
E. S. Ritchie & Sons, Inc

Your Most Important Instrument

Parts & Service Manual

The Information contained in this manual is intended to be used as a reference for trained and qualified compass service technicians only.

E.S. Ritchie & Sons, Inc. is not liable for any damage to its products caused by misuse or by repair service rendered by unqualified persons.

Service Manual Publish Date January 1, 2007

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Introduction & Parts Ordering

E.S. Ritchie & Sons, Inc. has a tradition of excellence in servicing its products. Our customers expect timely, accurate, and complete repair of all Ritchie® products, and we are committed to continuing this tradition.

As a qualified repair technician, your contribution is vital. Your work directly affects customer satisfaction.

This manual is your key resource to help you repair and service Ritchie® navigational instruments.

Parts ordering Information

1. Parts are available from the factory at 50% off list price to Ritchie Authorized Service Stations who meet all requirements.
2. There is a net \$20.00 minimum order.
3. Proper part numbers from the most recent Service Manual must be used.
If you are unsure of a part number please verify because there will be a 15% re-stocking fee for improperly ordered parts returned to the factory.

Parts can be ordered by:

Phone 781-826-5131
781-709-3202
Fax 781-826-7336

e-mail service@ritchienavigation.com
sales@ritchienavigation.com

Mail E.S. Ritchie & Sons, Inc.
P.O. Box 548
Pembroke, MA 02359

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CombiDamp™	Compass Dial	Ritchie®	Navigation Instruments
Explorer™	Magnetic Compass	RitchieAngler®	Magnetic Compass
Globemaster®	Magnetic Compass	RitchieSport®	Magnetic Compass
Helmsman™	Magnetic Compass	SportAbout™	Hand Held Compass
Kayaker™	Magnetic Compass	SuperSport™	Magnetic Compass
Navigator™	Magnetic Compass	Tactician™	Magnetic Compass
PowerDamp Plus®	Compass Dial	Trek™	Magnetic Compass
PowerDamp®	Compass Dial	Voyager®	Magnetic Compass

This manual is arranged by compass families. If you do not know what family the compass is in, see the index at the back of this manual.

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Mossy Oak® is a Registered Trademark of Haas Outdoors, Inc.

Break Up® is a Registered Trademark of Haas Outdoors, Inc.

Shadow Grass® is a Registered Trademark of Haas Outdoors, Inc.

Service Manual Information

Model and Serial Number Information

Most Ritchie compasses built after 1974 were supplied with a model & serial number sticker which can be found on the compass bowl or the bottom of the housing. The serial number is key to determining what year a compass was built, which in turn helps you determine what parts to order in this manual.

The serial number will take one of three forms.

1. A code number stamped in the bezel designated the model # and year of manufacture. Contact Ritchie with this number for model and year information.
2. A code that consists of a letter (A, B, C, or D) and a slash /, followed by a 2 digit number.
3. A 10-digit number in which the first 2 numbers represent the year of manufacture and the second two indicate any mid year model changes. These changes are referred to as Rev numbers. (00 indicates no changes) (01 would indicate Rev 1)

Note: Some compasses have a **-R** in the serial number. This indicates that a Globemaster has been upgraded to a bladder style diaphragm and bowl.

Examples of serial numbers

- A/87** Built in 1987; any parts ordered will be for a **1987** model compass.
A/87-R Built in 1987 but upgraded to a bladder style diaphragm and bowl, order accordingly.
94.000123 Built in 1994; consider it a **1994** in this manual
94.010124 Built in 1994: consider it a **1994 Rev 1** in this manual.

Zone Sticker & Dial Balance

For the ultimate in accuracy Ritchie Compass Dials are balanced to accommodate for magnetic inclination in the Northern Hemisphere. By special request Southern Hemisphere dials are available. To determine if a dial has been balanced for Zones 2 through 7 check the bottom of the dial for a scribed number. (Models made after 1997 will also have a zone label on the bowl. Please indicate zone when ordering a dial for the Southern Hemisphere. Note: Dials in the Explorer models will function properly in all zones except 7.

