Crewsaver®

SERVICE MANUAL

150N SEACREWSADER 2010

AND

150N CREWFIT TWIN 2010 LIFEJACKETS

Crewsaver®

Survitec House, Lederle Lane, Gosport,
Hants. PO13 0FZ, England.
Tel: +44 (0) 1329 820000 Fax: +44 (0) 1329 236218
email: crewsaver@survitecgroup.com
Web: www.crewsaver.co.uk

survitecgroup

Service Bulletin and Amendments Register

No.	Description	Date
	INTRODUCTION This Service Manual covers both the 150N Crewfit Twin 2010 and the 150N Seacrewsader 2010 which are identical in design. The major difference is that the Crewfit Twin is fitted with Hammar hydrostatic firing heads and the Seacrewsader is fitted with United Moulders Mk5 automatic firing heads.	
Issue 2	Amendments to General Features Drawings, pages 7 and 8. Requirement to check the toggles attaching the inflator to the jacket - Section 5.2.5 Page 22.	November 2013
Issue 3	Page 4 - change in procedure for accessing manuals on the website. Section 5.4 and Section 6.4 - Expired Lights to be replaced by CSL Lights. Section 8.1.3.3 - New procedure for fitting replacement cylinders to Hammar mechanism.	June 2014

Scope

This manual covers the servicing of the 150N Seacrewsader 2010 and 150N Crewfit Twin 2010 lifejackets.

Index

1.1 Introduction

1.1.1. This Service Manual will be published on the Crewsaver website (www.crewsaver.com). Click on PARTNER /LOGIN at the top of the screen. Personnel who have been trained in the servicing procedures for this lifejacket will be issued with a Username and Password to enable them to access the download section. Each manual carries an Issue Number and records of issue are logged by Crewsaver to ensure that the service network maintains correct and up to date servicing information. Emails will be sent regarding any new Issues. Periodically service bulletins may be issued which will be published on the Crewsaver website (www.crewsaver.com). Emails will also be sent. It is the service station's responsibility to regularly check the website for any new bulletins and to ensure inclusion within the servicing manual. The service bulletin register at the front of the Manual should be completed.

1.1.2. The information referenced in each section, follows a standard servicing procedure by which the inspection should take place.

1.1.3. This servicing manual details information to enable regular maintenance and servicing of the lifejacket to help prolong the life of the product and ensure it functions correctly.

1.1.4. The manual should be used as a reference document following training in servicing procedures instructed by Crewsaver approved personnel. The manual also details the equipment and parts needed for correct maintenance to be performed.

1.1.5. Servicing must be carried out annually by a Service Station authorised by the manufacturer. 

1.1.6. Regular servicing is to be carried out by qualified personnel trained by Crewsaver and holding a valid servicing certificate. Certificates are valid for a period of 3 years.

1.2 Product Description

1.2.1. The 150N Seacrewsader 2010 and the 150N Crewfit Twin 2010 are twin chamber 150N inflatable lifejackets. They are identical in design and construction. The only difference is that the 150N Seacrewsader 2010 is fitted with standard United Moulders Mk5 Automatic heads whilst the 150N Crewfit Twin 2010 is fitted with Hammar hydrostatic heads.

1.2.2. The lifejacket is approved to both SOLAS/MED  and CE approved to BS EN ISO 12402-3. It is also Transport Canada approved.

1.2.3. The lifejacket is easy to don and work in whilst still retaining high in-water performance.

1.2.4. The buoyancy of the jacket is provided by two chambers with a 3.5 psi relief valve oral tube on each chamber to ensure the full buoyancy is achieved whether on single or double chamber inflation. This feature enables the jacket to continue to operate providing full buoyancy even in the eventuality that one of the firing heads fails.

1.2.5. The high buoyancy of this lifejacket allows it to be suitable when the user is wearing heavy clothing , an immersion suit or carrying tools.

1.2.6. This lifejacket can be inflated manually, as well as automatically when entering the water. This lifejacket has a permanent crutch strap and is fitted with a light that is operated when the lifejacket inflates. The lifejacket can also be supplied with a factory fitted spray hood that conforms to BS EN ISO 12402-8.

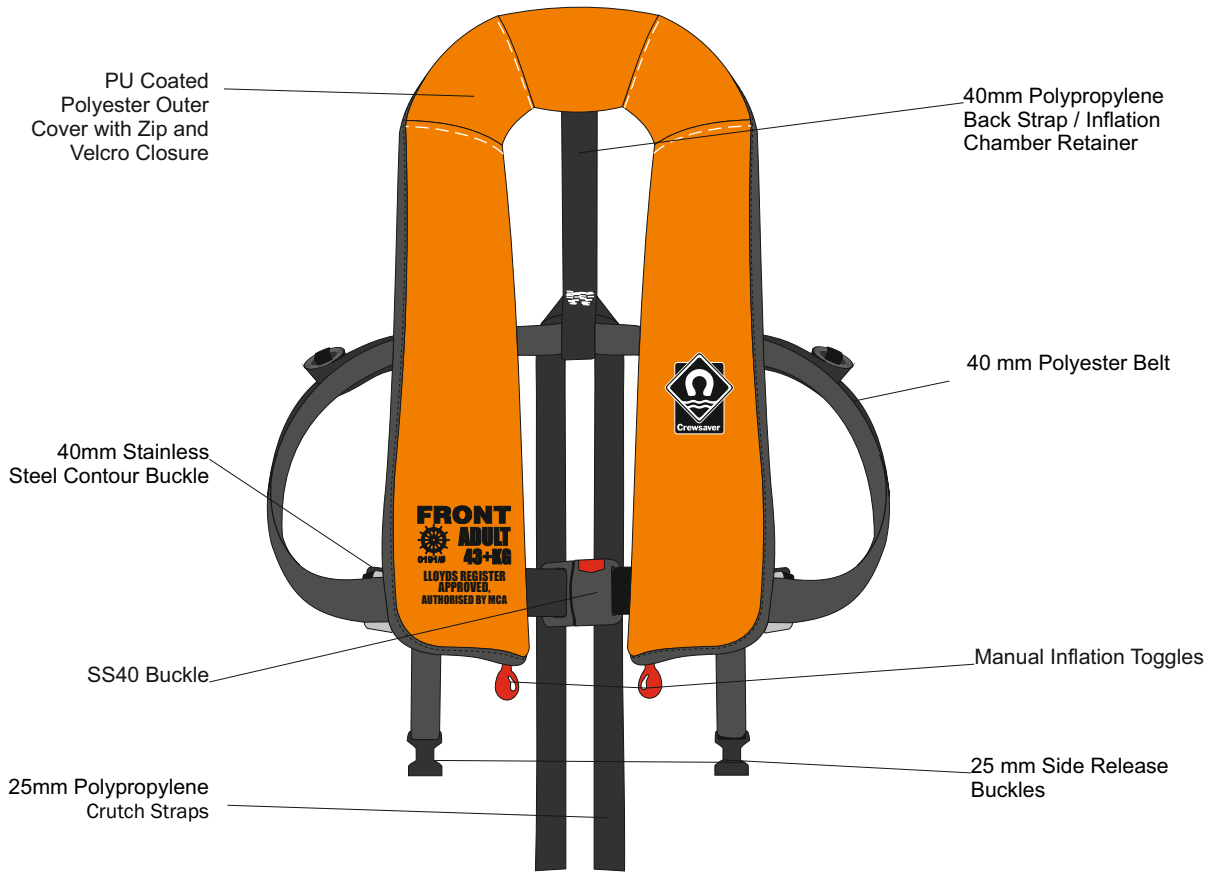
1.2.7. This lifejacket comes in two different versions, the waist belt version and integral deck safety harness version which both have zip and velcro cover closure. The jacket can also be supplied with a fitted Fall Arrest Harness.

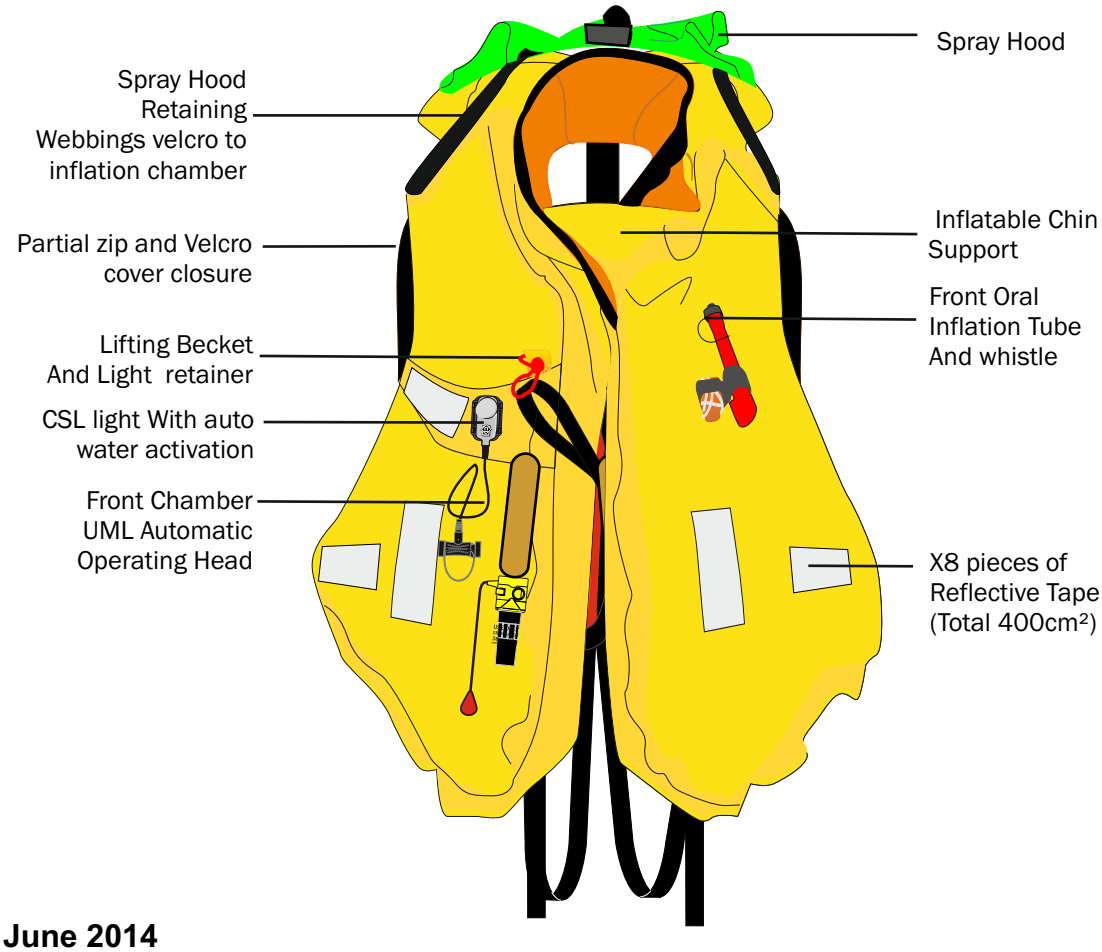
1.2.8. The standard outer cover is made from a hard wearing material. The 150N Crewfit Twin 2010 is also available with a Heavy Duty cover. The 150N Seacrewsader 2010 is also available with either a Heavy Duty cover or a Fire Resistant cover.

1.3 Data Sheet

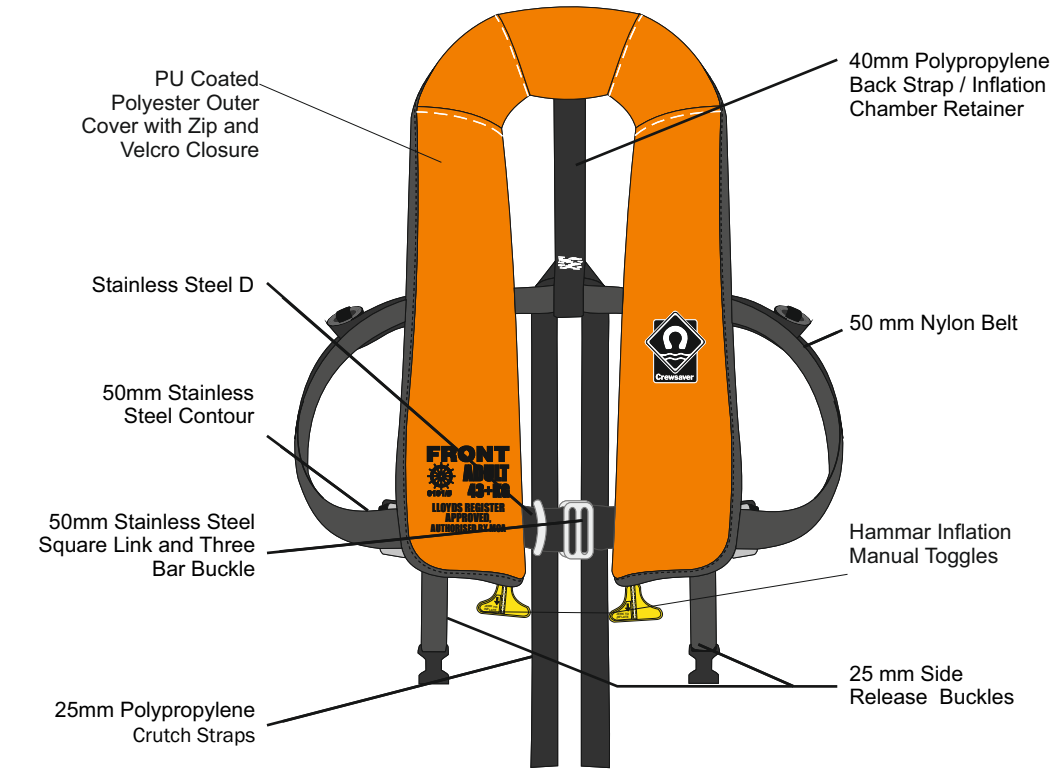
Features:	150N Seacrewsader & Crewfit Twin 2010
Front Chamber Buoyancy:	188N
Rear Chamber Buoyancy:	188N
Total Chamber Buoyancy:	190N
Buoyancy category:	150N
Cover Colour	Orange
MCA (UK) Approved	X
SOLAS Approved	X
CE Approved	X
Cylinder size	38g
Standard Automatic	150N Seacrewsader 2010 only
Hammar Automatic	150N Crewfit Twin 2010 only
Manual Firing head	N/A
Manual Override	X
Oral inflation tubes	X
Pressure relief valves	3.5 psi oral tube relief valves
Hard wearing cover	X
Whistle - fitted	X
Retro-reflective tape	X
Lifting Becket - fitted	X
Light - fitted	Permanently fitted
Factory fitted Spray Hood	Optional
Thigh straps	Permanently fitted
Fall Arrest Harness	Optional
Closure method	Zip and Velcro
Alternative covers	Heavy Duty - both lifejackets Fire Proof - Seacrewsader only

