NORTH AMERICAN DRÄGER

Operator's Instruction Manual

Open Reservoir Scavenger

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Operator's Responsibility for Patient Safety

North American Dräger anesthesia products are designed to provide the greatest degree of patient safety that is practically and technologically feasible. The equipment design, the accompanying literature, and the labeling on the equipment take into consideration that the purchase and use of the equipment are restricted to trained professionals, and that certain inherent characteristics of the equipment are known to the trained operator. Instructions, warnings, and caution statements are limited, therefore, to the specifics of the North American Dräger design. This publication excludes references to hazards which are obvious to a medical professional, to the consequences of product misuse, and to potentially adverse effects in patients with abnormal conditions. Product modification or misuse can be dangerous. North American Dräger disclaims all liability for the consequences of product alterations or modifications, as well as for the consequences which might result from the combination of North American Dräger products with products supplied by other manufacturers if such a combination is not endorsed by North American Dräger.

The operator of the anesthesia system must recognize that the means of monitoring and discovering hazardous conditions are specific to the composition of the system and the various components of the system. It is the operator, and not the various manufacturers or suppliers of components, who has control over the final composition and arrangement of the anesthesia system used in the operating room. Therefore, the responsibility for choosing the appropriate safety monitoring devices rests with the operator and user of the equipment.

Patient safety may be achieved through a variety of means depending on the institutional procedures, the preference of the operator, and the application of the system. These means range from electronic surveillance of equipment performance and patient condition to simple, direct contact between operator and patient (direct observation of clinical signs). The responsibility for the selection of the best level of patient monitoring belongs solely to the equipment operator. To this extent, the manufacturer, North American Dräger, disclaims responsibility for the adequacy of the monitoring package selected for use with the anesthesia system. However, North American Dräger is available for consultation to discuss monitoring options for different applications.

Restriction

Federal law restricts this device to sale by, or on the order of, a physician.

Limitation of Liability

North American Dräger's liability, whether arising from or related to the manufacture and sale of the products, their installation, demonstration, sales representation, use, performance, or otherwise, including any liability based upon North American Dräger's product warranty, is subject to and limited to the exclusive terms of North American Dräger's limited warranty, whether based upon breach of warranty or any other cause of action whatsoever, regardless of any fault attributable to North American Dräger and regardless of the form of action (including, without limitation, breach of warranty, negligence, strict liability, or otherwise).

North American Dräger shall in no event be liable for any special, incidental, or consequential damages (including loss of profits) whether or not foreseeable and even if North American Dräger has been advised of the possibility of such loss or damage. North American Dräger disclaims any liability arising from a combination of its product with products from another manufacturer if the combination has not been endorsed by North American Dräger. Buyer understands that the remedies noted in North American Dräger's limited warranty are its sole and exclusive remedies.

Furthermore, buyer acknowledges that the consideration for the products, equipment, and parts sold reflects the allocation of risk and the limitations of liability referenced herein.

Conventions Used in This Manual

This manual uses several conventions to help organize the information. Please read about these conventions carefully so that you understand their significance in the manual.

Typefaces

Different typefaces are used throughout the manual to differentiate between narrative information and machine messages and labels.

Warnings and Cautions

This manual contains warning and caution statements about the open reservoir scavenger.

- *Warning* statements provide important information which, if ignored, could lead directly to a patient's injury.
- *Caution* statements provide important information which, if ignored, could lead directly to equipment damage and indirectly to a patient's injury.

General Warnings

The following warnings apply to general operation and maintenance of the open reservoir scavenger. Warnings and cautions about installing and operating specific parts appear with those topics.

WARNING: Personnel involved with the setup, operation, or maintenance of the open reservoir scavenger must be thoroughly familiar with this instruction manual.

WARNING: This device must be serviced only by an authorized representative of North American Dräger. Refer any servicing to qualified service personnel.

