

# ***KOBELT***

## **HELM PUMP**

### **7005**

*Owner's Operation, Installation &  
Maintenance Manual*



April 2023  
(Rev C)





# TABLE OF CONTENTS

---

<b>1</b>	<b>Introduction .....</b>	<b>4</b>
1.1	Contact .....	4
1.2	Compliant Use .....	4
1.3	Copyrights & Trademarks .....	4
<b>2</b>	<b>Safety .....</b>	<b>5</b>
2.1	Safety Alerts.....	5
2.2	Notice to Installer .....	5
<b>3</b>	<b>About Helm Pump .....</b>	<b>6</b>
3.1	Product Description .....	6
3.2	Ordering options.....	7
3.3	Technical Specifications .....	7
<b>4</b>	<b>Unpacking the Product.....</b>	<b>8</b>
<b>5</b>	<b>Installation .....</b>	<b>9</b>
5.1	Mechanical .....	9
5.2	Hydraulic.....	10
<b>6</b>	<b>Commissioning .....</b>	<b>13</b>
6.1	Hydraulic Fill & Bleed .....	13
6.2	Calibration and Adjustment .....	14
<b>7</b>	<b>Operation .....</b>	<b>15</b>
<b>8</b>	<b>Maintenance .....</b>	<b>16</b>
8.1	Preventative Maintenance.....	16
8.2	Recommended Spare Parts.....	16
<b>9</b>	<b>Troubleshooting .....</b>	<b>17</b>
<b>10</b>	<b>Warranty .....</b>	<b>18</b>
<b>11</b>	<b>Appendix A: Installation Dimensions.....</b>	<b>19</b>
<b>12</b>	<b>Appendix B: Parts List .....</b>	<b>23</b>
<b>13</b>	<b>Appendix C: Shaft Seal Replacement .....</b>	<b>31</b>
<b>14</b>	<b>Appendix D: Lock Valve Sub-Assembly .....</b>	<b>32</b>
<b>15</b>	<b>Appendix E: Typical System Arrangement .....</b>	<b>33</b>

---

# 1 INTRODUCTION

---

## 1.1 CONTACT

**Kobel Manufacturing Co. Ltd.**

8238 129th Street  
Surrey, British Columbia  
Canada, V3W 0A6

Sales Tel: +1-604-572-3935

Fax: +1-604-590-8313

Email: [sales@kobelt.com](mailto:sales@kobelt.com)Website: [www.kobelt.com](http://www.kobelt.com)

This document is intended to clearly present comprehensive product data and provide technical information to assist the end user in design applications. Kobelt reserves the right, without notice, to change the design, or construction, of any products and to discontinue or limit distribution of any products. Kobelt also reserves the right to change, or update, without notice, any technical information contained within this document.

Kobel recommends that customers visit our website to check for updates to this Manual. Once a product has been selected for use, it should be tested by the user to ensure proper function in all possible applications. For further instructions, please contact our distributors or visit our website.

## 1.2 COMPLIANT USE

This device is only intended for use by persons trained in operating marine systems.

The installer shall:

- Only use non-defective products.
- Check the safety of operation and the condition of the device before each use.
- Verify that the product is operational at all times and keep it in good working conditions.

Only Kobelt Manufacturing Co. Ltd. Authorized Dealers or Authorized Technicians are to repair Kobelt products.

## 1.3 COPYRIGHTS & TRADEMARKS

All product names, logos and brands are property of their respective owners. All company, product and service names used in this manual are for identification purposes only. Use of these names, logos, and brands does not imply endorsement.

## 2 SAFETY

### 2.1 SAFETY ALERTS

Throughout this manual, the following symbols, and their accompanying explanation, are used to alert the user to special instructions concerning a service or operation that may be hazardous if performed incorrectly or carelessly. The associated risk levels are stated below.

 <b>DANGER</b>	This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	This symbol indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.
<b>NOTICE</b>	This symbol informs the reader of events not related to personal injury but which there is a risk of damage to property or equipment.
<b>SAFETY INSTRUCTIONS</b>	This symbol informs the reader of safety-related instructions or procedures.

### 2.2 NOTICE TO INSTALLER

Disregarding the following safety measures can result in an accident causing severe injury to personnel and damage to material assets.

- Only use the product as directed in this manual.
- Never put the product into service if there is evidence of visible damage.
- Never put the product into service before fully completing installation and commissioning.
- Do not carry out any modifications to the product.
- Only use authentic Kobelt spare parts.
- Observe all local regulations, directives and laws during the installation of this product.
- All installation, commissioning, and maintenance work must only be conducted by qualified personnel. (For the purpose of this manual, qualified personnel are persons who are familiar with the assembly, installation, commissioning, and operation of the product and who have the qualifications necessary for their occupation.)
- Observe all specifications in this manual. If these guidelines are not followed and damage occurs, the warranty will be voided.

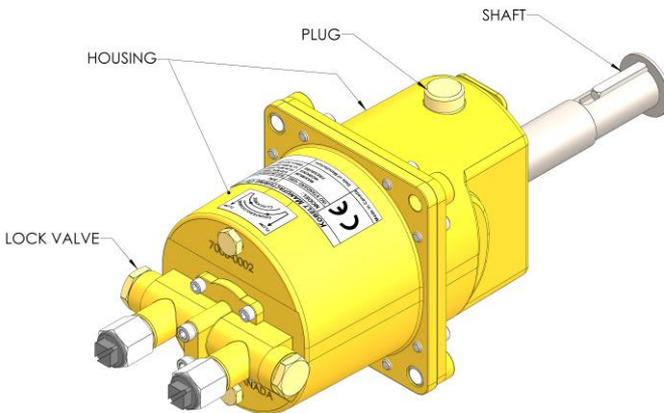
## 3 ABOUT HELM PUMP

### 3.1 PRODUCT DESCRIPTION

Kobelt Manufacturing produces different Helm Pumps, all of which are made from bronze and stainless steel, except for the thrust and roller bearings and, of course, hardened and ground pistons. These Helm Pumps can be installed in any location on the vessel because of their durable materials and watertight construction.

The Helm Pumps incorporate lock valves, filler plugs and interconnecting plugs for multi station applications. A front mounting plate is available (optional) for all pumps, where the pump is mounted behind the console face. The following Kobelt Hydraulic Pumps are based on the same design and are of the VARIABLE DELIVERY TYPE.

The delivery of these pumps is fully adjustable, with easy-to-alter output flow as simple as turning an external adjusting screw on the pumps' front face with a standard screwdriver.



