Volvo Cars Asia Pacific

PTS PROJECT

Logistics

VCDQ Pick to sequence package1

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Definitions

VCC -- Volvo Car Corporation

VCC -- 沃尔沃汽车制造公司

VCDQ -- Volvo Cars Daqing Plant

VCDQ--沃尔沃汽车大庆工厂

HMI -- Human Machine Interface

HMI -- 人机交互界面

FMEA -- Failure Mode Effect Analysis

FMEA -- 潜在失效模式分析

LCC -- Life Cycle Cost analysis

LCC -- 寿命周期成本分析

Equipment -- Shall be considered equivalent to the concept Product as this is used in IEC 61346

Equipment --设备-在 IEC 61346 应用中，与产品的概念等同。

Poka Yoke -- Error & Mistake Proofing system

Poka Yoke -- 防误&防错系统

PTL -- pick to light

PTL -- 物料捡料灯

PTS -- Pick to sequence

PTS -- 排序拣料系统

PTV -- Pick to voice

PTV – 语音拣选系统

SFIT -- Shop Floor IT

VD -- Virtual device

VD -- 虚拟服务器

PO -- Purchaser order

PO -- 采购订单

APPENDIX B 附件 B

Technical specifications

技术说明

1. General Description

1.1 Introduction 简介

This project is defined as one totally new PTS system for VCDQ TCF shop LC area, it's included the hardware selection, software design and programing, IT network connection and commissioning, PTS system installation and commissioning.

本项目被定义为在 VCDQ TCF 车间物流 LC 区域搭建一套全新的排序拣料系统，它包括了硬件选型，软件的设计和编程，IT 网络的连接和调试，排序拣料系统的安装和调试等等。

1.2 General Rules 一般性要求

1. The scope of supply shall be defined as a turn-key project of delivery the proper solution and equipments to C shop Volvo Daqing Plant.

本项目定义为对所需交付给沃尔沃大庆工厂总装车间的方案和设备的交钥匙工程。

2. Volvo Daqing will welcome the contractor for the latest technology and design with neccesay changes towards machine functionality in a formal discussion.

沃尔沃大庆工厂欢迎供应商通过正式渠道提供最新科技和设计。

3. The time schedule of this project shall be followed the planned target shown in Appedix C.

整体项目时间计划可参考附件 C。

4. Volvo reserves the right of final explaination and revision for the terms of this bidding documentation.

沃尔沃对本投标文件保留最终解释权。

5. The latest formal interpretation from Volvo shall be the final reference.

最终参考应为出自于沃尔沃的最新文件。

6. All changes or remarks will ONLY become into effect after formally agreed by the responsible Volvo Engineer.

只有沃尔沃对应项目工程师认可的变更或注释方可生效。

1.3 Scope of Supply 供应商范围

1.3.1 Contractor's Responsibility 承包商职责

- Design 设计
- FMEA 失效模式分析
- Manufacturing 制造
- Delivery 运输、交付
- Installation 安装
- Start-up and take into operation 就位，运行
- Education and training 教育及培训
- Standby 陪产
- Safety requirements and safety tests 满足安全需求和安全测试
- Electric drawing use Eplan 2.3/2.4 使用 Eplan 2.3 或 2.4 版本进行电气图纸设计
- Overview and copy of other technical specifications used in the design 总结和参考其它技术规范并植入到设计中
- On a regular base the design and manufacturing of the installation will be discussed With TCF 设备的设计和制造要定期与 Volvo TCF 进行讨论
- The contractor will deliver documents with a risk analysis at the start-up of the installation including safety lay-out and a test report with all "safety items". 供应商需在安装前提供带有安全布局图和测试报告的风险评估表。
- Confidential requirement: contractor candidates shall not disclose any information like technical specification or documents that offered by purchaser to a third party, especially information involved with production capacity, car models, management process, price &

cost, key skills and so on must keep confidential severely, as required. 供应商严禁泄露本项目任何信息，如产量，车型，管理流程，报价和支出以及关键技术。

1.3.2 Purchaser's Responsibility 采购方职责

1. Electrical 供电:

The purchaser provides power distribution cabinet/box connect interface which is designed to be located by the production line.

采购方提供设计在生产线边的电源分布箱/盒的接口.

2. Network 网络:

The purchaser provides foreseen Network interface.

采购方提供设计好的网络接口.

1.4 Delivery Address 交付地址

33 Longxing road, Gaoxin District, Daqing, Heilongjiang, China P.R.

中国，黑龙江省大庆市，龙兴路 33 号

2. Function, Performance and Operating Capabilities 功能、性能及运作能力

2.1 Factory 工厂

Description	Amount
Required Production Volume 生产能力要求	120,000 J/Year
JPH 每小时下线量	30
Body pitch (mm)车位长度	6,000
Yearly net working hours 年工作小时	4000
OEE	≥96 %
Working shifts	≤3

