F40 Series Side Port 300- 450PSI

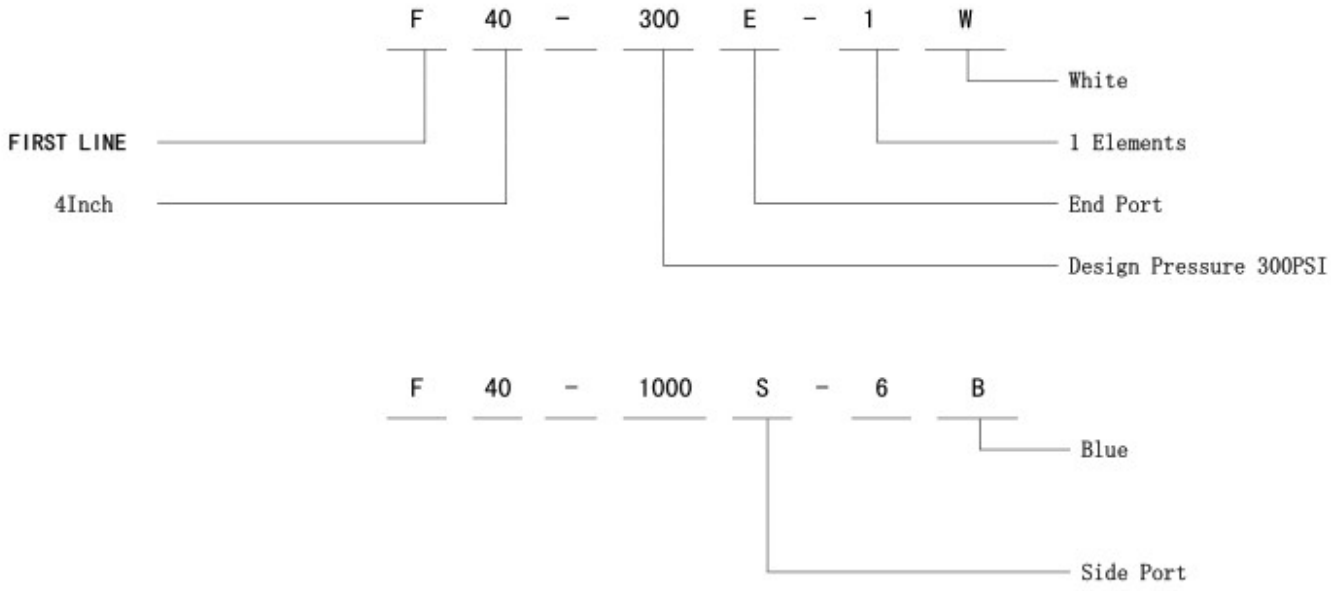
User Manual

For Use with First Line RO Pressure Vessel Models:
F40-300S F40-450S

General Product Description

F40-300S Design Pressure: 300PSI / 21Bar (at 150°F / 66°C)
F40-450S Design Pressure: 450PSI / 31Bar (at 150°F / 66°C)
Min. Operating Temp: 14°F / -10°C
Max. Operating Temp: 120°F / 49°C
Factory Test Pressure: Standard: 1.5x Design Pressure
ASME: 1.1x Design Pressure
Operating pH Range: 3 - 11
Cleaning pH Range: 2 - 12 (less than 30 minutes)

FIRST LINE Model Explanation



General Warning

First Line RO pressure vessels (vessel) are designed to provide safe operation over a long service life if properly installed, operated, and maintained. The vessel may cause loss of life, severe bodily harm, or property damage if it is NOT correctly installed, operated, or maintained. Please make sure you read and understand all the guidelines in the User Manual provided with the vessel. Observe every precaution contained therein. Failure to do so may result in malfunction and potential catastrophic failure. It is recommended that only qualified technicians experienced in servicing hydraulic systems work with this vessel. Misuse, incorrect assembly, or use of damaged/corroded components may result in catastrophic failure, or may cause to void the warranty.

