

## 技术协议书

### TECHNICAL AGREEMENT

船 号: MW467-1/2/3/4  
HULL NO.

船 名: 4200 车双燃料汽车滚装船  
SHIP NAME: 4200 CEU DF PCTC

船级社+入级标志: **DNV**  
CLASS+NOTATION: **+1A1, CAR CARRIER (MCDK), GAS FUELLED LNG, EO, NAUT(NAV), CLEAN, TMON (Oil Lubricated), BIS, BWM(T), Recyclable, COAT-PSPC (B), LCS, ER(SCR Tier III), Shore Power, Battery(Safety), DG(P)**

挂 旗(船籍) FLAG (REGISTRY): 马耳他/Malta

项 目 (SUBJECT): Tank level & Draft gauge

型 号 (MODEL): Detail See TA

制造厂/制造国: Emerson/China  
MANUFACTURE/COUNTRY:

代 理 商(AGENCY): Zohac Marine Equipment (Hongkong) Co., Ltd.

数 量 (QUANTITY): 1 (套/船 SET/SHIP)

买方: 福建省马尾造船股份有限公司  
Buyer: Fujian Mawei Shipbuilding Ltd.

签 字: 黄榕校 王剑峰  
Sign by 2024.04.16

联系人 Contact person: 黄榕校/王剑峰  
电话 TEL: 15159613146/13655075294  
邮箱 EMAIL: design@maweiship.com

审 核: 2024.04.16  
Checked by  
批 准: 2024.4.16  
Approved by

卖方: 艾默生船用过程控制系统(上海)有限公司  
Seller: Emerson Process Management Marine Systems (Shanghai) Co.,Ltd

签 字: 王超华  
Sign by

联系人 Contact person: 赵亮/吴超华  
电话 TEL: 13556004982/13602472347  
邮箱 EMAIL: liangzhao@emerson.com  
公司地址 company address: \_\_\_\_\_

## 1. 概述

### GENERAL

- 1) 设备和材料应符合船舶建造合同签订时生效的 DNV 船级社规范和挂旗国当局要求, 包括其附录及修正案。  
Equipment and material shall comply with the newest rules and regulations of classification society DNV and flag state including annexes and amendments at the time when the vessel building contract is executed.
- 2) 车间交付测试前 30 天, 卖方应通知买方和船东参加测试并提交相关的检验或测试项目。  
30 days prior to shop delivery test for the equipment, SELLER should inform BUYER and owner to attend the test and at the same time submit the inspection/test items information to them.
- 3) 本协议在设备订货合同生效时同时生效。  
This agreement shall become effective on the date when the contract has been duly executed.
- 4) 制造厂商应保证设备符合买方的确认图纸(包括修改注解)。加工过程中若有必须的修改, 制造厂商应立即联系并获得买方同意, 并且提交修改标记和注解说明。  
The manufacture shall guarantee that the equipment they supplied shall comply with the working drawing (including modified according to comments). In case any modification is necessary during the process of manufacture the manufacture shall immediately contact and obtain confirmation from the buyer and send the buyer the marking of modifications and the explanations.
- 5) 所有买方认可的修正, 卖方应在认可注解和认可工作图的封面上做说明, 并且应有明确标识。重要性能的更改应由买方认可。  
All revisions agreed by the buyer shall be noted on front cover of the confirmation and working drawing by the seller, and shall be marked clearly in these drawings. The revision on important performance shall be agreed by the buyer.
- 6) 制造厂商应在 5 天内, 确认买方的认可注解或解释自己的未认可原因。  
Makers shall give reply about buyer's confirmation comments or give explanation for failure of it within 5 days.
- 7) 完工图应与提供的设备相符。尽可能的使用能长期保存的印刷图纸。  
The finished drawing is to coincide with the provided equipment. For long-term conservation printed drawing to be used as far as possible.
- 8) 每套设备应在明显的位置装有铭牌, 包括设备名称, 型号和制造商等等。设备及其控制箱互为备用的, 厂家制作铭牌时应标明 1 号、2 号, 加以区分;  
Each set of equipment is to be fitted with a nameplate in notable place with equipment name, model code and the marker's name, etc. Equipment and control boxes which are standby for each other should be marked number one, number two on nameplates for

distinguishing.

9) 设备的维护, 在交付前由制造商承担。

Maintenance is to be done by the maker before delivery of equipment.

10) 所有设备如有必要应提供特殊的安装工具等, 特殊工具应满足大修及安装需要。

Special installation tools etc., if necessary should be delivered. All Special tools necessary for overhauling and assembling of any of the equipment and machinery on board of the ship (as per Makers standard) to be delivered on board of the ship.

11) 所有设备防护等级为 IP44 或以上者必须带有电缆金属填料函。电机证书的配备根据船级社的要求。除非特别说明, 所有电机均为符合 IEC/ISO 标准的船用鼠笼式。

All electrical equipment with protection class IP44 or above to be provided with cable metal cable glands. Certificates of E-motor to be provided according to the demand of classification society. If no other specified, all E-motor to be complied with IEC/ISO standard and to be squirrel cage type.

电机要求如下:

All motors of 0.5 kW or over will be 3-phase, induction squirrel cage marine type confirming to relevant IEC standards, insulation class F, temperature rise class minimum B.

Motors for separate pumps to be as far as possible from one maker, but the motors in machine units to be according to maker standard.

Motors for continuous operation mode (S1 duty class) of 0.75-375 kW (without VFD) shall be of energy efficiency class IE3 (premium efficiency) level according to IEC-60034-30 or as maker's standard which the rules and regulations are fulfilled.

All motors for deck machinery, on open decks and in steering gear compartment and all motors above 20 kW are to be equipped with 230V electric element type standstill heating.

In general, A-meter shall be provided for motors above 10 kW and for all essential motors.

Motor enclosure to be minimum IP56 for motors exposed to weather e.g. open decks, exposed locations to water in galleys etc.. In machinery spaces to be minimum of IP44, on cargo decks IP55.

