RFQ - Request for Quotation

Project: 4W

PRESS SHOP

Rev No. 4.0

Nov. 15th, 2022

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• General Information

The purpose of this document is to acquire an expression of a quote from a supplier to participate in the bidding process of the mentioned project. We are looking for a potential supplier to engage in the formal bidding process for the design, manufacturing & supply of Turnkey Press Shop. India safety, ergonomic regulations & all the legal compliance of State & Nation must be met at a minimum.

The contents of this specification as well as all received information carriers (product and equipment drawings, parts list, electronic data, etc.) must be treated confidentially and protected from access by third parties.

Technology process names are for reference only; each supplier has to submit his own process/ system.

All Recommendations/Alternative Scenarios should contain Process Details, Proposed Layout, approximate area required, utility requirement, types of machines and quantity, estimated CAPEX and leadtime to design, build, install, commission and Prove out.

Suppliers may request data from OLA required for Design & Proposal Submission.

• Project Description

The Press Shop line should be planned with the vision that the line should deliver parts to support an assembly line. The entire line and M & E should be dimensioned to support the assembly line. The scope of this proposal is for the design, construction, installation and commissioning and proving and Production support (min 6 months, after run at rate)

Project :

- SOT W1 Nov., 2023 (Start of Trials)
- SOP W1 March, 2024
- Line should have installation completed at OLA site by end of Nov. 2023
- Greenfield Site, near XXXX, India
- 7000 hour/Annum - working time
- 96% expected uptime (at beginning), 98% expected uptime after commissioning

1.0 Introduction

This specification provides the Supplier guidance in completing their quotation response to these specifications in accordance with the Buyers general requirements for the purchase of all machinery and equipment. The Supplier shall prepare their quotation in compliance with these requirements

All information provided by Ola Electric, either verbal, part print, process details or otherwise written is to be considered confidential and shall not be released to competitors of Ola Electric without the explicit written consent of Ola Electric. Ola's information is being provided to assist in your quotation preparation and shall not be divulged to other third parties except as necessary to complete this quotation.

1.1 Legal requirements and regulations

- The Supplier shall be fully responsible to design, build and deliver all equipment included within the purchase order agreement in full compliance with governmental laws and regulations applicable to the final destination location for the equipment.
- Ola Electric's requirements shall not supersede applicable governmental laws and regulations of the final destination location for the equipment.

1.2 Deviations to buyer's standards, specifications and components

- The Supplier shall submit requests for deviation, or exception to Ola Electric prior to quotation submittal, or as part of their quotation response.

2.0 Project Overview

The supplier is responsible for providing a complete system that will include design, build and integration of all system components further described in this document

- Product design documents for quotation are provided for reference only. Detailed product information will be provided as available at the time of order confirmation.
- OLA Electric shall make available product models to the Supplier during testing at the Ola electric plant.

- Changes to the product design may require changes to the equipment during project implementation. These changes shall be documented and approved through OLA Electric's change management process at the time the change is identified.
- The Supplier shall notify OLA Electric and OLA Electric's manufacturing engineer in case of any potential adjustment in price due to product design changes.
- In the event that the Supplier fails to inform OLA Electric of the necessity for a price change within 2 business days of receiving a notice of a product change, the Supplier and OLA Electric agree that the design change is accommodated in the original purchase order agreement.
- See attached models for additional information
- Suppliers need to inform about the support they will need during installation and commissioning

Note : only math data necessary for quotation has been provided; a full data exchange will take place after contract award.

All project management tasks are the responsibility of the Supplier. Major components of the manufacturing system are as follows:

2.1 Project Timing Dates

Project dates given in this specification are subject to change based on OLA electrics future development of the project. The following are forecasted key dates provided by Ola Electric as the basis for the Supplier to forecast their milestone dates for the project

2.1.1 Time Schedule and Deadlines

Target SOP - W1 Mar, 2024 - Line to start trials in Nov.2023

The contractor is required to provide a draft time schedule in MS Project with quote submission. This schedule should include the following key milestones:

1. DAP Milestones
2. Equipment manufacturing micro activity plan
3. Pre Dispatch Inspection Plan
4. Trials plan at Supplier Facility for equipment validation
5. Packaging and dispatch Plan via air or sea
6. Installation and commissioning Plan
7. Manpower Plan
8. Run at the rate for sustainable results
9. Prove out Plan
10. Training and Handover
11. Post SOP Support

The supplier is requested to review the basic details of this project and reply with:

1. Ability to meet requested timing or provide their best estimate of timing to complete.
2. Provide basic concepts /proposals/recommendations on the requested equipment.
3. Provide a non-binding estimate of costs to manufacture, ship, install & commission.
4. Suppliers recommended mechanical and electrical spec
5. Provide a maintenance schedule for all equipment listed within the quotation
6. Ability to perform Simulations as required

2.1.2 Deliverables

Supplier needs to provide data for below mentioned points for the process:

1. Technical details
2. Layouts
3. Process flow charts
4. Recommended Technology
5. Investment Details
6. Utilities requirement
7. Environment
8. Maintenance
9. MTBF/MTTR to be confirmed
10. Space requirement
11. Emissions details
12. Scaled drawings for 3D of Facilities and Equipment (In STEP Format)
13. Robot Simulation for Optimal selection of Robot Quantity
14. Timeline

The quotes are to be sent before or latest by **30 September, 2022**.

2.2 Destination Site Location

- Ola Electric will be responsible for all functions necessary to prepare the site for the machinery and equipment installation.
- The Supplier shall include in their quotation, response package notifications to buyers of any machinery and equipment having special preparation for installation and for operation.
- The Supplier will be responsible to provide pit dimensions for preparation by the building contractor
- Supplier should provide detailed information for pits, foundations, trenches, roof load, points of connections for utilities and anything else required for a smooth preparation for line installation

2.3 Shipping

- Supplier is responsible for shipping the equipment to the destination facility and the shipping method shall be at the Ola Factory (TBD)
- The Supplier is responsible for all shipping documentation
- ALL transport, packaging and associated cost (handling) to install the equipment/facility in the functionally correct line position are to be included in the quote.

2.4 Installation and Commissioning

- The supplier is responsible for installation and commissioning of the equipment at the destination site.

2.5 Language Requirements

- The Supplier shall reply to this quote in English.
- The primary language in the destination site is local, with the secondary language being in English.
- All costs associated with creating, producing, tags, signs, drawings and documentation in either primary or secondary language shall be included in the Supplier's quoted pricing.
- Supplier engineering and service personnel installing and servicing the destination site for the equipment shall be fluent in either Hindi or English.
- Safety labels, placards, warnings: primary language
- Component tags, functional descriptions: dual language
- Repair & maintenance manuals(Including calibration frequency and process) : dual language - 3 Hard Copy
- training materials: dual language - 3 Hard Copy
- Operator interfaces such as (but not limited to) HMI, buttons, controls, switches shall be dual language
- Mechanical, controls drawings: english only - 3 Hard Copy

3.0 Warranty

In submitting a quote for this scope of work, the contractor guarantees the following with respect to the entire scope of delivery:

- That the installation corresponds to the requirements of the specification, the applicable standards and regulations have been adhered to, the installation is of a high technical standard, has been manufactured from the most suitable materials and shows no defects which impair the functionality, operational reliability and economic viability, as well as the lifespan normally expected of this type of installation.

- That the installation produces the output agreed on as per specification, and that the documentation, in all its parts, is complete, technically correct conforms to the specification sheet and places the client in a position to operate and maintain the equipment in accordance with the specification sheet.

- The Supplier shall include in their quote a warranty for the system and equipment for a period of 1 year from the beginning of the Start Of Production (SOP) date.
- Supplier to explicitly mention the parts not covered under warranty, if any, which are not included in the price estimation response to the RFQ.

3.1 Spare parts during the warranty period

- The Supplier shall provide replacement parts with no additional cost for the equipment during the warranty period.

4.0 Maintenance

4.1 Replacement parts (post-warranty)

- The Supplier shall identify which spare parts are necessary to keep in stock to support the ongoing reliability of the equipment, and provide this list indicating makes, along with associated costs as part of the quotation package. This includes parts that frequently break down, as well as perishable parts.

