

simpson-lawrence
pacific
installation, operation & maintenance

instructions

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C3500



1.0 PARTS

1.1 Exploded Diagram

1.2.0 For Future Reference

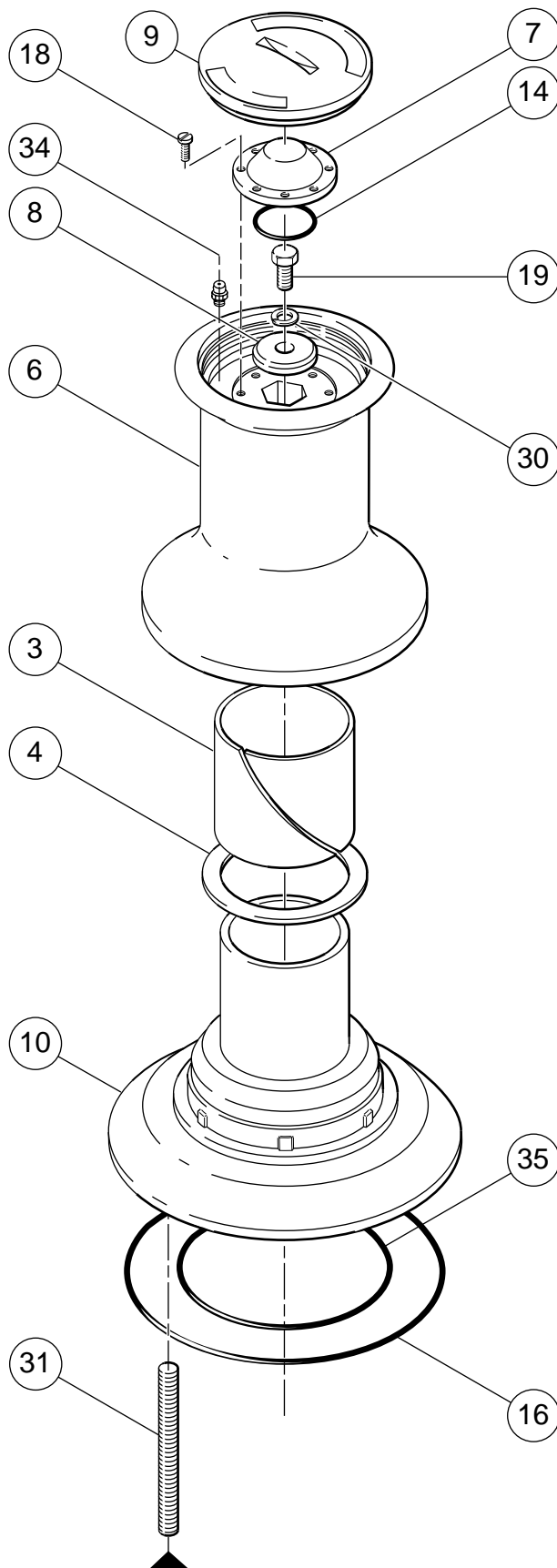
After you have read this instruction booklet, please keep it safe on board your vessel for future reference.

1.2.1 Identify your model

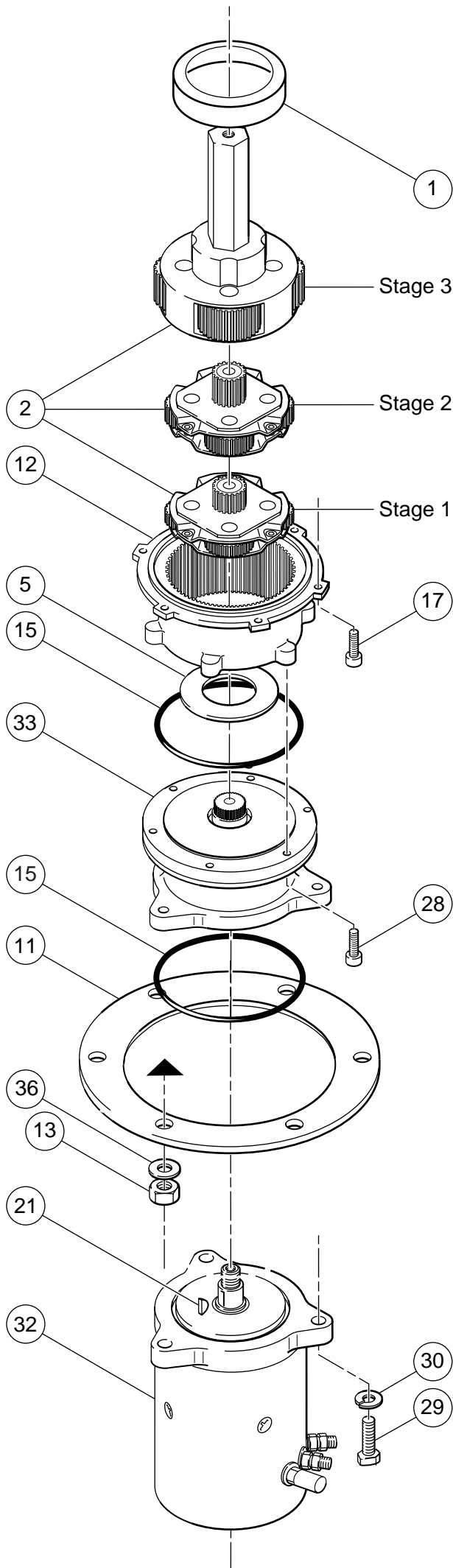
Type	List No.	Tick
12v Pacific C3500 Warming	0035010	
24v Pacific C3500 Warming	0035020	

