

# 干式清洗机

## Linear Brush Unit Technical Agreement

甲方：济南二机床集团有限公司

**Buyers: JIER MACHINE-TOOL GROUP CO., LTD.**

乙方：

**Sellers:**

2022 年 11 月

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甲方：济南二机床集团有限公司（简称 JIER）

**Party A: JIER MACHINE-TOOL GROUP CO., LTD.( referred to as“JIER”)**

乙方：

**Party B:**

经甲乙双方友好协商，就甲方购买乙方干式清洗机，双方达成如下共识。

Through friendly negotiation, Jier buy the Linear Brush Unit from DieTronic. Party A and Party B have reached the following agreement.

## 一、项目内容 Project Content

矫直机前干式清洗机 1 台

Brush Cleaning Unit before Leveler 1set

堆垛前干式清洗机 1 台

Brush Cleaning Unit before Stacker 1set

## 二、项目基本要求 Project Basic Requirements

### 1. 生产环境 Production Environment

每周工作日	6
Working days per week	6
每周轮班	18
Shifts per week	18
每班小时数	8
Hours per shift	8
生产线使用效率	≥95%
Usage efficiency of the production line	≥95%
生产条件	热/湿
Production conditions	Hot / Humid
Main voltage	3x380V±10 %/ 50Hz
Phase voltage	220V, AC, 50Hz
Power supply for devices	220V, 50Hz
Control voltage	24V DC
Interlock voltage	24V DC

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I/O voltage of PLC	24V DC
Solenoid valves	24V DC
厂房供应气压	最大6 .0 b a r
Building Air Pressure Supply	6 .0 b a r maximum
环境温度	16°C – 45°C
Ambient temperature	16°C – 45°C
相对大气湿度	25% - 99%
Relative atmospheric humidity	25% - 99%
海拔	<20米
Site altitude above sea level	Less than 20m

## 2. 原材料参数 **Raw material Technical Data**

### 2.1 矫直机前干式清洗机 **Brush Cleaning Unit before Leveler**

#### 带料参数 **Strip Technical Data:**

钢带: 冷轧钢带, 内外部用有涂层或无涂层钢, 中间无波浪边缘或在中间

**Steel strip:** Cold rolled steel strip, coated or non-coated steel for inner and outer parts, without wavy edges or waviness in the middle.

材料编码: FeP04, FeP05, FeP06, FeP07, DP600, QstE350, ZstE300 ,260BH,220P,220BH,180BH  
Material No. FeP04, FeP05, FeP06, FeP07, DP600, QstE350, ZstE300, 260BH, 220P, 220BH, 180BH.

铝板: 冷轧铝带, 内部和外部零件用涂层或非涂层铝, 中间无波浪边缘或在中间

**Aluminum stirp:** Cold rolled aluminum strip, coated or non coated aluminum for inner and outer parts, without wavy edges or waviness in the middle.

材料编码: A1 (6EH)、A2 (6DR1) A3 (6DR2)

**Material No.** A1 (6EH)、A2 (6DR1) A3 (6DR2)

带料宽度: 400 - 2150mm

**Strip width:** 400 - 2150

带料厚度: 0.5-2.5mm

**Strip thickness :** 0.5-2.5mm

带料速度: max 110m/min

**Strip speed:** max 110m/min

油膜: 卷料生产厂家标准

**Oil film:** coil manufacturer's standard

### 2.2 堆垛前干式清洗机 **Brush Cleaning Unit before Stacker**

板料材质: 与矫直机前干式清洗机一致

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Blank material: the same as Brush Cleaning Unit before Leveler

板料形状: 矩形、成型件、扇形、梯形、曲线切割坯料、有缺口板料、特制板料

Blank shape: rectangular, developed blanks, scalloped, Trapezoidal, form, curve cut blanks, blanks with cut outs, tailored blanks

钢板厚度 0.5 – 3.0 mm

Thickness steel 0.5 – 3.0 mm

铝板厚度 0.5 – 3.0 mm

Thickness aluminum 0.5 – 3.0 mm

最大毛刺 板厚的 10%

Burr max. 10% of thickness

油膜: 卷料生产厂家标准

Oil film: coil manufacturer's standard

物流方向板料尺寸 400-3800mm

Blank size in flow direction 400-3800mm

垂直物流方向板料尺寸 400-2150mm

Blank size across to flow direction 400-2150mm

板料节拍: max 110 spm

Blanks beat: max 110 spm

### 三、 矫直机前干式清洗机Brush Cleaning Unit before Leveler

干式清洗机用来清洁带料。当带料经过清洗机时, 通过横向移动的线性刷对带料上下面进行清洁, 污垢由直线刷拾起并输送到一侧, 在那里, 污垢被从刷子上剥离出来, 通过抽风机输送到过滤器。板料上所有的灰尘颗粒被去除。

The machine serves to clean strips. While running through the cleaner, the strips are cleaned on both sides by linear brushes moving crosswise to the passing direction.

The dirt is picked up by the linear brushes and transported to one side, respectively.

There the dirt is stripped off from the brushes transported into a filter via a suction ventilator. All dirt particles are removed that are relatively loose on the blank surfaces.

板料通过在进料和出料侧的驱动辊通过清洗机。

The blanks are transported through the machine by means of driven conveyor rolls at the infeed and outfeed side. 请确认是否由此驱动辊。

带料没有经过矫平。

The strip is not leveled.

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清洗机安装在车轮上，可通过电机在轨道上移动，轨道将由 JER 提供和安装。因此，在不使用或维修的情况下，机器可以开出工作区域。

The machine is mounted on wheels and is movable on rails by means of a motor, rails will be provided and installed by the JIER. Thus the machine can be traversed out of line when not in use or for maintenance purposes.