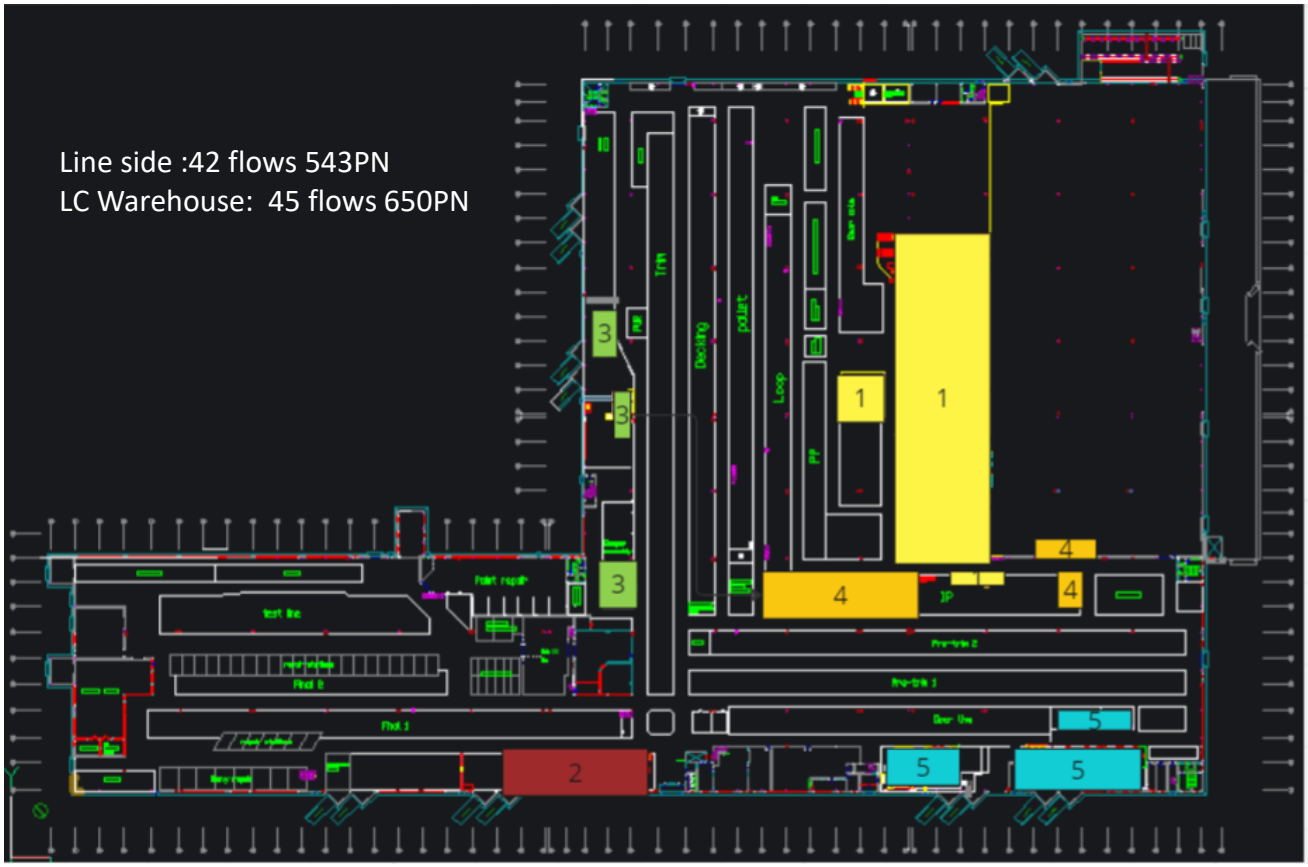
2.2 Equipment

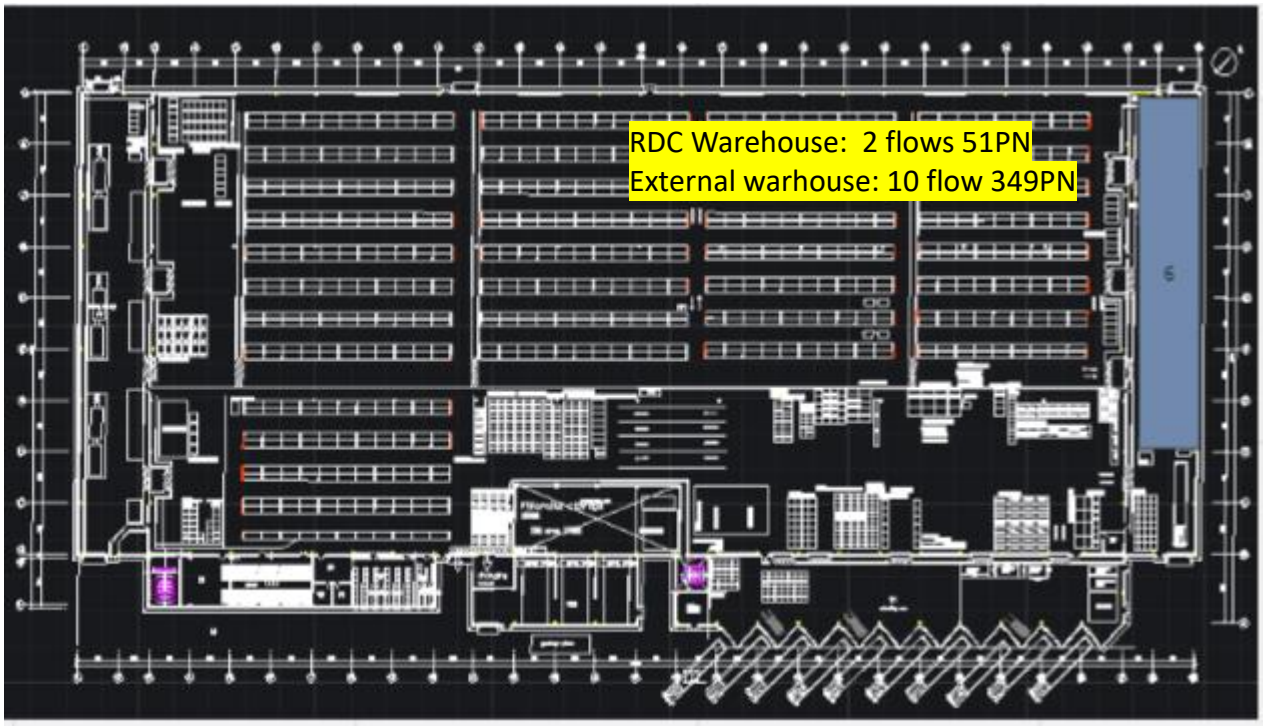
Description	Amount
Machine availability	99%
Reliability	≥99%
Cycle Time（Including operation）	≤102 sec
Life cycle time (Years)	15
Cmk	NA

3. Plant Description and Design Prerequisites

3.1 Plant Layout

The installation information will at TCF shop LC sequence area, detail as below
本项目安装区域在 TCF 车间 LC 物流物料排序区域&RDC 排序区域，生产线边排序区域，详见下图。





3.2 Factory Environment

3.2.1 Public Medium

Electricity: Three-phase five wire, AC 380±10%, 50Hz 三相五线制交流 380±10%, 频率 50Hz。

Compressed air: 6.3-7.5 bar 压缩空气：6.3-7.5 bar

3.2.2 Environment Condition

Temperature: -5℃~+45℃ 环境温度： -5℃~+45℃

Humidity: ≤90% 环境湿度：≤90%

Noise: ＜ 70 Db 噪音：＜ 70 Db

3.2.3 Plant's Condition

Ground Load: 3 T/㎡ 地面负荷：3 T/㎡

Roof lower beam height: elevation relative to ground 8.7m 屋架下悬高：相对地面标高 8.7m。

Loading capacity of suspension points: 300kg/㎡ 吊点负荷：300kg/㎡

3.3 Construction Interface

1. Electricity interface: the contractor is responsible for connecting between circuit breaker (VCDQ TCF FM cabinet) to PTS cabinet.

