**DRAFT SPECIFICATION – SUBJECT TO CHANGE**

The Purchaser requires two vehicle mounted winch units to support the mooring of vessels visiting the Port. The winch units are to be independently powered using an hydraulic bi- directional capstan that runs independently of the vehicles power train.

**SECTION 1 - GENERAL TECHNICAL SPECIFICATION**

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| 1.1 | **MATERIALS** |
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|  | a) | The whole of the materials used in the works shall be of the best quality, suitable for the duty, and unless the Engineer otherwise approves shall be of EC manufacture from materials of EC origin, conforming with the current EC Standard Specification and material certifications will be required. |
|  |  |  |
|  |  | Where the materials do not conform to such specification sufficient information shall be provided to enable the Engineer to identify the mechanical, electrical and chemical suitability of the materials. |
|  |  |  |
|  | b) | Materials shall be free from flaws of every description. All castings shall be smooth, sharp and free from blow holes, with ample fillets, and correctly centralised cores. All structural sections and plate shall be free from scale. |
|  |  |  |
|  | c) | Light alloy sections shall not be used unless authorised by the Engineer. |
|  |  |  |
|  | d) | No plates, flat bars or angles used in load bearing structural members, including platform supports, shall be less than 8mm thick. |
|  |  |  |
| 1.2 | **WORKMANSHIP** |
|  |  |
|  | a) | Workmanship throughout shall be of the highest standard and will be constantly monitored by the Engineer or his approved representative. If in his opinion the work, rectification work, or methods used do not meet with his approval then that work will be stopped at the Vendor's expense until a method approved by the Purchaser is adopted. |
|  |  |  |
|  |  | All plates sections, etc. shall be straightened or curved as may be required by pressure and not by hammering. All abutting ends and edges shall butt truly over the full areas. |
|  |  |  |
|  | b) | After drilling, materials shall be taken apart and all burrs left by the drill completely removed. Screws threads, accurately formed shall be to the appropriate ISO Standards unless otherwise specified. |
|  |  |  |
| 1.3 | **QUALITY CONTROL AND INSPECTION** |
|  |  |
|  | a) | The Vendor will be required to submit evidence that a formal system of quality control approved by the Engineer was applied to all bought in materials and equipment. |
|  |  |  |
|  | b) | Reasonable access shall be provided by the Vendor to the Purchasers’ inspecting authority which might be asked to attend the Vendor’s works, or the works of the Vendor’s sub-contractors, during construction. |
|  |  |  |
|  | c) | Acceptance and load tests will be carried out by the Vendor and witness by representatives of the Purchaser prior to Delivery. These tests will include full compliance with the Technical Specification and any Equipment not complying will not be Delivered. Notwithstanding this the Equipment will again be visibly checked and will undergo full operational tests including load test on arrival at its destination. |
|  |  |  |
| 1.4 | **ENVIRONMENTAL NOISE LEVELS** |
|  |  |
|  | Noise reduction both for the Operator and for radiated noise is an important aspect of the Technical Specification. |
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|  | The Vendor shall give full consideration to the design of the Equipment and the selection of materials to reduce noise levels. |

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| **SECTION 2 - MECHANICAL TECHNICAL SPECIFICATION** |
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| 2.1 | **REGULATIONS** |
|  |  |
|  | The Equipment and any Spare Parts shall in all respects comply with all current United Kingdom and EU Legislation that is in force at the time the Equipment or Spare Part is handed over to the Purchaser and will at least comply with:- |
|  |  |
|  | 1. | The Health and Safety at Work Act 1974 and subordinate legislation. |
|  | 2. | The Supply of Machinery (Safety) Regulations 2008 (as amended), which implement the European Machinery Directive 2006/42/EC and contain detailed requirements for manufacturing safe new machinery.  |
|  | 3. | The Electricity at Work Regulations 1989 and to comply in all respects with BS 7671: 2001 Requirements for Electrical Installations. IEE Wiring Regulations 18th Edition. |
|  | 4. | The Control of Noise at Work Regulations 2005. |
