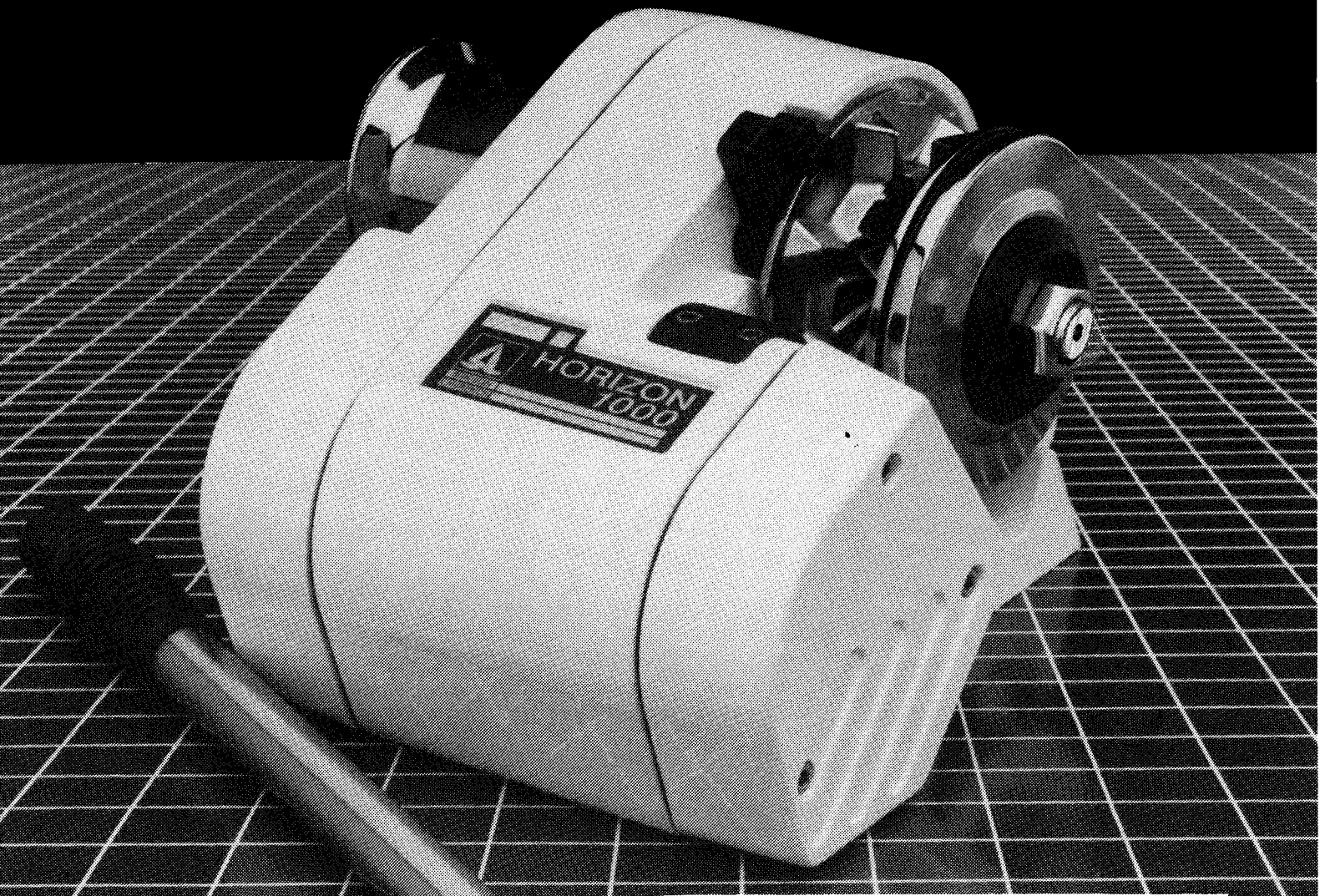
Horizon 1000 & 1500

Installation, Operation and Maintenance Instructions



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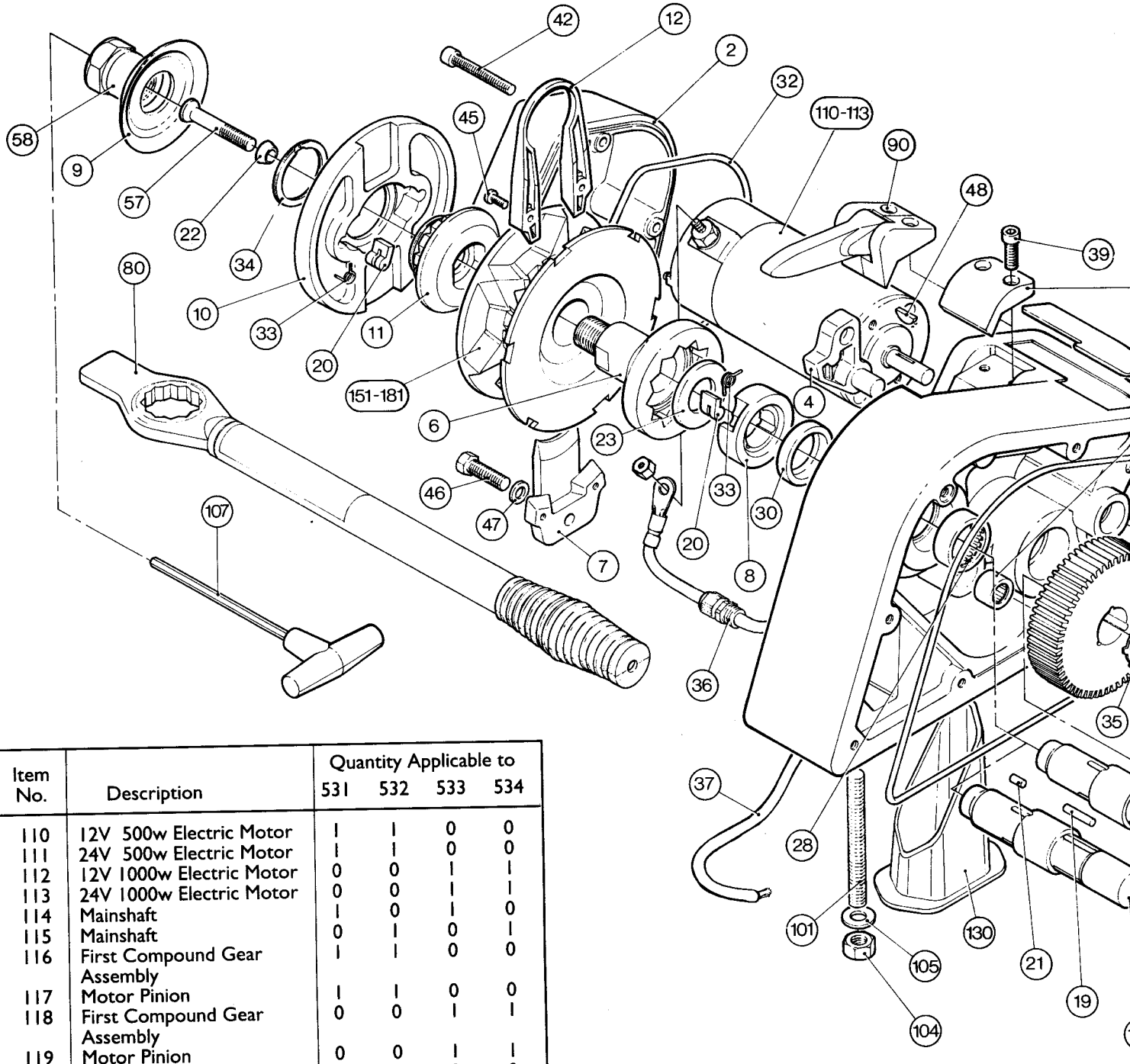
LAWRENCE

