small service loop as specified in the installation drawing shown in the appendix. A larger service loop should be used at the sensor end, typically 1 to 2 times the sensor length. Any small amount of extra cable length should be pulled into the nearest junction box and NOT left in the sensor housing or in the control unit enclosure. If there is a significant amount of extra cable (many feet), the cable should be shortened at the sensor end and the sensor end connectors should be re-assembled using factory-supplied connectors and instructions.

7 Routine Maintenance

WARNING

EQUIPMENT MAINTENANCE

- Only appropriately licensed professionals should perform maintenance on this product.
- For operator safety always disconnect power before servicing.

- Seuls des professionnels dûment agréés doivent effectuer la maintenance de ce produit.
- Pour la sécurité de l'opérateur, débranchez toujours l'alimentation avant l'entretien.

Particulate Sensor:

- The particulate sensor does not require routine checks and since it is a passive device without any active electronics, there is no electrical calibration or zero adjustment for the sensor. The sensor does not normally need any cleaning and for optimal performance, routine cleaning of the sensor is not recommended.

- Le capteur de particules ne nécessite pas de contrôles de routine et puisqu'il s'agit d'un dispositif passif sans aucune électronique active, il n'y a pas d'étalonnage électrique ou de réglage du zéro pour le capteur. Le capteur n'a normalement pas besoin de nettoyage et pour des performances optimales, un nettoyage de routine du capteur n'est pas recommandé.

8 Troubleshooting

- When troubleshooting, consider each component of the system: The Control Unit, the interconnecting coax cable, and the PS 10 sensor assembly. The quality of the cable and connectors should not be overlooked. The Control Unit and PS 10 housing should be clean and free of dust and moisture.

8.1 False High Signals (False Alarms)

- When an apparent false high signal is present, first check the process to be sure the particulate level has not increased. Keep in mind that the system can detect very low levels. In filtration applications the system can detect invisible particulate levels and very small leaks.
- Check the PS 10 sensor cover and conduit seal to be sure they were not left open allowing rain to enter the housing. Check the coaxial cable connectors using a digital voltmeter and check for shorts. If nothing can be found, conduct a System Zero Check.

8.2 No Reading or Alarm (When Believed Present)

- Increase the particulate level or introduce particulate into the air stream and monitor for a response. If the system responds properly re-evaluate the selected alarm points and the process conditions.
- If there is no response, check for electrical continuity from the sensor to the control unit end of the coax cable.
- Alternatively contact the factory for a Field Test Unit that can generate a signal to check response the calibration.

8.3 System Zero Check

- The System Zero Check is used at installation to confirm proper installation and for troubleshooting.

SAFETY

WARNING

- Always disconnect power to the Control Unit before making any wiring changes at either the Control Unit or PS 10 sensor as well as when making any mounting changes or replacing any component.
- Do not remove the PS 10 sensor (even when power is disconnected) from a running process if it will in any way compromise personnel or plant safety.
- Plant safety procedures must be always followed when performing any equipment check or maintenance.
- Débranchez toujours l'alimentation de l'unité de contrôle avant d'apporter des modifications au câblage de l'unité de contrôle ou du capteur PS 10, ainsi que lors de toute modification de montage ou du remplacement de tout composant.
- Ne retirez pas le capteur PS 10 (même lorsque l'alimentation est coupée) d'un processus en cours si cela risque de compromettre la sécurité du personnel ou de l'installation.
- Les procédures de sécurité de l'usine doivent toujours être suivies lors de toute vérification ou maintenance de l'équipement.

IMPORTANT

SYSTEM ZERO CHECK

- Shut the process off, stopping flow completely, including all airflow not just particulate flow. The slightest amount of flowing particles can create a signal. If process flow cannot be stopped, the particulate sensor can be removed from the process and installed in a grounded test pipe to create a shielded, no flow condition.
- Let the system stabilize for 2-3 minutes.
- Read the display. It should be below the control units specified minimum detection level (5.0pA, 0.5pA or 0.1pA). If the system passes this check, then it is assured that there are no false signals entering the system.
- If the system zero check is not successful, each component of the system should be checked individually, in the following order:
  1. Control Unit ZERO CHECK
  2. COAXIAL CABLE ZERO CHECK
  3. PS 10 SENSOR ZERO CHECK

