



APC SmartTouch Airborne Particle Counter

Operation Manual

Version 2.0



Produced by
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MANUAL HISTORY

The following is a manual history of the
APC SmartTouch
Revision Date: April 2012

IMPORTANT NOTE

In the following Merck shall mean Merck KGaA, Darmstadt, Germany.

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Safety Information

I. Symbols

Appropriate caution/warning statements are used throughout the manual and on the instrument that require you to take cautionary measures when working with the instrument.

CAUTION



Caution! The User Manual needs to be consulted! Failure to follow the procedures prescribed in this manual might result in irreparable equipment damage.

Warning! Failure to follow the procedures described in this manual might result in a hazard. Unsafe use of the instrument could result in serious injury to you or cause damage to the instrument.

Safety

This section gives instructions to promote safe and proper handling of the APC SmartTouch Airborne Particle Counters.

IMPORTANT

There are no user-serviceable parts inside the instrument. Refer all repair and maintenance to a qualified factory-authorized technician. All maintenance and repair information in this manual is included for use by a qualified factory-authorized technician.

Laser safety

- The APC SmartTouch Airborne Particle Counter is a Class I laser-based instrument.
- During normal operation, you will not be exposed to laser radiation.
- Precaution should be taken to avoid exposure to hazardous radiation in the form of intense, focused, visible light.
- Exposure to this light may cause blindness.

Take these precautions:

- **DO NOT** remove any parts from the particle counter unless you are specifically told to do so in this manual.
- **DO NOT** remove the housing or covers. There are no user-serviceable components inside the housing.

WARNING



The use of controls, adjustments, or procedures other than those specified in this manual may result in exposure to hazardous optical radiation.

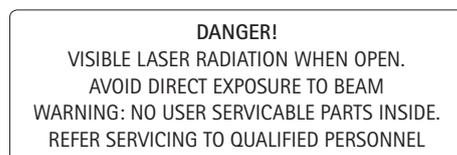
Labels

Advisory labels and identification labels are attached to the outside of the particle counter housing and to the optics housing on the inside of the instrument.

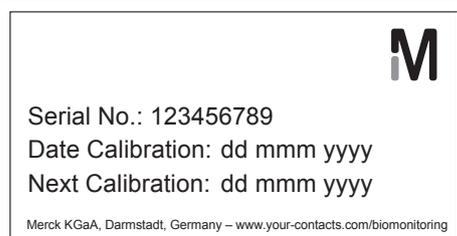
1. Serial number label (back panel)



2. Laser radiation symbol label (internal)



3. Calibration Label (side panel)



4. Laser radiation label (internal)



5. European symbol for non-disposable item. Item must be recycled.



Description of Caution/Warning symbols

Appropriate caution/warning statements are used throughout the manual and on the instrument that require you to take cautionary measures when working with the instrument.

CAUTION



Failure to follow the procedures prescribed in this manual might result in irreparable equipment damage. Important information about the operation and maintenance of this instrument is included in this manual.

WARNING



Warning means that unsafe use of the instrument could result in serious injury to you or cause damage to the instrument. Follow the procedures prescribed.

Caution or warning symbols

The following symbols may accompany cautions and warnings to indicate the nature and consequences of hazards:



Warns that uninsulated voltage within the instrument may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make contact with any part inside the instrument.



Warns that the instrument contains a laser and that important information about its safe operation and maintenance is included in the manual.



Warns that the instrument is susceptible to electrostatic dissipation (ESD) and ESD protection procedures should be followed to avoid damage.



Indicates the connector is connected to earth ground and cabinet ground.

Important information



The APC SmartTouch Airborne Particle Counter is to be used in controlled areas such as cleanrooms, isolators, operating theatres, flow hoods etc.

II. Warnings and precautions

The APC SmartTouch Airborne Particle Counter is a state-of-the-art instrument designed to collect ambient air in order to determine the concentration of micro particles in a controlled area. A safe operation of the APC SmartTouch requires trained staff aware of the general safety procedures and following the instructions set forth in this user manual. Potential risks associated with the operation of the counter are explained in this section. Safety procedures are provided to minimize these risks. Carefully follow the instructions to protect yourself and the counter from potential hazards.

IMPORTANT

Please read all operation instructions in this user manual and pay attention to all warnings displayed on the screen before using the instrument. Keep this manual in a known place so that it is available for all users for future reference.

IMPORTANT

Do not use the APC SmartTouch in hazardous areas, Eex areas, where a fire and/or explosion may occur.

Introduction and Unpacking

Introduction

The APC SmartTouch is an airborne particle counter with an infrared touch screen user interface. It operates on two lithium-ion batteries (included) or an external (AC) power supply. The enclosure is of stainless steel.

The counter can be equipped with a dual flow rate of 1 CFM (cubic feet per minute) & 100 LPM (litre per minute) or a single flow rate of 1 CFM, 50 LPM or 100 LPM. Six particle sizes from 0.3 to 10 µm are standard on every counter. Up to 10,000 data records can be stored in the internal memory of the counter and downloaded via the service software (included) for analysis and reporting.

Typical applications for the APC SmartTouch are cleanroom monitoring and certification, research, exposure assessment, indoor air quality, filter testing, clearance testing, quality assurance, and contaminant migration studies. All APC SmartTouch instruments meet the JIS B 9921: 1997 and ISO 21501 standard.

Delivery check

Carefully unpack the APC SmartTouch from the shipping container and verify that all the items (see pictures) listed in the following table are present. Contact your local Merck representative immediately if items are missing or broken.

The APC SmartTouch is to be used in controlled areas such as cleanrooms, isolators, operating theatres, flow hoods etc.

This Instrument should not be operated outside of this type of environment.

IMPORTANT

Please read all operation instructions in this user manual and pay attention to all warnings displayed on the screen before using the instrument. Keep this manual in a known place so that it is available for all users for future reference.

Qty.	Item description	Part/Model	Reference picture
1	APC SmartTouch 1 CFM APC SmartTouch 50 LPM APC SmartTouch 100 LPM APC SmartTouch 1 CFM & 100 LPM	1.44181.0001 1.44182.0001 1.44183.0001 1.44093.0001	
1	Stainless Steel Isokinetic Probe 1 CFM Stainless Steel Isokinetic Probe 50 LPM Stainless Steel Isokinetic Probe 100 LPM Remark: dual flow rate counters will contain two Isokinetic Probes	1.44084.0001 1.44121.0001 1.44119.0001	
1	Sampling Tubing of 1.5 meter	1.44104.0001	
1	Zero Count Filter	1.44132.0001	
1	Roll of Thermal Printer Paper	1.44147.0001	
1	AC Power Cord + Adapter	1.44145.0001	
	Network cable	1.44075.0001	
1	Table-top Tripod for Isokinetic Probe	1.44105.0001	
1	APC SmartTouch Download Utility Software CD	1.44077.0001	(not shown)
1	USB Cable	1.44100.0001	
1	Calibration certificate	included	(not shown)
1	User manual	On CD	(installed on CD)
1	Quick start guide	On CD	(installed on CD)

Optional accessories

The following photos and table list optional accessories. If you ordered optional accessories, make certain they have been received and are in working order:

Item description	Part/Model	Reference picture
Carrying Case Steel model	1.44005.0001	
Thermal Printer Paper Rolls (5ea)	1.44009.0001	
Temperature / Relative Humidity Probe	1.44088..0001	
Air Velocity Probe	1.44123.0001	(not shown)
Compressed Gas Adapter (CGA)	1.44179.0001	
Sampling Tubing (per meter)	1.44104.0001	
Purge Filter	942 841	
APC SmartTouch Download Utility Software CD	1.44077.0001	(not shown)
USB Cable	1.44100.0001	
Nozzle Set Compressed Gas Adapter, 1 CM	1.44170.0001	
Nozzle Set Compressed Gas Adapter, 50 LM	1.4168.0001	
Nozzle Set Compressed Gas Adapter, 100 LPM	1.44166.0001	
IQ / OQ Documentation	1.44076.0001	(not shown)

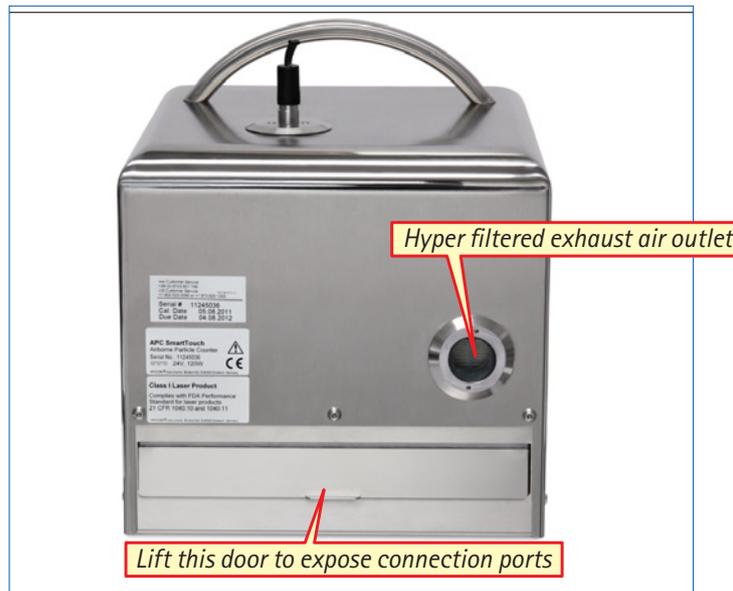
Getting Started

This chapter provides information to help you use the APC SmartTouch including:

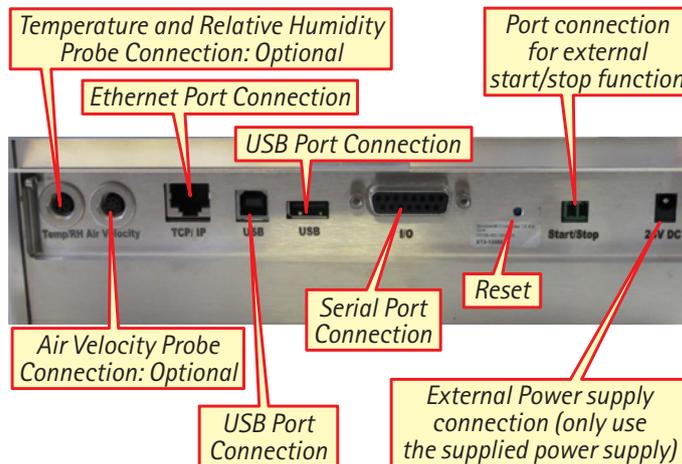
- rear panel
- connection ports
- providing power/charging the batteries
- switching on the instrument
- working with settings
- performing a zero count check
- installation of the Isokinetic probe
- Running a basic sample

Rear panel

This is the rear panel of the instrument.



Connection ports



Power supply connection

Please charge the instrument for 4 hours before using for the first time.



After this initial 4 hour charge the instrument can either be used via the external power supply or the internal rechargeable lithium ion batteries.

NOTES:

When the instrument is connected to a power source the batteries will be charged even when the counter is not switched on.

Disconnecting the AC power does not cause loss of data.

Turning on the instrument



This screen will appear after a few seconds:



Battery indicator



When these symbols turn red the instrument should be used reconnected with the external power supply. The instrument can be used as normal during the recharge cycle.

Then this screen will appear.

These symbols indicate the battery charge

Measuring Point	Channels	Σ	pa
N/A (Place)	0.3 μm		0
N/A (Building)	0.5 μm		0
N/A (Room)	0.7 μm		0
N/A (Measuring Point)	1.0 μm		0
	5.0 μm		0
	10.0 μm		0

Buttons: Σ / Δ , $\text{m}^3/\text{ft}^3/\text{l}$ counts

07.11.2011 12:39:11 pk 7

Setting the screen contrast

Press Here

Measuring Point	Channels	Σ	pa
N/A (Place)	0.3 μm		0
N/A (Building)	0.5 μm		0
N/A (Room)	0.7 μm		0
N/A (Measuring Point)	1.0 μm		0
	5.0 μm		0
	10.0 μm		0

Buttons: Σ / Δ , $\text{m}^3/\text{ft}^3/\text{l}$ counts

07.11.2011 12:39:11 pk 7

Press here or here to Increase or decrease the screen contrast, when you are happy press OK

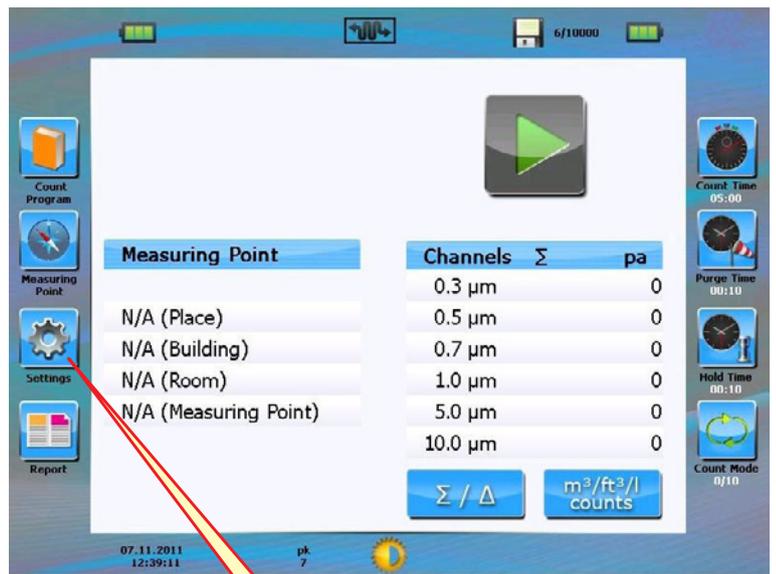
Measuring Point	Channels	Δ	pa/ft ³
N/A (Place)	0.3 μm		414775
N/A (Building)	0.5 μm		7468
N/A (Room)	5.0 μm		285
N/A (Measuring Point)	10.0 μm		407

Buttons: Σ / Δ , $\text{m}^3/\text{ft}^3/\text{l}$ counts

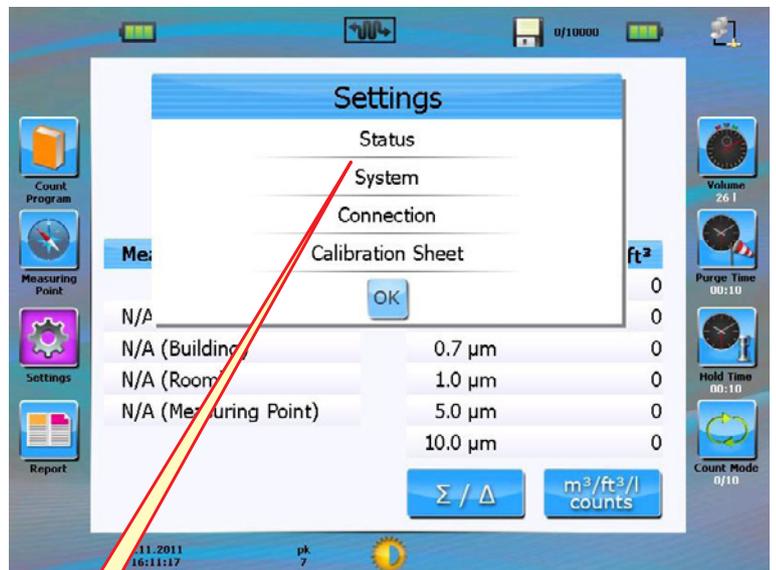
07.11.2011 15:44:50 pk 7

Settings

In settings all the basic parameters such as date and time and language can be set.



By touching the settings icon you will get the following screen.



To Access the current status of the instrument press here.

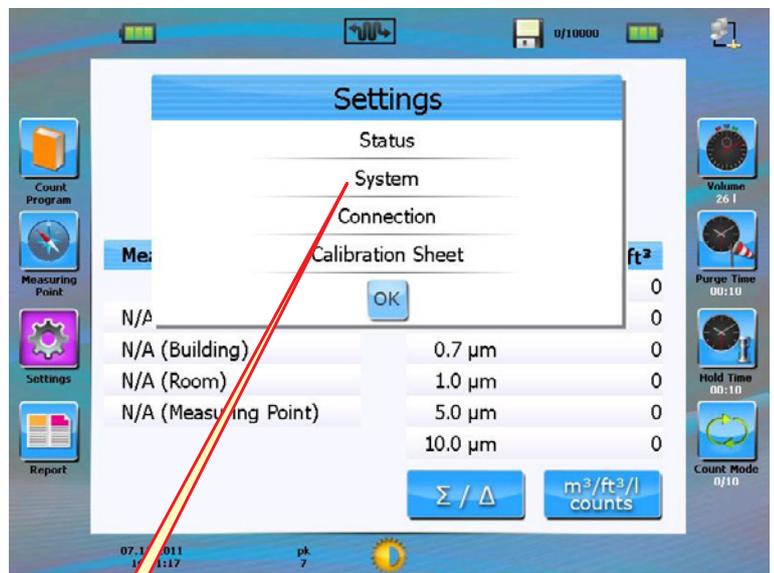
Status screen

This screen is showing the actual firmware version of the counter and also the calibration date, end of calibration date (calibration is valid for 12 months), pump duration time, laser current, storage battery, customer reference, serial number, MCA number (for internal use).



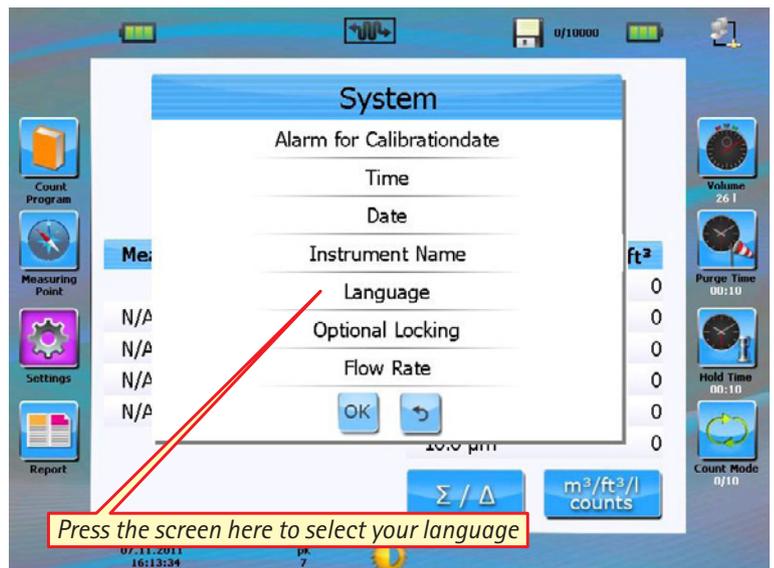
To return to the Settings Menu press here

This Screen re-appears.



To Access the System menu press here

System settings



Press the screen here to select your language

Language selection

Select your language by pressing next to your countries flag then press OK.

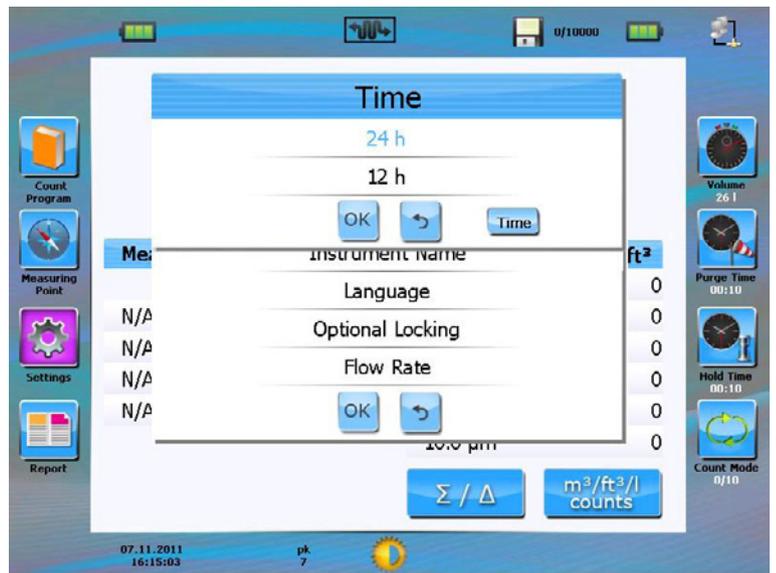
Please note you need to fully press the OK button twice for the new language to take effect.



Time format

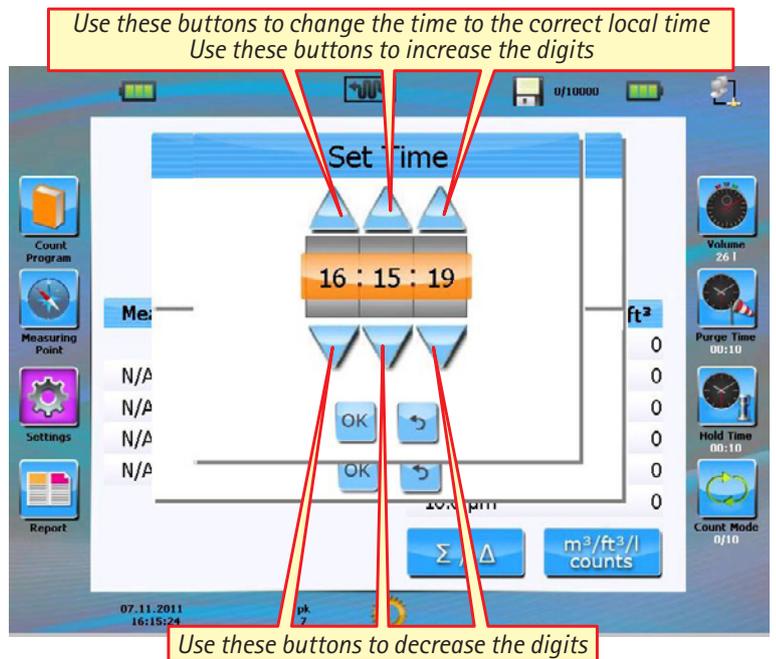
To set the time format select time from the settings menu, this screen will appear.

Select either 12 or 24 hour mode by pressing the required mode, to set the time. Press the key marked Time.

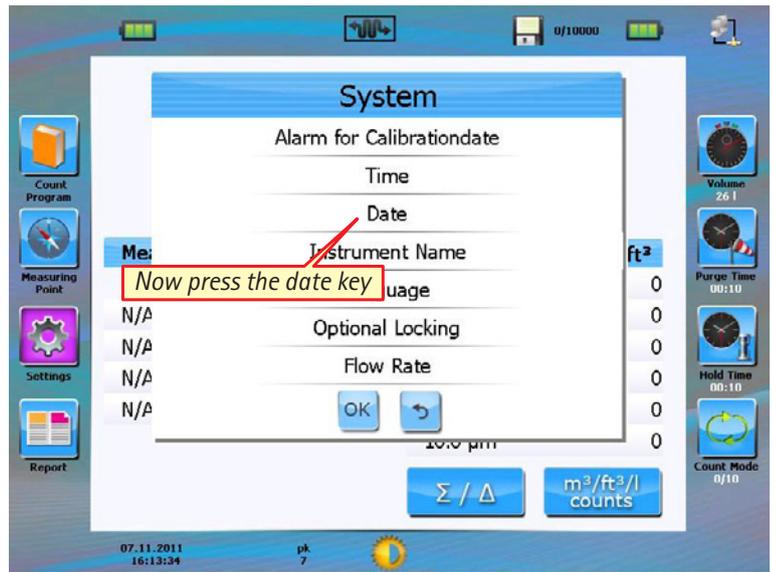


Setting the time

When you have set the correct time press OK and you will return to the system screen.



Setting the date



This screen will appear.

Setting date format



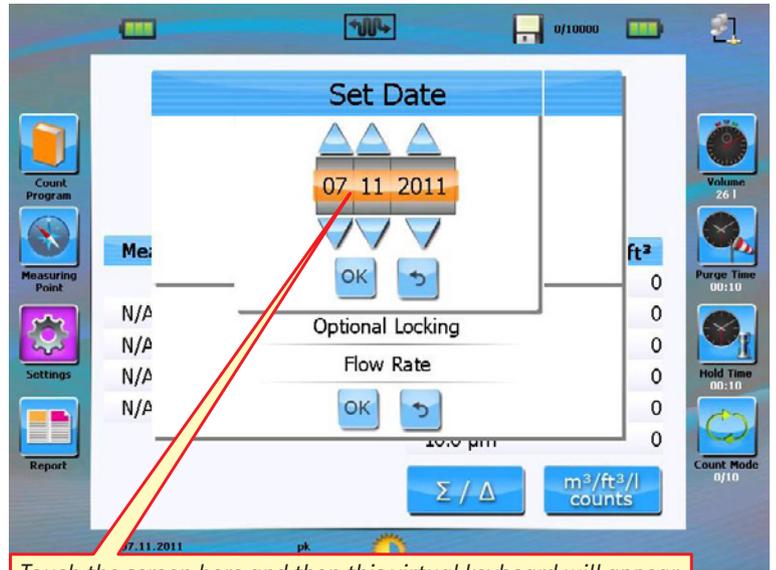
Select the required date format then press date to change the date.



The buttons above and below are used to increase or decrease the date. When correct press OK.

Setting date and time using the screen keyboard

To access this feature in both modes (time/date).



You can also use this virtual keyboard to set the date and time.

When finished press OK.

Setting instrument name

You can give the instrument a unique number or name if required.

From the system menu select Instrument Name.

This screen will appear.