供电接口：供应商需要连接从 VCDQ TCF FM 配电柜到 PTS 配电柜的供电线路。

2. Compressed air: not applicable 压缩空气：不适用

3. Network: the contractor is responsible for connecting the network cable from VCDQ IT network to each switch which belong to this project.

网络：供应商负责将本项目所有的交换机连入 VCDQ IT 网络。

4. Concrete construction: not applicable. 混凝土施工不适用

5. PC: Supplier responsible for choice the PC purchase and installation if have. 如果本项目需要包含电脑主机，供应商负责电脑的采购和安装。

6. Programing and Commissioning: The contractor is responsible for whole project program design and commissioning.

编程和调试：供应商负责整个工程的程序设计和调试工作。

7. Electrci Drawing use EPLAN 2.3 or 2.4 or 2.8 version.

电气图纸使用 EPLAN2.3 或 2.4 或 2.8 版本进行设计。

4. Poka yoke project specification

4.1 Description of the project 项目简述

This project is request for design the PTS system and installation at VCDQ TCF logistic sequence area, include system design, new hardware exploit, programming, netwok set up, hardware installation and commissioning, training and standby.

本项目要求供应商为Volvo（大庆）工厂总装车间物流排序区域设计Pick to sequence系统，包括但不限于系统设计，新硬件开发，编程，网络构建，安装和调试，培训和陪产等等。

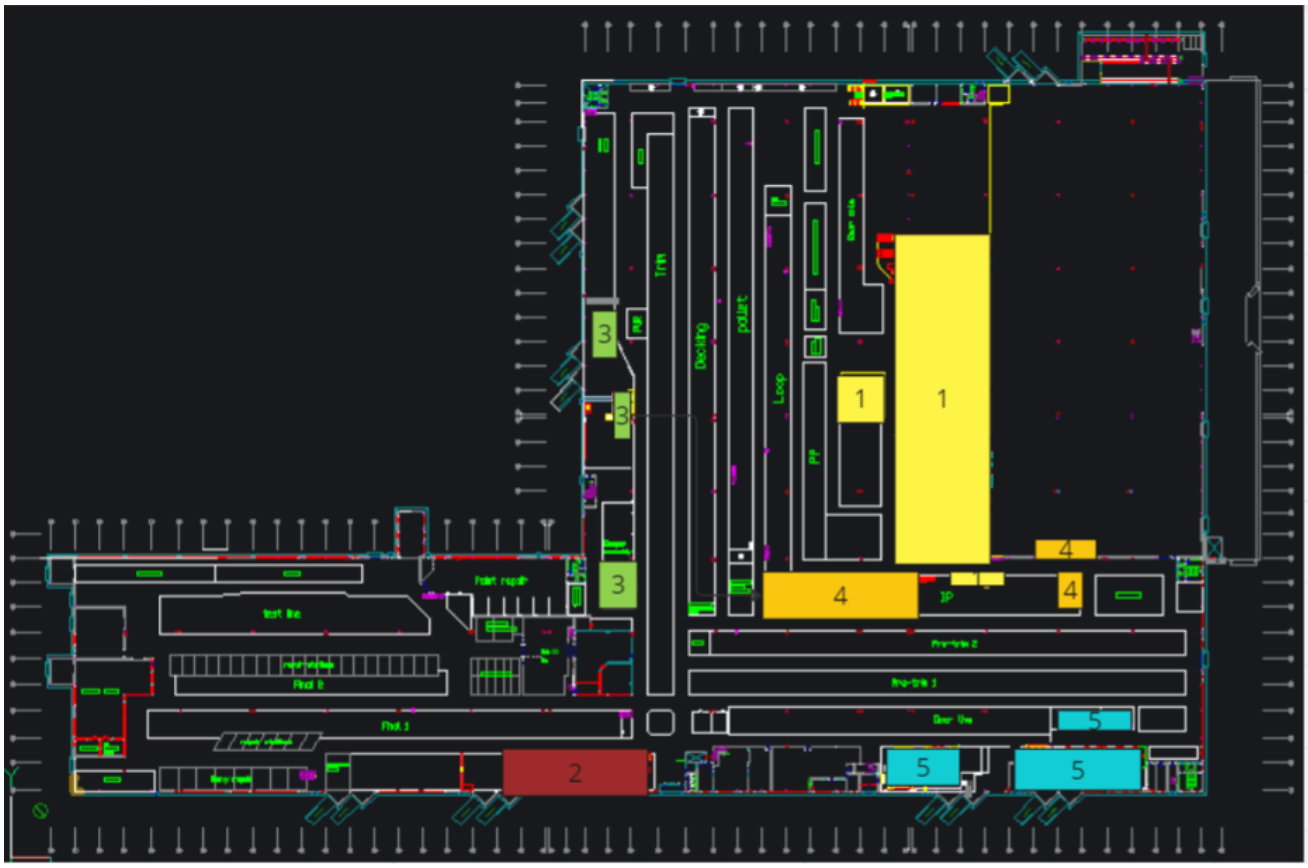
4.2 Function description 功能描述

The PTS system will be designed base on existing PTL system, system received one batch vehicle task from IT through communication and show the sequence and material to operiator.

