FROG-9 User Manual

Rev 05 | Issued 05-Mar-10

Reflex Marine

OFFSHORE ACCESS SPECIALISTS

Reflex Marine Ltd

Offshore Access Specialists

Purpose of Manual

This manual contains general instructions for the operation and maintenance of the FROG-9.

Safe and proper use of the FROG-9 is the responsibility of the user after having taken due regard of the information provided in this document.

The user must ensure that all safety measures as required by relevant legislation and by good operational practice are utilised for operations involving the FROG-9.

Adequate training must be provided for all personnel involved in the operation of the FROG-9 before the commencement of operational use.

For the purposes of this manual RML will be deemed to mean Reflex Marine Ltd.

Please retain this manual for future reference. Additional copies may be obtained by contacting Reflex Marine Ltd or by downloading the latest manual revision from www.reflexmarine.com/support.

Revision Approval

Revision	Date Issued	Status	Approved	Name	Signed
01	07 Jan 08	Revised	RML Operations Manager		
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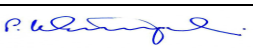
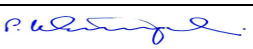
04	30 Oct 09	Revised	RML Operations Manager	Paul Wieczorek	
05	05 Mar 10	Current	RML Operations Manager	Paul Wieczorek	

Document Revision & Control

To ensure that all changes to any of the documents contained in this manual are carried out and distributed in a controlled and authorised manner:

i. Any proposed change in documentation must be submitted to the Reflex Marine Ltd Operations Manager in writing for authorisation. This refers to all drawings and documents contained in this manual.
ii. A record must be maintained of all documentation changes.
iii. A list of all revisions and amendments must be included in each controlled copy of this User Manual.
iv. Upon revision of the FROG-9 User Manual, the manual will be distributed to the list of document holders indicated below.
v. The control, revision and distribution of this manual will be the responsibility of the Reflex Marine Ltd Operations Manager.

Revisions

Rev No	Reason For Revision	Safety Critical Change
02	Section 2.3 - Para numbering corrected. Certification Pack contents corrected. Section 5.6 - Revised recommended load distribution arrangement. Section 6.1 - Ladder securing during inspection included. Appendix D - Parts list and material specification included. Appendix E - FROG-9 Markings included.	No Yes Yes No No
03	Page 23 - Point 8 wording revised. Page 23 - Drawing revision status updated. Page 26 - Part numbers in Table 1 & 2 updated. Page 26 - Back up eye description changed. Page 26 - Last two paragraphs added. Page 12 - Guidance on wind speed changed.	No No No No No Yes
04	Section 5.5 - Seating arrangement revised. Section 5.6 - Seatbelt instructions added. Section 5.7 - Rider instructions added. Section 5.8 - Emergency stop procedure added. Section 5.9 - PPE information added. Section 6.0 - Whole section revised.	No No No No No Yes
05	Section 2.1 - Include Operating temperature range into specification sheet. Section 4.10 - Insert new section on Night time transfer operations. Section 5.5 - Insert new section on Use of Tag Lines - update section numbers. Section 5.7 - Insert new section on Luggage storage. Section 5.10 - Insert images of emergency stop protocols. Sections 6.5, 6.6. 6.7 - Update tables with photographic and documentation recommendations. Section 6.6 - Corrected M/U Torque for Main Lift-Eye bolts from 210 Nm (incorrect) to 376 Nm (correct). Section 6.8 - Correct loading / sand bag weights to 2900 kg to avoid confusion. Appendix E - Insert new section Appendix E- Accessories.	No No No No No No Yes No No

Distribution List

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Reflex Marine Ltd				
Ref.	**Status**	**Issued To**	**Date Issued**	**Format**
Master	Controlled	RML Truro J Cryan	05 Mar 2010	Electronic
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RML 3	Notification	RML Website J Strong	05 Mar 2010	Electronic
RML 4	Notification	RML Sales Team Coordinator C Richards	05 Mar 2010	Electronic

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1 INTRODUCTION

1.1 Scope

This User Manual is for the nine passenger capacity FROG-9 (Model HC9-01).

Note: Throughout this manual the use of this symbol "  " denotes safety critical information.

1.2 Introduction

The FROG-9 Personnel Transfer Capsule (PTC) is a personnel transfer device designed to provide increased passenger protection when carrying out the transfer of personnel between vessels and installations.

Crane personnel transfers are carried out for a wide variety of reasons including routine, urgent operational and emergency reasons.

The FROG-9 comprises the following two main assemblies; firstly, the stainless steel outer framework containing polyethylene buoyancy panels, secondly, a spring-dampened seating assembly mounted on a central column. All materials have been selected specifically to minimise corrosion in the marine environment.

The outer framework protects passengers from impacts and contains the buoyant elements which ensure the FROG-9 floats and is self-righting in water. At its base are keel weights which assist in rapid self-righting.

The outer shell lands on three main peripheral feet which are supplemented by a further three centrally mounted feet. All six feet provide shock absorption and ensure that the FROG-9 is stable on uneven surfaces or when landing on a heaving vessel. The outer shell also has three large open accesses that allow rapid unimpeded exit.

During transit passengers are seated and secured with full harnesses to protect them against whiplash and falling. Seating is mounted on a sprung carriage to provide protection against heavy landings.

The sling assembly is of a special design to prevent rotation.

Note: The regulations governing personnel transfer operations vary greatly from country to country and it is imperative that operators of the equipment establish the relevant requirements for the area of operation.

1.3 Safety

Personnel transfer is a safety critical activity. The following items must be observed to properly control safe transfers.

i. Proper planning of the transfer operation is essential. Planning must include a risk assessment and method statement which takes account of all environmental and operational factors. Assessing the impact of these factors on operational risk is best done by Competent Persons (see note below) experienced in use of the equipment and the local conditions.
ii. It is imperative for the safe operation of the FROG-9 that each unit is periodically inspected and tested in accordance with the procedures and schedules set out within this document.
iii. Operating parameters detailed in this document must be adhered to unless modified following on-site risk assessment and method statement by competent, experienced personnel.
iv. The FROG-9 must only be used with properly designed, maintained and appropriately certified lifting equipment. (It should be noted that some national regulations require cranes to be specifically certified for man-riding operations).
v. Supervisory personnel (including Deck Crews and Crane Operators) must be competent and must only operate the equipment following proper instruction in its use. Crane Operators should read the 'Crane Operator Guidance' contained within this document.
vi. Pre-operational checks as detailed in this document must always be performed prior to use of the FROG-9.
vii. Transfer personnel must receive a proper briefing on the FROG-9 and the transfer operation.
viii. Transfer personnel must at all times be seated and properly strapped in using the harnesses supplied.
ix. The FROG-9 must only be used as a personnel transfer device.
x. The FROG-9 must not be used as a work-basket.

Note: Competent Person

A Competent Person is a person who has appropriate practical and theoretical knowledge and experience of the equipment. This will enable them to detect defects and weaknesses and to assess their importance in relation to the safety and continued use of the equipment. It is essential that the Competent Person is sufficiently independent and impartial to allow objective decisions to be made.

2 SPECIFICATION FROG-9

2.1 Specification Summary

Model No.	**HC9-01**
Payload	900 kg = 9 x 100 kg *(1984 lb = 9 x 220 lb)*
Dimensions	
Width 1	2794 mm
Width 2	3219 mm
Height	2877 mm
Weight	
Max Gross Weight	2000 kg (4410 lb)
Tare Weight	1100 kg (2425 lb)
Manufacture	To ISO 9001:2000
Materials	
Frame	SS 316 and A4 Stainless Steel
Central Column / Lift Eye	Duplex SAF 2205
Lift Eye Connection Bolts	17-4 PH H1075
Other Steel Components	SS 316 and A4 or A2 and Mild Steel Hot Dipped Galvanise
Buoyancy	Rotationally moulded MDPE shell with PU foam fill in lower unit. Polystyrene central buoyancy.
Seat Base	40 mm Nidaplast 8
Seat Back	Trespa Meteon 6 mm
Operating Temperatures	
Standard Model HC9-01	+50 deg C to -20 deg C
Suspension	
Springs	1 x 17,224 N @ 0.32 m 3 x 8,612 N @ 0.32 m
Dampers	3 x Stainless Steel
	40 mm cyl / 14 mm Rod
	300 mm Stroke

2.2 Design

Verification	ABS Product Design Assessment Certificate No. 07-LD299029-PDA. Manufactured to ISO 9001:2000.
National Technical Standards	UK, BS449: Part2:1969: The Use of Structural Steel in Building. UK, BS2830:1994: Suspended Chairs and Cradles for the use in the Construction Industry.
Industry European Standards	EC Machinery Directive. EN 1050, EN292 Parts 1 & 2.

	Load Test – ILO152 / LOLER.
National Regulations	UK, PUWER / LOLER.
Impact Behaviour	The seating assembly is suspended on a quadruple spring assembly designed to protect passengers from impacts up to 3.25 m/s. Spring recoil is handled by triple hydraulic dampers. The capsule is designed to withstand a 2 m/s lateral impact.
Other Features	Full height seating. Quick release seat harness buckle. Full harness ensures passengers are secure. Secondary back-up slinging. 6 x tie-down points. Angle of stability – 35 degrees.

2.3 Certification and Documentation

Each new build of the FROG-9 is supplied with a set of certification and documentation as specified below.

Certification Pack (includes the following)	Manufacturers Certificate of Conformance. Manufacturers BS EN ISO 9001:2000 Certificate. ABS Design Assessment Certificate FROG-9 Load Test Certificate. Sling set Load Test Certificate. Back-up Eye Material Certificate. Lifting Plug Material Certificate. Handling Eyebolt Certificate. M24 Lifting Plug Bolts Material Certificate. Seat Harness Certificate of Conformance. Inspection Checklist. Inspection Release Note.
User Manual	1 x User Manual
Additional	Reflex Marine Ltd will retain copies of the above certification and additional certification as specified below. If required, the applicable certification below can be made available for review by clients. Material Certification for all Critical and Non-critical Components. Inspection and Repair History. Weld Procedures / Welder Qualifications. NDT approval (PCN / NDT Reports) (where applicable). Manufacturing Signed Checklist and Route Cards.

3 OPERATING PARAMETERS

3.1 Introduction

The FROG-9 has been designed to ensure passenger safety even when operating in the most demanding conditions.

There are a large number of factors that affect the safe conduct of all marine personnel transfers. These include: crew skill and experience, met-ocean conditions, landing area, vessel station keeping capability and response to sea conditions, visibility, line of sight, etc. A combination of many factors will determine the risk involved in a transfer:

Vertical impacts

Passengers are protected during heavy landings at speeds of up to 3.25 m/s (10.6 ft/s) by the properties of the feet, frame and spring-mounted seat base. These protect passengers up to currently recommended operating limits as detailed in Section 3.2; Table 1.

Lateral impacts

Passengers are also protected from lateral impacts by the framework and seat harnesses. Lateral impacts are only likely to arise due to sway caused by off-lead when lifting and fast slewing. The passengers will be protected up to the 2 m/s (6.5 ft/s) maximum expected impact speed. The central column may deform on lateral impact and there may be damage to other components and therefore the equipment must be inspected after any impact.

Stability

The unit has a low centre of gravity and a tripod base, providing stability on uneven surfaces or on a pitching / rolling vessel. The polyurethane coated landing feet are also a non-skid design keeping grip on deck surfaces. The static angle of stability has been tested to 35 degrees, for a load of 1-9 passengers.

Control of Hoist Line

The FROG-9 is designed to stay firmly on the deck of the transfer vessel whilst passengers are entering or leaving the capsule. The Crane Operator must maintain slack in the line upon landing to allow for the vessel movement. The recommended limits in this section are based on the use of the standard FROG-9 sling length of 30 ft (9 m). For the use of shorter slings an additional risk assessment combined with dry runs should be performed to establish safe operational routines and weather conditions. (See Section 5.4 Crane Operator Guidance).

It is important that all environmental and operational factors are taken into account in the pre-transfer risk assessment. Assessing the impact of these factors on operational risk must be done by Competent Personnel experienced in use of the equipment and the local conditions.

3.2 Operating Parameters - Sea State

The FROG-9 has an inbuilt damping system which prevents passengers from experiencing shock loads up to relative landing and take-off velocities of 3.25 m/s (10.5 ft/s). The maximum recommended sea state, or significant wave height, for the operation of the FROG-9 is determined by the maximum relative velocity between the FROG-9 (or hook) and the landing deck.

The calculation for relative velocity used here is based on the European offshore crane standard, EN 13852-1:2004. Whereby the maximum anticipated relative velocity between a load and a vessel deck, is given by the following;

Relative velocity = Hook velocity* + √ (Vessel deck velocity 2 + Boom tip velocity 2)

**** Equal to 1.67 m/s (100 m/min, 330 ft/min) for lifts below 5 tonnes. Higher crane hook speeds may be available, and it follows that the higher the available crane speed the higher the possibility of a heavy landing or take off. However, with a qualified Crane Operator, it is considered unlikely that the FROG-9 will be landed at full hook speed on a deck rising at full speed.***
If there are concerns about heavy landings, operators may wish to consider the following methods to reduce risk of heavy landings and take-off; dry runs without passengers, landing in centre of deck where less vessel movement, transfer of fewer passengers to increase damping, hook speed indicator.

Table 1: Recommended Sea States for FROG-9

Sig. Wave Height (m / ft)	Max. Wave Height (m / ft)	Fixed Platform to Vessel	Semi-Sub to Vessel	FPSO to Vessel	Vessel to Vessel
≤ 1.0 m / 3 ft	≤ 1.9 m / 6 ft	●	●	●	●
≤ 1.5 m / 5 ft	≤ 2.8 m / 9 ft	●	●	●	◆
≤ 2.0 m / 7 ft	≤ 3.7 m / 12 ft	●	●	◆	■
≤ 2.5 m / 8 ft	≤ 4.6 m / 15 ft	●	●	◆	■
≤ 3.0 m / 10 ft	≤ 5.6 m / 18 ft	●	◆	■	■
≤ 3.5 m / 11 ft	≤ 6.5 m / 21 ft	◆	◆	■	■
≤ 4.0 m / 13 ft	≤ 7.5 m / 24 ft	◆	■	■	■
≤ 4.5 m / 15 ft	≤ 8.4 m / 28 ft	■	■	■	■
≤ 5.0 m / 16 ft	≤ 9.3 m / 30 ft	■	■	■	■
≤ 5.5 m / 18 ft	≤ 10.2 m / 33 ft	■	■	■	■

KEY	
●	Low risk of high landing or take-off velocity and exceeding FROG-9 personnel damping.
◆	Increasing risk of high landing or take-off velocity. Consideration of hook speed and all other factors is recommended to ensure controlled landing and take-off. A dry run to gauge risk (without personnel) is also recommended.
■	High risk of high landing or take-off velocity. Not suitable for routine operations unless a specific hazard analysis can demonstrate otherwise.

In all cases, adequate planning and risk assessment must be performed.

3.3 Operating Parameters - Additional Factors

Note 1: ***It is emphasised that users must not rely on these recommendations alone. Persons best placed to judge the risk of specific transfers are the onsite personnel that have experience of the local conditions and equipment to be used. All factors must be evaluated together in their pre-transfer risk assessment.***

Note 2: ***Crews must conduct dry runs without passengers if there are any concerns about conditions to help assess risk of transfer.***

Table 2: Other Operating Parameters

Parameter	Recommendation
Wind Speed	30 knot (normal) / 40 knot (subject to assessment*). **** Feedback from the field indicates that all FROG models are very stable during high winds and are considered suitable for operation in 30 knot winds. Transfers in 30 to 40 knot winds are also considered to be acceptable, subject to RML's recommendation that operators must first perform the necessary risk assessments and that trial transfers (without passengers) are used to confirm that controlled lifting is possible, prior to the transfer of personnel.***
Visibility	Crane Operator should have a clear view of the pickup and set down areas.
Vessel Motion / FROG-9 Stability	Pitch 10^{o}, Roll 10^{o}. (FROG-9 stable up to 35^{o} for a load of 1-9 Passengers. In static test).
Vessel Station-Keeping	Able to maintain position within a 5 m (15 ft) radius. If a high risk of the vessel losing position exists, recommend disconnecting FROG-9 for passenger embarkation.
Landing Area	Clear of obstructions, protrusions, trip and fall hazards.
Landing Area – Ice / Spills	Ice and spills must be cleaned from landing area prior to transfer.
Landing Area on Vessel	Recommended minimum 7.0 m x 7.0 m clear space (23 ft x 23 ft) based on +/- 1 m landing accuracy + 1 m entry and exit path for personnel Smaller deck spaces require individual risk assessment with consideration of reduced weather limits.
Landing Area on Installation	Recommended minimum 4.6 m x 4.6 m clear space (15 ft x 15 ft) based on + 1 m entry and exit path all round the FROG-9.
Crane Operator Experience	Briefing video within 1 month. Local authority requirements for personnel transfer must be adhered to.
Deck Crew Experience	Briefing video within 1 month.
Passenger Training	Briefing video within 1 month.
Communications	Radio communication must be established between the Crane Operator and the vessel Deck Crew and Master.
Crane Construction	Crane must be certified for lifting personnel and properly maintained.
Operating Temperature	Standard HC9-01 Units: +50 deg C to -20 deg C.

