

Tender No:

KDU/PRO/CAP/ 102 /2022



General Sir John Kotelawala Defence University,
Kandawala Estate, Ratmalana,
Sri Lanka.
T: Phone: 2632028 , 2622995
Fax : 2622504, 2623599
Web: www.kdu.lk

22 / 03 / 2022

INVITATION TO BID AND GENERAL CONDITIONS OF TENDER

1. The Vice Chancellor of the General Sir John Kotelawala Defence University, as the Chairman, Department Procurement Committee Invites Bid/s from prospective Bidders for supply of **item/s listed in the schedule in Annex "A". The relevant specifications of the item/s are indicated in Annex "B".**

2. **CLOSING DATE & TIME.** The tender will close at 1000 hrs. on 21/04/2022. Any Bid submitted after the closing time of the tender will be rejected & unopened such bids will be returned to the bidder.

3. **VALIDITY OF BID.** The bid submitted under this tender **must be valid for a period of 120 days from the date of closing of tender.**

4. BID BOND / GUARANTEE.

(a) If the quoted bid value exceeds Rs: 2,000,000.00, such Bids should be accompanied with 1% of Bid Value an "on demand" and "unconditional" Bid Bond/Guarantee for a sum of Rs:in the format given in Annex "C" through a recognized local Bank or Insurance Company registered in Sri Lanka which is authorized by the Insurance Board of Sri Lanka to issue such Bid Guarantees. All Bid Bond/Guarantees should be valid for at least 30 days more than the validity period of bids, ie, for 150 days from the date of Bid opening. **Cheques will not be accepted as Bid Guarantee.**

(b) Submission of insufficient Bid Bond/Guarantee value or period will be considered as a "**major deviation**" and such offer will not be considered for further procurement action and will be rejected.

5. **VALUE ADDED TAX.** The Bidders who bid for locally delivered items must have the VAT registration. The VAT portion must be shown separately in the price schedule in Annex "A" and VAT registration number must be indicated. If the quoted item is exempted from VAT or Bidding Company is not liable for VAT, reference number and date of relevant Act number/Gazette notification/a certificate (as applicable) **issued for the current financial year** from the Commissioner General of Inland Revenue to that effect should be submitted along with the Bid.

6. **BID SUBMISSION.** The **bidder must duly sign at the last page (before Annexes) of this document** indicating the name of the signatory and the name of the company & place the company common seal to confirm the acceptance of tender conditions. **The Bid/s that do not include authorized signature will be rejected.** The Bid/s duly signed by the bidder enclosed and sealed in an appropriate cover addressed to the following address should be sent by registered post or could be deposited in the **appropriate tender box placed at General Sir John Kotelawala Defence University, Kandawala Estate, Ratmalana** (at the Main Entrance of General Sir John Kotelawala Defence University) on or before the time & date specified for the closing of tender. **The tender reference number, date & time of closing tender should be indicated & underlined at the top left corner of the envelop.**

Tender Ref No :

Closing Date & Time :

The Chairman,
Department Procurement Committee,
General Sir John Kotelawala Defence University,
Kandawala Estate, Ratmalana,
Sri Lanka.

7. The Bid/s must be submitted in the attached schedule of prices in Annex "A" as applicable. However, bidders could use similar formats prepared with their own letter heads with all the details mentioned therein and submit in **three copies along with duly signed copy of a General Conditions of tender.** The Bid/s must contain **Technical Literature, Pamphlets, Drawings and Quality Standard Certificate etc** necessary to determine characteristics of items offered and in case of Machinery/Vehicles & Equipment, servicing and workshop data/after sales service, back up facilities or any other facilities provided by the supplier.

8. SUBMISSION OF SAMPLES/PAYMENT OF TESTING CHARGES.

When it is required to submit samples, **every offer** must be accompanied with pre - marked samples. The marking of samples **indicating the Bidder & Offer number** must be done and the samples must be handed over to the officer at same place where tender box is placed **on or before the closing date & time of the Bid.** Samples submitted after closing time of the Bid will be rejected. The documents such as Air Way Bills etc, will not be accepted in place of samples. When the testing charges are required to be paid, bidders shall pay testing charges separately **for all offers** indicated in their bid/s.

(1) **Samples.** Please submit samples.

(2) **Testing Charges.** A sum of Rs **per offer** must be paid to the Bursar of KDU, prior to the submission of bid and a copy of the receipt must be annexed to the bid. It is the responsibility of bidder to inform the Cashier of the Account Office to note the tender number on the receipt issued for such payments.

