Installation manual

SH
- 100/185 T
- 160/215 T
- 240/250 T

*SH 240/250 T

SLEIPNER MOTOR AS
P.O. Box 519
N-1612 Fredrikstad
Norway
www.side-power.com

Document id: 2746
Revision: 23
Date: 2019
DECLARATION OF CONFORMITY

Sleipner Motor AS
P.O. Box 519, Arne Svendsensgt. 6-8
N-1612 Fredrikstad, Norway

Declare that this product with accompanying standard control systems complies with the essential health and safety requirements according to:

DIRECTIVE 2013/53/EU
DIRECTIVE 2014/30/EU
DIRECTIVE 2014/35/EU
Planning Considerations and Precautions

• Do not install the thruster in a position where you need to cut a stiffener/ stringer/ support for the hull integrity without checking with the boat builder this can be done safely.

• The motor, its components, contacts/ plugs or other joints in the control cables must be mounted so they will remain dry at all times.

• We advise painting the thruster with primer and antifouling. (**NB: Do not paint the anodes, sealings or propeller shafts**)

• Do not finish the inside of the tunnel with a layer of gelcoat/ topcoat or similar. There is only room for a thin coat of primer and two layers of anti-fouling between the tunnel and the props.

• keep installation within advised measurements. The entire surface is hard coated seawater resistant aluminium. Do not damage/penetrate the coat.

• The oil tank is placed higher than the pumps to ensure enough gravity feed and pressure for feed ports. (**NB: The height of oil levels in the hydraulic tank should be higher than the connected hydraulic pumps.**)

• Find a suitable location for the hydraulic tank installation for future maintenance accessibility. There must be enough space around the oil tank to change filters, fill oil and inspect gauges and indicators.
Thruster Specifications

- **Description**
  - Twin Propeller
  - Propeller or gear leg must never extend out of the tunnel

**Thruster Measurements**

<table>
<thead>
<tr>
<th>Measurement Code</th>
<th>Measurement Description</th>
<th>*100</th>
<th>*160</th>
<th>*240</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Internal tunnel diameter</td>
<td>185</td>
<td>215</td>
<td>250</td>
</tr>
<tr>
<td>B</td>
<td>Tunnel thickness standard</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>C</td>
<td>Outside tunnel diameter</td>
<td>199</td>
<td>199</td>
<td>264</td>
</tr>
<tr>
<td>D</td>
<td>Minimum tunnel length</td>
<td>170</td>
<td>280</td>
<td>300</td>
</tr>
<tr>
<td>D2</td>
<td>Recommended tunnel length</td>
<td>340</td>
<td>560</td>
<td>600</td>
</tr>
<tr>
<td>E</td>
<td>Minimum depth center of tunnel to waterline</td>
<td>200</td>
<td>215</td>
<td>250</td>
</tr>
<tr>
<td>F</td>
<td>Height inside hull</td>
<td>215</td>
<td>195</td>
<td>235</td>
</tr>
<tr>
<td>G</td>
<td>Complete motor width inside hull</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>
### Technical Specifications

**Motor:** Hydraulic type (specifications above).

**Gearhouse:** Seawater resistant bronze. Ballbearing at propeller shaft and a combination of ball bearing and slide bearing at driveshaft.

**Gears:** Hardened precision gears

**Lubrication:** Oil bath from tank (gear oil EP 90)

**Bearings:** Angular contact ball bearing at propellorshaft and combination of ball bearing and needle bearing at driveshaft.

**Motor bracket:** Seawater resistant aluminium, galvanically insulated from the motor.

**Tunnel:** Cross spun with rowing G.R.P tunnel
Steel & aluminium tunnels available at request.

**Propeller:** SH 100/ SH 160/ SH 240/ SH 320/ SH 360: 5-blade skewback “Q-prop” propeller, fibreglass reinforced composite.
SH 420/ SH 550 Symmetrical 4 blade kaplan propeller, fibreglass reinforced composite.

**Safety:** Flexible coupling between hydraulic-motor and driveshaft protects gearsystem if propeller jams.

### Thruster Specifications

<table>
<thead>
<tr>
<th>description</th>
<th>* 100</th>
<th>* 160</th>
<th>* 240</th>
</tr>
</thead>
<tbody>
<tr>
<td>light duty thrust up to (kg * lbs)</td>
<td>100kg * 220lbs</td>
<td>160kg * 352lbs</td>
<td>240kg * 529lbs</td>
</tr>
<tr>
<td>Heavy duty thrust up to (kg * lbs)</td>
<td>80kg * 176lbs</td>
<td>140kg * 308lbs</td>
<td>220kg * 440lbs</td>
</tr>
<tr>
<td>Typical Boat Size (m * ft)</td>
<td>9m - 16m * 30ft - 34ft</td>
<td>11m - 19m * 35ft - 62ft</td>
<td>13m - 23m * 42ft - 75ft</td>
</tr>
<tr>
<td>Propulsion System</td>
<td>Twin</td>
<td>Twin</td>
<td>Twin Counter Rotating</td>
</tr>
<tr>
<td>Power (kw * Hp)</td>
<td>6.9kw * 9.3hp</td>
<td>10kw * 13.4hp</td>
<td>14.9kw * 20hp</td>
</tr>
<tr>
<td>Weight (kg * lbs)</td>
<td>7.8 kg * 17.19 lbs</td>
<td>11.4 kg * 25.13 lbs</td>
<td>13.5 kg * 29.76 lbs</td>
</tr>
<tr>
<td>Lubrication</td>
<td>Sealed</td>
<td>Sealed</td>
<td>Sealed</td>
</tr>
</tbody>
</table>