1.2.2 Please note your serial number and voltage. (Printed on motor label). This information is essential when ordering spares.

_____	_____ V
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1.3 PARTS LIST



Item	Part No.	Part Description	Quantity
1	P103004	Bearing	1
2	P418065	Gear Set (Stage 3)	1
	P418047	Gear Set (Stage 2)	1
	P418024	Gear Set (Stage 1)	1
3	P103053	Shim Washer - Main	1
4	P103021	Shim Bearing - Drum	1
5	P103036	Shim Bearing - Gears	1
6	P106020	Drum	1
7	P106214	Cap - Inner	1
8	P106217	Cap - Inner Lock	1
9	P108206	Cap - Outer	1
10	P109021	Deck Housing	1
11	P109306	Clamping Plate	1
12	P119006	Gearbox	1
13	P339021	Nut	6
14	P342030	O Ring	1
15	P342046	O Ring	2
16	P342452	O Ring	1
17	P354031	Screw	6
18	P354106	Screw	8
19	P354231	Hex Head Screw	1
21	P113020	Woodruff Key	1
28	P354020	Screw	6
29	P354232	Screw	3
30	P366042	Washer	3
31	P154003	Stud	4
32	P336032	Motor 12v	1
32a	P336031	Motor 24v	1
33	P436107	Mechanical Brake Assembly	1
34	P418100	Grease Nipple	1
35	P342051	O Ring	1
36	P366055	Washer	6

2.0 PLANNING THE INSTALLATION

METRIC or STARTER CABLE

2.1 Suitability

Suitable for vessels up to **24.4m** (80ft) LOA.

2.2 Package Contents

Capstan
 Mounting Studs, Washers, Nuts & 'O' Ring
 Clamping Plate
 Mounting Template
 Safety Instructions
 Installation Warning Label
 Instruction Manual

Voltage	Cable Length m (ft.)	Size (mm ²)
12	27.0m (90ft.)	50
	43.0m (140ft.)	70
	52.0m (170ft.)	95
	55.0m (180ft.)	95
24	27.0m (90ft.)	16
	55.0m (180ft.)	25

2.3 Additional Requirements

Each capstan installation requires :

- A solenoid.
- A control switch(es) by preference.
- A breaker/isolator for overload protection which can also be used as a main isolating switch. (Simpson-Lawrence recommend the breaker/isolators listed under **3.0 Accessories**)

- The following tools:

Capstan Installation

Flat Blade Screwdriver
12mm (1/2") Diameter Drill
13mm AF (1/2") Spanner (Wrench)
17mm AF (1 1/16") Spanner (Wrench)
 Jig Saw or Trepanning Tool

Wiring Installation

Flat Blade Screwdriver
 Crimping Pliers / Wire Stripper
13mm A/F (1/2") Spanner or Socket
8mm A/F (5/16") Spanner or Socket

- Marine grade silicone sealant. **DO NOT use permanent adhesive/sealant.**
- Suitable electrical cable and crimp terminals.

2.4 Electric Cable Selection

To achieve the best performance and safeguard your electrical system, it is essential that any electric capstan is fitted with sufficiently large diameter cable to cope with the current draw imposed upon it and, to keep the voltage drop within acceptable limits. In any circumstance, voltage drop due entirely to cable resistance should not exceed 5%, roughly 0.5V for a 12V installation and 1.0V for a 24V one.

The following tables give recommended cable sizes. The recommendations are based on the total length of cable required, from the battery to the capstan and back to the battery, following the route of the cables. (See the Wiring Diagram for the definition.)

DO NOT confuse Cable Length with the length of the vessel!

AMERICAN CABLE

Voltage	Cable Length m (ft.)	Size (AWG)
12	27.0m (90ft.)	1/0
	43.0m (140ft.)	2/0
	52.0m (170ft.)	3/0
	55.0m (180ft.)	4/0
24	27.0m (90ft.)	6
	55.0m (180ft.)	4

Thin wire of **1.5mm²** cross sectional area, 21/0-30 PVC covered (American equivalent 14 AWG) is required for the control switch circuits. This is used to connect the switch(es) to the solenoid(s).