8. **BID OPENING.** All duly received bids **will be opened immediately after the scheduled closing time of Bids at the same venue.** Bidders or their accredited agents could be present at the time of opening of bids.

9. **PRICES.**

For locally delivered items (including locally manufactured items & foreign items imported by the bidders) price must be quoted in Sri Lankan Rupees, inclusive of all charges for delivery of items to General Sir John Kotelawala Defence University Ratmalana, Faculty of Allied Health Science (FAHS) Werahera and University Hospital Werahera or Southern Campus Sooriyawewa. Unit price, VAT and Total price should be clearly indicated in schedule in Annex "A". Other than VAT, all other type of taxes (eg : NBT, BTT, etc.) should not be indicated separately and should be included in unit price.

10. **RESTRICTED TENDERS.**

Invitation to Bids are circulated among the registered suppliers with Ministry of Defence (MOD), only bids submitted by registered suppliers will be allowed for consideration. However, Chairman, Department Procurement Committee reserves the right to invite the bids from multiple combinations of Procurement Methods as stipulated in Chapter III of the Government Procurement Guideline, 2006 to ensure highest competitiveness.

11. **PERFORMANCE BOND/GUARANTEE.**

A successful bidder shall furnish a Performance Bond/Guarantee in the form of "On Demand" & "Unconditional" Bank/Insurance Guarantee for a sum equivalent to 10% of the contract value for every contract that exceeds Rs. 2,000,000.00 or equivalent amount in foreign currency through a recognized Commercial Bank registered in Sri Lanka or through an Insurance Company authorized by the Insurance Board of Sri Lanka to issue such Performance Guarantee for this purpose, within two weeks from the date of notification of award. The proceeds of the Performance Bond/Guarantee shall be payable to the Vice Chancellor of the General Sir John Kotelawala Defence University as compensation for any loss resulting from the supplier's failure to complete his performance obligations under the contract. If the contracted supplier fails to deliver the items on time or fails to complete the works as per the agreed contract, THE TOTAL VALUE OF THE PERFORMANCE BOND/GUARANTEE will be forfeited. If only partial delivery is made during the agreed contract period, the corresponding value percentage of undelivered quantity from the Performance Bond/Guarantee will be forfeited.

12. **SIGNING OF CONTRACT.**

The notification of award will be transmitted to the successful bidder by post, by fax or e-mail. This notification constitutes the formation of the contract. The successful bidder should submit his written acceptance for the award and performance bond / guarantee (For awards over Rs. 500,000.00 without VAT) within 14 days of receipt of such notification. Upon acceptance of the award and furnishing of the Performance Bond/Guarantee, the successful bidder will have to enter into a formal contract with the Vice Chancellor of the General Sir John Kotelawala Defence University by signing the Contract.

13. **DELIVERY.**

Preference will be given for early delivery. In case of bulk supplies for locally manufactured items, the delivery of total quantity must be completed within 120 days of signing of contract, unless mutually agreed for extended delivery period with General Sir John Kotelawala Defence University. The bidder/s must indicate the proposed delivery schedule in Annex "D". In the event of placing a purchase order with the successful bidder, the total quantity so ordered must be supplied as one consignment unless part deliveries are agreed upon in the contract. The deliveries not made as per agreed delivery schedule will be considered as bad performances by the suppliers and no extended delivery period will be authorized. Under extreme unavoidable conditions too, the Chairman, Department Procurement Committee (Vice Chancellor of the General Sir John Kotelawala Defence University) reserves the right to grant or refuse delivery period extensions only within the current financial year with or without liquidated claim for delayed deliveries and that decision will be final.

14. **LIQUIDATED DAMAGES.**

In case of delivery period extensions requested by the successful bidder, a sum equivalent to 1% of the total value of the delayed supply per delay of one week or part thereof may be deducted from the payment due to the supplier from the General Sir John Kotelawala Defence University as liquidated damages up to the maximum limit of 12% of the total value of delayed supplies.