4 TRANSFER PLANNING

The key to safe operations is the familiarisation and participation of all the involved crew in the careful planning of the operation.

The Operating Parameters detailed within this document are generic, therefore safe operating conditions must be determined by onsite supervision with due regard to site specific equipment, vessels and conditions, taking account of any local conditions and equipment.

Safe transfers require careful planning and supervision.

The following are recommended as a means of ensuring safe transfer operations:

4.1 Risk Assessment and Method Statement

A risk assessment and method statement should be completed by the responsible authority on board the installation and by the transfer vessel Captain prior to the first transfer operation for the specific installation and vessel. The risk assessment should be reviewed periodically and the method statement amended in the event of any substantive changes to equipment, procedures or any other factors considered relevant.

4.2 Communications

Communications are an important part of controlling transfer operations. Local communication practice will vary from work group to work group. However, dedicated 3-way radio communication channels must, as a minimum, be provided between the Crane Operator, vessel Master, and Lift Supervisor. A suitable radio protocol must be agreed and adhered to. Contingency communications using a loud speaker or deck tannoy must be available.

Standard hand signals must be used by Crane Banksmen, where required, to supplement the agreed radio communications.

4.3 Information Exchange

The following transfer vessel information must be provided to the installation:

i. General layout including the landing area position.
ii. Limiting environmental parameters for vessel station keeping.
iii. Onboard marine personnel transfer procedures.

The following installation information must be provided to the transfer vessel:

i. Crane position and hoist speed.
ii. General layout including the landing area position.
iii. Limiting environmental parameters for crane operations.
iv. Onboard marine personnel transfer procedures including responsible persons.
v. Communications channels.
vi. Any relevant information regarding local currents, field operations etc.

4.4 Operational Planning

An overall plan must be in place for the proposed personnel transfer operation which details all of the relevant information:

i. Installation name.
ii. Vessel name.
iii. Number of personnel to be transferred - vessel to installation.
iv. Number of personnel to be transferred - installation to vessel.
v. Key personnel on installation.
vi. Key personnel on vessel.
vii. Installation crane to be used.
viii. Crane hoist speed.
ix. Requirements for visual inspections of equipment.
x. Vessel position and station keeping limits.
xi. Environmental limits.
xii. Current and forecast weather conditions.
xiii. Checklists to be used.

4.5 Briefings

Ensure that passengers and crews (both installation and vessel) are fully briefed prior to an operation. It is recommended that video briefings are utilised for briefing transfer passengers supplemented as necessary by verbal briefing on any relevant installation / vessel specific information.

4.6 Supervision

All transfer operations must be properly supervised. All personnel directly involved in the transfer operation should be appropriately qualified and experienced.

4.7 Transfer Log

Operational records must be maintained by both the installation and the vessel. Records must include:

i. Time of vessel in position.
ii. Time of checklists completed.
iii. Time of commencement of transfer operations.
iv. Weather conditions.
v. Vessel motion (roll, pitch and heave).
vi. Any special conditions or circumstances.
vii. Number of passengers transferred to installation.
viii. Number of passengers transferred to vessel.
ix. Time of completion of transfer operation / vessel clear of installation.
x. Name of the Lift Supervisor.

An example transfer log is included in Appendix A of this document.

4.8 Emergency Transfers

If a transfer must be carried out in poor conditions in an emergency then (where time permits) a 'trial run' must be performed without passengers to assess operating conditions and limits.

4.9 Training

Regular transfer drills must be carried out. RML recommend weekly training drills.

4.10 Night Time Operations

With the following controls in place it may be allowable for personnel transfers using the FROG Personnel Transfer Capsule to take place during the hours of darkness:

i. The risk assessment for the task shall be comprehensively reviewed prior to commencing operations. The lifting plan and risk assessment shall be approved in writing by the Offshore Installation Manager or appointed deputy.
ii. The operator should have contingency to immediately rescue the passengers from the water e.g. Fast Rescue Craft. Without fast rescue contingency personnel transfers should not take place.
iii. The crane boom should be fitted with adequate floodlights to illuminate the crane hook and FROG unit. The Crane Operator must maintain a clear line of view with the FROG unit at all times.
iv. The takeoff and landing areas should be illuminated to a level of at least 20 lux or greater.
v. The FROG unit should be fitted with a strobe light to allow clear locating by all parties.
vi. The hoisting, transit and landing paths of the FROG unit should be predefined in the lifting plan and are adhered to.
vii. Radio contact should be maintained throughout the entire lifting operation between the Crane Operator and the take-off and landing site.
viii. An unmanned trial run which covers, as a minimum, the take-off, transit and landing paths of the FROG should be conducted prior to commencing personnel transfers. The Crane Operator should confirm readiness to proceed on completion of the trial run.
ix. A non-visual based method of communicating with the lifted personnel should be in place, e.g. radio or loudhailer, in the event of an emergency.

5 OPERATING PROCEDURE

5.1 Pre-Transfer Activity List

Activity No.	Responsible	Activity
1	Supervisor	Conduct pre-transfer risk analysis (See Section 3 and Section 4).
2	Supervisor	Conduct pre-operational 'Visual Check' of equipment (See Section 6.4).
3	Supervisor	Brief all persons; i) Crane Operator, ii) Deck Crew, iii) Passengers, iv) Vessel – Master and Deck Crew.
4	Passengers	Don recommended PPE (Personal Protective Equipment), PFD (Personal Flotation Device) and survival suit (as required and where applicable). ***Note: Send PFD to vessel prior to transfer***

5.2 Lifting

Activity No.	Responsible	Activity
1	Deck Crew	Hook-up masterlink*. Check that harnesses are slackened ready for passengers.
2	Supervisor	Signal to passengers to enter capsule when safe to do so. Ensure even load distribution and that passenger / luggage load does not exceed 900 kg (See Section 5.6).
3	Passengers	Ensure any loose items are secure.
4	Passengers	Strap-in, do not rush, loosen belt, tighten lower straps, then upper straps.
5	Passengers	Signal to deck crew when seat belt secure by holding hand up / thumbs up.
6	Deck Crew	Ensure passengers are strapped in and hands and feet are correctly positioned.
7	Deck Crew	Ensure taglines (if used) and sling are not snagged.
8	Deck Crew	Stand clear.
9	Supervisor	Signal lift to Crane Operator.

5.3 Landing

Activity No.	Responsible	Activity
1	Crane Operator	All raising and lowering must be over water.
2	Crane Operator	Guide capsule into clear landing area.
3	Deck Crew	Keep safe position if handling unit - do not stand under or between FROG-9 and rail.
4	Deck Crew	If taglines are used beware of specific risks.
5	Crane Operator	Release slack when FROG-9 has landed (See Section 5.4).
6	Crane Operator	Place sling down-wind of unit to prevent hindering access.
7	Deck Crew	Ensure sling slack is not a hazard for exiting passengers.*
8	Supervisor	When FROG-9 is securely on deck, signal "All Clear" to passengers.
9	Passengers	Remain seated until given "All Clear" by the Supervisor.
10	Passengers	Exit capsule and move away towards safe area.

**** Note - If risk of vessel losing position or crane line snatch (e.g. vessel to vessel transfers) the FROG-9 must be disconnected for passenger exit and entry.***

5.4 Crane Operator Guidance

When landing the FROG-9 on the deck of a heaving vessel the Crane Operator must always release and maintain line slack to prevent any snatching. This means the FROG-9 will be secure on the deck and will provide occupants plenty of time to enter and exit the FROG-9. (This landing procedure is different to the rope basket procedure, which requires the Crane Operator to maintain tension on the hoist to keep the soft rope basket upright during entry and exit).

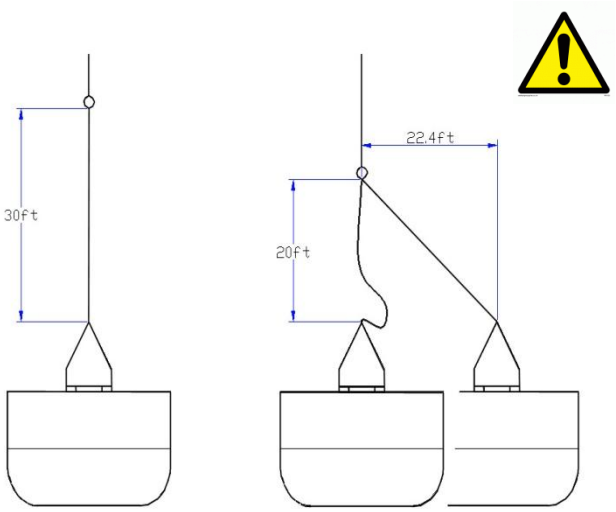


Fig 1: Sling Diagram

For the standard 30 ft / 9 m sling provided with the FROG-9, it is generally recommended that approximately 10 ft / 3 m of slack is paid out once the unit has landed on the vessel. However, the required amount may vary according to sea state and vessel motion response. The Crane Operator must pay out sufficient slack to avoid snatching, although, must avoid paying out more than is necessary as the section of sling hanging could constitute a hazard to crews alighting or entering the capsule.

It is also recommended that the Crane Operator slews the boom 'down weather' from the capsule. This will provide more time for the Crane Operator / crews to react in the event of a failure of the vessel's station keeping.

5.4.1 Use of Shorter Slings

Reflex Marine Ltd recommends the use of a 30 ft / 9 m sling, however for operations where the 30 ft sling is not suitable then a 20 ft / 6 m or 10 ft / 3 m sling can be supplied.

It must be noted that using shorter slings increases the risk of snatching. Using the 20 ft / 6 m sling, 10 ft / 3 m of slack will provide a 17.3 ft / 5.3 m allowable offset before the sling becomes taught from the crane hook weight – this does not however account for vessel heave. For a 10 ft / 3 m sling, 8 ft / 2.4 m of slack will provide 9.8 ft / 2.7 m (allowable offset).

Using a shorter sling set also increases risks associated with the hook block being in close proximity to the passengers alighting.

Note: The operating parameters in Section 3.2 are defined for a FROG-9 with a sling length of 30 ft / 9 m. For transfers using a shorter sling an additional risk assessment combined with dry runs should be performed to establish safe operation routines and weather conditions.

5.4.2 Handling Eyebolt

The FROG-9 is equipped with a handling eye in addition to the main Lift-Eye and the back-up Lift-Eye. The handling eyebolt is an M30 stainless steel eyebolt with a Safe Working Load (SWL) of 4 Tonnes (8818 lb).

The handling eyebolt is provided for use as a lift point when it is necessary to move the FROG-9 unit and it is not possible to use the main sling set arrangement (e.g. when a shorter sling is required due to height restriction). In this case a shorter sling may be connected to the handling eyebolt for handling or transportation of the FROG-9 unit and the main sling set arrangement may remain connected.

IMPORTANT

i. **The handling eyebolt must never be used as a lift point when transporting passengers.**
ii. **If the main sling set is to remain connected it must be coiled down inside the FROG-9 unit and secured.**
iii. **The sling and attachments used for moving the FROG-9 must always be commensurate with the load. Note: The Tare Weight of the FROG-9 is 1100 kg (2425 lb).**

5.5 Use of Tag Lines

Tag lines (Hand Lines) are not supplied with the FROG. However if users wish to use tag lines for handling the FROG the following should be considered:

Tag lines should be attached to the floor grating and 30 x 30 brace at the edge of the doorway (see below). Reflex Marine Ltd suggest one or two 3 m lines are practicable for handling the FROG, however length of line used is at the discretion of the deck crew.

Be aware of specific risks arising from use of tag lines:

i. Deck Crew using tag lines will be standing closer to frog during landing, which increases the risk of impact or being caught in between.
ii. Ensure tag lines are not tied or caught on any adjacent equipment of structures.
iii. Ensure tag lines are clear of knotting and deck crew have suitable hand and eye protection.

5.6 Seating and Load Distribution

In order to perform loading efficiently and safely, the following procedures are recommended:

i. Organise passengers into groups of 9 (see note*).
ii. Confirm that passenger and luggage weight does not exceed the SWL of the FROG-9 unit: 900 kg (or 9 x 100 kg).
iii. Split into three groups of three

Group 1: 1, 2, 3 / yellow
Group 2: 4, 5, 6 / orange
Group 3: 7, 8, 9 / red

iv. Firstly load Group 1 (1, 2 and 3) into the centre seats as shown.
v. Next load Group 2 (4, 5 and 6) into the seats on the right hand side of the first three.
vi. Lastly load Group 3 (7, 8 and 9) into the left hand remaining seats.

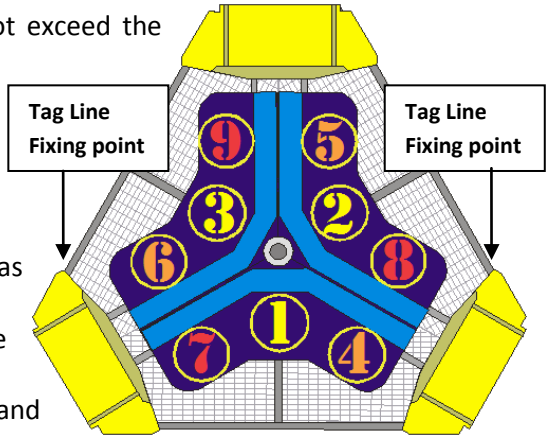


Fig 2: Seat Loading and Tag Line Fixing Points

Note - When the FROG-9 is used for less than 9 passengers, continue to follow the loading procedure above for as many passengers as possible. In this way the unit will always be balanced as far as possible.

Fig 3: FROG-9 Loaded and Ready for Lift Off

5.7 Luggage Storage

The FROG-9 is not supplied with separate luggage stowage. All luggage items should be transferred separately in dedicated luggage container or cargo net.

5.8 Seatbelt Operation

Take the lap fastener clip and feed through eye. Fold over the clip and the safety belt is secure. Reverse operation for quick release.

Fig 4: Fastening the Belt

Next pull the LOWER straps first, then the UPPER straps to make a tight fit.

Fig 5: Tightening the Belt

5.9 Rider Instructions

i. Keep hands and feet inside the FROG-9.
ii. Hold the upper straps to keep body stabilised.
iii. Keep feet inside the FROG-9 with heels against the kick board.


Fig 6: Position of Body

5.10 Emergency Stop Procedure

In the event of an emergency situation the Deck Supervisor / Banksman will give the Crane Operator the emergency stop signal.

i. Crane Operator must stop all movements.
ii. The Deck Supervisor / Banksman will shout “OUT OUT OUT”.
iii. Personnel to release seat belt buckles and vacate FROG.
iv. Deck Supervisor / Banksman will direct passengers to a safe area.

UK Emergency STOP signal	**US / API Emergency STOP signal**
Both arms pointing upwards with palms facing forwards	Both arms extended, palms pointing down, move arms rapidly back and forth horizontally


Images sources:

5.11 Personal Protective Equipment (PPE)

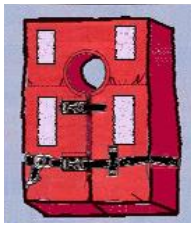
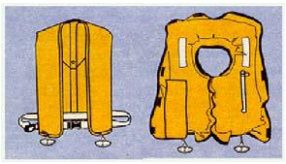
Whilst making the transfer, all personnel must be equipped with appropriate Personal Protective Equipment. Each location and transfer activity will demand a range of differing levels of PPE and RML recommend that PPE requirements are evaluated in recognition of the particular activity and environmental risks that exist at each location. Some items for consideration whilst establishing PPE are:

i. Survival rates in water (summer and winter).
ii. Wind temperature ranges.
iii. Proximity of overboard rescue facility, fast rescue boat (FRB), standby vessels.
iv. Deployment time and personnel capacity of each rescue craft.
v. Drill timings and multiple casualty scenarios.
vi. Routine and non-routine offshore activities that might provide source of risk.

The Operator must decide the recommended minimum standard for personal protective equipment requirement according to local conditions, regulations, standards and individual activity risk assessments.

5.11.1 Personal Flotation Devices (PFD's)

Reflex Marine Ltd has evaluated the 5 most common types of PFD's used in the offshore and marine sector and has the following comments about their suitability for use with the FROG.