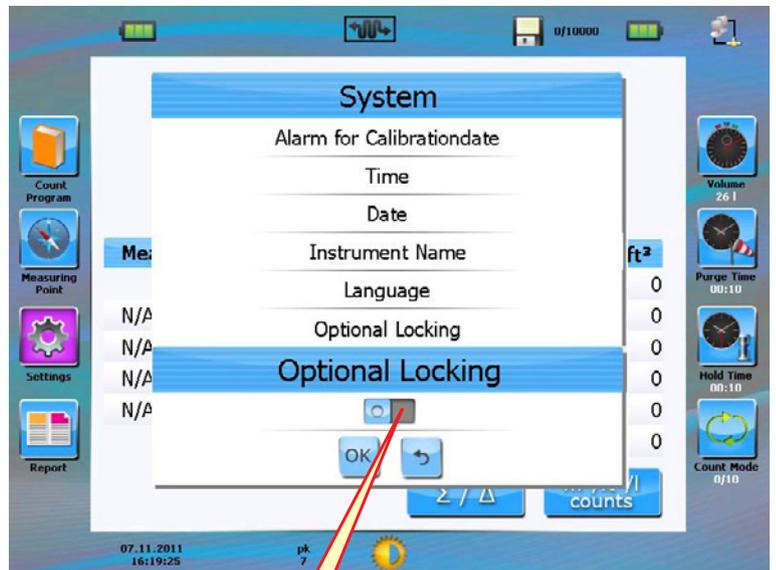


Type in the Name required and press OK.

Calibration lock

It is possible to lock the instrument so it cannot be used if the calibration has expired.

From the system menu screen select Optional Locking this screen will appear.



By pressing here you can switch the lock on and the screen will change to this.

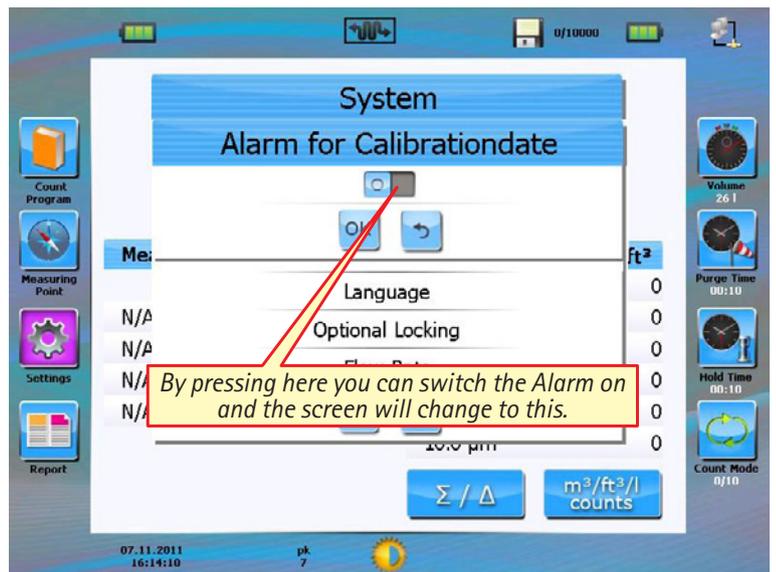


Now press OK to return to the system Menu screen.

Calibration alarm

You can also set an alarm to be displayed when the calibration is out of date.

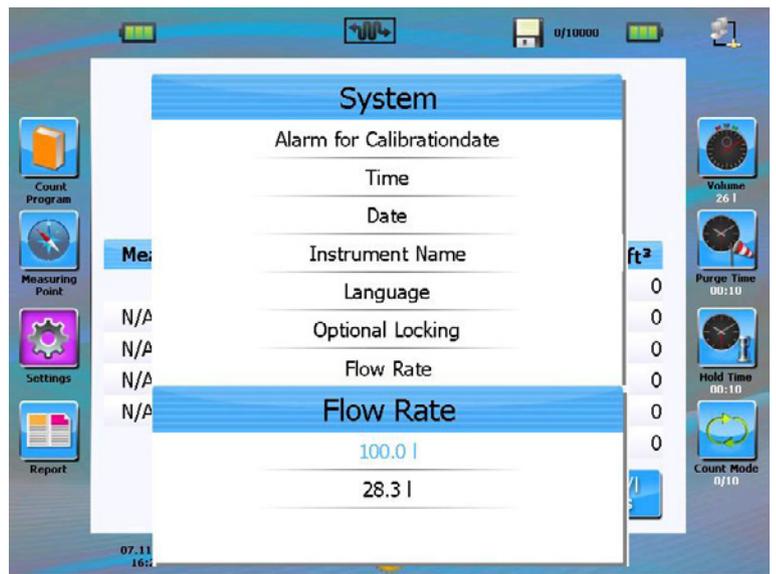
From the system menu screen select Alarm for Calibration date and this screen will appear.



Press OK to return to system menu screen.

Selecting flow rate (Dual flow only)

This is only available for dual flow rate APC SmartTouch instruments. You will get the following screen. You can select between a 1 ft³ and a 100 LPM flow rate.



Select the required flow rate and the instrument will return to the main screen.

Calibration sheet

The APC SmartTouch retains a full electronic copy of its current calibration sheet this can be accessed via the calibration sheet button on the settings menu.



LAN (Local Area Network) connections IP address

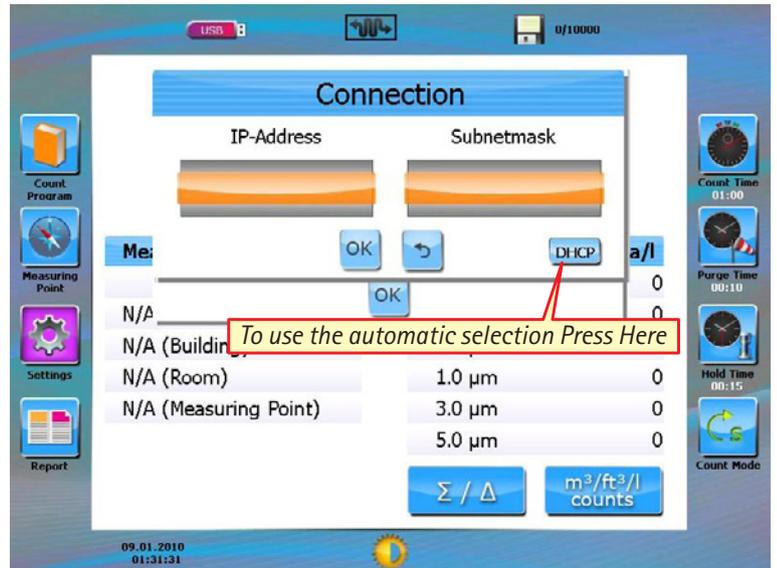
It is possible to connect the instrument to a LAN Network, this requires an Instrument IP address, to set this address follow the next screens.

NOTE:

We would recommend the use of the fully automatic feature built into this Instrument unless you are fully trained in setting this type of address.

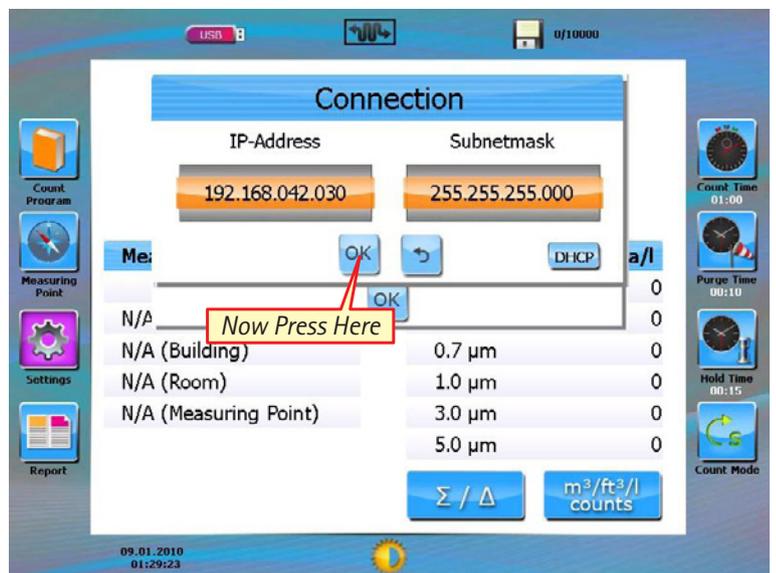
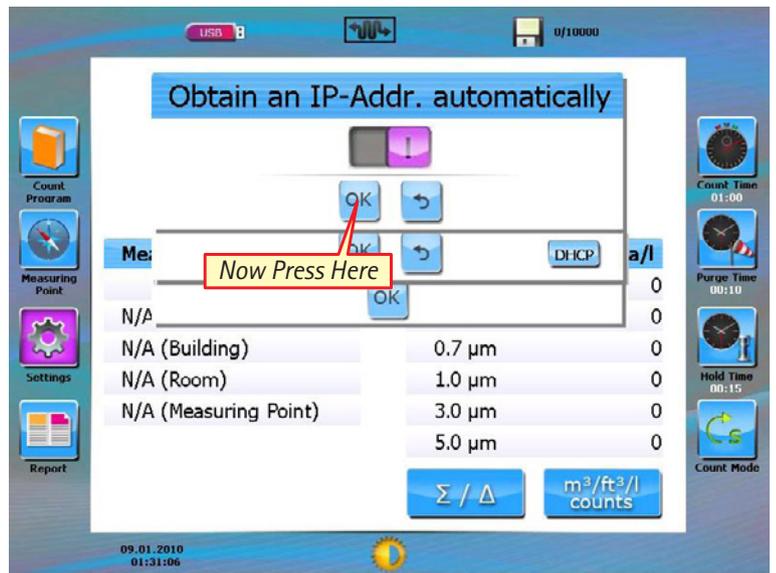
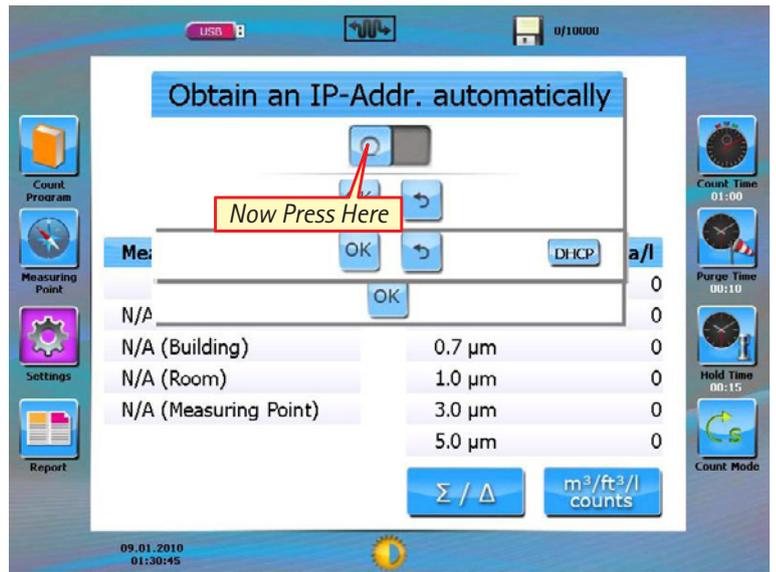
From the settings menu select Connection.

This screen will appear.



This will not work if you are not connected to a LAN-Network.

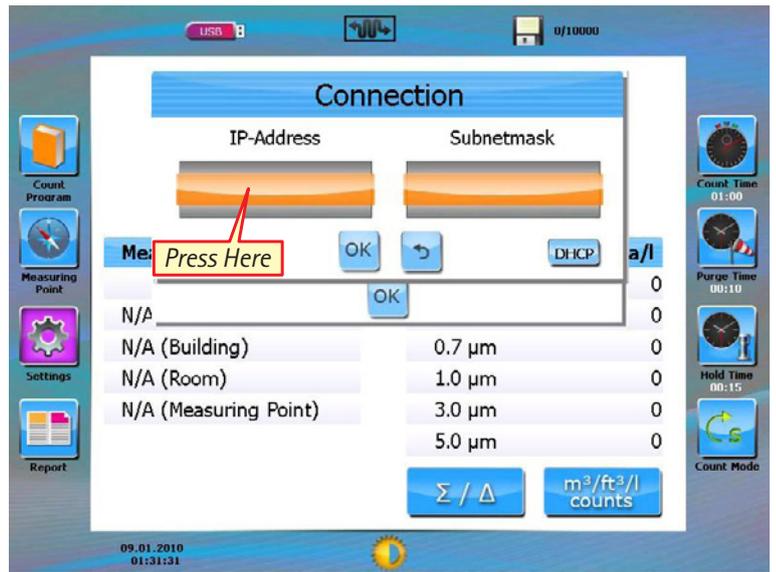
Automatic method



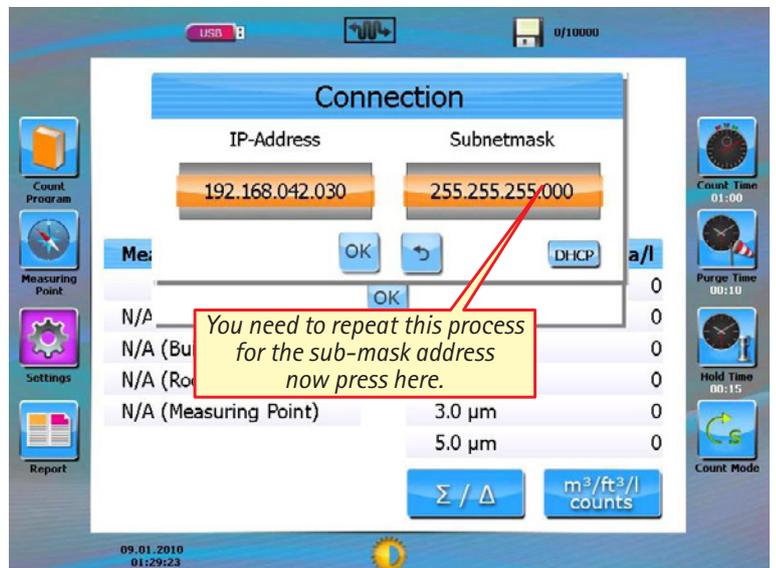
You are now connected to a LAN-Network

Manual method

If you are fully trained in how to set this type of address please follow these steps.

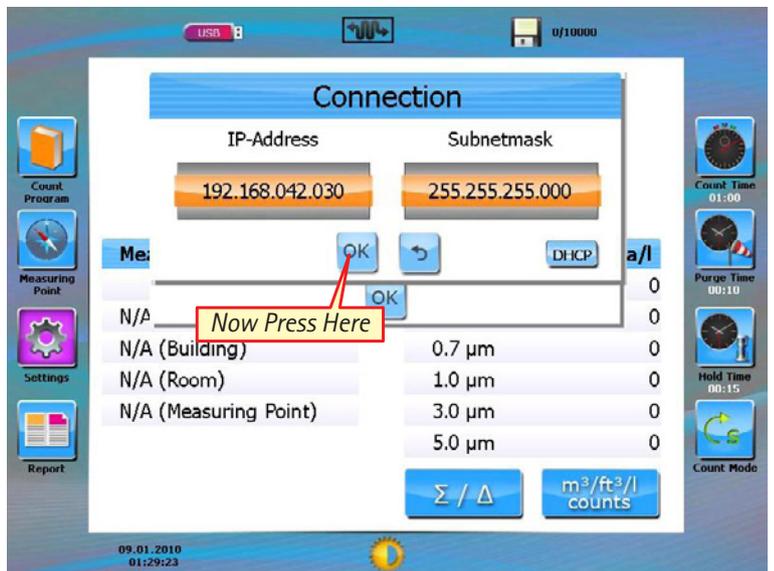


Type in the required IP Address. Then press OK.





Type in the required IP Address and then press OK.



You are now connected to a LAN-Network.

You now need to set the IP address on your computer

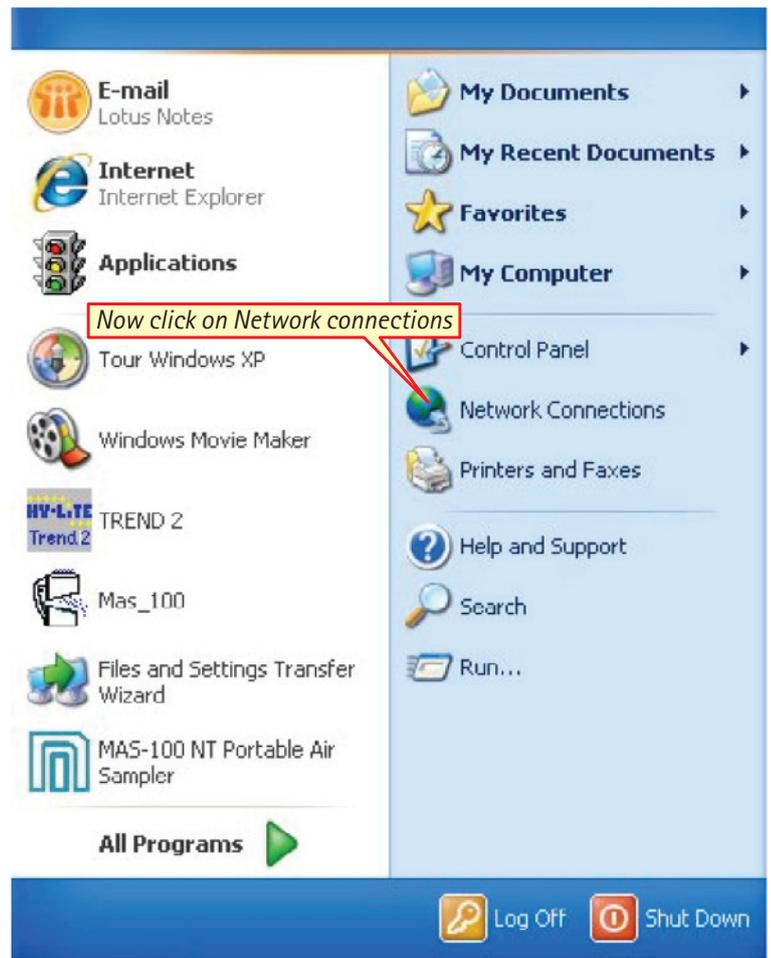
NOTE:

Switch off your wireless connection before you proceed with the following steps!

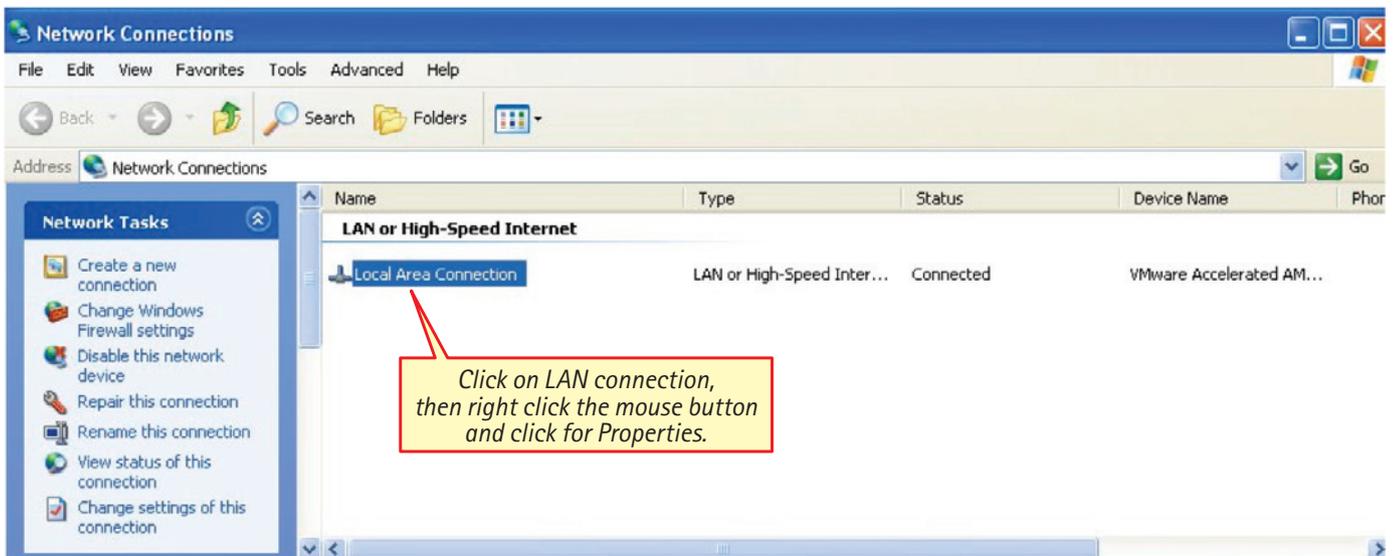
A direct link means that the APC SmartTouch will be connected directly with a network cable to a PC.

Click on the Start Icon  on your desktop

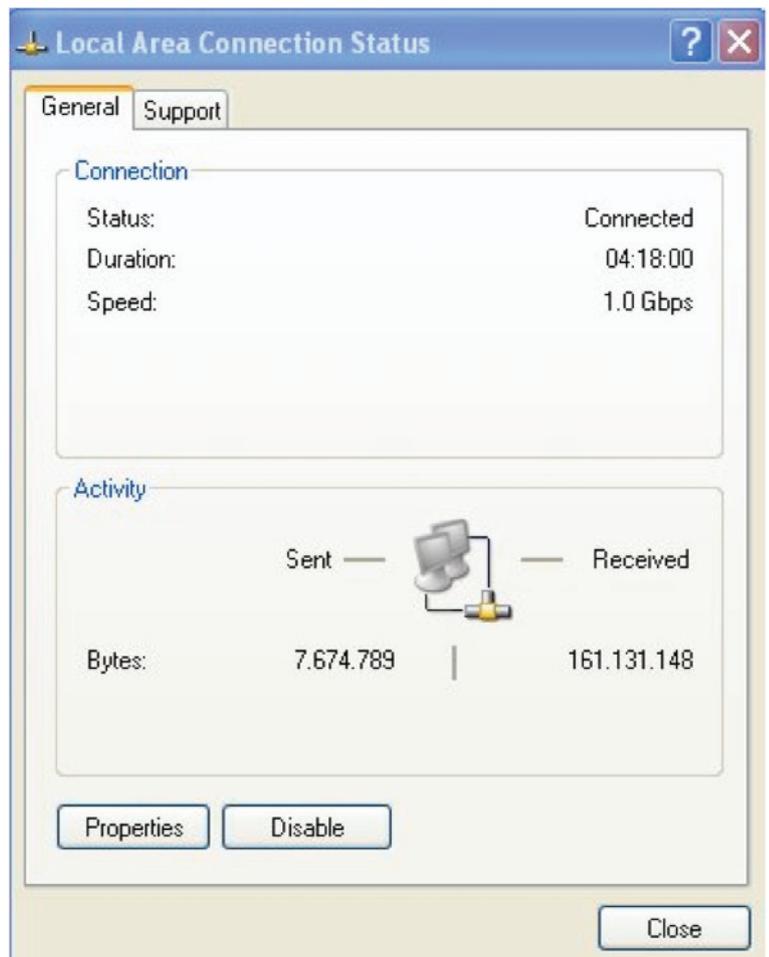
This Screen will appear



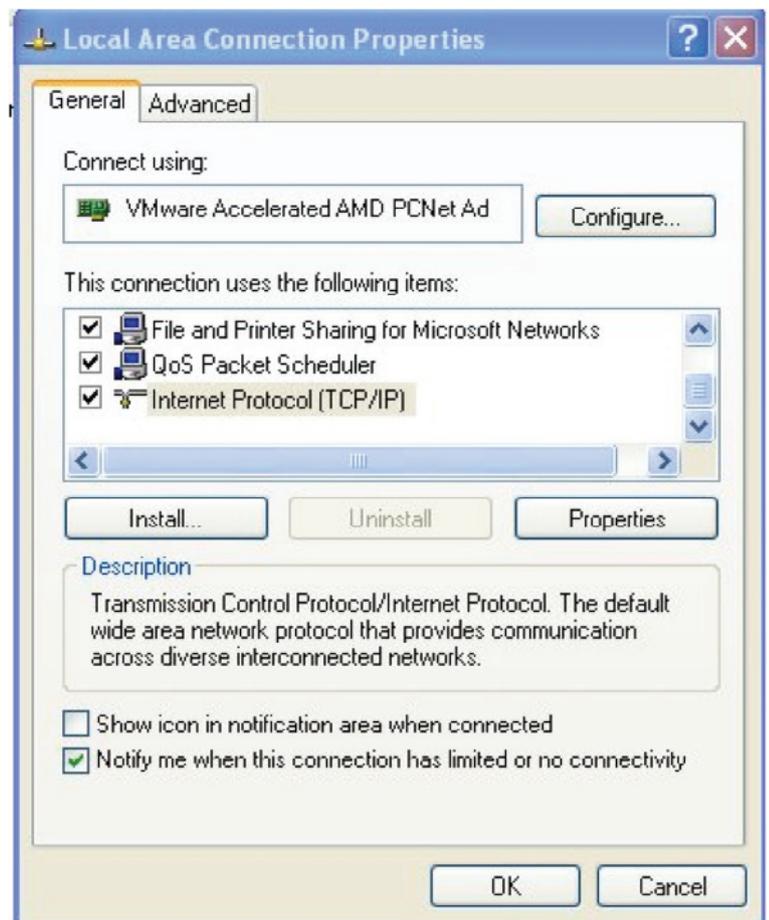
The window below appears:



This window will appear

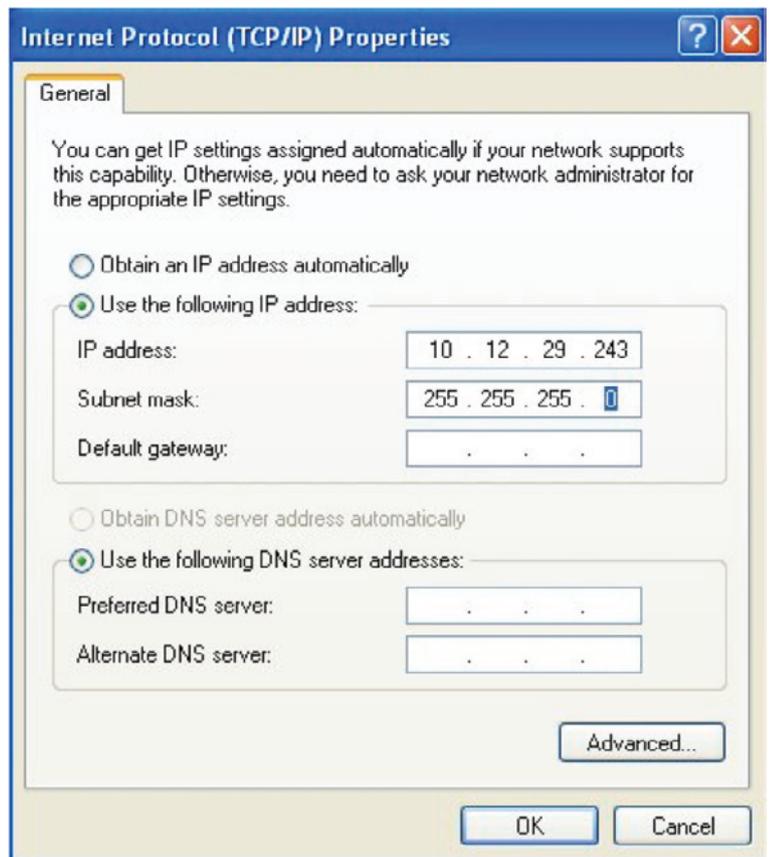


Click on features, the following screen appears:



Double click on Internet protocol (TCP/IP) the following screen appears:

This window will appear



Add the IP address and the Subnetmask shown above.

