

# **VENTIS® SLIDE-ON PUMP**



# **Field Guide**

Setup, Operation, and Service

Edition 9

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[www.indsci.com/ventis/vsp](http://www.indsci.com/ventis/vsp)

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# General Information

Each Ventis™ Slide-on Pump is certified by one or more certifying bodies (CBs). Certifications for the Ventis Slide-on Pump, at the time of this document's publication, are listed below in Table 1. To determine the hazardous-area classifications for which a pump is certified, refer to its label or the product order.

Table 1 Hazardous-area Certifications








Certifying Body (CB)	Area Classifications	Standards	Approved Temperature Range
ATEX <sup>a</sup>	Ex ia I Ma and Ex ia IIC T4 Ga; Equipment Group and Category: I M1 and II 1G;	EN 60079-0:2012: +A11:2013 EN 60079-11: 2012 EN 60079-26: 2007 EN 50303: 2000	-20 °C to +50 °C (-4 °F to +122 °F)
CSA <sup>b</sup>	Class I, Division 1, Group A B C D, T4 Ex ia IIC T4	CSA C22.2 No. 152 CSA C22.2 No. 157 CSA C22.2 No. 60079-0 CSA C22.2 No. E60079-11	-20 °C to +50 °C (-4 °F to +122 °F)
GOST- EAC	0 Ex ia IIC T4 X PO Ex ia I X	GOST R 51330.0, GOST R 51330.10, GOST R 51330.20, GOST 24032, GOST 14254	-20 °C to +50 °C (-4 °F to +122 °F)
IECEx <sup>c</sup>	Ex ia IIC T4 Ga	IEC 60079-0: Sixth Edition IEC 60079-11: Sixth Edition IEC 60079-26: Second Edition	-20 °C to +50 °C (-4 °F to +122 °F)
INMETRO	Ex ia IIC T4 Ga	—	-20 °C to +50 °C (-4 °F to +122 °F)
UL	Class I, Division 1, Groups A B C D, T4; Class I, Zone 0, AEx ia IIC T4 Ga; Class II, Group F G (Carbonaceous and Grain Dust)	UL 913 8th Ed. UL 60079-0 6th Ed. UL 60079-11 6th Ed. CSA C22.2 No. 157	-20 °C to +50 °C (-4 °F to +122 °F)
China Ex	Ex ia IIC T4 Ga	GB 3836.1-2010, GB 3836.4-2010, GB 3836.20-2010	-20 °C to +50 °C (-4 °F to +122 °F)

<sup>a</sup>The EC type examination certificate is DEMKO 12 ATEX 1204290 with marking code Ex ia I Ma and Ex ia IIC T4 Ga for equipment group and category II 1G and I M1. The Ventis Slide-on Pump (VSP) complies with relevant provisions of European ATEX directive 2014/34/EU and EMC directive 2014/30/EU. The VSP is constructed with reference to published standards of directive 2014/35/EU, to eliminate electrical risks and fulfill 1.2.7 of ANNEX II of directive 2014/34/EU.

<sup>b</sup>The VSP is CSA certified according to the applicable CSA standards for use in Class I, Division 1 and Class I, Zone 0 hazardous locations within an ambient temperature range of Tamb: -20 °C to +50 °C.



<sup>c</sup>The IECEx examination certificate is IECEx UL 12.0021 with marking code Ex ia IIC T4 Ga for hazardous locations with an ambient temperature range of Tamb: -20 °C ≤ Ta ≤ +50 °C. The charging contact parameters are: Um = 6.2V; Ii = 1.3A.