4.2 Perishable Items

- As part of the quotation the Supplier is required to provide sufficient perishable items to support equipment reliability from SOP +6 months of production, up to Run@Rate . This includes but is not limited to items such as; filters, seals, part touching details, etc.

4.3 Predictive maintenance

- As part of the quotation supplier is required to provide the quote for Predictive maintenance details and features as option category.

5.0 Technical Details of the Production Line

- Product design documents for quotation are provided for reference only. Detailed product information will be provided as available at the time of order confirmation.
- OLA electric shall make available product models to the Supplier during testing at Ola electric plant.
- Changes to the product design may require changes to the equipment during project implementation. These changes shall be documented and approved through OLA Electric's change management process at the time the change is identified.
- The Supplier shall notify OLA Electric and OLA Electric's manufacturing engineer in case of any potential adjustment in price due to product design changes.
- In the event that the Supplier fails to inform OLA Electric of the necessity for a price change within 2 business days of receiving a notice of a product change, the Supplier and OLA Electric agree that the design change is accommodated in the original purchase order agreement.
- See attached models for additional information

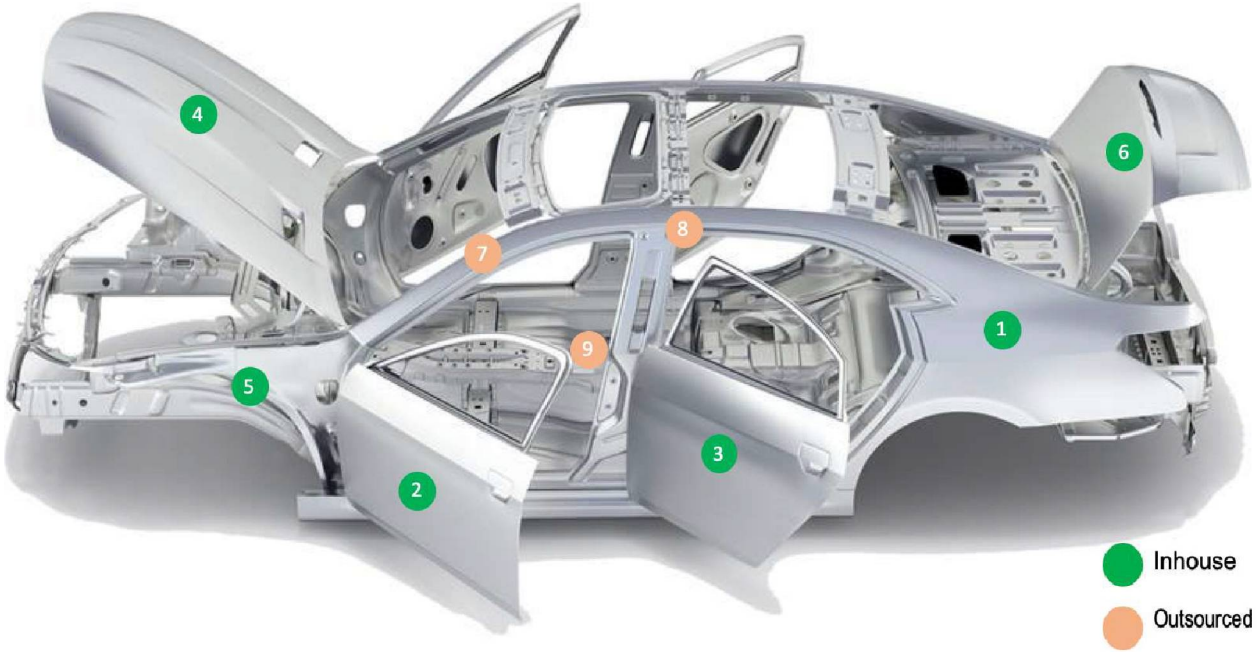
Note : Only math data necessary for quotation has been provided, a full data exchange will take place after contract award.

5.1 Press Shop data

1. To ensure high-level quality of finished production it is proposed to produce class A parts by OLA, class B and C by nearby suppliers, Below is the list of parts considered as plant-made (inhouse)

#	Main Components
1	Body Side Outer (LH/RH)
2	Front Door Inner (LH/RH)
3	Front Door Outer (LH/RH)
4	Rear Door Inner (LH/RH)
5	Rear Door Outer (LH/RH)
7	Fender LH/RH
8	Tailgate Inner
9	Tailgate outer

Visual reference for Press parts



No.	Part name
1	Side Panel Outer
2	Front Door Outer
3	Rear Door Outer
4	Hood Outer
5	Fender
6	Tailgate
7	A pillar
8	B, C and D pillars and reinforcements
9	Center floor and RR floor and other parts

5.2 Assumptions

5.2.1 Automation assumptions

The press line is considered to have below operations automated -

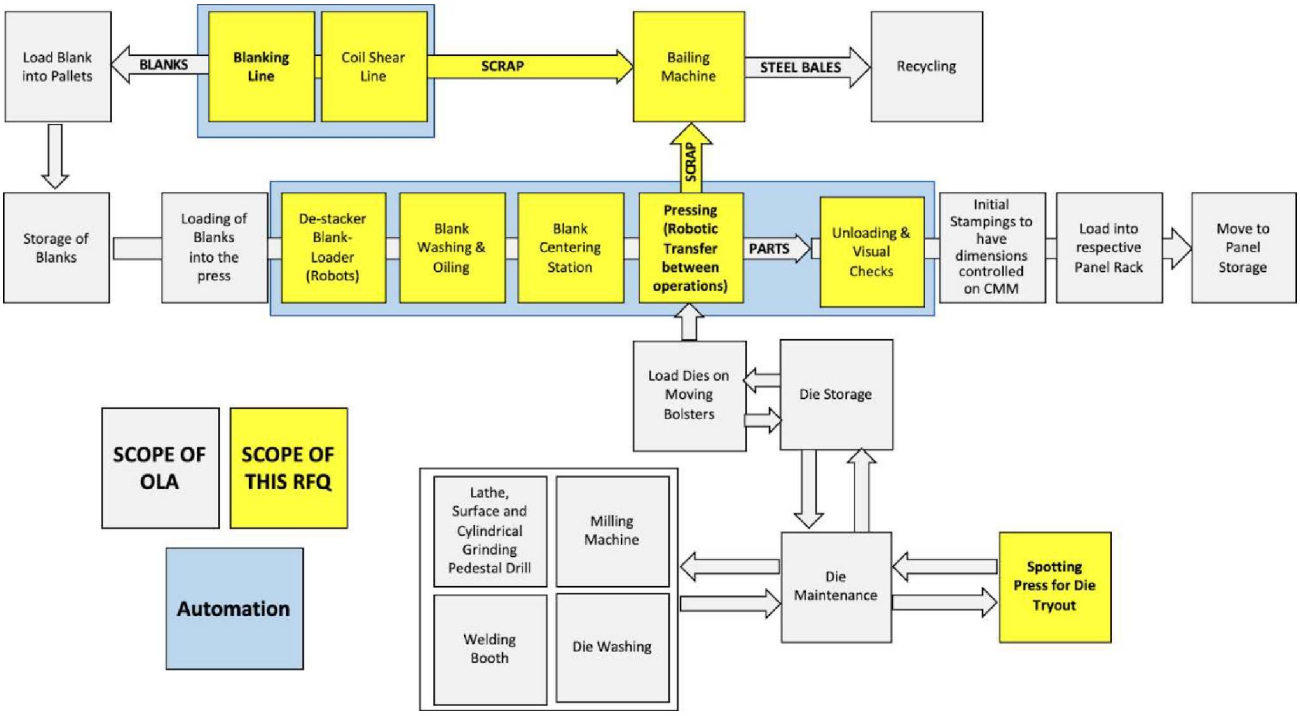
1. Autonomous Forklift or AGV for Blank palette transfer
2. Destaker for blanks
3. Blank washing unit with closed loop filtration unit and level control
4. Blank oil lubricating unit with oil filtration unit and level control
5. Robot at the start of operation which will match the line speed
6. Cross bar feeder for blank/part transfer between operations
7. Presses
8. Blanking Line
9. Spotting Press

5.2.2 Type of material

We are considering both steel and aluminum as a type of material used in our product. The presses should be compatible with both types of materials.