Overview

The North American Dräger open reservoir scavenger is intended for use with suction (vacuum) waste gas disposal systems. This scavenging approach applies a continuous suction to transfer waste gas from the scavenger to the disposal system.

The open reservoir scavenger is classified as an *open* system with continually open relief ports that provide positive and negative pressure relief.

The reservoir canister contains excess waste gas, if necessary, to accommodate a variety of waste gas flow rates from the patient breathing system.

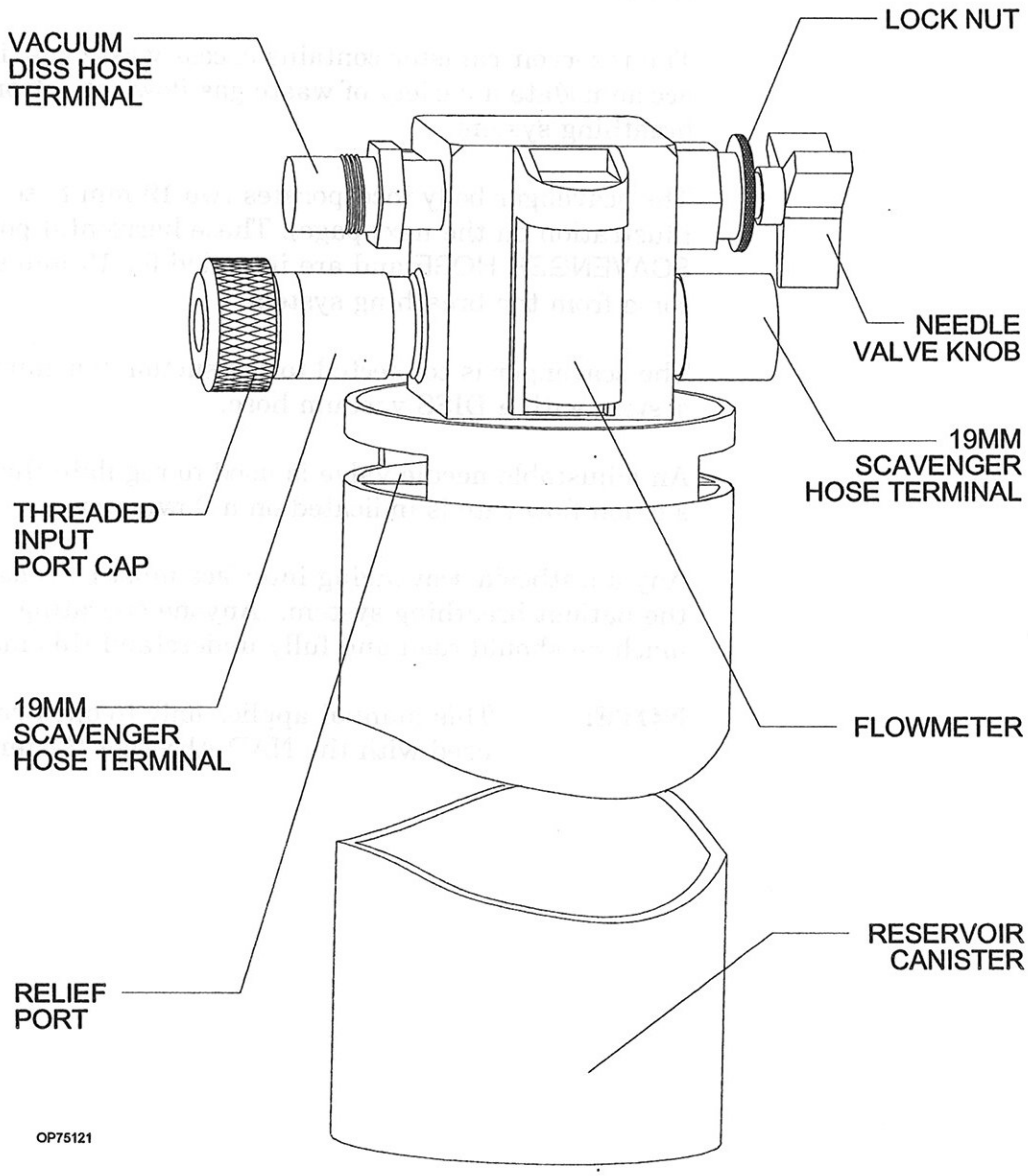
The scavenger body incorporates two 19 mm hose terminals (see illustration on the next page). These horizontal ports are labeled SCAVENGER HOSE and are intended for 19 mm scavenger hoses that come from the breathing system.