1. PARTS
1.1 Exploded Diagram



Item No.	Description	Quantity Applicable to 531	532	533	534
110	12V 500w Electric Motor	1	1	0	0
111	24V 500w Electric Motor	1	1	0	0
112	12V 1000w Electric Motor	0	0	1	1
113	24V 1000w Electric Motor	0	0	1	1
114	Mainshaft	1	0	1	0
115	Mainshaft	0	1	0	1
116	First Compound Gear Assembly	1	1	0	0
117	Motor Pinion	1	1	0	0
118	First Compound Gear Assembly	0	0	1	1
119	Motor Pinion	0	0	1	1
120	Nameplate	1	1	0	0
121	Nameplate	0	0	1	1
122	Drum Cap	1	0	1	0
123	Drum	1	0	1	0
124	Key	1	0	1	0
125	Washer	1	0	1	0
126	Seal	1	0	1	0
127	End Cover Seal	0	1	0	1
128	Bolt	1	0	1	0

1.2 For Future Reference

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

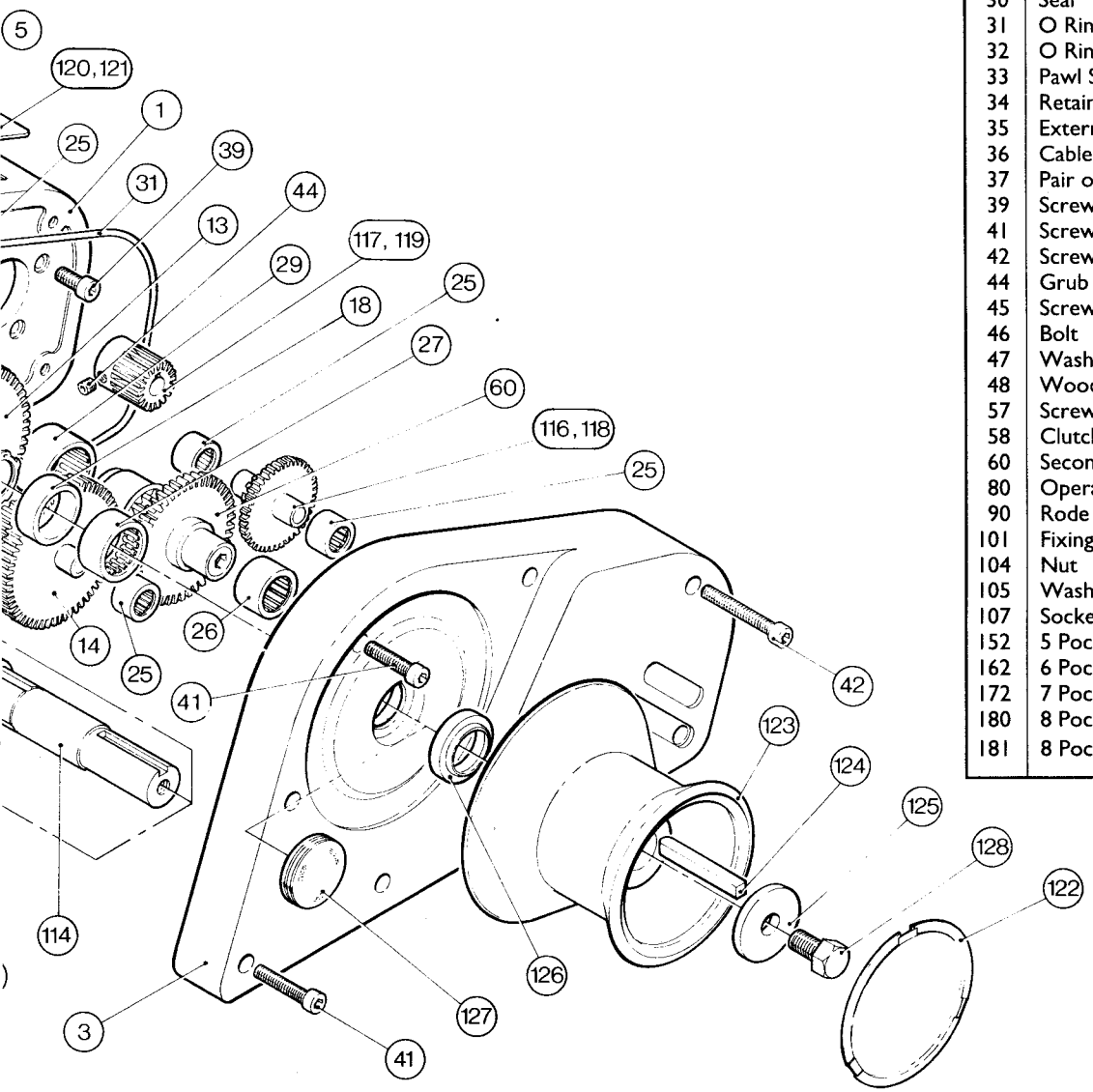
1.2.1 Identify your model, GD = Gipsy Drum, G = Gipsy Only

TYPE	LIST No.	TICK
Horizon 1000 GD	0053100	
Horizon 1000 G	0053200	
Horizon 1500 GD	0053300	
Horizon 1500 G	0053400	

1.2.2 Please make a note of your windlass' serial number and voltage, which are to be found on the nameplate.

	V

The above information is essential when ordering spares.