Vessel Use and Precautions

- Positive pressure up to the design pressure (PSI) of the specific model being used
- Accommodates standard 4" nominal diameter spiral-wound element
- The required vessel/element interface hardware is supplied with the vessel (please refer to First Line's adapter list)
- Vessel expands under pressure and careful consideration must be taken when installing straps/saddles and system connection piping
- Installation with the straps/saddles provided is strongly recommended
- Vessel should not support any other system components, connections should be non-load bearing
- Periodic inspection of the vessel end cap is recommended to ensure all parts are dry and free of corrosion
- Failure to understand and follow all precautions may void warranty and result in catastrophic failure of the vessel
- These guidelines are subject to change without prior notice. Please check with FIRST LINE to ensure that the User Manual is the latest version for the vessel model being used.
- Mount vessel using strap/saddle hardware provided and span recommended in the engineering drawing
- Do not over tighten the straps - vessel must be allowed to expand under operation
- Maximize the connection flexibility to allow for vessel growth under pressure
- Align the side ports with the system manifold, correcting any misalignment before final installation
- Provide overpressure protection in the system safety devices
- Inspect end caps regularly for signs of corrosion. Immediate corrective action and/or replacement are recommended in case of corrosion.
- Relieve system pressure before working on the vessel
- Do not attempt to over-tighten the Permeate Port connections as this may damage the end cap. One turn past hand tight should be sufficient.
- Never operate the vessel in excess of its ratings. This may void the warranty and cause bodily or property damage.
- Do not operate the vessel permeate port over 125PSI.

•Flush the vessel with permeate before system shutdown to reduce the chance of corrosion
•Do not install the vessel under direct sunlight
•Operate the vessel within the recommended pH range
o Operating pH Range: 3 - 11
o Cleaning pH Range: 2 - 12 (less than 30 minutes)

Head Removal

Step 1 Shut Down the RO System and then Relieve the System Pressure

The RO system should be totally shut down and all pressure relieved before conducting any maintenance or repair on the vessel.

Step 2 Disconnect Permeate Piping

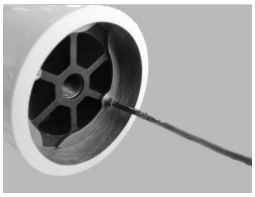
The system permeate piping must be carefully removed from the permeate port of the vessel.

Step 3 Inspect the End Cap

The end cap should be inspected for any signs of corrosion or damage.
Surface corrosion can be removed with a wire brush, while flushing with water. Damaged components should be replaced with approved components from FIRST LINE.

Step 4 Disconnect the Locking Screws

Each of the two locking crescent is held in place with a single locking screw. The locking screws can be unthreaded using an M5 hex wrench.



Step 5 Remove the Locking crescent/Screw Assemblies

The locking crescent/screw assemblies should be easily removed from the retaining groove. Should the assemblies be difficult to remove, it may be necessary to rock the head slightly or tap the head inward with a rubber mallet.
Be careful when using metal tools, avoid leveraging against the sidewall of the vessel or scratching the inside surface of the bell area.

Step 6 Remove the Head Assembly with One of the Following Techniques

FIRST LINE Head Removal Tools - A set of head removal tools is available from FIRST LINE. These head removal tools are expressly designed for the purpose and have proven to be an effective and easy way to remove the vessel head without causing any damage to the vessel.

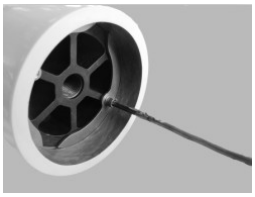

FIRST LINE head removal tools

Alternative Head Removal - It is possible to remove the head assembly without the FIRST LINE head removal tools. A 1/2" NPT Male threaded piece of PVC (or similar material) pipe should be threaded into the head permeate port to hand tightness. Pull the pipe outward to remove the head. If the vessel has been in operation for an extended time, a slight rocking motion or forceful tug may be required to break the head seal bond. Also, a handle at the end of the pipe will ease head removal - forming a T with the pipe that threads into the permeate port.

Head Installation

Step 1 Install Head - Hold the head assembly, square to the axis of the vessel.
Push firmly until the head is correctly positioned and the retaining groove is visible. It may be necessary to use a rubber mallet to tap the head into its engaged position.

Step 2 Install Locking Crescents - Clean and dry the retaining groove. Position the first locking crescent so that the end section sits in the retaining groove and the screw aligns with one of the threaded openings in the bearing plate. Use an M5 hex wrench to tighten the screw until snug. Do not over-tighten - maximum torque guideline: 10Nm. Install another crescent in the same manner.
Conduct a final tightness check of each screw after two crescents are installed.



Step 3 Reconnect Permeate Piping - Reconnect the system permeate piping to the permeate port.