Ex-protected motors to be used on cargo areas where needed according to Rules. Cargo hold fan motors to be of IP56.

All essential pumps shall have a stand-by pump, which shall start automatically when the discharge pressure decreases to a pre-set value. Automatic start of stand-by pump shall also be initiated by electric failure, alarm to be arranged in IAS.

Vital motors and services shall be restarted automatically and sequentially after recovery of the mains supply voltage following a blackout.

Motors to be rated for continuous full load duty except the following motors:

1) S2-60 (60 minutes): Turning gear, Thruster motor

2) S2-30 (30 minutes): E/R overhead crane

3) Maker's standard: Steering gear, Provision crane, Lifeboat davit, Mooring

winch and Windlass, Ro-Ro equipment

组合启动屏和独立启动器的要求:

Motor Control Centre and Individual motor starters:

In general, all motors are to be provided with direct online starting equipment. Starters for motors of 20 kW and above are to be reduced voltage start type (star-delta, autotransformer, frequency converter or soft starter).

A safety switch for main power is to be provided next to the motor unless the starter is equipped with an isolating device with possibility for securely locking it in open position or the starter is in close vicinity (1-3m) of the motor.

Separate starters (e.g. motors with inverters or starters included in machinery deliveries) can be used where practical.

Local control box including start/stop/running is to be installed close to respectively motors.

About 10% spare space shall be reserved for group starter panels/MCC's.

Running hour counters for motors above 10 kW to be provided in the IAS and in the starter panel.

- 12) 厂家必须及时提供设计师和船厂要求的设备相关图纸或相关技术文件。如可行，应尽可能将设备的外形尺寸和重量附在本协议中。

The maker must submit the drawings and/or document as required by designer and shipyard in time. The outline drawing and weight of the equipment to be attached to this agreement as far as possible.

- 13) 所有备品备件及工具和属具应该按规范要求及制造厂标准。技术协议应包含备件和工具清单。

Spares & tools and inventories, if not otherwise specified, are to be delivered as required and/or recommended by the Classification Society and Authorities (written rules) and/or

according to Makers' normal delivery extend. Normal delivery extends means such spares

and inventories as supplied without additional cost. The technical agreement shall include spare part and tools list.

- 14) 主要机械设备按厂家的专门品牌; 除厂家专门品牌颜色外, 电气设备的颜色标准为: 厂家标准。应急和报警设备的颜色为: IMO 标准。电气设备内部颜色以厂家标准颜色为准。特殊设备, 如航行设备、无线电设备、内部通信设备等, 以厂家标准颜色为准。发电机及变压器颜色需要船东认可。

To follow the maker trademark colour for all major machinery, Except maker's trademark's colour, the painting of electric equipment' colour should be: manufacturer's standard colours. The emergency and alarm device with IMO standard Interior metal surfaces of electric equipment should be painted with manufacturer's standard colours. The special equipment, such as nautical equipment, radio equipment, inter communication equipment etc. should be painted with manufacturer's standard colours. The colour for generators, transformers to be approved by owner.

15) 厂家须提供设备无石棉证书或声明书,满足规范要求。证书或盖公章声明书原件随认可图发船厂。

Supplier should supply the asbestos free Certificate or the asbestos free statement for the equipment to fill the class rules. And the certificate or the sign official sealed original statement should be submitted to shipyard with approval drawing.

16) 厂家需根据“国际安全与环境无害化拆船公约”也称香港公约的要求,填写并提供“供应商的一致性声明表格--(SDoc)”和材料声明表格--(MD).该声明表格随认可图发船厂。

The seller must fill and provide" Supplier Declaration of Conformity form-- (SDoc) and "Material Declaration form--(MD)"according to the international Convention for the safe and Environmentally Sound Recycling of Ships. Supply the declaration form with approval drawings.

17) 所有设备须列出主要部件的型号和厂家(品牌)。

The main components of all equipment should list the type and maker (brand).

18) 所有设备的管子进、出口连接位置须便于船厂外部接管,且设备本体管子固定整齐。

All equipment pipes inlet/outlet position should be arranged convenient for yard piping connecting, and pipes attached on equipment to be fixed properly.

19) 所有设备电缆填料函进线位置须便于船厂外部接线,且设备本体电缆用扁铁或托架固定整齐。

All equipment cable glands inlet position should be arranged convenient for yard.

Cables connecting, and the cables attached on equipment to be fixed properly by cable tray or flat bar.

20) 厂家应保证设备送审的所有 DNV 船级社退审意见要关闭。

Vendor must take responsibility for closing all the DNV's comments which drawings are submitted by the vendor.

## 2. 基本技术参数

### Basic technical specification

1) 环境条件 Environmental Conditions:

船舶的设计应能满足无限航区的环境条件和海水温度下运行。

The vessel shall be designed to operate in conditions and sea water temperatures encountered worldwide.

船上所有系统和设备的设计在下列条件下成应能安全运行:

The vessel including all systems and equipment shall be designed for safe operation under the following conditions:

		Air temp celcius	Relative humidity %
Summer	outside	+35	80

	inside	+25	50
	seawater	+32	
Winter	outside	-10	
	inside	+22	50
	seawater	+2	

此外,本规则所涵盖的所有机械、设备和电器的设计应符合最终选定的船级 DNV 规则 Pt.4 Ch.1 Sec.3。

Additionally, all machinery, equipment and appliances covered by the rules shall be designed to operate under the environmental conditions as per final selected Classification DNV Rule Pt.4 Ch.1 Sec.3 :

水温

Water temperature

Coolant	Temperature, Celcius
Charge air coolant inlet to charge air cooler	+32

空气温度

Air temperature

Installations, components	Location, arrangement	Temperature range, Celcius
	In enclosed spaces	0 to 45
	On machinery components, boilers	According to specific local conditions
	In spaces, subject to higher or lower temperatures	
	On the open deck	-25 to +45