PTS 系统要求基于现有的 PTL 系统进行设计，系统每次需要通过和 IT 通讯来获取一个批次车辆的拣料信息，然后把排序顺序和物料信息显示给操作工。

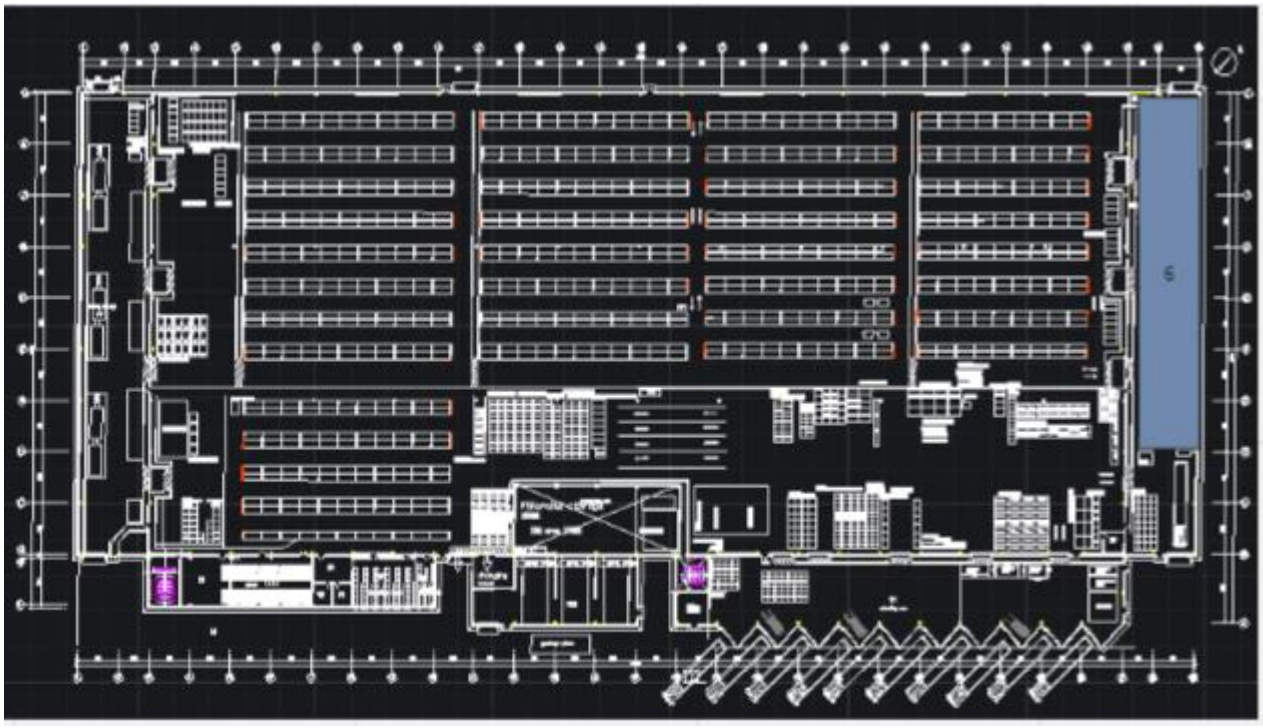
The system activity will separate to 2parts, detail as below picture

系统施工时间会分为 2 个阶段，详见下图



Step-1: installation time plan: 23W49-23W51

施工区域：生产线边排序区域+LC 库区排序区域



Step-2: installation time plan: 24W12-23W14

施工区域：RDC 排序区域+LC 排序区域转移至外库+外库安装

4.3 POKA YOKE detail requirement introduction

4.3.1 Pick to sequence scope clarify

1) EC 061836
2) This package includes LC area power source build and P2S system installation and commissioning.

4.3.2 Pick to sequence detail requirement

1. Total 93 sets sequence flow

   共计 93 个 Flow 的 PTS 拣料排序循环

2. Electric picking label 930 sets reqirement for whole area.

   排序区域共计需要 930 个电子标签。

3. The installation area is equipped with FM power cabinet, detailed configuration should be checked onsite. The power box should be build actual to the design, which should be approved by Vovlo.

   安装区域配置有 FM 的动力柜，详细的配置需要现场查看。供电箱根据实际设计提供，需要得到 Vovlo 的批准。

4. Supplier needs consider the network communication method and hareware, suggest use hub for connection with IT interface, the hardware should be famous brand and industrial grade.

   供应商需要考虑设计网络的通讯方法和硬件选材，建议使用集线器与 IT 进行连接，硬件选型方面必须是国际或者国内知名品牌的工业级产品。

5. Supplier needs to calculate the Xgate quantity depends by area and lamps requirement and confirmed with Volvo engineer.

   供应商需要根据安装区域的实际要求和电子标签的数量来计算 Xgate 的数量并与 Volvo 相关工程师确认。

6. Another four set X-GATE network controller should be considered

   额外的 4 套 X-GATE 需要提供。

7. Supplier needs to provide 3 set configuration computer and cabinet, computer type is 6AG4011-1CA11-0XX0, supplier should provide the display and other accessories. The windows system should be win10, supplier should be responsible for the system installation.

   供应商需要安装三台调试电脑，电脑型号推荐为 6AG4011-1CA11-0XX0，电脑和电脑柜均由供应商提供，电脑包含主机和显示器以及其他必要的配件.

8. Cabinet brand Beituo & Changchuan is recommend.

   电控柜推荐国产品牌贝拓或常川。

9. Supplier needs consider the network communication method and hareware, suggest use hub for connection with IT interface, the hardware should be famous brand and industrial grade.

   供应商需要考虑设计网络的通讯方法和硬件选材，建议使用集线器与 IT 进行连接，硬件选型方面必须是国际或者国内知名品牌的工业级产品。

10. Supplier needs to calculate the Xgate quantity depends by area and lamps requirement and confirmed with Volvo engineer.

    供应商需要根据安装区域的实际要求和电子标签的数量来计算 Xgate 的数量并与 Volvo 相关工程师确认。

11. Supplier should provide the programming source code to volvo.

    供应商需要提供系统开发源代码给 Volvo。

12. 60 people day Design & commissioning and 60 people day standby should be sondider for specific system development.

    针对特定的系统的开发，额外 60 人天的设计调试和和 60 人天陪产需要被考虑。

4.3.4 General requirement

1. Pick to sequence function should use to each logistic sequence area, it should have one main controller to control all the sequence picking request and sub picking system for different picking flow to show deteail picking number and storage.

PTS 系统需要适用于不同的物流排序区域，它需要有一个主控制系统来处理所有排序区域的拣选需求数据，然后在不同的排序区域有不同的拣料子系统来显示详细的物料拣选情况和库位放置要求。

2. Picking to sequence need to receive the material picking information by vehicle batch, different flow has different batch, when the PTS controller received one batch material sequence message, it will lighting the relative material lamps and show the storage location&material picking number to operator.

   PTS 系统需要按车辆批次接收物料的拣选信息，不同的物料排序区域接收的车辆批次数量不同，PTS 接收到一个物料的批次拣料信息后，它会点亮该区域内一批次需要拣选的所有物料的提示灯，并且将排序库位和拣料数量都显示给操作员工。

3. Picking to sequence will communication with Volvo IT server to get the picking information, supplier should ensure no delay and error for the communication.PTS main system will get all the materials information by different batch, the system should consider the response time and reliability for the system.

   PTS 系统需要通过和沃尔沃 IT 系统通讯来获取拣料信息，供应商需要确保整个通讯过程没有延时和错误， PTS 系统需要按不同的批次获取所有的拣选物料排序信息，供应商需要考虑整个系统的响应时间和稳定性。

4. Picking to sequence sub system setup by flow, each flow should have independent sub system, generally one flow should just have one material, but supplier need to consider one flow two material function.