Style / Type	Picture	Evaluation	Recommendation
Inherently buoyant work vest buoyancy aid (100 N)		Flat buoyancy panels are unobtrusive and allow passengers easy entry and exit from seat harness.	Acceptable RML recommend that any PFD of this type is tested with seat harness in FROG for compatibility.
Manual inflatable lifejacket (150 N)		Inflation toggles may interfere with seat harness creating risk that PFD may inflate when person is strapped in. Personnel should be informed that PFD should not be inflated when person is strapped in the FROG.	Acceptable (exception basis) RML recommend that this style is used carefully to prevent accidental inflation.
Inherently buoyant 'yoke' type lifejacket (100-150 N)		This type of PFD is bulky and may prove restrictive when donning seat harness. PFD generally has a poor fit with seat harness, particularly over shoulders. Seat harness buckle release mechanism may become positioned underneath PFD out of line-of-sight of passenger, making exit more difficult.	Not acceptable
Offshore work vest buoyancy aid (50 N)		This PFD may be ineffective for passengers with heavy clothing.	Not acceptable
Automatic inflatable lifejacket (Contact with water)		Risk that PFD may inflate when person is strapped in and FROG is immersed which may impede passengers exit for rescue.	Not acceptable

Additional Considerations:

i. Reflex Marine Ltd recommend that a number of PFD's, specifically designated for use with the FROG, are marked as 'FROG USE ONLY' and are kept in a safe, clean storage area near the transfer muster area.

ii. It is recommended that 3 sets (+ 10% spares) of PFD's are made available for the transfer activity:

1 set for uplift transfers (ready and donned).
1 set for down lift transfers (ready and donned).
1 set for in-transit for next uplift transfers.

Total PFD requirement for FROG-9 = 3 x 9 + 3 = 30 PFD's.

iii. Deck crew should ensure that when passengers are exiting the FROG, the passengers move clear of the landing area to the designated safe area before removing PFD's.

iv. Passengers using the PFDs for the first time should be given assistance by the deck crew. PFD's should be tried by all crew as part of any practical training given.

5.11.2 Immersion Suits

Immersion suits may be required in certain situations. Reflex Marine Ltd recommends that risk assessments are performed to determine whether immersion suits are to be used.

6 PERIODIC INSPECTION, TESTING AND MAINTENANCE

6.1 Introduction

It is imperative for the safe operation of the FROG-9 that each unit is periodically inspected and tested in accordance with procedures and schedules set out in this section.

6.2 Definitions

Visual Check

A Visual Check is a careful and critical assessment of the components, carried out by a Competent Person without dismantling of the assembly. Normally the check itself is not formally recorded although the fact that the check has been performed is registered within a daily event log or tour log.

Visual Inspection

A Visual Inspection is a careful and critical assessment of the components, carried out by a Competent Person without dismantling of the assembly. The inspection is formally recorded.

Examination

An Examination is a careful and critical assessment of the components, carried out by a Competent Person. This should include dismantling the assembly and performing a visual assessment of the condition of each component, supplemented by other means such as measurement and non destructive testing as considered necessary. For sling sets this should include a visual inspection of the condition of the sling. In order for end fittings of sling sets to be examined properly, they may need to be dismantled. The examination is formally recorded.

Post Load Test Visual Inspection

A Post Load Test Visual Inspection is a careful and critical assessment of the components, carried out by a Competent Person without dismantling of the assembly post load testing. The post load test visual inspection is formally recorded.

Critical Components

Critical Components are defined as those that are primarily essential to the critical load bearing path.

6.3 Frequency of Inspection, Test and Maintenance

The recommended frequency and type of inspection, test and maintenance is shown in Table 3. (SEE OVER). Please note:

i. If any doubt exists regarding the number of transfer operations performed then the maintenance strategy must revert to a more conservative higher usage category. This must also be considered if there is any concern over heavy impacts or overloads.
ii. This recommendation applies to change out of components parts only and does not replace or alter the inspection intervals as prescribed by the relevant legislation.
iii. The check, inspection, examination and test routine as detailed in this document must always be carried out on schedule.
iv. Where the FROG has sustained substantial damage, a detailed examination of the unit must be carried out to ensure the integrity of the unit before conducting any further lifts. Details of all damage should be recorded in a Damage Report. Details of the cause of the damage should also be recorded, if known. If damage to the frame has occurred, welds should be examined for cracks using dye penetrant.
v. Details of all repairs or modifications carried out must be recorded and copies of damage and repair / modifications reports must be sent to the party controlling the use of the FROG-9.
vi. Reflex Marine Ltd is pleased to provide direct technical advice to support users with any inspection, testing, repair or refurbishment query. It is always helpful if customers provide detailed photos and reports along with their query to support@reflexmarine.com.

Table 3: Inspection and Maintenance Recommendations

INSPECTION AND MAINTENANCE RECOMMENDATIONS (ALL RML TRANSFER PRODUCTS) [Rev01-91030]			RECOMMENDED FREQUENCY							
			INSPECTIONS				LOAD TESTS	MAINTENANCE		
			Pre Operational Visual Check	Visual Inspection	Examination	Post Load Test Visual Inspection	Proof Load Test	Sling Replacement	Critical Parts Replacement	Unit Replacement
USEAGE CATEGORY			*Section 6.4*	*Section 6.5*	*Section 6.6*	*Section 6.7*	*Section 6.8*	*Section 6.9*	*Section 6.10*	*Section 6.11*
Usage Category	No of Transfers per Year	No of Transfers per Week		*not exceeding*	*not exceeding (depending on Visual Inspection this period may be reduced)*		*not exceeding*	*not exceeding*	*not exceeding*	*not exceeding*
Low	<100	<2	before every use	6 months	12 months	After Load Test	12 months	12 months	36 months	8 years
Medium	100 to 500	2 to 10	before every use	6 months	12 months	After Load Test	12 months	12 months	24 months	7 years
High	500 to 1500	10 to 30	before every use	3 months	12 months	After Load Test	12 months	6 months	12 months	6 years
Very High	1500 to 2500	30 to 50	before every use	3 months	12 months	After Load Test	12 months	3 months	whenever Examination conducted	4 years

6.4 Pre-Operational Visual Check

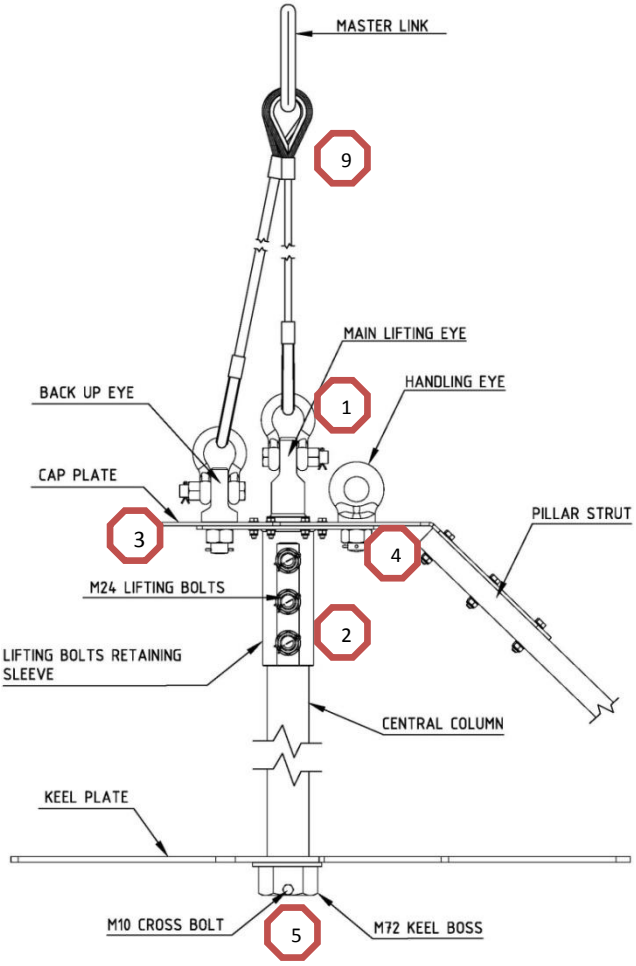
<table>
<tr><th>Question</th><th>Response</th></tr>
<tr><td>When must a Visual Check be conducted?</td><td>A Visual Check must be conducted PRIOR to EVERY use of the equipment (multiple lifts in one series of transfer operations constitute one usage period).</td></tr>
<tr><td>Who must conduct this check?</td><td>A person who has been formally trained to perform this Visual Check and is familiar with this equipment, i.e. a Competent Person.</td></tr>
<tr><td>Does this check require a formal record?</td><td>Yes, a record that the visual check has been completed should be recorded appropriately, e.g. an entry in the daily tour record stating date the check has been completed, unit number and any relevant comments.</td></tr>
<tr><td>What drawings are required to support this check?</td><td>
<table>
<tr><th>Drawing No</th><th>Revision</th><th>Description</th></tr>
<tr><td>HC9-CC-A1</td><td>E</td><td>Load Path Assembly</td></tr>
<tr><td>HC9-SE-A1</td><td>C</td><td>Seating Assembly</td></tr>
<tr><td>HC9-GA-02</td><td>E</td><td>Central Column Assembly</td></tr>
</table>

The above diagrams are available in Appendix B.</td></tr>
<tr><td>What equipment is required to perform this check?</td><td>i. A ladder.
ii. An inspection frame or floor matting.
iii. Good lighting.

A suitable means of safely accessing the top and the bottom parts of the FROG-9 is required. When using a step ladder or ladder it must be securely fixed to prevent slippage whilst accessing the top of the FROG. The FROG-9 keel assembly can be visually checked from ground level using a torch. Do not go underneath an active lift.
Be aware that in some regions “Working at Height” regulations may apply.</td></tr>
</table>

The following checklist is suggested as a suitable list for a 9 POINT PRE-OPERATIONAL CHECK.

Pre-Operational Visual Check – A 9 POINT Check

Check	Description	Reference
1.	**Main Lift-Eye Plug** Check main lifting eye is fully engaged.	
2.	**Main Lift-Eye Plug M24 Bolts** Check three M24 lifting eye bolts, nuts, split pins and tamper proof seals are present and secure.	
3.	**Back-Up Lift-Eye** Check nut, split pin and tamper proof seal are fitted and in good order.	
4	**Handling Lift-Eye** Check nut, split pin and tamper proof seal are fitted and in good order.	
5.	**M72 Keel Boss and M10 Cross Bolt** Check keel boss and cross bolt are in position c/w split pin and tamper proof seal. Do not go underneath an active lift.	
6.	**Frame and Buoyancy** Check for any damage and ensure that all bolts and fasteners are present, tight and secure.	
7.	**Seat Harness Security** Check seat harnesses operate properly and attachment points are secure.	
8.	**Load Test Plate** Check the date of the last load test to ensure the unit is in compliance.	
9.	**Lifting Sling Set** Check slings are correctly attached and in good order. Check the split pins are fitted to shackles. Slings should be in the high visibility cover.	

6.5 Visual Inspection

<table>
<tr><th>Question</th><th>Response</th></tr>
<tr><td>When must a Visual Inspection be conducted?</td><td>A Visual Inspection must be conducted at the recommended frequency in Table 3. This frequency may be as long as every 6 months or as short as every 3 months according to usage.</td></tr>
<tr><td>Who must conduct this inspection?</td><td>A Competent Person.</td></tr>
<tr><td>Does this inspection require a formal record?</td><td>Yes.</td></tr>
<tr><td>What drawings are required to support this inspection?</td><td>
<table>
<tr><th>Drawing No</th><th>Revision</th><th>Description</th></tr>
<tr><td>HC9-CC-A1</td><td>E</td><td>Load Path Assembly</td></tr>
<tr><td>HC9-SE-A1</td><td>C</td><td>Seating Assembly</td></tr>
<tr><td>HC9-GA-02</td><td>E</td><td>Central Column Assembly</td></tr>
</table>

The above diagrams are available in Appendix B.</td></tr>
<tr><td>What equipment is required to perform this inspection?</td><td>i. A ladder.
ii. An inspection frame or floor matting.
iii. Good lighting.

A suitable means of safely accessing the top and the bottom parts of the FROG-9 is required. When using a step ladder or ladder it must be securely fixed to prevent slippage whilst accessing the top of the FROG. The FROG-9 can be laid on its side on protective matting, or the use of a secure inspection frame assembly to safely access the underside of the FROG-9 is recommended. Do not go underneath an active lift.
Be aware that in some regions “Working at Height” regulations may apply.</td></tr>
</table>

The following checklist is suggested as a suitable list of required inspection items and a suitable format for recording key inspection data. A ‘WORD’ and ‘EXCEL’ copy of this inspection checklist is included on the distributed CD’s and is also available on the Reflex Marine Ltd website at www.reflexmarine.com/support.

Visual Inspection Checklist Form

Unit No		**This Inspection Date**	
Usage Category		**Last Inspection Date**	
Installation / Vessel			
Avg No of Transfers / Year			

Inspect No	Description	Comment	Pass / Fail
1.	**Main Lift-Eye Plug (Critical Part)** Visually inspect in situ for any signs of wear, cracks, deformation or other damage.		
2.	**Main Lift-Eye Plug M24 Bolts (Critical Part)** Visually inspect the three M24 lifting eye bolts, nuts, split pins and tamper proof seals that connect the main Lift-Eye plug to the central column (through the lifting bolt retaining sleeve) for wear or damage.		
3.	**Back-Up Lift-Eye** Visually inspect for any wear or damage and check that the split pin and tamper proof seal are intact.		
4.	**Handling Lift-Eye** Visually inspect for any wear or damage and check that the split pin and tamper proof seal are intact.		
5.	**Seat Base Assembly and the Hydraulic Damper and Anti-Tilt Assembly** Visually inspect for any wear or damage and ensure that all bolts, clevis' and other fasteners are fully secure.		
6.	**M72 Keel Boss and M10 Cross Bolt (Critical Part)** At the bottom end of central column, visually inspect the M72 keel boss nut and ensure that the M10 cross bolt is secure c/w split pin and tamper proof seal. Do not go underneath an active lift.		
7.	**Frame and Buoyancy** Visually inspect for any damage and ensure that all bolts and fasteners are tight and fully secure.		
8.	**Landing Feet** Examine the feet to ensure that they are in good condition and that they are properly secured to the capsule. Do not go underneath an active lift. ***Notes:*** ***i. Measure height of foot and replace if under 120 mm in height*** ***ii. Measure height of inner foot and replace if under 150 mm in height*** ***iii. Small (20 mm in length) cuts are acceptable but feet should be replaced when the internal foam becomes visible***		
9.	**Seat Harness Security** Visually inspect the seat harness attachment points and the harness webbing for any signs of wear, fraying or damage. Check that attachment points are secure.		
10.	**Seat Harnesses (sit-in)** Check all seat harness buckles to ensure each is functioning correctly. (Inspector to sit in each seat and check fastening and unfastening of each harness).		

11.	**Load Test Plate** Check the date of the last load test to ensure the unit will remain in compliance with requirements for at least 6 months.		
12.	**Lifting Sling Set (Critical Part)** The lifting sling set (including attachments) must be visually examined by a Competent Person. Note: High visibility cover must be completely removed to allow inspection of steel wire rope components. Replace the sling set according to the usage of the FROG (see Table 3 in Section 6.3). This may be as frequently as every 3 months. Irrespective of apparent condition the lifting sling set should be replaced at least every 12 months.	Note serial number and test date stamp (specify decision to retain or replace).	
13.	**Storage of FROG** Check the storage cover is in good condition and not showing any signs of UV degradation.		
14.	**Storage of Sling Sets (active and spares)** Sling sets should be stored in an appropriate dry place without high visibility cover fitted.		
15.	**Photographic Report** As an inspection record aid, the critical elements and condition of the unit may be recorded in photographs; Photographs of each of the 14 points of the check list would provide a concise inspection record. Photographs should be clearly marked pre and post inspection as appropriate.		
16.	**Documentation / Report** Complete an inspection report on the above which must be signed and dated by a Competent Person. Order required spares in time for next inspection. Reflex Marine Ltd offer to keep an archive copy of your inspection records against the unit number. You can submit your completed checklists and photographs on www.reflexmarine.com/support.		
NOTES:			

Inspected by	
Position/ Company	
Signature	
Original Inspection record filed in	
Inspection record copied to	
Inspection record copied to	
Inspection record copied to	Reflex Marine Ltd (optional archive of unit history).

