



3M™ Liqui-Cel™ **EXF-8×40 and 8×80 Series** **Membrane Contactor**

Assembly and Disassembly Instructions

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I. SAFETY INFORMATION

Read, understand, and follow all safety information contained in these instructions prior to the use of this 3M™ Liqui-Cel™ Membrane Contactor. Retain these instructions for future reference.

Intended Use:

This Liqui-Cel Membrane Contactor is intended to add to or remove dissolved gases from non-dangerous liquid streams. It is expected that all users be fully trained in the safe operation of membrane contactors. Membrane contactors are intended for installation and operation by qualified installers and operators in accordance with all operating guidelines, installation instructions, and any other industry requirements. Use in any other application may not have been evaluated by 3M and may lead to an unsafe condition.

WARNING

To reduce the risks associated with explosion:

- Only use replacement parts supplied by 3M for this product.

To reduce the risks associated with crush or impact related injuries:

- Always ensure the membrane contactor is properly secured. Be sure the membrane contactor cannot tip, roll, fall, slide or make any movement that may cause injury or damage to other system components.
- No liquid, vacuum or sweep gas should be running through the contactor when changing cartridges or other parts. Membrane contactors should be completely drained of liquid before attempting to service.
- Care must be taken not to hit or jar (shock) the membrane contactor.

To reduce the risks associated with lifting or moving:

- Always consult the product datasheet or operating guide for membrane contactor weights. Use appropriately rated lifting equipment for lifting or moving heavy membrane contactors.
- Drain liquid from the contactor before moving. **Do not** move a membrane contactor while it contains liquid.

CAUTION

To reduce the risks associated with environmental contamination:

- At the end of useable life, dispose of the membrane contactor or cartridges in accordance with local regulations and laws.

NOTICE

- The membrane contactor(s) should not be stored where they are exposed to direct sunlight. Membrane contactors should always be stored in sealed bags or shrink wrap material and in the original box or other opaque box.
- Store dry membrane contactor(s) at temperatures <49°C (120°F) with low to moderate humidity levels (<60% relative humidity).
- Avoid contact with surfactants/solvents or oxidants (e.g. ozone, chlorine) to prevent wet-out or oxidation of the hydrophobic membrane.
- To avoid contamination, gloves are recommended when handling the membrane cartridges.
- **Do not** use dope or metal connections to connect to plastic connections of the membrane contactor.
- Failure to follow any instructions in this guide will void any warranty, if any exists.

EXPLANATION OF SIGNAL WORD CONSEQUENCES

 WARNING	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury and/or property damage.
 CAUTION	Indicates a potentially hazardous situation, which, if not avoided, could result in minor or moderate injury and/or property damage.
NOTICE	Indicates a potentially hazardous situation, which, if not avoided, could result in property damage.

EXPLANATION OF SAFETY AND RELATED SYMBOLS

	Warning: Explosion
	Warning: Crush or Impact
	Caution: Lifting or Moving Hazard
	Caution: Possible Environmental Impact

II. ASSEMBLY PARTS AND TOOLS

New contactors are shipped fully assembled and do not require cartridge insertion. However, contactors in the field may periodically require cartridge change-outs. This document provides guidelines on how to change-out cartridges for 8×40-inch and 8×80-inch membrane contactors.

When operating in vacuum or combo mode the gaskets that come with the Victaulic® clamps must be replaced with the gaskets that are suitable for these operating modes. Six replacement gaskets are sent with each contactor and are contained in a separate bag. These replacement gaskets are required when operating 8×40-inch and 8×80-inch membrane contactors with a vacuum.

To protect the hollow fibers from contaminants, **DO NOT** open replacement cartridges until they are ready to install.

It is recommended that both ends of the 8×80 membrane contactor remain accessible during installation in order to facilitate the removal the membrane cartridges.

Note: We recommend the purchase of the End Cap and Cartridge Removal tools for cartridge replacement. Instructions in this guide assume these tools are being used.

