

THE FOLLOWING USER MANUAL APPLIES TO ALL TSUNAMI MEMBRANE DRYERS



21999-0889



21999-0957



21999-0357



21999-0524

**WARNING**

Your safety is very important. Read all instructions before beginning any service or installation on your Tsunami Membrane Dryer. Always wear safety eye protection when working with compressed air products. Failure to follow maintenance instructions could result in operating failure or product damage. System pressure must be released prior to any installation or service. Always install the system with the arrows indicating the direction of airflow. Use appropriate thread sealant on all connection fittings unless otherwise specified. Do not alter the dryer or filtration system from its original design as this may cause failure in its operational parameters.

**DESCRIPTION**

Congratulations on the purchase of your Tsunami Membrane Drying System! By adhering to the specifications and maintenance schedule listed in the manual, your air system will provide years of service with minimal maintenance.

Incoming air enters the 1st stage water separator where water and particulates are removed down to 10 micron. The air then travels through the 2nd stage oil coalescing filter where oil aerosols are filtered down to .001 ppm and particulates are trapped down to .01 micron. For units using the 3<sup>rd</sup> stage activated carbon filter, oil vapors are removed down to .003 ppm. The pretreated air enters the membrane dryer where it is dried as the air travels down through the specialized hollow tubes which allow water vapor to permeate through and collect in the housing. A small amount of dry air is then taken from the downstream supply and redirected up and around the hollow tube fibers, “sweeping” away the collected water vapor; see Note below. Tsunami Membrane Drying Systems can provide dew points down to -40°F and relative humidity down to .01% RH, dependent on the inlet air conditions.

*Note: The “sweep” air is expelled through orifices in the membrane dryer and this sweep air will be audible, like an air leak.*

**DRYER SPECIFICATIONS**

Maximum Inlet Air Temperature: 100°F      Maximum Pressure: 175 psi  
Sweep Air: 3.3 CFM @ 100 psi

Dryer P/N	Max Flow	Inlet Port	Outlet Port	Drain Type	Voltage	Weight
21999-0889	15 CFM*	1/4" NPT	1/4" NPT	Float	N/A	9 lbs
21999-0357	20 CFM*	1/2" NPT	1/2" NPT	Float	N/A	16 lbs
21999-0957	15 CFM*	1/4" NPT	1/4" NPT	Electronic	120 VAC**	12 lbs
21999-0524	20 CFM*	1/2" NPT	1/2" NPT	Electronic	120 VAC**	22 lbs

\* 6 SCFM flow recommended to achieve 100°F dew point suppression  
\*\* Alternative voltages available as special order, lead time will be affected

**INSTALLATION & SERVICE REQUIREMENTS**

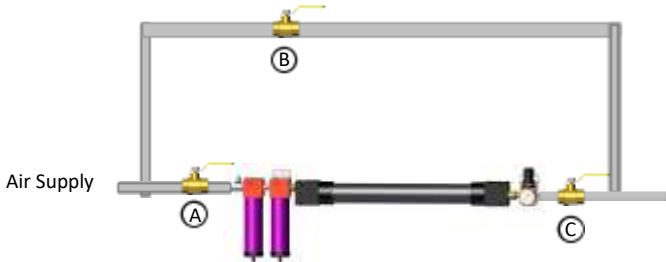
**IMPORTANT: Tsunami Membrane Dryers are configurable in multiple variations. Before beginning installation, it is important to determine the direction of air flow which best meets your installation application requirements. Failure to follow required maintenance schedule will void warranty.**

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**INSTALLATION INSTRUCTIONS - BYPASS CIRCUIT INSTALL**

For ease of service, it is highly recommended to install a bypass circuit around the membrane dryer. Follow the diagram below when installing a bypass circuit. Verify that system pressure is relieved prior to performing installation.

A. Inlet Ball Valve B. Bypass Ball Valve C. Outlet Ball Valve



Using the dryer: Open the inlet (A) and outlet (C) ball valves and close the bypass (B) valve to direct air flow through the membrane dryer. This will provide clean, dry air downstream.

Bypassing the dryer: Close the inlet (A) and outlet (C) ball valves and open the bypass (B) valve to direct airflow around the dryer; this will allow service or maintenance to be performed without shutting down total compressed air supply. Wait until membrane core stops sweeping air prior to servicing.

