

VENTIS® SLIDE-ON PUMP



Field Guide

Setup, Operation, and Service

Edition 8

May 14, 2018

Part Number: 17154524-1

INDUSTRIAL

SCIENTIFIC

Industrial Scientific Corporation, Pittsburgh, PA USA

Industrial Scientific Co., Ltd. Shanghai, China

© 2016, 2017, 2018 Industrial Scientific Corporation

All rights reserved. Published 2018.

Revision 10



www.indsci.com/ventis/vsp

Contents

Tables and Figures	iii
General Information.....	1
Guidelines for using a motorized pump and sampling line.....	3
Product overview	4
Installation.....	4
Power source	4
Sample draw	4
Hardware overview	7
Setup, Operation, and Service	7
Pump setup.....	7
Instrument installation and removal.....	8
Pump test and operation	9
Shutting down	9
Service	10
Door Installation and removal	10
Battery	10
Water barrier	10
Exhaust filter or audible alarm filter	10
Alarms	11
Warranty	12
Limitation of Liability.....	12
Contact Information.....	13

Tables and Figures

Table 1.1 Certifications.....	1
Table 1.2 Warnings and cautionary statements.....	2
Table 1.3 Minimum sample time for common sample-line lengths	3
Table 1.4 Compatibilities	5

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.

Certifying Body (CB)	Area Classifications	Standards	Approved Temperature Range
ATEX ¹	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 ²	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 ³	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)

¹The 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.







²The model 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.

³The 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.



³The 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.

³The charging contact parameters are: Um = 6.2V; li = 1.3A.

Table 1.2 Warnings and cautionary statements

-  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.
-  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.

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.
-

Guidelines for using a motorized pump and sampling line

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

- Choose the tubing type based on the target gases. If the target gases are *known*, use Teflon-lined tubing when sampling for these gases: chlorine (Cl₂), chlorine dioxide (ClO₂), hydrogen chloride (HCl), and volatile organic compounds (VOCs). For other *known* target gases, urethane tubing or Teflon-lined tubing may be used.

When the target gases are *unknown*, use Teflon-lined tubing.

- 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 a thumb to block the end of the sampling line at the water-stop opening. This should cause a pump-fault alarm.
 - Remove the thumb from 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 1.3 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 in-field 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 secured 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): .27 liters per minute (LPM).

Table 1.4 Compatibilities

Item	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*	Door	Ventis MX4; MX4 iQuad
Tubing Kit	18109206-XX	Air-sample tubing kit (Teflon-lined)	If the target gases are <i>known</i> , use Teflon-lined tubing when sampling for these gases: chlorine (Cl ₂), chlorine dioxide (ClO ₂), hydrogen chloride (HCl), and volatile organic compounds (VOCs). For other <i>known</i> target gases, urethane tubing or Teflon-lined tubing may be used. When the target gases are <i>unknown</i> , use Teflon-lined tubing.
	18109207-XX	Air-sample tubing kit (Urethane)	
Batteries	17134453-XY	Li-ion battery kit**	Run time is 18 hours at 20° C; recharge time is 3 to 5 hours ^a .
	17148313-Y	Extended range Li-ion battery pack**	Run time is 36 hours at 20° C; recharge time is 3 to 7.5 hours ^a .
	17151184-XY	Cover	For use with Extended Range Lithium-ion battery pack.
	17154577-XY	Alkaline battery kit**	Includes pack, batteries, and cover. Run time: 10 hours at 20° C (typical) ^a
*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

*MX4 iQuad can only be used with pump door 17154396.

**Ships with pump as ordered.

^aBattery run-times are typical for operation at room temperature

Hardware overview

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
Door latch closed	Door latch open	Pump cradle

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

Pump setup

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



1. 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 .39 Newton-meters (55 ounce-inch).
2. 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.

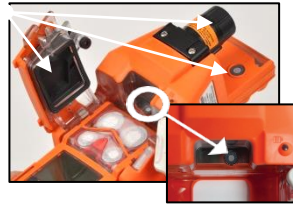


Tip. The battery charge indicators are:

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

3. 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.
-

Instrument installation and removal



1. To open the door, move the latch up to its open position.
2. Check for and clear the pump inlet, door openings, exhaust filter, and audible alarm filter (see inset photo), of any dirt or debris.
3. To install the instrument, place it in the pump cradle at a slight angle; the instrument top meets the cradle top.
4. 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.




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

5. To close the pump door, lower it and hold it closed. Move the latch to its closed position to secure the door.
6. After installing the instrument and before taking an air sample, perform a pump test.

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 a thumb to block the end of the sampling line at the water-stop opening. This should cause a pump-fault alarm.
Remove the thumb from 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.

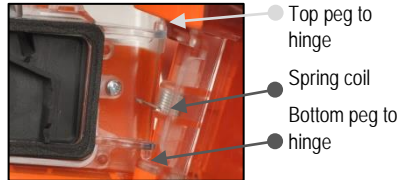
*Operation at room temperature.

Shutting down

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

Service

Door Installation and removal



1. Power off the pump.
2. Open the door.
3. To remove the door, lightly press it past the full open position.
4. A wire extends from the spring coil located 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



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. Tighten the battery's four captive screws to a torque setting of .39 newton-meters (55 ounce-inch).

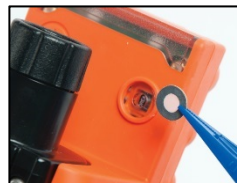
Water barrier



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.

