FROGXT

USER MANUAL REV 1

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Original Instructions

reflexmarine

Introduction

This manual contains information for operating, maintaining and storing the FROG-XT series of personnel carriers: XT4, XT6, and XT10. Appropriate training and pre-operational briefings should be provided for all personnel involved in the use of this device.

Safe and proper use of the FROG-XT is the responsibility of the user, taking due consideration to the information provided in this document. The user should ensure compliance with all relevant legislation and good industry practice.

Risk awareness and planning

Crane transfers (like other forms of marine transfer) are complex operations and operators must take account of a wide range of variables. By their nature, crane transfers require the management of an interface between two separate organisations, most commonly an installation and a vessel. It is essential that all the key risk factors are assessed, and proper planning and preparation are completed. All personnel involved should be aware of their roles and should have the necessary competence to perform them.

Best practice references

Offshore Personnel Transfer by Crane, Marine Transfer Forum.
http://www.marinetransferforum.org/resources

Offshore Personnel Transfer by Crane is comprehensive guidance and information on each element of operation. It is for those researching, planning, managing or carrying out the safest possible crane transfers.

10 Golden Rules: Personnel Transfer by Crane**,** Reflex Marine,
http://www.marinetransferforum.org/resources

10 Golden Rules: Personnel Transfer by Crane provides a useful overview of the key risks and considerations in planning crane transfer operations. Also available as video presentation at https://youtu.be/JDljjCqr2Zw

Control of manual

This manual is controlled by Reflex Marine and may be revised from time to time. The latest revision may be obtained by contacting RML or by downloading the latest version from www.reflexmarine.com/support.

Note*: For the purposes of this manual RML will be deemed to mean Reflex Marine Limited*

Contents

1 Product Specifications

Table 1 Product Specifications

Model No.		XT4	XT6	XT10
Dimensions (Nominal)	Width 1	2110 mm	2110 mm	4090 mm
	Width 2	2110 mm	2110 mm	2660 mm
	Height	2180 mm	2180 mm	2180 mm
Weight	Max Gross Mass	1000 kg	1240 kg	2120 kg
	Tare Weight	500 kg	580 kg	970 kg
	Payload	500 kg	660 kg	1150 kg
Materials	Frame	316 Stainless steel, A4 stainless fixings		
	Columns/ Plates	316 Stainless/ Duplex Stainless		
	Steel Parts	All stainless except for floor grating		
	Buoyancy	PE shell with Polyurethane (PU) closed cell foam fill.		
	Seat Base/ Back	Polyolefin shell filled with polystyrene closed cell balls		
	Landing Feet	EVA Foam		
Operating Temperatures	Standard Model	-20°C to +50°C		
	Arctic Model	-40°C to +50°C		
Suspension	Springs	2 x	4 x	4 x
		Coated heavy duty coil springs		
	Dampers	2 x	2 x	4 x
		Stainless steel 400mm recoil dampers		
Seating	Seats	4 x Full height seats	6 x Full eight seats	10 x Full height seats
	Harnesses	3 Point, Quick Release Buckle		
	Grab Handles	2 per buoyancy panel		
Lifting Points SWL	Main	1000 kg	1240 kg	1060 kg
	Backup	1000 kg	1240 kg	1060 kg
	Handling	1000 kg	1240 kg	1060 kg
Wire Rope Lifting Assembly	Safe Working Load	1240 kg	1240 kg	Two-leg lifting assembly: 2170 kg
	Wire Rope	Anti-rotation, galvanised wire rope		
Number of Passengers	Standard	4	6	10
	Stretcher Mode	1 + Stretcher	1 + stretcher	2 + 2 stretcher
Luggage Capacity	Light Luggage	Accessory available on request		
	Luggage Tray	Accessory available on request		
Impact Protection	Vertical impacts	4.5 m/s		3.7 m/s
	Lateral impacts	2 m/s		
Stability	Horizontal	35°, for a load of 1-max passengers.		
	Self-Righting	Up to 180° inverted to the vertical position		
Certification	Class	Attestation of Conformity Certificate No. MAC0000002 i01	Attestation of Conformity Certificate No. MAC0000005 i01	Attestation of Conformity Certificate No. MAC0000004 i01
Quality	System	Manufactured to ISO 9001:2015		
Standards	National Technical Standards	UK, BS EN 1993: Use of Structural Steel in Building.		
	Industry European Standards	EC Machinery Directive EN 14121-1, BS EN 12100-10 Load Test – ILO152 / LOLER		

2 Operating Parameters

2.1 General

The FROG-XT range has been designed to ensure passenger safety in the most demanding conditions.

There are many factors that affect the safe conduct of marine personnel transfers. These include crew skill and experience, met-ocean conditions, landing areas, vessel station keeping capability and response to sea conditions, visibility and line of sight. A combination of many factors will determine the risk involved and careful planning is a prerequisite for safe operations (see Introduction)

2.1.1 Sea State

The FROG-XT has a suspension and damping system which prevents passengers from experiencing shock loads during landing and pick-up. The maximum recommended significant wave height is based on the maximum relative velocity between the load and the deck.

The calculated operational sea states detailed below are based on vertical impact speeds and biomechanical considerations. They reflect the ability to withstand such impacts with minimal risk of injury to the human body. However, there are many additional factors that may affect the safety of crane transfer operations. These include vessel station-keeping, crew competence, wind and visibility. The operator should always refer to general guidelines on crane transfers operations to assess overall risks.

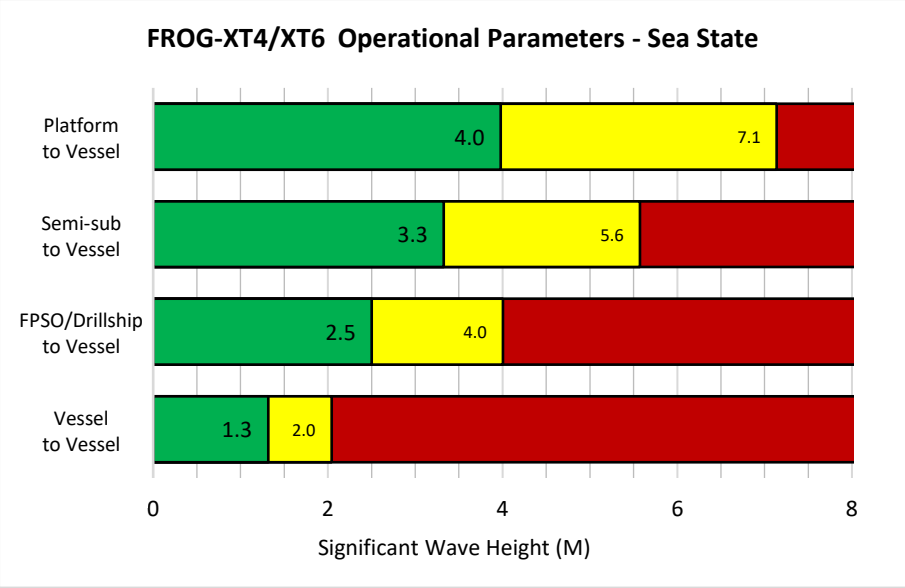
Technical note:

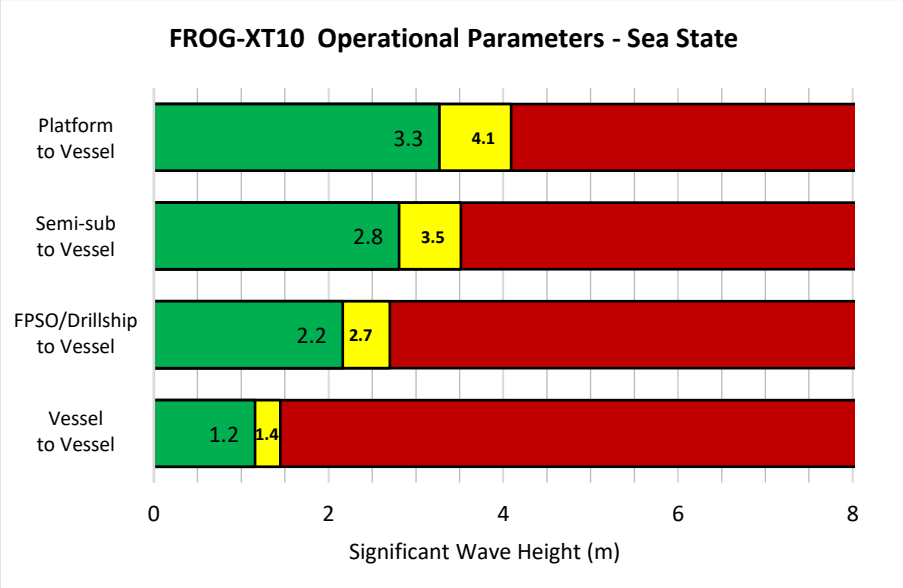
The calculation for relative velocity used here is based on the European offshore crane standard, BS EN 13852-1:2013. Whereby the maximum anticipated relative velocity between a load and a vessel deck, is given by the following;

Relative velocity = (0.5*Hook velocity)[1] + √ (Vessel deck velocity [2] + Boom tip velocity [2])

[1] Equal to 1.67 m/s (100 m/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-XT 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 risks; dry runs without passengers, landing in centre of deck where there is less vessel movement, transferring fewer passengers to increase damping, using a hook speed indicator.

Table 2 FROG-XT Operating Parameters





Note:

- **Recommended Operating Window** – For an impact at worst case scenario* under these sea conditions, XT products are well within performance range. Consideration of all risk factors and pre-job planning are still requisite.
- **Extended Operating Window** - For an impact at worst case scenario* under these sea conditions, XT product performance has been designed, tested, and validated to provide complete passenger protection. In such elevated sea states other risk factors will increase. A thorough risk assessment and trials should be conducted to ensure. Contact Reflex Marine if you need assistance.
- **High Risk Operating Window** – Operating in this window presents risk of exceeding XT product safety performance. For any operations in this window, specific measurements of relative motion are recommended to ensure they are within safety margin. A thorough risk assessment and trials should be conducted to ensure. Please contact Reflex Marine for any guidance.

**Relative velocity between load and landing deck based on European offshore crane standard, BS EN 13852-1:2013*

2.2 Recommended Operating Parameters

Table 3 Recommended Operating Parameters

Parameter	Recommendation	
	XT4 + XT6	**XT10**
Vertical Impact Protection	4.5 m/s : 14.8 ft/s	3.9 m/s : 12.10 ft/s
Lateral Impact Protection	2 m/s : 6.6 ft/s	
Wind Speed	20 m/s : 40 knots	
	Frog-XT is very stable in high winds. However, crane limits must be observed	
Visibility	Crane Operator should have a clear view of the pickup and set down areas.	
Vessel Motion	10º Pitch and Roll	
Vessel Station-Keeping Radius	5 m : 16 ft	
Landing Area: Vessel	6m x 6m : 20ft x 20ft	8m x 8m : 26ft x 26ft
	Landing area on vessel recommended equivalent to 2m clearance all round.	
Landing Area: Installation	4m x 4m : 13ft x 13ft	6m x 6m : 20ft x 20ft
	Landing area on vessel recommended equivalent to 1m clearance all round.	
Landing Area: General	Smaller landing areas may be used provided a risk assessment of factors such as deck hazards, weather, sea state, vessel size, station-keeping is carried out.	
	Must be clear of any obstructions or hazards	
Crane Requirements	Crane must be suitable for lifting personnel	

2.3 Crane Transfer Planning Tool

Reflex Marine has developed a **Crane Transfer Planning** that can be used to determine whether the conditions are suitable for transfers to take place. There are four main sections that need to be completed

i. Risk Assessment
ii. Pre-Transfer Checklist
iii. Passenger Log
iv. Post Transfer Review

The Crane Transfer Planning Tool can be found on the flash drive contained in your user pack, or alternatively, you can download a copy from our website.

- **It is important that the conditions are assessed prior to every set of transfers as conditions are never the same.**

- **It is recommended that a trial run is always conducted as this provides real-time feedback on the conditions.**

- **The operator should always refer to general guidelines on crane transfers operations to assess overall risks.**

- **If there is ever any concern about the conditions or the safety of the operations transfers should be stopped.**

Key references

i. Offshore Personnel Transfer by Crane, Marine Transfer Forum, http://www.marinetransferforum.org/resources

ii. 10 Golden Rules: Personnel Transfer by Crane, Reflex Marine, https://www.youtube.com/watch?v=JDljjCqr2Zw

3 Using the FROG-XT

3.1 Safety Features

Protected Seating Position:

Seats are positioned directly behind the buoyancy panels providing maximum protection and minimised sense of exposure. The arrangement of the seats and entry/exit points allow rapid access and egress, allowing faster and more efficient transfers.

Fall Protection:

3-point harness system and grab handles protect from the risk of falling during transfer.