   PTS 的子系统需要按物料链来配置，每一个物料链需要有其独立的一套子系统，通常来说一个物料链只包含一种物料，但是供应商也需要考虑一个物料链包含两种物料的情况。

5. Each flow will have one display area to show the batch Mix number status, for example one flow display area will show the mix number from 123456 ~ 123466(10 vehicle for one batch), some sequence mix number incontinuity, so just show the front and rear mix number is enough.

   每个物料链需要有一个数显区域来显示每个批次的 MIX 号，比如某一个物料链显示的 MIX 号为 123456 到 123466（此链每批次 10 台车），由于某些情况下 MIX 号可能会不连续，所以只需要显示出每次批 MIX 号的首位号数即可。

6. According to the logistic area will modify material layout frequently, supplier should consider the flexibility for the PTS system, include hardware and software, the lamp must easy to be add and remove at each flow, the system setup must keep in 10min by maintenance.

由于物流区域会经常性的优化物料的排布，所以供应商必须从硬件和软件两方面考虑 PTS 的柔性化设计，每个区域的拣料灯需要能被快速的增加或者减少，必须考虑能在 10 分钟内由维修完成系统设置。

7. One hooter should setup for each flow PTS, when pick the right/wrong part, a sound will be sent by hooter to indicate the picking status.

   每个 flow 的 PTS 需要有一个蜂鸣器，当员工正确/错误的拣取物料后，有一个声音会提示不同的拣料状态。

8. One pause and jump button will setup for each flow PTS. When press the pause button, the process will be paused, and all status are frozen. When this pause button is pressed again, it will recover. The jump button can jump out one batch flow and move to next flow when pressed.

   每个 flow 的 PTS 需要有一个暂停按钮和跳过按钮，当员工拍下暂停按钮时，所有的状态暂停，当前状态冻结，直到员工复位暂停按钮后状态恢复，当员工拍下跳过按钮时，该 flow 跳过当前批次的订单，生成下一个批次的订单。

9. The PTS system design by supplier, supplier need to show the detail design plan to Volvo and agreed by relative engineer before PO.

   PTS 的系统设计由供应商完成，在 PO 之前供应商需要向沃尔沃给出详细的设计计划并和相关工程师达成一致。

10. According to the sequence picking improtance, availability and reliability is KPI for the PTS system, availability and reliability must better than 99%, supplier must have fully consideration for the system running status and backup solution.

    由于物流排序拣料的重要性，PTS 系统的可靠性和有效性是其重要 KPI，必须确保其大于 99%，供应商需要充分的考虑其运行可靠性和失效模式的备用计划。

4.4 Material requirement 材料要求

1) The supplier shall purchase, acquire and install all components from owner approved list（**reference as 5.5 Purchasing Parts Requirement**） of material. Any deviations from the approved list of material must be approved by the owner in writing prior to use.

   供应商必须从经过业主审核过的材料清单中采购和安装所有的元器件(详细清单参考 5.5 采购方元件需求清单)，任何不属于材料清单中的元器件的使用，都必须通过业主的书面批准。

2) I/O cable should be multi-strand soft wire, the nominal cross section shall not be less than 1mm², if have special request，discuss with Volvo engineer。

I/O 电缆必须使用多芯软电缆，最低标称截面不得小于 1mm², 如果有特殊情况，需与 VOLVO 工程师协商 。

4.5 Project management

Project Management for all project related things Include all the design, manufacturing, delivering, installation, testing, training, stand by, after sale service and hand over.

保证项目顺利进行的全部项目管理内容包括整体的设计，制造，运输，安装，调试，培训，陪产，质保以及交验工作.

5. Common Technical Requirement

5.1 General

1) The equipment shall be designed, manufactured and installed in accordance with applicable International and European standards. The Volvo standards and specifications listed in Contract appendix E, shall also applied. Applicable EU directives shall be complied with
2) If there is fatal difficulty which makes it impossible to meet VOLVO standards, contractor must inform Volvo responsible engineer and get written approval. If not in accordance with VOLVO standards is not approved, even if Volvo has approved the drawings, contractor must modify design to meet VOLVO standards for free
3) Volvo shall countersign the approved drawings, and shall assume no responsibility for any design error or failure to meet any technical requirement. Issues proposed by Volvo during installation, trial operation and trial production shall be corrected without compensation if they are reasonable.
4) The whole supply including everything shall be considered as one machine and CE-marked by the contractor and be accompanied by Declaration of conformity
5) When supplier start with technical solution and design, the existing high value (unit price > 5000CNY) spare parts list (delivered in appendix I4_ R&M: 3_Maint. Demands on Spare Parts) shall always be the 1st choice for component selection, perhaps some components

can’t be purchased due to production upgrade or resource limit, supplier shall get agreement from VCCD responsible engineer before bidding.

5.2 Safety

Design, production, installation, construction and inspection must meet the national and industrial standards and Volvo standards as well as our requirements of relevant benchmarks and management methods.

Contractor must conform to following standards:

1) ISO 12100:2010 Safety of machinery
2) Appendix E: 8010.39, Safety of machinery
3) Appendix E: 8010.69, Safety requirement
4) Contract Appendix I1_ Local Safety Regulations

5.3 Mechanical

5.3.1 Conveyor system

Not applicable

5.3.2 Auxiliary works

Not Applicable

5.3.3 Other

1) Color chart: Follow appendix E: Priming and Painting.
2) Anti-loosening requirement: Follow appendix I7 Anti-loosening Requirement.
3) Additional protection must follow Volvo standard, see appendix I APPENDIX I10 Additional protection requirement for TCF equipment.
4) Noise emission: see standard VCS 8010.39.

5.4 Electrical Common Requirement

5.4.1 General

1) This is the guiding document for Volvo Technical Standard.

2) All design, integration, installation and programming shall follow the Volvo Standard (Appendix E). This is one of the final acceptance conditions.

3) Volvo Cars reserves the right of explaination. Any conflits shall be discussed with VCC responsible engineer. Deviations without written permission of VCC electrical responsible engineer will be un-acceptable.

4) The Volvo Programming Standard may be updated during project time due to latest technology development. This shall not be regarded as any forms of modification and change request.

5.4.2 Design

1) E-plan P8 is the only diagrams design platform. The contractor shall follow VCS 8008,5 as reference.

2) As a reference to electrical equipment, VCS 8015,29; 8015,159 has to be complied.

