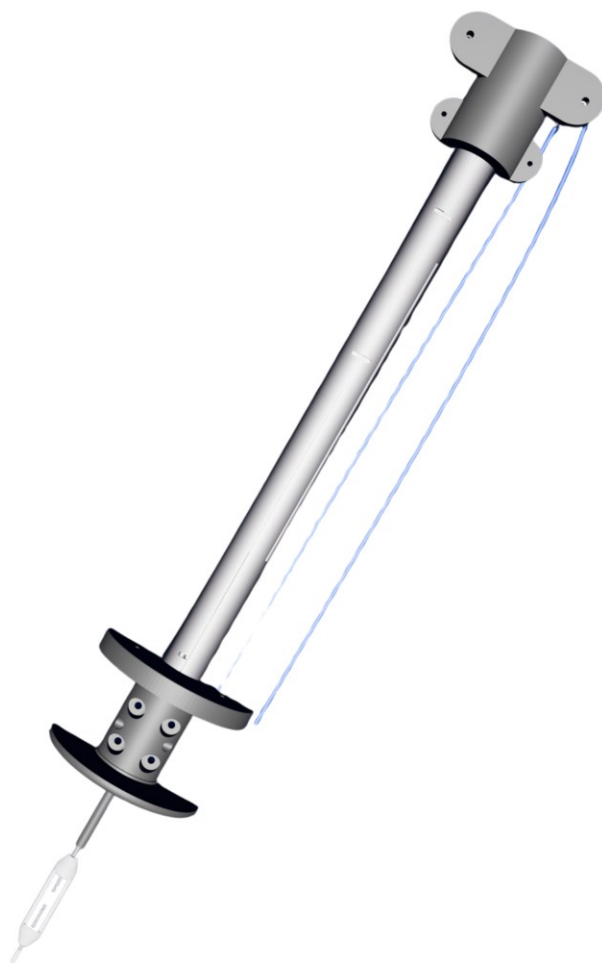


3DFURLER.COM

3D Furler™

Installation & Operation Manual



Version 2.4

Roller furling system for sailing vessels

Questions? We're here to help.

help@3dfurler.com | 904-600-4105

Contents

- Before You Begin 3**
 - Introduction 3
 - Parts Included 3
 - Tools and Materials Required 3
 - Preparing for Installation 4
- Step 1 – Prepare the Drum 5**
- Step 2 – Install the Top Assembly 6**
- Step 3 – Install the Foils and Luff Feed 8**
 - Seat the Foils in the Drum 9
- Step 4 – Final Checks 9**
- Step 5 – Add the Sail and Trim the Halyard 10**
 - Furling Line – Drum Angle and Fairleads 11
- Step 6 – Load the Sail 13**
- Operating the 3D Furler 14**
 - Safety 14
 - Unfurling 14
 - Reefing 14
 - Furling (Full Stop) 14
 - Care and Maintenance 14
- Troubleshooting 15**
 - Liability Waiver 15

Before You Begin

Introduction

Congratulations on your purchase of the 3D Furler™. Your furler is designed for long-lasting, trouble-free performance and simple operation. Please read this manual in full before you begin, and keep it aboard for future reference.

TIP Dry-fit your sail first

If you are using an existing sail, we strongly recommend a dry fit on the ground or dock before installing on the boat. This will save you time and trouble if your sail does not fit.

Parts Included

Item	Qty	Notes
Top Assembly – Part A (body) and Part B (cover plate)	1 set	
Friction Bar	1	
Standard Foils	As ordered	12 in. sections
Luff Feed Foils	2	
Short Foil (6 in.)	1	Final foil on ¼ in. wire and larger
Insert Lock Pins	1 per foil	
Pulleys	2	Top Assembly
Drum Halves	2	
Rope Clamps	1 set	Secure the halyard under the drum
Halyard Line – single length, $2 \times \text{halyard length} + 5 \text{ ft}$	1	Supplied; trim to suit after installation
¼-20 × 1½ in. round-head stainless steel bolts, with nylon nuts	4	Drum
¼-20 × ¾ in. stainless steel bolts, with nylon nuts	2	Top Assembly – upper (small) ears
¼-20 × 2½ in. stainless steel bolts, with nylon nuts	2	Top Assembly – lower (large) ears and pulleys