*Figure 1: Product Overview Diagram*

These pumps have been extremely well received by the industry, because of their variable displacement capability, which allows the operator to select the number of turns from hardover to hardover, without installing a different pump. For manual hydraulic systems, under normal conditions, the load on the steering wheel rim should not exceed 36 ft. lbs. (16 kg), and generally the hydraulic system pressure should not exceed 650 psi (45 bar). For electro-hydraulic systems on emergency-driven hydraulic pumps, the steering angle that must be maintained manually, in case the power fails, is only 15° to either side. At 15° the rudder torque is easily controlled with a helm pump and the helmsman will have no problem maintaining the steering. One must remember that producing 6 cubic inches per turn at 600 to 1000 PSI requires a tremendous amount of human effort, and it is not practical to expect a person to produce this kind of pressure and volume continuously.

## 3.2 ORDERING OPTIONS

Ordering options:

Finish	A	Bronze Finish
	B	Black Epoxy Finish
Shaft Length	L	Long Shaft (for behind console mount)
	N	Short Shaft (for through console mount)
Shaft Type	T	Tapered shaft
		Omit for straight shaft
Connection block	P	Porting Block (no lock valve)
		Omit for lock valve option
Plug	V	Vent plug
		Omit for non vented plug

For example, a 7005-BNT, is a Helm pump with black epoxy finish, and a short, tapered ended steering shaft.

## 3.3 TECHNICAL SPECIFICATIONS

Table 1: Technical Specifications

MODEL		7005			
KOBELT P/N		7005-L	7005-LT	7005-N	7005-NT
DISPLACEMENT PER TURN		2 - 6 in <sup>3</sup> [33 - 98 cc]			
MAXIMUM PRESSURE		1000 PSI [69 bar]			
RECOMMENDED FLUID		ISO VG 32, VI 60 hydraulic oil			
LOCK VALVE PORT SIZES		-06 SAE ORB			
REAR TOP/BOTTOM THREAD SIZE		1/4" NPT			
FILLER CAP THREAD SIZE		5/8" UNF			
STEERING WHEEL DIAMETER		20" to 30" [500 mm to 750 mm]			
PHYSICAL DIMENSIONS	L	15.25" [390 mm]	14.50" [370 mm]	12.75" [325 mm]	11.75" [300 mm]
	W	5.0" [127 mm]			
	H	5.4" [137 mm]			
MOUNTING DIMENSIONS (L x W)		4.63" x 4.25" [117.5 mm x 108 mm] 4x 0.39" [10 mm] THRU-HOLES			
PRODUCT WEIGHT		23 lbs [10.4 kg]			
SHIPPING DIMENSIONS (L x W x H)		20.0" x 8.0" x 8.0" [508 mm x 203 mm x 203 mm]			

---

## 4 UNPACKING THE PRODUCT

---

When unpacking the box containing the 7005 Helm Pump, the box should include the following additional items:

- 1x 7005 Helm Pump
- 1x 7005 Owner's manual (this document)
- 1x 7005 Cut-Out

If any of these items are missing or damaged, please contact Kobelc to arrange replacements.

---

## 5 INSTALLATION

---

### 5.1 MECHANICAL

The helm pumps are supplied with a short shaft or with a long shaft. The helm pumps can be mounted through the console or behind the console, although the short shaft version would normally be mounted in the thru-console mode.

When deciding which way to mount the pump, attention must be paid to the method of filling the system. Now is a good time to install your fittings in the helm pump.

Allow space for the steering wheel.

When mounted thru-console, the filler plug is accessible, but when behind the console, it is obscured. In the behind console mounting, either arrange access to the filler plug or adopt some form of remote filling system. The remote filling system can either be a small tank or a tube run up from the pump to a position convenient for topping up with oil.

Helm pump Model 7005 are best installed with the shaft on a horizontal plane.

#### 5.1.1 Thru-console

A template is provided for the cut-out to allow the front half of the pump to protrude through the console with the flange butting up against the back or front face of the console.

The pump should be secured to the console by four bolts through the bolt holes at the four corners of the pump flange.

#### 5.1.2 Behind console

A template is provided for the cut-out to allow the pump shaft through the console and for the drilling of four holes to secure the pump to the back face of the console.

Four bolts and washers are required to screw into the tapped holes in the face of the pump.

If the variable flow facility of the helm pump is to be used, cut the hole for access to the adjusting screw.

#### 5.1.3 Expansion Tanks

Expansion Tanks are normally supplied by the shipyard. They can also be obtained from Kobelt and, we recommend that approximately 1 Quart (or 1 Litre) minimum volume should be used in this application. The vent line from the Expansion Tank to the Helm Pump should protrude approximately 1" from the bottom of the Expansion Tank into the tank itself. This avoids dirt and condensed water from entering the steering system. The vent plug must be arranged in such a fashion that water spray and rain cannot enter the tank. (See Figure 3).

#### 5.1.4 Installation with adaptor plate

An adaptor plate is optionally available to simplify mounting of the pump. This plate can be installed on either side of the console. A template is provided to drill the necessary holes.

Two bolts with washers are required in this case to secure the pump to the bulkhead.

Ordering number: 7005-0011A (cast bronze finish)  
7005-0011B (black epoxy finish)

## 5.2 HYDRAULIC

For Manual Systems, it is recommended to use ISO #32 Hydraulic Oil. We do not recommend using any other type of fluid. The hydraulic oil used should be new and clear of all foreign matters.

During installation it is of utmost importance to keep dirt and foreign matters out of the system. Cleanliness is extremely important.

- We do not recommend the use of Teflon tape for pipe sealing. This often rolls over the edge of the fitting and is cut off on installation; it then floats in the system. It is recommended that liquid Teflon sealant or its equivalent is used. It is easier to ensure that none of this type of sealant gets into the system.
- Copper or Stainless-Steel tubing is preferred for the piping material. The tubing should be of large inside diameter to avoid excessive friction in the hydraulic system, especially in cold weather environments.  
Depending on the number of stations, the length of runs and the size of the Helm Pump, the piping must be chosen accordingly.  
We recommend the minimum diameter of 1/2" tubing, but on the long runs 3/4" tubing is recommended. When installing this tubing, it is very important to have a steady rise in the lines towards the highest point in the steering system. It is very difficult to bleed the tubing system with a rise and fall pattern, because air gets trapped in the elevated pockets.
- It is also recommended that an expansion tank is installed on the uppermost station, to provide an additional reservoir of oil. This expansion tank must have a vented plug. The plug, however, must be arranged in such a fashion that water cannot enter the steering system. All other filler plugs on the steering stations must be of a non-vented type. If an expansion tank is not used, the uppermost steering station must have a vented filler plug on the Helm Pump.  
This is to allow the oil to expand during a hot day and contract when the temperature declines.