3.0 ACCESSORIES

Item		List Number
Breaker/Isolator (70 Amp)	12V Installation	0050711
Breaker/Isolator (50 Amp)	24V Installation	0050710
12 Volt Solenoid	Single direction	0052505
24 Volt Solenoid	Single direction	0052506
Foot Switch	Single direction	0052514
High Load Foot Switch	Single direction	0052516

4.0 SPECIFICATION

4.1 Performance Data:

Typical Working Figures (12v) Warring		
Load	Speed	Current Draw
320kg (700lb)	7m (23ft) /min	110 Amp

Typical Working Figures (24v) Warring		
Load	Speed	Current Draw
320kg (700lb)	7m (23ft) /min	55 Amp

Motor 1200W Series Wound
Weight **38kg (84lb)**

5.0 INSTALLATION

5.1.0 Fitting Capstan To Deck

5.1.1 Preparation

The capstan must always be mounted vertically. **DO NOT** mount capstan in a horizontal direction as oil will leak from the gearbox and the capstan will wear out prematurely. If the deck top is uneven a suitable mounting pad may be required to take up camber or sheer. Decks which are thin, of foam or balsa laminate construction, will require a backing piece in order to spread the load which will be applied locally to the deck while the capstan is in use. Care must be taken if the deck is of uneven thickness and a mounting pad and/or backing piece fitted that the top and bottom surfaces are parallel for optimum clamping.

5.1.2 Position of Capstan

Select a site for the capstan on the deck that is a comfortable position for the operator to tail rope off the drum and preferably feed rope straight into the storage area. A position for the switch should be found that makes it accessible to the capstan operator's foot or knee.

5.1.3 Access

Allow for access to the top of the drum during maintenance.

5.1.4 Mounting Template

Place the mounting template in the desired position. Drill a clearance hole for the motor to pass through as detailed and six **12mm (1/2")** holes for the studs. The studs supplied suit decks and mounting pads up to **75mm (3")** thickness.

5.1.5 Fitting

Place the capstan and studs through the holes in the deck, when satisfied that all is correct, fit any packing, the clamping ring, the nuts and washers, and tighten evenly and firmly using a **150mm (6")** long spanner.

5.1.6 Longer Studs

For thicker than standard decks, simply fit longer studs as appropriate (Thread M10 x 1.5). Studs to special lengths may be obtained from Simpson-Lawrence Engineering Limited.

5.2.0 Wiring

5.2.1 General Recommendations

Warning! Carefully check to ensure that the capstan motor is wired to correct polarity. It is possible to damage the gearbox if the motor is wired to the wrong polarity.

The wiring system should be of the two cable fully insulated return type, which avoids possible electrolytic corrosion problems. Most modern installations are negative return (negative earth) but polarity should be checked.

Solenoids should be mounted as close to the battery as possible, in a dry location using the mounting holes provided. Under no circumstances should solenoids or solenoid control boxes be installed in chain lockers or similar damp or semi exposed areas.

Overload protection must be built into the capstan wiring circuit. This protects the wiring and prevents undue damage to the capstan motor, in the event of it being stalled by an excessive load in service. It is advisable to site the Breaker/ Isolator in a dry, readily accessible place, as it must be manually reset should an overload occur that causes it to trip to the **OFF** position.

If you are **NOT** using the Breaker/Isolator recommended, an alternative **MUST** have identical characteristics.

NB: Crimp terminals should be used on all wire ends for good electrical connections.

5.2.2 Control Switch Installation

Follow the mounting instructions supplied with the switch. Remember when using more than one control switch, it is important to their correct operation, that they are wired in a parallel circuit.