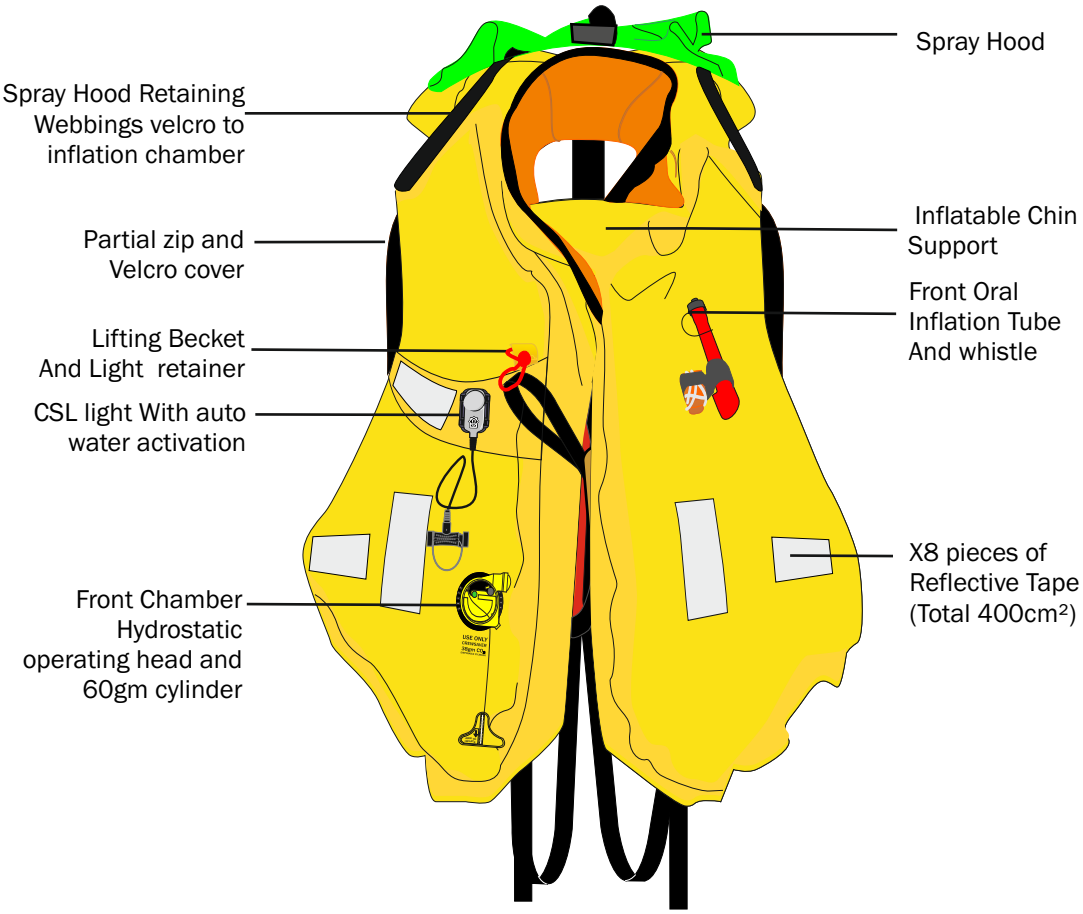
1.4.1 General Features - Seacrewsader Non-Harness



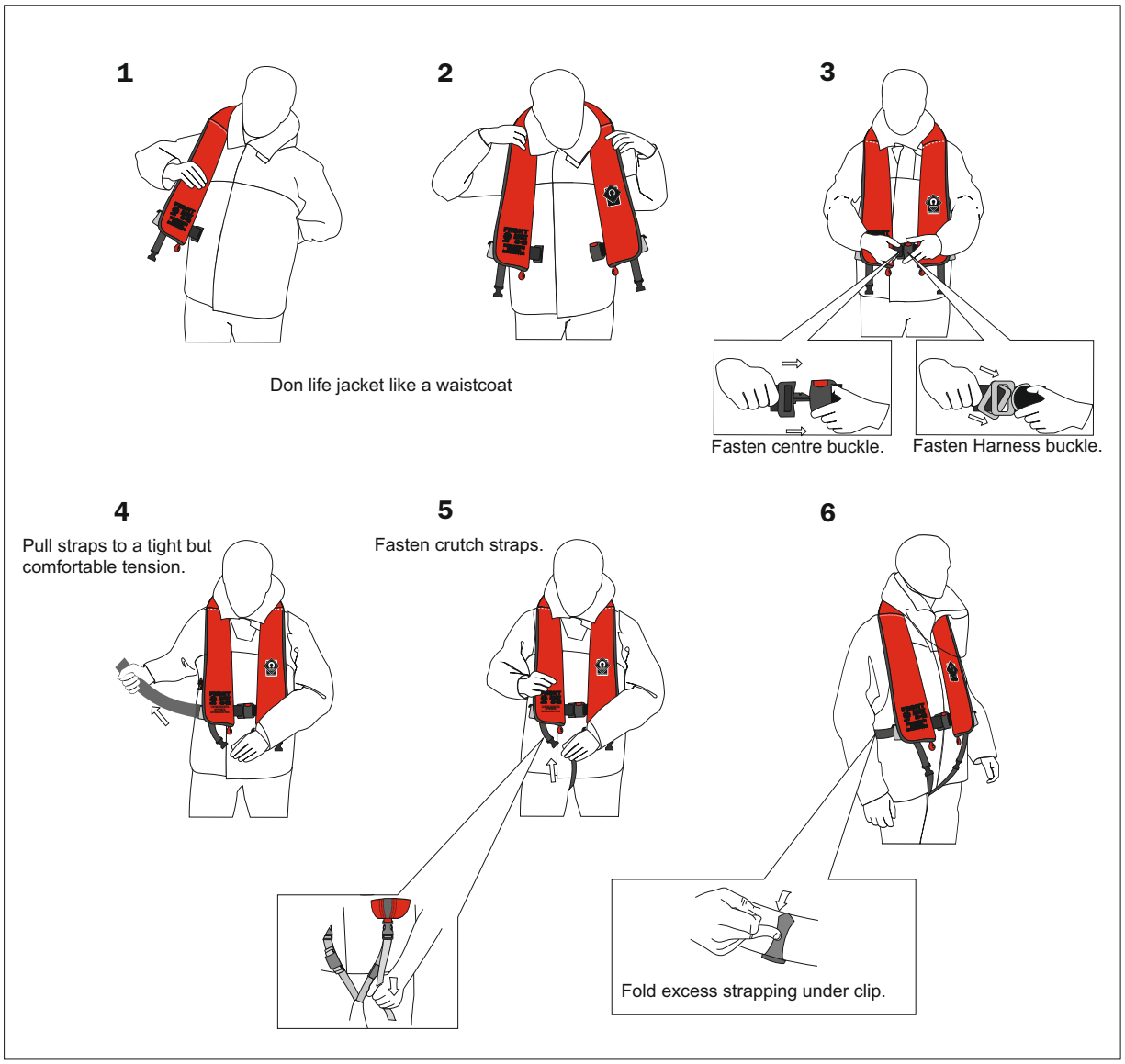


1.4.2 General Features - Crewfit Twin with Harness

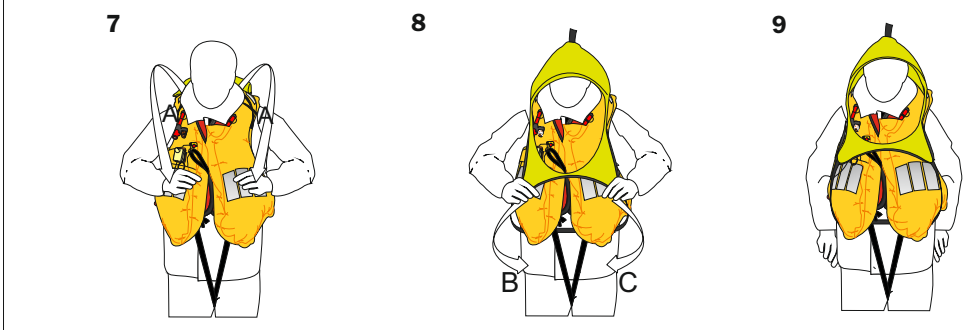




1.5.1 Donning Instructions



Donning the sprayhood (if fitted)



When lifejacket is fully inflated pull the hood over the head using the hood retainers (A) located either side of the neck.

Pull the retaining loops over the head. Pass hood webbing over the inflated chambers B and C.

Figure 9 shows the hood donned correctly with the hood retainers looped over the outside edge of the inflator.

2.1 Service Stations

2.1.1 Service stations shall comply with the following as a minimum;
2.1.2 Servicing of Inflatable Lifejackets shall be carried out in a fully enclosed area only.
2.1.3 The area shall be well lit and protected from direct sunlight
2.1.4 The temperature and humidity shall be sufficiently controlled to ensure that the servicing of inflatable Lifejackets may be carried out successfully.
2.1.5 The area shall be efficiently ventilated but free from draught
2.1.6 Sufficient Tools (including specialist tools) shall be available to ensure Lifejackets may be disassembled, tested and reassembled in accordance with this Manual. These shall include but not be limited to:
2.1.6.1 Manometers and pressure gauges
2.1.6.2 Oil free and dry air supply
2.1.6.3 Scales for weighing Gas Cylinders
2.1.6.4 Crewsaver Service tool kit (See 2.6). This is recommended but similar calibrated devices may also be used.
2.1.7 Stock of materials and components shall be held to allow efficient servicing with readily available replacement parts to ensure a prompt service for the customer.
2.1.8 Only personnel trained and certified in accordance with Crewsaver requirements are approved to carry out Servicing and Maintenance. They must be holders of a valid Certificate issued by Crewsaver.
2.1.9 The service station shall be of an approved standard.
2.1.10 Procedures shall be introduced to ensure that service bulletins, Manuals and replacement parts are obtained from Crewsaver.
2.1.11 Subsequent to initial approval and thereafter the service station shall be subject to regular surveillance by Crewsaver.
2.1.12 The service station must comply with and have met all QA criteria in the Crewsaver servicing protocol file.

2.2 On Receipt Inspection

2.2.1 On receipt of the Lifejacket(s), check the state of the packaging before opening and notify the owner and the company delivering the package of any defects or damage.
2.2.2 On opening the package, check the contents for their general condition and quantity
2.2.3 Prepare Servicing Record Sheet
2.2.4 Visually inspect the Lifejacket cover and the inflatable chamber for damage, abrasion, contamination etc. in accordance with this manual
2.2.5 Note repairs or replacements required on the record sheet
2.2.6 Unless obvious damage is evident test the Lifejacket in accordance with Section 6. If it is considered that the damage found would cause the Lifejacket to fail the tests then corrective action shall be carried out prior to testing.
2.2.7 Damaged areas shall only be marked using wax based crayon. Marks shall be with a small circle or cross. Ballpoint, rollerball or other forms of ink shall not be used. If in doubt refer to Crewsaver for guidance.
2.2.8 Repairs to the Lifejacket cover are limited to those detailed in Section 7.1.
2.2.9 Repairs to welded components including the inflatable chambers are expressly forbidden.

2.3 General Care

2.3.1 This automatic jacket should be stowed in accordance with the manufacturer's instructions

2.3.1.1 Lifejackets should be stowed in a dry compartment. Avoid high humidity, such as a car boot.

2.3.1.2 Automatic Lifejackets should have stowage facilities which are provided with a method to encourage moisture removal.

2.3.1.3 Lifejackets should be stowed vertically, for example hung on hooks, in order that any trapped water or condensation can drain away naturally.

2.3.1.4 Lifejackets should be rinsed in fresh water and dried thoroughly after use.

WARNING
Prior to sponging or washing remove automatic capsules from the firing mechanism. Allow to dry thoroughly afterwards.

2.3.2 Contaminants such as oil or diesel fuel may be sponged off immediately with clean water and allow to dry naturally.

2.3.3 Mud can be removed with a stiff (not wire) brush when dry.

2.3.4 The Lifejacket cover may be hand washed in good quality mild detergent in cool water (40°C) rinse well, drip dry naturally in air.

2.3.5 Sponge the inflatable chamber with pure soap solution only. Rinse in clean water immediately, inflate and allow to dry naturally in air.

WARNING
Do not use proprietary cleaning fluids, thinners, spirits or similar substances.

2.3.6 In cases of severe contamination the unit shall be deemed beyond economic repair and the customer advised to purchase a replacement lifejacket

2.3.7 It is advised that personnel are familiarised with the operation of all lifejackets and lifesaving appliances.

2.4 Lifejacket Servicing Tools

Fig. 2.4 Table of Tools Required

Description	Type
Crewsaver Servicing Tool Kit	
A fine screw driver or tool suitable for removing gaskets	
Scissors or good quality trimming shears	
“Chinagraph” pencil	
Fine point indelible pen	
1 off metal calibrated metre stick	
Scales to weigh gas cylinders	0-1000gram (+1/-1 grams)
Adaptor/tee piece for the testing of inflation chambers.	
Manometer	0-500Mbar
Timing Device	
Thermometer	0-40ºC
Clean and dry air supply	
450mm wide bag sealer (3mm element)	

Suitable large area for the work to be carried out

2.5 Lifejacket Service Record Sheet

2.5.1. An electronic copy of the sheet is available to aid reproduction (or copy next page).

2.5.2. Each lifejacket serviced should be recorded either individually or as a batch, showing the serial numbers and the work performed during the service.

2.5.3. The service record sheet should be signed and a copy given to the owner certifying that the lifejacket has been serviced.

2.5.4. All replacement parts should be noted - recording either the serial numbers of the component or the expiry date.

2.5.5 The record sheet shown on the next page is a recommended version. Similar record sheets, including the same information, may also be used.

Crewsaver

CERTIFICATE NUMBER:

LIFEJACKET SERVICING SCHEDULE

W/O Number:

TYPE	
CUSTOMER	
VESSEL	
LAST SERVICED BY	DATE OF LAST SERVICE

SERIAL NUMBER/S:

CHAMBER INSPECTION	☑☒	COMMENTS
GENERAL CONDITION		
MATERIAL		
WELDS		
WEBBINGS		
RETRO TAPE		
WHISTLE		
ORAL TUBES		
RELIEF VALVES		
MANIFOLDS		
SCHRAEDER VALVES		
CYLINDERS		
LIGHT		
CYALUME POCKET		
BUDDY LINE		

COVER	☑☒	COMMENTS
MATERIAL		
VELCRO		
ZIP		
PLB POCKETS		

INFLATION MECHANISM	☑☒	COMMENTS
OPERATING MECHANISM		
CORD		
AUTOMATIC CAPSULE		
WASHERS		
RETAINING NUT		
RETAINING CLIP		
TOGGLE		

SPRAY HOOD	☑☒	COMMENTS
FABRIC		
ATTACHMENT		
VELCRO		

WEBBINGS	☑☒	COMMENTS
WAIST BELT / HARNESS		
BACK STRAP		
LIFTING BECKET		
CROTCH STRAP		
BUCKLES		
STITCHING		

PRESSURE TEST RESULTS

TIME		FRONT CHAMBER	REAR CHAMBER
ON			
OFF			
TEMP.		ON	OFF

RELIEF VALVE TEST RESULTS	FRONT CHAMBER	REAR CHAMBER
OPEN		
CLOSE		

REPAIRED ITEMS (COMMENTS)

SERVICED BY:		DATE:	

2.6 Lifejacket Servicing Tool Kit

UML Mk5 Auto Socket

Turned Socket

Calibrated Socket Driver
(Tighten Cylinder)

Calibrated Socket Driver
(Remove & Replace Locking Nuts
For UML & HR)

Manometer

Valve Extraction
Tool

Inflation Adaptor

Pressure Measuring
Adaptor

Calibrated Torque Driver
(Schraeder Valve)

3.1 Unpacking

3.1.1. Starting at the operating mechanism side of the cover, unpeel the velcro and pull the zips apart, exposing the operating Mechanism and cylinder. See Fig 3.1

WARNING: Care should be taken not to snag the operating mechanism pull cord

3.1.2. Open the rest of the velcro and zip around the outside of the cover by peeling the fabric apart. Care should be taken not to snag the operating mechanism pull cords.

WARNING: All defects should be noted onto the service record sheet.

3.1.3. Remove the operating mechanisms. This must be followed in the order outlined below.

3.1.3.1 For lifejackets fitted with United Moulders mechanisms refer to Fig 3.2 - Automatic Operation

3.1.3.1.1 Unscrew the Automatic capsule from the operating head. Place to one side for testing and reassembly later. See section 6.

3.1.3.1.2 Carefully remove the CO_2 cylinder by unscrewing it from the operating Mechanism. Retain for further inspection. Refer to Section 5.

3.1.3.1.3 Remove operation mechanisms by unscrewing the retaining nuts. Retain for re-assembly.

3.1.3.2 If a Hammar operating mechanisms are fitted, remove using the special Hammar operating head “Service Key" See Fig 3.3. Place to one side for further inspection. Refer to Section 5.