Vertical impact protection:

i. Seats mounted on a suspension system which consists of coil springs and recoil dampers
ii. Semi-upright secure seat position, cushioned saddle seat
iii. Impact absorbing EVA foam feet

Lateral impact protection:

i. Stainless steel frame
ii. Buoyancy panels
iii. High backed headrest designed to reduce the risk of whiplash
iv. Grab handles and pommel shaped seat cushion for secure seating position

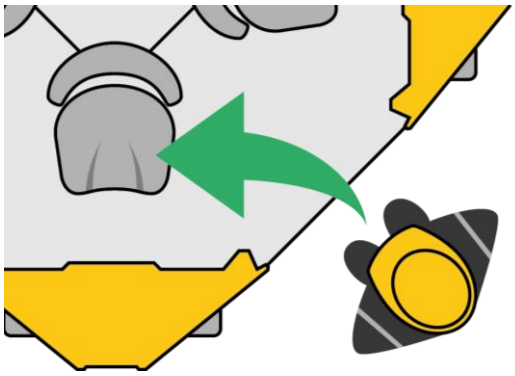
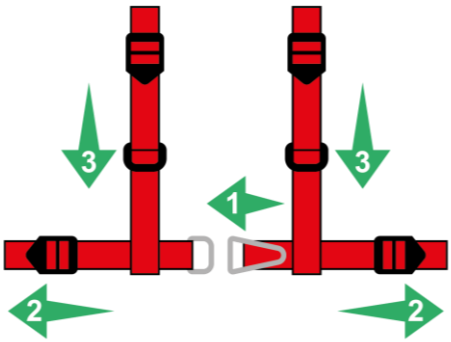
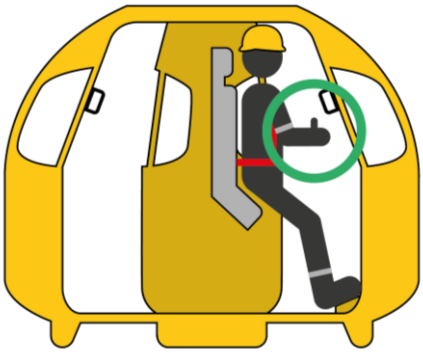
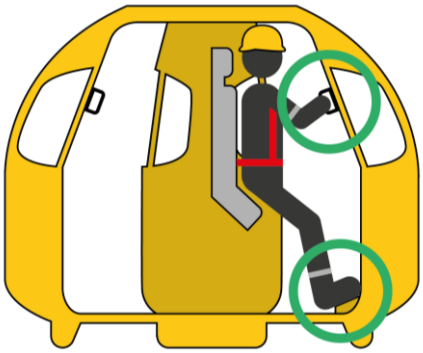
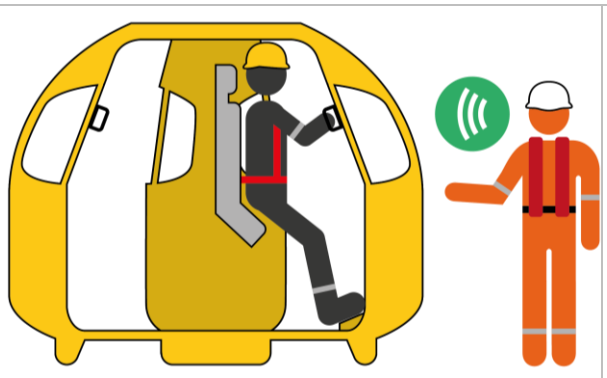
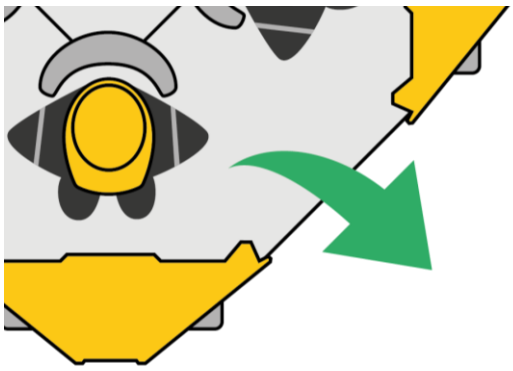
Flotation:

Buoyancy panels ensure the carrier floats with both passengers and stretcher above the waterline. All XT transfer capsules are performance tested for the most extreme immersion scenarios and self-right. All Frog-XT capsules self-right up to 180° inverted to the vertical position in less than 10 seconds and will provide a stable floating platform in a wide range of conditions. Frog-XT carriers are also tested for their responses to free-fall into water.

3.2 Passenger Instructions

All passengers should be familiar with seating procedure and practice entry prior to operations.

To make passenger entry more efficient, where possible, deck crew or passengers should loosen all harnesses prior to entering the carrier.

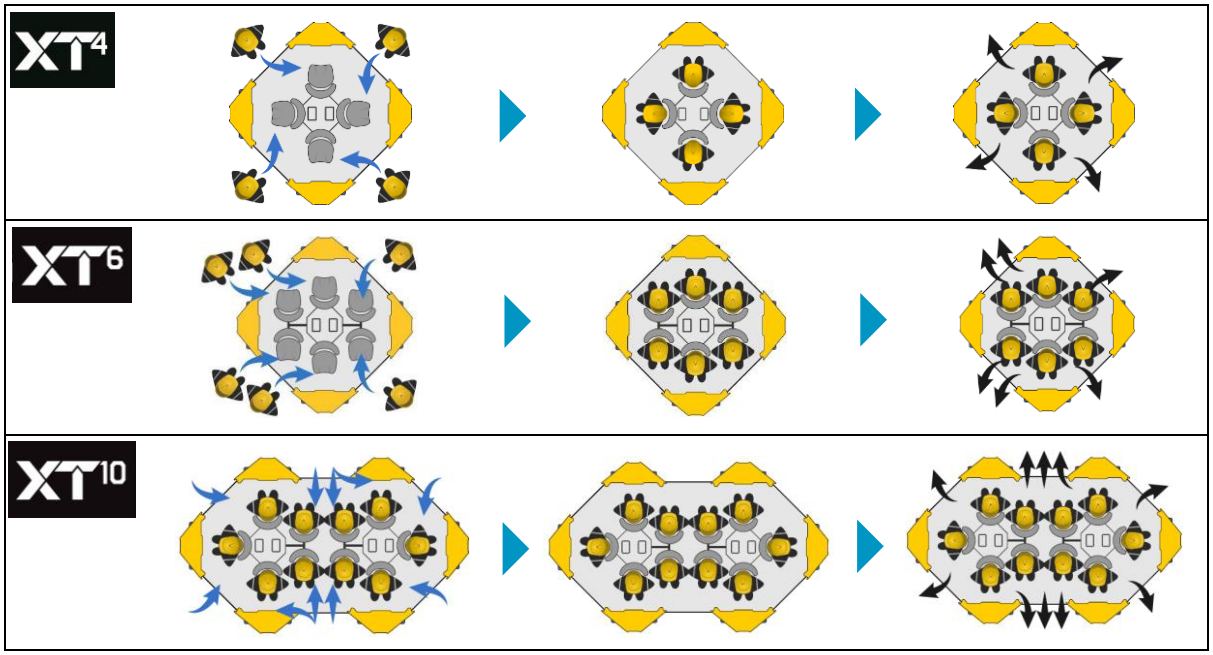
ENTRY	
	
1 Take your allocated seat	2 Fasten buckle. Tightening lower straps, then upper straps
	
3 Give thumbs up when ready	4 Use handholds and keep feet inside
Exit	
	
5 Wait for instructions	6 Exit and move to a safe area

3.3 Entry and Exit

Passenger entry to and exit from should only be conducted with the carrier in a stable position on deck as advised by the crane operator and vessel master to the deck crew member in charge of the transfer operation.

All exiting passengers must be clear of the carrier before any new passengers attempt to board.

Each individual seat has a dedicated entry/exit point to prevent confusion and ensure efficient operation. All passengers must enter and exit in the same direction. Chevrons on the buoyancy panels are present to indicate the direction of entry.



Entry

When advised to do so by the deck crew, passengers should proceed as directed to one of the four entrances. When instructed, all passengers should step into the carrier and take the seat to their left.

Passengers should ensure they are securely seated and ensure the seat harness is securely fastened. Grab handles are provided on the tubular upright members either side of the buoyancy panel and passengers should grip these firmly or the harness straps whenever seated. Passengers should never place their hands near the load plate.

Exit

Following landing and when advised to do so by the deck crew, passengers should unfasten the safety harness, stand and exit the carrier by the exit to their left.

Passengers should move clear of the carrier as directed by the deck crew, ensuring they remain clear of the lifting assembly.

Passengers should remain alert to hazard posed by the lifting assembly (particularly in harsh weather with high deck motions). The lifting assembly position should be managed by the deck crew as required (see Deck Crew Instructions).

3.4 Deck Crew Instructions

Briefings

Deliver passenger briefings prior to every transfer lift and contain the following information:

i. Location specific instructions;
ii. Potential hazards;
iii. Loading and unloading procedures;
iv. Seating position;
v. Emergency procedures.

Other Responsibilities

i. Highlight potential hazards to passengers e.g. trip hazards during entry/exit;

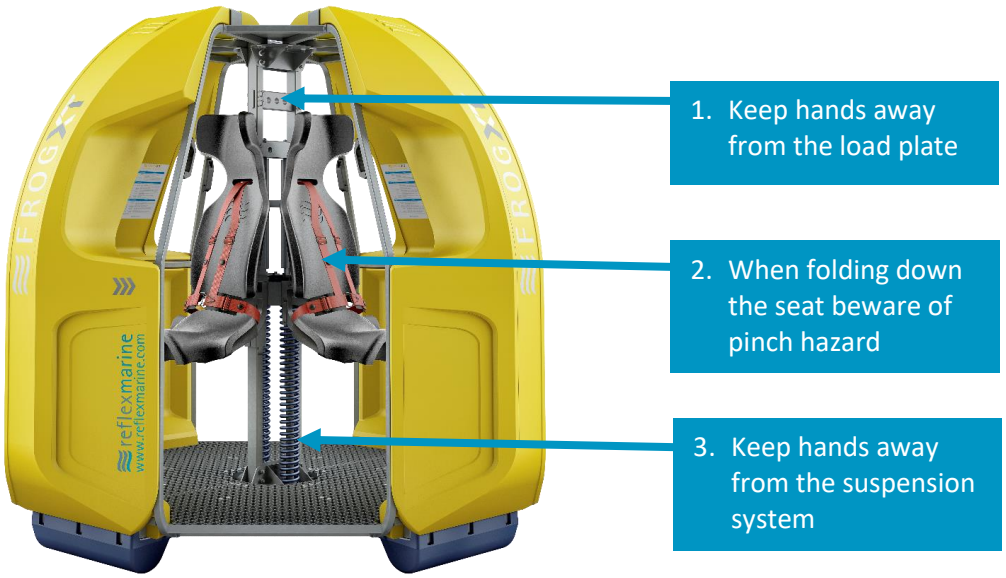
ii. Remain alert from any hazards as they arise and take appropriate action;

iii. Check that passengers' harnesses are secure and correctly fitted;

iv. When the carrier is landed on deck, the wire rope lifting assembly may obstruct passenger entry/exit points. Ensure passengers observe and remain clear of the wire rope lifting assembly. It is recommended that Deck crew hold the lifting assembly in a safe position, away from the carrier entrances.

v. Ensure passengers keep hands clear of any pinch points, as illustrated below.

Figure 1 Pinch Points

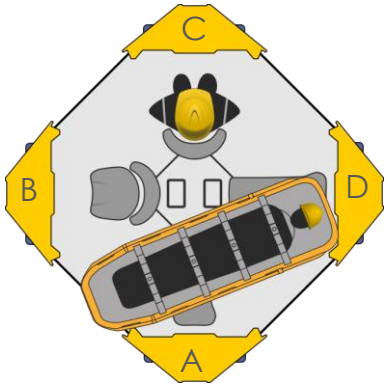
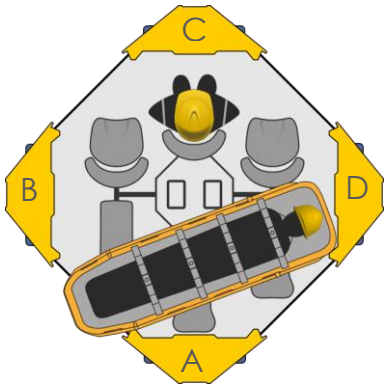
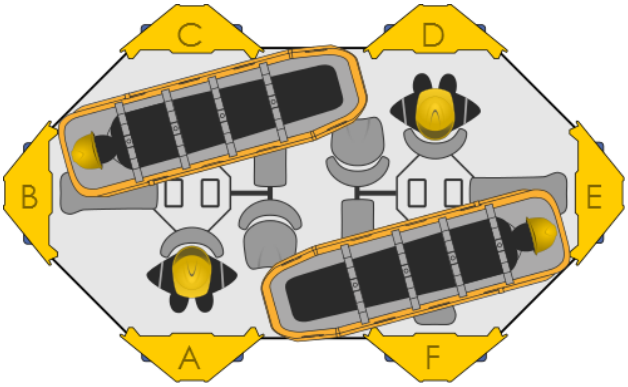


3.5 Stretcher Mode

All models in the FROG-XT range can be converted into medevac mode to accommodate a stretcher. Specific seats require to be folded down, upon which the stretcher rests.

The stretcher clamp has been designed to fit the **Ferno Model 71 Basket stretcher**. Other stretcher models may be compatible but not all stretcher types will fit. The specific stretcher in use should be test fitted prior to being used.