|  |  |  |
|  | 5. | IEC 947-7-1: 1991 Electrical Terminals. |
|  |  |  |
|  | 6. | BS EN 61508: 2010 Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems. |
|  |  |  |
|  | 7. | European Safety Signs 92/58/EEC. |
|  |  |  |
|  | 8. | The International Standards Organisation (ISO). |
|  |  |  |
|  | 9. | The Lifting Operations and Lifting Equipment Regulations 1998. |
|  |  |  |
|  | 10. | Note: Special attention shall be given to access for operating and all maintenance functions. |
|  |  |  |
|  |  | Relevant British Standard Specifications or EEC approved (Equivalents or Superior Standard). |
|  |  |  |
|  | 11. | The COSHH Regulations and the Purchaser’s Environment Policy. |
|  |  |  |
|  | 12. | EU Exhaust Emission Directive NRMM/97/68EC. |
|  |  |  |
|  | 13. | Pressure Systems Safety Regulations 2000 |

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| 2.2 | **MECHANICAL DESIGN** |
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|  | The Vendor shall: |
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|  | a) | design, manufacturer, ship and install all the necessary mechanical materials, equipment and appurtenances; |
|  |  |  |
|  | b) | Shop test as far as practicable and to field test the entire mechanical equipment of the Equipment in accordance with this Technical Specification. |
|  |  |
| 2.3 | **GENERAL** |
|  |  |
|  | a) | Responsibility for the reliable operation of the Equipment in accordance with the requirements of this Technical Specification shall be borne entirely by the Vendor. The Vendor shall demonstrate with his drawings and specifications and with the required tests that the Equipment is capable of performing all of the required functions with a minimum of downtime. |
|  |  |  |
|  | b) | The mechanical equipment shall be designed to be fully capable of operating the Equipment reliably at the specified requirements on a continuous duty cycle with ease, safety and a minimum of noise, vibration and maintenance. |
|  |  |  |
|  | c) | All parts of the mechanical equipment shall be designed so that they may be easily assembled, adjusted, removed for replacement and easily accessible for lubrication, inspection, maintenance, and repair. Emphasis shall be placed upon quick replacement of faulty or worn parts as opposed to repair in place. |
|  |  |  |
|  | d) | The design shall be fail-safe as far as practical so that the failure of a component or loss of power precludes accidental coasting out of control. |
|  |  |  |
|  | e) | Parts, components, and purchased sub-systems shall be readily accessible in England. |
|  |  |  |
|  | f) | All materials used shall be identified by reference to the Technical Specification of an internationally recognised body with indication of equivalence to a local standard where applicable. |
|  |  |  |
|  | g) | All major components, sub-assemblies and complete assemblies shall be provided with suitably rated, integral lifting points to facilitate correct handling. All removable eye bolts shall be suitably rated and supplied with a relevant test certificate. All integral lifting points shall be marked with their safe working load (SWL). |

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| 2.4 | **DESCRIPTION OF WORKS** |
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|  | The works comprising this Agreement are the design, manufacture, painting, testing and Delivery to site of the Equipment built in accordance with this Technical Specification. The Equipment supplied shall meet or exceed the requirements of the Technical Specification and comply with the appropriate European, National and Local Standards, Statutory Orders, Regulations, Acts, Codes etc. that apply. |
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|  | Note: A certificate of conformity shall be supplied with each unit on Delivery. |
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| 2.5 | **AREA OF USE** |
|  |  |
|  | The Equipment will be required to operate within the confines of the Dock Estate at the Port of Felixstowe.  |
|  |  |
| 2.6 | **GENERAL DESCRIPTION** |
|  |  |
|  | Each unit supplied under this Agreement shall be designed to aid in the mooring of vessels that visit the Port. The Equipment shall have a hydraulically powered capstan mounted on the back of a Ford Transit Double Cab RWD L3 H1, (supplied by the Purchaser) as per Drawing BK3V-010000-D089 attached. The capstan shall be cable of being operated by a single person external to the operator’s cabin.The capstan units shall be individually powered from the vehicle to allow for the vehicle to be replaced at end of life. The Capstan shall be bi-directional.The capstan should have a safe working load of 1.2 tonnes.The hydraulic capstan will be powered by an individual generator fitted with a spark arrestor. |