Fluid Labels (Isopar L)

All Ritchie compasses (except sealed capsule models) will have an ID label indicating that the compass is filled with Isopar. Older models containing odorless Mineral Spirits will have no ID label.

Using This Manual

This manual is divided into seven sections arranged by compass family. An Index is provided at the back of the manual for model number reference.

Most even number pages have diagrams showing compass breakdown. Each part is assigned a key number, which is used in conjunction with the parts list found on the next page. If there is more than one key number assigned to part, different colors or types are available.

N/A indicates that the part is no longer available. In some cases a replacement part may be available and the part number is given.

Repair Tips

Opening comments

1. Be careful not to disturb the compensators when performing a repair. If you do, re-compensation will be necessary.
2. Before beginning any service work, check the dial's sensitivity.
3. Replace O-rings on all repairs.
4. Make sure you do not disturb the factory bend in the balance tab, unless re-balancing the gimbal ring & pan assembly is necessary.
5. When reassembling fully gimbaled units, make sure to install the gimbal with the correct side up. The flat surface should be on top and the gimbal pins and springs should not be visible.

General Repair Tips

Sticking dial

1. Before disassembly, follow these steps to test for a sticking dial.
 - a) Allow dial to settle, and then take note of the reading.
 - b) Deflect the dial 5° to port with a ferrous screwdriver or similar device.
 - c) Check to see that the dial returns to the original reading.
 - d) Repeat steps b and c, this time deflect the dial to starboard.
2. If the dial fails to return accurately the cause is usually a worn or defective pivot or jewel. The complete dial assembly must be replaced. The pivot and jewel are not field repairable.
3. Drain the compass of fluid and remove the dome.
4. Do not disturb the factory bend in the balance tab, unless the gimbal system is off balance. If it is off balance, refer to the next section.
5. Replace the dial assembly and re-assemble the compass with new O-ring seals.

Gimbal system off balance

1. Drain the compass of fluid and remove the dome.
2. Allow the dial/pan/gimbal assembly to dry thoroughly before attempting to balance them.
3. Check the pan to gimbal ring spacing. The pan should have just enough clearance to swing freely within the ring. Excess spacing will cause the pan to slide side to side and make accurate gimbal balance virtually impossible.
4. Set the bowl on the bench and using a small bubble level shim it until the top is level.
5. Place the dial/pan/gimbal assembly in the bowl and observe the relationship between the gimbal ring and the top of the bowl. If necessary, bend the balance tab to level the gimbal ring with the top of the bowl.
6. Observe the relationship of the pan to the gimbal ring. If necessary, bend the balance tab to level the pan with the gimbal ring.
7. Re-assemble the compass with new O-ring seals.

Repair Tips & Fluid Requirements

Bubble in the fluid

A bubble in the fluid usually indicates a leak or incomplete vacuuming of the fluid. The problem may be caused by inadequately bottomed bezel or diaphragm retaining screws, improperly installed fill plug screw, failed o-ring, diaphragm, bowl, or crazed dome.

1. Check to see if there is an O-ring or diaphragm leak by pressing on the diaphragm.
2. Replace the failed part.
3. Make sure the diaphragm retainer is completely bottomed out.
4. Re-assemble the compass with new O-ring seals.

Dome Replacement

1. Always replace the dome if any cracks or de-lamination is visible.
2. When re-assembling a flare type dome, the dome must be centered inside the bezel and the bezel screws must be tightened evenly in a torque pattern. There should be a space left between the bezel and clamping ring that is even all the way around.
3. When re-assembling a compression type dome, the dome and bezel will self-center. the bezel screws must be tightened evenly in a torque pattern. The bezel will bottom against the bowl (or clamping ring) when the screws are tight.

Dampening Fluid

Always use Ritchie compass fluid. (Be sure to subject the fluid to a vacuum equivalent of 28 inches of mercury for a minimum of 15 minutes before sealing it in the compass. This step prevents the formation of a bubble in the fluid due to temperature changes.)