The scavenger is connected to the suction (vacuum) waste gas disposal system with a DISS vacuum hose.

An adjustable needle valve is used to regulate the suction flow. The suction flow rate is indicated on a flowmeter.

Any anesthesia scavenging interface must be considered an extension of the patient breathing system. Anyone operating a Narkomed anesthesia machine should read and fully understand this manual.

NOTE: This manual applies only to open reservoir scavengers used with the NAD Absorber Systems.


VACUUM DISS HOSE TERMINAL
LOCK NUT
NEEDLE VALVE KNOB
19MM SCAVENGER HOSE TERMINAL
THREADED INPUT PORT CAP
19MM SCAVENGER HOSE TERMINAL
FLOWMETER
RESERVOIR CANISTER
RELIEF PORT
OP75121

Installation Procedures

Use the following procedures to install the open reservoir scavenger.

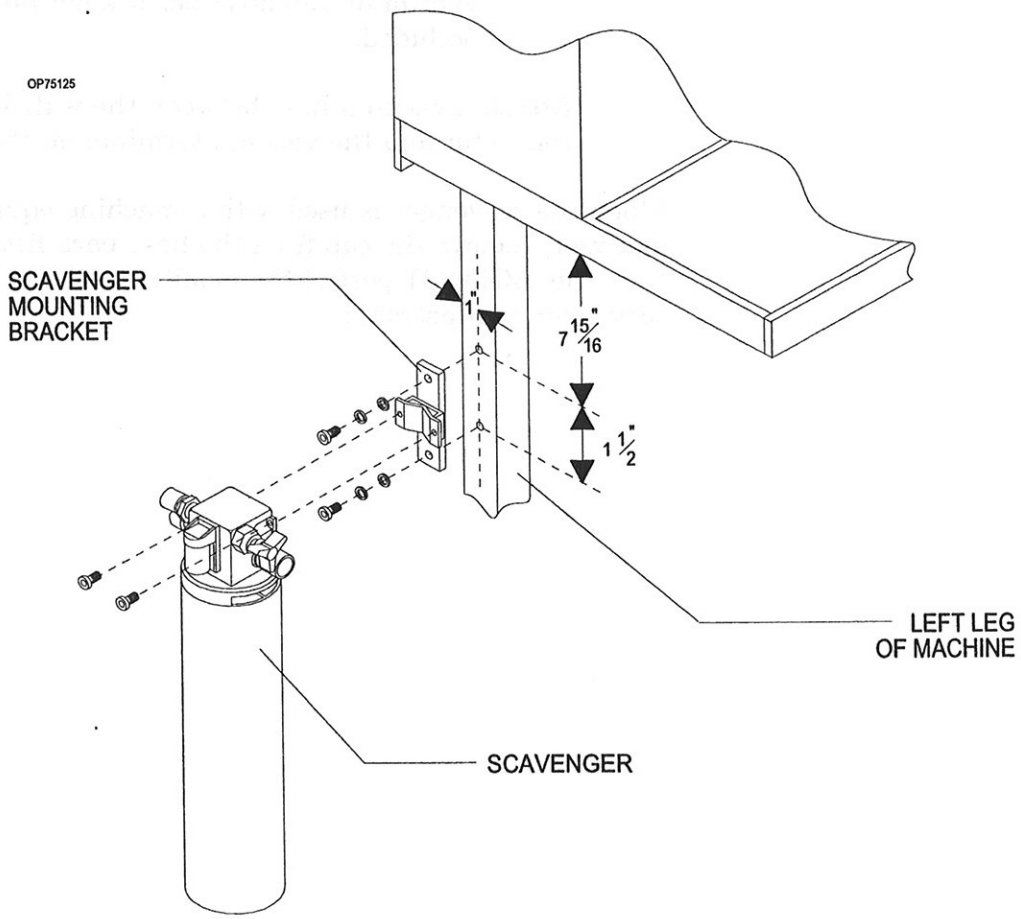
1. Turn the system power switch to STANDBY and remove AC power from the machine.