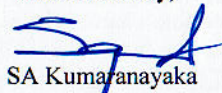
15. **PAYMENT TERMS FOR LOCALLY DELIVERED ITEMS.**

Payment will be made after acceptance of items which should be subjected to a pre-acceptance inspection/testing by General Sir John Kotelawala Defence University authorities. The delivery made to the General Sir John Kotelawala Defence University should not be considered as quantities taken over by General Sir John Kotelawala Defence University until items are properly accepted after pre-acceptance inspection. Any item that does not conform to the specifications or already approved sample will be rejected & it is the responsibility of the supplier to remove them from General Sir John Kotelawala Defence University stores/premises within 07 working days of such intimation (either verbal or written) at his own cost and replace them with items conforming to specification within one month of such rejection. The bidder shall allow approximately 60-90 days' period of credit from the date of acceptance of items for Account Office, General Sir John Kotelawala Defence University to obtain liquid cash from General Treasury & release the payment.

16. **RIGHTS OF THE PROCUREMENT COMMITTEE.**

The Department Procurement Committee reserve the right to accept or reject whole or part of this tender and their decision will be final. The successful bidders will be notified. Information with regard to rejected or unsuccessful bids will not be communicated.

Thanking You,
Yours faithfully,


SA Kumaranayaka
For Vice Chancellor

General Sir John Kotelawala Defence University

I/We agree to abide by the conditions of tender and undertake to supply the items as per delivery schedule mentioned in the contract, in the event of an order been placed with me/my firm/company as a result of this tender.

..... Signature

..... Name of Signatory

.....Name of the Company/Bidder

Date :-

Company seal

SCHEDULE OF PRICES FOR LOCALLY DELIVERED ITEMS

S/N	ITEMS	DENO	QTY	PRICE EACH SLRS	TOTAL PRICE SLRS
	<u>PURCHASE OF CIM/FMS TRAINING SYSTEM FOR MECHANICAL ENGINEERING DEPARTMENT</u>				
01	CIM/FMS Training System	No's	01		
	As per attached specification				
	TOTAL				
	DISCOUNT				
	TOTAL(AFTER DISCOUNT)				
	VAT %				
	GRAND TOTAL				

(A) OTHER DETAILS

- (i) DELIVERY PERIOD -
- (ii) MAKE & MODEL -
- (iii) VALIDITY PERIOD -
- (iv) WARRANTY PERIOD -
- (v) PAYMENT TERMS - CREDIT
- (vi) COUNTRY OF ORIGIN -
- (vii) DISCOUNT IF ANY -
- (viii) ANY OTHER TAXES -

(B) VAT DETAILS

- VALUE ADDED TAX PERMANENT REGISTRATION CERTIFICATE / VAT EXEMPTION LETTER ISSUED BY DEPARTMENT OF INLAND REVENUE TO BE ATTACHED

(C) PLACE OF DELIVERY

- ITEMS TO BE DELIVERED TO THE "GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY, KANDAWALA STATE, RATMALANA ALONG WITH THE COPY OF ORDER AND RELEVANT INVOICE.

(D) Any queries / information with regard to this procurement / tender could be obtained from Officer Commanding Logistics Services office at General Sir John Kotelawala Defence University through e-mail ocls@kdu.ac.lk and by telephone number 0112622504 during working hours.

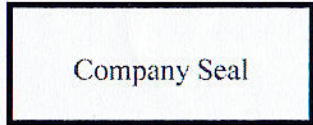
NOTE: UNIT PRICE AND TOTAL PRICE ARE TO BE INDICATED CLEARLY IN THE TENDER, IF NOT QUOTATION WILL BE REJECTED.

SUPPLIER NAME -

ADDRESS -

CONTACT NUMBER -

E MAIL ADDRESS -



(E) Bid Reference: KDU/PRO/CAP/ 102 /2022

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DATE


THE CIM/ FMS TRAINING SYSTEM

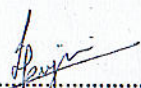
Overview


Flexible manufacturing system has processing equipment like a robot, CNC lathe, CNC machining center, and a series of hardware and software like robot slide guide rail, conveyor belt, smart cameras, servers, control software, and service software. The system uses advanced control strategies and service software, which integrate hardware to achieve the intelligent communication and collaboration of people, machined parts, and machines. Truly achieve the industrial 4.0 which featured as the Internet of things, mobile Internet, big data, cloud computing, and other emerging technologies, etc.

The expected outcomes

- Understand, operate, troubleshoot, and optimize production lines.
- Have an advanced understanding of electrical, mechanical, hydraulic, and pneumatic systems
- Troubleshoot and tune complex electrical and mechanical components of production lines
- Operate and modify PLC programs; operate and program HMI (Human Machine Interface).
- Operate manufacturing machines including an in-depth understanding of CNC programming, CAD, and CAM software
- Be fully familiar with machine vision systems and product identification techniques.
- Integrate smart sensors and inputs into automation-controlled systems
- Gain a solid understanding of the advanced concepts and components of Industry 4.0 manufacturing.