### **技术参数 Technical Data**

送料高度	TBDmm
Passing height	TBD mm
送料速度	MAX110m/min，变频控制
Working speed	MAX110m/min., frequency-controlled
刷带驱动电机功率	1,2 kW
Drive linear brushes-motor output	1,2 kW
夹送辊驱动电机功率	1 kW，变频控制
Drive conveyor rolls-motor output	1 kW, frequency controlled
刷带形式	Polyamid; $\varnothing 0,2$ mm; h=19 mm
Type of linear brushes	Polyamid; $\varnothing 0,2$ mm; h=19 mm
下部和上部刷子的宽度	80mm
Width of the brushes at lower&upper side	80mm
高度调整	-5~+90mm
Height adjustment	-5~+90mm
清洗剂容器容积	1000L
Volume cleaning fluid tank	1000L
鼓风机电机功率	2,2 kW
Suction filter ventilator-motor output	2,2 kW
抽吸能力	6000 m <sup>3</sup> /h
Suction capacity	6000 m <sup>3</sup> /h
最大抽吸压力	1600 Pa
Max. low-pressure	1600 Pa
总功率	8 KW
Total installed power	approx. 8 KW
供电	380 V, 50 Hz, 3/PEN TN-C

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Electric equipment	380 V, 50 Hz, 3/PEN TN-C
阀的电压	24 V DC
Valve voltage	24 V DC
控制电压	24 V DC
Control voltage	24 V DC
压缩空气	6 bar,
Compressed air required	6 bar
总重量	待定
Weight of the machine	TBD

刷子清洁装置将位于第一个剪切剪和矫直机装置之间。刷子清洁装置由底座、清洁模块和吸油过滤器组成，且提供试车清洗液。

The brush cleaning unit will be positioned between the first cropping shear and the straightener unit. The brush cleaning unit consists of a base frame, cleaning modules and a suction filter, and cleaning liquid for test run.

### **机架Machine Frame**

清洗机机身由焊接钢材结构。上下清洁刷在侧向支撑中以特殊的导向来引导，它们可以作为一个完整的部件从机架的顶部拆卸和安装。清洗机以方便维护的方式设计的，抽吸和过滤单元以及其它部件直接安装在机器外壳上。清洗机下端设有用于安装在底座上的实心底板。

The machine frame is a solid, welded steel construction. The upper/lower brush aggregates are guided in special guidances in the lateral supports. They can be dismantled and mounted, respectively, as complete component from top of the machine frame. The machine is designed in a maintenance-friendly way. The suction and filter unit as well as other aggregates are mounted directly to the machine housing. The lower end of the machine is provided with solid base plates for installation onto a base frame.

### **清洗机外壳Machine Housing**

清洁单元周围有一个外壳。所有其他盖子都可以轻易拆卸。在进料和出料侧的每个上盖安装到上辊部件并随之上下移动。

The cleaning unit has a housing all around. All other covers can be easily demounted.

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Each of the upper covers at the infeed and outfeed side is mounted to the upper roller aggregate and move with it up and down.

### **电机驱动移动Motorized Displacement Drive**

清洗机装有移动装置，可以在轨道上移动。在齿轮制动马达的驱动下，清洗机可以开进开出工作区域。最终位置通过传感器记录。在最终位置，清洗机可以自动锁定在基础中。锁定由传感器驱动。电缆和气路走桥架。移动距离向 JER 确认。如果干式清洗机在轨道上移出生产线，间隙将由伸缩台闭合（JIER 提供）。该装置将由控制元件直接控制在其机柜上（用于服务目的），并通过下料线的主操作面板进行控制。此外，还将提供一个额外的控制，用于将装置车移入或移出。当干式清洗机移入/移出安全区域时，将提供视觉和听觉警报以警告工人。清洁装置将在传感器和开关的帮助下自动定位。还有一个气动锁销系统，用于固定装置的内部/外部。

The machine is equipped with a traversing mechanism on rails. With the help of a gear brake motor the machine can be moved into the line or out of the line. The final positions are recorded via sensors. In the final positions the brushing machine can be automatically locked in the foundation. The locking is actuated by sensors. The energy connections for the electrics and pneumatics run along the machine side in a cable pack. The moving distance should be confirmed to JIER. In case the cleaning unit is moved on rails out of the line, the gap will be closed by a telescoping table(JIER supply). The unit will be controlled with control elements directly on its cabinet (for service purpose) and via the main operating panel of the blanking line. There will be also an additional control for moving the cart in or out. A visual and audible alarm will be provided to warn workers when cleaning unit is moving in/out of safety area. Cleaning unit will be positioned automatically by the help of sensors and switches. There will be also a pneumatic locking pin system for fixing the unit inside/outside.

### **电刷和旋转剥离器Brush Aggregates and Rotation Stripper**

上下点刷均来自市场领先的 Wandres 核心产品- 其垂直于物流方向 at 90°进行操作。带刷扫走脏物，其被安装在机身侧面的刮土器分离出带刷。同时该带刷系统配置了气囊。刷子单元配有四个旋转的微湿剑刷，通过压缩空气和机械支持进行自清洁。接触压力由电刷下方的压力缓冲器保持恒定。电刷校准和高度调整必须通过控制器单元完成。HMI

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控制器上将有调整/校准页面。校准/调整皮带（刷子）和装置上其他设备所需的所有工具将随机器一起交付。

Top and bottom brushes are market leading products from Wandres Inside – operate at 90° to the direction of material throughput. The brush takes up the dirt, which is then subsequently removed from the brush by a rotating scraper at the peripheral point. The brush system is equipped with air buffer. The brush unit is equipped with four rotating, micro-moistened sword-brush which is self-cleaning by compressed air with mechanic support. The contact pressure is held constant by a pressure buffer beneath the brushes. Brush calibration and height adjustment has to be done via controller unit. There will be adjustment/Calibration pages on the HMI controller. All the required tools for calibrating/adjusting the belts ( brushes ) and other equipments on the unit will be delivered with the machine.

### **清洁模块Cleaning Modules**

清洁模块将设置在焊接框架的顶部。它们由四个安装在铝型材框架上的刷子清洁装置组成。两个装置都可以通过连接的调整主轴自动调整高度，以便根据带钢厚度进行初始调整。刷子清洁装置将配备一个旋转的微湿刷子（磨损部件），该刷子通过压缩空气和机械支持进行自清洁。接触压力将由电刷下方的压力缓冲器保持恒定。去除的颗粒被吸入吸入过滤器。

The cleaning modules will be set on top of the welded frame. They will consist of four brush cleaning units mounted on an aluminium profile frame. Both units are automatically height adjustable via linked adjustment spindles for initial adjustment according to the strip thickness. Brush cleaning units will be equipped with a rotating, micro-moistened brush (wear and tear part) which is self-cleaning by compressed air with mechanic support. The contact pressure will be held constant by a pressure buffer beneath the brushes. Removed particles are being sucked into a suction filter.