5.3 Main Operations - Process Steps

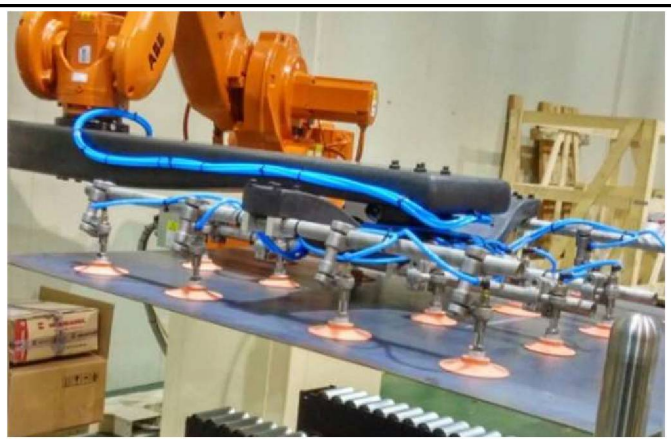
- This study of no of stages is an approximate calculation based on detailed steps as mentioned below to support the vehicle assembly line of capacity 20 JPH.
- Supplier has to make the proposal as per Capacity scenario
- Blanking operation is considered outsourced so the press shop will receive blanks from the supplier for the start of press operations.



A= Auto
SA=Semi Auto
M=Manual

Preliminary Process Steps

OP	Process Details	Picture	A or M or SA
10	From blank storage, an autonomous forklift or AGV transports the pallets to the start of the press line (blank destacker stage)		A
20	Pallets are loaded onto destacker using a crane or AGV on locating pins ; Since the blanks are stuck, a magnet on the de-stacker lifts the first blank partially so that it is easy to separate		SA

40	The destacker uses a robotic arm with vacuum cups to pick the first blank and place it on the roller conveyor		A
50	The blank then goes to the washing machine where it is: Washed with water-based cleaner (removing oil, dust, and foreign particles) Cleaned with water and sprayed with oil on the top and bottom		A
60	The blank is centered with the help of fingers and a stopper (this process takes a fraction of a second)		A
70	A robot will pick blank and load into first press for drawing operation		A

80	After drawing operation the part is moved using cross bar feeder for the next operation This process repeats until the last operation		A
90	After press operations, the last robot puts the stamped part on a conveyor at the end of the line		A
100	On both sides of the conveyor belt, parts are visually checked for dents, damages, or missing holes		M
110	Some selected samples are sent to a coordinate measuring machine (CMM) for inspection; some parts are also sent to a green room to find surface defects visually Each part is checked on checking fixture		SA

120	At the end of the conveyor belt, manual unloading of stamped parts		M
130	If there is a dent on stamped parts, people are needed to remove the dent and match the surface by buffing		M
140	Parts are stored on racks manually and moved to panel storage area		M

5.4 Equipment Details

5.4.1 Press operations

	Mechanical press line	Servo press line
Description	Presses with power transmission of mechanical clutch, brake and flywheel	Presses with power transmission of a servo drive (electric motor with control device)
Speed of operations	Max. 14 SPM	Max. 18 SPM

Ola is open for both mechanical press line and servo press line. Suppliers need to quote for both mechanical and servo press suitable for our requirement out of which we can decide the best suited press line.
We need to have a line with 4 **(5 as an option)** presses with below Specification:

CAPACITY	2500T + 3x1200T + (**1X1200T as an option**)
DIE SPACE	4600 x 2500 mm
STROKE	1000 ~ 1200 mm
DIE HEIGHT	1400 mm
CUSHION	400 TON

2500 T Press

Machine Designation	Single-action Press
Nominal Force	25 000 kN
Stroke per minute - SPM	18 Max
Slide Stroke	1300 mm
Slide Adjustment	300 mm

Slide Clamping Surface	4600 x 2500 mm
Moving Bolster Clamping Surface	4600 x 2500 mm
Press Cushion	Hydraulic 6 points
Force per hydraulic cylinder	Max-1 250 kN (total for 6 points 6 000 kN)

1200 T Press

Machine Designation	Single-action Press
Nominal Force	12 000 kN
Stroke per minute - SPM	18 Max
Slide Stroke	1300 mm
Slide Adjustment	300 mm
Slide Clamping Surface	4600 x 2500 mm
Moving Bolster Clamping Surface	4600 x 2500 mm

Blanks

Material	Steel or Aluminum
Thickness	0.7 to 3.0 mm
Blank Shape	Square/rectangular/shaped with cutouts

Press Line should have below characteristics:

1. Fully automated die and tooling change, and robot / crossbar grippers in < 4 mins
2. Press line should have moving bolster
3. Split scissor lifted carts (to pick up the blank stack to support continuous production)
4. Blank de- stacker
5. All transfers between presses with Crossbar feeder
6. Two robots at the beginning for destaking and feeding to first press
7. Shuttle tooling and Robot Tooling - change stations
8. Two integrated double blank monitoring sensor
9. Control station for complete monitoring of line during operation
10. Optical or mechanical centering station
11. Blank Washing unit
12. Blank Lubricating Unit
13. 2 Exit Belt Conveyors in parallel - L 12000 mm x W 1750 mm (approximately)
14. Complete press line should be enclosed for noise abatement
15. Provided with fine-adj, inch, single, and continuous operational modes and e-stop functions.
16. Protection and safety devices required during potentially harmful processes; for example, protection for moving bolster table to prevent damage to people or device around table during table moving process
17. Press provided with anti-vibration; foundation pads
18. Safety shutters on the left and right side of the press upright for each press
19. Safety fence integrated with automation equipment

5.4.1.1 - Stamping Process Monitoring

Sr. No.	Area	Automation Required
1	Start of Press Line	Avoid the double blank during destacking
2	Blank storage area	Blank Batch traceability / Individual blank traceability
3	Before 1st press operation	Shape size & thickness check of blanks
4	Before 1st press operation	Sample checking system integration with Production system
5	Washing and oiling station	Proper working of washing and oil station
6	After Washing and Oiling station	Quality checking in washing machine and oiling machine (Any contamination check)
7	All Air cushions	Air cushion monitoring
8	Die Maintenance	Automatic die handling system based on actual production plan
9	All Dies	Loose material check on die

5.4.1.1.1 - Monitoring of the Process

Automated alarm generation based on smart sensor data collection, for continuous monitoring of the process

- Blank Alignment to feed in Die
- Blank Clean and no damage on the surface
- Blank Size, thickness and Shape
- Inline real time stamping process checks - Checks for proper blanks/parts insertion, location, and confirmations of parts removal before next stroke
- Foreign Body Detection - Check the dies for any foreign objects (offall, bolts, pins, washers, nuts, broken die components,...)
- Set-up Checks - Checks the dies before first stroke after a die set changes
- Final stamped part Visual Check - No surface damages (scratch, cracks, dents), no missing holes, no missing or incomplete cut-offs, final shape and size
- Supplier to quote for camera inspection as option

5.4.1.1.2 - Monitoring of Critical Die Functions

Automated alarm generation based on smart sensor data collection

- Presence of all required air cushion pins
- Air Cushion Pressure
- Blank Loader Pressure
- Cams, Rotary-Cams
- Lubrication

5.4.1.1.3 - Monitoring of Critical Press Functions

Production Monitor

- Current and historical production data to be made available whenever required
- Comparison of system productivity over periods of time
- Identification of trends in production stroke rates
- Early detection of abnormalities
- Use of historical data for accurate order planning, and realistic parts costing
-

Cooling Analytics

- Current and historical status data for the equipment's cooling system (motor temperatures, lubricating oil temperatures) are available whenever you need them.
- Comparison of die-specific status data over periods of time
- Detection of abnormalities, such as motor bearings.
- Early identification of potential system overloads
- Early detection of problems developing in the cooling system

Press Force Monitor

- Current and historical process data (stroke rates, peak press force, infeed/outfeed press force ratio) to be available whenever required
- Comparison of die-specific process data over periods of time.
- Identification of incorrectly positioned dies in the direction of flow.
- Detection of improperly set press forces specific to each die.
- Early detection of die-specific discrepancies in the press force distribution
- Use of die-specific historical data to plan die overhauls/repairs.