5.2.1 Non-Vented and Vented

If no Header Tank is installed, a Vented Plug is required at the highest pump. This can be done by drilling a small hole into the side of the plug, shown in Figure 2.

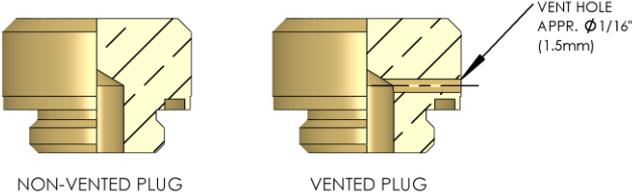
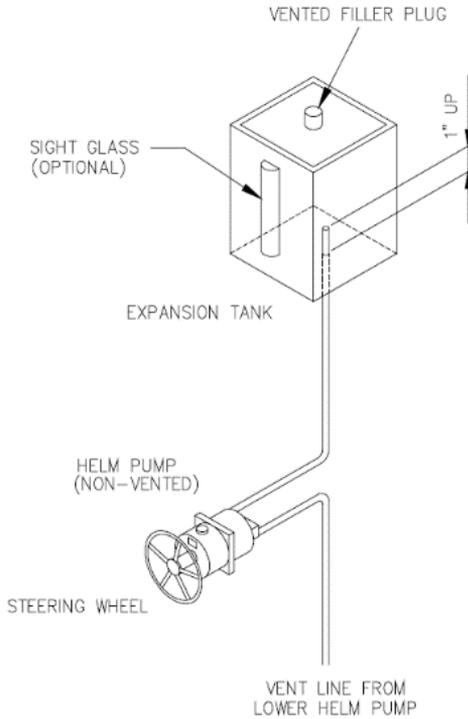


Figure 2: Vented vs. Non-vented plug

**NOTICE**

Installers should familiarize themselves with the equipment and their instructions.  
Operators should fully understand how the system works



*Figure 3: Expansion Tank Installation*

## 6 COMMISSIONING

---

### 6.1 HYDRAULIC FILL & BLEED

#### 6.1.1 Filling a Single Station System

1. The pump(s) should be set to maximum volume prior to filling and bleeding the system.
2. Fill the helm pump with hydraulic oil using a funnel or filling tube. Be sure to re-install all filler plug. If a header tank is installed, fill the header tank to about ½ full.
3. Turn the wheel slowly in one direction until the pump starts to operate, at which point the level in the helm pump/header tank will go down.
4. Check the oil level frequently and top up as required.
5. Continue to turn the wheel in the same direction, until some resistance is felt.
6. At this point, the cylinder may be observed to move.
7. Open the bleed fitting on the cylinder on the side into which the oil is passing.
8. Continue to turn the wheel once again at about one turn per second and ensuring a good head of oil on the pump until clear oil and no air emerges from the bleed fitting on the cylinder.
9. Close the bleed fitting and do not turn the steering wheel in the opposite direction.
10. Provided the head of oil has been maintained and the wheel has been turned slowly, this side of the system should now be reasonably free of air.
11. Continue to turn the wheel until the cylinder moves to the hard over position.
12. There should, at this point, be a significant resistance to further turning.
13. Now turn the wheel in the opposite direction. There may be, at this point, a blow-back of air up the tubing into the pump, which can expel oil with some force from the funnel, or filling tube. A rag held over the top will prevent the oil from splashing over onto the surrounding area. If the oil level in the funnel has dropped, refill to ensure that the head of oil is maintained.
14. Open the bleed fitting on the pressure side (opposite side) of the cylinder and continue to pump until clear oil and no air is issuing from the bleed fitting.
15. Close the bleed fitting.
16. Fill the helm pump/header tank to the correct level.

The system should now be reasonably free of air and the cylinder should operate in both directions when the wheel is turned to either starboard or port.

Residual air may be removed from the system as follows:

Put the wheel hard over in one direction and apply pressure to the wheel. On breaking the hydraulic lock and turning the steering wheel in the opposite direction, air may be observed coming up the funnel or filling tube (Sometimes with considerable force).

Repeat this procedure in both directions several times.

Allow a period of several hours for any air bubbles in the system to group together and then repeat the hard over to hard over procedure.

While there is still air trapped in the system, the pump may be quite stiff to turn and on reversing the wheel, there is quite a distinct noise as the lock valve moves across. Once air is out of the system, the pump should turn smoothly, and the lock valve will move quietly from one side to the other on reversing the rotation of the wheel.

### 6.1.2 Filling a Two Station System

1. Fill the system from the top Helm Pump or Header Tank.
2. At the lower helm, follow steps (3) to (15) in section "Filling a Single Station System", keeping a head of oil at the top pump.

 <b>WARNING</b>	Do not use other types of fluids such as automotive transmission fluid or brake fluid. They contain additives that are harmful to oil seals used in steering systems.
 <b>CAUTION</b>	All hydraulic lines in the steering system must be thoroughly cleaned prior to filling the system. Ensure all hydraulic lines are secured and fittings are tight.

## 6.2 CALIBRATION AND ADJUSTMENT

The Kobelt Model 7005 helm pumps outputs are adjustable. These Helm Pump have a variable output. This enables the pump to be set at the optimum number of turn's hard over to hard over, either during or after installation.

Increasing the output of the pump decreases the number of turn's hard over to hard over. The lower the number of turns, the stiffer the steering will feel. Larger diameters of wheel may be necessary at full pump output, depending on cylinder size. Consult our distributor or dealer.

Decreasing the output of the pump increases the number of turn's hard over to hard over. The steering will become lighter with the increased number of turns and this should allow the use of small diameter wheels.

To increase output, Turn the screw clockwise

To decrease output, Turn the screw counter clockwise

## 7 OPERATION

---

The operation of a hand hydraulic steering system is very simple. A steering wheel is fitted directly to the helm pump. Two hydraulic lines from the lock valve (or porting block) on the rear of the helm pump connect to a double acting balanced displacement steering cylinder. A tiller arm is clamped to the rudder shaft and the steering cylinder is bolted to the tiller arm.