### Thruster Measurements

<table>
<thead>
<tr>
<th>Measurement code</th>
<th>Measurement description</th>
<th>mm</th>
<th>inch</th>
<th>mm</th>
<th>inch</th>
<th>mm</th>
<th>inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Internal tunnel diameter</td>
<td>185</td>
<td>7.28</td>
<td>215</td>
<td>8.46</td>
<td>250</td>
<td>9.84</td>
</tr>
<tr>
<td>B</td>
<td>Tunnel thickness standard</td>
<td>6</td>
<td>0.24</td>
<td>6</td>
<td>0.24</td>
<td>7</td>
<td>0.28</td>
</tr>
<tr>
<td>C</td>
<td>Outside tunnel diameter</td>
<td>199</td>
<td>7.83</td>
<td>199</td>
<td>7.83</td>
<td>264</td>
<td>10.39</td>
</tr>
<tr>
<td>D</td>
<td>Minimum tunnel length</td>
<td>170</td>
<td>6.69</td>
<td>280</td>
<td>11.02</td>
<td>300</td>
<td>11.81</td>
</tr>
<tr>
<td>D2</td>
<td>Recommended tunnel length</td>
<td>340</td>
<td>13.39</td>
<td>560</td>
<td>22.05</td>
<td>600</td>
<td>23.62</td>
</tr>
<tr>
<td>E</td>
<td>Minimum depth center of tunnel to waterline</td>
<td>200</td>
<td>7.87</td>
<td>215</td>
<td>8.46</td>
<td>250</td>
<td>9.84</td>
</tr>
<tr>
<td>F</td>
<td>Height inside hull</td>
<td>215</td>
<td>8.46</td>
<td>195</td>
<td>7.68</td>
<td>235</td>
<td>9.25</td>
</tr>
<tr>
<td>G</td>
<td>Complete motor width inside hull</td>
<td>200</td>
<td>7.87</td>
<td>200</td>
<td>7.87</td>
<td>200</td>
<td>7.87</td>
</tr>
</tbody>
</table>
Positioning of the tunnel / thruster

Aim to install the thruster as far forward as possible (Fig. 1)
Due to the leverage effect around the boats' pivot point. The relative distance difference from the boat pivots' point to the thruster will determine the amount of real thrust for the boats, rotation.

Example:
A: 100kg thrust x 11m leverage = 1100kgm torque to rotate the boat
B: 100kg thrust x 10m leverage = 1000kgm torque to rotate the boat
In position A you will get 10% more thrust to turn the boat around.

Aim to install the thruster as deep as possible under the waterline (Fig. 2)
Two reasons:

1. So it does not suck air down from the surface which will reduce thrust performance and increase noise levels during operation.
2. To get as much water pressure as possible to receive maximum efficiency from the thruster.

The centre of the tunnel should be a minimum of 1 x the tunnel diameter below the waterline. However the installer must make evaluations based on thruster performance, boat type and operating conditions. For average performance the thruster it is at least 1.25 x tunnel diameter (♂) below the waterline. For best performance, the distance should be 1.5 x tunnel diameter (♀) below the waterline. (NB: The position of the tunnel should not be a minimum of 1/4 of the diameter of the tunnel from the boat keel.)
Increase tunnel length to protect the propeller from water forces when high-speed cruising.

Ensure the top and bottom tunnel lengths are respectable lengths from one another. It is important the propeller never extrudes from the tunnel ends.

Water flow must have space to "straighten" itself for best performance.

Cavitation

Standard Use

Optimal tunnel length
Correct tunnel lengths depend on many factors from the hull type, operation and environmental conditions. Tunnels should avoid being longer than 6 x the tunnel diameter as this will reduce thruster performance. *(NB: Installing tunnels at longer lengths or if added support is required for the tunnel consult a naval architect.)*

1. If the tunnel is too long, the friction inside will reduce the water speed and thereby the thrust.
2. If the tunnel is too short (typically only in the bottom section of the tunnel) cavitation problems can occur as water flow will not be able to "straighten" itself before reaching the propeller. This cavitation will reduce performance and increase noise during operation.

Thruster within the tunnel
It is important the propellers and the lower unit/ gear leg must be entirely inside the thruster tunnel. Propellers that protrude from the tunnel will not perform as intended.

Standard Use
Tunnel length must be long enough to ensure the propellers are not extruding the tunnel.

Flat Bottom Hull
Tunnel lengths must be longer than the standard measurement outlined within the manual to ensure a circular vacuum is not created between the thruster and the bottom of the boat.