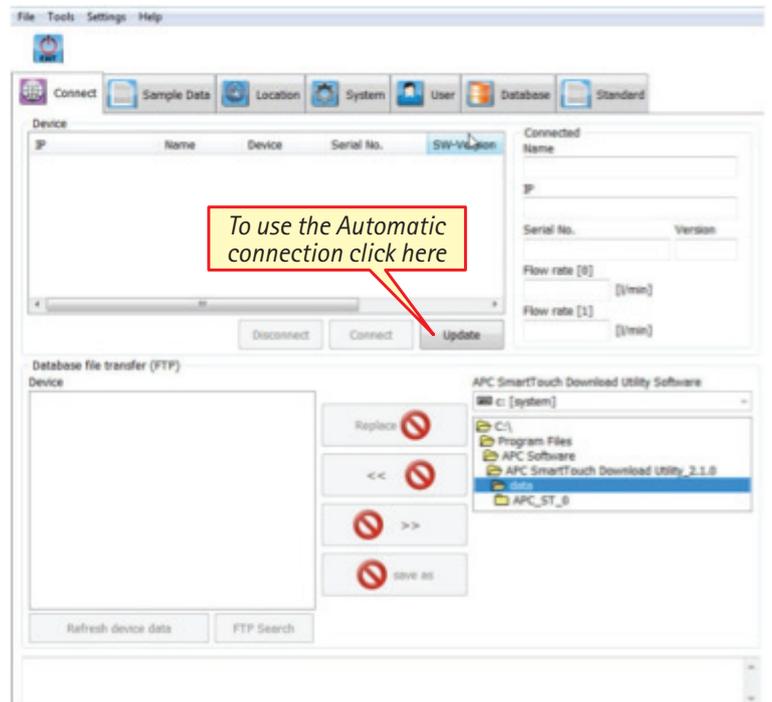
Press the OK button twice.

Now the IP and Subnet Mask address has been set to communicate with the APC Download Utility Software.

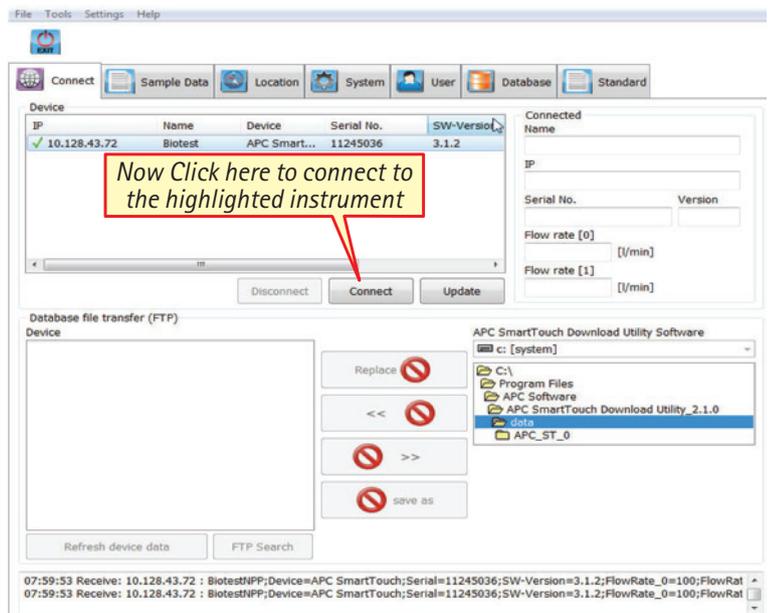
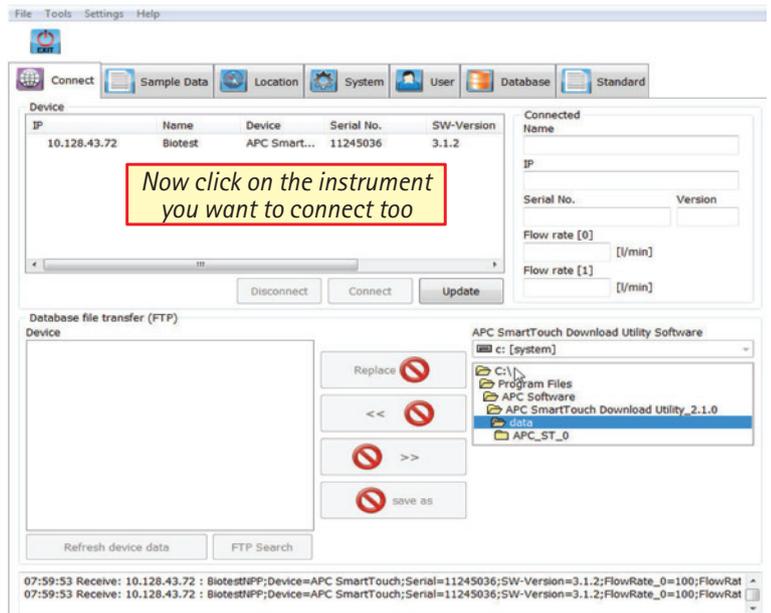
USB Connection

For direct connection between a single computer and the APC SmartTouch we recommend the use of a USB connection.

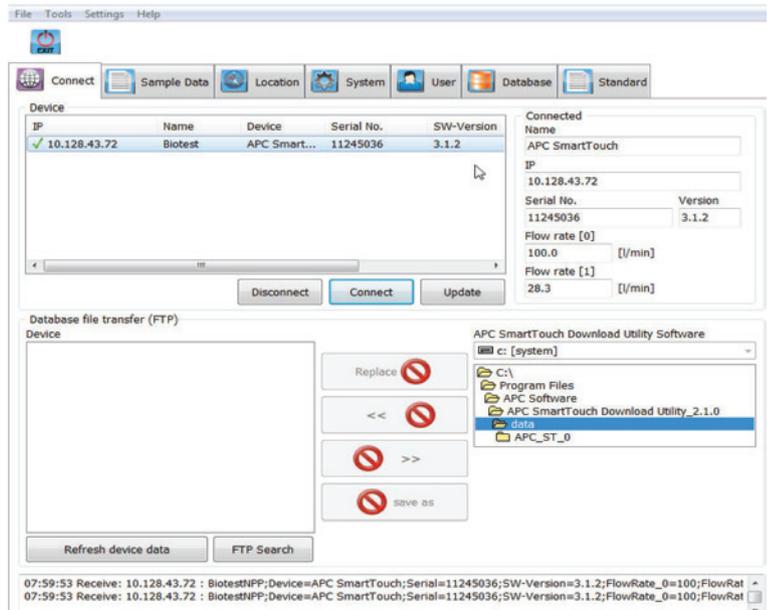
Plug the USB cable into the APC SmartTouch and into a USB port of the computer then start the APC Download Utility software pear.



The Connected Instrument will appear here (if you have more than one instrument connected to the network they will all appear in this box).



This is the same screen after connection.



You can now see all the connected instrument data. You can now use the software.

Installing And Using Zero Count Filter

Zero Count Filter



It is important to the correct operation of the Zero Count Filter that the tube is kept as short as possible and never over 100 mm. Only the correct tube should be used.

If a different filter is used to the one supplied with the instrument a incorrect flow rate may be seen, the instrument may also not get a zero count.

Installation steps

Remove instrument protective cap

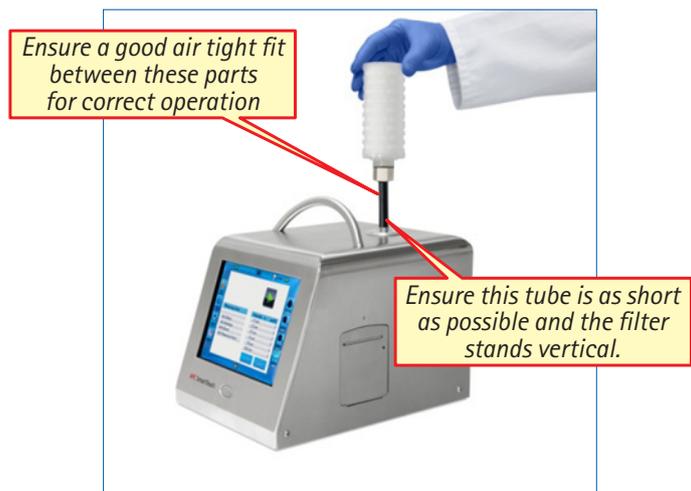
First you must remove the protective cover from the instrument.



Remove protective cover from Zero Count Filter



Fitting Zero Count Filter to instrument



After the Zero Count Filter has been installed it is very important to clean (purge) the system before reading the values to qualify the system.

Purge System

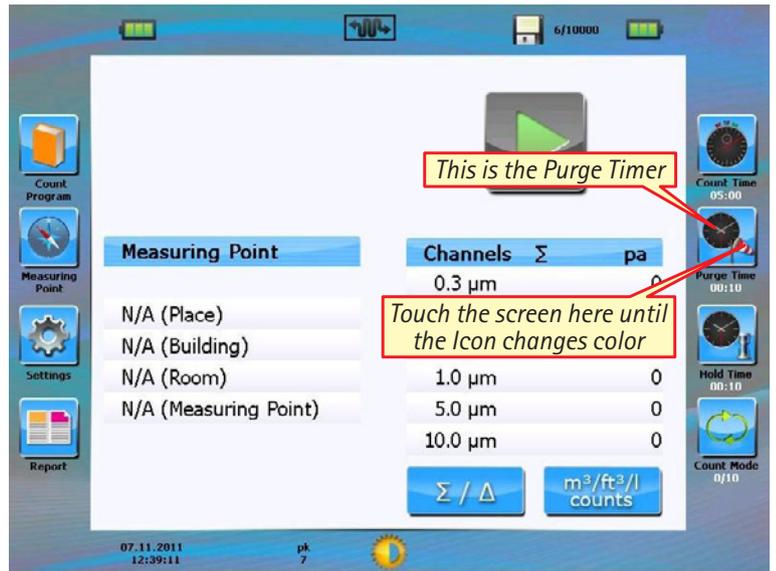
Press "Purge Time" to define the initial wait time and the purge time.

"Initial wait time" means the time delay before the pump starts working. For example, you can use this time to leave a clean room and let the laminar air flow re-establish itself before starting the sampling.

"Purge Time" is the time when the pump is already working, but the counting has not started yet. The pump needs a time of about 10 seconds to reach a stable operating condition. Therefore, the purge time should not be set below 10 seconds.

Setting Purge Timer

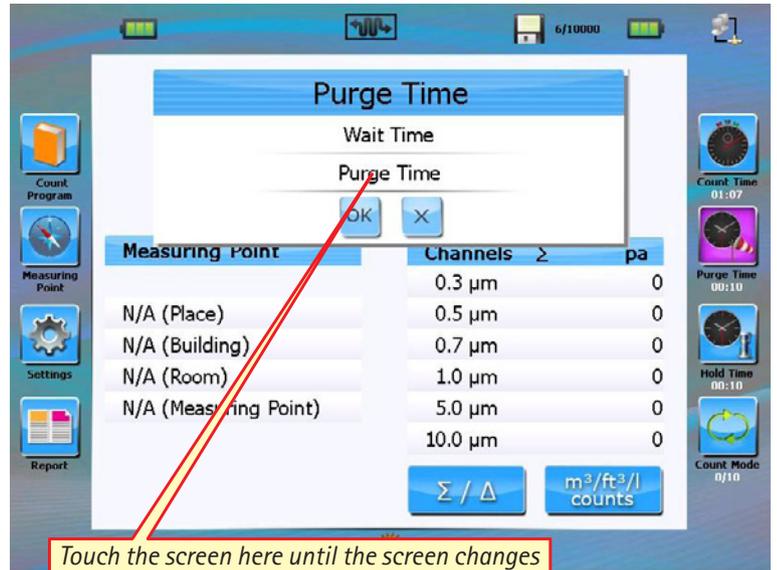
To purge the system first select the Purge Timer from the main screen.



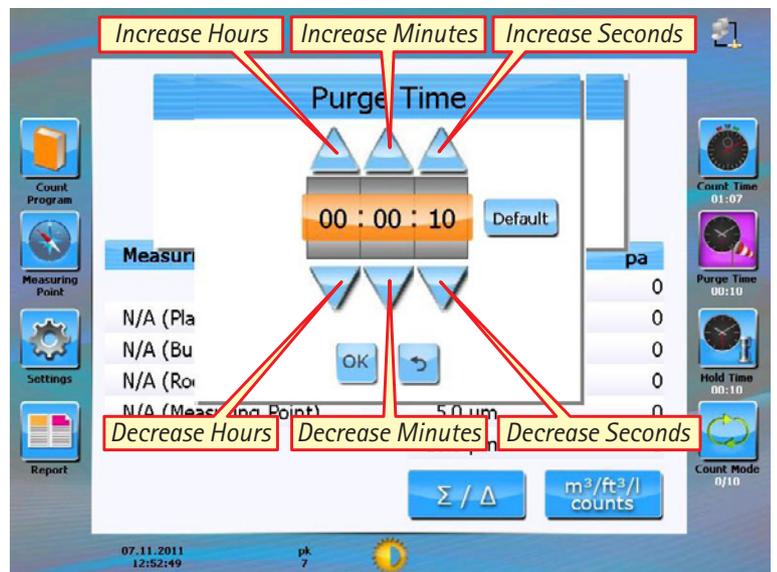
The screen will look like this briefly



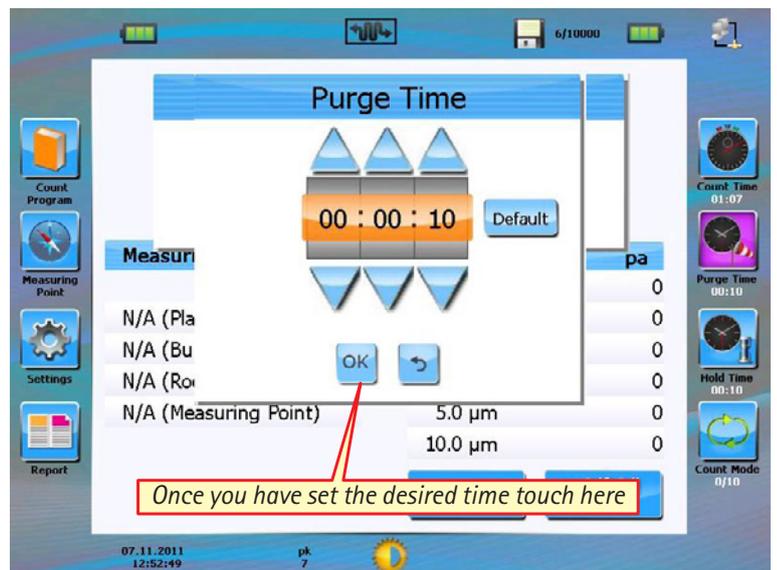
This screen will now appear.



This screen will now appear.



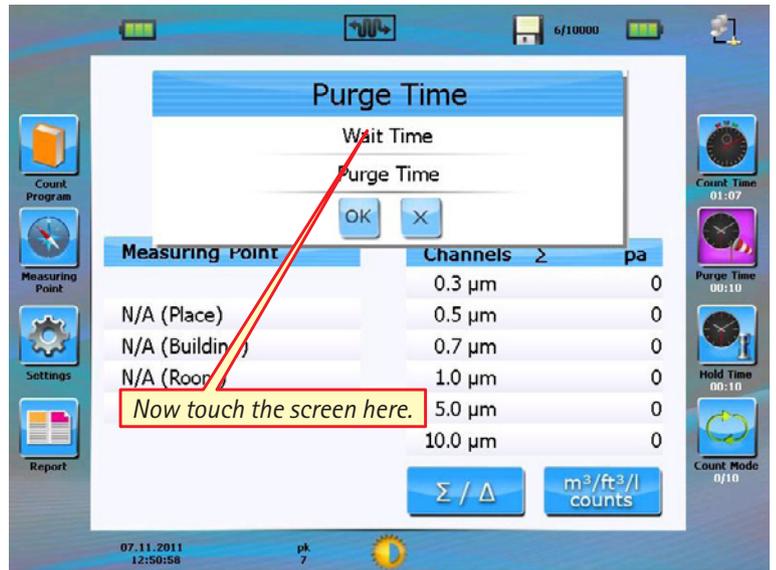
To set the desired time touch the up or down points intern until the desired time is set.



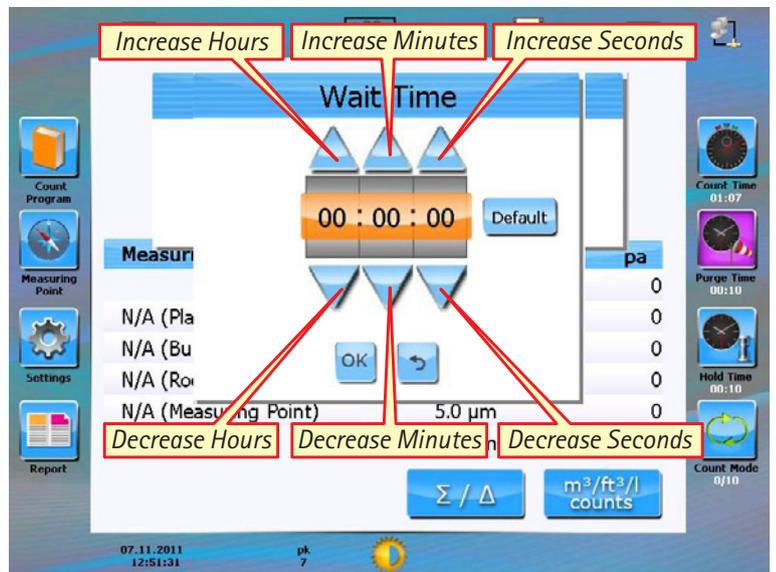
This screen will reappear

Setting Purge Wait Timer

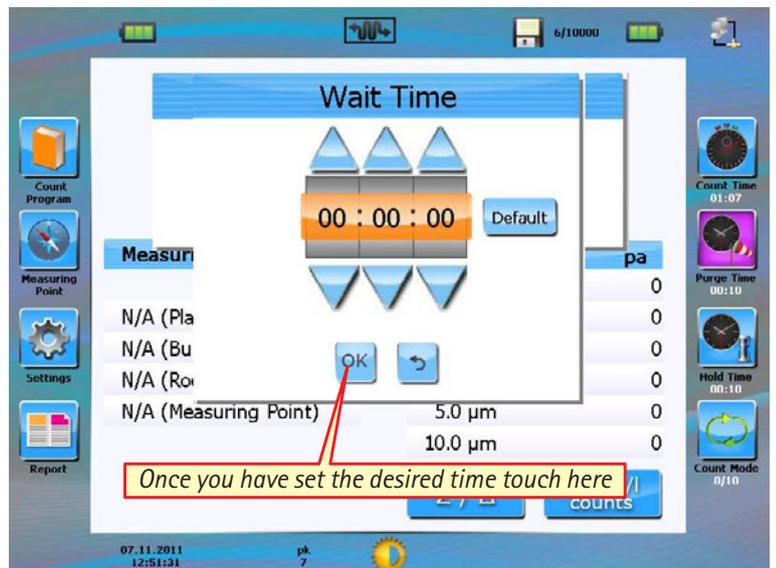
The hold time defines how long the sampling stops between samples. This value is only relevant if "Count Cycle Mode" or "Auto Mode" is activated.



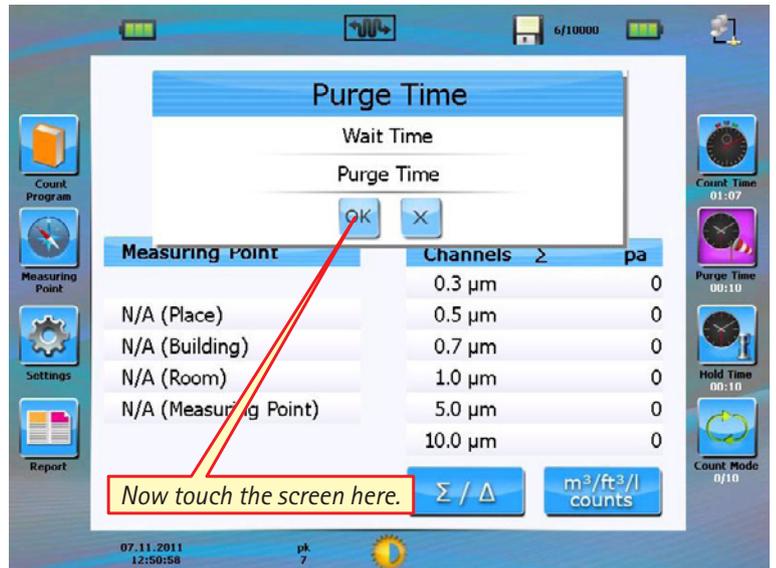
This screen will now appear.



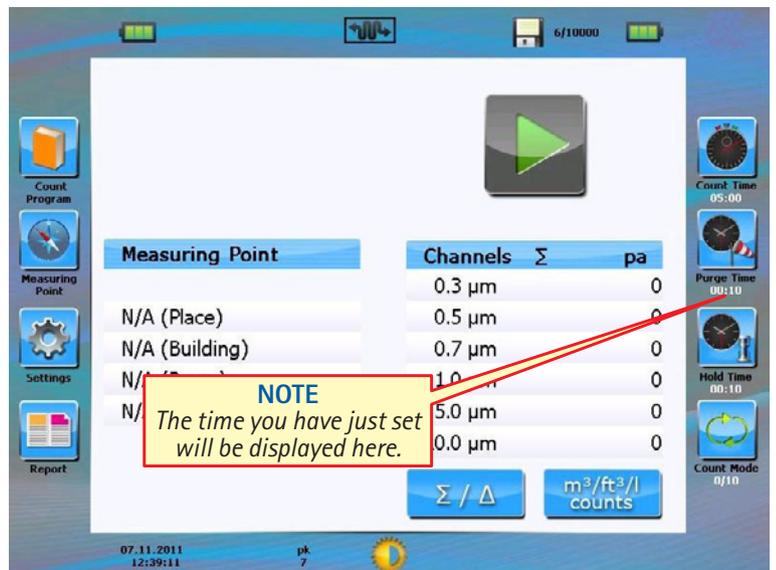
To set the desired time touch the up or down points intermittently until the desired time is set.



This screen will reappear.

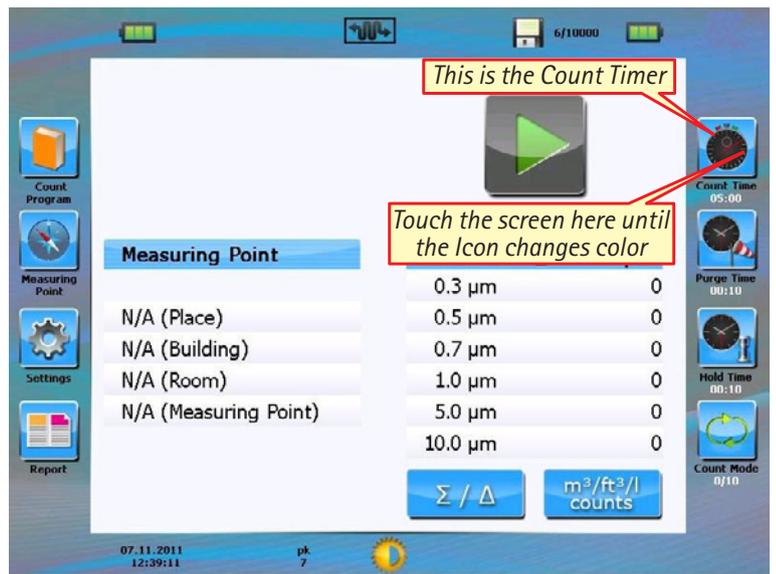


This screen will reappear.



You have now successfully set the purge timer.
Next you need to set the count timer.