2. Locate the two scavenger bracket mounting holes in the left leg of the machine. If the holes are not already drilled, mark their locations as shown in the illustration below.

   Drill the holes with a #21 (.159 diameter) drill, and tap 10-32 threads. Carefully de-burr the holes and vacuum all chips from the area.

3. Attach the scavenger mounting bracket to the leg of the machine with two 10-32 x 1/2 inch socket head screws, lock washers, and flat washers.

4. Attach the scavenger to the bracket with two 1/4-20 x 1/2 inch socket head screws.



5. Connect one end of a 19 mm scavenger hose to the 19 mm hose terminal labeled SCAVENGER HOSE on the bottom of the absorber pole and connect the other end to the 19 mm hose terminal labeled SCAVENGER HOSE on the right side of the scavenger body.

6. Connect one end of an additional 19 mm scavenger hose to the 19 mm hose terminal labeled SCAVENGER HOSE on the ventilator relief valve and connect the other end to the 19 mm hose terminal labeled SCAVENGER HOSE on the left side of the scavenger body.

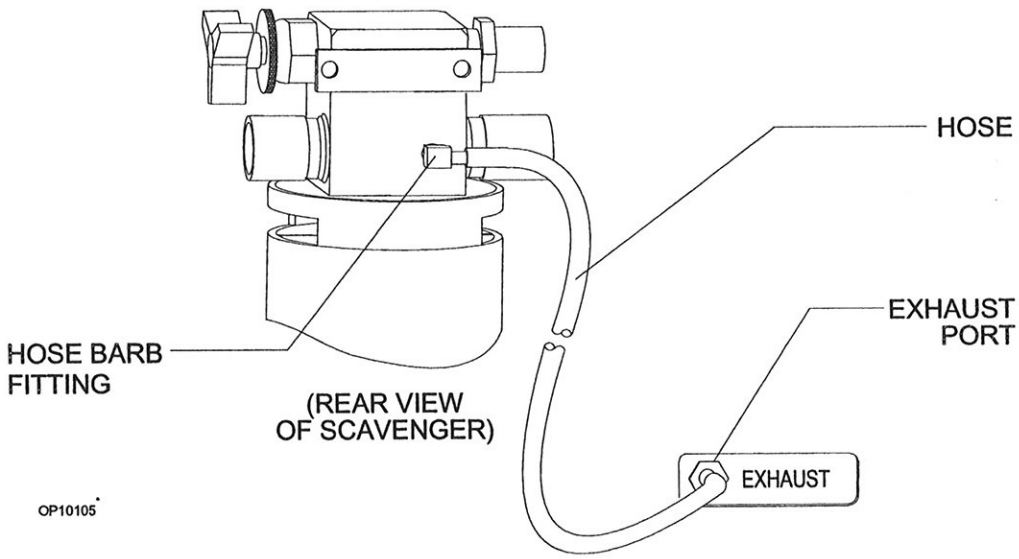
7. Connect the short 19 mm scavenger hose between the absorber system APL valve and the 19 mm hose terminal near the top of the absorber pole.

NOTE: If the particular installation uses only one of the scavenger ports, install the threaded input port cap in the unused port.

WARNING: Verify that the 19 mm scavenger hoses leading from the ventilator and absorber are not pinched, kinked, or occluded.