Turning the steering wheel will pump hydraulic oil to one end of the steering cylinder. As the cylinder moves, oil from other end of the steering cylinder is push backed up to the opposite side of the helm pump. This called a two-line system.

When you stop turning the steering wheel, the hydraulic oil in both lines is “locked” by the rudder lock valve (sometimes called a non-return valve). The rudder will stay in place and not move until you start turn the steering wheel. Second function of the lock valve in a two or more-station system, - steering wheels not in use do not turn.

### NOTICE

If helm pump order with **Porting Block** instead of lock valve, then the rudder will not stay in position and can move by water current. Some sailing boats use a porting block to feel rudder force on the wheel.

## 8 MAINTENANCE

### 8.1 PREVENTATIVE MAINTENANCE

Minimal maintenance is necessary. All Kobelt products are designed to provide many years of trouble-free operation. Kobelt products are machined and assembled in-house and then put through comprehensive testing and quality assurance procedures before shipping.

- Monthly (12 times/year)
  - Check the oil level in pump. If a header tank (expansion tank) is installed, the oil level should be about ½ full.
  - Test Manual Mode to ensure proper hand-over and operation.
- Quarterly (4 times/year)
  - Inspect connections for leaks, and mounting bolts and nuts are tight for their functions.
- Every two years
  - Sample and analyze the oil in the steering lines.
  - Check for corrosion and excessive wear at all moving parts that could cause problem in normal operation.

### 8.2 RECOMMENDED SPARE PARTS

As a minimum Kobelt recommends the following spare parts are on-hand:

*Table 2: Recommended Spares*

RECOMMENDED SPARES		
QTY	ITEM	KOBELT PART #
1	REPAIR KIT FOR HELM PUMP 7005 <ul style="list-style-type: none"> <li>• O-RINGS AND SEAL SHAFT</li> </ul>	7005-RK

When purchasing spare parts refer to Appendix B: Parts List at the back of this manual for Kobelt component Part Numbers. See instructions at the end of this manual for shaft seal replacement.

## NOTICE

It is recommended that any required service work on a Kobelt product be performed by a factory authorized service representative. Please contact the nearest Kobelt authorized distributor for assistance.

## 9 TROUBLESHOOTING

If you encounter problems with the operation of your product, please refer to the troubleshooting suggestions before contacting Kobelt for assistance. If the steps below do not resolve your issue, please reach out either Kobelt directly or our Dealers in your area.

*Table 3: Common Troubleshooting Problems*

<b>Problem (Issue encountered)</b>	<b>Cause (What it means)</b>	<b>Corrective Action (What to do)</b>
<b>Helm pump doesn't turn actuator in correct direction.</b>	The tube connection from helm pump to cylinder is backward.	Switch PORT and STBD connection at helm pump or at the cylinder.
<b>Cylinder movement is not smooth</b>	Air did not bleed properly.	Refer to bleeding procedure in section 6.1.1.

---

# 10 WARRANTY

---

Kobel Manufacturing Co. Ltd. ("Kobel") warrants the Products and Parts manufactured by Kobel to be free from defects in workmanship or material and that said products are designed mechanically and functionally to perform to specifications.

This warranty is effective providing:

- The equipment is used within the intended operating conditions and in accordance with Kobel recommendations
- The equipment is installed according to equipment diagrams, specifications and recommendations which Kobel has provided

This warranty becomes invalid if the factory supplied serial number has been removed or altered on the product. This warranty does not cover cosmetic damage or damage caused by an act of God, accident, misuse, abuse, negligence or modification of any part of the product. This warranty does not cover damage due to improper operation or maintenance, connection to inappropriate equipment or attempted repair by anyone other than an authorized Kobel representative.

Upon identification of a potential issue or defect with a Kobel Product or Part, the Warranty Applicant ("Applicant") must immediately contact Kobel and describe the issue in writing, by letter, fax, email or other electronic conveyance. Kobel will then assess the cause of the defect and determine warranty applicability and appropriate remediation.

If any part is found to be defective, Kobel will replace said part FOB the Kobel factory provided that any such defective part is returned by the Buyer with freight and applicable forwarding charges prepaid by the Buyer. Kobel's sole obligation to the Applicant will be to repair or replace the defective part with same or similar product, to a maximum value of the list price of the product or part. The Kobel warranty does not cover labour charges, travel or any other associated expenses.

All Products and Parts manufactured by Kobel, are subject to a warranty against manufacturer's defects in materials or workmanship for a period of two (2) years from the date of purchase.

Kobel will be responsible for all Products or Parts sold by Kobel but manufactured by 3<sup>rd</sup> party manufacturing companies. However, these products and parts are subject to applicable 3<sup>rd</sup> party warranties and may not be the same as the Kobel warranty.

# 11 APPENDIX A: INSTALLATION DIMENSIONS

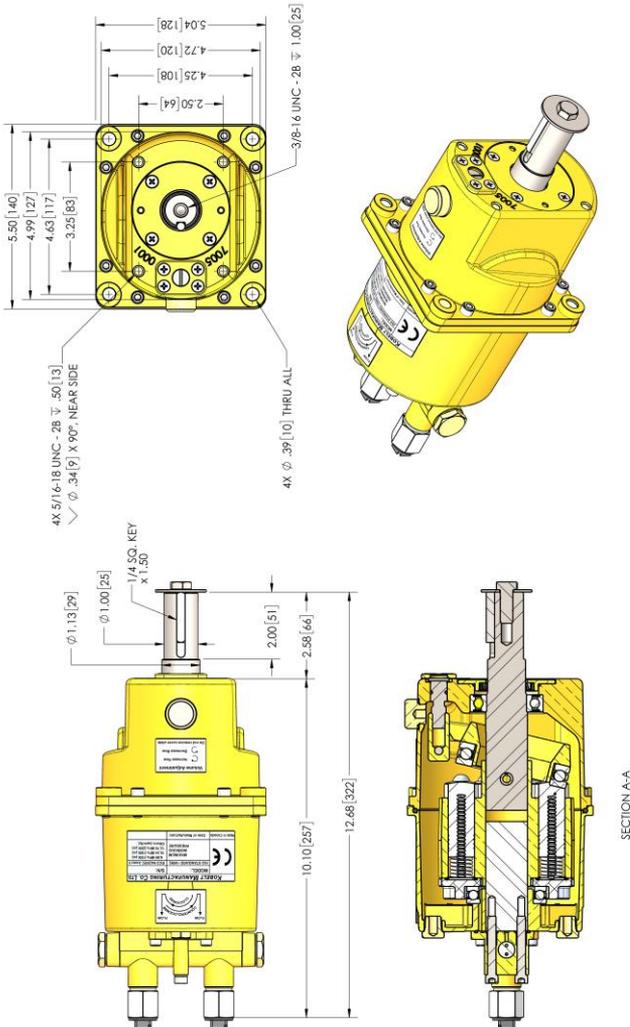


Figure 4: Installation Dimensions (Straight Short Shaft)