1.3 Parts List

Item No.	Description	No. Off
1	Main Case	1
2	Motor Cover	1
3	Geartrain Cover	1
4	Gipsy Pawl	1
5	Cover	1
6	Gipsy Carrier	1
7	Fleming Support	1
8	Drive Pawl Carrier	1
9	Clutch Operating Nut Trim	1
10	Handle Socket	1
11	Ratchet Drive Cone	1
12	Fleming	1
13	Mainshaft Gear	1
14	Third Compound Gear Assembly	1
18	Mainshaft Spacer	1
19	Drive Roller	3
20	Pawl	5
21	Drive Roller	3
22	Friction Cone	1
23	Washer	1
25	Bearing	4
26	Bearing	1
27	Bearing	1
28	Bearing	1
29	Clutch Bearing	1
30	Seal	1
31	O Ring Seal	1
32	O Ring Seal	1
33	Pawl Spring	5
34	Retaining Ring	1
35	External Circlip	1
36	Cable Gland	2
37	Pair of Cables with Terminals	1
39	Screw	6
41	Screw	6
42	Screw	5
44	Grub Screw	1
45	Screw	2
46	Bolt	1
47	Washer	1
48	Woodruff Key	1
57	Screw (Left Hand Thread)	1
58	Clutch Operating Nut	1
60	Second Compound Gear Assembly	1
80	Operating Handle	1
90	Rode Management Module	1
101	Fixing Stud	4
104	Nut	4
105	Washer	4
107	Socket Screw Key	1
152	5 Pocket Gipsy	
162	6 Pocket Gipsy	
172	7 Pocket Gipsy } To Suit Chain	1
180	8 Pocket Gipsy	
181	8 Pocket Gipsy	

2. PLANNING THE INSTALLATION

2.1 Gipsy Suitability

The rope/chain gipsy enables the windlass to be used for hauling rope and chain without the need to transfer from warping drum to gipsy.

It is ideally suited to anchor rodes which consist of rope with a chain tail.

Rope used with rope/chain gipsies should be three strand nylon.

The RC172 gipsy is designed to suit 12 mm (1/2") rope, the RC162 and RC152 gipsies to suit 16 mm (5/8") rope but they all may accept diameters that are plus or minus 3 mm (1/8") depending on the particular lay of the rope. The 180 & 181 gipsies handle chain only.

Chain should be chosen to suit gipsies as follows : -

GIPSY	CHAIN	
RC152	American NACM	5/16"
RC162	S-L 0058004	9.5 mm
	American Proof Coil	5/16"
	American BBB	3/8"
	American Proof Coil	3/8"
	American Hi Test	3/8"
	French NFE 26011	10 mm
	German DIN 766	9 & 10 mm
	Italian	10 mm
	Norwegian	1/4"
	Australian PWB & Beavers	8 mm
	Australian Grade 'L'	10 mm
RC172	S-L 0058002	1/4"
	S-L 0058003	8 mm
	American Transport	1/4"
	American BBB	5/16"
	American Hi Test	5/16"
	French NFE 26011	8 mm
	German DIN 766	8 mm
	Italian	8 mm
	Norwegian	1/4"
		5/16"
		8 mm
	Australian	8 mm
180	Accoloy	9/32"
181	German DIN 766(86)	6 mm

Depending on manufacture, other chains in the range from 6mm to 10mm and 1/4" to 3/8" may be suitable with one of the above gipsies. Should you have difficulty in matching a gipsy to your chain please consult your local agent or Simpson-Lawrence Ltd.

2.2 Package Contents (Checklist)

Windlass
Rode Management Module
Mounting Studs, Nuts & Washers
Operating Handle
Torque Key
Mounting Template D1009-2
Instruction Booklet D1010-3

2.3 Additional Requirements

Each windlass installation requires :

a. The following tools:

WINDLASS INSTALLATION
11mm (7/16") Diameter Drill
18mm (45/64") Diameter Drill
17mm A/F (11/16") Spanner
(Optional)
Jig Saw or Trepanning Tool

WIRING INSTALLATION
Flat Bladed Screwdriver
Crimping Pliers / Wire Stripper
13mm A/F (1/2") Spanner or Socket
Single Direction only -
7mm A/F (9/32") Socket
Reversing only -
8mm A/F (5/16") Spanner or Socket

b. Sealant

c. A Circuit Breaker for overload protection which can also be used as a main isolating switch. (We recommend the ones listed under '3. Accessories')

d. A control switch (or switches) by preference.

e. A solenoid for a single direction installation, or a boxed pair of solenoids for a reversing installation. (Unless the High Load Footswitch only is used)

f. 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 windlass 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 windlass 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!

METRIC OR STARTER CABLE

	Cable Length		Size
VOLTAGE	m	ft.	mm
12	9.2	30	20
	12.8	42	25
	17.7	58	35
	19.7	64	40
	24.0	79	50
24	23.3	76	15
	25.3	83	16
	28.9	95	20
	40.1	131	25

AMERICAN CABLE

	Cable Length	Size
VOLTAGE	ft.	AWG
12	35	4
	56	2
	71	1
	89	1/0
24	69	6
	110	4
	176	2

Thin wire of 2.5mm cross sectional area, 35/0.30 or 50/0.25 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) and the circuit breaker pilot light to the main circuit.

3. ACCESSORIES

List Number	Item	
0053101	Windlass Cover - - - - -	White
0053102	Windlass Cover - - - - -	Blue
0053901	Rode Management System	
0050711	70 Amp Circuit Breaker - -	12 Volt Installation
0050710	50 Amp Circuit Breaker - -	24 Volt Installation
0052505	12 Volt Solenoid - - - - -	Single direction
0052506	24 Volt Solenoid - - - - -	Single direction
0052509	12 Volt Solenoids - - - - -	Reversing
0052510	24 Volt Solenoids - - - - -	Reversing
0052512	Push Button Switch - - - -	Single direction
0052514	Foot Switch - - - - - - -	Single direction
0052516	High Load Footswitch - - -	Single direction
0052511	Joystick Control Switch - -	Single or Reversing
0052515	Hand Remote Switch - - -	Single or Reversing
0052513	Push Button Switch - - - -	Reversing
0052514	Foot Switch X 2 - - - - -	Reversing
0052522	Touch Pad Control - - - -	Reversing

4 . SPECIFICATION

4.1 Performance

4.1.1 Horizon 1000

Maximum Load

	12V Rating		24V Rating	
Chain in Gipsy	400 kg	(880 lb)	500 kg	(1100 lb)
Rope on Drum	425 kg	(940 lb)	525 kg	(1150 lb)
Rope in Gipsy	450 kg	(1000 lb)	550 kg	(1200 lb)

Typical Working Figures

	Load	Speed	Current Draw
12V	100 kg	14.0 m/min	85 Amp
	220 lb	46 ft./min.	
24V	100 kg	15.0 m/min	48 Amp
	220 lb	49 ft./min.	