8. Attach a vacuum hose between the wall VACUUM or EVAC hose connector and the vacuum terminal on the scavenger.

When the scavenger is used with a machine equipped with a NAD gas analyzer, remove the cap from the hose barb fitting and connect a hose from the EXHAUST port of the monitor to the hose barb fitting on the scavenger as illustrated.


HOSE
EXHAUST PORT
HOSE BARB FITTING
(REAR VIEW OF SCAVENGER)
EXHAUST
OP10105

Pre-use Checkout Procedure

Follow these instructions to test the scavenger for proper operation.

Testing negative pressure relief:

1. Connect hoses as described in the installation procedure section.
2. Short circuit the absorber inspiratory and expiratory valves with a 22 mm breathing hose.
3. Set the absorber manual/auto selector valve to the BAG position.
4. Turn the APL valve control knob fully counterclockwise.
5. Verify that the suction waste gas disposal system is active.
6. Adjust the scavenger needle valve to a flowmeter indication between the two white lines on the scavenger flowmeter. Close all flow control valves on the anesthesia machine. Occlude the absorber breathing bag terminal and observe the breathing pressure gauge on the absorber. The gauge should indicate approximately 0 cmH_2O pressure.

Testing positive pressure relief:

1. Perform steps 1 through 5 above.
2. If the absorber system or ventilator bellows is equipped with a PEEP valve, turn the PEEP valve control knob to its lowest setting or set the peep bypass to the PEEP OFF position.
3. Turn the scavenger needle valve knob clockwise to its fully closed position.
4. Turn the system power switch to on, adjust the oxygen flow control valve on the anesthesia machine to a flow of 10 lpm, and occlude the absorber breathing bag terminal.

5. The flow of oxygen should now exit the system through the relief ports around the top of the canister. The absorber breathing pressure gauge should indicate pressure less than 5.0 cmH_2O.