- A. **End Cap Adapter (2)** Plastic adapter component inserted into the end cap that properly fits into the cartridge's center tube.
- B. **Cartridge O-ring (4)** 2-263 O-rings are used to seal the cartridge to the housing. Only 2 are used for 8×40 contactors.
- C. **End Cap O-ring (10)** 2-124 O-rings are used to seal the end cap adapter to the end cap and cartridge.
- D. **Inner Connector (1)**
(used in 8×80 only) Plastic component used to connect cartridges together inside of 8×80 contactors.
- E. **End Cap Removal Tool** Tool used to remove the end cap of the housing (sold separately).
- F. **Cartridge Removal Tool** Custom tool used to extract and insert cartridges (sold separately).

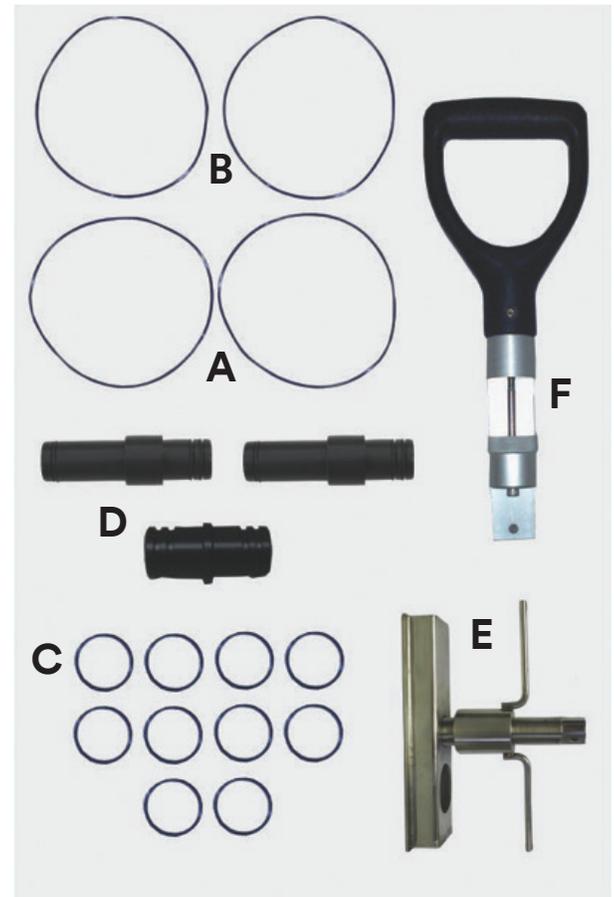


Standard gasket



Internal Rib

Replacement gasket for use when running vacuum or combo mode.



III. END CAP REMOVAL

WARNING

To reduce the risks associated with crush or impact related injuries:

- Always ensure the membrane contactor is properly secured. Be sure the membrane contactor cannot tip, roll, fall, slide or make any movement that may cause injury or damage to other system components.
- No liquid, vacuum or sweep gas should be running through the contactor when changing cartridges or other parts. Membrane contactors should be completely drained of liquid before attempting to service.
- Care must be taken not to hit or jar (shock) the membrane contactor.

To reduce the risks associated with lifting or moving:

- Always consult the product datasheet or operating guide for membrane contactor weights. Use appropriately rated lifting equipment for lifting or moving heavy membrane contactors.
- Drain liquid from the contactor before moving.
Do not move a membrane contactor while it contains liquid.

NOTICE

Avoid contamination, gloves are recommended when handling the membrane cartridges.

END CAP REMOVAL STEPS

- Remove the retaining ring that holds the shellside end cap in place by pulling outward on the tab with your fingers. The retaining ring should slip out of the groove located on the inside of the vessel. Pull the retaining ring free of the housing and set aside.
- Place the End Cap Removal tool into the shellside NPT port and slowly turn the handle clockwise.

- The end cap will become loose and can then be removed from the housing. The cartridge will be visible with the end cap removed.

Note: For the 8×80 inch contactor the second end cap should also be removed in order to expose the second cartridge. The cartridge may slide out with the end cap. If this occurs, there is no cause for concern. Simply remove the end cap from the cartridge and set aside.

It is not necessary to remove the second end cap on the 8×40 inch contactor.

A



B



C



IV. CARTRIDGE REMOVAL

⚠ WARNING

⚠ To reduce the risks associated with crush or impact related injuries:

- Always ensure the membrane contactor is properly secured. Be sure the membrane contactor cannot tip, roll, fall, slide or make any movement that may cause injury or damage to other system components.
- No liquid, vacuum or sweep gas should be running through the contactor when changing cartridges or other parts. Membrane contactors should be completely drained of liquid before attempting to service.
- Care must be taken not to hit or jar (shock) the membrane contactor.

