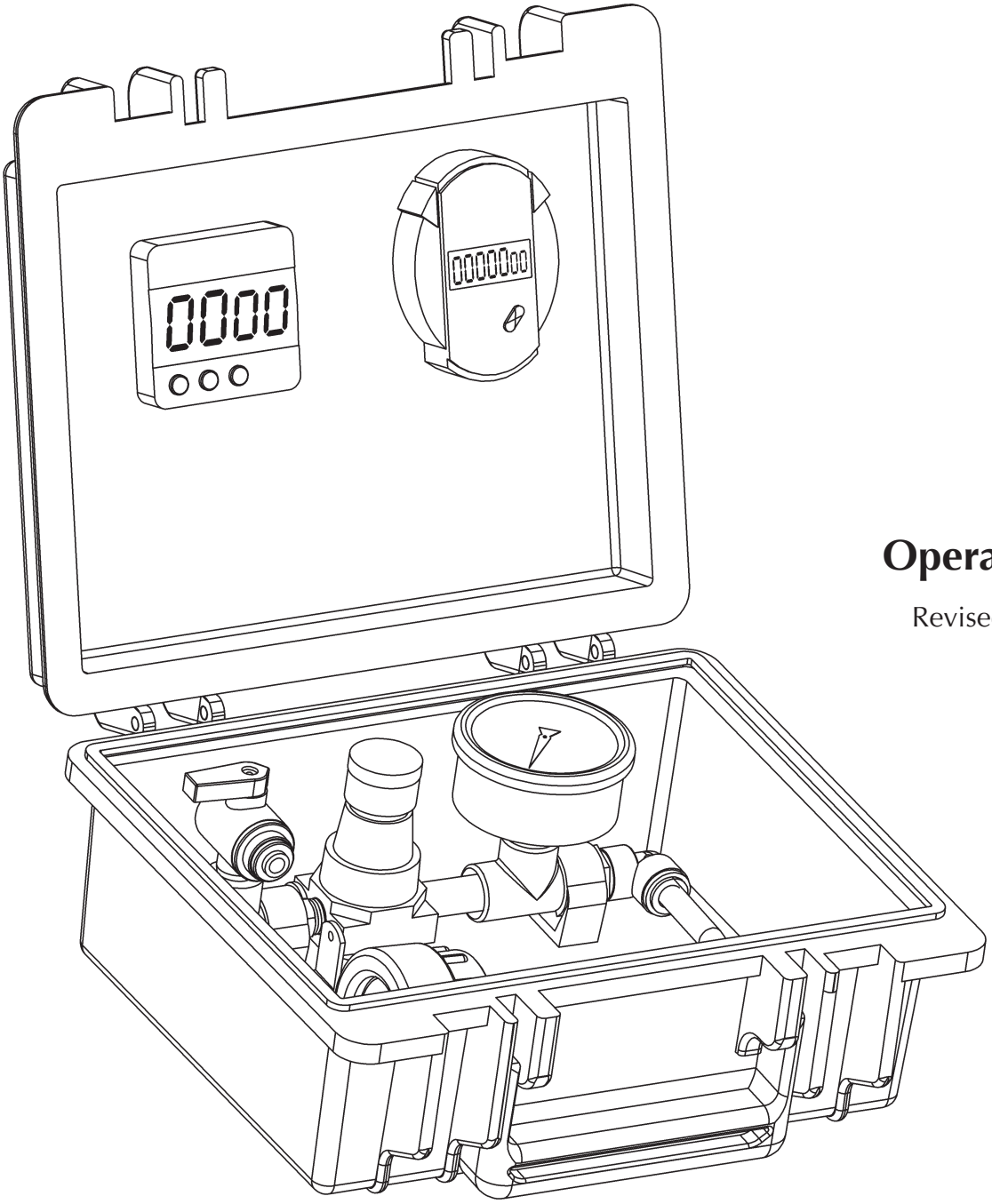


Operators Guide

Revised February, 2013

Manufactured by:

SDI Solutions

A division of Procam Controls, Inc.
2605 Technology Drive #300 Plano, TX 75074
PH 972-422-1212 FAX 972-422-6262
email: sdisolutions@optipure.net

Table of Contents

Introduction

Thank you for purchasing **manualSDI**. We hope you'll find **manualSDI** to be an indespensible tool.

We developed **manualSDI** as a lower cost alternative to our popular ***simpleSDI***. Based on the classic or standard (ASTM D-4189-07) SDI test **manualSDI** includes everything you need in a compact convenient package to conduct SDI tests.