船体钢型材的设计温度(最低日平均温度)应为-10 摄氏度。(根据 IACS UR S6, 2018 年 7 月 9 日修订版)

The design temperature for hull steel (Lowest mean daily average temperature) shall be -10 Celsius. (According IACS UR S6, Rev.9, July 2018)

2) 证书要求(所有证书应提供 1 正 2 副):

Certificates required (all certificates to be delivered in 1original and 2copies):

(□: 不包括 excluded; ■: 包括 included; ○: 可选项 option)

挂旗当局证书 \_\_\_\_\_

Administrator TA Certificate

DNV 产品证书 \_\_\_\_\_

DNV Product Certificate

DNV 图纸认可 \_\_\_\_\_

DNV Plan Review

<u>DNV 型式认可证书</u>	■
DNV TA Certificate	
<u>工厂证书</u>	■
Manufacture Certificate	
<u>MED 型式认可证书</u>	□
MED TA Certificate	
<u>SDoc 及 MD 声明文件</u>	■
<u>SDoc &amp; MD Declaration Document</u>	

3) 标准 Standard:

本船设计建造应遵照 ISO/GB/CB/CBM/DIN/JIS 等相关行业标准。本船的建造质量应符合《中国造船质量标准 CSQS》及经船东认可的建造方标准或惯例。建造方的质量管理体系、环境保护体系等应符合相关标准，并经专门机构认证。当规范、规则、标准和公约的要求和规格书的要求矛盾时，除非规格书的要求高于规范、规则、标准和公约的要求，否则应优先考虑规范、规则、标准和公约的要求。

The vessel should be designed and constructed in accordance with ISO, GB, CB, CBM, DIN, JIS and other relevant industry standards. The vessel should be built in accordance with China Shipbuilding Quality Standard CSQS and Builder's standards or practices approved by the owner. The quality management system and environmental protection system of builder shall conform to relevant standards and be certified by specialized organizations. Where the requirements of rules, regulations, standards and conventions are in conflict with technical specifications, priority shall be given to the requirements of rules, regulations, standards and conventions unless the requirements of technical specifications are superior to those of rules, regulations, standards and conventions.

4) 尺寸单位: 国际单位

Measuring unit: SI system

5) 铭牌/操作说明牌 Nameplate/instruction plate:

Nameplates shall be fitted for each electrical component in the Engine Rooms and elsewhere, including transmitters, sensors, actuators, breakers etc. The nameplates shall include name or code referring to drawings, Instrument schedules, etc.

The letters on the name plates from acrylic resin should be engraved (white background with black letter for general use and red background with white letter for emergency use).

Flame retardant materials to be used for name plates, labels, etc.

Nameplates on open decks shall be made of brass or stainless steel, SUS316. All nameplates shall be fixed to the components.

All nameplates, warning signs, etc. shall be in English.

### Consoles and Main Panels:

All components inside and on the front shall be clearly marked with engraved nameplates with white letters on a black or console color background.

- 6) 电制: AC440V / 230V 60 Hz; DC24V

Power source

- 7) 设备本体上的传感器由厂家接至统一的接线盒或控制箱内, 设备本体上由厂家预装好合适的电缆固定件如扁铁或托架;

Junction boxes to be supplied and mounted on sets for all sensors on sets if any. And cable trays or flat bar to be installed on sets for secured yard's cables connection  
散供的传感器由厂家配合合适的填料函(钢质或铜质), 填料函大小认可图阶段确认;

Loose supplied sensors should be provided with proper cable glands, the glands material should be steel or brass, the size of glands to be confirmed by shipyard.

控制箱内部接线需有明确标识。

Inner connection of control boxes should be clear labeled.

设备电控箱内需配有限位卡扣。

The control box of equipment needs a door stopper.

所有控制箱上需要带标有 IP 等级和电制的铭牌。

All control box should have nameplate with IP class and Power source.

配电板, 变频器, 推进电机, 发电机等需要将电缆直接连接在铜排上的设备, 厂家需提供配套的螺栓、螺母、垫片。

The suitable bolts, nuts and washers should be supplied by the maker for the connection between copper bus bar and yard's cable, such as switchboard, drive, propulsion motor, generator.

设备启动箱、控制箱、分电箱宽度大于 600mm 的需要做双开门。所有电气控制箱内必须附带工作图纸。

If the widths of starters, control cabinets, distribution boxes are more than 600mm, double doors to be installed on the cabinets. All electric control panels should c/w as built control diagram drawings.

驾控台上安装设备如有指示灯或者显示屏, 必须带有调光装置。

Dimmers to be supplied for all equipment that installed on the bridge control console which are fitted with indicators or displays.

- 8) 厂家需提供设备管路接口配对法兰或接头。法兰标准。

All the counter flanges or counter connections should be supplied by maker, if no other special note, flange should be according to ISO, GB, CBM, CB, JIS or equivalent standard

- 9) 所有热工仪表应适合其最大工作值, 精度至少为量程的+/- 1.5%。并且在最大额定工作位置需用红线标记。使用在压力容器上的热工仪表需有法定检验机构签发的检验证书。所有泵进出口提供压力表/真空压力表。所有压力表需要是重型、



充液式的, 并且都要配考克; 温度计要采用黄铜本体的充液玻璃管, 并且要有保护罩,

All instruments to be suitable for their maximum operating value. Accuracy to be at least  $\pm 1.5\%$  of span. The maximum rated parameter on instruments shall be marked with a red line. All thermal instruments used on pressure vessels should with inspection certificates issued by statutory inspection organs. All pump need Provide the pressure gauge and vacuum pressure gauge All pressure gauge should be heavy-duty type 、liquid filled, also with cock; thermometer should be liquid filled glass tube with body of brass, also with safeguard.