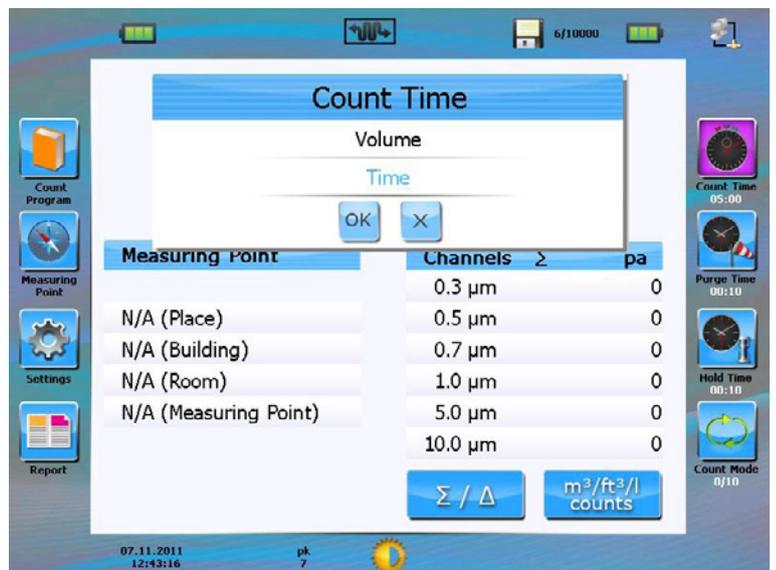
Setting Count Timer



The screen will look like this briefly.

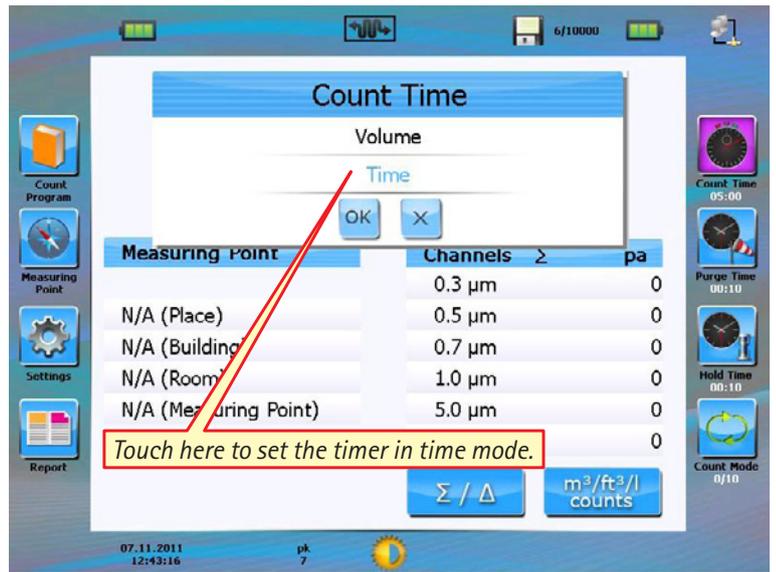


This screen will now appear.

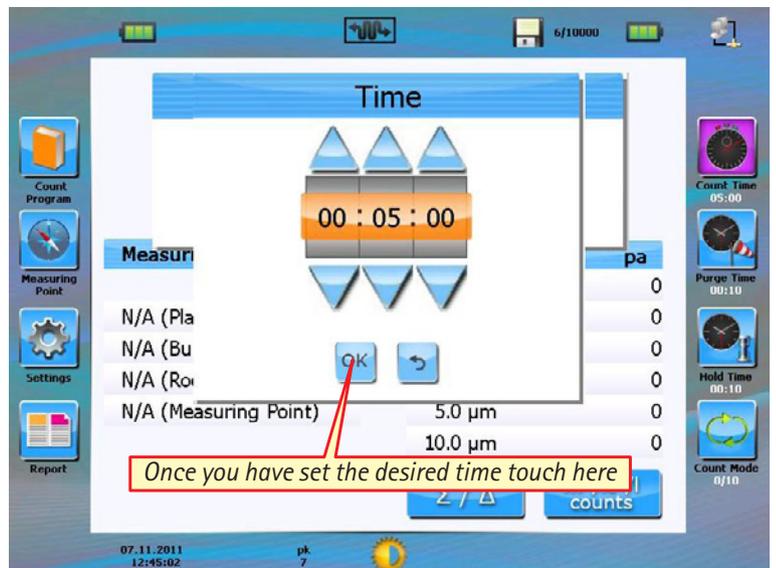
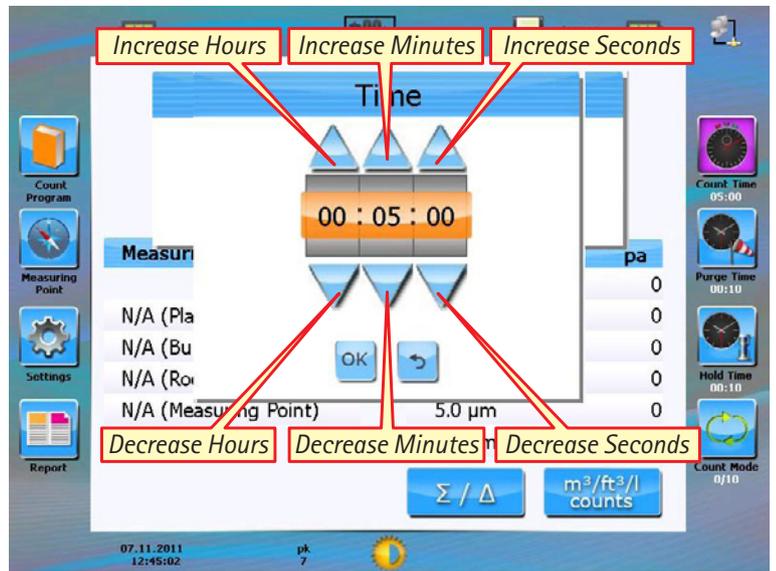


You can either select "Time" or "Volume".

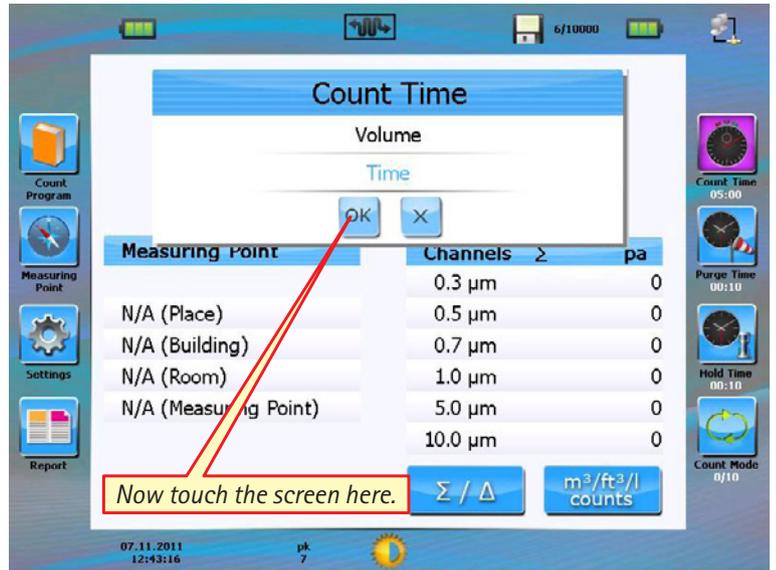
Setting Timer



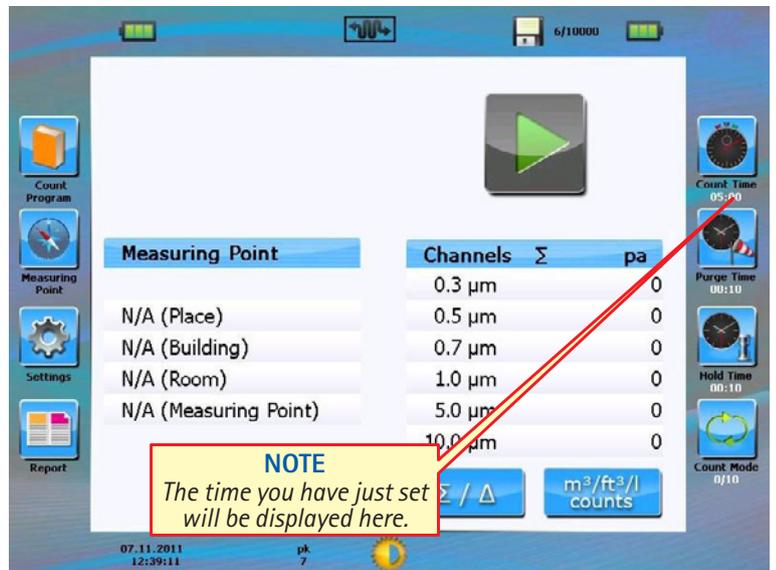
This screen will appear.



This screen will reappear.

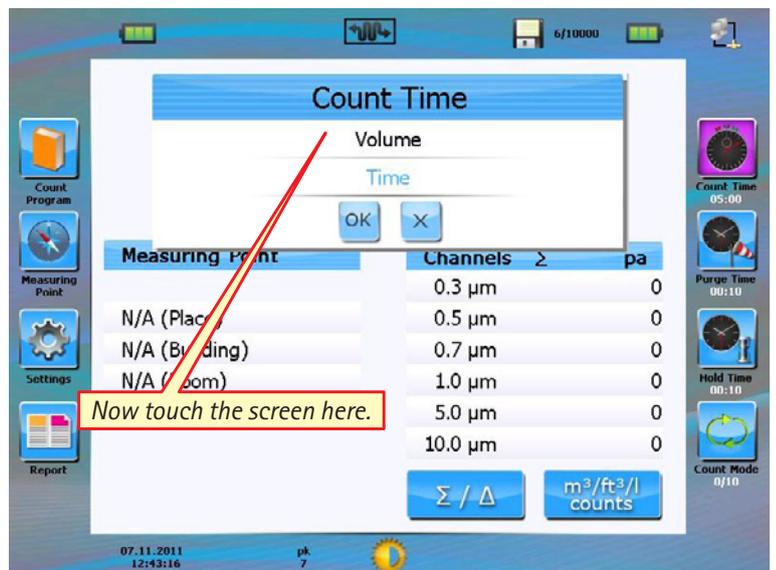


This screen will reappear.

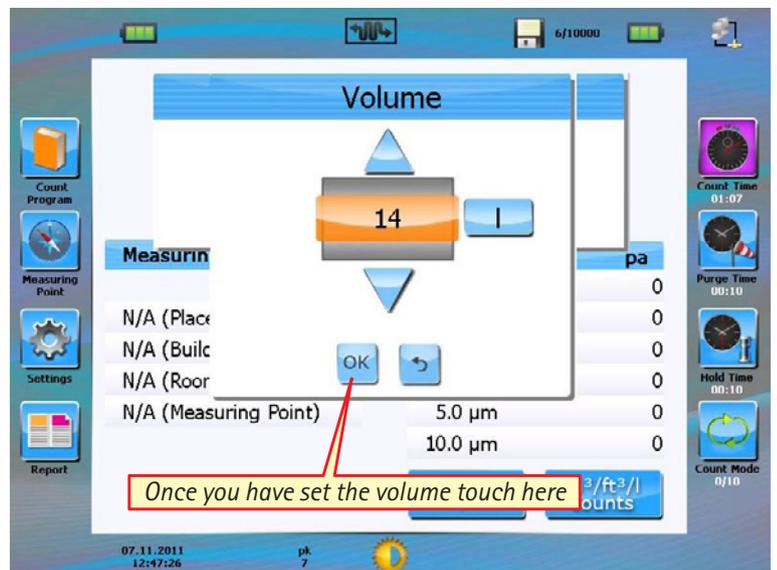
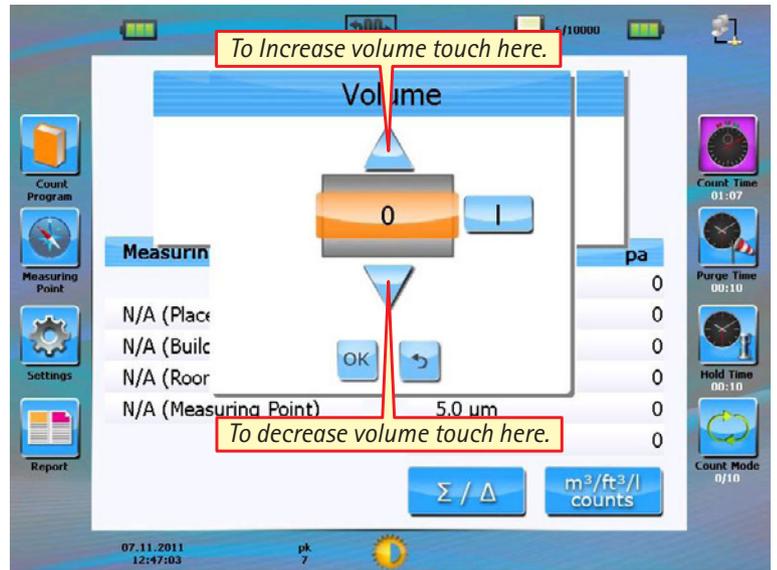


NOTE

If you want to use the Volume function follow the next steps instead of setting the count timer, if you do not want to use the volume function go to next section Starting Purge Cycle.

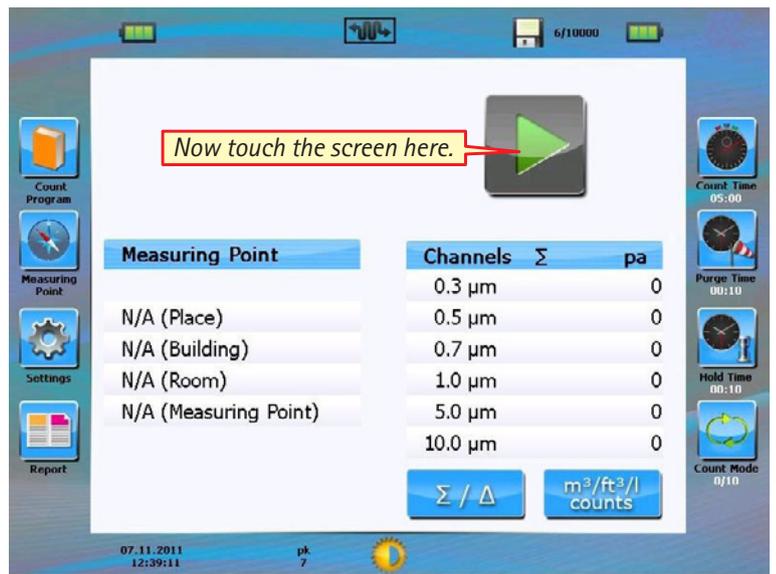


This screen will appear.

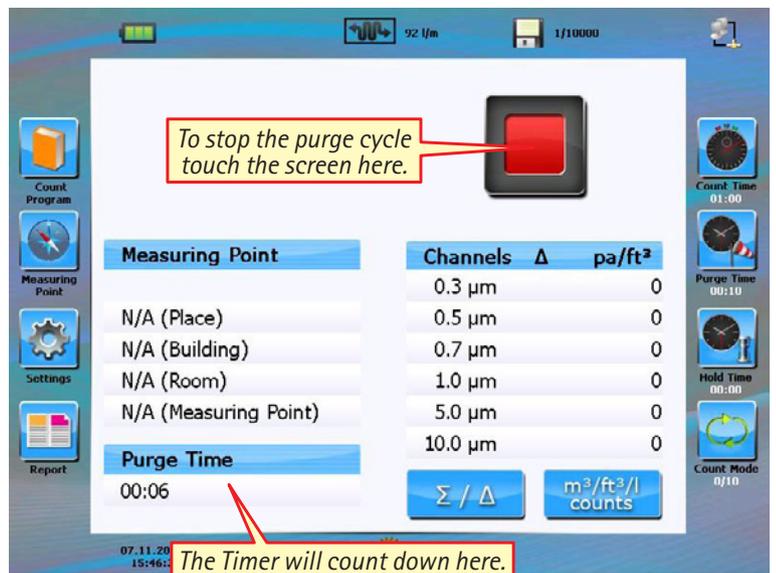


You have now successfully set the count timer or the volume next.

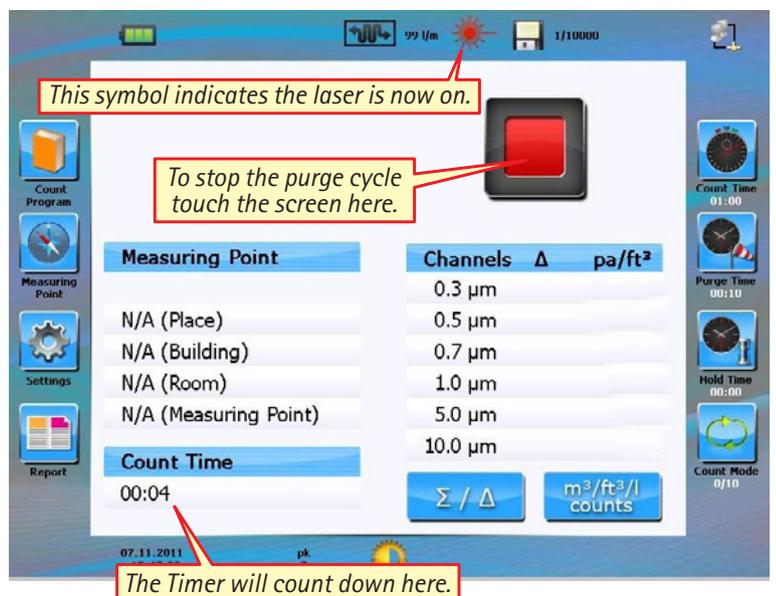
Starting Purge Cycle



This screen will now appear and the motor will start (the laser is not active).



After the purge time you set has elapsed the count timer will automatically switch on and this screen will appear.



After the purge cycle has completed This screen will appear and all channels should read "0".

NOTE

If this is not the case please repeat twice, if the counts are still not zero please contact the Merck organisation.



Removal of Zero Count Filter

Pull Zero Count Filter off instrument and replace the protective cap.



If you are not going to start using the instrument immediately please replace the protective cover.



Normal Purge Cycle Operation

It is advised that during normal operations the instrument should be purged at least once per day.

The normal times should be set as follows using the method described above.

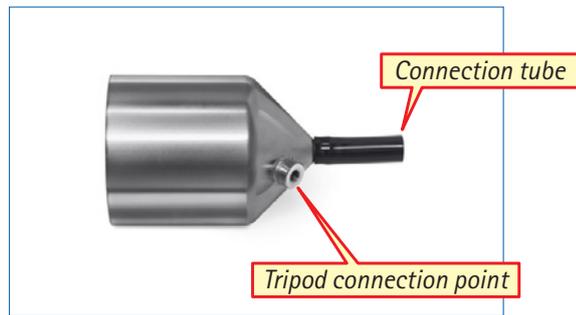
- Set the purge time to two 2 minutes and the count time to five 5 minutes
- Press the start button . After a two 2 minutes purge, the five 5 minute sampling is started. There should be no more than one (1) particle counted at any size in five 5 minutes.

NOTE:

If the instrument does not go to zero (one (1) particle in 5 minutes is considered zero), run a extended purge cycle as described above if the instrument still not give a zero count please contact Merck.

Installing and Using the Isokinetic Probe

100 Litre isokinetic probe



NOTE

It is important to remember only the tube supplied should be used with this instrument.

If a tube length of over 1 meter is required we would advise the instrument is recalibrated with the required length of tube. Failure to do this may result in a low flow reading.

Installation steps

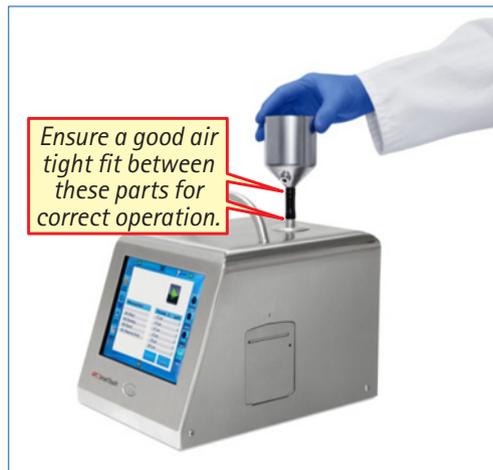
Remove instrument protective cap.



Pull off to remove and retain for future use



Now fit the correct isokinetic probe by pushing down.



You are now ready to take your first sample.

NOTE

There is a pre-programmed sample cycle that can be used at this point, to use it follow the following instructions.

If you wish to program your own recipe (sample program) go to basic controls.

Pre-programmed sample

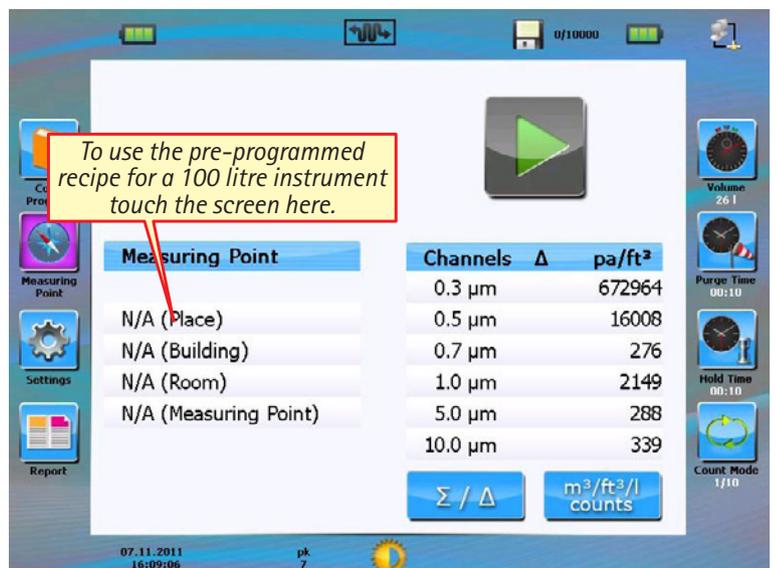
From the main screen.



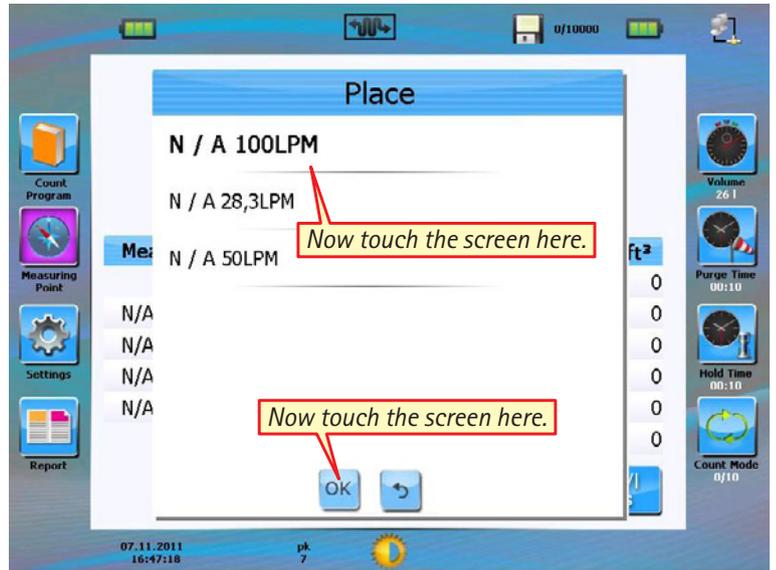
This screen will briefly appear.



Now this screen will appear.



This screen will appear.

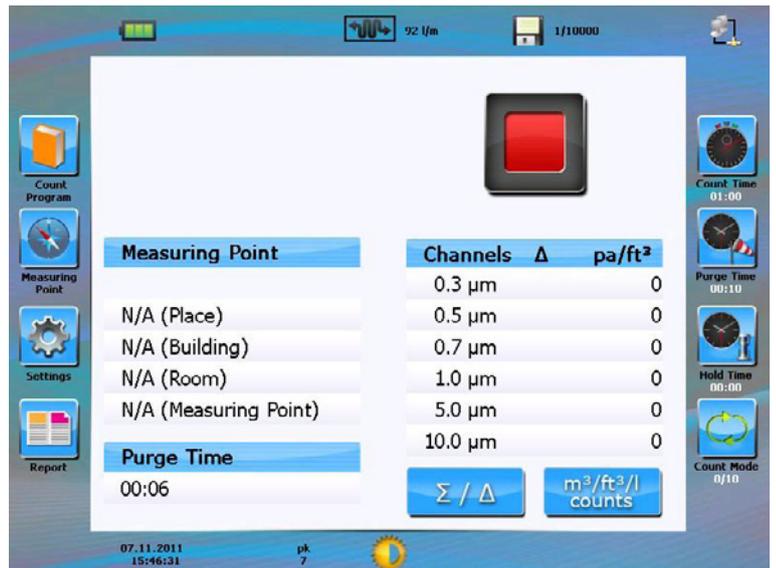


This screen will appear.

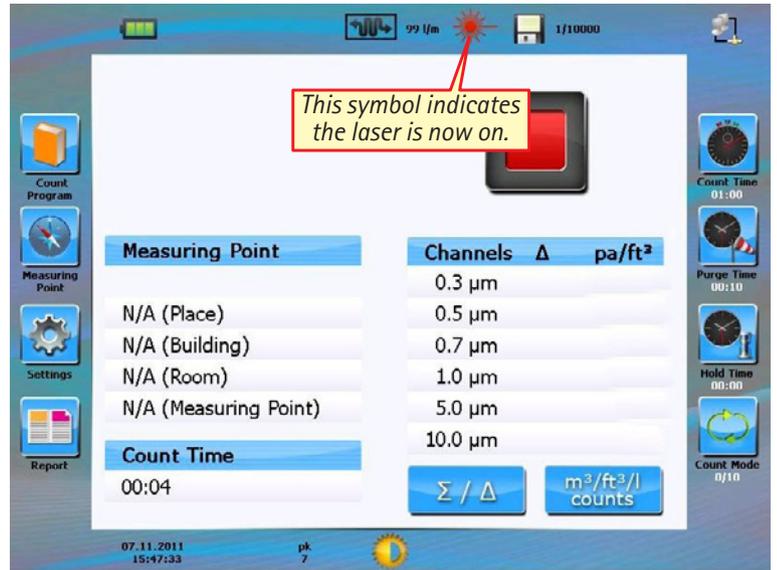


The pre-programmed sample will now start.