Table 2 Warnings and cautionary statements

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-  Read and understand the manual before use. Failure to perform certain procedures or note certain conditions may impair the performance of this product.
  -  When sample tubing is connected to the pump and the pump is powered on, it continues to draw sample air even if the pump door is open. This can cause an unsafe condition. Remove the sample tubing from the pump inlet or power off the pump before opening the pump door.
  -  When the pump is powered on and no instrument is installed, the pump continues to draw sample air. This can cause an unsafe condition. Power off the pump before removing the instrument.
  -  Service the pump and replace or charge the battery packs *only* in an area known to be nonhazardous. Not for use in oxygen- enriched atmospheres.
  -  Battery contacts are exposed on battery packs when they are removed from the instrument. Do not touch the battery contacts and do not stack battery packs on top of each other.
  -  **WARNING**—Do *not* use the Ventis Slide-on Pump when sampling for these gases: Chlorine (CL<sub>2</sub>), Chlorine Dioxide (CLO<sub>2</sub>), Hydrogen Chloride (HCL), and volatile organic compounds (VOC), or when a sensor for any of these gases is installed and the target gas is unknown. The use of the Slide-On Pump with these gases will result in inaccurate gas readings due to their susceptibility to absorption.
  -  Insert the alkaline batteries with the correct positive (+) and negative (-) orientation. The Ventis Slide-on Pump is approved for use with the AAA alkaline battery types Energizer EN92 and Duracell MN2400 only. Do *not* mix battery types; when replacing alkaline batteries, replace each and every battery.

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IECEX

-  Replace battery packs with these part numbers only.  
IECEX: 17148313-1, 17134453-X1, 17138041, or 17150608.
  -  Alkaline battery pack part numbers 17150608 and 17138041 are only approved for use with three AAA battery types Duracell MN2400 and Energizer EN92. Replace all batteries at the same time.
- 

## Motorized pump and sampling line guidelines

When sampling with a motorized pump and sampling line, Industrial Scientific recommends the following:

- When the target gases are *unknown*, use Teflon-lined tubing. Otherwise, use either urethane or Teflon-lined tubing.  
*Note: WARNING*—Do *not* use the Ventis Slide-on Pump when sampling for chlorine (Cl<sub>2</sub>), chlorine dioxide (ClO<sub>2</sub>), hydrogen chloride (HCl), or volatile organic compounds (VOCs) or when the target gas is unknown and sensors for these gases are installed. The use of the Slide-On Pump with these gases will result in inaccurate gas readings due to their susceptibility to absorption.
- Know the length of the sample line as it is a factor in determining sampling time. A sample line may consist of tubing, a probe, or a probe and tubing. It should also have a dust filter-water stop installed at the line's end that will extend into the sample area. Sample-line length is defined as the distance from the dust filter-water stop opening to the point where the line connects to the pump's inlet. Ensure sample-line length does not exceed the pump's maximum draw.
- Before and after each air sample, perform a test of the full sampling line.

- Use your thumb to block the end of the sampling line at the water-stop opening. This should cause a pump-fault alarm.
  - Unblock the water-stop opening. After the alarm cycle completes, the pump should resume normal operation.
- Note:* If a pump fault does *not* occur, check and correct for cracks or other damage, debris, and proper installation in these areas: the sampling line and its connections, the pump's inlet cap and inlet barrel, and the dust filter-water stop items at the end of the sampling line and inside the pump inlet barrel.
- Based on sample-line length, calculate the *minimum time* recommended for the air sample to reach the instrument's sensors. As shown in Table 3, use a base time of 2 minutes, and add 2 seconds for each 30 cm (1 ') of line length. Watch the display screen for gas readings and, if present, allow them to stabilize to determine the reading.

Table 3 Minimum sample time for common sample-line lengths

Sample-line length	Base time (minutes)	+	Sample-line-length factor	=	Minimum sample time (mm:ss)
3.05 m (10')	2 min	+	(10' x 2 s)	=	02:20
6.10 m (20')	2 min	+	(20' x 2 s)	=	02:40
9.14 m (30')	2 min	+	(30' x 2 s)	=	03:00
12.10 m (40')	2 min	+	(40' x 2 s)	=	03:20
15.24 m (50')	2 min	+	(50' x 2 s)	=	03:40
18.29 m (60')	2 min	+	(60' x 2 s)	=	04:00
21.34 m (70')	2 min	+	(70' x 2 s)	=	04:20
24.38 m (80')	2 min	+	(80' x 2 s)	=	04:40
27.43 m (90')	2 min	+	(90' x 2 s)	=	05:00
30.48 m (100')	2 min	+	(100' x 2 s)	=	05:20

## Product overview

The Ventis Slide-on Pump is an in-field attachable and removable pump. This enables the use of a single compatible instrument for both personal monitoring (diffusion) and confined space applications (aspirated).