### **抽吸过滤装置Suction & Filter Unit**

线性刷通过剥离系统被清洁。使用一个高性能吸气通风机。在过滤单元中，空气通过多级过滤器从污垢颗粒和液体介质中清除。过滤器的污垢程度通过差压测量装置来自动监



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控和在 HMI 屏幕上进行警告。滤芯容易清洗。分离的油被收集在过滤器中，可以通过永久的管路排出。

The linear brushes must be cleaned by means of a stripper system. A high-performance suction ventilator shall be used. The filter unit air must be cleaned from dirt particles and liquid media by a multiple-step filter system. The level of dirt in the filter must be automatically monitored via differential pressure measurement and create warning and fault conditions to the HMI. The filter cartridges must be easily cleaned. Separated oil collected in the filter must have provisions for draining by a permanent connection.

用于分离气溶胶的吸入过滤器将直接安装在移动车上。所有维护开口应易于接近，尤其是当推车驶出隔音层时。

The suction filter for the separation of aerosols will be mounted directly on the moving cart. All openings for maintenance will be easily accessible, especially when the cart is driven outside of the sound insulation.

清洁液（Ingromat®）将储存在一个1000升的储罐中，该储罐位于隔音层外。储罐将配备一个抽吸泵，用于将液体输送至清洁设备。空罐通过闪烁的警告灯显示，主控制站上将显示警告信息，泵将停止工作以保护自身。

The cleaning fluid (Ingromat®) will be stored in a 1000 l tank which is located outside of the sound insulation. The tank will be equipped with a suction pump for transportation of the fluid to the cleaning devices. An empty tank is displayed by a blinking warning lamp and there will be a warning message on the main control station and the pump will stop working to protect itself.

### **板料传输Blank Transport**

清洗机出入口布置输送辊，它们将板料通过机器输送而不发生滑动和横向偏移。下辊被驱动，该驱动器是变频控制的。板料的速度可调，并可与皮带机同步（额定速度为 120 米/分钟）。上部进料/出料辊可通过气缸提升以防碰撞和进行维护。

Driven entry and exit for transporting the blanks through the machine without slipping and lateral offset. The lower rolls are driven. The drive is frequency-controlled. The speed of the blank can be adjusted, and can synchronize with the belt conveyor (Rated speed 120m/min) .The upper infeed/outfeed rolls can lift by pneumatic cylinders for

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**crash protection and maintenance purposes.**请确认是否有此功能。

#### 四、堆垛前干式清洗机Brush Cleaning Unit before Stacker

干式清洗机用来清洁板料。当带料经过清洗机时，通过横向移动的线性刷对板料上下面进行清洁，污垢由直线刷拾起并输送到一侧，在那里，污垢被从刷子上剥离出来，通过抽风机输送到过滤器。板料上所有的灰尘颗粒被去除。

The machine serves to clean blanks. While running through the cleaner, the blanks are cleaned on both sides by linear brushes moving crosswise to the passing direction.

The dirt is picked up by the linear brushes and transported to one side, respectively.

There the dirt is stripped off from the brushes transported into a filter via a suction ventilator. All dirt particles are removed that are relatively loose on the blank surfaces.

板料通过在进料和出料侧的驱动辊通过清洗机。

The blanks are transported through the machine by means of driven conveyor rolls at the infeed and outfeed side.

清洗机安装在车轮上，可通过电机在轨道上移动，轨道将由 JER 提供和安装。因此，在不使用或维修的情况下，机器可以开出工作区域。

The machine is mounted on wheels and is movable on rails by means of a motor, rails will be provided and installed by the JIER. Thus the machine can be traversed out of line when not in use or for maintenance purposes.

#### 技术参数 Technical Data

送料高度	TBDmm
Passing height	TBD mm
送料速度	MAX200m/min, 变频控制
Working speed	MAX200m/min., frequency-controlled
刷带驱动电机功率	1,2 kW
Drive linear brushes-motor output	1,2 kW
夹送辊驱动电机功率	1 kW, 变频控制
Drive conveyor rolls-motor output	1 kW, frequency controlled
刷带形式	Polyamid; $\varnothing 0,2$ mm; h=19 mm
Type of linear brushes	Polyamid; $\varnothing 0,2$ mm; h=19 mm
下部和上部刷子的宽度	80mm

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Width of the brushes at lower&upper side	80mm
高度调整	-5~+90mm
Height adjustment	-5~+90mm
清洗剂容器容积	1000L
Volume cleaning fluid tank	1000L
鼓风机电机功率	2,2 kW
Suction filter ventilator-motor output	2,2 kW
抽吸能力	6000 m <sup>3</sup> /h
Suction capacity	6000 m <sup>3</sup> /h
最大抽吸压力	1600 Pa
Max. low-pressure	1600 Pa
总功率	6 KW
Total installed power	approx. 6 KW
供电	380 V, 50 Hz, 3/PEN TN-C
Electric equipment	380 V, 50 Hz, 3/PEN TN-C
阀的电压	24 V DC
Valve voltage	24 V DC
控制电压	24 V DC
Control voltage	24 V DC
压缩空气	6 bar,
Compressed air required	6 bar
总重量	待定
Weight of the machine	TBD

刷子清洁装置将位于第一条和第二条传送带之间。刷子清洁装置由底座、清洁模块和吸油过滤器组成，且提供试车清洗液。

The brush cleaning unit will be positioned between the first and second conveyor belt.

The brush cleaning unit consists of a base frame, cleaning modules and a suction filter, and cleaning liquid for test run.

### **机架Machine Frame**

清洗机机身由焊接钢材结构。上下清洁刷在侧向支撑中以特殊的导向来引导，它们可以作为一个完整的部件从机架的顶部拆卸和安装。清洗机以方便维护的方式设计的，抽吸

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和过滤单元以及其它部件直接安装在机器外壳上。清洗机下端设有用于安装在底座上的实心底板。

The machine frame is a solid, welded steel construction. The upper/lower brush aggregates are guided in special guidances in the lateral supports. They can be dismantled and mounted, respectively, as complete component from top of the machine frame. The machine is designed in a maintenance-friendly way. The suction and filter unit as well as other aggregates are mounted directly to the machine housing. The lower end of the machine is provided with solid base plates for installation onto a base frame.

### **清洗机外壳Machine Housing**

清洁单元周围有一个外壳。所有其他盖子都可以轻易拆卸。在进料和出料侧的每个上盖安装到上辊部件并随之上下移动。

The cleaning unit has a housing all around. All other covers can be easily demounted. Each of the upper covers at the infeed and outfeed side is mounted to the upper roller aggregate and move with it up and down.