⚠ To reduce the risks associated with lifting or moving:

- Always consult the product datasheet or operating guide for membrane contactor weights. Use appropriately rated lifting equipment for lifting or moving heavy membrane contactors.
- Drain liquid from the contactor before moving.
Do not move a membrane contactor while it contains liquid.

⚠ CAUTION

⚠ To reduce the risks associated with environmental contamination:

- At the end of useable life, dispose of the membrane contactor or cartridges in accordance with local regulations and laws.

NOTICE

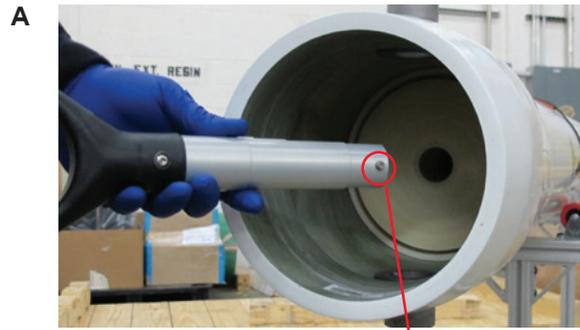
Avoid contamination, gloves are recommended when handling the membrane cartridges.

CARTRIDGE REMOVAL STEPS

- Begin by inserting the Cartridge Removal Tool into the cartridge center tube. Near the tip of the Cartridge Removal Tool there is a small knob that must be inserted into one of the slots, or holes, on the inside of the center tube.
- With the Cartridge Removal Tool inserted into the cartridge, slide moveable sliding lock (g) forward and into the center tube to lock the tool in place.
- Using the Cartridge Removal Tool, pull the cartridge out of the housing enough to grab the cartridge with both hands.
- Slide the moveable sliding lock (g) back toward the handle to release it from the center tube.
- Remove the Cartridge Removal Tool from the center tube and set aside.
- Remove the cartridge from the vessel and set aside or discard.

Additional instructions (steps G and H) are for 8×80 membrane contactors only. The 3M™ Liqui-Cel™ 8×40-inch Membrane Contactor only contains 1 cartridge. The following steps can be skipped for the 8×40-inch contactor.

- Repeat the steps in section II to remove the second end cap from the opposite end of the 8×80 contactor if the end cap has not been removed already.
- There is an Inner Connector that joins the 2 cartridges inside the 8×80 together. This part may come out with the first or second cartridge. In either case, if a replacement part was ordered the Inner Connector can be removed and discarded. Otherwise, retain this piece to use with the replacement cartridges.



V. END CAP ASSEMBLY

WARNING

To reduce the risks associated with explosion:

- Only use replacement parts supplied by 3M for this product.

To reduce the risks associated with crush or impact related injuries:

- Always ensure the membrane contactor is properly secured. Be sure the membrane contactor cannot tip, roll, fall, slide or make any movement that may cause injury or damage to other system components.
- Care must be taken not to hit or jar (shock) the membrane contactor.

To reduce the risks associated with lifting or moving:

- Always consult the product datasheet or operating guide for membrane contactor weights. Use appropriately rated lifting equipment for lifting or moving heavy membrane contactors.

NOTICE

- To avoid contamination, gloves are recommended when handling the membrane cartridges.

END CAP ASSEMBLY STEPS

- Be sure the O-ring on the end cap is securely in the groove.
- Insert the End Cap Adapter into end cap as shown.
- Place 2 of the small O-rings, 2-124, into the grooves of the End Cap Adapter.
- Apply a small volume of the 50/50 water and glycerin solution to the O-rings and Adapter.
- Set the end cap aside for now. It will be installed during cartridge insertion in section V.

Note: For 8×80-inch contactors only, repeat the end cap assembly process for the second end cap.

A



B



C



D



VI. CARTRIDGE INSERTION

WARNING

To reduce the risks associated with crush or impact related injuries:

- Always ensure the membrane contactor is properly secured. Be sure the membrane contactor cannot tip, roll, fall, slide or make any movement that may cause injury or damage to other system components.
- No liquid, vacuum or sweep gas should be running through the contactor when changing cartridges or other parts. Membrane contactors should be completely drained of liquid before attempting to service.
- Care must be taken not to hit or jar (shock) the membrane contactor.