Ritchie began using Isopar L as dampening fluid during 2001. This fluid is a high-purity isoparaffinic solvent very similar to Odorless Mineral spirits. Ritchie changed to this fluid because it has a higher flash point and conforms to most of the world's shipping regulations. It is important to note that some other manufacturers use Isopar M as their dampening fluid.

PLEASE NOTE: **ISOPAR M CANNOT BE USED IN RITCHIE COMPASSES.**

Replacing Odorless Mineral spirits with Isopar L

Ritchie will no longer be providing Odorless Mineral Spirits. If you have a compass that has odorless mineral spirits, you can replace it with Isopar L. It is recommended that you completely replace the old fluid with Isopar L. There is no harm to the compass if a small amount of Odorless Mineral Sprits is mixed with the Isopar L.

Quantity	Ritchie Part #
Pint (16 fl oz)	SH-0154
Quart (32 fl oz)	SH-0155
1 Gallon (128 fl oz)	SH-0156
4 Gallons (512 fl oz)	SH-0157

Fluid Capacity	
Voyager	9.4 fl oz
Helmsman	17.0 fl oz
Navigator	24.4 fl oz
5" Globemaster	40.0 fl oz
6" Globemaster	66.1 fl oz

Options for Alternate Lighting Voltages

Type 1 Lighting (1 LED)
These Compasses have one light wire
B-80's (all) & B-81's (1981 to 1997)
D-84's (all) & D-85 (1981 to 1997)
F-82's (all) & F-83's (1981 to 1997)
HB-70 (All) & HB-71 (1981 to 1995)
HB-85 (All)
HD-74 (All) & HD-75 (1981 to 1995)
HD-75 (1981 to 1995)
HF-72's (all) & HF-73's (1981 to 1995)
HF-742's (all)
HV-76 & 77 (all)
SS-1000's (all) & SS-1002's (all)

Type 2 Lighting (2 LED's)
These Compasses have two light wires (2 LED's Total)
B-81's & D-85 (1998 to 2005)
F-83's (1998 to 2005)
HB-71 & HD-75 (1996 to 2005)
HF-73's & HF-743's (1996 to 2005)
HF-79's (all)
S-87's (2000 to 2005)

Type 3 Lighting (2 LED's)
These Compasses have one light wire
DNB-200, DNP-200 & DNW-200 (all)
FN-201's & FNW-201's (all)
Globemasters (1996 to present)
SS-2000's (all)

Type 1a Lighting (1 ultra bright LED)
These Compasses have one light wire
B-80's (2005 rev 1 to present)
D-84's (2005 rev 1 to present)
F-82's (2005 rev 1 to present)
HB-70 (2005 rev 1 to present)
HB-740 & HB-845 (all)
HB-85 & HD-74 (2005 rev 1 to present)
HD-744 (all)
HF-72's & HF-742's (2005 rev 1 to present)
SS-1000's & SS-1002's (2005 rev 1 to present)

Type 2a Lighting (2 ultra bright LED's)
These Compasses have two light wires
B-81's (2005 rev 1 to present)
F-83's (2005 rev 1 to present)
HB-71 (2005 rev 1 to present)
HB-741 & HD-745 (all)
HD-75 (2005 rev 1 to present)
HF-743's (2005 rev 1 to present)
S-87's (2005 rev 1 to present)

Type 4 Lighting (4 LED's)
These Compasses have two light wires
DNB-203, DNP-203 & DNW-203 (all)
FN-203's & FNW-203's (all)

Type 5 Lighting (3 LED's)
These Compasses have two light wires
BN-202 (all)

