



# The Owner's Manual Caliber 35 LRC SE

Hull # 3599, s/v *Alisios*



Version: May 2015  
Matthew B. Jenkins



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**TABLE OF CONTENTS**

1	Key Information .....	1
2	Introduction and 35 Timeline .....	1
3	Rigging, Sails, and Canvas .....	3
3.1	Spars and Standing Rigging .....	3
3.2	Running Rigging.....	5
3.3	Sails and Roller Furling .....	7
3.3.1	ProFurl Maintenance, Cleaning, and Lubricating .....	8
3.4	Winches .....	11
3.4.1	Maintenance, Cleaning, and Lubricating .....	12
3.5	Canvas .....	15
3.5.1	Canvas Water / UV Protection .....	15
3.6	Miscellaneous .....	15
4	Deck .....	15
4.1	Steering System.....	15
4.2	Ground Tackle.....	16
5	Paints and Varnish .....	19
5.1	Exterior.....	19
5.2	Interior.....	20
6	Electrical System.....	21
6.1	Battery Bank.....	21
6.2	Distribution Panel.....	23
6.3	Fuse Blocks and In-Line Fuses.....	25
6.4	Ample Heavy Duty High Output Alternator and Next-Step Voltage Regulator.....	26
6.5	Connecting Other Equipment to the 12-Volt System .....	28
6.6	Shore power and AC Battery Charger .....	28
7	Auxiliary Engine and Fuel Systems.....	29
7.1	Engine.....	29
7.1.1	Fuel, Lubricating, and Transmission Oil.....	32
7.1.2	Engine Maintenance Intervals.....	33
7.2	Fuel System .....	34
7.2.1	Fuel Tanks .....	37
7.2.2	Walbro Electric Fuel Pump and Transferring Fuel Between Tanks .....	38
7.3	Cooling System.....	39
7.4	Propeller Shaft, Zinc, Shaft Seal, Cutlass Bearing, and Prop.....	39
8	Galley and Fresh Water Systems .....	41
8.1	LPG Gas System .....	41
8.2	Galley Range .....	42
8.3	Fresh Water System .....	43
8.3.1	Fresh Water Tanks.....	43
8.3.2	Fresh Water Pumps .....	44
8.3.3	Water Heater.....	45
8.3.4	Faucets and Transom Shower .....	46
8.3.5	Water Treatment .....	47
8.4	Ice Box .....	49
9	Head & Holding Tank.....	50
10	Pumps.....	52

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## Caliber 35 LRC SE

---

10.1	Primary Bilge / Shower Sump Pump.....	52
10.2	High-Capacity Emergency Bilge Pump.....	53
10.3	Manual Bilge Pump.....	53
10.4	Manual Holding Tank Pump-out.....	54
11	Lights.....	54
11.1	Running, Steaming, Anchor, and Deck Lights.....	54
11.2	Cabin Lights.....	55
12	Hardware.....	56
12.1	Portlights and Hatches.....	56
12.2	Cabinet Door Latches, Door Handles and Holders.....	57
12.3	Thru-Hulls.....	58
13	Electronics.....	58
13.1	Raymarine E80 Radar/Chartplotter, ST60+ Depth/Speed/Wind.....	58
13.2	Simrad AP11 Autopilot.....	61
13.3	iCom IC-M402A VHF Radio and DSC / MMSI Registration.....	64
13.4	ACR GlobalFix™ RLB-35 CAT II EPIRB.....	65
13.5	Stereo.....	67
14	Other.....	67
14.1	Name.....	67
14.2	Interior Fabric.....	67
14.3	Fans.....	68
14.4	CBP Decal.....	68
15	Troubleshooting.....	68
15.1	High Voltage Alarm From Blue Sea Multimeter.....	68
15.2	The Alternator Belt.....	68
15.3	Anchor Windlass.....	69
16	Miscellaneous.....	70
16.1	Useful Formulas.....	70
16.2	The Beaufort Scale.....	71
16.3	Tonnage.....	71
16.4	The Marine Alphabet – Phonetic, Flags, & Morse Code.....	73
16.5	VHF Channel Usage – USA.....	74
16.6	Types of Sailing Vessels.....	75
16.7	Useful Knots.....	77
16.8	Splicing 3-Strand Line.....	78
16.9	Points and Parts of Sail.....	79
16.10	Wire Gauge Selection Table.....	80
16.11	AWG-To-Metric Wire Gauge Conversion Table.....	80
17	Tables And Diagrams.....	81
17.1	Specifications.....	81
17.2	3599 – As Ordered From Caliber.....	82
17.3	Approximate Amp-Hour Draws.....	85
17.4	Oil and Common Engine Maintenance Parts.....	86
17.5	Tank Tender Readings (#3599).....	87
17.6	Winterizing Checklist.....	88
17.7	Thru-Hull Locations.....	89
17.8	Light and AC Electrical Outlet Locations.....	90
17.9	Sail Plan.....	91

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## Caliber 35 LRC SE

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17.10	Mast Exit Locations .....	92
17.11	Line Configuration .....	93
17.12	Mainsheet Arrangement.....	94
17.13	Stainless Tubing Diameters .....	95
17.14	Yanmar 2YM30 .....	96
17.15	Electrical – Main Diagram .....	97
17.16	Next-Step Alternator Regulator .....	98
17.17	Tricolor Option – DC Panel Wiring .....	99
17.18	Tricolor Option – Mast Base Connections.....	100
17.19	Insulated Backstay Option .....	101
17.20	Fuel Filter Panel .....	102
17.21	Fuel Pump .....	103
17.22	Raymarine Electronics – System Diagram.....	104
17.23	Raymarine Electronics – Terminal Block .....	105
17.24	Anchor Windlass – Wiring .....	106
17.25	Lofrans Project 1000 Windlass – Deck Breakdown .....	107
17.26	Lofrans Project 1000 Windlass – Complete Breakdown .....	108
17.27	Caliber 35 LRC Artist’s Profile.....	110
17.28	Caliber 35 LRC Profile and Interior Layout .....	111
18	Addresses .....	112

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## 1 KEY INFORMATION

### 2005 Caliber 35 Series Hull #3599 s/v *Alisios* –

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<b>Designer:</b>	Michael McCreary, N.A.		
<b>Model:</b>	2005 Caliber 35 LRC SE		
<b>Hull #:</b>	3599		
<b>Hull ID #:</b>	CYQ03599G405		
<b>U.S.C.G. Documentation:</b>			
<b>Vessel Name:</b>	Alisios		
<b>Hailing Port:</b>	Deale, MD		
<b>Official #:</b>	<b>No. 1166685</b>		
<b>MMSI #:</b>	338033697		
<b>EPIRB UIN:</b>	2DCC56926CFFBFF (registered USA, 10 August 2007)		
<b>Vessel Type:</b>	Sailboat – 1 mast (convertible cutter-rigged sloop)		
<b>Color:</b>	White (cream) with forest green canvas dodger and bimini		
<b>Length Overall:</b>	35' 9" <sup>1</sup>	<b>Beam:</b>	11' 4"
<b>Draft:</b>	4' 6"	<b>Height (top of mast to water):</b>	52.5 ft. <sup>2</sup> (16.0 m)

## 2 INTRODUCTION AND 35 TIMELINE

Because of their low yearly production volume and the semi-custom nature of each vessel, Caliber Yachts does not provide a user manual with their boats. Instead they provide some hand-outs and system diagrams, affix numerous labels throughout the vessel, and pass on copies of all the documentation from the component parts. While the lack of a formal manual is understandable, the original owner of 2005 35 LRC Hull # 3599 felt the need for a one-stop reference. The following pages form an UNOFFICIAL Caliber 35 LRC SE owner's manual and reference that is specific to 2005 hull # 3599. Its goal is to serve as a primary reference for every component on board while also providing other useful information. While many of the items are common across the 33s, 35s and 40s, others are boat-specific. Only two 35 LRC SEs were built and the newer features pulled heavily from the 40 LRC SEs, so its contents are also

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<sup>1</sup> This is the builder spec. With the bowsprit, the actual overall length is closer to 37'

<sup>2</sup> This is a measured best guess. 3599 has successfully gone under 56' drawbridges. Don't go under anything less than 55'.

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quite applicable to late-model 40 LRCs. This document grew iteratively over the course of many years, which may be apparent in its structure.

### **A Brief History of Caliber –**

Caliber Yachts grew out of brothers Michael and George McCreary's great love of sailing. Michael McCreary attended the University of Michigan and earned his degree in marine engineering with a specialization in naval architecture. George McCreary majored in business administration and marketing at the University of South Florida. After graduation, Mike worked for numerous boat building companies in design and construction capacities. George worked for a major boat building company in marketing, accounting, and customer service capacities where he met his wife Kathy. Using these years of planning, education, and on the job training, the two brothers founded Caliber Yachts in the fall 1979 with a vision to produce a safe, strong, and seaworthy yacht. In the 1990s, George bought out Michael's share of the company. At their height, around 2006, Caliber hired approximately 25 staff and built about 18 boats a year. They operated as a builder into the early 2010s, producing up to 18 boats a year, with the 40 ending up as their most popular design. The economic downturn of 2009 had a profound effect on Caliber and they were unable to continue as a builder past the 2010s. While a low debt load kept Caliber from bankruptcy, the owner was forced rebuild the company as a boat brokerage dedicated to the Caliber brand, while limiting construction operations to refurbishing and customization work. Throughout, Caliber has remained a family-owned and operated business.

- In 1980 – The first Caliber design, a 28-footer, is built in a backyard garage shop. It is launched in 1981. 56 Caliber 28s were built in total.
- In 1985 – Caliber opens its own production facility. Their second design, the Caliber 33 is introduced. 66 hulls were built.
- In 1987 – The 33 is followed by the Caliber 38. Caliber enlarges their factory in order to meet increased demand.
- In 1991 – The Caliber 35 and 40 are introduced, extensions of the 33 and 38 with swim platforms and an optional convertible-cutter rig. 19 Caliber 35s were built in total, hull numbers 67 – 85.
- In 1994 – Caliber introduces its Long Range Cruiser (LRC) series with greatly increased tankage for both water and fuel. Hull number 86 is the first Caliber 35 LRC.
- In 1996 – The Caliber 47 LRC is introduced, a center-cockpit design which is the queen of the Caliber fleet.
- In 2001 – The Smart Electrical system is made standard across the product line.
- In 2004 – Caliber introduces their Simple Elegance interior upgrades along with further enhancements to the electrical and other major systems.
- 2005 Caliber 35 LRC SE hull number 99 is the first 35 LRC to incorporate both the interior and major system upgrades. Hull number 100 was the last 35 built.

### **33 / 35 Timelines –**

- Caliber 33:                    1985 – 1990    Hulls # 1 – 66        66 built
- Caliber 35:                    1991 – 1993    Hulls # 67 – 85      19 built
- Caliber 35 LRC:            1994 – 2004    Hulls # 86 – 98      13 built
- Caliber 35 LRC SE:        2005 – 2009    Hulls # 99 – 100    2 built

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### 3 RIGGING, SAILS, AND CANVAS

Caliber 35 LRC SE Hull # 3599 is configured as a convertible cutter-rigged sloop.

**The approximate cumulative height above water of the mast + equipment of 3599 is 52.5 feet (16.0 meters).** This boat is capable of sailing or motoring under 55' bridges.

The mast extrusion is 51 feet long. The top of the mast stands approximately 48 feet 10 inches over the water level. Mast-mounted equipment (e.g. antennae, secondary nav lights, windex, and the anemometer transducer) extends approximately 3.5 feet above the top of the mast. The boom is 12 feet long.

#### 3.1 Spars and Standing Rigging

The 35 LRC uses Selden spars. Selden redesigned their mast extrusions in the 2003 – 2004 timeframe and hull # 3599 is the first 35 LRC that uses the new Selden mast.

3599 has a **standard** mast (not a roller-furling main) that is outfitted with Selden's **MDS** batten car system (attached to the sail with **Schaefer Marine #401-10 Combination Receptacles**) and a Selden **RodKicker hard vang**. A ring was mounted on the front of the mast for use with a whisker pole and a pull-line for a radar cable, which exits just over the deck light, was pre-run within the mast.

A Selden catalog and parts list is included in the parts documentation provided by Caliber. NOTE: Selden's newer style mast deck ring system proved to be too large for the 35 so the older deck ring was used on 3599 in conjunction with the newer mast.



3599 is rigged by Selden using Selden-provided parts. It is a conventional mast-head rig with a single forestay, split back stays, an upper cap shroud, a forward lower shroud, and aft lower shroud. 3599 is configured with Caliber's optional convertible cutter-stay<sup>3</sup>. A pair of mast steps have been installed at the top of the mast to facilitate servicing mast-head lights and electronics.

The following table contains specifications for the standing rigging of 3599. It was provided by Selden through Caliber.

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<sup>3</sup> Some refer to the cutter-stay as the forestay and the foremost stay as the jib stay. The term cutter-stay is used in this document to avoid confusion.



Standing Rigging					
Item	Qty.	Wire Size	Fittings	Overall Length	
Upper Cap	2	8 mm	T-Terminal 308-326 174-326-76 Rig Screw 5/8" 308-445 Terminal Stud Sta-lok	42' 11 5/8"	13,100 mm
Forward Lowers	2	8 mm	T-Terminal 308-326 174-325-76 Rig Screw 1/2" 308-444 Terminal Stud Sta-lok	23' 6 5/8"	7,180 mm
Aft Lowers – RD1	2	8 mm	Stemball 308-514 174-325-76 Rig Screw 1/2" 308-444 Terminal Stud Sta-lok	24' 4 1/8"	7,420 mm
Backstay	2	6 mm	Eye 308-362 174-324-76 Rig Screw 7/16" 308-440 Terminal Stud Sta-lok	47' 6 7/8"	14,500 mm
Forestay	1			47'	14,330 mm
Cutterstay	1	7mm	Eye 308-363 / Eye 308-363 Sta-lok Eye 301-120 Navtec Screw D320-516 ½" Eye end w/tgl D531-1616	35' 9 1/8"	10,900 mm

Fittings		
Qty	Size	Fitting
4	8 mm	308-326 Terminal
2	8 mm	174-326-76 Rig Screw 5/8"
2	8 mm	308-445 Terminal Stub Sta-lok
4	8 mm	174-325-76 Rig Screw 1/2"
4	8 mm	308-444 Terminal Stub Sta-lok
2	8 mm	308-514 Stemball
2	6 mm	308-362 Eye
2	6 mm	174-324-76 Rig Screw 7/16"
2	6 mm	308-440 Terminal Stud Sta-lok
	7 mm	308-363 Eye
	7 mm	301-120 Sta-lok
	7 mm	Navtec screw D320-516
	7 mm	½" Eye End w/tgle D531-1616

### 3.2 Running Rigging

The rigging on the 35 LRC is provided by Selden. The following table contains specifications for the standing rigging of 3599. It was provided by Selden through Caliber.

Boat: Caliber 35 LRC Conventional			Selden Mast # RRIG-2674			Date: 08/10/2004		
Item	Qty	Line Size	Line Type	Color	End 1	Length		End 2
Main Halyard	1	10 mm (3/8")	32/3 pl	White	SO138-CP10 H.B. Shackle	32.6 m	107'	Eye
Furlex Halyard	1	10 mm (3/8")	32/3 pl	Blue	307-338 Shackle	32.6 m	107'	Eye
Genoa Halyard	1	10 mm (3/8")	32/3 pl	Red	307-338 Shackle	32.6 m	107'	Eye
Main Traveler	2	10 mm (3/8")	16/16 pl	White	Eye	6.4 m	21'	Bare
Mainsheet	1	12 mm (3/8")	16/16 pl	White	Eye	18.3 m	60'	Bare

SLR Boom Lines								
<u>Reef #1</u>								
Fwd Tack Line	1	10 mm (3/8")	16/16 pl	Blue	Eye	5.1 m	17'	Knot
Aft Clew Line	1	12 mm (3/8")	16/16 pl	Blue	Bare	18.8 m	62'	Bare
<u>Reef #2</u>								
Fwd Tack Line	1	10 mm (3/8")	16/16 pl	Red	Eye	5.1 m	17'	Knot
Aft Clew Line	1	10 mm (3/8")	16/16 pl	Red	Bare	28.1 m	93'	Bare
<u>Reef Line # 3</u>								
Genoa Sheet	2	12 mm (3/8")	16/16 pl	Red	Bare	18.3 m	60'	Bare
Spinnaker Halyard	1	12 mm (3/8")	32/3 pl	White	307-339 Shackle	32 m	105'	Bare
RodKicker Tackle	1	10 mm (3/8")	16/16 pl	White	Bare	7 m	23'	Bare

### IFS Running Rigging

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Staysail Car Uphaul	1	10 mm (3/8")	16/16 pl	White	307-021 Shackle	18.3 m	60'	Eye
Staysail Halyard	1	10 mm (3/8")	32/3 pl	White	307-021 Shackle	21.6 m	8'	Knot
Staysail Sheet	1	12 mm (1/2")	16/16 pl	Yellow	Eye	15.0 m	50'	Bare

Cruising Spinnaker Sheet	2	10 mm (3/8")	32/3 pl	Red	Bare	21.3 m	70'	Bare
	1	10 mm (3/8")	16/16 pl	White	Bare	10.3 m	34'	Bare

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### 3.3 Sails and Roller Furling

The sails on the 35 LRC are made for Caliber by Doyle Sails, Clearwater FL which has a manufacturing facility in Barbados.

**Mainsail** – 3599 is configured with a full-battened standard (non-roller furling) mainsail that uses Selden's MDS batten car system. The sail has four battens and is configured with three reefing points. The first two are run back to the cockpit. The third is managed at the boom. The mainsail fabric is Polyant Dimension Dacron, 345 gsm (approx. 8oz).

The sail uses Seldon's bat car system. The bat cars are attached to the sail with a Schaefer Marine #401-10 Combination Receptacle. The Combination Receptacle uses two 10-24 x 1/2" barrel nuts with associated 10-24 x 7/8" Philips head bolts. These are difficult to find in hardware stores and replacements may have to be ordered directly from Schaefer.



The mainsail is configured with Doyle's StackPack system which combines lazy-jacks with a sail cover that is sewn directly into the foot of the mainsail. The outer fabric is Sunbrella Forest Green # 4637.

**Staysail** – 3599 is configured with a convertible cutter rig and standard, hank-on staysail. Like the mainsail, the staysail fabric is Polyant Dimension Dacron, 345 gsm (approx. 8oz).

**Genoa Jib Sail** – 3599 is configured with a 135% Dacron Genoa. The sunshield strip is Sunbrella Forest Green # 4637. The Genoa fabric is Polyant Dimension Dacron, 290 gsm (approx. 7oz).

The sunshield strip was re-stitched May 2015 by Meade A. Breese, Sailmaker, Rock Hall, MD

**Spinnaker Halyard** – A spinnaker halyard is rigged and run aft for future use with an asymmetrical cruising spinnaker. However, no spinnaker was ever purchased or rigged.

**Roller Furling** – 3599 is configured with a [Selden] Furlex ProFurl model # 200 S roller furling unit. The single furling line is run aft along the base of the port rails.

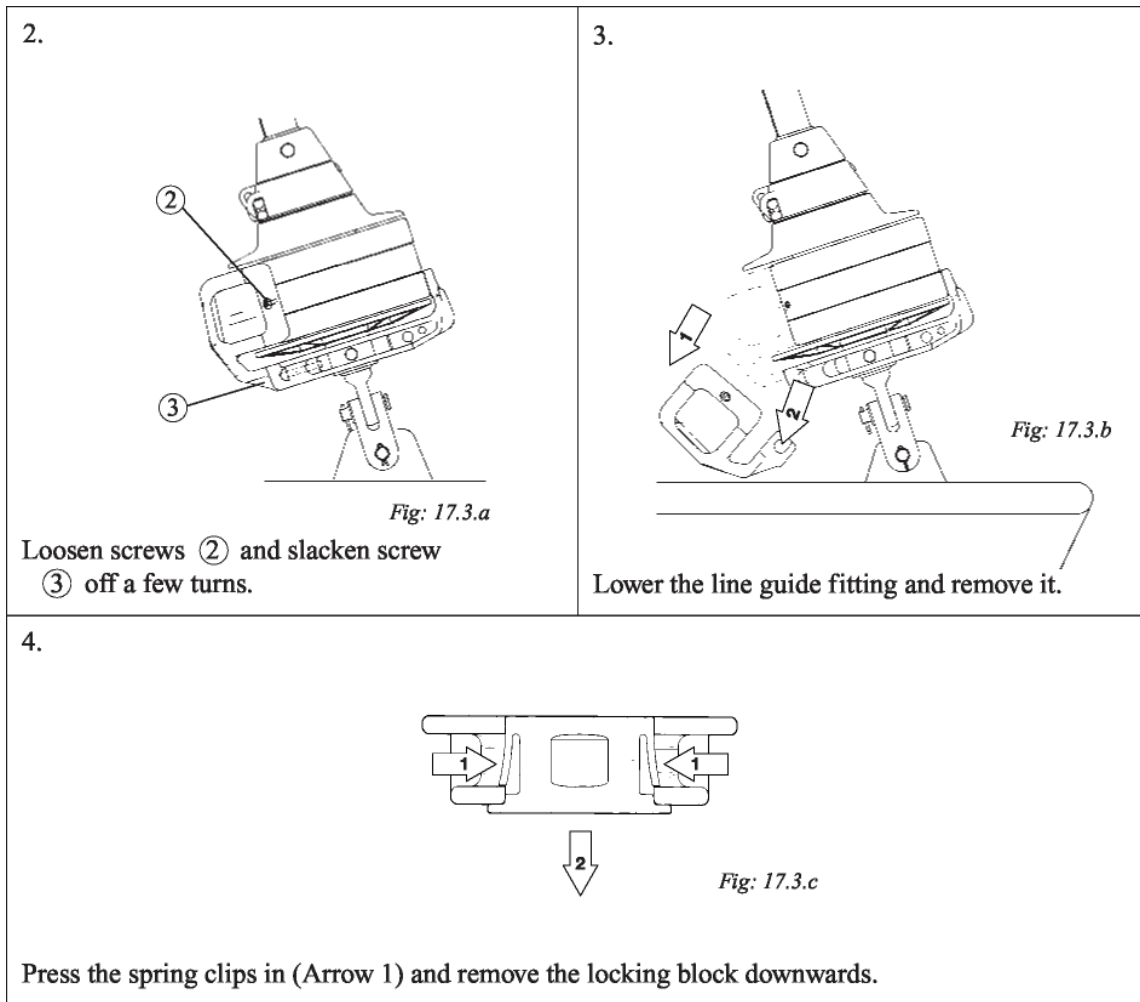
### 3.3.1 ProFurl Maintenance, Cleaning, and Lubricating

The following information is copied from the Furlex Manual, 595-104-E.

To ensure that the system rotates easily and functions satisfactorily year after year, regular maintenance should be carried out. This should be done once a year. Maintenance straight-forward, even when the Furlex is rigged on the boat. Halyard leads should be inspected once a year and any sharp edges smoothed with a file. The halyard lead should be replaced when wear reaches 50%. You will need a Torx wrench set for disassembly / reassembly.

**Cleaning** – Wash and rinse the entire Furlex-system with fresh water and a mild detergent to remove dirt and salt crystals. It is important to rinse all detergent off thoroughly. When the parts have dried, the anodized surfaces of the luff extrusions can be treated with a silicon-free boat polish or wax. The stainless steel components can be treated with a suitable polish.

**Dismantling the Drum** – Place a piece of marker tape on the line and unwind all the line from the line drum. Note the direction of turn. **The line is re-wound counter-clockwise.**



Remove the line drum housing from the line drum.

1. Dismantle the line drum halves. One turn of the furling line wound around the line drum during disassembly prevents the free half of the drum from falling overboard.

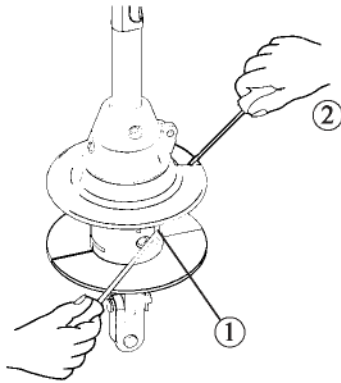


Fig: 17.4.a

Insert a screwdriver ① under one of the connecting clips. At the same time, press another screwdriver ② between the drum halves on the same side so that these are forced apart 3–4 mm.

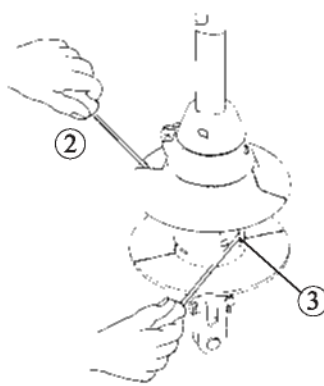


Fig: 17.4.b

Keep screwdriver ② in the same place and turn the drum half a revolution. Release the second clip ③ in the same way.

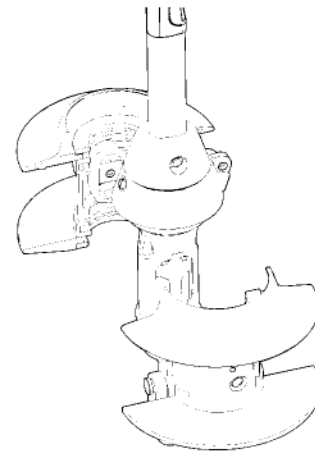


Fig: 17.4.c

The line drum halves now separate.

### Lubricating the Lower Bearing Assembly –

Lubricate all ball bearings as described below using the grease enclosed with the Furlex kit. Lubricating holes “A” and “C” are for the most important bearings to be greased, as the Furlex-system rotates around these. However, lubricating hole “D” is rather more difficult to reach. This is for the tack ring’s lower bearing, which only rotates one revolution on each furling operation. This does not need to be lubricated as frequently; once every other lubricating cycle should be sufficient.

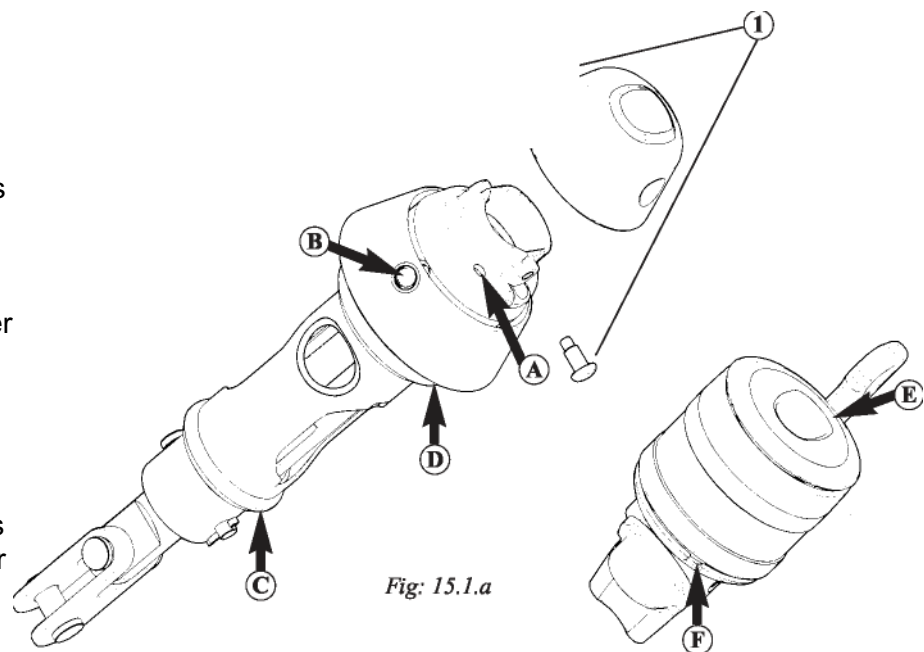


Fig: 15.1.a

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For best results, first rinse the system with fresh water and allow it to dry.

1. Loosen the screws “1” (x 2) fastening the adapter to the lower bearing assembly. Slide the adapter up the luff extrusion.
2. Press grease into the hole marked “A”. Re-fit the adapter and tighten the screws “1” firmly.
3. Press grease into hole “B” on the front of the tack ring.
4. Press grease into the slot “C” between the terminal part and the line drum.
5. Dismantle the line guide and line drum halves.
6. Press grease into the slots in the bearing “D” which is now exposed.
7. Re-fit the components in reverse order. (**The line is re-wound counter-clockwise.**)
8. Ensure all nuts are snug. Align the line feed properly and tighten screw #3 hard.

#### **Lubricating the Halyard Swivel –**

1. Bring the halyard swivel down to the sail feeder.
2. Press grease into the upper bearing through the recess “E” and into the lower bearing through opening “F” in the plastic cover.

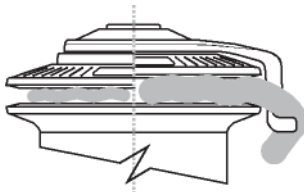
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### 3.4 Winches

3599 is configured with **Lewmar Ocean No. 30 ST** – 2 Speed Self-Tailing Winches on the cabin roof for the main halyard, sheet and reefing lines. This same model is also installed on the starboard side of the mast for the Genoa #1 and 2 and staysail halyards. These winches were an upgrade, installed at the Caliber factory, over the Lewmar No. 16 STs that are standard with the 35 LRC.

3599 is configured with **Lewmar Ocean No. 48 ST** – 2 Speed Self-Tailing Winches on the cockpit sides for the Genoa sheets. These winches were an upgrade, installed at the Caliber factory, over the Lewmar No. 44 STs that are standard with the 35 LRC.

Lewmar uses what they refer to as a Wavespring™ design for the self-tailing feature of their winches. This is able to handle a wide variety of rope diameters and textures without the need for adjustment.



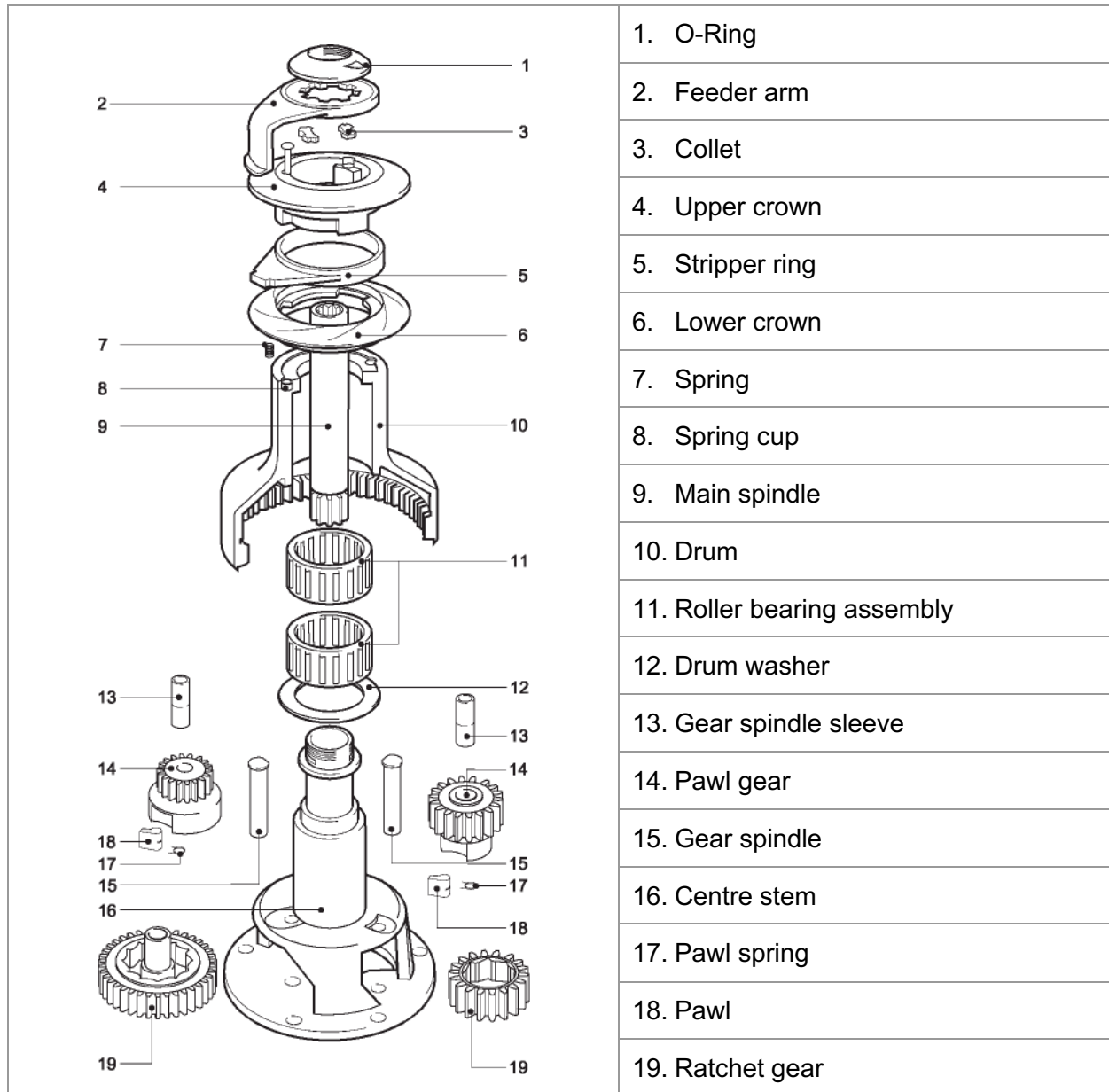
There must be a minimum of three turns on the drum. The turn leading from the drum must then be passed across the stripper mechanism and placed into the spring jaws as shown. Although the jaws are designed to accept a range of rope diameters, winches should only be used with ropes of recommended size.

The Ocean No. 30 ST is designed for use with 8 – 12 mm (5/16" – 1/2") line diameters.

The Ocean No. 48 ST is designed for use with 8 – 14 mm (5/16" – 9/16") line diameters.



The following diagram shows the breakdown / configuration of the Lewmar Ocean winch:



### 3.4.1 Maintenance, Cleaning, and Lubricating

The following information is paraphrased from the Lewmar Volume 10 Service Manual.

All Lewmar winches should be completely stripped, cleaned, thoroughly checked for damage and lubricated on a yearly basis.

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The pawls and their springs need inspecting at regular intervals. Remember they are among the most important internal parts of your winch and the least costly to replace. Don't wait for them to break before changing them.

The following tools are needed for maintenance – An Allen wrench set, a small flat bladed screwdriver, a Philips screwdriver, clean soft cotton cloth, cleaning fluid – white spirit, paraffin (not petrol), light machine oil, and Lewmar winch grease.

All winches are designed according to Lewmar's "strip from the top" philosophy, so that any winch can be quickly stripped for servicing, without the need to remove the winch from its fittings, and using a very basic set of tools.

All components should be removed and cleaned in a paraffin bath in the course of servicing. A plastic container and an old toothbrush can be used. Even a cotton cloth soaked in paraffin or white spirit will suffice<sup>4</sup>. It is helpful to lay out a clean white towel by the winch on which to organize parts during disassembly and assembly.

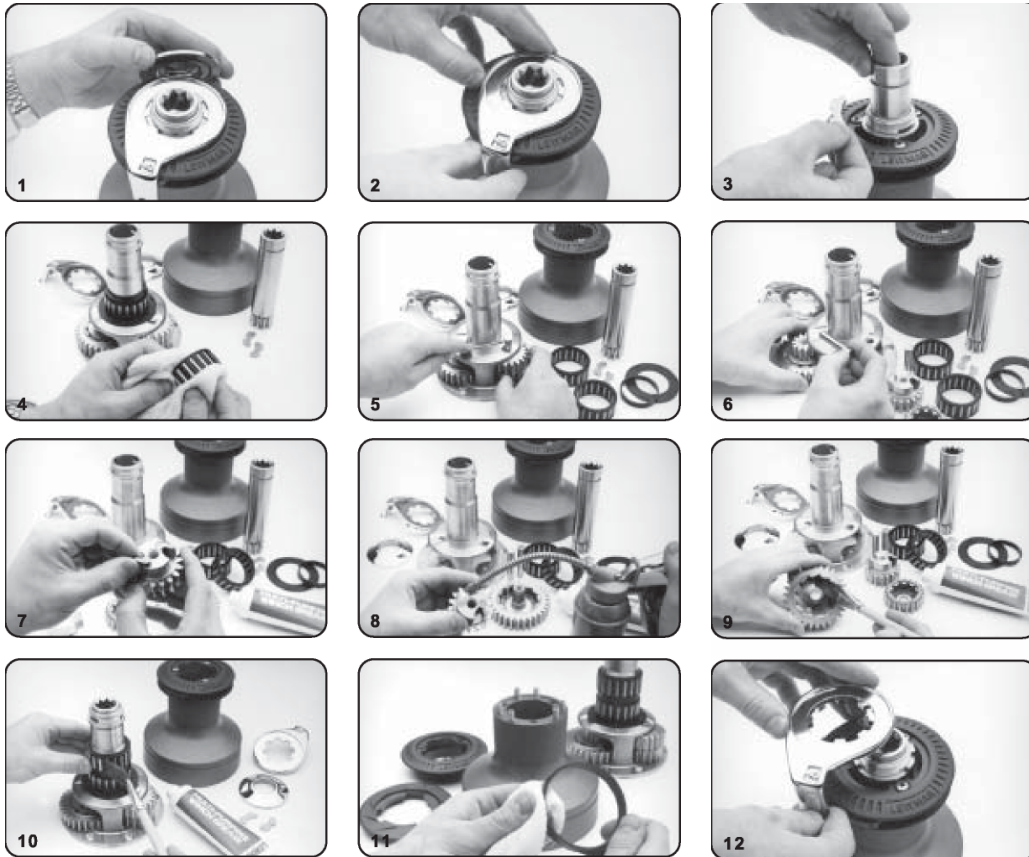
When lubricating, use only a light smear of winch grease when lubricating ratchet tracks, gear teeth and bearings. Otherwise, excess grease will be forced out and will collect in potentially dangerous areas, such as pawl pockets. Never use grease to lubricate your pawls, as this can lead to pawls sticking in their pockets and disabling the winch. Instead, lubricate pawls with a light engine oil.