High-Speed Boats
Tunnel lengths must be increased to protect the propeller from damage when crashing against the water surface during high-speed cruising. The optimal tunnel length is 3 x tunnel diameter *(NB: This can include the length of a spoiler)*
Some sailboats have a racing hull which means they may have a flat bottom and shallow draft in the bow section. This can make installing the thruster as far forward from the boat's main pivot point difficult. (Fig. 1).

However, it is possible to install a tunnel thruster in most sailboats, even when the hull does not directly support the fitting of a tunnel. Instead fit the tunnel halfway into the underneath section of the existing hull. Strengthen it with a deflector/spoiler directing the water flow around the tunnel. This will allow installation of the thruster in the proper position on the boat, maintaining the reliability and space advantages of the tunnel thruster.

This installation is being used by some of the world's largest sailboat builders and has proven to give little to no speed loss during normal cruising. This can also be an installation method for flat bottomed barges to avoid extremely long tunnels and large oval tunnel openings in the hull.
A possible problem in sailboats or fast powerboats is that a non-rounded surface can generate drag from the back face of the tunnel, as it creates a “flat” area facing the flow of water (Fig. 1).

The thruster propeller can spin (passively) producing noise while sailing or cruising as water is forced through the tunnel. Waterflow directed through the tunnel at high speeds, during turning or as the boat bumps waves while underway can also damage the thruster (Fig. 4).

This problem can be solved in two different ways, depending on what is possible or easier to perform.

1. The best solution which generally reduces the most drag is to make a recess in the hull at the back of the tunnel. As the back face is removed water can flow freely past the tunnel entry. The depth and shape of this recess will depend on the boat and the angle facing up/ down aft of the tunnel insert. Normally it is angled slightly down because of the water flow on this area (Fig. 2).

2. Making a deflector/spoiler in front and underneath the tunnel can also reduce damage to the thruster and drag. The deflector/spoiler will push the water flow out from the hull so water can pass by the back face of the tunnel. The shape and size of this deflector/spoiler will depend on the hull shape. The easiest way of making the deflector/spoiler is to retain a part of the lower forward area of the tunnel while installing the tube. Use this area as support to mould a soft curve/spoiler shape from the hull. (Fig. 3).

(NB: As a rule, you should not see the back face of the tunnel when standing directly in front of the boat looking aft.)

(NB: Remember always round the tunnel ends as much as possible to get optimum thruster performance and minimum noise.)
Rounded tunnel ends will maximise thrust and minimise noise.

For best performance round the tunnel connection to the hull-side as much as possible. The optimum rounding has a radius of 10% of the diameter of the tunnel.

Significant advantages of a rounded tunnel over a sharp tunnel to hull connections are:

1. A rounded tunnel end will prevent the creation of turbulence/ cavitation created from a sharp tunnel end when water passes by fast. (Fig. 1&2).
   - The turbulence/ cavitation will block the outer area of the tunnel and thereby reduces the effective tunnel diameter and thrust.
   - The turbulence/ cavitation hits the propeller and will lessen the propellers performance and create excess noise.

2. A rounded tunnel end makes the thruster draw water from along the hull-side, creating a vacuum that will suck the boat sideways and thereby give additional thrust (Fig. 3&4).
   - With a sharp tunnel end, the thruster will be unable to take water from along the hull-side, and you will not gain the desired vacuum and additional thrust. This “free” extra thrust in optimal installations be 30 - 40% of the total thrust.

(NB: A Side-power thruster propeller does not produce cavitation at working speed. Therefore, any cavitation and cavitation noise in the tunnel will be caused during improper tunnel installation.)

(NB: It is essential to round the tunnel end as much as possible. If it is not possible to round edges an angled tunnel to hull connection can also offer similar performance as a rounded connection.)
1. Find the position in the boat considering the information earlier in this manual and the applicable measurements for the thruster model you are installing. Mark the centre of the tunnel on both sides of the hull. Drill a 6mm hole horizontally at these marks (Fig. 1). *(NB: it is critical that the thruster tunnel installed is perpendicular to the boats’ centre line)*

2. Bend a steel bar as shown with the “tip” bent back set to the tunnel radius. Ensure the length of the bar runs through both holes. Mark the circle for the tunnel opening (outside diameter of the tunnel). Cut the hole with a jigsaw (Fig. 2).

3. Grind off the gel coat and polyester so that you are in the “real fibreglass” area 12cm around the hole on both inside and outside the hull to cast the tunnel to the hull (Fig. 3).

4. Insert the tunnel and mark its shape to fit the hull (Fig. 4). *(NB: if you are installing with a deflector/spoiler, leave a part of the tunnel in the front and underside of the tunnel that will cover the back face.)*

5. Cut the tunnel ends to the desired shape and lightly sand its surface and clean with acetone or similar where you are going to apply fibreglass. *(NB: Do not cast/fibreglass on the area where the thruster will be placed.)*

6. Cast the tunnel to the inside of the hull, use at least eight layers of 300g fibreglass and resin, preferably alternating mat and roving types of fibreglass. If you are rounding the tunnel ends to the perfect 10% radius you may need to make further layers inside to preserve the desired hull thickness. *(See next page)*

*(NB: Make sure that any gaps between the tunnel and the hull are completely filled with resin/fibreglass. In areas where you can not access to make normal layers of resin/fibreglass, a resin/fibreglass mixture must be used in that area.)*
Tunnel installation

With tunnel installed and cast (Fig. 1) round the edges with a radius of 10% of the tunnel diameter (Fig. 1a) or make a slope with a length of 10-15% of the tunnel diameter (Fig. 1b). If this is not possible, round the tunnel end as much as possible.