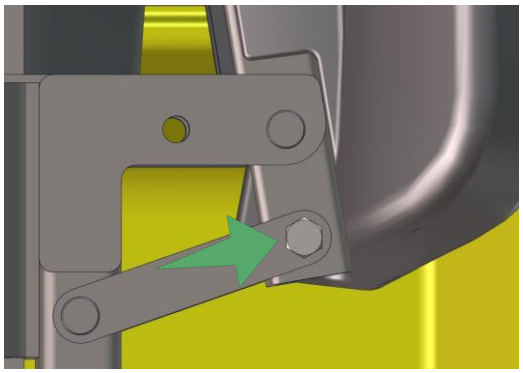
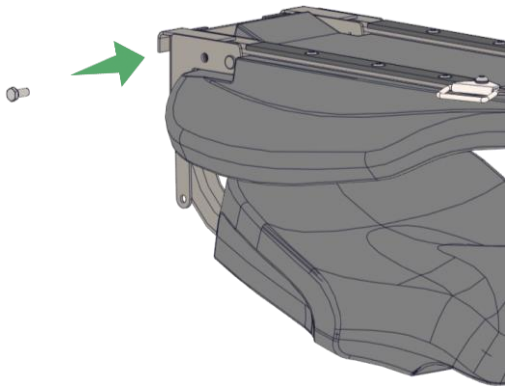
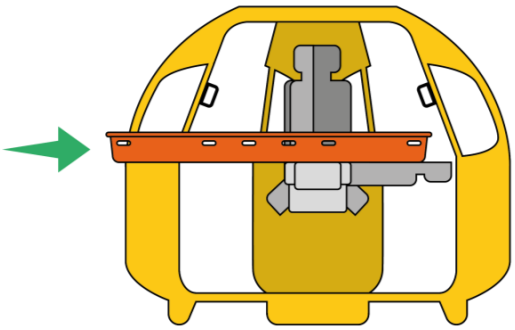
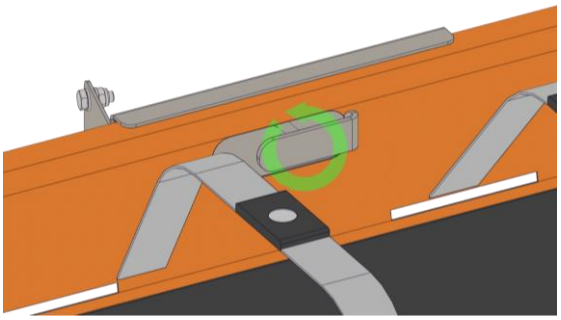
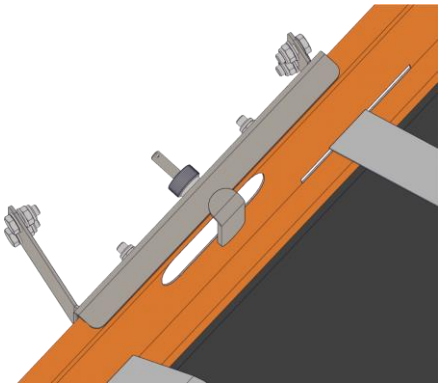
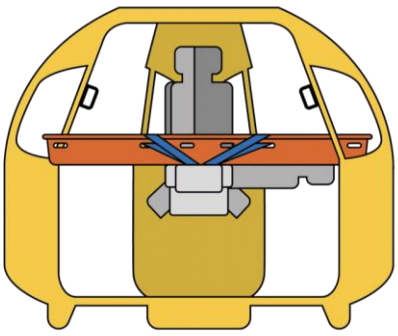
Figure 2 Stretcher Positioning

FROG-XT4 Two seats behind buoyancy panels A and D.	
FROG-XT6 Three seats behind buoyancy panel A.	
FROG-XT10 For one stretcher, fold down the three seat backs behind buoyancy panels B and C. For two stretchers, fold down the three seat backs behind buoyancy panels B and C and the three seat backs behind buoyancy panels E and F.	

3.6 Stretcher Installation

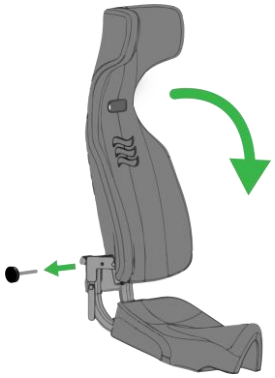
There are two types of stretcher clamps fitted to Frog-XT range products.

The following steps outline the procedure to convert the FROG-XT into stretcher mode

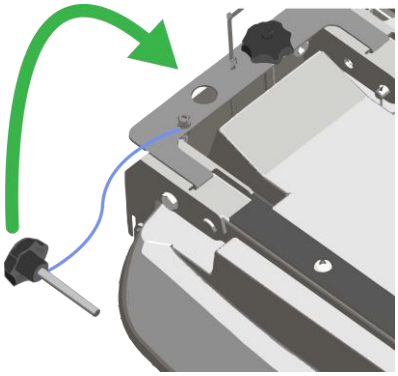
TYPE 1 Stretcher Clamp	
	
1 Remove hex screws on either side of the seat as indicated, and fold down seat;	**2** Refit hex screws into the position shown;
	
3 Slide in the stretcher, rest on the folded seatback;	**4** Rotate clamp anti-clockwise 90 degrees
	
5 Tighten thumbscrew	**6** Attach straps to anchor points

Type 2 Stretcher Clamp

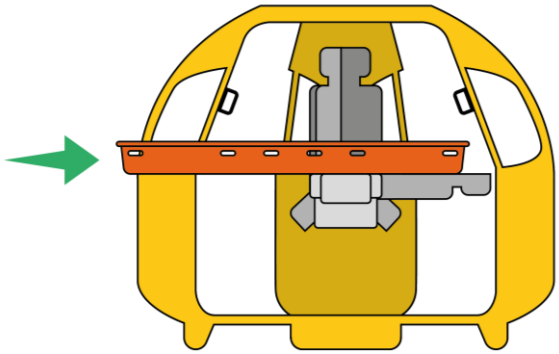
For units XT4-126 onwards.



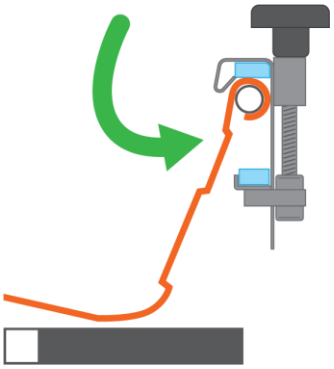
1 Remove thumbscrews on either side of the seat and fold down seats;



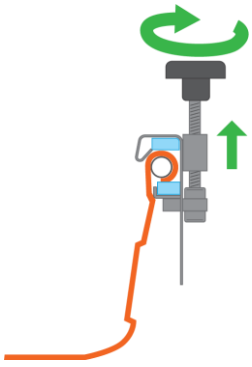
2 Place both thumb screws into place holder;



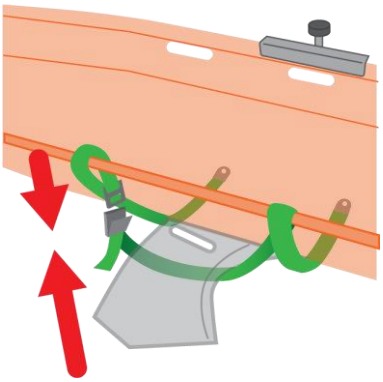
3 Slide in the stretcher, rest on the folded seatback;



4 Insert stretcher handrail into clamp;



5 Tighten thumbscrew;



6 Attach straps to anchor points.

3.7 Carrying Luggage

Floor mounted luggage baskets are available as an accessory, however, where practical, passenger luggage should be transferred separately in a cargo box or basket. This will minimise distraction and the risks from carrying out additional procedures whilst transferring personnel.

The following recommendations should be considered when transferring luggage:

i. The weight of the passengers plus the luggage should not exceed the SWL.
ii. All luggage items should be handled by deck-crew, not passengers, to ensure efficiency and ensure passenger awareness is focussed on personal safety.
iii. Luggage items should be secured prior to passenger boarding and removed after passenger exit.
iv. For luggage secured in floor-mounted basket it is recommended no more than 15 kg per person is loaded. Luggage should fit comfortably in the basket and remain secure. Height of luggage placed underneath seat should be restricted to 20 cm (8”) so that it will not impede the damping system. See Figure 4.

Figure 4 Floor-Mounted Luggage Basket - Height Clearance

v. Heavy or large materials such as tools, boxes, or equipment should be transferred separately in suitable cargo box or basket.

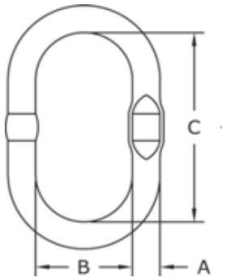
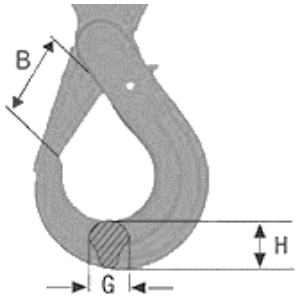
3.8 Lifting Assembly Connection – Rigging compatibility with Crane Hook

It is important to ensure that the crane hook being used is compatible with the master links provided in the XT Range Lifting Assembly.

The guide below is designed to help understand the sizes of crane hooks that are compatible.

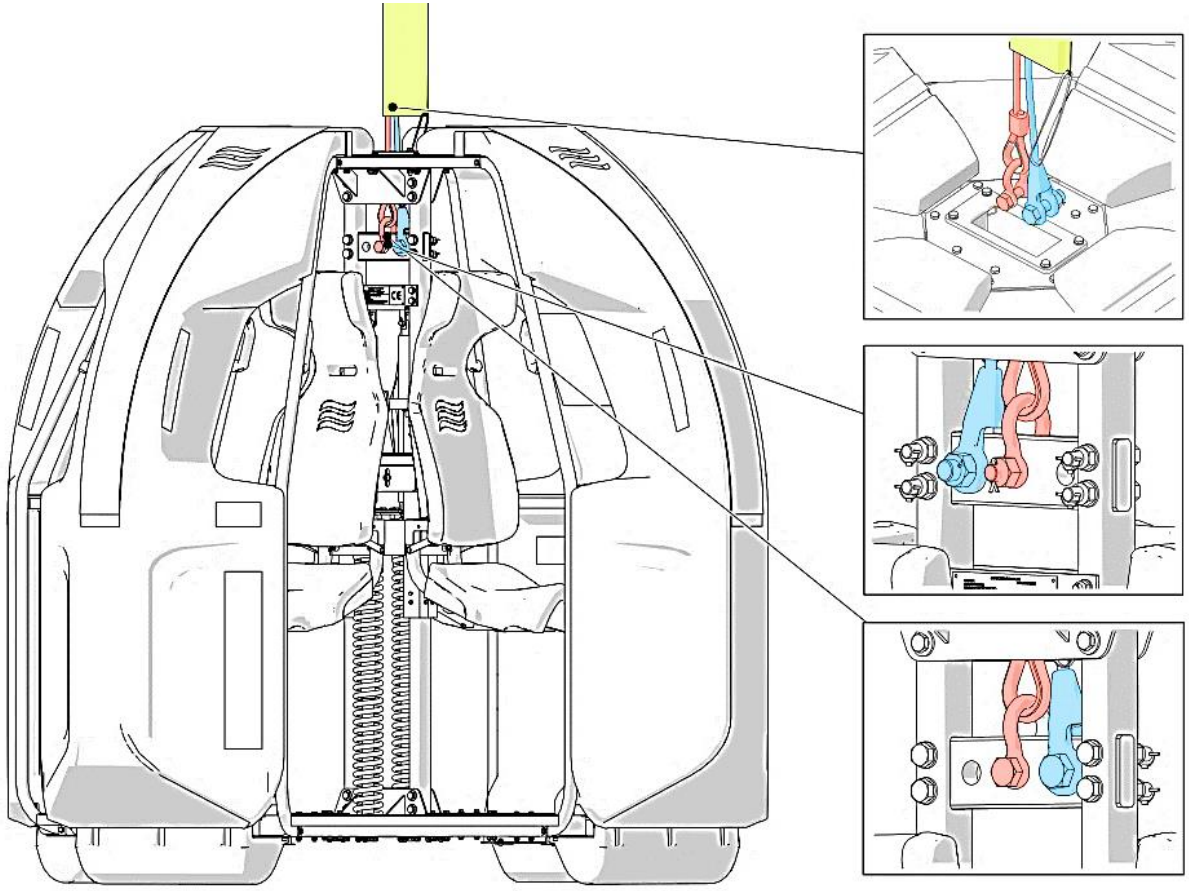
If master links provided in standard lifting assembly are not compatible, please contact Reflex Marine to arrange a solution.