This screen will appear and the motor will start.



After the short purge time the screen will change to this.

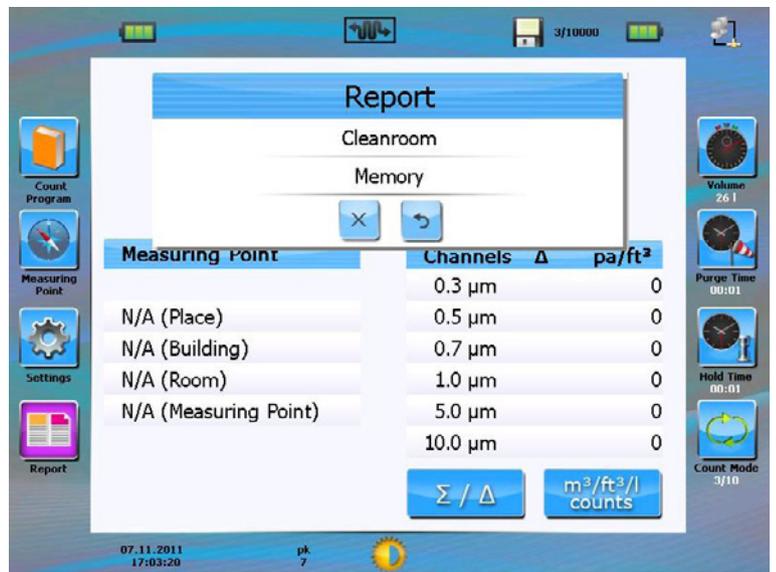
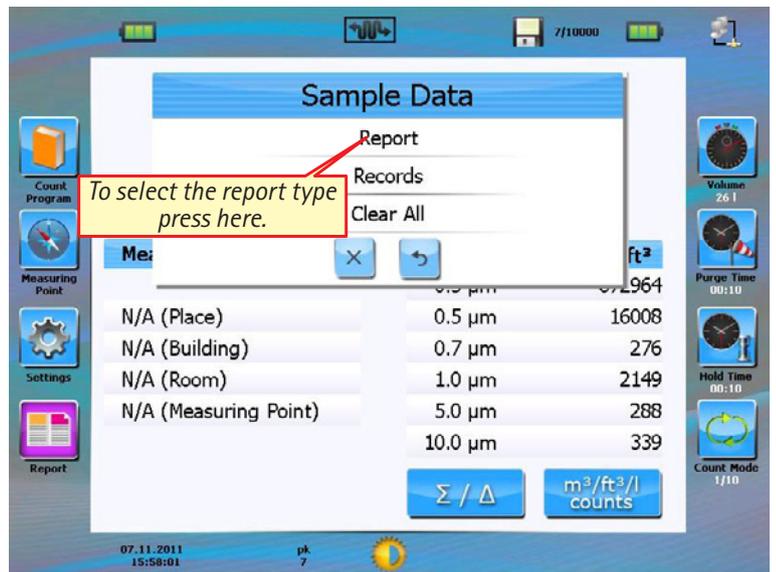
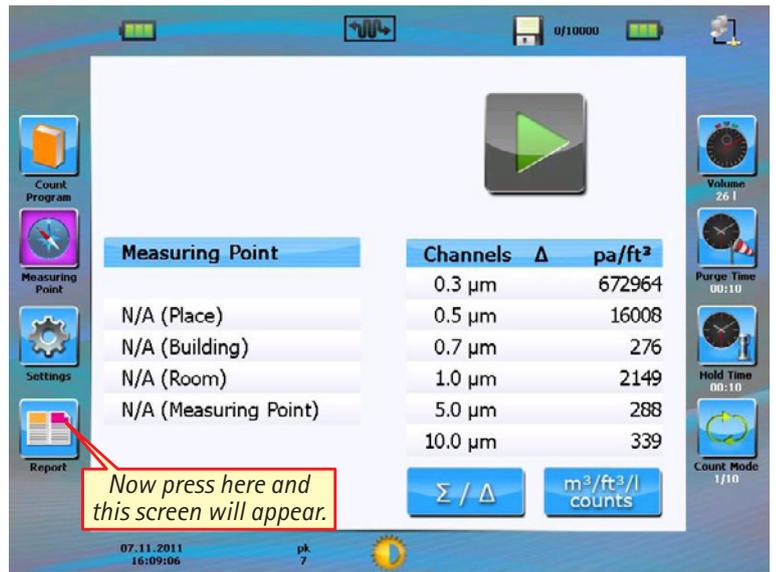


You can now see counts on each of the channels

After the pre-programmed time the laser symbol will disappear and the instrument motor will switch off. This is the result per channel. This information can be displayed in various ways.



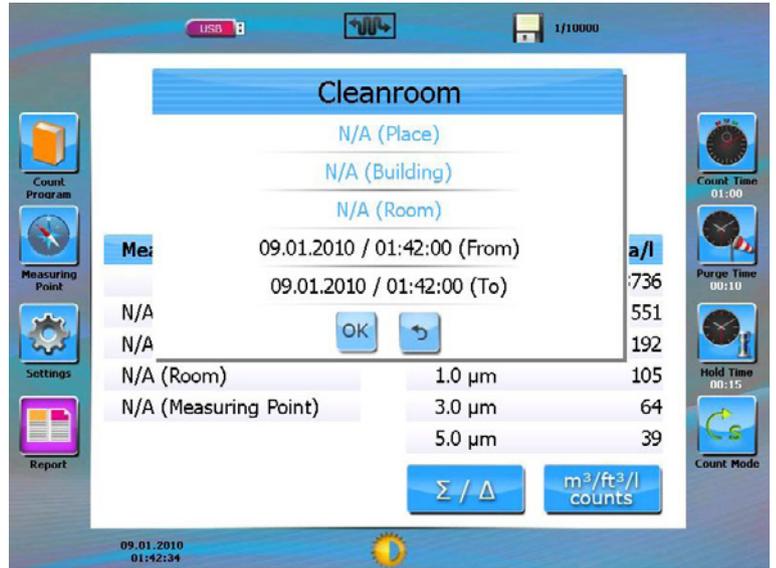
Result reports



Now select either "Cleanroom" (data stored for named Cleanrooms) or "Memory".

We will now presume you have selected cleanroom.

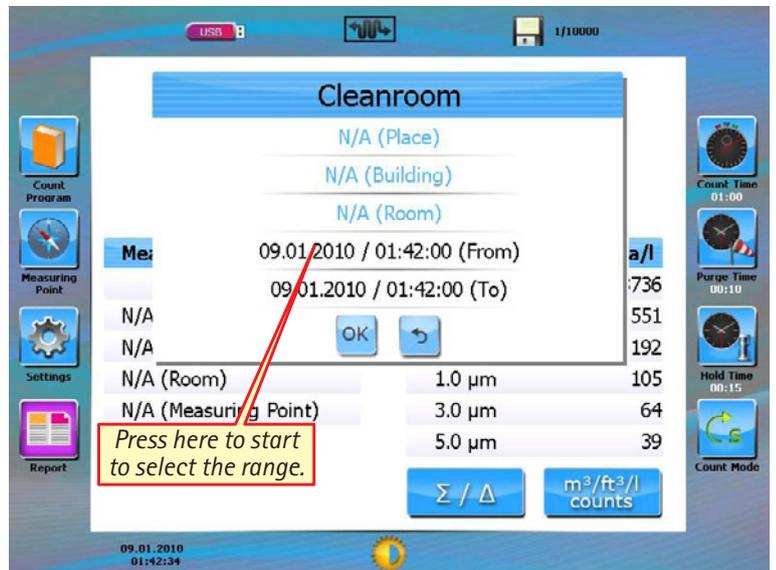
This screen will appear.



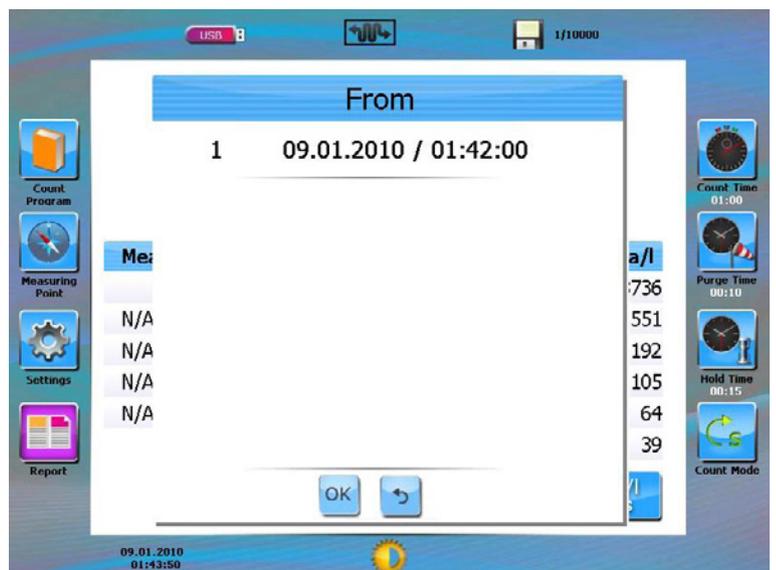
On this screen you can either select a range of results based on date and time or by a place, building, or room.

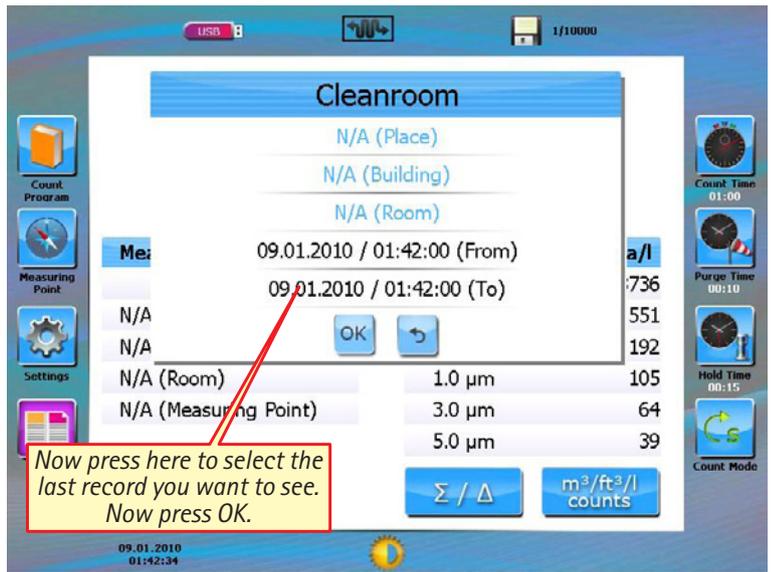
We will assume you select by date and time first.

Report Range Selection



Select the date and time from the list you want to see. Now press OK.





Report Type Selection Range

You can now select the type of report you need for your records.

Each report is configured to meet the requirements of the regulations.



The following screens show examples of each type.

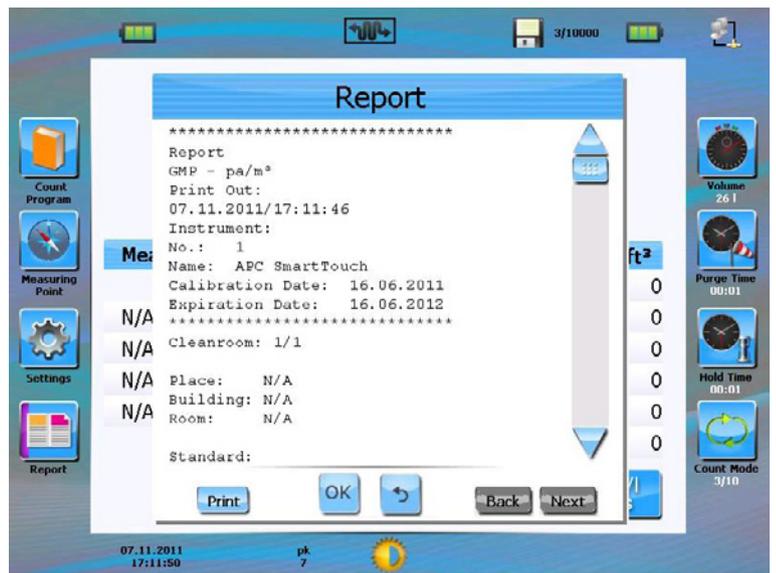
FS 209 (range)



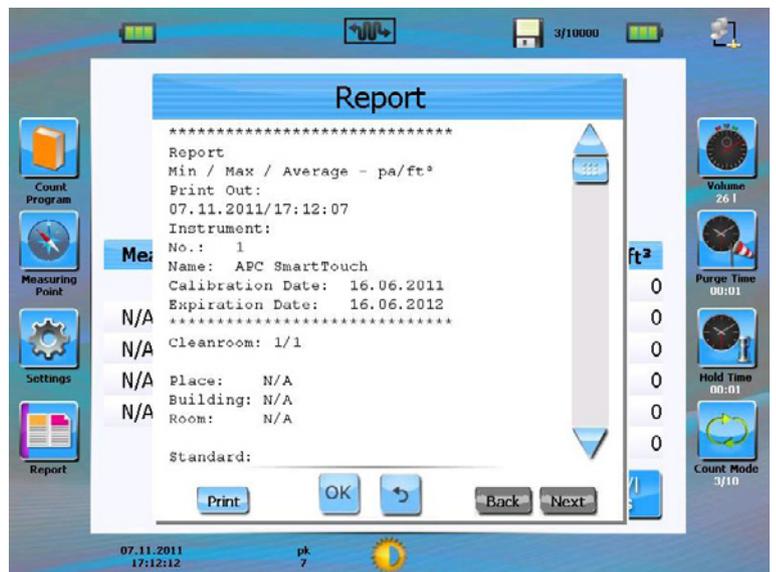
ISO 14644 (range)



GMP (range)



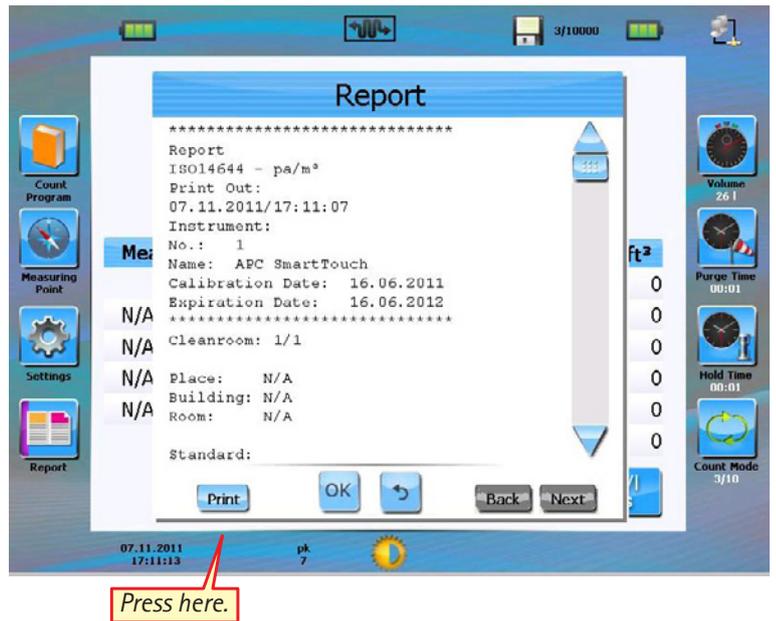
Average/Min/Max (range)



Printing reports

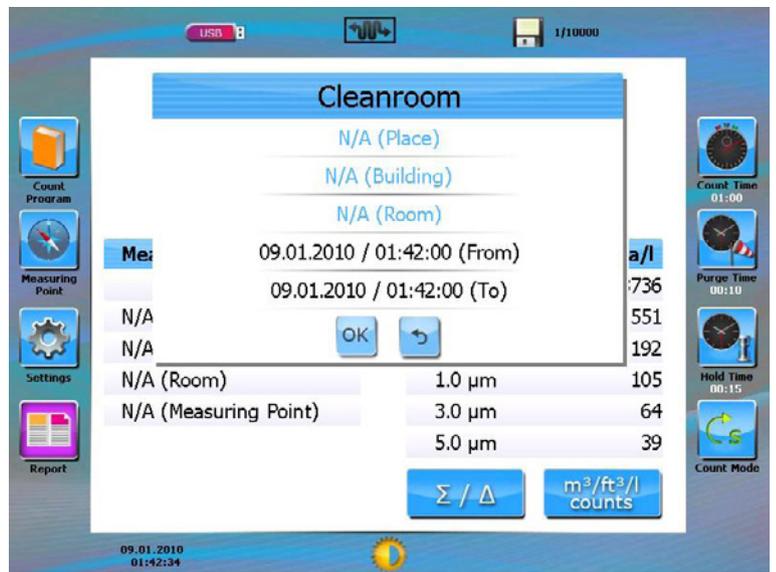
This is the same for all the report types.

The built in printer will now start and the selected report will be printed.

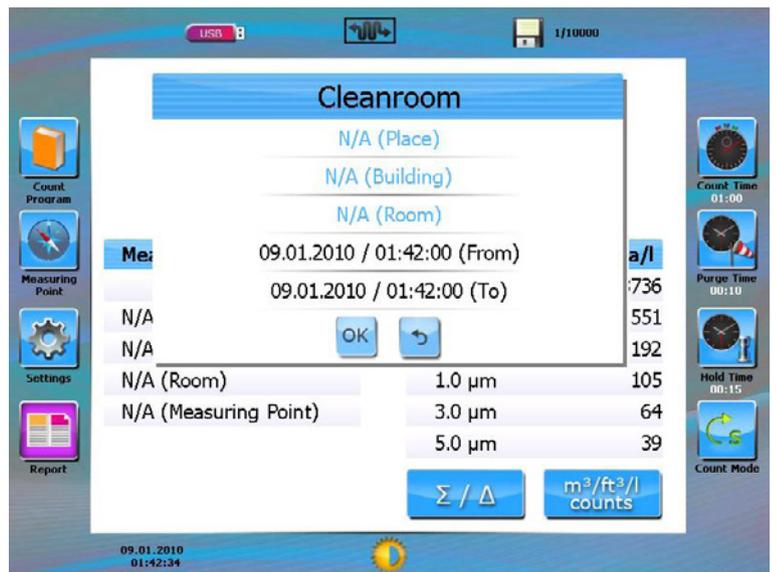


Report place, building or room

Now Press one of the 3 selection types (you must start with Place).



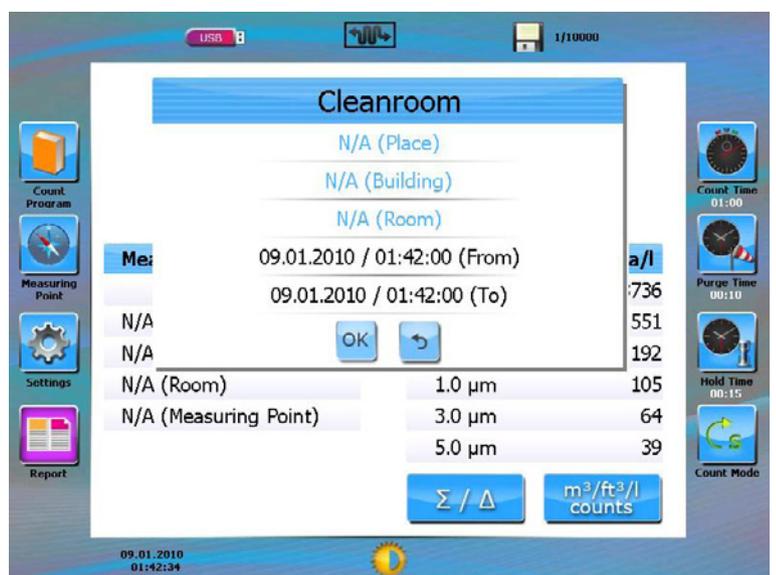
Select the place you require from the list and then press OK.



You must now select the building.



Select the building you require then press OK (you must select building before room).



Now select the room you want from the list.



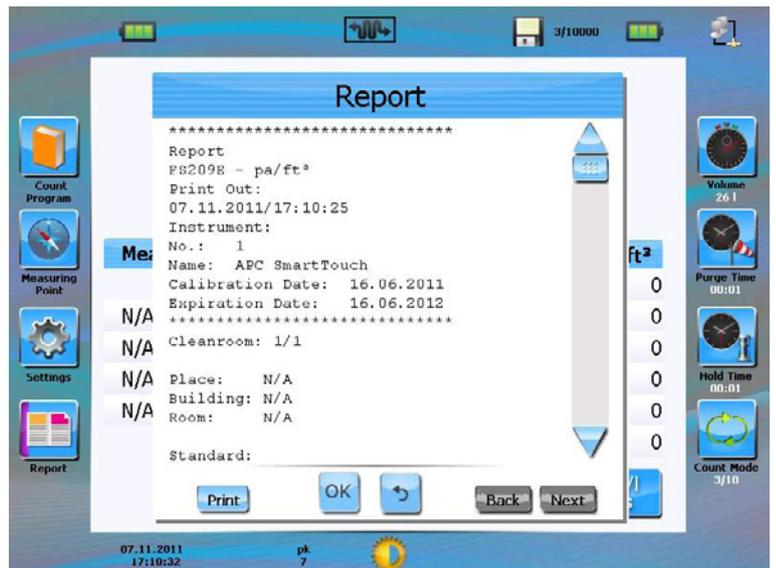
Now press OK.

Report type selection locations



You can now select the type of report you need for your records. Each report is configured to meet the requirements of the regulations. The following screens show examples of each type.

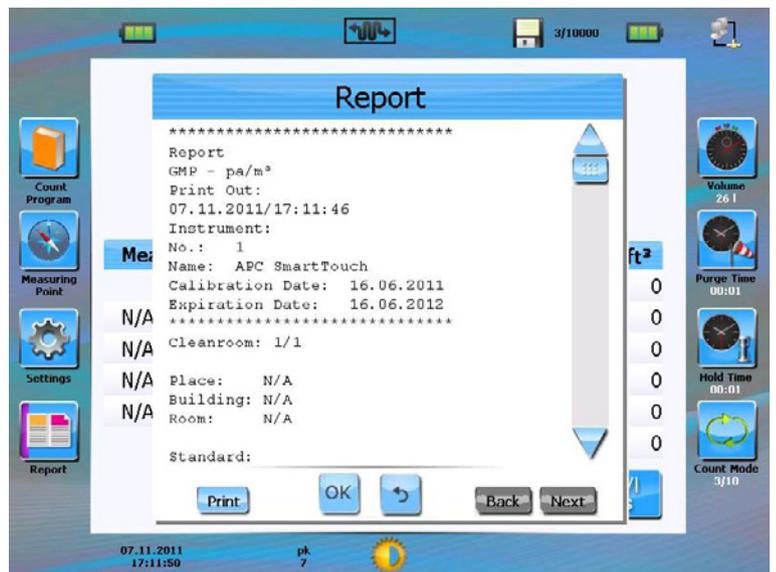
FS 209 (Location)



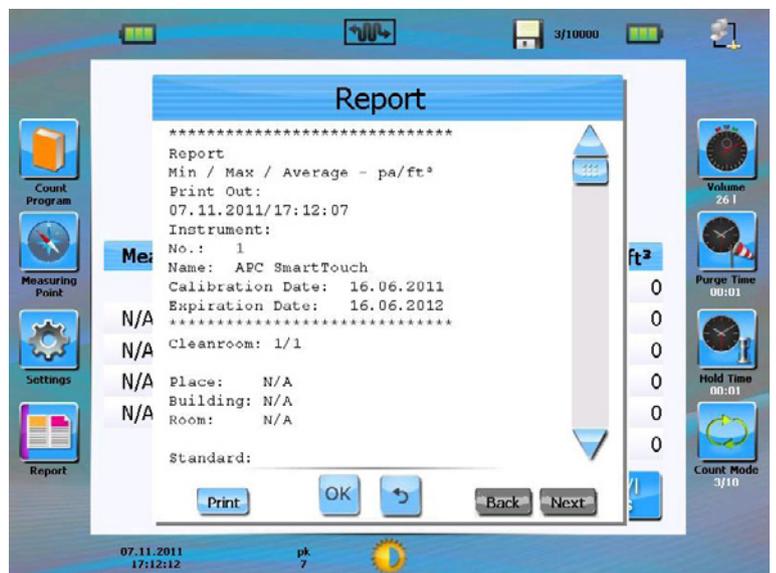
ISO 14644 (Location)



GMP (Location)

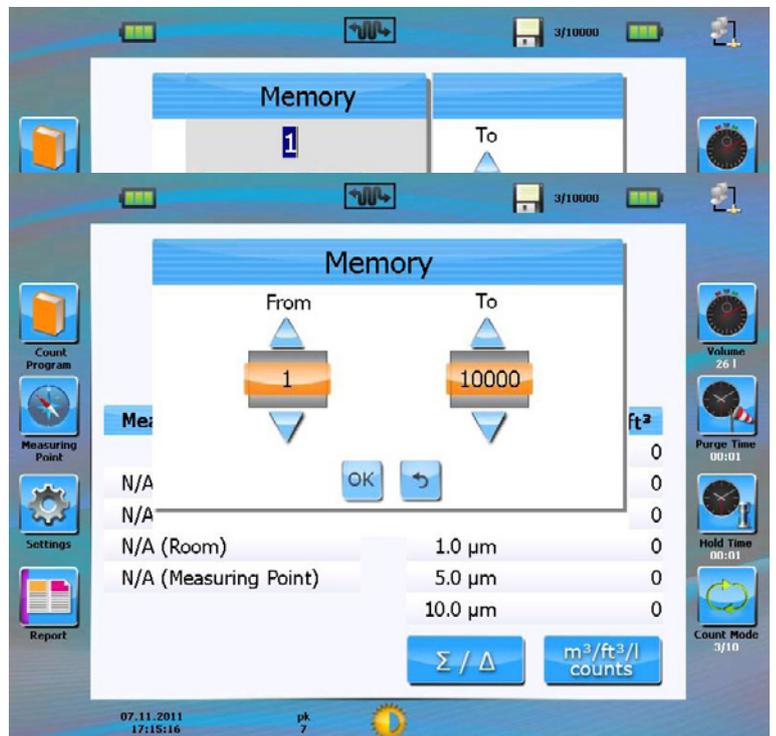
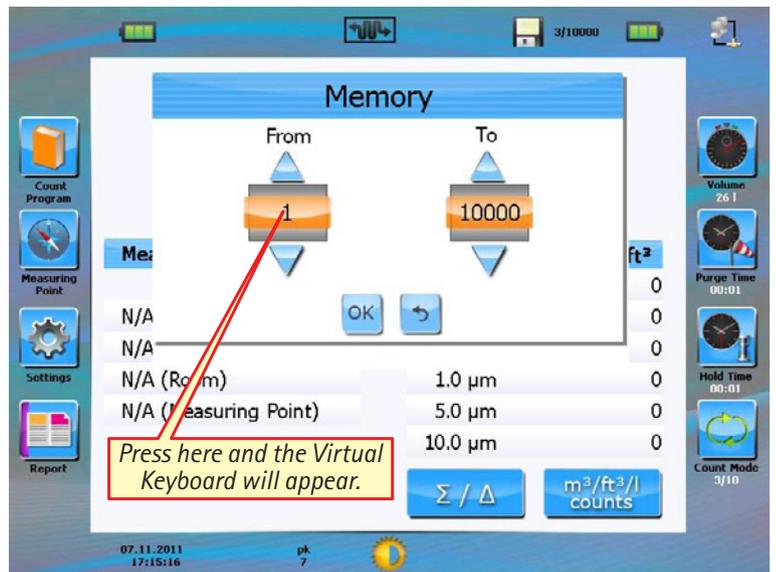
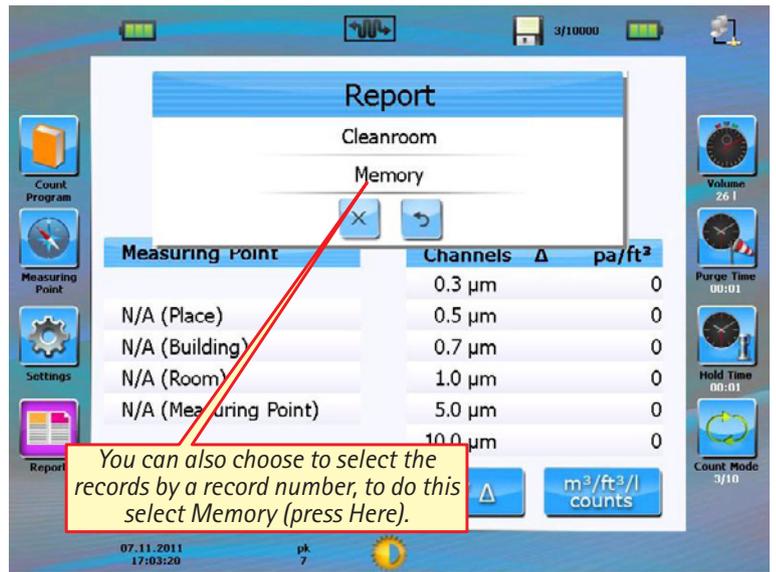


Average/Min/Max (Location)



As before all record types can be printed.
Please see printing reports.