1. Unscrew top cap.
2. Lift and remove the feeder arm.
3. Remove the two retaining collets, lift out the main spindle.
4. Remove and clean the drum bearings and washer.
5. Using Lewmar winch grease, lightly grease the gear ratchets and internal bearing surfaces. Reassemble the gears.
6. Lift out the gear spindles and remove the gear assemblies.
7. Remove and inspect the pawls and pawl springs, replace if necessary.
8. Assemble the pawls and springs, lightly oil the pawls, check for correct operation (no sticking).
9. Lightly grease the ratchet and bearing surfaces, reassemble the gears.
10. Lightly grease and fit the gears, gear spindles and the main spindle.
11. Strip and clean crown assembly. See the Servicing Wavespring section in this manual.

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<sup>4</sup> Caution: Some Lewmar winches contain plastic components which may be damaged by inappropriate cleaning agents. Always check the manufacturer's directions before using any cleaning agents.

12. Reassemble the drum, main spindle retaining collets and feeder arm. Lightly grease the 'O' ring and top cap thread before fitting.



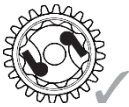
**LEWMAR**

Page 40

Winches must be re-assembled in the reverse sequence to the order of dismantling. After re-assembly, immediately check that the winch functions correctly.



When assembling ratchet gears, check pawl engagement as shown. Incorrect assembly will lead to back winding of the winch. This is very dangerous for obvious reasons, so extreme care should be taken.



Finally, winches are self-draining, so care should be taken to ensure the drain holes are not obstructed.

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## 3.5 Canvas

All after-market canvas on 3599 was manufactured by North Sails, Annapolis. The color is Sunbrella Forest Green # 4637.

- Dodger with hand-holds side and aft, strata glass, and zip-off side panels
- Bimini with zip-out panel to connect to Dodger
- Wheel / pedestal cover
- Rain shield / umbrella for bow hatch (color = off-white)

### 3.5.1 Canvas Water / UV Protection

The canvas life will be extended if it is removed from the boat each winter, washed with a mild detergent such as Downey and sprayed with a ultra-violet protectorant and water-repellant product. "303 High Tech Fabric guard" is Sunbrella-recommended. Although 303 is expensive, we have found it to be far superior to cheaper products such as Kiwi Camp Dry sold in hardware stores. It is important that the canvas be thoroughly cleaned before treating.

## 3.6 Miscellaneous

A Davis Windex wind vane is installed at the top of the mast (in addition to the anemometer transducer / head).

Aladdin Shroud Cleats, part # 0110 have been added to both the port and starboard shrouds.

## 4 DECK

The 35 LRC features extra-long sea rails for added safety. The stern rail literally envelopes the cockpit creating a secure zone and providing a convenient place to mount solar panels. The bow pulpit has been extended to wrap the foredeck with security.

### 4.1 Steering System

The 35 LRC is equipped with an **Edson Classic Series chain and wire steering system** with a radial drive wheel, stainless steel dished destroyer wheel, and 58" angled guard. A side-mount single-lever engine control is used, incorporating a Morse SL3 Engine control mechanism for single-lever operation of both the clutch and the throttle

Maintenance information is available in the *Edson Chain & Wire Steering Systems Planning, Installation and Maintenance Guide* which is available for free download at <http://www.edsonmarine.com/>.

**Emergency Tiller** – The 35 LRC comes with an emergency tiller that is inserted over the top of the rudder post (which is accessed via the aft locker). The emergency tiller on 3599 is stored in the port cockpit locker.

**Cockpit Table** – An Edson 737 [teak] drop-leaf table is mounted on the binnacle guard. The table was varnished with 3 coats of Sikkens Cetol Marine IVA300, then over-coated with Sikkens Cetol Marine IVA315 Gloss.

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**Drink Holder** – The 4-cup teak drink holder is mounted on the binnacle guard with Helm Products Inc. rail mounts (1 1/8" with included shim). Like the cockpit table, it is coated with 3 coats of regular Cetol and 3 coats of gloss.

## 4.2 Ground Tackle

When anchoring, the anchor rode should be brought back through the bow choc(s) and cleated off so any load is borne through the reinforced choc(s) and cleats rather than by the end of the anchor platform and the windlass. When using a chain rode, this can be accomplished through the use of a snubber(s).

**Anchor(s)** – 3599 a 33 lb Bruce with 100' of 5/16" HT chain and 200' of 5/8" anchor line. It is used with an Imtra snubber made up of 20 ft. of 3-strand 5/8" line spliced to a 5/16" galvanized chain hook.

The lid to the anchor locker is secured when open using the Handi-Hanger (flat mount) manufactured by Schaefer Marine.

NOTE: If the primary anchor chain is ever replaced, consider using 120 or 150' of chain as weight, though a concern, does not appear to be a significant problem.

**Anchor Windlass** – 3599 is equipped with a Lofrans Project 1000 anchor windlass which accommodates 5/16" HT chain and 5/8" anchor line. The Windlass package is made up of the following components:

- Lofrans Project 1000 Capstan windlass, USA version.
- Imtra SPA-10700 Control Box (solenoid), 12V for 3-Wire Motors
- Lewmar air deck switch(es)
- A 3-Amp in-line fuse (mounted in the anchor well)
- Imtra cockpit remote toggle switch.
- Blue Sea 110A thermal circuit breaker

A generic wiring diagram and schematic / parts breakdown of the Project 1000 is included with the diagrams at the end of this document as is an updated diagram of the deck assembly (with a couple new parts) and a wiring diagram of the actual installation on 3599.

The windlass circuit breaker is located in the base of quarter-berth next to the DC Parallel Battery Switch. This Blue Sea 110A thermal circuit breaker has a somewhat odd, non-intuitive switch. Pushing the red button on the front trips the breaker (turns it off). A small black lever will drop when the breaker is tripped. To reset the breaker (turn it on), this lever needs to be pushed back up and clicked into place.

Note: The windlass breaker bypasses the main DC cut-off switch in the engine compartment.



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**Operation** – The Lofrans Project 1000 is cone clutch-equipped which allows to you to lower the anchor without using the electric motor. Lofrans strongly recommend use of a chain stopper in conjunction with the windlass. The windlass should not be used to secure the chain / rode while underway or at anchor. Anchors should be independently secured with a chain stopper or lanyard while underway to prevent accidental release. When at anchor, the rode should be properly secured to a bow cleat.

**WARNING: Do not allow the chain to pile up in the anchor locker to a height that will impede the windless.** Much of the stress of a chain jam is borne by the stripper and repeated jams will eventually bend it and damage the windlass. You must periodically reach inside the anchor locker and pull down the chain pile each time you use the windlass (e.g. every 40 feet).

**WARNING:** Be sure to disable the windlass circuit breaker and tie down the anchor when sailing or motoring. It is possible for an item placed in the cockpit coaming box to accidentally trigger the windlass by hitting the remote up – down switch when the boat is underway.

The following operation information is paraphrased from the Lofrans instruction manual.

Use of the Clutch	To disengage the clutch insert the handle into the clutch nut (top center of capstan) and loosen it. To engage the clutch, tighten it until you cannot move the handle any more.
Lowering the anchor with the electric motor	Turn on the circuit breaker. Make sure the clutch is engaged. Push the DOWN button.
Lowering the anchor with the clutch	Using the handle, disengage the clutch very slowly and carefully. The speed of the fall of the chain is controlled by the clutch handle. Avoid an un-controlled / out-of-control descent. When the desired length of rode has been let out, re-engage the clutch.
After anchoring	Engage the clutch. Engage the chain stopper / affix rode to a cleat. Turn off the circuit breaker.
Raising the anchor	Disengage the chain stopper. Check that the clutch is engaged. Turn on the circuit breaker. Start the engine of the boat. Push the UP button while with the boat at minimum speed going towards the anchoring point. Do not use the windlass to pull the boat to the anchor. Release the button UP to stop the operation. Pay attention to the speed of the anchor to avoid damaging the bow of the boat. In the event that the anchor becomes stranded and the Lofrans circuit breaker trips, wait several minutes before re-setting the breaker and trying once more. Should the circuit breaker trip again, affix the rode to a cleat and use the boat engine to break the anchor loose.
Using the capstan drum	Disengage the clutch. Turn 2 – 3 laps of line clockwise around the drum. Push the UP button, tailing the line at the same time.
Manual (emergency) use	Engage the clutch. Turn off the circuit breaker. Insert the handle and turn it clockwise to exceed the gearbox spring strength. The stress will

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be hard in case of deep anchoring.
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**Maintenance** – It is important to service (clean and lubricate) the windlass at the end of each season. The following information is paraphrased from the Lofrans instruction manual.

1. Clean all outer surfaces and hidden points with fresh water, removing any accumulated salt, regularly. Check for evidences of corrosion and stress.
2. Grease the outer rotation parts, particularly the main shaft thread and the clutch cones every 6 months – 1 year, depending on frequency of use. To do this:
  - a. Unscrew the clutch nut (912)<sup>5</sup>
  - b. Remove the drum (914)
  - c. Unscrew the 3 cap screws (907 & 1011) and put in a safe place (e.g. a cup)
  - d. Remove the cover (908). When you do this, be careful not to loose the finger spring assembly (909 & 887 / 1008) – put them in a safe place.
  - e. Remove the stripper (910) and check it for wear. It should be symmetrical (not bent to either direction) and line up cleanly with the gipsy center without touching.
  - f. Remove the top cone clutch (915), the gipsy (916), and lower cone clutch (915). If any parts are stuck, gently tap them out. Don't use force. Inspect for wear.
  - g. Clean all parts with a t-shirt rag or paper towel and a lubricating solvent like WD-40 or CRC 3097 "Long Life". (A toothbrush may help with build-ups of old grease and minor electrolysis.)
  - h. Very lightly grease the tops of the cones, the portion of the gipsy that comes in contact with the cones, and the main shaft thread.
  - i. Reassemble
3. Check the terminals of the electric motor and test the drop of voltage at the terminals yearly.
4. Replace of the all outer seals and ensure that the gearbox is properly filled with SAE 90 long life oil every 3 years.
5. Remove the windlass from the deck to clean the salt under the base plate every 3 years.

NOTE: Lofrans redesigned the cap cover and finger assembly, adding a 3<sup>rd</sup> cap screw for added strength and replacing the plastic finger with one made of stainless steel. The 3<sup>rd</sup> cap screw (part number 1011) does not show up in the main Project 1000 exploded parts diagram. Part number 887 (the pin for the finger spring assembly) was changed to part number 1008.

NOTE: While the capstan top appears to be sized to accept a standard winch handle, it is actually slightly smaller and will only accept the handle shipped by Lofrans.

NOTE: Both switches (foot switches at bow and the toggle in the cockpit) are powered via an orange wire coming off the center post of the Imtra control box (solenoid) in the anchor well. There is a 3-Amp in-line fuse mounted under the Lewmar switch box next to the control box. Because of its location, this fuse is prone to corrosion. If the windlass fails to operate when the switches are hit, open the fuse housing, clean the connections, and replace<sup>6</sup> this fuse before taking more drastic action. See the wiring diagram at the back of this document.

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<sup>5</sup> See complete parts breakdown at the end of this document.

<sup>6</sup> Visual inspection is not sufficient to tell whether the existing fuse is OK.

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NOTE: The windlass terminals / contacts are painted with Star Brite brand liquid electrical tape which is sold at most hardware stores.

NOTE: The Project 1000 is the newer version of the earlier Progress 1 model with an added two-speed feature where the down direction runs faster than up. The result of this improvement is a greater amperage load when down is hit. The same Airpax circuit breaker used for the Progress 1 was initially shipped with the Project 1000. It is not adequate for the newly designed windlass and will trip when the anchor is lowered if there is sufficient battery capacity to supply the higher amperage draw. The Caliber LRC's electrical system has this capacity. This breaker was first replaced with an Airpax Series #53, which has a longer delay. This was a great improvement, but still tripped periodically. Finally this was replaced by a Blue Sea 110A thermal circuit breaker which has worked properly. Any replacement breaker should be obtained through Caliber or Imtra as selection of breakers can be somewhat complex. A more standard, switch-type breaker may now be available.

**Raw-Water Washdown Pump** – 3599 is configured with a Shurflo Blaster Series Washdown Pump. The pump draws water via a “T” junction in the water line through a mesh strainer from through the same raw-water thru-hull used by the head. The pump and a mesh strainer are located under the head sink. An “Anchor Wash Down” breaker is located at the main DC panel and there is a ball-type cut-off valve just before the spray hose attachment on the starboard inside wall of the anchor locker.



NOTE: The coiled hoses that are commonly attached to wash-down pumps are susceptible to chafe and do not tolerate high pressure well for long periods of time. In order to avoid pin-hole leaks, the ball valve in the to the anchor locker should be turned to the off position, the anchor wash down breaker turned off, and the hose should be discharged when it is not in use.

## 5 PAINTS AND VARNISH

This section provides specifics on the various finishes used by Caliber for the 35 LRC.

### 5.1 Exterior

Caliber calls the gel coat color used for the hull and smooth portions of the deck “Caliber White”. Beige gel coat is used for the Deck/Non-Skid. The vendor for both is Ashland Chemical Co.

Dusky White Gel Coat is used for the interior parts. The vendor is Fiberglass Coatings



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The cove and boot stripes on 3599 are Dupont Imron brand paint, [forest] green #7666 (color chart M-3699)

Should portions of the hull or interior require repainting, paint can be procured through Caliber.

The bottom was coated with three layers of Pettit Protect 4700/4701 Epoxy Undercoater (barrier coat) at the Caliber factory.

Two layers of Pettit Top Coat Trinidad Red bottom paint #1675 were applied over the barrier coat at the Caliber factory.

According to Pettit either of their ablative paints, Ultima SR or Horizons (previously known as ACP-50), may be used over a Trinidad base. While Pettit would like you to use their paints for subsequent coats, other brands of ablative paint should work fine.

The prop is sprayed with Pettit “Zink Coat Barnacle Barrier 1793” to prevent barnacles. (Care should be taken only to spray the prop and shaft. One must never spray the zink.)

The exterior teak is treated with 3 coats of Sikkens Cetol Marine IVA300 Satin (regular), which is over-coated with Sikkens Cetol Marine IVA315 Gloss. Adding an additional maintenance coat of gloss at the end of each season will GREATLY increase the life of the bright-work.

Sikkens can be removed using “Soy Strip” which is manufactured by Franmar Chemical Inc., 1-800-538-5069, <http://www.franmar.com/>. Use Soy Strip with a normal brush, not a foam brush. While, limited contact with gelcoat is OK, Soy Strip will scar Lexan, so use blue tape on the companionway slide.

The teak inserts on each side of the cockpit are caulked / bordered with West Marine Multi Caulk Sealant – Quick Cure Polyether (black). This is quite nasty stuff to work with (like tar). If you need to re-caulk the inserts, remove the old caulk and wipe down the crevice with an acetone-soaked paper towel to remove any dirt and oils. Carefully lay two strips of blue tape – one on the outside fiberglass and one on the inside teak, being sure to cut the tape so the curves are properly covered and the lines are clean. A good tape job is very important. Lay your caulk bead between the two tape lines, being sure to fill the crevice, but not using too much. Place a plastic sandwich bag over your index finger and smooth the bead out. Allow to dry overnight. When you pull off the tape the following day, you should have a nice clean line.

## **5.2 Interior**

White gel-coat is used on the interior of the anchor well.

White latex paint is used on the locker interiors.

Defthane Clear Satin #2 Polyurethane [varnish] is used on the interior bulkheads (3712502501)

Defthane Clear Gloss #1 Polyurethane [varnish] is used on the floor (3712502001)

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## 6 ELECTRICAL SYSTEM

The Caliber 35 LRC is fitted with an electrical system designed for both 120 volt AC and 12 volt DC current. The system, which Caliber refers to as their Smart Electrical system consists of a separate starting battery and house battery bank with emergency cross-over capability, a small-frame high-output alternator, automatic multi-step voltage regulator, and a circuit protection device (CPD) that protects the entire system. Additional positive and negative distribution posts are provided as convenient attachment points for future electronics. Finally a manual emergency cut-off switch is installed that is capable of shutting down the entire DC house battery system quickly.

The Diagrams section at the end of the document contains schematics for many of the electrical system components.

### 6.1 Battery Bank

The 35 LRC has a two-battery bank system consisting of:

1. A service (house) battery bank made up of two Deka 4D high acceptance deep-cycle 200 amp Absorbed Glass Mat (AGM) marine batteries in a parallel configuration, part no. 8A4D, 1110CCA, 198 A.H.@20Hr. It is theoretically possible to add a third 4D battery to increase amperage-hour capacity. However, there may be space issues with the 35 LRC.
2. An independent Deka Group 27 AGM starting battery, part no. 8A27M, 810 MCA, 580 CCA, 92 A.H. @20Hr.

In the event the starting battery fails, there is an emergency parallel switch in the system that makes it simple to transfer the power from the house batteries to start the engine. (See “DC Parallel Battery Switch”.)

The battery terminals are painted with Star Brite brand liquid electrical tape which is sold at most hardware stores.

Note: In a parallel configuration it is important NOT to connect different types of batteries (e.g. wet cells and AGMs; cranking and deep-cycle) or batteries of different capacities. Differences between the batteries will accelerate the destruction of both.

**Main DC Emergency Cut-Off Switch** – The 35 LRC is equipped with a Blue Sea Systems 9003E main DC cut-off switch. This is located in the main engine compartment and is accessible via the top companionway step.



This switch is the main DC “off” switch. It physically disconnects the two large 4D service (house) batteries from all external circuits, thus isolating these batteries. This switch should only be turned off in the event one suspects an electrical fire, or if one needs to perform work on the main electric system, or should one want to leave the boat unattended for a length of time without the bilge and sump pump being connected (e.g. after a haul-out).

When the main DC switch is on, power is supplied to the main DC circuit breaker panel via the #8080 Blue Sea DC Parallel Battery Switch Panel as well as all auxiliary fused circuits located in the engine room such as the bilge pump, sump pump, electric fuel pump, and windlass. This switch is normally always left on so the bilge and sump pump are able to function.

**WARNING:** The bilge and sump pump is on automatic only if the DC emergency cut-off switch remains on.

**WARNING:** Do not turn this switch off while the engine is running. The alternator will produce continued output with no place to go. This voltage can peak at several hundred volts or more, blowing out all alternator diodes and the voltage regulator. This can happen in a fraction of a second.

**NOTE:** The windlass was installed by Caliber bypassing this manual emergency cut-off. You must trip the dedicated windlass circuit breaker to disable it.

**DC Parallel Battery Switch** – The 35 LRC is equipped with a Blue Sea Systems DC Parallel Battery Switch Panel, PN 8080, which includes:

- The main DC House breaker.
- The main on-off switch connecting the starting battery to the engine starter. This must be on when starting the engine.
- A key-operated emergency cross connect switch that will allow the house battery bank to be connected to the starter should the starting battery be discharged for any reason.



The cross connect should be left in the off position by default and the key stored in the chart table. Only use the key “On” when the engine start battery will not start the engine and the Main DC breaker is on.

NOTE: Care should be taken not to accidentally hit the main DC house breaker with one’s knee while sitting at the chart table under sail.

**Xantrex Battery Monitor (XBM)** – 3599 has a Xantrex Battery Monitor (XBM) the nav station. The XBM is a micro-processor controlled monitor that measures amperage hours out of and into the house battery bank. It provides a number of screens with information on the health and discharge / charge status of the battery bank. A battery monitor is crucial if you want to know the charge status of the house bank. You cannot tell the discharge status of a battery with a volt meter like the one on the Blue Sea panel.

## 6.2 Distribution Panel

The AC / DC Power Distribution Panel is located at the nav station. It is custom made by Blue Sea Systems for Caliber (PN 10094) but uses standard Blue Sea replacement parts for panel PN 8408. It includes an 8208 DC and 8247 AC Digital Multimeter, both with alarm and back-lighting.



The master AC switch is on the panel. The master DC switch is part of the DC parallel battery switch assembly and is not on the panel.

The following table shows the layout of the Blue Sea DC/AC panel.

DC Multimeter	Sump Pump	AC Multimeter	
	Bilge Pump (15A)		
	Stove (5A)		
Navigation Lights (5A)	Electronics (5A)		AC Main (30 A)
Steaming Light (5A)	Anchor Wash Down (15A)		Water Heater (15A)
Anchor Light (5A)	GPS / Plotter (15A)		Outlets <sup>7</sup> (15A)
Foredeck Light (5A)	Fan (5A)		Outlets <sup>9</sup> (15A)
Lights <sup>8</sup> (15A)	Strobe Light (5A)		Battery Charger (15A)
Lights 2 <sup>10</sup> (15A)	VHF (10A)		
Lights 3 <sup>11</sup> (15A)	Auto Pilot (20A)		
Water Pressure (10A)	Stereo (15A)		

The DC circuit breakers used are a Blue Sea “World Circuit Breaker”. These are offered with black or white toggles. Caliber’s breaker panel uses white. The breakers are manufactured by Carling Technologies and the same breaker is available from different vendors. While other brands can be used, the finish, labeling, and back-side screw diameters may differ slightly. Blue Sea part numbers:

- 5 Amp toggle style white, Blue Sea part # 7202B
- 10 Amp toggle style white, Blue Sea part # 7206B
- 15 Amp toggle style white, Blue Sea part # 7210B
- 20 Amp toggle style white, Blue Sea part # 7214B
- The Sump Pump uses a special breaker

There are no free spaces on the panel itself for additional DC circuit breakers, though fuses and breakers can easily be added elsewhere at the nav station. There are two free spaces for AC circuit breakers. If additional circuit breakers are needed in the future, a sub-panel will need to be added. Caliber recommends the Blue Sea Systems DC 6 Position Horizontal Circuit Breaker Panel, part # 8096 and AC 8 Position Circuit Breaker Panel, part # 8059.

<sup>7</sup> All three starboard-side AC outlets.

<sup>8</sup> Lights for the forward 1/3 of the boat – The head and forward [v-berth] cabin ceiling lights + the forward cabin reading lights.

<sup>9</sup> All three port-side AC outlets.

<sup>10</sup> Lights for the middle 1/3 of the boat – The ceiling lights on the starboard side of the main cabin and over the dining table, all four reading lights in the main cabin + the chart light at the nav station.

<sup>11</sup> Lights for the aft 1/3 of the boat – The ceiling lights over the nav station, galley, and ice box + the quarter-berth reading light.

A wide array of additional labels are available from Blue Sea. A Blue Sea label ordering form is included with the parts documentation provided by Caliber.

In addition to the Blue Sea circuit breakers, there is a small un-labeled toggle switch on the breaker panel near the DC Multimeter. This toggle switches between the deck level navigation lights and the mast-head lights. Down is deck level. Up is mast head. The Navigation Lights switch is used to switch on the lights. It is not possible or legal to have both on simultaneously.

### 6.3 Fuse Blocks and In-Line Fuses

The electrical system on 3599 includes a number of fuse blocks and in-line fuses tucked away in various behind-the-scenes locations.



One 6-circuit Blue Sea Systems ST blade fuse block with cover, with negative bus, part #5025 was installed by Caliber under the cockpit, next to the Ample “Next-Step” voltage regulator.

<b>Blue Sea 5025 6-Circuit Fuse Block Under The Cockpit</b>	
<u>Left Fuse Column</u>	<u>Right Fuse Column</u>
Voltmeter (at breaker panel) – 1A	Walbro Fuel Pump – 10A
Engine Battery Parallel Solenoid – 3A	Sump Pump – 10A
Next-Step Voltage Regulator – 15A	[Emergency] Bilge Pump – 15A

To combat the proliferation of in-line fuses, two 6-circuit Blue Sea Systems ST blade fuse block with cover, without negative bus, part #5028, have been installed – one behind the engine by the positive and negative distribution busses, the second behind the nav station panel. Where appropriate, several of the in-line fuses originally installed by Caliber have been re-routed to these blocks.

<b>Blue Sea 5028 6-Circuit Fuse Block Behind The Engine</b>	
<u>Left Fuse Column</u>	<u>Right Fuse Column</u>
{empty / unused}	{empty / unused}

Stereo – 15A	Xantrex Battery Monitor (XBM) – 2A
12-volt outlet in cockpit – 15A	Xantrex Battery Monitor (XBM) – 2A

### Blue Sea 5028 6-Circuit Fuse Block Behind The Nav Station

Left Fuse Column	Right Fuse Column
{empty / unused}	TankWatch Holding Tank Warning – 1A
{empty / unused}	12-volt outlet at nav station front – 15A
{empty / unused}	12-volt outlet at nav station aft side – 15A

In-line fuses exist in the port side cockpit locker, behind the nav station panel, and in the anchor well (see Anchor Windlass).

### In-Line Fuses

Location	Purpose
Behind the nav station breaker panel	AC / DC Panel LEDs at nav Station – 1A
Inside cockpit locker, above fuel valves	Fuel Pump Relay – 3A
Inside cockpit locker, above fuel valves	Regulator Engine Ignition Switch – 3A
Inside cockpit locker, behind engine panel	Yanmar panel – 3A
Inside the anchor locker, aft wall	Anchor Windlass Switches – 3A

Note: According to conversations with Caliber, the industry standard fuse size for 12-volt outlets is 10A – 15A. If the length of wire used between the electrical panel and the DC Outlet being installed, multiplied times 2, is less than 10 feet it's OK to use 12 gauge wire. If the length is more than 12 feet one should use 10 gauge. I've included a wire size chart in the appendix.

## 6.4 Ample Heavy Duty High Output Alternator and Next-Step Voltage Regulator

**Alternator** – The standard Yanmar alternator has been replaced with an Ample high output, small frame alternator capable of producing 110 amps of charging power. (Ample Alternator, heavy duty high output alternator, marine certified model # 4023, serial # RR1903, 12 volts, Rating amps SAE / 200° F 124 / 106.)

An Eng, 35/40 Mag. Sensor Pick Up #128170-91160 was installed on the Yanmar engine to accommodate this.

Battery charging while the engine is running is fully automatic and does not require any manual intervention. Details are provided under Next-Step Regulator.

The alternator as shipped by Caliber uses a Bando v-belt A-37.5, Yanmar part # 119831-42290. Yanmar also sells a toothed belt, part # 129612-42290, that can be substituted. According to Ample, heavy duty belts are required for this alternator. Ample recommends Gates Super HC

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Series and Industrial CV series or the Dayco Top Cog which should be available at many auto parts stores.

NOTE: The alternator belt should be checked regularly (e.g. every time the oil is checked). With the engine off, verify that the surfaces are in good condition and the belt is not burnt, worn, or cracked. Verify that it is aligned and tensioned properly.

NOTE: Spare belts should be carried on board as part of any spare parts kit.

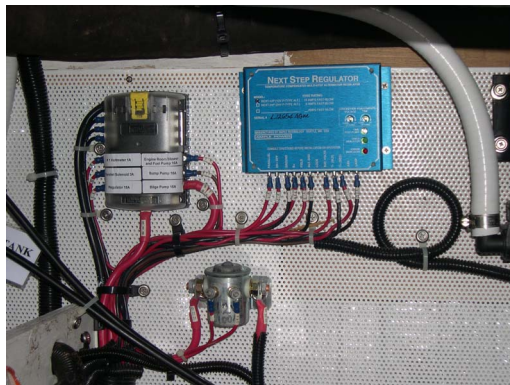
NOTE: The alternator surface and interior should be kept clean and free of foreign debris and buildup. The alternator case should not be painted as this will effect cooling.

An Ample Alternators information sheet is provided by Caliber with the parts documentation.

The troubleshooting section of this document contains information and steps aligning the alternator, re-tensioning the belt, and troubleshooting alternator-related DC charging problems.

**Voltage Regulator** – The alternator works in conjunction with an Ample Technology Lifeline “Next-Step” multi-step voltage regulator that acts as the communicator between the batteries and the alternator. A voltage regulator controls the output of an alternator by varying the current supplied to the field winding. It holds the alternator’s output to whatever the battery will accept at a given charging voltage. This regulator is located under the cockpit, mounted on the starboard bulkhead over the battery bank. It is accessible via the cockpit locker.

Ample Technology Next-Step Regulator Temperature compensated multi-step alternator regulator model # NEXT-12P (12V P-Type Alt)



The regulator controls the charging power to the batteries in a sophisticated step sequence regulated by both the voltage and temperature for optimal charging. Should there be a malfunction in the system, it would be indicated by an error lamp and associated audio buzzer on the regulator. **The troubleshooting section of this document contains information on buzzer and error lamp readings and their meanings.** Application of too high a voltage during charging at higher temperatures is eliminated by a battery-mounted temperature sensor on the house bank that sends data to the regulator.



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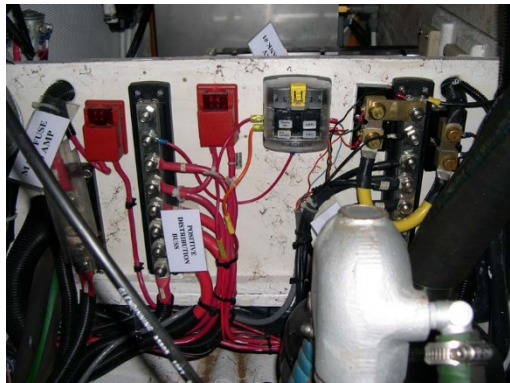
When the engine ignition switch is turned on this also turns on the Next-Step Regulator, which activates the error indicator lamp and associated audio buzzer for a period of 6 seconds. After this 6 second period the regulator starts it's multi-step charge procedure. There are three main steps in the charging sequence:

1. Bulk Charge: The alternator is full-fielded and thus generates its maximum current (amperes). It will stay in this state until the battery voltage has reached the casing voltage which is 0.6 volts less than the absorption voltage.
2. Absorption Charge: The regulator brings the voltage up to the absorption voltage setting. It then goes to an interim step called "absorption voltage setting" during which one may make adjustments to the exact absorption voltage.
3. Float Charge: After keeping the batteries at the absorption voltage for a time determined by the "absorption time setting", the voltage drops to a float voltage during which the battery voltage makes the transition from absorption to float.

The absorption voltage is temperature compensated. Thus, although AGM batteries, for example, are specified for 14.5 volts at 77° F, this voltage must diminish as temperature rises, or increase as temperature decreases. This is accomplished with an external temperature sensor that is connected to one of the house battery posts. If one were to disconnect one of the temperature sensor wires from the regulator, it would regulate as if the battery temperature were 77° F. So, although the regulator might be adjusted to have an absorption voltage of 14.5 volts (at 77° F), one shouldn't be surprised to see 14.1 volts on the batteries during absorption charge in the heat of a 90° F summer.

## 6.5 Connecting Other Equipment to the 12-Volt System

The positive and negative cables of additional high-power equipment such as a windlass, SSB transceiver, inverter, battery charger, wind generator, etc. should be connected directly to the **positive and negative distribution bus** located behind the engine and NOT to the battery posts. Each piece of equipment must have its own current protection such as a fuse or circuit breaker located as close to the distribution bus as possible.



## 6.6 Shore power and AC Battery Charger

In addition to its 12-volt DC electrical system, The 35 LRC is equipped with for use with 120-volt, 30 amp, 3-prong, AC marine shore power. The inlet is located aft on the starboard

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gunwale. The master AC breaker and all other AC circuit breakers are located on the main Blue Sea Systems electrical panel at the nav station. A Marinco 30 amp, 125 volt Stainless Steel inlet is used, part # 303SSEL-B.

Always use a proper 30 amp 125 volt capable marine cord power-cord like those manufactured and sold by Marinco. If the cord becomes sun-degraded or otherwise damaged, replace it.

**WARNING:** do not allow your dockside power cord to come in contact with the water. Never operate any AC power tool or other electrical equipment while you or the device are in contact with the water.

**AC Battery Charger** – 3599 is equipped with a Xantrex Truecharge 40+ Amp Multistage [AC] Battery Charger installed through Caliber at the Caliber factory. The serial # is 810226786. This charger is equipped with a regulator, remote panel mounted at the nav station, and a remote temperature sensor.

## 7 AUXILIARY ENGINE AND FUEL SYSTEMS

### 7.1 Engine

The Caliber 35 LRC's auxiliary power plant is a 29 horse power Yanmar 3YM30G-2.62 marine diesel engine with Yanmar's Digital B-Type Panel. An engine owner's manual is supplied with the boat and should be read thoroughly. The manual contains safety information, technical specifications, running instructions, and maintenance schedules for lubricants and other fluids. For long engine life, follow routine maintenance schedules. Proper inspection and maintenance will GREATLY enhance the safety and life of the engine. The Yanmar Service Manual was also purchased for 3599 (Yanmar part # M9961-03E100).

The engine can be accessed by first removing the trash can and then pulling out the companionway steps. If greater access is needed, the wooden front panel can also be removed by unscrewing the 5 screws that hold it in place.



**NOTE:** It is advisable to glue some felt to the bottom of the companionway step assembly to help protect the finish of the floor.

The raw-water intake thru-hull for the engine is located under the bottom galley drawer. Make sure it is open prior to starting the engine. The raw-water strainer is located in the engine compartment and is accessible via the top companionway step. Once the engine is started, verify that water is “spitting” in a strong, regularly patterned fashion out of the exhaust. One can also check the raw water strainer under the companionway steps for water movement.



The engine oil, transmission fluid, coolant levels, and the raw-water strainer should be checked before each use. Water, rust, scale, and dirt will cause serious damage to the injectors on diesel engines. You should check your filters frequently and change when necessary. Run the engine a minimum of 15 minutes after starting to bring it up to operating temperature. This insures that any condensation is evaporated. Your engine should be “run-out” at 3/4 throttle at least once a month to clean out carbon build-up and moisture.

The engine should be aligned by experience marine service personnel. Final alignment should be done after launching, with all normal gear aboard. Alignment should be checked again after several weeks of use. An Engine Plate, mounted on top of the engine contains important information such as the model number, power output, and serial number. The engine plate from #3599 reads as follows:

Model:	3Y30	
Gear model:	{blank}	
Continuous power KW:	20.1 / 3489	min <sup>-1</sup>
Speed of prop shaft:	{blank}	min <sup>-1</sup>
Fuel stop power KW:	22.1 / 3600	min <sup>-1</sup>
Engine NO.:	E01470	
Yanmar Diesel Engine		
Yanmar Co. LTD		
Made in Japan		

**Instrument Panel** – The boat is configured with Yanmar’s Digital B-Type Panel which is located on the port side of the cockpit. This panel uses analog electric systems and includes:

- A tachometer

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- An hour meter
  - A key switch with moisture cap
    - Off
    - On
    - Start
    - Glow
  - A stop [engine] button
  - Warning lights for
    - Coolant high temperature alarm – lamp lights and buzzer sounds when the temperature reaches 95°C / 203° F. Continuing operation at temperatures exceeding the maximum limit will result in damage and seizure. Check the load and the fresh water cooling system for any abnormalities.
    - Lubricating oil low pressure alarm – lamp lights and buzzer sounds when the lubricating oil pressure falls below normal. Continuing operation with insufficient oil pressure will result in damage and seizure. Check the oil level.
    - Water in sail drive seal alarm<sup>12</sup>
    - Battery low charge alarm – lamp will come on when the alternator output is too low. When charge begins, the lamp will turn off. (The alarm buzzer will not sound when the lamp comes on.)

**Throttle** – An Edson Morse SL3 single handle engine control mechanism is used to operate the marine gear-clutch (neutral, forward, reverse) and to control the engine speed. The handle controls the direction of the boat (ahead or astern) and at the same time acts as an accelerator increasing the engine speed as it is pushed further in the FWD or REV direction. If the [black] button at the center of the handle's base is pushed in, the engine speed can be controlled without engaging the clutch (the clutch remains in the Neutral, no load position).

**Operating Speeds** – According to Yanmar, the engine is designed to be operated at cruising speed (3,400 rpm or lower) for less than 90% of total engine time (9 hours out of every 10 hours). The engine is designed to be operated at maximum throttle (3,600 – 3,800 rpm) for less than 5% of total engine time (30 minutes out of every 10 hours).

In practice, running at more than 3,100 – 3,200 rpm may result in overheating. A normal cruising speed is 2,500 – 2,600 rpm.

**Shut Down** – To shut down the engine, push the stop button on the instrument panel when the key is in the ON position.

There is also an [orange] emergency stop button at the back of the stop solenoid on the engine itself, if the engine cannot be stopped by the stop button on the panel.