3.1.4. Remove light and battery if required. Place to one side for further inspection. Refer to section 5

3.1.5. For Cleaning. Refer to Section 4.

3.1.6. Carry out visual inspection. Refer to section 5.

Fig 3.1 Unpacking the Lifejacket

Fig. 3.1.1

Fig. 3.1.2

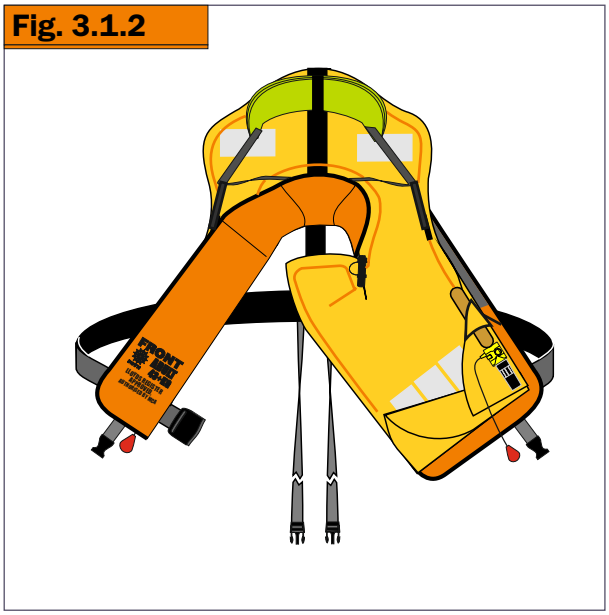


Fig. 3.1.3

Fig. 3.1.4

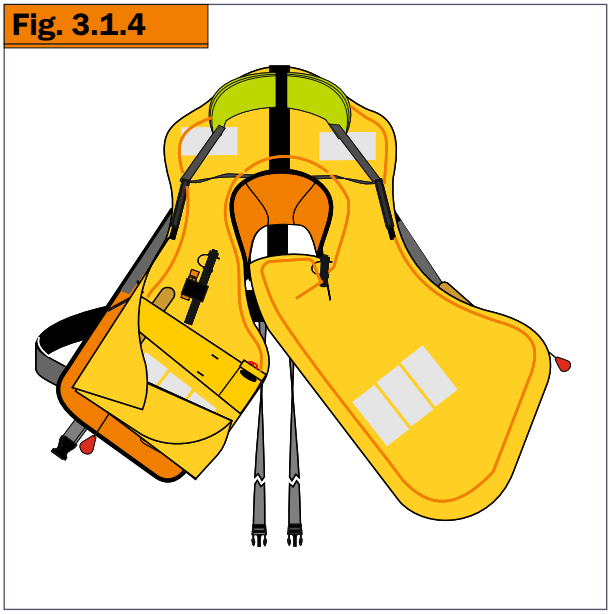


Fig. 3.1.5

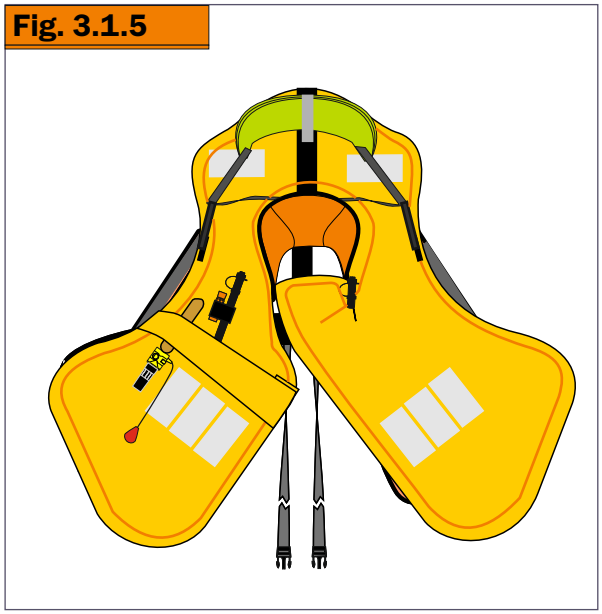


Fig. 3.1.6

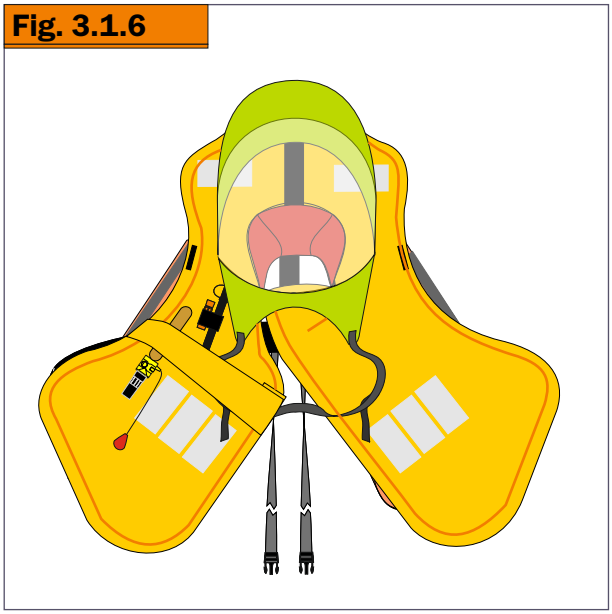
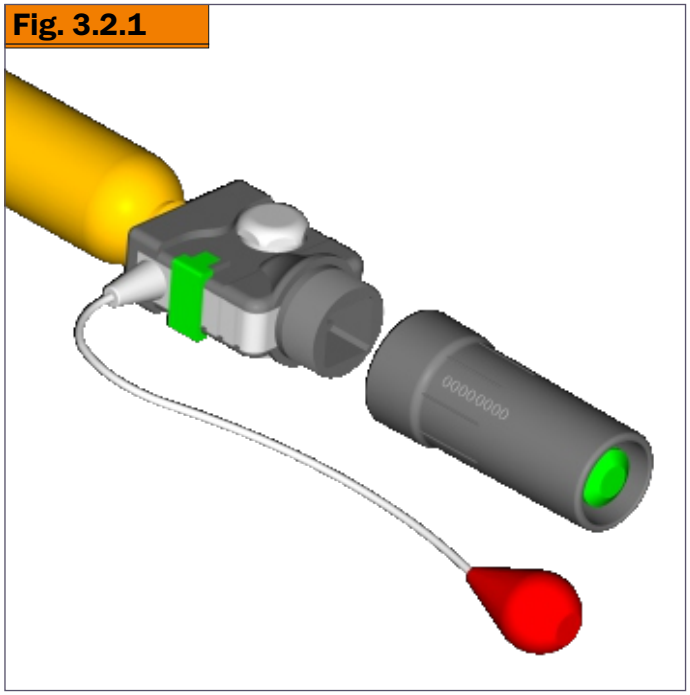
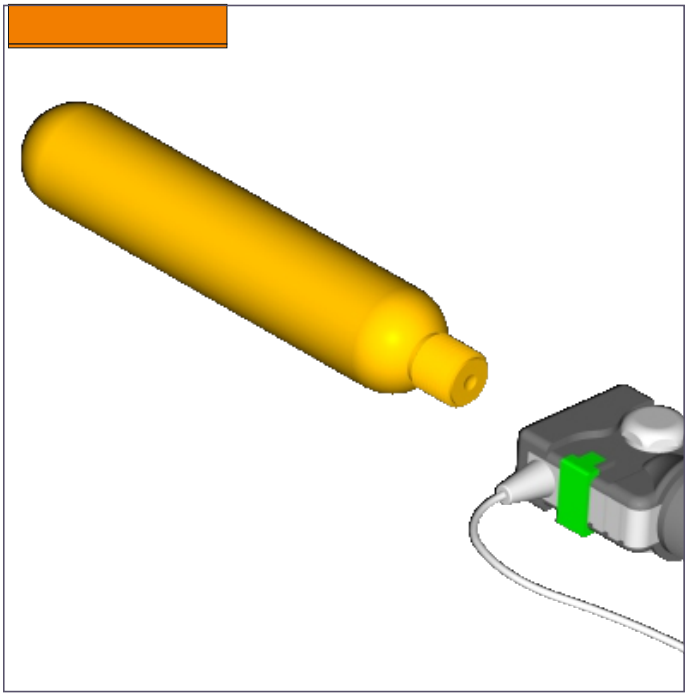


Fig 3.2 United Moulders Operating Head

Fig. 3.2.1

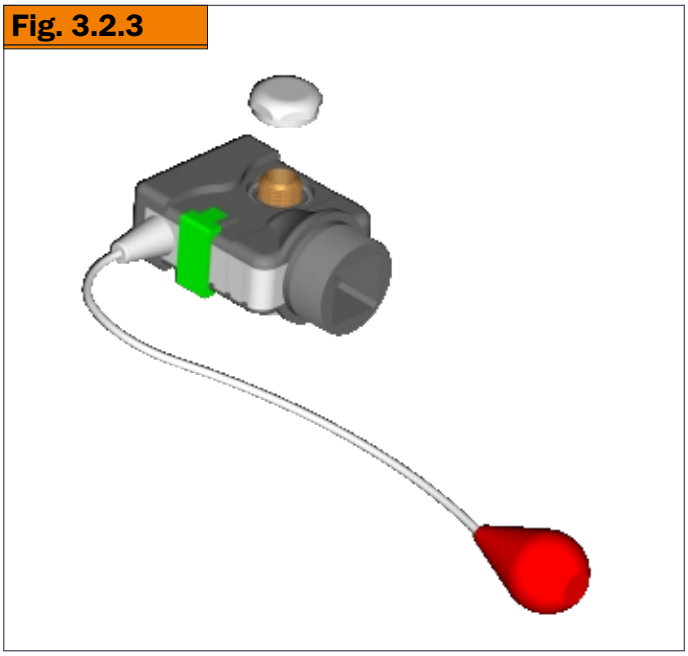


Unscrew the Automatic firing capsule from the end of the operating head. This should only be done after the test detailed in Section 6 has been performed in order to test the old unit, or if the operating head has already been fired. Discard and replace with a new automatic firing capsule upon reassembly. The Capsule must be replaced if it expires before the date of the next annual service.



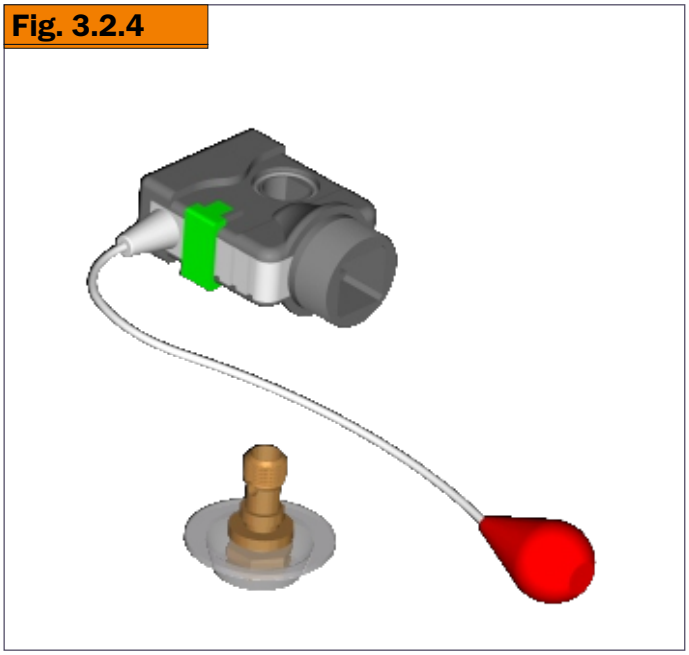
Unscrew the 38 gram cylinder from the automatic operating head. Once the cylinder has been removed inspect the cylinder O-Ring seal. Check the seal is in place and that it is in a good condition. Take the cylinder and check to see if the cylinder has been used. This should be performed by check weighing. If under the minimum weight as displayed on the cylinder body, discard in a safe manner.

Fig. 3.2.3



Unscrew the valve retaining nut from the top of the operating head. Check for corrosion and discard if corroded. Inspect the top sealing O-ring. This must be replaced with a new part if damaged.

Fig. 3.2.4

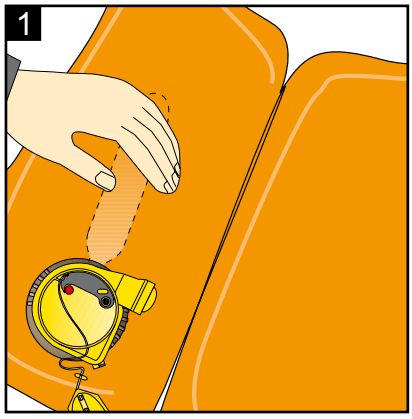


Remove the operating head from the manifold which is welded to the inflation chamber fabric. Inspect the bottom sealing O-ring. This must be replaced with a new part if damaged.

Please note: The operating head may not match the images above but the processes are always the same.

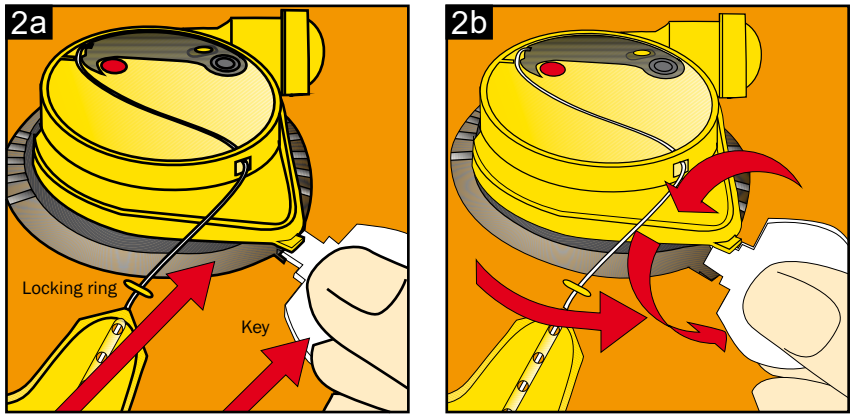
Fig 3.3 Hammar Operating Head

Fig. 3.3.1



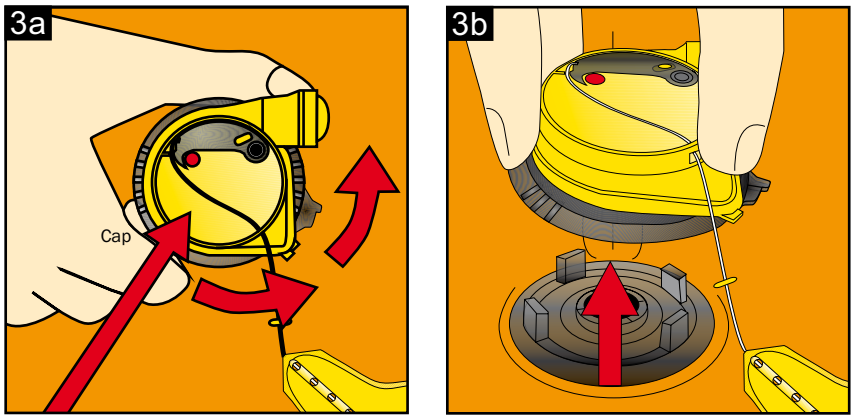
1.
Place the lifejacket on a smooth, flat surface and wipe off any water. Hold the gas cylinder through the fabric, using one hand.

Fig. 3.3.2



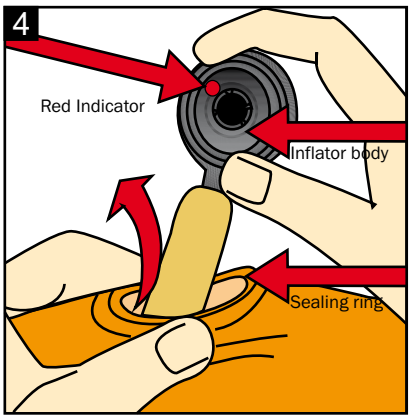
2.
Insert metal key as shown in 2a and turn the key counter-clockwise (2b) between black locking ring and labelled yellow cap. The black locking ring will now turn counter-clockwise.

Fig. 3.3.3



3.
Now turn black locking ring counter-clockwise (3a) and lift cap (3b). (cap = yellow inflator operating head) Dispose of used cap.

Fig. 3.3.4



4.
Squeeze sealing ring to elongate and remove the inflator body through the sealing ring.
Dispose of used inflator body in an environmentally approved manner.

4.1 Cleaning Lifejackets

4.1.1 The standard cover of the 150N Seacrewsader 2010 and the 150N Crewfit Twin 2010 is made from a Polyester fabric that can be cleaned with care.
The 150N Crewfit Twin 2010 also comes with a Heavy Duty cover. The 150N Seacrewsader 2010 also comes with a Fire Resistant cover or a Heavy Duty cover.

4.1.2 For all types of cover, mud can be removed with clean water and the zip can be cleaned with a stiff (not wire) brush when dry.
4.1.2.1 Contaminants such as oil or diesel fuel may be sponged off immediately with clean water, allow to dry naturally.
4.1.2.2 Covers may be hand washed in good quality mild detergent in cool water (40°C) rinse well, air drip dry.

4.1.3 Sponge the inflatable chamber with PURE SOAP SOLUTION ONLY. Rinse in clean water immediately, inflate and air dry.

WARNING: Do not use proprietary cleaning fluids, thinners, spirits or similar substances.