5.3 Test

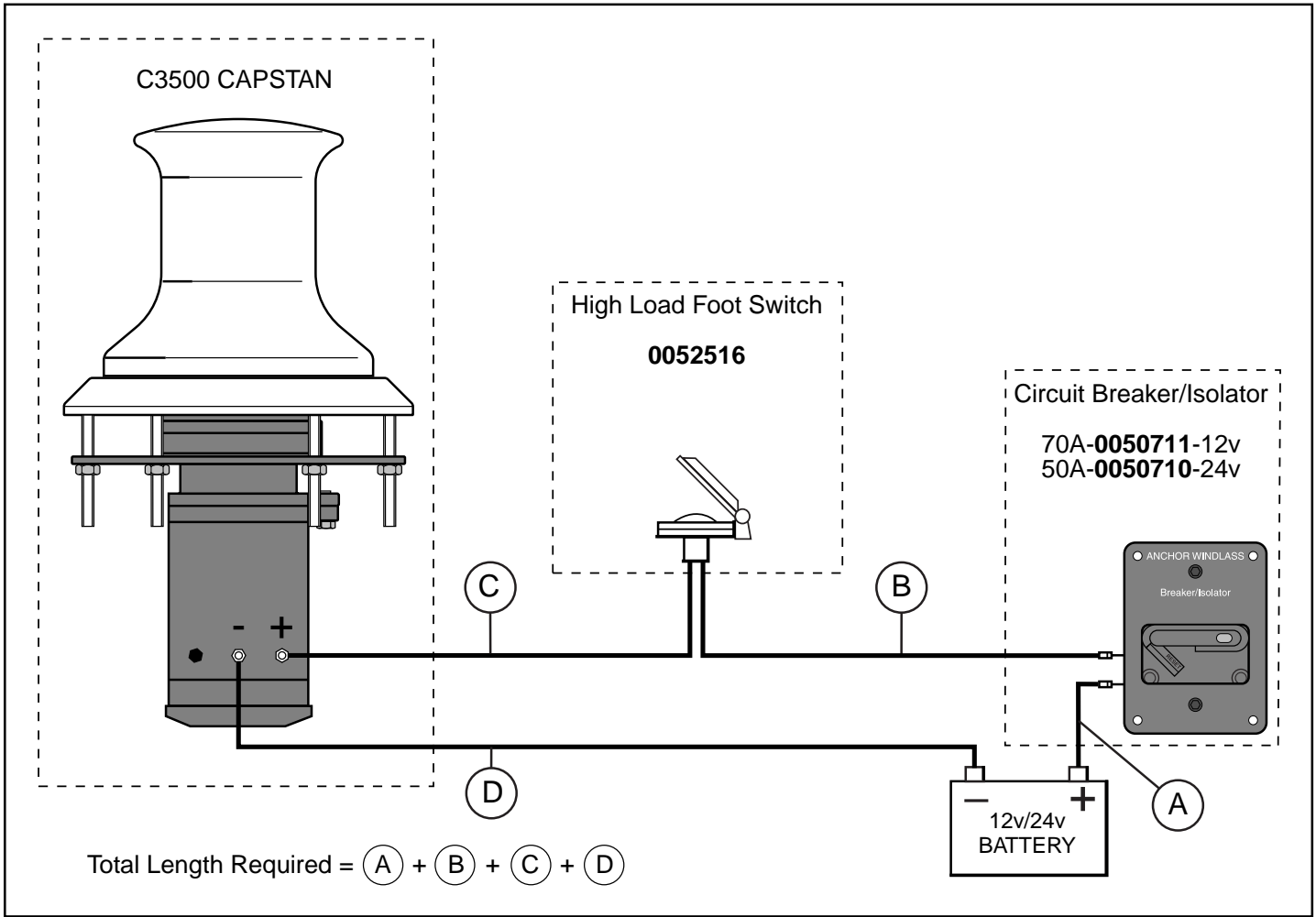
Immediately after installation, it is recommended that the capstan is tested to ensure it functions correctly, i.e., that it rotates freely, in a clockwise direction.

5.4 Protection of Below Deck Parts

Check all terminals or connections are firmly secured. Coat **ALL** below deck surfaces, including the terminals, with rubber or plastic type paint (automotive underseal is one convenient way) **OR** wrap completely in self amalgamating tape **OR** coat/protect in a similar way with some other system suitable for a marine environment.