- **manualSDI** uses standard .45 micron, 47 mm membranes, no encapsulated or proprietary size single-source membranes.
- **manualSDI** operates on as little as 35 psi feed water pressure. Testing is now possible on many water supplies that previously required a booster pump.
- **manualSDI** includes a digital timer, stopwatch and graduated cylinder. Necessary components missing from other kits.
- **manualSDI** is housed in a rugged crush-proof case. No flimsy tissue-thin plastic here.

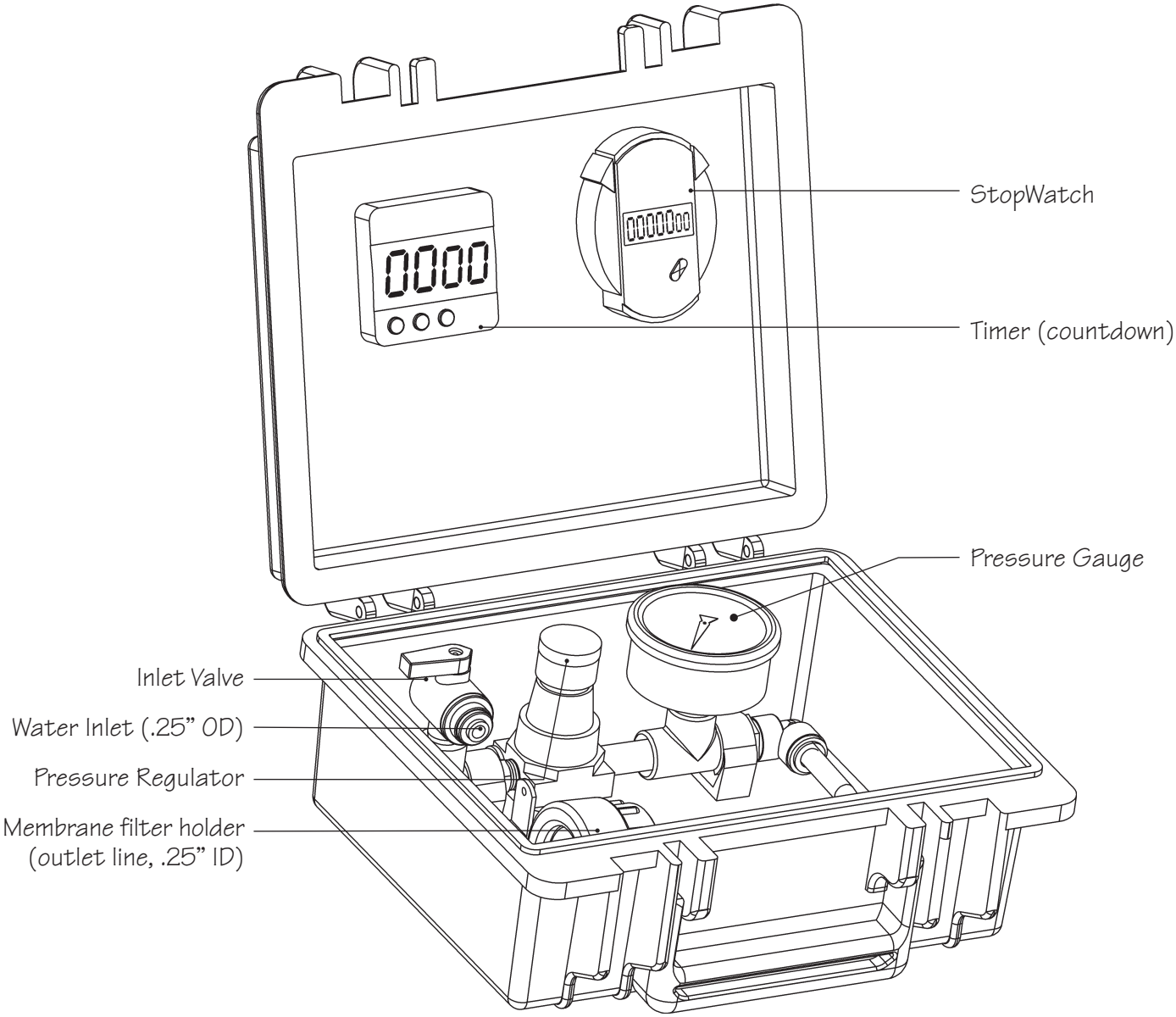
As good as **manualSDI** is, there's always room for improvement. If you have an experience, idea or input either positive or negative we'd love to hear from you.

Again, thanks for your purchase. Welcome to the community of simple SDI users.