6.6 Examination

<table>
<tr><th>Question</th><th>Response</th></tr>
<tr><td>When should an Examination be conducted?</td><td>An Examination must be conducted at least EVERY 12 months. According to the findings of any Visual Inspection a more frequent Examination schedule may be warranted according to wear, age of unit and usage conditions. At each Examination it is a good opportunity to replace a small number of critical and other replacement parts and therefore more frequent examinations may be prudent.</td></tr>
<tr><td>Who should conduct this examination?</td><td>A Competent Person.</td></tr>
<tr><td>Does this examination require a formal record?</td><td>Yes.</td></tr>
<tr><td>What drawings are required to support this examination?</td><td>
<table>
<tr><th>Drawing No</th><th>Revision</th><th>Description</th></tr>
<tr><td>HC9-CC-A1</td><td>E</td><td>Load Path Assembly</td></tr>
<tr><td>HC9-SE-A1</td><td>C</td><td>Seating Assembly</td></tr>
<tr><td>HC9-GA-02</td><td>E</td><td>Central Column Assembly</td></tr>
</table>

The above diagrams are available in Appendix B.</td></tr>
<tr><td>What equipment is required to perform this examination?</td><td>i. A ladder.
ii. An inspection frame or floor matting.
iii. Good lighting.
iv. Appropriate metric tool kit (socket set, combination spanners, allen keys etc).
v. Riveter.
vi. Inspection and test plate (with stamps).
vii. Proof load equipment (see Section 6.8).

A suitable means of safely accessing the top and the bottom parts of the FROG-9 is required. When using a step ladder or ladder it must be securely fixed to prevent slippage whilst accessing the top of the FROG. The FROG-9 can be laid on its side on protective matting, or the use of a secure inspection frame assembly to safely access the underside of the FROG- 9 is recommended. Do not go underneath an active lift.
Be aware that in some regions “Working at Height” regulations may apply.</td></tr>
</table>

The following checklist is suggested as a suitable list of required Examination items and a suitable format for recording key Examination data. A ‘WORD’ and ‘EXCEL’ copy of this Examination checklist is included on the distributed CD’s and is also available on the Reflex Marine Ltd website at www.reflexmarine.com/support.

Examination Checklist Form

Unit No		**This Examination Date**	
Usage Category		**Last Inspection Date**	
Installation / Vessel		**Last Examination Date**	
Avg No of Transfers / Year		**Load Test Performed**	**Y/N**

Inspect No	Description	Comment	Pass / Fail / Replaced?
1.	**Main Lift-Eye Plug (Critical Part)** Remove and visually inspect the main Lift-Eye plug for any signs of damage or strain. Replace according to the usage of the FROG-9 (see Table 3 in Section 6.3) or on the recommendation of a Competent Person / Inspector.		
2.	**Main Lift-Eye Plug M24 Bolts (Critical Part)** Remove and visually inspect the three M24 main Lift-Eye plug securing bolts for any signs of damage or strain. Visually inspect the three M24 holes in the lifting bolt retaining sleeve and in the central column tube for signs of damage or strain. Replace appropriate parts according to the usage of the FROG-9 (see Table 3 in Section 6.3) or on the recommendation of a Competent Person / Inspector. Bolt torque to 376 Nm.		
3.	**Back-Up Lift-Eye (replacement part as required)** Inspect the back-up eye in situ, nut, split pin and tamper proof seal. Replace on the recommendation of a Competent Person / Inspector.		
4.	**Handling Lift-Eye (replacement part as required)** Inspect the back-up eye in situ, nut, split pin and tamper proof seal. Replace on the recommendation of a Competent Person / Inspector.		
5.	**Seat Base Assembly and the Hydraulic Damper and Anti-Tilt Assembly (replacement part as required)** Visually inspect and test all fixings for any wear or damage and ensure that all bolts, clevis' and other fasteners are fully secure. Ensure that the damper rod-end threads are not visible below the clevis pin eye. (see Technical Bulletin 01-09 at http://www.reflexmarine.com/index.cfm/p/Technical-Safety-Alerts).		
6.	**M72 Keel Boss and M10 Cross Bolt (Critical Parts)** Remove the M72 keel boss nut and visually check that the threads at the bottom of the central column tube are in good condition. Replace appropriate parts according to the usage of the FROG-9 (see Table 3 in Section 6.3) or on the recommendation of a Competent Person / Inspector. Do not go underneath an active lift.		
7.	**Frame and Buoyancy (replacement part as required)** Visually inspect for any damage and ensure that all bolts and fasteners are fully secure.		
8.	**Landing Feet (replacement part as required)** Examine the feet to ensure that they are in good		

	condition and that they are properly secured to the capsule. Do not go underneath an active lift. ***Notes:*** ***i. Measure height of outer foot and replace if under 120 mm in height*** ***ii. Measure height of inner foot and replace if under 150 mm in height*** ***iii. Small (20 mm in length) cuts are acceptable but feet should be replaced when the internal Foam becomes visible***		
9.	**Seat Harness Security (Critical Part)** Visually inspect the seat harness attachment points and the harness webbing for any signs of wear, fraying or damage. Check that the attachment points are secure.		
10.	**Seat Harnesses (sit-in)** Check all seat harness buckles to ensure each is functioning correctly. (Inspector to sit in each seat and check fastening and unfastening of each harness).		
11.	**Load Test Plate (replacement part)** Renew the load test plate after completion of approved load test.		
12.	**Lifting Sling Set (Critical Part)** Replace the sling set according to the usage of the FROG (see Table 3 in Section 6.3). This may be as frequently as every 3 months. Irrespective of apparent condition the lifting sling set should be replaced at least every 12 months. Check the anti-fouling tie wraps or the back-up eye shackle insert are in good condition (see Section 5.4.2). Replace as necessary.		
13.	**Full Load Test (see Section 6.8)** A full load test must be conducted by an independent test house company, nationally recognised and in accordance with ILO 152.		
14.	**Post Load Test Visual Inspection (See Section 6.7)** Conduct and report a post load test visual inspection.		
15.	**Photographic Report** As an inspection record aid, the critical elements and condition of the unit may be recorded in photographs; Photographs of each of the 14 points of the check list would provide a concise inspection record. Photographs should be clearly marked pre and post inspection as appropriate.		
16.	**Documentation / Report** Complete an examination report on the above which should be signed and dated by a Competent Person. This documentation set must include: i. Unit Examination Report. ii. Load Test Report. iii. Post Load Test Visual Inspection Report. iv. Other supporting material, certificates, photographs etc.	Make note of unique critical parts numbers for future cross reference.	

	Note: Order required spares in time for next inspection / examination. Reflex Marine Ltd offer to keep an archive copy your inspection records against the unit number. You can submit your completed checklists and photographs on www.reflexmarine.com/support.		
NOTES:			

Examined by	
Position/ Company	
Signature	
Original Examination record filed in	
Examination record copied to	
Examination record copied to	
Examination record copied to	Reflex Marine Ltd (optional archive of unit history).

6.7 Post Load Test Visual Inspection

<table>
<tr><th>Question</th><th>Response</th></tr>
<tr><td>When should a Post Load Test Visual Inspection be conducted?</td><td>A post load test visual inspection must be conducted immediately following every load test.
The load test exerts additional stress into the FROG and this inspection formally records whether any resulting weakness is observed.</td></tr>
<tr><td>Who should conduct this inspection?</td><td>A Competent Person.</td></tr>
<tr><td>Does this inspection require a formal record?</td><td>Yes.</td></tr>
<tr><td>What drawings are required to support this inspection?</td><td>
<table>
<tr><th>Drawing No</th><th>Revision</th><th>Description</th></tr>
<tr><td>HC9-CC-A1</td><td>E</td><td>Load Path Assembly</td></tr>
<tr><td>HC9-SE-A1</td><td>C</td><td>Seating Assembly</td></tr>
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</table>

The above diagrams are available in Appendix B.</td></tr>
<tr><td>What equipment is required to perform this inspection?</td><td>i. A ladder.
ii. An inspection frame or floor matting.
iii. Good lighting.

A suitable means of safely accessing the top and the bottom parts of the FROG-9 is required. When using a step ladder or ladder it should be securely fixed to prevent slippage whilst accessing the top of the FROG. The FROG-9 can be laid on its side on protective matting, or the use of a secure inspection frame assembly to safely access the underside of the FROG-9 is recommended. Do not go underneath an active lift.
Be aware that in some regions “Working at Height” regulations may apply.</td></tr>
</table>

The following checklist is suggested as a suitable list of required inspection items and a suitable format for recording key inspection data. A ‘WORD’ and ‘EXCEL’ copy of this inspection checklist is included on the distributed CD’s and is also available on the Reflex Marine Ltd website at www.reflexmarine.com/support.

Post Load Test Visual Inspection Checklist Form

Unit No		**This Inspection Date**	
Usage Category		**Load Test Date**	
Installation / Vessel		**Load Test Report / Cert No**	
Avg No of Transfers / Year		**Load Test Authority**	

Inspect No	Description	Comment	Pass / Fail
1.	**Main Lift-Eye Plug (Critical Part)** Visually inspect in situ for any signs of wear, cracks, deformation or other damage.		
2.	**Main Lift-Eye Plug M24 Bolts (Critical Part)** Visually inspect the three M24 lLift-Eye bolts, nuts, split pins and tamper proof seals that connect the main lifting eye plug to the central column (through the lifting bolt retaining sleeve) for wear or damage.		
3.	**Back-Up Lift-Eye** Visually inspect for any wear or damage and check that the split pin and tamper proof seal are intact.		
4.	**Handling Lift-Eye** Visually inspect for any wear or damage and check that the split pin and tamper proof seal are intact.		
5.	**Seat Base Assembly and Hydraulic Damper and Anti-Tilt Assembly** Visually inspect for any wear or damage and ensure that all bolts, clevis' and other fasteners are fully secure.		
6.	**M72 Keel Boss and M10 Cross Bolt (Critical Part)** At the bottom end of central column, visually inspect the M72 keel boss nut and ensure that the M10 cross bolt is secure c/w split pin and tamper proof seal. Do not go underneath an active lift.		
7.	**Frame and Buoyancy** Visually inspect frame for any deformation, cracks bending and ensure that all bolts and fasteners are fully secure.		
8.	**Photographic Report** As an inspection record aid, the critical elements and condition of the unit may be recorded in photographs; Photographs of each of the 7 points of the check list would provide a concise inspection record. Photographs should be clearly marked pre and post inspection as appropriate.		
9.	**Documentation / Report** Complete an inspection report on the above which should be signed and dated by a Competent Person.		
NOTES:			

Inspected by	
Position/ Company	
Signature	
Original Inspection record filed in	
Inspection record copied to	
Inspection record copied to	Reflex Marine Ltd (optional archive of unit history).

6.8 Proof Load Testing

<table>
<tr><th>Question</th><th>Response</th></tr>
<tr><td>When must a Proof Load Test be conducted?</td><td>Immediately after any of the following events:
i. At least annually.
ii. Immediately following an Examination.
iii. After replacement of any critical parts.
iv. After any suspected damage arising from overloading, impact loading or impact.
v. If the history of the FROG unit is uncertain.
vi. If the test plate is missing, illegible or out of date.</td></tr>
<tr><td>Who must conduct this test?</td><td>The Load Test must be carried out by an independent test house company with nationally recognised accreditation in accordance with ILO 152.
A competent and certified test person.</td></tr>
<tr><td>Does this test require a formal record?</td><td>Yes.</td></tr>
<tr><td>What drawings are required to support this test?</td><td><table><tr><th>Drawing No</th><th>Revision</th><th>Description</th></tr><tr><td>HC9-CC-A1</td><td>E</td><td>Load Path Assembly</td></tr><tr><td>HC9-SE-A1</td><td>C</td><td>Seating Assembly</td></tr><tr><td>HC9-GA-02</td><td>E</td><td>Central Column Assembly</td></tr></table>
The above diagrams are available in Appendix B.</td></tr>
<tr><td>What equipment is required to perform this test?</td><td>i. Loading weights or sand bags (2900 kg).
ii. Certified weighing scale or load cell.
iii. Lifting equipment certified for > 5 Tonnes SWL.
iv. A ladder or top access platform.
v. An inspection frame or floor matting.
vi. Good lighting.

A suitable means of safely accessing the top and the bottom parts of the FROG-9 is required. When using a step ladder or ladder it must be securely fixed to prevent slippage whilst accessing the top of the FROG. The FROG-9 can be laid on its side on protective matting, or the use of a secure inspection frame assembly to safely access the underside of the FROG-9 is recommended. Do not go underneath an active lift.
Be aware that in some regions “Working at Height” regulations may apply.</td></tr>
</table>

6.8.1 Load Test Procedure

Table 4 details the required proof load tests that are applicable to the FROG-9. Following the load tests, a post load test visual inspection should be conducted as recommended in Section 6.7.

Table 4: Proof Load Tests – FROG-9

Load Test Number	1	2	3
Components Under Test	i. Main Lift-Eye. ii. Central Column Load Bearing Assembly. iii. Seats and Floor Structure.	i. Back-Up Lift-Eye. ii. Central Column Load Bearing Assembly. iii. Seats and Floor Structure.	i. Handling Lift-Eye
Test Proof Load	2900 kg (6393 lb)	2900 kg (6393 lb)	1100 kg (2425 lb)
Test Proof Load Distribution	1800 kg (3968 lb) on the seats and spread equally between them. 1100 kg (2425 lb) placed on the floor and distributed evenly.	1800 kg (3968 lb) on the seats and spread equally between them. 1100 kg (2425 lb) placed on the floor and distributed evenly.	1100 kg (2425 lb) should be distributed evenly on the floor.
Basis of Test Proof Load	Twice Maximum Gross Weight, less Tare Weight* = 2 x 2000 kg – 1100 kg = 2900 kg	Twice Maximum Gross Weight, less Tare Weight* = 2 x 2000 kg – 1100 kg = 2900 kg	Twice Tare weight*, less Tare weight* = 2 x 1100 kg – 1100 kg = 1100 kg
Crane Hook Load	4000 kg	4000 kg	2200 kg
Test Method	Lift the unit and hold static for 3 minutes.	Lift the unit and hold static for 3 minutes.	Lift the unit and hold static for 3 minutes.

* ***Note: The Tare Weight of the FROG-9 is approximately 1100 kg but may vary slightly. Each FROG-9 must be weighed prior to load test.***

6.8.2 Test Plate

A test plate will be issued and attached by the test house, which should show:

i. Tare Weight (kg).
ii. Pay load / SWL (kg).
iii. Maximum gross load (kg).
iv. The load test date.
v. Test load (kg).
vi. The serial number of the FROG-9: HC9-XXX (where XXX is unit I.D. No).
vii. The model number of the FROG-9: HC9-01.

6.9 Sling Replacement and Management

6.9.1 Sling Set (Critical Part) Replacement

Replace the sling set according to the usage of the FROG (see Table 3 in Section 6.3). This may be as frequently as every 3 months for very high use. Irrespective of apparent condition the lifting sling set should be replaced at least every 12 months.

6.9.2 Sling Set Management

The wire rope sling set supplied for use with the FROG-9 capsule is a critical component. Good management of sling sets is essential for ensuring safe personnel transfers.

Do

i. Clearly identify that a sling is still within the current inspection / examination period.
ii. Inspect the sling set prior to use. Open the velcro cover and visually check both legs of the sling set for any signs of mechanical damage or corrosion which may affect the integrity of the sling set.
iii. Ensure that the sling set is thoroughly examined by a Competent Person at intervals as specified in Table 3.
iv. Discard slings that have not passed inspection.
v. Use only OEM slings as replacement sling sets.
vi. Replace slings according to usage and inspection results.
vii. Remove the velcro cover if a FROG unit or the sling set is to be removed from service for more than one month.
viii. Store sling sets in dry conditions when not in use.

Do Not

i. Do not use a sling set which has not been visually inspected prior to use.
ii. Do not use a sling set which has not been thoroughly examined by a Competent Person within the time interval as stated in Table 3. Note: for high and very high use, this frequency is every 3 months.
iii. Never use a sling set which has been in service for more that 12 months.
iv. Do not leave a sling set in a position where it is vulnerable to mechanical damage or contamination or where it may come into contact with abrasive or corrosive materials.
v. Do not use a sling set which has incurred mechanical damage - including damaged eyes or ferrules, kinks, crimps, 'birdcages' or broken strands.
vi. Do not secure the high visibility cover along its length with cable ties or similar which will prevent opening of the cover for inspection of the sling set.
vii. Do not allow the sling set to become immersed in water or to be stored where it may be subject to sea water spray or fresh water spray.
viii. Do not use non-OEM sling sets.

6.10 Critical Spares Kits and Replacement Parts

Use only genuine parts (including sling sets) provided by Reflex Marine Ltd.

Reflex Marine Ltd can supply critical and non-critical replacement parts as individual items or as appropriate kits. Prior to ordering any replacement parts or part kits, establish the FROG-9 Serial Number which is stamped on the Load Test Data Plate. The Number is typically HC9-XXX where XXX represents a three digit number.

Replace the critical parts (as identified in the Examination Checklist) according to the usage of the FROG (see Table 3 in Section 6.3). This may be as frequently as every time an Examination and Load Test in conducted (this could be every 3 months) up to every 3 years for the units with the lowest usage. All other replacement parts kits and parts should be replaced according to the advice of the Competent Person conducting the Visual and Examination procedure.

Any parts required for a FROG-9 can be ordered through support@reflexmarine.com.