5.5.0 Wiring Diagrams

5.5.1 Single Direction Wiring (High Load Foot Switch Only)

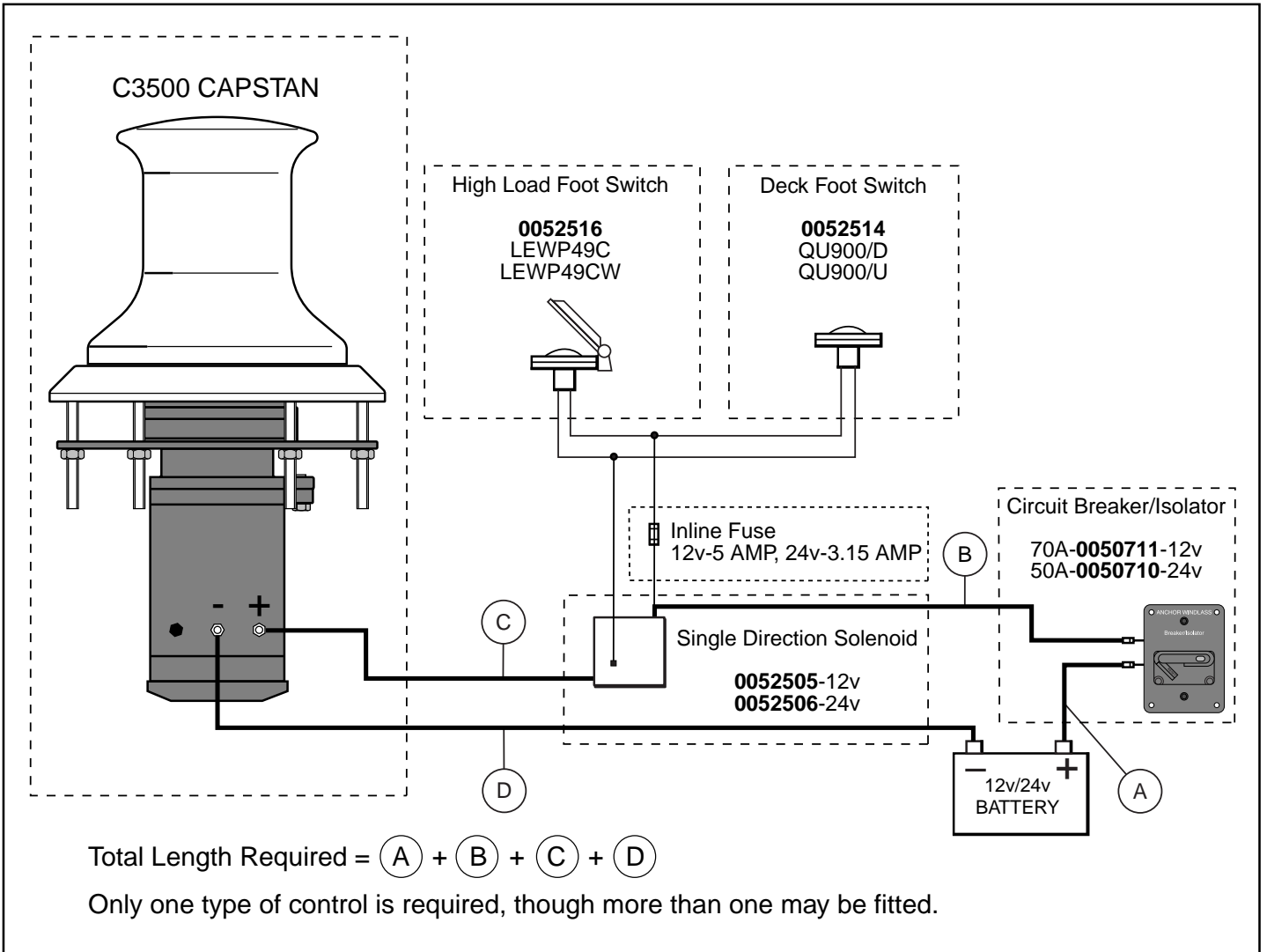


WIRE	FROM	TO
Thick cable	Positive battery terminal	Breaker/isolator
Thick cable	Breaker/isolator	High load foot switch
Thick cable	High load foot switch	Capstan positive terminal
Thick cable	Negative battery terminal	Capstan negative terminal

Note: Reversing polarity will result in permanent damage to the capstan (see 5.2.1). ALL installations must be carried out in accordance with USCG, ABYC and NMMA requirements. If you have any questions regarding this installation contact nearest Simpson-Lawrence Agent.

Warning!: If you are not sure that you understand the above guidelines seek professional advice.

5.5.2 Single Direction - Multiple Switches



WIRE	FROM	TO
Thick cable	Positive battery terminal	Breaker/isolator
Thick cable	Breaker/isolator	Solenoid
Thick cable	Solenoid	Capstan positive terminal
Thick cable	Negative battery terminal	Capstan negative terminal
Thin wire	Solenoid	Control switch
Thin wire	Control switch	Main circuit (positive)
Thin wire	Solenoid	Main circuit (negative)

Note: Reversing polarity will result in permanent damage to the capstan (see 5.2.1). ALL installations must be carried out in accordance with USCG, ABYC and NMMA requirements. If you have any questions regarding this installation contact nearest Simpson-Lawrence Agent.

Warning!: If you are not sure that you understand the above guidelines seek professional advice. **NB:** Use a minimum wire gauge of 1.5mm² (14 AWG) to connect switches.

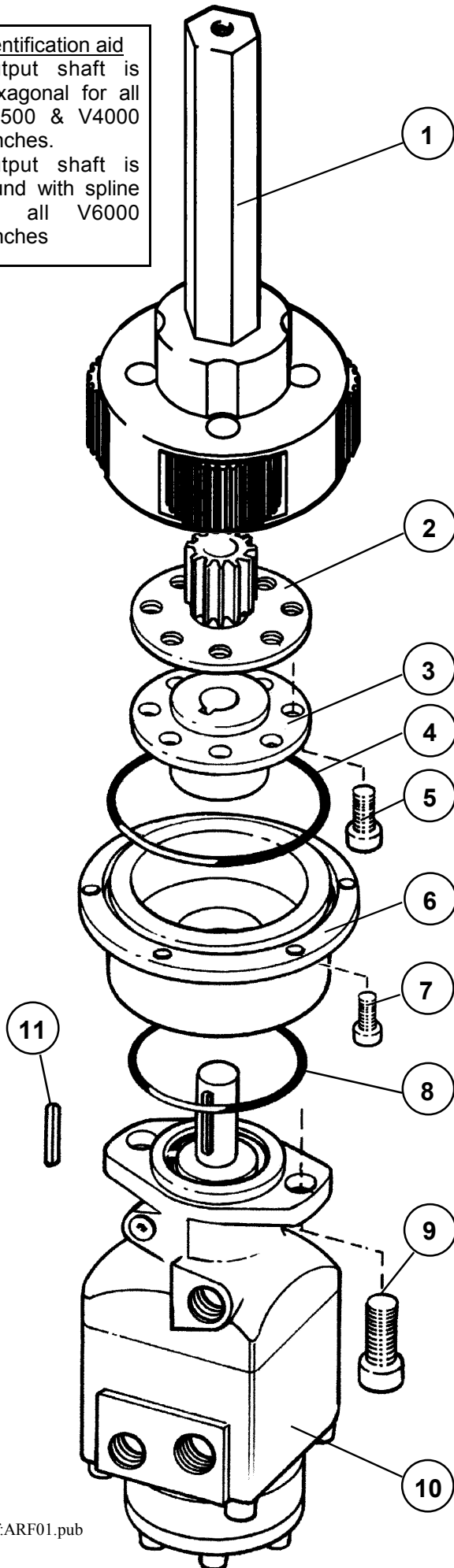
Identification aid
 Output shaft is hexagonal for all C3500 & V4000 winches.
 Output shaft is round with spline for all V6000 winches