Tools and Materials Required

- Phillips screwdriver to fit ¼-20 and #8-32 bolts
- Adjustable wrench
- Nut driver or socket to fit ¼-20 and #8-32 nylon nuts
- Small locking pliers (Vise-Grip® type)
- 5/16 in. furler (furling) line – about 1.5 times the vessel length
- Fairleads and a cleat for the furler line

- 10–12 in. nylon cable ties or carabiner bungee cords, to secure parts while working over water

Preparing for Installation



Figure 1 Tarp the bow

Prevent parts going overboard. Tether all loose parts to a line secured to the vessel, and lay a tarp over the bow as a catch-all so nothing is lost if it “jumps” overboard. (An open umbrella works too!)

Tune the rig first. Tension the forestay and make sure the rigging is tuned before you start. Follow the LOOS™ tension guides for tuning.

WARNING

Installing any roller furler on a loose forestay can damage the furler. Always tension the forestay before installation.

STEP 1

Prepare the Drum

The drum is shipped assembled. Take it apart carefully, and read the steps below before reassembling it on the stay.

**Use Control Line Feeds
to secure both halves
around the stay**

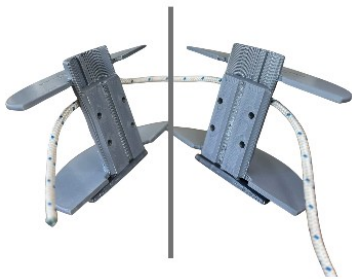


Figure 2 Use the furler-line feeds to hold both halves around the stay

**Insert Bolts and Nylon Nuts &
leave loosely fitting**



Figure 3 Insert the bolts and nylon nuts; leave them loose

1. Secure the two drum halves together around the stay so they cannot drop overboard.
2. Fit the 4 drum bolts ($\frac{1}{4}$ -20 $\times$ 1½ in.) and nylon nuts, but **leave them loose**. Let the drum rest on the swage shoulder.
3. The drum now supports the foils while you install them.

STEP 2

Install the Top Assembly

CAUTION

Tether both Top Assembly halves before you begin, so neither can drop overboard.



Figure 4 Top Assembly halves, tethered

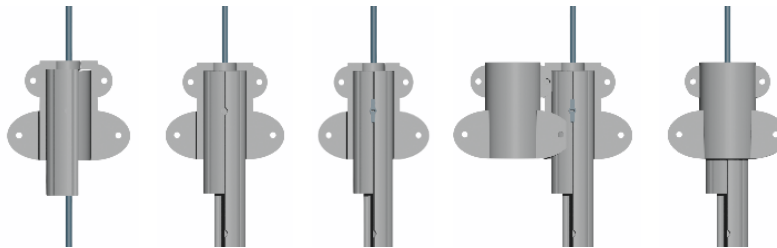


Figure 5 Top Assembly sequence, left to right

1. Place Top Assembly **Part A** (the long body) on the wire.
2. Add any full-size foil (**not** a Luff Feed Foil).
3. Press in the Insert Lock.
4. Add **Part B** (the cover plate). Fit the short bolts ($\frac{1}{4}$ -20 $\times$ $\frac{3}{4}$ in.) in the upper (small) ears.
5. Fit the pulleys with the long bolts ($\frac{1}{4}$ -20 $\times$ 2½ in.) in the lower (large) ears. Do not overtighten the nylon nuts.
6. Check that both pulleys spin freely.

NOTE

Add the Insert Lock **before** you fit the cover plate (Part B).

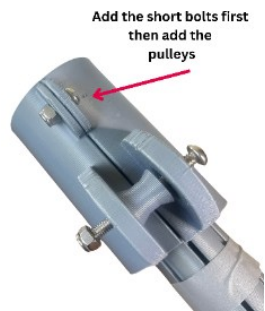


Figure 6 Fit the short bolts first, then the pulleys

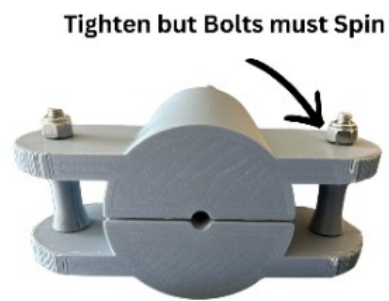


Figure 7 Tighten, but the pulleys must still spin

IMPORTANT Do not overtighten

Snug the nylon nuts only until they stop. The pulleys must turn freely.