David Spears

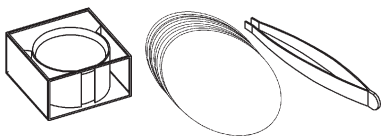
email: david@simplesdi.com

Getting to know *manualSDI* Overview

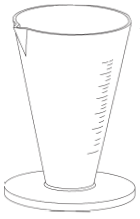


Included with manual SDI:

Membrane filters (100) & Tweezers

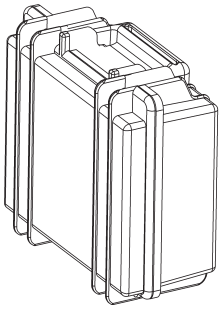


Graduated Cylinder (500ml)

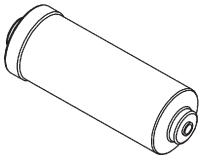


Optional Components:

Booster Pump

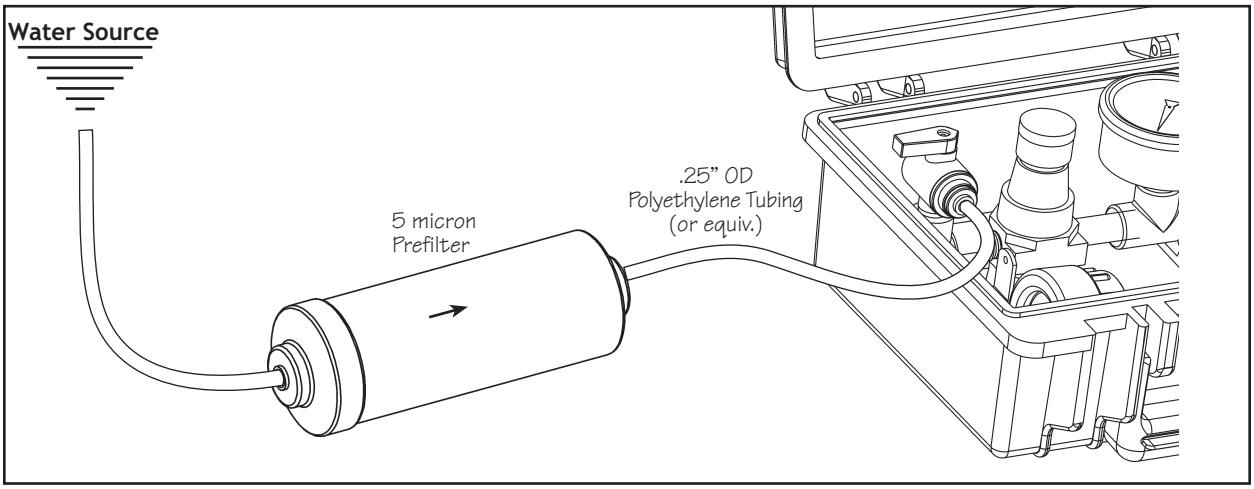


Prefilter (5 micron)

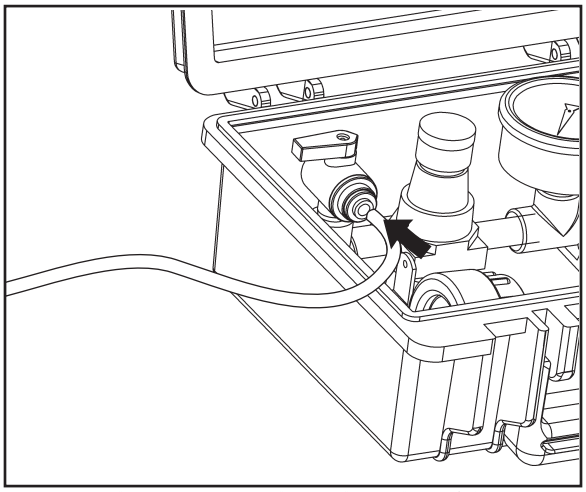


Setting up *manualSDI* **Prefiltration**

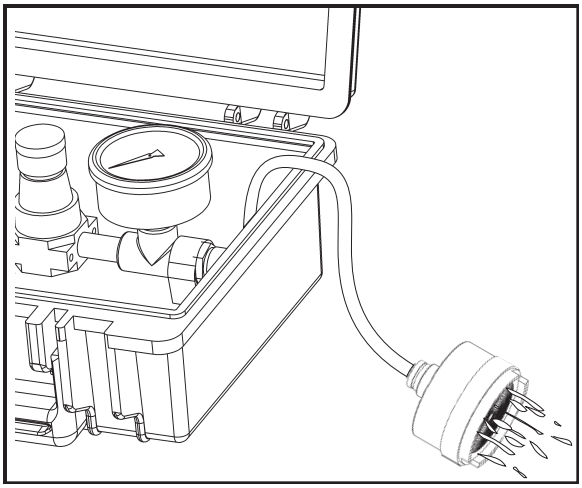
In most cases, the water to be tested will require prefiltration in order to obtain a meaningful SDI result. For existing RO systems, take the SDI measurement following the pretreatment systems. If evaluating a water supply for a new installation, a 5 micron inline prefilter like the one shown below is recommended.