6. After the test, adjust the scavenger needle valve to a flowmeter indication halfway between the two white lines.

7. Remove the occlusion from the absorber breathing bag terminal.

8. Remove the 22 mm breathing hose used to short circuit the inspiratory and expiratory valves.

9. Close the oxygen flow control valve and turn the system power switch to STANDBY.

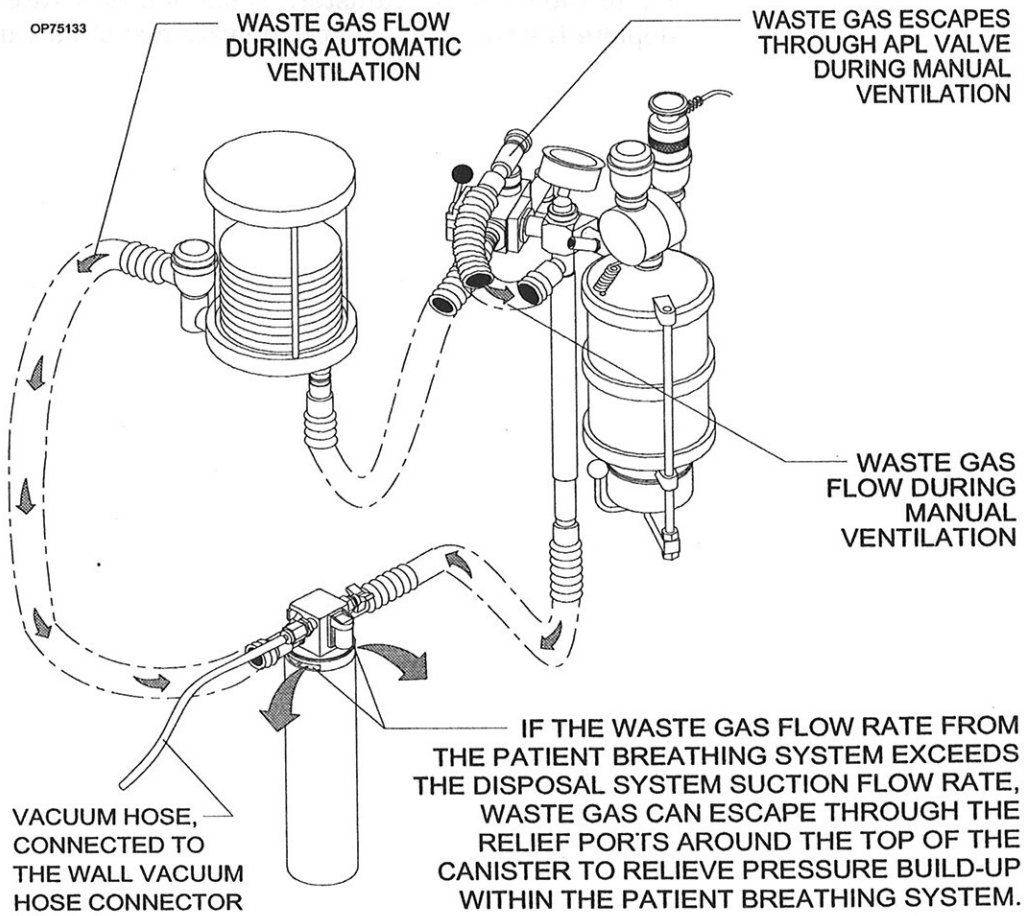
Operating Instructions

The open reservoir scavenger reservoir canister has relief ports around the top that are open to the atmosphere. If the waste gas flow rate from the patient breathing system exceeds the disposal system suction flow rate, the canister initially accommodates excess waste gas. After excess waste gas fills the canister, waste gas then exits through the relief ports around the top of the canister. This relieves pressure build up within the patient breathing system.

CAUTION: Waste gas vented from the relief ports may contaminate the operating room. Adjust the needle valve properly to prevent such contamination.

If the disposal system flow rate exceeds the waste gas flow rate from the patient breathing system, the disposal system draws room air through the relief ports. Consequently, the disposal system does not apply a negative pressure to the patient breathing system.

Since the open reservoir scavenger relies on the relief ports for positive and negative pressure relief, it is very important to verify that the relief ports are not occluded.



Needle Valve Adjustment

The needle valve setting may require readjustment during a case. For example, a *shared* suction disposal system may provide a varying suction flow rate, depending on the number of users at any given time. Adjust the waste gas flow rate properly to prevent waste gas contamination of the operating room. Adjusting the needle valve regulates the waste gas exhaust flow (refer to illustration in Section 2).

To adjust the needle valve:

1. Attach all appropriate hoses as described in the installation section and verify that the waste gas disposal system is active.

2. Loosen the lock nut and adjust the needle valve knob until the flowmeter indicates a flow halfway between the two white lines, re-tighten the lock nut. This setting corresponds to a suction flow rate of approximately 25 lpm.

Depending on the fresh gas flow rate, the needle valve setting may have to be adjusted to achieve a suction flow above or below the lines on the flowmeter. A suction flow rate too low will cause waste gas contamination of the operating room through the relief ports around the top of the reservoir canister. A suction flow rate too high will needlessly deplete the waste gas disposal system suction capacity and cause noise.

Maintenance and Cleaning Procedures

Disassemble and clean the scavenger at a minimum of six month intervals. Use the following step-by-step instructions to perform maintenance and cleaning. Refer to the illustration on the following page.

1. Inspect all scavenger hoses for deterioration. Replace worn hoses.

2. Clean the outer surface of the scavenger with a moist cloth.

3. Unscrew and remove the needle valve assembly. Inspect the needle valve and seat for lint or dust accumulation. Clean with compressed air if necessary.

4. The flowmeter incorporates a small port, located on its underside, which is open to the atmosphere. This port must remain open to enable proper flowmeter operation. Inspect the port and clean with compressed air if occluded.

