

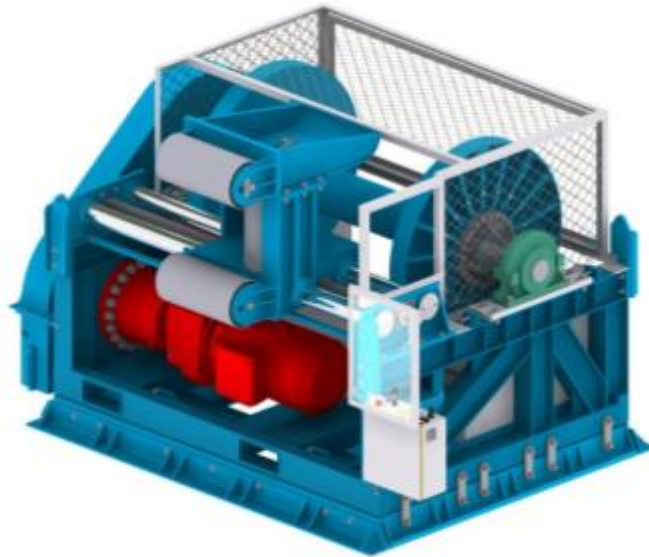


Heavy Lift Winch

Maximum Capability Document

Winch Model: HLW-25066L-125

Serial Number: 447-001



Sound Ocean Systems Inc.
PO Box 2978
Redmond, Washington 98073-2978
USA

Tel: +1-425-869-1834
Fax: +1-425-869-5554
E-mail: info@soundocean.com
Web: www.soundocean.com

The information contained in this document is the proprietary property of Sound Ocean Systems, Inc. (SOSI). External use of this document shall be limited to the purposes of information and evaluation only. Any commercial use for manufacturing is strictly prohibited. Release of this document or any information contained herein to third parties is prohibited without written permission from SOSI.

| | | | | |
|--|-----------------|-----------------------------|--------------|-------------|
| Sound Ocean Systems, Inc. 17455 NE 67 th Court, Suite #120 Redmond, WA 98052 USA Tel: 425-869-1834 Fax: 425-869-5554 | Document | S140005-447-MCD-01 | | |
| | Title | Maximum Capability Document | | |
| | Revision | 2.0 | Date | 11 MAR 2015 |
| | Author | DLB | Sheet | 2 of 6 |

1. Introduction

This document has been prepared in accordance with the UNOLS RVSS Appendix B. It describes the general arrangement of the Heavy Lift Winch and establishes the load capacity as a component of the overall handling system. This machine is designed for synthetic lines between 3/8" and 3/4" nominal diameter, with a maximum design line tension of 70,000 lbs. The winch also includes load limiting and rendering features which will limit the line pull of the winch to 25,000 lbs, the Safe Working Tension, and actively render the winch if the line tension exceeds a pre-set value. The winch includes a tension member monitoring system compliant with a Factor of Safety of 1.5 as described by the UNOLS RVSS Appendix A. The HLW-25066L-125 serial number 447-001 is supplied with a separate split flange drum, which has a different storage capacity described below. The winch has two mounting options, both of which are described separately.

2. Abbreviations

| | |
|-------|---|
| Amp | Ampere |
| C | Celcius |
| DLT | Design Line Tension |
| ft | Feet |
| HLW | Heavy Lift Winch |
| Hz | Hertz |
| kg | Kilograms |
| lbs | Pounds |
| m | Meters |
| MCD | Maximum Capability Document |
| min | Minutes |
| NBL | Nominal Breaking Load |
| NSF | National Science Foundation |
| OSU | Oregon State University |
| ph | Phase |
| SWT | Safe Working Tension |
| UNOLS | University-National Oceanographic Laboratory System |
| VAC | Volts Alternating Current |

| | | | | |
|--|-----------------|-----------------------------|--------------|-------------|
| Sound Ocean Systems, Inc. 17455 NE 67 th Court, Suite #120 Redmond, WA 98052 USA Tel: 425-869-1834 Fax: 425-869-5554 | Document | S140005-447-MCD-01 | | |
| | Title | Maximum Capability Document | | |
| | Revision | 2.0 | Date | 11 MAR 2015 |
| | Author | DLB | Sheet | 3 of 6 |

3. Winch Characteristics

| | |
|----------------------------|--------------------------------------|
| Empty Weight: | 16,000 lbs (7,258 kg) |
| Capacity*: | 3,328 m (10,919 ft) |
| Maximum Weight: | 17,500 lbs (7,938 kg) |
| Design Line Tension: | 70,000 lbs (31,751 kg) |
| Safe Working Tension: | 25,000 lbs (11,340 kg) |
| Bare Drum Line Pull: | 25,000 lbs (11,340 kg) |
| Bare Drum Line Speed: | 10.5 m/min (34.5 ft/min) |
| Full Drum Line Pull: | 25,000 lbs (11,340 kg) |
| Full Drum Line Speed: | 41.6 m/min (136.3 ft/min) |
| Power Requirements: | 400-480 VAC, 50-60 Hz, 3 ph, 200 Amp |
| Ambient Temperature Range: | -20° to +45° C (-4° to 113° F) |