Memory



Enter the number you want to start the report for then press OK.

Enter the highest number you would like to see, then press OK.



You will now be taken to the report type screen

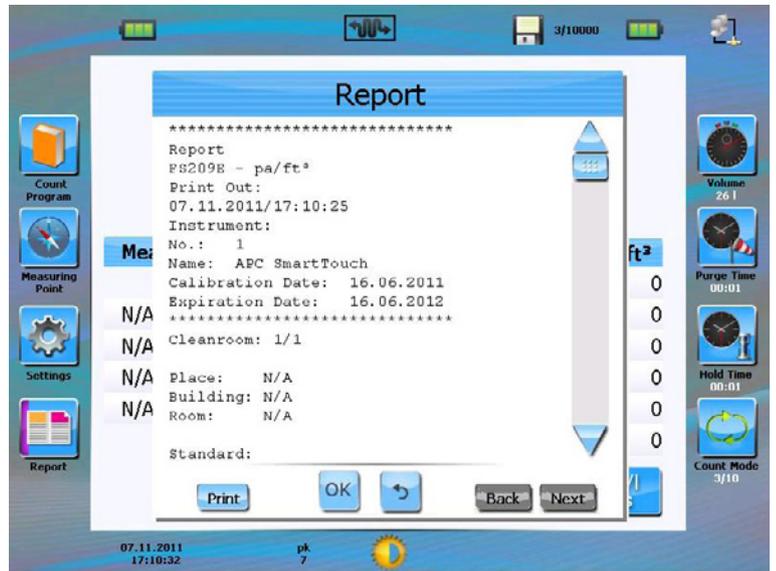
Report Type Selection Memory

You can now select the type of report you need for your records. Each report is configured to meet the requirements of the regulations.

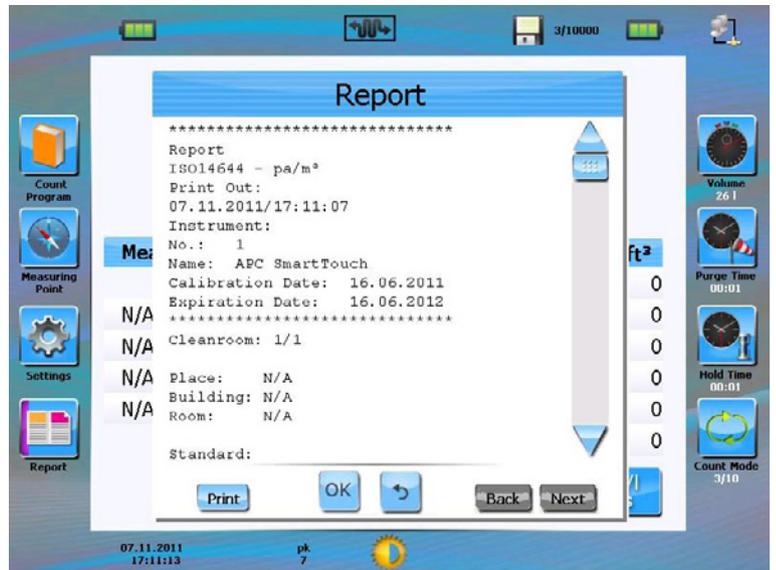


The following screens show examples of each type.

FS 209 (Memory)



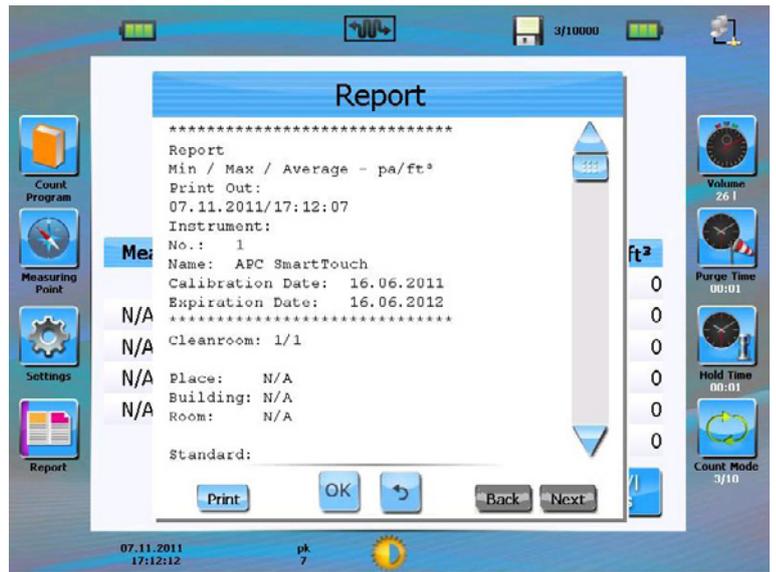
ISO 14644 (Memory)



GMP (Memory)



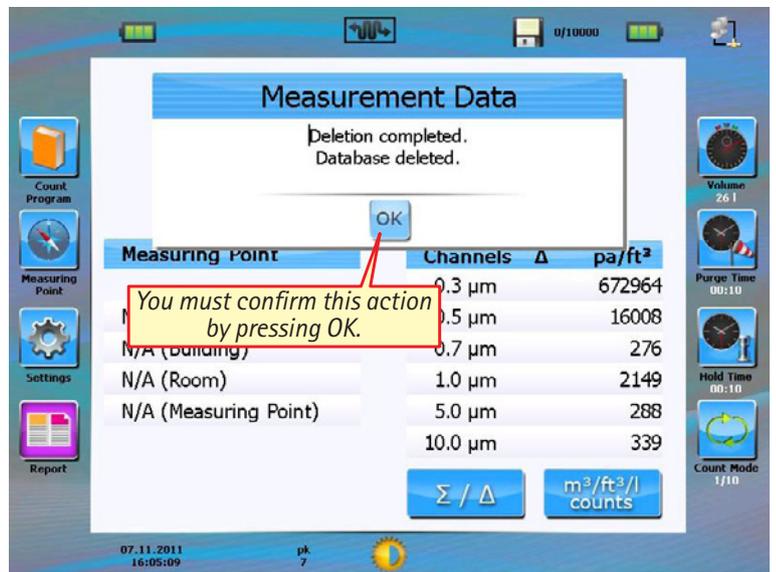
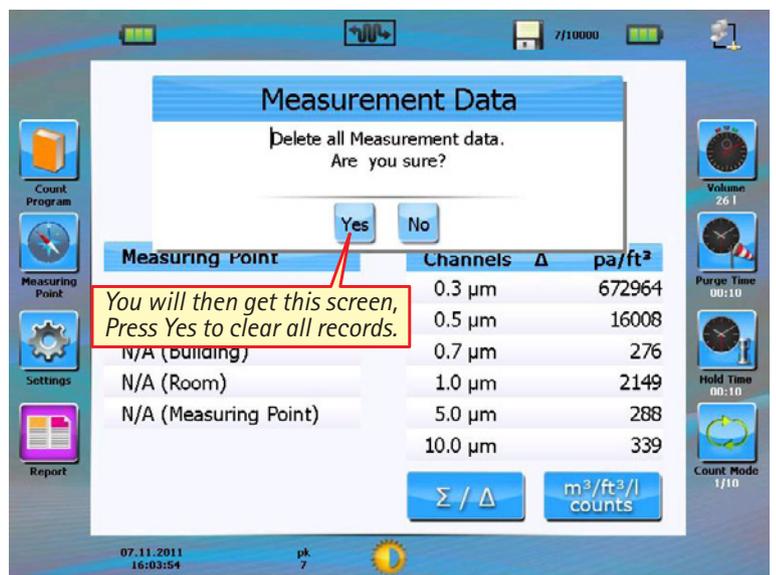
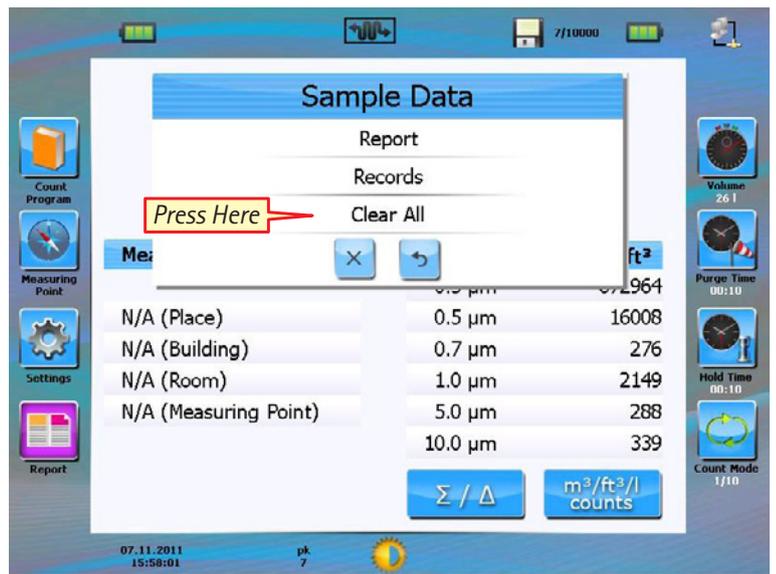
Average/Min/Max (memory)



As before all record types can be printed please see printing reports.

Clear records

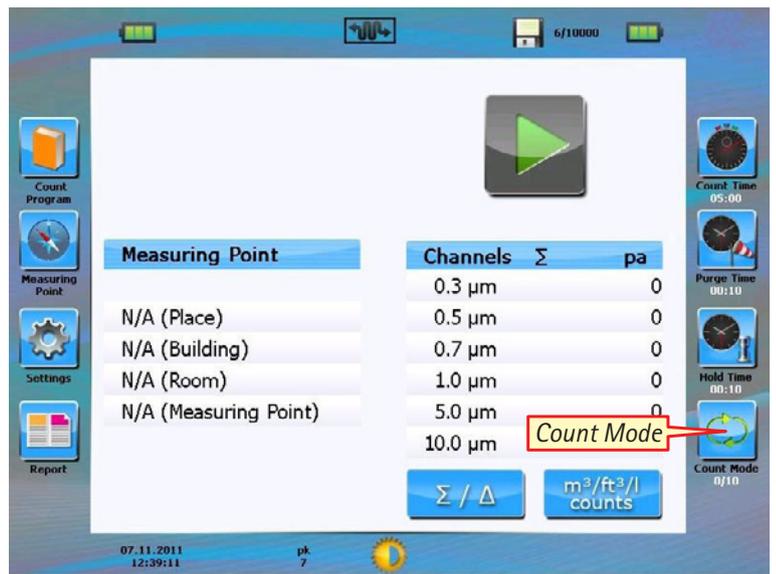
The following screens explain how to clear records from the instrument.



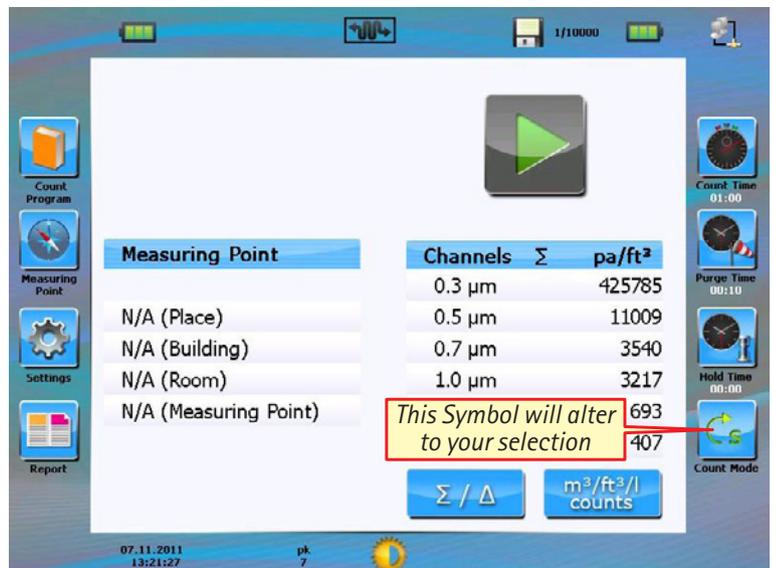
After you press OK all records will be deleted.

Count Mode

There are six different count modes to perform the sampling. By touching count mode you will get the following screen.

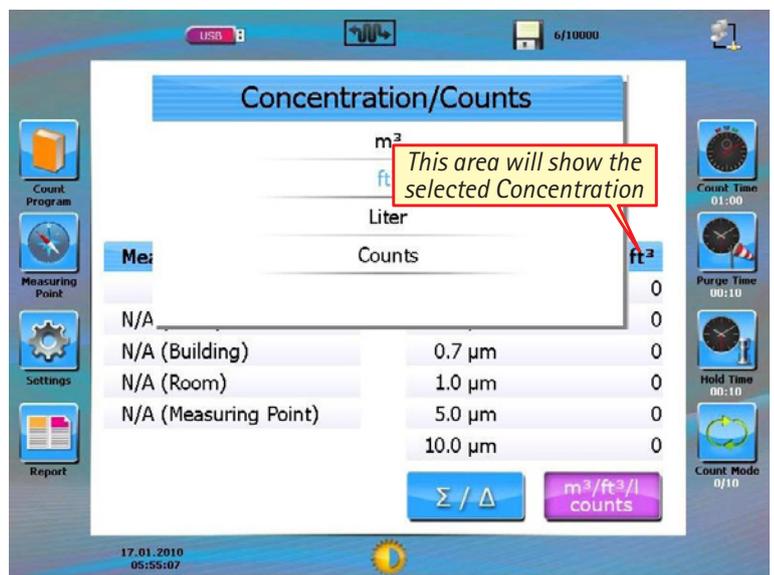


Select the type of count mode you require by pressing on it.



Setting concentration/counts

There are four modes to present the count results of the particle channels: counts per m3, counts per ft3, counts per liter and total counts.

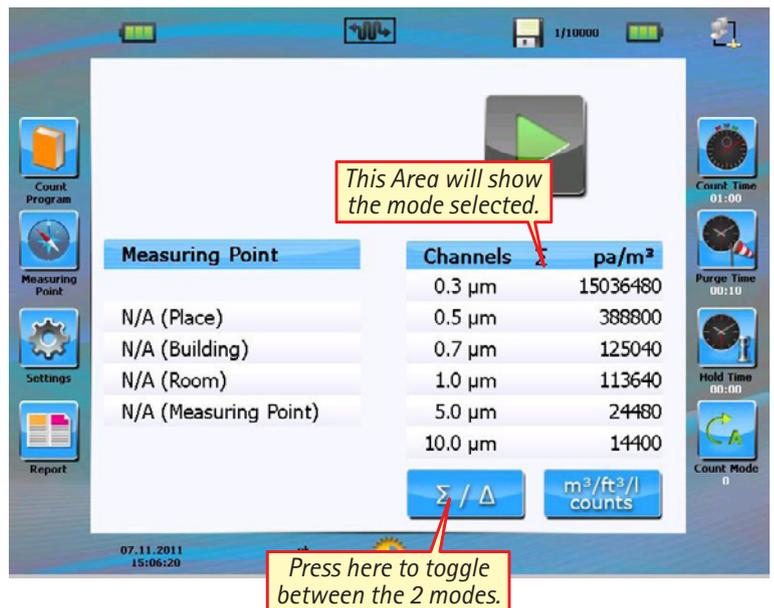


Press on the type of concentration you require.



Selecting differential or cumulative

The count results per particle size channel can be presented in the cumulative or differential mode.

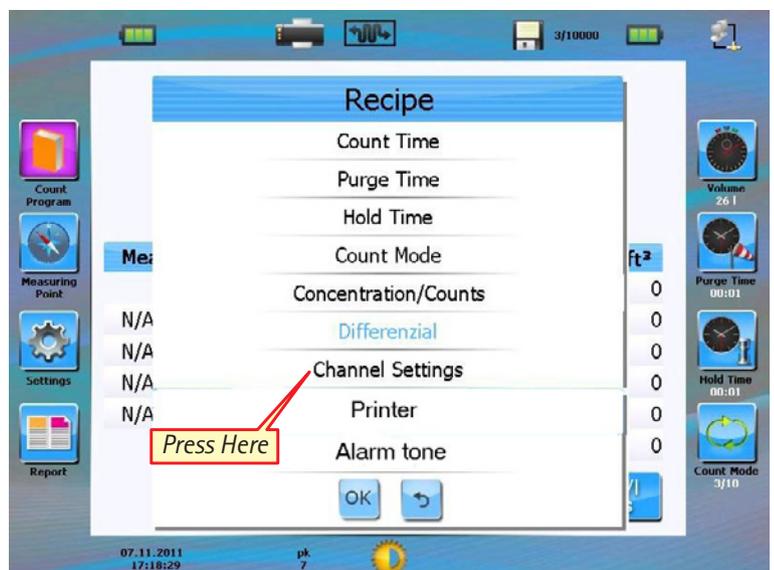


Recipe

All the settings that have been used up to now can also be accessed via the recipe screens. To access the recipe screen follow the next steps.



In this screen all the previous settings can be entered, you can also access the channel, alarm, printer and alarm tone.

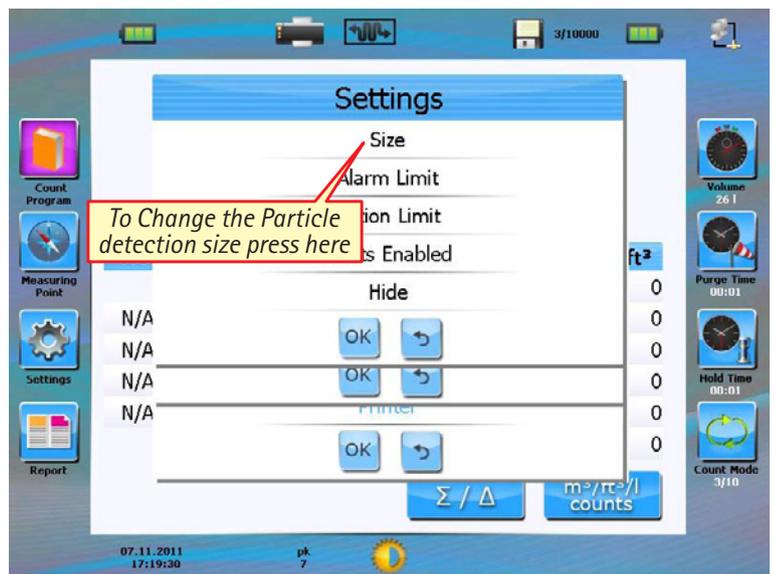


Setting channels

In channel settings it is possible to change the particle size of the channel in increments of 0,1 μm . For example the 0,3 μm channel can be set into 0,4 μm .



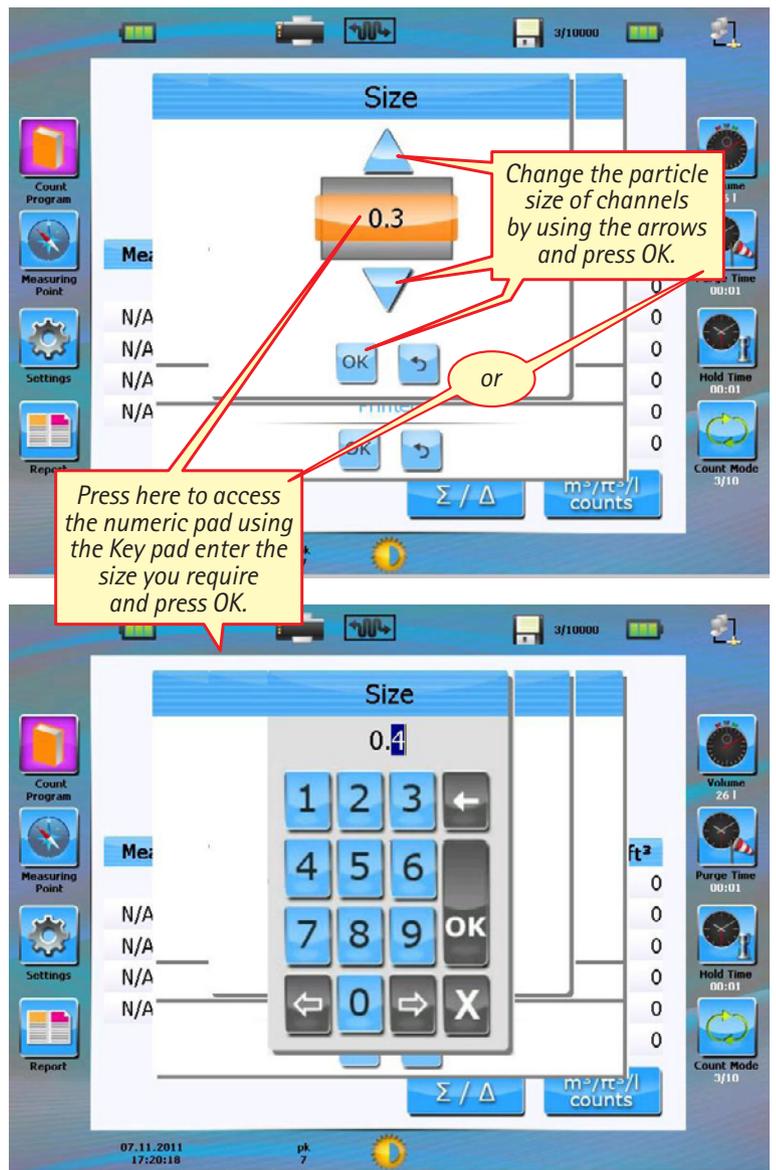
Touch a channel and you will get the following screen.



NOTE

All compliance reports are based on the preset values. Only very experienced operators should alter the particle sizes.