Ref:ARF01

Transmission Parts List
C3500ARF Capstan
V4000GARF, V4000GDARF Windlass
V6000GARF, V6000GDARF Windlass

All other parts of winch are as shown on DC electric powered parts diagram.

When ordering parts, give full description of part item required, winch model, and all details from nameplate(s)



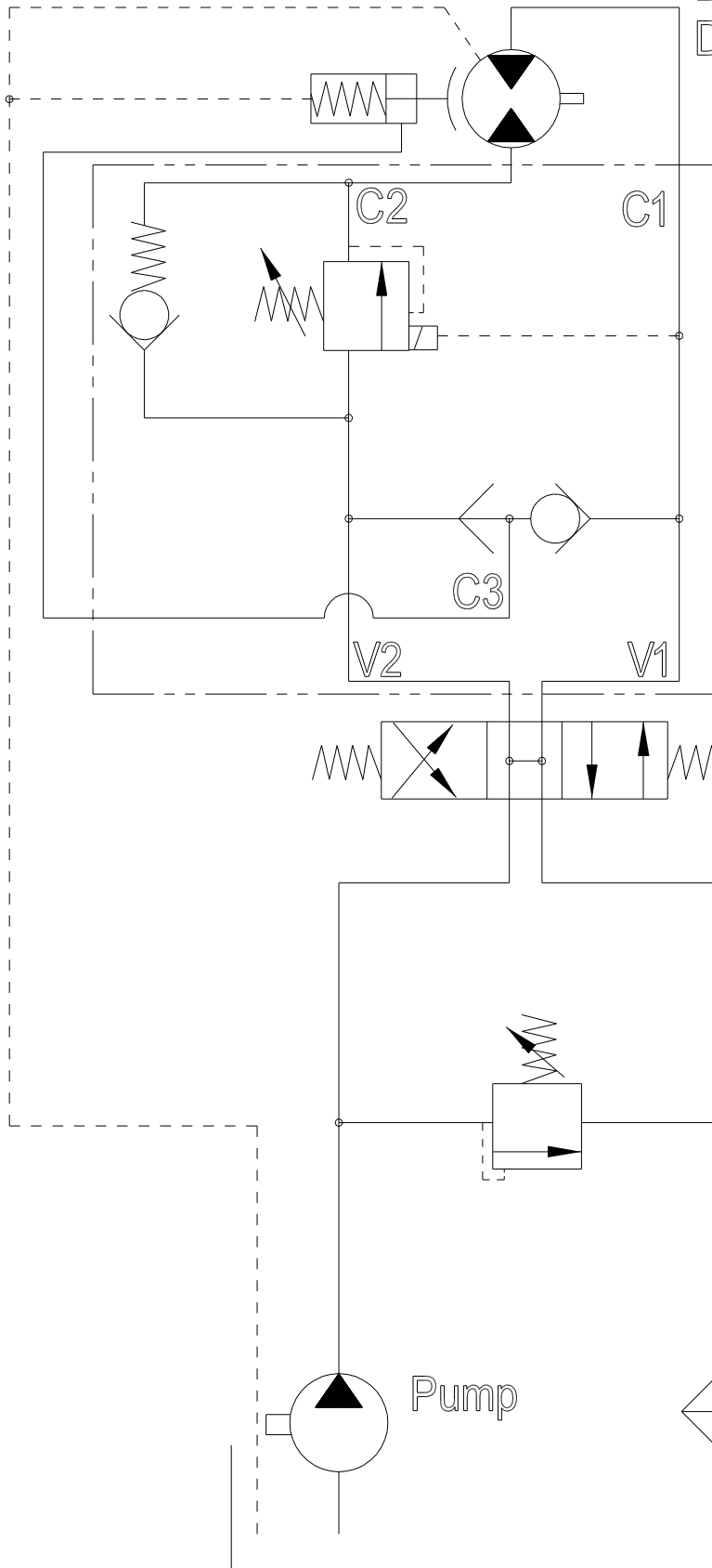
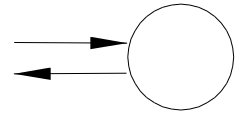
Ref	Part number	Description	Quantity used per winch				
			C3500	V4000G	V4000GD	V6000G	V6000GD
1	418065	Final drive	1				
	418063			1			
	418064				1		
	418067					1	
	418066						1
2	106602	Pinion	1	1	1		
	106604					1	1
3	106606	Coupling	1	1	1		
	106603					1	1
4	342051	Seal	1	1	1		
	342053					1	1
5	354032	Screw	6	6	6		
	354050					8	8
6	119056	Adaptor	1	1	1		
	119053					1	1
7	354032	Screw	6	6	6		
	354044					6	6
8	342042	Seal	1	1	1	1	1
9	354060	Screw	2	2	2	4	4
10	336054	Motor	1	1	1		
	336053					1	1
11	-	Key	1	1	1	1	1