3) Safety systems for production equipment Definitions, stop functions: 8001,2

4) Safety rules: VCS 8010,39

5) Programming: VCS 8015,39; 8015,391

6) Profinet will be the only industry network to be implemented.

7) A start package will be released to the contractor after the contract is signed.

8) The use of component list (Appendix E): only the components on the list are freely chosen for the design, any deviation shall be written approved by VCC responsible engineer.

9) Besides those documents stated in handover document, VPSM file for each block shall be provided.

5.4.3 Installation

1) The installation has to meet the requirement of ergonomics, the contractor has to provide a reasonable installation of every components. Some reference can be found in VCS 8000,5; 8010,39; 8003,29.

2) Moving cables requirement is clarified in Appendix E

3) Part of function test: refer to VCS 8015,5.

5.4.4 Project management

1) The project team shall be stable within the project period, any changes within electrical organization chart shall be discussed with VCCD in 2 weeks advance.

2) Regular meeting shall be appointed within the project period.

3) Every person working for this project is required for an Electircian Certificate which is ready for inspection from VCC at anytime.

5.4.5 Others

1) Network connection and IP address shall be clarified in the requirement. The contractor shall make the network concept and a quantity proposal of IP address.

5.5 Purchasing Parts Requirement

The list as below is use for supplier material purchasing reference:

Equipment	Description	Brand	Remarks
PLC	PLC 控制器	SIEMENS	1517F/1512F
HMI	人机界面	SIEMENS	TP1500
Prox Switch, etc.	接近开关	Turck/P+F	
Photo Sensor	光电开关	SICK/Schneider	
Limit Switch	限位开关	Schneider	
Switch,push button,Led, etc.	操作按钮、旋钮、塔灯等	Siemens Schneider	
Circuit Breaker	断路器	Siemens Schneider	
Contactor	接触器	Siemens Schneider	
Relay	继电器	Siemens Schneider	
DC Power supply unit	直流电源	Siemens Schneider	
Terminal	控制柜端子内	Phoenix	
Multi-cable Connector	多芯电缆接头	Harting	
Fuse	柜内熔断丝	Siemens Schneider	
Palm button	人工操作台按钮	Siemens Schneider	
Cable	电缆	Lapp, Belden	
Sensor cable	传感器电缆	Turck	
Y cord cable	三通电缆	Siemens	
communication cable	通信电缆	Lapp, Belden	
DP/DP Coupler PN/PN Coupler	总线耦合器	Siemens	

I/O module IP20	I/O 模块 IP20	Siemens	
I/O module IP67	I/O 模块 IP67	Siemens	
Encoder	编码器	SICK/P+F	
Profinet switch	交换机	Siemens	
RFID Components	RFID 元器件	SICK	Volvo specification
Cable tray	电缆桥架	OBO/Huawei(江苏华威)	
Cabinet	各种盘柜	Rittal	
Cabinet fan	盘柜风扇	Rittal	
Cabinet air condition	盘柜空调	Rittal	
Light Curtain	光栅	SICK	
Scanner	雷达	SICK	
Safety components	安全元器件	PILZ	
Safety door locker	安全门开关	EUCHNER	
Cylinder(standard)	气缸（标准）	FESTO	
Air Filter	缓慢进气阀	FESTO	
Pressure Switch	压力检测开关	FESTO	
AIR 3 SET UNIT	气动三联件/两联件	FESTO	
Valve	阀	FESTO	
Flow meter	流量计	E+H	
JIG Hose	工装气管	Eisele/Tema/STUBLI	
hose connector, fitting	管接头	Eisele/Tema/STUBLI	
Ball valve	球阀	FESTO	
Pneumatic Unit (Vacuum)	气压单元	FESTO	
Motor	电机	SEW	
CENTRALIZED Inverter	集中式变频器	Schneider/SIEMENS	
Decentralized Inverter	分布式变频器	SEW/SIEMENS	
Servo Motor	伺服马达	SEW/SIEMENS	
Soft Starter	软启动器	SEW/SIEMENS	
Bearing	轴承	SKF	
Linear slider	直线滑轨	SKF	
Spring	弹簧	MISUMI	
Pillow Block	轴承座	SKF	
TANK CHAIN	坦克链	IGUS	
Shock Absorber	缓冲器	Enidine	
Spring Balancer	平衡器	Dalian AUTO	
Rails for Gun Hanging	导轨	EEPOS	
Trolley for Gun Hanging	吊挂滑车	EEPOS	

Plate for TR/TC Hanging	连接板	EEPOS	
Guide Wheel/Roller	滑轨	EEPOS	
Vision system	视觉系统	Cognex	
Electrical Hoist	电动马达	DEMAG	
Belt	皮带	CONTITECH	
Flexible cable	拖曳电缆	Lapp	
Air Hoist	气动马达	IR	
Rail	导轨	EEPOS	

6. Project Management

6.1 Project organization

1. Within one week after order, the Contractor shall transmit to the Purchaser a project organization chart. The chart shall include the key persons from contractor and the used sub suppliers (PLC, Mechanical…) purchasers can see who is responsible for each area in the project.

   合同签订后一周内，承包商需提供详细的项目组织机构图，组织机构图中需展示承包商及下级承包商的关键负责人（PLC，机械…）,购买方可通过此机构图明了项目不同领域的负责人。

2. Detail description of responsibility should be present in the project organization chart.

   在项目组织图中需明确阐述每个人员在项目开展过程中的详细职责。

3. If changes in the organization for the project occurred, a new project organization must be draft by the Contractor within a week and approved by the Purchaser.

   如果在项目开展过程中项目组织机构发生变更，承包商负责在发生变更后的一周内更新组织机构图并呈报购买方。

4. Appoint deputy project manager to handle all the activity during project manager is absent.

   指定固定的副总负责人，在总负责人不在时，负责所有项目活动。

5. At least one electrical leader, one mechanical leader shall be assigned to communicate technical issues, the designer and leader can not part time for other project or other position in this project.