Lubrication Analytics

- Current and historical data for the lubrication system (lubrication pulses, oil temperature, oil level, status bits, lubrication system, Lubrication Pressure)
- Comparison of die-specific status data over periods of time and production shifts.
- Detection of leaks in the lubrication circuit before system stoppages
- Early detection of issues developing in the lubrication distributors, which allows the prevention of system downtime.

- Use of historical status data for the lubrication system enables purchase of lubricating oil and scheduling of oil changes and oil filter replacements based on actual needs.

Drive Analytics

- Current and historical status data for the drive system (motor currents, motor temperatures, motor torques, converter, status bits) to be available whenever required
- Detection of abnormalities, such as those that indicate emerging motor or converter damage.
- Comparison of die-specific status data over periods of time
- Use of historical data (e.g., torques, speeds, operating hours) to plan converter replacements or motor overhauls.

5.4.2 Scrap conveyor

Scrap is generated throughout the press shop. About 90% of scrap material is generated in the press lines. This scrap should be automatically disposed into chutes that lead to an underground scrap conveyor. The scrap conveyor should have an underground connection to the blanking line to collect scrap from blank operation. This scrap is taken to a baling machine and the scrap metal bales are sent back to the suppliers on trucks. The supplier needs to provide Below -

1. An underground scrap conveyor for the Press line and Blanking line (The speed of the scrap conveyor should match with the speed of the press line.)
2. Baling machine

5.4.3 Blanking Line

Blanking can be done by a mechanical blanking line, or a blanking line with servo-motors.. Although blanking lines with servo-motors provides greater control over stroke motion with greater precision, leading to high quality of blanks. The Supplier should quote both the blanking lines and Ola will assess cost x benefit and will decide

The blanking line should include :

1. Decoiler,
2. Straightening roller
3. Strip washing plant
4. Adjustment and lubrication unit
5. Blanking press
6. Bundle turnover

Parameter	Option 1	Option 2
	Mechanical blanking	**Blanking line with servo-motors**
Speed of operations	35 max SPM *(for parts with complex geometry)* 60 max SPM *(for parts with simple geometry)* Average 40 max SPM (1,211K)	35 max SPM *(for parts with complex geometry)* 85 max SPM *(for parts with simple geometry)* Average 60 max SPM (1,817K)

5.4.3.1 Blanking Line Process Steps

A = Auto
SA=Semi Auto
M=Manual

Process step	Description	A or M or SA
Coil transportation	• Coils brought to press shop through trucks; unloaded using overhead crane • Since coils are heavy, all coils in truck are unloaded in a pit near dock, before being moved to coil storage	SA
Manual inspection for incoming goods	• Manual inspection of rolled coil packaging for deformation or rust • If packaging is damaged, then coil is checked: a small sample is extracted from the coil and tested[1] • If coils are damaged at the beginning (2-3 m), a cutting tool is used to cut that and send to scrap • Supplier provided inspection reports are checked by quality control	SA
Coil storage	• Storage of coils on the wooden V-blocks (2-3 levels of storage; separate storage of skin parts and inner parts)	A
Steel coils unwinding	• An overhead crane transports coil (with packaging) to de-coiler • Packaging is removed[2] and coils loaded into the de-coiler, where the coils are unwound	SA
Blanking	• The unwound sheets pass through a straightening roller • These sheets pass through a station for washing, cleaning, and oiling • The sheet (on rollers) sags to define a pitch based on the blank size[3] • The sheet passes into the blanking press and is cut accordingly	A

[1] Can be in-house or outsourced

[2] The removed packaging is placed in a manual chute that transports it to a scrap conveyor running underground

[3] Feeder rollers control the size of the blank, while the blanking die simply cuts the blank

Scrap	• The Scrap generated is collected and sent to truck or bailing machine via underground scrap conveyor	A
Stacking of blanks after blanking press	• The cut blank goes forward on rollers towards a magnetic belt at the end • If there are burrs on the blank (from the cutting operation), the magnetic belt separates them • The magnetic belt automatically stacks blanks into a pallet at the end of the conveyor belt • Pallet size is determined by part size and a sensor checks the height of the stack and alerts when the target volume is reached • A bundle turnover is needed to rotate blanks for L/R orientation	*A*
Geometry characteristics control	• While unloading, geometry characteristics control takes place where visuals and dimensions of blank are checked with blank thickness. Metallography of blanks should also be checked.	A/M
Blank storage	• The pallets are changed manually or automatically driven trolley and taken to a stopper • An Autonomous forklift or AGV transports the pallets to blank storage; here, pallets can be stacked vertically in a magazine to reduce the need for storage space	SA
Inspection of blanks	• In the trolley, the blanks are checked for burr • Corrective action is taken; the die maintenance team works on blank dies to ensure that burr is eliminated and the blank itself is cleaned manually with fine sandpaper	M

5.4.3.2 Blanking Line parameters

PARAMETER	STANDARD
Press Capacity	800 Ton
Coil width (min.- max.)	600 – 2,150 mm
Material thickness (Mild steel)	0.45 – 3.0 mm
Material thickness (High tensile strength steel)	0.45 – 2.0 mm
Blank length	600 – 5,000 mm
Blank width	600 – 2,000 mm
Driving mechanism	Mechanical/Servo
No. of blanks per stroke	Max. 4 for each stacking position
Press stroke rate	35 – 80 strokes/min
Uncoiling Speed	0-90 m/min
Stacking height(without pallet)	500 mm
Line speed	Max. 90 ,/min.

5.4.4 Spotting Press

Die spotting uses a spotting press which applies pressure on the mold to check the contact surfaces between the moving side and the fixed side. It is needed to verify the tool before going into a trial press. The Supplier should quote both mechanical and servo spotting press. Ola to select one which is most suitable.

Parameter	**Standard**
Die spotting Press design	Mechanical/Servo
Capacity	500T
Forming speed (Press capacity related)	15 mm/sec
Slide speed (Closing and return)	95 mm/sec
Stroke length	1900mm
Slide/Bolster dimensions	4,600 x 2,500 mm
Turn-over angle	0-180°
Working height	340 mm
Daylight	2500 mm

5.5 Layout and line details

The supplier needs to submit the technical proposal with a press line layout. In which Press bed height to be mentioned to define the building height , also mention press minimum width.Supplier should also include reference pit drawing in the layout.
Please provide a layout for the following alternatives:

Alternative 1

One blanking press

One press lines with four presses

Spotting press

Additional areas (blank storage, coil storage, stamped parts storage, die maintenance)

Scrap disposal system

Alternative 2

One blanking press

One press lines with five presses

Spotting press

Additional areas (blank storage, coil storage, stamped parts storage, die maintenance)

Scrap disposal system

5.6 Measurement Characteristics and tolerances

Equipment must be capable of measuring, and identifying non-conforming products outside of the following specifications and tolerances and report printing with necessary data .

Note : Vendors should recommend the future protection test for as per other OEM.