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Candidate CIM/FMS Training system

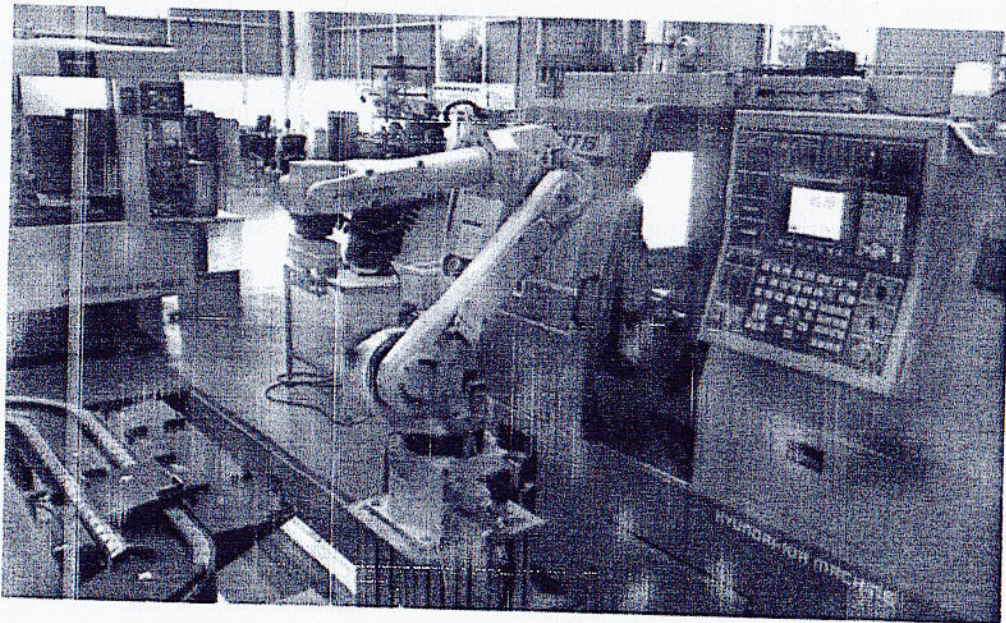


Fig. 1 The CIM/ FMS system with CNC turning center, Robot arm, and conveyer system

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TECHNICAL SPECIFICATIONS OF CIM/FMS TRAINING SYSTEM


Equipment	Specifications	Estimated cost
CIM/FMS system	<p>The Flexible Manufacturing System (FMS) needs to expose students to automation and industrial applications by combining CNC technology with robotics and materials handling. Students should be able to develop and edit programs, record precise robotic positions, accurately mill/turn parts, and synchronize mill/turn and robot operation. Students should gain "virtual hands-on" experience in CNC and robot programming, especially in I/O commands.</p> <p>These packages can be able to use as a stand-alone work cell, or integrated within a CIM system. The robot tends the CNC machine and performs other part manipulation and/or assembly tasks. When used in a CIM system, the robot loads and unloads parts to and from the CIM conveyor. The robot is mounted on a base for mobility and a larger work area.</p>	22M
No	Station	Technical Specifications
1.	CNC Turning Center	<ul style="list-style-type: none"> a) Turning Center can be linked with robot FMS/CIM b) Swing over bed: 210mm c) Chuck diameter: 100mm d) Spindle speed: 100-1750r/min (control speed by G code)



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| | <ul style="list-style-type: none"> e) Spindle through-hole: 25mm f) Spindle mount: MT4 g) Spindle motor power: 1100W h) X travel: 80mm i) Z travel: 290mm j) The max moving speed: 4000mm/min k) X/Z motor: 400W Servo Motor l) The max feeding speed: 2000mm/min m) MPG hand wheel: 4 axis n) Tool position: 4 o) Tool dimension: 10*10mm p) Tailstock taper: MT2 q) Travel of tailstock: 50mm r) Positioning accuracy: 0.03mm s) Repeatability accuracy: 0.02mm t) Power: single phase 230VAC u) Weight(NW/GW): 330/350KG v) Electric Auto Door feeding speed: 90mm/s w) Pneumatic three-jaw chuck: 110mm | |
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