Table: XT Range Lifting Assembly Standard Master Link / Crane Hook Compatibility

		Gunnebo Safety Hook WLL / Dim Spec **(mm) B** x **G** x **H**			**GN Rope HK2S Eye Hook Standard** WLL / Dims(mm): **B** x **G** x **H**					
Unit Type	**Masterlink** **Manufacturer Part No. (Part Code) WLL** Dims (mm): **A** x **B** x **C**	**1.5t** 29x15x21	**to**	**27.3 t** 100x54x68	**50t** 103x89x116	**to**	**100t** 151x125x172	**150** 173x160x199	**to**	**250t** 264x220x310
XT4, XT6	**CROSBY A347** (1257979) 5.8t **22**x**145**x**275**	✔			✔			**X**		
XT10	**CROSBY A344** (1257215) 6.3t **22**x**145**x**275**	✔			✔			**X**		
										

3.9 Lifting Assembly Connection – XT4 and XT6

Figure 5 Lifting Assembly – XT4 and XT6



Lifting assembly is fitted to the FROG-XT by initially lowering it through the letter box opening at the top of the carrier.

The lifting assembly is fitted with two different terminations.

The **main leg** (highlighted in red) is fitted with a bow shackle.

The **back-up leg** (highlighted in blue) is fitted with a spelter socket.

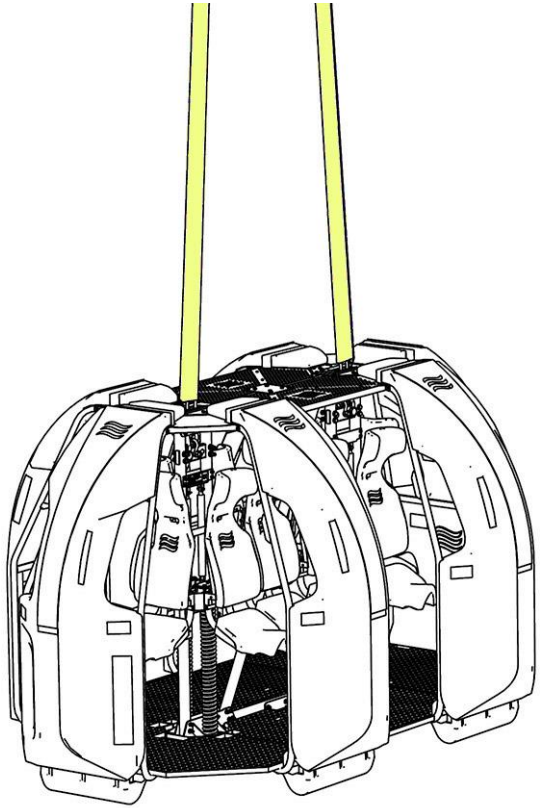
The **main leg** connects to the centre hole in the load plate.

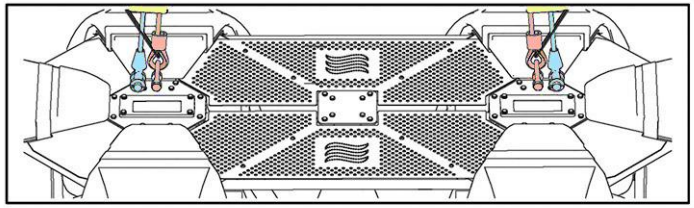
The **backup leg** connects to either the far right or far left hole.

A handling line can then be fitted to the other free hole in the load plate

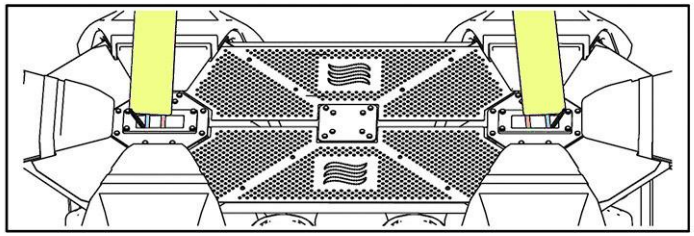
3.10 Lifting Assembly Connection – XT10

Figure 6 Lifting Assembly – XT10

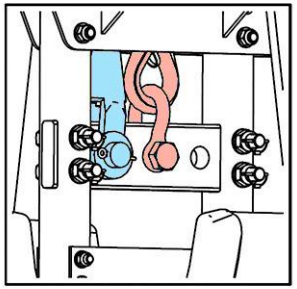


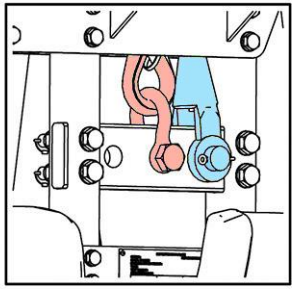


Lifting assembly is fitted to FROG-XT10 by initially lowering it through the letter box openings at the top of the carrier.



As there are two pairs of legs, one pair needs to go into each of the letterbox openings at the top of the unit.





The **main leg** (highlighted in red) fitted with a bow shackle connects to the centre hole on each load plate.

The **backup leg** (Highlighted in blue) fitted with a spelter socket connects to the outside hole.

The remaining two holes towards centre of unit are used for handling.

3.11 Control of Lifting Assembly during Operations

The FROG-XT is designed to stay firmly on the deck of the vessel whilst passengers are entering or leaving the capsule. To do so, the Crane Operator must maintain slack in the lifting assembly upon landing to allow for the vessel movement.

A designated deck crew member should be responsible for managing the position of the lifting assembly to ensure it remains clear of potential snagging points and that it does not endanger passengers entering or exiting the capsule. When lifting the capsule deck crew should ensure the lifting assembly remains safely routed. Only the designated deck crew, wearing appropriate PPE (i.e. gloves) should manage the position of the lifting assembly. Using a shorter lifting assembly also increases risks associated with the hook block being in close proximity to the capsule.

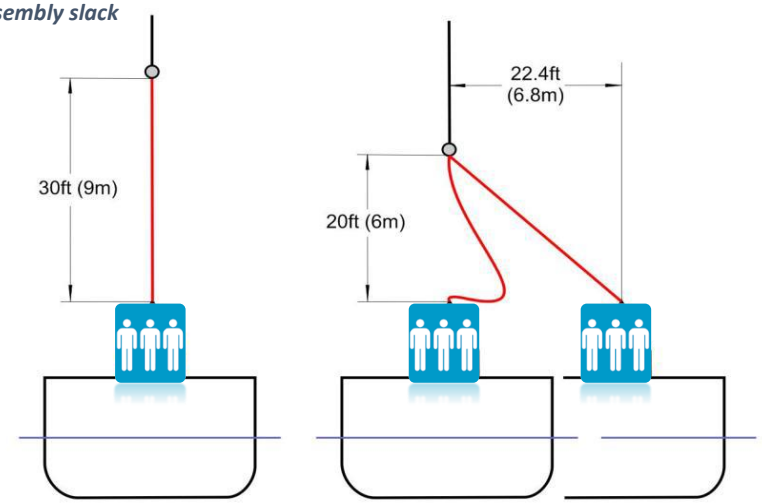
The recommended limits below are based on the use of the standard FROG-XT lifting assembly length of 30 ft (9 m).

For the use of shorter lifting assemblies, an additional risk assessment combined with dry runs should be performed to establish safe operational routines and weather conditions.

Table 4 Sling lengths

Sling Length	Recommended Slack	Lift Point to Hook Height	Allowable Drift Offlead
30 ft	10 ft	20 ft	22.4 ft
20 ft	10 ft	10 ft	17.3 ft
10 ft	8 ft	2 ft	9.8 ft

Figure 7 Lifting assembly slack

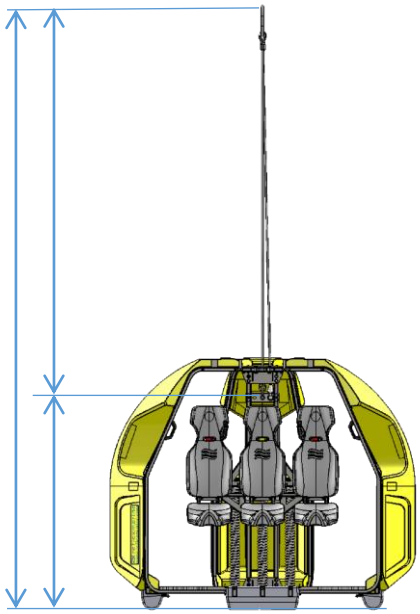


3.12 Lifting Assembly – Height Clearance

When selecting Lifting Assembly length, **please thoroughly evaluate the height clearances of obstacles during the lift to be conducted:** taking into account the maximum hook height; wire travel (such as limit switches); and the effect the sling length will have on the lift.

The clearance heights – deck to hook are shown in the table below.

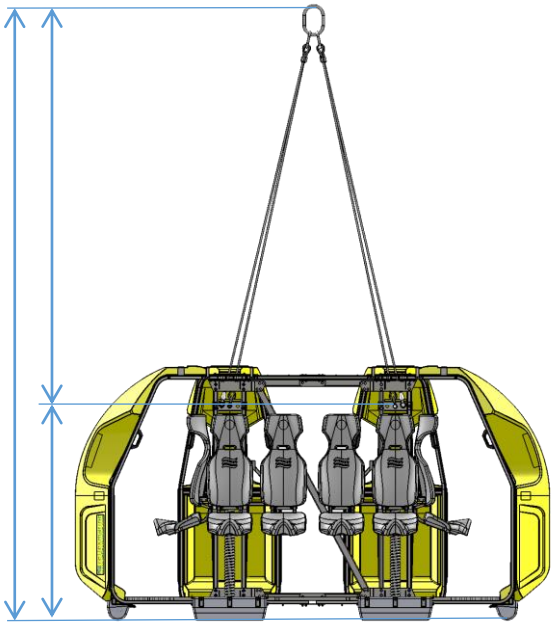
Figure 8 Lifting assembly clearance heights



XT4 / XT6	Sling Length**		
	30 ft	20ft	10ft
Maximum Overall Height	**11.84m 38′ 10″**	**8.76m 28′ 9″**	**5.59m 18′ 4″**
Maximum Sling Length	9.82m 32′ 3″	6.74m 22′ 1″	3.72m 12′ 2″
Lifting Points Height*	1.88m 6′ 2″	1.88m 6′ 2″	1.88m 6′ 2″

* XT4 / XT6/ XT10 Height is 2.18*m*.
Lifting points are 0.3*m* below.

** NOTE: Values are based on maximum manufacturing tolerances of lifting assembly which can vary +/- 10%.



XT10	Sling Length**		
	30 ft	20ft	10ft
Maximum Overall Height	**11.90m 39′ 5″**	**8.81m 28′ 11″**	**5.76m 18′ 11″**
Maximum Sling Length	9.94m 32′ 7″	6.86m 22′ 6″	3.83m 12′ 7″
Lifting Points Height*	1.88m 6′ 2″	1.88m 6′ 2″	1.88m 6′ 2″

* XT4 / XT6/ XT10 Height is 2.18*m*.
Lifting points are 0.30*m* below.

** NOTE: Values are based on maximum manufacturing tolerances of lifting assembly which can vary +/- 10%.

4 Inspection & Maintenance

4.1 Definitions

Critical Parts
Key structural (loadbearing) components which keep the Frog-XT suspended.

Competent Person
A person with appropriate practical and theoretical knowledge and experience of the equipment. This shall enable them to detect defects and weaknesses and to assess their importance in relation to the safety and continued use of the equipment. A competent person must sufficiently independent and impartial to allow objective decisions to be made.

Usage Category
The usage category dictates the frequency of inspection and maintenance. The number (or estimated number) of transfer lifts per year for a specific XT unit defines its usage category.

4.2 Sourcing of Safety-Critical Parts

Control of Safety-Critical Rigging – Reflex Marine´s lifting assembly is an integral part of the Frog-XT certification to Machinery Directive 2006/42/EC. It comprises a carefully selected and combined quality-controlled components for use with the anti-rotation wire rope. A full technical file documents the evaluation and testing programmes used to verify all key components – this exceeds the requirements of BS EN 13414-1. This provides our customers with the confidence they demand for the safety-critical activity of lifting people. **Replicated parts do not meet the same high safety standards. To avoid the risk of compromising the devices safety or certification use only Reflex Marine OEM sourced components.**

4.3 Supporting Documentation

Identification drawings
Every FROG-XT is provided with an Identification drawing pack that contains all relevant drawings to aid in its maintenance, including;

- Assembly drawings
- Replacement parts kit drawings
- Torque settings
- Operational stickers
- Bill of materials

Certification pack
Every FROG-XT comes with a certification package, which includes, but not limited to, manufacturer's declaration of conformity, certificates for all critical parts, load test certificates, release note, and checklist. RML retains copies of the certification for all units and components involved in their manufacture. Copies are available on request.

Inspection and Maintenance Manual
Provides detailed instructions for inspection and maintenance activities unique to Frog-XT range products.

4.4 Care in use / Preventative maintenance

All components in the FROG-XT are designed for purpose and selected to be as durable as possible for their specific function. However, operational and storage environments can propagate deterioration if the equipment is not kept in good condition. Factors causing deterioration can include:

- UV
- Sea Spray
- Dirt/ Grease and chemical
- Humidity/
- Radiated heat
- Wind
- Handling and operational damage.
- Seawater with high chlorine content
- High/ Excessive vibration
- Mould growth

Components that may specifically be affected by one or a combination of these factors are:

Wire rope lifting assembly. The wire rope lifting assembly is the most safety-critical and vulnerable component in the whole FROG assembly. It is vulnerable to damage from handling and operations and susceptible to corrosion from sea spray and moisture build-up. The lifting assembly should be inspected by a competent person prior to every use. To prevent damage or corrosion the following is advised:

- When not in use the lifting assembly is coiled and stored on the floor grating of the FROG;
- When not in use for long periods the lifting assembly should be removed from the FROG, the cover removed, and stored in a secure, dry place;
- If the FROG is kept on an open vessel deck and subject to sea spray, where possible, keep equipment covered or keep in a deck area sheltered from sea spray. Note: for high-speed craft wind effects may cause covers to fray.