|  | The design of the Equipment shall recognise that the machines will be subjected to an arduous duty cycle and will be working in an environment where protection against impact damage is essential. Whilst the provision of damage protection is important, however, it should not be at the complete expense of access to the basic components which require regular maintenance. Particular attention shall be given to maintainability. |
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|  | Each unit will be operating on a 24 hour day, 7 days per week operation. |
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| 2.7 | **STRUCTURE** |
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|  | The Equipment shall be constructed from stainless steel and all fittings should be suitable for a marine environment. |
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|  | The structure shall be so designed that water pockets are not formed in any structural member or area or by the inter-section of members and be such that there shall be no unsealed blind areas where paint cannot be applied. Adequate drainage holes shall be provided to discharge water clear of the structure in all cases where there is a tendency for water to collect.  |
|  |  |
| 2.8 | **ENGINE** |
|  |  |
|  | The Equipment shall be powered by a suitably rated environmentally friendly clean air diesel engine, meeting EU exhaust emission legislation.  |
|  | Access to those parts requiring regular checking and maintenance such as engine oil dipstick/filler and filters, cooling water filler, injectors, fuel/water trap and hand primer, electric alternator, starter, battery, air filter, etc., shall be easily accessible and approved by the Engineer. Areas for daily maintenance by the Operator must be accessible without raising the Operator’s cab or exposing the Operator to any potential risks for injury. The ‘daily maintenance’ points shall be easily accessible and simple to use in order for the Operator to perform these checks with the minimum amount of time. |
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|  | Particular attention to be given to the means of access for engine removal. |
|  |  |
|  | Exhaust to be fitted with a spark arrestor. |
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| 2.9 | **FUEL TANK** |
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|  | The fuel tank of the vehicle shall be used to supply the generator. This should not fully drain the fuel tank in the event of the winch units using all remaining fuel in the vehicle. |
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| **SECTION 3 - ELECTRICAL SPECIFICATION** |
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| 3.1 | **ELECTRICAL SYSTEMS** |
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|  | The electrical system shall be up to a maximum of 24 volts D.C. supplied from HD 12-volt batteries each with a minimum capacity of 140 Ampere-hours. The system shall be maintained by an alternator. |
| 3.2 | **PROTECTION** |
|  |  |
|  | All devices, cables, and circuits shall be protected by main circuit breakers. Fuses will not be acceptable. The fuse panel shall be located so access can be easily achieved for maintenance purposes. |
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| 3.3 | **ISOLATION SWITCH** |
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|  | A battery isolation switch shall be provided in an accessible and clearly marked position outside the cabin. |
|  |  |
| 3.4 | **EMERGENCY STOP BUTTONS** |
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|  | Strategically placed push-buttons of an unguarded, mushroom-headed, latch type plainly marked “EMERGENCY STOP” shall be provided. These push-buttons shall be mounted in a position and at a height where they are clearly visible and convenient for operation. In addition, the position of the push-buttons shall be clearly indicated by using the appropriate “Symbol Sign” to BS.5378 or BS5499 i.e. Safe Condition Symbols and to EC Regulations.Each of the stop-buttons shall be arranged to interrupt power to all drives and directly engage the service brakes.‘Emergency Stop’ push-button mounted externally must be to IP 65 minimum. |