### **电机驱动移动Motorized Displacement Drive**

清洗机装有移动装置，可以在轨道上移动。在齿轮制动马达的驱动下，清洗机可以开进开出工作区域。最终位置通过传感器记录。在最终位置，清洗机可以自动锁定在基础中。锁定由传感器驱动。电缆和气路走桥架。移动距离向 JER 确认。如果干式清洗机在轨道上移出生产线，间隙将由伸缩皮带闭合（JIER 提供）。该装置将由控制元件直接控制在其机柜上（用于服务目的），并通过下料线的主操作面板进行控制。此外，还将提供一个额外的控制，用于将装置移入或移出。当干式清洗机移入/移出安全区域时，将提供视觉和听觉警报以警告工人。清洁装置将在传感器和开关的帮助下自动定位。还有一个气动锁销系统，用于固定装置的内部/外部。

The machine is equipped with a traversing mechanism on rails. With the help of a gear brake motor the machine can be moved into the line or out of the line. The final positions are recorded via sensors. In the final positions the brushing machine can be automatically locked in the foundation. The locking is actuated by sensors. The energy connections for the electrics and pneumatics run along the machine side in a cable pack. The moving distance should be confirmed to JIER. In case the cleaning unit is

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moved on rails out of the line, the gap will be closed by a telescoping belt (JIER supply). The unit will be controlled with control elements directly on its cabinet (for service purpose) and via the main operating panel of the blanking line. There will be also an additional control for moving the cart in or out. A visual and audible alarm will be provided to warn workers when cleaning unit is moving in/out of safety area. Cleaning unit will be positioned automatically by the help of sensors and switches. There will be also a pneumatic locking pin system for fixing the unit inside/outside.

### 电刷和旋转剥离器Brush Aggregates and Rotation Stripper

上下点刷均来自市场领先的 Wandres 核心产品- 其垂直于物流方向 at 90°进行操作。带刷扫走脏物，其被安装在机身侧面的刮土器分离出带刷。同时该带刷系统配置了气囊。刷子单元配有四个旋转的微湿剑刷，通过压缩空气和机械支持进行自清洁。接触压力由电刷下方的压力缓冲器保持恒定。电刷校准和高度调整必须通过控制器单元完成。HMI 控制器上将有调整/校准页面。校准/调整皮带（刷子）和装置上其他设备所需的所有工具将随机器一起交付。

Top and bottom brushes are market leading products from Wandres Inside – operate at 90° to the direction of material throughput. The brush takes up the dirt, which is then subsequently removed from the brush by a rotating scraper at the peripheral point. The brush system is equipped with air buffer. The brush unit is equipped with four rotating, micro-moistened sword-brush which is self-cleaning by compressed air with mechanic support. The contact pressure is held constant by a pressure buffer beneath the brushes. Brush calibration and height adjustment has to be done via controller unit. There will be adjustment/Calibration pages on the HMI controller. All the required tools for calibrating/adjusting the belts ( brushes ) and other equipments on the unit will be delivered with the machine.

### 清洁模块Cleaning Modules

清洁模块将设置在焊接框架的顶部。它们由四个安装在铝型材框架上的刷子清洁装置组成。在装置的入口上，有保护板和支撑辊，用于引导带钢。两个装置都可以通过连接的调整主轴自动调整高度，以便根据带钢厚度进行初始调整。刷子清洁装置将配备一个旋

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转的微湿刷子（磨损部件），该刷子通过压缩空气和机械支持进行自清洁。接触压力将由电刷下方的压力缓冲器保持恒定。去除的颗粒被吸入吸入过滤器。

The cleaning modules will be set on top of the welded frame. They will consist of four brush cleaning units mounted on an aluminium profile frame. On the inlet of the unit there are both protection sheets and support rolls for guiding the strip. Both units are automatically height adjustable via linked adjustment spindles for initial adjustment according to the strip thickness. Brush cleaning units will be equipped with a rotating, micro-moistened brush (wear and tear part) which is self-cleaning by compressed air with mechanic support. The contact pressure will be held constant by a pressure buffer beneath the brushes. Removed particles are being sucked into a suction filter.

将有一个加热和旋风系统，用于熄灭污垢中的油（蜡），保持清洁并打开吸入系统。

There will be a heating and cyclone system that extinguish the oil ( wax ) from the dirt and keep clean and open the suction system.

溶解的颗粒被吸入并通过吸入式旋风分离器。在吸入旋流器中，粘性污垢颗粒和油性污垢颗粒被分离。气溶胶通过管道进入中央排气过滤器。

Dissolved particles are sucked in and run through a suction cyclone. In the suction cyclone the viscous dirt particles and the oily dirt particles are separated. The aerosols furthered via pipes to the central exhaust filter.

为了安全运输小毛坯，在两个刷子清洁模块之间安装额外的驱动压紧辊。辊子必须保证同步。

For secure transportation of small blanks additional driven hold-down rolls are mounted between the two brush cleaning modules. The rollers must be synchronized.

在干式清洗机前面，安装了光学传感器（JIER 提供），以检测未对齐的坯料。如果检测到，刷子清洁将采取适当措施保护自身。如果毛坯未对齐或弯曲而造成挤压，将使用气动高度调整将线性刷快速移出产品表面。上部刷子将快速移开至少 50 mm，下部刷子将移开 25 mm .

In front of the cleaner, a optical sensor (JIER suply) is installed to detect misaligned blanks. In case of detection the brush cleaner will take appropriate actions to protect itself. Pneumatic height adjustment will be used to move the linear brushes quickly

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away from the product surface in case of a crush by misaligned or bended blanks.  
Upper brushes will quickly move away at least 50 mm and lower ones 25 mm.

### **抽吸过滤装置Suction & Filter Unit**

线性刷通过剥离系统被清洁。使用一个高性能吸气通风机。在过滤单元中，空气通过多级过滤器从污垢颗粒和液体介质中清除。过滤器的污垢程度通过差压测量装置来自动监控和在 HMI 屏幕上警告。滤芯容易清洗。分离的油被收集在过滤器中，可以通过永久的管路排出。

The linear brushes must be cleaned by means of a stripper system. A high-performance suction ventilator shall be used. The filter unit air must be cleaned from dirt particles and liquid media by a multiple-step filter system. The level of dirt in the filter must be automatically monitored via differential pressure measurement and create warning and fault conditions to the HMI. The filter cartridges must be easily cleaned. Separated oil collected in the filter must have provisions for draining by a permanent connection.