6.10.1 Spares Kits

The following kits are available for routine and non-routine maintenance. Ordering an appropriate kit is more economical than replacing individual parts.

Kit Name	Kit Number	Contents
Critical Parts Kit (with Sling Assembly)	HC9-CPK-01	1 x Main Lift-Eye Plug 3 x M24 Main Lift-Eye Securing Bolts 3 x M24 Securing Nuts 3 x M4 Split Pins 3 x Tamperproof Seals 1 x M72 Keel Boss 1 x Tamper Proof Seal for M72 Nut 1 x M10 Bolt 1 x M10 Nut 1 x M10 Washer 1 x 3 mm Split Pin 1 x 30 ft (9 m) Sling Set Assembly
Replacement Parts Kit (without Sling Assembly)	HC9-RPK-01	1 x Main Lift-Eye Plug 3 x M24 Main Lift-Eye Securing Bolts 3 x M24 Securing Nuts 3 x M4 Split Pins 3 x Tamperproof Seals 1 x M72 Keel Boss 1 x Tamper Proof Seal for M72 Nut 1 x M10 Bolt 1 x M10 Nut 1 x M10 Washer 1 x 3 mm Split Pin
30 ft Sling Set (only)	HC9-SA-01	1 x 30 ft (9 m) Sling Set Assembly c/w 1 x Identification Tag for use with FROG-9 2 x Shackles

Back-Up Lift-Eye Refurbishment Kit	HC9-BEK-01	1 x Back-Up Lift-Eye 1 x M30 Nut 1 x 4 mm Split Pin 1 x Tamper Proof Seal
Handling Lift-Eye Refurbishment Kit	HC9-HEK-01	1 x Handling Lift-Eye 1 x M30 Nut 1 x 4 mm Split Pin 1 x Tamperproof Seal
Landing Outer Feet Kit	HC9-LOFK-01	3 x Outer Foot 6 x M10x75 Bolt 12 x M10 Washer 6 x M10 Nut 12 x M8 Washer 12 x M8x20 Bolt
Landing Inner Feet Kit	HC9-LIFK-02	3 x Inner Feet 3 x Cone Washer 3 x M20 Hex Nut 3 x M20 Washer 3 x M20 Hex Bolt
Restraint Harness Kit	HC9-RHK-01	6 x Red Seat Harness 3 x Yellow Seat Harness Plus Fixings
Full Service Kit	HC9-FSK-01	This Kit combines the following Kits: i. Critical Parts Kit ii. Back-Up Lift-Eye Kit iii. Landing Outer Feet Kit iv. Landing Inner Feet Kit v. Sling Cover

6.10.2 All Other Replacement Parts

Reflex Marine Ltd carries spares and accessories stock and is able to supply most individual components of the FROG-9. A full list of FROG-9 Parts (latest version) is contained in Appendix C.
In many cases an Operator is advised to carry a local spare parts stock inventory to ensure the continued safe operation of the FROG unit. Minimum stock quantities shall be influenced by:

i. Remoteness of location and certifying authority.
ii. Criticality of maintaining crew and emergency response (MedEvac) access.
iii. Usage envelope.
iv. Customs processing time.
v. Cost of logistics for small parts.

Reflex Marine Ltd would be pleased to offer the recommended minimum stock items for critical and replacement parts for your operation, please contact support@reflexmarine.com.

6.11 Unit Replacement Recommendation

The FROG design is strong and robust and is able to be refurbished to full working capacity. FROGs work in a very wide range of operating conditions and environments. The work they perform and the way they are maintained and looked after has wide variability.

Reflex Marine Ltd expects all FROGs to provide many years of excellent reliable service with minimal operating costs.

RML do however recommend that after a certain duty cycle, it is time to renew this critical lifting equipment. Based on RML's field observations and usage category, RML has established the recommended unit retirement age as specified in Table 3 in Section 6.3.

RML would be pleased to offer renewal customers attractive quotes for the latest equipment.

7 UNIT IDENTIFICATION

7.1 Product ID Numbers

There is currently one version of the FROG-9. The model number is:

HC9-01: Standard 9 passenger version.

7.2 Part Numbers

In the drawing / part numbering system, each assembly or part is assigned a three part number which provides the unique identification of the part /assembly.

7.3 FROG-9 Serial Numbers

Every FROG-9 built is assigned a build serial number. These serial numbers are allocated sequentially in the order in which FROG-9 units are built. Serial numbers start from HC9-001, and continue in numerical sequence. The serial number for each FROG-9 will be stamped on a plate, which is attached to each unit.

7.4 Component Serial Numbers

Where material grades and material traceability are deemed to be safety critical these components will be allocated unique component numbers which will be stamped or etched as required.
Components that require unique identification are referenced in the Parts List.

For bolts, where etching is impractical, batches of bolts will be colour coded and a note added to the mill certificate to identify the colour coded bolts with a particular mill certificate.

8 HANDLING, SHIPPING AND STORAGE

8.1 Dimensions

The FROG-9 overall dimensions are as follows:

Height	2877 mm	(9.44 ft)
Max Width 1	2794 mm	(9.17 ft)
Max Width 2	3219 mm	(10.56 ft)
Tare Weight	1100 kg	(2425 lb)

8.2 Handling & Transportation

8.2.1 Forklift

Handling of the FROG-9 with a forklift truck may damage the underside of the FROG-9 (landing feet, cross braces or main column). Therefore the unit must be secured to a pallet specifically designed for forks.

8.2.2 Crane

When lifting the FROG-9 with short chain or strop, the handling eye must be used. Care must be taken not to damage the FROG-9 lifting sling set.

8.2.3 Securing

Each FROG-9 is fitted with 6 tie-down / lashing points in way of the main frame pillar struts. Each tie-down point will sustain a load of 500 kg (1101 lb).

8.2.4 Inspection

Before and after transportation the FROG-9 must be inspected to check for damage sustained in transit. The unit must not be used if any structural damage is observed. If any damage has been observed please refer to Section 6.3, item iv, for remedial instructions.

8.2.5 Preparation for Road Transport

Prior to shipping, the seat harnesses must be secured by tightening the seat harnesses and tying the buckles together. This will prevent seat harnesses flapping and damaging the seating area. It is recommended that the FROG-9 is covered for shipping either with a FROG-9 weatherproof protective cover or other heavy duty tarpaulin material.

8.2.6 Containerisation

The FROG-9 will not fit in a standard or high-cube container. If the FROG-9 is transported on flat rack it must be secured. Recommended securing points in addition to the tie down / lashing points are the radial / peripheral floor braces and the handling eye. To protect it from excess loading, the main Lift-Eye must not be used as a securing point. Feet must be supported to prevent collapse by placing suitable chocks or props under the unit.

8.2.7 Storage

The FROG-9 has been designed to cope with the harsh conditions on an offshore installation or vessel; however it is important to protect the unit as much as possible from any hazardous elements and UV degradation.

It is recommended that the FROG-9 is covered with the FROG-9 weatherproof cover whilst not in use.

Fig 7: FROG-9 Protective Cover

9 APPENDIX A – TRANSFER LOG

MARINE PERSONNEL TRANSFER LOG			
Date		**From** (vessel name)	
Transfer Time		**To** (vessel name)	
Unit Type		**Crane** (port / starboard etc)	
Wind Speed		**Sea State**	
Wind Direction		**Visibility**	
Transfer Classification		ROUTINE / EMERGENCY	
Reason for Transfer			
Other Factors Affecting Transfer (vessel position / deck space etc)			

Passenger Details			
Passengers are requested to sign below if they consent to undertaking the transfer detailed above. ***Important note to passengers –*** *Certain National regulations place constraints on the use of personnel transfers. Passengers should ensure they are aware of any local regulations prior to proceeding.*			
Name	**Designation**	**Signed consent**	**Time / Date**

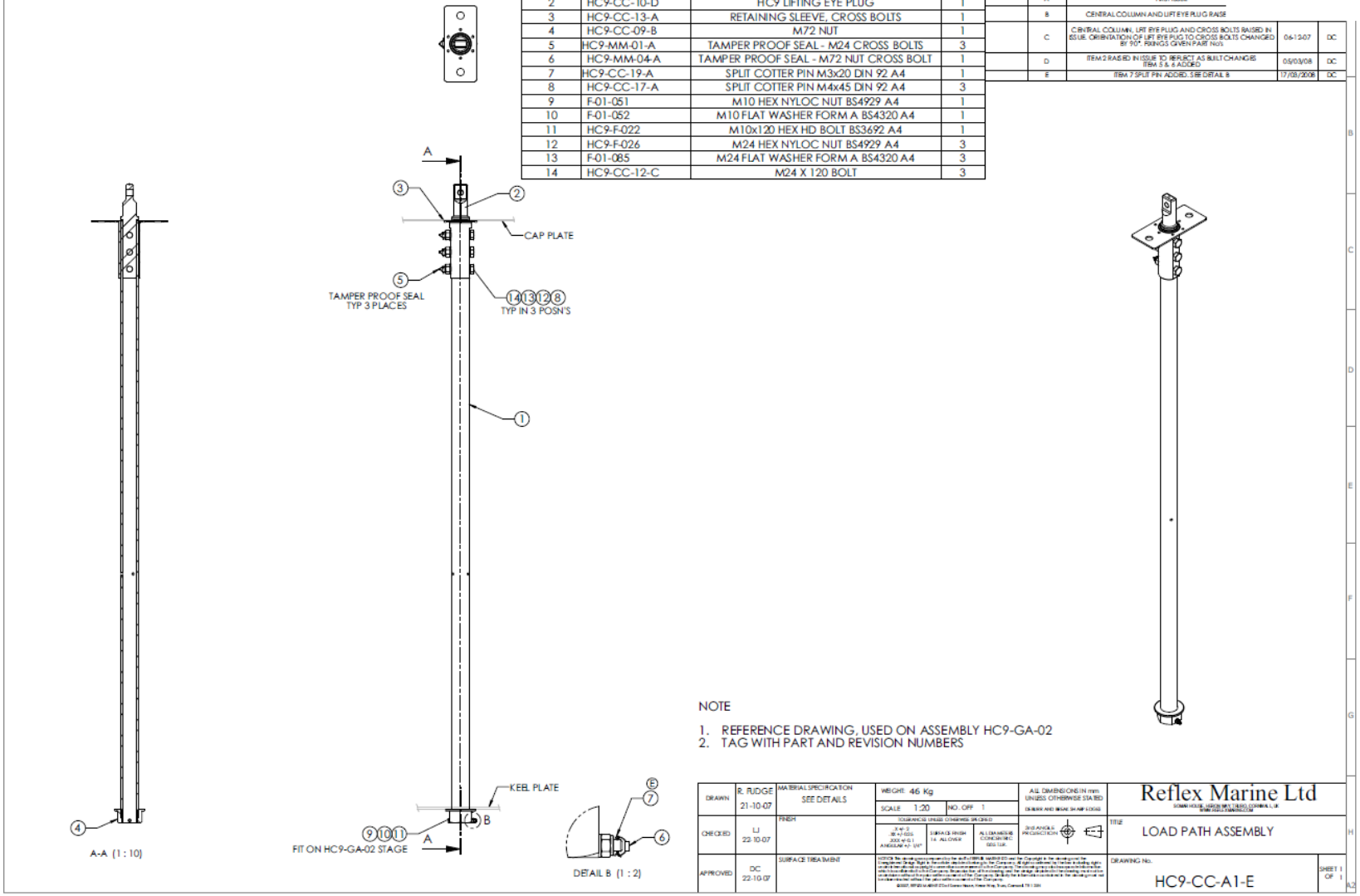
TO BE COMPLETED BY THE LIFT SUPERVISOR			
Have operating instructions in the capsule been read and understood?			YES / NO
Has the condition of the transfer capsule and associated equipment been checked?			YES / NO
Have passengers been fully briefed on the operation?			YES / NO
Hazards Identified			YES / NO
Action Taken to Minimise Hazards			
The transfer was carried out without incident			YES / NO
Name	**Position**	**Signature**	**Time / Date**
ADDITIONAL COMMENTS			

10 APPENDIX B – DRAWINGS

Drawing No	Revision	Description
HC9-CC-A1	E	Load Path Assembly
HC9-SE-A1	C	Seating Assembly
HC9-GA-02	E	Central Column Assembly
Reference		FROG-9 Plan, Elevation and Isometric Views

ITEM NO.	PART NUMBER	Description	QTY.
1	HC9-CC-01-C	CENTRAL COLUMN	1
2	HC9-CC-10-D	HC9 LIFTING EYE PLUG	1
3	HC9-CC-13-A	RETAINING SLEEVE, CROSS BOLTS	1
4	HC9-CC-09-B	M72 NUT	1
5	HC9-MM-01-A	TAMPER PROOF SEAL - M24 CROSS BOLTS	3
6	HC9-MM-04-A	TAMPER PROOF SEAL - M72 NUT CROSS BOLT	1
7	HC9-CC-19-A	SPLIT COTTER PIN M3x20 DIN 92 A4	1
8	HC9-CC-17-A	SPLIT COTTER PIN M4x45 DIN 92 A4	3
9	F-01-051	M10 HEX NYLOC NUT BS4929 A4	1
10	F-01-052	M10 FLAT WASHER FORM A BS4320 A4	1
11	HC9-F-022	M10x120 HEX HD BOLT BS3692 A4	1
12	HC9-F-026	M24 HEX NYLOC NUT BS4929 A4	3
13	F-01-085	M24 FLAT WASHER FORM A BS4320 A4	3
14	HC9-CC-12-C	M24 X 120 BOLT	3

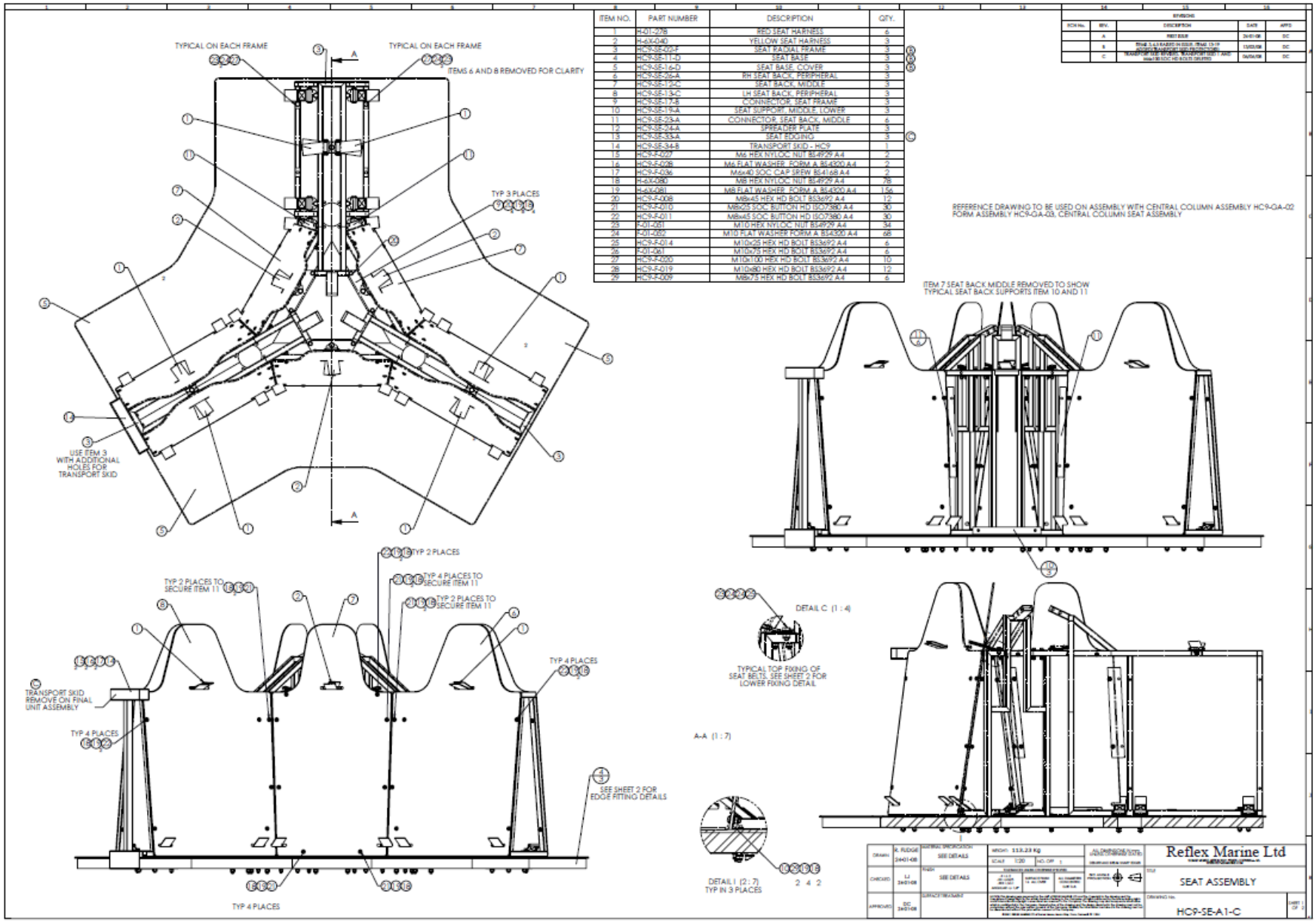
REVISIONS				
ECN No.	REV.	DESCRIPTION		
	A	FIRST ISSUE		
	B	CENTRAL COLUMN AND LIFT EYE PLUG RAISE		
	C	CENTRAL COLUMN, LIFT EYE PLUG AND CROSS BOLTS RAISED IN ISSUE. ORIENTATION OF LIFT EYE PLUG TO CROSS BOLTS CHANGED BY 90°. FIXINGS GIVEN PART No's	06-12-07	DC
	D	ITEM 2 RAISED IN ISSUE TO REFLECT AS BUILT CHANGES ITEM 5 & 6 ADDED	05/03/08	DC
	E	ITEM 7 SPLIT PIN ADDED. SEE DETAIL B	17/03/2008	DC