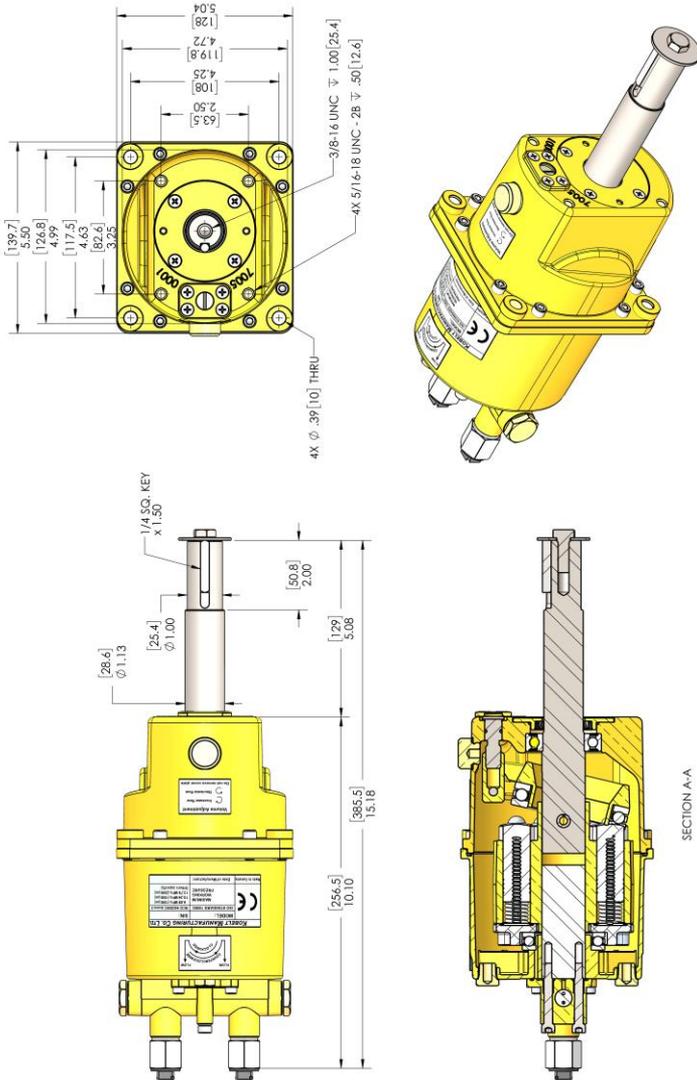


Figure 5: Installation Dimensions (Straight Long Shaft)

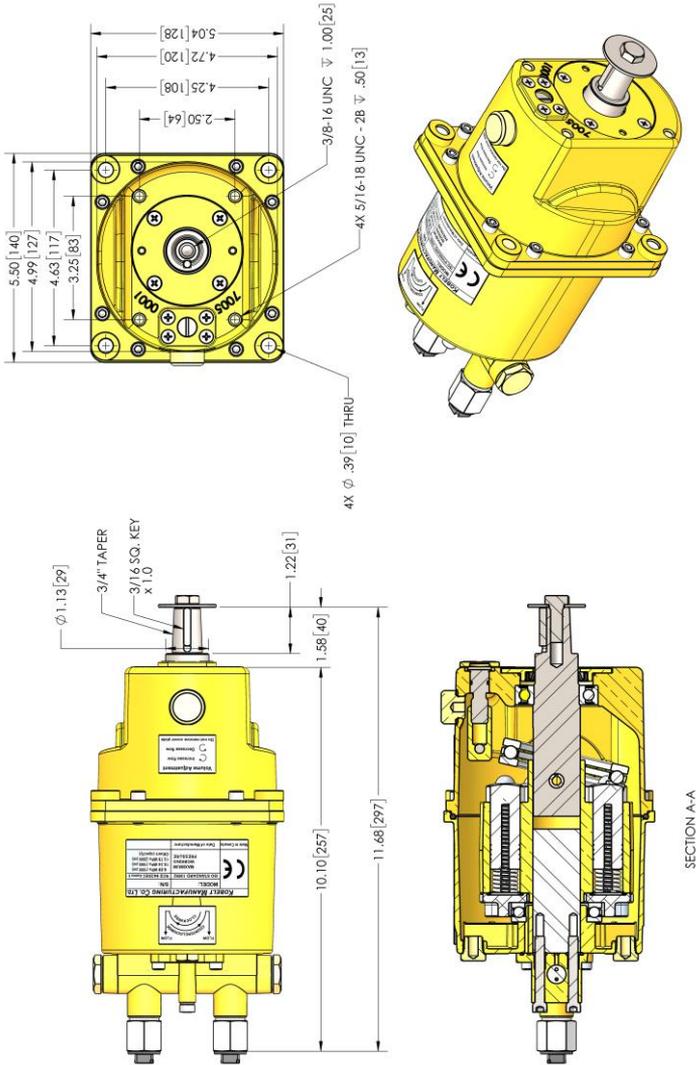


Figure 6: Installation Dimensions (Tapered Short Shaft)