用于分离气溶胶的吸入过滤器将直接安装在移动车上。所有维护开口应易于接近，尤其是当推车驶出隔音层时。

The suction filter for the separation of aerosols will be mounted directly on the moving cart. All openings for maintenance will be easily accessible, especially when the cart is driven outside of the sound insulation.

清洁液（Ingromat®）将储存在一个1000升的储罐中，该储罐位于隔音层外。储罐将配备一个抽吸泵，用于将液体输送至清洁设备。空罐通过闪烁的警告灯显示，主控制站上将显示警告信息，泵将停止工作以保护自身。

The cleaning fluid (Ingromat®) will be stored in a 1000 l tank which is located outside of the sound insulation. The tank will be equipped with a suction pump for transportation of the fluid to the cleaning devices. An empty tank is displayed by a blinking warning lamp and there will be a warning message on the main control station and the pump will stop working to protect itself.

### **板料传输Blank Transport**

驱动入口和出口，用于通过机器运输坯料，无滑动和横向偏移。上下辊均为伺服驱动。板料的速度可调，并可与皮带机同步（额定速度为 200 米/分钟）。上下进料/出料辊必

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须包括用于碰撞保护和维护的气缸。对于维护工作，可通过气缸/系统分别调整进料侧和出料侧辊道输送机的高度。Driven entry and exit for transporting the blanks through the machine without slipping and lateral offset. Both upper and lower rolls are to be servo driven. The speed of the blank can be adjusted, and can synchronize with the belt conveyor (Rated speed 200m/min) .The upper and lower infeed/outfeed rolls must include pneumatic cylinders for crash protection and maintenance purpose. For maintenance work, the height of the roller conveyors on the infeed and outfeed sides can be adjusted separately by the pneumatic cylinders/system

## 五、电气要求 **Electrical Requirements**

### 1 、PLC系统 PLC-System

1.1 CPU:SIEMNES S7-1517F

1.2 分布式I/O系统: Distributed Input Output peripherals

**ET200SP with profinet**

1.3总线 Bus System: Network with PROFINET

1.4安全系统: Safety with PROFISAFE

### 2、设计注意

2.1 所有电源均在主空开之后

All Power After Main power Switch

2.2 阀使用2A输出模块

For valves have to be used 2A output cards only

2.3 清洗涂油机移动输入信号进安全,，急停需要安全复位按钮，

Brush Cleaner/ Spray Lubrication move input signal for safety, E-STOP have safety reset button.

**2.4 CPU 触摸屏及交换机电源采用 UPS**

**CPU 、HMI and Network Switch use UPS power supply**

2.4 每个操作站都要有灯测试

In each panel with indicating lights must be installed a push-to-test push button.

2.5 指示灯必须按照EN-60204的比例安装，在安装前，功能应与NY/FF-16配合

Indicating lights have to be installed in sufficient proportions and according to



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EN-60204. Before installation the functions shall be co-ordinated with NY/FF-16.

### 3、供电 Power Supply

- \* Main Voltage: 3x 380 V + 10%, 50 Hz
- ☐ \* Phase Voltage: 220 V, AC, 50 HZ
- ☐ \* Power supply for devices: 220 V, 50 Hz
- ☐ \* Control voltage: 24 V, DC
- ☐ \* Interlock voltage 24 V, DC
- ☐ \* I/O voltage of PLC: 24 V, DC
- ☐ \* Solenoid valves: 24 V, DC
- ☐ **Cable cross section :TN-C**

### 4、电柜 Cabinet

#### 4.1、使用螺丝把电柜装配一起

Fitting together the cabinet cells should only be done by screwed connections.

#### 4.2、在每个电柜单元，所有的电缆都有标记

All cables and wires shall be labelled before the cable entries, in each cabinet cell.

#### 4.3、电柜门除了安装空调的门，其余可以打开180°

Cabinet doors have to be mounted by the way, that with opened doors the minimum escape space is ensured. A remedial action can be a door angle of 180° . (except Air-conditioner door)

#### 4.4、设计电柜底座，在断开所有电缆之后，每个单元都可拆除，意思是电柜底座可以从电缆出来

The cabinet base shall be designed, that after disconnection of all cabling each cell could be removed, this means that the cabinet base can be get out from the cabling.

#### 4.5、电柜电气装置一般安装在底板，电缆使用线槽并且固定，必须保证电气设备的安装、更换和附加接线都能从前端进行

Electrical devices in cabinets should be for front mounting in general. The wiring has to be in trunking. It must be guaranteed, that the complete mounting, change and additional wiring of electrical devices can be made from the front.

#### 4.6、控制单元，接触器，继电器等固定使用安装导轨（35mm, 根据DIN EN 50022），电柜门、安装板、底板等必须直接接地，不允许间接接地

The fixing of conventional control devices e.g. contactors, relays etc. has to be on

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the mounting rails using snap- on fastenings (35mm, according to DIN EN 50022 Inside of cabinets, the cabinet doors, side panels, top- and bottom plates, mounting plates as well, should be direct connected to the earth bar. The indirect connection is not permitted.

#### 4. 7、 电柜预留20%备用空间

For later modifications and extensions of the electrical cabinets there must be at minimum 20% reserved space.

#### 4. 8、 电柜内有一个放置电路图的金属盒

Circuit diagram pockets must be of sheet metal with a lid and fixed on the door inner.

#### 4. 9电柜照明24V, 使用LED灯

Electric cabinet lighting will be realized with 24 V DC and LED luminaire will be used.

### 5、 走线系统 Cable tray system

#### 5.1 电缆走线槽 Cable tray

#### 5.2 所有走线槽有盖子

All che cable tray with cover

#### 5.3 机床上的电柜/接线盒要有减震、绝缘措施

IF cabinet or terminal box are in the machine,adequate isolation or vibration-dampening means shall be provided

#### 5. 4所有的电缆无卤素

All cables used in the electric panel must be halogen free.

5. 5在工作区域电缆，应高安装保护管或保护软管，地面的电缆需要特殊金属保护，对于运动过程中的电缆连接使用高柔电缆, 驱动使用屏蔽高柔电缆

Cable, which are in working areas, should be installed in protected channels, tubes or protective hoses. Cables in foot areas need specially mechanical protection. For operationally moved cables have to be used only, high flexible cables in protective hoses and drive cable for using shield high flexible cable

#### 5. 5 设备和电柜都要与建筑地面相连，用16mm<sup>2</sup>接地线。

Both the body and the electric cabinet of the equipment will be connected to the building ground. The connection shall be made with a 16 mm<sup>2</sup> grounding wire.