To reduce the risks associated with lifting or moving:

- Always consult the product datasheet or operating guide for membrane contactor weights. Use appropriately rated lifting equipment for lifting or moving heavy membrane contactors.
- Drain liquid from the contactor before moving.
Do not move a membrane contactor while it contains liquid.

NOTICE

Avoid contamination, gloves are recommended when handling the membrane cartridges.

CARTRIDGE INSERTION STEPS

Note: The 8×40-inch contactor should already have an end cap installed on one end. An 8×80-inch contactor should not have any end caps installed when beginning the cartridge insertion steps.

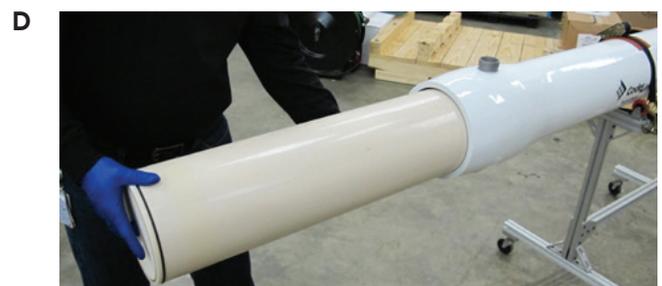
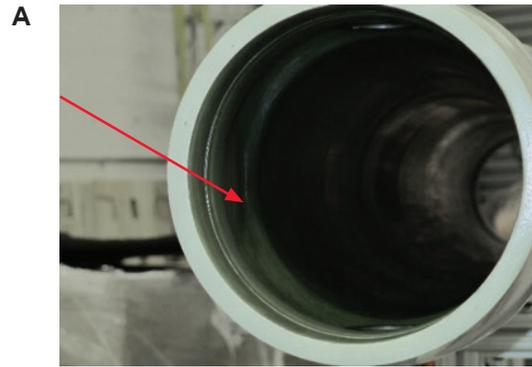
Unwrap the new replacement cartridge.

- A. It is recommended to apply a thin coat of a 50/50 mixture of water and glycerin to the entire inside surface area of the vessel.
- B. Install a large O-ring, 2-263, to one end of a cartridge. Be sure the O-ring is placed completely into the groove at the end of the cartridge.
- C. Apply a thin coat of the 50/50 water and glycerin solution to the outside of the cartridge and the O-ring after it is in place.

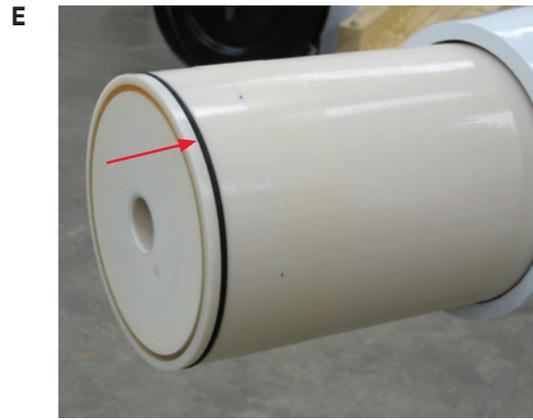
Do not apply any of the 50/50 water and glycerin solution to the open ends of the cartridge.

- D. Using both hands, insert the cartridge into the vessel part of the way.

Care should be taken with the exposed fibers on the face of the cartridge. **Do not** allow any contact that risks contaminants coming into contact with the fibers, including the 50/50 water and glycerin solution.



E. Install a second large O-ring, 2-263, to the end of the cartridge that is sticking out of the housing. Be sure the O-ring is fitted completely into the cartridge groove.



F. Apply a small amount of the 50/50 water and glycerin solution to the O-ring.

Do not allow the 50/50 water and glycerin solution to contact the fibers at the end of the cartridge.

If the contactor is an 8×40 (1 cartridge), continue with steps G-I to complete cartridge insertion.

If the contactor is an 8×80 (2 cartridges), skip steps G-I and go to step J.



G. Insert the assembled end cap into the cartridge center tube.

H. Using the end cap, push the cartridge all the way into the housing. If needed, apply a small amount of the 50/50 water and glycerin solution.

The end cap must be inserted so it is completely passed the groove on the inner wall of the housing.