Servicing this transmission unit.

- 1] Disconnect hydraulic lines. Plug motor ports and line ends to ensure no contamination of oil system.
- 2] Remove winch from installation and secure in upside down position.
- 3] Do not disassemble motor/brake unit - item 10. This should be serviced by an authorised service agent.
- 4] If necessary remove components following diagram. Clean all parts thoroughly.
- 5] Removal of final drive requires release of centre screw at top end of winch. Final drive should fit freely in housing
- 6] Keep screw thread holes clean and free of lubricant. These must be kept clean for thread lock compound on assembly
- 7] With final drive in position and secured by centre screw (not shown), fill gear box to top with fluid grease (Castrol TC or similar 00 grade fluid grease). Rotate gear train and top up. Assemble in sequence filling voids with grease. Apply locking compound to all screw threads and tighten evenly and firmly.
- 8] After a few hours use, check all fastenings are tight and re check from time to time. Follow standard commissioning procedures for hydraulic systems

Braked motor: Ports: G1/2"
 Drain & Brake : G1/4"

Oil flow shown gives
 clockwise rotation
 viewed from above



Brake shuttle + c.balance
 valve. Ports: G1/2"
 Drain: G1/4"

Scope of supply by James Nilsson Ltd
 varies with contract. Check with us if
 in doubt.

Control valve with
 motor spool

Pressure relief
 valve

Pump

Tank

We recommend BREVINI hydraulic equipment

James Nilsson Ltd
 Auckland, New Zealand
 Tel: [64 (0) 9] 444 5219
 Fax: [64 (0) 9] 444 5222
 Email: sales@jamesnilsson.co.nz

Typical hydraulic circuit for
 V6000, V4000, C3500
 with "ARF" braked drives

Sheet Issue: 1-01/00

Drawing no:
ARFCIRC

6.0 OPERATING INSTRUCTIONS

6.1 Safety First!

Your Simpson-Lawrence Pacific capstan is a powerful piece of equipment and should be respected as such. Keep young children and observers, who are unfamiliar with anchoring procedures, away from the operating area when in use. To avoid personal injury, ensure that fingers, limbs and clothing are kept clear of the rode and capstan during operation. Always ensure there are no swimmers nearby when dropping your anchor.

Always keep the breaker/isolator switch **OFF** except when in use.

6.2.0 Hauling In

6.2.1 Warping

Warp should be laid onto the drum, two or three turns in a clockwise direction. The operator should stand (or kneel) in a comfortable position to activate the deck switch whilst tailing the warp behind and into the storage area, if possible.

6.2.2 Apply Tension

Apply a light even tension to the warp before activating the switch. If very heavy pulls are necessary apply power in short bursts of about 10 seconds duration. The speed of hauling depends on the load on the warp and will increase once the warp has tightened up.

6.2.3 Caution!

Should the capstan stall, switch off and wait a few seconds before trying again. If the recommended breaker/isolator has tripped, it will require to be manually reset before the capstan can operate again. It is important to the future, good performance of the capstan's motor that the capstan is not allowed to stall for more than a few seconds and therefore, sensible to avoid stalling your capstan whenever possible.

6.2.4 Recovery

Should you wish to use the warping capstan for anchor retrieval, then always remember to secure your anchor independently of the capstan so as to prevent accidental launch when under way.

6.2.5 Caution!

For safety, it is best not to wrap chain around the capstan barrel, however, if it is necessary, be aware that marking of the drum will occur.

6.2.6 Power off

Turn the power breaker/isolator **OFF** after use.

6.2.7 Warning!

Serious damage can be caused by incorrect assembly and your guarantee may be invalidated as a result. Always proceed with care. The Pacific family of capstans have been designed for ease of installation and removal. It should not, therefore, be necessary to remove any parts other than the deck clamping ring, nuts and washers.