Seat damping springs. Sea spray, particularly on equipment that is kept on vessel open deck, can propagate corrosion and cracking in the springs, therefore, the following is advised in such situations:

- Where possible equipment is covered or kept in a deck area sheltered from sea spray. Note: for high-speed craft wind effects may cause covers to fray;
- Springs are washed down with fresh water at regular intervals, i.e. after each voyage;
- Springs are inspected regularly. Specific inspection recommendations for springs can be found in the inspection checklist.
- Protection grease may be used to coat springs to reduce the onset of corrosion.

Seat harnesses. A combination of the factors listed above can cause deterioration of the seat harnesses. These should be cleaned regularly with fresh water and mild detergent. When stored the harnesses should be fastened so that they do not flap in the wind. For longer durations of storage, it is recommended that the equipment is covered, or the harnesses are secured with cable ties. Signs of damage will be fraying and brittle webbing weave.

Landing feet. Heat radiated from the deck can cause accelerated compression in the shock mitigation foam landing feet. For periods where the FROG-XT is stored for long durations, it is recommended that the unit is chocked (raised) from the deck, removing loading from the feet.

Transport and vibration. For longer periods of storage in environments with vibration, and when equipment is transported, the threaded fixings on the unit should be inspected to ensure no slackening has occurred.

General. The Frog-XT should be washed with fresh water regularly to prevent the build-up of salt, dirt, and any contaminants.

4.5 Inspection Types

Table 5 Inspection Types

Inspection Type	Description
Pre-Operational Check	A visual check of key areas of assembly prior to each use. Inspection is conducted without dismantling the assembly.
Visual Inspection	A thorough examination of the assembly with emphasis on critical components. Inspection conducted without dismantling the assembly.
Examination	A thorough examination of the assembly which may include removal of parts to assist visual assessments and may be supplemented by other means such as measurement and non-destructive testing.
Post Load Test Inspection	A thorough examination of the assembly following a proof load test with emphasis on components that have been subject to stress during the test. Inspection is conducted without dismantling the assembly.

All inspections should be:

i. Performed by a Competent Person;
ii. Conducted at the frequency defined in section 4.6 Inspection & Maintenance Schedules.
iii. Formally recorded in a Report of Thorough Examination, section 4.11.

4.6 Frequency

Reflex Marine's Inspection & Maintenance Schedules (Examination Scheme) provides a recommended frequency for inspection, maintenance, and testing. The schedule follows a risk-based approach, where inspection and maintenance frequency will increase with the usage of the equipment.

Personnel transfer carriers are safety-critical pieces of lifting equipment, therefore Reflex Marine guidance is conservative and has stringent requirements to ensure that the equipment is always in a suitable condition for safe use.

Additional to the inspection and maintenance schedule for in-service units, a thorough examination should be conducted:

i. before lifting equipment is put into service for the first time.
ii. if there is any concern over heavy impacts, overloads, or if lifting equipment is exposed to conditions causing deterioration liable to jeopardise the safety of the equipment.
iii. if the equipment, in whole or in part, has been disassembled and reassembled.

Details of all repairs or modifications carried out should be recorded and copies of damage and repair/modifications reports should be sent to the party controlling the use of the equipment

If damage to the frame has occurred, welds, mechanical fasteners, and structural sections should be examined for cracks using the dye penetrant method.

Contact REFLEX MARINE or one of our Approved Service Centres for technical advice on inspection, testing or maintenance.

4.7 FROG-XT Inspection and Maintenance Schedules

From issuing of this manual, all critical parts supplied by Reflex Marine will be provided with load test certification. This means load test is not required on replacement of critical parts. Load test should be completed at a minimum of every 5 years. For any stock parts bought prior to issuing of this manual without load test certification, the load test and post-test inspection should be conducted after critical parts replacement.

Table 6. FROG-XT recommended inspection and maintenance schedules (Examination scheme)

Usage Category No of Transfer Lifts per year	**Pre-Use Check**	**Visual Inspection**	**Examination**	**Lifting Assembly Replacement**	**Critical Parts Replacement**	**Suspension System Replacement**	**Load Test and Post Load Test Inspection**	**Unit Replacement**
Low <100	Prior To Every Use	6 months	12 months	12 months	36 months	4 Years	5 Years	12 years
Medium 100 - 500	Prior To Every Use	6 months	12 months	12 months	24 months	3 Years	5 Years	8 years
High 500 - 2000	Prior To Every Use	3 months	12 months	6 months	12 months	2 Years	5 Years	6 years
Very High 2000 – **5000** [1]	Prior To Every Use	3 months	6 months	3 months	6 months	1 year	5 Years	4 years
Notes:	[1] When exceeding 5000 lifts per year please contact Reflex Marine for further inspection guidance. These schedules should be maintained over the service-life of the equipment. However, given operational and logistical constraints of scheduling inspection, Reflex Marine acknowledge it may be acceptable to advance or delay an individual inspection by +/- four weeks - subject to agreement by a competent person.							

4.8 Load Test Procedure

Table 7 Load Test Requirements

Question	Response
When should a Proof Load Test be conducted?	▪ At least every 5 years. ▪ After replacement of critical parts that are not provided with load test certificate. ▪ After any suspected damage arising from overloading or impact. ▪ If the history of the unit is uncertain. ▪ If the inspection data plate is missing, illegible or out of date.
Who should conduct this test?	A Competent Person (See 4.1 Definitions)
Does the test require a formal record?	Yes.
What equipment is required to perform this test?	▪ Loading weights or sandbags. ▪ Certified weighing scale or load cell. ▪ Lifting equipment certified for > 5 Tonnes SWL.

Table 8 Load Test Instructions

Item	Instruction		
Components Under Test	▪ Main Lift Point / Backup Lift Point / Handling Point ▪ Central Column Load Bearing Assembly. ▪ Seats and Floor Structure.		
Test Method	Lift the unit and hold static for 3 minutes.		
Order	1st - Main Lift Point; 2nd - Backup Lift Point; 3rd - Handling Point.		
Basis of Load Test	Twice Maximum Gross Weight		
Basis of Proof Load Applied	Twice Maximum Gross Weight, minus Tare Weight*		
Unit Type	**XT4**	**XT6**	**XT10**
Max. Gross Mass	1000 kg	1240 kg	2120 kg
Tare Weight*	500 kg	580 kg	970 kg
SWL (Payload)	500 kg	660 kg	1150 kg
Crane Hook Load	2000 kg *4,410 lb*	2480 kg *5290 lb*	4240 kg *9350 lb*
Proof Load (Applied)	**1500 kg** *3310 lb*	**1900 kg** *4100 lb*	**3270 kg** *7210 lb*
Test Proof Load Distribution	At the discretion of Competent Person: the proof load may be applied to FROG-XT either solely on the floor **or**, split between the floor and seats. For the latter the recommended distribution is; ▪ SWL(Payload) spread equally on seats. Harnesses should be protected prior to loading with weight. If solid test weights are used the seats may be folded down to create a flat platform. Wooden boards placed on folded seatbacks will increase the area for test weights. The test load should be concentrated towards the centre of the unit to prevent damage to the seats. ▪ Remaining mass placed on the floor and distributed evenly.		
Seat Distribution	500 kg	660 kg	1150 kg
Floor Distribution	1000 kg	1240 kg	2120 kg

* *Note: The tare weight of FROG-XT may vary slightly. Each FROG-XT should be weighed prior to the load test.*

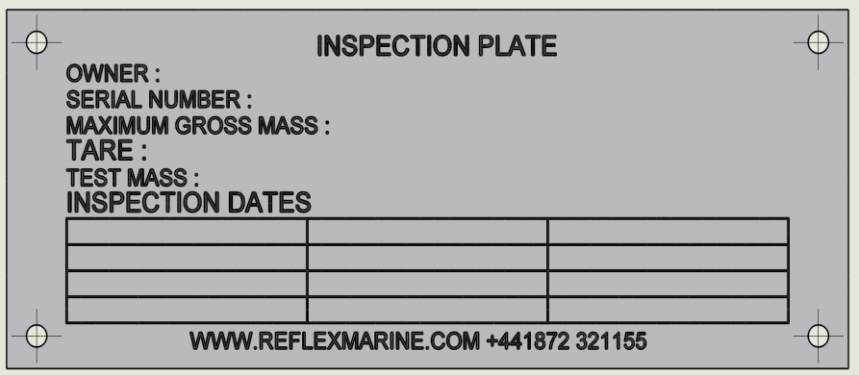
4.9 Data Plates

An Inspection data plate and Marker Plate will be issued and attached to the Frog-XT located on the damper mounting plate below the lifting points. Each plate will show the following information:

Inspection Data Plate

i. Equipment Owner;
ii. Serial number: XT4-###:
where ### is a unique unit I.D. No;
iii. Maximum Gross Mass (kg);
iv. Tare Weight (kg);
v. Test Mass (kg);
vi. Inspection Date:
Date format: DD/MMM/YYYY.

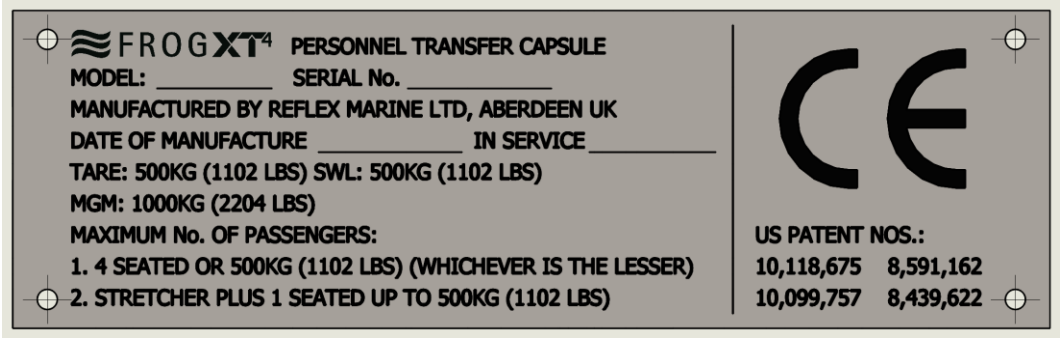
Figure 9 Inspection Data Plate



Data Marking Plate

i. Model number: XT4, XT6, or XT10;
ii. Serial number: XT4-### :
Where ### is unique unit I.D. No;
iii. Date of manufacture:
Date format: DD/MMM/YYYY;
iv. In Service Date;
v. Tare Weight (kg)
vi. Maximum Gross Mass (kg)
vii. Payload / SWL (kg)
viii. Maximum number of passengers (Standard & stretcher mode)

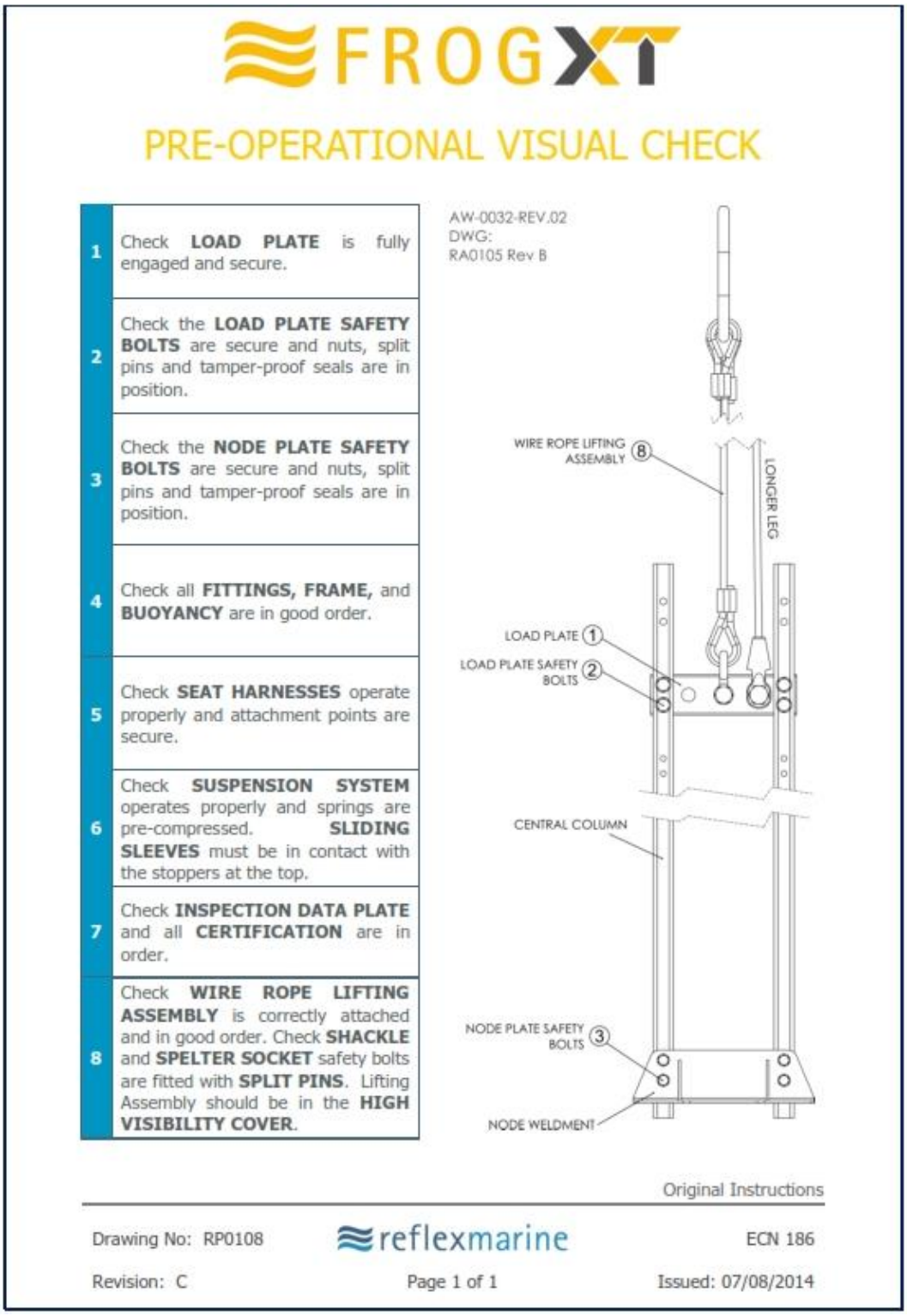
Figure 10 Frog-XT Data Marking Plate



4.10 Pre-Operational Check

Pre-operational visual checklists are posted inside Frog-XT. Frog-XT4 and XT6 checklists are identical. Frog-XT10 Checklist highlights additional column and lifting assembly.