Setting up simple SDI: **Getting Started**



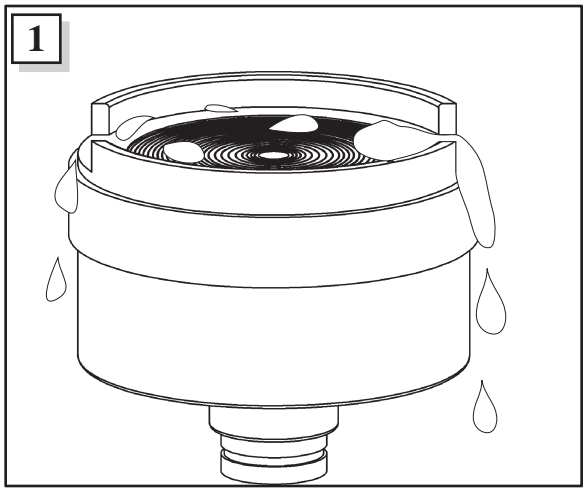
Connect the water supply to the inlet of the meter.



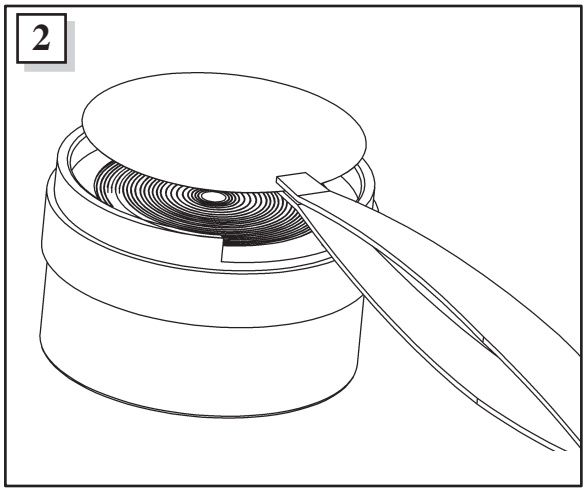
Place the open membrane filter holder over a bucket or drain. Open the inlet valve and flush water through the meter for 15-30 seconds. The objective is to remove any water or particulates from previous tests as well as to clear air bubbles from the system.

Setting up *manualSDI* Test Procedure

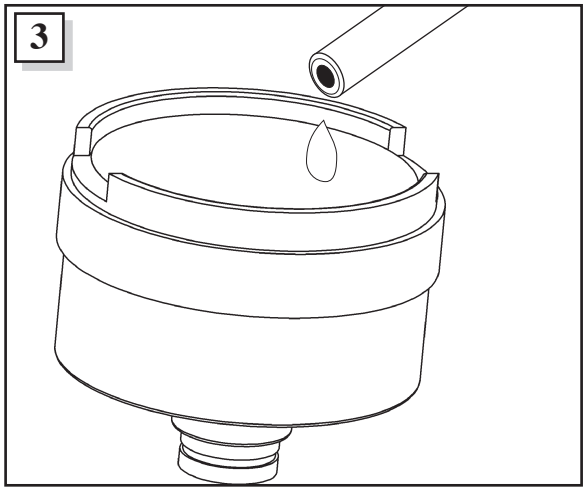
Filter installation:



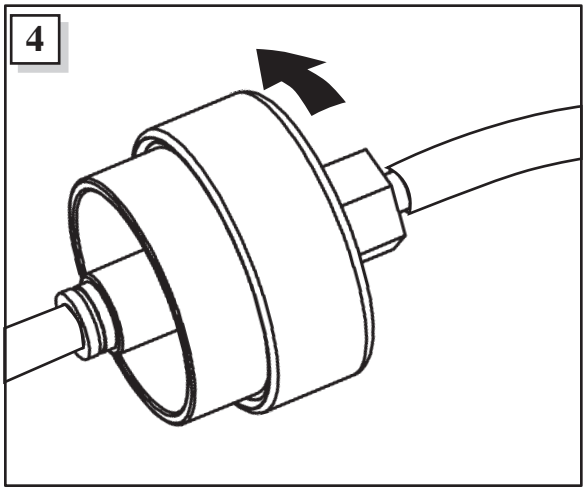
After completing the flush procedure, hold the inlet half of the filter housing in one hand. Tilt the filter housing UP so that the face of the housing is up and parallel to the ground. Open the inlet valve very slightly so that water spills out of the housing. Close the valve while keeping the filter housing face up and parallel to the ground.