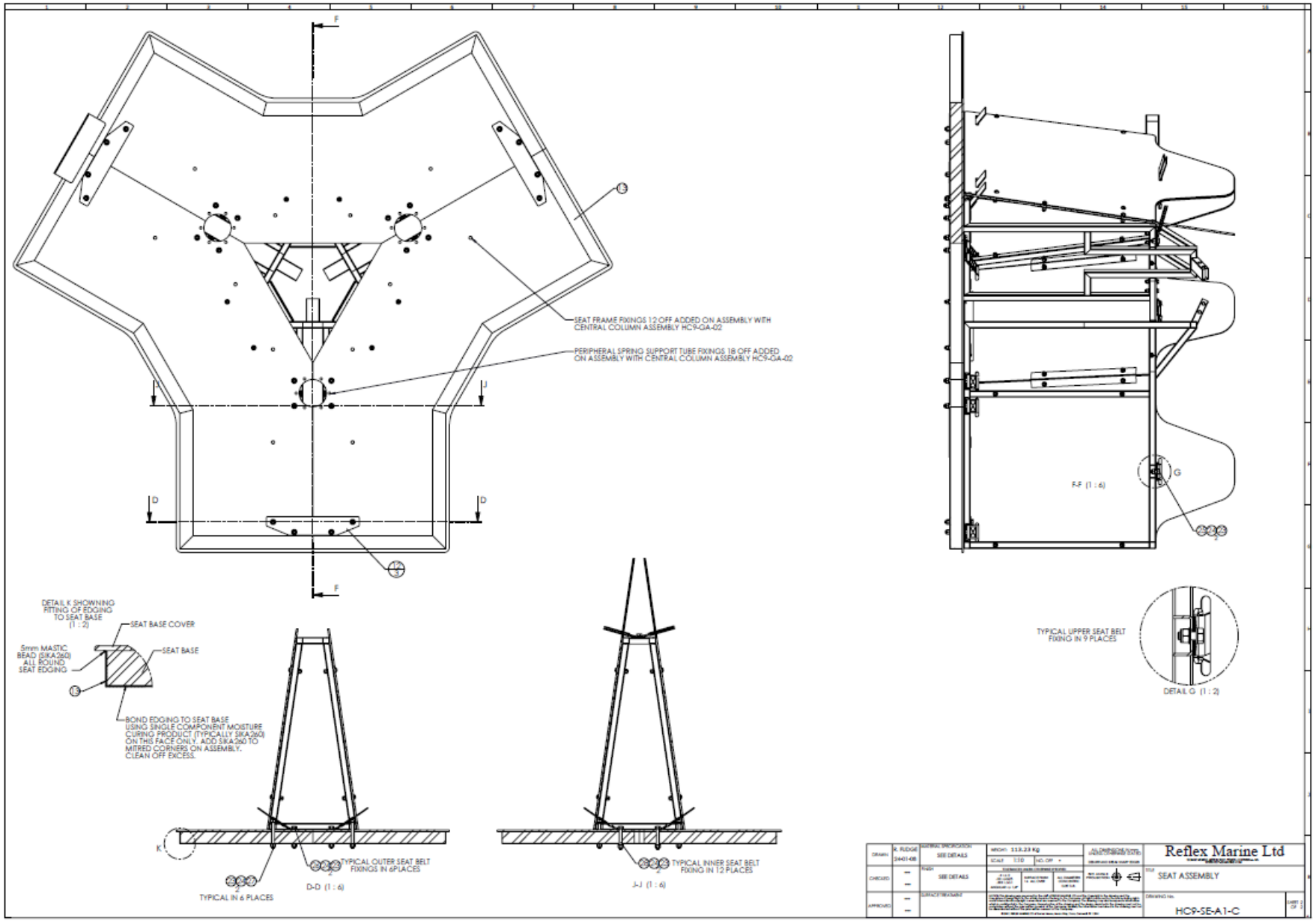
NOTE

1. REFERENCE DRAWING, USED ON ASSEMBLY HC9-GA-02
2. TAG WITH PART AND REVISION NUMBERS

DRAWN	R. FUDGE 21-10-07	MATERIAL SPECIFICATION SEE DETAILS	WEIGHT: 46 Kg	ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED	Reflex Marine Ltd
			SCALE 1:20 NO. OFF 1		
CHECKED	LJ 22-10-07	FINISH			TITLE: LOAD PATH ASSEMBLY
APPROVED	DC 22-10-07	SURFACE TREATMENT			DRAWING No. HC9-CC-A1-E SHEET 1 OF 1

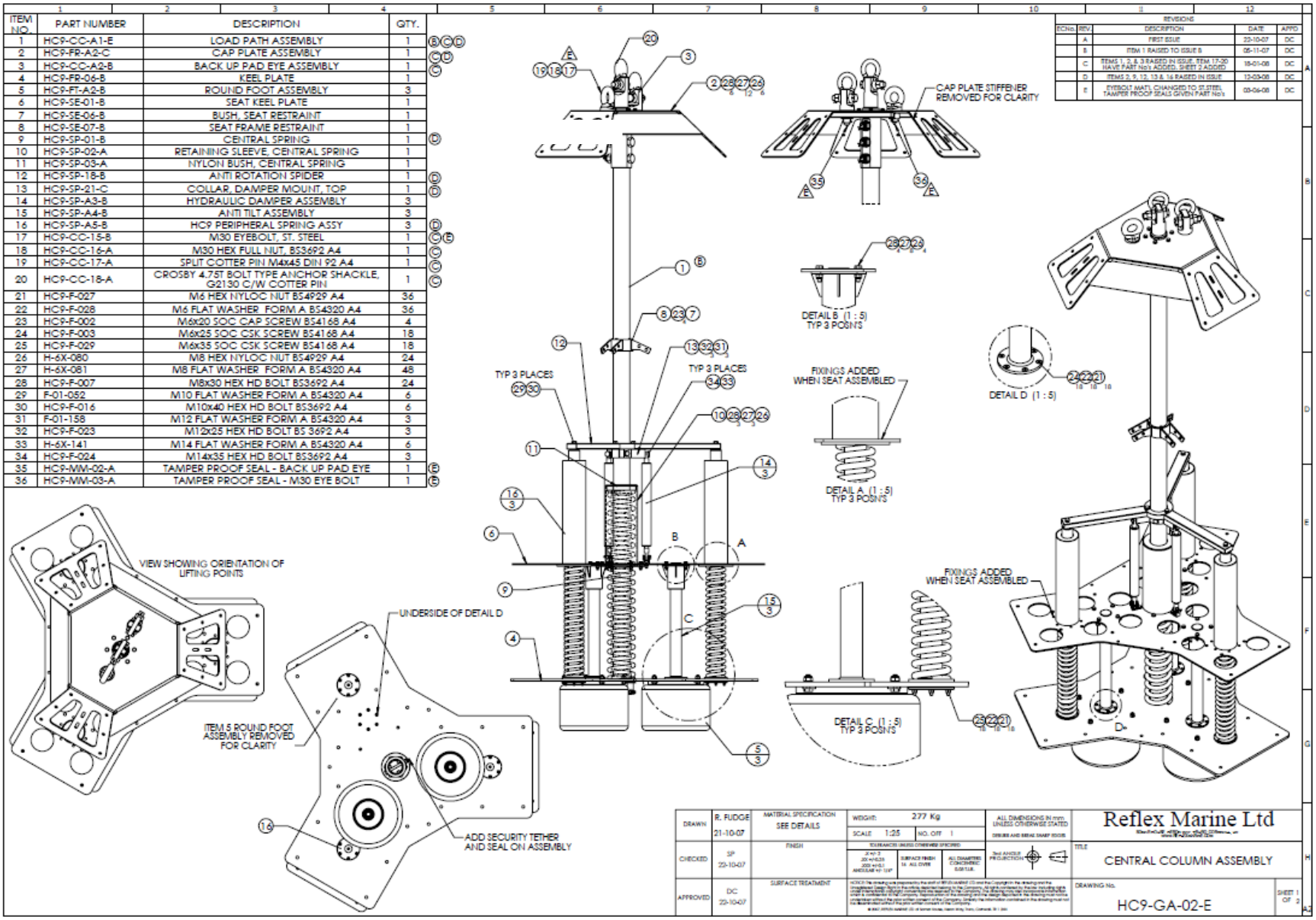


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	H-01-278	RED SEAT HARNESS	6
2	H-6X-040	YELLOW SEAT HARNESS	3
3	HC9-SE-02-F	SEAT RADIAL FRAME	3
4	HC9-SE-11-D	SEAT BASE	3
5	HC9-SE-16-D	SEAT BASE, COVER	3
6	HC9-SE-26-A	RH SEAT BACK, PERIPHERAL	3
7	HC9-SE-12-C	SEAT BACK, MIDDLE	3
8	HC9-SE-13-C	LH SEAT BACK, PERIPHERAL	3
9	HC9-SE-17-B	CONNECTOR, SEAT FRAME	3
10	HC9-SE-19-A	SEAT SUPPORT, MIDDLE, LOWER	3
11	HC9-SE-23-A	CONNECTOR, SEAT BACK, MIDDLE	6
12	HC9-SE-24-A	SPREADER PLATE	3
13	HC9-SE-33-A	SEAT EDGING	3
14	HC9-SE-34-B	TRANSPORT SKID - HC9	1
15	HC9-F-027	M6 HEX NYLOC NUT BS4929 A4	2
16	HC9-F-028	M6 FLAT WASHER, FORM A BS4320 A4	2
17	HC9-F-036	M6x40 SOC CAP SREW BS4168 A4	2
18	H-6X-080	M8 HEX NYLOC NUT BS4929 A4	76
19	H-6X-081	M8 FLAT WASHER, FORM A BS4320 A4	156
20	HC9-F-008	M8x45 HEX HD BOLT BS3692 A4	12
21	HC9-F-010	M8x25 SOC BUTTON HD ISO7380 A4	30
22	HC9-F-011	M8x45 SOC BUTTON HD ISO7380 A4	30
23	F-01-081	M10 HEX NYLOC NUT BS4929 A4	34
24	F-01-260	M10 FLAT WASHER FORM A BS4320 A4	68
25	HC9-F-014	M10x25 HEX HD BOLT BS3692 A4	6
26	F-01-061	M10x75 HEX HD BOLT BS3692 A4	6
27	HC9-F-020	M10x100 HEX HD BOLT BS3692 A4	10
28	HC9-F-019	M10x80 HEX HD BOLT BS3692 A4	12
29	HC9-F-009	M8x75 HEX HD BOLT BS3692 A4	6

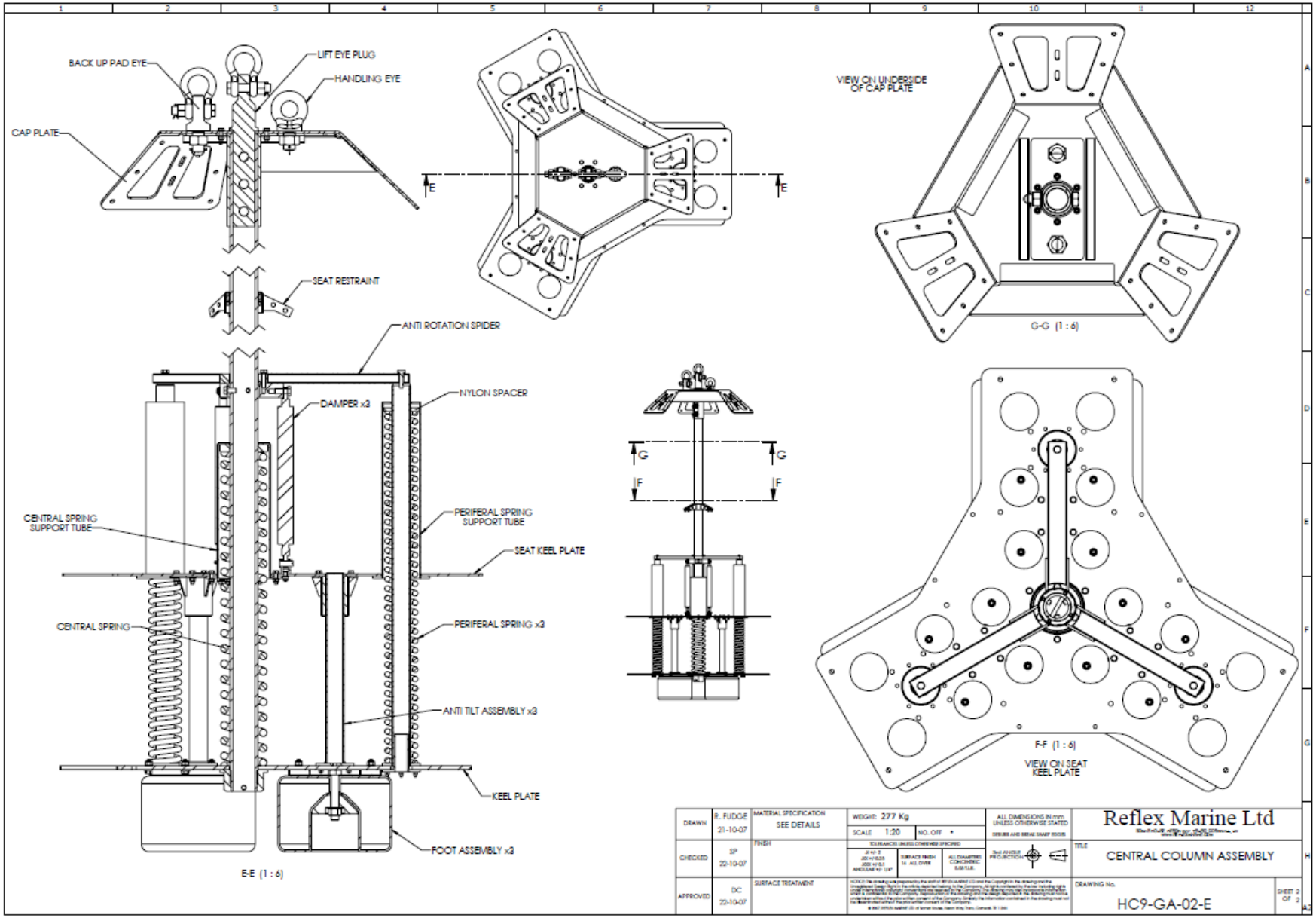

SEAT FRAME FIXINGS 12 OFF ADDED ON ASSEMBLY WITH CENTRAL COLUMN ASSEMBLY HC9-GA-02
PERIPHERAL SPRING SUPPORT TUBE FIXINGS 18 OFF ADDED ON ASSEMBLY WITH CENTRAL COLUMN ASSEMBLY HC9-GA-02
F-F (1 : 6)
DETAIL K SHOWING FITTING OF EDGING TO SEAT BASE (1 : 2)
SEAT BASE COVER
SEAT BASE
5mm MASTIC BEAD (SIKA 260) ALL ROUND SEAT EDGING
BOND EDGING TO SEAT BASE USING SINGLE COMPONENT MOISTURE CURING PRODUCT (TYPICALLY SIKA 260) ON THIS FACE ONLY. ADD SIKA 260 TO MITRED CORNERS ON ASSEMBLY. CLEAN OFF EXCESS.
TYPICAL OUTER SEAT BELT FIXINGS IN 6 PLACES
TYPICAL IN 6 PLACES
D-D (1 : 6)
TYPICAL INNER SEAT BELT FIXING IN 12 PLACES
J-J (1 : 6)
TYPICAL UPPER SEAT BELT FIXING IN 9 PLACES
DETAIL G (1 : 2)
Reflex Marine Ltd
SEAT ASSEMBLY
HC9-SE-A1-C