- 10) 一般情况下, 除 0.5kW 以下的小型电机可以通过每极上的线路开关手动操作外, 起动器应采用磁控。一般情况下, 电机应为直接在线启动, 但对于 20kW 以上的电机, 应采用降压启动方式(星三角、自耦变压器、变频器、软启动方式)。一般情况下, 控制电路的电压应通过变压器与主电源隔离。起动器接线图应安装在每个起动箱门的背面。带运行指示灯启动/停止按钮盒应安装在各自电机附近。停止按钮上要有锁。启动/停止按钮盒暴露在户外下, 应采用不锈钢盒保护。一般情况下, 起动器应尽可能组合在起动板上。组合起动板应采用壁挂式或埋入安装, 并应尽可能安装在各自电机附近。组合起动面板中的起动器应彼此物理隔离。未包含在组起动板中的起动器应安装在船用型防滴金属柜中。一般情况下, 在 MSB 和其他 10kW 及以上的电动机的组起动面板上的起动器上应安装 1.5 级电流表和运行小时计数器, 运行小时计数器需在监测报警系统上显示。起动器上的电流表应该是过载型的。

In general, starters shall be of magnetic control except that small motors not more than 0.5kW may be manually operated by line switch on each pole. In general motors shall be arranged to start direct on-line, but reduced voltage starting means (star-delta, autotransformer, frequency converter or soft starter) shall be adopted for motor more than 20 kW. In general, voltage for control circuits shall be isolated from main power source through transformer. The wiring diagram of starter shall be fitted on the back of each starter box door. The start/stop with running indicating lamp push button box shall be installed near respective motors. The stop push button to be provided with lock. The start/stop push button box exposed to weather shall be protected by stainless steel box. In general, starters shall be assembled in group starter board, as far as practicable. These group starter boards shall be of bulkhead or floor mounting type and shall be installed near the respective motors as far as practicable. Starters which are contained in the group starter panels shall be physical isolated from each other. Starters which are not contained in the group starter panels shall be mounted in the marine type drip-proof metal cabinet. In general ammeter of class 1.5 type and running hour counter shall be equipped on the starters in group starter panel in MSB and other motors of 10 kW or above. Running hour counters for motors above 10 kW to be provided in the IAS, The ammeter on the starter shall be of overload type.

- 11) 所有安装在驾驶室的指示灯(除了报警指示灯), 需带有独立调光功能, 可以调节至完全黑暗。

All signal lamps in the wheelhouse, except alarm lamps, shall have dimming from maximum to completely dark. Lamps serving different systems shall have separate

dimmers.

12) 用于高温的温度传感器用NiCr/Ni, 用于中低温的温度传感器用Pt100。

Sensors for high temperatures, such as exhaust gas, shall be NiCr/Ni thermocouples.

Sensors for low and intermediate temperatures shall be Pt100 types.

### 3. 供图范围

#### Scope of drawing to be supplied

1) 认可图纸: 3份和电子文件(用电子邮件提交, 图纸格式为 AutoCAD2000, 文件格式为 PDF 或 Excel)

Approval drawing: 3 copies and also to be submitted by E-mail in form of AutoCAD2000 for drawings, PDF or Excel for documents.

2) 工作图纸(根据注解修改的图纸): 3份, 1份电子文件。

Working drawing (drawing modified according to comments): 3 copies 1 copy of Electronic format documents.

3) 完工图纸/使用维修手册: 3份白图/船+1份 CD/船+3份 U 盘/船(图纸为.DWG 和.DXF, 文件为.PDF 格式)

Final drawing/Manuals 3copies per ship+1CD folds &+3folds of U-disc of per ship (in .DWG format for drawings, in .PDF format for documents) .

4) 在船厂通知中标厂家后, 为了保证设计进度, 卖方要在 2 周内提供设备布置、最终负载、基座尺寸、外型尺寸等设备基本信息。合同生效后, 卖方应在 2 周内提供认可图纸。完工资料和证书必须在到货后 30 天内提供给买方。如果不能按期提供, 罚款率为每周按货款总额的 1%, 不足一周者, 按一周计算, 罚款最多不得超过本合同总价的 5%。

After the shipyard notifies the winning manufacturer, Seller need provide preliminary vendor information as layout, Final loads, Foot print, geometry etc.. to keep design schedule. After the contract is executed, seller should submit the approval drawing to buyer within 2 weeks. Final drawing and certificate delivery to buyer within 30 days after the goods arrive, if the seller fails to delivery to the buyer on time, penalty shall be charged at the rate of 1% of the total value for every week, and days less than 1 week should be counted as 1 week. The total penalty shall not exceed 5% of the total value of the goods involved.

5) 在收到认可图后, 买方应回复认可意见, 若在 4 周内, 买方未回复认可意见, 则视为买方没有意见。卖方需对买方的认可意见在 5 个工作日内作出回复, 如不回复, 则视为卖方同意买方的所有认可意见。

After receiving the approval drawing, Buyer should return approval comments within 30 days, if Buyer has not returned the comments within 4 weeks, that means Buyer has no comments on the approval drawing. Seller should give reply to Buyer's approval comments or give explanation within 5 working days, if not reply, that means Seller has accepted all of Buyer's approval comments.

- 6) 图纸及文件应为: 英文或中英文。  
The drawings and documents shall be in English or Chinese/English.
- 7) 卖方应在交货时或买方要求的更早时间提交设备的船上交验程序(英文/中英文)。  
Seller should submit the on board commissioning procedure (in English or Chinese/English) delivery of the equipment or more early as required by the buyer.
- 8) 备件和工具清单应另外提供。  
Spare parts and tool list to be delivered.
- 9) 前述的相关 1~8 条款也作为供货范围一部分。  
The maker supply should be satisfied item 1~8 as above.