6.0 Manufacturing Requirements

6.1 Utilities

7.1.1 Power Supply Requirements
7.1.2 Compressed air
7.1.3 Floor Load
7.1.4 Water
7.1.5 Requirements for Controlled Temperature and Humidity

Provide estimated data for the following Utilities:

	Servo Press	Mechanical Press	Blanking Line	Spotting Press
Power (KVA)				
Demand (KVA)				
Water (KLD)				
Floor Load (Tons)				
Air (CFM)				

6.2 Environmental conditions in the Ola Futurefactory

Temperature	Low 18 °C - High 41 °C
Relative Humidity	Humidity : 20 - 80 %

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (C)	30	33	37	40	42	36	33	32	32	32	30	29
Precipitation (mm)	8	2	3	7	13	87	67	95	79	51	24	9

7.0 Standard BOE

To be complemented by Line builder (Same make or equivalent)

Sr. No.	Items	Make	Remarks
1	PLC and PC or System software and hardware	Siemens S7-1500 Programming Version TIA 16.2 (Minimum 20% free Space)	To be integratable with Ola's MES System Requirements and to be compatible with Ola's Industry 4.0 / IIoT latest requirements for executions
2	Drive motor (IE4 rating)	Siemens / SEW	
3	Lubrication unit	SKF/Ecolab/ Cenlube	
4	VFD	Siemens (2nd option SEW)	
5	Bearing	SKF / FAG / NTN / NBC	
6	Air Balancer	IR	
7	Tool rail	IR / EEPOS	
8	Scanner	Zebra / Cognex / Sick	
9	Spring Balancer	Sando	
10	Push Button	Siemens	
11	Tower lamp	Siemens / Banner	
12	Lighting	Wipro / Phillips	
13	Control panel	Rittal	
14	Utility Socket	Schneider	
15	AndON TV	Samsung / LG	
16	UPS	Fuji / APC / Emerson	
17	Energy Meter	Siemens / Schneider	
18	Power cable	Lapp	

19	MCB, RCCB, MPCB	Siemens/Schneider	
20	Power contactor	Siemens/Schneider	
21	Relay - Solid state	Pheonix	
22	HMI TP1200 12"TFT	Siemens 3SU series	
23	High Resolution Vision System	Cognex/Basler	Intelligence system with Industry 4.0 / IiOT latest requirements
24	All Pneumatic fittings, FRL, Tubes	SMC/Festo	
25	Servo Slides/Motor	Siemens (IE4 or Higher)	
26	Pneumatic guide slides	SMC/Festo	Pneumatic Unit/Pneumatic cylinder
27	Scara Robot for Pick and Place with Robots Flexible Grippers	Mitsubishi	# Robots, Machine / System Controllers to have UPS of Suitable capacity, 15 minutes backup, Standard make.
28	6 Axis Robot (Spot Welding, Painting, Loading/Unloading)	ABB (IRB 6700/150/3.2) (IRB 4600/60/2050)	# Robots, Machine / System Controllers to have UPS of Suitable capacity, 15 minutes backup, Standard make.
30	Handheld high resolution scanner	Cognex	
31	HMI TP1200 12"TFT	Siemens 3SU series	
32	Power supply switches	Schneider/Siemens	
33	Stepping Motor	Siemens	
34	Production Management Control system	Customized OPC UA compliant (SIEMENS WINCC)	Central system for capturing the all process data
35	Industrial PC i7, 512 MB, 1TB SSD	Advantec	
36	Light curtain (Omron-F3SG-4RA1230-30)	Sick / Banner OMRON / SIC Equivalent (final make to be confirmed with Ola)	

8.0 Safety, Norms and Guidelines

The contractor is to ensure that equipment supplied, and installations performed comply with the applicable legal and regulatory specifications.

The above list does not claim to be complete. The contractor is responsible for compliance with the additions applicable at the time of signing the contract. If the contractor does not have any of the guidelines listed in the specification, he may request these from the client.

8.1 Safety and Protection Measures

1. The deactivation of the emergency stop at the facility cabinet must be via key, a facility
2. Emergency stop button near the operation.
3. LOTO system for electrical panels.
4. Rotation elements / moving parts should be fully covered to avoid safety issues.
5. a. For enclosures ,Latch interlocks with HMI access must be considered.

   b. For stations , light curtains with safety standards (including jacob relay) must be considered.

8.1.1 Safety and Ergonomics

The equipment shall adhere to applicable laws related to safety, health and ergonomic standards of India.. In addition, the following requirements apply:

8.1.2 Sound / Noise levels

Machinery and equipment shall not exceed 80dBA sound levels for 8-hour continuous operation under all anticipated actual production load conditions on the plant floor.

8.1.3 Safety Controls

Safety controls should follow the standards set out in ISO 45001

8.1.4 Initiation with light screens

If the equipment has a light curtain, cycle initiation using light screen devices is to follow the ISO 13855:2010 specification

8.1.5 Safe distance formula

Safe distance formula is to follow the ISO 13857:2019 standard

8.1.6 Emergency Stops

Emergency stop design is to follow standards: ISO 13850:2015

8.1.7 Energy Lockout Placards

All machines shall have an energy lockout placard to identify the types of energy sources, lockout points, and methods to control energy, means of verifying deactivation of energy sources and exposure to special conditions which might affect the control of energy.

8.1.8 Safeguarding

Machine/hazard safeguarding is to follow ISO 12100:201

8.2 Ergonomics & Environment

1. Lighting arrangement: LED light with diffuser having the 400 lux
2. Ergonomic height will be considered for operators
3. The maintenance area must be staffed with specialists to facilitate easy access of the equipment.
4. Top portion should be closed with transparent cover to avoid dust and other particles drops

8.3 Installation Specific Part: Electrical

Standard power supply at the nominal voltage of 440 V / 415 V, 3Ph/N/PE, 50Hz is used. The incoming supply and control thereof with fault recognition are to be monitored for system and equipment protection. For decentralized elements of the control systems, (switchgear/cabinets/controls), an isolator to switch off the 400V power to that section is to be provided. Further, a separate power supply of 24Vdc must be provided at decentralized sites.

- Mountings for electrical components must be bolted to a stable sub-structure. For limit and proximity sensors, mountings must be adjustable, and be positively locked after adjustment. Mountings for the signal transmitters must be done via tapped holes (no nuts allowed).
- The calling of the movement for all function elements (lifting movement, interlocking etc.) must be executed individually, and sensors must be fitted as close to the function element as possible.
- All sensors must be pluggable (bayonet/screw type), or PG-connection, to facilitate maintenance.
- Cable trays and ducts must have 20% reserve free space after installation. Any holes in structure / covers that require cable to pass through, is to be adequately lined to protect electrical & sensor cables with grommets and / or edge protection

8.4 Installation Specific Part: Mechanical

The contractor is responsible for project installation and commissioning.

Prior to the commissioning, induction of all the involved personnel (operators, users and maintenance, etc.) must take place.

- Safety equipment MUST be fully functional during the commissioning.
- During the commissioning phase, up to the point of the final acceptance, the contractor is to ensure all inspection; servicing and maintenance related activities, and including necessary part replacements are carried out to counteract the wear due to the commissioning activities and trial runs. This is to maintain an “as new” condition for project handover.
- Loading, unloading, unpackaging and placement on the floor as per the layout would be the responsibility of the project contractor.
- The shipment, installation and commissioning milestones are the subject to the contract
- Supplier is responsible for the preparation of cleaning supplies before the equipment is delivered for use (such as cleaning cloths, alcohol, etc.)
- Supplier needs to arrange the commute working time according to Ola Electric Technology requirements (generally needs to be synchronized with OLA production time)
- Suppliers need to arrange the trial materials for the FAT of the machine. The trial materials need to be arranged according to the project schedule milestone, and the delay caused by the trial materials is the responsibility of supplier

8.5 Final Settings

All final settings (after deep clean, final balancing, and verification tests with the customer present) shall be recorded by the Contractor and submitted with final documentation.
The inspection, servicing and maintenance activities, carried out by the contractor must be recorded in the technical documentation, as a component of the project-standard.
The contractor shall train the OLA engineers for the operational, maintenance and any other software aspects of the line.
All the drawings, manuals, software has to be provided before sign off the SAT

8.6 Structure and Steelwork

The contractor is responsible for the design, manufacture, and installation of all structural steel work. The design will be certified by a third-party engineering firm, from which manufacturing go-ahead will be issued. The contractor is responsible for the manufacture, delivery, and installation of all support structures in accordance with this specification, local and national regulations.