Using the tweezers provided, place a membrane on the face of the filter housing. *(Note that the membranes are white and are separated by light blue pieces of paper. Make sure that you have a membrane and only a membrane.)*



Next, wet the membrane thoroughly. An eyedropper or small bottle with a spout are helpful in doing this.

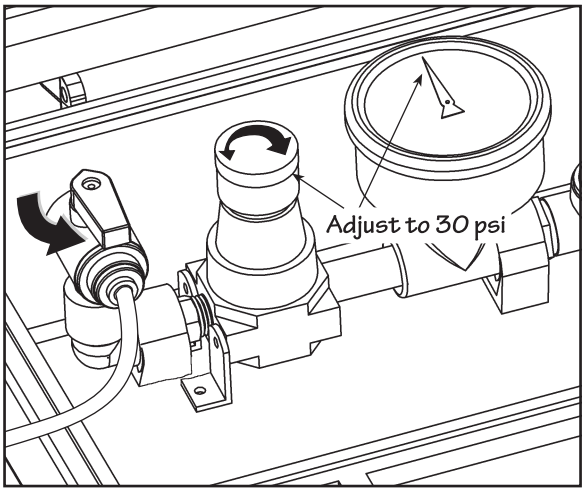


Once the membrane has been wetted thoroughly, put the top back on the membrane filter housing and tighten fully. *(Go to Page 10.)*

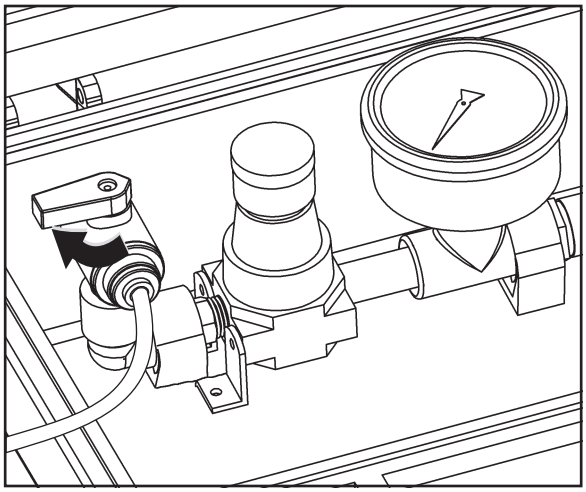
Setting up *manualSDI* Test Procedure

- With the system purged of air bubbles and the membrane filter installed, the only thing left is to adjust the pressure and then start the test.

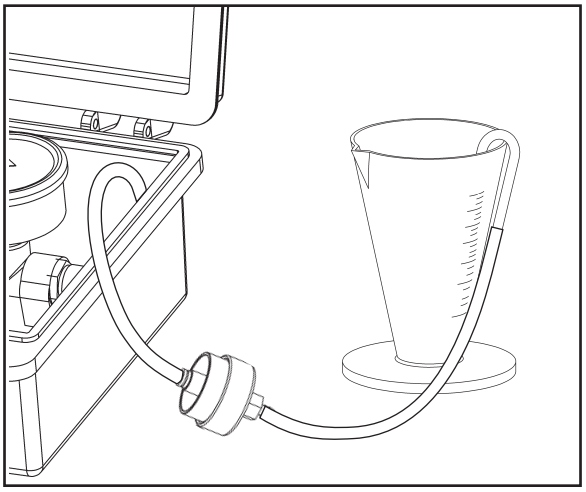
Adjusting the test pressure.



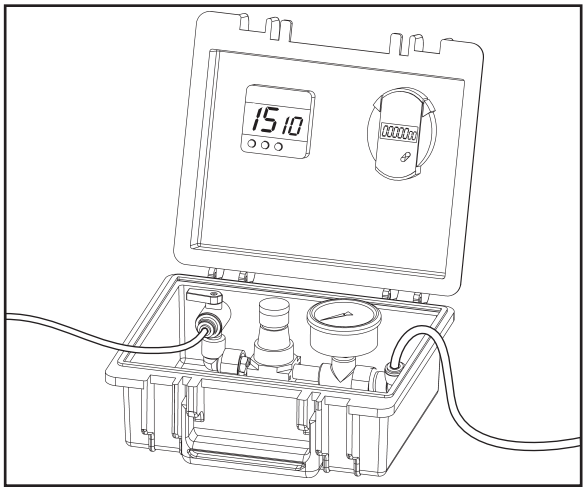
Open the Inlet Valve and as quickly as possible adjust the pressure to 30 psi. (Turning the knob on the pressure regulator clockwise increases the pressure, turning it counter-clockwise reduces the pressure.)