Add the External Halyard

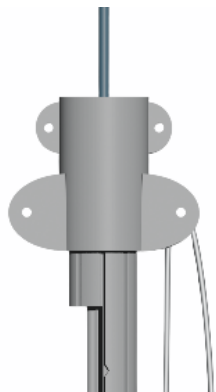


Figure 8 External halyard on the right-hand side

1. Reeve the supplied halyard line (a single length, $2 \times \text{halyard length} + 5 \text{ ft}$; trim to suit later) through the Top Assembly on the **right-hand side**, with the first full foil in place.
2. Mark the end closest to the foil as the **uphaul line** and secure it to the deck.
3. The other end travels up with the Top Assembly as you install the foils.

STEP 3

Install the Foils and Luff Feed

Choose the method that suits your crew. In both methods, set the Luff Feed Foil(s) and the short foil aside before you start.

Method A – Two people

1. Set the Luff Feed Foil(s) and the short foil aside.
2. One person installs while the second passes up the 12 in. foils. Slide each foil on, post into hole, one after another until complete.
3. Rotate the system alternately left and right as you add foils, keeping the halyards untwisted.
4. Temporary Insert Locks are optional. Using them adds time, so fit them only if you wish.

Method B – One person

1. Set the Luff Feed Foil(s) and the final short foil aside, within reach. Keep the remaining foils near you.
2. Slide the foils on one after another, using the Insert Locks if you wish.
3. To take a break, rest the foils on the drum turned 90° so they do not drop into the shoe.

NOTE

Only the first Insert Lock, inside the Top Assembly, is permanent. The others are temporary aids for single-handed installation and may fall out over time.

Finish the Foil Stack

As you near the end of the foils, lift the system until it bumps against the mast top. The final foil depends on your wire size:

Wire size	Final foil(s)
3/16 in. and smaller	The Luff Feed Foil is the final foil.
1/4 in. and larger	Add the Luff Feed Foil, then the 6 in. short foil as the last foil.

Check that the last foils finish at an even length.

IMPORTANT Do not cut foils

If there is no room for the last foil(s), remove one or two foils. If there is too much space, add more foils. Measuring errors do happen, and adding or removing foils is not a problem.

CAUTION Stopping work for long periods

Before a long break, always add the last short foil to complete the system.

Wrap the wire with sail tape, clamp flat locking pliers on it, and let the system rest on the pliers.

Seat the Foils in the Drum

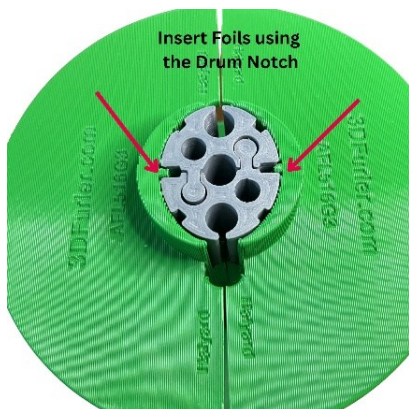


Figure 9 Align the foil gap with the drum notch

1. Position the foil gap so it lines up with the drum notch.
2. Tighten the drum bolts evenly until they just stop, and no further (**2 ft-lb maximum**).
3. Do a final tightening until the bolts stop. The gap should close equally on both halves, leaving a slight curve.

STEP 4

Final Checks

- ☐ All drum bolts are snug but not overtightened (2 ft-lb maximum).
- ☐ The whole system rotates freely in both directions.
- ☐ Pulleys at the Top Assembly spin freely.