## 5.6 入口出口采用插头插座: Plug and receptacle

Cables constantly moved in operation must be connected by plugs and sockets at both ends.

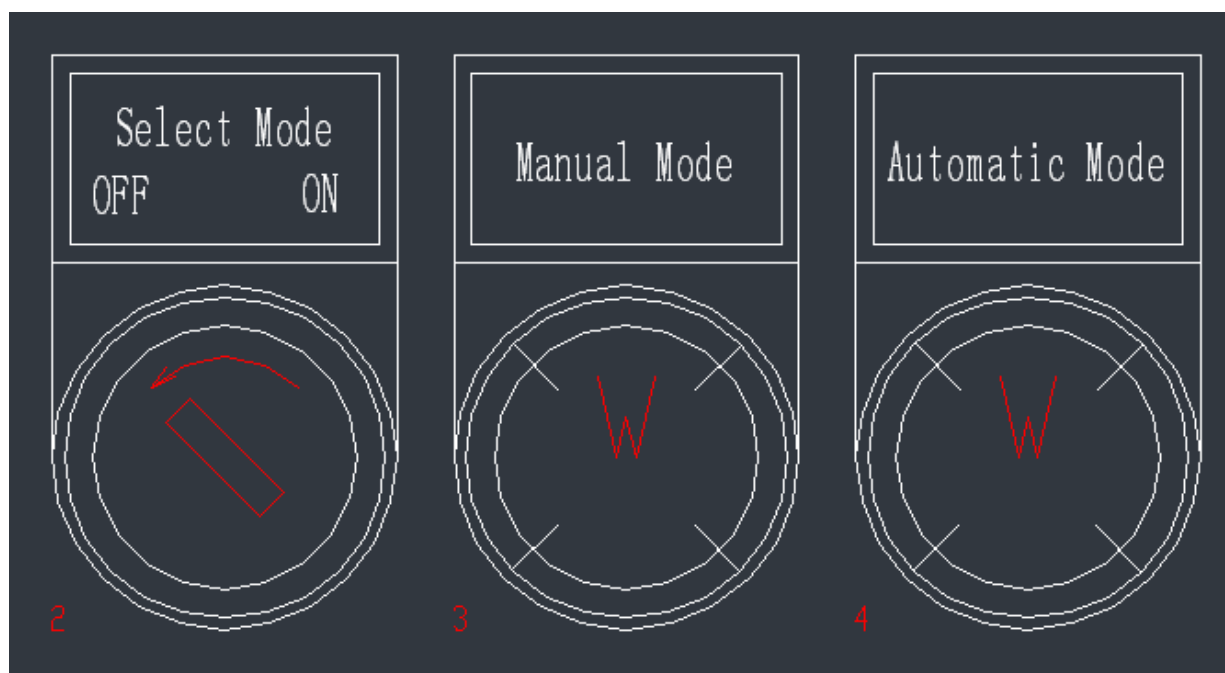
5.7 电缆使用耐油和柔性, 插头插座应该符合FORD OTOSAN, 不允许互换

Cabling must be oil resistant and flexible. Socket and plug connections must be in correspondence with FORD OTOSAN and must not be interchangeable.

## 6、操作站 Operation Panel

操作模式选择, 需要符合FORD要求, 如图, 输入控制采用安全

Operation mode choose must be in correspondence with Ford Safety Standards, such as picture, And input signal for safety.



## 7、Materials

### 7.1 操作站急停按钮使用西门子直径60mm

Emergency Stop button in operator panel: comp. Siemens, ,  $\phi$  60mm

### 7.2 电机断路器, 熔断器等必须有辅助触点监控

Motor circuit breakers, fuse breakers etc. must be monitored by auxiliary contacts  
The status of all fuses, protection breakers, pressure switches, safety guards, emergency stops, interlocks and protection devices must be displayed.

The messages must have a detailed description of the actuator, affiliated indication

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and PLC relevant I/Q address. Further are shown missing release starting conditions.

### 7.3 接触器和断路器使用压敏电阻保护（需要与OFRD讨论后确定）

Contactors and relays are to be protected by varistors. (confirm after discuss with FORD)

### 7.4 所有插座220V, 使用漏电保护断路器

All sockets, 220V, should be protected by earth leakage breakers (FI).

## 8、分工表 Responsibility List:

Electrical Interface:

Cable of Incoming power main switch; JIER(Supplier offer power capacity when sign an agreement)

Electrical connections from Brush Cleaner/ Spray Lubrication cabinets to maciners are required: Supplier□

Supplier need offer interface list when sign an agreement

## 六、其它要求Other Requirements

### 1、油漆种类 Paint Type: 无铅漆Lead free

油漆颜色 Paint Color

主体颜色 Body color: 灰白色 RAL 9002

电柜和接线盒 Cabinet and operation panel Terminal box: 浅灰色 RAL 7035（需要与Ford讨论后确定）

旋转零件的护罩 Rotating Parts Covers: 黄色 RAL 1003后续确认

### 2、产品符合 CE 认证，提供 CE 认证证书。

**Products meet CE certification, and provide CE certification.**

### 3、标准 Standards

#### Ford Manufacturing Standards

E1-QSL, Electrical Qualified Safety Source List

w-EX0, Electrical Annex of Standards

w-EL3, Programmable Controller Requirements and Application

w-EL4, Light Curtains and Presence Sensing Devices

w-ES5, Cable Pull Emergency Stop Switches

w-EX7, Remote Expert Assistance

w-EL10, Programmable Safety Systems

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w-ES20, Disconnect Switches and Operating Mechanisms EM-1, NEMA Electric Motors

w-KA0, Safety of Machinery

w-KA1, Weight Marking of Manufacturing Equipment

w-KA2, Manufacturing Equipment Handling and Packaging

w-SX1, Sound Standards

DR-8, Press Room Die Blocks

### **Ford Safety Standards**

Ford Safety Bulletin FAS08-015, Health and Safety Rules, Work Permits, Licenses & Compliance

Ford Safety Bulletin FAS08-035, New Process Design & Installation Review Procedure

Ford Safety Bulletin FAS08-036, Risk Assessments

Ford Safety Bulletin FAS08-040 Safe Practices for Workplace Organization, House Keeping and Walking Working Surfaces

Ford Safety Bulletin FAS08-055, Safety Standards for Mechanical Power Presses

Ford Safety Bulletin FAS08-100, Energy Control and Power Lock Out and Permitted Minor Tasks