8.7 Wall and Floor mounting

Chemical anchors are to be used for attachment to concrete flooring.
The transmission of horizontal forces is to be avoided by means of expansion joints.
All structural mounting into concrete structure is to be authorized in writing

9.0 Pre-shipping Test

The equipment will be completely assembled, mechanically and electronically with the necessary measuring instruments. The equipment will be tested in all functions, including software. The following tests will be performed by OLA Electric, or alternatively by the supplier and provided to Ola Electric electronically:

- Verification of general functionality according to the specifications
- Inspection of the main functional and overall dimensions
- Verification of settings, control plan functions

10.0 Commissioning and Final Test

At the destination site: Supplier will be responsible for carrying out the commissioning of the equipment and final tests of the equipment prior to releasing the equipment to Ola Electric.
Support for Production (on site) : Supplier is responsible for production support SOP + 6 months, after run at rate

11.0 Training

Supplier will support the scheduling and training of onsite staff for 3 distinct courses:

- Operator training in the use of equipment in day-to-day activities
- Skilled trades in servicing, troubleshooting, preventative maintenance, and main functionalities of the equipment
    - Engineers in programming, changes in acceptance criteria, data-acquisition etc.
    - Train the trainer program for 6 OLA employees.
        - The supplier is responsible for determining the appropriate time, number of hours/days for each class type as well as the agenda and course content.
        - Include line items associated with training

12.0 Equipment Drawings and Manuals

The supplier is responsible for providing 2D drawings and manuals with the equipment.

- Repair & maintenance manuals(Including calibration frequency and process) : dual language - 3 Hard Copy
- training materials: dual language - 3 Hard Copy
- Operator interfaces such as (but not limited to) HMI, buttons, controls, switches shall be dual language
- Mechanical, controls drawings: english only - 3 Hard Copy (Formate should be compatible to convert into 3D)

13.0 Scope of Project

The contractor is required to provide a draft time schedule with quote submission. This schedule should include the following key milestones:

- Concept Freeze
- Design Freeze
- Manufacture
- Shipping Approval (end of Manufacture at the Contractor's Premises)
- Start of Installation
- Start of Commissioning (end of Installation)
- Handover to Customer (end of Commissioning)
- Production Trials
- Job No.1 support
- Documentation Acceptance
- Support upto run at rate
- To Final Acceptance

13.1 General Project Requirements

13.1.1 FMEA

- Failure Mode and Effect Analysis (FMEA) studies are to be conducted for each facet of the scope of supply and are to include the following where applicable:
    - On the design of new elements.
    - On the operational process.
    - Safety, Health, and Environmental impact.

- The proposal of the equipment and the layout of the entire line are subject to the detailed engineering
- All labeling for equipment and identification of cables shall be done nicely
- Quality surface coating and quality of welding joints on the line, construction of maintenance cabinet should not have any sharp corner and joints
- Electrical insulated and electrical protection for equipment and personnel shall be in place.
- For all Equipment / Machines / their parts, Color Standards of OLA (Look and Feel - L&F) need to be followed, and need to get signed off before the manufacturing of the line.
- All the documentation should be in English.
- Service and maintenance manual for lines & equipment, including: Technical architecture drawings soft copy in dwg and pdf format, Schematic diagrams of electrical circuit and pneumatic soft and hard copy.
- Complete mechanical drawing for jigs, fixtures and vulnerable parts equipment soft copy in dwg and pdf format;
- PLC, HMI and PMS programing and robot software program enabling OLA reinstall PLC, HMI and PMS with instruction
- All calibration certificate for the measurement instrument and warty card for all standard items
- A risk assessment for the proposed installation identifying hazards, including mitigating actions. This document was to be submitted as part of the design proposal and quotation.
- The noise level of all the machines should be <75db (as per standard Safety / EHS practice).
- No. of equipment and number of pallets need to be proposed by the supplier with a cycle time break-up

13.1.2 Spare Parts

- A complete list of all wearing parts, complete with required replacement information is to be supplied (with item wise rates, detailed drawings and specifications to be shared).
- Critical and vulnerable spare parts need a minimum of 6 months to be considered as part of the supply.
- List of contact persons for different technology and escalation matrix for quick support.

13.1.3 Contractor Services

The contractor is responsible for the following services:

- Project engineering and planning (layout of all installation components).
- Regular communication with reporting on the project progress.
- A detailed time schedule with milestones.
- Layouts with all the data.

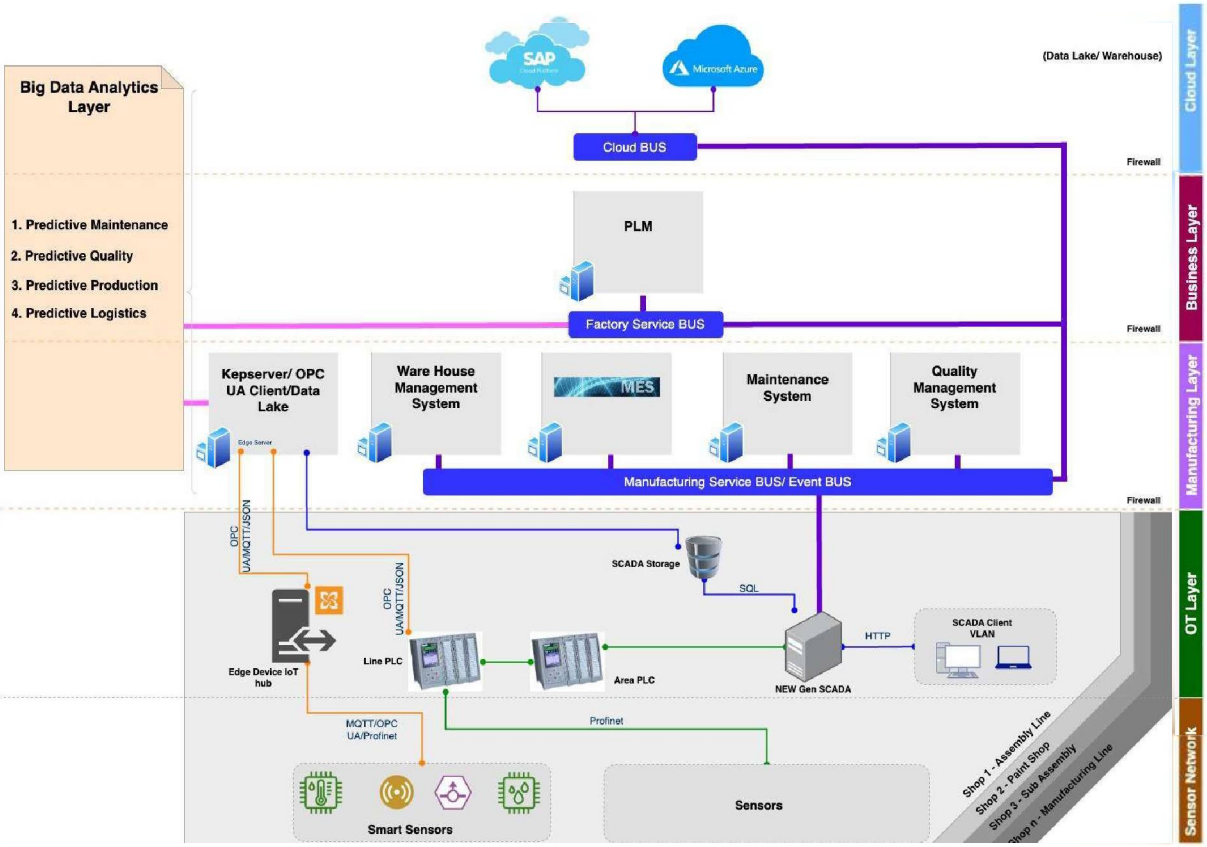
- Guidelines on building requirements from the client.
- The electrical control concept (PLC Topology)
- The complete design of the requested production equipment.
- The Safety / CE documentation of the whole installation as per the project requirements.
- Risk analysis / design FMEA.
- The manufacture / construction / installation.
- The “Dispatch Approval “at the supplier's manufacturing plant.
- Delivery / assembly and installation
- The commissioning and the “technical approval” and acceptance-checklists.
- Supervision of the installation up to final acceptance.
- Provision of spare parts/preventive maintenance procedures up to acceptance as per final acceptance.
- Capability certificates where required.
- The training/qualification of the operators and users and maintenance staff
- Defect elimination, optimization and implementation of improvements.
- The maintenance of the equipment up to the final acceptance.
- The ”final acceptance” follows after the elimination of all defects found in previous acceptances, the availability of all capability verifications and the presentation of the complete documentation as described and the acceptance checklists.
- Start-up supervision after final acceptance
- Technical support after the handover of the installation, over the entire life of the installation, on a pay as you need basis.