**DRYER INSTALLATION – 21999-0889 & 21999-0357**

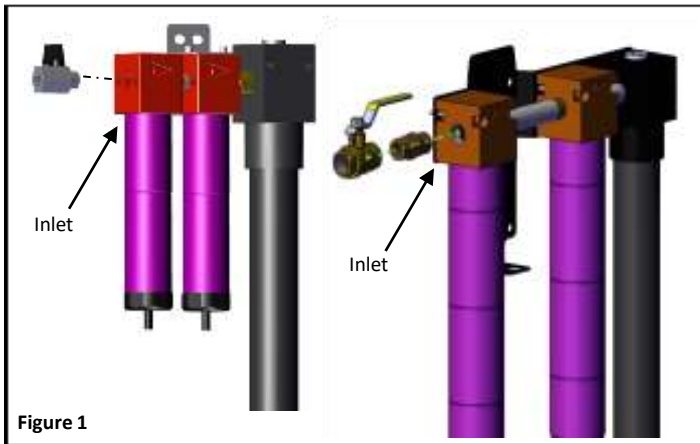


Figure 1

1. Prior to mounting the unit, Step 5, follow all assembly instructions to assemble the regulator and gauge to the unit.
2. Install the supplied ball valve to dryer inlet directly or with the use of the ½" NPT hex nipple. *Figure 1*
3. Vertical installation of the membrane dryer is typical, proceed to Step 4; if horizontal install is needed, proceed to Step 8.  
*Note: Horizontal installation is only recommended with P/N 21999-0889, converting P/N 21999-0357 to have the membrane dryer horizontally is not an easy nor convenient process; contact the factory to discuss this option with one of their trained technical specialists.*
4. Install pressure gauge into regulator using appropriate thread sealant. *Figure 2*
5. Mount the filters in an upright position. Mount on sturdy wall or frame using the supplied mounting brackets. On 20 CFM models, be sure to properly secure the bracket using all 4 mounting holes whenever possible.  
*Note: If using dryer in an automotive paint application, install outside of spray booth. Bake cycles may cause premature aging of the membrane tubes inside the unit*

**DRYER INSTALLATION continued – 21999-0889 & 21999-0357**

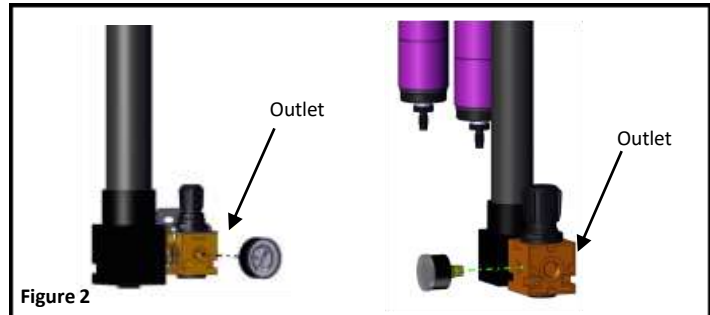


Figure 2

6. Plumb facility air into the inlet ball valve using appropriate thread sealant.
7. Connect the outlet regulator to the equipment, application, or to the facility air system downstream of the dryer.

**DRYER INSTALLATION – Horizontal Membrane Dryer**

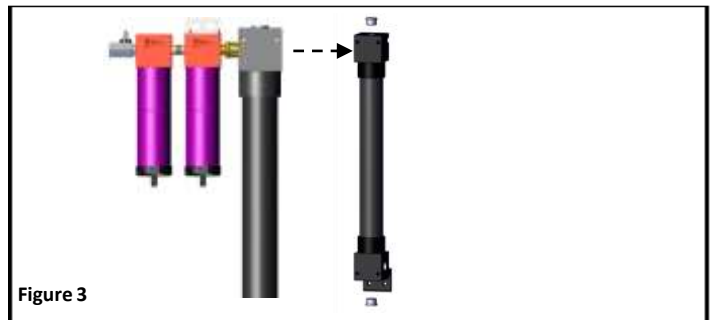


Figure 3

8. Disassemble membrane dryer from brass fitting on prefilters.
9. Use an adjustable wrench to remove the regulator assembly from the outlet port of the membrane dryer.
10. Use a 10mm hex wrench to remove the o-ring plugs on the ends of the inlet and outlet end caps of the membrane dryer and install on the side ports of each end cap; do not use thread sealant. *Figure 3*
11. Assemble the membrane dryer to the brass fitting on the prefilters, using thread tape, MR-GS1 or MR-GS2 only, and reattach the regulator to the outlet end cap. *Figure 4*  
*Note: Be sure to follow flow directions marked on the membrane dryer end caps.*
12. Install regulator gauge with thread sealant and then proceed to mounting the unit, Step 5, and finish the installation.