7.0 IMPORTANT USER INFORMATION

Classification Societies require that a vessel lying to anchor should have its rode held by a chain stopper or equivalent **independent strong point** as capstans are not designed to withstand the loads generated under storm conditions. This rule should be applied to all craft!

At all times it is the responsibility of the boat user to ensure that the anchor and rode are properly stowed for the prevailing sea conditions. This is particularly important with high speed power boats as an anchor accidentally falling into the water whilst under way can cause considerable damage.

A capstan is mounted in the most exposed position on a vessel and is thus subject to severe atmospheric attack resulting in a possibility of corrosion in excess of that experienced with most other items of deck equipment. As the capstan may only be used infrequently, the risk of corrosion is further increased.

When the capstan is mounted in an anchor well with a closing lid, due to lack of ventilation and consequent high saline conditions the rate of corrosion is accelerated. It is essential that the capstan is regularly examined, operated and given any necessary maintenance.

8.0 MAINTENANCE

8.1 General Recommendations

Isolate the capstan electrically, before carrying out any maintenance work. After the first two or three operations, check that the capstan is still fastened tightly to the deck as it should now be **bedded-in**.

Every three months, unscrew the drum 'Cap - Outer' (Part 9) using a broad bladed tool. As the cap may be stiff, a good fit in the slot is advised to avoid damage to the cap. A smear of grease around the seat area of the top cap will ease future removal. Give the grease nipple 2 or 3 shots of grease.

Regularly wash down the above deck parts of your capstan with fresh water.

Ensure that all below deck parts are kept dry. The gears and gearbox bearings have been lubricated for you and require no regular attention. It is recommended that the gearbox and motor exteriors are regularly treated with a water repellent spray when mounted exposed within a chain locker.

Examine all electrical connections for possible corrosion. Clean and lightly grease as necessary.

8.2.1 Winter Laying Up

As with all items of marine equipment poor installation or neglect is often responsible for damage caused during the winter lay up period. Given correct installation and maintenance your capstan will require little attention prior to, or after, winter lay up. Check between the deck plate and deck for signs of water ingress. Should it occur, remove, clean and reseal the deck plate. If necessary, replace 'O' ring seal.

9.0 THREE YEAR LIMITED WARRANTY

WARRANTY COVERAGE: SIMPSON-LAWRENCE ENGINEERING LIMITED., warrants to the original purchaser, subject to the limitations and exclusions described below, that this product will be free from defects, in material and workmanship under normal use and service, for a period of three (3) years from the date of its original sale, except that the warranty shall be for a period of one (1) year for seals, electric motors, electrical equipment, electronic controls, composite gipsies and hydraulic pumps. Simpson-Lawrence will repair or replace any part which proves to be defective in normal use during the period of the warranty.

WARRANTY CLAIMS PROCEDURES: If a defect is discovered during the applicable warranty period, Buyer must promptly notify Simpson-Lawrence of such, in writing, at the nearest address shown, providing proof of purchase. For warranty service, the product must be returned to Simpson-Lawrence for examination. This examination will be performed by Simpson-Lawrence at no charge to Buyer. Buyer is responsible for any labour costs associated with preparing the product or parts for shipping and the cost of shipping or transporting the product or parts to and from Simpson-Lawrence.

REMEDY: Simpson-Lawrence will repair any defect in material or workmanship or, at it's option, correct such defect by replacing non-conforming goods or parts. Such repairs and/or new parts are warranted for the unexpired portion of the original warranty, or for 90 days, whichever is later. Warranty work (parts and/or Labour) shall be at Simpson-Lawrence's expense; however, product preparation and shipping costs to or from Simpson-Lawrence shall be borne by Buyer. These remedies are the Buyer's exclusive remedies for breach of warranty.

LIMITATIONS AND EXCLUSIONS: (1) This warranty applies only if the product is used under non-commercial, normal use in service, and shall not apply to (a) products subjected to (i) conditions or usage that exceed the product's performance specifications, (ii) incorrect maintenance, or (iii) use in applications for which they are not intended; (b) defects or damage caused by a force majeure which exceed design specifications, including but not limited to, wear and tear, corrosion or ultraviolet degradation; and (c) defects or damages caused by unauthorized attachments, accessories or modifications. (2) Simpson-Lawrence's warranties of fitness and merchantability, as well as other expressed warranties contained herein, shall apply only to those parts and components manufactured by Simpson-Lawrence, which were installed by Simpson-Lawrence or other authorized personnel, and shall not be effective or actionable if any warranty repair or replacement work is performed by any unauthorized party. Simpson-Lawrence reserve the right to alter the products specifications and design without prior notice.

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SOME STATES, OR COUNTRIES, DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE, OR COUNTRY TO COUNTRY.

The model described in this document is subject to a policy of continual improvement. **Simpson-Lawrence Engineering Limited** reserve the right to alter specifications and recommendations without notice. For the latest information regarding any aspect of your windlass please contact your local agent or Simpson-Lawrence Engineering Limited:-

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