#### 4. 图纸内容

##### Detail of the drawings as following

序号 No.	图纸名称 Drawing name	认可 图 Appr. draw.	工作 图 Work. Draw.	完工 图 Final draw.	备注 Remarks
1	结构使用及维修说明书 Description instruction & maintenance manuals		√	√	
2	外型图 (包括传感器布置) Outline drawing (incl. sensor arrangement)	√	√	√	包括电子版 (CAD,DXF,DWG) 比例 1:1
3	管系图 Piping diagram	√	√	√	
4	控制系统图 Control system diagram	√	√	√	
5	电气原理及接线图 Electric wiring & connection diagram	√	√	√	
6	运行参数表 Operation data sheet	√	√	√	
7	放样小样 1:1 Lofting scale 1:1	√	√	√	包括电子版 (CAD,DXF,DWG)
8	附件清单 Accessory list	√	√	√	
9	备件清单 (带示意图) Spare list & tool list (with diagrams)	√	√	√	
10	试验程序及方法 Test procedure & method	√	√	√	
11	安装说明书 Installation manual	√	√	√	

序号 No.	图纸名称 Drawing name	认可图 Appr. draw.	工作图 Work. Draw.	完工图 Final draw.	备注 Remarks
12	安装图 Installation drawing	√	√	√	
13	与外部管路联接的法兰坐标图 Coordinate drawing of connection flanges for external piping	√	√	√	
14	提供 3D 模型, 须提供 stl, stp, step 文件 Providing 3D models, file type should be stl, stp, step format	√	√	√	

附注 Remark:

n 认可图、工作图需注明每一部件的重量, 实际来货的重量与图纸的重量有变化的需要通知船厂, 设备来货实际重量与提供的协议(认可图)重量的误差需在 3%之内。

Approval and working drawing should show the weight for each main part, any weight change in delivery must be recorded and informed to yard, the error weight of the equipment delivered should be within 3% .

n 认可图, 工作图, 完工图均应装订成册, 并有封面及目录;

Approval, working and final drawings should be bound up into one volume respectively with covers and contents

n 电缆应标明截面或通过电流. 电气接线图内须标明系统/设备的额定功率及电流。

For the cable, please also mark the cross sectional area or the current (ampere)

n 如实际来货与船厂确认的认可图不一致, 设备厂商需免费派遣服务工程师来船厂依据认可图纸整改并且船厂保留索赔的权利。

If the actual delivery is inconsistent with the approved drawing confirmed by the shipyard, the equipment manufacturer should send the service engineer to rectify according to the approved drawing free of charge and shipyard reserves the right to claim.

## 5. 售后服务: 见商务合同

Commissioning: Please see the commercial contract

## 6. 卖方提供的材料和设备应满足但不局限于下列规则和规范的要求:

The vessel to be registered in a port of MALTA and to be built in accordance with the following rules, regulations and conventions:

-International Convention on Load Lines, 1966 with the Protocol of 1988 and 2003 amendment.

-International Convention for the Safety of Life at Sea, 2020

and applicable IMO Standards (eg. IMO performance standard for Protective Coatings, IMO PSPC).

-International Convention for the Prevention of Pollution from Ships, 1973 (Annex I,

- IV, V & VI (Regulation 12, 13 and 16)), as modified by the Protocol 1978 and Latest Amendments (herein called "MARPOL 73/78").
- Convention on the International Regulations for Preventing Collisions at Sea, 1972 with the Amendments up to 1993 and latest amendments (2007).
  - International Convention on Tonnage Measurement of Ships, 1969.
  - International Telecommunication Union (ITU) Radio Regulation, 2016 with GMDSS, and latest amendments.
  - Rules and Regulations Governing Navigation of the New Panama Canal and Adjacent Waters and Rules for the Measurement (Panama Canal Universal Measurement System) of Vessels.
  - Rules of Navigation of the Suez Canal Authority, including Regulations for the Measurement of Tonnage.
  - Rules and Regulations of USCG for Foreign Vessels Operating in the Navigable Waters of the United States (CFR Title 33 - Navigation and Navigable Waters, Part 155, 156, 159 and 164, without certificate nor inspection) with letter of compliance.
  - ILO Code of Practice (Safety and Health in dock work).
  - ILO Convention Concerning Crew Accommodation on Board Ships (No. 92 and 133).
  - ILO 147: ILO Convention concerning Crew Accommodation onboard ships.
  - Maritime Labour Convention 2006
  - International Code for Fire Safety Systems (FSS Code)
  - International Life-Saving Appliance Code (LSA Code)
  - International Ship & Port Facility Security Code (ISPS Code)
  - IEC, Publications and Recommendations of the International Electrotechnical Commission, publication 60092 Electrical Installations in Ships
  - IMO A.830(19) Code on Alarms and Indicators
  - IMO MSC Circ.648 Guide for the operation, inspection and maintenance of ship sewage system
  - IMO Resolution A.868(20) Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens
  - International Convention on the control of harmful anti-fouling systems on ships, 2001 including latest amendments.
  - BMW convention with D2 standards.
  - IMO MEPC.306(73) – Amendments to the guidelines for BWM
  - Marine Equipment Directive (MarED) EU Council directive 96/98/EC as amended (Wheelmark)
  - IGF code
  - Safety and Health Regulations for Longshoring, U.S. Department of Labor.
  - ICS Guide to Helicopter/Ship operations (Winch only)
  - Society for gas as a marine fuel (SGMF) Guidelines for LNG Bunkering 2019
  - EEDI and SEEMP rules
  - IMO MEPC 1/circ 854 Annex VI Tier III requirements for dual fuel ships
  - 2013 VGP compulsory requirements for foreign flag ships calling USA ports
  - Ship recycling rules IMO res A.962(23), Res A.980(24), MEPC 269(68) and EU No

1257/2013

- Relevant rules of carrying dangerous cargo as specified in Chapter 2
- National Maritime Regulations of the Flag
- Code on Noise levels on board ships (the noise code – MSC.337(91))2012, including latest amendments
- ISO 6954:2000(E) "Mechanical vibration Guidelines for the measurement, reporting and evaluation of vibration with regard to habitability on passenger and merchant ships".
- IMO MSC.1/Circ. 1471 Recommendation on safety measures for existing vehicle carriers carrying motor vehicles with compressed hydrogen or natural gas in their tanks for their own propulsion as cargo
- IMDG Code, as applicable for New energy vehicles
- Mooring equipment, ref SOLAS ch.II-1/3-8. MSC.1/Circ. 1620 guidelines for inspection and maintenance of mooring equipment including lines (enter into force 1/1/2023)
- Lifting appliances, ref SOLAS Ch. II-1/3-13 adopted by MSC107 /2023 (enter into force 1/1/2026)
- Shore power requirements for PCTC's stipulated in IEC/IEEE 80005-1 "Utility connections in port - Part 1:High Voltage shore connection (HVSC) systems and its Amendment 2 (IEC80005-1b-2023) Annex G "Additional requirements for Vehicle carriers" approved by IEEE board on 5/6/2023.