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	
1	HC9-CC-A1-E	LOAD PATH ASSEMBLY	1	(B)(C)(D)
2	HC9-FR-A2-C	CAP PLATE ASSEMBLY	1	(C)(D)
3	HC9-CC-A2-B	BACK UP PAD EYE ASSEMBLY	1	(C)
4	HC9-FR-06-B	KEEL PLATE	1	
5	HC9-FT-A2-B	ROUND FOOT ASSEMBLY	3	
6	HC9-SE-01-B	SEAT KEEL PLATE	1	
7	HC9-SE-06-B	BUSH, SEAT RESTRAINT	1	
8	HC9-SE-07-B	SEAT FRAME RESTRAINT	1	
9	HC9-SP-01-B	CENTRAL SPRING	1	(D)
10	HC9-SP-02-A	RETAINING SLEEVE, CENTRAL SPRING	1	
11	HC9-SP-03-A	NYLON BUSH, CENTRAL SPRING	1	
12	HC9-SP-18-B	ANTI ROTATION SPIDER	1	(D)
13	HC9-SP-21-C	COLLAR, DAMPER MOUNT, TOP	1	(D)
14	HC9-SP-A3-B	HYDRAULIC DAMPER ASSEMBLY	3	
15	HC9-SP-A4-B	ANTI TILT ASSEMBLY	3	
16	HC9-SP-A5-B	HC9 PERIPHERAL SPRING ASSY	3	(D)
17	HC9-CC-15-B	M30 EYEBOLT, ST. STEEL	1	(C)(E)
18	HC9-CC-16-A	M30 HEX FULL NUT, BS3692 A4	1	(C)
19	HC9-CC-17-A	SPLIT COTTER PIN M4x45 DIN 92 A4	1	(C)
20	HC9-CC-18-A	CROSBY 4.75T BOLT TYPE ANCHOR SHACKLE, G2130 C/W COTTER PIN	1	(C)
21	HC9-F-027	M6 HEX NYLOC NUT BS4929 A4	36	
22	HC9-F-028	M6 FLAT WASHER FORM A BS4320 A4	36	
23	HC9-F-002	M6x20 SOC CAP SCREW BS4168 A4	4	
24	HC9-F-003	M6x25 SOC CSK SCREW BS4168 A4	18	
25	HC9-F-029	M6x35 SOC CSK SCREW BS4168 A4	18	
26	H-6X-080	M8 HEX NYLOC NUT BS4929 A4	24	
27	H-6X-081	M8 FLAT WASHER FORM A BS4320 A4	48	
28	HC9-F-007	M8x30 HEX HD BOLT BS3692 A4	24	
29	F-01-052	M10 FLAT WASHER FORM A BS4320 A4	6	
30	HC9-F-016	M10x40 HEX HD BOLT BS3692 A4	6	
31	F-01-158	M12 FLAT WASHER FORM A BS4320 A4	3	
32	HC9-F-023	M12x25 HEX HD BOLT BS 3692 A4	3	
33	H-6X-141	M14 FLAT WASHER FORM A BS4320 A4	6	
34	HC9-F-024	M14x35 HEX HD BOLT BS3692 A4	3	
35	HC9-MM-02-A	TAMPER PROOF SEAL - BACK UP PAD EYE	1	(E)
36	HC9-MM-03-A	TAMPER PROOF SEAL - M30 EYE BOLT	1	(E)

REVISIONS				
ECNo.	REV.	DESCRIPTION	DATE	APPD
	A	FIRST ISSUE	23-10-07	DC
	B	ITEM 1 RAISED TO ISSUE B	05-11-07	DC
	C	ITEMS 1, 2, & 3 RAISED IN ISSUE, ITEM 17-20 HAVE PART No's ADDED, SHEET 2 ADDED	15-01-08	DC
	D	ITEMS 3, 9, 10, 13 & 16 RAISED IN ISSUE	13-03-08	DC
	E	EYEBOLT MAT'L CHANGED TO ST.STEEL TAMPER PROOF SEALS GIVEN PART No's	03-06-08	DC



DRAWN	R. FUDGE 21-10-07	MATERIAL SPECIFICATION SEE DETAILS	WEIGHT: 277 Kg	ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED	Reflex Marine Ltd
CHECKED	SP 22-10-07	FINISH	SCALE 1:25 NO. OFF 1		TITLE: CENTRAL COLUMN ASSEMBLY
APPROVED	DC 22-10-07	SURFACE TREATMENT			DRAWING No. HC9-GA-02-E SHEET 1 OF 2 A2


BACK UP PAD EYE
LIFT EYE PLUG
HANDLING EYE
CAP PLATE
SEAT RESTRAINT
ANTI ROTATION SPIDER
DAMPER x3
NYLON SPACER
CENTRAL SPRING SUPPORT TUBE
PERIFERAL SPRING SUPPORT TUBE
SEAT KEEL PLATE
CENTRAL SPRING
PERIFERAL SPRING x3
ANTI TILT ASSEMBLY x3
KEEL PLATE
FOOT ASSEMBLY x3
E-E (1 : 6)
VIEW ON UNDERSIDE OF CAP PLATE
G-G (1 : 6)
F-F (1 : 6)
VIEW ON SEAT KEEL PLATE
DRAWN R. FUDGE 21-10-07
CHECKED SP 22-10-07
APPROVED DC 22-10-07
MATERIAL SPECIFICATION SEE DETAILS
FINISH
SURFACE TREATMENT
WEIGHT: 277 Kg
SCALE 1:20
NO. OFF 1
ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED
Reflex Marine Ltd
TITLE
CENTRAL COLUMN ASSEMBLY
DRAWING No.
HC9-GA-02-E
SHEET 2 OF 3
A2

11 APPENDIX C – PARTS LIST AND MATERIAL SPECIFICATIONS

11.1.1 Definition According to Criticality

Critical components are those in which, if failure were to occur, there would be a high risk to the safety of the passengers in the FROG-9. The critical components are all connected to the Main Support Tube, which is the prime structural component in the design.

11.1.2 Fastener Specifications

Because of corrosion considerations, all fasteners on the FROG-9 are supplied in stainless steel suitable for marine use. All nuts and bolts must be Grade A4 or A2. All nuts should be fitted with NYLOC inserts where applicable.

11.1.3 Certification

Certification Supplied is identified with the following letters:

MC - Material Certificate
CC - Certificate of Conformance
LTC - Load test Certificate
NDE - Non-Destructive Examination Report

The Parts List below is for the FROG-9 Standard Model HC9-01.

Please refer to the User Pack for the parts listing for the FROG-9. The serial number of the FROG-9 in question can be identified from the data plate fixed to the unit. Please contact support@reflexmarine.com if you require any assistance with identifying the correct replacement parts for your FROG-9.

LIST TITLE	FROG 9 Rev2.0		28/10/2009					
Part Type	**Part Number**	**Qty**	**Part Description**	**Material**	**Standard**	**Critical Part**	**Certification**	**ID Number Stamped**
Main Component Parts								
	3lbs-rs-0-5	6	LBS-RS LOAD RING, WELDED RS 0,5t	St Steel 316Ti (1.4571)		N	N	N
	F-01-019	3	FOOT - (Foam shock-damper)	High density polyethylene foam, coated with tear resistant polyurethane elastomeric skin		N	N	N
	F-01-119	3	FOOT WASHER - Machined nylon foot assembly support cone	Nylon		N	N	N
	H-01-278	6	RED SEAT HARNESS	Polyester webbings with St Steel fittings.		Y	CoC	N
	H-01-296	3	GAS DAMPER LOWER MOUNTING BRACKET	316, 4 St Steel		N	N	N
	H-01-299	3	GAS DAMPER LOWER MOUNTING CLEVIS PIN DIA. 14 X35 C/W C-CLIP	316, 4 St Steel		N	N	N
	H-6X-018	3	HYDRAULIC DAMPER (-40C SPECIFICATION)					
	H-6X-040	3	YELLOW SEAT HARNESS	Polyester webbings with st. Steel fittings.		Y	CoC	N
	HC9-BY-01	3	LOWER BUOYANCY	Polyethylene Skin		N	N	N
	HC9-BY-02	3	UPPER BUOYANCY	Polyethylene Skin		N	N	N
	HC9-BY-10	3	LOCK, UPPER BOUYANCY	316 St Steel (1.4401)		N	N	N
	HC9-BY-12	3	LOCK, LOWER BOUYANCY	316 St Steel (1.4401)		N	N	N
	HC9-BY-13	6	THREADED BAR, BOUYANCY LOCK	316 St Steel (1.4401)		N	N	N
	HC9-BY-14	2	BUOYANCY - CENTRAL COLUMN	Polystyrene		N	N	N
	HC9-BY-15	1	CENTRAL COLUMN CLAMP	316 AISI St Steel		N	N	N
	HC9-CC-01	1	CENTRAL COLUMN	Duplex SAF 2205		Y	Mat. Cert.	Y
	HC9-CC-10	1	HC9 LIFTING EYE PLUG	UNS S32205		Y	Mat. Cert.	Y
	HC9-CC-14	1	BACK UP PAD EYE	Duplex SAF 2205		N	Mat. Cert.	N
	HC9-CC-15	1	HANDLING EYE - HW410/8 M30 EYEBOLT			N	N	N
	HC9-FR-01	1	CAP PLATE	316 St Steel		N	N	N
	HC9-FR-02	3	PILLAR STRUT	316 St Steel		N	N	N
	HC9-FR-02-Mirror1	3	PILLAR STRUT, OPP HAND	316 St Steel		N	N	N
	HC9-FR-03	3	CORNER PLATE	316L or 1.4404 St Steel		N	N	N
	HC9-FR-04	3	RADIAL BRACE, RH VERSION	316 St Steel		N	N	N
	HC9-FR-04	3	RADIAL BRACE, LH VERSION	316 St Steel		N	N	N

HC9-FR-05	3	PERIPHERAL BRACE	316 St Steel		N	N	N
HC9-FR-06	1	KEEL PLATE	316 St Steel		N	N	N
HC9-FR-07	6	FLOOR GRATING	Galvanised Steel	BS 4592-1:1995	N	N	N
HC9-FR-08	3	PLATE, BRACE, PILLAR STRUT	316 St Steel		N	N	N
HC9-FR-09	3	PLATE - BUOYANCY LOCKING	316 St Steel		N	N	N
HC9-FR-10	3	LANDING FOOT SUPPORT	316 St Steel		N	N	N
HC9-FR-11	3	STIFFENER, CAP PLATE	316 St Steel		N	N	N
HC9-FR-12	3	BALLAST WEIGHT, 30 Kg	Galvanised Mild Steel		N	N	N
HC9-FR-13	3	RETAINER 1, GRATING (4mm plate)	316 St Steel		N	N	N
HC9-FR-14	3	RETAINER 2, GRATING (4mm plate)	316 St Steel		N	N	N
HC9-FR-15	6	RETAINER 3, GRATING (2mm plate)	316 St Steel		N	N	N
HC9-FR-17	2	TUBE, STIFFENER	316 St Steel		N	N	N
HC9-FR-19	12	CLAMP PLATE	316 St Steel		N	N	N
HC9-FR-20	3	KICK PLATE	316 St Steel		N	N	N
HC9-FT-02	3	FOOT MOUNTING PLATE	316 St Steel (1.4401)		N	N	N
HC9-FT-04	3	SPACER, ROUND FOOT	316 St Steel		N	N	N
HC9-FT-A1	3	HC9 LANDING FOOT ASSEMBLY			N	N	N
HC9-SE-01	1	SEAT KEEL PLATE	316 St Steel		N	N	N
HC9-SE-02	3	SEAT RADIAL FRAME	316 St Steel		N	N	N
HC9-SE-06	1	BUSH, SEAT RESTRAINT	Nylatron White		N	N	N
HC9-SE-07	1	SEAT FRAME RESTRAINT	316 St Steel		N	N	N
HC9-SE-11	3	SEAT BASE	??		N	N	N
HC9-SE-12	3	SEAT BACK, MIDDLE	Trespa Meteon		N	N	N
HC9-SE-13	3	LH SEAT BACK, PERIPHERAL	Trespa Meteon		N	N	N
HC9-SE-16	3	SEAT BASE, COVER	Trespa Meteon		N	N	N
HC9-SE-17	3	CONNECTOR, SEAT FRAME	316 St Steel		N	N	N
HC9-SE-19	3	SEAT SUPPORT, MIDDLE, LOWER	316 St Steel		N	N	N
HC9-SE-23	6	CONNECTOR, SEAT BACK, MIDDLE	316 St Steel		N	N	N
HC9-SE-24	3	SPREADER PLATE	316 St Steel		N	N	N
HC9-SE-26	3	RH SEAT BACK, PERIPHERAL	Trespa Meteon		N	N	N
HC9-SE-32-A	1	TRANSPORT SKID 1	316 St Steel		N	N	N
HC9-SE-33-A	3	SEAT EDGING	PVC External Grade		N	N	N
HC9-SE-34-A	1	TRANSPORT SKID 2	316 St Steel		N	N	N
HC9-SP-01	1	CENTRAL SPRING	Spring Steel , powder coat RAL5002	BS5216-HS3	N	N	N
HC9-SP-02	1	RETAINING SLEEVE, CENTRAL SPRING	316 St Steel		N	N	N
HC9-SP-03	1	NYLON BUSH, CENTRAL SPRING	Nylatron White		N	N	N
HC9-SP-10	3	PERIPHERAL SPRING	Spring Steel, powder coat RAL5002	BS -EN 10270-2 or equivalent	N	N	N
HC9-SP-11	3	PERIPHERAL SPRING RETAINING SLEEVE	316 St Steel		N	N	N
HC9-SP-12	0	PERIPHERAL SPRING NYLON BUSH	Nylatron White		N	N	N
HC9-SP-13	3	PERIPHERAL SPRING SUPPORT TUBE	316 St Steel		N	N	N
HC9-SP-14	3	PERIPHERAL SPRING SUPPORT TUBE MOUNTING	316 St Steel		N	N	N
HC9-SP-18	1	ANTI ROTATION SPIDER	316 St Steel		N	N	N
HC9-SP-21	1	COLLAR, DAMPER MOUNT, TOP	316 St Steel		N	N	N
HC9-SP-22	3	SUPPORT TUBE, PERIPHERAL SPRING	316 St Steel		N	N	N
HC9-SP-23	3	NYLON BUSH, PERIPHERAL SPRING	Nylatron White		N	N	N
HC9-SP-24	3	SUPPORT TUBE, ANTI TILT	316 St Steel		N	N	N
HC9-SP-25	3	HOUSING, BUSH,ANTI-TILT	316 St Steel		N	N	N
HC9-SP-26	3	BUSH, ANTI-TILT	Nylatron White		N	N	N
Fixings Lists							
Bolts							
HC9-F-010	30	M8x25 SOC BUTTON HD ISO7380 A4	316 St Steel	ISO7380 A4	N	N	N
HC9-F-011	30	M8x45 SOC BUTTON HD ISO7380 A4	316 St Steel	ISO7380 A4	N	N	N
F-01-132	6	M10 BUTTON HEAD SCREW X 20 - A4 Stainless Steel Screw	316 St Steel	ISO7380 A4	N	N	N
Socket Heads (Cap)							
HC9-F-002	4	M6x20 SOC CAP SCREW BS4168 A4	316 St Steel	BS 4168 A4	N	N	N
HC9-F-006	3	M8x25 SOC CAP SREW BS4168 A4	316 St Steel	BS 4168 A4	N	N	N
HC9-F-033	2	M8x35 SOC CAP SREW BS4168 A4	316 St Steel	BS 4168 A4	N	N	N
H-6X-084	18	M8 X 80 SOCKET HEAD CAP SCREW	316 St Steel	BS 4168 A4	N	N	N
Socket Heads (csk)							
HC9-F-003	18	M6x25 SOC CSK SCREW BS4168 A4	316 St Steel	BS4168	N	N	N
HC9-F-029	18	M6x35 SOC CSK SCREW BS4168 A4	316 St Steel	BS4168	N	N	N
HC9-F-004	15	M6x55 SOC CSK SCREW BS4168 A4	316 St Steel	BS4168	N	N	N
HC9-F-012	12	M10x80 SOC CSK SCREW BS4168 A4	316 St Steel	BS4168	N	N	N
HC9-F-013	6	M10x90 SOC CSK SCREW BS4168 A4	316 St Steel	BS4168	N	N	N
Socket Heads (Unspecified)							
Hex Heads							
HC9-F-001	12	M6x20 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A4	N	N	N
HC9-F-005	12	M8x20 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A4	N	N	N
HC9-F-007	30	M8x30 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-008	12	M8x45 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-009	6	M8x75 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-014	6	M10x25 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-015	12	M10x30 HEX HD BOLT BS 3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-016	6	M10x40 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-017	36	M10x65 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-018	3	M10x70 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
F-01-061	24	M10, 75 LONG HEX BOLT (STOP COLLAR)	316 St Steel	BS3692 A5	N	N	N
HC9-F-019	30	M10x80 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-020	10	M10x100 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-021	12	M10x110 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-022	1	M10x120 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-023	3	M12x25 HEX HD BOLT BS 3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-F-024	3	M14x35 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-CC-13	1	RETAINING SLEEVE, CROSS BOLTS	316 St Steel		N	N	N
HC9-F-025	3	M20x120 HEX HD BOLT BS3692 A4	316 St Steel	BS3692 A5	N	N	N
HC9-CC-12	3	M24X120 BOLT	UNS S17400 St Steel		Y	Mat. Cert. / CoC	Y
Nuts							