* Capacity is based on ¾" synthetic line with a double spaced cable lay, with 2 in. of radial clearance between the top layer and the OD of the drum flange.

| | | | | |
|--|-----------------|-----------------------------|--------------|-------------|
| Sound Ocean Systems, Inc. 17455 NE 67 th Court, Suite #120 Redmond, WA 98052 USA Tel: 425-869-1834 Fax: 425-869-5554 | Document | S140005-447-MCD-01 | | |
| | Title | Maximum Capability Document | | |
| | Revision | 2.0 | Date | 11 MAR 2015 |
| | Author | DLB | Sheet | 4 of 6 |

4. Free Body Diagram

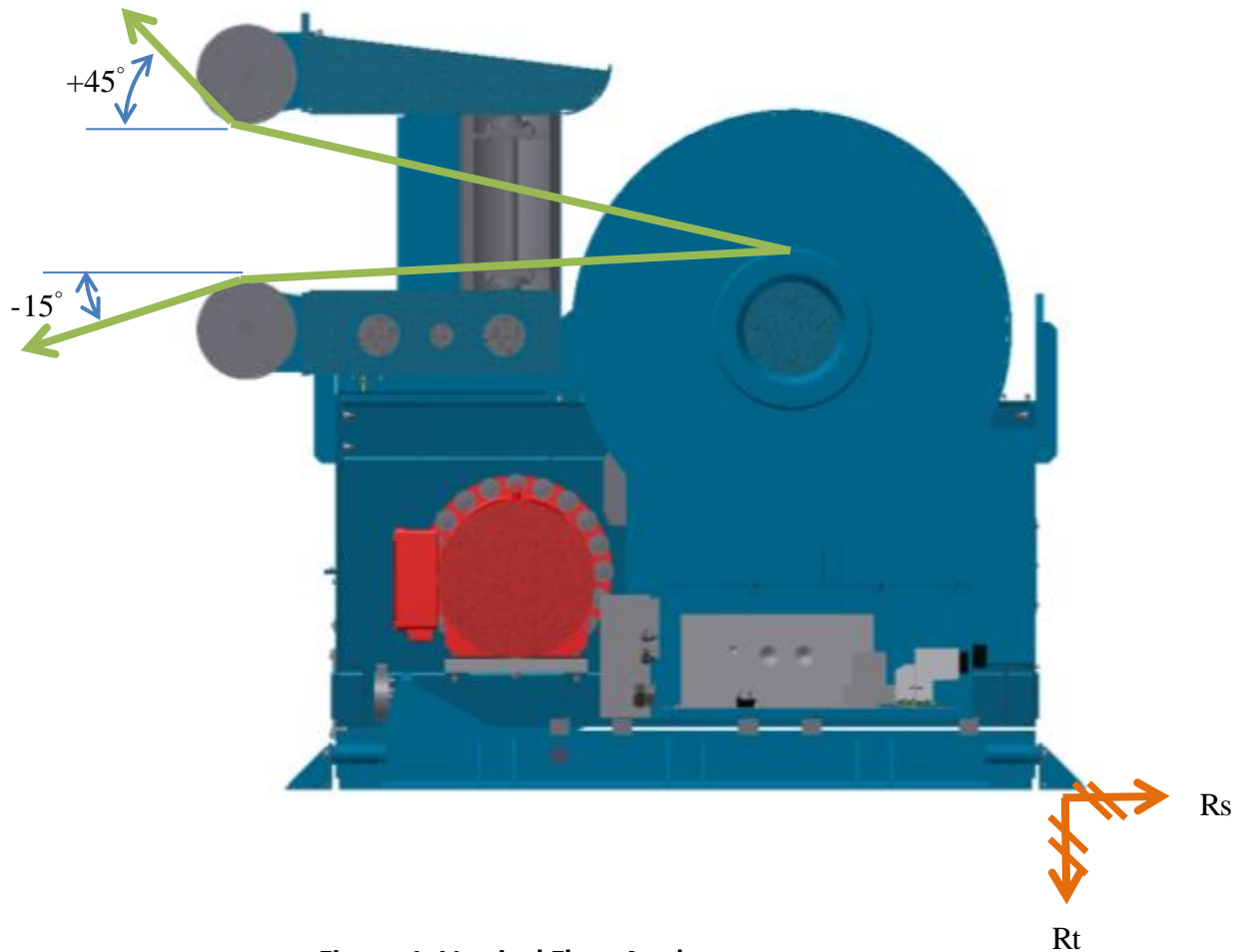


Figure 1: Vertical Fleet Angle

At DLT

Rt = 12,500 lbs (5,682 kg)