14.0 Automation & MES Standard

14.1 Control System

The contractor will recommend an Automation solution to OLA, which has to be confirmed by OLA. A bi-directional data exchange via OPC UA/MQTT standard needs to be ensured to allow data transfer between different machines and OT Devices, OLA Server and the manufacturing execution system (MES). The data concept needs to be defined in between OLA and the contractor and documented in the appendix of this document.

Network topology as mentioned below.



- Till the OT layer (from bottom) development will be in line builder scope
- Manufacturing layer and above layer development in OLA scope
- Line builder to develop the new gen SCADA with SCADA storage (min 2 days)
- All the line level pokayoke validation to be done at SCADA layer
- Any signal and input (based on data received from Edge devices) given from MES (Bi-direction) for process, SCADA must execute the feedback.
- MES will be giving the Work order with Bill of process for the execution
- We preferred to use siemens or beckhoff PLC.

Features includes:

- All the data(PLC, sensors, software) should be provided to the OLA server in real time and data fetching time should be configurable.
- Tag name, data structure, Function block details should be provided after agreement and should be agreed with the OLA team(Preferred to follow the OLA Automation Standards).

- Automation systems should be able to communicate with any other PLCs/standard automation device which have different communication protocols.
- Standard function blocks should be created to communicate with other OT systems (PLCs).
- All the ports of the PLCs or HMIs or OT system should be open and there should not be any restrictions to access the data.
- HMIs front end design / colour schema/font should be discussed and agreed with the OLA team.
- Two way communication should be available with PLC/Smart sensors/OT system (It will not create impact on existing operations).
- The PLC(control panel) should have min 30% spare IOs and the system should be flexible enough to add more sensors if required (Additional sensors will not affect or create impact on existing operations).
- PLC data /Sensor data should be accessible to the maximum extent possible to allow for data & analytics applications. There should not be any locking/password protected mechanism for the data and all the data should be available to OLA.
- Expandable memory capability in the PLC for the future modifications in the PLC program.
- For the IT/OT connectivity in real time, a gateway must be provided for standard interfaces (e.g., OPC, MQTT) as a connector with the OT-Devices (PLCs, Sensors etc.).
- All the key process/functional parameters and key quality characteristics should be on smart sensors instead of analog sensors to ensure data is easily usable for analytics applications. Also the communication protocol from Smart Sensors should be on IO Link/MQTT.
- For the smart sensors, if a gateway is required to push the data to the cloud, it should be provided.
- All the vision systems should be closed loop and images of the vision camera should be provided for further analysis.
- All the gauges(i.e Pressure) data should be available digitally.
- All the sensors should be able to communicate with PLC based on the PLC's available protocols and should be able to communicate with Cloud/Edge server on MQTT over wifi/5G.
- Systems should have any predictive maintenance capability to identify the failure detection of any equipment, provide the details - OLA prefers to have a predictive maintenance system for the components.
- All the processes/machine simulations should be available and 3D simulated models should be provided to OLA with common files (.stp), which can be opened in any simulation software(eg.Delmia, NX, Plantsim).
- 3D Simulation should be done before the actual machine commissioning or delivery of the machines and it should have a complete process/machine simulation.
- 3D simulations files should be used for virtual commissioning/Virtual modeling and have capabilities to provide feedback (Closed loop systems should be there to check and create changes and based on that result should be available in simulation for the processes.)

- All the programming (PLC programming, Proprietary programming) must be tested virtually before actual testing (i.e. testing in SIMIT) (Plc advance sim & Simit license to be provided by Contractor)
- Automation systems should have Centralized SCADA/Interface to control the system.Communication between PLC and SCADA/interface should be on OPC UA.
- Will you provide any MES for the automation system? Communication between PLC and SCADA/Interface should be on OPC UA.Also, mention the modules used for MES, functionality and reports provided by the system.
- The contractor will provide the support required for the integration with the MES system or OLA's Edge server based on the needs and for the modification to be done based on the requirements till 12 months after SOP.
- Platform should be provided for the centralized monitoring system for the Dashboards, Alerts and reporting.
- Dashboards should be provided for real time monitoring and historical analysis.
- Automatic Reports(station wise /shift wise/day wise/batch wise etc) should be provided for the mentioned metrics and reports should be available on demand and time basis in Email /SMS/Whatsapp and on your platform for downloading .
    1. Overall Equipment Effectiveness (OEE) - machine stops with timestamp for start and end, ideally with automatic/semi-automatic tagging of stop reason codes
    2. Quality / Yield - quality inspection data on cell level, including measurement value and good/non-good decision
    3. Single-unit traceability - process execution documentation on cell level, including timestamps and equipment identifiers for each production step
- There should not be any constraints to create customized reports as per OLA's requirements.
- All the alerts/events data should be pushed via MQTT protocol.
- Historians should be available for a minimum of one year and should have all the data of the production,process and quality.
- Platform design/ colour schema/font should be discussed, aligned with OLA standards and agreed with the OLA team.
- Do you have a real time analytics system/capability for the anomaly detection or remaining useful life detection of the components? Please provide the details.
- All the AI/ML or any other model details and code should be provided for the analytics platform.
- All the systems should be completely closed loop and parameters/set values should be changed based on the real time feedback provided by the analytics system.
- APIs layer will be provided for the connecting and accessibility of the data from the Dashboard. API format should be agreed with the OLA team.

- The system should have a self diagnosis capability system, which can monitor the complete automation network system/ control system (e.g. Procentec's solution) and provide alerts if some components (IOs, sensors or any OT system) fails.
- PLCs and Sensors data should be accessible from middleware like Kepware/Matrikon.
- All the automation systems(PLCs, Sensors, Switches ,Gateways etc) & Software/firmware should be the latest models/versions and should not be discontinued, All the firmware versions and libraries should be updated and latest.
- For the EOL - Receipes/Data should be tested and validated in the OLA system. Clear Report with all the Virtual Simulation & data validation must be provided
- Interfaces with smart devices should be provided and alerts to be sent on smart devices like smart watches.
- Do you have any system for the PA?Provide the details.
- Provide the details of the fire system available on the line, and alerts should be generated for the fire situations.
- What kind of safety systems are used in the machines/lines? provide the safety document along with a safety audit/testing report.
- Is there any Safety PLC used for the machines/lines? Is it interconnected with individual processes/machines?

14.2 Traceability

The equipment must ensure complete traceability throughout the whole process chain. Therefore, the contractor needs to ensure the traceability of the product in all process steps.

Features includes:

- The traceability concept includes all measures that are taken within the process step to ensure the traceability of the product & process parameters. This also includes necessary technical properties and product movement in the assembly line with process parameters.
- For all the parts, unique code should be generated and from that code traceable data should be available.
- The contractor can use RFID/BLE/UWB or any other technology for the traceability and should be agreed with the OLA team.
- All the traceability data should be available on the Traceability dashboard/platform in real time. The traceability data should be sent in real time to the OLA server. All the historians should be available for a minimum of 1 year.
- All the process parameters/ quality parameters should be available for individual part no. with time,date and units. In the event of a batch process like mixing/slicing etc at batch code level traceability should be ensured.

- APIs should be available for the Traceable data if required and API format should be agreed with the OLA team.
- Reports stationwise/shiftwise/daywise/batchwise should be provided for Traceability recording and should be available on demand based on needs and time basis in Email and on your platform for the downloading .All the historians should be available for minimum 1 year.