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

Exhaust filter or audible alarm filter



1. Using a pair of tweezers, peel off the audible alarm filter (shown) or the exhaust filter and discard.
 2. Lift to remove a new filter from the pack.
 3. Place the filter on the alarm (or exhaust) adhesive side down. Press and hold for five seconds to ensure the adhesive is activated.
-

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”).

Alarm type and indicators	Possible causes	Recommended actions
Battery failure		
<ul style="list-style-type: none"> Audible alarm beeps on and off continually. Battery status LED blinks amber continually. 	The battery pack can no longer operate the pump unit.	Charge or replace the battery pack.
System alarm		
<ul style="list-style-type: none"> Audible alarm turns on. Each LED blinks <i>twice</i>. Audible alarm turns off. The above sequence repeats continuously. 	There is system level fault.	Check the inlet barrier for blockage. See an on-site supervisor or contact ISC Technical Support (see “Contact Information”).
Pump flow fault		
<ul style="list-style-type: none"> Audible alarm turns on. Each LED blinks <i>once</i>. Audible alarm turns off. The above sequence repeats continuously. 	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.
Charge fault		
<ul style="list-style-type: none"> Battery status LED blinks amber continually. 	<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

THE WARRANTY SET FORTH ABOVE IS STRICTLY LIMITED TO ITS TERMS AND IS IN LIEU OF ALL OTHER WARRANTIES, GUARANTEES, EXPRESS OR IMPLIED, ARISING BY OPERATION OF LAW, COURSE OF DEALING, USAGE OF TRADE OR OTHERWISE. INDUSTRIAL SCIENTIFIC MAKES NO OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.

SHOULD THE PRODUCT FAIL TO CONFORM TO THE ABOVE WARRANTY, BUYER'S ONLY REMEDY AND INDUSTRIAL SCIENTIFIC'S ONLY OBLIGATION SHALL BE, AT INDUSTRIAL SCIENTIFIC'S SOLE OPTION, REPLACEMENT OR REPAIR OF SUCH NON-CONFORMING GOODS OR REFUND OF THE ORIGINAL PURCHASE PRICE OF THE NONCONFORMING GOODS.

IN NO EVENT WILL INDUSTRIAL SCIENTIFIC BE LIABLE FOR ANY OTHER SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR OTHER SIMILAR DAMAGES, INCLUDING LOSS OF PROFIT OR LOSS OF USE, ARISING OUT OF THE SALE, MANUFACTURE OR USE OF ANY PRODUCTS SOLD HEREUNDER WHETHER SUCH CLAIM IS PLEADED IN CONTRACT OR IN TORT, INCLUDING STRICT LIABILITY IN TORT AND WHETHER INDUSTRIAL SCIENTIFIC HAS BEEN ADVISED OF THE POTENTIAL FOR SUCH DAMAGES. Industrial Scientific's total liability hereunder from any cause whatsoever (except liability from personal injury caused by Industrial Scientific's negligence), whether arising under contract, warranty, tort (including negligence), strict liability, products liability or any other theory of liability, will be limited to the lesser of Buyer's actual damages or the price paid to Industrial Scientific for the Products that are the subject of Buyer's claim. All claims against Industrial Scientific must be brought within one year after the cause of action arises, and Buyer expressly waives any longer statute of limitations.

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.

Buyer acknowledges that it alone has determined the intended purpose and suitability of the goods purchased. It is expressly agreed by the parties that any technical or other advice given by Industrial Scientific with respect to the use of the goods or services is given without charge and at Buyer's risk; therefore, Industrial Scientific assumes no obligations or liability for the advice given or results obtained.

Contact Information

Industrial Scientific Corporation

1 Life Way

Pittsburgh, PA 15205-7500 USA

Web: www.indsci.com

Phone: +1 412-788-4353 or 1-800-DETECTS (338-3287)

E-mail: info@indsci.com

Fax: +1 412-788-8353

Industrial Scientific France S.A.S.

5 Rue Frédéric Degeorge, CS 80097

62002 Arras Cedex, France

Web: www.indsci.com

Téléphone : +33 (0)1 57 32 92 61

E-mail: info@eu.indsci.com

Fax: +33 (0)1 57 32 92 67

英思科传感仪器（上海）有限公司

地址：中国上海市浦东金桥出口加工区桂桥路290号

邮编：201206

电话：+86 21 5899 3279

传真：+86 21 5899 3280

E-mail： info@ap.indsci.com

网址： www.indsci.com

服务热线：+86 400 820 2515

To locate a nearby distributor of our products or an Industrial Scientific service center or business office, visit us at www.indsci.com.

Rendez-vous sur notre site Web www.indsci.com, si vous voulez trouver un distributeur de nos produits près de chez vous, ou, si vous recherchez un centre de service ou un bureau Industrial Scientific.

Besuchen Sie uns unter www.indsci.com, um einen Vertriebshändler unserer Produkte oder ein Servicecenter bzw. eine Niederlassung von Industrial Scientific zu finden.

Para buscar un distribuidor local de nuestros productos o un centro de servicio u oficina comercial de Industrial Scientific, visite www.indsci.com.

如需查找就近的产品经销商或 Industrial Scientific 服务中心或业务办事处，请访问我们的网站 www.indsci.com。

INDUSTRIAL

SCIENTIFIC