### Installation

The pump's spring-assisted, hinged door is opened and securely closed by the body-mounted latch; therefore, no tools are needed for instrument installation or removal. The pump also allows for the installation of a clip-equipped instrument.

### Power source

The pump is powered by its own battery and it does not draw power from the instrument battery. When using Li-ion battery packs, the pump and instrument batteries should be charged separately.

### Sample draw

50 feet. Flow rate (nominal): 0.27 liters per minute (LPM).

Table 4 Compatibilities

Category	Part number	Item	Notes
Instruments	Varies	Ventis Pro Series, Ventis MX4	Diffusion unit only Use of the VSP may result in sensor readings that are within $\pm 5\%$ of their published accuracy specifications; sensor T90 response times may increase by 10 seconds.
Pump Door	17157329-X	Door	Ventis Pro; Ventis MX4
	17154396 <sup>a</sup>	Door	Ventis MX4; MX4 iQuad
Tubing	18109206-XX	Air-sample tubing kit (Teflon-lined)	When the target gases are <i>unknown</i> , use Teflon-lined tubing. Otherwise, use either urethane or Teflon-lined tubing.
	18109207-XX	Air-sample tubing kit (Urethane)	<i>Note:</i> Do NOT use the Ventis Slide-on Pump when sampling for chlorine (Cl <sub>2</sub> ), chlorine dioxide (ClO <sub>2</sub> ), hydrogen chloride (HCl), or volatile organic compounds (VOCs) or when the target gas is unknown and sensors for these gases are installed. The use of the Slide-On Pump with these gases will result in inaccurate gas readings due to their susceptibility to absorption.
Batteries	17134453-XY	Ventis Standard Battery <sup>b</sup>	Run time is 18 hours at 20° C; recharge time is 3 to 5 hours <sup>c</sup> .
	17148313-Y	Ventis Extended Run-time Battery <sup>b</sup>	Run time is 36 hours at 20° C; recharge time is 3 to 7.5 hours <sup>c</sup> .
	17151184-XY	Cover	For use with Ventis Extended Run-time Battery.
	17154577-XY	Alkaline battery kit <sup>b</sup>	Includes pack, batteries, and cover. Run time: 10 hours at 20° C (typical) <sup>c</sup> .
"X" denotes color where 0=black and 1=orange. "Y" denotes approvals where 1 = ATEX, CSA, IECEX, and UL; and 5 = INMETRO.			
Chargers	18108191	Single-unit charger	—
	18108209	Single-unit charger with datalink	—
	18108650-A	6-unit charger	—
	18108651	12VDC Single-unit automotive charger	With plug
	18108652	12VDC Single-unit truck-mount charger	With plug
	18108653	12VDC Single-unit truck-mount charger	Hard wired

<sup>a</sup>MX4 iQuad can only be used with pump door 17154396.

<sup>b</sup>Ships with pump as ordered.

<sup>c</sup>Battery run-times are typical for operation at room temperature



# Hardware overview

The main hardware components of the Ventis Slide-on Pump are identified below in Table 5.

Table 5 Slide-on pump diagram and parts list

Feature	Feature	Part number
Power-on and -off button	Visual alarm (pump)	—
Power status indicator	Inlet cap and tubing nipple	17129909
Visual alarm (instrument)	Audible alarm (with filter) 90dB (typical)	17154581-5 (filter)
	Water barrier (inside inlet barrel; not shown)	17152395
	Battery status indicator and battery charge indicator	—
	Door latch	—
	Door	17157329
	Exhaust with exhaust filter	17154853-5 (filter)
	Wrist strap (not shown)	17128737

NOTE: If any ordered item is missing or appears to have been damaged, contact a local distributor of ISC products or ISC (See "Contact Information").  
 — indicates part is not field replaceable. See "Contact Information" to locate an ISC Service Center.