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| 3.5 | **LIGHTING** |
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|  | Lighting should be fitted to allow safe operation during the night. These should be an LED type. |
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|  | The rotating warning beacon, rear work light, stop, tail and indicators lights shall be of the LED type.  |
|  |  |  |
| 3.6 | **WIRING** |
|  |  |
|  | All wiring shall be colour coded in accordance with BS. AU7A:1983 and in separate removable harnesses. Ratings shall be in accordance with BS. AU88A:1985. |
|  |  |
| 4.0 | **HYDRAULIC SYSTEM** |
|  |  |
| a) | Hydraulic systems shall be designed in accordance with relevant British Standards or EU equivalent standard and be manufactured using components, which are readily available within the EC. Accumulators may be fitted in the system with approval of the Purchaser to achieve improved system performance. |
|  | Serial numbers and certificates shall be supplied for all accumulators. |
| b) | All hydraulic system components shall be compatible with the hydraulic fluid used. Under continuous stall conditions of a hydraulic cylinder with the pump running, the pump inlet temperature of the fluid must not exceed 65°C.  |
|  | The equipment shall operate efficiently in an ambient temperature range of minus (-) 15°C to plus (+) 35°C and incorporate a fluid over-temperature protection to indicate the fault and stop the pump operation. |
| c) | A pressure relief valve capable of relieving the maximum flow at the outlet of the pump shall be provided on the delivery side of the pump with no other valve between the pump and the relief valve. |
| d) | Hydraulic equipment shall be so designed that there is no external fluid leakage from it or ingress of air into it. The hydraulics pack will be suitably “bunded”. |
| e) | Each individual component in a hydraulic circuit shall be capable of functioning satisfactorily after being subjected to a static pressure in excess of 50% of the maximum working pressure.  |
| f) | All the hydraulic equipment and piping shall be so located or protected as to prevent damage from external forces and adverse atmospheric conditions and must be isolated electrically from the structure. |
| g) | Where pressure-testing points are required, they shall be provided in accessible positions. |
| h) | All equipment, piping and pipe couplings shall be accessible and mounted in a position that will permit safe, adequate maintenance and adjustment. Components must be removable without undue loss of fluid and without the need for major dismantling of the system. Pipes shall not be used to support valves or other equipment. |
| i) | All enclosures shall be of stainless steel and of rigid construction. |
| j) | Each hydraulic power-pack shall be appropriate for the duty required, be self-contained and complete with filters, pressure gauges, test points, level indicators, condition monitoring etc. |
|  | Open packs shall be protected with clear plastic curtain. |
| k) | All the hydraulic equipment and piping shall be so located or protected as to prevent damage from external forces and adverse atmospheric conditions by use of stainless steel enclosures of rigid design. All piping must be isolated electrically from the structure. |
| l) | Hydraulic circuits shall be designed so that load variations and changes in fluid temperature will not cause variations in the cycle time inconsistent with the service intended. |
| m) | Where pressure-testing points are necessary, they shall be provided in accessible positions. |
| n) | Easily accessible bleed points shall be provided to release air, which would otherwise cause malfunctioning of the system. |
| o) | All equipment, piping and pipe couplings shall be accessible and mounted in a position that permit, safe adequate maintenance and adjustment. Components must be removable without undue loss of fluid and without the need for major dismantling of the system. |
| p) | Hydraulic circuits shall be so designed that any failure of a pipe or joint in a circuit will not endanger the operation. |
| q) | Each hydraulic power-pack shall be appropriate for the duty required, be self-contained and complete with stainless steel covers, filters, pressure gauges, test points, level indicators, condition monitoring and low oil level indication. |
| 4.1 | **Installation – Hydraulics** |
| a) | All openings in hydraulic equipment shall be sealed, and all hydraulic reservoirs thoroughly cleaned prior to installation. |