## 7. 本船设备需满足以下技术规格书的要求: **The requirement of technical specification**

### 1174 Loading computer

A loading computer (Owner's supply) to be provided to calculate the stability before departure. The loading computer system shall be interfaced to IAS, (tank level content, draught readings). Yard to provide the ship data to develop the loading software.

### 8732 Sounding pipes

Ballast tank remote sounding system to be provided with display in ECR and ship office, and on-line the loading computer. An electro-pneumatic type tank level gauge system to be provided for ballast and peak tanks and ship drafts.

For fuel bunker and storage tanks, remote sounding system to be provided, with display in ECR.

Remote sounding shall be of electrical type or equivalent with continuous reading.

Level alarm for bilge wells on tank top to be fitted on car deck No 1 and E/R bilge wells.

Fuel oil service tanks to have single remote sounding system, level glasses/gauges and sounding pipes with recess mounted plugs on deck 5.

All double bottom tanks which are equipped with single remote sounding to be provided also with manual sounding devices.

Remote sounding system, tank data, shall be on-line with the loading computer.

### 9903 Sensors and installation

Standardizing of sensors/transmitters shall be given high priority. Sensors selected as standard for the vessel shall be used wherever possible.

Analogue sensors/transmitters shall be used as far as possible.

Sensors for high temperatures, such as exhaust gas, shall be NiCr/Ni thermocouples. Sensors for low and intermediate temperatures shall be Pt100 types.

Float type level switches shall be used where switching is required (e.g. high/low level alarm, start/stop of pumps).

Level switches for sewage tanks and other tanks shall be resistant type for highly corrosive content.

Shut off and test valves with standard connection to be fitted for all pressure regulating and measuring units.

In general, level switches to be fitted with a testing device.

Thermometers, thermocouples and thermo-resistance bulbs for remote indication and alarm to be provided with pockets and connections shall be arranged to draw-out for testing purposes.

All sensors installed in hazardous areas shall be Ex-type. All intrinsically safe circuits shall have a Exi-barriers.

#### 9911 Integrated Automation System (IAS)

The machineries having own separate stand-alone automation will be interfaced to integrated automation system (IAS) by serial line. For example, following systems may be connected to IAS by serial line interface (Ethernet or communication cable):

Navigation System

Dual Fuel Boiler System

LNG System (incl. ESD, LNG gas detection system)

Main DF Engine, Auxiliary generator sets

SG Frequency Drive System, SGFC1

Remote Controlled Valve System (for tank level alarms)

Voyage Data Recorder, VDR

Onboard Energy Management System

Battery Management System, BMS

Solar Panel Management System (option)

#### 9941 Remote Tank and Draft Gauging System

An independent remote tank level monitoring and draft gauging system with electro-pneumatic (bubbling) tank level measuring type of transmitters shall be provided.

At least, the following tanks shall be included to remote sounding system:

Ballast water tanks

Bilge water tank

Fuel oil service, storage and settling tanks (Electric pressure transducers to be used)

Heeling tanks

LNG level monitoring will be by LNG system. LNG tanks level, mass volume and density will be sent from the LNG system to remote tank level monitoring and draft gauging system and from from the system to loading computer.

Tank levels to be connected via serial lines from tank remote sounding system to the loading computer. Tank level alarms will be connected to the IAS system

#### 9971 Draught, Trim and List Measuring System

A Draught, Trim and List Measuring system is to be provided with indication to the Bridge. System may be integrated to the ballast and remote valve control system according to maker`s practice.

Interfaces to IAS, loading computer and cargo/ballast systems.

#### 9972 Loading Computer

One (1) on-line loading computer shall be installed for simulation and calculation of different loading conditions.

System will cover calculations related to intact stability, longitudinal strength and car and cargo stowing planning.

Interface connections to be provided with draught, trim and list measuring system, and tank gauging system.

The loading computer will be Owners supply and the Yard will provide the data for preparation of the software

#### 998 Onboard Energy Management System

Onboard energy management system Interfaces to other systems shall be arranged as follows:

- Integrated automation system, IAS (if not part of it)
- Navigation system
- Shipboard data network
- Draught, Trim and List Measuring System



8. 如果厂家的技术协议和规格书有偏离的需要详细列出。

**In case maker' s standard execution deviates from Buyer' s standards as set out in the Specifications (Item 8), the deviation should be list as below:**

序号 No.	页码 和项目 Page and Item	买方要求 Buyer's requirement	卖方意见 Seller's clarification	差异原因 Reason & Benefits	结论 Conclusion
1					
2					

除特别说明, 如第9款及以下内容与第1~8款有矛盾时以第1~8款为准。

Except special note, if any discrepancy is found between item 9 together with the following description and item 1~8, item 1~8 to be taken precedence.

## 9. 详细规格及供货范围

Details of specification and scope of supply

见后页

See the following pages.

# Technical Agreement

## Marine Tank Management

### Tank Level Gauging

Shipyard: Fujian Mawei Shipbuilding Ltd

Newb. No: MW467-1/2/3/4

Class: DNV

Revision: A



A handwritten signature in black ink, appearing to be the initials "LW".

A handwritten signature in black ink, appearing to be the Chinese characters "董" (Dong).