	HC9-F-027	63	M6 HEX NYLOC NUT BS4929 A4	315 St Steel	BS4929 A4	N	N	N
	HC9-F-027	0	M6 HEX NYLOC DIN 985 A4		DIN 985 A4			
	HC9-SP-17	0	M6 NYLOCK NUT					
	H-6X-080	129	M8 NYLOCK NUT	315 St Steel	BS4929 A3	N	N	N
	F-01-051	158	M10 NYLOCK HEX NUT (PERIPHERAL BRACE + CAP PLATE)	316 St Steel	BS4929 A4	N	N	N
	F-01-060	3	M20 NYLOCK HEX NUT (FOOT)	316 St Steel	BS4929 A4	N	N	N
	HC9-F-026	3	M24 HEX NYLOC NUT BS4929 A4	316 St Steel	BS4929 A4	Y	N	N
	HC9-CC-16	2	M30 HEX FULL NUT, BS3692 A4	316 St Steel	BS3692 A4	Y	N	N
	HC9-CC-09	1	M72 NUT	Duplex SAF 2205		Y	Mat. Cert.	Y
Washers								
	HC9-F-028	75	M6 FLAT WASHER FORM A BS4320 A4	316 St Steel	BS4320 A4	N	N	N
	HC9-SP-16	0	M6 PLAIN WASHER			N	N	N
	H-6X-081	267	M8 PLAIN WASHER	316 St Steel	BS4320 A4	N	N	N
	F-01-052	285	M10 PLAIN WASHER (CAP PLATE + SEAT)	316 St Steel	BS4320 A4	N	N	N
	F-01-158	3	M12 WASHER			N	N	N
	H-6X-141	6	M14 PLAIN WASHER (FORM A)	316 St Steel	BS4320 A4	N	N	N
	F-01-059	3	M20 WASHER (FOOT)	316 St Steel	BS4320 A4	N	N	N
	F-01-085	3	M24 WASHER (BACK-UP EYE)	317 St Steel	BS4320 A5	N	N	N
Split Pins								
	HC9-CC-17	5	SPLIT COTTER PIN M4x45 DIN 92 A4		DIN 92 A4	N	N	N
Auxiliary Parts								
	HC9-MM-01	3	TAMPER PROOF SEAL - M24 CROSS BOLTS	St Steel		N	N	N
	HC9-MM-02	1	TAMPER PROOF SEAL - BACK UP PAD EYE	St Steel		N	N	N
	HC9-MM-03	1	TAMPER PROOF SEAL - M30 EYE BOLT	St Steel		N	N	N
	HC9-MM-04	1	TAMPER PROOF SEAL - M72 CROSS BOLTS	St Steel		N	N	N
	F-01-201	1	H/DUTY CABLE TIE	PVC		N	N	N
Slings Sets								
	HC9-SA-01	1	2 LEG SLING (30FT) c/w 2 x 4.75 T Crosby anchor shackles with PVC Sling ID Tag			Y	LTC, Mat.Cert.	Y
	F-01-124	1	HIGH VISIBILITY SLING COVER (STD 30 ft) - Mesh sling cover (Red) : Anti-condensation breathable fabric with integral velcro fitting straps.					
	F-01-128-M40	0	HIGH VISIBILITY SLING COVER (30 ft) - Suitable for Low temperatures					

12 APPENDIX D – FROG-9 MARKINGS

12.1 Essential Marking Requirements

The FROG-9 should be indelibly marked with the following information:

i. Description of Equipment.
ii. Model.
iii. Serial Number.
iv. Manufacturer's Address.
v. Year of Construction.
vi. Mass of Usual Configuration / Mass without Payload (Tare weight).
vii. Safe Working Load (SWL).
viii. Maximum Gross Mass (MGM).
ix. Maximum Number of Passengers.

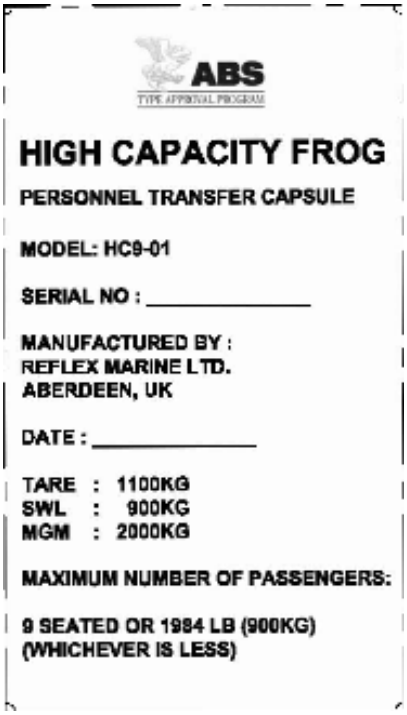


Fig 8: FROG-9 Marking Plate

Decal - Vinyl Stickers on Front Edge of Seats

Note: MDPE buoyancy requires preparation of surface for good contact adhesion. Gently heat the contact area until the surface is oxidised and appears shiny.

Refer to diagram FROG-9 Seat Marking Plan for layout:

i. Front edge of seat base: 3 off per FROG-9. "No Step".
ii. Top of centre seat backs: 3 off per FROG-9. "Ensure belts are properly tightened and adjusted before lift-off".
iii. Top of all seat backs: 9 off per FROG-9 "No Hand Hold".
iv. Top of all seat backs: Seat numbers to be placed according to loading plan in Section 5.6.

Decal - Vinyl Stickers Located on Outside of Buoyancy Units

Note: MDPE Buoyancy requires preparation of surface for good contact adhesion. Gently heat the contact area until the surface is oxidised and appears shiny.

Refer to diagram FROG-9 Column Marking Plan for layout:

i. 3 off per FROG-9 Circular FROG Logo - 250 mm dia.
ii. 3 off per FROG-9 Rectangle Reflex Marine Ltd Logo – 250 x 125 mm.
iii. 2 off per FROG-9 Rectangle Reflex Marine Ltd URL "www.reflexmarine.com" - 250 x 100 mm.
iv. 1 off per FROG-9 Rectangle Reflex Marine Ltd Tel No "+44 (0)1872 321155" - 250 x 100 mm.
v. Buoyancy columns numbered "A, B, C" Arial bold 150 mm height, black on upper buoyancy.
vi. 3 off per FROG-9 Reflective tape (1 x 220 mm on upper buoyancy).

vii. Buoyancy columns marked externally with unit number.

Decal - Vinyl Stickers Located Inside of Buoyancy Units

Note: MDPE buoyancy requires preparation of surface for good contact adhesion. Gently heat the contact area until the surface is oxidised and appears shiny.

Refer to diagram FROG-9 Column Marking Plan for layout:

i. 6 off per FROG-9: “Ensure belts are properly tightened and adjusted before lift-off” at upper outer edge of lower buoyancy unit. One at each side of lower buoyancy unit.
ii. 6 off per FROG-9: “Keep Feet Inside FROG” at upper outer edge of lower buoyancy unit. One at each side of lower buoyancy unit.

Decal - Operating Instructions - Located Inside of Buoyancy Units

Note: MDPE buoyancy requires preparation of surface for good contact adhesion. Gently heat the contact area until the surface is oxidised and appears shiny.

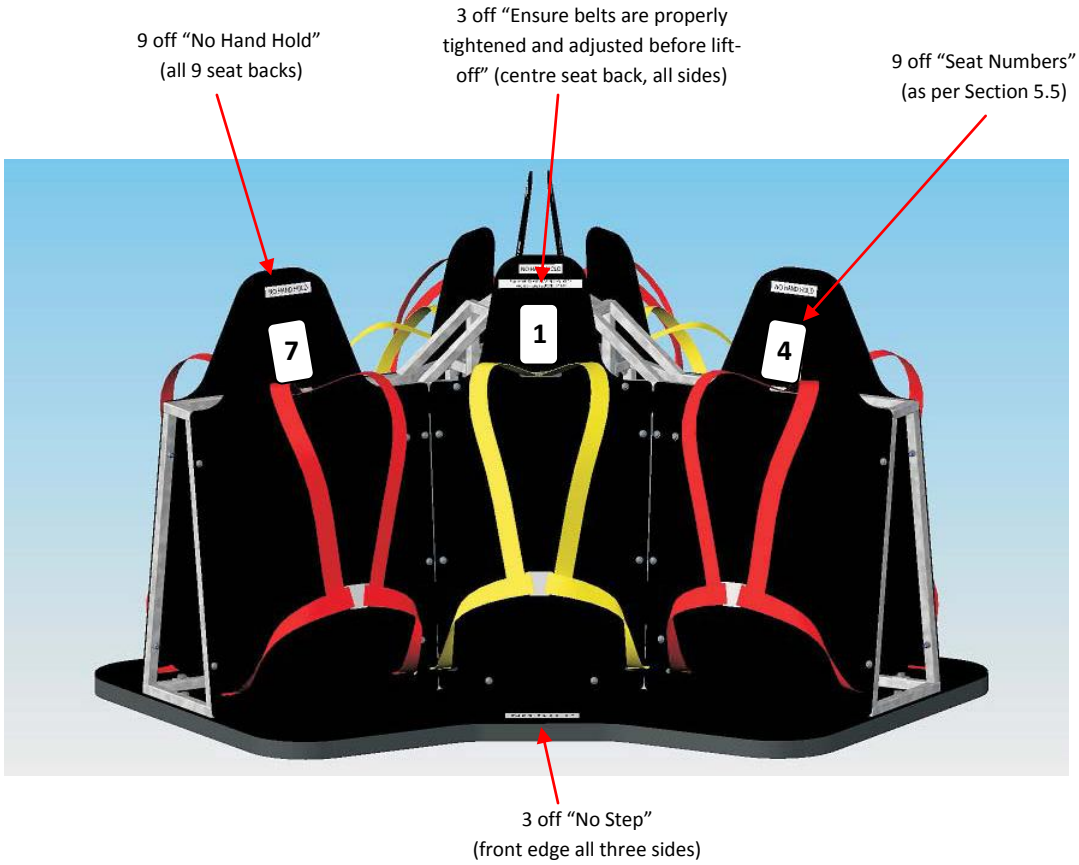
Refer to diagram FROG-9 Column Marking Plan for layout:

i. Operating Instructions.
ii. Pre-Operational Checks.
iii. Seating Arrangement.
iv. SWL Rating.

Positioned as follows:

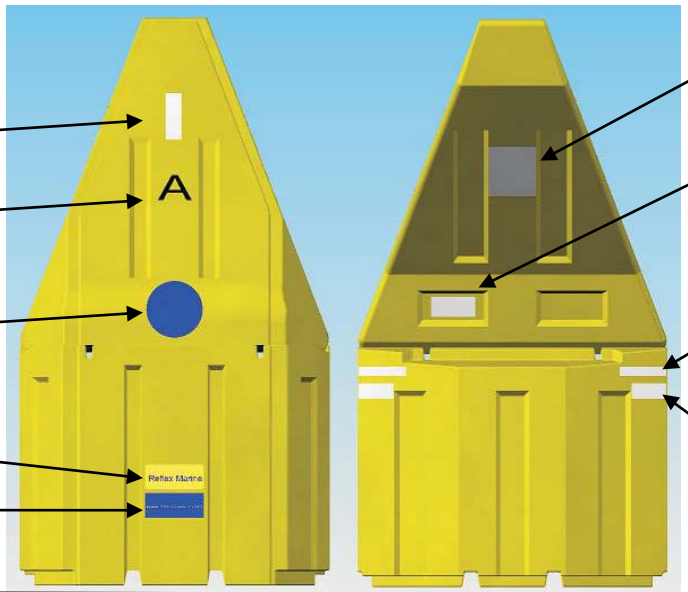
	Column A	Column B	Column C
Operating Instructions	1 x A4 Page	-	-
Pre-Operational Checks	-	1 x A4 Page	-
Seating Arrangement	-	-	1 x A4 Page
SWL Rating	1	-	1

12.2 FROG-9 Seat Marking Plan



12.3 FROG-9 Column Marking Plan

COLUMN A



Reflective Tape (all columns)

Column / Unit Identifier (all columns)

FROG Logo (all columns)

Reflex Marine (all columns)

Web Address (all columns)

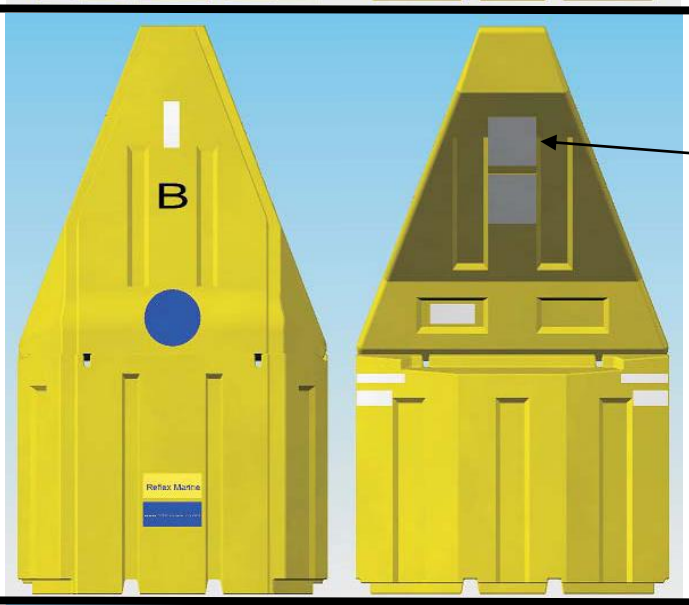
FROG-9 Operating Instructions (A4)

SWL = 900 kg Maximum Transfer Capacity 9 Persons Seated (all columns)

Ensure belts are properly tightened and adjusted before lift off (both sides all columns)

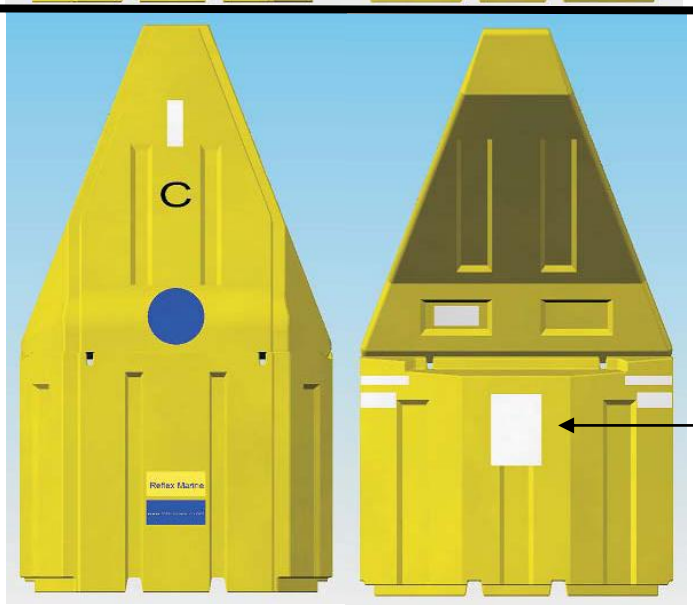
Keep feet inside FROG (both sides all columns)

COLUMN B



FROG-9 Pre-Operational Checks (1 or 2 A4)

COLUMN C



FROG-9 seating arrangement (A4)

13 APPENDIX E – ACCESSORIES

Reflex Marine Ltd provides a range of flexible accessories to optimise the use of the FROG-9.

Strobe Light

Provides greater visibility in poor weather conditions. High-intensity: light weight, waterproof to 300 m, Flash Rate 50 per min and also provides 6 mile visibility. C cell battery powered, fitted to central column of FROG-9.
Note: The strobe is not certified for use in hazardous areas.

Protective Cover

The cover protects against degradation from UV light and the weather elements as well as worksite debris. It is adjustable for either standard or emergency configuration of the FROG-9. The silver reflective cover is made of flame resistant fabric (BS3408).

Multi-Lingual Operational Briefing DVD's

The FROG-9 is supplied with Multi-Lingual Operational Briefing DVD's in English, French, Spanish, Portuguese and Italian. Russian Operational Briefing DVD's are also available. Additional copies can be ordered through www.reflexmarine.com/support.