As soon as you reach 30 psi, close the inlet valve. This procedure is only necessary on the first test on a given water supply. On subsequent tests the pressure can be adjusted, if necessary, during the first few seconds of the test.

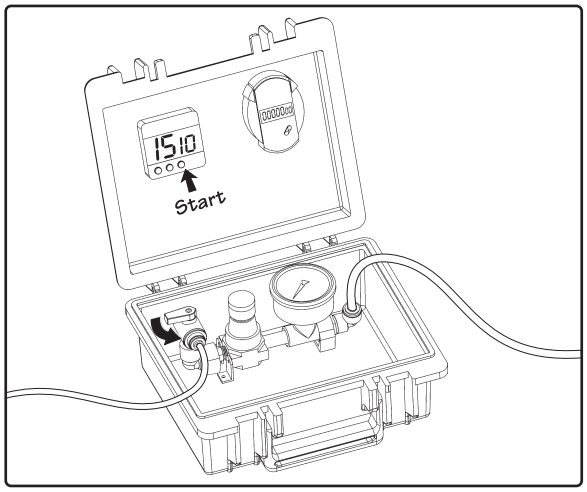


Drain the water from the outlet tube. Empty any water out of the 500 ml graduate. Place the J tube at the end of the outlet tube over the lip of the graduate.

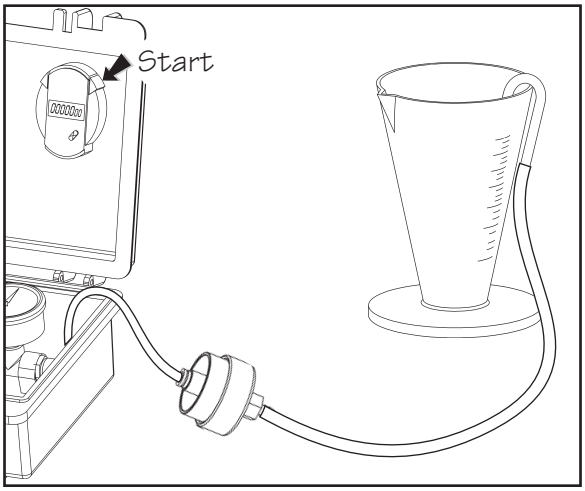


Set the timer to 15 Minutes and 10 seconds. Reset the stopwatch to Zero.

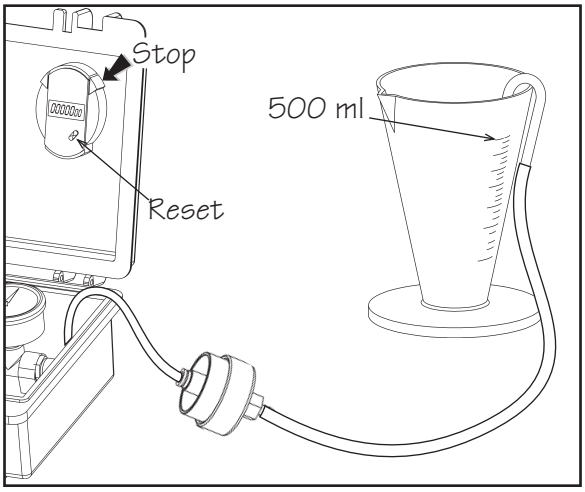
Setting up *manualSDI* Test Procedure; continued



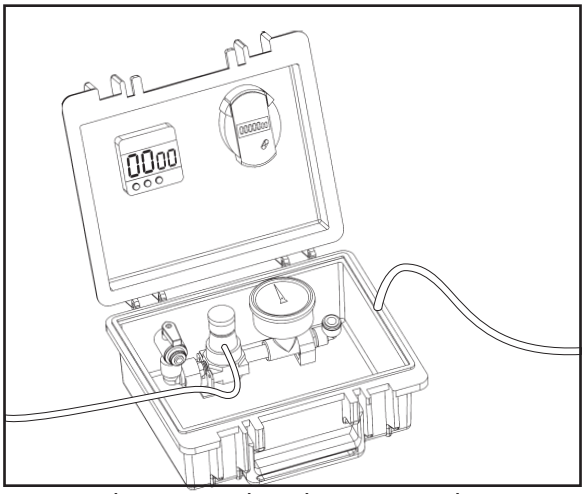
Start the countdown timer. Watch the timer. When the time reaches 15:00, open the inlet valve.