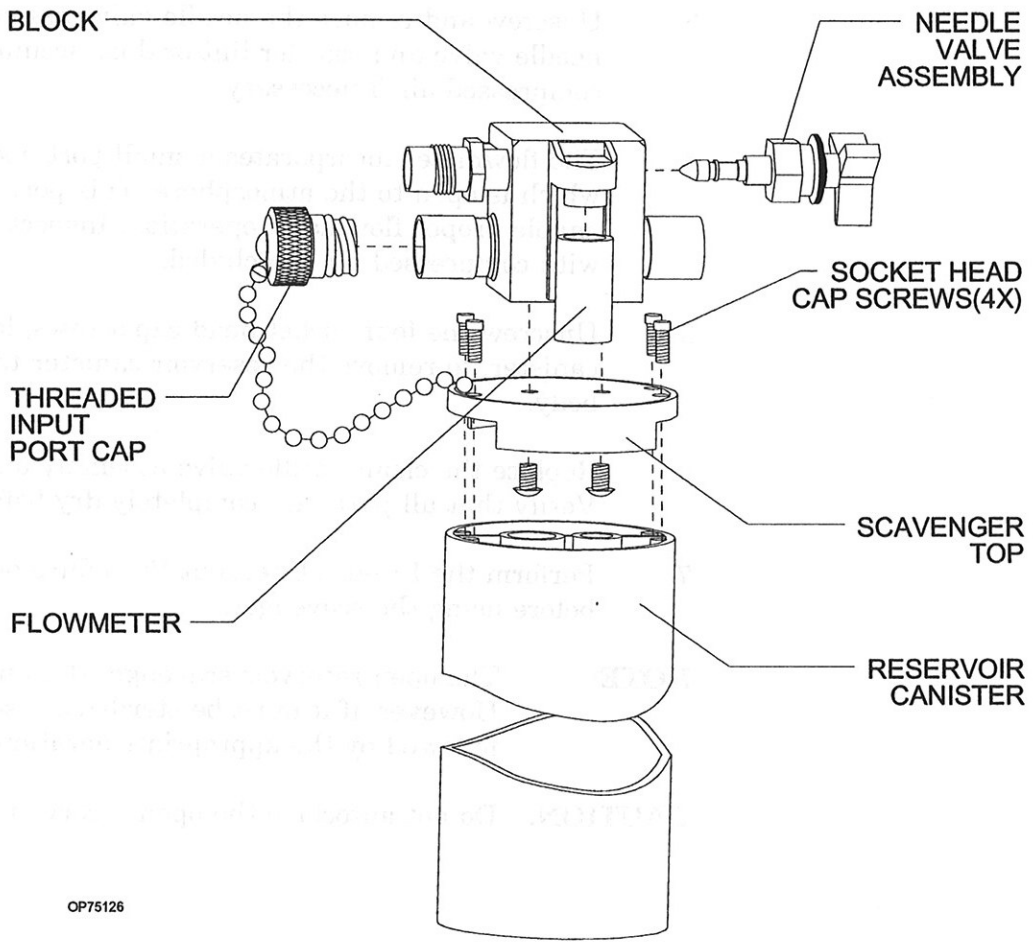
5. Unscrew the four socket head cap screws, located at the top of the canister, to remove the reservoir canister from the scavenger body.

6. Replace the clean needle valve assembly and reservoir canister. Verify that all parts are completely dry before reassembly.

7. Perform the Pre-use Checkout Procedure described in Section 4 before using the scavenger.

NOTE: The open reservoir scavenger does not require sterilization. However, if it must be sterilized, use ethylene oxide gas followed by the appropriate aeration.

CAUTION: Do not autoclave the open reservoir scavenger.


BLOCK
NEEDLE VALVE ASSEMBLY
SOCKET HEAD CAP SCREWS(4X)
THREADED INPUT PORT CAP
SCAVENGER TOP
FLOWMETER
RESERVOIR CANISTER
OP75126

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AMERICAN
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