**CAUTION:** If the engine is stopped suddenly at a high temperature, the temperature of various parts will increase and engine trouble may occur. It is advisable to slowly throttle down and allow the engine to idle for several minutes to cool before shutting it down.

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<sup>12</sup> This boat is not configured with a sail drive.

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### 7.1.1 Fuel, Lubricating, and Transmission Oil

**Fuel** – Use diesel fuels. The Cetane fuel number should be 45 or greater.

When fueling, it is a good idea in some areas, particularly warmer climates, to use a biocide. BIOBOR JF is the industry standard for the treatment and prevention of microbial growth. 1 fluid ounce treats 40 gallons.

The use of a fuel conditioner with diesel is optional.

**Engine Lubricating Oil** – 3599 uses Multi grade **SAE 15W-40 for diesel engines** (e.g. Shell Rotella T Heavy Duty SAE 15W-40). This general purpose grade is recommended for use within a temperature range of 5° F to 104° F

The Engine Lubricating Oil should have an API Classification of CD or better. Be careful not to allow dust and water enter the lubricating oil. Clean around the filler port before refilling.

Do not mix lubricating oils of different types or brands. Mixing may cause the chemical characteristics of the lubricating oil to change and lubricating performance to drop, reducing the engine's life.

Lubricating oil supplied to the engine will undergo natural degradation with time even when the engine is not used. Lubricating oil should be replaced at the specified intervals regardless of whether the engine is being used or not (every 100 hours or the end of each season).

Check the Yanmar owner's manual for recommendations on grades of oil to use. Using other than the specified lubricating oil will lead to seizure of parts, abnormal wear, and shorten engine life.

**Oil Filter** – The Yanmar 3YM30 engine uses **Yanmar oil filter part # 119305-35151**. (This same oil filter is also used by Yanmar's 3GM and 2GM engines.)

The 3YM30 with KM2P-1 **engine oil capacity is 3.0 quarts (2.8 L)**. Do not overfill. Overfilling will cause oil to be sprayed into the cylinder and lead to engine problems.

When the engine has not been used for a long period of time, lubricating oil will not be distributed to all of the operating parts. Using the engine in this condition will lead to seizure. After a long period of disuse, distribute lubricating oil to each part by cranking the engine in accordance with the following procedures before beginning operation.

1. Open seacock.
2. Put remote control lever in NEUTRAL.
3. Put the key into the key switch. Turn the key to the ON position,
4. Push the stop button on the instrument panel continuously while cranking.
5. Continue cranking for about 5 seconds. (If you remove our hand from the stop button while cranking, the engine will start.)

**Marine Gear (Transmission) Lubricating Oil** – The Marine Gear Lubricating Oil should have an API Classification of CD or better, SAE #20 or #30-weight regular engine oil. Do not use Dextron III transmission fluid.

The filler port cap and dipstick for the marine gear lubricating oil are combined in a single unit and is located on top of the transmission on the aft side of the engine, where the prop shaft attaches. Fill oil to the upper limit on the dipstick. The capacity is quite small. Be careful not to overfill. Insert the dipstick fully (without screwing it down) to check the level. Tighten the filler port cap securely by hand when done.

The 3YM30 with KM2P-1 **marine gear oil capacity is 0.64 pints (0.3 L).**

### 7.1.2 Engine Maintenance Intervals

The following engine maintenance intervals were copied from the Yanmar 3YM30 owners manual.

Before starting	<input type="checkbox"/> Check fuel level <input type="checkbox"/> Check crankcase lube oil level <input type="checkbox"/> Check transmission lube oil level <input type="checkbox"/> Check cooling water level <input type="checkbox"/> Check the alarm lamps and devices	
Initial 50 hours	<input type="checkbox"/> Replace the crankcase lube oil <input type="checkbox"/> Replace the crankcase lube oil filter <input type="checkbox"/> Replace the transmission (marine gear) lube oil <input type="checkbox"/> Adjust the alternator belt tension <input type="checkbox"/> Adjust the intake / exhaust valve clearance	
Every 100 hours	<input type="checkbox"/> Replace the crankcase lube oil <sup>13</sup>	
Every 250 hours or 1 year	<input type="checkbox"/> Drain / check the fuel tank <input type="checkbox"/> Replace the fuel [filter] / water separator <input type="checkbox"/> Replace the crankcase lube oil <input type="checkbox"/> Replace the crankcase lube oil filter <input type="checkbox"/> Replace the transmission (marine gear) lube oil <input type="checkbox"/> Check the impeller of the seawater pump <input type="checkbox"/> Clean the element of the air intake <input type="checkbox"/> Clean the exhaust / water mixing elbow <input type="checkbox"/> Clean the breather pipe <input type="checkbox"/> Adjust the alternator belt tension <input type="checkbox"/> Check the wiring connectors	
Every 1,000 hours or 4 years	<input type="checkbox"/> Replace the alternator belt <input type="checkbox"/> Replace the water pump belt <input type="checkbox"/> Replace the impeller of the seawater pump Have dealer:	

<sup>13</sup> Though not called for in the owner's manual, it is good practice to change replace the oil filter every time the oil is changed.

	<input type="checkbox"/> Check the injection timing <input type="checkbox"/> Check the injection spray <input type="checkbox"/> Clean and check the water passages <input type="checkbox"/> Inspect the diaphragm assembly <input type="checkbox"/> Retighten all major nuts and bolts <input type="checkbox"/> Adjust the intake / exhaust valve clearance	
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## 7.2 Fuel System

The 35 LRC is equipped with a completely redundant fuel system that is managed through a central Fuel Control Panel located on the forward bulkhead of the port side cockpit locker.



This panel incorporates three-way switching or valves that allow one to easily switch from one fuel delivery system to another. The panel allows one to choose which filter system to use with which tank and offers easy access to all filters, gauges, and controls. Additional features are a coarse fuel filter to trap large contaminants in the fuel before they reach the primary filters, a vacuum gauge indicator of when a filter element needs replacing, and an electric fuel pump. A schematic of the Fuel Control Panel is included in the Diagrams section.

**Primary Filter / Water Separator** – The primary fuel filter / water separators are **Racor model 500 MA**. The fuel ports are 3/4" – 16 UNF and feature the SAEJ1926 O-ring seal design. The see-thru collection bowl allows the operator to check for water and solid contamination at a glance. There is a pet-cock at the bottom of the bowl for draining any water that accumulates.

The Racor 500 series filter elements are sold in three sizes which are color-coded:

1. 30-micron (coarsest), model # 2010PM-OR
2. 10-micron (medium), model # 2010TM-OR (blue)
3. 2-micron (finest), model # 2010SM-OR (brown)

Though 10-micron filters are normal under most circumstances, Caliber ships the 35 LRC with 2-micron filters for added protection. Spare filters should be carried on board as spare parts for general maintenance purposes.

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In line with the filters is a Racor Vacuum Gauge Kit (part # 1606B) that measures resistance in the hoses (how much force is required to suck the fuel through the filters). It is mounted inconveniently on the port (outside) edge of the fuel control panel, so one almost has to climb into the locker to read it, rendering it somewhat useless. This can be used to tell when the fuel filters need replacing. The reading will vary from boat to boat. One should monitor the gauge. Eventually it will peak and the engine may start showing signs of not getting enough fuel. As a rule this will be in the 7 – 10 inHg (inches of mercury) range. The gauge should be marked at or slightly before this peak. This is when the filter should be changed.

**Replacing the Primary Fuel Filter Element** – Generally speaking / for normal pleasure boat use, the primary fuel filter should be changed at the end of each season. Assuming you've only used one of the two filters during the season, you need only replace the one that has been used. If the boat is being used more heavily, change the active filter every 150 hours.

**Materials Needed** – A replacement filter element (comes with replacement gasket and O-ring), a container in which to place the old filter (the cut-off bottom of a gallon jug such as those used for non-toxic antifreeze works well), and paper towels.

- Run the engine for 5 – 10 minutes in neutral to make sure it is warm and will re-start easily, particularly if you're changing the filter in cold weather. Turn the engine off before changing the filter.
- Remove the T-handle and lid of the Racor 500 MA canister.
- Using the element bail (the handle at the top of the element cartridge), carefully remove the contaminated element with a twisting motion and discard.
- Install the replacement element by positioning it over the return tube and pushing the element down until it bottoms.
- Top off the canister by pouring clean diesel fuel into the filter cavity until full. (This step is optional. If you don't have a small container of clean diesel It's OK to skip it.)
- Remove and discard the old lid gasket. Use a paper towel to clean the seal gland of any dirt or debris. Lubricate the new lid gasket with clean diesel fuel prior to installation.
- Remove and discard the old T-handle O-ring. Use a paper towel to clean the O-ring gland of any dirt or debris. Lubricate the new O-ring with clean diesel fuel prior to installation
- Replace the lid and T-handle and hand-tighten.

#### **Draining Water From the Water Separator –**

- The see-thru collection bowl allows the operator to check for water and solid contamination at a glance. A drainage pipe comes off the bottom of this collection bowl, through a protective bowl at the bottom of the unit. This drainage pipe has a small in-line [yellow] pet-cock and the end plugged. To drain any water in the bowl:
  - Use a Crescent wrench to unscrew and remove the brass plug from the end of the drainage pipe.
  - While holding a small container at the outlet of the pipe (if you've just changed the oil, an empty 1-quart oil container works well), open the pet-cock and allow the water to discharge.
  - When finished, close the petcock and replace the plug.



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**Note: The glass collection bowl and metal protective bowl are connected as a single unit. Do not attempt to take them apart.**

**Secondary (On-Engine) Filter** – A small secondary fuel filter is mounted on the front starboard side of the Yanmar 3YM30 engine. It is part of the engine. The fuel filter elements are inside a cup which is held upwards onto the engine by a threaded ring which falls down around and off the cup when unscrewed.

**The fuel filter element for the Yanmar 3YM30 is Yanmar part # 104500-55710.** (This same element is also used by the 2GM and 3GM.) This is somewhere between a 7 and 10 micron filter. (Yanmar is unclear on this point.) Therefore, if 2-micron elements are used with the primary Racor filter(s), the engine-mounted fuel filter should not get particularly dirty. Though one generally changes the fuel filters at the end of each season, you may find that you can get away with changing this second filter every other season, assuming normal weekend pleasure boat usage and that the primary filter is changed each year. That said, don't ignore this filter element, as it can corrode over time if water gets into its bowl.



**Replacing the Secondary Fuel Filter Element** – Materials Needed – A Yanmar replacement fuel filter element, a container in which to place the old filter and catch any spilled fuel (the cut-off bottom of a gallon jug such as those used for non-toxic antifreeze works well), and paper towels. A small strap wrench or a large flat-head screwdriver may also come in handy (to loosen the retaining ring).

- Run the engine for 5 – 10 minutes in neutral to make sure it is warm and will re-start easily, particularly if you're changing the filter in cold weather. Turn the engine off before changing the filter.
- Place several paper towels under the fuel filter cup as there will be some spillage when you open the cup.
- Unscrew the outer ring of the fuel filter cup. Note that this ring is screwed on with the bottom facing upwards, so you unscrew it in the same direction you would unscrew a ceiling light bulb. The outer ring will drop down and off the filter cup. As soon as the ring parts, the cup will also drop from its mount on the engine. So, be prepared to hold it steady to minimize fuel spillage.

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- Slowly lower and remove the cup setting it upright (in a container you've reserved for the purpose) in order to preserve the fuel inside if the fuel is clean. If the fuel is dirty or there is water in the bottom of the cup, discard it.
  - Pull the old element off its stem and discard.
  - Install the replacement element by pushing it firmly into place over the stem.
  - Use a paper towel to clean the threads at the top of the cup of any dirt or debris. Inspect the lid gasket and replace if necessary. (Unfortunately, Yanmar does not supply a replacement gasket with the filter.)
  - Use a paper towel to clean the threads of the ring of any dirt or debris.
  - Replace the cup and lock it into place by screwing back on the outer ring until hand-tight.
  - Turn on the engine and run for 10 minutes. If there is air in the fuel line, it may cause the engine to cut off. Use the bleed screw on top of the engine's filter canister to remove any air in the line. Air in the fuel line will be visible as small bubbles. The Walbro electric fuel pump (next to the primary filters) can be used to assist. There is also a small finger-operated lever at the side of the engine's fuel pump that can be used to manually pump the fuel. When the fuel seeps clear out of the bleed screw, the air has been removed from the line. Immediately re-tighten the bleed screw. Re-start the engine and run it in neutral at partial throttle for 10 minutes to make sure the fuel line is clear of air and everything is functioning properly.

### 7.2.1 Fuel Tanks

The 35 LRC has two fuel tanks with an advertised combined capacity of 120 gallons. Actual capacity may vary a bit. 3599 has a TankTender S30-4 Four Tank System gauge for spot-checking the fill-level of each fuel and water tank. The in-the-tank tube is called a "Tank Penetration Fitting" Should one of the in-the-tank tubes break, one should replace it with a new tank penetration fitting as the tubing on the fitting is different than the tubing that runs back to the instrument / gauge. To remove the fitting, detach the connection tube, and unscrew the hex-nut top with a socket or wrench. You do not need to mess with the bedded metal plate into which it's screwed.

#### **Tank #2 should be used as the primary fuel tank.**

**Tank #2** (the primary tank) is located under the port cockpit locker. It has one inspection port on the floor of the cockpit locker under the fuel control panel. There is a cut-off valve for the fuel intake line located by the fill plate. The fill is located on the port deck over the tank. 3599 Tank #2 holds about 46 gallons.

**Tank #1** (the secondary tank) is located under the cabin sole from the bottom companionway step to just past the "L" of the settee. It has two inspection ports – one under the trashcan under the bottom step of the companionway, the second under the "L" of the starboard settee. There is also a cut-off valve for the fuel intake line under the starboard settee. This valve should be left in the off position when the tank is not being used. The fill is located on the starboard deck just forward of the gate. This is a backup tank for extended cruising. It is quite shallow and should not be used as the primary fuel tank. 3599 Tank #1 holds about 67 gallons.



When filling the tanks, in order to avoid an overflow situation it is advisable for one person to open the inspection port for the tank being filled and monitor the level while fuel is being pumped.

NOTE: Diesel tank #1 is quite shallow and has two sets of baffles, which rise from the floor of the tank. The baffles may cause the fuel to pool in different areas of the tank, depending on how the boat is sitting. As the tank empties, the chance of introducing air into the fuel line exists.



Caliber does not recommend using Tank #1 unless planning to cruise for an extensive period of time where good fuel is not readily available. This tank should be inspected before filling from empty as there may be some water from condensation over time. This can be removed by soaking it up with a towel. Leaving a towel in the tank during several sea trials (when the boat is placed on different heels) will help ensure that all water is captured. If the tank has never been filled, it is advisable when winterizing the boat, to leave both inspection ports open in order to maximize ventilation and minimize condensation buildup within the tank.

### 7.2.2 Walbro Electric Fuel Pump and Transferring Fuel Between Tanks

The 35 LRC includes a Walbro electric fuel pump. This device is multi-purpose. If left in automatic mode, it will cycle the active tank through the fuel filters, “polishing” the fuel when the engine is run. It can also be used to prime the fuel system after filter changes, or to transfer fuel between the two tanks. This is the black cylinder mounted by the primary fuel filters on the fuel control panel. It is activated by a three-way toggle switch (manual / off / auto) next to the unit.

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Walbro Marine Electronic Fuel Pump, part # 14-527U, includes switch 14-528 with 94-558 harness.

**The switch should be left in the “Auto” position by default.**

**Transferring Fuel Between Tanks** – Tank #1 is more of a shallow reservoir for extra fuel than a usable tank. Use tank #1 only when full. It is preferable to transfer the fuel into tank #2 and use it. To transfer the fuel:

1. Make sure the fuel intake valve from tank # 1 (under the starboard settee) is open.
2. Make sure that you have room in tank #2.
3. Put the supply valve on tank #1.
4. Put the return valve on tank #2.
5. Activate the electric pump. This will pump fuel from tank #1 to tank #2 through the core strainer and fuel Racor filter.
6. Be careful not to overfill tank #2.
7. Remember to properly reset the supply and return and intake valves when done.

Any fuel transfers should be performed while at dock or anchor (not on heel). It is advisable to open the inspection port on tank 2 and monitor the level as it is being filled. The pump on 3599 transfers fuel at a rate of roughly 13 - 15 gallons / hour. (Don't rely on this figure, monitor any transfers).

### **7.3 Cooling System**

Yanmar recommends that the coolant solution be changed every 500 hours or once a year whichever comes first. It is recommended that the cooling system be drained and flushed before filling. Yanmar does not recommend any additives be added to the cooling system. Purified / distilled water mixed with the approved coolant / anti-freeze is the only protection approved by Yanmar. Concentrations of the mixture should follow the recommendations of the manufacturer. **The coolant / anti-freeze must be compatible with aluminum.**

The coolant / anti-freezes that have been tested and approved by Yanmar are:

- Texaco Long Life Coolant Anti-Freeze both regular and pre-mixed, product codes 7997 and 7998. (Texaco and Shell are the same company.)
- Havoline Extended Life Anti-Freeze / Coolant, product code 7994
- Dex-Cool Long Life Coolant (\* this is the one originally used in 3599)
- Prestone Extended Life Coolant, product code AF888.

However, by their own admission, Yanmar has not performed extensive testing, so other brands may function fine.

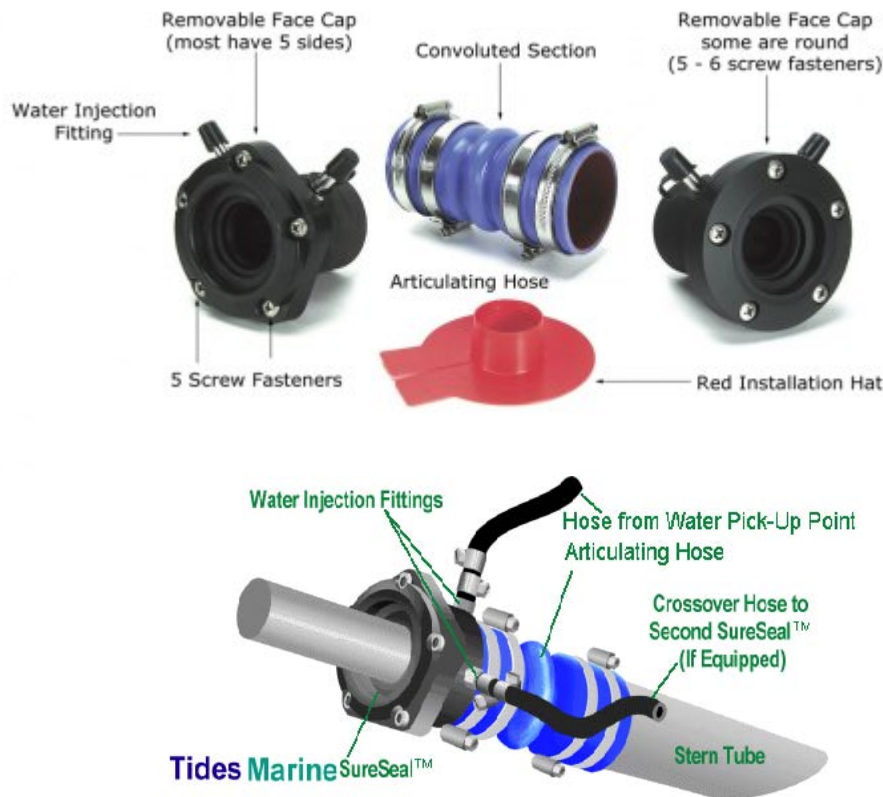
### **7.4 Propeller Shaft, Zinc, Shaft Seal, Cutlass Bearing, and Prop**

**The 35 LRC uses a 1” diameter propeller shaft.**

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**Zinc** – A 1-inch diameter collar-type sacrificial zinc should be used for the propeller shaft. When replacing the zinc, make sure there is a half-inch or larger gap between the zinc and the cutlass bearing. The dripless shaft seal is lubricated via a raw-water input and this water exits through the cutlass bearing. Be sure not to block off the cutlass bearing with the zinc.

**Dripless Shaft Seal** – 3599 is equipped with a SureSeal System Drip Free Self-Aligning Propeller Shaft Seals (dripless stuffing box) and Water Pick-up Kit manufactured by Tides Marine. According to Tides Marine, the water pickup should be checked twice a year to make sure it is producing a steady water flow. The seal itself, which is called a “Nitrile Lip Seal”, is inside the black donut-like disk at the front of the assembly. This will need to be replaced periodically (when it begins to drip much like a stuffing box). If it is replaced, a spare lip seal can be left inside a “Seal Carrier” on the shaft to make future replacement easier. A “Red Installation Cap” is included with the seal and must be used during lip seal installation to avoid damaging (scoring) the new seal. Contact Tides Marine for instructions.



NOTE: The water flow from the water pick-up exits through the cutlass bearing. It is, therefore, important to leave a ½ inch or greater gap between any sacrificial zincs and the outboard end of the cutlass bearing.

- SureSeal Shaft Seal Kit, Part # FSK-1000-1750-0
- Water Pickup Kit with 3/8 Inch Tee, Part # TK0750-3/8-.218
- Nitrile Lip Seal, Part # LIP SEAL F 1000
- Spare Seal Carrier Kit (includes lip seal), Part # KF-1000-00

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The **cutlass bearing** is manufactured by Morse Rubber LLC and is widely available, including through Port Supply (the wholesale division of West Marine).

- Morse Marine Bearing: Standard Brass Sleeve Series, part # E00800 “BONITO”, Shaft diameter = 1”, Outside diameter = 1-1/2”, Length = 4”, Metal wall = 1/8”

The cutlass bearing is a bronze tube with a rubber insert that steadies the prop within the shaft log (strut). Allen screws are used to hold the bronze cutlass bearing tube firm within the shaft log. If the cutlass bearing is replaced, you should leave about 1/2” (or a little more) sticking out. If you do not do this, it will be very difficult to remove in the future. Once the cutlass bearing is in place it should be dimpled with a drill bit (being careful not to penetrate the rubber insert) before tightening the Allen screws in place. Use blue Loctite on the Allen screws when tightening. The engine should be realigned when the cutlass bearing is serviced.

The 35 LRC uses a 3-blade 15” fixed **prop** with a pitch of 11. In order to maintain the warranty, Caliber must be contacted if a different prop is desired.

## 8 GALLEY AND FRESH WATER SYSTEMS

The Caliber 35 LRC comes with a fully functional galley that includes a gimbaled propane oven, two-burner stove, ice box, and pressurized hot and cold running water.

### 8.1 LPG Gas System

The 35 LRC is configured with a Trident Marine single cylinder L.P. Gas system that includes:

- A marine-grade Worthington Cylinders “10 lb Alum Vert w/opd 281935” 10 lb aluminum LPG tank with a type-1 (newer-style) valve and overfill prevention device that prevents the tank from being filled past the legal and safe 80% capacity, Trident Marine part # 1410-0010. The LP gas capacity is approximately 2.4 gallons. This is a standard (vertical) tank configuration and is installed in a dedicated aft, port propane locker.
- A marine LPG regulator with 300 psi pressure gauge and 1 stage, 1 port tank mount and a 3/8 FPT outlet, Trident Marine part # 1200-1411.
- A 12 volt DC brass low-pressure 3/8” FPT LPG solenoid valve, Trident Marine part # 1300-7706.2. The solenoid is mounted directly to the regulator which is connected to the tank in the propane locker. The on-off breaker for the solenoid valve is located at the nav station and is labeled “Stove”.

To operate the system, both the tank valve and the Stove breaker (solenoid valve) must be in the open / on position. The solenoid provides an added level of safety and allows immediate cut-off of gas flow from within the cabin. It draws approximately 0.9 amps of current. For both safety and battery conservation reasons, the Stove breaker should always be switched off when the system is not in use.

When a full tank is installed the pressure gauge reads approximately 150. However its reading varies depending on temperature and it is not a particularly reliable gauge of tank contents.

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The system as installed by Caliber does not include LPG gas [leak] detection. However, detection components are available through Trident and could be added in the future. A Trident Marine L.P. Gas Systems catalog is included with the parts documentation provided by Caliber.

On the 35 LRC, a spare LPG tank can be stored in the anchor locker. (Owners of earlier 35s / 33s should check for sufficient locker depth.). U-bolts can be screwed into the aft side of the locker allowing the spare tank to be bungeed in place. Because propane is denser than air, it is important that the storage location of any propane tanks vent overboard (i.e. not into the bilge).

## 8.2 Galley Range

The 35 LRC is equipped with a 2-burner LPG Force 10 gimbaled galley range model # 63251 (North American Standard), Serial # 045583.

This range uses model # 86001 pot holders that consist of separate left and right pieces that screw onto the range grill.

The interior dimensions of the oven are 14.75" wide \* 9.75" deep. It accepts a standard 9" \* 13" baking pan or cookie sheet or two standard bread pans. Larger pans won't fit.

**For the range to function, the valve on the top of the propane tank must be open AND the Stove (solenoid) circuit breaker switch at the nav station must be switched on.**

To turn on the stove, turn the appropriate knob to the ignite position (flame icon at approximately 9:00), push and hold down to ignite.

According to the manufacturer, the orifices of the burners should be cleaned periodically. To do this, remove the burner caps and, using a 7mm socket, remove the orifice from the middle (below top) of the burner. The orifice is a brass fitting with a pin sized hole that allows gas to pass through. Another thing to clean is the bottoms of the burner caps. Carbon will build up there causing a disruption in the air flow pattern. This may cause trouble with the flame.

**Trouble-shooting Ignition Spark** – Should you encounter a situation where there is no ignition spark at the burners (and due to the range's design, you will over time), you can just use a grill lighter to start the stove burners and/or oven (easy) or you can attempt to triage the problem starting with the following steps.

First replace the AA battery located under the stove door on the right side towards the front of the stove. Make sure the battery holder in good condition and well connected to the stove frame, the terminals are clean, and the red wire connecting the battery holder to the black or brown ignition box at the back of the stove is in good shape. Verify connectivity with a multimeter, if you have one.

If after this the problem still exists, note whether it is limited to one burner or all, whether the oven knob sparks (it sparks all burners, not just the oven) but the individual stove burners don't. This will help indicate whether the problem is caused by the burner-specific microswitch or microswitch harness (the two burner microswitches are daisy-chained, the oven is separate), the oven wiring harness or the ignition box (which can short if exposed to water spills). Check the microswitches first. They can be accessed by removing the control panel faceplate (pull out

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the knobs, unscrew the 2 gimbal screws, then remove the 3 screws holding the face plate from the top of the stove. The face plate pulls straight out). The microswitches are the little black boxes mounted over the knob shafts and held in place by a washer, spring and E-clip. They have small 4 tabs (2 on each side) that can be popped outwards (very carefully) so they come apart. Inside, there is a little copper plate with a small spring behind it. The copper plate tends to flatten over time, which is the problem. Taking it out and squeezing it between your thumb and finger so it forms more of an “A”, then re-assembling the microswitch may fix the problem. Be careful to look at how everything is put together and don't drop or lose any of the little springs or other pieces.

If you need to replace the ignition box, it is possible to tilt the stove on its pivot and replace the box without dismounting the stove.

If the burners light fine, but the oven does not, open the oven, pull out the rack and heat plate so you can see the spark plug and gas burner and make sure the plug is sparking properly. The gap may need to be adjusted. (Note: There are two spark plugs – the main one below and in back, and also a broiler burner on the ceiling of the oven.) Use over time may also melt the wire insulation, in which case just using a grill lighter is, by far, the easiest recourse. Replacing the wiring harness requires dismounting the stove.

### **8.3 Fresh Water System**

The 35 LRC includes pressure water pumps of the demand type. Assuming the system is powered, opening the faucet will produce water flow. Both hot and cold water is available at the Galley sink, head sink, and transom shower. Both sinks include removable spray faucets to facilitate cleaning of dishes, filling of buckets, or showers in the case of the head.

**See the “Pumps” section for details on the water pumps used.**

NOTE: Intermittent operation of the fresh water pump while all faucets are closed usually indicates a leak somewhere in the lines. This may be audible as a low “hum” from the pump and small associated amperage draw rather than full pump cycling. Trace the lines to locate the leak and repair. The most likely source of any leaks are the fresh-water strainers and valves located at the fluid control panel. Properly tightening all connections should solve any problems. If these are OK, check the small piece of hose connecting the water pump and accumulator tank for pinhole leaks.

In addition to the pressure water system, there is a cold-water manual foot pump in the galley that is meant to be used as an emergency stand-alone system, not in conjunction with the electric water pressure system. It has a cut-off valve at the inside base of the galley cabinet.

#### **8.3.1 Fresh Water Tanks**

The 35 LRC has two water tanks with an advertised combined capacity of 100 or 105 gallons depending on what literature you read. Both tanks are located under the starboard aft quarter-berth. Each has a single inspection port. The inspection ports are located next to each other and may be accessed by lifting the quarter-berth cushion. The inspection ports should be hand-tightened firmly to create a good seal. Be careful not to over tighten.



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**Tank #1 is forward and holds 40 gallons, + or -.**

**Tank #2 is aft and holds 55 gallons, + or -.**



**The deck fills are located in the cockpit floor** and are routed, shortest possible path, directly into the tanks. The outflow and vent lines are accessible from the engine compartment. The outflow lines are routed across the top of the engine compartment to the water control valves in the port cockpit locker inboard of the fuel control panel.



The vent lines exit to the starboard side of the transom.

### **8.3.2 Fresh Water Pumps**

The potable water system uses a Jabsco Water System Pump, Par-Max 3 40-psi automatic, 31600-0592.

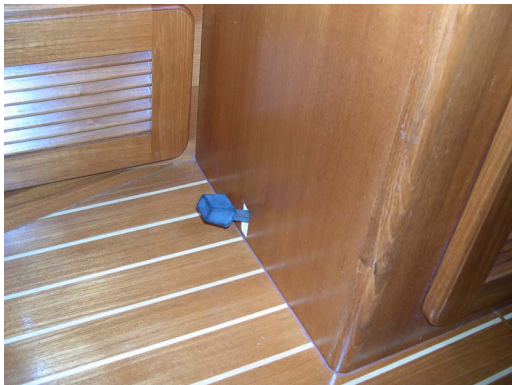
This is used in conjunction with a Jabsco Accumulator Tank, model 30573-000

Both are accessible via the port cockpit locker.



NOTE: The short piece of hose between the pump and the accumulator tank must be of a reinforced type otherwise small pin-holes may develop over time. It's also prone to developing drips by the hose clamps as it's under constant high pressure. If the pump cycles periodically (indicating a small leak), check this hose as one of your first triage steps. Carry a spare.

A Gusher MKIII Cabinet Mount Foot Pump, part # GP0550 is located at the galley. Its cut-off valve is at the inside base of the galley cabinet. This is a self-priming pump that discharges on each stroke. Its capacity is 4.3 gpm. It has 1/2" ports. It is meant to be used as an emergency, stand-alone system should the DC pump become unavailable and cannot be used in conjunction with the DC pressurization system.



To use the pump first make sure all faucets aboard the boat are turned off then open the grey on-off valve under the galley sink, next to the pump itself. This enables the small telescoping spigot to the left of the main galley sink faucet. Slowly pump the foot pedal to produce the desired water flow.

Note: If you need to drain the water tanks, opening the cut-off valve for this pump while the system is pressurized will greatly speed the outflow.

### 8.3.3 Water Heater

The 35 LRC is equipped with Force 10 model # 40601, six gallon Electric Water Heater located behind the batteries and accessible via the cockpit locker. This unit can heat water via a

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switched, internal heating element powered by 120 volt AC shore current or automatically via a heat exchanger that works with the engine when motoring.

When operating from AC shore power, the unit is turned on via a switch at the nav station. Assuming water is in the system, it is OK to leave the unit on for many hours at a time, including over night while sleeping on board at dock. However, it should be turned off (along with other equipment) when leaving the boat.

**CAUTION: Do not turn the water heater on unless you are sure the tank is filled with water otherwise you will destroy the heating element.**

To obtain hot water from the engine, no manual intervention is necessary. Water is automatically passed through a heat exchanger. The engine must run a minimum of one-half hour for the water to heat.

3599 has a bypass valve installed on the water heater for use when for winterizing. This allows the water heater to be drained via the standard drain valve then taken off line when non-toxic antifreeze is being pumped through the water system. Before draining the tank, run an appropriately cut piece of garden hose from the gate valve at the bottom of the water heater, to the bilge drain, aft of the water heater / under the steering quadrant (or you will have a mess)

When the bypass valve lever is down, water is fed into the water heater tank. This is the normal (water heater being used) position. When the bypass valve lever up, water is cut off from the water heater and re-routed to the "out" hose / path. Again, the water heater must NOT be used (turned on) when bypassed.

The water heater must NOT be used (turned on) while bypassed or the heating element will be destroyed.

NOTE: Force 10 sold their line of water heaters and barbeques to Kuuma Products in 2006. So any parts and informational requests must now be made to Kuuma Products. (Force 10 kept and still services their line of galley ranges.)

### **8.3.4 Faucets and Transom Shower**

The galley sink uses a Scandvik Galley Mixer Faucet, Model # 10871 hand spray faucet.

The head sink uses a Grohe Sink Mixer model 31 547 hand spray faucet.

Note: After time, if you experience an apparent drop in pressure at one of the faucets, particularly at the galley faucet, this may be due to sand / grit from calcification accumulating and clogging the back of the screen insert of the faucet nozzle. You can remove the screen by unscrewing the end of the nozzle with a crescent wrench. (Be careful not to drop the spring down the drain.) Clean it under running water with an old toothbrush then reassemble.

3599 is configured with a SCANDVIK brand recessed transom shower with hot and cold water mixer valve. This is a factory-installed upgrade from Caliber's standard cold water -only configuration. The toggle mixer valve is somewhat less than intuitive.

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- **On** – pushed over to starboard
  - **Off** – pushed over to port
  - **Hot** – turned clockwise
  - **Cold** – turned counter-clockwise (opposite of a household shower)

**WARNING: Care should be taken with the hot water setting. Running the engine will leave the water near boiling and there is a very real burn risk.**

The spray head (push-button valve) should be serviced cleaned and lightly lubricated with silicone grease) periodically. The head is unscrewed from the spray-hole side using a coin.

Replacement caps or other parts can be ordered directly from Scandvik by calling their customer service # (even though their website directs you to 3<sup>rd</sup> party vendors). Although the shower head and valve caps look the same, they are slightly different sizes.

[http://www.scandvik.com/index.cfm/method/Shopping\\_list/CatId/128/startrow/19.htm](http://www.scandvik.com/index.cfm/method/Shopping_list/CatId/128/startrow/19.htm)

- SCANDVIK recessed shower with 6' nylon hose, part # 10750
  - Replacement cap with the Scandvik logo, part #10030
- SCANDVIK hot and cold water mixer valve – white, part # 10498
  - Replacement cap with shower symbol, part #10252
- The sprayer itself (alone) is part # 10283. SCANDVIK publishes a .pdf on how to take it apart and clean it.

Note: SCANDVIK has a new and improved cup and cap system with a hinged lid that can be substituted with the one that came with the unit. The part # is 12104. 2 of the 3 screw holes line up. However, it requires a slightly larger hole, so some grinding (enlargement) of the existing hole would be required if one chooses to install it.

### **8.3.5 Water Treatment**

Several steps can be used to keep drinking water safe and tasting “sweet”.

1. When empty, the tanks should be inspected and wiped clean via the inspection ports to remove any slime or debris.
2. In order to eliminate well-water related impurities that may come in via a marina hose, a threaded water filter may be attached to the hose when filling the tanks. A garden-hose on-off fitting available from any hardware store can be attached to the end of the water filter to allow the filler to shut off the water flow as soon as the tank is full. An example of such a filter is the SHURflo WaterGuard filter, model RV-210GH-A, which is available through most marine chandleries.



3. A small amount of non-scented household (chlorine) bleach should be added to the water in the newly filled tanks to kill off any organisms. The ratio to use is 1 teaspoon (1/6 oz.) per 10 gallons of water.
4. If you boat in an area where water iron or sulfur content is high, or if you're particularly sensitive to water taste, a separate water filter and associated spigot can be installed at the galley sink for drinking water.

3599 uses has a General Ecology Seagull IV X-1F drinking water purification system installed by Caliber at the Galley sink.

The replacement filter cartridge for the Seagull IV X-14F is part # RS-1SG. A Seagull-compatible filter is sold under the name "The Purest One" TP-1 Replacement Filter. It is manufactured by Clean Drinking Water Systems Inc., a company founded by a former Seagull employee. Their filter was designed by the same person who designed the Seagull filter but sells for 2/3 the price.

NOTE: The filter element MUST be removed before the boat is winterized / before anti-freeze is flushed through the water system. It can be used multiple seasons.



**Shocking the Water System** – Depending largely on how long a boat has been left unused, it may be desirable to “shock” the water system by flushing all the piping with a bleach-water solution to kill off anything growing within.

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To shock the water system<sup>14</sup>:

1. Remove the galley sink water filter.
2. Add 1 oz. of household bleach per 10 gallons of water.
3. Run all faucets until a strong chlorine smell is evident.
4. Let stand for 2 – 4 hours
5. Run all faucets to drain tanks.
6. Fill as normal using the purification steps in the earlier section.