Figure 4

**OPERATING INSTRUCTIONS**

1. Open the inlet ball valve slowly to pressurize the dryer and all downstream plumbing.  
*Note: Opening the ball valve too quickly could allow the compressed air to travel through the membrane dryer at too high of air velocity which can damage the delicate hollow tube fibers.*
2. Once the system is pressurized, the membrane dryer is ready for operation.  
*Note: The membrane dryer uses some of the dried air to “sweep” away the removed water vapor through the vent holes on the inlet end of the dryer core; this “sweep” air will sound like an audible air leak.*
3. When finished using the membrane dryer, close the inlet ball valve. This will prevent the use of unnecessary sweep air.

**DRYER INSTALLATION – 21999-0957 & 21999-0524**

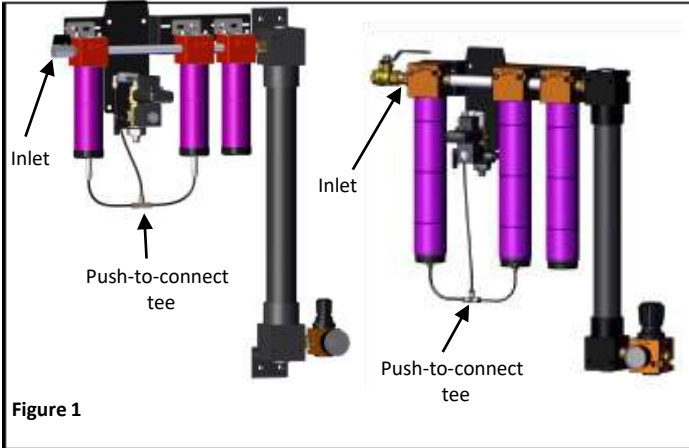


Figure 1

1. Prior to mounting the unit, Step 5, follow all assembly instructions to assembly the regulator and gauge to the unit.
2. Install the supplied ball valve to dryer inlet directly or with the use of the ½” NPT hex nipple. *Figure 1*
3. Vertical installation of the membrane dryer is typical, proceed to Step 4; if horizontal install is needed, follow the process starting on Step 8 of the preceding page, Page 2.  
*Note: Horizontal installation is only recommended with P/N 21999-0957, converting P/N 21999-0524 to have the membrane dryer horizontally is not an easy nor convenient process; contact the factory to discuss this option with one of their trained technical specialists.*
4. Install pressure gauge into regulator using appropriate thread sealant. *Figure 2*

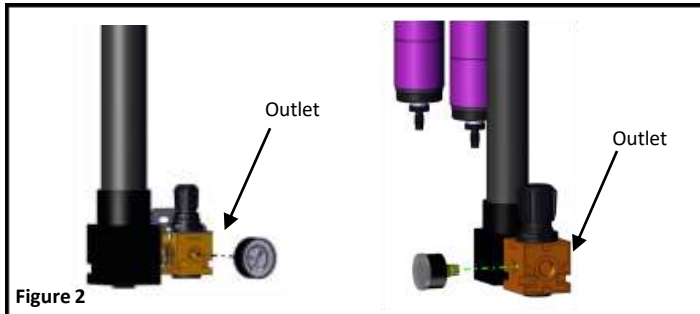


Figure 2

5. Mount the filters in an upright position. Mount on sturdy wall or frame using the supplied mounting brackets. On 20 CFM models, be sure to properly secure the bracket using all 4 mounting holes whenever possible.
6. Plumb facility air into the inlet ball valve using appropriate thread sealant.
7. Connect the outlet regulator to the equipment, application, or to the facility air system downstream of the dryer.

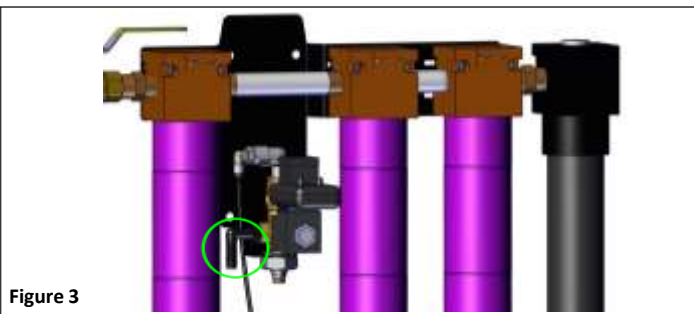


Figure 3

6. Connect drain tubing to solenoid drain; line should run to a floor drain or to a covered collection container. *See Figure 3*  
*Note: Follow all Federal, State, and Local regulations.*
7. Initial drain timer settings; adjust timer setting as needed by your system.  
ON time: ½ to 2 seconds  
OFF time: 5 minutes