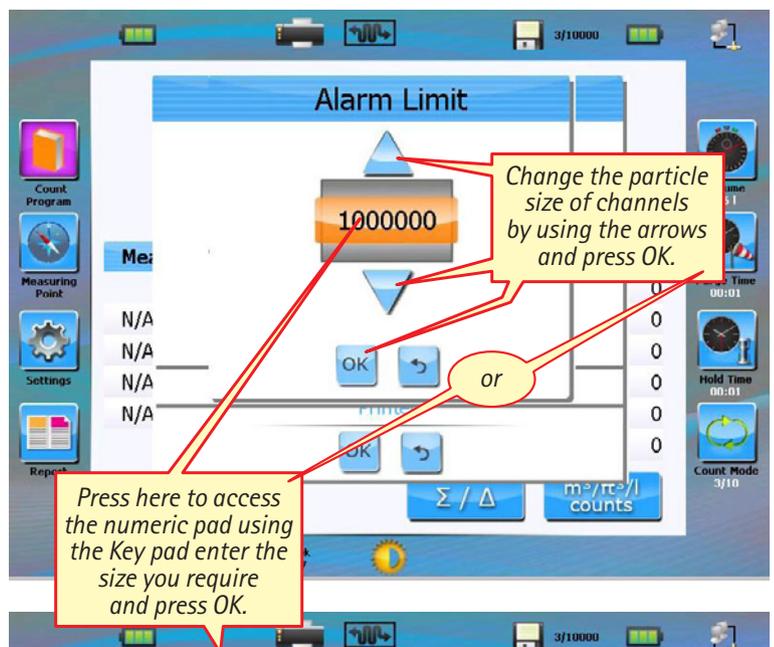
Touch size and you will get the following screen to change the size of the particle of a certain channel.



Setting channel alarms



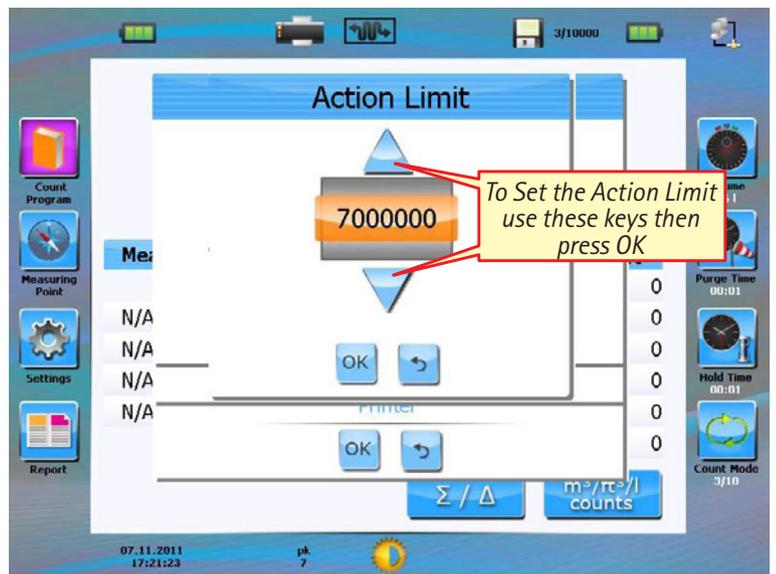
In this screen you can set the alarm limit to a desired level of particles. An alarm (audible and visible, the channel that generated the alarm will be highlighted in orange) will occur when the level has been passed.



Change the particle size of channels by using the arrows or press the figures to access the numeric pad using the key pad enter the size you require and press OK.

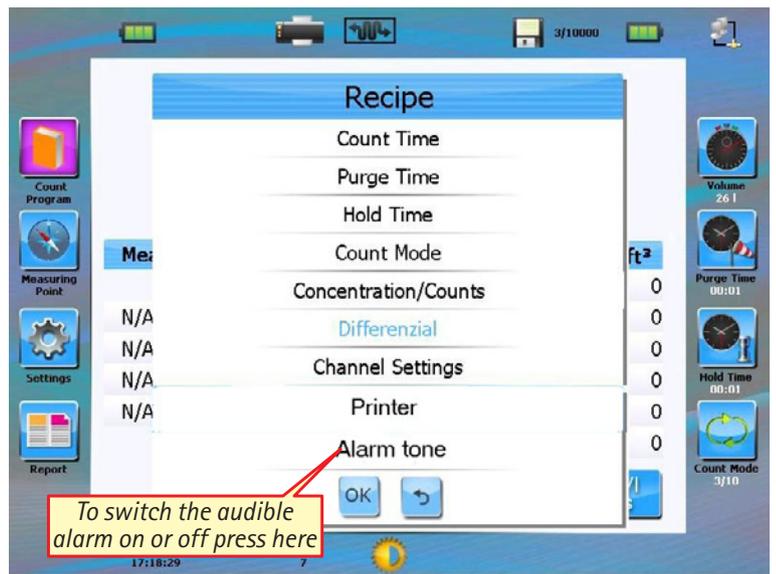
Action Limits

To set the action limit to a desired limit.

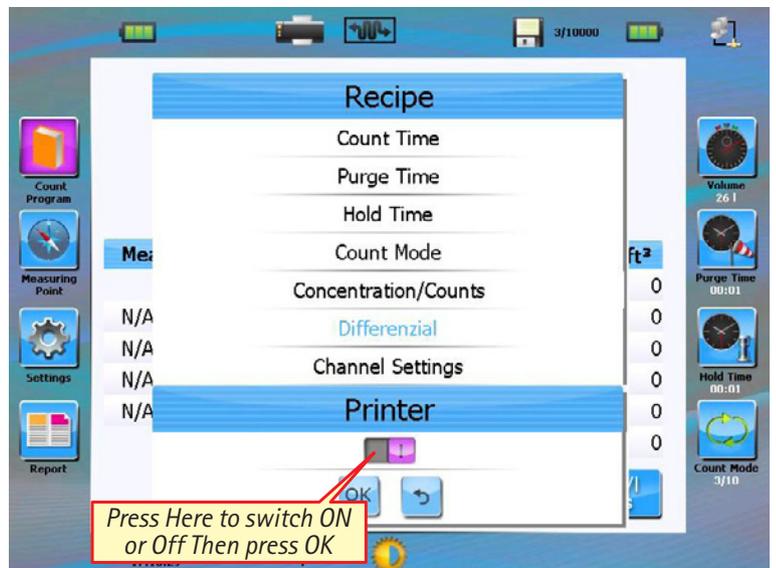
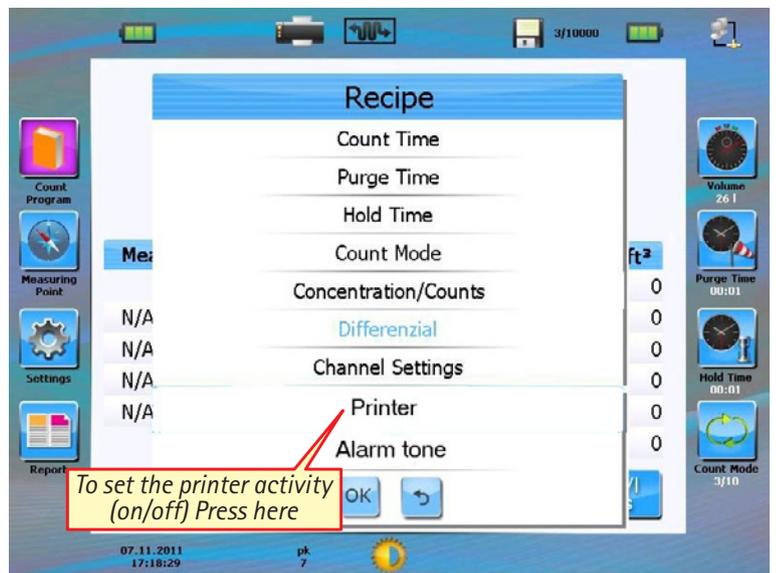


This alarm level should be used as an action alarm and should be interpreted in a way that action (like a production stop) needs to be taken in the measurement area. Also in this case you will get an audible and visual alarm, the channel that generated the alarm will be highlighted in red.

Alarm tone



Printer

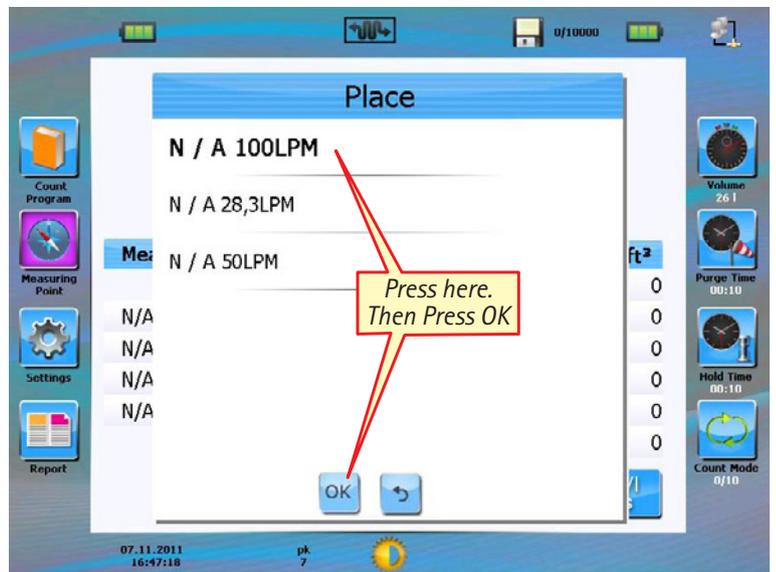
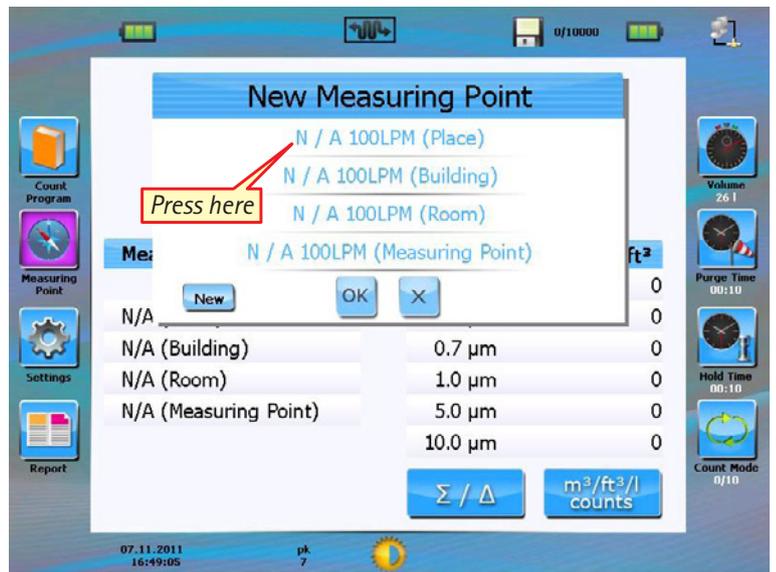


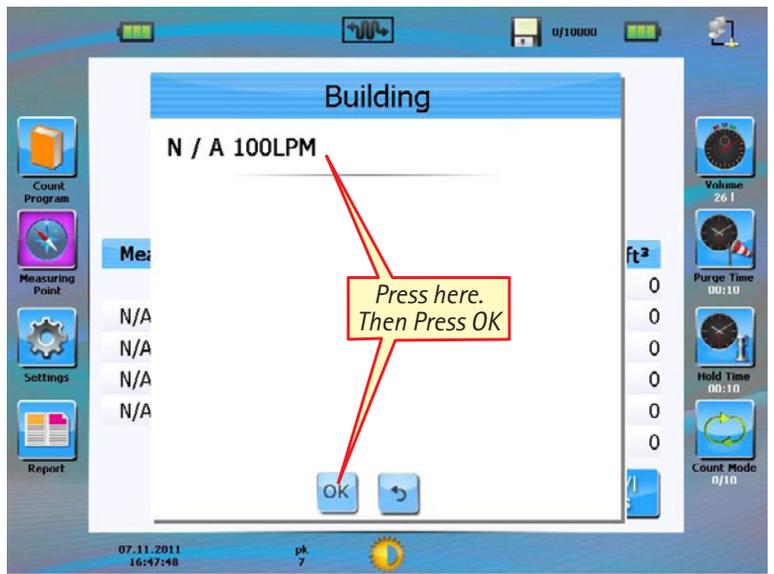
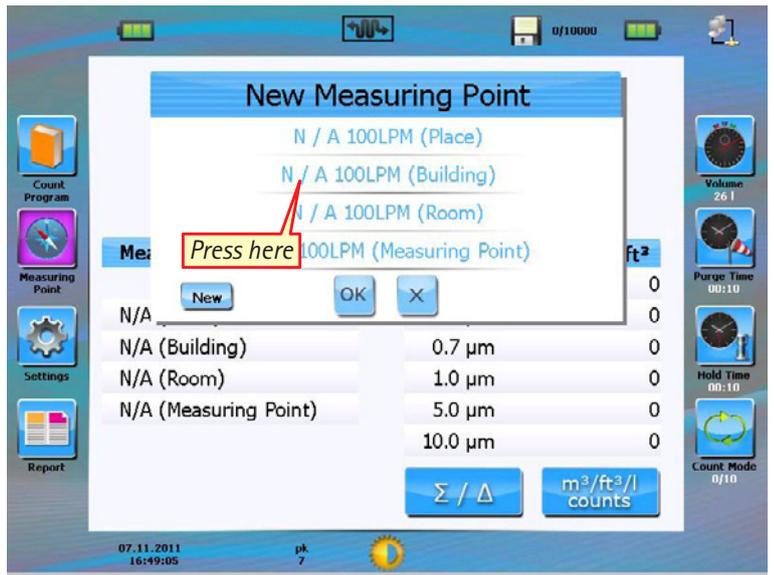
New Measurement Point

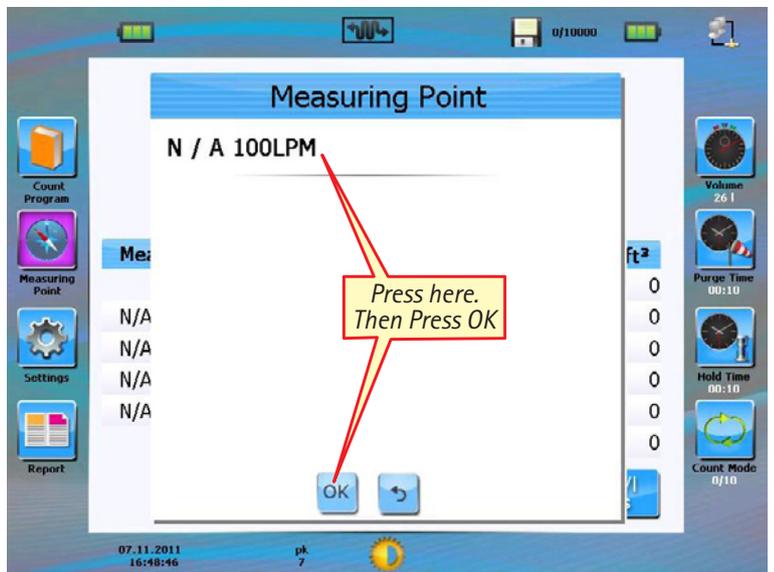
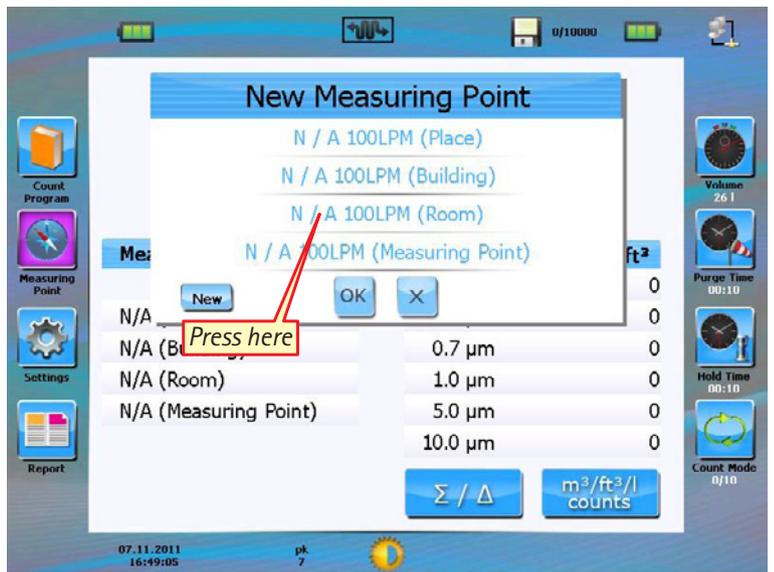
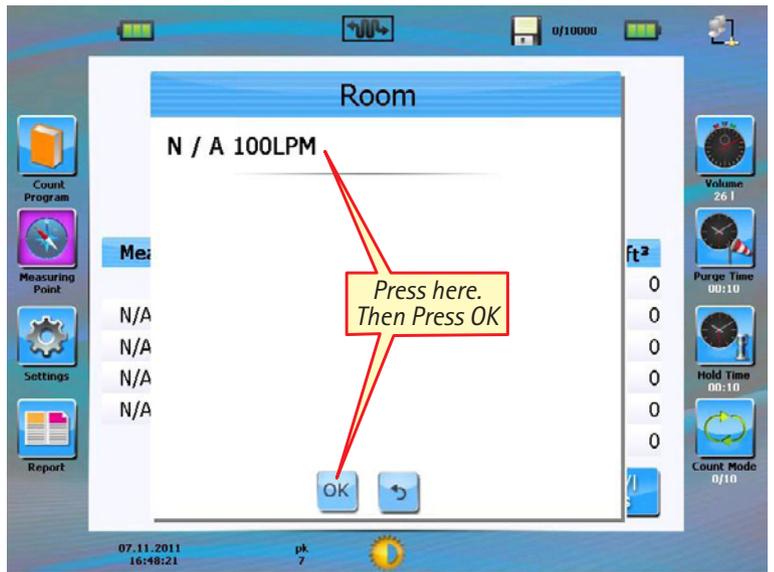
The measuring point is described by 4 levels: place, building, room and measuring point. As used with HACCP.

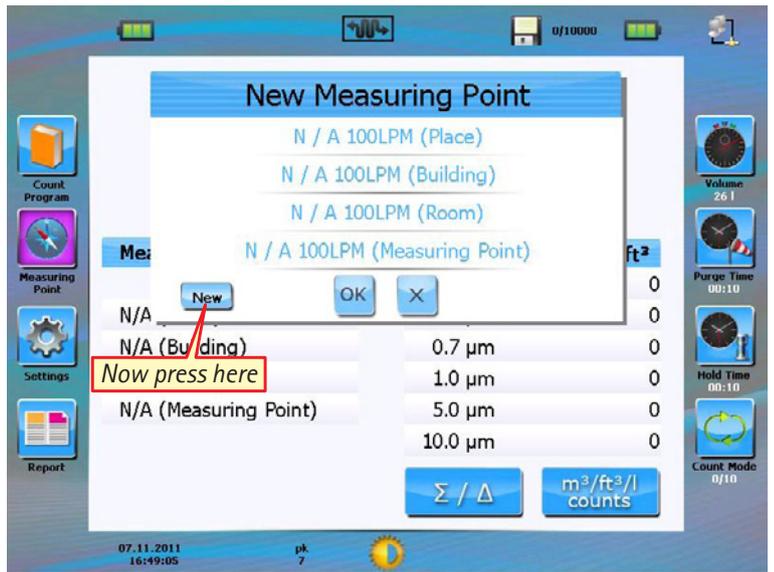
Measuring points can be uploaded by using the APC SmartTouch Download Utility Software. Detailed instructions can be found in the Software Manual.

A limited amount of new test points can be added directly on the instrument.









Now type in the required name then press OK.

You can now enter new names by repeating the last 2 screens only.

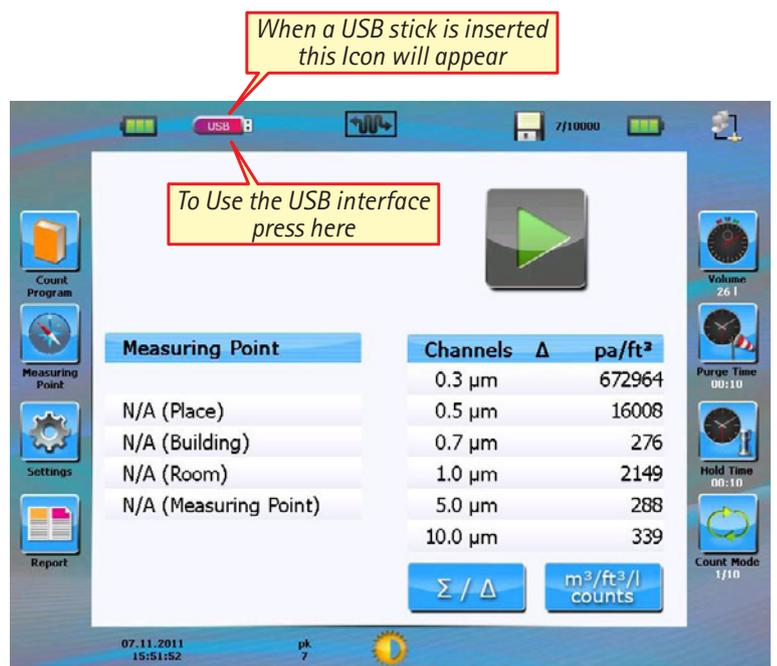
Full new measurement points including place, building; room and measurement points can be created and downloaded to the instrument using the PC Software.

Please see the PC software manual for full instructions.

To use one of the saved test points select it and then press the green start button.

USB interface

USB stick icon



Import/Export via USB



Press either "Import" or "Export" and then OK.

Export data

If you have chosen export this screen will appear, the default is all fields to be ticked for export to deselect a field press on it.

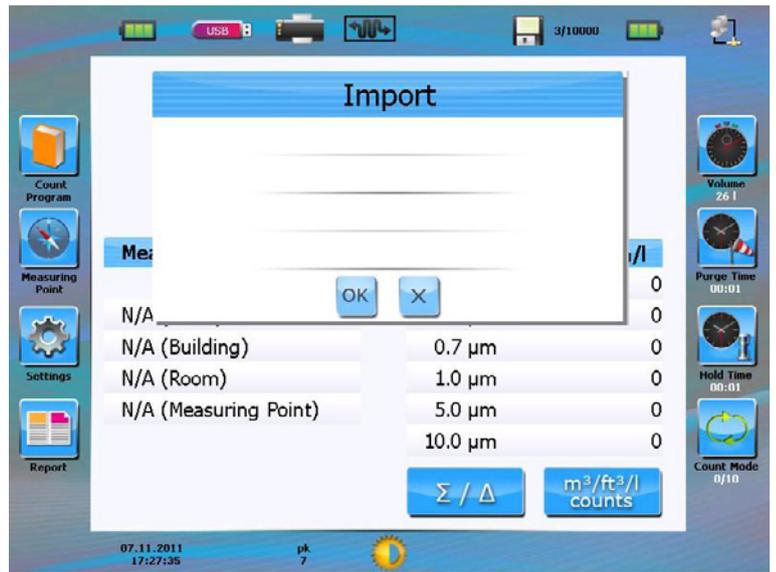


When you have selected the data you do not want to export press on OK the data with the tick next to it will now be exported to the USB Port.

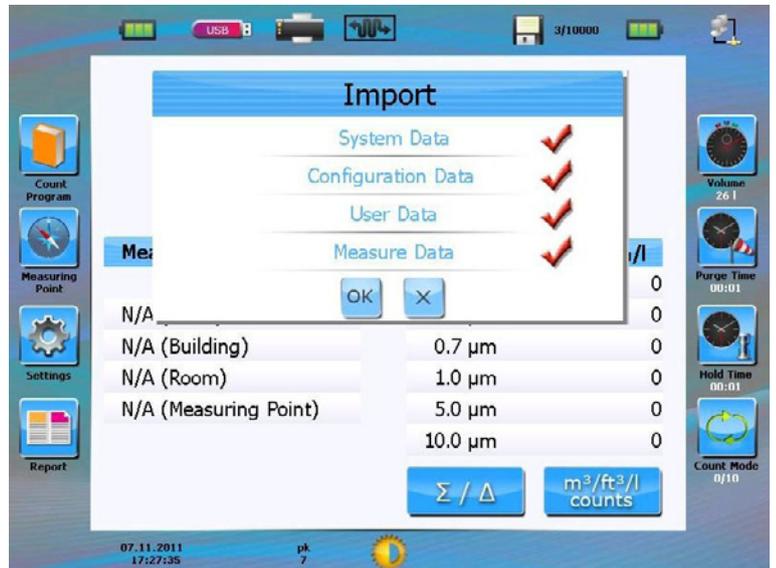


Import data

If there is no data to import the screen will look like this.



The default is all fields to be ticked for export to deselect a field press on it.



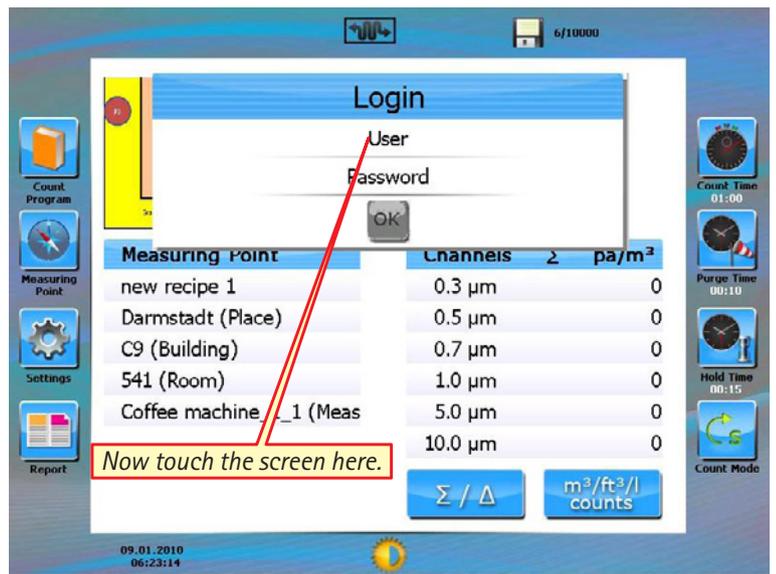
In the same way you need to select the data to import from the list then press OK to import the required data.