Monitor the graduate. When water starts flowing into the graduate, start the stopwatch.



When the water level reaches 500ml, stop the stopwatch. Record this value as T_i on the SDI calculation worksheet. Reset the stopwatch to zero. Empty the graduate. Allow water to continue to flow through the system.



Monitor the timer. When the timer reaches 00:00 an alarm will sound. Measure once more, the time it takes to fill the graduate to 500ml. Record this value as T_{15} on the SDI calculation worksheet. The test is now complete. The SDI calculation procedure is found on the next page.

SDI Calculation Worksheet and Log.

(Make copies as needed.)

SDI Calculation

$$SDI_T = \frac{\% P_{30}}{T} = \frac{\left[1 - \frac{t_i}{t_f}\right] 100}{T}$$

where %P30 = *percent @ 30 psi feed pressure (see note 1)*
T = *total elapsed flow time (see note 1)*
t_i = *initial time required to collect 500 ml sample.*
t_f = *time required to collect 500 ml sample after test time T. (see note 1)*

Note 1. The value $\%P_{30}$ is commonly referred to as the "plugging factor". $\%P_{30}$ (plugging factor) should not exceed 75%. If you obtain values higher than 75%, the test should be conducted using a shorter time for T, that is 5 or 10 minute measurements for T_f. If $\%P_{30}$ exceeds 75% on a 5 minute test, you have water that needs further treatment before a meaningful SDI result can be obtained.

Date ________ Time ______ Location __________
Water Source ___ _________ Water Temp. ________
Membrane Manuf./Type ______ ______________

Measurements	Calculations: SDI	$\%P_{30}$
T_i ______ (seconds)		
T_5 ______ (seconds)	SDI_5 ______	______
T_{10} ______ (seconds)	SDI_{10} ______	______
T_{15} ______ (seconds)	SDI_{15} ______	______

Date ________ Time ______ Location __________
Water Source ___ _________ Water Temp. ________
Membrane Manuf./Type ______ ______________

Measurements	Calculations: SDI	$\%P_{30}$
T_i ______ (seconds)		
T_5 ______ (seconds)	SDI_5 ______	______
T_{10} ______ (seconds)	SDI_{10} ______	______
T_{15} ______ (seconds)	SDI_{15} ______	______

Date ________ Time ______ Location __________
Water Source ___ _________ Water Temp. ________
Membrane Manuf./Type ______ ______________

Measurements	Calculations: SDI	$\%P_{30}$
T_i ______ (seconds)		
T_5 ______ (seconds)	SDI_5 ______	______
T_{10} ______ (seconds)	SDI_{10} ______	______
T_{15} ______ (seconds)	SDI_{15} ______	______

Date ________ Time ______ Location __________
Water Source ___ _________ Water Temp. ________
Membrane Manuf./Type ______ ______________

Measurements	Calculations: SDI	$\%P_{30}$
T_i ______ (seconds)		
T_5 ______ (seconds)	SDI_5 ______	______
T_{10} ______ (seconds)	SDI_{10} ______	______
T_{15} ______ (seconds)	SDI_{15} ______	______

Date ________ Time ______ Location __________
Water Source ___ _________ Water Temp. ________
Membrane Manuf./Type ______ ______________

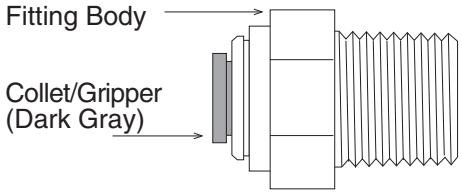
Measurements	Calculations: SDI	$\%P_{30}$
T_i ______ (seconds)		
T_5 ______ (seconds)	SDI_5 ______	______
T_{10} ______ (seconds)	SDI_{10} ______	______
T_{15} ______ (seconds)	SDI_{15} ______	______

Date ________ Time ______ Location __________
Water Source ___ _________ Water Temp. ________
Membrane Manuf./Type ______ ______________

Measurements	Calculations: SDI	$\%P_{30}$
T_i ______ (seconds)		
T_5 ______ (seconds)	SDI_5 ______	______
T_{10} ______ (seconds)	SDI_{10} ______	______
T_{15} ______ (seconds)	SDI_{15} ______	______

Operating *manualSDI* How to use our quick-connect fittings

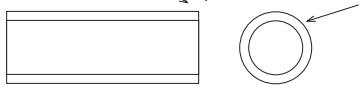
Fitting Overview



Tubing Preparation

The outside of the tubing must be free of knicks and gouges.