Follow the same method if making the deflector/ spoiler (Fig. 2).

We advise to additionally cast two layers on the outside of the tunnel/ hull in a 10cm area (Fig. 1c & 1d).

You must apply topcoat/ epoxy to areas outside where you have grounded/ moulded to make these areas waterproof. These areas allow water access to the hull which is typically not waterproof without these applications outside. *(NB: All original Side-Power tunnels are fully waterproof when delivered except in the areas where you have cut and bonded it to the hull.)*

If you desire to have another colour on the tunnel, you do not need to apply topcoat or the several layers of primer that is necessary on the boats’ hull to make it water-resistant. Sand it very lightly and apply one coat of primer to make the anti-fouling sit.

*(NB: Avoid all casting where the motor-bracket is to be placed, as this will cause misfit and possible failure to the gear house.)*
Stern thruster installation has extra considerations and precautions and thruster installation procedures.

See the attached manual supplied in the stern thruster kit
Before installation, The installer must read this guide to ensure necessary acquaintance with this product.

- If the height of the room you are installing the Side-Power is limited, it can be installed horizontally or at any angle in-between.
- If the electromotor is positioned more than 30° off vertical, it must be supported separately.
- The electromotor must be handled with care. Do not lift it by internal connections/ main terminals or bed placed down on the driveshaft.
- Beware of keeping installation within advised measurements. No part of the propeller or gear house must be outside the tunnel.

- Do not install the thruster in a position where you need to cut a stiffener/ stringer/ support for the hull integrity without checking with the boat builder this can be done safely.

- The electromotor, its components, contacts/ plugs or other joints in the control cables must be mounted so they will remain dry at all times.

- We advise painting the gear house and propellers with antifouling. *(NB: Do not paint the anodes, sealings or propeller shafts)*

- Do not finish the inside of the tunnel with a layer of gel coat/ topcoat or similar. There is only room for a thin coat of primer and two layers of anti-fouling between the tunnel and the props.

- With the boat on land, run the thruster for a fraction of a second, as without resistance it will accelerate very fast to a damaging rpm.

- While the thruster is in the air, ensure that the propellers have come to a complete stop before performing a directional change of the thruster, as it might cause damage to the thruster.

If an original Side-Power hydraulic system is NOT installed, please ensure the following:

- Install an oil filter to keep the oil clean.

- Fit an oil cooler or use an oil tank to ensure the maximum oil temperature is 43 - 50 degrees Celcius.

- Hydraulic thrusters are supplied with hydraulic motors only.

- The installed hydraulic system is the responsibility of the fitter/ installer and must be within the limitations outlined in this manual to ensure no damage is caused to the thruster.

- The hydraulic valve must have flow and pressure limits that are either set within or can be adjusted to the limits of the thrusters capability.

- We strongly advise that a shock valve is fitted and set to 10% - 15% above the chosen maximum pressure set in the valve. This will prevent the system from being damaged if the propellers are blocked for any reason.

- It is required that a device is installed to ensure that the drive direction cannot be suddenly changed, as this can severely damage the gear house. *(NB: By adding an electronic time-lapse/delay safety on the electric control system or by using a valve that has this type of protection built in will prevent this issue. *The required time delay is 1 second.)*

**IMPORTANT**

If installing S-link products DO NOT connect any other control equipment to the S-link controlled products except Side-Power original S-link products or via a Side-Power supplied interface product made for interfacing with other controls. Any attempt to directly control or at all connect into the S-link control system without the designated and approved interface will render all warranties and responsibilities for the complete line of Side-Power products connected void and null. If you are interfacing by agreement with Sleipner and through a designated Side-Power supplied interface, you are still required to also install at least one original Side-Power control panel to enable efficient troubleshooting if necessary.
It is required that a device is installed to ensure that the drive direction cannot be suddenly changed, as this can severely damage the gear house.

We strongly advise that a shock valve is fitted and set to 10% - 15% above the chosen maximum pressure set in the valve. This will prevent the

The hydraulic valve must have flow and pressure limits that are either set within or can be adjusted to the limits of the thrusters capability.

The installed hydraulic system is the responsibility of the fitter/installer and must be within the limitations outlined in this manual to ensure no damage

Hydraulic thrusters are supplied with hydraulic motors only.

Install an oil filter to keep the oil clean.

If an original Side-Power hydraulic system is NOT installed, please ensure the following:

- While the thruster is in the air, ensure that the propellers have come to a complete stop before performing a directional change of the thruster, as it
- anti-fouling between the tunnel and the props.
- We advise painting the gear house and propellers with antifouling.
- Beware of keeping installation within advised measurements. No part of the propeller or gear house must be outside the tunnel.
- The electromotor must be handled with care. Do not lift it by internal connections/main terminals or bed placed down on the driveshaft.
- If the electromotor is positioned more than 30º off vertical, it must be supported separately.
- If the height of the room you are installing the Side-Power is limited, it can be installed horizontally or at any angle in-between.
- Before installation, The installer must read this guide to ensure necessary acquaintance with this product.