**OPERATING INSTRUCTIONS**

1. Open the inlet ball valve slowly to pressurize the dryer and all downstream plumbing.  
*Note: Opening the ball valve too quickly could allow the compressed air to travel through the membrane dryer at too high of air velocity which can damage the delicate hollow tube fibers.*
2. Once the system is pressurized, the membrane dryer is ready for operation.  
*Note: The membrane dryer uses some of the dried air to “sweep” away the removed water vapor through the vent holes on the inlet end of the dryer core; this “sweep” air will sound like an audible air leak.*
3. When finished using the membrane dryer, close the inlet ball valve. This will prevent the use of unnecessary sweep air.

**MAINTENANCE INSTRUCTIONS**

**6 Month Service**

- Inspect Water Separator – replacement not typically required.
- Replace Oil Coalescing Filter Element
- Replace Activated Carbon Filter Element (3-stage prefilter dryers only)

**Your safety is very important. Read all instructions before beginning any service or installation on your Tsunami Regenerative Dryer. Always wear safety eye protection when working with compressed air products. Failure to follow maintenance instructions could result in operating failure or product damage. System pressure must be released prior to any installation or service.**

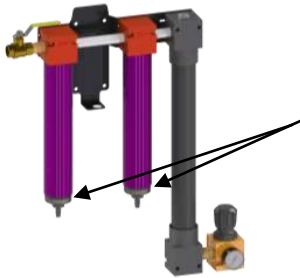


Figure 4

1. Release all system pressure.
2. (EDV Models Only) Unplug drain valve from power supply and disconnect drain tubing at the push-to-connect tee. *Figure 1*
3. Remove filter tube from filter head by holding filter head and rotating tube counter-clockwise.
4. For the water separator; slide the outer tube down to expose the stainless steel mesh and inspect for impacted debris. If OK, reinstall outer tube; if impacted with debris, continue following replacement element procedures, Step 5.
5. Remove bottom baffle, filter element, top adaptor, and O-ring. *Figure 5*
6. Replace filter element and assemble in reverse order.
7. Tighten bottom baffle until filter element can no longer spin freely; DO NOT OVERTIGHTEN!
8. Install outer tube. For water separator, you may need to assist in pinching the mesh into the tube to start, then rotate the tube upwards until reaching the filter head. *Note: outer tube should thread onto head easily; do not cross thread the head and tube as you will damage the filter assembly and need to replace the entire filter.*
9. (EDV Models Only) Reconnect the drain tubes to the push-to-connect tee
10. Slowly pressurize the unit per the Operating Instructions.

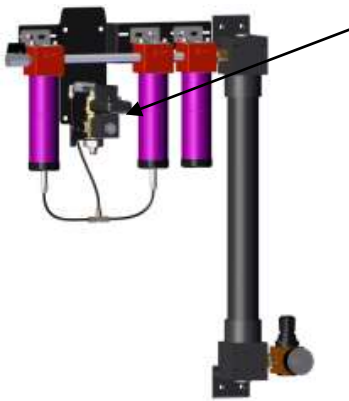
**DRAIN REPLACEMENT**

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Float Drain

1. Verify system pressure is not present.
2. Remove bottom cap from outer filter housing.
3. Grasp float drain stem below screen with pliers and spin counter-clockwise to remove.
4. Install new float drain by tightening ¼ turn past o-ring contact to bottom cap. DO NOT OVERTIGHTEN, damage to float drain stem could occur.
5. Assemble bottom cap to outer filter tube; be sure not to cross-thread during assembly.



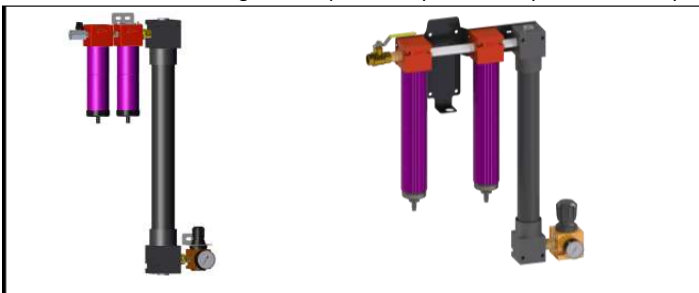
Electronic Drain Valve

1. Verify system pressure is not present.
2. Unplug (disconnect) from power supply.
3. Disconnect tubing from push-to-connect fitting on drain valve.
4. Remove clean drain tubing from barbed fittings.
5. Remove bulk head nut from drain body.
6. Replace EDV, assembly in reverse order from drain removal.
7. Connect to power supply.