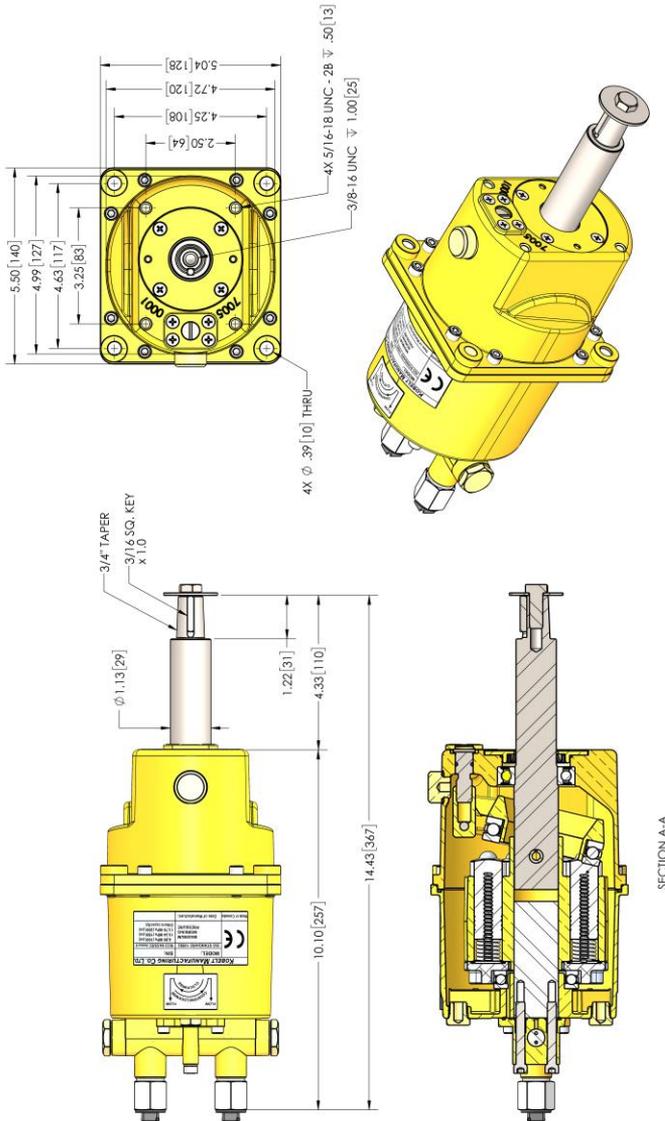


Figure 7: Installation Dimensions (Tapered Long Shaft)

# 12 APPENDIX B: PARTS LIST

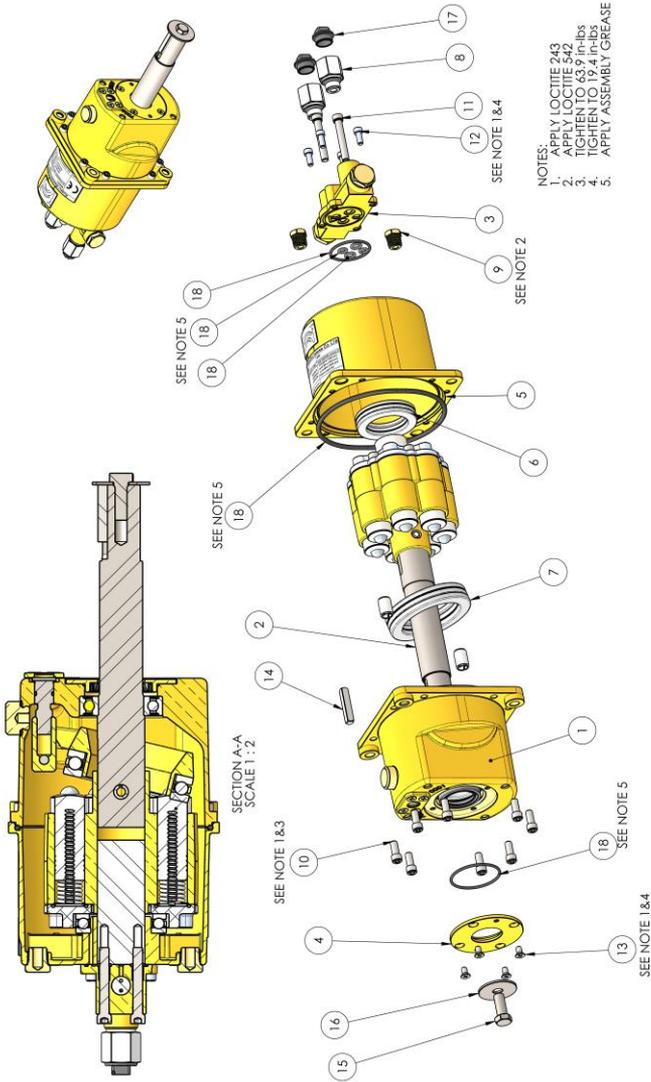


Figure 8: Parts Diagram

Table 4: Parts List

Model No.:		7005			
Part No.:		7005-AL	7005-ALT	7005-AN	7005-ANT
ITEM	DESCRIPTION				
1	FRONT HOUSING SUB-ASSEMBLY	7005-5001			
2	ROTOR SUB-ASSEMBLY	7005-5002-L	7005-5002-LT	7005-5002-S	7005-5002-ST
3	LOCK VALVE SUB-ASSEMBLY	7005-LVC			
4	FRONT SEAL RETAINER SUB-ASSEMBLY	7012-5005			
5	REAR HOUSING	7005-0002			
6	BEARING, THRUST	7005-51108			
7	BEARING, THRUST	7005-51112			
8	FITTING, ADAPTER	7039-0139			
9	FITTING, HEX HD PLUG	7039-1342			
10	SOCKET HEAD SCREW	1002-1010			
11	SOCKET HEAD SCREW	1002-1028			
12	SOCKET HEAD SCREW	1002-0808			
13	FLAT HEAD SCREW	1009-0806			
14	SQUARE KEY	7005-0019	7005-0020	7005-0019	7005-0020
15	HEX HEAD SCREW	1001-1216			
16	WASHER	1023-0245			
17	PLUG	7039-3043			
18	HELM PUMP REPAIR KIT	7005-RK			