5.1 Cover Inspection

5.1.1 Visually inspect the cover material for wear, abrasion, pulled threads, contamination, cuts and holes.
5.1.2 If necessary the cover may be washed. Refer to Section 4.
5.1.3 Effect repairs if necessary and re-inspect for quality of repaired cover.
5.1.4 Carefully examine the zips and the slider for wear, broken teeth or slider and worn or fraying tape.
5.1.5 If it is considered that the cover is beyond economic repair the customer shall be advised and offered a replacement lifejacket.
NOTE: Due to the construction of this lifejacket no individual cover is available for replacement, therefore the lifejacket as a whole must be replaced.

5.2 Inflatable Chamber Inspection

5.2.1 Visually inspect the chamber material for wear, pulled threads, contamination or signs of mistreatment .

5.2.2 Visually inspect all welds.

5.2.3 Visually inspect all webbings in accordance with Section 5.7

5.2.4 Visually inspect the whistle and its attachment to the lifejacket for mistreatment, defects, and fraying of the cord and its attachment.

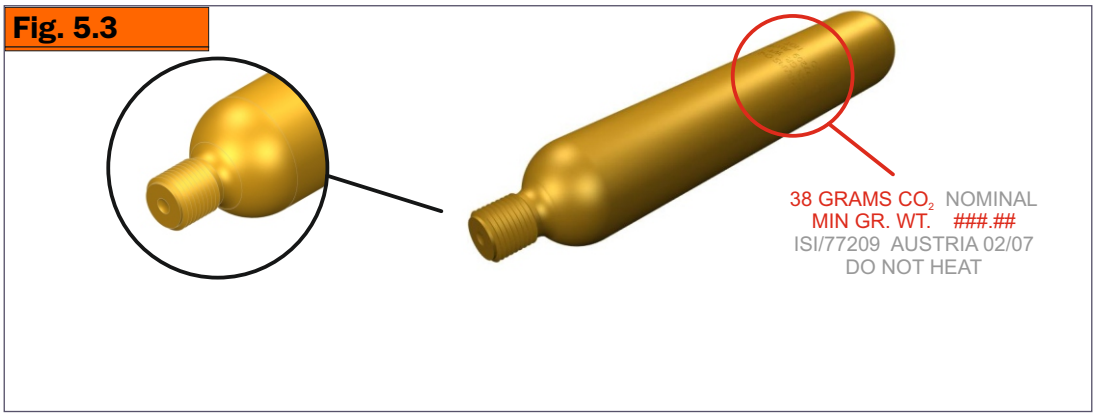
5.2.5 Check that the toggles attaching the inflation chamber to the lifejacket are threaded TWICE through the retainers on the inside of the cover.

5.2.6 Test Lifejacket in accordance with Section 6.

5.3 Disposable Cylinders

5.3.1 Visually examine:
5.3.1.1. For Corrosion (All cylinders corroded with red rust or with visible pitting must be replaced).
5.3.1.2. Pierced or damaged piercing disc. (Seacrewsader 2010 only).
5.3.1.3. That the two cylinders have the correct gas charge - 38 grams CO_2
5.3.2 Check Min Weight of Cylinder against that marked on the barrel. The 150N Crewfit Twin 2010 is fitted with an MA1 Hammar Inflation system and the cylinder is glued permanently into the backplate using an epoxy glue. Do NOT attempt to unscrew the cylinder from the backplate. Instead add 22 grams to the minimum weight shown on the cylinder.

Fig. 5.3



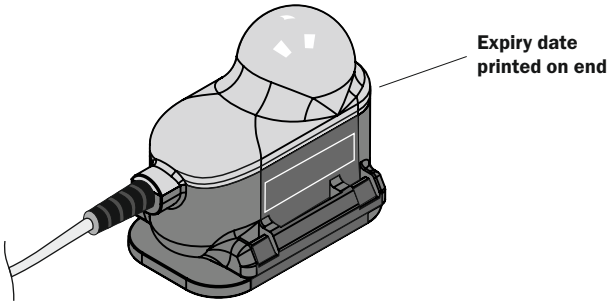
Remedial Action: If any of the above conditions are found to be incorrect the cylinder shall be replaced. See Section 9.

5.4 Light and Battery

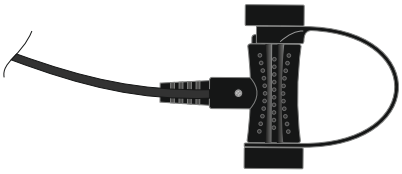
5.4.1 The lifejackets are fitted with the Crewsaver CSL Water Activated Light.

Visually inspect the light for signs of damage to:
5.4.1.1. The switch.
5.4.1.2. the cable.
5.4.1.3. the lens and its mounting or housing.

5.4.2 Check expiry date on battery. The expiry date must exceed the date of the next annual service.



5.4.3 Ensure that the switch is in the Auto-on position.



Water activated switch in Auto-on position

5.4.4 Test the assembly as detailed in Section 6

5.5 Oral & Relief Valves

5.5.1 Visually inspect for damage.

5.5.2 Test in accordance with Section 6.

Remedial Action: These items are not repairable refer to Section 9 for replacement Part.

5.6 Operating Mechanism

5.6.1 Visually inspect the Operation of the United Moulders Automatic Mechanism for:

5.6.1.1 Operation of the Manual override lever. This shall move easily and freely.

5.6.1.2 Operation of the firing pin cam action. Similarly this shall be a smooth action when the lever is operated.

5.6.1.3 Firing Pin centre discharge hole clear.

5.6.1.4 Pull cord for frays and damage.

5.6.1.5 Moulded body for cracks and damage. Special attention to be given to the areas around the operating lever/body connection pin.

5.6.1.6 Check the Automatic plunger.

Remedial Action: In the event that the Operating Mechanism fails any of the above inspection procedures, the complete unit shall be replaced. No Repairs are allowed. Refer to Section 9 for the part number of the relevant replacement part.

5.6.2 Visually inspect the Automatic Capsule:

5.6.2.1 Check plug is in place at the base of the capsule.

5.6.2.2 New Capsules are to be fitted where the expiry date is before the next annual service of the lifejacket.

5.6.2.2.1 If the capsule is to be replaced – Re-fit the old capsule and carry out operational tests refer to section 6.

Remedial Action: In the event that the Operating Mechanism fails any of the above inspection procedures, the complete Unit shall be replaced. No repairs are allowed. Refer to Section 9 for the part number of replacement parts.

5.6.3 Where the jacket is fitted with a Hammar Hydrostatic head, visually inspect to ensure that the indicator is green and that the expiry date is before the date of the next annual service. Fit new auto cap if either of these requirements is not met.

5.7 Webbings

5.7.1 Visually inspect for damage:
5.7.1.1. Fraying
5.7.1.2. Pulled Threads
5.7.1.3. Broken Stitches

Remedial Action: No repairs are allowed. In the case of damage being found, return the Lifejacket to Crewsaver.

5.8 Buckles

5.8.1 Visually inspect all buckles used on the webbings for signs of damage or corrosion.

Remedial Action: No repairs are allowed. In the case of damage being found, return the Lifejacket to Crewsaver.

5.9 Spray Hood

5.9.1 Visually inspect the spray hood for:
5.9.1.1. Damage to the points of attachment to the Lifejacket.
5.9.1.2. Cracking or crazing of the clear plastic face shield.
5.9.1.3. Damage or degradation of the velcro.
5.9.1.4. Fraying of Material.
5.9.1.5. Check stiffening tube of hood.

Remedial Action: No repairs are allowed. In the case of damage being found, return the Lifejacket to Crewsaver.

5.10 Labelling/Markings

5.10.1. Check all Markings and Labelling are clear and legible.

Remedial Action: No repairs are allowed. In the case of damage being found, return the Lifejacket to Crewsaver.

6.1 Inflatable Chamber

6.1.1. Air Holding Test. (Both Chambers must be tested independently)

6.1.1.1 Connect through a suitable Tee piece and adaptor, the oral tube with the oral valve in the open position, to a graduated water manometer (or a similar digital device for measuring back pressure).

6.1.1.2 Slowly inflate the lifejacket from a regulated supply until the relief valve expels excess.

Warning: Regulated supply pressure must not exceed 20psi.

6.1.1.3 Close off the air supply and leave for 10 minutes to ensure pressure is stable.

6.1.1.4 Check and record the pressure and temperature reading on the Service Record Sheet.

6.1.1.5 Leave for 30 minutes.

6.1.1.6 Check and record the pressure and temperature reading on the Service Record Sheet.

The maximum difference in the two pressure readings (pressure drop) allowed is 10%. The temperature differential shall be within plus or minus 3 degrees of the original reading. For each degree Centigrade rise in temperature subtract 2.5 mbar. For each degree Centigrade drop in temperature add 2.5 mbar to the readings to obtain the actual pressure variation. Should the temperature variation be outside 3 degrees either way then the test shall be repeated.

PSI	in/H2O	in/Hg	mm/H2O	mm/Hg	kg/cm2	bar	mbar	Pa	kPa
1.0	27.71	2.036	703.1	51.75	0.0703	0.0689	68.95	6895	6.895
1.1	30.48	2.240	773.4	56.93	0.0773	0.0758	75.85	7585	7.585
1.2	33.25	2.443	843.7	62.10	0.0844	0.0827	82.74	8274	8.274
1.3	36.02	2.647	914.0	67.28	0.0914	0.0896	89.64	8964	8.964
1.4	38.79	2.850	984.3	72.45	0.0984	0.0965	96.53	9653	9.653
1.5	41.57	3.054	1054.7	77.63	0.1055	0.1034	103.43	10343	10.34
1.6	44.34	3.258	1125.0	82.80	0.1125	0.1102	110.32	11032	11.03
1.7	47.11	3.461	1195.3	87.98	0.1195	0.1171	117.22	11722	11.72
1.8	49.88	3.665	1265.6	93.15	0.1265	0.1240	124.11	12411	12.41
1.9	52.65	3.868	1335.9	98.33	0.1336	0.1309	131.01	13101	13.10
2.0	55.42	4.072	1406.2	103.50	0.1406	0.1378	137.90	13790	13.79
2.1	58.19	4.276	1476.5	108.68	0.1476	0.1447	144.80	14480	14.48
2.2	60.96	4.479	1546.8	113.85	0.1547	0.1516	151.69	15169	15.17
2.3	63.73	4.683	1617.1	119.03	0.1617	0.1585	158.59	15859	15.86
2.4	66.50	4.886	1687.4	124.20	0.1687	0.1654	165.48	16548	16.55
2.5	69.28	5.090	1757.8	129.38	0.1758	0.1723	172.38	17238	17.24
2.6	72.05	5.294	1828.1	134.55	0.1828	0.1791	179.27	17927	17.93
2.7	74.82	5.497	1898.4	139.73	0.1898	0.1860	186.17	18617	18.62
2.8	77.59	5.701	1968.7	144.90	0.1968	0.1929	193.06	19306	19.31
2.9	80.36	5.904	2039.0	150.08	0.2039	0.1998	199.96	19996	20.00
3.0	83.13	6.108	2109.3	155.25	0.2109	0.2067	206.85	20685	20.69
3.1	85.90	6.312	2179.6	160.43	0.2179	0.2136	213.75	21375	21.37
3.2	88.67	6.515	2249.9	165.60	0.2250	0.2205	220.64	22064	22.06
3.3	91.44	6.719	2320.2	170.78	0.2320	0.2274	227.54	22754	22.75
3.4	94.21	6.922	2390.5	175.95	0.2390	0.2343	234.43	23443	23.44
3.5	96.99	7.126	2460.9	181.13	0.2461	0.2412	241.33	24133	24.13
3.6	99.76	7.330	2531.2	186.30	0.2531	0.2480	248.22	24822	24.82
3.7	102.53	7.533	2601.5	191.48	0.2601	0.2549	255.12	25512	25.51
3.8	105.30	7.737	2671.8	196.65	0.2671	0.2618	262.01	26201	26.20
3.9	108.07	7.940	2742.1	201.83	0.2742	0.2687	268.91	26891	26.89
4.0	110.84	8.144	2812.4	207.00	0.2812	0.2756	275.80	27580	27.58
4.1	113.61	8.348	2882.7	212.18	0.2882	0.2825	282.70	28270	28.27
4.2	116.38	8.551	2953.0	217.35	0.2953	0.2894	289.59	28959	28.96
4.3	119.15	8.755	3023.3	222.53	0.3023	0.2963	296.49	29649	29.65
4.4	121.92	8.958	3093.6	227.70	0.3093	0.3032	303.38	30338	30.34
4.5	124.70	9.162	3164.0	232.88	0.3164	0.3101	310.28	31028	31.03
4.6	127.47	9.366	3234.3	238.05	0.3234	0.3169	317.17	31717	31.72
4.7	130.24	9.569	3304.6	243.23	0.3304	0.3238	324.07	32407	32.41
4.8	133.01	9.773	3374.9	248.40	0.3374	0.3307	330.96	33096	33.10
4.9	135.78	9.976	3445.2	253.58	0.3445	0.3376	337.86	33786	33.79
5.0	138.55	10.180	3515.5	258.75	0.3515	0.3445	344.75	34475	34.48
5.1	141.32	10.384	3585.8	263.93	0.3585	0.3514	351.65	35165	35.16
5.2	144.09	10.587	3656.1	269.10	0.3656	0.3583	358.54	35854	35.85
5.3	146.86	10.791	3726.4	274.28	0.3726	0.3652	365.44	36544	36.54
5.4	149.63	10.994	3796.7	279.45	0.3796	0.3721	372.33	37233	37.23
5.5	152.41	11.198	3867.1	284.63	0.3867	0.3790	379.23	37923	37.92
5.6	155.18	11.402	3937.4	289.80	0.3937	0.3858	386.12	38612	38.61
5.7	157.95	11.605	4007.7	294.98	0.4007	0.3927	393.02	39302	39.30
5.8	160.72	11.809	4078.0	300.15	0.4077	0.3996	399.91	39991	39.99
5.9	163.49	12.012	4148.3	305.33	0.4148	0.4065	406.81	40681	40.68
6.0	166.26	12.216	4218.6	310.50	0.4218	0.4134	413.70	41370	41.37

6.1.1.7. If Lifejacket fails the Air holding test inspect as follows.

6.1.1.7.1 With the lifejacket inflated carefully brush the surface with a weak solution of soap and water or alternatively lower the lifejacket into a tank of water to observe for bubbles.

6.1.1.7.2 Identify and mark the source of leakage. Wash off in clean water and allow to dry naturally in air.

6.1.1.7.2.1 Special Attention to be given to:

a) Manifold Schraeder Core
b) Oral Tube/ Top-up Valve
c) Oral Tube/ Relief Valve

6.1.2 Subsequent to the air holding test in para 6.1 slowly inflate the lifejacket until the relief valve vents (Opens). Record the pressure reading on the manometer. See 6.2.2 below regarding type of Relief Valve.
6.1.2.1. Allow the pressure to relieve through the valve until the relief valve reseats (Closes).
Record the pressure reading. Note: Relief valves should operate at 3.5psi.
Relief valves that do not operate within the 3.5 - 4.0 psi range must be replaced.
6.1.2.2. The Opening (vent) and closing (reseat) readings shall be within 15% of the original reading.
Note: Valves that fail to reseat within the 15% tolerance must be replaced.
6.1.3 If the test is satisfactory deflate the Lifejacket in preparation for re-assembly. Refer to Section 8.
6.1.3.1. Insert the inverted oral valve dust cap into the top of the oral valve and expel the air.
6.1.4 Effect repairs in accordance with the Repair Procedures within the limits defined in Section 7.
6.1.5 Subsequent to remedial action being taken (see Section 7), retest the lifejacket in accordance with Section 6.

6.2 Valves

6.2.1. Oral Valves.
When removing the test adapter from each oral valve check that the oral valve reseats. If in doubt this may be checked by placing the valve underwater.

6.2.2. Relief Valves.
Relief Valves should be tested as detailed in 6.1.2.1, if defective the relief valve must be changed.
Refer to Section 9 for replacement part.

6.2.3 Schraeder Valves.
Should a leak be found in the Schraeder valve the faulty core must be removed and a new valve inserted using the Torque Screwdriver from the tool kit.

6.3 Operating Mechanisms

6.3.1 Operational Test for United Moulders Manual Operation.
6.3.1.1 Remove the operating mechanism from the lifejacket. With the cylinder also removed, pull the lever on the side of the operating head, and check that the firing pin is visibly moving inside the open end.
6.3.1.2 If the lever does not move, or the firing pin is not clearly moving, the operating head must be replaced. Refer to Section 9 for part number.