4.1.2 Horizon 1500

Maximum Load

	12V Rating		24V Rating	
Chain in Gipsy	575 kg	(1260 lb)	675 kg	(1490 lb)
Rope on Drum	630 kg	(1400 lb)	725 kg	(1600 lb)
Rope in Gipsy	680 kg	(1500 lb)	775 kg	(1700 lb)

Typical Working Figures

	Load	Speed	Current Draw
12V	150 kg	13.0 m/min	85 Amp
	330 lb	43 ft./min.	
24V	150 kg	13.5 m/min	48 Amp
	330 lb	44 ft./min.	

4.2 Materials

Mainshaft	Stainless Steel
Geartrain	Carbon Steel
Gipsy	Chrome Plated Bronze
Drum	Chrome Plated Bronze
Main Case	Marine Grade Aluminium
Side Covers	Reinforced Polyester Mouldings
Body Finish	Powder Coated Polyester
Weight GD	21kg (46lb)
G	19.5kg (43lb)

5. INSTALLATION

5.1 Fitting Windlass to Deck

5.1.1 If the deck is not flat a suitable mounting pad may be required to take up camber or sheer. Decks which are thin, or of foam or balsa laminate construction, will require reinforcement in order to spread the loads which will be applied to the deck while the windlass is in use.

5.1.2 Place the windlass on the deck and decide upon a position for it with reference to the vessel's stemhead roller and the chain locker below.
Rode lead from the roller should ideally be fed horizontally back to the top of the gipsy and along its centre line. Check also that there will be sufficient room for a person to be able to move the operating handle to and fro comfortably when using the clutch, or during manual operation of the windlass.

5.1.3 The standard M10 threaded mounting studs supplied suit deck and packing thicknesses of up to 70mm (2, 3/4"). These are adequate for most installations. Place the mounting template on the deck or mounting pad in the desired position for the windlass and hold it in place using adhesive tape.

Using an 11mm diameter drill, make the four holes for the mounting studs.

Using an 18mm diameter drill, make a hole to pass the motor cables through. The template suggests one position for this hole, though it may be more convenient to move it elsewhere.

It is essential however, that the hole remains within the perimeter formed by the base contact area, as illustrated by the solid black line on the template.

With a trepanning tool and/or a jigsaw cut the hole for the rode to pass through. The template shows centres which will suit an 18mm diameter drill and such holes may make a useful start. To help avoid water absorption by the deck, apply silicone sealant to the freshly cut hole edges.

When all of the holes have been made, remove the template.

5.1.4 Fully screw the four mounting studs into the base of the windlass. This can be done quite simply by screwing two nuts onto the opposite end. Put them close enough to one another to use the inner one of them as a lock nut. Use the outer nut to screw the stud into the case with the aid of a spanner.

Do this to each of the studs in turn and remove the nuts for use later.

5.1.5 Apply a suitable sealant around the base sealing face and within the black seals. Secure the windlass firmly to the deck using the nuts and washers supplied.

NB If using silicone or other rubbery type sealants it is advisable to allow curing of the sealant before the final tightening of the mounting nuts.

5.2 Wiring

5.2.1 General Recommendations

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.

Overload protection must be built into the windlass wiring circuit. This protects the wiring and prevents undue damage to the windlass motor, in the event of it being stalled by an excessive load in service.

It is advisable to site the Circuit Breaker in a dry, readily accessible place. Our recommended Breaker must be manually reset should an overload occur that causes it to trip to the 'OFF' position.

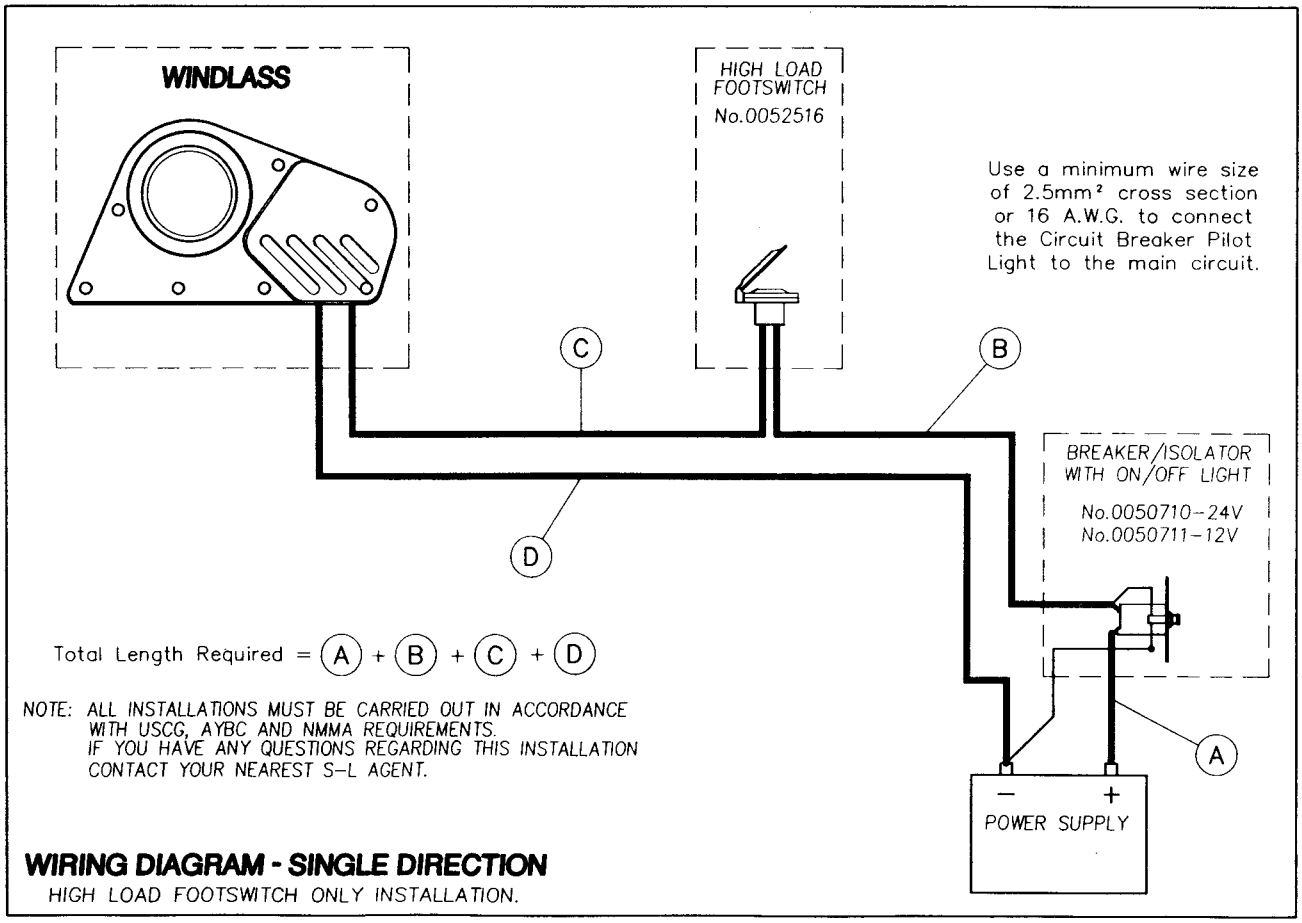
If not using the Circuit Breaker recommended, an alternative must have identical characteristics.