User

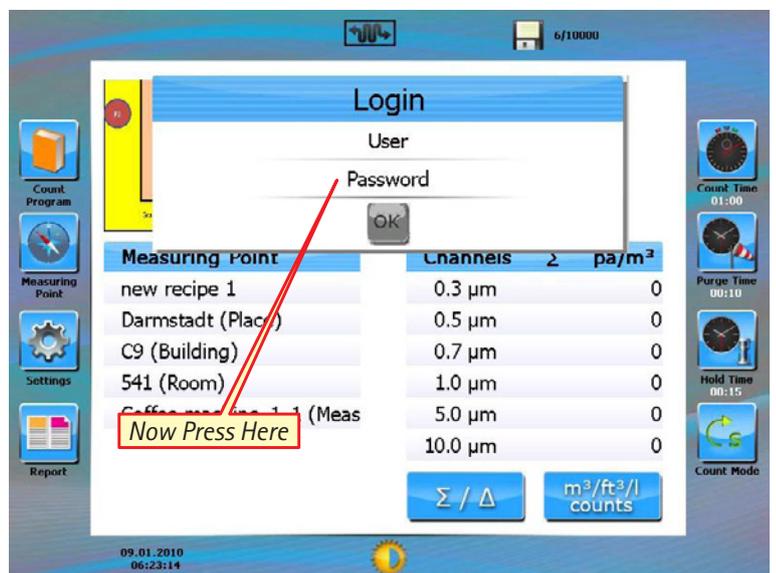
If you are using the Instrument with the PC software you will be able to select a user.

After you have downloaded the data from the PC Software, the next time you switch on you will be prompted for a User and Password.



Now type in the user name that you want to use (it must be one of the ones downloaded from the PC Software).

This name is case sensitive. When you have finished press OK.



Now type in the password for the user name that you have selected.

This password is case sensitive. When you have finished press OK.



Compressed Gas Adapter (CGA)

Compressed Gas Adapter Packing List

Upon receipt you will receive the following items with your purchase:

- 1 - CGA Assembly which includes the Compressed Gas Adapter and Wall Mount
- 1 - Owners Manual
- 1 - 1 meter of tubing

Safety During Operation

WARNING:

Indicates a potentially hazardous situation which, if instructions are not followed, could result in injury.

CAUTION:

Indicates a situation which could potentially affect your final results.

NOTES:

Indicates that an alternate procedure may need to be taken depending on the device which you are using.

Introduction

The Compressed Gas Adapter (CGA) is an accessory used with the APC ErgoTouch Pro 2, APC Handheld, APC Portable, APC M3 and APC SmartTouch Airborne Particle Counters to monitor the particulate content of compressed gasses. It is routinely used in areas where specified particle counts must not be exceeded due to legal requirements or individual standards. This manual describes the procedures to install, use and clean this device in a safe manner.

Background

Compressed air and Nitrogen are used for many applications within various industries. In particular, cleanrooms use compressed gasses to operate equipment and clean manufactured products. Since the cleanliness of the compressed gas affects both the cleanroom and the products manufactured therein, it is essential to quantify the particulate levels in it.

All APC Airborne Particle Counters are designed to handle gasses at atmospheric pressure only. Therefore, without a Compressed Gas Adapter, a particle counter cannot sample directly from a compressed gas line. Using a standard particle counter to sample a compressed gas line is unsafe and can damage the particle counter. The Compressed Gas Adapter (CGA) provides a convenient interface between a compressed gas line and particle counter.

Product Details

A particle counter requires air at atmospheric pressure and a nominal air velocity of about 0.5 meters per second (m/s). The CGA uses an orifice to lower the pressure from the compressed gas line to atmospheric pressure. In addition, the orifice restricts the flow rate of the gas to slightly above the flow rate required by the particle counter. As the air enters the diffuser cone, the velocity of the gas is reduced, and provides a more uniform flow to an isokinetic probe. The isokinetic probe is connected to the inlet of the particle counter via a short length of tubing and provides the gas sample to the counter. The excess gas from the diffuser cone flows past the isokinetic probe and then through a baffle to quiet the flow from the orifice. It then exits the CGA via the vent port, which may be open to the cleanroom or exhausted outside of the cleanroom using tubing.

WARNING:

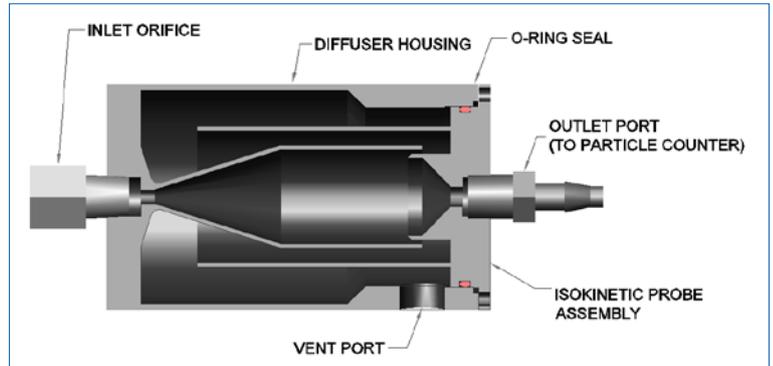
If the vent port is sealed while the adapter is connected to the gas line, pressure will build up inside of the diffuser, potentially causing harm to the user. Visually make sure that the vent port is not sealed before using.

An orifice is used as a pressure/flow control device. Since the CGA is designed for output flow rates ranging from 0.1 cubic feet per minute to 100 litre per minute, different orifice sizes must be used, depending on the output flow rate and the inlet pressure. For each output flow rate (0.1 cubic feet per minute, 1 cubic feet per minute, 50 litres per minute, 75 litres per minute, 100 litres per minute) a complete set of orifices is provided to cover an inlet pressure range from 10 PSIG up to 150 PSIG. (As the output flow rates vary depending on the model of particle counter these orifice sets are not included in this product, they are separate items.) Each orifice has a number stamped on it, and these numbers uniquely identify the orifice.

NOTE:

The correct orifice must be selected for the input pressure and output flow rate, or the particle count accuracy will be affected.

The CGA may be mounted to a wall using the included bracket, or it may simply be connected to the pressure line if the line can support the weight.



CGA Installation

To sample a compressed gas line you must first select and install the correct orifice to the particle counter. Then, attach the device to the pressure line.

Selection of the Orifice

The orifice in the CGA drops the pressure to atmospheric, while also limiting the flow rate. When an orifice is used in this manner, the flow rate from the orifice is pressure dependent. In the CGA, the correct orifice must be used to keep the flow rate in a desired range for a given input pressure.

If the flow rate from the orifice is less than the flow rate of the particle counter, then the counter will pull in air through the vent port in addition to the air that is sampled from the pressure line. This will lead to an incorrect particle count in the pressure line. Conversely, if the flow rate from the orifice is too high, then the isokinetic condition is not met in the CGA, and the particle counts could be biased higher, especially for the larger size channels.

1. Make sure the flow rate your orifice set was designed for matches your instrument flow rate.
100 lpm for APC M3, article no. 1.44166.0001
50 lpm for APC M3, article no. 1.44168.0001
1.0 cfm for APC Portable, article no. 1.44170.0001
0.1 cfm for all APC Handheld, article no. 1.44172.0001
0.1 cfm for APC ErgoTouch (Pro), article no. 1.44180.0001
2. Find the input pressure in the line to be sampled.
3. Match the correct orifice number to use following the pressure range indications given in the orifice set box.

Install that orifice in the CGA inlet. (Section 5.2)

NOTE:

If the pressure fluctuates from one orifice range to another, use the orifice for the lower pressure. This will keep the flow rate high enough to ensure that the excess gas exits the device from the vent port and that air is not taken in through the vent.

Installation of the Orifice

All threads from the pressure line to the orifice should be sealed. This will prevent leaks into the cleanroom that could cause particulate contamination. It is also recommended to seal the threads in the inlet, outlet, and vent port of the CGA. This will help to ensure that no air is drawn in from the cleanroom through the CGA and into the particle counter.

The inlet port, outlet port and vent port all have 1/8 inch NPT threads. These threads are tapered, so that the more that a fitting is screwed in, the tighter the fit gets between the two parts being connected. In theory, to provide a complete seal between the mating parts, all that needs to be done is to tighten the fittings more. However, in practice thread sealing tape or compound is used to help seal the threads.

The appropriate thread sealer depends on the application. Where possible, Teflon Tape is recommended to seal the threads. Teflon Tape is inexpensive and widely available. You may also use whatever thread sealer is used in your facility's cleanroom.

To connect the proper orifice to your CGA:

1. Wrap the threads of the orifice with Teflon tape, or coat them with the desired thread sealer.
2. Screw the orifice into the pressure inlet port on the CGA. The side of the orifice with the smallest opening should be installed into the CGA inlet port. Use a 7/16 inch wrench to tighten the orifice fitting into the CGA diffuser housing.
3. Connect the inlet side of the orifice to the pressure line as shown in Figure 3, which is a typical installation or with the swage fittings as discussed in Section 5.4.
4. Make sure that all connections are properly tighten and sealed.

Wall Mount

Use the wall mount bracket to attach the CGA to a wall or other structure using the included four 40 type screws. The wall mount bracket has holes for #8 mounting screws. Next, properly secure the bracket to the wall using appropriate hardware. If the CGA is being mounted to a sheet rock wall, appropriate hardware anchors should be used in the sheet rock to provide a rugged mount. Mounting the CGA to a stainless steel wall may require drilling holes into the wall, and tapping threads into the holes.

Connection to a Pressurized Line

A typical installation to the pressure line is shown in Figure 3.

A port is required in the pressure line from which samples may be taken. Ideally, this is a 1/8 inch or 1/4 inch NPT pipe fitting. Other size fittings may be reduced to this size as appropriate using an adapter. In addition a valve is required between the pressure line and the Compressed Gas Adapter to turn the flow of gas off and on. A ball valve is recommended, but other valve types may also be used. The CGA has a 1/8 inch NPT male fitting for its input connection.

The installation shown below in Figure 2 is recommended for a permanent installation. If the CGA needs to be removed, it is recommended to use swage type fittings. The SwageLok Company (www.swagelok.com) has a wide selection of these fittings with mating valves and quick-connect fittings. Other companies make similar products.

CAUTION:

Make sure that all components are rated for the maximum pressure that may occur in the pressure line.

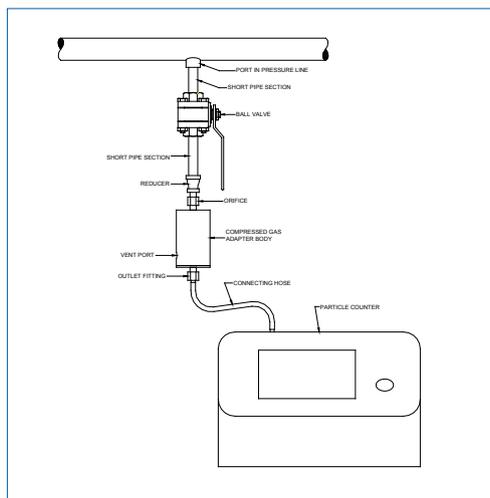


Figure 2:
Typical installation of the Compressed Gas Adapter to an APC Portable or APC M3 Airborne Particle Counter.

CGA Fitting to Particle Counter

1. After you have installed the correct orifice on the CGA and have properly connected the CGA to the pressure line, wrap the threads of the barbed fitting on the CGA Outlet Port with Teflon Tape or thread sealer.
2. Place the particle counter in a convenient, flat location near the CGA. (For APC Handheld particle counters, you may also use the wall mount bracket.)
3. Connect one end of the provided 1/4 inch tubing to the outlet fitting of the CGA (See connecting hose in Figure 3). It is recommended to keep the connecting hose equal to or less than 3 meters.
4. Connect the other end of the 1/4 inch tubing from the CGA outlet port to the inlet port of the particle counter.

NOTE:

For APC Handheld counters (0.1 CFM), remove the isokinetic probe from the counter and install the included Inlet Adapter into the inlet port or top of the counter. Make sure that the adapter seals properly against the O-ring in the counter inlet.

5. Determine how the excess gas will be vented (Section 6).
6. Turn on the pressure line.

CAUTION:

Make sure that you turn on the pressurized gas line first and that it is flowing into the particle counter before beginning a count cycle. If not followed you will pull air in through the exhaust port!

7. Turn on the particle counter.
8. Begin your count cycle as usual.

WARNING:

Dangerous gasses such as Oxygen and toxic gasses should not be sampled using the CGA. If the CGA will be used with gasses other than air or Nitrogen please contact Merck for more information.

CONNECTING the VENT PORT

The vent port provides a path to exhaust the excess gas from the CGA. There are three commonly used procedures for venting the excess gas coming from the CGA.

If it is:

- Acceptable to vent the gas into the cleanroom
 - Leave the vent port open.
- Acceptable to vent the gas into the cleanroom, but a few meters away from the CGA location
 - Then install the included outlet nozzle into the vent port of the CGA. Next, connect a 1/4 inch tubing to this port to direct the vented gas to an acceptable location, such as to the outlet ducts of the cleanroom.
- Unacceptable to vent the excess gas into the cleanroom
 - The tubing may be run from the CGA vent port to a port in the cleanroom barrier to exhaust the gas to the air outside of the cleanroom.

WARNING:

The vent port must have a clear path from the vent port to the atmosphere. At no time should the vent port be closed off, blocked or sealed. This port ensures that the pressure inside of the Compressed Gas Adapter remains at atmospheric pressure. If the vent port is blocked, the device may become pressurized, and could cause damage to the particle counter.

Aseptic areas are typically maintained at a more positive pressure than their surrounding rooms in order to keep the flow of air moving from a more positive to negative environment. For the APC Airborne Particle Counters, it is recommended to vent the gas into the cleanroom, especially if the pressure inside of the cleanroom is higher than atmospheric pressure (typically 14.7 PSI) or is more than about an inch or two of water (less than about 5 millibars). If the cleanroom is at a positive pressure and the exhaust gas is vented out of the cleanroom to an environment that is at negative pressure, then the pressure inside of the CGA is equal to the pressure outside of the cleanroom. However, the pressure at the output of the particle counter is slightly higher because it is located within the positive pressure environment. Since the APC is not designed to adjust the flow rate according to different pressures, it is highly recommended to vent the air into the same area where the compressed gas is being sampled. Pressure will affect the flow rate of the particle counter.

In addition, please note that if the tubing connected to the vent port is longer than 5 meters (or 15 feet), use 1/2 inch ID tubing instead of the 1/4 inch ID tubing provided with your airborne particle counter and CGA. The larger ID tubing will offer much less resistance to the air flow than the 1/4 inch tubing. Also, you will need to use a barbed fitting adapter for the larger size tubing. This should be placed on the vent port of the compressed gas adapter.

Maintenance

Daily cleaning of your CGA is not necessary unless it is stored or used in an uncontrolled environment, the gas line was highly contaminated, or your particle counts are unexplainably high. Since the device is made of stainless steel it does not generate particles but it can harbor contaminants from other sources.

It may be disassembled for easy cleaning and replacement of the O-ring. Other than cleaning, the CGA is maintenance free. However, if cleaning is necessary please follow these instructions.

Items Needed:

Ultrasonic Bath (optional)

Autoclave (optional)

Swab

Solvent

Unidirectional Flow Hood or Clean Bench (optional)

It is recommended that all disassembly and assembly of the CGA be performed under a flow hood or clean bench.

1. Disconnect the CGA from the pressurized line and particle counter.
2. Place the CGA under the hood (if necessary) and un-screw the three small screws located on the bottom.
3. Separate the CGA and remove the O-ring.
4. Spray all parts with a solvent i.e. alcohol and use the swab to wipe along the interior of the device.
5. If necessary place the CGA in an ultrasonic bath (placed under the hood) for 15 minutes.
6. Allow the cleaned parts to dry inside of the hood.

Autoclaving

The CGA can be autoclaved under either of the following conditions:

- Steam Sterilization at 121 °C for 20 minutes
or
- Dry Heat Sterilization at 170 °C for 30 minutes.

CAUTION:

Under no circumstances should you autoclave or submerge your APC Airborne Particle Counter in liquid. Any of these procedures will cause extensive damage to the unit and will require factory servicing. If necessary the exterior of the unit may be cleaned by wiping it with a commercially available disinfectant or isopropyl alcohol.

CGA Technical Specifications

The APC Compressed Gas Adapter can be used with all instruments, the APC SmartTouch, M3 and other Portable Airborne Particle Counters.

Sample Gas Pressure

Range	10-150 PSIG
Sample Flow Rate	0.1 and 1.0 CFM, 50, 75 and 100 LPM
Sample Gas	Compressed Air and Nitrogen

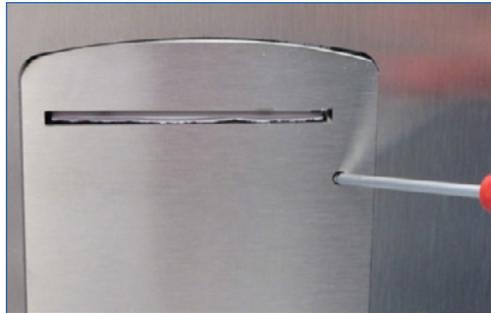
Pressure Line

Connection	1/8 inch NPT
Vent Port	1/8 inch NPT
CGA Material	Stainless steel
Weight	1.15 lbs. (0.52 kg)
Dimension	3.75" Length x 2" Diameter (9.53 cm x 5.08 cm)

Adding New Printer Paper



1. Turn off the power on the APC SmartTouch.
The printer is located on the right side of the instrument.
Open the printer door by pressing a stylus in the hole of the printer door. Press until the door opens.



2. The printer door can stay attached to the housing or be removed completely for easy installation of the thermal printer paper.



3. Remove the paper axle. Unroll 60 mm of the printer paper. Place the axle into the printer roll and install them into the printer housing with the loose end of the roll at the top and towards the side of the instrument.



4. Put the paper through the paper slit. Hold the loose end, and close the printer door. When the printer door is closed, pull the paper so that is aligned in the opening of the paper slit. The printer is now loaded with paper.



Maintenance

NOTE

There are no user-serviceable parts inside this instrument. Opening the instrument case may void the warranty. Merck recommends that you return the APC SmartTouch Airborne Particle Counter to your authorized service center for any required maintenance or service not described in this manual.

Maintenance and calibration Schedule

Merck recommends annual factory cleaning and calibration for the APC SmartTouch. See Chapter 7, "Contacting Customer Service" for service/calibration.

Recommended Field Maintenance Schedule

Item	Frequency
Daily zero check	Daily (or before each use).
Factory cleaning and calibration	Annually.
Cleaning the instrument enclosure	As needed

Daily Zero Count Check

The daily zero count check ensures that the instrument is working properly and free from residual particles and electronic noise. Please see Chapter 2, "Getting Started" for detailed instructions on performing the zero count check.

Cleaning the Instrument Enclosure

To clean the enclosure, dampen a lint-free cloth and gently wipe the surface until surface contamination is removed.

Troubleshooting

Symptom	Possible Cause	Corrective Action
Counts are too low	<ul style="list-style-type: none"> Instrument is being operated outside temperature or relative humidity specifications. Internal parts have been damaged because instrument was stored at a temperature higher than 122 °F (50 °C). Instrument has contamination on the optics due to condensation or excessive loading Laser or pump control is damaged Unit is due for calibration 	<ul style="list-style-type: none"> Operate instrument within specifications Return to factory for service
Instrument does not turn on	<ul style="list-style-type: none"> Battery is empty AC cord is not plugged into unit 	<ul style="list-style-type: none"> Recharge battery or connect to AC power Connect AC power cord
Instrument does not meet zero count specification (≤1 particle / 5 min)	<ul style="list-style-type: none"> HEPA filter is not connected properly and room air is leaking into the HEPA filter assembly Residual particles from previous samples are shedding off internal parts and into the optics An internal component has been damaged due to operation outside of temperature specifications or one or more excessive bumps or jolts, and electronic noise is inducing false counts A leak has developed in the air flow path Internal optics have become dirty 	<ul style="list-style-type: none"> Check that the HEPA filter has been tightly connected to the inlet. Purge instrument by running the instrument for 10–15 minutes before attempting zero count test Return to factory for service Return to factory for service Return to factory for service
Battery does not charge	<ul style="list-style-type: none"> The unit must be turned on but not in sampling mode for the battery to charge 	<ul style="list-style-type: none"> Turn on unit.
Low Battery Error	<ul style="list-style-type: none"> Low battery 	<ul style="list-style-type: none"> Recharge battery or connect AC cord
 Photodetector Error	<ul style="list-style-type: none"> Direct light is entering the air inlet Laser has become misaligned due to excessive bumps or jolts Internal optics have become dirty 	<ul style="list-style-type: none"> Remove instrument from direct light Return to factory for service Return to factory for service
System Error	<ul style="list-style-type: none"> Information is not being read properly by microprocessor 	<ul style="list-style-type: none"> Restart instrument. If problem persists, contact Merck technical support
Temperature Humidity Probe Error	<ul style="list-style-type: none"> Temperature/RH probe was not recognized 	<ul style="list-style-type: none"> Detach and reconnect probe. If problem persists, contact Merck technical support
Flow Error The flow error is indicated by the crossed flow rate icon if the flow rate is out of the range of +/- 5% on the nominal flow rate	<ul style="list-style-type: none"> Instrument was unable to control flow rate (if any tubing is connected to particle counter) Pressure drop across inlet may be too large Inlet not at ambient pressure 	<ul style="list-style-type: none"> Restart measurement Lessen pressure drop across inlet by using larger diameter tubing, less tubing, and/or adding a bleed valve Do not subject the unit to other than ambient pressure conditions
 Laser Power Warning	<ul style="list-style-type: none"> Laser power has fallen outside of specification 	<ul style="list-style-type: none"> Return to factory for service

Contacting Customer Service

Before returning your APC SmartTouch please check the trouble shooting guide.

Returning the APC SmartTouch Airborne Particle Counter for Service

First contact your local Merck representative to make arrangements. If you don't know or don't have a Merck representative, you can contact Merck directly:

Visit our website at <http://www.your-contacts/biomonitoring.com>, write an email to hycon@merckgroup.com, or call your local Merck KGaA representative.

Customer Service will need the following information when you call:

- The instrument model number, i.e. APC SmartTouch
- The instrument serial number
- A purchase order number (unless under warranty)
- A shipping address
- A billing address

All instruments must be properly decontaminated prior to packing and return to the Service Center or Service Point. Use the original carrying case and if available, the original packing material when returning the instrument. Please include the rotor and the accessory hardware from the scope of supply.

Appendix A Specifications

All specifications meet or exceed JIS B 9921: 1997. They are subject to change without notice.

Size Range	0.3–10 µm
Channel Sizes	0.3, 0.5, 1.0, 3.0, 5.0, 10.0 µm (user configurable in 0.1 µm units)
Counting Efficiency	50% @ 0.3 µm; 100% for particles > 0.45 µm (per JIS)
Concentration Limits	2,000,000 particles/ft ³ @ 5% coincidence loss
Light Source	Laser diode
Zero Count Level	≤1 count/5 minutes (<2 particles/ft ³) Meets JIS B 9921:1997
Flow Rate	1 CFM, 50 LPM, 100 LPM with ±5% accuracy
Flow Control	Automatic, alarm if +/- 5% out of the range on nominal flow
Calibration	NIST traceable
Sample Probe/Tubing	Isokinetic sampling probe
Sampling Modes	Manual, automatic, beep, concentration and cumulative/differential
Sampling Time	1 second to 99 min 59 sec
Sampling Frequency	1 to 999 cycles or continuous
Sample Output	Internal HEPA filter
Vacuum Source	Internal pump
Communication Mode	USB, Ethernet
Data Storage	10,000 samples
Data Security	Password protected
External Alarm	Internal audible alarm. Indicators for counts, low battery, and sensor failure
Environmental Sensors	Optional temperature/RH probe supported
Display	Color IR touchscreen
Languages	English
Reports	ISO-14644-1, FS-209E & EC GMP
Printer	Thermal, integrated
External Surface	Plastic or stainless steel
Power	110 to 240 VAC 50 to 60 Hz Universal in-line power supply
Battery	Removable Li-Ion
Battery Capacity two (2) batteries	9 hours for 1 CFM, 3.5 hours for 100 LPM
Recharge Time	3 hours
Dimensions (L x W x H)	Steel: 21 X 23 X30 cm Plastic: 22 X 30 X 32 cm
Weight	Steel: 9.1 kg with batteries Plastic: 7.2 kg without battery / 8.5 kg with batteries
Operating Conditions	5°C to 35°C; 20% to 95% non-condensing relative humidity Height: < 2000 meter (NN)
Room conditions	Indoor use only. For use in controlled and non-controlled areas. No hazardous locations where a fire and/or explosion hazard exists.
Storage Conditions	0°C to 50°C; Up to 98% non-condensing relative humidity
IP Protection	IP20
Included Accessories	Power supply, power cord, two (2) batteries, isokinetic probe, purge filter, APC SmartTouch Utility software, user manual on CD, USB computer cable, calibration certificate, and Quick Start Guide.

We provide information and advice to our customers on application technologies and regulatory matters to the best of our knowledge and ability, but without obligation or liability. Existing laws and regulations are to be observed in all cases by our customers. This also applies in respect to any rights of third parties. Our information and advice do not relieve our customers of their own responsibility for checking the suitability of our products for the envisaged purpose. The M mark is a trademark of Merck KGaA, Darmstadt, Germany.

Contact:

www.your-contacts.com/biomonitoring