Cut tubing with a plastic tubing cutter or a razor knife. Make a clean, square cut.

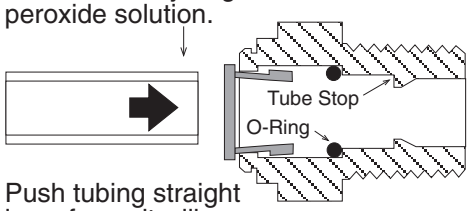


After cutting, make sure the end of the tube is round. Correct any out-of-roundness that may have occured in cutting the tubing.

To Attach Tubing:

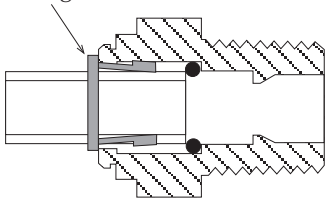
Cutaway view of fitting and tubing

To ease insertion, moisten end of tubing with fresh water or 3% hydrogen peroxide solution.

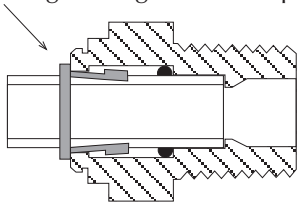


Push tubing straight in as far as it will go.

Note: Resistance will be felt when the tubing meets the O ring.



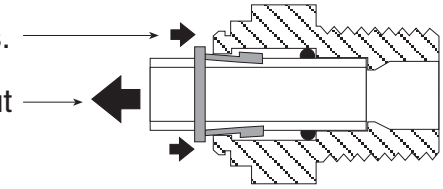
Keep pushing until the resistance is overcome and the tubing rests against the stop.



To Remove Tubing:

Press collet in to release grippers.

While holding the collet in, pull out on the tubing.



It may be necessary to use a partially open crescent wrench or similar device to hold both sides of the collet in while pulling the tubing out.

manualSDI Specifications

Dimensions

Inch (mm)

Wide	Deep	High
10.75 (273	9.75 (248)	5 (127)

Weight

5 pounds, (2.3kg)

Sample Water Requirements

Feed Pressure 35 psi minimum, 100 psi maximum.

Minimum flow rate 1.4 Liters per minute at 35 psi at start of test. Flow decreases during test.

Temperature 100°F maximum. (max 1°F variation during test)

Tests Performed

SDI_5 500 ml sample volumes

SDI_{10} 500 ml sample volumes

SDI_{15} 500 ml sample volumes

manualSDI Limited Warranty

What the warranty covers:
Procam Controls warrants the manualSDI test kit to be free from defects in materials and workmanship during the warranty period. If a product proves to be defective during the warranty period, Procam will at is sole option repair or replace the product with a like product. Replacement product or parts may include remanufactured or refurbished parts or components.

How long the warranty is effective:
The manualSDI test kit is warranted for one (1) year for parts and labor from the date of the first consumer purchase or 15 months from ship date, whichever comes first.

What the warranty does not cover:

1. Damage, deterioration or malfunction resulting from:
    a. Accident misuse, neglect, fire, water, lightning or other acts of nature, unauthorized product modification or failure to follow instructions supplied with the product.
    b. Repair or attempted repair by anyone not authorized by Procam
    c. Any damage of the product due to shipment.
    d. Causes external to the product such as electric power fluctuations.
    e. Use of supplies or parts not meeting Procam's specifications.
    f. Normal wear and tear.
    g. Any other cause which does not relate to a product defect.
2. Transportation costs necessary to obtain service under this warranty.
3. Labor other than factory labor.

How to get service:

1. To obtain warranty service, contact Procam for a Return Material Authorization (RMA).
2. You will be required to provide:
    a. The serial number of your meter
    b. Your name and address
    c. A description of the problem
3. Package the meter carefully for shipment and return the meter to Procam, freight prepaid.

Limitation of implied warranties:
There are no warranties, expressed or implied, which extend beyond the description contained herein including the implied warranty of merchantablility and fitness for a particular purpose.

Exclusion of damages:
Procam's liability is limited to the cost of repair or replacement of the product. Procam shall not be liable for:

1. Damage to other property caused by any defects in the product, damages based upon inconvenience, loss of use of the product, loss of time, loss of profits, loss of business opportunity, loss of goodwill, interference with business relationships or other commercial loss, even if advised of the possibility or such damages.
2. Any other damages, whether incidental, consequential or otherwise.
3. Any claim against the customer by any other party.

Effect of state law:
This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on implied warranties and/or do not allow the exclusion of incidental or consequential damages, so the above limitations and exclusions may not apply to you.