至少指定一名电气，一名机械设计总负责人，负责与购买方的沟通。设计人员和负责人不能兼职其他项目或者本项目的其他职位。

6. Appoint full-time on-site safety engineer to responsible for safety relevant.

   指定全职的现场安全负责人。

7. If purchaser is not satisfied with the project manager, purchaser is entitled to require changing the project leader.

   承包商的项目负总责人不能满足购买者的要求时，购买方有权要求选定新的项目总负责人。

6.2 Time Schedule

See Appendix C “Time Schedule”

6.3 The Contractor's and Purchaser's Duty

See Appendix D “The Contractor's and Purchaser's Duty”

6.4 On-site Management

1. Supplier must follow guidance for access to and working in VCCD, see appendix I2.

   按 Volvo 相关程序办理施工手续，详见 Appendix I2：Guidance for Access。

2. Supplier must strictly follow safety regulation from Volvo during installation.

   施工过程中需严格遵守 Volvo 施工安全规范。

3. All the activities and necessary equipment and resources, transportation to VCCD, building site (a certain place arranged in Volvo plant), crating, loading, off-loading, storage of equipment, fork lift, e.g.. , are within contractor’s responsibility.

   运输及现场施工设施搭建（由 Volvo 指定的厂内区域），包装，装载，卸载，存放等所有活动及所需的资源、设施，如叉车，全部由承包商负责。

4. Before construction, installation drawings bound in the A3 size shall be submitted to Volvo in 2 sets.

   施工前必须提供用 A3 纸装订成册的安装图给我公司，2 套。

5. The contractor shall be responsible for the accidental injury insurance of their installation and adjustment staff; we will not be liable for any accidental personal injury not caused by Volvo.

   承包商负责现场贵公司安装调试工作人员的意外伤害保险相关事宜；非我公司原因造成的人身意外伤害后果，我公司概不负责。

6. When the contractor is working on site, such positions as safety supervisor, project site leader and technical leader shall be set up.

   承包商现场施工时，需设立固定的现场经理、安全监督员、技术主要负责人等。

7. If any product or equipment of our company or any other unit is damaged by accident during construction, the contractor shall be responsible for compensation.

   施工期间不慎对我公司或其它单位产品或设备造成损坏，承包商负责赔偿。

8. During construction, no alcohol or smoking is allowed, and safety suit（safety helmet、safety shoes） shall be worn always. A life belt shall be worn during working at height. 5S work shall be performed during and after construction (waste materials produced during construction shall be removed out of the factory by the contractor).

   施工中要求禁烟、禁止喝酒、戴好防护服 (安全帽、安全鞋等)，高空作业佩带安全带、施工中及完工后做好 5S(含施工产生的废料由承包商清除及运输出厂)。

9. Oxyacetylene, welding machines, fire extinguishers, fireproof fabrics, tools, lifters and forklifts shall be prepared and kept by the contractor itself.

   施工用氧乙炔、焊机、灭火器、防火布、工具、升降机、叉车等由承包商自行准备并保管。

10. All extra expenses incurred in overtime work performed to ensure the construction schedule shall be borne by the contractor.

    为保证工期而进行的加班，所产生的各种额外费用承包商自行承担。

11. To differentiate liabilities, the vendor shall prepare necessary labels and affix them on control cabinets and key equipment, which are included in the quotation. There are 3 cases: The equipment can be operated and adjusted by the vendor only; it can be operated by both the vendor and the maintainer; it can be operated by the maintainer only.

    为区分责任，请厂家准备必要的标识，粘贴在控制柜、关键设备上，报价内；分三种情况：只能承包商操作、调整设备；承包商、甲方维修人员都可操作设备；只能甲方维修人员操作设备。

12. A billboard shall be set up on the site, with a size of not less than 1,500 × 4,000 mm , information showed include installation plan, contact info of responsible person, relevant document for installation.

    现场设置看板，板面不小于 1500×4000 mm，看板需详细展示至少三部分内容：施工计划，现场主要负责人联系方式，施工相关文件。

13. Anything unstated here will be otherwise negotiated.

    未尽事宜，另行商议。

6.5 Others

6.5.1 Document Priority

1) The document priority (from high to low): the latest meeting minutes > contract and technical agreement > bidding file.

6.5.2 Biding and Quotation

1) In case of language problems, cost for translation and for interpreters will be the responsibility of the supplier.
2) The original suppliers of important equipment and components should be provided, as electric, pneumatic, hydraulic equipment or component.
3) In the bidding files, It's not allowed for supplier only copy this requirement, and mark "Meet requirement" or "No deviation" on every item, supplier must raise detail proposal to support this requirement.
4) Contractor should make clear statement of payment requirement during quotation, for instance, payment condition like pre-payment, payment time requirement, etc...
5) Quotation shall consist of three level, take conveyor line for example, first level present the price of each production line. The second level present the price of single activity (design, manufacture, installation, test…) of each production line. The third level present detail composition of each single activity.
6) All sub-contractors must be approved by Volvo.

7. Reliability and Maintainability

7.1 General

1) All installations are to be designed "easily maintainable" which means first of all, minimal demand for repair and revision, and secondly easy repair, which means easy and fast trouble-shooting and fast and easy intervention (access, minimal need for tools etc.).
2) Intervals and actions needed shall be presented. Also parts which are liable to special wear have to be designed in such a way that they are free of maintenance for at least one year. Attention will be paid on designs with a minimum demand of space, number of components, weight, energy and material and a maximum of performance, flexibility and lifetime.
3) Minor repairs should be done within 5 min and subassemblies no more than 15 min.
4) Modularisation, i.e. breakdown of the equipment in components replaceable on line.
5) All parts which need to be replaced in the future must be easy to access.
6) All moving parts on the equipment must be as visible as possible. (Use of Plexiglas).
7) Parts, which will be replaced, must be designed so that they cannot be mounted incorrectly. (Use dowels, locking...).
8) All components with set-up need to be visualized at the spot in the English or Chinese.
9) Wear on components has to be visualized.
10) Clear work instructions must be available (reset, start up, use of equipment, suppressing, safety…).
11) Home positions physically marked.

7.2 Questionnaires

1) Follow Contract Appendix I4_ R&M: 2_Questionnaires

7.3 Spare Parts

7.3.1 Amount

TBD

7.3.2 Spare Part List

1) Contractor shall submit recommended part list within one week after detailed design review. Maintenance of purchaser will check and determine the final part list and feed back to contractor within two weeks after receiving the recommended part list.

   承包方在详细设计会签完成后一周内提交推荐备件清单目录， Volvo 维修部门收到备件清单目录后两周内检查、确认最终的备件清单目录并反馈给承包商。

2) Part list form must follow “Spare Part list”, delivered in Appendix I4_ R&M\3_Maint. Demands on Spare Parts.

   备件清单格式必须遵循“Spare Part list”，具体格式要求见 Contract Appendix I4_ R&M\3_Maint. Demands on Spare Parts。

3) All consumable goods, i.e. equipment parts that need to be replaced within one year after those put into production, a set of spare parts for them should be provided with equipment and free of charge.