IMPORTANT

ZERO CHECK

1. If the Control Unit has self-checks, run the self-checks, and VERIFY that the ZERO reading is within tolerance and that the Probe Fouling PASSES (>1 MEG typical).
   - If the 'PROBE FOULING' self-test FAILED, the PS 10 needs the sensing rod cleaned.
   - If the ZERO CHECK passed, continue to 'COAXIAL CABLE ZERO CHECK' section.
2. If the Control Unit does not have self-checks:
   - Disconnect power to the Control Unit.
   - Unscrew the enclosure cover, remove the Display/IU Module, and then remove the coaxial cable connector from the Control Unit.
   - Reinstall the Display/IU Module, and then screw the enclosure cover ON.
   - Re-apply power to the Control Unit and allow the reading to stabilize for 1-2 minutes.
   - Read the display. It should be below the Control Unit's minimum detection level (5.0pA, 0.5pA or 0.1pA). If this test passes, then there are no false signals entering the Control Unit.

If 'ZERO CHECK' FAILED:

1. RETURN the Control Unit to the Factory for evaluation.

If 'ZERO CHECK' PASSED:

1. Disconnect power from the Control Unit.
2. Unscrew the enclosure cover, remove the Display/IU Module, and then reinstall the coaxial cable connector into the Control Unit.
3. Reinstall the Display/IU Module, and then screw the enclosure cover ON.
4. Proceed to the Coaxial Cable Zero Check.

IMPORTANT

COAXIAL CABLE ZERO CHECK

1. VERIFY power to the Control Unit is OFF.
2. Open the PS 10 sensor enclosure cover and disconnect the coaxial cable center conductor from the sensor probe end. Do not disconnect the coaxial cable shield. Do not remove the PS 10 probe from the process. Leave the coaxial cable center

conductor ring terminal hanging in free space within the PS 10 sensor enclosure (do not isolate it with tape) and close the cover.

3. Re-apply power to the Control Unit and allow the reading to stabilize for 1-2 minutes.
4. Read the display. It should be below the Control Unit's specified minimum detection level (5.0pA, 0.5pA or 0.1pA).

IF the 'COAXIAL CABLE ZERO CHECK' FAILED:

1. Either the coaxial cable is not routed correctly, or it is defective.
2. VERIFY cable routing (refer to section 3.3 for cable routing guidance).
3. Contact the factory for further assistance.

IF the 'COAXIAL CABLE ZERO CHECK' PASSED:

1. Disconnect power to the Control Unit.
2. Open the PS 10 sensor enclosure cover and re-attach the coaxial cable center conductor to the sensor probe end.
3. Close the PS 10 sensor enclosure cover and proceed to the 'PS 10 SENSOR ZERO CHECK'.

IMPORTANT

PS 10 SENSOR ZERO CHECK

To perform the 'PS 10 Sensor Zero Check' the process flow must be stopped or a sensor test pipe (available from Factory) or length of metal pipe will be needed (2" diameter pipe or larger). The pipe should be at least 3 in (8 cm) longer than the probe itself and must be grounded. The length of pipe will serve as an electrical shield for the probe while it is out of the process.

1. Do not remove the PS 10 sensor from a running process if it will in anyway compromise personnel or plant safety.
2. Disconnect power to the Control Unit.
3. Remove the PS 10 sensor from the process and insert it into the grounded metal test pipe.
4. Re-apply power to the Control Unit and allow the reading to stabilizefor 1-2 minutes.
5. Read the display. It should be below the control units specified minimum detection level (5.0pA, 0.5pA or 0.1pA).
6. When performing a 'PS 10 ZERO CHECK', keep in mind that it may be acceptable to consider a small false signal negligible. For example, if the baseline readings are 100pA and a system zero offset of 1pA was found, this is only a 1% effect on the normal readings. If using the device for basic flow/no flow detection or basic filter leak detection this would not be significant.

IF the 'PS 10 SENSOR ZERO CHECK' PASSED:

1. Disconnect power to the Control Unit.
2. Remove the PS 10 sensor from the grounded test pipe and re-insert into the process.
3. APPLY power to the Control Unit and VERIFY operation.

IF the 'PS 10 SENSOR ZERO CHECK' FAILED:

1. VERIFY that the PS 10 sensor rod and nipple area is free of water, liquids, process residues, etc. CLEAN if necessary and RETEST.
2. Contact the factory for further assistance.