Figure 11 FROG-XT4/XT6 Pre-Operational Visual Check List



FROGXT

PRE-OPERATIONAL VISUAL CHECK

1	Check **LOAD PLATE** is fully engaged and secure.
2	Check the **LOAD PLATE SAFETY BOLTS** are secure and nuts, split pins and tamper-proof seals are in position.
3	Check the **NODE PLATE SAFETY BOLTS** are secure and nuts, split pins and tamper-proof seals are in position.
4	Check all **FITTINGS, FRAME,** and **BUOYANCY** are in good order.
5	Check **SEAT HARNESSES** operate properly and attachment points are secure.
6	Check **SUSPENSION SYSTEM** operates properly and springs are pre-compressed. **SLIDING SLEEVES** must be in contact with the stoppers at the top.
7	Check **INSPECTION DATA PLATE** and all **CERTIFICATION** are in order.
8	Check **WIRE ROPE LIFTING ASSEMBLY** is correctly attached and in good order. Check **SHACKLE** and **SPELTER SOCKET** safety bolts are fitted with **SPLIT PINS**. Lifting Assembly should be in the **HIGH VISIBILITY COVER**.

AW-0032-REV.02
DWG:
RA0105 Rev B

Original Instructions

Drawing No: RP0108 reflexmarine ECN 186

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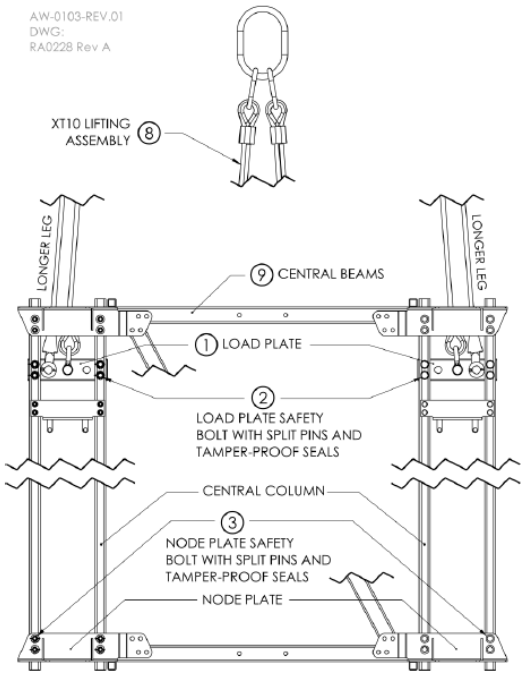
Figure 12 FROG-10 Pre-Operational Visual Check List

FROGXT10

PRE-OPERATIONAL VISUAL CHECK

1	Check **LOAD PLATE** is fully engaged and secure.
2	Check the **LOAD PLATE SAFETY BOLTS** are secure and nuts, split pins and tamper-proof seals are in position.
3	Check the **NODE PLATE SAFETY BOLTS** are secure and nuts, split pins and tamper-proof seals are in position.
4	Check all **FITTINGS, FRAME,** and **BUOYANCY** are in good order.
5	Check **SEAT HARNESSES** operate properly and attachment points are secure.
6	Check **SUSPENSION SYSTEM** operates properly and springs are pre-compressed. **SLIDING SLEEVES** must be in contact with the stoppers at the top.
7	Check **INSPECTION DATA PLATE** and all **CERTIFICATION** are in order.
8	Check **WIRE ROPE LIFTING ASSEMBLY** is correctly attached and in good order. Check terminations are fitted with **SPLIT PINS**. Lifting Assembly should be in the **HIGH VISIBILITY COVER**.
9	Check **CROSS BEAM WELDMENT** and **BRACING BEAM** fixings are secure and in good order.



Original Instructions

Drawing No: RP0231 — reflexmarine — ECN 133

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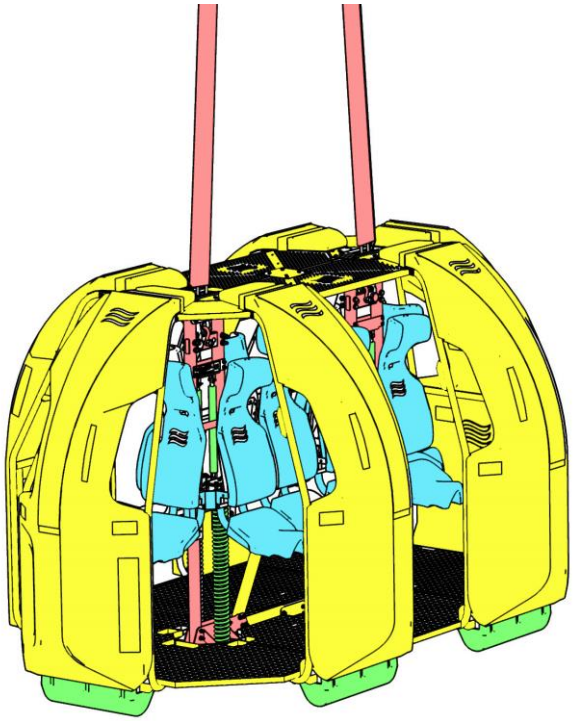
4.11 Frog XT Inspection

For inspection, the Frog XT can be grouped into four assemblies, colour-coded below:

Figure 13 FROG-XT Assembly Groups

1	Structural Load Path. CRITICAL PARTS
2	Seating & Harness Assembly.
3	Damping System & Landing Feet.
4	Framework & Buoyancy.

Note: Frog XT10 (shown here) has two Load Path, Seating Assembly, and Damping Systems. XT4 and XT6 have one of each assembly.



Parts on the Structural Load Path, including Wire Rope Lifting Assembly, are deemed **Critical Parts**. Any damage or deformation to these parts may constitute a high safety risk, hence these parts should be under high scrutiny during inspection. Some of these parts are subject to regular recommended replacement and testing within the assembly.

The Wire Rope Lifting Assembly is the most safety-critical and vulnerable component in the whole Frog XT assembly. It is vulnerable to damage from handling and operations and susceptible to corrosion from sea spray and moisture build-up. The lifting assembly should be inspected by a competent person prior to every use.

The inspection checklist below is set out in the order defined above.

Reference should be made to relevant **Identification Drawings** and **Inspection and Maintenance Manuals** for the specific product, provided with the product, or available on request at info@reflexmarine.com

Frog XT Inspection checklist form (Page 1/3)					
Unit Serial Number		**Inspection date**		**Inspection Type *(tick one)***	
Installation / Vessel		**Inspected by**		**Visual Inspection (V)**	
No of Transfers / Year		**Company**		**Examination (E)**	
Usage Category		**Job/ Ref Number**		**Post Load Test Inspection (P)**	

No.	Part/ Assembly	V	E	P	Action	Comment on Action / Condition	Information/ Measurement
1	**Structural Load Path**						
1.1	**Lifting Assembly** **Critical Part** Periodic Replacement*	✓	✓	-	Record unique ID number and any colour code. Confirm date installed: Lifting Assembly should not be used for more than 12 months.		*ID No:* *Colour Code:* *Date Installed:*
		✓	✓	-	Inspect master link and upper terminations; Remove cover, inspect the full length of wires and lower terminations; Inspect shackle and socket, ensure safety bolt and pins are secure.		
1.2	**Load Plate(s)** **Critical Part**	✓	-	✓	Visually inspect in-situ for signs of wear, cracks, or other damage. Record ID No.		*ID No:*
		-	✓	-	Remove and visually inspect for signs of wear, cracks, or other damage.		
1.3	**Load Plate Safety Bolts** **Critical Part** Periodic Replacement*	✓	-	✓	Visually inspect in-situ Load Plate Safety Bolts, nuts, split pins and seals that connect the load plate to the central columns for wear or damage. Record colour code.		*Colour Code:* *Bolt Torque:*
		-	✓	-	Remove and visually inspect for any signs of damage or strain. Visually inspect the holes in the central columns for signs of damage or strain. Ensure correct **bolt torque 140 Nm** for re-installation**		
1.4	**Columns** Critical Part	✓	✓	✓	Visually inspect in-situ for any signs of wear, cracks, or other damage.		-
1.5	**Node Plates** **Critical Part**	✓	✓	✓	Visually inspect in-situ for signs of wear, cracks, or other damage. Record ID No.		*ID Nos:*
1.6	**Node Plate Safety Bolts** **Critical Part** Periodic Replacement*	✓	-	✓	Visually inspect in-situ bolts, nuts, split pins and seals that connect the Node plate to the central columns for wear or damage. Record colour code.		*Colour Code:* *Bolt Torque:*
		-	✓	-	Remove and visually inspect for any signs of damage or strain. Visually inspect the holes in the node plate for signs of damage or strain. Ensure correct **bolt torque 50 Nm** for re-installation** It is recommended to remove, inspect, and replace one bolt at a time.		
-	*Periodic Replacement Parts: Replace according to usage per Examination Schedule section in this user manual, or on the recommendation of Competent Person. ** **Bolt torques** - Check RA0122 in Product Identification Drawings for most up-to-date torque settings.						

Frog XT Inspection checklist form (Page 2/3)							
Unit Serial Number		**Inspection date**		**Inspected by**			
No.	**Part/ Assembly**	**V**	**E**	**P**	**Action**	**Comment on Action / Condition**	**Information/ Measurement**
2	**Seat & Harness Assembly**						
2.1	**Seat Support Assembly**	✓	✓	✓	Check signs of damage. Ensure all fittings are secure.		-
2.2	**Seats**	✓	✓	✓	Check signs of damage. Ensure all fittings are secure.		-
2.3	**Seat Harnesses**	✓	✓	-	Inspect Harnesses for signs of wear, fraying, or damage. Check attachment points are secure.		-
		✓	✓	-	Sit in each seat and check fastening of each harness operates correctly.		
2.4	**Stretcher Fittings**	✓	✓	-	Visually inspect the stretcher fittings to ensure that they are all present, in good condition, and operational.		-
3	**Damping System and Landing Feet**						
3.1	**Springs** Periodic Replacement*	✓	✓	-	Check condition and operation of springs. If springs show excessive corrosion or have started to compress, then they should be replaced. Springs can be susceptible to yield over time. This can be verified by measuring the deflection of the seat base. The top of the sliding sleeve should rest against the horizontal compression bar. If the gap is greater than 10mm, then the springs should be replaced.		*Gap Height:*
		✓	✓	-	Check the spring cap plate for any signs of deformation.		
3.2	**Dampers** Periodic Replacement*	✓	✓	-	Ensure that threads of damper rod-end are not visible below the clevis eye. Ensure that there is no sign of fluid leaking onto the damper rods. Check mounting points have no deformation.		-
			✓	-	Disconnect dampers and check for bowing of the damper rods.		
3.3	**Landing Feet**	✓	✓	✓	Examine Landing feet to ensure good condition and properly secured. Do not go underneath an active lift.		*Heights:*
		✓	✓	-	When unit is on floor. Measure height of each foot. Replace if under 100 mm in height		
		✓	✓	-	Small cuts and damage are acceptable. The foot should be replaced when damage larger than 50mm is present.		