I. Insert the retaining ring into the groove on the inner wall of the vessel. The retaining ring tab will snap into the groove. The retaining ring should be flat and even. If it is not, remove and try again.



8×80 (2 cartridges) only: the 2 cartridges are connected with an Inner Connector. This part must be installed before the second cartridge can be inserted.

J. Apply small O-rings, 2-124, to all the grooves (4) on the Inner Connector. Be sure the O-rings are seated snugly.



- K. Apply a small amount of the 50/50 water and glycerin solution to the O-rings on the Inner Connector.

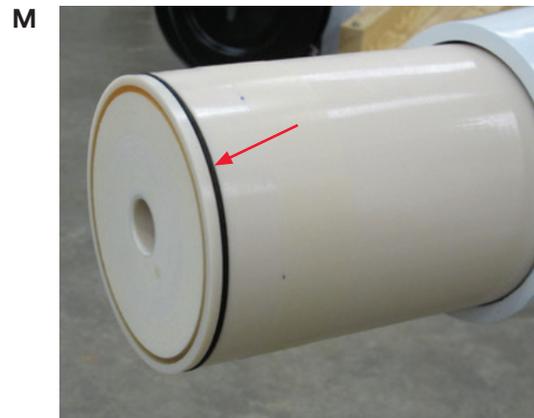


- L. Insert the Inner Connector into the first cartridge's center tube until it bottoms out.



- M. Open the second cartridge and install a large O-ring to one end just like in step E of this section. Be sure to fit the O-ring snugly into the groove of the cartridge.

Care should be taken with the exposed fibers on face of the cartridge. **Do not** allow any contact with the fibers and avoid the risk of any contaminants coming into contact with the fibers, including the 50/50 water and glycerin solution.



- N. Using the 50/50 mixture of water and glycerin, apply a thin coat of the solution to the outside of the second cartridge and the O-ring just like step K of this section.

Do not apply any of the glycerin solution to the open ends of the cartridge.

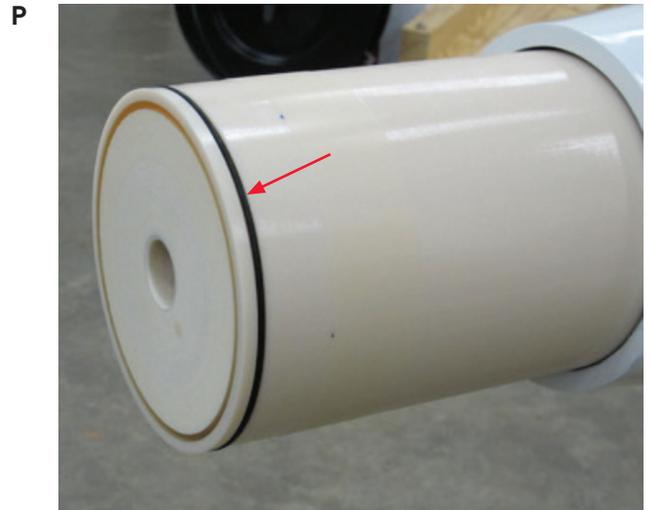


- O. Using both hands, push the end of the second cartridge with the installed O-ring onto the Inner Connector. Push until the cartridge bottoms out on the Inner Connector.



- P. Slide the connected cartridges into the vessel leaving some of the second cartridge hanging out.

Care should be taken as the fibers on face of the cartridge are exposed. **Do not** allow any contact that risks contaminants coming into contact with the fibers, including the 50/50 water and glycerin solution.



- Q. Install a large O-ring into the groove located on the end of the second cartridge.

- R. Insert the assembled end cap into the vessel by sliding the End Cap Adapter into the cartridge center tube. The end cap must be inserted so it is completely passed the groove on the inner wall of the housing.

Be careful not to push the other cartridge out the other end of the 8×80 vessel.



- S. Using the end cap, push the cartridge all the way into the housing. It is recommended to apply a thin coat of a 50/50 mixture of water and glycerin to the entire inside surface area of the vessel.

- T. Insert the retaining ring into the groove on the inner wall of the vessel. The retaining ring tab will snap into the groove last. The retaining ring should be flat and even. If it is not, remove and try again.

Note: Repeat steps R-T to install the second end cap for an 8×80-inch contactor.



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LC-1095
Rev. 04/2021

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