# 7005-5001

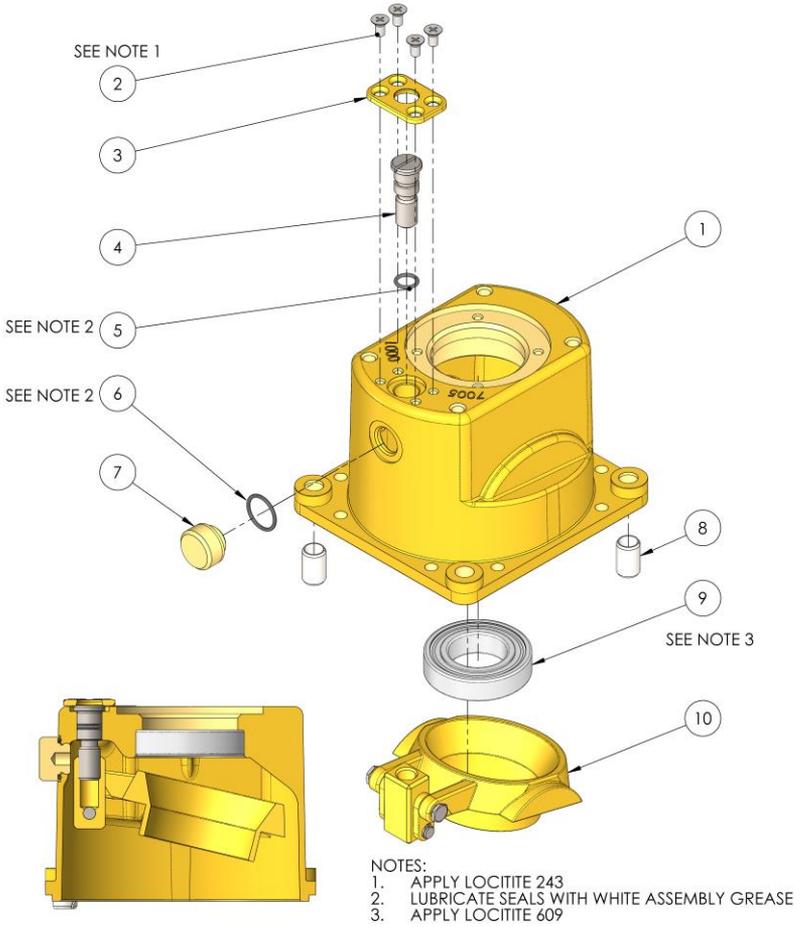


Figure 9: Front housing sub-assembly parts diagram

Part No.: 7005-5001		
ITEM	DESCRIPTION	
1	FRONT HOUSING	7005-0001
2	FLAT HEAD SCREW	1009-0806
3	ADJUSTMENT SCREW COVER	7005-0008
4	ADJUSTMENT SCREW	7005-0023
5*	O-RING	1101-0012
6*	O-RING	1101-0017
7	FILLER PLUG	7005-0028
8	DOWEL PIN	7012-0030
9	BALL BEARING	7005-6006
10	ADJUSTMENT BLOCK SUB-ASSEMBLY	7005-0007-SA

\*Items included in 7005-RK repair kit



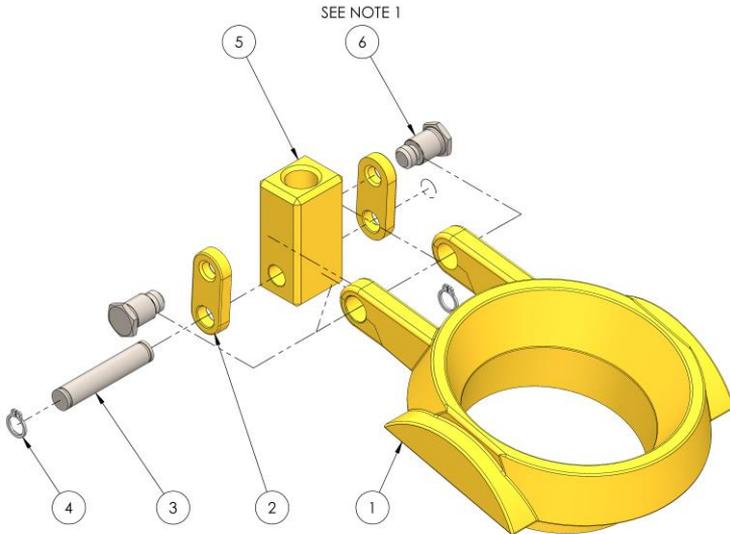
## CAUTION

Front housing of the pump is spring loaded. Opening and closing of front housing for repair or maintenance needs extra caution.

## NOTICE

At the time of installation leave the adjustment screw (item 4) all the way out at minimum displacement position.

## 7005-0007-SA



## NOTES:

1. APPLY LOCITITE 243 AND TIGHTEN TO 112 IN-LBS

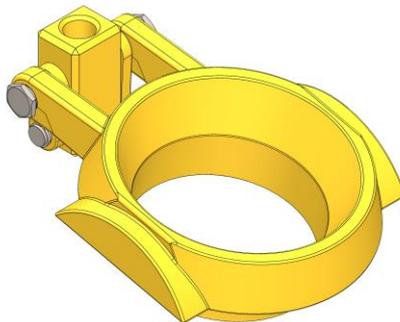


Figure 10: Adjustment block sub-assembly

<b>Part No.: 7005-0007-SA</b>		
<b>ITEM</b>	<b>DESCRIPTION</b>	
<b>1</b>	THRUST BEARING RETAINER	7005-0007
<b>2</b>	ADJUSTMENT LINK	7005-0009
<b>3</b>	PIN	7005-0021
<b>4</b>	RETAINING RING	1029-1025
<b>5</b>	ADJUSTING BLOCK	7005-0010
<b>6</b>	SHOULDER BOLT	7005-0022