Resistor selection by LED Part Number		
	24 volt	32 volt
GM-0087 ASY	SH-0126-200	SH-0126-330
NV-0044 ASY w/ NV-0045 ASY	SH-0126-200	SH-0126-330
SH-0028 ASY	SH-0126-200	SH-0126-330
SH-0029 ASY	SH-0126-330	SH-0126-500
SH-0102 ASY	SH-0126-330	SH-0126-500
SH-0102 ASY (2)	SH-0126-200	SH-0126-330
SH-0111 ASY	SH-0126-200	SH-0126-330
SH-0174 ASY	SH-0126-200	SH-0126-330
SH-0174 ASY w/ NV-0128 ASY	NV-0160-150	NV-0162-250
SH-0176 ASY	SH-0126-200	SH-0126-330
SH-0194 ASY*	SH-0126-820	SH-0126-1.1
SH-0194 ASY w/ SH-0195* ASY	SH-0126-390	SH-0126-560
SH-0195 ASY*	SH-0126-820	SH-0126-1.1
SH-0195 ASY* (2)	SH-0126-390	SH-0126-560
SH-0202 ASY*	SH-0126-820	SH-0126-1.1

* ultra-bright LED

Resistor selection by Lighting Type		
	24 volt	32 volt
Type 1	SH-0126-330	SH-0126-500
Type 1a	SH-0126-820	SH-0126-1.1
Type 2	SH-0126-200	SH-0126-330
Type 2a	SH-0126-390	SH-0126-560
Type 3	SH-0126-200	SH-0126-330
Type 4	NV-0160-150	NV-0162-250
Type 5	SH-0126-200	SH-0126-330

Protective Covers

Protective Covers			
Family		Ritchie Part #	Comments
Explorer			
All	B-51's, D-55's F-50's, RA-91's, RA-93's, S-53's & S-0FF90	E-50-C	
Voyager			
All	B-80, D-84, D-85, F-82, F-82W	V-80-C*	Use V-80-C when you have a RU-90 or RU-90W with the optional Light Kit installed.
82 to 2000	B-81, F-83, F-83W		
2000 rev 1 to present	B-81, B-81W, F-83, F-83W S-87, S-87W	V-83-C*	
All	RU-90 & RU-90W	V-81-C*	
Helmsman			
All	HB-740, HB-741, HD-744, HD-745, HF-742's, HF-743's SS-1002's	HF-741-C*	
All	HF-72's, HF-73's, HB-70, HB-71, HD-74, HD-75, HB-85, SS-1000's,	H-71-C*	Some OEM's and older style Helmsman's use the HL-0087 sunshade (see page 5-12). Use Protective cover # H-70-C*
	HF-79, HF-79G, HF-79G	H-79-C**	
	HV-76 & HV-77	HV-C*	
		HC-80	
Navigator			
All	ALL Models (except BN-202)	N-203-C*	replaces N-200-C
	BN-202	BN-C*	
		NC-20	Back Cover
Globemaster			
All	FB-500 & SF-500	LL-C**	
	SS-5000 & SS-5000W	LL-C**	
	SP-5C & SP-5B	GM-5C	
	SS-5100P & SS-5100B	GM-5C	
* For replacment rubber bumpers order Part # SH-0012			
**For replacment rubber bumpers order Part # 5G-0139			

Leveling Blocks		Weather Shields	
HV-76 & HV-77	HL-B	Binnacle mount	WS-P
BN-202	N-LB		