Frog XT Inspection checklist form (Page 3/3)							
Unit Serial Number			**Inspection date**			**Inspected by**	
No.	**Part/ Assembly**	**V**	**E**	**P**	**Action**	**Comment on Action / Condition**	**Information/ Measurement**
4	**Framework & Buoyancy**						
4.1	**Framework / Floor grating**	✓	✓	✓	Check for signs of damage. Ensure all parts, bolts, and fasteners are tight and fully secure.		-
4.2	**Buoyancy**	✓	✓	✓	Check for signs of damage. Ensure all parts, bolts, and fasteners are tight and fully secure. If buoyancy shell is breached, then it should be replaced.		-
4.3	**Inspection Data Plate**	✓	✓	✓	Record Previous (Last) Inspection Date Update (Stamp/ Etch) data plate to show date and completed works: Date in Format: **DD-MM-YYYY**; Visual Inspection, stamp: **V**; Examination: **E**; Load Test: **T**		*Last Inspection Date:* *New Plate Marking:*
4.4	**Stickers / Instructions**	✓	✓	✓	Check that all stickers on the unit are in good condition and none are missing. Sticker location drawing can be found in the drawing pack.		-
Notes - Comments - Actions							

Other Documentation and References	
Document	**Document Number / Location**
Report of Thorough Examination / Certificate for this Inspection	
Certificate for Load Test	
Photographic Report/ Archived Photograph Folder	
Certification for Critical Parts Installed	

4.12 Report of Thorough Examination

A Report of Thorough Examination should be completed and issued on completion of service work (see example below). This certificate format is based on UK LOLER 1998 SI 2307 requirements and LEEA guidance. Other certification standards may take precedence in different regions.

Report of Thorough Examination (TE) / Certificate of Test															
Name and Address of Employer for whom the Test/Thorough Examination is made (Client)		Location of Equipment Tested/Examined		Report No:		Date of Report									
				PO No:		Date of Test/ Exam									
				Job No:		Revision									
Unique ID No.	Equipment Description/ Scope of Works/		SWL (Payload)	Proof Load Applied or Date/ Cert No. previous test		Date/ Cert No. previous TE	Manufacture date / Manufacturer		Safe for Use/ Limitations / Comments		Date/ Type Next TE				
Attached NDE Report No.				New Installation or Assembly											
Basis of Examination **(tick one)**	6 monthly under SI 1998 No 2307 Reg 9(3)(a)(i)*	☐	12 monthly under SI 1998 No 2307 Reg 9(3)(a)(ii)*	☐	Examination Scheme under SI 1998 No 2307Reg 9(3)(a)(iii)*	☐	Exceptional Circumstance under SI 1998 No 2307 Reg 9(3)(a) (iv)*	☐							
* SI 1998 No 2307 Lifting Operations and Lifting Equipment Regulations Or equivalent part of Regulation 12 of the Merchant Shipping Vessels (Lifting Operations and Lifting Equipment) Regulations I hereby declare that, on the date above, the item(s) of equipment listed above was/were tested and/or thoroughly examined and that the particulars stated above are correct. Any qualification due to access limitation is described in Comments column above. If appropriate an NDE Report will be issued simultaneously.															
Company Appointed Examiner Name in Capitals, Employer, Qualification, Signature.				OR	**Person signing on behalf of or authenticating the Report** Name in Capitals, Employer, Qualification, Signature.										

Note: Items that can be disassembled should be identified on separate lines. For example: XT unit, Wire Rope Lifting Assembly, and Shackles.

5 Handling & Storage

5.1 Stock Inspections

These guidelines are for the stocking of new units and parts before they are put into service. They are not applicable to units and parts that have already been put into service.

Stock Part	Recommended Storage actions	In Stock Inspection	Stock Release Inspection	Certification/ Marking
Personnel Transfer Carriers	▪ Remove lifting assembly ▪ Place lifting assembly into clean, dry storage ▪ Chock unit off feet. ▪ Store in a secure area away from the risk of damage. ▪ Cover and protected from exposure to environment elements.	Thorough examination (Visual Inspection): Every 12 months	Thorough examination (Examination) *Greater than 5 years in storage: Load test and Thorough examination (Examination)*	▪ Thorough examination date to be stamped on inspection plate; ▪ Thorough examination checklist to be completed; ▪ Report of Thorough Examination to be issued.
Wire rope lifting assembly	Store off the ground in clean, dry, and ventilated storage area with any lifting assembly cover removed.	Thorough examination (Visual Inspection): Every 6 months	Thorough examination *Greater than 2 years in storage : Discard*	Report of Thorough Examination to be issued.
Other stock parts	Store in clean, dry storage.	None	Thorough examination	Not required
Note: When a carrier first enters service, the "**In-service date**" should be stamped onto the unit's Data Marking Plate. (see section 4.8 for location) At this date the examination and service-life for XT begins.				

5.2 Shipping and storage

Transit inspections

Before and after transportation Frog-XT should be inspected to check for damage sustained in transit. If any damage has been observed unit must not be used and a thorough examination should be conducted by a competent person.

Preparation for road transport

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

Lifting assembly

Particular care should be taken to ensure that the wire rope lifting assembly is protected from damage and degradation during transit and storage. It is recommended that it is secured by plastic tie wraps in a protected position on floor grating inside the unit.

Forklift handling

Care should be taken when handling Frog-XT with a forklift truck to avoid damage to the underside (landing feet, cross braces or base of the central lifting column). Alternatively, the unit may be secured to a pallet specifically designed for use with forks.

Crane handling

When handling by crane with a short chain or strop a temporary shackle should be fixed to the handling lifting point. Care must be taken not to damage the lifting assembly. To avoid damage to lifting assembly **shackle should not be fitted through the thimble of the lifting assembly eyes.**

Marine deck fastening

For deck fastening, straps can be secured to or placed across the floor grating. To prevent over compression of landing feet and floor structure care should be taken not to over tighten and cause damage. It is recommended to chock the unit, to raise the feet from contact to the floor before strapping down.

Shipping containers and racks

The FROG-XT4 and XT6 will fit in a standard or high-cube container as shown in the figure opposite. Frog-XT10 will require all buoyancy panels to be removed to fit into a high-cube container.

If transported on a flat rack, the carrier must be secured. Recommended securing points are the radial / peripheral floor braces and the handling eye. The main lift-eye should not be used as a securing point. Feet should be supported to prevent compression; this can be done by placing suitable chocks or props under the unit.

Feet deformation during storage

Prolonged periods of exposure to hot decks and self-weight can cause permanent set deformation of the elastomeric feet. If the carrier is to be stored for prolonged periods a set of chocks should be used to lift the feet from the deck. Any chocks used should fit properly underneath the main base frame and not impinge any exposed bolt heads . The chocks can be pre-laid on the deck ready for landing.

Storage

The FROG-XT range has been designed to cope with the harsh conditions on an offshore installation or vessel; however, it is recommended to protect the unit as much as possible from any hazardous elements such as excessive sea-spray, contaminants, and UV degradation. The FROG-XT should be stored under a FROG-XT weatherproof cover whilst not in use.

Storage of Replacement Parts

Replacement parts should be stored in dry, clean environments and be suitably labelled and tagged.

6 Replacement Parts

6.1 Introduction

Frog-XT is a safety-critical item and only genuine Original Equipment Manufacturer (OEM) parts should be used. This is of particular importance for the wire rope lifting assembly due to its very specific bespoke design for this application.

Replacement parts can be supplied as individual items or as appropriate kits. Prior to ordering any replacement parts or kits, establish the serial number which is stamped on the data plate. The serial number is, for example, XT4- ### where ### is a three-digit number.
RML holds replacement parts and accessories in stock. We are able to supply most individual components. A full list of parts is contained in the identification drawing pack issued with every unit.
It may be advisable to hold an inventory of frequently replaced parts. This will help to ensure the continued safe operation of the carrier. Minimum stock quantities will be influenced by:

- Remoteness of location
- Downtime implications
- Usage
- Customs processing time
- Delivery cost for small parts

Contact Reflex Marine for recommended stock items and quantities for your operation.

6.2 Parts identification

Each assembly or part is assigned a part number which provides the identification.

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.

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

Components that require unique identification are referenced in the parts list.

6.3 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	Model	Part Number	Contents
Lifting Assembly Kit*	XT4, XT6	RA0116	Wire Rope Lifting Assembly; Lifting Assembly Cover and Fixings.
	XT10	RA0227	
Replacement Parts Kit	XT4, XT6	RA0117	4x Load Plate Bolt, Nut, Washer, Pin, Seal; 4x Node Plate Bolt, Nut, Washer, Pin, Seal.
	XT10	RA0268	8x Load Plate Bolt, Nut, Washer, Pin, Seal; 8x Node Plate Bolt, Nut, Washer, Pin, Seal.
Critical Part Kit*	XT4, XT6	RA0090	Wire Rope Lifting Assembly; Replacement Parts Kit.
	XT10	RA0278	
Landing Foot Kit	XT4, XT6	RA0303	4x Landing Feet and Fixings
	XT10	RA0271	6x Landing Feet and Fixings
Suspension Kit	XT4	RA0132	2x Spring, Recoil Damper and Fixings.
	XT6	RA0294	4 X Spring, Recoil Damper and Fixings.
	XT10	2 x RA0132	4 X Spring, Recoil Damper and Fixings.
Harness Kit	XT4	RA0118	4 X Harnesses. (4x Red)
	XT6	RA0295	6 X Harnesses. (4 Red, 2 Yellow)
	XT10	RA0270	6 X Harnesses. (6 Red, 4 Yellow)
Full-Service Kit*	XT4	RA0120	1x Lifting Assembly Kit 1x Replacement Parts Kit 1x Harness Kit 1x Landing Foot Kit 1 x Suspension Kit
	XT6	RA0293	
	XT10	RA0272	

***Note:** These kit part numbers contain the "standard" 30ft wire rope lifting assembly: Master Links per Section 3.8, Aluminium Ferrules, Working Temp -20C to +50C. For alternative lifting assembly kits with alternative Master link, Ferrule, and working temperature, contact Reflex Marine.

6.4 Accessories

The following accessories are available from RML to maximise operational effectiveness. They can be supplied with the carrier or ordered separately.

Strobe Light

Provides greater visibility at night and in poor weather conditions. High-intensity: lightweight, waterproof to 300 m, Flash Rate 50 per min and provides 6-mile visibility. C cell battery-powered fitted to the overhead protection plate in the FROG-XT.

Note: This strobe is not certified for use in hazardous areas. A zoned strobe light is available on request.

Basket Stretcher

Essential for conducting emergency medical transfers, RML supply a rigid stretcher that is compatible with the FROG-XT range.

Protective Cover

A silver reflective protective cover which is made of flame-resistant fabric (BS7837) and protects against degradation from UV light and the weather.

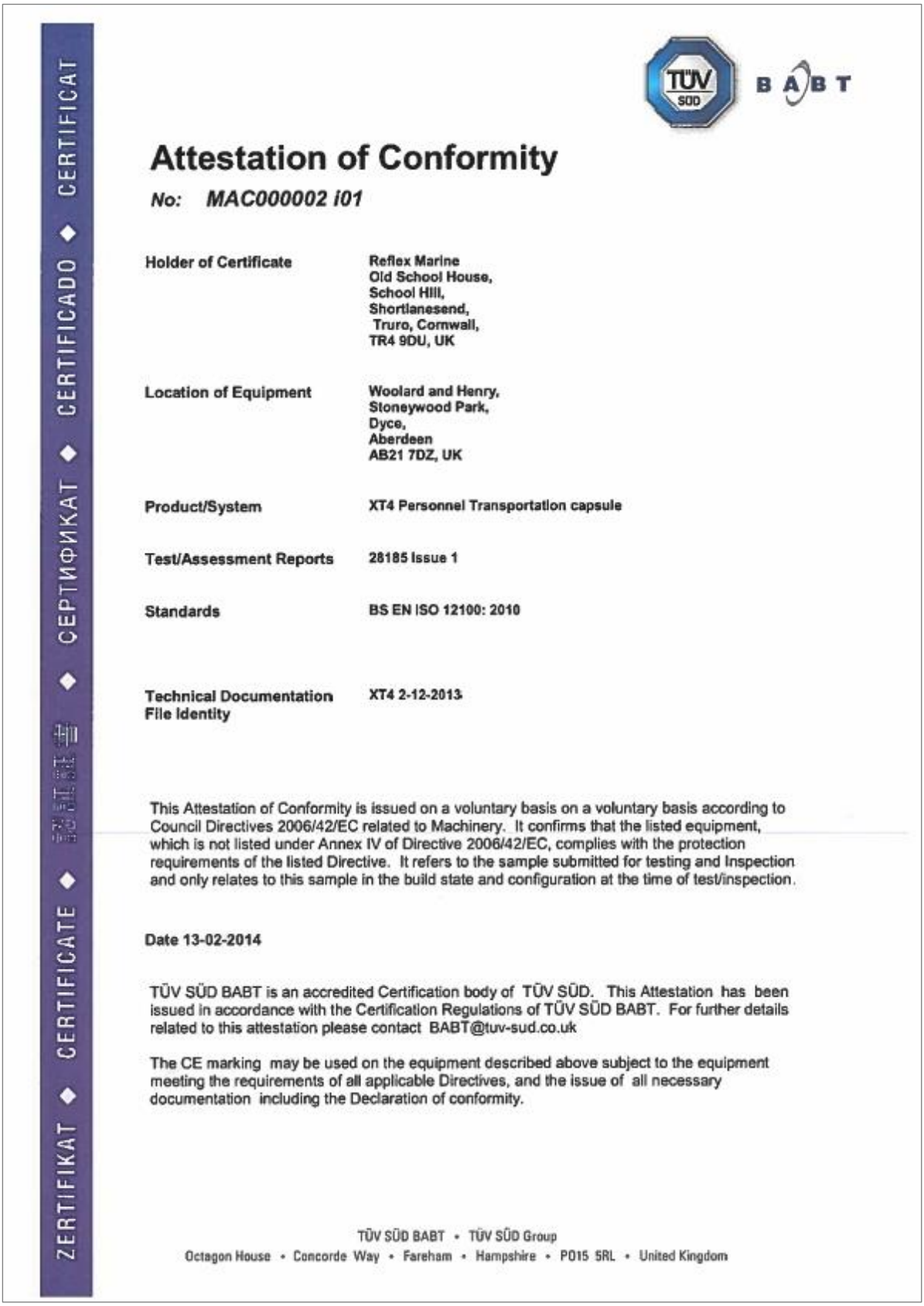
Luggage Basket

Luggage basket is attached to the floor grating underneath the passenger seat.