## 7005-5002

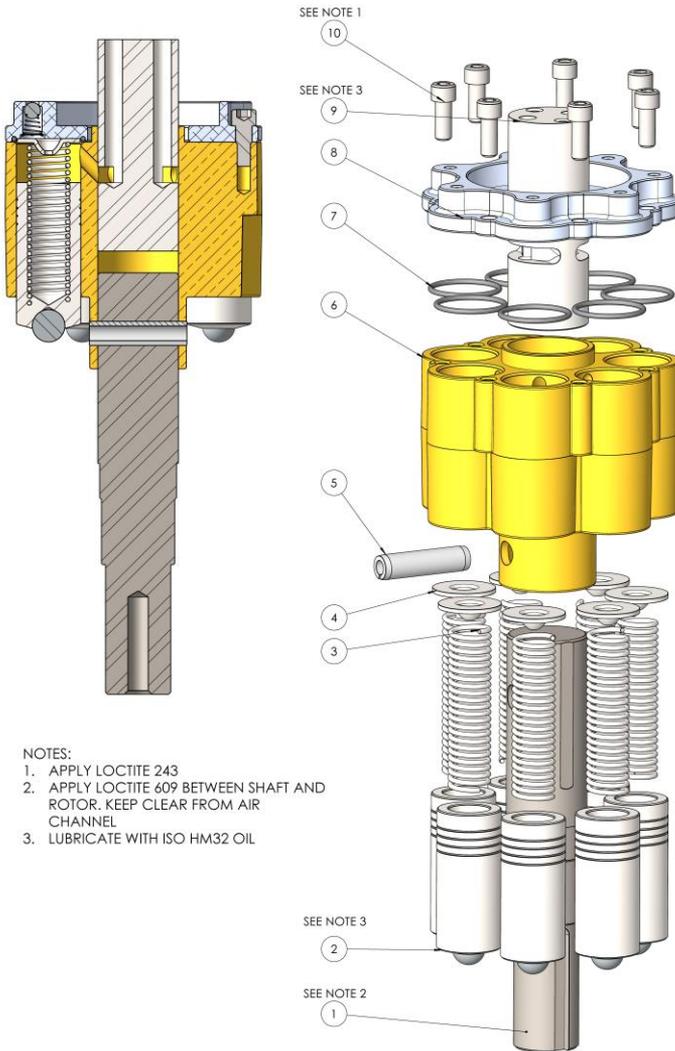


Figure 11: Rotor sub-assembly

Model No.:					
7005-5002-L      7005-5002-LT      7005-5002-S      7005-5002-ST					
ITEM	DESCRIPTION				
1	SHAFT	7005-0016	7005-0018	7005-0015	7005-0017
2	PISTON	7005-0012			
3	SPRING	1201-0164			
4	SPRING SEAT	7005-0032			
5	PIN	1024-1224			
6	ROTOR	7005-0005			
7*	O-RING	1101-0022			
8	PISTON CHECK VALVE	7005-5003			
9	PINTLE	7005-0013			
10	SOCKET HEAD CAP SCREW	1002-1010			

\*Item supplied with 7005-RK repair kit.

# 13 APPENDIX C: SHAFT SEAL REPLACEMENT

## 7012-5005



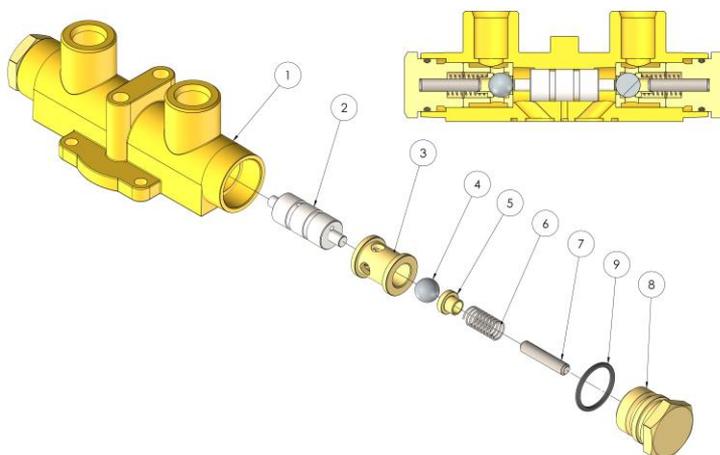
Figure 12: Front Seal Retainer sub-assembly

Model No.:		7012-5005
ITEM	DESCRIPTION	
1	FRONT SEAL RETAINER	7012-0003
2*	SHAFT SEAL	7005-11130

\*Item supplied in 7005-RK repair kit.

# 14 APPENDIX D: LOCK VALVE SUB-ASSEMBLY

## 7005-LVC



Model No.:		7005-LVC
ITEM	DESCRIPTION	
1	LOCK VALVE BODY	7005-0006
2	SHUTTLE	7005-0014
3	BALL SEAT	7005-0026
4	BALL	1301-0112
5	SPRING SEAT	7005-0031
6	SPRING	1201-0165
7	PIN	7005-0024
8	PLUG	7005-0025
9*	O-RING	1101-0017

\*Item supplied in 7005-RK repair kit.

# 15 APPENDIX E: TYPICAL SYSTEM ARRANGEMENT

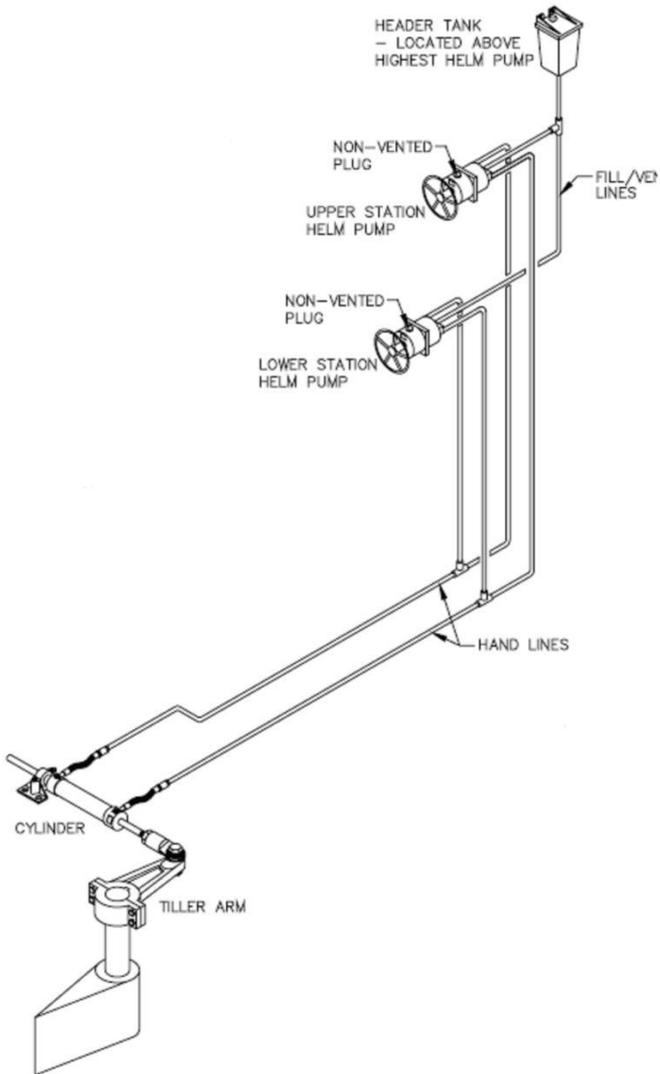


Figure 13: Typical system arrangement

*Page Intentionally Left Blank*

*Page Intentionally Left Blank*

# ***KOBELT***

**Kobelt Manufacturing Co. Ltd.**

8238 129th Street  
Surrey, British Columbia,  
Canada, V3W 0A6

Sales Tel: +1-604-572-3935

Fax: +1-604-590-8313

Email: [sales@kobelt.com](mailto:sales@kobelt.com)

Website: [www.kobelt.com](http://www.kobelt.com)

Made in Canada / Printed in Canada