| b) | The bores of all piping and fittings shall be thoroughly cleaned to ensure that all scale and foreign matter is removed prior to final assembly. |
| c) | Each system shall be protected against damage through impact, vibration or any other cause and mounted such that access for inspection, routine maintenance and general repairs can be achieved without major dismantling of adjacent machinery or equipment. |
|  |  |
| 4.2 | **Pumps and Motors – Hydraulics** |
| a) | Positive displacement pumps and motors are required. |
| b) | Means and good access shall be provided for filling and draining pump and motor casings in accordance with the manufacturer's specifications. |
| 4.3 | **Valves – Hydraulics** |
| a) | Wherever possible, valves shall be mounted so that their removal and replacement can be made without disconnecting fittings. Adjustable valves shall be such that their settings, when made, will be maintained against vibration. |
| b) | Variable flow control valves shall show the direction of operation for increase and decrease of throughput. |
| c) | Wet type solenoid valves with lights shall be used to indicate mode of operation and include a mechanical means for actuating. |
| 4.4 | **Reservoirs - Hydraulics** |
| a) | The capacity of the fluid reservoir shall be sufficient to contain all the fluid that can flow from the system into the reservoir and maintain the fluid level at a safe working height to prevent cavitations in the pump during the operating cycle. |
| b) | Reservoirs shall be equipped with clearly viewed flush mounted or protected fluid level indicators with markings indicating high level when pumps are stopped and low level when the pumps are in operation. |
| c) | Reservoirs shall be constructed to prevent entry of foreign matter, including fluid contamination and moisture. |
| d) | Both fluid intake and return points shall terminate sufficiently below the minimum fluid level to prevent aeration. |
| e) | All reservoirs will be provided with thermostatically controlled heating elements if required. |
| f) | All hydraulic reservoirs shall have an access suitable for cleaning purposes. |
| 4.5 | **Filters – Hydraulics** |
| a) | Filters shall be full-flow shut off type, complete with visual condition monitoring. The filter may generally be fitted either in the intake, pressure, or return lines, and a 10micron nominal filtration rating.  |
|  | When the filter is installed in the pressure or return lines, the pump intake shall be fitted with a wire mesh screen (125 mesh or finer). |
| b) | The filter shall be easily accessible for element replacement purposes without having to drain the reservoir or system. |
| c) | A suitable magnet shall also be fitted in the bottom of the reservoir between the return side of the reservoir and the suction strainers and be easily removable for cleaning. |
|  |  |
| 4.6 | **Piping and Hoses – Hydraulics** |
| a) | Due to the corrosive condition of the environment Stainless Steel alloy piping, fittings and brackets shall be used. All couplings shall be ZINC plated passivated type for corrosion protection to DIN 2353. |
| b) | Flexible hoses and couplings shall be in accordance with the requirements of the relevant British Standards and be of an approved type and manufacturer. |
| c) | Piping between actuating and control devices shall be as short as possible and pipes must be removable without dismantling equipment, components or adjacent piping. |
| d) | All rigid piping shall be securely supported to minimise vibration or movement. The length and method of supporting flexible piping shall be such as to avoid sharp flexing and straining, particularly at the end fittings. The spacing between adjacent rigid pipes and the surrounding steel work shall be sufficient to allow the pipe couplings to be secured with ease and without damage to adjacent pipes or couplings. |
| e) | Hoses shall be designed for burst pressures of 700 bar and tested at 350 bar. |
| f) | Details of rigid and flexible hoses are to be provided in the form of a schedule within the maintenance manual giving, hose types, lengths, pressure, reinforcements and fittings. |
| g) | No hydraulic pipes shall be installed with welded fittings.  |
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| **SECTION 5 - PAINTING SYSTEM** |
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| 5.1 | **PAINTING SYSTEM** |
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|  | 1. All non corrosion protected surfaces shall be painted to a suitable standard in a manner approved by the Purchaser’s Engineer.