For a complete list of accessories please contact RML

7 Certificates

7.1 EC Attestation of Conformity – Frog-XT4



ZERTIFIKAT ◆ CERTIFICATE ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD BABT

Attestation of Conformity

No: MAC000002 i01

Holder of Certificate	**Reflex Marine Old School House, School Hill, Shortlanesend, Truro, Cornwall, TR4 9DU, UK**
Location of Equipment	**Woolard and Henry, Stoneywood Park, Dyce, Aberdeen AB21 7DZ, UK**
Product/System	**XT4 Personnel Transportation capsule**
Test/Assessment Reports	**28185 Issue 1**
Standards	**BS EN ISO 12100: 2010**
Technical Documentation File Identity	**XT4 2-12-2013**

This Attestation of Conformity is issued on a voluntary basis on a voluntary basis according to Council Directives 2006/42/EC related to Machinery. It confirms that the listed equipment, which is not listed under Annex IV of Directive 2006/42/EC, complies with the protection requirements of the listed Directive. It refers to the sample submitted for testing and Inspection and only relates to this sample in the build state and configuration at the time of test/inspection.

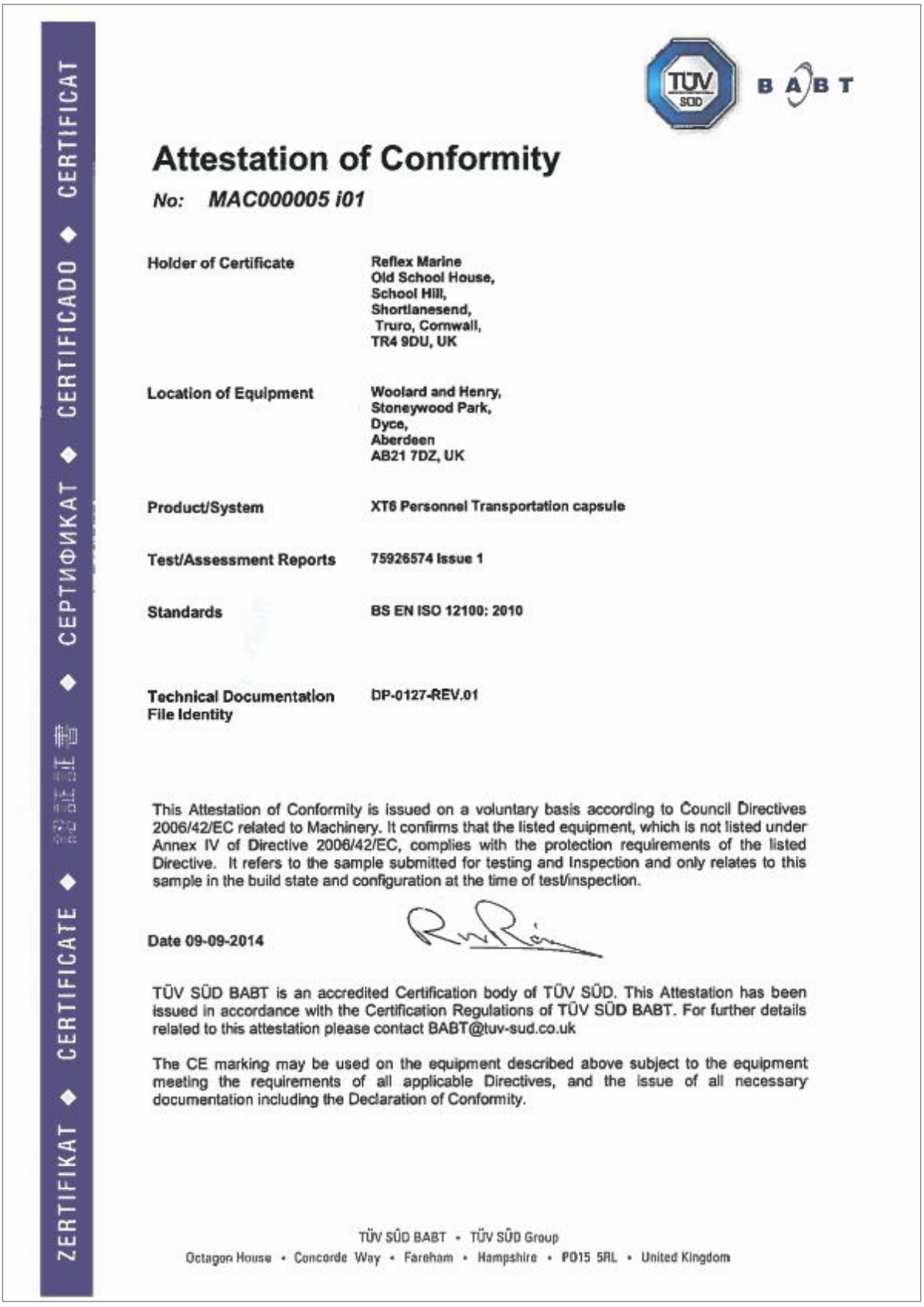
Date 13-02-2014

TÜV SÜD BABT is an accredited Certification body of TÜV SÜD. This Attestation has been issued in accordance with the Certification Regulations of TÜV SÜD BABT. For further details related to this attestation please contact BABT@tuv-sud.co.uk

The CE marking may be used on the equipment described above subject to the equipment meeting the requirements of all applicable Directives, and the issue of all necessary documentation including the Declaration of conformity.

TÜV SÜD BABT • TÜV SÜD Group
Octagon House • Concorde Way • Fareham • Hampshire • PO15 5RL • United Kingdom

7.2 EC Attestation of Conformity – Frog-XT6



ZERTIFIKAT ◆ CERTIFICATE ◆ 合格证书 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD BABT

Attestation of Conformity

No: *MAC000005 i01*

Holder of Certificate	**Reflex Marine Old School House, School Hill, Shortlanesend, Truro, Cornwall, TR4 9DU, UK**
Location of Equipment	**Woolard and Henry, Stoneywood Park, Dyce, Aberdeen AB21 7DZ, UK**
Product/System	**XT6 Personnel Transportation capsule**
Test/Assessment Reports	**75926574 Issue 1**
Standards	**BS EN ISO 12100: 2010**
Technical Documentation File Identity	**DP-0127-REV.01**

This Attestation of Conformity is issued on a voluntary basis according to Council Directives 2006/42/EC related to Machinery. It confirms that the listed equipment, which is not listed under Annex IV of Directive 2006/42/EC, complies with the protection requirements of the listed Directive. It refers to the sample submitted for testing and Inspection and only relates to this sample in the build state and configuration at the time of test/inspection.

Date 09-09-2014

TÜV SÜD BABT is an accredited Certification body of TÜV SÜD. This Attestation has been issued in accordance with the Certification Regulations of TÜV SÜD BABT. For further details related to this attestation please contact BABT@tuv-sud.co.uk

The CE marking may be used on the equipment described above subject to the equipment meeting the requirements of all applicable Directives, and the issue of all necessary documentation including the Declaration of Conformity.

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7.3 EC Attestation of Conformity – Frog-XT10

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Attestation of Conformity

No: *MAC000004 i01*

Holder of Certificate	**Reflex Marine Old School House, School Hill, Shortlanesend, Truro, Cornwall, TR4 9DU, UK**
Location of Equipment	**Woolard and Henry, Stoneywood Park, Dyce, Aberdeen AB21 7DZ, UK**
Product/System	**XT10 Personnel Transportation capsule**
Test/Assessment Reports	**75926574 Issue 1**
Standards	**BS EN ISO 12100: 2010**
Technical Documentation File Identity	**DP0101 – Rev 01**

This Attestation of Conformity is issued on a voluntary basis on a voluntary basis according to Council Directives 2006/42/EC related to Machinery. It confirms that the listed equipment, which is not listed under Annex IV of Directive 2006/42/EC, complies with the protection requirements of the listed Directive. It refers to the sample submitted for testing and Inspection and only relates to this sample in the build state and configuration at the time of test/inspection.

Date 26-09-2014 **R. W. Raine.**

TÜV SÜD BABT is an accredited Certification body of TÜV SÜD. This Attestation has been issued in accordance with the Certification Regulations of TÜV SÜD BABT. For further details related to this attestation please contact BABT@tuv-sud.co.uk

The CE marking may be used on the equipment described above subject to the equipment meeting the requirements of all applicable Directives, and the issue of all necessary documentation including the Declaration of Conformity.

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8 Contact Details

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Order enquiries (sales & replacement parts) – support@reflexmarine.com

Accounts Department – accounts@reflexmarine.com

9 Revision notes

Frog-XT User manual Revision 1.0 combines information from the following user manuals into one document:

- Frog-XT4 revision 3.1 (16-Mar-2018)
- Frog-XT6 revision 0.2 (13-Apr-2015)
- Frog-XT10 revision 0.2 (13-Apr-2015)

The combined manual aims to improve document control and efficiency in communicating best practice information to all XT product users.

There are several updates and changes to note from previous manual versions. These are summarized below in order of importance and impact to operations or maintenance.

Section(s)	Description	Effect/ Reason
4.6, 4.7	Change in Load Test schedule. From 01-May-2020 Reflex Marine will supply critical parts with individual or batch load test certificates. Therefore, when installed the assembly as whole does not require to be load tested. The recommendation for load test of whole assembly is at 5 years minimum.	Inspection and Maintenance Reduce risks of equipment damage in Load test process. More efficient Examination Scheme.
4.6	Addition of flexibility for Examination schedule. Reflex Marine provide a risk-based inspection and maintenance schedule (examination scheme) that is conservative and thorough. Reflex Marine understand that operational and logistical constraints can compromise scheduling inspector to conduct servicing and recertification that adheres strictly to the schedule. Reflex Marine present flexibility/ leeway for inspection dates by +/- 4 weeks to allow overall service schedule to be conducted practicably with operational and logistical constraints. This flexibility of service date should be on agreement with competent person.	Inspection and Maintenance Flexibility for practicability of scheduling service works. Check these recommendations against local regulations.
2.1.1	Change in terminology/ Explanation of Sea-state operating parameters. Where previous sea state guidance were described as 'limits', these do not take into account all factors and variables and can be restrictive in certain operations. The new guidance describes sea state 'window' with emphasis on the increasing risks of operating at higher sea-states, rather than absolute cut-off points.	Operations Focus on risk-based operational parameters rather than absolute limits

Section(s)	Description	Effect/ Reason
3.11	Update to control of lifting assembly guidance Safety note added with recommendation to evaluate height clearance needed for lifting plan, and risk of crane limit switches.	Operations Safety recommendation
3.12	Addition of lifting assembly clearance height tables. Supports evaluation of height clearance in lifting plan described in section 3.10.	Operations Data to support safety recommendation
3.8	Addition of Hook Compatibility with Lifting Assembly (rigging)	Supply/ Operations Ensure Client procedures correct size part
4.10	Inspection checklist grouped into four assemblies. Inspection checklist items grouped together to segment procedure into focussed sections.	Inspection and Maintenance Clearer procedure
4.10	Visual, Examination, and Post Test Inspection checklist combined into one sheet. Inspection procedures have large overlaps. Combining checklists reduces risk of selecting incorrect checklist and highlights differences between different inspections.	Inspection and Maintenance Clearer procedure
4.10	Addition of Torque Values Previously only contained in Identification Drawings document	Inspection and Maintenance Clearer procedure
4.11	Addition of Report of Thorough Examination Template. Report of Thorough Examination is becoming best practice for recording lifting equipment inspections (LEEA). Ensures minimum data is recorded by inspector.	Inspection and Maintenance Best practice record of inspection.
4.3	Addition of Care in use/ Preventative maintenance guidance Addition of preservation guidance for users. (Previously not included in XT6/ XT10 user manuals)	Inspection and Maintenance Additional guidance
3.7, 6.4	Removal of under seat light luggage box from accessories. This assembly is no longer provided.	Production/ Supply Change in production/ supply

For any clarification on these updates and changes please contact Reflex Marine.

FROGXT

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