## Setup, Operation, and Service

Figure 1, below, details key setup, operation, and service tasks for the Ventis Slide-on Pump including pump setup, instrument installation, pump operation, and service activities.

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## Figure 1 Setup, operation, and service tasks

### Pump setup

**WARNING:** This task must be completed in an area known to be nonhazardous.



Attach the battery to the upper portion of the pump case back; the battery contacts align with the top of the pump.



Tighten the battery's four captive screws to a torque setting of 0.39 Newton-meters (55 ounce-inch).



To attach the wrist strap to the pump:

Thread the shorter strap loop through the pass-through on the back of the pump.



Thread the longer strap loop through the shorter loop, pull it to tighten.



Charge the pump in a compatible charger (single-unit charger shown). The pump's orientation is contact-side down so its battery contacts touch the charger's contact pins.

*Tip.* The battery charge indicators are:

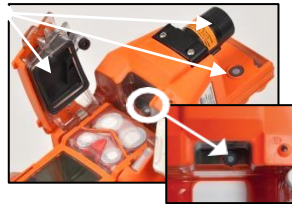
- Solid green indicates charging is complete.
- Blinking green indicates charging is in progress.
- Blinking amber indicates a charge fault.

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### Instrument installation and removal



To open the door, move the latch up to its open position.



Check for and clear the pump inlet, door openings, exhaust filter, and audible alarm filter (see inset photo), of any dirt or debris.



To install the instrument, place it in the pump cradle at a slight angle; the instrument top meets the cradle top.

Press down on the instrument to secure it in the cradle.

**NOTE:** Remove the instrument in a similar fashion by pulling it up from and out of the pump.



To close the pump door, lower it and hold it closed. Move the latch to its closed position to secure the door.




After installing the instrument and before taking an air sample, perform a pump test.

*Tip.* To prevent damage to or loss of the door, transport or store the pump with its door closed and latched.

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## Pump test and operation



1. Power on the pump: press and hold the power button  for three seconds. The pump will emit a series of audio and visual indicators as it goes through the start-up sequence. When the pump's power status LED turns green, it is ready for use.
2. Check the pump's battery status indicator.
  - Solid green indicates the battery's charge level is between 50% and 100%.
  - Solid amber indicates the battery's charge level is at 50% or less.
  - A blinking amber light with audible beep indicates a *critically* low battery; the battery's remaining charge will operate\* the pump for less than one hour.
3. Attach one end of the sample tubing to the pump inlet's nipple. Use a compatible water stop at the other end of the sampling line.


4. Use your thumb to block the end of the sampling line at the water-stop opening. This should cause a pump-fault alarm. Unblock the water-stop opening. After the alarm cycle completes, the pump should resume normal operation.

*Note:* If a pump fault does *not* occur, first check the pump's inlet cap and ensure that it is tight. Then check and correct for cracks or other damage in the sampling line and its connections, the pump's inlet cap and inlet barrel, and the dust filter-water stop items at the end of the sampling line and inside the pump inlet barrel.

\*Operation at room temperature.

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## Shutting Down

To power off the pump, press and hold the pump power button . The audible indicator will sound five times before complete shutdown.

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## Service Tasks

### Door Installation and removal



- Top peg to hinge
- Spring coil
- Bottom peg to hinge

1. Power off the pump.
2. Open the door.
3. To remove the door, lightly press it past the fully open position.
4. A wire extends from the spring coil inside the covered hinge. To attach the door, ensure the wire rests on the inside of the door. Press the door's flexible pegs into the pump case grooves located above and below the covered hinge.

### Battery removal and installation



**WARNING:** This task must be completed in an area known to be nonhazardous.

1. Power off the pump.
2. To remove the battery from the pump, loosen its four captive screws.
3. Attach the battery to the pump case back; align the battery contacts with the top of the pump.
4. Tighten the battery's four captive screws to a torque setting of 0.39 newton-meters (55 ounce-inch).