STEP 5

Add the Sail and Trim the Halyard

Attach the Halyard and Sail Tack

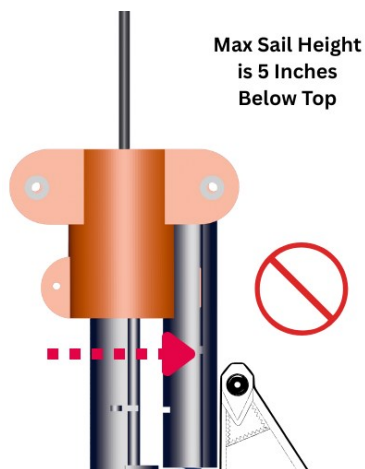


Figure 10 Maximum sail height: 5 in. below the top

1. **Attach the jib sheets now.**
2. Feed the sail into the luff feed and slowly haul it up until the sail tack is at least a few inches above the drum top. Do not try to stretch the luff or put excessive tension on the line.
3. If the tack sits too low, add more foils or have the sail re-sized. The head of the sail does not need to reach the top; the performance loss is negligible.
4. Run the uphaul line (the one you pulled down to carry the sail up) through the hub channel on the same side of the drum top and bottom.



Figure 11 Under-drum clamps

Temporarily Secure Halyard

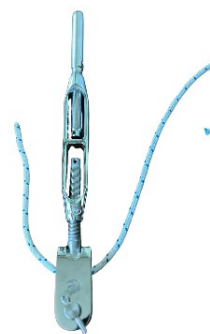


Figure 12 Temporarily secure the halyard

1. Secure the halyard with the cleats under the bottom flange. You can also use the rope clamps provided.
2. Trim the excess halyard, leaving the ends long enough to tie together, so you can remove the sail later without losing the halyard. Store the excess line where it is easy to reach.
3. Rotate the whole 3D Furler (clockwise for starboard fairleads) until the jib sheets wrap a couple of times around the furled sail.

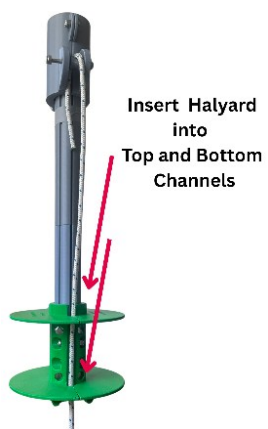


Figure 13 Route the halyard through the top and bottom channels



Figure 14 Sail head position

Furling Line – Drum Angle and Fairleads



Figure 15 Furling line access points on the drum

The drum has an upper and a lower furler-line access point. Which one you use depends on where your fairleads are mounted. The furler line should meet the drum hub as close to **90°** as possible.

TIP

If neither the upper nor the lower access suits your setup, run a short line in at the top and out at the bottom to form a loop that centers itself.

Most vessels need a furling line about 1.5 times the vessel length.

5/16" Control Line Capacity on 150 mm Drum

Layer	Effective Diameter (mm)	Rotations This Layer	Cumulative Rotations	Rope Length This Layer (ft)	Cumulative Rope Length (ft)
1	60.0	10	10	6.2	6.2
2	75.9	10	20	7.8	14.0
3	91.8	10	30	9.5	23.5
4	107.6	10	40	11.1	34.6
5	123.5	10	50	12.8	47.4
6	139.4	10	60	14.4	61.7
Total Capacity: ≈ 62 feet of 5/16" Rope			60 Total Rotations ≈ 61.7 feet Total		

Figure 16 5/16 in. furler line capacity on the 150 mm drum

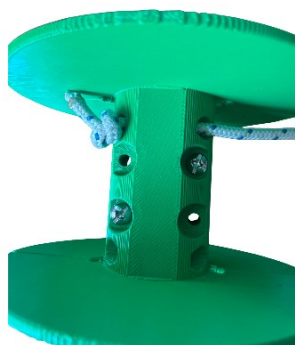


Figure 17 Furling line knotted at the access point

Feed the furling line into the access point and out the other side of the drum. Tie a stopper knot and secure it.

STEP 6

Load the Sail



Figure 18 *Sail furled on the 3D Furler – wrap extra turns before attaching furler line.*

Load the sail when you can keep the wind on the bow. The easiest way is to anchor somewhere safe while you do it.