## 8.4 Ice Box

The 35 LRC is equipped with a 6.3 cubic foot ice box that is insulated with 4 inches or more of expanded foam and has a spring-supported lid. There is no drain for melted ice. It must be manually drawn off via the pump at the galley sink. This ensures that ice box impurities are flushed directly overboard and do not generate odors in the bilge.

**Ice Box Pump** – The galley sink ice box pump is a Whale V-pump Mk.6 GP0650

**Spring** – The ice box lid uses an 8.5” spring manufactured by Moonlite Marine (part #0045-2 small). The same spring is used for the top companionway step and the chart table top.

Many owners choose to add mechanical refrigeration to the ice box. There are many configurations, but consider using the space under the dry locker by the galley sink as an out of the way option for associated equipment.

**Using an Ice Box Effectively** – An ice box can be used to refrigerate food effectively for many weeks. The key to doing so is to properly build and maintain an ice block core. The 35 LRC’s ice box is well designed for this. It is divided into two levels with a removable, split Lucite shelf separating the top level from the bottom. When cruising for longer periods of time, the lower level should be tightly packed with block ice, minimizing any air voids. Solid block ice is preferable to blocks created using cube ice immersed in water and re-frozen. However, both will work. (We build make our own ice blocks using plastic shoeboxes in our garage fridge.) Any foods that can be, should be frozen ahead of time and placed around the outside and on top of the blocks. Cube ice should then be poured over top and around the blocks filling all voids and raising the ice level to the level of the shelf or slightly above being careful not to bury food so deeply it cannot be retrieved. One should be aware that the separate blocks may fuse together over the course of several days / weeks, so sliding items between blocks may result in their becoming encased in the ice. This is why it is best to keep items on the outside and top of the blocks. Once this ice “core” is created, the cube ice and shelves will keep air flow and melting to a minimum. This core should be maintained by topping it up with cube ice every few days and pumping out any melt-water once a day. If this is done, the ice core should keep for several weeks or more.

Note: It is important to be careful not to contaminate the ice core with any spills. This is particularly true of milk. Only a few drops of milk will soon generate extremely bad odors that will permeate the entire ice box and may affect the taste of foods within. Milk and other liquids should be kept in liquid-tight containers that can safely fall on their sides.

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<sup>14</sup> Source: “RV / Marine Pure Water Tips” from General Ecology Incorporated

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## 9 HEAD & HOLDING TANK

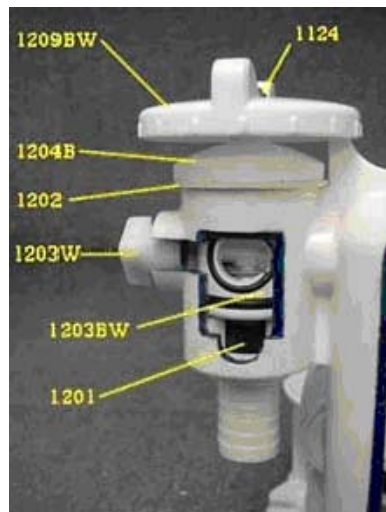
The Caliber 35 LRC is shipped with a Raritan PH II Manual Marine Toilet (“head”).

To use the head, place the lever in the “wet” position for flushing and pump until the bowl is thoroughly cleaned. Continue with several more full strokes to flush the discharge lines. Return the lever to the “dry” position and pump slowly until the bowl is empty. Repeat if necessary. When not in use, the lever **MUST** be left in the “dry” position to prevent flooding.

**Only human waste and a minimal amount of toilet paper should be flushed through the system - Nothing else! Wipe with 3 – 4 squares at a time. While it’s OK to use multiple sets of 3 – 4 squares, using larger (“mummy hand”) size wads may cause a clog. Always use paper sparingly with a marine head.**

An extra joker valve and some silicone grease should be carried as spare parts. If cruising for longer periods of time, it’s a good idea to also carry a full pump re-build kit.

Maintenance – There is little to maintain on this head. Raritan recommends that a little silicone grease be applied to the piston rod periodically. If the “Dry to Flush” valve (part # 1029BW) becomes squeaky and hard to turn it can be disassembled, cleaned, and some silicone grease applied to its O-rings. Disassembly is performed by turning the inlet valve cap (part # 1024B) counter-clockwise about 5 turns and pulling the entire assembly upwards. (You don’t need to touch the screw on top of the dry-flush valve.) Be sure the through-hull is closed before doing this. Reassemble in the reverse order making sure that the alignment post of the 1200CW housing protrudes between the two limiting stops in the underside of the 1209BW. This allows for the proper position of the inlet valve. If installed properly this creates a maximum of a 1/4 turn from “Dry” to “Flush” not 3/4 turn. Do not over-tighten #1204B



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**Y-Valves and Thru-Hulls** – The raw-water thru-hull for the toilet is located at cabin sole-level inside the head sink cabinet. The anchor raw-water wash-down pump also draws from this thru-hull.



The toilet pumps out through a “Y” valve located under the v-berth on the starboard side (aft bulkhead). The discharge thru-hull is also located under the v-berth on the starboard side.



Note: To comply with U.S. inland and coastal (within 3 miles of shore) regulations the Y-valve must be tie-wrapped in the “to the holding tank” position. There is a small hole in the valve handle to facilitate this. The Coast Guard will check this if you are boarded and will issue a citation if the Y-valve is not secured. (Boaters we’ve spoken to who have been boarded say they usually just flush a dye pack down the head to see if it flushes overboard.)

**Holding Tank** – Like the water and fuel tanks, the holding tank is built and glassed into the hull itself. It occupies the forward-most bow of the boat under the v-berth and doubles as a collision pocket. **The capacity of the holding tank is ~44 gallons.** 3599 is equipped with a Dometic brand TankWatch Level Monitor System that was installed at the factory. There is a warning light at the nav station that comes on to provide a warning when the tank is nearly full. When not at least 3 miles off shore, U.S. law requires waste to be pumped into the holding tank and disposed of properly (e.g. at a pump-out station). **The pump-out port is on the starboard side of the deck at the bow (by the anchor locker).** On some earlier 35s / 33s it is inside the anchor locker.



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When not using the head for over a week, flushing at least two gallons of fresh water through the marine toilet bowl will help reduce odors and extend the life of the parts. Flushing (rinsing) the holding tank with fresh water at the end of each pump out will also help reduce odors.

There is a metal inspection plate for the holding tank (of the same type used for the fuel tanks) behind the little board / bulkhead at the foot of the v-berth (bow). The board must be pulled out bottom first.

**Hoses** – The hose used is Shields 1 ½” Sanitation Hose, #101, made in Italy. This is a medium-to-high-end hose. When new, it can have a strong chemical rubber odor that does not dissipate well with time in the enclosed v-berth cavity. Vent the v-berth by flipping the cushion up and opening the wooden cover plate when the boat is not in use. If the hoses are replaced, consider using a different hose (and don’t skimp on price). Caliber and others now recommend Dometic Sanitation Systems (VacuFlush®) “OdorSafe Plus Sanitation Hose” as being the “best” on the market. Another hose that gets good ratings is Trident Sani Shield Sanitation Hose #102. However, the Trident hose may also have a rubber smell.

## 10 PUMPS

All pumps should be checked frequently to insure proper operation. This is an especially important regular maintenance item since functioning of a pump could save your vessel from serious damage at some future time.

Inspect all hoses for chafing and dry rot. See that hose clamps are tight and hoses are double-clamped where appropriate. Check that the pump impeller area is clean and free of obstructions. Inspect electrical wiring for corrosion.

### 10.1 Primary Bilge / Shower Sump Pump

The primary bilge pump, which doubles as the shower sump pump, is a Jabsco 37202 Series, model 37202-0000 Electric Bilge Pump (main / shower sump), 4.5 gpm open flow. It is activated either automatically by a Groco AS-100 Bilge Pump Control Kit (diaphragm water-level switch) or manually by the “Sump Pump” switch on the main DC panel. These two switches are on separate circuits.

The Groco AS-100 Bilge Pump Control Kit is mounted under the starboard settee. It uses a 10 amp, 3/4" long, 13/16" diameter, in-line fuse which is located in the AGC fuse block under the cockpit, next to the Next-Step voltage regulator (see the Diagrams section).

NOTE: Extra fuses should be carried as part of a basic spare parts kit.

Water is drawn from the sump pump well in the bilge through a 1-way ball valve at the end of the intake hose (bottom of the sump pump well), through a mesh strainer, and through the pump. The mesh strainer should be checked regularly and cleaned as needed. The ball valve should be checked periodically, particularly if any clogs are suspected, as it is susceptible to being jammed by schmutz in the bilge.

Instructions for adjusting the Groco AS-100-6 bilge pump switch: There is a small white plastic dial near the top of the switch. When you turn it counter-clockwise it will rotate up on the

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spindle. This will make the unit more sensitive. If you want it less sensitive, turn the dial clockwise (rotate it down the spindle). Only rotate the dial 1/8 to 1/4 of a turn. It only takes the slightest movement to have results. Keep rotating it in small intervals until you feel it is adjusted to what you want. Caliber adjusts the switch to a high degree of sensitivity so just the slightest bit of water in the sump sets it off.

Note: It is important to keep the bell mouth of the switch's tube dry. If the boat is sailed in an area with seasonal temperature fluctuations and the mouth of the tube is submerged, one can encounter a situation where the air inside the tube contracts, drawing a bit of water into the opening. If this happens the switch may not trigger the pump until an excessive amount of water builds inside the bilge. If this occurs, use the sump pump switch at the nav station to manually trigger the pump, then either dry out the sump well enough for the tube to drain and clear or unscrew and clear the tube. Be sure to also periodically clean the mesh strainer

WARNING: The Main DC Emergency Cut-Off switch under the companionway steps must be turned to OFF when the boat is hauled over the winter so that the bilge / sump pump is disabled. If this is not done, rain water that comes down the mast the mast may enter the mouth of the Groco bilge pump switch's tube and freeze overnight, creating a plug. When the air warms during the day, it will expand without being able to escape and will trigger the diaphragm switch causing the pump to run. This could cause the fuse to burn out, the pump to fail, and/or the batteries to run down.

## 10.2 High-Capacity Emergency Bilge Pump

The 35 LRC is equipped with an Atwood Heavy Duty [emergency] Bilge Pump 2000, model # HD2000, part # 4080. This is a 2000 GPH, 12 volts DC unit with a 12 amp fuse. The inside diameter of the outlet hose is 1 1/8". It is located in the main bilge just aft and port of the mast step. The pump is activated either automatically by a Groco AS-100 Bilge Pump Control Kit (diaphragm water-level switch) or manually by the "Bilge Pump" switch on the main DC panel. These two switches are on separate circuits.

The Groco AS-100 Bilge Pump Control Kit (switch) is mounted under the starboard settee. It uses a 15 amp, 3/4" long, 13/16" diameter, in-line fuse which is located in the AGC fuse block under the cockpit, next to the Next-Step voltage regulator (see the Diagrams section). Instructions for adjusting this switch are in the Primary Bilge / Shower Sump Pump section above.

NOTE: Extra fuses should be carried as part of a basic spare parts kit.

## 10.3 Manual Bilge Pump

The 35 LRC includes a manual bilge pump permanently mounted in the aft port side of the cockpit. **The handle is stored in the engine compartment and is accessible via the top step.** The pump is a Whale Gusher Titan Thru Deck/Bulkhead Bilge Pump model # BP4410. It has 38 mm (1 1/2") smooth bore hose connections and pumps up to 105 liters (28 U.S. gallons) per minute.

The rebuild kit is part # AK4400 (Neoprene). It contains diaphragms & valves.

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## 10.4 Manual Holding Tank Pump-out

The 35 LRC includes a manual pump that can be used to empty the contents of the waste holding tank overboard (subject to applicable regulations). It is mounted underneath the v-berth towards the center from the y-valve.

The pump is a Whale Gusher Urchin model # BP9005. It has 38 mm (1 1/2") smooth bore hose connections and pumps up to 43 liters (11.4 U.S. gallons) per minute.

The rebuild kit is part # AK9003 (Neoprene). It contains diaphragms, valves & circlips.



## 11 LIGHTS

### 11.1 Running, Steaming, Anchor, and Deck Lights

**Running Lights** – There are two sets of running lights on 3599 – the standard, deck-level running lights and a separate tri-color set at the top of the mast. The standard, deck-level lights are for use in normal Bay and coastal conditions. The mast-head lights are intended for use off-shore where wave heights may limit the visibility of the deck-level lights. It is not legal or possible to use both sets at the same time. There is a toggle switch on the DC panel by the nav station that switches between the two (down = deck-level lights, up = mast-head lights).

**Strobe** – The masthead lights include a strobe. This is for emergency use only to help with location of the vessel. The strobe is activated by a separate circuit breaker / switch at the main DC panel

Aqua Signal Series 40 Navigation Lights are used for all of the running lights and the anchor light / strobe. These include:

1. Bi-Color red-green (bow) running light, Aqua Signal part # 40100-7
2. Stern 12 pt. white running light, Aqua Signal part # 40500-7
3. Masthead (Steaming) Light, Aqua Signal part # 40400-7
4. Tri-Color, Anchor, Strobe (top of mast) running lights, Aqua Signal part # 40806-7

The Aqua Signal Series 40 lights all use a common bulb: 25w / 12v Aqua Signal part # 99W 90002-7.

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**Anchor LED** – 3599 uses a LED replacement bulb for the Aqua Signal Series 40 anchor light that is manufactured by a company named “Dr. LED” and sold as the Polar Star 40. The Polar Star 40 is a bayonet bulb the same size and shape as the OEM Series 40 incandescent bulb it replaces. It appears to be as visible at night as the original incandescent. However, it gives off a noticeably blue-white light vs. the yellow-white of the incandescent bulb. The original incandescent anchor light bulb draws about 1.3 amps per hour. The Dr. LED Polar Star 40 LED bulb draws about 0.1 amps.

NOTE: Unlike cabin lights, anchor lights have USCG mandated visibility requirements (2 miles for the Aqua Signal 40 / all-around lights on boats under 50 meters). There could, therefore, be legal ramifications if you change the bulb, it doesn’t function according to USCG required specs, and you are involved in a collision. I emailed Dr. LED and asked them if their Polar Star 40 bulb was USCG approved. Their response was hazy – ‘in general, no third-party replacement bulbs are USCG approved. However, according to preliminary data from an independent USCG approved lab the White Polar Star 40 and White Polar Star 25 will be USCG 2nm approved for use with aqua signal series 40 and series 25 all around lights respectively in accordance with the USCG COLREG 1972 (IMO) standards and the navigation light regulations of ABYC A-16, which is, to our best knowledge, the equivalent of MCA type approval as both USCG, MCA, and others certify a product complies with the requirements of IMO Conventions.’ This isn’t a clear “Yes”. (It isn’t clear period.) I take it to mean that they’ve done some testing and believe it’s OK, but you accept the risk if it isn’t. USCG approval is obviously something to consider and the status is worth following up on as time passes.

**Deck Light** – 3599 has a single deck light mounted on the front of the mast. This is activated by a separate circuit breaker / switch at the main DC panel.

The deck light is part of the standard spar equipment package installed by Selden. According to Selden’s operations manager, it uses a tractor bulb that should be widely available.

## 11.2 Cabin Lights

Dual color ceiling dome cabin lights are standard throughout the entire interior. Flipping the “on” switch one direction turns on standard clear bulbs for when anchored out or docked in port. Flipping the “on” switch the other direction activates red bulbs for saving one’s sight at night.

NOTE: It is a good idea to configure all lights so that red and white activated are by flipping the toggle in the same directions. If one or two lights are different, this can be corrected by opening the light and switching the bulbs.

### Ceiling Dome Lights –

Whitewater Marine Dome Lights, part # 2124SD

Clear bulb, part # 2114, 12V, 15W

Red bulb, part # 2114R, 12V, 15W

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3599 is configured with “SensiBulb LED Light” replacement bulbs for two main salon ceiling domes. This is a strange bulb that looks like a computer heat sink with a chip and some diodes in the middle and two dangling wire connectors. It comes in both white and red. However, only the white bulbs were replaced. Because the wire connector has halogen-type pins, you must also purchase a bayonet to G4 socket adaptor in order to use it. To install it in a dome, you replace the old incandescent bulb with the adaptor and plug in the SensiBulb. It has a piece of double-sided foam tape on the back and you just stick it to the inside ceiling of the dome light then replace the cover / lens. It gives a nice warm, broad-beamed, light similar in color and area to the normal incandescent. The Fresnel lens of the dome, certainly helps. It is not quite as bright as the 15W bulb. However, it is quite good – probably the equivalent light of a 12W incandescent bulb. The 15W incandescent bulb draws about 1.2 amps per hour. The SensiBulb draws about 0.2. This was a state-of-the-art replacement bulb when they were installed. However, the technology has advanced, so if replacing, research the market.

**Swivel Reading Lights** – A & B Industries Large Swivel Xeon Chrome [Reading] Lights, part # 410411, Xenon bulb, part # G483077220W.

Note: The OEM Xenon bulbs shipped with the lights are overpoweringly bright, use a lot of power (1.7 amps) and are quite hot. There are a number of LED replacement bulb options that provide a softer, quite decent white / yellow light with much lower power consumptions (0.1 – 0.3 amps). 3599 uses the MR16 1W (30W Beam) and “G4 MR11 Magnum Ring” (older model) bulbs manufactured by “Dr. LED”.

In 2007 we tested the following bulbs:

- Dr. LED MR16 1W (30W Beam) - .2 AH draw. Natural yellow light. Somewhat focused beam, a little dim, but overall nice - the one we chose.
- Precision Lighting MRP-16 18 LED White Model 881250 - .1 AH draw. Blue white LED light. 2nd choice. But preferred the more natural beam and color of the Dr. LED.
- Dr. LED MR16 3W (60W Beam, Extra-Long) - .3 AH draw. Natural yellow light, Somewhat focused beam, too bright. Didn't like as much as others.
- Dr. LED MR 11 Magnum - between 0.1 and 0.2 amps. The first LED reading bulb we purchased. We like it. However, it has been discontinued. Unlike the newer Dr. LED bulbs, this it is a cluster type bulb. We purchased 3 (one, then two more later) and experienced quality problems with latter two – About 50% of the diodes in the clusters died, rendering them too dim to use.

**Galley Light** – A & B Industries Chrome Vanity Lights, part # 430011

Festoon bulb, part # 883710, 12V 10W

**Chart Table Light** – Hella Marine map light, part # 004532171, 12V 6W

## 12 HARDWARE

### 12.1 Portlights and Hatches

**Portlights** – 3599 was constructed with the following portlights (portholes)

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Deckhouse Port lights: Quantity 10, Vendor: White Water Marine, Part # 7085A10, Part Description: Port Open SS 5" x 12" x 1" (Sloped).

Quarter-berth – Cockpit Portlight: Quantity 1, Vendor: Lewmar, Part # 393122500 Clear, Part Description: Deck Port Light Size 1

All portlights have separate removable screens that can be stored when not in use.

**Hatches** – The 35 LRC uses Lewmar Ocean Hatches. The two larger hatches are configured with an OceanAir Mk V Recessed SkyScreen including PVCliner for Recessed SkyScreen.

The small “vent” hatches are restricted to a 90 degree opening and should not be forced beyond their “stop” position as damage to the lever mechanism may occur. Larger hatches are not self supporting beyond the vertical position and will fall fully open if unrestrained.

On 3599, the two small vent hatches under the dodger were installed facing aft at the buyer’s request because it was known ahead of time that the dodger would be installed.

The locking ventilation position is used by closing the handles into the catch block center slot.

Care should be taken not to stand on or load the hatch lid in this position as damage could occur to the handle or catch block.

Always wash the hatch with mild soap, water, and a soft cloth. Never use abrasive or solvent cleaners on the acrylic lid as this may, at a later date, damage the acrylic.

**Friction Lever Adjustment:** The friction lever units installed on Ocean hatches are pre-set when manufactured to give correct positioning with a minimum opening load. It may be necessary to occasionally adjust the lever setting to correct the operation of the hatch. Adjustment is made by means of the socket head screws on either side of the lever assembly. Using a 4mm (5/32”) hexagon key, turn the adjustment screw approximately 1/8 of a turn in the clockwise direction to increase the positioning force. This is most easily carried out in the fully open or closed positions. Do not over tighten the adjusting screws. On hatches with multiple lever units, care must be taken to adjust all levers to a similar loading. Open the hatch and check for correct operation. Re-adjust if necessary until the desired operation is achieved.

Lubricants should not be used on the friction level assemblies as this will adversely effect the function of the units.

## **12.2 Cabinet Door Latches, Door Handles and Holders**

**Cabinet Latches** – The cabinet door latches are Southco, Push to Close Fixed Latches, part # M1-2A-13-1

**Door Handles and Holders** – Two different latches are used on the Caliber 35 v-berth and head doors:

1. McCoy Portofino style [latch] with striker LI part #MA-99-170-520 (2 used)
2. McCoy Portofino style [latch] with striker RI part #MA-99-169-321 (1 used)

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<http://www.southco.com/product/class.aspx?cid=7407>

They are held open by an ABI / PRECISION LIGHTING, Model #: 351177 stainless steel door Holder, straight version for bulkhead mount.

### 12.3 Thru-Hulls

Apollo Marine Valves sea cocks and thru hulls are used by Caliber. The valves operate through 90 ° rotation of the handle from fully open to fully closed. The handle indicates the position of the valve. No lubrication is needed under normal operating conditions. However, **the valves must be cycled (opened and closed) every three months to clear the ball of marine growth.** The valves are equipped with drain port to drain water from the valve prior to freezing conditions when winterizing the boat. However, it is good practice to open sea cocks after a boat has been placed on the hard in order to allow seawater accumulation in the hoses to drain out.

## 13 ELECTRONICS

### 13.1 Raymarine E80 Radar/Chartplotter, ST60+ Depth/Speed/Wind

3599 is configured with a Raymarine networked set of instrumentation that was installed in late October and early November 2006. It includes the following components:

- Raymarine E80 – E-Series Networked Display (Radar / Chart Plotter), part # E02011, serial # AE020110760139
- Raymarine RD218 – 18" 2kW Radome Scanner, part # E52065, serial # AE520650760279
- Raymarine Raystar 125 GPS Sensor (integrated antenna & receiver), part # E32042, serial # AE320420661353
- Raymarine P/Finder Smart Heading System, part # E12102, serial # AE121020760099
- Raymarine ST60+ Wind & Close Hauled Wind Instrument, part # A22012-P, serial # AA22012-P0660611
- Raymarine ST60+ Tridata Instrument, part # A22004-P, serial # AA22004-P0561523
- Raymarine ST60+ Graphic Display, part # E22075-P, serial # AE22075-P0660309
- Raymarine E26030 D800-P17 Retractable Thru-Hull Depth & Temperature Transducer (no serial # listed)
- Raymarine E26031 ST800-P120 Retractable Thru-Hull Speed & Temperature Transducer (no serial # listed)
- Raymarine SeaTalk High-Speed Bus (pre-wired to nav station for future expansion, but not currently used)
- Questus 500G Gambled Radome Mount
- NavPod GP1170 Instrument Housing
- Navionics Platinum Chart #905P – US Mid Atlantic & Canyons, serial #000000275268

In August 2014 the Thru-Hull Speed & Temperature Transducer and the ST60+ Masthead Wind Vane Transducer were both replaced by Marine Technical Services (MTS).

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The overall system connections are documented in the Diagrams section of this manual.

The E80, Tridata, and Wind displays are mounted at the binnacle. The following cables run down each of the pedestal guard legs.

Port Leg:	Starboard Leg:
<ul style="list-style-type: none"><li>• Radar = thick white. Runs to junction box at forward bulkhead under starboard settee via the quarter-berth cable run.</li><li>• Simrad Autopilot = Light gray 6-strand. Runs to J300X located in the port cockpit locker.</li><li>• Power cable for E80<sup>15</sup> = Yellow + Red. This cable is blue-sheathed in the cable runs. The sheath was removed for the portion that goes up the pedestal guard leg to reduce its size. Runs to the nav station via the quarter-berth cable run.</li><li>• iCom RAM Mic Jack = Black. This is an extension cable that has a connection inside the half-loom just behind the access panel in the aft of the quarter berth. From there it runs to nav station and the back of iCom VHF.</li><li>• SeaTalk = Black. Runs to the nav station via the quarter-berth cable run.</li><li>• Wind = Black 5-strand. Runs to the mast top via the quarter-berth cable run and starboard settee.</li></ul>	<ul style="list-style-type: none"><li>• Depth = black. Runs to the V-berth via the quarter-berth cable run, starboard settee, and head.</li><li>• Speed = black. Runs to the V-berth via the quarter-berth cable run, starboard settee, and head.</li><li>• Two engine control cables, transmission and throttle, also run through the lower half of this leg. Both are black.</li></ul>

The Raystar 125 GPS (integrated antenna and receiver) is mounted on the aft starboard rail. The cable runs to the nav station via the quarter-berth cable run. The GPS is interfaced with the network using NMEA (rather than SeaTalk) so that it can also provide the iCom VHF with position information for its DSC functionality.

A Graphic (multi) display is mounted at the nav station and networked into the system. The Radome is mounted on the mast via a Questus 500G gimballed mount. It is affixed to the unit with M-8 (metric 8) 3.5 cm long stainless steel bolts with locking washers. The radome cable runs through a conduit pre-installed in the mast for this purpose to a junction box located on the forward bulkhead under the starboard settee.

The E80 could not easily be made to interface with the current Simrad AP11 autopilot<sup>16</sup>. Consequently a Raymarine Smart Heading System with its own fluxgate compass was installed.

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<sup>15</sup> The Tridata and Wind instrument displays are powered through the SeaTalk bus.

<sup>16</sup> The AP11 control head is hard-coded and can not be upgraded to a newer software release. Although it is possible to upgrade the EPROM of the Simrad J300X junction unit, such an upgrade will not allow the AP11 to



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**The Smart Heading control box is located on the aft bulkhead underneath the starboard settee. The Smart Heading System's fluxgate compass is mounted under the V-berth under the starboard access board, near the holding tank pump.**

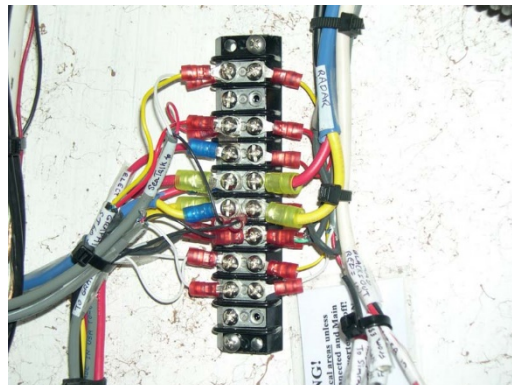
Note: The compass must be linearized (calibrated) in a sea trial after it is either installed or moved. This entails running the compass setup – linearize compass option from the E-80 display (Menu – Linearize Compass) while performing very slow (e.g 3 minute) circles on a calm day. The linearization function will automatically calculate the compass deviation. This must be between 1 and 15 degrees, preferably below 10 degrees – the closer to 1 the better.

Note: Steel objects (such as canned food) should not be stored next to the compass.

Note: If the compass fails, disconnecting power to it will cause the GPS to take over, pick up the boat direction and reflect it on the display, but only if the boat is moving.



A terminal block is used to organize the wire connections. This terminal block is located behind the nav station panel. The connections are documented in the *Diagrams* section of this manual.



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interface with the Raymarine system. NMEA output wires are run from The J300X to behind the nav station, but are not currently terminated.

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Note: The Raymarine system has only two NMEA interfaces – one at the back of the E-80 display at the binnacle and one at the back of the Graphic (multi) display at the nav station. The GPS uses the “NMEA in” of the Graphic display.

### 13.2 Simrad AP11 Autopilot

3599 is configured with a Simrad AP11 autopilot installed through Caliber at the Caliber factory. It includes the following components:

- Simrad AP11 autopilot control head
- J300X junction unit, P/N CODE S/N: 22081830 NA3096
- (EPROM: J300X, 22081640, V1R8)
- RC25 rate compass (old name = RFC35R), P/N CODE S/N: 22084438 CA3678
- HLD 2000 MK2 linear hydraulic drive, , P/N CODE S/N: 21113360 FA5252
- Edson bronze tiller arm

**Configuration** – Autopilot configuration must be performed both after installation and again after any changes to the steering system (e.g. adjusting the rudder cable). The initial configuration is divided into “Dockside” settings and “Sea Trial” settings which should be performed in that order. After they those configuration screens have been gone through, it is possible to use the “View Parameters” screens to either view or fine-tune the setup. Configuration should be performed referencing the Simrad autopilot instruction manual. However, the manual is somewhat vague in spots, so some clarification is added here:

#### Dockside Setup –

- Turn the unit on. It must be in Stand-By mode.
- Push both arrow buttons simultaneously and hold them down for about 5 seconds. This will put you into setup mode. The first setup mode section is the DOCK SET menu.
- Press the mode button to enter the DOCK SET menu. Press the arrow keys to proceed through the menu items. Press stand-by at any time to exit the menu.

COLOUR	R	Background color
BOAT TYP	SAIL	
DRIV.VOLT	12	
RUDDER MAX >	Starting with the wheel at center, turn Rudder hard over to starboard	Starboard max rudder degrees. Per Caliber, actual max angle is 35° (+ or -). Press the Mode button and use the arrow keys to adjust the value to 35.
RUDDER MAX <	Turn Rudder hard over to port	Port max rudder degrees. Per Caliber, actual max angle is 35° (+ or -). Press the Mode button and use the arrow keys to and adjust the value to 35. Note: The starboard and port readings picked up by the autopilot should have been almost the same (even if over 35).

		If they are significantly different, verify that the steering cable is tensioned evenly, then re-run the dockside setup.
RUD TEST	YES?	Press mode twice to enter automatic rudder test. The Autopilot will turn rudder several times. Wait until it reads DONE.
Compass	NET	“NET” is the setting for a Robertson RFC35R Rate Compass
Radar	A	No radar is connected on 3599 so this setting doesn’t matter.
Speed	0	Transition Speed. On a sailboat this should be set to zero. This eliminates the transition between “HI” and “LOW” parameters. Only “HI” is used.

- Press stand-by to exit menu once done.

**Sea Trial Setup** – The Sea Trial setup should be performed under power, in open water, preferably on a calm day. You will need sea room, free of other boats, for some of the steps.

- Enter setup mode by repeating the steps above. The first setup screen is Dockside setup. Use the arrow key to move to Sea Trial setup.
- Press the mode button to enter the SEA SET menu. Press the arrow keys to proceed through the menu items. Press stand-by at any time to exit the menu.

RUD ZERO		Rudder Zero Adjust – Under power, bring the boat to cruising speed (e.g. 5 knots) and <u>head directly into the wind</u> . Manually steer the boat on a steady course. Take your time and make sure she’s running dead straight. Press Mode to activate the rudder zero adjust. The screen should flash “YES”. Press Mode again to set the rudder center. It should read “Done”
COMP CAL		Compass Calibration – Down-throttle to just over idle (e.g. 11,000 RPM). Manually turn the boat in a very slow, wide, circle (e.g. wheel over a quarter turn, 2 minutes to complete a circle). While turning your circle(s), press

		Mode to activate. The screen should flash "YES". Press Mode again to acknowledge. The calibration should complete after the boat has made about 1 1/4 turns. It will display "Done" when complete.
COMP ADJ	103 (Hull #3599)	Compass Offset – Optional adjustment used to correct for a constant compass heading offset (e.g. RFC35R installed with lubber line offset, or fixed offset remains after the calibration procedure completed.
AUT TUNE		Automatic Tuning – Attempts to automatically customize the autopilot parameters. Only works marginally.

- Press stand-by to exit menu once done.

**View Parameters** – The View Parameters screens can be used to view and manually change the current settings. HI parameters are for automatic steering at HI speed. LO is for automatic steering at LO speed. As sailboats are not generally capable of sudden surges of acceleration, the transition speed (SPEED) setting should be set to zero. This causes the unit always to operate at HI unless one manually toggles between the two. The two most important parameters in determining performance are Rudder and Counter Rudder.

**Rudder** sets the rudder gain, which is the ratio between the commanded angle and the heading error (P-factor). This is how much rudder it puts into a turn. Too little Rudder and the autopilot will fail to keep a steady course. Too much rudder gives unstable steering and reduces speed. Low speed requires more rudder than high speed.

**Counter Rudder** counteracts the effect of the boat's turn rate and inertia when the boat is coming out of a turn. For a short time it is superimposed on the normal rudder response as provided by the rudder parameter. It may sometimes appear as if it makes the rudder move to the wrong side (counter rudder). The best way of checking the value of the counter rudder setting is when making turns. If the counter rudder is too low the boat will tend to overshoot it's turns. If the setting is too high, the turn will be sluggish (slow, creeping turn).

**Autotrim** is a time value in seconds at which the autopilot checks whether the boat is holding course and applies a small offset to the rudder angle. The standard Autotrim value is 40 which should work well on most boats. On sailboats it may be preferable to set Autotrim to zero to avoid unwanted rudder offset when changing course.

**Rudder Limit** is the maximum rudder angle the autohelm will steer. Simrad recommends leaving Rudder Limit at 20 degrees unless there is a need for more rudder when performing

dockside maneuvers. In no event should the Rudder Limit be set to a value higher than the actual maximum rudder angle. Therefore, on the 35 LRC, it must always be less than 35.

- Enter setup mode by repeating the steps above. The first setup screen is Dockside setup. Use the arrow key to move to move past Sea Trial setup to View Parameters. Use the Mode and arrow buttons to change individual settings.

	DEFAULT – SAIL		AUTO TUNE		3599 FINAL	
	LO	HI	LO	HI	LO	HI
RUDDER	0.50	0.35	0.33	0.21	.48	.36
C. RUDDER	1.40	1.00	1.76	1.16	1.76	1.16
AUTOTRIM	40	40	40	40	40	40
RUDDER LIMIT	20	20	20	20	25	25

- Press stand-by to exit menu once done.

### 13.3 iCom IC-M402A VHF Radio and DSC / MMSI Registration

3599 is configured with an iCom IC-M402A VHF radio, serial # 0110230, with a remote microphone in cockpit. Because of the distance between the nav station and the binnacle, an iCom extension cable was used when installing the remote microphone. The cable connection is located inside the half-loom just behind the access panel in the aft of the quarter berth.

NOTE: The VHF must be turned off when the remote mic is plugged in. The power should be turned on at the master unit only after the remote mic is connected or the two units may not sync up and the remote mic / may not function properly.

This VHF is Digital Selective Calling (DSC) enabled. DSC is a relatively new radio technology that allows enhanced distress radio messages to be sent digitally by pressing an emergency transmit button. This causes the radio to send the vessels Marine Mobile Security Identification (MMSI) number and position if the DSC-equipped radio is linked to a GPS. The VHF on 3599 has been interfaced with the Raymarine GPS to enable the DSC functionality.

**DSC / MMSI Registration** – The MMSI number is a unique 9-digit number assigned to a DSC radio station that registers the boat information in the U.S. Coast Guard’s national distress database for emergency situations. In order to activate the DSC functionality you must obtain a MMSI number. Boat U.S. in partnership with the U.S. Coast Guard and the FCC provides a website where U.S. vessels can apply for, and maintain a MMSI number at no cost. The MSSI number contains a country code and Boat U.S.’s site is hard-coded with the United States’ country code. The site is available at <http://www.boatus.com/mmsi/>.

**Logon ID:** \_\_\_\_\_

**Password:** \_\_\_\_\_

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**Email:** \_\_\_\_\_

The MMSI number can only be entered into the unit once. Once it has been set, changing it requires sending the unit back to iCom or to an iCom service center. The MMSI # programmed in the IC-M402A can be verified in the following manner. This has already been done for 3599:

- Turn on the unit.
- Push the DSC button once. Do not be dismayed if it says “NO ID”. This is an irrelevant reading.
- Click the down arrow [6 times] until you see MMSI displayed
- Push the DSC button once again. The MMSI number will be displayed.

### 13.4 ACR GlobalFix™ RLB-35 CAT II EPIRB

3599 is equipped with a Category II (manually deployed) ACR GlobalFix™ RLB-35 (part # 2744) Emergency Position Indicating Radio Beacon (EPIRB) that includes an internal / integrated Global Positioning System (GPS) receiver.

When activated, EPIRBs provide emergency distress alerts via radio transmission on the 406 MHz frequency to the LEOSAR satellites of the COSPASSARSAT network. This is an international system that uses Russian Federation and United States low altitude, near-polar orbiting satellites (LEOSAR) to assist in detecting and locating activated 406 MHz satellite beacons. The ACR GlobalFix™ can also transmit a distress alert to the separate GEOSAR network that includes GPS latitude and longitude coordinates that are acquired by the internal GPS. The addition of the GEOSAR satellite system greatly improves the reaction time for a SAR event. This satellite system will relay the distress alert to any of the LUT stations. When there is GPS data included in the distress message, SAR authorities instantly know your location to within 110 yards (100 m). This speeds up the reaction time by not having to wait for one of the LEOSAR satellite to pass overhead. Because most of the search and rescue forces presently are not equipped to home in on the 406 MHz Satellite beacons signal, homing must be accomplished at 121.5 MHz.