NB Crimp terminals should be used on all wire ends wherever possible for good electrical contacts.

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.

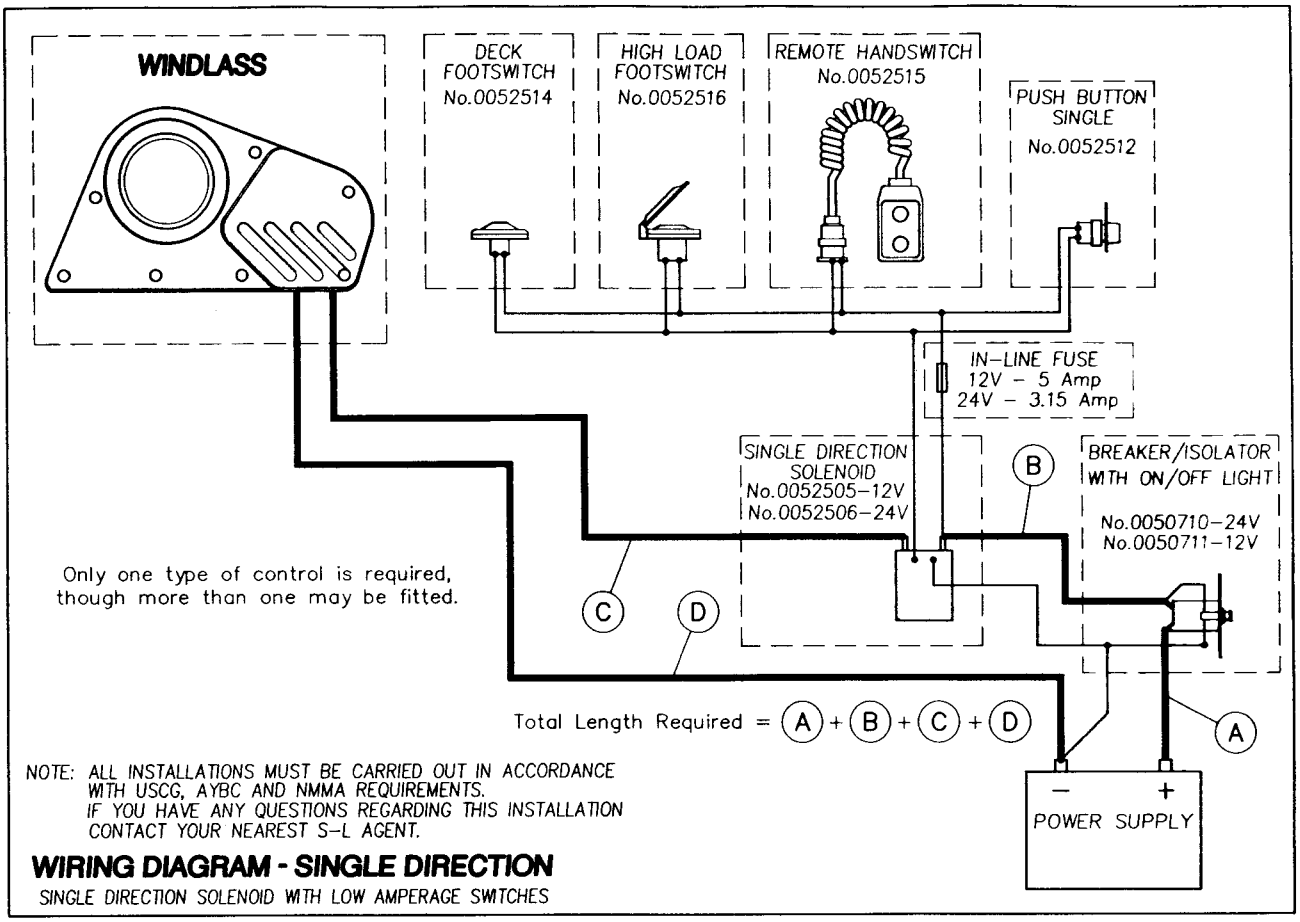
5.2.3 Single Direction Wiring (High Load Footswitch Only)



WIRE	FROM	TO
Thick cable	Positive battery terminal	High Load Footswitch
Thick cable	High Load Footswitch	Windlass Lead
Thick cable	Negative battery terminal	Windlass Lead
Thin wire	Circuit Breaker Pilot Light	Main circuit (positive)
Thin wire	Circuit Breaker Pilot Light	Main circuit (negative)

If the Windlass turns in the wrong direction, change over the thick cable connections at each windlass lead.