1. Rotate the whole furler to roll up the sail in the direction you want it to **unfurl**, until there are at least 3 wraps of jib sheet around the foils. Then add the furling line.
2. In safe conditions, pull the appropriate jib sheet out while keeping a little tension on the furler line.
3. The furler line will wind onto the drum. Set your reef as you like.
4. To reef or furl, point the vessel into the wind to take pressure off the sail, then slowly pull in the furler line while easing the jib sheets at the same time.

Operating the 3D Furler

Safety

- Always operate the furler in safe conditions. Avoid deploying or reefing the sail in dangerous winds or stormy weather.
- Watch out for other vessels and traffic. Make sure the area is clear before operating the furler or adjusting sails.
- Do not install or operate the furler in high winds. Wait for calm weather to prevent injury or equipment damage.
- Keep hands, clothing, and equipment clear of moving parts during operation.
- If the furler does not operate smoothly, stop and troubleshoot before continuing.

Unfurling

- Always deploy with the bow pointing into the wind. This reduces the load on the stay, sail, sheets, furler, and crew. Note: A loose stay may cause foil binding when under wind loads.
- Prepare the working jib sheet, make sure the windward sheet is free, and take up any slack. Reduce power to idle.
- Prepare the furler line (take a wrap around a winch if possible) and keep tension on it. The furler line controls how fast the sail unfurls and prevents the drum from tangling.
- Unfurl steadily; never let the drum freewheel, or excess line will tangle on the drum.
- Watch the drum as you unfurl, and stop if the line is loading unevenly.
- Stay within your vessel's safety limits and your own skill level.

Reefing

- The best time to reef is when you deploy the sail. If the forecast calls for more wind during your passage, reefing early is safe and wise. It is easier to let out the furler line than to bring it in.
- To reef mid-passage, steer into the wind to reduce pressure, and keep tension on the furler line as you pull it in and/or ease the sheets.
- Remember: every doubling of wind speed quadruples the wind pressure.
- Reefing at night in wind still requires a change of course.

Furling (Full Stop)

- Point the vessel into the wind. If necessary, use engine power to keep the vessel from tacking.
- Ease the sheets and bring in the furler line. Secure the furler line.

Care and Maintenance

The 3D Furler is built with advanced 3D-printing techniques for optimal strength and durability.

- Regularly inspect all bolts, nuts, and connections. Do not overtighten, but make sure nothing is loose.

- Do not cut, drill, or modify any 3D-printed component. Altering the parts can compromise their structural integrity and lead to equipment failure or unsafe operation.
- Do not lubricate with any acetone-based product.
- If adjustments or replacement parts are needed, contact us at 904-600-4105 or help@3dfurler.com.

Troubleshooting

Problem	Possible cause	Solution
Drum does not turn smoothly	Furler line angle	Reset the fairleads so the line meets the drum at close to 90°.
	Furler line in the wrong opening	Re-feed the furler line through a different opening.
System does not rotate	Top Assembly jamming on the mast	Remove one set of A & B foils.
Sail does not reach the top	Incorrectly sized sail	Check the sail measurements.
	Halyard lines crossed	Remove the sail and uncross the lines.
Furler line fouls on the drum	Over-speed during deployment	Keep more tension on the furler line while unfurling.
Hard to reef in high winds	Excessive wind pressure	Steer into the wind.
Drum drops below the swage	Incorrect wire size	Re-confirm the wire size and contact help@3dfurler.com .
Foils too tight on the wire	Stay tension or incorrect wire size	Check the stay tension and tighten accordingly. Re-check the wire size. If the problem persists, call the office at 904-600-4105.

Still having trouble? Email help@3dfurler.com or call 904-600-4105.

Liability Waiver

The 3D Furler and all related components are designed for safe and reliable operation when installed and used according to the instructions provided. 3DFurler.com and its owners and affiliates assume no responsibility or liability for any injury, damage, or loss resulting from improper installation, modification, misuse, or operation of this product. Users accept all risks associated with installation and use, including but not limited to risks arising from adverse weather conditions, failure to follow safety guidelines, or unauthorized alterations to any 3D-printed parts.

By installing and operating the 3D Furler, you acknowledge and agree to these terms. If you have any questions or concerns, contact help@3dfurler.com before proceeding.