The message transmitted is unique for each beacon, which provides identification of the transmitter through computer access of registration files maintained by the National Oceanic and Atmospheric Administration or other national authority. Once the 406 MHz signal is relayed through the LEOSAR and/or GEOSAR network, SAR forces determine who is closest, and then proceed to the beacon using the 121.5 MHz homing frequency.

U.S. EPIRBs must be registered with NOAA upon purchase or transfer. **The registration data must be updated with NOAA at least every two years.** Registration can be performed on-line at [www.beaconregistration.noaa.gov](http://www.beaconregistration.noaa.gov). Within two weeks of registration, a decal will be mailed to the registered address. This decal must be affixed to the EPIRB.

3599's EPIRB was registered on-line with the following information:

<b>Registration Date:</b>	10 Aug. 2007, updated 08 Sept. 2014
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<b>UIN (Beacon ID):</b>	2DCC56926CFFBFF
<b>Password:</b>	
<b>Manufacturer:</b>	ACR
<b>Model:</b>	RLB-35 CAT II
<b>Part Number:</b>	2744
<b>Serial Number:</b>	2358
<b>Owner / Operator:</b>	<i>Name</i> <i>Address</i> <i>City, State, Zip</i> <i>Email</i> <i>Telephone (home)</i> <i>Telephone (cell)</i> <i>Telephone (work)</i>
<b>Vessel Usage:</b>	Non-commercial
<b>Vessel Type:</b>	Sail: 1 mast
<b>Vessel Name:</b>	
<b>Vessel Color:</b>	White
<b>Survival Craft(s on Vessel):</b>	Life Boat: 0, Life Raft: 0
<b>Is EPIRB equipped with a Simplified Voyage Data Recorder (SVDR)?:</b>	No
<b>Radio Equipment:</b>	VHF
<b>Vessel Telephone Numbers:</b>	Cellular: 301-452-0391 MMSI: 338033697
<b>Federal Registration Number:</b>	No. 1166685
<b>Length Overall (ft)</b>	35
<b>Homeport</b>	
<b>Additional Data:</b>	White cream color with forest green dodger and bimini
<b>Primary 24-Hour Emergency Contact:</b>	<i>Name</i> <i>Phone(s)</i>
<b>Alternate 24-Hour Emergency Contact:</b>	<i>Name</i> <i>Phone(s)</i>

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The battery (P/N 1098.1) must be replaced by the date indicated on the beacon or every five (5) years or if the beacon has been activated for any use other than the self test. Refer all long life battery replacement and other beacon service to a factory authorized service center. Battery replacement includes servicing the beacon by replacing all o-rings, testing the water seal and the electrical properties. There are no user serviceable items inside the beacon. DO NOT OPEN THE BEACON UNLESS TO DISABLE IN CASE OF FAULTY ACTIVATION. For the Battery Replacement Centers, visit ACR's website: <http://www.acrartex.com/>.

### **13.5 Stereo**

3599 is configured with a Sony CDX-M30 marine AM/FM/CD player with MP3/WMA/AAC playback located at the nav station.

The stereo is configured with VHF splitter and uses the masthead antennae. Attached to the player is a Bose Acoustimass 3 speaker system installed in the main salon at the Caliber factory. There are no cockpit speakers.

Note: In addition to the stereo breaker on the DC panel, power to maintain channel / program memory is fed through a 15A fuse in the 6-fuse Blue Sea fuse block mounted behind the engine. This fuse is labeled "Stereo 15A"

## **14 OTHER**

### **14.1 Name**

*Alisios* is the old Spanish word for "trade winds" – vientos alisios. The name was chosen after reading the following passage from *World Cruising Routes, Fifth Edition* by Jimmy Cornell –

"Trade winds: These steady winds which blow on either side of the equatorial doldrums were so called because of the assistance they gave to the trade of sailing ships. The early Spanish navigators gave them the more romantic sounding name of alisios."

**Font** – The *Alisios*' name is in the "Daniela" font.

### **14.2 Interior Fabric**

The interior fabric on 3599 is Caliber's standard dark green shell, color # 6700, style # 07600. It is no longer available for purchase.

Clean this fabric with pure solvents (petroleum distillate-based products, Energine, Carbona, Renuzite, or similar products may be used) in a well-ventilated room. Cleaning by a professional furniture cleaning service only is recommended.

**CAUTION:** Use of water-based or detergent-based solvent cleaners may cause excessive shrinking. Water stains may become permanent and impossible to be removed with solvent cleaning agents. Avoid products containing Carbon Tetrachloride as it is highly toxic. To prevent overall soil, frequent vacuuming or light brushing to remove dust and grime is recommended.



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### 14.3 Fans

3599 is equipped with 5 Hella fans that were installed by Caliber: 1 in the v-birth, 3 in the main salon, and 1 in the aft cabin.

### 14.4 CBP Decal

U.S. Vessels over 30' are required to have a Customs and Boarder Protection (CBP) decal when entering (or returning to) U.S. waters.

The CBP decal is available through <http://www.cbp.gov/>

- Click on Travel
- Click on User Fee Decals and Transponders
- Click on Apply online for User Fee Decals and Transponders
- Click OK to accept re-direction to an external website
- You should be directed to the following link:  
<https://tradelinks4.mellon.com/cbp/Dispatcher>
- Logon and follow the appropriate links / directions.

## 15 TROUBLESHOOTING

### 15.1 High Voltage Alarm From Blue Sea Multimeter

The Blue Sea DC Multimeter at the nav station panel has an alarm that will go off if the voltmeter believes that the voltage coming into (charging) the battery is too high. This alarm will trigger at 14.80 amps. Because the Next Step Regulator is temperature compensated, it is possible that if the batteries are extremely cold (e.g. in northern areas in the winter months) the bulk charge phase could slightly exceed this threshold. In this case, the Blue Sea voltmeter alarm would trigger not long after the engine is turned on. Such a situation should be rare and only in abnormally cold weather. Even in very cold weather the output should not exceed about 14.85 volts. Assuming there is no more significant problem, the alarm is merely an annoyance and should stop after several minutes.

If the alarm cannot be tolerated, temporarily disconnecting the temperature input (T+) wire from the Next Step Voltage Regulator will cause the regulator to default to a 70 degree output, lowering the charging voltage. It may also be possible to re-configure the Blue Sea voltmeter.

**WARNING:** A voltage much higher than 14.9 (e.g. 15+ amps) would indicate a problem with the Next Step Regulator / charging system and must be dealt with to avoid risk to the batteries.

### 15.2 The Alternator Belt

The alternator belt should be checked regularly (e.g. every time the oil is checked). With the engine off, verify that the surfaces are in good condition and the belt is not burnt, worn, or cracked. Verify that it is aligned and tensioned properly.

**Tension** – It is important that proper tension is maintained on the belt. If it becomes loose it will slip. If a belt is allowed to slip for any length of time it can heat up the alternator pulley which transmits heat along the shaft to the rotor, which demagnetizes the rotor, crippling alternator output. Belts must be kept tight. It should be firm when pressed down with the thumb. There

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should be a little give, but not much. It should not be possible to depress the belt more than 3/8 to 1/2 inch with moderate finger pressure. With the engine running there should not be much noticeable wobble in the belt. The alternator belt tension is adjusted via a single bolt at the bottom of the alternator that tightens into a crescent-shaped slot. Loosen this bolt with a socket wrench to allow the alternator to pivot on its two mounting bolts. Use an object such as a hammer handle, 12" Crescent wrench (shifting spanner) handle, or large screw driver as a lever to carefully pry the alternator upwards, holding steady pressure to tension the belt while tightening the bolt. (I've found the 12" Crescent wrench handle works best.) Be very careful not to damage the alternator as the outer housing is not overly thick.

Alignment – It is important that the alternator pulley and engine pulley(s) are properly aligned so the belt does not wear unduly. To judge alignment, a straight edge can be held against the alternator and engine pulleys. As the pulleys are of different thicknesses, some guesstimation is required. The belt should be parallel to the inside channels of the two pulleys. The alternator alignment is adjusted via the two mounting bolts on the top (fore and aft). The aft bolt goes through a bushing sleeve. Generally speaking, this bolt should be tightened first in order to push this sleeve forcing the alternator housing forward until it is in the desired position. At that point the forward-most bolt should be tightened and the belt tensioned following the steps above. If the alternator is still not aligned, it may need to be shimmed either forward or aft with a couple stainless steel washers until alignment is achieved.

NOTE: It may be necessary to un-mount and re-mount the alternator in order to change the belt.

NOTE: It is important that the alternator surface and interior be kept clean and free of foreign debris and buildup. The alternator case should not be painted as this will effect cooling.

### **15.3 Anchor Windlass**

Both switches (foot switches at bow and the toggle in the cockpit) are powered via an orange wire coming off the center post of the Imtra control box (solenoid) in the anchor well. There is a 3-Amp in-line fuse mounted under the Lewmar switch box next to the control box. Because of its location, this fuse is prone to corrosion. If the windlass fails to operate when the switches are hit, open the fuse housing, clean the connections, and replace<sup>17</sup> this fuse before taking more drastic action.

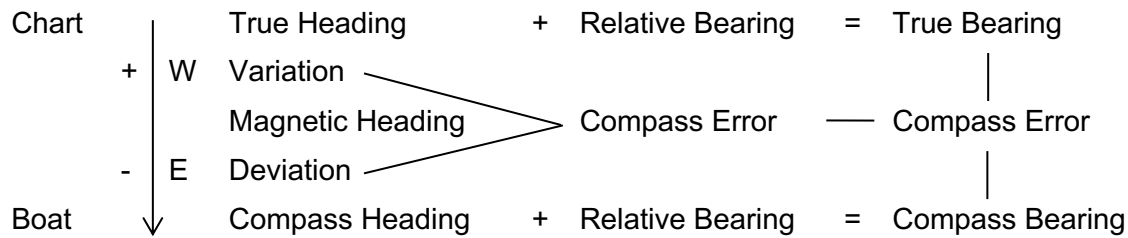
See the anchor windlass wiring diagram at the back of this document.

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<sup>17</sup> Visual inspection is not sufficient to tell whether the existing fuse is OK. Replace it.

## 16 MISCELLANEOUS

### 16.1 Useful Formulas



(True Virgins Make Dull Companions. Add Whiskey)

1 nautical mile (nm) = 1.1508 statute miles = 1852 meters

1 statute mile = 0.8690 nautical miles

1 millibar (mb) mercury = .02953 inches mercury

Celsius = (Fahrenheit - 32) / 1.8

Fahrenheit = (1.8 \* Celsius) + 32

1 fathom = 6 feet

1 meter = 3.2808 feet = 39.3701 inches<sup>18</sup>

1 foot = 0.30480 meters

1 inch = 0.02540 meters = 2.54 centimeters = 25.4000 millimeters

1 gram = 0.0353 ounces

1 ounce = 28.3495 grams

1 kilogram = 2.2046 pounds

1 pound = 0.4536 kilograms

1 stone = 14 pounds

1 Imperial gallon = 1.2 U.S. gallons

1 Imperial gallon = 4.56 liters

1 U.S. gallon = 3.785 liters

Set (direction) and Drift (speed) formulas:

Distance = Speed \* Time / 60

Speed = 60 \* Distance / Time

Time = 60 \* Distance / Speed

Theoretical max hull speed for displacement hull =  $1.34 * \sqrt{LWL}$

Ohms Law:

$I = V / R$  (current in amperes (amps) = voltage ÷ resistance)

$V = I * r$

$r = V / I$

<sup>18</sup> Online conversion calculator: <http://www.metric-conversions.org/>

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Watts = volts \* amps  
 Amps = watts / volts (An 18 watt bulb will draw 18/12 = 1.5 amps on a 12 volt system)

Fresh water weighs 8.33 lbs / U.S. gallon

Diesel fuel weighs between 7.0 and 7.3 lbs / U.S. gallon depending on specifications and temperature

Gasoline weighs between 6.0 and 6.3 lbs / U.S. gallon depending on specifications and temperature

## 16.2 The Beaufort Scale

Force	Speed in Knots	Description	Force	Speed in Knots	Description
0	< 1	Calm	7	28 – 33	Near Gale
1	1 – 3	Light air	8	34 – 40	Gale
2	4 – 6	Light breeze	9	41 – 47	Strong Gale
3	7 – 10	Gentle breeze	10	48 – 55	Storm
4	11 – 16	Moderate breeze	11	56 – 63	Violent Storm
5	17 – 21	Fresh breeze	12	>= 64	Hurricane
6	22 – 27	Strong breeze			

## 16.3 Tonnage

**Tonnage** is neither the weight of the vessel, nor a measurement of the amount of water it displaces, but rather a measurement of the vessel's volume. The term derives from the taxation paid on tuns of wine, and was later used in reference to the weight of a ship's cargo. In modern maritime usage, "tonnage" specifically refers to a calculation of the volume or cargo volume of a ship.

**Gross tonnage** refers to the overall volume of a vessel, the volume of all ship's enclosed spaces (from keel to funnel) measured to the outside of the hull framing. It is always larger than gross register tonnage, though by how much depends on the vessel design. It was a measurement of the enclosed spaces within a ship expressed in "tons" – a unit which was actually equivalent to 100 feet.

Tonnage measurements are now governed by an IMO Convention (International Convention on Tonnage Measurement of Ships, 1969 (London-Rules)), which applies to all ships built after July 1982. In accordance with the Convention, the correct term to use now is GT, which is a function of the volume of all enclosed spaces of the ship. There are two methods for calculating gross tonnage. A complex formula is used for commercial ships and the tonnage is usually figured out

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precisely by a hired tonnage measurer. Vessels under 79 feet LOA are eligible to be measured under the Simplified Measurement System.

A documented pleasure vessel's tonnage is listed on the USCG documentation papers, calculated using the Simplified Measurement System. An extract of USCG information on documented vessels is also available online at <http://cgmix.uscg.mil/PSIX/VesselSearch.aspx>.

**3599 is listed on it's USCG documentation as 11 gross tons, 10 net tons.**

## 16.4 The Marine Alphabet – Phonetic, Flags, & Morse Code

A phonetic alphabet is a list of words used to identify letters in a message transmitted by radio or telephone. Spoken words from an approved list are substituted for letters. This practice helps to prevent confusion between similar sounding letters, such as "m" and "n", and to clarify communications that may be garbled during transmission.

An early version of the phonetic alphabet appeared in the U.S. Navy's 1913 edition of The Bluejackets' Manual. It was paired with the Alphabetical Code Flags defined in the International Code. Later Morse Code was added. During World War II, when it was necessary for the Navy to communicate with the Army or Allied forces, signalmen were directed to use standard words. These words changed again in 1957 when the current phonetic alphabet was introduced and adopted by international agreement. The current (1957) phonetic alphabet is:

Alpha		. -	November		- .
Bravo		- . . .	Oscar		- - - -
Charlie		- . - .	Papa		. - - .
Delta		- . .	Quebec		- - . -
Echo		.	Romeo		. - .
Foxtrot		. . - .	Sierra		. . .
Golf		- - .	Tango		-
Hotel		. . . .	Uniform		. . -
India		. .	Victor		. . . -
Juliette		. - - - -	Whiskey		. - - -
Kilo		- . -	X-Ray		- . . . -
Lima		. - . .	Yankee		- . - - -
Mike		- -	Zulu		- - . .

### Digit Morse

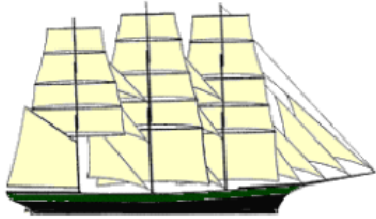


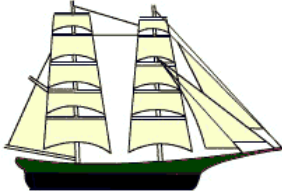

0		- - - - -	5		. . . . .
1		. - - - -	6		- . . . .
2		. . - - -	7		- - . . .
3		. . . - -	8		- - - . .
4		. . . . -	9		- - - - .

## 16.5 VHF Channel Usage – USA

1	VTS, Port Operations	63	Canadian Coast Guard
3	Port Operations *	64	Canadian Coast Guard *
5	Port Operations	65	Port Operations
6	Intership Safety	66	Port Operations
7	Commercial	67	Commercial
8	Port Operations	68	Recreational Boat Operations
9	Hailing	69	Recreational Boat Operations
10	Commercial	70	Digital Selective Calling
11	Commercial	71	Recreational Boat Operations
12	Port Operations	72	Recreational Boat Operations
13	Navigation, Bridge to Bridge	73	Port Operations
14	Port Operations	74	Port Operations
15	Environmental	75	CH 16 Guard Band
16	Emergency, Hailing	76	CH 16 Guard Band
17	State Controlled	77	Port Operations
18	Commercial	78	Recreational Boat Operations
19	Commercial	79	Commercial
20	Port Operations	80	Commercial
21	U.S. Coast Guard *	81	U.S. Coast Guard *
22	U.S. Coast Guard	82	U.S. Coast Guard *
23	U.S. Coast Guard *	83	U.S. Coast Guard *
24	Marine Operator	84	Marine Operator
25	Marine Operator	85	Marine Operator
26	Marine Operator	86	Marine Operator
27	Marine Operator	87	Marine Operator
28	Marine Operator	88	Commercial
61	Canadian Coast Guard *		

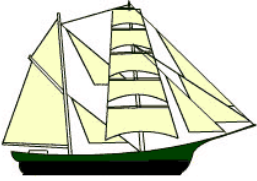






\* Channels 3, 21, 23, 61, 64, 81, 82, and 83 are not for use by the general public in U.S. waters. These frequencies may only be used when authorized by the U.S. Coast Guard.

## 16.6 Types of Sailing Vessels<sup>19</sup>

Full-rigged-ship	A fully square rigged sailing ship with three or more masts.	
Bark or Barque	A sailing vessel with three or more masts: fore and aft rigged on the aftermast, square rigged on all others.	
Barkentine	A 3-masted sailing vessel with square-rigged sails on foremast only.	
Brig	A 2-masted sailing vessel with both masts square rigged. On the stern-most mast, the main mast, there is also a gaff sail.	
Brigantine	A 2-masted sailing vessel in which the foremast is square rigged. The mainmast carries a fore-and-aft mainsail, above which are a square main-topsail and square topgallant sail.	

<sup>19</sup> Images from <http://www.globalsecurity.org/military/systems/ship/rig.htm>



<p>Hermaphrodite Brig or Brig-schooner</p>	<p>A 2-masted sailing vessel which has square sails on the foremast combined with a schooner rig on the mainmast (triangular topsail over a gaff mainsail). As such it has a mix of the two main types of sail plan. (Note: Some consider this just a type of Brigantine.)</p>	
<p>Schooner</p>	<p>A fore-and-aft rigged sailing vessel having at least two masts, with a foremast that is usually smaller than the other masts.</p>	
<p>Cutter</p>	<p>A small single-masted sailing vessel, fore-and-aft rigged, with two or more headsails, a bowsprit, and a mast set further back than in a sloop</p>	
<p>Sloop</p>	<p>A single-masted, fore-and-aft-rigged sailing vessel with a short standing bowsprit or none at all and a single headsail set from the forestay. The mast of a sloop is farther forward than the mast of a cutter. Sloops and Cutters may be Bermuda (a.k.a. Marconi) rigged or gaff rigged.</p>	
<p>Ketch</p>	<p>A 2-masted, fore-and-aft-rigged sailing vessel with a mizzenmast stepped aft of a taller mainmast but forward of the rudderpost.</p>	
<p>Yawl</p>	<p>A 2-masted, fore-and-aft-rigged sailing vessel similar to the ketch but having a smaller mizzenmast (or jigger) stepped abaft the rudderpost. Also called a "dandy".</p>	
<p>Catboat</p>	<p>A sailboat with a single mast carried well forward and single sail. The traditional catboat has a wide beam, a centerboard, and a gaff-rigged sail.</p>	

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## 16.7 Useful Knots



Cleat Hitch



Figure Eight



Bowline



Two Half Hitches



Clove Hitch



Rolling Hitch



Reef  
(a.k.a. Square)



Surgeon's



Sheet Bend  
(a.k.a. Becket Bend)



Sheep Shank



Double Sheet Bend



Fisherman's



Sailor's

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## 16.8 Splicing 3-Strand Line

A splice retains 95% of the rope's strength. A bowline reduces the breaking strength of a line by about 40%. Twelve inches is a good eye size for transient dock lines, making it easy to pull the line through the eye to form a loop. Anchor lines require an eye splice around a metal thimble so the line can be shackled to the chain lead on the anchor. The thimble protects the line from chafe.

**Step 1 – Tape the ends:** Cut rope will have been sealed with a hot knife to prevent the ends from unraveling. To make a splice, you need to unravel a short length of one end, but you do not want the individual strands to unravel. Put a couple of wraps of masking tape around one end of the rope and slice through it with a sharp knife to cut off the melted end. Untape the rope and tightly tape the ends of the three individual strands.

**Step 2 – Unlay the strands:** Pick one strand--it doesn't matter which--and unwind it, making eight revolutions around the other two. Tape the rope tightly just below where this "loose" strand joins the others. Now untwist the other two strands.

**Step 3 – The first tuck:** Form a loop in the rope the size you want the eye. The splice begins at the wrap of tape on the rope, so this marks the closing point of the eye. If you are doing an anchor line, make the loop tightly around the thimble. I generally secure the thimble in position with a wrap of tape on each leg.

With the loop formed and the unlayed end on top of the standing part and pointing away from you, fan the unlayed strands naturally, i.e., with the center strand leading directly away from you, the right strand spread to the right, and the left strand spread to the left.

Commit to memory that the first tuck is always the center strand and you will avoid confusion in the future about the start of splice. Lift a strand on the standing part of the rope at the point where you want the eye to close and tuck the center strand under it. On smaller and/or soft-lay rope you will be able to make the tucks just using your fingers. Large, stiff, or old line may require use of a fid or marlinespike to open the strands in the standing part of the rope.

Pull this first tucked strand all the way through so that the eye is closed, but don't pull so hard that you distort the lay of the line.

**Step 4 – The second tuck:** The second tuck is always the left-hand strand. The strand on the standing part it goes under is the one above the one you just tucked the center strand under. I remember "left-above" to keep me straight. Again, pull all of the loose strands through.

**Step 5 – The third tuck:** This is where you are most likely to go wrong, so be careful.

If the left strand goes under the "above" strand, then the right strand must go under the below strand. The confusion is not which strand, it is which direction. All tucks go right to left. The easy way to avoid doing this wrong is to flip the eye over to tuck the third strand.

Once this third tuck is made, pull on all three strands in turn to snug the closure of the eye evenly.

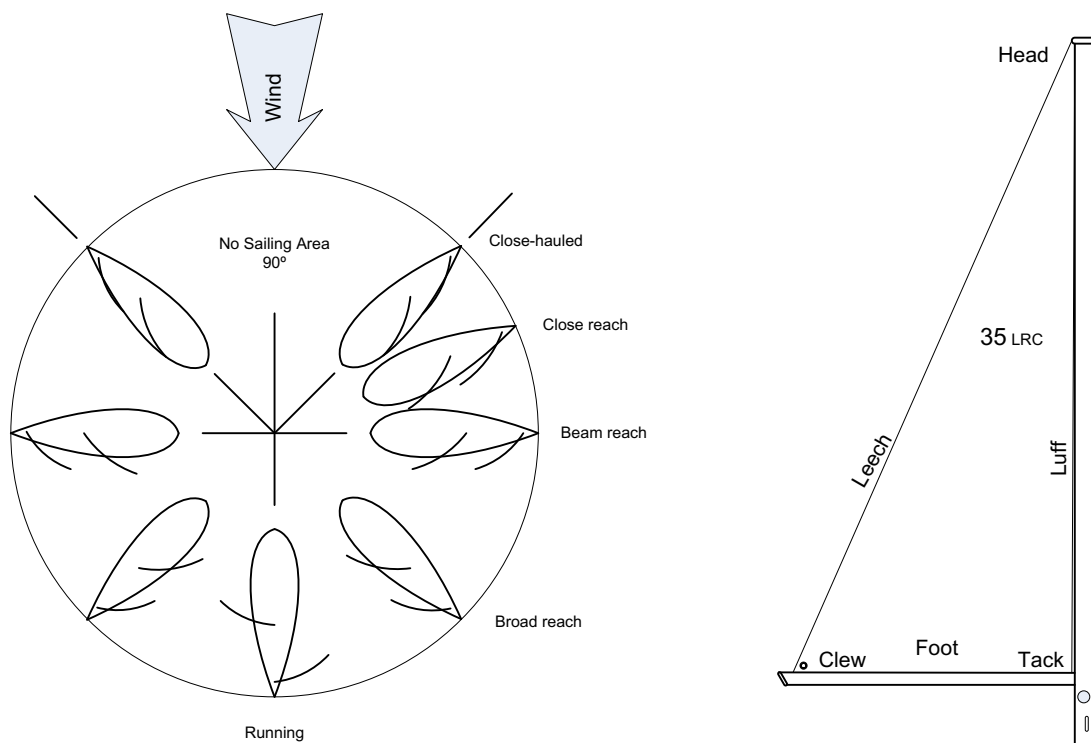
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**Step 6 – Over and under:** The rest is easy. Pick one strand and tuck it under the strand on the standing part that is two above the one it is already under. In other words, each strand goes under one strand, over the next one above it, then under the next above that. Tuck each loose strand in turn, one tuck at a time. Turning the rope counterclockwise about a third of a turn after each tuck will help you keep the sequence and the strands straight.

Give each strand a total of six tucks. Once all of the tucks are completed, place the splice on the floor and roll it back and forth under your foot to smooth it. Then loop the eye over something and put a strain on the line. Cut off the projecting "tails" of the strands and the splice is finished.

**Tapering is optional:** Some boaters prefer to end the splice with a taper. This is accomplished by cutting out about a third of the yarns in each strand before their final tuck. When the remaining tails are clipped after the final tuck, the result is a splice with a somewhat nicer appearance. Tapering is a strictly cosmetic practice, having no impact on the strength of the splice<sup>20</sup>.

## 16.9 Points and Parts of Sail



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<sup>20</sup> Written by Don Casey with minor edits

## 16.10 Wire Gauge Selection Table

When choosing wire gauge, the distance the wire must run and the amperage it will be expected to carry must be determined first. Find the amperes (amps) or watts the circuit is expected to carry on the left and the distance the wiring must run at the top. Follow the columns until they intersect. For example: a 12 volt circuit which is 15 feet long and carries 10 amperes should use at least 16 gauge wire. Note that you can always use thicker wire (lower gauge number) than is recommended.

Circuit Amps		Circuit Watts		Wire gauge (for length in feet)						
6V	12V	6V	12V	3'	5'	7'	10'	15'	20'	25'
0 to 2.5	0 to 5	15	30	18	18	18	18	18	18	18
3.0	6	18	36	18	18	18	18	18	18	16
3.5	7	21	42	18	18	18	18	18	18	16
4.0	8	24	48	18	18	18	18	18	16	16
5.0	10	30	60	18	18	18	18	16	16	16
5.5	11	33	66	18	18	18	18	16	16	14
6.0	12	36	72	18	18	18	18	16	16	14
7.5	15	45	90	18	18	18	18	14	14	12
9.0	18	54	108	18	18	16	16	14	14	12
10	20	60	120	18	18	16	16	14	12	10
11	22	66	132	18	18	16	16	12	12	10
12	24	72	144	18	18	16	16	12	12	10
15	30	90	180	18	16	16	14	10	10	10
20	40	120	240	18	16	14	12	10	10	8
25	50	150	300	16	14	12	12	10	10	8
50	100	300	600	12	12	10	10	6	6	4
75	150	450	900	10	10	8	8	4	4	2
100	200	600	1200	10	8	8	6	4	4	2

## 16.11 AWG-To-Metric Wire Gauge Conversion Table

AWG Size	Metric Size, mm2	AWG Size	Metric Size, mm2
0	52.0	12	3.0
2	32.0	14	2.0
4	19.0	16	1.0
6	13.0	18	.8
8	8.0	20	.5
10	5.0		

<http://www.rbelectronics.com/wtable.htm>

## 17 TABLES AND DIAGRAMS

### 17.1 Specifications

The following are Caliber's published specifications for the 35 LRC. Actual measurements will vary in some instances.

Designer	Michael McCreary, NA		
Head Room	6' 3"	Length Overall	35' 9" (10.9 meters)
Length Waterline	29' 10"	Length on Hull	33' 10"
Beam	11' 4" (3.5 meters)	Draft	4' 6"
Displacement	13,100 lbs.	Ballast	6,100 lbs.
Sail Area	563 sq. ft.	Mast Height (Above LWL)	48' 10"
Propeller Size, 3 blades (Diameter * Pitch)	15 * 11	Water Capacity	100 gal.
Holding Tank Capacity	44 gal.	Fuel Capacity	120 gal.
Weight of Water <sup>21</sup> (full tanks)	835 lbs.	Weight of Fuel <sup>22</sup> (full tanks)	852 lbs.
Weight of Waste Water (full tank)	365 lbs.	Number of Fuel Tanks	2
Diesel Tank #1	74 gal.	Diesel Tank #2	46 gal.
Engine Model	Yanmar 3YM30	Engine Max	29 hp
Reduction Gear	2.62:1	Shaft Diameter	1"
Cruising RPM	2,500	Speed in Knots (Cruising at RPM)	5.60
Range Under Power	1,000 km	Max Rudder Angle	35°
Headstay	1/4"	Intermediate Headstay	7/32"
Twin Backstays	3/16"	Forward Lower Shroud	1/4"
Upper Shroud	1/4"	Aft Shroud	1/4"
P (Main Luff)	39.25'	E (Main Foot)	12.00'
I (Mast off Deck)	43.00'	J (Jib Foot)	15.25'
Theoretical Hull Speed <sup>23</sup>	7.32 knots		

<sup>21</sup> The weight of water is approximately 8.35 pounds per gallon.

<sup>22</sup> The weight of diesel fuel is approximately 7.1 pounds per gallon.

8 Knot Wind Speed	4.20 knots	10 Knot Wind Speed	4.75 knots
15 Knot Wind Speed	6.00 knots	20 Knot Wind Speed	7.25 knots
Ballast to Displacement Ratio	47	Sail Area to Displacement Ratio	16.21
Displacement to Length Ratio	220	Angle of Vanishing Stability	138 degrees <sup>24</sup>
Sail Maker	Doyle	Winches	Lewmar
Deck Hardware	Harkin	Mast and Boom	Selden
Hatches	Lewmar	S.S. Portholes	Lewmar
Stove	Force 10		
Interior Wood Type	Teak <sup>25</sup>	Exterior Wood Type	Teak
Exterior Teak Coating	Sickens Cetol	Interior Teak Coating	Defthane
Ice Box Foam (Expanded Foam)	4" Plus	Ice Box Size	6.3 cu. Ft.

## 17.2 3599 – As Ordered From Caliber

2005 Caliber 35 LRC new base yacht with standard features and equipment	
Lofrans Progress I Capstan windlass, foot switch(es), breaker, & cockpit remote	
Sea-water pump with hose in anchor well (for spraying off anchor and chain)	
Upgrade headsail to 135% Genoa with Sunbrella Forest Green # 4637 sun panel	
Roller furling for headsail - Furler model #200	
Spinnaker halyard, rigged and run aft	
Convertible cutter rig, including staysail and associated rigging	
Conventional mainsail, full battens, 2 reefing points run to cockpit	
Upgrade 2 reefing point full battened mainsail to 3 reefing points, fully rigged	
Selden bat car system	
Doyle StackPack (color = Sunbrella Forest Green # 4637)	
Radar conduit pre-installed in mast	
Ring on front of mast for whisker pole	

<sup>23</sup> The formula for determining theoretical hull speed of a displacement hulled vessel is 1.34 multiplied by the square root of the length at water line in feet. For the 35 LRC this is 1.34 \* the square root of 29.833 = 1.34 \* 5.46 = 7.32 knots. Since sailboats like the 35 LRC do plane to a small extent the 35 LRC can and does exceed this theoretical maximum.

<sup>24</sup> Caliber's designs are hand-drawn, not computerized, so this is only an estimate based on the shape of the hull, deck, draft, and ballast ratio.

<sup>25</sup> Most of the larger surfaces are veneer.

Include a spare attachment ring on the bottom of the boom for clipping a preventer to	
Masthead running lights + strobe (in addition to normal, deck level running lights)	
Teak handholds on cabin roof (rather than chrome)	
Upgrade both halyard winches from Lewmar #16 to #30	
Upgrade both primary [Genoa sheet] winches from Lewmar #44 to #48	
Mount aft hatches opening aft (so they will function under a dodger)	
Finished teak Edson fold-down drop-leaf cockpit table for binnacle	
Cockpit cushions	
Spare propane tank (same size and type as primary)	
Hot and cold water transom shower	
Full tank warning light at nav station for waste holding tank	
4-switch Tank Tender for diesel and water, gauges at nav station	
Bypass kit on water heater for use when winterizing	
Seagull Filter X-1F IV (drinking water filter) at galley sink	
Cigarette lighter 12 volt power outlet at nav station	
Cigarette lighter 12 volt power outlet in cockpit	
Five Hella fans (1 v-birth, 3 main salon, 1 aft cabin)	
Teak batten interior - main salon	
Teak batten interior - V birth	
Dripless shaft seal	
Epoxy barrier coat and bottom paint	
2 pulleys pre-mounted on each spreader (for courtesy flags and radar reflector)	
Simpson Lawrence 35 lb CQR anchor (later replaced with 33 lb. Bruce)	
100' 5/16" HT chain, 200' 5/8" anchor line (for primary anchor)	
One stainless steel anchor connector	
15' snubber for anchor rode (5/16" HT chain)	
Windex type wind vane at top of mast	
Nexus System 3000 depth, speed, wind, with repeater at nav station (Multi display, digital wind, and 4-guage pod at binnacle, multi display at nav station) <sup>26</sup>	
Simrad AP11 autopilot with RFC35R compass, HLD 2000 linear hydraulic drive, Edson bronze tiller arm	
Xantrex True Charge 40+ charger with remote panel and temperature sensor	
iCom IC-M402 w/DSC VHF with RAM mike in cockpit	
Sony AM/FM/CD stereo at nav station, with VHF splitter, Bose Acoustimass 3 speakers in main salon	

<sup>26</sup> Removed and replaced with Raymarine electronics in October 2006



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Garmin GPSMap 76 GPS mounted at nav station (DC power, external antennae, interface with Nexus) <sup>27</sup>	
<b>Installed by North Sails</b>	
Dodger with handholds side and aft + Bimini with panel that connects to dodger (Color = Sunbrella Forest Green # 4637, StrataGlass upgrade on dodger, Zip-off sideds upgrade on dodger)	
Pedestal (wheel / binnacle) cover. Color = Sunbrella Forest Green # 4637	
Canvas rain shield / umbrella for bow hatch. Color = off-white	

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<sup>27</sup> Removed and replaced with Raymarine electronics in October 2006. Garmin GPS used as handheld.