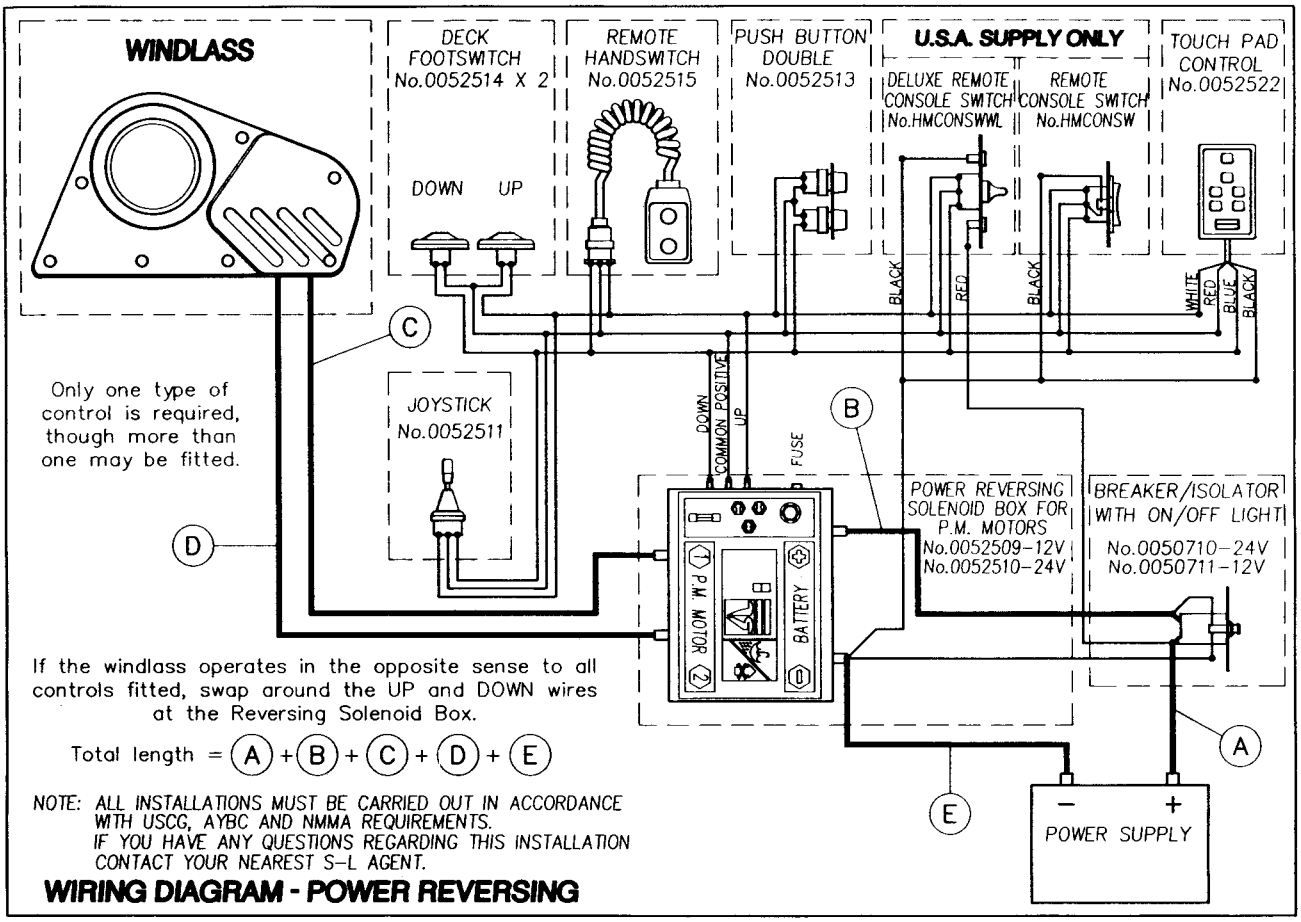
5.2.4 Single Direction Wiring



WIRE	FROM	TO
Thick cable	Positive battery terminal	Overload Protection Unit
Thick cable	Overload Protection Unit	Solenoid
Thick cable	Solenoid	Windlass Lead
Thick cable	Negative battery terminal	Windlass Lead
Thin wire	Solenoid	Control switch(es)
Thin wire	Control switch(es)	Main circuit (positive)
Thin wire	Solenoid	Main circuit (negative)

If the Windlass turns in the wrong direction, change over the thick cable connections at each windlass lead.

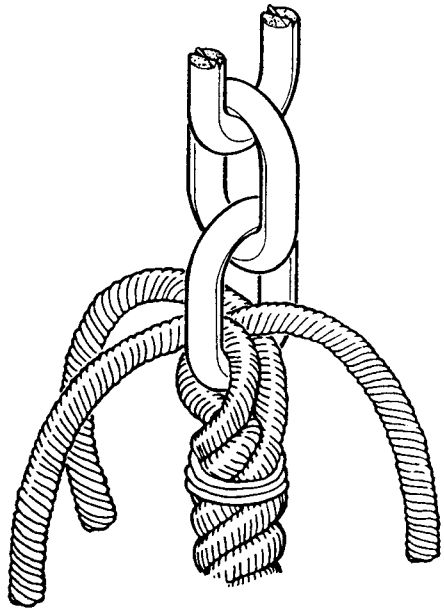
5.2.5 Power Reversing Wiring



WIRE	FROM	TO
Thick cable	Positive battery terminal	Overload Protection Unit
Thick cable	Overload Protection Unit	Solenoid box
Thick cable	Solenoid box	Windlass Lead
Thick cable	Negative battery terminal	Solenoid box
Thick cable	Solenoid box	Windlass Lead
Thin wire	Solenoid box	Control switch(es) common terminal
Thin wire	Solenoid box	Control switch(es) up terminal
Thin wire	Solenoid box	Control switch(es) down terminal

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

5.3 JOINING ROPE TO CHAIN



5.3.1 When using combination rope/chain rodes it is essential that the 'Rode Management Module' (supplied) be fitted to the windlass in place of the cover (part 5).
The following method of joining rope to chain is designed to minimise chafe between the rope and chain but as a matter of prudent seamanship the splice should be checked regularly and remade if there is any evidence of wear.

5.3.2 With whipping twine or similar, seize your rope 300 mm (12") from the rope's end and unlay the strands.

5.3.3 Pass one strand through the chain end link from one side and the other two strands from the opposite side.

5.3.4 Remove seizing and complete a back splice in the normal manner for two full tucks.

5.3.5 With a hot knife pare down the three strands by one third and continue with two further tucks.

5.3.6 Pare the strands down by another third and finish with another two tucks.

5.3.7 Cut away the remaining tails.
Because of wide variations in rope type and construction some experimentation may be required.