Rs = 6,000 lbs (2,727 kg)

At SWL

Rt = 4,465 lbs (2,030 kg)

Rs = 2,143 lbs (974 kg)

Forces are the maximum forces per bolt for the highest loaded bolt in the pattern, as shown in Figure 3. Analysis is valid for DLT with a 30 bolt hold down pattern, a vertical fleet angle of $+45^{\circ}/-15^{\circ}$, and a horizontal fleet angle of $\pm 10^{\circ}$. Bolt tension does not include any pretension load due to installation torque.

| | | | | |
|--|-----------------|-----------------------------|--------------|-------------|
| Sound Ocean Systems, Inc. 17455 NE 67 th Court, Suite #120 Redmond, WA 98052 USA Tel: 425-869-1834 Fax: 425-869-5554 | Document | S140005-447-MCD-01 | | |
| | Title | Maximum Capability Document | | |
| | Revision | 2.0 | Date | 11 MAR 2015 |
| | Author | DLB | Sheet | 5 of 6 |

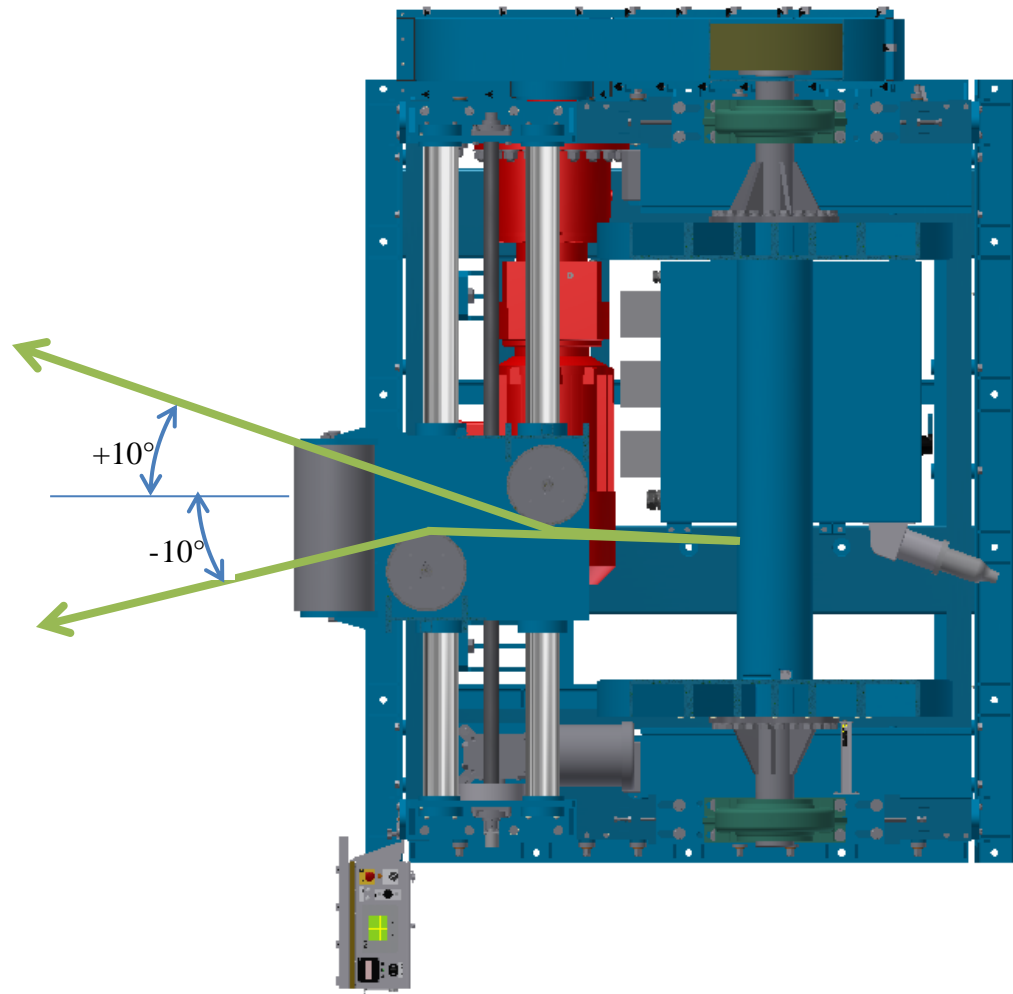
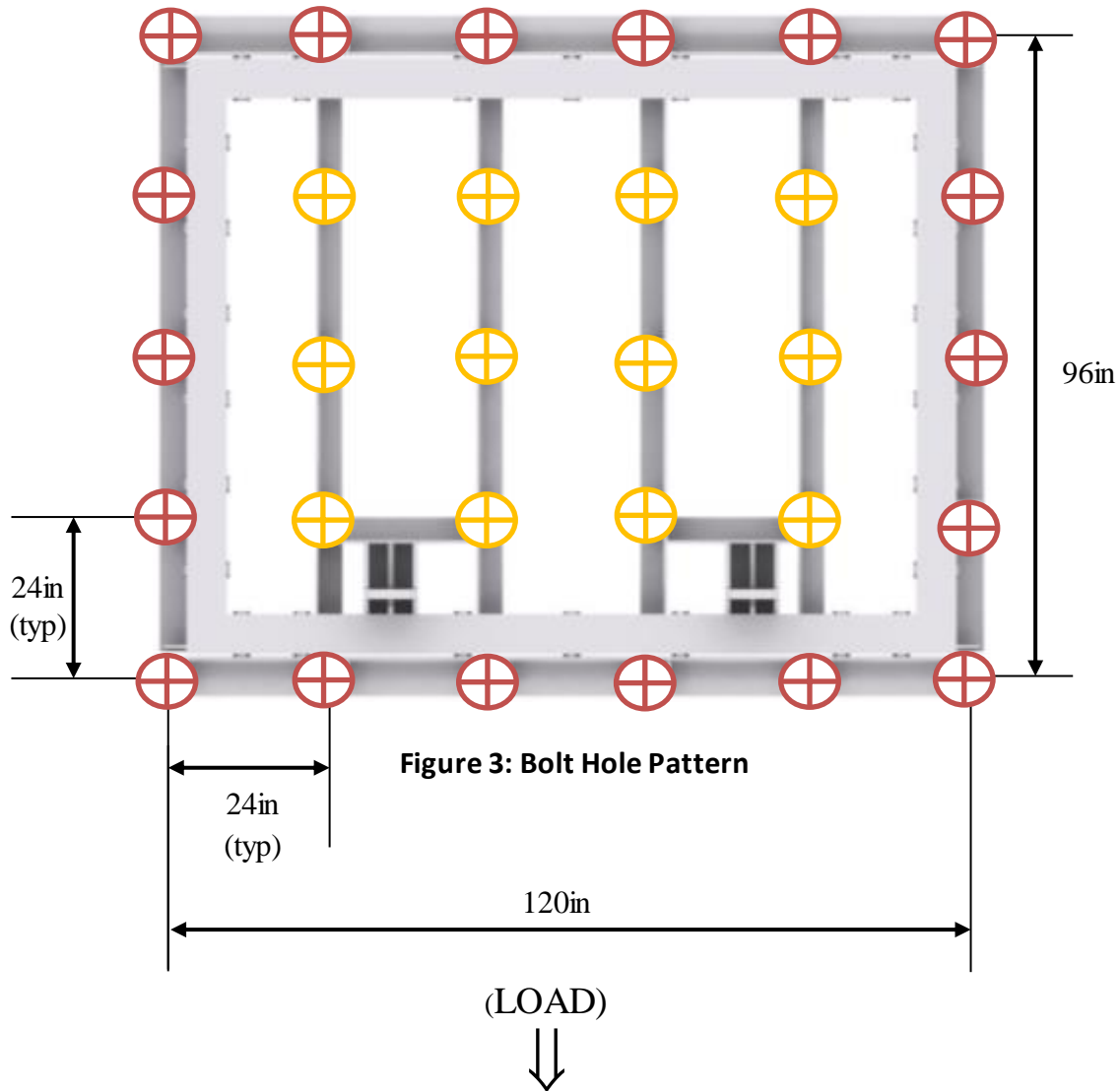


Figure 2: Horizontal Fleet Angle

| | | | | |
|--|-----------------|-----------------------------|--------------|-------------|
| Sound Ocean Systems, Inc. 17455 NE 67 th Court, Suite #120 Redmond, WA 98052 USA Tel: 425-869-1834 Fax: 425-869-5554 | Document | S140005-447-MCD-01 | | |
| | Title | Maximum Capability Document | | |
| | Revision | 2.0 | Date | 11 MAR 2015 |
| | Author | DLB | Sheet | 6 of 6 |

5. Bolting Pattern (Standard Installation)



Standard installation of the HLW means the winch is bolted to a flat deck with deck sockets arranged in the UNOLS bolt pattern. This mounting configuration can be used for either the standard drum or the split flange drum. It is understood that some bolts will be difficult to install, either because of access or misalignment with the deck. For this reason, it has been assumed that all perimeter bolts have been installed, and $\frac{3}{4}$ of the interior bolts have been installed. Figure 3 shows a diagram of the HLW bolt hole pattern where ALL holes marked in **RED** are required and $\frac{3}{4}$ of those holes marked in **ORANGE** are required (12 available bolt holes, a minimum of 9 bolts must be installed).