Accessories & Screwdrivers

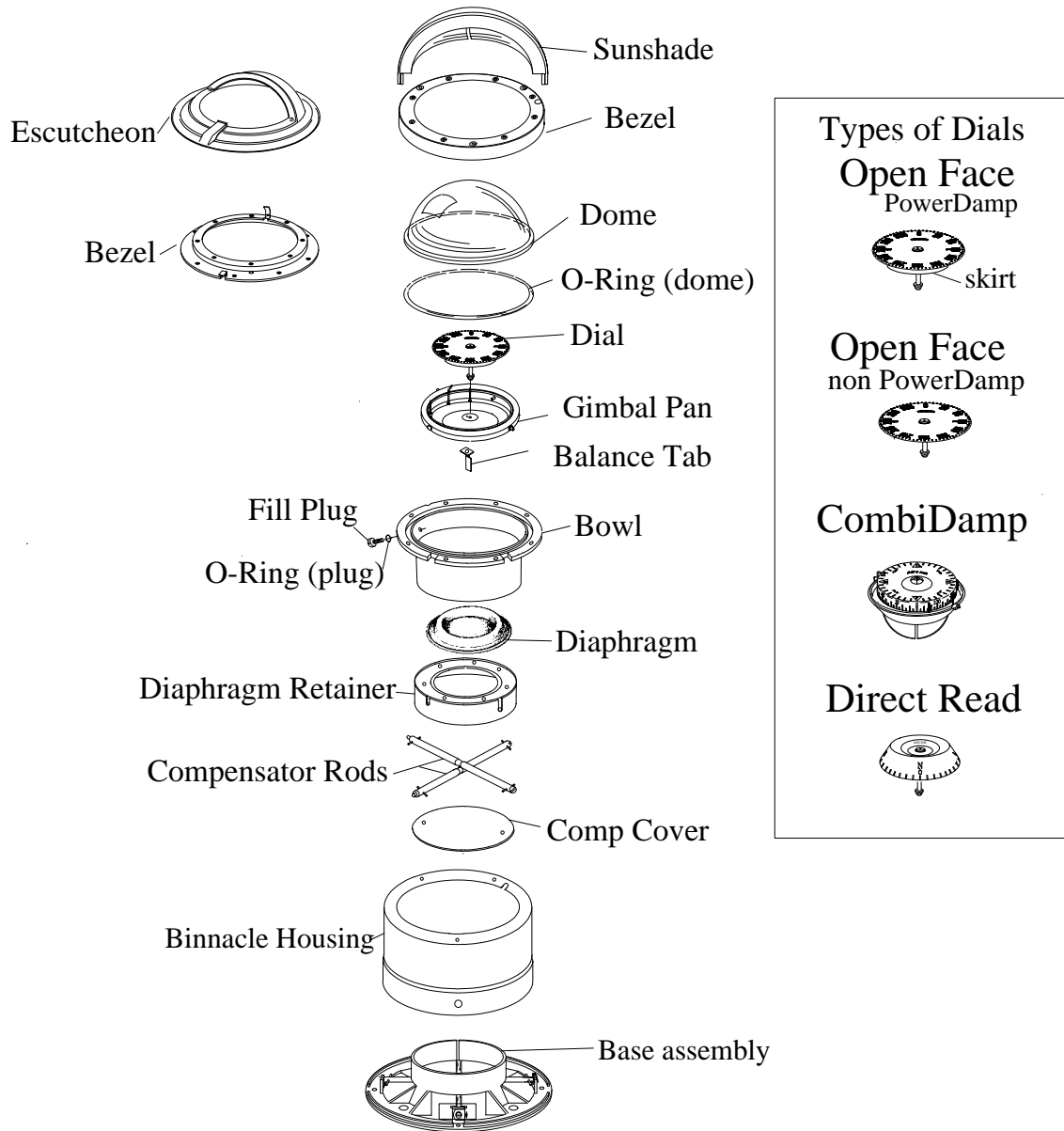
Compensator Screwdrivers			
Sport	EX-0066	Helmsman (except HV-76 & 77)	SH-0069
Trek	EX-0066	Navigator (except BN-202)	SH-0069
Explorer	EX-0066	HV-76 & 77, BN-202	SH-0058
Voyager	SH-0069	Globemaster	SH-0058

Kayak Tie downs		
	X-TD	KTD.2
Bungee Cord 3'	RS-0117	RS-0117
Snap Clip	RS-0118	RS-0118
Mounting Plate	RS-0115	EX-0193
Foam Spacer	RS-0119	EX-0150
Holder	X-11-H	N/A

Navy Standard	
CS-06P1T1	Jewel, Navy Std.
CS-08J1D1	Pivot, Navy Std.
CS-08E1G1	O-ring, Navy Std. (old)
CS-08E3G1	O-ring, Navy Std.

The Ritchie Compass

Repairable Capsule Design



Sealed Capsule Design