6. OPERATING INSTRUCTIONS

6.1 Safety First

To avoid personal injury ensure that limbs, fingers and clothing are kept clear of the anchor rode and windlass during operation. Always ensure that there are no swimmers nearby when dropping your anchor.

6.2 Gipsy Clutch Operation

NB The Clutch Operating Nut (Part 17) has a left hand thread.

6.2.1 Use the Operating Handle supplied (Part 80), to operate the gipsy clutch.

6.2.2 Place the handle over the Clutch Operating Nut.

6.2.3 Push the handle forwards (clockwise) to release the clutch and pull it backwards (anti-clockwise) to tighten it.

6.2.4 It helps to hold the Gipsy Pawl (Part 4) in engagement with the gipsy flange when tightening the clutch.

6.2.5 Always remove the handle after use.

6.3 Letting Go Under Power

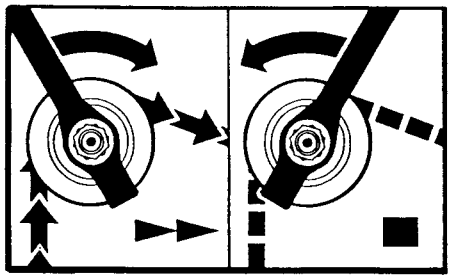
6.3.1 Engage the Gipsy Pawl (Part 4) with the inboard gipsy flange.

6.3.2 Ensure that the gipsy clutch is tight with reference to paragraph 6.2 above.

6.3.3 Disengage the gipsy pawl.

6.3.4 Release any independent anchor lock.

6.3.5 If it safe to do so, let go under power by operating a 'Down' control.



6.4 Letting Go Under Gravity

6.4.1 Engage the gipsy pawl (Part 4) with the inboard gipsy flange.

6.4.2 Ensure that the gipsy clutch is tight with reference to paragraph 6.2 above.

6.4.3 Disengage the gipsy pawl.

6.4.4 Release any independent anchor lock.

6.4.5 Place the operating handle over the clutch operating nut and, if it is safe to do so, push the handle forwards to release the anchor rode. The anchor's rate of descent can be controlled by moving the handle back or forth.

6.4.6 When enough rode has been paid out re-tighten the clutch operating nut as described above and remove the operating handle.

6.5 Lying to Anchor Safely

6.5.1 Boats lying to their anchor in a high swell or heavy weather conditions will snub on the rode and this can cause slippage or apply excessive loads to the windlass.

6.5.2 For maximum safety and to prevent damage, the windlass must not be left to take the entire force from the anchor rode. A bridle should be fixed to the rode, relieving the load on the windlass.
Alternatively, some rode can be removed from the windlass and made fast directly to a bollard or sampson post.

6.6 Hauling In Under Power

6.6.1 Ensure that the Clutch Operating Nut (Part 58) on the gipsy end of the mainshaft, is tight, by engaging the operating handle and pulling it back.

6.6.2 Untie the bridle or replace the rode in the gipsy.

6.6.3 If it is safe to do so, operate an 'Up' control.

6.6.4 Having retrieved the anchor, ensure it is independently secured to prevent its accidental release.

6.7 Warping On Drum

6.7.1 If the gipsy is in use, engage the Gipsy Pawl (Part 4).
If the gipsy is not in use, make sure the gipsy pawl is disengaged and go to section 6.7.3

6.7.2 Slacken the gipsy clutch with reference to paragraph

6.2 above. The warping drum will now revolve independently of the gipsy when the power is applied.

6.7.3 Power up the windlass.

6.7.4 Rope/drum slippage can normally be overcome by increasing the number of turns of rope taken on the drum.

6.8 Emergency Manual Hauling

6.8.1 Ensure that the Clutch Operating Nut (Part 58) is tight, by engaging the Operating Handle (Part 80) and pulling it back.

6.8.2 Insert the Torque Key (Part 107) through the central hole in the Clutch Operating Nut (Part 17). Engage it with the Screw (Part 57).

NB The Screw (Part 57) has a left hand thread. Slacken the screw off by turning it clockwise at least one revolution.

6.8.3 Untie the bridle or replace the rode in the gipsy.

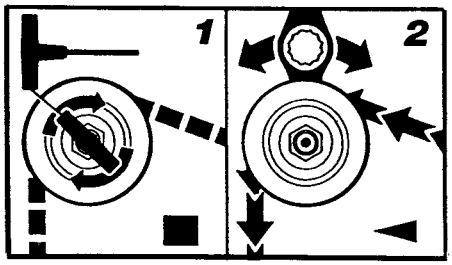
6.8.4 Insert the flat end of the Operating Handle into a slot on the edge of the Operating Socket (Part 10), which is outboard of the gipsy.

6.8.5 If it is safe to do so, haul in the rode by moving the Operating Handle backwards and forwards. The emergency recovery gear is designed to ratchet during the forward stroke so there is no need to remove the Operating Handle from the slot until the task is complete.

6.8.6 When finished hauling, remove the Operating Handle from the slot.

6.8.7 Using the Torque Key (Part 107), tighten the Screw (Part 57) by turning it anti-clockwise.

6.8.8 Having retrieved the anchor, ensure it is independently secured to prevent its accidental release.



6.9 Operating Tips

6.9.1 When anchoring, it is best to allow the rode to run out slowly, allowing the vessel to take up stern way before full scope is let out. This helps prevent the rode from becoming tangled on top of your anchor on the sea bed.

6.9.2 To aid anchor recovery, we recommend that the vessel's engine be used to assist by moving the vessel towards the anchor. We do not recommend that the vessel is motored over and beyond the anchor, as this can cause the rode to damage your topsides.

6.9.3 When mooring stern to, at a suitable distance from the jetty, deploy the anchor to preventing the bows from swinging. Gently pay out the rode under the influence of the stern way of the vessel. By stopping the windlass, the anchor can be used to restrain the vessel as it approaches the jetty. Make fast your vessel with warps from the stern.

7. IMPORTANT USER INFORMATION

Classification Societies require that a vessel lying to anchor should have its rode held by a chain stopper or equivalent strong point as windlasses 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.

An anchor windlass 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 windlass may only be used infrequently, the risk of corrosion is further increased.