**MEMBRANE DRYER CORE REPLACEMENT – 21999-0355**

Your safety is very important. Read all instructions before beginning any service or installation on your Tsunami Membrane Dryer. Always wear safety eye protection when working with compressed air products. Failure to follow maintenance instructions could result in operating failure or product damage. System pressure must be released prior to any installation or service.

Replacing the membrane dryer core requires the entire dryer package be removed from its mounting location prior to any disassembly and reassembly.



1. Release all system pressure.
2. (EDV Models Only) Unplug drain valve from power supply.
3. Remove dryer assembly from its mounting location.

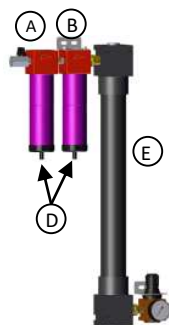
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1. Use a 7/8" or adjustable wrench to hold brass hex nipple; unscrew membrane dryer core from the brass nipple and discard.
2. Assemble new membrane dryer core while still securing the brass hex nipple with the wrench. Use thread tape, MR-GS1 or MR-GS2 only!
3. Reattach dryer assembly to its original mounting location.

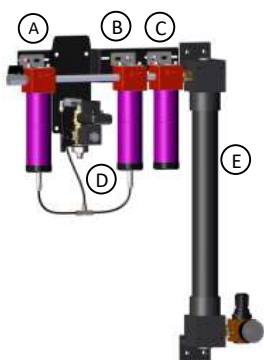
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1. Remove dryer assembly from mounting bracket using hex wrench and wrench or adjustable wrench.
2. Using a locking pliers or small pipe wrench, secure the nipple between the oil coalescing filter and the membrane dryer and unscrew the dryer core.
3. Assemble new membrane dryer core while still securing the nipple with the locking pliers or pipe wrench. Use thread tape, MR-GS1 or MR-GS2 only!
4. Reattach dryer assembly to the mounting bracket and then secure completed assembly back into its original mounting location.

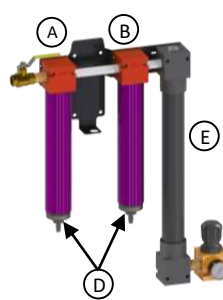
**TSUNAMI MEMBRANE DRYER PARTS BREAKDOWN – SERVICE PARTS**



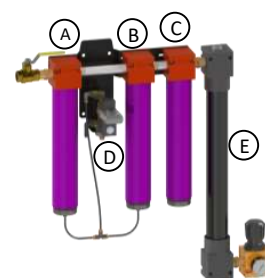
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21999-0524

**Service Part Number Guide**

Dryer P/N	A	B	C	D	E	F	B	C	
	Water Separator Service Kit	Oil Coalescing Filter Service Kit	Activated Carbon Filter Service Kit	Drain Replacement	Membrane Dryer Core Replacement	Regulator Replacement	5-Pack Oil Coalescing Elements	5-Pack Activated Carbon Elements	3-Stage Filter Annual Service Kit
21999-0889	21999-0846	21999-0394	N/A	21999-0868	21999-0355	21999-0870	21999-0823	N/A	N/A
21999-0957	21999-0846	21999-0394	21999-0395	21999-0868	21999-0355	21999-0870	21999-0823	21999-0824	21999-0818
21999-0357	21999-0227	21999-0202	N/A	21999-0177	21999-0355	21999-0871	21999-0825	N/A	N/A
21999-0524	21999-0227	21999-0202	21999-0200	21999-0177	21999-0355	21999-0871	21999-0825	21999-0826	21999-0819

**TROUBLESHOOTING GUIDE - TSUNAMI MEMBRANE DRYER**

PROBLEM	PROBABLE CAUSE	CORRECTION
Water / Oil Carryover	A. Water Separator not properly draining	A. For EDV, adjust OFF time to cycle drain more often. Float drains, see B
	B. Drain not working	B. Replace float or electronic drain; see parts list for replacement P/N
	C. Coalescing filter element fully saturated and impinged with debris prior to 6 month service	C. System seeing more than usual contamination, replace coalescing filter element (procedure on Page 3).
	D. Over flowing the dryer; more CFM than rated	D. Reduce consumption downstream to slow air velocity through membrane core for more effective drying.
Excessive Purge Air	A. Membrane core contaminated by oil or excessive oil vapors	A. Replace membrane core (procedure on Page 4).
Electronic Drain Valve not working	A. Cord damaged	A. Replace drain.
	B. Coil or timer exposed to power surge or immersed to excess moisture	B. Replace drain.

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