2. All coatings shall be applied strictly in accordance with the manufactures recommendations.
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| **SECTION 6 - SAFETY, INSPECTION, DRAWINGS, MAINTENANCE MANUALS AND TRAINING** |
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| 6.1 | **SAFETY PROVISIONS** |
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|  | In the design and construction of the Equipment all safety provisions called for in the legislation which is referred to in Section 2 of this Technical Specification shall be observed. |
|  |  |
|  | In particular the standards applied by the U.K. Factory Inspectorate shall be met. |
|  |  |
| 6.2 | **INSPECTION** |
|  |  |
|  | Inspection shall be carried out in accordance with BS5750 part 2: 1979. |
|  |  |
|  | The Purchaser may carry out a number of inspections prior to and during manufacture at the Vendor's premises either by one of his own inspectors or by an outside appointed inspector. The Vendor shall allow access for the purpose of these inspections. |
|  |  |
| 6.3 | **DRAWINGS** |
|  |  |
|  | After placement of the order, the Vendor shall submit for approval to the Purchaser general arrangement, fully dimensioned detail drawings, and schematic diagrams covering every aspect on the Equipment. |
|  |  |
|  | The drawings and diagrams shall be checked by the Purchaser so far as it is possible with the information in his possession. |
|  |  |
|  | However, approval of drawings, whilst made in good faith, does not remove from the Vendor his responsibilities and does not carry with it responsibility for subsequent alterations which the Vendor may find necessary as the work proceeds. |
|  |  |
|  | The Vendor shall provide two copies of the above drawings as modified and approved immediately prior to commencement of Commissioning. |
|  |  |
|  | On completion of the contract, a copy of 'as made' drawings shall be supplied on CD in DXF Format and supplied at the Vendor's expense to the Purchaser within one month of the Acceptance Certificate being issued. |
|  |  |
|  | The drawings shall include such details as:- |
|  |  |
|  | a) | Circuit diagrams, wiring diagrams and schematic diagrams of all electrical equipment. |
|  | b) | Hydraulic schematics, piping diagrams. |
|  |  | Fully dimensioned detail drawings of all major components and assemblies. |
|  |  | General arrangement of the Equipment. |

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| 6.4 | **DELIVERY OF THE EQUIPMENT** |
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|  | Primary notice of delivery shall be given no later than seven (7) days in advance with final confirmation 48 hours before Delivery.The Vendor is to provide transportation costs including taxes, custom clearance and any other associated fees. |
|  |  |
| 6.5 | **TRAINING** |
|  | Training in the safe operation of the Equipment for two of the Purchaser’s staff is required. |
|  |  |
| 6.6 | **OPERATING AND MAINTENANCE MANUALS** |
|  |  |
|  | The respective manuals shall be produced in A4 paper or PDF format and include as a MINIMUM the following: |
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|  | a) | Installation Manuals |
|  |  |  |
|  |  | * Two installation manuals are to be provided.
 |
|  |  |  |
|  | b) | Operating Manuals |
|  |  |  |
|  |  | * Equipment specification in terms of weights, loading and dimensions appropriate to the driving and operational function.
 |
|  |  | * Operator maintenance including recommended lubricants and time-scales.
 |
|  |  | * Safety features and consequences of oversight.
 |
|  |  | * Operating practices to include the use of ancillary attachments as appropriate.
 |
|  |  | * One operating manual required with each unit of Equipment.
 |
|  | c) | Maintenance Manuals |
|  |  |  |
|  |  | * Safety features.
 |
|  |  | * General description of plant components and functionality.
 |
|  |  | * Special tooling and torque settings.
 |
|  |  | * Spare parts manual and all associated spare part drawings for identification when ordering spare parts.
 |
|  |  | * Recommended servicing schedules to include fluid capacities and specifications.
 |
|  |  | * Mechanical components – functionality, diagnostics, repair and servicing (where appropriate).
 |
|  |  | * Electrical components - functionality, diagnostics and repair.
 |
|  |  | * Electronic interfaces – hardware / software functionality, diagnostics and repair.
 |
|  | Manuals to include such illustrations / diagrams / charts etc. to facilitate and embellish user understanding. |
|  |  |
|  | The Vendor will be responsible for the inclusion of material within the manual relative to sub-contract components.  |

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|  | The Vendor will provide, **in writing**, permission to reproduce such text, diagrams, illustrations, charts etc. for inclusion in the Purchaser’s documents as agreed between the two parties. (Copyright licence). |
|  |  |
|  | An Operators Manual shall be supplied with each unit of Equipment. Four sets of Maintenance Manuals (including the spares manual) shall be supplied in total. |
| 6.7 | **INSTALLATION**Installation of the Equipment on the vehicle shall be undertaken by the Purchaser with instruction from the Vendor. The Purchaser will use its best endeavours to install the Equipment within two weeks of Delivery of the Equipment to the Port. An installation manual is to be provided with Tender submission. |
| 6.8 | **COMMISSIONING AND ACCEPTANCE TESTS** |
|  |  |
|  | The Vendor will carry out Commissioning of the Equipment. Commissioning and acceptance test details to be supplied by the Vendor prior to Delivery.  |