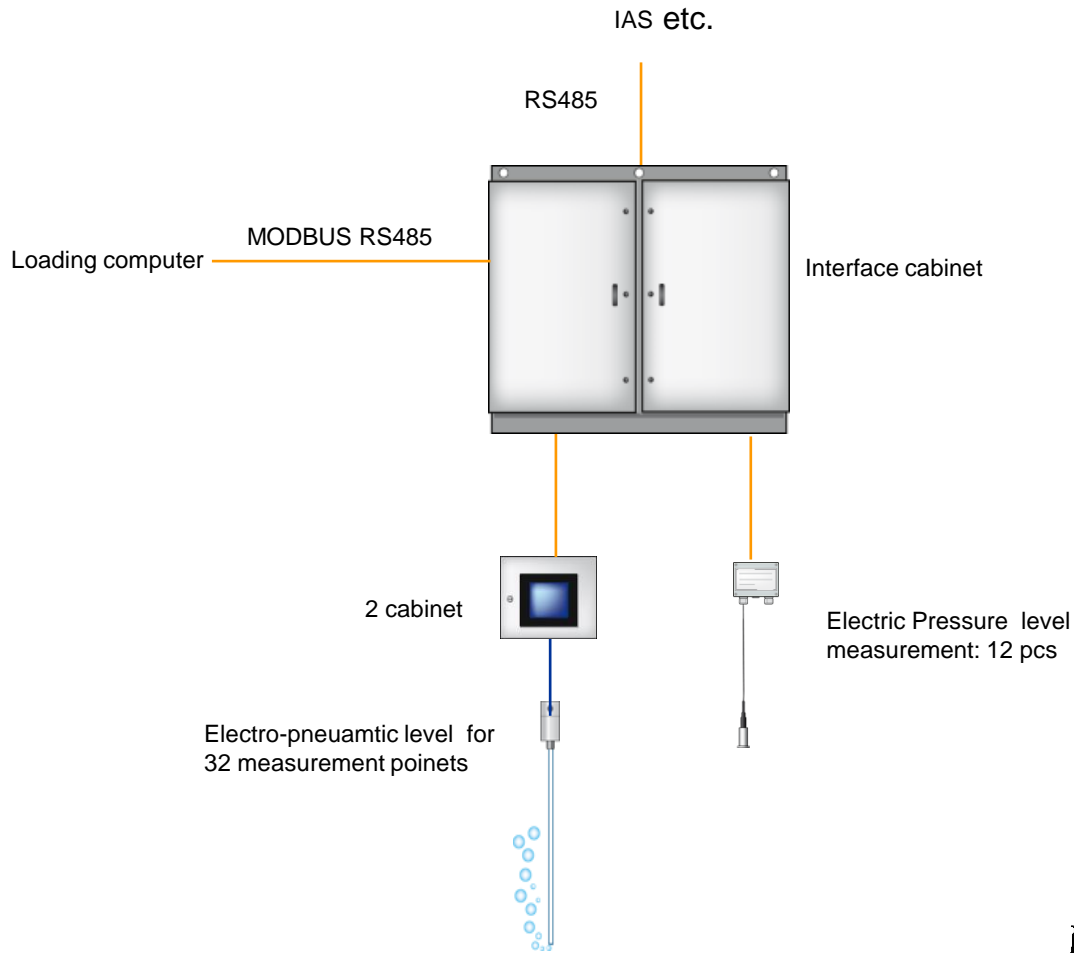
• System Layout For Reference



Project: 4200 PCTC  
HULL NO. : MW467-1/2/3/4

Date: 2024-04-11

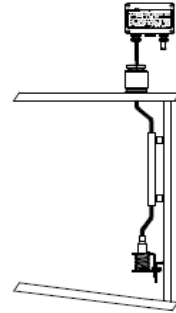
Author: zhaoliang



## 1.01 Electric Pressure Sensor – Top Mounted

7 Pcs Sensor mounted inside the tank and prepared to be specified later

Each tank gauge sensor is connected through a junction box to the system control by means of 4-20mA, each sensor installation consists of below parts.



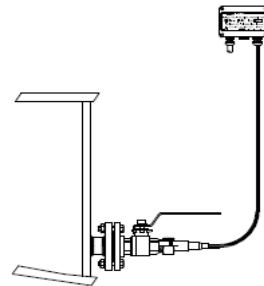
### Parts list:

1	Gauge transmitter, IP68
1	Cable Skotten with welded flange DN50
15m	Standard cable up to 85 deg. C
-	(Cable length can be confirmed by yard in approval drawing)
1	Brackets for internal mounting
1	Junction box with cable gland, material: Polyester, IP56

## 1.02 Electric Pressure Sensor – Side Mounted

5 Pcs Sensor mounted outside the tank and prepared to be specified later

Each tank gauge sensor is connected through a junction box to the system control by means of 4-20mA, each sensor installation consists of below parts.



### Parts list:

1	Gauge transmitter, IP68
5m	Standard cable up to 85 deg. C
-	(Cable length can be confirmed by yard in approval drawing)
1	DN 25 flange with 1" ball valve
1	Junction box with cable gland, material: Polyester, IP56

## 2.01 Electro-Pneumatic Level Gauging System

The electro-pneumatic level gauging system provides reliable information on tank levels, tank volumes and ship's draft. The system provides solutions for all types of vessels measuring ballast, fuel, miscellaneous tank and void spaces using electro-pneumatic technology. The system offers trouble-free ownership with limited life-cycle cost, ease-of-use configuration and fault-finding utilities.

The system consists of 2 cabinets with a total of 32 measuring points. Each cabinet contains pressure sensors, non-return valves, air filter and has RS-485 MODBUS RTU as standard interface. Each measuring point is connected from tank or void space through yard supplied piping to the cabinets. H8 system automatically purges the pipes at preset intervals in order to keep them clean.