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### Water barrier



1. Power off the pump.
2. Turn the pump inlet cap counterclockwise to remove.



3. Remove the water barrier from the inlet barrel.
4. Place the new water barrier inside the inlet barrel; the side with the larger filter surface should face the instrument operator.



5. Reattach the cap and turn clockwise to tighten. Ensure that the inlet cap is tight.

NOTE: The pump will not operate without a water barrier.

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### Exhaust filter or audible alarm filter



1. Using tweezers, peel off the audible alarm filter (shown) or the exhaust filter and discard.



2. Lift to remove a new filter from the sheet.



3. Place the filter on the alarm (or exhaust), adhesive side down. Press and hold for five seconds to ensure the adhesive is activated.



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Figure 1 Setup, operation, and service tasks

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# Alarms

The following table describes the types of alarms that may occur when using the pump. Indicators, possible causes, and recommended actions are described for each alarm type. For additional assistance in resolving any alarm condition, see an on-site supervisor or contact ISC Technical Support (see “Contact Information”).

Table 6 Alarms and indicators

Alarm type and indicators	Possible causes	Recommended actions
<b>Battery failure</b>		
<ul style="list-style-type: none"> <li>Audible alarm beeps on and off continually.</li> <li>Battery status LED blinks amber continually.</li> </ul>	The battery pack can no longer operate the pump unit.	Charge or replace the battery pack.
<b>System alarm</b>		
<ul style="list-style-type: none"> <li>Audible alarm turns on.</li> <li>Each LED blinks <i>twice</i>.</li> <li>Audible alarm turns off.</li> <li>The above sequence repeats continuously.</li> </ul>	There is system level fault.	Check the inlet barrier for blockage. See an on-site supervisor or contact ISC Technical Support (see “Contact Information”).
<b>Pump flow fault</b>		
<ul style="list-style-type: none"> <li>Audible alarm turns on.</li> <li>Each LED blinks <i>once</i>.</li> <li>Audible alarm turns off.</li> <li>The above sequence repeats continuously.</li> </ul>	The pump nipple, inlet barrel, water barrier, exhaust (inside pump cradle), or sample tubing is blocked.	Check for debris at the pump nipple, inside the inlet barrel, at the water barrier, inside the pump cradle, and in the tubing. Attempt to clear any blockage.  If the condition persists, the filter or the tubing may need to be replaced.
<b>Charge fault</b>		
<ul style="list-style-type: none"> <li>Battery status LED blinks amber continually.</li> </ul>	<p>The pump unit is not properly seated in the charger or the battery is alkaline and cannot be charged.</p> <p>The battery temperature is outside the allowable temperature range for charging.</p>	<p>Remove the pump from the charger. Redock a Li-ion powered pump.</p> <p>Allow the battery to reach a temperature that is within the allowable range for charging.</p>

## Warranty

Industrial Scientific Corporation's Ventis™ Slide-on Pumps are warranted to be free from defects in material and workmanship for a period of two years after purchase. This warranty includes the pump and the battery pack as shipped with the Ventis™ Slide-on Pump.

Filters are warranted to be free from defects in material and workmanship for 18 months from date of shipment, or one year from date of first use, whichever occurs first, except where otherwise stated in writing in Industrial Scientific literature.

### Limitation of Liability

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It shall be an express condition to Industrial Scientific's warranty that all products be carefully inspected for damage by Buyer upon receipt, be properly calibrated for Buyer's particular use, and be used, repaired, and maintained in strict accordance with the instructions set forth in Industrial Scientific's product literature. Repair or maintenance by non-qualified personnel will invalidate the warranty, as will the use of non-approved consumables or spare parts. As with any other sophisticated product, it is essential and a condition of Industrial Scientific's warranty that all personnel using the products be fully acquainted with their use, capabilities and limitations as set forth in the applicable product literature.

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