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### 17.3 Approximate Amp-Hour Draws

Cabin Light (each)	15W White Incandescent = 1.1, SensiBulb White LED = 0.2, 15W Red Incandescent = 1.1
Reading Light (each)	Xenon incandescent = 1.7, Dr. LED G4 MR11 Magnum Ring = 0.1
Galley Light	1.4
Navigation Lights – Lower	3.4
Navigation Lights – Masthead	2.1
Steaming Light	2.0
Anchor Light	AquaSignal 40 Incandescent = 1.3, Dr LED Polar Star 40 = 0.1
Foredeck Light	2.5
Electronics	0.4
Chart-Plotter Without Radar	1.7
Chart-Plotter With Radar Standby	3.0
Chart-Plotter With Radar On	4.7
VHF	0.3
Autopilot	
Windlass	≈ 100
Cabin Fan (each)	Low 0.2, High 0.3
Stove Solenoid	0.9
Stereo	≈ 0.8

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## 17.4 Oil and Common Engine Maintenance Parts

Engine Oil:	SAE 15/40 for diesel engines, e.g. Shell Rotella T (The Yanmar 3YM30 takes 3 quarts. You should not mix lubricating oils of different types or brands.)
Marine Gear Lube Oil: (Transmission Fluid)	API classification CD or better, SAE #20 or #30 regular oil (0.64 pints total, somewhat less during changes) (This is regular 20 or 30-weight engine oil. The Yanmar 3YM30 does <u>NOT</u> use Dexron III transmission fluid.)
Oil Filters [3YM30]:	Yanmar part # 119305-35151
Air Filters [3YM30]:	Yanmar part # 128270-12540
Fuel Filter Elements [3YM30]:	Yanmar part # 104500-55710
Water Pump Impeller [3YM30]:	Yanmar part # X08810B
Water pump belt [3YM30]:	Yanmar part # 128990-77350
Engine Alternator Belt [for hull #3599]:	Bando v-belt A-37.5 (smooth), Yanmar part # 119831-42290 or Bando v-belt A-37.5 (toothed), part # 129612-42290

## 17.5 Tank Tender Readings (#3599)

<b>Tank Tender 1<sup>28</sup></b> (Diesel Tank 1 – Under Cabin Sole)		<b>Tank Tender 2</b> (Diesel Tank 2 – Port Aft)	
0	Dead empty	0	Dead empty
0	5 gallons	4	5 gallons
0	10 gallons	6	10 gallons
1	15 gallons	8	15 gallons
1.5	20 gallons	9.5	20 gallons
2	25 gallons	10.5	25 gallons
2.25	30 gallons	11.5	30 gallons
2.5	35 gallons	12.5	35 gallons
2.75	40 gallons	13.5	40 gallons
3.25	45 gallons	14.5	45 gallons (full)
4	50 gallons		
4.5	55 gallons		
4.75	60 gallons		
5	65 gallons		
5.1	67 gallons (full)		

<b>Tank Tender 3</b> (Water Tank 1 – Starboard Forward)		<b>Tank Tender 4</b> (Water Tank 2 – Starboard Aft)	
0	Dead empty	0	Empty
1	Empty at Intake	3.5	5 gallons
2.5	5 gallons	5.5	10 gallons
5	10 gallons	7	15 gallons
7.5	15 gallons	8.5	20 gallons
9	20 gallons	9.5	25 gallons
10.75	25 gallons	10.5	30 gallons
12.5	30 gallons	11.5	35 gallons
15	35 gallons	12.75	40 gallons
16.5	40 gallons	13.75	45 gallons
17	41 gallons (full at vent)	14.75	50 gallons
		15.25	53 gallons (full at vent)

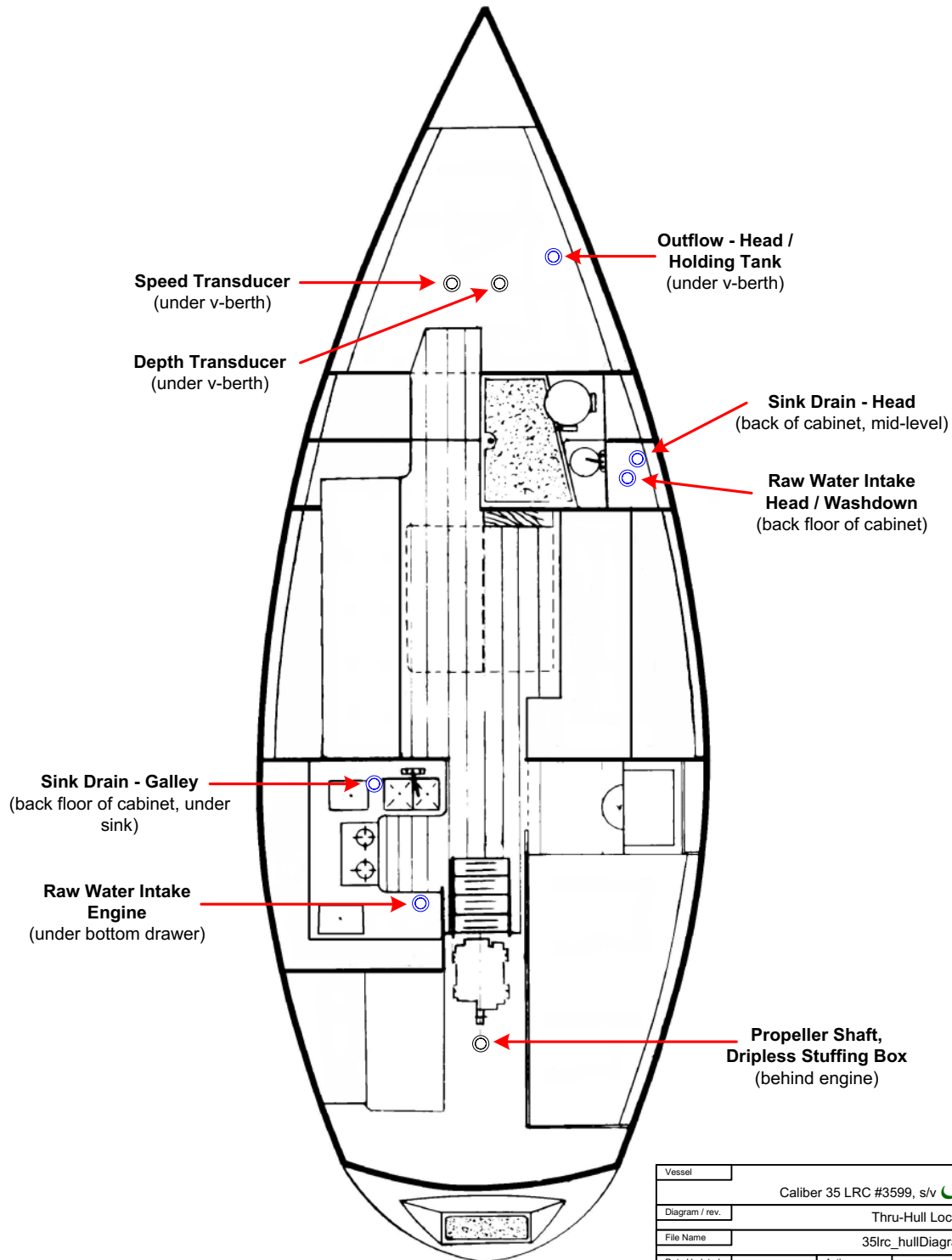
<sup>28</sup> Tank Tender readings aren't of much worth for diesel tank 1. It is very shallow. They're OK for the other tanks.

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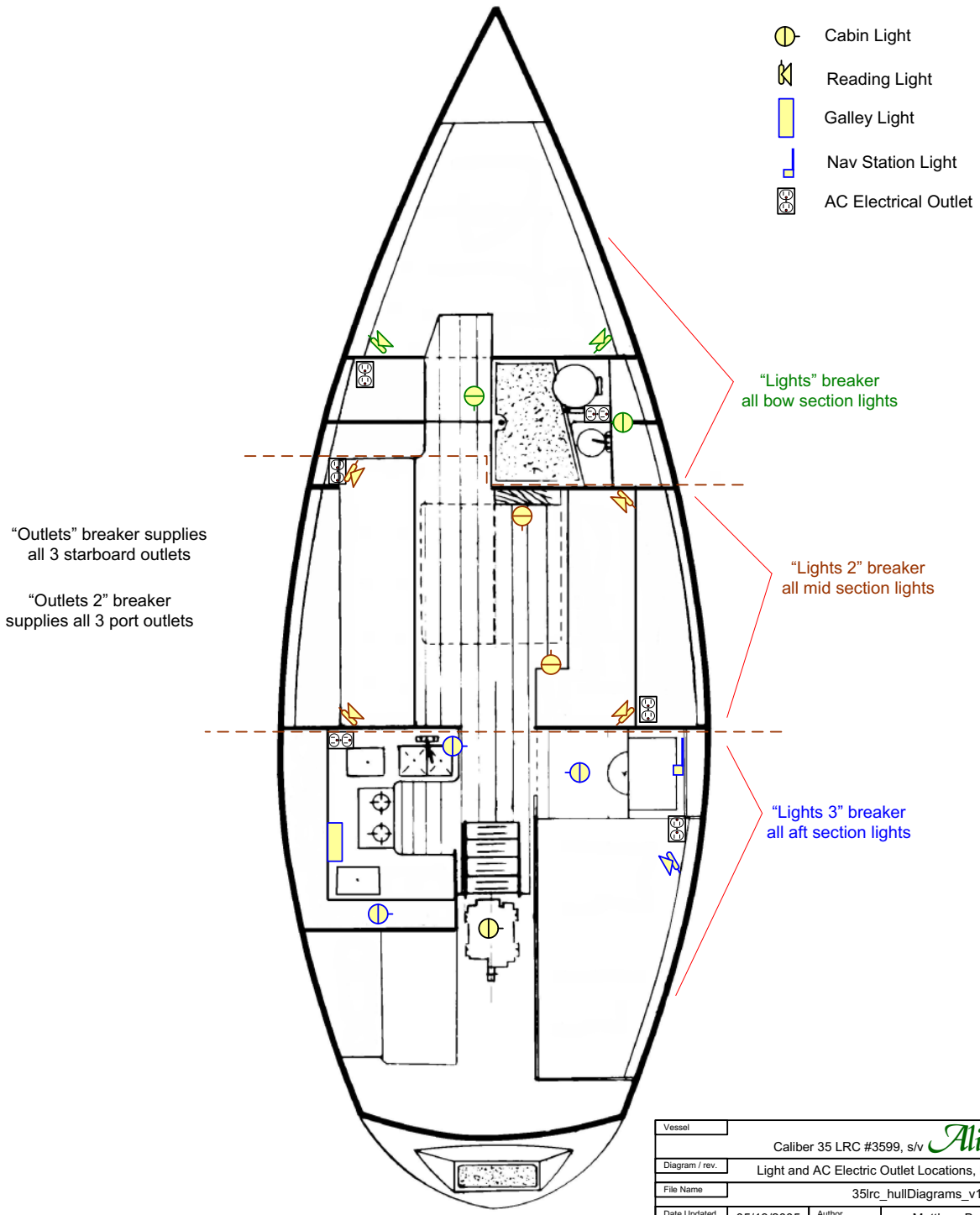
## 17.6 Winterizing Checklist

- \_\_\_\_\_ Review engine manual maintenance schedule and take appropriate action.
  - \_\_\_\_\_ Change oil and oil filter.
  - \_\_\_\_\_ Change primary Racor fuel filter(s).
  - \_\_\_\_\_ Change secondary Yanmar (on engine) fuel filter.
  - \_\_\_\_\_ Inspect air filter, clean, replace if necessary.
  - \_\_\_\_\_ Check specific gravity of antifreeze, flush and replace if necessary.
  - \_\_\_\_\_ Check and clean raw-water strainers
    - \_\_\_\_\_ Engine intake
    - \_\_\_\_\_ Bilge
    - \_\_\_\_\_ Head intake
  - \_\_\_\_\_ Empty water tanks.
  - \_\_\_\_\_ Drain water heater.
  - \_\_\_\_\_ Remove filter cartridge from Seagull water filter under galley sink.
  - \_\_\_\_\_ Empty holding tank (flushing thoroughly with fresh water).
  - \_\_\_\_\_ Pump non-toxic antifreeze through the water system from both tanks (approximately 8 gallons).
    - \_\_\_\_\_ Transom shower (hot and cold)
    - \_\_\_\_\_ Galley sink (hot and cold)
    - \_\_\_\_\_ Galley foot pump (manual) system.
    - \_\_\_\_\_ Head sink (hot and cold)
  - \_\_\_\_\_ Pump (flush) 1.5 gallons of non-toxic antifreeze through the head (both branches of the Y-valve”).
  - \_\_\_\_\_ Pump non-toxic antifreeze through the raw-water wash-down pump system (via the T-junction intake).
  - \_\_\_\_\_ Pump 2 gallons of non-toxic antifreeze through the raw-water intake of the engine
  - \_\_\_\_\_ Remove and Navionics chart flash memory card from E-80 and store
  - \_\_\_\_\_ Ensure bilge is dry
  - \_\_\_\_\_ Take down and store mainsail
  - \_\_\_\_\_ Take down and store Genoa jibsail
  - \_\_\_\_\_ Take down and store bimini and dodger
  - \_\_\_\_\_ Lubricate all lifeline gates (stern and both sides) and snap shackles with WD-40 or equivalent.
  - \_\_\_\_\_ Lift cushions and ventilate all lockers and similar areas, leave bilge uncovered.
  - \_\_\_\_\_ Ensure batteries are fully charged
  - \_\_\_\_\_ Ensure main / emergency battery cut-off switch under companionway steps is turned to OFF
  - \_\_\_\_\_ Ensure all sea-cocks are open after the boat is on the hard.
  - \_\_\_\_\_ Tie 10' \* 12' tarp (heavy duty best) over boom and top of stanchion posts to toe rails
-

## 17.7 Thru-Hull Locations

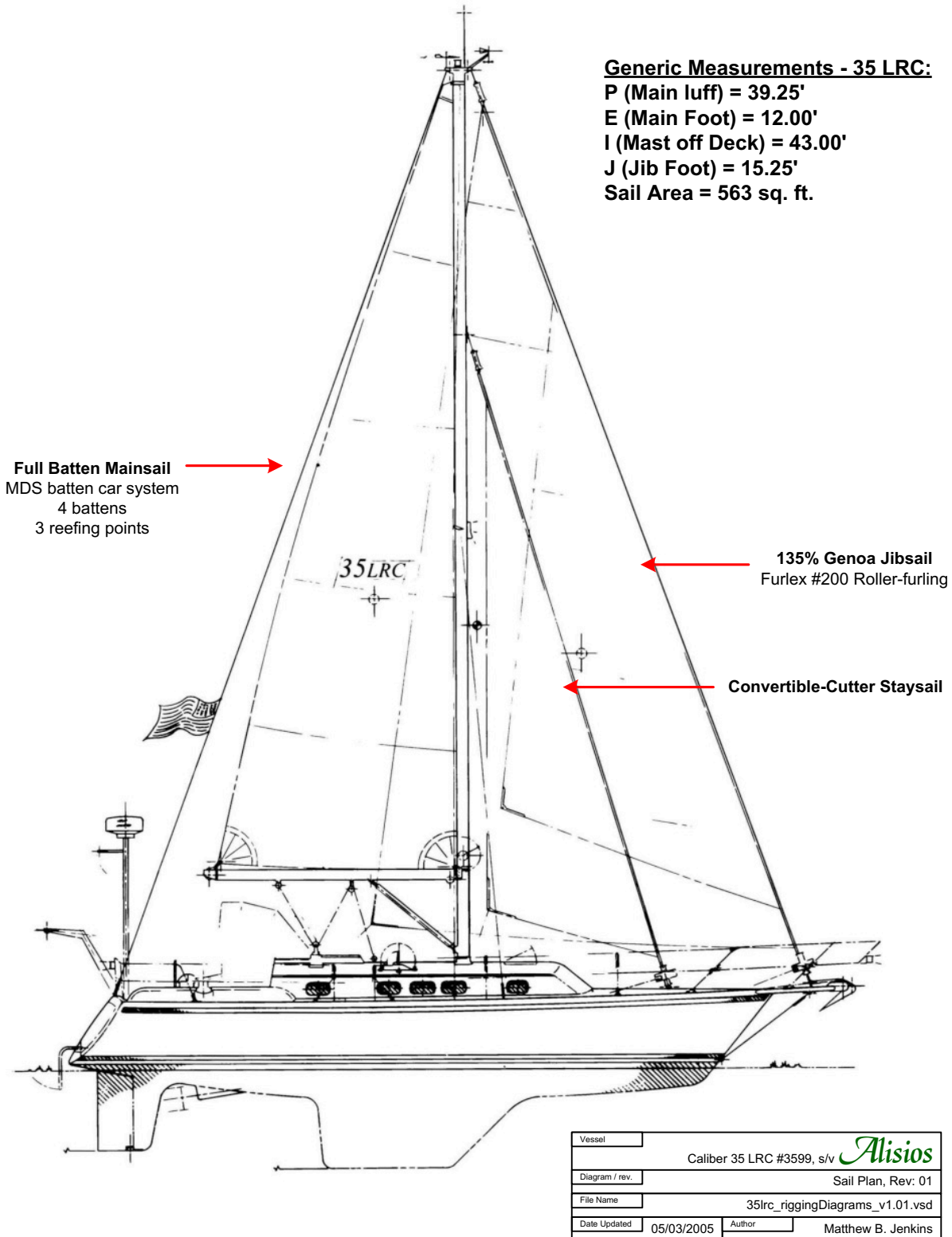


## 17.8 Light and AC Electrical Outlet Locations



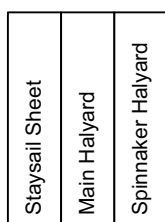
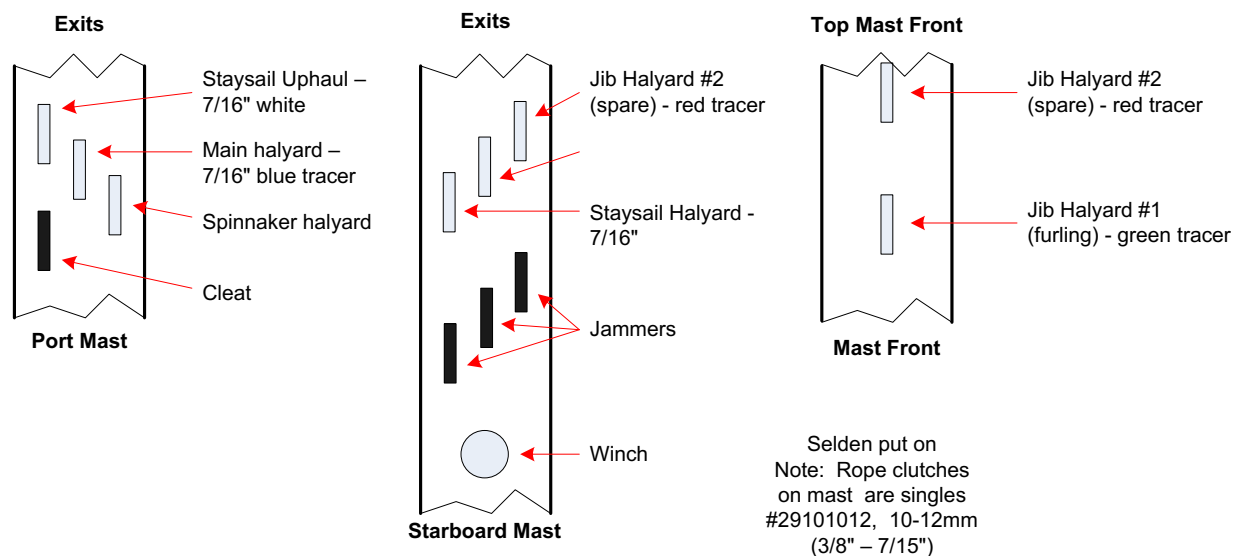
Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>		
Diagram / rev.	Light and AC Electric Outlet Locations, Rev: 01		
File Name	35lrc_hullDiagrams_v1.01.vsd		
Date Updated	05/13/2005	Author	Matthew B. Jenkins

## 17.9 Sail Plan

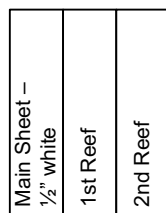




## 17.10 Mast Exit Locations



**Deck Port Side Line Clutch**



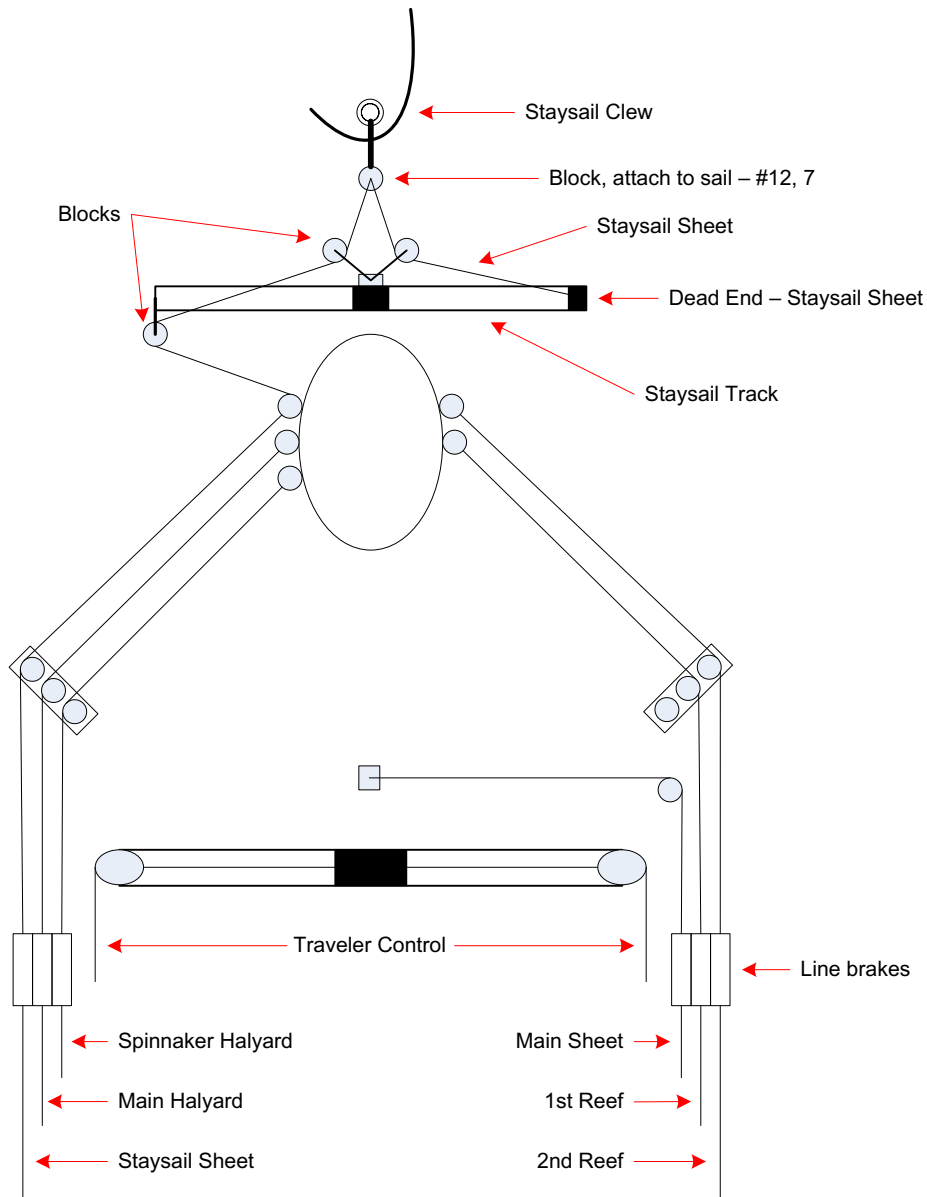
**Deck Starboard Side Line Clutch**

Selden put on  
Note: Rope clutches on deck are singles #29103012, 10-12mm (3/8" – 7/15")

\* Not Drawn To Scale

Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>	
Diagram / rev.	Mast Exit Locations, Rev: 01	
File Name	35lrc_riggingDiagrams_v1.01.vsd	
Date Updated	05/03/2005	Author Caliber (mbj)

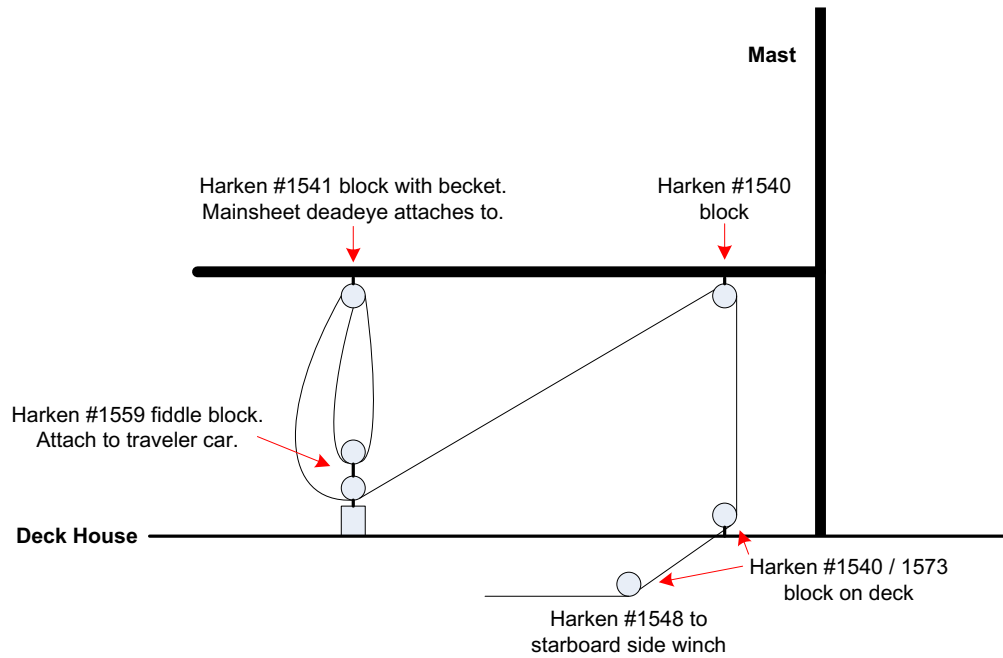
## 17.11 Line Configuration



\* Not Drawn To Scale

Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>		
Diagram / rev.	Running Rigging – Selden Mast, Rev: 01		
File Name	35lrc_riggingDiagrams_v1.01.vsd		
Date Updated	05/03/2005	Author	Caliber (mbj)

## 17.12 Mainsheet Arrangement



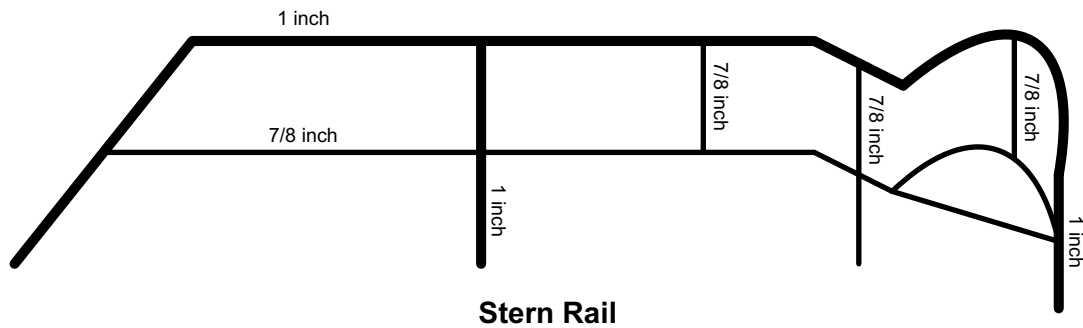
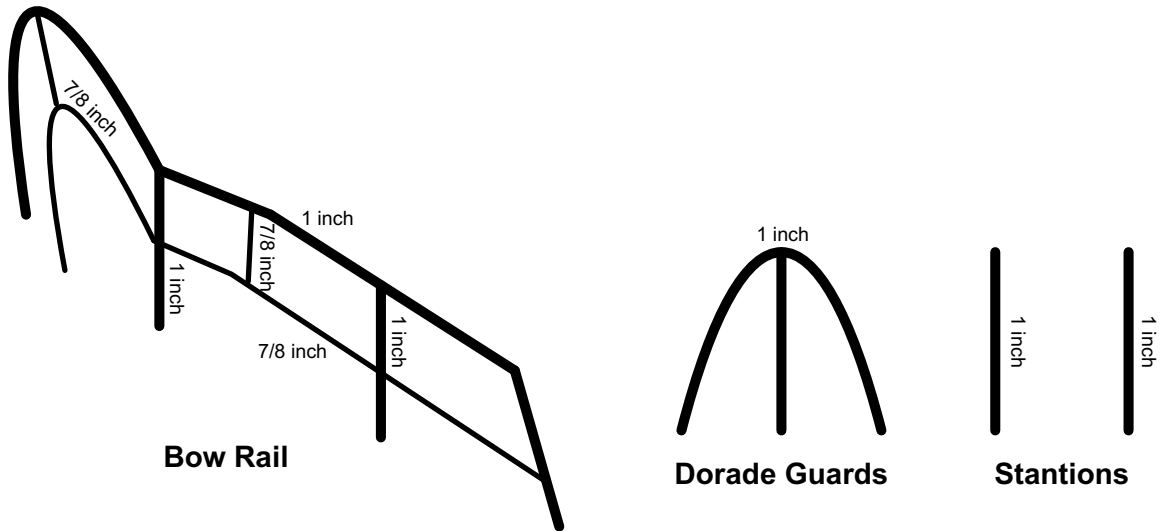
\* Not Drawn To Scale

Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>	
Diagram / rev.	Mainsheet Arrangement, Rev: 01	
File Name	35lrc_riggingDiagrams_v1.01.vsd	
Date Updated	05/03/2005	Author Caliber (mbj)

### 17.13 Stainless Tubing Diameters

Edson pedestal guard = 1 1/8" diameter. The two tubes are spaced 9 1/2" apart.

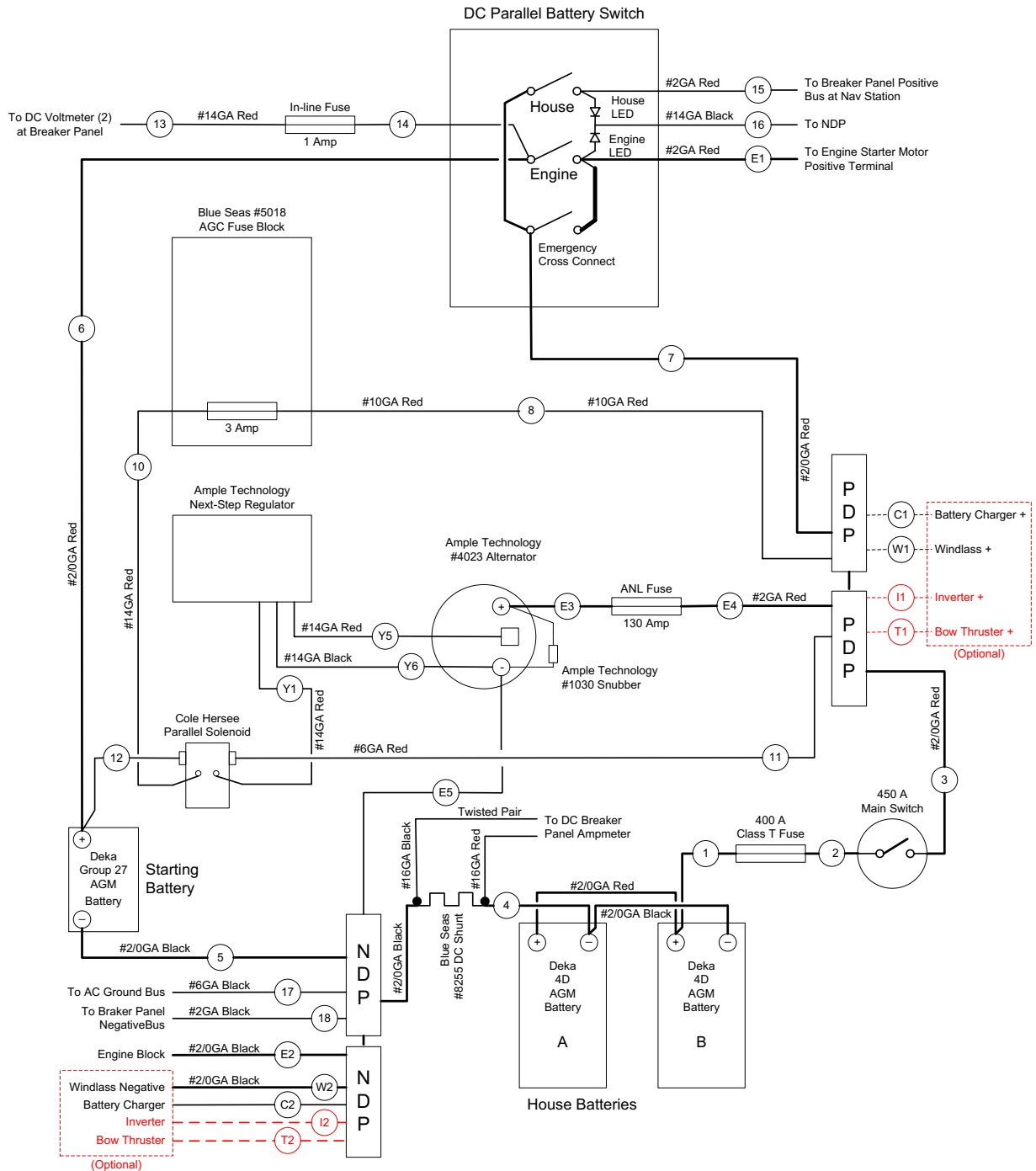
Dodger and bimini = 1"



Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>		
Diagram / rev.	Stainless Diameters, Rev: 01		
File Name	35lrc_riggingDiagrams_v1.01.vsd		
Date Updated	08/15/2006	Author	Caliber (mbj)



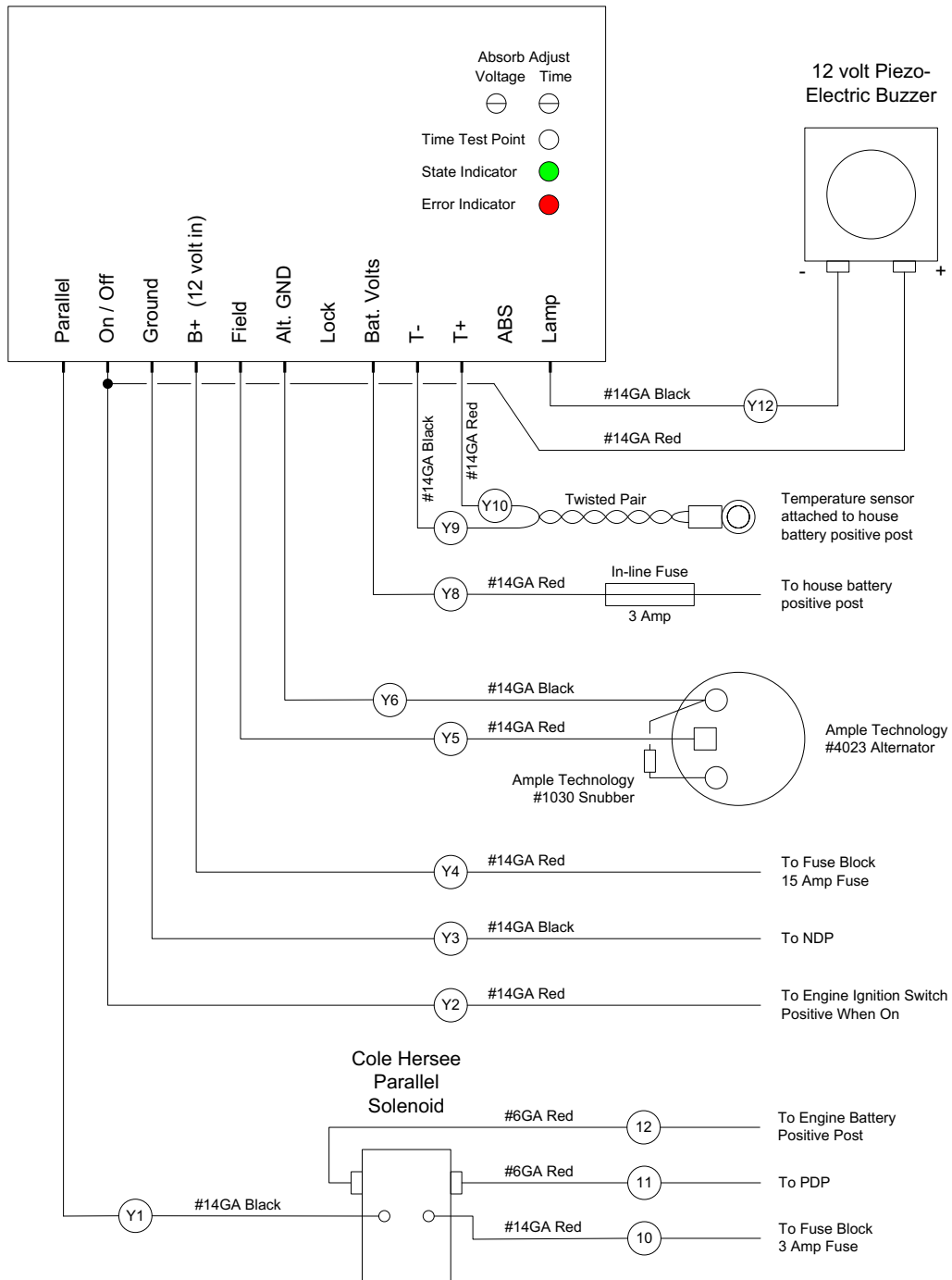
# 17.15 Electrical – Main Diagram



**Comments:**  
 Designations in circles are wire numbers  
 NDP = Negative Distribution Post  
 PDP = Positive Distribution Post  
 House battery voltage is indicated by voltmeter 1  
 Engine battery voltage is indicated by voltmeter 2

Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>
Diagram / rev.	Electrical – Main Diagram, rev: 03
File Name	35lrc_electricalDiagrams_v1.01.vsd
Date Updated	07/07/2005
Author	Jonathan Perret (mbj)