If installing S-link products DO NOT connect any other control equipment to the S-link controlled products except Side-Power original

3) Max. thrust: 162kg
4) Max. thrust: 228kg
5) Max. thrust: 211kg
6) Max. thrust: 269kg
7) Max. thrust: 302kg
8) Max. thrust: 307kg
9) Max. thrust: 313kg
10) Max. thrust: 370kg
11) Max. thrust: 399kg

### Technical Specifications

<table>
<thead>
<tr>
<th>Thruster model</th>
<th>Motor type</th>
<th>L/min</th>
<th>Bar</th>
<th>Max. thrust</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH 100</td>
<td>U6</td>
<td>18.8</td>
<td>103</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>U8</td>
<td>25.8</td>
<td>117</td>
<td>29.6</td>
</tr>
<tr>
<td></td>
<td>U10</td>
<td>31.3</td>
<td>62</td>
<td>36.1</td>
</tr>
<tr>
<td></td>
<td>U14</td>
<td>43.1</td>
<td>64</td>
<td>49.7</td>
</tr>
<tr>
<td></td>
<td>U16</td>
<td>56.1</td>
<td>92</td>
<td>58.3</td>
</tr>
<tr>
<td></td>
<td>U18</td>
<td>33.3</td>
<td>158</td>
<td>33.8</td>
</tr>
<tr>
<td></td>
<td>U21</td>
<td>33.3</td>
<td>161</td>
<td>42.7</td>
</tr>
<tr>
<td></td>
<td>U23</td>
<td>39.8</td>
<td>109</td>
<td>44.0</td>
</tr>
<tr>
<td></td>
<td>U26</td>
<td>45.1</td>
<td>92</td>
<td>52.5</td>
</tr>
<tr>
<td></td>
<td>U29</td>
<td>44.7</td>
<td>177</td>
<td>53.7</td>
</tr>
<tr>
<td></td>
<td>U32</td>
<td>50.9</td>
<td>173</td>
<td>58.5</td>
</tr>
<tr>
<td></td>
<td>U35</td>
<td>55.3</td>
<td>146</td>
<td>65.1</td>
</tr>
<tr>
<td></td>
<td>U38</td>
<td>50.7</td>
<td>2118</td>
<td>81.9</td>
</tr>
<tr>
<td></td>
<td>U41</td>
<td>54.5</td>
<td>146</td>
<td>62.3</td>
</tr>
<tr>
<td></td>
<td>U44</td>
<td>14.4</td>
<td>2118</td>
<td>16.46</td>
</tr>
<tr>
<td></td>
<td>U49</td>
<td>43.5</td>
<td>195</td>
<td>50.2</td>
</tr>
<tr>
<td></td>
<td>U52</td>
<td>52.2</td>
<td>193</td>
<td>60.4</td>
</tr>
<tr>
<td></td>
<td>U55</td>
<td>33.3</td>
<td>158</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>U62</td>
<td>44.7</td>
<td>168</td>
<td>51.6</td>
</tr>
<tr>
<td></td>
<td>U65</td>
<td>11.8</td>
<td>2726</td>
<td>13.63</td>
</tr>
<tr>
<td></td>
<td>U68</td>
<td>49.8</td>
<td>169</td>
<td>57.6</td>
</tr>
<tr>
<td></td>
<td>U71</td>
<td>13.6</td>
<td>2450</td>
<td>15.22</td>
</tr>
<tr>
<td></td>
<td>U74</td>
<td>53.7</td>
<td>151</td>
<td>55.8</td>
</tr>
<tr>
<td></td>
<td>U77</td>
<td>11.8</td>
<td>2190</td>
<td>14.74</td>
</tr>
<tr>
<td></td>
<td>U80</td>
<td>56.1</td>
<td>148</td>
<td>64.7</td>
</tr>
<tr>
<td></td>
<td>U83</td>
<td>14.8</td>
<td>2146</td>
<td>17.09</td>
</tr>
<tr>
<td></td>
<td>U86</td>
<td>72.1</td>
<td>132</td>
<td>71.8</td>
</tr>
<tr>
<td></td>
<td>U89</td>
<td>56.1</td>
<td>1914</td>
<td>18.59</td>
</tr>
<tr>
<td></td>
<td>U92</td>
<td>61</td>
<td>121</td>
<td>70.4</td>
</tr>
<tr>
<td></td>
<td>U95</td>
<td>16.12</td>
<td>1755</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>U98</td>
<td>68.8</td>
<td>158</td>
<td>80.5</td>
</tr>
<tr>
<td></td>
<td>P42</td>
<td>18.8</td>
<td>2291</td>
<td>18.27</td>
</tr>
<tr>
<td></td>
<td>G45</td>
<td>89.5</td>
<td>142</td>
<td>103.4</td>
</tr>
<tr>
<td></td>
<td>B48</td>
<td>23.6</td>
<td>2059</td>
<td>27.32</td>
</tr>
<tr>
<td></td>
<td>U55</td>
<td>95</td>
<td>128</td>
<td>109.7</td>
</tr>
<tr>
<td></td>
<td>U58</td>
<td>25.10</td>
<td>1856</td>
<td>28.98</td>
</tr>
<tr>
<td></td>
<td>P52</td>
<td>105.1</td>
<td>124</td>
<td>121.4</td>
</tr>
<tr>
<td></td>
<td>B55</td>
<td>27.7</td>
<td>1798</td>
<td>27.77</td>
</tr>
<tr>
<td></td>
<td>B60</td>
<td>104.6</td>
<td>106</td>
<td>120.8</td>
</tr>
<tr>
<td></td>
<td>B63</td>
<td>27.4</td>
<td>1537</td>
<td>31.92</td>
</tr>
</tbody>
</table>
U, P & G-motor:

Port A

Port B

Drain port

(Must be installed, Port location varies)

BA-motor:

Prefill motor housing with hydraulic oil before startup

Always use upper positioned drain port for optimal lubrication of the motor.

<table>
<thead>
<tr>
<th>Motor type</th>
<th>Port A/B**</th>
<th>Port flange threads</th>
<th>Drain port</th>
</tr>
</thead>
<tbody>
<tr>
<td>U6</td>
<td>1/2&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP</td>
</tr>
<tr>
<td>U8</td>
<td>1/2&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP</td>
</tr>
<tr>
<td>U10</td>
<td>3/4&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP</td>
</tr>
<tr>
<td>U11</td>
<td>3/4&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP</td>
</tr>
<tr>
<td>U14</td>
<td>3/4&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP</td>
</tr>
<tr>
<td>U16</td>
<td>3/4&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP</td>
</tr>
<tr>
<td>U19</td>
<td>3/4&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP</td>
</tr>
<tr>
<td>U26</td>
<td>3/4&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP*</td>
</tr>
<tr>
<td>U29</td>
<td>3/4&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP*</td>
</tr>
<tr>
<td>U33</td>
<td>3/4&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP*</td>
</tr>
<tr>
<td>U37</td>
<td>3/4&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP*</td>
</tr>
<tr>
<td>U37</td>
<td>3/4&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP*</td>
</tr>
<tr>
<td>U50</td>
<td>1&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP*</td>
</tr>
<tr>
<td>P42</td>
<td>1&quot; 3000 PSI SAE J518/ ISO 6162 Code 61</td>
<td>3/8-16 UNC-2B, 22 deep</td>
<td>1/4&quot; BSP*</td>
</tr>
<tr>
<td>P52</td>
<td>1 1/2&quot; 3000 PSI SAE J518/ ISO 6162 Code 61</td>
<td>M12 x 1,75, 19 deep</td>
<td>1/4&quot; BSP*</td>
</tr>
<tr>
<td>G45</td>
<td>1 1/4&quot; BSP</td>
<td>—</td>
<td>1/4&quot; BSP*</td>
</tr>
<tr>
<td>BA16</td>
<td>1.1/16&quot; - 12UN-2B</td>
<td>—</td>
<td>9/16&quot; UNF-18</td>
</tr>
<tr>
<td>BA19</td>
<td>3/4&quot; BSP</td>
<td>—</td>
<td>3/8&quot; BSP*</td>
</tr>
</tbody>
</table>

* Drain port connector must not extend internally beyond 10,5mm from end face.
** Use only parallel threaded adaptors, preferably with soft seal. Do not use plumbing tape, hemp, tread sealant or similar products.
1. Mark the tunnel centreline and the boat’s centreline. (NB: Install the gear leg and propeller(s) as shown above for the thrust direction to correspond with the control panel. If installing a twin propeller, place gear leg with the P-mark facing port and the S-mark facing starboard.)

2. Use the gasket or template (recommended) to mark the centre of the holes and double check the measurements. One hole MUST be placed with the boat centreline as its centre as shown above. (NB: All holes must be in-line with the tunnels’ centreline for correct installation, as the clearance between the propeller and the tunnel is minimal.)

3. There must be no casting where the motor bracket is to be installed, as this will cause possible failure to the gear leg. The motor bracket must rest steady on the tunnel. If the tunnel is not smooth, all bumps or uneven parts must be ground flat.

4. Drill the main-hole and then the screw-holes.

5. Place the gear leg in the tunnel (without the propeller) with the gasket inside the tunnel. Place the propeller(s) to ensure it is in the centre of the tunnel and rotates freely with the same clearance from each blade to the tunnel wall. If propeller(s) rotate off centre, try to use the other or both gaskets.

6. Remove the gear leg and propeller for final installation. Apply MS Polymer sealant or equal to both sides of the gasket, and then run the gear leg shaft through the central hole in the tunnel. With the gasket install the gear leg and motor bracket gently together. Use suited sealant to ensure that no leakages occur. (NB: See your sealant datasheet for the correct application process.)