Ford Safety Bulletin FAS08-102 Energy Control and Power Lock Out Placards

Ford Safety Bulletin FAS08-131, Robotic and Robotic Systems

Ford Safety Bulletin FAS08-145, Secondary Restraints

Ford Safety Bulletin FAS08-161, Arc Flash Requirements

Ford Safety Bulletin FAS08-211, Laser Safety Standard

Ford Safety Bulletin FAS08-212, Occupational Noise Standard

Ford Safety Bulletin FAS08-254, Global Confined Space Standard

Ford ECPL Placarding Requirements, Placarding, Template for creating ECPL, ECSPMT and ECTLCD (Energy Control Tasks using Lockable Control Device) Placards

Ford Arc Flash Labeling

Ford "ProTag" Launch Requirements

### **ANSI Standards**

ANSI B11.1 Safety Requirements for Mechanical Presses

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ANSI B11.19 Performance Criteria for Safeguarding  
ANSI B11.20 Safety Requirements for Integrated Manufacturing  
ANSI B11.TR3 Risk Assessments and Risk Reduction  
ANSI B11.TR4 Programmable Controller Safety Applications  
ANSI B11.TR5 Risk Reduction Methods  
ANSI T2.24.1 Hydraulic Fluid Power  
ANSI B93.114M Pneumatic Fluid Power  
ANSI Z535.4 Product Safety Signs and Labels (ISO 3864)  
ANSI RIA R15.06 Industrial Robots and Robot Systems – Safety Requirements  
ANSI RIA R15.106 Teaching Multiple Robots  
ANSI/NFPA 70 NEC National Electric Code, Current Revision  
ANSI/NFPA 70E Standards for Electrical Safety Requirements for Employee  
Workplaces  
ANSI/NFPA 79 Electrical Standards for Industrial Machinery  
ANSI/NFPA 101 Life Safety Code

### **ISO Standards**

EN 131 Ladders  
EN 982 Safety of Machinery, Safety Requirements for Fluid Power Sys & Their  
Components, Hydraulic  
EN 983 Safety of Machinery, Safety Requirements for Fluid Power Sys & Their  
Components, Pneumatic  
ISO 3864 Colors and Safety Signs  
ISO 4413 Hydraulic Standards  
ISO 4414 Pneumatic Standards  
ISO 5170 Lubrication Standards (SAE J-1751)  
EN 692 Mechanical Presses  
EN 1050 Safety of Machinery, Principles of Risk Assessment  
ISO/EN 10218-1, 10218-2 Robots for Industrial Environments – Safety Requirements  
ISO/EN 11161 Safety of Integrated Manufacturing Systems  
ISO/EN 12100 Safety of Machinery – Basic Concepts, General Principles for Design  
Parts 1 & 2

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EN 13101 Steps for Underground Man Entry Chambers

ISO/EN 13849 Safety Related Parts of Control Systems Parts 1 and 2 (Replaces EN 954-1)

ISO/EN 13850 Safety of Machinery, Emergency Stops Devices, Principles for Design

ISO 13851 Safety of Machinery, Two Hand Control Devices (EN 574)

ISO 13854 Safety of Machinery, Minimum Distances to Avoid Crushing Injuries of Human Body (EN 349)

ISO 13855 Safety of Machinery, Position of Protective Equip, Approach Speeds of Human Body (EN 999)

ISO/EN 13857 Safety of Machinery, Safety Distances to Prevent Danger Zones Being Reached

ISO 14118 Safety of Machinery, Prevention of Unexpected Start Up, Isolation, Energy Dissipation. (EN 1037)

ISO 14119 Safety of Machinery, Interlocking Devices associated with Guards (EN 1088)

ISO 14120 Safety of Machinery, General Requirements for Design and Construction of Guards (EN 953)

ISO/EN 14121 Safety of Machinery, Principles of Risk Assessments

EN 14122 – Safety of Machinery, Permanent Means of Access to Machinery, Parts 1, 2, 3, 4, Access between levels, Platforms, Stairs and Guardrails, Fixed ladders

EN 61310 – Safety of Machinery – Indication, Marking and Actuation, Parts 1, 2, 3

### **OSHA Standards**

OSHA 1910 Machinery and Machinery Guarding, Subpart O

OSHA 1910.211 Definitions

OSHA 1910.212 General Requirements for All Machines

OSHA 1910.217 Mechanical Power Presses, and App A, B, C and D

OSHA 1910.219 Mechanical Power

OSHA 1910.399 Electrical Definitions

OSHA Publication 3067, Concepts and Techniques of Machine Guarding

### **UL Standards**

UL-508A Industrial Control Equipment

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UL-1998 Software in Programmable Components

**SAE Standards, IEC Standards**

SAE HS-1738 Electrical Standards for Industrial Machinery

SAE J-1739 FMEA in Designs

SAE J-1751 Lubrication Components and Systems

IEC/EN 60204-1 Electrical Equipment of Industrial Machines

IEC/EN 61131 Wiring Methods

IEC/EN 61496 Electro Sensitive Protective Equipment (Light Curtains)

IEC/EN 61508 Functional Safety of Electrical, Electronic and Programmable Electronic Systems

IEC/EN 62061 Functional Safety of Safety Related Elect, Electronic & Programmable Electronic Systems

IEC/EN 61800-5-2 Functional Safety of Power Drive Systems

**Other Standards**

ASME Sec VIII, Div 1 – Pressure Vessels

ASTM A-185 Pressure Vessels

AWS American Welding Society – Welding Methods

**七、服务 Services**

乙方在合同签订一周内提供设备外形图（CAD版）和导轨图纸（CAD版）。

Party B shall provide the equipment profile (CAD) and the rails drawing (CAD) within one week after the contract is signed.

设备将在卖方工厂组装完成并进行预验收。

The machine will be installed in proper working condition in our works for the buy-off with the customer.

最终安装、调试及培训。

Support for final installaton, commissioning and training at the end customer.

提供备件清单和易损件清单。

Provide spare parts list and quick-wear parts list.

标牌和文档分别提供2套英文、土耳其语纸质和电子版本。

Labeling of the machine and machine documentation in 2 copies in English and

Turkish language .