When the windlass 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 windlass is regularly examined, operated and given any necessary maintenance. This is of even greater importance when the windlass is installed in an anchor well!

8. MAINTENANCE

8.1 General Recommendations

Isolate the windlass electrically, before carrying out any maintenance work.

After the first two or three anchor recoveries, check the mounting nuts to ensure that the windlass is still fastened tightly to your deck as it should now be 'bedded-in'.

Regularly wash down the exterior of your windlass with fresh water.

For smoothest operation of the clutch ensure that the clutch cones and their seats on the sides of the gipsy are kept free from excess salt deposits.

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

The following tools should cover most tasks:

Operating Handle	13mm A/F Socket
Flat Bladed Screwdriver	15mm A/F Box Spanner
3mm A/F Torque Key	17mm A/F Socket
5mm A/F Torque Key	Circlip Pliers
10mm A/F Spanner	

8.2 Dismantling Procedures

8.2.1 **Gipsy replacement.** Remove the Clutch Operating Nut (Part 58) using the Operating Handle (Part 80) and the Screw (Part 57) using the Torque Key (Part 107). Remember that they both have left hand threads and must be turned clockwise to undo them.

Carefully set aside the Friction Cone (Part 22).

Pull the Handle Socket assembly away from the Gipsy Carrier (Part 6). If the rode management module (Part 90) is fitted, pull the control arm upwards until it clicks into the upright position. Remove the bolt (Part 46) and washer (Part 47) that retains the Fleming Support (Part 7) using a 13mm socket. Keep the Gipsy Carrier (Part 6) in place on the end of the Mainshaft (Part 114 or 115) with your thumbs as you remove the Gipsy assembly. This

avoids the need to re-engage the Drive Pawls (Part 20) inside the Gipsy Carrier or the possibility of displacing the Drive Rollers (Part 21). Remove the two screws (Part 45) from the Fleming Support. Open out the Fleming (Part 12) and remove it from the gipsy.

To replace a Gipsy, reverse the above procedure.

8.2.2 **Drum removal.** Prise off the Drum Cap (Part 122) using two flat bladed screw drivers. Remove the bolt (Part 128) and the washer (Part 125) using a 17mm socket. Pull the Drum (Part 123) and Key (Part 124) off the mainshaft. Grease the drum bore and key on re-assembly.

8.2.3 **Lubrication.** The geartrain and its' bearings have been lubricated for you with 'SFG 100' grease and should require no regular attention. SFG 100 is a white synthetic grease containing PTFE, use grease to a similar specification throughout. It is recommended that all assemblies outwith the main case be stripped, cleaned, and re-greased at least annually. To do this, the gipsy with its fleming should be removed as detailed above. The handle socket assembly comes apart with the removal of the Retaining Ring (Part 34) located in the groove around the Ratchet Drive Cone (Part 11). The ring is best removed using a small flat bladed screwdriver.

Hook the screwdriver under the end of the ring and pull it out of the groove, turning to dislodge it as you go. Having removed the retaining ring, separate the ratchet drive cone from the Handle Socket (Part 10) to access the Ratchet Pawls (Part 20). The Ratchet Pawls under the Gipsy Carrier (Part 6) are easier to gain access to. Pull the gipsy carrier from the mainshaft. It may take the Drive Pawl Carrier (Part 8) off with it, in which case, remove it by pulling it out from the gipsy carrier.

If not, slide the drive pawl carrier from the mainshaft, in either operation be careful not to lose the three Drive Rollers (Part 21), located between the drive pawl carrier and the mainshaft. Inspect the mainshaft seal (Part 30) for signs of wear. If this seal is found to be unserviceable, the mainshaft will have to be withdrawn and the seal replaced. This entails removing the Drum, see paragraph 8.2.2 above, and the Geartrain Cover (Part 3), remove the latter using a 5mm torque key. Remove the geartrain to withdraw the mainshaft assembly. Prise the seal out and replace it with a new one. Re-assemble in reverse order. Clean the stripped down components in paraffin, dry them and inspect them for wear. Rebuild the windlass applying generous amounts of grease. Do not forget to grease around the mainshaft seal. Stick the drive rollers to the mainshaft with grease, they are retained in place with the drive pawl carrier.

Re-assembly should be done in reverse order of the strip down, but note that there is a right way and a wrong way to replace the pawl springs. The right way has the 'bent back' tang lying in contact with the inside face of the pawl, this will hide the coil of the spring within the slot.

If the windlass is a Gipsy/Drum model, the Mainshaft Seal (Part 126) behind the drum should not be neglected. Remove the Drum with reference to paragraph 8.2.2 above, clean and inspect the seal for wear, if serviceable, apply a fresh coat of grease to it. If not, remove the Geartrain Cover (Part 3) using a 5mm torque key and prise the seal out. Replace the seal with a new one and rebuild in reverse order

8.2.4 **Electric motor replacement.** Isolate the windlass electrically! If fitted, remove the drum and key as directed above. Remove the Motor Cover (Part 2) using a 5mm torque key. Disconnect the Cables (Part 37) from the motor terminals using a 10mm A/F spanner. Remove the Geartrain Cover (Part 3) using a 5mm torque key. Withdraw the First Compound Gear (Part 116 or 118) from its bearing in the Main Case (Part 1) to allow access to the four Motor Mounting Screws (Part 39). Using the 5mm torque key, remove the screws. Withdraw the motor from the main case and loosen the Grub Screw (Part 44) that retains the Pinion Gear (Part 117 or 119) using a 3mm torque key. Pull the pinion from the motor shaft being careful to retain the small Woodruff Key (Part 48). Replace the motor by reversing the above procedure.

8.2.5 **'O'-Ring Seals.** When replacing 'O'-Ring Seals (Parts 31 and 32), apply a few spots of 'super glue' to keep them in place on the covers until they get clamped against the main case.

8.3 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 windlass will require little attention prior to, or after, winter lay up.

Check below deck for signs of water ingress around the mounting studs and motor wire hole. Should it occur, remove, clean and reseal the windlass to the deck.

9. WARRANTY

The Simpson-Lawrence warranty covers your unit for a period of one year from the date of purchase, to be free from defects in material and workmanship. This warranty is subject to proper installation and use in service as described in this booklet. Our current catalogue contains our full "Conditions of Sale". A copy of these conditions can be obtained by application to any of our branches or our agents.

The models described in this document are subject to a policy of continual improvement. Simpson-Lawrence Ltd 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 : -

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