Step 4 Conduct Pre-Pressurization Inspection - A thorough pre-pressurization inspection should be conducted, including verifying that the heads are properly installed, system piping connections are in place, elements are installed, adapters are installed, and thrust cone is installed at downstream end of the vessel.

Step 5 Pressurize System

Step 6 Inspect for Leaks - All connections should be free from leaks. Do not operate leaking vessels.

Piping and Mounting Recommendations

• Use two flexible Victaulic™ connections with an intermediate section of pipe when possible.

This is the preferred method for connecting the feed/concentrate ports to the system piping, especially when system manifold tolerances cannot be guaranteed. There is a maximum 0.03" misalignment allowance per port.

• Single flexible Victaulic™ connections should only be used when the axial misalignment from the port to the manifold is less than 0.03" per port.

Make sure the vessel is centered on the rack when checking for port/manifold alignment.

•Using intermediate flexible Victaulic™ connections in the manifold will ease port alignment and vessel installation.

• Do not force any connections.

• The Header and related piping should be self-supported.

• Space strap/saddle locations using "S" dimension shown in model engineering drawing.

4 and longer vessels have a third strap/saddle assembly, to be installed at the center point of the vessel.

• Tighten straps to hand tightness plus one turn.

• Manifold span should be greater than vessel span to allow for vessel growth under pressure.

FIRST LINE Limited Warranty

Harbin First Line Environmental Technology Co., Ltd. (hereinafter called "FIRST LINE") RO pressure vessels (the "Product") are warranted to the original purchaser (the "Customer") under normal use and if installed, operated and maintained in accordance with applicable User Guides to be free of defects in material and/or workmanship for a period of one (1) year from date of manufacture subject to the following. Any replacement Product or Part will be warranted only for the remainder of the original warranty period or thirty (30) days, whichever is longer.

Exclusions from this Limited Warranty

The warranty shall be void if:

1. Defects are not reported during the warranty period.
2.The Product is subject to accident, damage, incorrect installation, mishandling, abuse, misuse, negligence or accident by any other party.
3. Problems caused by modification or alteration.
4. Chemical exposure or acts of nature.
5. Any item manufactured by other companies.
6. Wear on replaceable components under normal conditions - seals are excluded from this warranty.

Procedure for Obtaining Warranty Performance

FIRST LINE reserves the right to determine if a reported defect is a breach of this warranty. This may require, at FIRST LINE's discretion, one or more of the following:

1. An inspection or test of the Product and/or the system that was installed by a FIRST LINE representative - the customer is responsible for arranging access to the Product.
2. An inspection or test of the product and/or the system in which that was installed by the Customer.
3. An inspection or test of the product and/or the system performed by third party inspector appointed by FIRST LINE.
4. Return of the Product to FIRST LINE's factory for inspection or testing. This is not a statement of limitations for warranty performance and FIRST LINE reserves the right to conduct warranty performance outside of the items shown.

If the Product is found by FIRST LINE to be defective under the terms of this warranty, FIRST LINE will perform one of the following at its option:

1. Supply a similar replacement part based on FOB factory terms.
2. Conduct a field repair of the Product.
3. ssue a credit for the original cost of the Products. This is not a statement of limitations for warranty performance and FIRST LINE reserves the right to conduct warranty performance outside of the items shown.

Products returned to FIRST LINE for inspection or testing must be shipped freight prepaid at the Customer's expense. If a breach of warranty is confirmed, FIRST LINE will bear all costs related to the inspection and testing. If after investigation, the Product failure is due to breach of warranty, all costs related to the inspection and testing of the Product will be borne by the Customer. This includes a USD$500 per day fee and all related travel expenses.

All reported defects must be submitted to FIRST LINE in writing.

Disclaimer

FIRST LINE makes no express or implied warranty other than that specifically set forth in this warranty statement. FIRST LINE disclaims any warranty of merchantability or of fitness for a particular purpose. FIRST LINE's liability under the terms of this warranty shall not exceed the purchase price of the Product that are claimed to be defective. FIRST LINE shall not be liable for any consequential or incidental damages whatsoever, including but not limited to injuries or damages to person or property, loss of business profits, business interruption, loss of use, cost of removing/installing Products, or the claims of third parties.

Warranties or Representations by Others

No agent, employee, dealer, or other person has any authority to make any warranties or representations concerning FIRST LINE or the Product. FIRST LINE is not responsible for such claims of warranty or representation.