6.3.2 Operational Test for United Moulders Automatic Operating Heads (to be performed when capsules have expired).
6.3.2.1 Remove the operating mechanism from the lifejacket and remove the cylinder.
6.3.2.2 Assemble the expired capsule onto the body of the operating mechanism.
6.3.2.3 Place the complete unit into water and check that the unit operates within 5 seconds.
6.3.2.4 If the mechanism fails to pass this test replace the complete unit. Refer to Section 9 for part Number of the replacement part.
NOTE: all failures of this test must be reported to Crewsaver. Crewsaver may require the failed units to be returned. Please do not discard.

6.4 Lights and Batteries

6.4.1. Testing Procedure for lights fitted to lifejackets.

6.4.1.1 Crewsaver CSL Water Activated Light.
Test the light by immersing the sensor in water. The light must flash, remove the light from the water and dry it. The light must stop flashing. If the light does not flash the unit has expired and must be replaced.

6.5 Retro Reflective Tape

6.5.1 If the retro reflective tape shows any signs of degradation the following tests shall be carried out in accordance with Marine Guidance Note MGN 105 (M+F) Issued by the UK Marine and Coast guard Agency March 1999, the retro-reflective material shall be tested at each service as follows.

6.5.1.1 Place a new piece of the same retro-reflective material to, and on the same plane as, a representative piece of material fitted to the appliance.

6.5.1.2 Pour water over both pieces of material.

6.5.1.3 Using a powerful torch or "Aldis" lamp held at eye level, compare the performance of the two pieces of material from a distance of 10 Metres.

6.5.1.4 If a noticeable deterioration in performance is observed then the retro-reflective material on the appliance should be replaced.

6.5.1.5 Dry off the lifejacket before repacking.

7.1 Cover

7.1.1 Attaching a patch on to the inside of the outer cover, using a compatible adhesive, may be used to repair cuts and holes in the cover. Cuts which may be repaired in this manner are limited to:

7.1.1.1 No more than 25mm in length in any direction.
7.1.1.2 Patches must not be within 25mm of any stitching, fixing points or markings.
7.1.1.3 The cut is covered by a minimum of 25mm of patch. See Fig 7.1.
7.1.1.4 The patch does not interfere with the operation and egress of the inflation chamber.

7.1.2 For Stitching Repairs refer to Fig 7.11.

7.1.3 No other repairs are allowed on the outer cover.

7.2 Inflatable Chamber

7.2.1 No repairs are permitted to the chamber fabric or its assembly, due to the construction of this lifejacket.

7.2.2 Components attached to the chambers may be repaired in line with the limits defined below.

7.3 Disposable Cylinders

7.3.1 No repairs permitted. For the Part No. of the replacement part refer to Section 9
7.3.2 Please ensure cylinders are disposed of in accordance with local regulations.
Treat empty cylinders as steel for recycling purposes.

7.4 Light and Battery

7.4.1 No repairs permitted. For the Part No. of the replacement part refer to Section 9

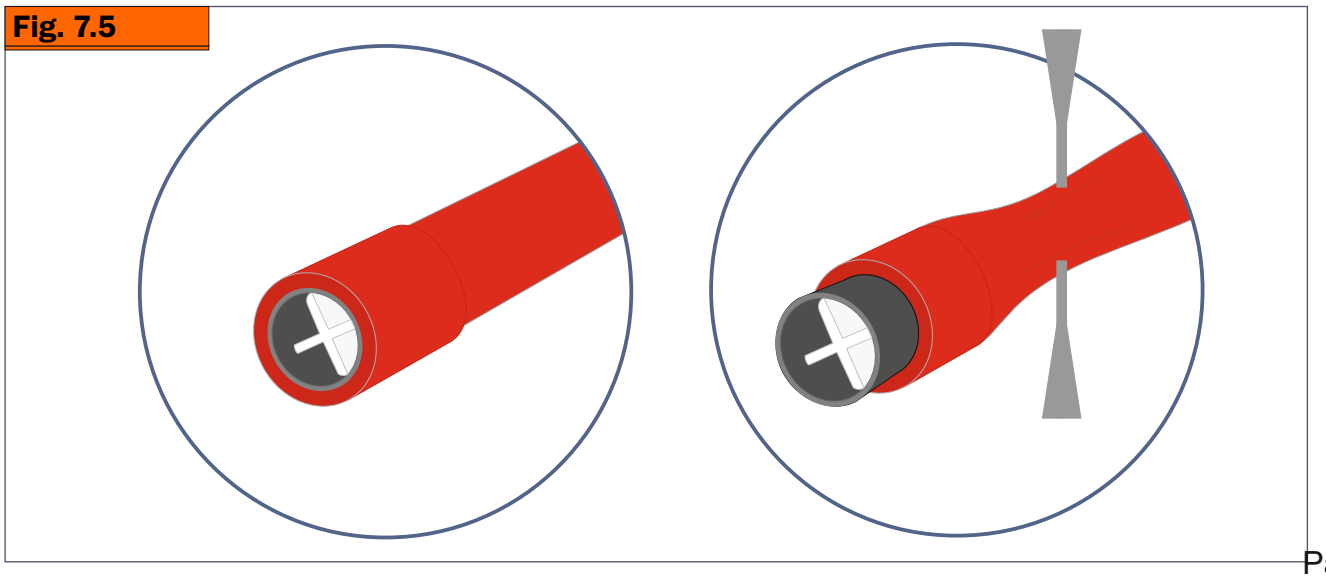
7.5 Valves

7.5.1 No repairs permitted. For the Part No. of the replacement parts refer to Section 9

7.5.2 Replacement of the Oral valve may be achieved by.

7.5.2.1 Carefully removing the defective unit by applying force, with a blunt instrument, behind the oral valve Squeezing the tube and gently pushing the valve out. See Fig. 7.5 below. Or remove the inner valve using pliers and use the extraction tool to remove the remainder of the valve.

Fig. 7.5



7.6 Operating Mechanism System

7.6.1 A Schraeder core is located inside the Valve Stem.

7.6.1.1 Remove and replace using the calibrated torque driver for Schraeder valves set to 0.32 - 0.36 Nm. Refer to Section 9 for the Part No. of the replacement part.

WARNING: Only fit replacement Schraeder valves obtained from Crewsaver.

7.6.2 Operating Mechanism.

7.6.2.1 No repairs permissible. Replace the complete unit. Refer to Section 9 for the Part No. of the replacement part.

7.7 Webbings

7.7.1 No repairs are permitted to the webbing on the lifejacket. Lifejackets with damaged webbing (including crutch straps) should be returned to Crewsaver.

7.8 Buckles

7.8.1. These components are not repairable or replaceable. Lifejackets with damaged buckles should be returned to Crewsaver.

7.9 Spray Hood

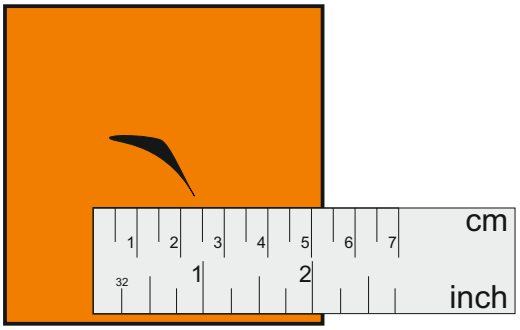
7.9.1. No Repairs Permitted. Lifejackets with damaged Sprayhoods should be returned to Crewsaver.

7.10 Repair Parameters - Holes in Cover

a.) Attaching a patch on to the inside of the cover, using a compatible adhesive, may be performed to repair cuts and holes in the cover. This is the only part of a lifejacket that may be repaired. Cuts and holes that may be repaired in this manner are limited to:

ai. No more than 25mm in length in any direction.
aii. Cut or Holes not crossing any lines of stitching.
aiii. Cuts or Holes no closer than 25mm from any fixing points, or screen-printing / marking.
aiv. An example of a repairable hole is shown below

Hole Size does not exceed 25mm



Outer line corresponds to the size of the patch that would be applied to this hole.

b.) When performing a repair the following considerations must be adhered to:

bi. For the correct type of adhesive contact Crewsaver
bii. Patches must always be cut from identical material to the cover or fabric to be repaired
biii There must be a minimum of 25mm excess patch covering the hole in all directions
biv. Patches should always be adhered to the inside of the cover only.
bv. Ensure the fabric is both clean and dry before the application of glue.

7.11 Repair Parameters - Stitching

All repairs to stitching must be carried out by a company deemed fit to perform the repair by Crewsaver prior to the work commencing.

a.) Stitching repairs should be performed when the visible inspection as detailed in section 5, Para 5.7 identifies broken or pulled stitches. The following repairs maybe made:

ai. Repairs to broken stitches should be over sewn following the same line of stitching , ensuring that the stitching continues for a minimum of 20mm past the repair section, each end must be back tacked twice.
aii. Repairs to pull threads should be repaired by first trimming the lose ends and then repeating the process as detailed above.
aiii. Any repairs carried out must be made using the correct thread available from Crewsaver. No other types of thread are to be used.
aiv. No stitching repairs are to be made to the inflation chamber, or parts stitched to it.
av. No stitching repairs are to be made on Harness Lifejackets

8.1 Assembly

8.1.1 Ensure the whistle is positioned and tied in correctly.
8.1.2 Expel the air from both chambers by inverting the dust cap on the oral tube. Do not use vacuum pumps to deflate jackets.
8.1.3 Assemble the Operating Mechanism to the inflation chamber - to be repeated for each chamber.
8.1.3.1 For United Moulders Automatic Operating Mechanisms. See Fig 8.1.
8.1.3.1.1 A new retaining clip must be fitted. Refer to Section 9 for replacement parts.
8.1.3.1.2 Fit the gas cylinder to the firing mechanism using the torque wrench (4Nm) and head adaptor from the toolkit. The cylinder is gripped in one hand and the head tightened using the torque wrench held in the other hand.
8.1.3.1.3 Fit the new automatic firing capsule to the operating head, screw hand tight. MIRG jackets must be re-assembled with automatic capsules fitted. Ensure that the manual capsules are in the pouch attached to the waistbelt.
8.1.3.1.4 Locate Operating head onto the Manifold.
8.1.3.1.5 Tighten the retaining nut onto the body using the Calibrated torque driver provided in the Crewsaver servicing tools. Note: Retaining nut must be tightened to between 2.5 and 2.7 Nm.

Warning: Care must be taken not to 'cross thread' the connection.

8.1.3.2 For Hammar Hydrostatic Operating Mechanisms. See Fig 8.2
8.1.3.2.1 If the operating head has failed the checks in 5.6.3 or is in any other way damaged a replacement operating mechanism must be fitted.
8.1.3.2.2 If the gas cylinder and inner body assembly has failed any of the checks in 5.3 then it is to be replaced. Replacement assemblies are listed in Section 9.1
8.1.3.2.3 Insert the cylinder and inflator body into the inflation chamber through the sealing ring, ensure that the cylinder is vertically positioned in the inflation chamber
8.1.3.2.4 Seat the inflator body underneath the sealing ring. Locate the inflation mechanism to the sealing ring and the inflator body, with the manual pull cord and toggle facing directly down the inflation chamber away from the cylinder. Using the Hammar operating head tightening key, clip the mechanism closed.

Warning: Care must be taken not to 'cross thread' the connection.

8.1.4 To re-pack the lifejacket. See 8.4 (150N Seacrewsader 2010), 8.5 (150N Crewfit Twin 2010).
8.1.5 Expel additional excess air, during the packing operation, from within the inflation chamber by again inverting the cap on the oral tube and inserting it into the oral valve. When all excess has been expelled replace the cap.
8.1.6 Mark Service Label on Lifejacket (using an indelible pen) and Service Record Sheet with the date of the service.
8.1.7 Ensure the serial number has been correctly recorded and that it is clearly marked on the Record Sheet.

Warning: The lifejacket folding procedures must be followed accurately to ensure that the lifejacket inflation mechanism operates and the lifejacket deploys correctly. The lifejacket shall not be folded and/or packed using any other method or procedure than that specified.

8.2 United Moulders Operating Head

Check that the cylinder sealing gasket in the end of the operating head has been correctly fitted, or replaced if necessary. Fit the 38 gram CO_2 cylinder. Ensure that the cylinder has been check weighed before fitting to the lifejacket. Fit the gas cylinder to the firing mechanism using the torque wrench (4Nm) and head adaptor from the tool kit. The cylinder is gripped in one hand and the head tightened using the torque wrench held in the other hand.

Fig. 8.2.1

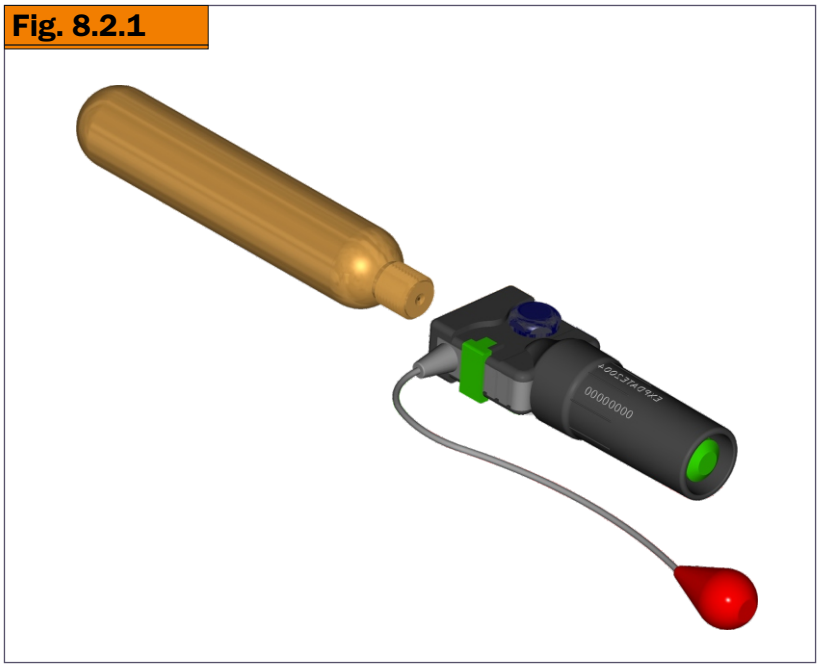
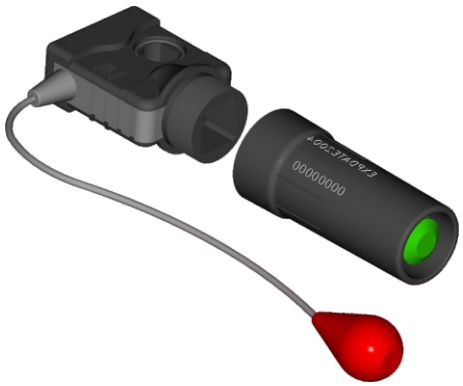
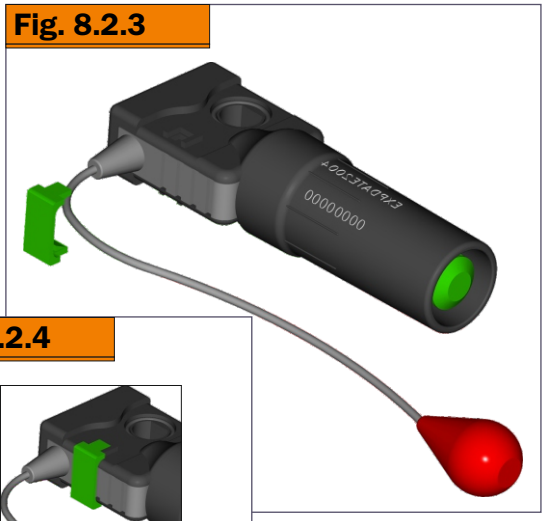


Fig. 8.2.2



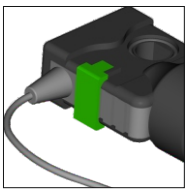
Fit the new Mk5i firing capsule onto the operating head. Capsules fitted on the United Moulders Mk5 head are black in colour. The capsule should be screwed tight to the end. Make a note of the batch number and manufacture date on to the service record sheet.
Do not attempt to fit the navy blue capsule used with the Crewsaver Mk5 operating head.