## 17.16 Next-Step Alternator Regulator

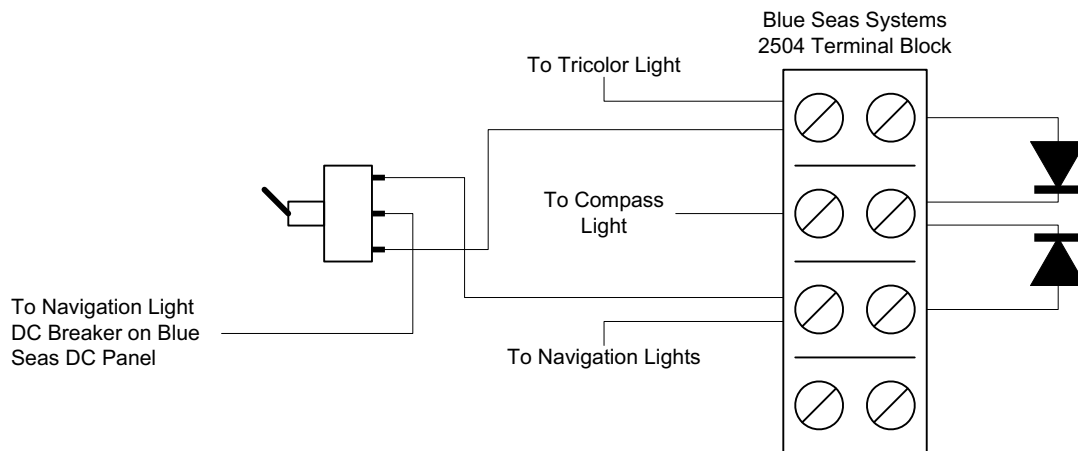
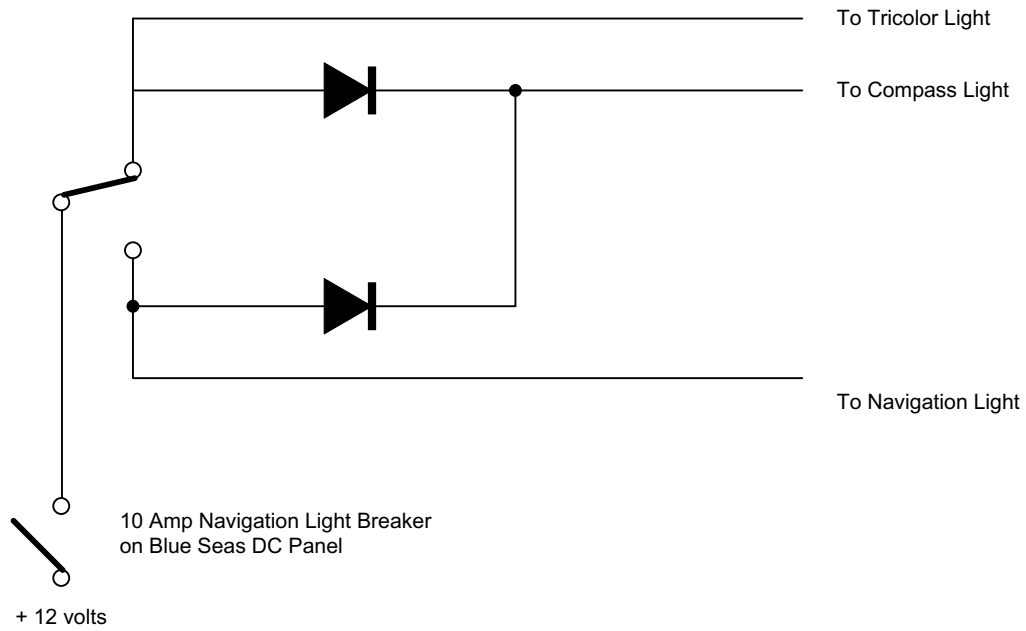


**Comments:**

Designations in circles are wire numbers  
 NDP = Negative Distribution Post  
 PDP = Positive Distribution Post

Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>	
Diagram / rev.	Next Step Alternator Regulator, rev: 02	
File Name	35lrc_electricalDiagrams_v1.01.vsd	
Date Updated	05/12/2005	Author Jonathan Perret (mbj)

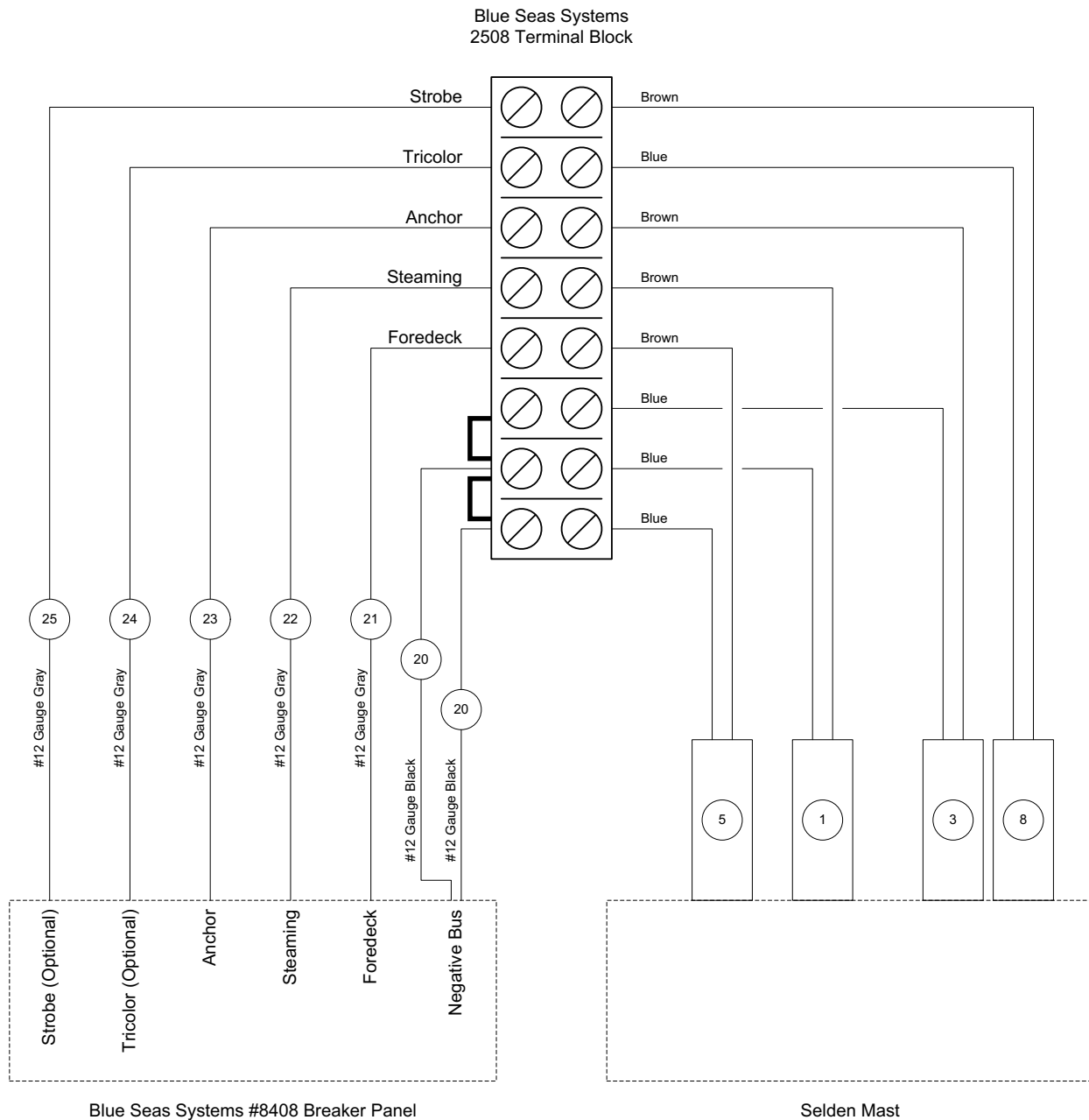
## 17.17 Tricolor Option – DC Panel Wiring



Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>	
Diagram / rev.	Tricolor Light Option – DC Panel Wiring, rev: 01	
File Name	35lrc_electricalDiagrams_v1.01.vsd	
Date Updated	05/03/2005	Author Jonathan Perret (mbj)

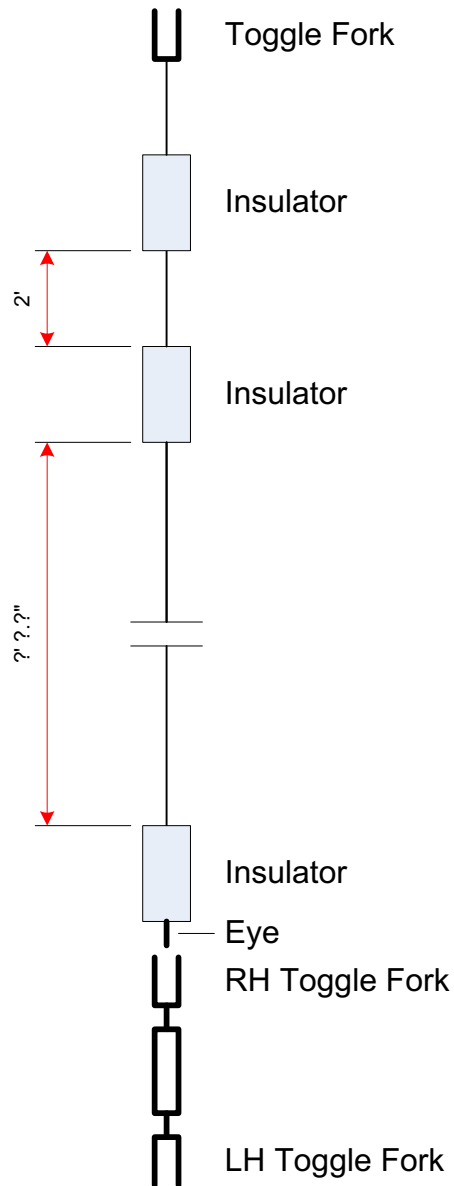


## 17.18 Tricolor Option – Mast Base Connections



Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>	
Diagram / rev.	Tricolor Option – Mast Base Connections, rev: 01	
File Name	35lrc_electricalDiagrams_v1.01.vsd	
Date Updated	05/03/2005	Author Jonathan Perret (mbj)

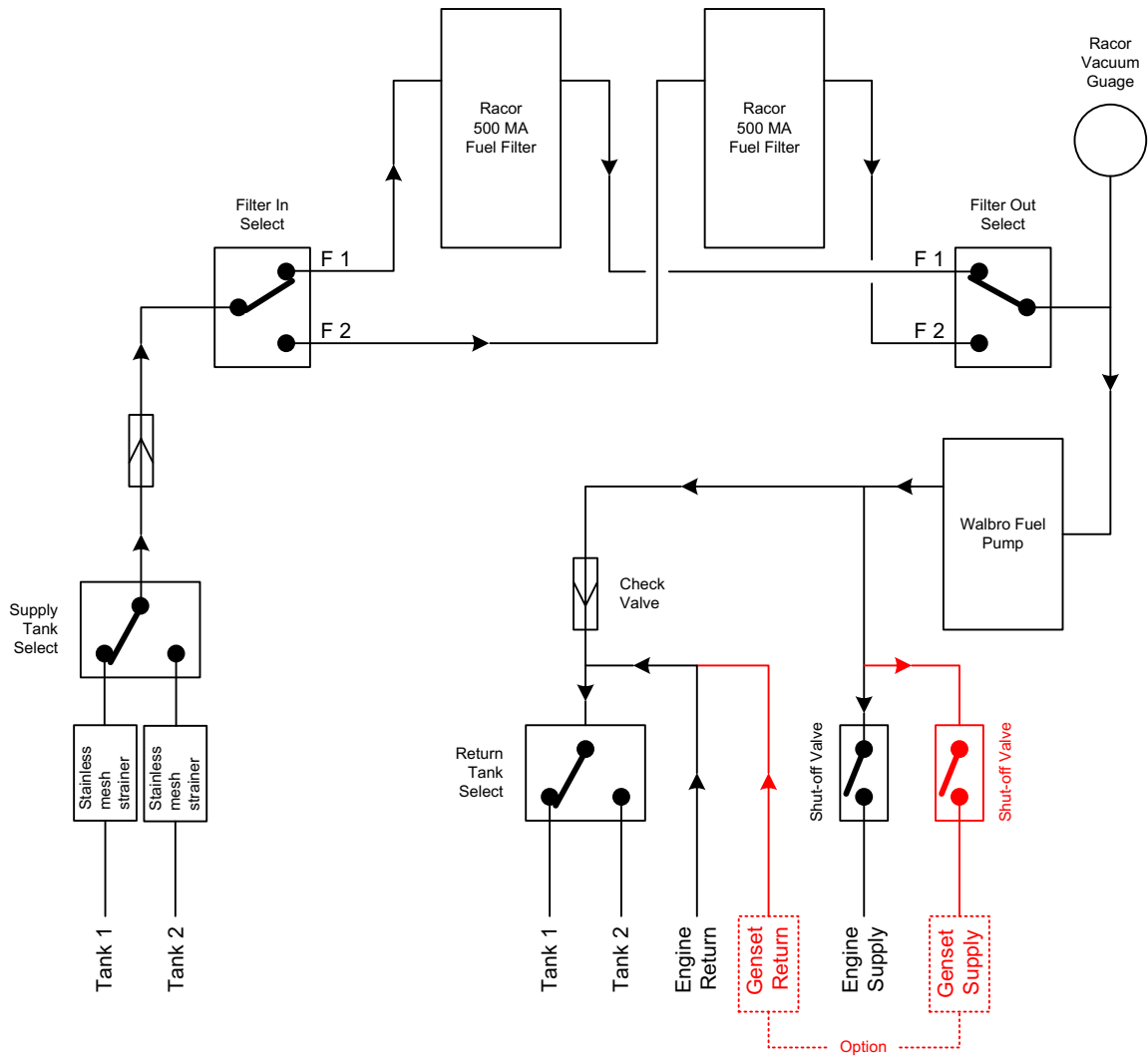
## 17.19 Insulated Backstay Option



\* Not Drawn To Scale

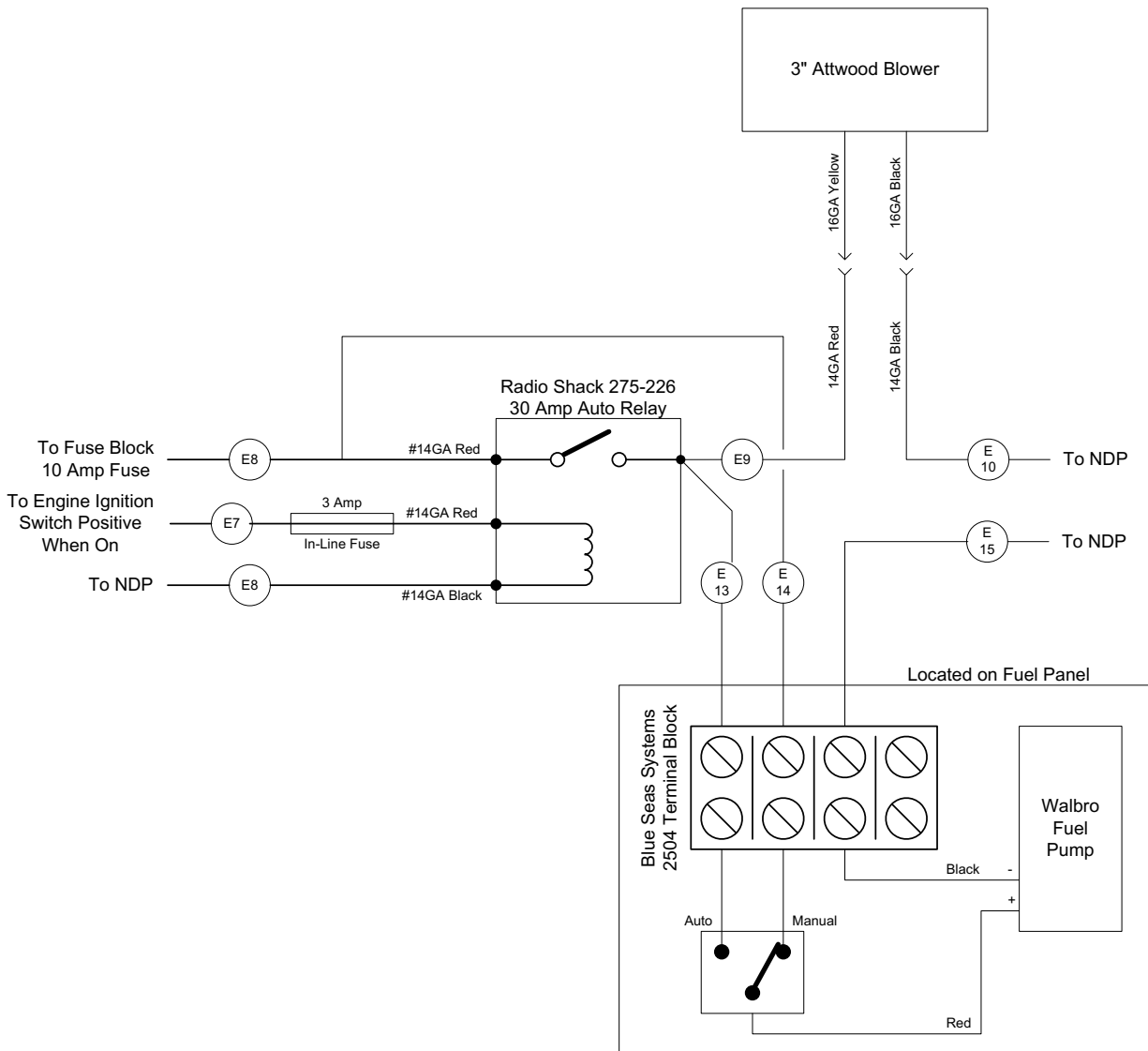
Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>	
Diagram / rev.	Insulated Backstay Option, rev: 01	
File Name	35lrc_electricalDiagrams_v1.01.vsd	
Date Updated	05/03/2005	Author Jonathan Perret (mbj)

## 17.20 Fuel Filter Panel



Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>	
Diagram / rev.	Fuel Filter Panel, rev: 03	
File Name	35lrc_fluidDiagrams_v1.01.vsd	
Date Updated	05/11/2005	Author Jonathan Perret (mbj)

## 17.21 Fuel Pump

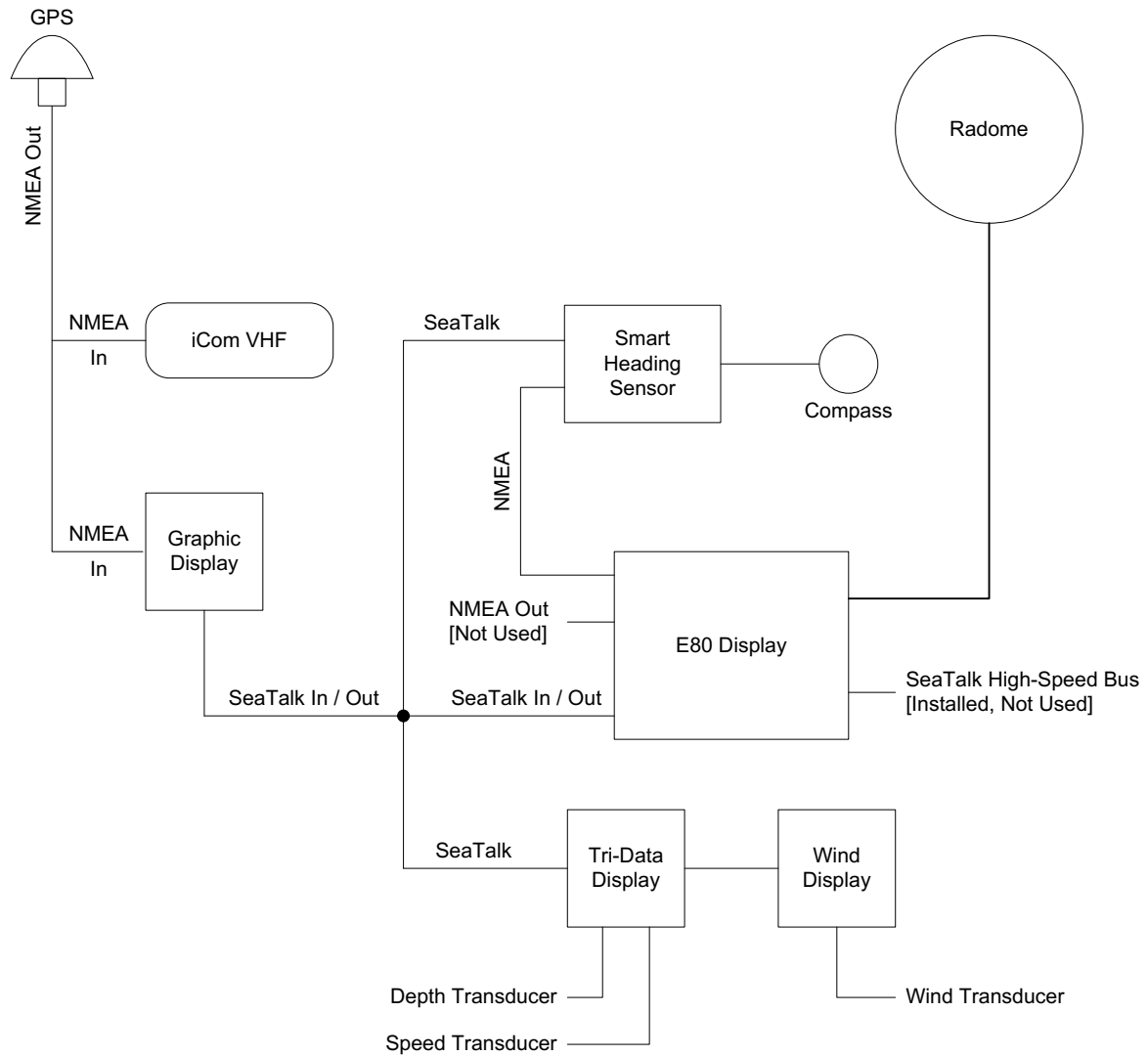


**Comments:**

There is no blower on the 35 LRC.

Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>		
Diagram / rev.	Engine Room Extraction Fan & Fuel Pump, rev: 03		
File Name	35lrc_fluidDiagrams_v1.01.vsd		
Date Updated	05/03/2005	Author	Jonathan Perret (mbj)

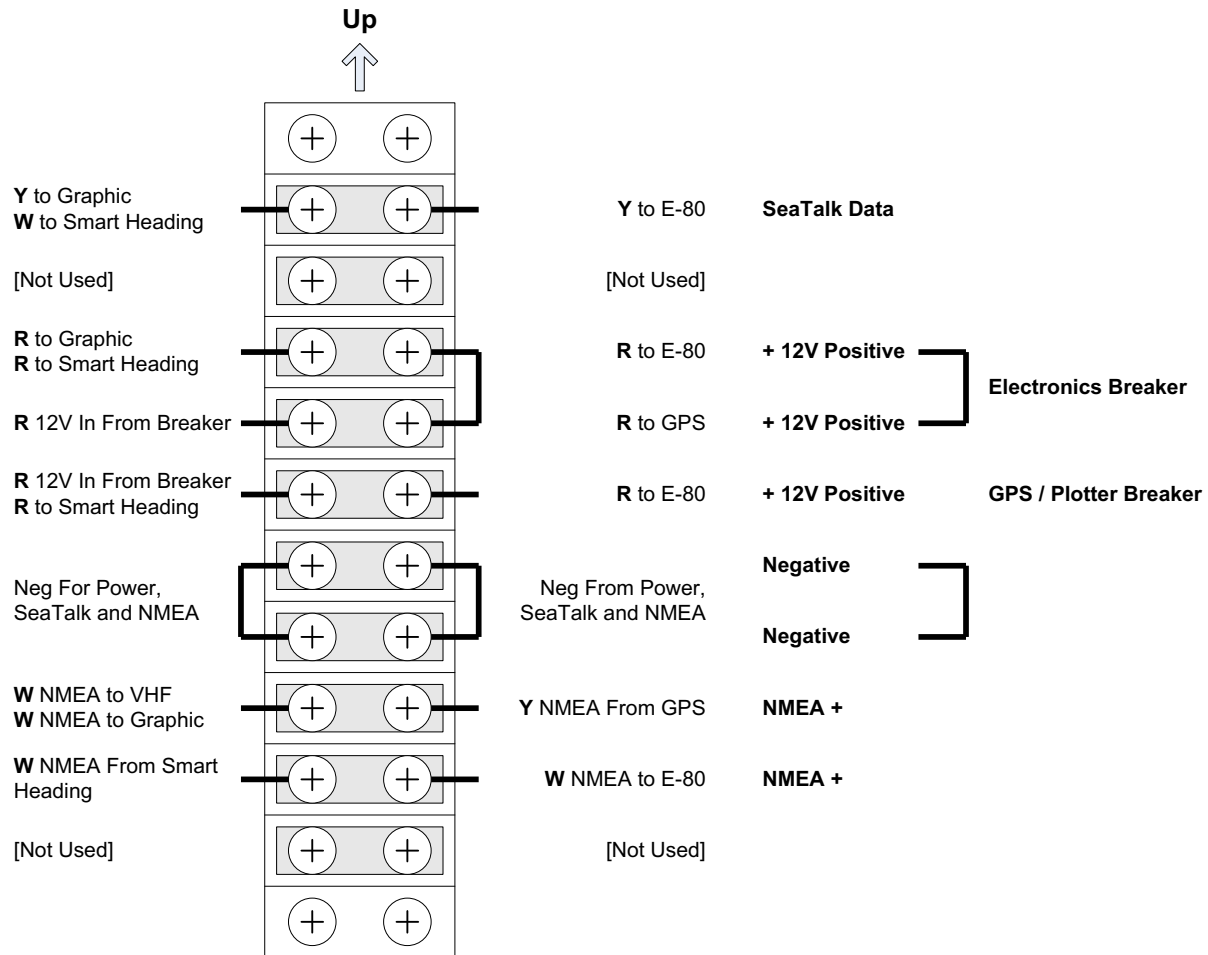
## 17.22 Raymarine Electronics – System Diagram



Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>		
Diagram / rev.	Raymarine – Overall System Connections, rev: 01		
File Name	35lrc_electricalDiagrams_v1.01.vsd		
Date Updated	11/10/2006	Author	Matthew Jenkins

## 17.23 Raymarine Electronics – Terminal Block

The wiring terminal block for the Raymarine electronics is located behind the nav station panel.

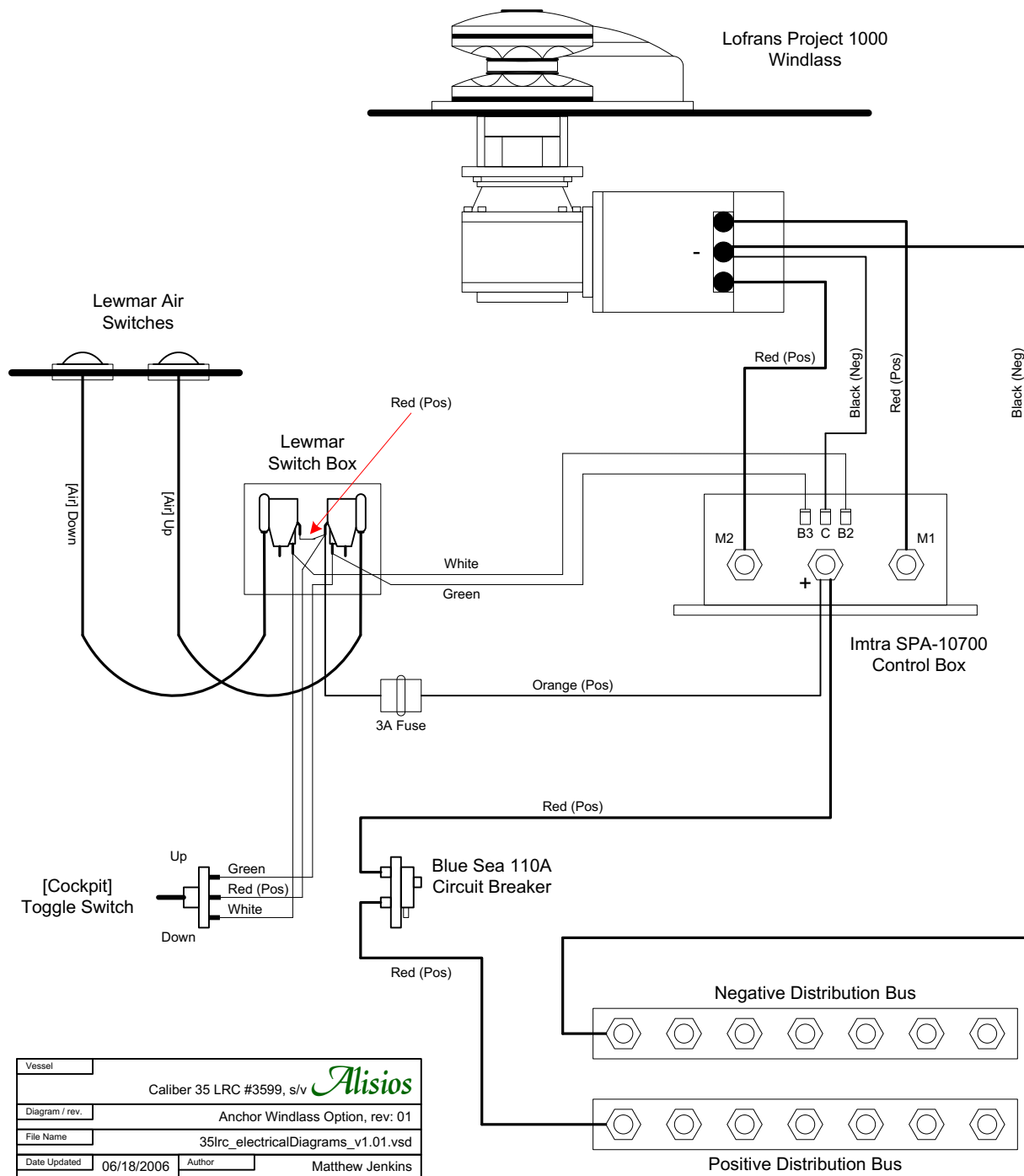


**Comments:**

R = Red  
W = White  
Y = Yellow

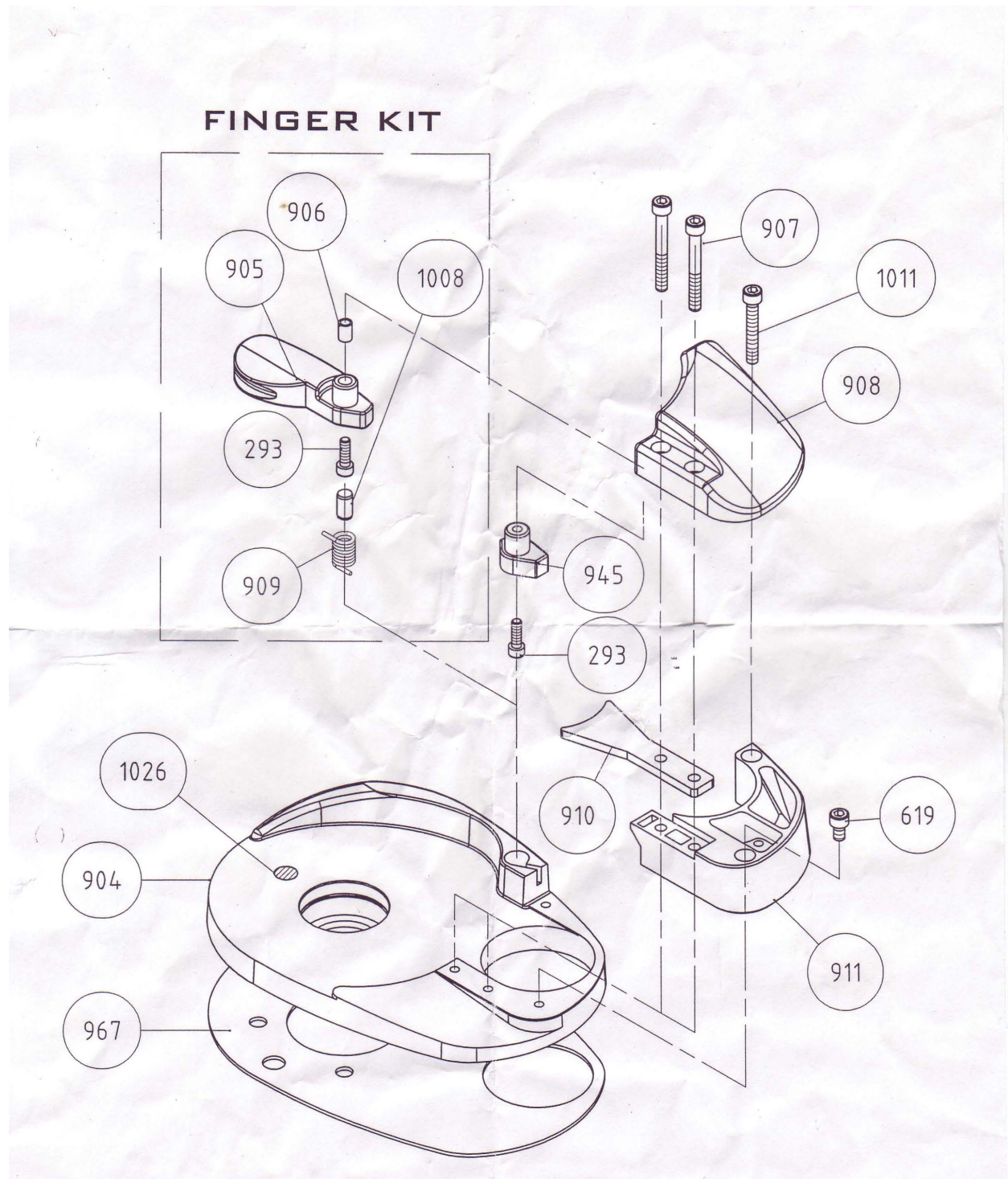
Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>		
Diagram / rev.	Raymarine Electronics - Terminal Block, rev: 01		
File Name	35lrc_electricalDiagrams_v1.01.vsd		
Date Updated	11/10/2006	Author	Matthew Jenkins

## 17.24 Anchor Windlass – Wiring



Vessel	Caliber 35 LRC #3599, s/v <i>Alisios</i>		
Diagram / rev.	Anchor Windlass Option, rev: 01		
File Name	35lrc_electricalDiagrams_v1.01.vsd		
Date Updated	06/18/2006	Author	Matthew Jenkins

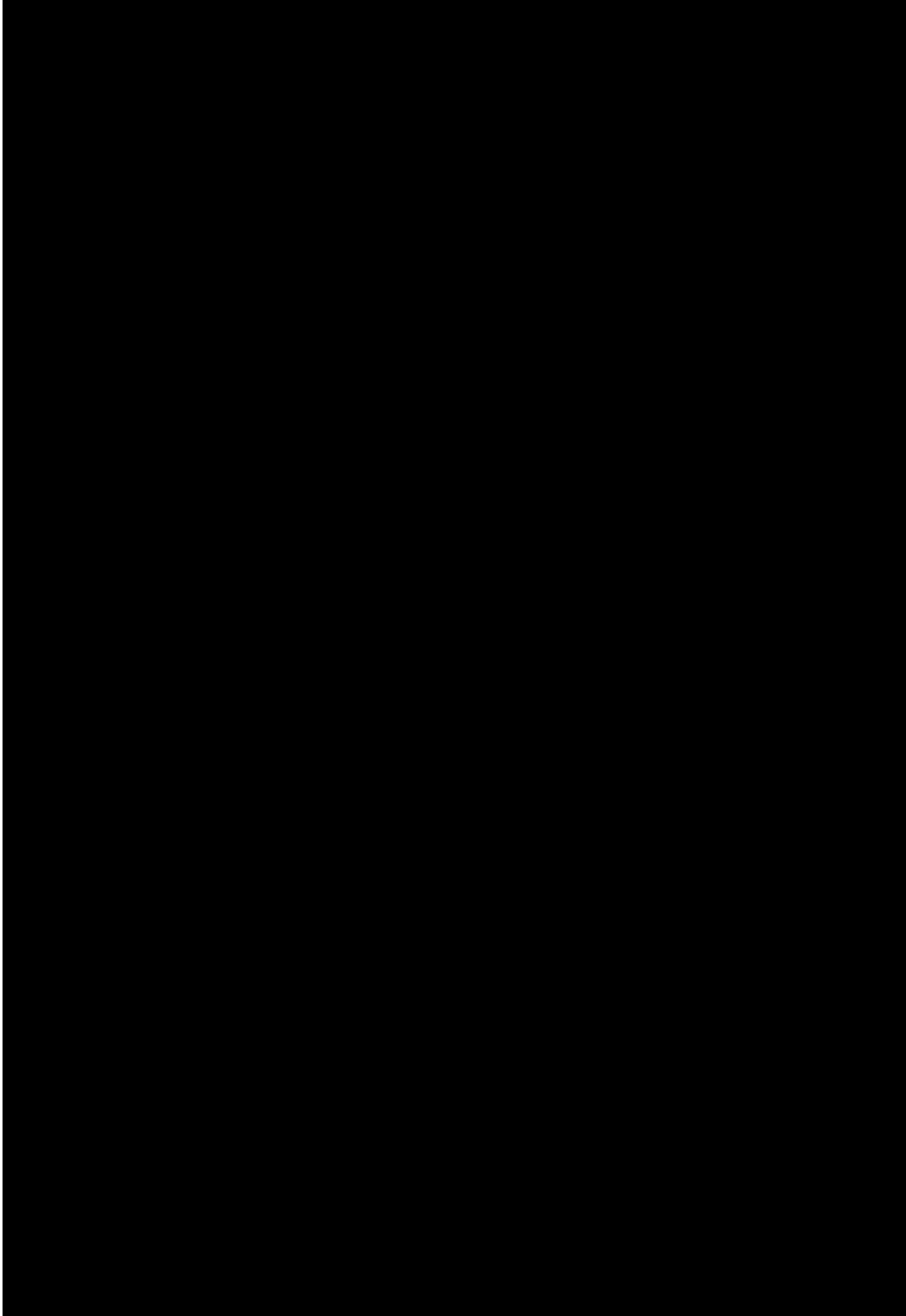
## 17.25 Lofrans Project 1000 Windlass – Deck Breakdown





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**17.26 Lofrans Project 1000 Windlass – Complete Breakdown**



Item <sup>29</sup>	Description	Qty.	Item	Description	Qty.
226	Washer M8 Uni 6592 (Kit B)	4	<b>914</b>	<b>Drum</b>	1
227	Nut M8 Uni 5587 (Kit B)	4	<b>915</b>	<b>Cone clutch</b>	2
255	Key 6x6x25 (Kit C)	2	<b>916a</b>	<b>Gipsy chain 06101</b>	1
260	Lock kasher M8 (Kit B)	4	<b>916b</b>	<b>Gipsy chain 08101</b>	1
272	Handle 1 926 Wormwheel	1	<b>916c</b>	<b>Gipsy chain 10101</b>	1
278	Seal 25-47-7 (Kit A)	1	<b>916d</b>	<b>Gipsy chain 10102</b>	1
280	Circlip 25 Din 471 (Kit D)	2	<b>917a</b>	<b>Std main shaft</b>	1
284	Key 8x7x60 Kit C 1 929 Worm	1	919a	LP main shaft	1
292a	Stud M8x75 Kit B 4 945 Cap	1	920	Gearcase - upper	1
293	Hd cap screw M5x16 Uni 5931 (Kit B)	1	921	O Ring 4375 (Kit A)	1
304	Seal 40-55-7 (Kit A)	2	922	Sleeve	1
308	Washer M6 Uni 6592 (Kit B)	4	923	Washer	1
309	Bearing 6203	1	924	Spring	1
311	Thrust bearing 51105	1	925	Dog clutch	1
312	Circlip 43 Din 472 (Kit D)	1	927	Circlip 40 Din 471 (Kit D)	2
313	Seal 25-43-7 (Kit A)	1	928	Gearcase - lower	1
351	Hd cap screw M6x20 Uni 5931 (Kit B)	8	946	Gipsy cap	1
550	Ring	1	947	Lock nut	1
619	Hd cap screw M6x10 Uni 5931 (Kit B)	2	948	Bush	1
870	Bearing 6008	2	950	Circlip 47 Din 472 (Kit D)	1
<b>887</b>	<b>Pin 4x14 Uni 1707. See 1008</b>	1	951a	Electric motor 1000W 12V	1
903	Stainless steel bearing 6005 2RS	1	951b	Electric motor 1000W 24V	1
904	Base. See 1026	1	967	Gasket	1
905	Finger	1	<b>1008</b>	<b>Pin – New part # for 887</b>	1
906	Spacer	1	<b>1011</b>	<b>[3<sup>rd</sup>] Hd cap screw for use in conjunction with 907</b>	1
<b>907</b>	<b>Hd cap screw M6x50 Uni 5931 (Kit B) Also see 1011.</b>	2	1026	Base – New part # for 904	1
<b>908</b>	<b>Cover</b>	1			
<b>909</b>	<b>Spring</b>	1	KA25101	Kit A – Seals for Project 1000	
<b>910</b>	<b>Stripper</b>	1	KB25101	Kit B – Screw&Nuts for Project 1000	
911	Support	1	KC25101	Kit C – Keys for Project 1000	
<b>912</b>	<b>Clutch nut</b>	1	KD25101	Kit D – Circlips for Project 1000	
913	O Ring 3287 (Kit A)	2			

<sup>29</sup> Parts in bold tie back to instructions for basic maintenance / lubrication.