7. Fasten the gear leg and the motor bracket with the bolts provided. Fasten to torque as shown above.

Gear Leg & Motor Bracket Installation

1 Please refer to the graphic for special considerations relating to your model!
**Motor Installation**

1. Remove the 4 bolts in the motor bracket.
2. Turn the driveshaft in the gear house and the motor shaft so the key in the shaft and the keyway in the flexible coupling align. Loosen the set screws in the lower part of the flexible coupling. Insert the rubber “ring” in this lower part.
3. Attach the motor with its pre-fitted adaptor plate onto the driveshaft and motor bracket gently. Ensure the “rubber ring” is in position.
4. Fasten the motor loosely to the bracket with the provided bolts.
5. Fasten the adaptor plate firmly to the bracket with the provided screws.
6. Lift the lower part of the flexible coupling together with the rubber ring into the upper flexible coupling. The rubber ring must be in its correct position in the upper part, but not compressed. Secure the lower part of the flexible coupling in its new position by tightening the two set-screws.
7. Fasten the bolts holding the hydraulic motor to its adaptor plate with the above torque. Apply thread glue (Locktite or similar) to the lower set screw. (NB: Upper set screw is pre-fitted with Loctite thread glue.)
8. Check the drive shafts engage by rotating the propeller. It is required the propeller can rotate via hand power. (NB: Rotating the propellers can be hard because of the gear reduction and the motor.)
9. Ensure to install the drain hose. Apply the gear leg and propeller with antifouling designed for propellers. Do not apply to the propeller drive shaft, the anodes or the end of the gear leg facing the propellers. Only in shallow installations in workboat and fishing boats we recommend protecting the propeller by installing a grid in the tunnel opening. (NB: Keep the grid configuration to a minimum to ensure water flow for the thruster is not significantly affected. Be aware that any grid configuration will change the effectiveness of the thruster and circular profile steel will decrease thrust significantly.) (NB: The motor must be covered to avoid dust from fabrication/maintenance operation entering the motor or the solenoids. After fabrication/maintenance operations have ceased the cover must be removed before operating the thruster.)

**Propeller Installation**

1. Centre the drive pin and rotate the propeller shaft, so the pin is in a horizontal state.
2. Insert the propeller onto the shaft and rotate the propeller until the drive pin aligns into the slot/groove in the propeller. (NB: Installation requires almost no gap (approximately 1mm) between the propeller and the gear leg.)
3. Insert the washer on the propeller shaft and fasten the propeller lock-nut. (NB: Ensure the propeller turns freely.)
4. Insert the anode to the end of the propeller and fasten the anode holding screw. Apply a thread glue (Locitite 243 or similar) to ensure that the anode holding screw does not un-screw itself from during the rotation of the propeller. (NB: Apply Loctite 243 or similar to the middle of the screw)

---

**IMPORTANT**

**SH240TC/SH320TC**  
(COUNTER ROTATING PROPELLERS):  
Fit the propellers to the shafts with the LH marked propeller on the port side and the RH marked propeller on the starboard side.
**Motor Installation**

1. Remove the 4 bolts in the motor bracket.
2. Turn the driveshaft in the gear house and the motor shaft so the key in the shaft and the keyway in the flexible coupling align. Loosen the set screws in the lower part of the flexible coupling. Insert the rubber “ring” in this lower part.
3. Attach the motor with its pre-fitted adaptor plate onto the driveshaft and motor bracket gently. Ensure the “rubber ring” is in position.
4. Fasten the motor loosely to the bracket with the provided bolts.
5. Fasten the adaptor plate firmly to the bracket with the provided screws.
6. Lift the lower part of the flexible coupling together with the rubber ring into the upper flexible coupling. The rubber ring must be in its correct position in the upper part, but not compressed. Secure the lower part of the flexible coupling in its new position by tightening the two set-screws.
7. Fasten the bolts holding the hydraulic motor to its adaptor plate with the above torque. Apply thread glue (Loctite or similar) to the lower set screw. **(NB: Upper set screw is pre-fitted with Loctite thread glue.)**
8. Check the drive shafts engage by rotating the propeller. It is required the propeller can rotate via hand power. **(NB: Rotating the propellers can be hard because of the gear reduction and the motor.)**
9. Ensure to install the drain hose. Apply the gear leg and propeller with antifouling designed for propellers. Do not apply to the propeller drive shaft, the anodes or the end of the gear leg facing the propellers.

Only in shallow installations in workboat and fishing boats we recommend protecting the propeller by installing a grid in the tunnel opening. **(NB: Keep the grid configuration to a minimum to ensure water flow for the thruster is not significantly affected. Be aware that any grid configuration will change the effectiveness of the thruster and circular profile steel will decrease thrust significantly.)**

**(NB: The motor must be covered to avoid dust from fabrication/ maintenance operation entering the motor or the solenoids. After fabrication maintenance operations have ceased the cover must be removed before operating the thruster.)**
S-link Planning & Precautions

S-link is a "CAN" based control system with full intelligent communication between all units in the system. Main advantages include:
- Round, compact and waterproof plugs with unique keying and colour coding to avoid faulty hookup.
- An unlimited number of commands or information transfer on a single cable.
- Proprietary Sleipner commands, but built 100% on NMEA 2000 standard.