Fig. 8.2.3



With the firing capsule fitted, fit the retaining clip. The clip is fitted by pressing it over the firing arm and in to the recess either side in the centre of the operating head. The clip will click into place, thereby preventing the arm from moving.

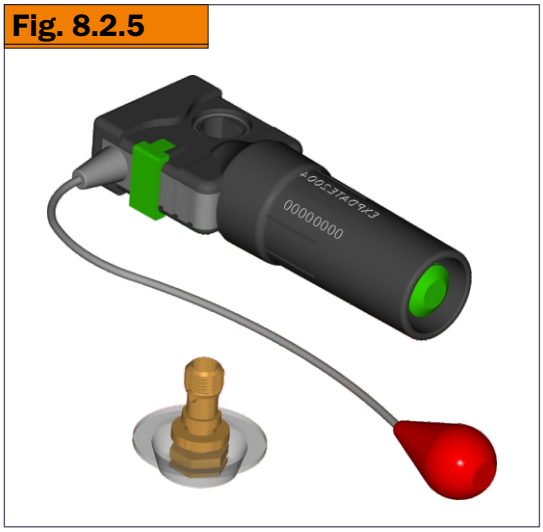
Fig. 8.2.4



Please note: The operating head may not match the images above but the processes are always the same.

8.2 United Moulders Operating Head

Fig. 8.2.5

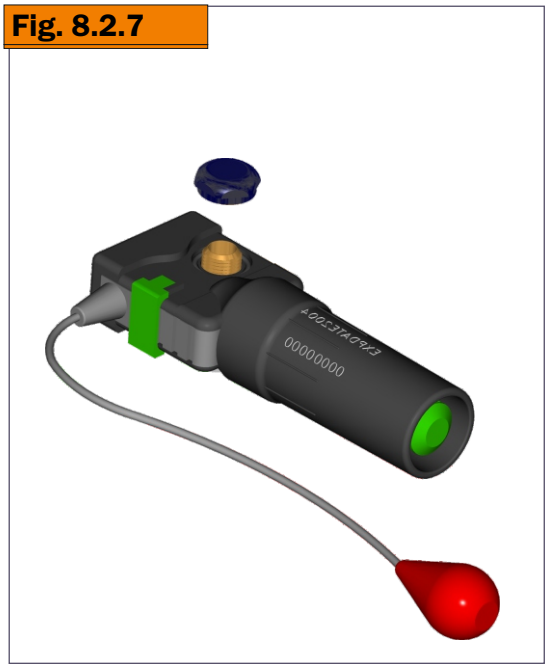


Check the bottom O-ring seal is in place. Before fitting the operating head onto the manifold, check that the schraeder valve is fitted. If fitting a new schraeder valve use a calibrated torque driver set to 0.32 - 0.36 Nm. Then place the operating head onto the manifold , so that the cylinder is pointing upwards.

Fig. 8.2.6

Sealing O-Ring

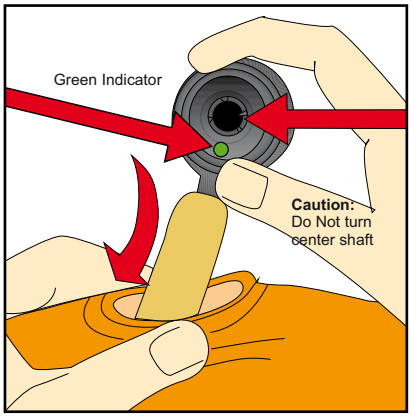
Fig. 8.2.7



Check the O-ring seal is in the recess on the top face of the operating head. With the top O-ring in place, fit the retaining nut. The retaining nut should be screwed into place using a torque wrench or driver fitted with a 9/16" socket. The wrench or driver should be set to between 2.5 and 2.7 Nm. This will prevent damage to the operating head and ensure a good seal is maintained.

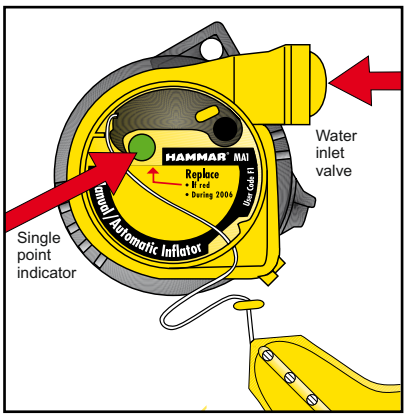
Fig 8.3 Hammar Operating Head

Fig. 8.3.1



Check that the indicator is green. Insert new inflator body with gas cylinder pointing upward inside the lifejacket (PFD). Let the sealing ring rest on the inflator body around the four lugs.

Fig. 8.3.2

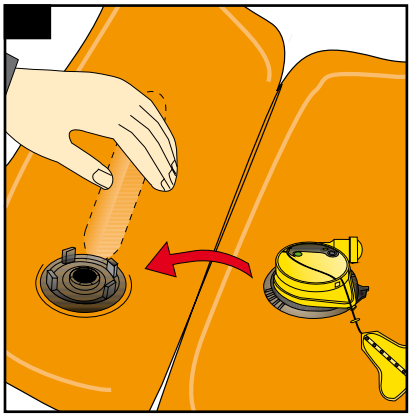


Now check the new manual/ automatic cap as follows:

1. Single point indicator showing green?
2. Expiry date OK?

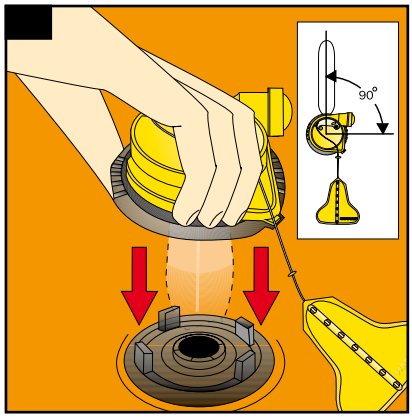
If YES is the answer to both these questions, then proceed as follows.
If NO get a new cap.

Fig. 8.3.3



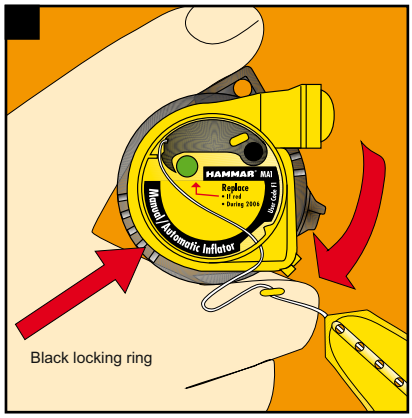
Hold the gas cylinder through the fabric of the lifejacket.

Fig. 8.3.4



Position the replacement cap with the water inlet valve pointing to the right (7b) and press it FIRMLY onto the inflator body and sealing ring.

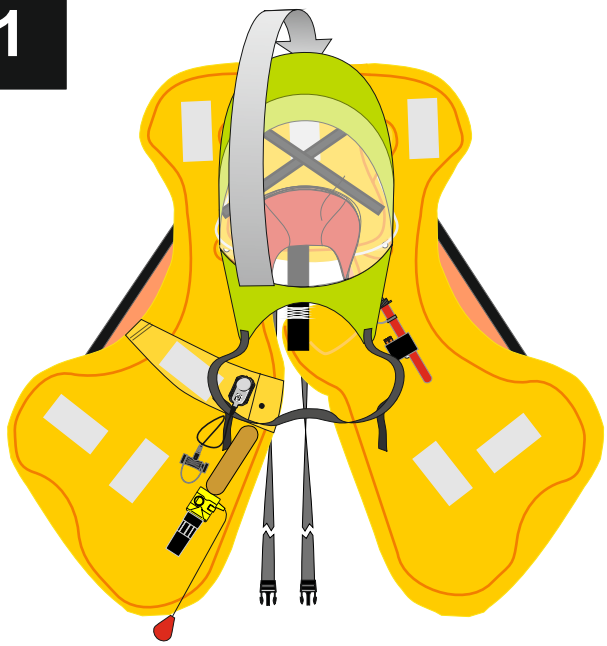
Fig. 8.3.5



While pressing FIRMLY onto the inflator body turn the BLACK locking ring clockwise into the locked position. Pull on the cap to make sure it has locked onto the inflator body.

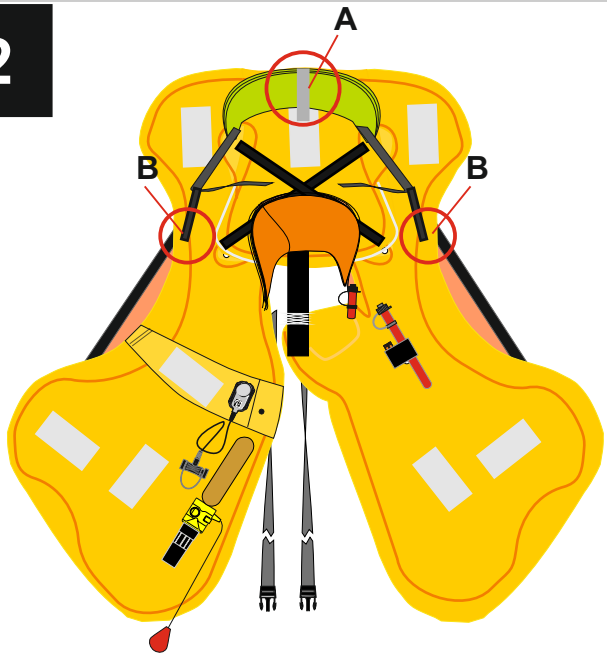
8.4 Packing Instructions - 150N Seacrewsader 2010

1



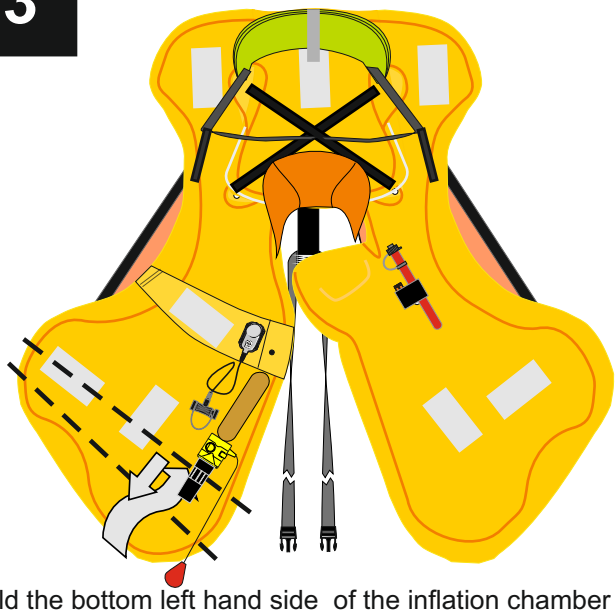
Following inspection of the lifejacket. Lay the deflated jacket out on a flat dry surface. Ensure dust caps are fitted. Concertina fold the sprayhood to the back of the lifejacket.

2



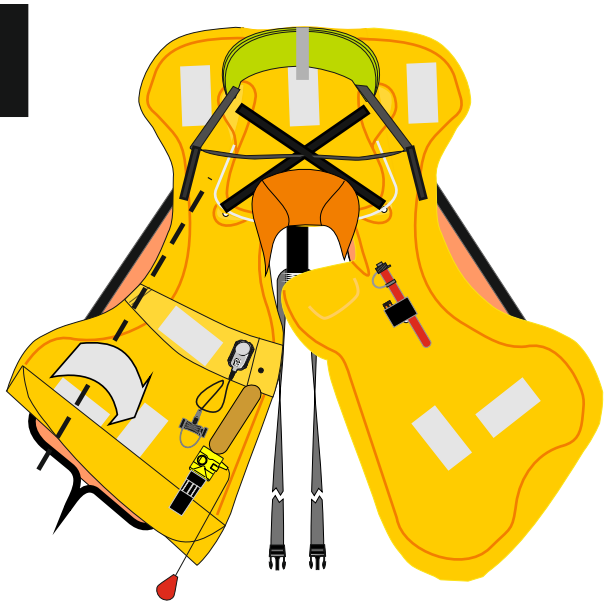
Retain the Spray Hood using the Velcro Tabs (A) that are attached inside and outside of the hood. Attach the Hood lanyard retainers (B) to the velcro tabs on the inflation chamber

3



Fold the bottom left hand side of the inflation chamber up under the Automatic capsule and fold the excess chamber back down so that the partly folded chamber does not extend below the cover or covers the Automatic capsule.

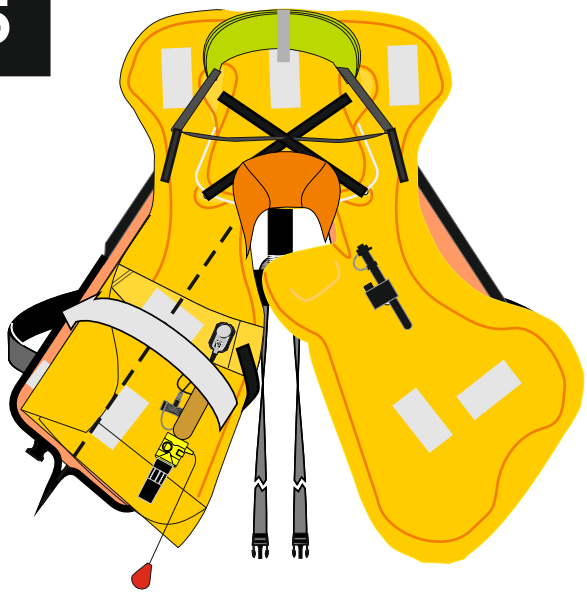
4



Fold the outer edge of the inflation chamber so that it is inside the cover.

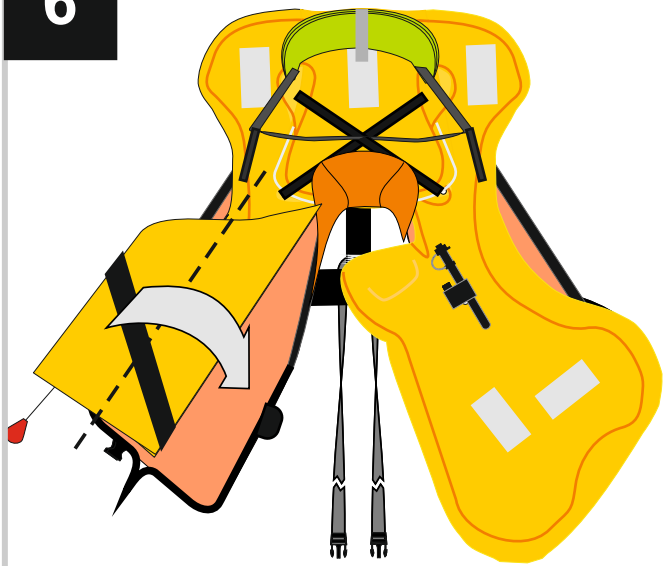
8.4 Packing Instructions - 150N Seacrewsader 2010

5



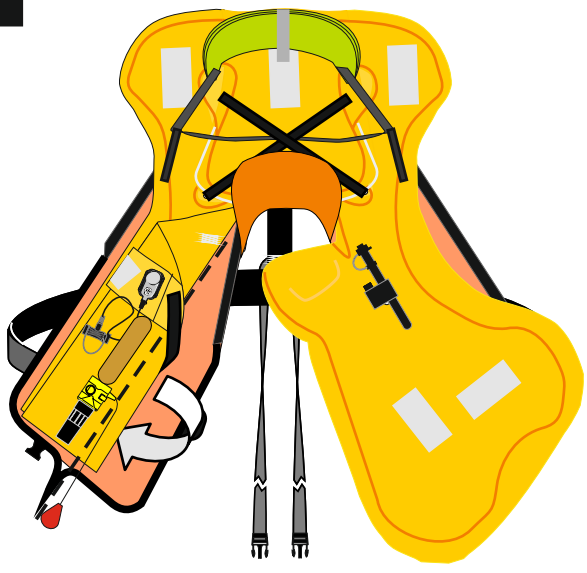
Fold the inside edge of the inflation chamber over as far as the attachment point of the bladder to the cover.