   凡是易耗品，即设备投产后一年内需要更换的设备零部件，应免费随机提供一套备件。

4) Losses caused by incorrect part list information, for instance, spare parts bought by purchaser according to part list cannot be used, will be afforded by contractor.

   因承包商失误造成的备件信息不准导致的损失，如购买方按备件清单购买的备件无法使用，损失由供应方承担。

7.4 Prevenive Maintenance

Follow Contract Appendix I4_ R&M: 4_Maint. Demands on Preventive Maintenance

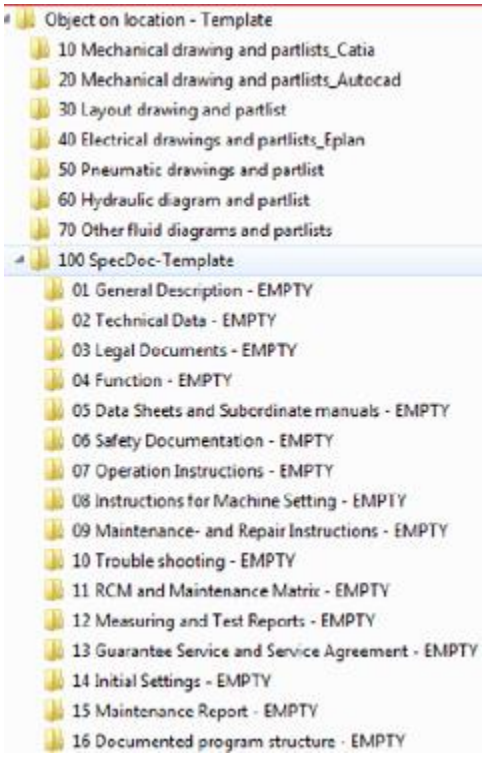
7.5 Education and Training

Follow Contract Appendix I4_ R&M: 5_Maint. Demands on Training

7.6 Documentation

7.6.1 General

1. All technical documentation should be made according VCC standard “APPENDIX G” detail or unclear item please refer to VCS 8010, 1, see appendix E.
2. A folder structure template for documentation along with instructions will be delivered to the contractor after formal order, folder structure like below:



If some folders not valid for this project, please put a word file with the correct name, but the content is “NA” or “not valid for this project”, and need to be printed as well for the paper version.

Folder 13 and 15 are only for Volvo internally use , no file from contractor side can be put in these 2 folders, contractor needs to keep these 2 folders in the structure, but keep them empty.

For detail information required in each folder, please look into the “APPENDIX G” and standard VCS 8010, 1 in APPENDIX E.

3. 2D drawings and 3D modelling must strictly follow Volvo standard “APPENDIX I6 Catia delivery requirement”, detail or unclear item please refer to “VCS 9130, 69 Equipment design”, delivered in appendix E.
4. Electrical documentation shall be done with Eplan P8.
5. All the documentation should be updated (both paper copies and DVD disk) and sent to Volvo again if any detailed information modified, no matter for Volvo reasons or contractor reasons.

7.6.2 Delivery Step

1. The scope and content from each chapter will be showed, checked and reviewed at least at each project meeting. The technical documentation will grow towards the final status during design (maintenance, operating and functional descriptions), manufacturing and installation.

2. The corrected version will be transmitted to VCCD within 2 weeks after giving comments.
3. As reasons from above, the technical documentation should be completed together with the installation and handed over to maintenance **before** final acceptance.
4. Delivery step:
    - Step 1 – Design review:

    10 Mechanical drawing and part list_catia

    20 Mechanical drawing and part list_Autocad

    30 Layout drawing and part list

    40 Electrical drawing and part list _Eplan

    50 Pneumatic drawing and part list

    60 Hydraulic diagram and part list

    70 Other fluid diagrams and part list

    02 Technical data

    04 Function

    07 Operation instruction

    09 Maintenance-repair instruction---spare part list

Digital version is OK at this phase, all the files in these folders must be updated after design review.

- Step 2 –Delivery and installing on site

10 Mechanical drawing and part list_catia

20 Mechanical drawing and part list_Autocad

30 Layout drawing and part list

40 Electrical drawing and part list _Eplan

50 Pneumatic drawing and part list

60 Hydraulic diagram and part list

70 Other fluid diagrams and part list

07 Operation instruction

08 Instructions for machine setting

09 Maintenance-repair instruction

11 RCM and maintenance Matrix

12 Measuring and test reports

At this phase, for Volvo side, digital version is OK, and all the files in these folders above must be updated after commission and training onsite.

- Step 3 –Final acceptance

10 Mechanical drawing and partlist_catia

20 Mechanical drawing and partlist_Autocad

30 Layout drawing and partlist

40 Electrical drawing and partlist _Eplan

50 Pneumatic drawing and partlist

60 Hydraulic diagram and partlist

70 Other fluid diagrams and partlists

01 Generation description

02 Technical data

03 Legal documents

04 Function

05 Data sheets and subordinate manuals

06 Safety documentation

07 Operation instruction

08 Instructions for machine setting

09 Maintenance-repair instruction

11 RCM and maintenance Matrix

12 Measuring and test reports

13 Guarantee service and service agreement

14 Initial settings

15 Maintenance report

16 Documented program structure

All the files in the folders must be updated to the latest version according to the installation, commission and modification onsite. And the delivery requirement refers to Item 7.6.3

7.6.3 Delivery Quantity

3 sets of DVD copies of entire documentation, 3 sets of printed copies of entire documentation. For purchased manuals, certification files must be in DVD copies, and 1 paper copy.

8. Process Control and Taking-over Test

See Appendix F “Process Control and Taking over Test”

9. Quality warranty

The warranty period shall be one year and starts when the final acceptance is done, include all hardware and software.

质保期从终验收时开始计算，为期一年，包含所有的硬件和软件。

During the warranty period, the contractor shall response within 2 hours after any malfunction and come on-site within 2 hours.

在质保期内，供应商须在故障发生后 2 小时内反馈并 2 小时内赶到现场。

10. Standby

4 weeks standby, detailed standby plan should be align with Volvo.

4 周的陪产时间，具体陪产计划需和 Volvo 达成一致。

After machine running stably, match availability and MCBF requirements, all safety issue and function relevant issue be resolved. Stand by work beginning.

陪产自现场设备运行稳定满足设备开动率和 MCBF 后，所有安全、功能相关的问题解决后开始计算。

11. Option Service

TBD