Routing the Backbone:
Keep routing backbone spur cables to a minimum. Avoid routing the S-link cables close to equipment that might cause interference to the S-link signals such as radio transmitter equipment, antennas or high voltage cables. The backbone MUST be terminated at each end with the 6 1327 End Terminator.

Spur cables:
Spur cables can be left unterminated (NB: Routing can be prepared for future additional equipment). Make sure to protect open connectors from water and moisture to avoid corrosion in the connectors.
Find a comfortable location for the control panel where it does not obstruct or is obstructed by other controls. Install the control panel where it is easy to use. *(NB: As a guide the side thruster is often operated together with the gear/throttle control. For the optimal user-friendly solution install the control panel where access to both controls are accessible with one hand for each control.)*

1. Use the enclosed cut-out template to mark the area to remove on your control dash.
2. Cut out the area per template for the control panel. *(NB: If the front surface around your cut out is jagged or chipped, use a sealant to assist the gasket.)*
3. Place the gasket to the back face of the panel
4. Plug cables into the connectors at the rear of the control panel. *(NB: Twist the locking ring on the connector clockwise to secure connector.)*
5. Insert the control panel in place and fasten screws.
6. Insert the control panels covering caps.
☐ Propeller is fastened correctly to the shaft.

☐ Propeller turns freely in tunnel.

☐ Lower-unit is filled with gearoil.

☐ Oil-drain screw is tightened and the copper seal is present.

☐ The anode holding screw is tightened well with thread glue.

☐ Anti-fouling have been applied to the gearhouse and propeller but NOT on the anode or the gearhouse lid where the propeller is fastened.

☐ Oil tank is fitted above the waterline as required and filled with gearoil.

☐ Correct drive direction as per controlpanel.

☐ The bolts holding the gearhouse and motorbracket together are tightened correctly.

☐ The bolts holding the motor to its bracket are tightened correctly.

The thruster has been installed as per the instructions in this manual and all points in checklist above have been controlled.

Signed: ..........................................................................................

Date: .............................................................................................

Extra pre-delivery tests by installer / yard who does not use other quality control systems!

Thruster type: ..........................................................................................................................................................................................

Serial number: ..........................................................................................................................................................................................

Date of delivery: ..................................................................................................................................................................................

Correct drive direction as per controlpanel: ...........................................................................................................................................

The compartment for the thruster has been isolated from general bilge water and has no obvious or suspected risks for flooding:

........................................................................................................................................................................................................

........................................................................................................................................................................................................

........................................................................................................................................................................................................

Other comments by installer: .................................................................................................................................................................
Spare Parts

For the most up to date documentation, we advise you to visit our website www.side-power.com for the spare parts list.

Warranty statement

1. The equipment manufactured by Sleipner Motor AS (The “Warrantor”) is warranted to be free from defects in workmanship and materials under normal use and service.

2. This Warranty is in effect for of two years (Leisure Use) or one year (Commercial use) from the date of purchase by the user. Proof of purchase must be included, to establish that it is inside the warranty period.

3. This Warranty is transferable and covers the product for the specified time period.

4. In case any part of the equipment proves to be defective, other than those parts excluded in paragraph 5 below, the owner should do the following:
   (a) Prepare a detailed written statement of the nature and circumstances of the defect, to the best of the Owner’s knowledge, including the date of purchase, the place of purchase, the name and address of the installer, and the Purchaser’s name, address and telephone number;
   (b) The Owner should return the defective part or unit along with the statement referenced in the preceding paragraph to the warrantor, Sleipner Motor AS or an authorized Service Centre, postage/shipping prepaid and at the expense of the Purchaser;
   (c) If upon the Warrantor’s or Authorized Service Centre’s examination, the defect is determined to result from defective material or workmanship, the equipment will be repaired or replaced at the Warrantor’s option without charge, and returned to the Purchaser at the Warrantor’s expense;
   (d) No refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so. Prior to refund of the purchase price, Purchaser must submit a statement in writing from a professional boating equipment supplier that the installation instructions of the installation and Operation Manual have been complied with and that the defect remains;
   (e) Warranty service shall be performed only by the Warrantor, or an authorized Service Centre, and any attempt to remedy the defect by anyone else shall render this warranty void.

5. There shall be no warranty for defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion except for equipment specifically designed as waterproof.

6. No other express warranty is hereby given and there are no warranties which extend beyond those described in section 4 above. This Warranty is expressly in lieu of any other expressed or implied warranties, including any implied warranty of merchantability, fitness for the ordinary purposes for which such goods are used, or fitness for a particular purpose, and any other obligations on the part of the Warrantor or its employees and representatives.

7. There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any person or persons, or damage to property, loss of income or profit, or any other consequential or resulting damage or cost which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure or malfunction of the equipment, or part thereof.

8. The Warrantor assumes no liability for incidental or consequential damages of any kind including damages arising from collision with other vessels or objects.

9. This warranty gives you specific legal rights, and you may also have other rights which vary from country to country.
Worldwide sales and service

www.side-power.com

The information given in the document was correct at the time it was published. However, Sleipner Motor AS can not accept liability for any inaccuracies or omissions it may contain. Continuous product improvement may change the product specifications without notice. Therefore, Sleipner Motor AS can not accept liability for any possible differences between product and document.