6



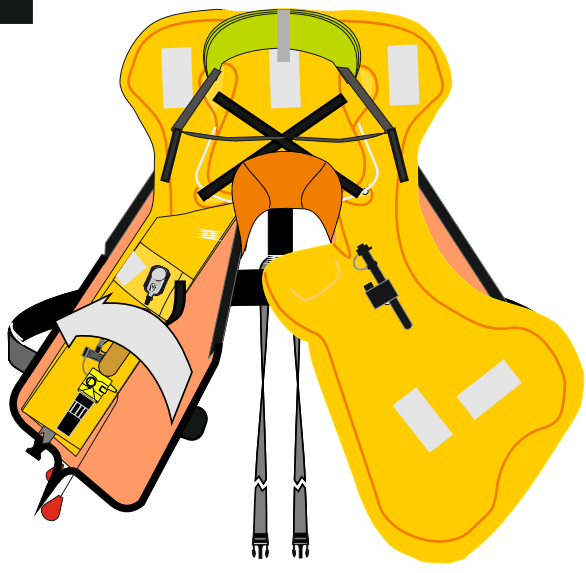
Fold the partially folded chamber back over towards the centre of the jacket so the operating head is visible on top of the folded bladder.

7



Tuck the inside edge of the chamber between the folded bladders

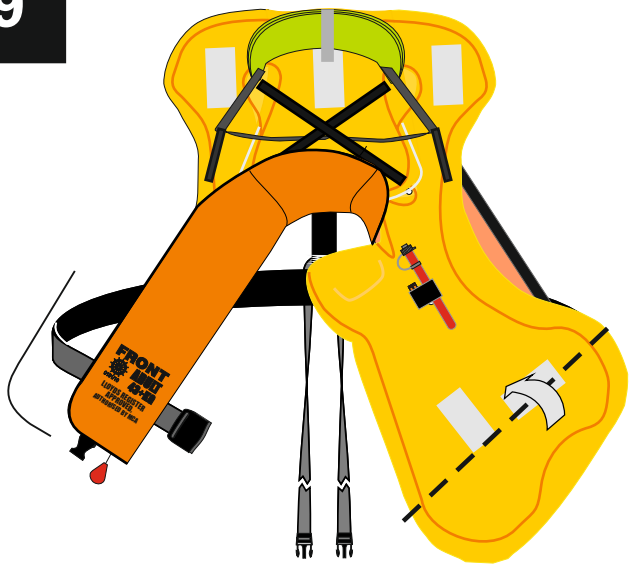
8



Hold the folded chamber and fold the inside cover over to the outside edge. Close the flap over the end of the zip / Velcro to hold the cover.

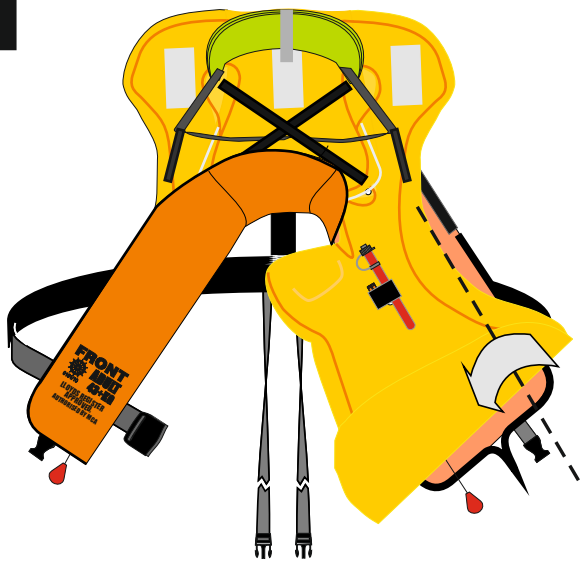
8.4 Packing Instructions - 150N Seacrewsader 2010

9



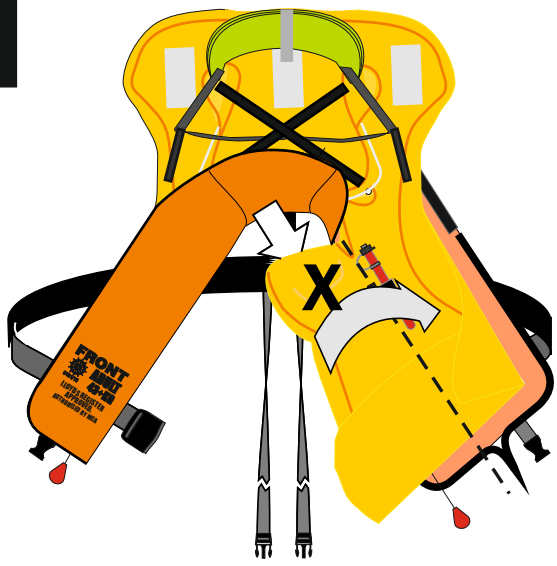
Close the cover by running the zip from the bottom of the cover up to the end of the zip and back. Tuck the bottom of the zip inside the cover ensuring the lanyard is visible. Repeat the folding of the right side of the chamber by folding up the bottom of the chamber.

10



Fold the outside edge of the chamber so that it is inside the cover.

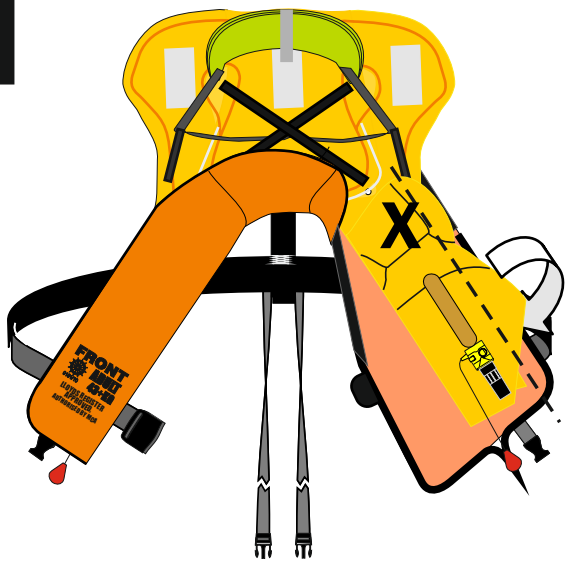
11



Fold the remaining inside edge of the inflation chamber over as far as the attachment point of the bladder to the cover.

Tuck the chin support (X) inside the chin support retainer

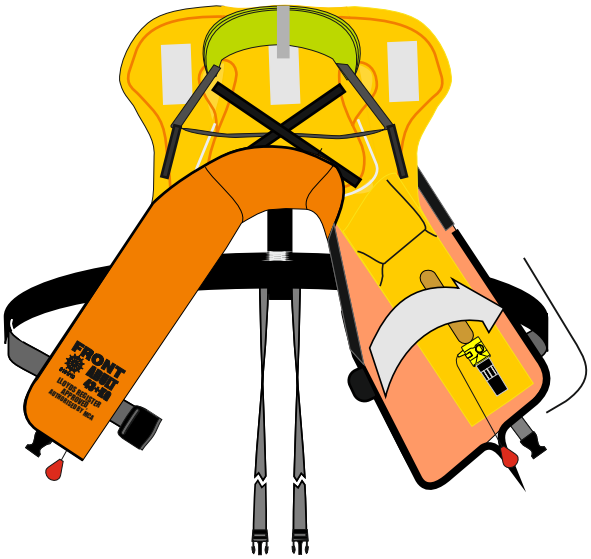
12



Tuck the remainder of the chamber that extends outside the cover under between the folded bladders. (**DO NOT TUCK BETWEEN BLADDER AND COVER.**)

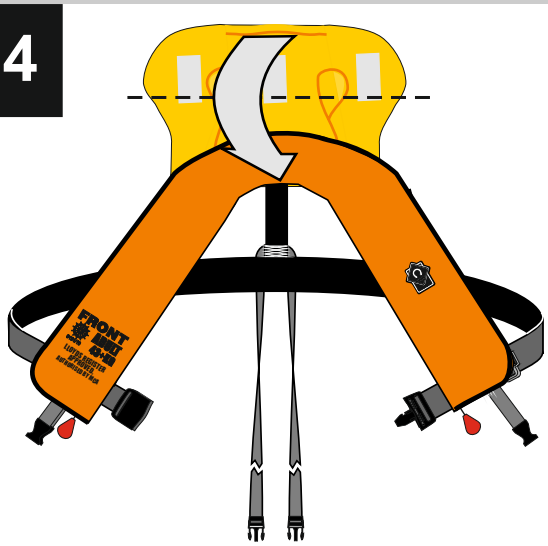
8.4 Packing Instructions - 150N Seacrewsader 2010

13



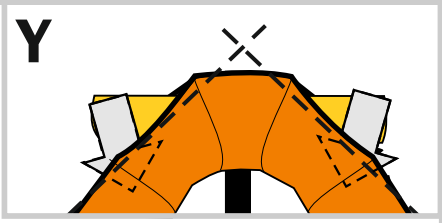
Hold the folded chamber and fold the inside cover over to the outside edge. Close the flap over the end of the zip / Velcro to hold the cover.
Close the cover by running the zip from the bottom of the cover up to the end of the zip and back. Tuck the excess zip inside the cover ensuring the operating lanyard is visible.

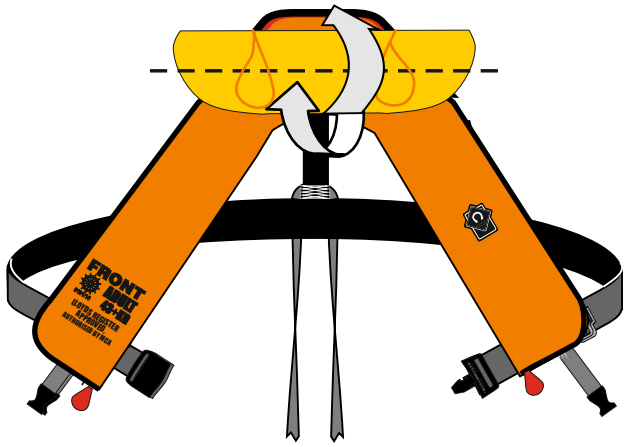
14



Fold the collar down so the rear cover is visible.

15

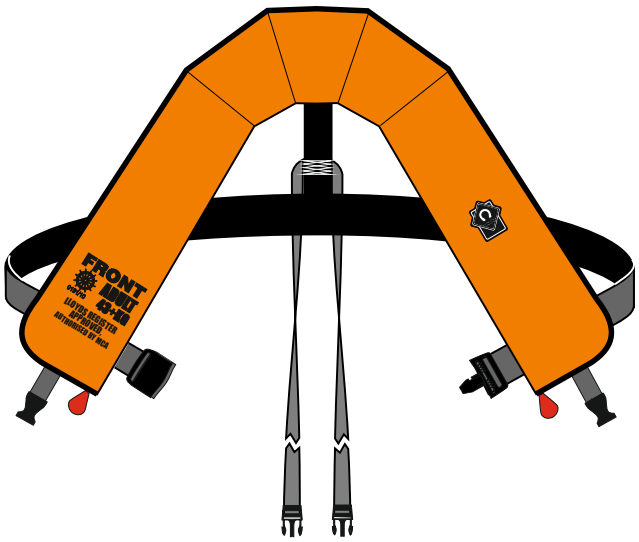




Fold the remainder of the collar up and close the centre part of the cover by pushing the Velcro together.

Fold the remaining exposed inflation chamber into the cover, folding each side down each leg. (Y)

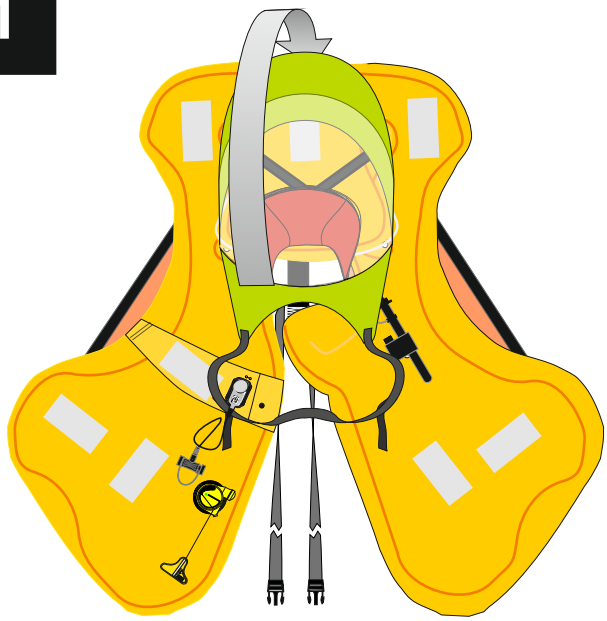
16



Above shows the lifejacket packed with the lanyards exposed and the ends of the zips tucked away inside the jacket.

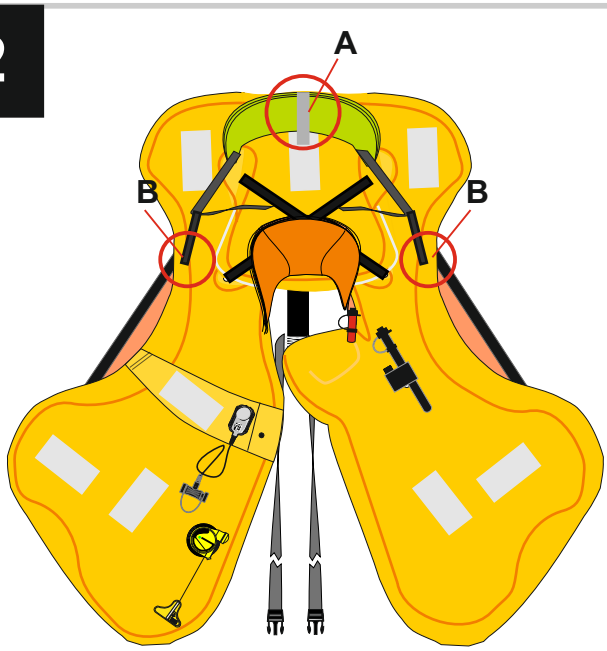
8.5 Packing Instructions - 150N Crewfit Twin 2010

1



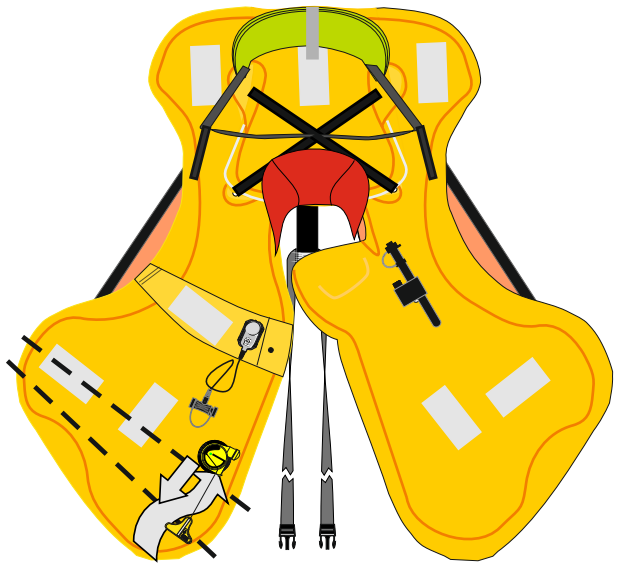
Following inspection of the lifejacket. Lay the deflated jacket out on a flat dry surface. Ensure dust caps are fitted. Concertina fold the sprayhood to the back of the lifejacket.