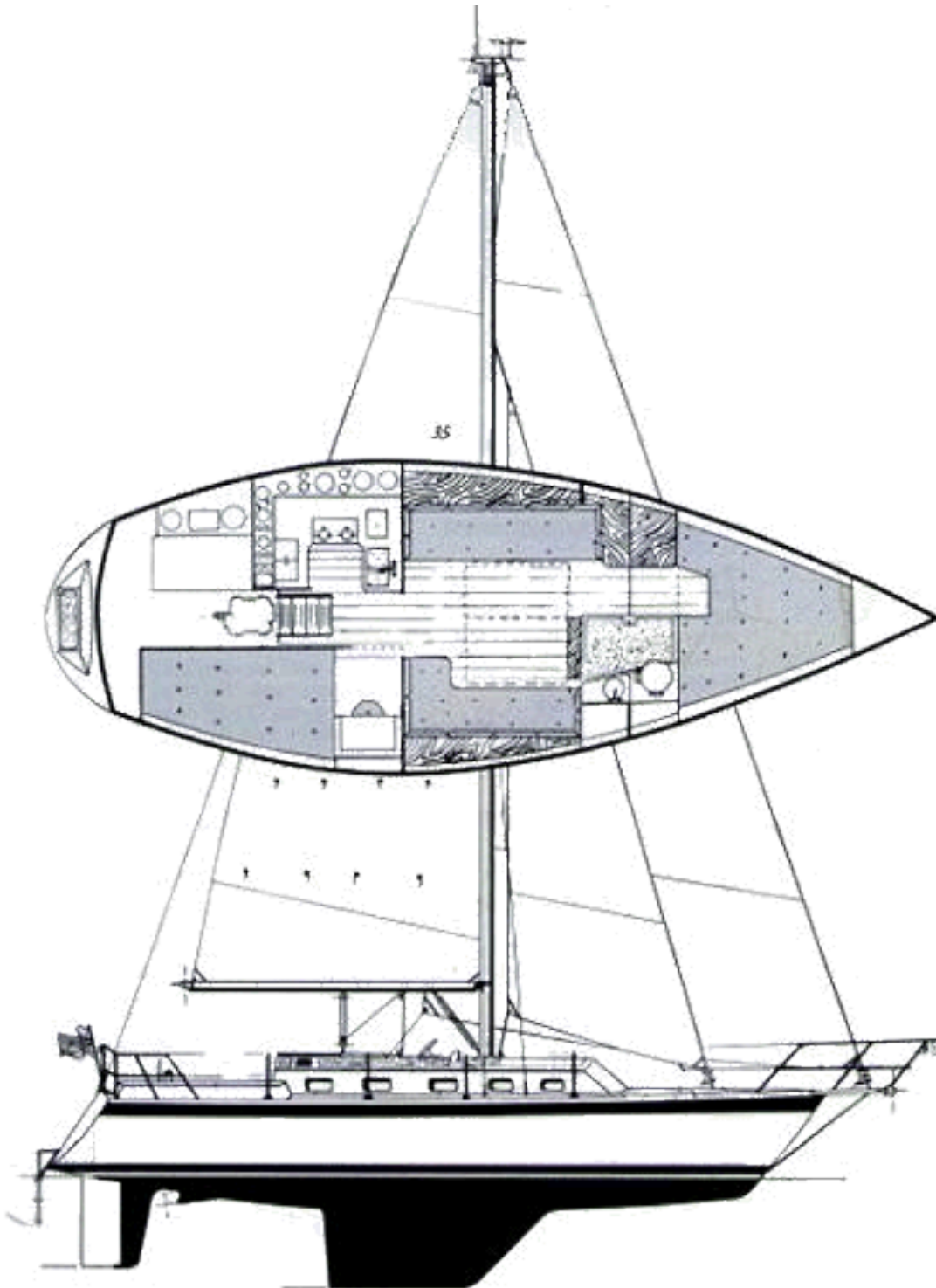
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**17.27 Caliber 35 LRC Artist's Profile**



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## 17.28 Caliber 35 LRC Profile and Interior Layout



## 18 ADDRESSES

<b>Vendor</b>	<b>Notes:</b>
ABI / Precision Lighting phone: 800-422-1301 phone: 707-585-6210 <a href="mailto:info@abimarine.com">info@abimarine.com</a> <a href="http://www.abimarine.com/">http://www.abimarine.com/</a>	Does not sell directly to the public.
ACR Electronics 5757 Ravenswood Rd. Fort Lauderdale, Florida 33312 phone: 800-432-0227 phone: 954-981-3333 fax: 954.983.5087 <a href="http://www.acrelectronics.com/">http://www.acrelectronics.com/</a>	EPIRB
Airpax Corporation Power Protection Products 807 Woods Road P.O. Box 520 Cambridge, MD 21613-0520 phone: 410-228-4600 <a href="http://www.airpaxppp.com/">http://www.airpaxppp.com/</a>	Original windlass series #53 circuit breaker. Replaced with a Blue Sea model due to nuisance tripping. (Go through Caliber if replacement is needed.)
American Flag and Gift Co. 1101 Highland Way, Suite B Grover Beach, CA 93433-3127 Questions: 805-473-0395 Orders Only Line: 800-448-3524 <a href="http://www.anyflag.com/">http://www.anyflag.com/</a>	Any flag, reasonable prices, website difficult to navigate need to use search to find anything
Apollo Ball Valve Division Conbraco Industries, Inc. P.O. Box 125 Pageland, SC 29728 phone: 1-843-672-6161	Sea cocks and thru-hulls
Attwood Corporation 1016 North Monroe Street Lowell, MI 49331-0260 USA phone: 616-897-2290 <a href="http://www.attwoodmarine.com">www.attwoodmarine.com</a>	Heavy duty electric bilge pump
Blue Sea Systems Inc. 425 Sequoia Drive Bellingham, WA 98226 USA phone: 800-222-7617 phone: 360-738-8230 fax: 360-734-4195 <a href="http://www.blueseas.com">www.blueseas.com</a>	DC / AC power distribution panel, DC battery parallel switch, Fuse blocks, Circuit breakers, etc.
Bluewater Books and Charts 1481 S.E. 17 <sup>th</sup> Street	

<p>Fort Lauderdale, FL 33316 USA  phone: 800-942-2583  fax: 954-522-2278  <a href="http://www.bluewaterweb.com">www.bluewaterweb.com</a></p>	
<p>Boats.net  730 US Hwy 27 North  Lake Placid, Florida 33852  phone: 877-512-6287  fax: 801-881-1039  <a href="mailto:parts@boats.net">parts@boats.net</a>  <a href="http://www.boats.net/">http://www.boats.net/</a></p>	Discount Yamaha outboard parts and a wide variety of other marine items
<p>Boat U.S.  880 South Pickett Street  Alexandria, VA 22304  <a href="http://boat.us.com">http://boat.us.com</a>  24-hour towing dispatch: Hail on VHF 16  or call 1-800-391-4869  Membership: 1-800-395-2628</p>	(Boat Owners Association of The United States)
<p>Meade A. Breese, Sailmaker  21295 Allens Lane / P.O. Box 546  Rock Hall, MD 21661  410-639-2646  <a href="http://www.breesesailmakers.com/">http://www.breesesailmakers.com/</a></p>	Re-stitched Genoa sunshield 05/2015
<p>Caliber Yachts, Inc.  4551 107th Circle N.  Clearwater, FL 33762  phone: 727-573-0627  fax: 727-573-2413  <a href="http://caliberyacht.com/">http://caliberyacht.com/</a>  <a href="mailto:George.McCreary@caliberyacht.com">George.McCreary@caliberyacht.com</a></p>	
<p>Caribbean Weather Center  Chris Parker, <i>Belamie</i>  <a href="http://www.caribwx.com/ssb.html">http://www.caribwx.com/ssb.html</a></p>	As of March 2008 – 06:30 through 10:00 EST SSB Frequencies were: 4045, 8137, 4045, 8104, 12350, 6221, 14300
<p>CBP Decals  <b>Mailing Address:</b>  Customs and Border Protection  User Fee Program Administrator  P.O. Box 382030  Pittsburgh, PA 15250-8030  <b>Courier Delivery:</b>  Customs and Border Protection  User Fee Program Administrator  500 Ross Street, Suite 640  Pittsburgh, PA 15262  phone: 317-298-1245  <a href="mailto:decals@dhs.gov">decals@dhs.gov</a>  <a href="http://www.cbp.gov/">http://www.cbp.gov/</a></p>	<p>As of Fall 2007, from <a href="http://www.cbp.gov">www.cbp.gov</a> website:</p> <ul style="list-style-type: none"> <li>• Click on Travel</li> <li>• Click on User Fee Decals and Transponders</li> <li>• Click on Apply online for User Fee Decals and Transponders</li> <li>• You will be re-directed to an external website – Click OK</li> <li>• You should be directed to the following link:  <a href="https://tradelinks4.mellon.com/cbp/Dispatcher">https://tradelinks4.mellon.com/cbp/Dispatcher</a></li> </ul>
<p>Chesapeake Marine Fasteners, Inc.  P.O. Box 6521</p>	Every sort of marine nut, bolt, fastener imaginable (except the one you need)

<p>10 Willow St. Annapolis, MD 21401 phone: 410-266-9332 fax: 410-266-0709 <a href="mailto:cmf321@hotmail.com">cmf321@hotmail.com</a> <a href="http://www.chesfast.com/">http://www.chesfast.com/</a></p>	
<p>C-Level, Inc. 141 Casco Drive Avon, IN, 46123 USA phone: 800-998-8683 phone: 317-536-5298 fax: 317-536-8350 <a href="mailto:Info@clevel.com">Info@clevel.com</a> <a href="http://www.clevel.com/">http://www.clevel.com/</a></p>	<p>Manufacture dinghy lifts, tow bridals, outboard lifts, jacklines, tethers, etc.</p>
<p>Coast Guard – see “U.S. Coast Guard”</p>	
<p>ComNav Marine Ltd. #15 – 13511 Crestwood Place Richmond BC Canada V6V 2G1 phone: 800-428-0212 phone: 604-207-1600 <a href="http://www.comnavmarine.com">www.comnavmarine.com</a></p>	<p>Also see Jon Josephson, JRJ Group Silva, ComNav, and Nexus are the same.</p>
<p>Crestec U.S.A. / <a href="http://yamahapubs.com">yamahapubs.com</a> (888) 530-9446 <a href="http://yamahapubs.com/">http://yamahapubs.com/</a></p>	<p>Official publisher of Yamaha owner and service manuals. 5MSHX Service Manual is part #: LIT-18616-01-33 Less expensive, .pdf versions of the same manuals are available through <a href="http://marinepartsman.com/">http://marinepartsman.com/</a>.</p>
<p>Davis Instruments Corp. 3465 Diablo Ave. Hayward, CA 94545, USA phone main: 510-732-9229 tech support: 510-732-7814 <a href="http://www.davisnet.com/marine/">http://www.davisnet.com/marine/</a></p>	
<p>Defender phone: 800-628-8225 fax: 800-654-1616 <a href="http://www.defender.com/">http://www.defender.com/</a> <a href="mailto:orders@defender.com">orders@defender.com</a></p>	<p>Discount marine chandlery</p>
<p>Deka East Pen Manufacturing Co. Inc. Deka Road Lyon Station, PA 19536 USA phone: 610-682-6361 <a href="mailto:eastpenn@eastpenn-Deka.com">eastpenn@eastpenn-Deka.com</a> <a href="http://www.eastpenn-deka.com/">http://www.eastpenn-deka.com/</a></p> <p>Stevens Battery Warehouse 1900 Forest Drive Annapolis, MD 21401 Phone :410-267-0799</p>	<p>AGM batteries</p>

<a href="http://www.stevensbattery.com/marine-and-rv-batteries.html">http://www.stevensbattery.com/marine-and-rv-batteries.html</a>	
Discount Boat Tops 14000 66 <sup>th</sup> Street Largo, FL 33771 phone: 727-536-4412 fax: 727-535-8351	Did the upholstery work and cockpit cushions for Caliber. Note: The interior of each boat is slightly different and is measured individually. However, the cockpit cushions are made to a template. The shell green fabric used in 3599 is no longer available.
Dometic Corporation Marine Systems (SeaLand® and VacuFlush®) 13128 State Rt. 226, P.O. Box 38 Big Prairie, OH 44611 USA phone: 800-321-9886 phone: 330-496-3097 phone: 330-496-3211 fax: 330-496-3097 <a href="mailto:sealand@dometicus.com">sealand@dometicus.com</a> <a href="http://dometicsanitation.com/home.asp">http://dometicsanitation.com/home.asp</a>	TankWatch Level Monitor System for holding tank  Dometic Sanitation Systems VacuFlush® OdorSafe® Plus Sanitation Hose. Can be purchased from Delmar Marine Services, 941-751-4486 or any Vacuflush dealer
Doyle Sails Chesapeake Eastport, MD Chuck O'Malley phone: 410-263-4840 cell: 443-994-5547 <a href="mailto:comalley@doylesails.com">comalley@doylesails.com</a>	
Doyle Sails Clearwater Andy Watts phone: 246-423-4300, ext. 101 cell: 246-262-6255 <a href="mailto:doyle@caribnet.net">doyle@caribnet.net</a>	Manufacturer of sails for Caliber. (Has facilities in both Clearwater, FL and Barbados.)
Dr. LED PO Box 25775 Seattle, WA98125 Jimmy or Yoshi 206-388-3701 <a href="mailto:info@doctorled.com">info@doctorled.com</a> <a href="http://doctorled.com">http://doctorled.com</a>	LED replacement bulbs
Edson International 146 Duchaine Blvd. New Bedford, MA 02745 phone: 508-995-9711	Pedestal steering system
Electronic Marine, Inc. (EMI) 7310 Edgewood Road Bldg #8 Annapolis, MD 21403 phone: 410-268-8101 <a href="http://www.electronicmarine.com">http://www.electronicmarine.com</a>	Marine electronics installer
FilterPros.com 41-910 Boardwalk Ave., Suite B1 Palm Desert, CA 92211 888-949-8883 <a href="mailto:sales@filterpros.com">sales@filterpros.com</a>	Re-seller of water filtration products.  Seagull IV X-1F replacement filter cartridge RS-1SG and The PurestOne TP1 (Seagull-compatible) replacement filter



<a href="http://www.filterpros.com/">http://www.filterpros.com/</a>	
Fisheries Supply 1900 N Northlake Way Seattle, WA 98103 800-426-6930 <a href="mailto:support@fisheriessupply.com">support@fisheriessupply.com</a>	Tank Tender distributor / parts The in-the-tank tube is a "Tank Tender Tank Penetration Fitting", SKU 31776
Force 10 Marine Company 23080 Hamilton Road Richmond BC Canada V6V 1C9 phone: 800-663-8515 phone: 604-522-0233 fax: 604-522-9608 <a href="http://www.force10.com">www.force10.com</a> <a href="mailto:sales@force10.com">sales@force10.com</a>	Gimbaled Galley Range model # 63251  For Hot Water Heater see Kuuma Products
Forespar Inc. 22322 Gilberto Rancho Santa Margarita, CA 92688 phone: 800-266-8820 phone: 949-858-8820	Manufacture whisker poles, etc.
Fortress Marine Anchors 1386 West McNab Road Fort Lauderdale, FL 33309 phone: 800-825-6289 <a href="http://www.fortressanchors.com">http://www.fortressanchors.com</a>	
Franmar Chemical P.O. Box 5565 Bloomington, IL 61702 phone: 800-538-5069 phone: 309-452-7526 <a href="mailto:franmar@franmar.com">franmar@franmar.com</a> <a href="http://www.franmar.com/">http://www.franmar.com/</a>	Manufacture SOY Strip
Furlex – See Selden	
Garmin International 1200 East 151 <sup>st</sup> Street Olathe, Kansas 66062 USA phone: 913-397-8200 <a href="http://www.garmin.com">www.garmin.com</a>	
Garhauer, Inc. 1082 West Ninth Street Upland, CA 91786 phone: 909-985-7513	
General Ecology Incorporated 151 Sheree Blvd Exton, PA 19341 USA phone: 1-800-441-8166 <a href="http://www.generalecology.com">www.generalecology.com</a>	Seagull IV X-1F drinking water filter Replacement filter cartridge RS-1SG  See FilterPros – reseller of both genuine Seagull and compatible replacement cartridges.
GlenMar Marine Supply	Supplier Caliber uses for the cutlass bearing

6870 142 Ave North Largo, FL 33771 phone: 727.536.1955	
Grohe America Inc. 241 Covington Drive Bloomington, IL 60108 USA phone: 630-582-7711	Head faucet
Grundig / Lextronix Inc. P.O. Box 2307 Menlo Park, CA 94026 phone: 1-800-872-2228	Grundig Yacht Boy 400 Professional Edition (YB 400 PE) World Receiver [AM / FM / SSB receiver]
Hamilton Marine, Inc. 155 East Main Street Searsport, ME 04974-0227 phone: 800-639-2715 phone: 207-548-6302 <a href="http://www.hamiltonmarine.com/">www.hamiltonmarine.com/</a>	Mid-sized (5 stores) marine chandlery in Maine with decent on-line store. Better prices than West Marine and others.
HART Systems Inc. Gig Harbor, Washington phone: 253-858-8481 fax: 253-858-8486 <a href="http://tanktender.com/">http://tanktender.com/</a>	Bought by Xantrex TankTender tank monitoring system See Fisheries Supplies for TankTender parts
iCom America 2380 116 <sup>th</sup> Avenue, NE Bellevue, WA 98004 phone: 800-872-4266 phone: 425-454-8155 <a href="http://icomamerica.com">http://icomamerica.com</a>	IC-M402A Remote-control mic compatible VHF marine transceiver
Imtra Corporation 30 Samuel Barnet Blvd. New Bedford, MA 02745 USA phone: 508-995-7000 fax: 508-998-5359 <a href="http://imtra.com/">http://imtra.com/</a> Jim Thomas <a href="mailto:jim@imtra.com">jim@imtra.com</a> phone: 508-995-8188 Ext. 102	Windlass and associated equipment
Jabsco ITT Industries 20 Icon Foothill Ranch, CA 92610 USA phone: 949-609-5106 fax: 949-859-1254 <a href="http://www.jabsco.com">www.jabsco.com</a>	Par Max 3 water system pump Accumulator tank 37202 series electric bilge pump
Jon Josephson, JRJ Group 4816 NW 129 <sup>th</sup> Street Vancouver, WA 98685 USA phone: 360-571-5835 <a href="mailto:jrigroupservice@comcast.net">jrigroupservice@comcast.net</a>	ComNav / Nexus distributor and technical support

<p>Kuuma Products 724 Whitney Street San Leandro, CA 94577 USA phone: 866-995-8862 phone: 920-321-1880 <a href="http://www.kuumaproducts.com/">http://www.kuumaproducts.com/</a></p>	<p>Bought Force 10's line of water heaters and barbeques in 2006</p> <p>Force 10 model # 40601, six gallon Electric Water Heater</p>
<p>Landfall Navigation 151 Harvard Avenue Stamford, CT 06902 phone: 800-941-2219 phone: 203-487-0775 <a href="http://www.landfallnavigation.com/">http://www.landfallnavigation.com/</a> <a href="mailto:order@landfallnavigation.com">order@landfallnavigation.com</a></p>	<p>Discount marine chandlery</p>
<p>Lewis Offshore Ltd. 12636 Selsey Rd. Ocean City, MD 21842 phone: 410-213-2725 fax: 410-213-0378 email: <a href="mailto:info@explorercharts.com">info@explorercharts.com</a> web: <a href="http://www.explorercharts.com/">http://www.explorercharts.com/</a></p>	<p>Explorer charts of the Bahamas</p> <ul style="list-style-type: none"> <li>• Near Bahamas, including the ABACOS</li> <li>• Exumas, including the Ragged Islands</li> <li>• Far Bahamas</li> <li>• Custom Chart: Sea of Abaco</li> </ul>
<p>Mack Boring &amp; Parts Company 2365 Route 22 West Union, NJ 07083 USA phone: 908-964-0700 <a href="http://www.mackboring.com/">http://www.mackboring.com/</a></p>	<p>Yanmar distributor for NE USA. Caliber uses Mastry Engine Center. (Yanmar distributors will not generally sell direct to the customer.)</p>
<p>Maptech, Inc. 10 Industrial Way Amesbury, MA 01913 USA phone: 888-839-5551 phone: 978-792-1198 <a href="mailto:sales@maptech.com">sales@maptech.com</a> <a href="mailto:support@maptech.com">support@maptech.com</a></p>	
<p>Maritime Consortium, Inc. 619 Severn Ave, Suite 201 PO Box 4070 Annapolis, MD 21403-6070 phone: 800-775-6985</p>	<p>Random drug testing for captains license</p>
<p>Marinco 2655 Napa Valley Corporate Drive Napa, CA 94558 phone: 707-226-9600 fax: 707-226-9670 <a href="mailto:info@marinco.com">info@marinco.com</a> <a href="http://www.marinco.com/">http://www.marinco.com/</a></p>	<p>Shore power inlets and cord sets</p>
<p>Maryland Department of Natural Resources (DNR) Licensing and Registration Service P.O. Box 1869 Annapolis, MD 21404-1869</p>	

phone: 410-260-8200	
<p>MarineFilters.com  phone: 800-470-3586  <a href="http://www.marinefilters.com/">http://www.marinefilters.com/</a></p> <p>Green Marine &amp; Ind. Equipment  1111 Central Avenue  Metairie, LA 70001  phone: 504-833-7386</p>	<p>Racor filters 40% below list  From the invoice, MarineFilters.com appears to be Green Marine &amp; Ind. Equip.</p>
<p>Marine Technical Services (MTS)  Ryan McQueeney  Herrington Harbor North Marina  389 Deale Road  Tracy's Landing, MD 20779  phone: 410-867-0676  <a href="http://www.goMTS.net">http://www.goMTS.net</a></p>	<p>Electronics installer</p>
<p>Mastry Engine Center  2801 Anvil Street North  St. Petersburg, FL 33710  phone: 800-545-4574  phone: 727-522-9471  fax: 727-527-7013  <a href="http://www.mastry.com/">http://www.mastry.com/</a></p>	<p>Yanmar distributor for SE USA used by Caliber.  (Yanmar distributors will not generally sell direct to the customer.)</p>
<p>Monogrammed Heirlooms  Nellie Feizbakhsh  Scholls Business Center  10150 SW Nimbus Avenue, Suite E2-B  Portland, OR 97223  phone: 503-639-5636 or 503-502-7380  fax: 503-639-1001  <a href="mailto:info@monogrammedheirlooms.com">info@monogrammedheirlooms.com</a>  <a href="http://www.monogrammedheirlooms.com/">http://www.monogrammedheirlooms.com/</a></p>	<p>Monogrammed boat towels</p>
<p>Moonlite Marine  776 West 17<sup>th</sup> Street  Costa Mesa, CA 92627 USA  phone: 949-645-0130  fax: 949-645-7512  <a href="http://www.moonlitemarine.com/">http://www.moonlitemarine.com/</a></p>	<p>Manufacture the Aladdin shroud cleat part # 0110 and 8.5" (small) spring used by ice box lid, top companionway step, and the chart table.</p>
<p>Morse Rubber LLC  3588 Main Street, Keokuk, IA 52632 USA  phone: 800-553-7036  phone: 319-524-8430  <a href="http://www.morserubber.com/">http://www.morserubber.com/</a></p>	<p>Manufacture the cutlass bearing  Morse Marine Bearing: Standard Brass Sleeve Series, part # E00800 "BONITO"</p>
<p>Mustang Survival  3870 Mustang Way  Bellingham, WA 98226  phone: 1-800-526-0532  <a href="http://www.mustangsurvival.com/">http://www.mustangsurvival.com/</a></p>	<p>(Superior) inflatable life vests</p>

<p>Navionics Inc. 6 Thatcher Lane Wareham, MA 02571 USA phone: 800-848-5896 phone: 508-291-6000 <a href="http://www.navionics.com">www.navionics.com</a> <a href="mailto:sales@navionics.com">sales@navionics.com</a></p>	<p>Electronic charts Platinum (also can use Gold +)  <ul style="list-style-type: none"> <li>• 905P - US Mid Atlantic &amp; Canyons</li> <li>• 906P - US Southeast &amp; Bahamas</li> </ul> </p>
<p>NavPod Instrument Housings by Ocean Equipment 2 Thomas Irvine, CA 92618 phone: 949-588-1470 fax: 949-588-1479 <a href="http://www.navpod.com">www.navpod.com</a></p>	
<p>Randy Neiman (pronounced Nyman) Chestertown, MD O: 410-778-2840 (preferred #) C: 443-480-1682 <a href="mailto:neimanrandall@yahoo.com">neimanrandall@yahoo.com</a></p>	<p>Mechanic / marine engineer with a lot of experience working on Calibers in the Rock Hall, MD area</p>
<p>NOAA/SARSAT E/SP3, FB4, Room 3320 5200 Auth Road Suitland, MD 20746-4306 phone: 888-212-7283 phone: 301-457-5678 fax: 301-568-8649, <a href="http://www.beaconregistration.noaa.gov">www.beaconregistration.noaa.gov</a></p>	<p>U.S.A. EPIRB registration and registration updates</p>
<p>Rick Nordhoff (Fiberglass work) Rock Hall, MD 410-708-1480</p>	
<p>North Sails Annapolis 317 Chester Ave Eastport, MD 21403 phone: 1-410-269-5662 Rob Pennington – canvas <a href="http://www.northsails.com/">http://www.northsails.com/</a></p>	<p>3599 dodger and bimini</p>
<p>Oceanair Marine Limited Chichester P02071B UK phone +44 (0) 1243-514411 fax: +44 (0) 1243-511133 <a href="http://www.oceanair.co.uk">www.oceanair.co.uk</a> <a href="mailto:techsupport@oceanair.co.uk">techsupport@oceanair.co.uk</a></p>	<p>Recessed Sky Screen and PVC liner for hatches</p>
<p>PARA-TECH Engineering Co. 2117 Horseshoe Trail Silt, CO 81652 phone: 800.594.0011 phone: 970.876.0558 fax: 970.876.5668 email: <a href="mailto:paratech@rof.net">paratech@rof.net</a></p>	<p>Sea anchors and drogues</p>

<a href="http://www.seaanchor.com">http://www.seaanchor.com</a>	
Chris Parker, <i>Belamie</i>	See Caribbean Weather Center
Pettit Marine Paints phone: 800-548-0489 Tech. Assistance: 1-800-221-4466	Bottom paints
Questus Marine, Inc 21 Lime Street PO Box 9 Marblehead MA 01945 phone: 800-723-2766 phone: 781-639-1900 fax: 781-639-1905 <a href="http://www.questusmarine.com">www.questusmarine.com</a> <a href="mailto:info@questusmarine.com">info@questusmarine.com</a>	Self-leveling radar mount. The model on 3599 is a 500G for mast-mounted 18" radomes.
Raritan Engineering Company, Inc. P.O. Box 1157 530 Orange Street Millville, NJ 08332 USA phone: 856-825-4900 fax: 856-825-4409 <a href="http://www.raritaneng.com">www.raritaneng.com</a>	Head
Raymarine Inc. 21 Manchester Street Merrimack, NH 03054-4801 phone: 800-539-5539 <a href="http://www.raymarine.com">www.raymarine.com</a>	Installation / Technicians see: <ul style="list-style-type: none"> <li>• Electronic Marine, Inc. (EMI)</li> <li>• Marine Technical Services (MTS)</li> <li>• Peter Kennedy Yacht Services</li> </ul>
Reeds Nautical Almanac 800-995-4995 <a href="mailto:Info@ReedsAlmanac.com">Info@ReedsAlmanac.com</a> <a href="http://www.reedsalmanac.com/">http://www.reedsalmanac.com/</a>	
SCANDVIK 423 4th Place, SW Vero Beach, FL 32962 USA 772-567-2877 800-535-6009 <a href="http://www.scandvik.com">http://www.scandvik.com</a>	
Schaefer Marine Industrial Park - 158 Duchaine Blvd. New Bedford, MA 02745-1293 phone: 508-995-9511 fax: 508-995-4882 <a href="http://www.schaefermarine.com/">http://www.schaefermarine.com/</a> <a href="http://www.schaeferhardware.com/">http://www.schaeferhardware.com/</a>	Also sell on-line direct through <a href="http://www.schaeferhardware.com">schaeferhardware.com</a>
Sea Dog Line P.O. Box 479 Everett, WA 98206 USA phone: 425-259-0194 fax: 425-339-1345	Marine hardware Horseshoe Buoy Bracket Rail Mount, part # 327135-1

<a href="mailto:custserva@sea-dog.com">custserva@sea-dog.com</a> <a href="http://www.sea-dog.com/">http://www.sea-dog.com/</a>	
Selden Mast, Inc. Tom Sharkey, General Manager 4668 Franchise Street N. Charleston, SC 29418 USA phone: 843-760-6227 cell: 843-814-4591 <a href="mailto:ts@seldenus.com">ts@seldenus.com</a> <a href="http://www.seldenus.com">www.seldenus.com</a>	Manufacture spars used by Caliber Manufacture Furlex
Seven Seas Cruising Association (SSCA) <a href="http://ssca.org">http://ssca.org</a> Members area: <a href="http://ssca.org/members/index.shtml">http://ssca.org/members/index.shtml</a>	
Sierra International 1 Sierra Place Litchfield, IL 62056-3029 phone: 800-648-3976 phone: 217-324-9400 24 Hour Fax: 217-324-2461 <a href="mailto:info@shieldshose.com">info@shieldshose.com</a> <a href="http://www.shieldshose.com/">http://www.shieldshose.com/</a>	Phone answers as Teleflex Marine Distribution. Sanitation hose on 3599 is Shields Hose 1 ½”
Simrad USA 19210 33 <sup>rd</sup> Ave. W. Suite A Lynnwood, WA 98036 phone: 800-426-5565 phone: 425-778-8821 <a href="http://www.simradusa.com/">http://www.simradusa.com/</a>	AP11 Autopilot Technical Support contact – Rob Bright
Shurflow 5900 A Katella Avenue Cypress, CA 90630 USA phone: 800-854-3218 phone: 562-795-5200 fax: 1-562-795-7564	Wash-down pump
Skipper Bob Publications P.O. Box 1125 Deltaville, VA 23043 804-776-8899 <a href="http://www.skipperbob.net/">http://www.skipperbob.net/</a>	Anchorage and Marina guides to ICW and Bahamas Bound book + others. Skipper Bob died in 12/2006. His wife Elaine sold the company to Waterway Guides who intends to continue Bob’s legacy, publishing and updating his guides in the same no-frills, useful format.
SolLight 1832 Cascade Avenue Hood River, OR 97031 phone: 888-557-6464 <a href="mailto:info@sollight.com">info@sollight.com</a> <a href="http://www.sollight.com/">www.sollight.com/</a>	RailLight solar-powered LED light
SOSpenders (Stearns, Inc.) 1100 Stearns Drive	

<p>Sauk Rapids, MN 56379  phone: 800-333-1179  phone: 320-252-1642  <a href="http://www.suspenders.com/">http://www.suspenders.com/</a></p>	
<p>Southco  United States &amp; Canada  phone: 610-459-4000  <a href="mailto:info@southco.com">info@southco.com</a>  <a href="http://www.southco.com/">http://www.southco.com/</a></p>	Cabin door latches, 3599
<p>Taunton Stove Company, Inc. /  Tasco Marine Division  490 Somerset Avenue  North Dighton, MA 02764  phone: 508-823-0786  fax: 508-824-3003  <a href="http://www.tauntonstove.com/">http://www.tauntonstove.com/</a></p>	Stove top toaster M1100
<p>Tides Marine  3251 A SW 13<sup>th</sup> Drive  Deerfield Beach, FL 33442 USA  phone: 800-420-0940  phone: 954-420-0949  <a href="http://www.tidesmarine.com">www.tidesmarine.com</a></p>	SureSeal dripless shaft seal
<p>Trident Marine Systems  585 Plum Run Road  Houston, PA 15342 USA  phone: 800-414-2628  phone: 724-745-9311  fax: 724-745-1709  <a href="http://www.tridentmarine.com">www.tridentmarine.com</a>  <a href="mailto:trident@sgi.net">trident@sgi.net</a></p>	LPG gas system, including propane tanks
<p>Tufted Topper  1-888-989-6503  <a href="http://www.tuftedtopper.com">http://www.tuftedtopper.com</a></p>	Custom fitted mattress pad and sheets
<p>U.S. Coast Guard  Cell: *24  Annapolis: 410-267-8107  Baltimore: 410-576-2525  <a href="http://www.uscg.mil/">http://www.uscg.mil/</a></p>	
<p>National Vessel Documentation Center  792 T J Jackson Drive  Falling Waters, WV 25419  phone: 800-799-8362  phone: 304-271-2400  Status Questions: 304-271-2410  fax: 304-271-2405  <a href="http://www.uscg.mil/hq/g-m/vdoc/nvdc.htm">http://www.uscg.mil/hq/g-m/vdoc/nvdc.htm</a></p>	
<p>Walbro Engine Management Corp.</p>	Electric fuel pump



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After-market Division 6242 Garfield Street Cass City, MI 48726-1397	
West River Rigging Paul Langelier phone: 410-867-1012 cell: 410-991-0310 <a href="mailto:westriverrigging@msn.com">westriverrigging@msn.com</a>	Rigger, Local warranty representative for Selden
Whale Water Systems Old Belfast Road Bangor, Co Down Northern Ireland BT19 ILT Tel: 028 91270531 <a href="http://www.whalepumps.com">www.whalepumps.com</a> <a href="mailto:sales@whalepumps.com">sales@whalepumps.com</a>	Ice box pump Manual bilge pump Manual holding tank pump
Xantrex Technology Inc. phone: 800-670-0707 phone: 604-420-2145 <a href="http://www.xantrex.com">http://www.xantrex.com</a>	AC battery charging system
Yanmar Marine <a href="http://www.yanmarmarine.com/">http://www.yanmarmarine.com/</a>	See Mastry Marine & Industrial Supply, Inc. and Mack Boring & Parts Company (distributors)