The cabinets are coated with Standard RAL 7035. (confirmed in approval drawing)

*Note: on deck piping, in-tank piping shall be supplied by the yard. Dry and clean instrument air of maximum seven (5-8) bar pressure shall be provided from the ship's control air supply system.*

### Parts list:

- 1 x H8, cabinet for 24 measuring points IP54 with metal cable gland
- 1 x H8, cabinet for 8 measuring points IP54 with metal cable gland
- 1 x Power Supply 230/115 VAC 60Hz
- 1 x Air Filter
- 1 x Rs485 Modbus RTU
- 32 x Pipe Connector
- 12 x NRV, AISI 316L, Integrated ball valve, AISI 316L, Flange DN25 PN16
- 20 x NRV, AISI 316L, Flange DN25 PN16

Note: 4 pcs DN50 shipside valve (confirmed in approval drawing) supplied for Draft.

## 3.01 Interface Cabinet

- 1 Interface with I/O modules for controlling and supervision of signals IP44, with metal cable gland  
Yard power supply : AC440V / 230V 60 Hz; DC24V

Mounted with

interface module to be installed for below function:

- 44 Tank level gauge, draft monitoring
- 1 Inclinator for trim/heel
- 1 System alarm, Power failure alarm relay output to IAS
- 1 Modbus Rs485 to IAS
- 1 Modbus Rs485 to loading computer
- 1 Modbus Rs485 to onboard energy management system
- 1 Modbus Rs485 (spare, if necessary)

## 4.01 Spare Parts

1 set of spare parts according to Emerson standard and Class recommendation



TANK LIST			
Customer: Fujian Mawei Shipbuilding Ltd		Hull: MW467-1/2/3/4	Type: 4200PCTC
System: TANK LEVEL GAUGE		Class: DNV	Revision: Rev.A

Item	Tank Name	Installation		Measuring Range		Cable Length m	Location			Type		Remark
		Top	Side	Tank (m)	Vent pipe (m)		Safe	Haz	Deck	Pressure Sensor	Electric-Pneumatic	
1	WBAP,BALLAST(PS)		✓				✓				X	
2	WBAP,BALLAST(SB)		✓				✓				X	
3	WB7C,BALLAST WATER	✓					✓				X	
4	WB7P,BALLAST WATER	✓					✓				X	
5	WB7S,BALLAST WATER	✓					✓				X	
6	WB6C,BALLAST WATER	✓					✓				X	
7	WB6P,BALLAST WATER	✓					✓				X	
8	WB6S,BALLAST WATER	✓					✓				X	
9	HWBP,BALLAST(P)		✓				✓				X	
10	HWBS,BALLAST(S)		✓				✓				X	
11	WB5C,BALLAST WATER	✓					✓				X	
12	WB5P,BALLAST WATER	✓					✓				X	
13	WB5S,BALLAST WATER	✓					✓				X	
14	WB4C,BALLAST WATER	✓					✓				X	
15	WB4P,BALLAST WATER	✓					✓				X	
16	WB4S,BALLAST WATER	✓					✓				X	
17	WB3C,BALLAST WATER	✓					✓				X	
18	WB3P,BALLAST WATER	✓					✓				X	





TANK LIST			
Customer: Fujian Mawei Shipbuilding Ltd		Hull: MW467-1/2/3/4	Type: 4200PCTC
System: TANK LEVEL GAUGE		Class: DNV	Revision: Rev.A

Item	Tank Name	Installation		Measuring Range		Cable Length m	Location			Type		Remark
		Top	Side	Tank (m)	Vent pipe (m)		Safe	Haz	Deck	Pressure Sensor	Electric-Pneumatic	
19	WB3S,BALLAST WATER	✓					✓				X	
20	WB3,BALLAST WATER	✓					✓				X	
21	WB2,BALLAST WATER	✓					✓				X	
22	WB1P,BALLAST WATER		✓				✓				X	
23	WB1S,BALLAST WATER		✓				✓				X	
24	WBFP,BALLAST WATER	✓					✓				X	
25	LSHFOSERV1,LSHFO SERVICE1	✓					✓			X		
26	LSHFOSETT1,LSHFO SETTLING1	✓					✓			X		
27	LSHFOSERV2,LSHFO SERVICE2	✓					✓			X		
28	LSHFOSETT2,LSHFO SETTLING2	✓					✓			X		
29	LSHFOTORS,LSHFO C		✓				✓			X		
30	LSHFOTORS,LSHFO P		✓				✓			X		
31	LSHFOTORS,LSHFO S		✓				✓			X		
32	MGOSERV2, MGO SERVICE2	✓					✓			X		
33	MGOSERV1, MGO SERVICE1	✓					✓			X		
34	MGOSTOR, MGO		✓				✓			X		
35	LOSUMP, S/T LO SUMP	✓					✓			X		
36	MELOSUMP, ME LO SUMP		✓				✓			X		



TANK LIST		
Customer:	Fujian Mawei Shipbuilding Ltd	Hull: MW467-1/2/3/4 Type: 4200PCTC
System:	TANK LEVEL GAUGE	Class: DNV Revision: Rev.A

Item	Tank Name	Installation		Measuring Range		Cable Length	Location			Type		Remark
		Top	Side	Tank (m)	Vent pipe (m)	m	Safe	Haz	Deck	Pressure Sensor	Electric-Pneumatic	
37	OILYBILGE,OILY BILGE TANK	✓					✓				X	
38	BILWAT,BILGE WATER	✓					✓				X	
39	GREYWAT,GREY WATER		✓				✓				X	
40	BLAWAT,BLACK WATER		✓				✓				X	
41	Draft sensor(Fwd)		✓				✓				X	Sea side valve to be supplied by maker
42	Draft sensor(Aft)		✓				✓				X	Sea side valve to be supplied by maker
43	Draft sensor(Mid/P)		✓				✓				X	Sea side valve to be supplied by maker
44	Draft sensor(Mid/S)		✓				✓				X	Sea side valve to be supplied by maker
<b>NOTE: 1,The specific installation type needs to be confirmed in the approval drawing. 2. The specific alarm signal from sensor needs to be confirmed in the approval drawing 3,The measurement range is conformed in the approved drawing</b>												