2



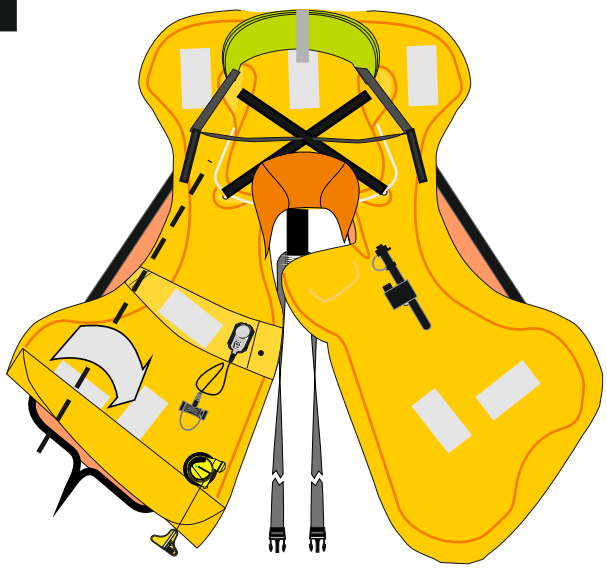
Retain the Spray Hood using the Velcro Tabs (A) that are attached inside and outside of the hood. Attach the Hood lanyard retainers (B) to the velcro tabs on the inflation chamber

3



Fold the bottom left hand side of the inflation chamber up under the operating lanyard and fold the excess chamber back down so that the partly folded chamber does not extend below the cover

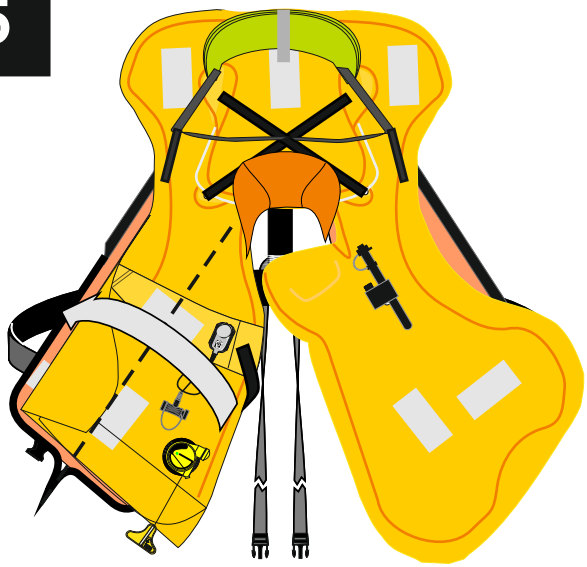
4



Fold the outer edge of the inflation chamber so that it is inside the cover.

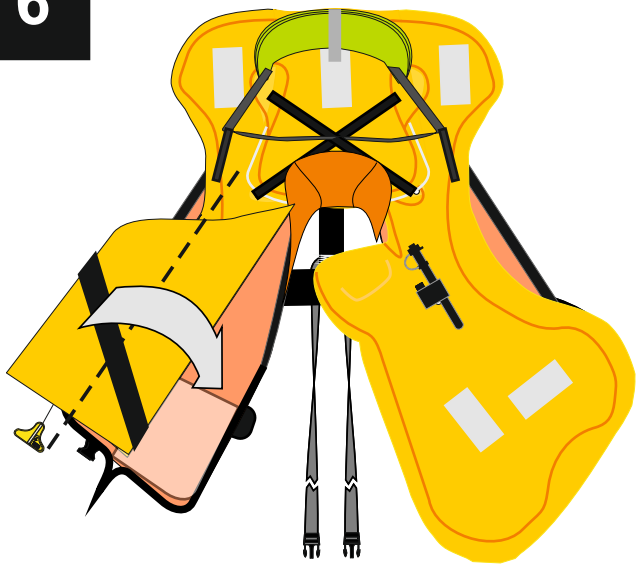
8.5 Packing Instructions - 150N Crewfit Twin 2010

5



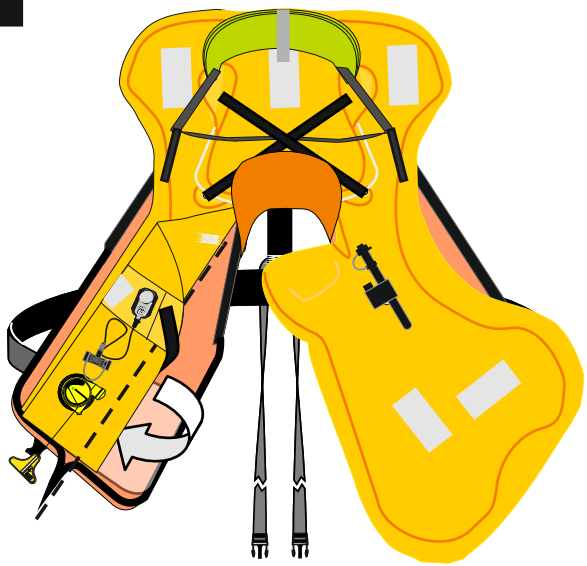
Fold the inside edge of the inflation chamber over as far as the attachment point of the bladder to the cover.

6



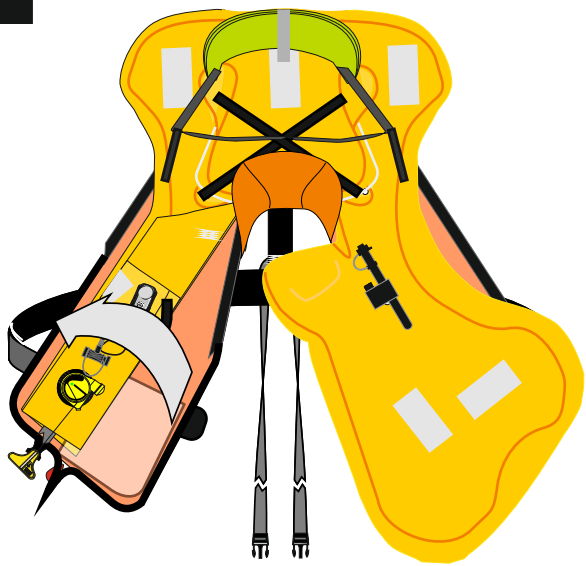
Fold the partially folded chamber back over towards the centre of the jacket so the operating head is visible on top of the folded bladder.

7



Tuck the inside edge of the chamber between the folded bladders

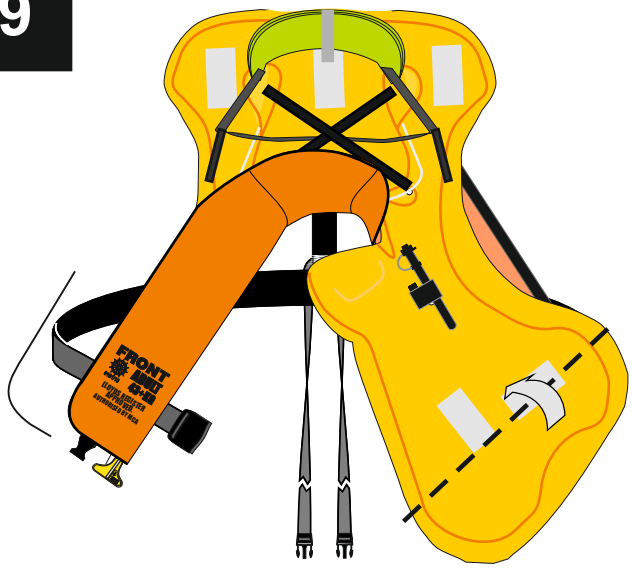
8



Hold the folded chamber and fold the inside cover over to the outside edge. Close the flap over the end of the zip / Velcro to hold the cover.

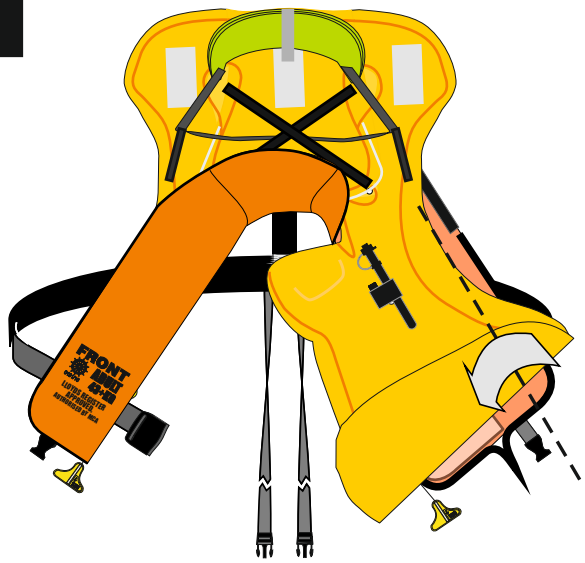
8.5 Packing Instructions - 150N Crewfit Twin 2010

9



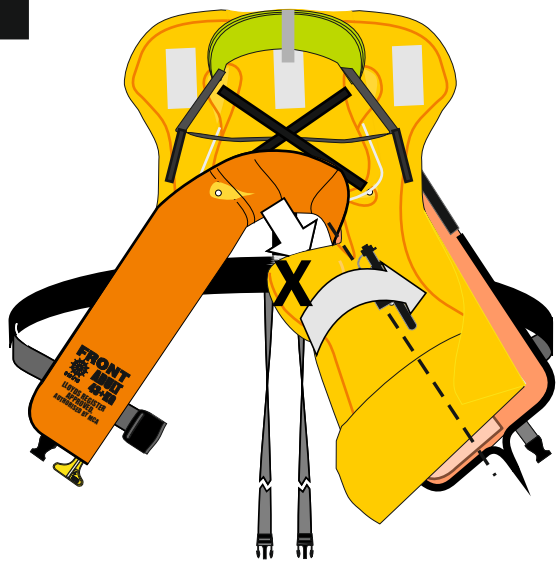
Close the cover by running the zip from the bottom of the cover up to the end of the zip and back. Tuck the excess zip inside the cover ensuring the lanyard is visible. Repeat the folding of the right side of the chamber by folding up the bottom of the chamber.

10



Fold the outside edge of the chamber so that it is inside the cover.

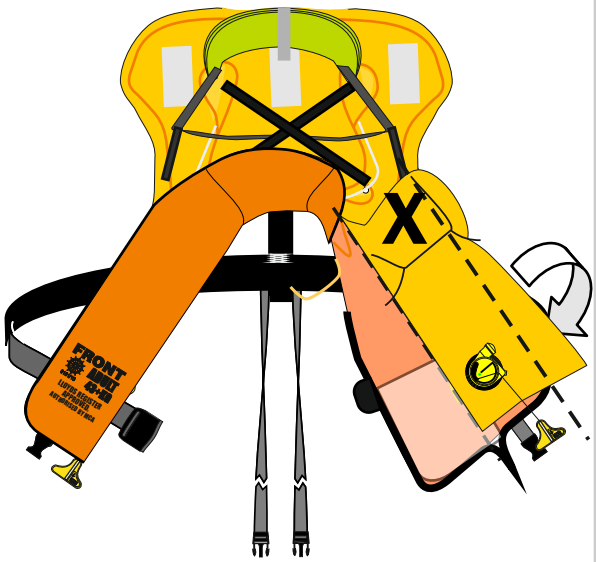
11



Fold the inside edge of the inflation chamber over as far as the attachment point of the bladder to the cover.

Tuck the chin support (X) inside the chin support retainer

12

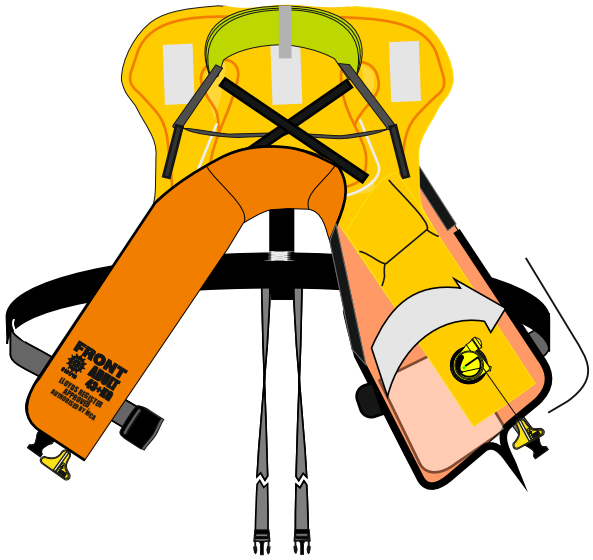


Tuck the remainder of the chamber that extends outside the cover under between the folded bladders. (**DO NOT TUCK BETWEEN BLADDER AND COVER.)**

Tuck the chin support (X) under the inside folded chamber.

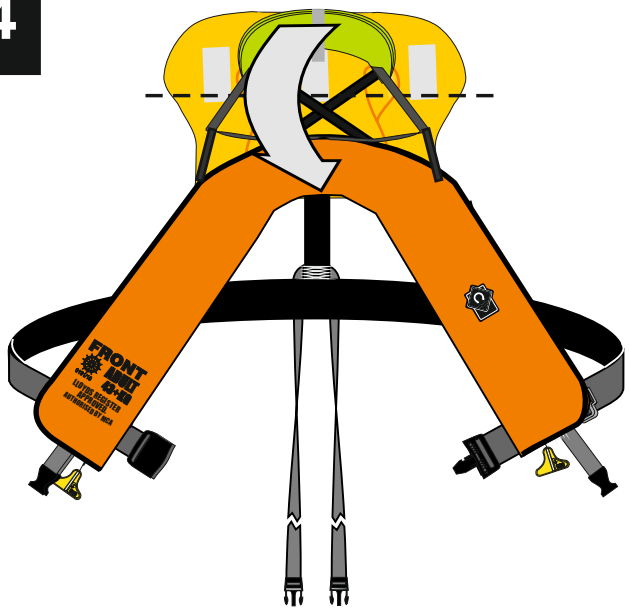
8.5 Packing Instructions - 150N Crewfit Twin 2010

13



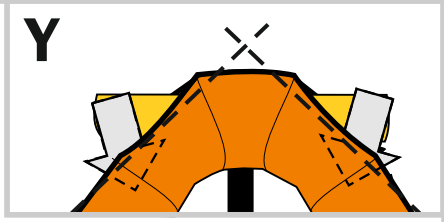
Hold the folded chamber and fold the inside cover over to the outside edge. Close the flap over the end of the zip / Velcro to hold the cover.
Close the cover by running the zip from the bottom of the cover up to the end of the zip and back. Tuck the excess zip inside the cover ensuring the operating lanyard is visible.

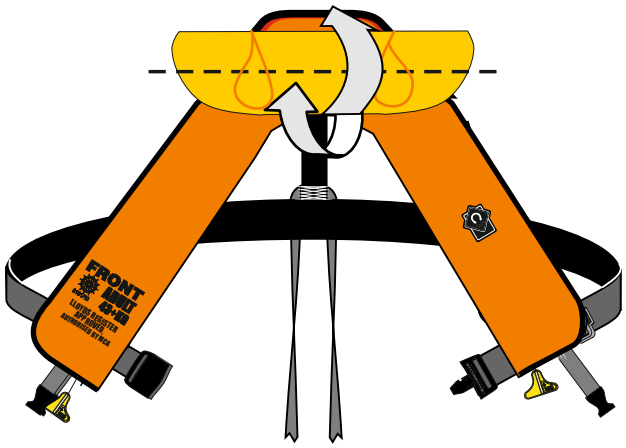
14



Fold the collar down enough to expose the rear cover.

15

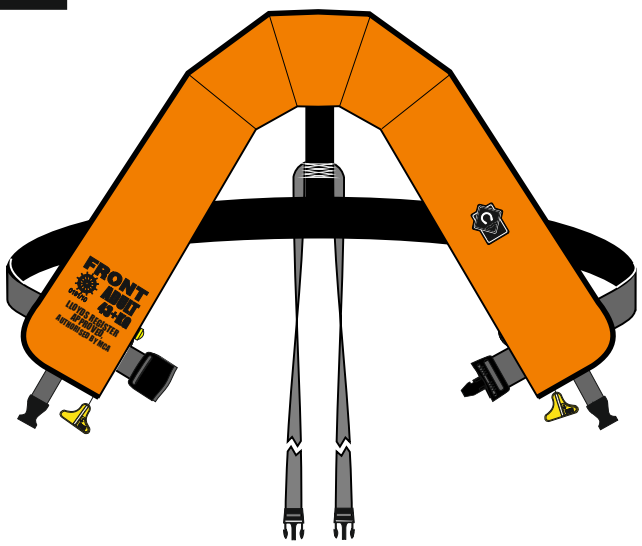




Fold the remainder of the collar up and close the centre part of the cover by pushing the Velcro together.

Fold the remaining exposed inflation chamber into the cover, folding each side down each leg. (Y)

16



Above shows the lifejacket packed with the lanyards exposed and the ends of the zips tucked away inside the jacket.

9.1 Parts Lists

Product Description	Part Number
38 gram CO_2 Cylinder	12045
United Moulders Mk5i Auto Capsule	11042
United Moulders Mk5 Automatic Head	11044
United Moulders Mk5 Automatic Head with extended lanyard	R16923
Auto Head Retaining Clip	11043
Auto Head Sealing Gasket (Top and Bottom)	10373
Auto Head Cutter 'O' Ring	11048
Hammar Auto Cap Ma1	11007
38 gram CO_2 Cylinder & MA1 Backplate Assembly	12038
Whistle	10677
CSL Light	10226
Mouth Inflation Valve	10208
Mouth Inflation Valve Cap	10151
3.5psi Pressure Relief Valve	11059
Schraeder Valve	10049
Retaining Nut	11047