14.3 Material Handling, Robotics And Warehouse

The factory targets a high degree in automation in case of material handling (material supply of equipment and intralogistic transport between equipment). Therefore, the utilization of autonomous mobile robots ['AMR'] is considered in the operation of the factory.

The equipment needs to be designed to ensure safe operation with AMRs in the production environment. Specific requirements for AMRs regarding a safe operation must be pointed out by the contractor during the design phase of the equipment.

Furthermore, the contractor shall provide necessary material handling equipment in the appendix included in the bill of material.

Features includes:

- AMRs should send real time data to the centralized system/Platform for monitoring .
- AMRs should show speed, usage, battery and weight of the material in the centralized platform.
- AMRs should have VDA5050 communication protocol and should be open to send data to the OLA's server.
- AMRs data should be provided to OLA's server based on requirements and should not have any restrictions/password protections.

14.4 Documentation For Automation System

The documentation of the Automation Control System includes:

- General information about the control system
- Training material for all the systems (Programs, HMIs, Analytics platforma, Dashboards etc).
- Software structure, assignment of function groups, program modules, flag areas
- List of components
- System architecture diagram to understand the system topology
- Tag name, data structure, Function blocks details
- Program structure (tree structure)
- Block printout in ladder diagram/any other language
- Cross references (assignment list)
- Special files and tables
- Symbolic designation of the I/O from the circuit diagram

- Symbolic (speaking) designation of flags and data areas
- Block comments
- Network headings, instruction comments
- Description of identifiers and functionality of function blocks
- Software structure with assignment of function groups, program block
- API documentation
- Traceability platform documentation
- Analytics platform, Centralized monitoring system, SCADA, MES document and program backups
- All Interfaces/Scada/HMI must have a self-explanatory help/training module inbuilt and accessible on the interface/online. Same should be provided on a PDF Document for record purpose.
- All relevant and latest software/firmware installed on the devices should be a perpetual licensed version and the licenses /keys along with Software/Firmware to be provided to OLA on USB/Cloud.
- Standard Troubleshooting and diagnostic modules should be available along with training video/document to be part of the handing over document.

Furthermore applies:

- Self-created function modules must be documented in detail and submitted for approval.
- Self-created texts must be stored on a separate data carrier as a text file. In addition, all memory areas, insofar as they are not covered by normal program archiving, must be saved on data carriers.
- Plant-specific firmware/programs/Licenses of the software along with software setup files must be handed over as an additional backup copy.
- Two data carriers with the current software version must be handed over for each control system (one copy remains in the control cabinet on site, one remains in the maintenance department).

General :

- All the software licenses, Automation control system (PLC, HMIS, Sensors, control Panel etc) cost breakup should be provided.
- For all the machines, testing reports of the Hardware, Certifications of the products, Warranty documents, and Cyber securities documentation must be provided.
- For all machines, spares should also be provided for the Automation systems (Sensors, IO Modules, etc).

15.0 Look and Feel

The below mentioned color combination to be followed for the equipment:

Equipment	Color
Robots	Green with Black Accents
Conveyors	Gray
Steel Structures	Gray (Galvanized Steel)
Fixtures	Black
Control Panel	Gray (Galvanized Steel)
Rest of the equipment	Gray (Galvanized Steel)

Shade	Pantone	RAL Shade	Axalta Code	PPG-Asian Paints Code
Green	P 157 - 8c	NA	Imron XD GREEN P157-80C	
Black		9005	Imron XD BLACK RAL 9005	
White		9010		

Finish type : Semi Glossy

Ola Factory of the Future - Color Ideology

The team has leveraged a combination of 3 colors to highlight movement of machines, movement of people and definition of the areas.

Primary Interior Elements :

Robots & key equipment : Green with black accent

Interior PEB Structure : White

Equipment :

Moving Machines and key Equipment : Green with Black Accents

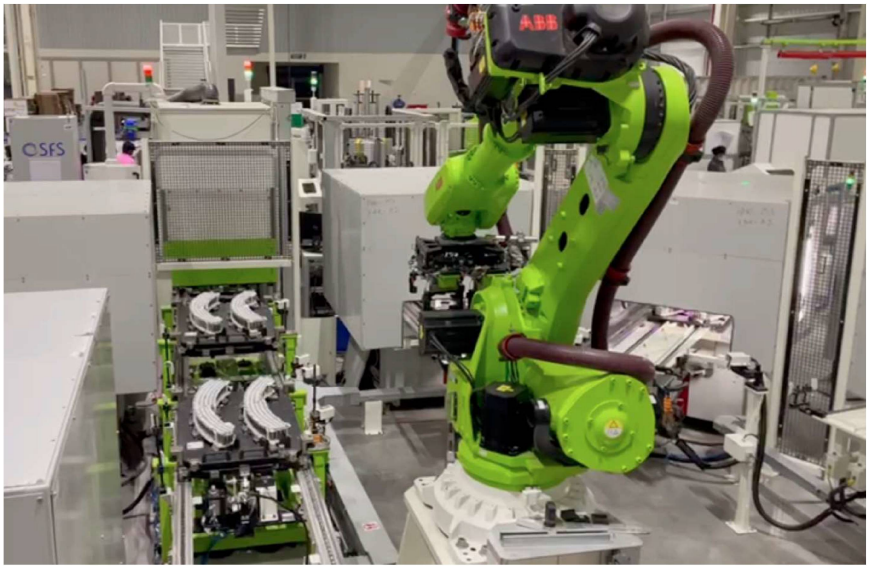
Stationery or Fixed items : White

- Moving Equipment - considered Ola Green with black accents as the primary theme.

- Strong contrast with the floor and ceiling
- Highlight the advanced technologies of manufacturing in the factory
- Highlighting the moving parts which will enable the users/employees and visitors to work or walk in tandem

Sample Visuals :

- Stationary parts of the lines - the stationary parts have been marked as white to provide a clear contrast to the moving parts, ensure minimalistic feel and cleanliness to the lines



16.0 Terms and conditions

Sl.No	Descriptions	OLA Expectation	Supplier Comments
1	Commercial Offer	1. Cost to be given separately 2. Include Supply, Installation, Commissioning & Training (Delivery at OLA Plant)	
2	Payment Milestones	Tax invoice will be issued for each milestone completion and LC will be issued for each milestone separately for discounting 10% Against design approval by Ola Electric 15% Against equipment ready to dispatch 20% Against after delivery 20% Against Installation & Commissioning 15% Against Trial, Training & Equipment handover to Ola Electric 20% Against bank guarantee till warranty exists (Warranty Period : 2/3 Years) (Payment terms: Net 180 days credit from the date of invoice)	

3	Product Specifications and Description	Mutually agreed technical specifications for all the products in details	
4	Delivery Milestones/Terms	Mutually agreed project timeline to be shared	
5	Limitation of Liability	Unlimited Liability for all the failures	
6	Warranty for after sales	Minimum 2 years warranty for all the parts installed.	
7	All the spare parts list , Make & Warranty	1. Mutually agreed make & products to be installed. 2. All spare parts list to be shared with specification, make, price, lead time & quantity.	
8	After Sales Support	1. 2 person to be posted at OLA Electric full time to support operation and maintenance team during warranty period.(No Additional Cost) 2. 24x7 support for all the service related issues and within agreed timeline equipment should be up & running.	
9	Critical Spare Parts list and lead time	1. All the critical spares should be readily available in India (24x7 for 365 days) to support the line. 2. All the critical spare parts list to be shared with specification, make, price, lead time & quantity. 3. TAT for attending the service would be less than or equal to 6 hours. 4. Spares pricing validity should be minimum 3 years with no changes in pricing (All the currency should be in INR) 5. All the import items should be declared with item, currency, country of origin & cost	
10	L/D Clause	If there is any delay in the execution as per agreed project timeline, Supplier is liable to pay Liquidity damage (LD) of minimum 0.5 % to max. cap of 5% weekly.	
11	Efficiency	Equipment should be 99% up & running all the times	

12	MES & I4.0	Equipment should be compatible to communication with MES., with I4.0	