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所有文件将以电子格式提供（3份副本，2xUSB，1xSSD）

All documentation will be supplied in electronic format ( 3 copies, 2xUSB, 1xSSD )

#### 文档和语言

标签、设备标签。ECPL、次要任务条目、操作站按钮等必须使用目的地语言（突厥语）。

手册、文件和图纸应采用英语和设备目的地的语言。HMI和PLC编程可在英语和设备目的地的语言之间切换。

#### Documentation and Language

The labelling, Device tags. ECPL, Entry for Minor tasks, Buttons on operating stations, etc must be in the language of the destination (Turkisch). The Manuals, Documents and Drawing will be in both English and the language of the equipment destination. The HMI's and PLC programming will be switchable between English and the language of the equipment destination.

Language. in English and Turkish language。

## 八、外购件品牌要求 **Out Sourced Parts Brand**

伺服电机Servo Motor: SIEMENS

电机机减速机Gear Motor: SEW

过滤系统Filter: Ufi Filter

气动元件Pneumatic Coponents: Festo

气动柱塞泵Pneumatic plunger pump: Debem

液压接头Hydraulic Flare or Straight Connectors: Parker 37 degrees flared

液压软管Hydraulic Hose: PARKER

液压阀Hydraulic Valve: REXROTH

液位开关Level Switch: IFM

压力计Fluid Pressure Gauges, Liquid Filled: Wika

同步带Synchro belts: OPTIBELT

轴承Bearings: SKF

接近开关Inductive sensors: TURCK

光电开关Photoelectric sensors: SICK

编码器 Encoders SICK

电缆Cables: Lapp

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电柜和操作站、接线盒Cabinet and operation panel 、 Terminal box : Rittal

控制柜 Control Cabinets : Rittal with ISO Handles

电柜空调: Air condition: Rittal

HMI: Panel IPC Siemens IPC477D – 19” (需要与Ford讨论后确定)

驱动器 Drive: SIEMENS G120

空开、断路器 Breaker : SIEMENS

I/O 模块 I/O Module : ET200SP with profinet interface

接触器, 继电器 Relay and contactor: SIEMENS

24V电源24V power supply: SIEMENS, Sitop BUF series with buffer module 10s

(6EP3437-8SB00-2AY0 Siemens Power Supply will be used ) (6EP4293-8HB00-0XY0

Siemens Buffer module will be used )

UPS: SIEMENS

插座 socket:MURR

按钮、指示灯 Pushbutton,pilot lamp,select swich: SIEMENS 3SU metal

堆叠灯 Stack Lights : Balluff Smart Light

交换机Network Switch :SIEMENS X208

变压器 Transformer: Schneider/ Telemecanique (需要与 Ford 讨论后确定)

插头插座 Plug and receptacle: Harting

接线端子 terminal : Phoenix

其它元件均应采用欧美知名品牌产品。

All other components should be known brand from Europe or America.,

## 九、文件 Documentation 后续确认

### 9.1 Buy off book

Risk assessments for design, maintenance and production

Reliability & Maintainability (R&M)

### 9.2 Maintenance and Operator Manuals

The supplier shall furnish a preliminary copy of these manuals for approval and scope at the time of shipment. After approval the suppliers shall furnish one copy to the receiving plant (to use during startup activities) and one set to the regional central engineering group. With each copy there shall be an electronic version supplied on CDROM that is software based and useable on Ford Motor Company computer

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systems. Final (as-built) updated copies to be sent within thirty (30) days of final buyoff at the receiving plant. The manuals shall contain, but not be limited to the following data:

Ford purchase order number, equipment serial number(s) and identification.

- ☐ Equipment specifications showing all capacities and adjustments.
- ☐ Reduced copies of all prints and diagrams.
- ☐ A list of commercially available parts with original manufacturer's catalogue.

Drawings displaying the location of these parts will be included.

- ☐ A list of parts manufactured by the press/automation suppliers and prints showing their location.
- ☐ Preventative maintenance recommendations and testing procedures.

Prints for all wear strips, plates and inserts.

- ☐ Recommended spare parts list, including: Mfg. Part #, Price, Contact Name, and Phone Number.
- ☐ Lifting and rigging instruction for major components, along with associated diagrams.
- ☐ An illustrated description of the operation and instructions for a step by step procedure for equipment operation - during automatic and manual operating modes.
- ☐ Lubrication, pneumatic, hydraulic and electrical equipment layouts each separately superimposed on elevation plan and detail drawings as required showing the location of all pertinent equipment.
- ☐ All lubrication points superimposed on elevation plan and detail drawings as required to display type of lube, frequency and how performed.
- ☐ I.O. list, control manuals, documentation and disks.
- ☐ A complete list of perishable items, including: all bearings, seals, packings, O-rings, wear strips and wear plates with sizes and locations.
- ☐ A completed "Maximo" spreadsheet Performa for electronically entering in the maintenance activities into Ford Motor Company maintenance system. A simple spreadsheet template will be provided and must be populated with specific data such as frequency, skill trades needed, etc. The supplier will be required to enter in the simple data that includes basic maintenance requirements by task, trades needed to complete the task, how long it takes, and frequency.

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### 9.3 Final Drawings and Diagrams

Scope - The following paragraphs pertain to drawings, circuit diagrams, and data required for installation and maintenance of stamping equipment.

Supplier Responsibilities - Copies of all final drawings and circuit diagrams of the equipment "as-built" and CD-ROMs in the requested version of AutoCAD will be forwarded no later than six weeks after the equipment has been accepted.

The final drawings and diagrams shall be identified with the Purchase Order number, serial number(s), (Ford Project number) and a full description which will identify the particular equipment to which the prints and diagrams pertain to. If any field changes are required, the changes shall be recorded and the press/automation suppliers shall forward new copies of the changed drawings as replacements. A copy of the latest marked-up version must always be on-site.

Final electrical diagrams, layouts, and electric motor data shall be forwarded by the affected suppliers before delivery of the equipment. Latest copy of all control programs shall be shipped to requisitioning activity before starting of the installation. The final copy of all programs, after receiving plant's acceptance, must be submitted to receiving plant and requisitioning activity.

本技术协议经双方代表签字后，与合同文本同时生效，具备同等的法律效力。未尽事宜双方友好协商解决。

This technical agreement is the integral part of the contract and have the same legal binding.

此技术协议书为中文、英文对照版本，当中文和英文发生歧义时，以英文版本为准。如果只有英文的句子，依据英文为准。

The technic agreement book is written in Chinese and English, the English is standard when the mean is different between Chinese and English, if only have English, the English is standard.

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JIER: (signature and seal)

甲方（签章）

DieTronic: (signature and seal)

乙方（签章）

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