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<p>2.</p>	<p>6 Axis Robot</p>	<p>6 Axis Robot grabs the workpiece and places it on the machine tool to process and complete the relevant action requirements.</p> <p>1. Technical parameter :</p> <ul style="list-style-type: none">a. 1 axis(bottom rotation):337.5°/sec.b. 2 axis (lower arm) : 270°/sec.c. 3 axis(upper arm) : 375°/sec.d. 4 axis(arm rotation) : 360°/sec.e. 5 axis(arm swing) : 450°/sec.f. 6 axis(arm rotation) : 900°/sec.g. 1 axis travel(bottom rotation) : 170°h. 2 axis travel(lower arm)+135°/-100°i. 3 axis travel(upper arm) : +145°/-105°j. 4 axis travel(arm rotation) : ±185°k. 5 axis travel(arm swing) : ±120°l. 6 axis travel(arm rotation) : 360°m. working temperature 0-45°C ;n. Maximum arm span : ≥ 1389mmo. Minimum protection level : IP54
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Robot station basic equipment

2. Industrial robot

- a) 6-axes articulated robots
- b) Drive system: AC servo motors
- c) Position detection method: absolute encoder
- d) Position repeatability: $\pm 0,02$ mm or better
- e) Maximum load capacity: min. 2 kg
- f) Robot controller
 - i. 32 digital Inputs/Outputs
 - ii. Max. number of additional axes: 8
 - iii. Ethernet interface incl. real-time joint control
 - iv. Pneumatic hand interface
 - v. USB interface
- g) Power supply 230 V, max. 2 kVA
- h) Teach box
- i) Pneumatic multi-functional gripper with an optical sensor
- j) Station trolley with profile plate
- k) User panel with emergency stop
- l) Pneumatic equipment including maintenance unit
- m) The power supply unit 24 V
- n) Robot interface box
- o) Electric cabling


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
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	<p>3. Process module robot handling</p> <ul style="list-style-type: none">a) Input slide moduleb) Workpiece socket with sensorc) Assembly retainer with sensord) 2 stack magazinese) Mounting platef) Standardized cabling conceptg) Fixing materials for repeatable highly accurate fixation of the processing module on the profile plate <p>4. Process module robot assembly</p> <ul style="list-style-type: none">a) Stack magazine module (caps)b) Pallet (pistons)c) Separating module (springs)d) Output slide modulee) Mounting platef) Standardized cabling conceptg) Fixing materials for repeatable highly accurate fixation of the processing module on the profile plate <p>5. Silent compressor for the Pneumatic multi-functional gripper</p> <ul style="list-style-type: none">a) Pressure: 800 kPa (8 bar)b) Performance: 50 l/minc) Reservoir capacity: 24 l
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
- d) Compressed air outlet: 1/4" or KD4
 - e) Noise level: <= 45 dB (A)/1 m
 - f) Duty cycle: max. 50 %
 - g) Pressure regulator valve with gauge
 - h) The compressor should be able to be kept inside an active classroom.
6. Workpiece set consisting of 12 cylinder bodies in the colours red, black, and silver as well as end caps, springs, and pistons
 7. Software package with a eight-user license for offline programming and simulation of robot cells.
 8. Software package with a dual-user license for online programming and visualization of robot cells
 9. The robot arm should satisfy the EU Machinery Directive 2006/42/EC in compliance with DIN EN 60204-1 and DIN EN ISO 12100.
 10. This station should be able to operate as a standalone station to perform customized assembly and manipulation tasks. When used in a CIM system, the robot loads and unloads parts to and from the CIM conveyor.
 11. The robot arm should be teachable, programmable and customizable for different practicals with grippers and manipulations.
 12. Expected function of the system is given in annexure B.
 13. A practical / workbook for students is required for operating the robot standalone activities.
 14. Installation / Training session / after sales service required.
 15. Computer - A Desktop computer with an i7 processor, 8 GB RAM, 1 TB HDD, DVD ROM, 23-inch monitor, keyboard, and mouse.



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
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<p>3</p>	<p>CNC Milling Center (3 axes) (optional- either CNC turn or mill can be considered)</p>	<ul style="list-style-type: none">a) X-axis travel: minimum 300mmb) Y-axis travel: minimum 175mmc) Z-axis travel: minimum 270mmd) Spindle taper: ISO 20e) Tool number: 10f) Tool DIA. Range: 1-13mmg) Standard Size Collet: 1mm- 13mmh) Control system: Run ISO G codei) MPG handwheel: 3 axisj) Spindle Power: 1.5kwk) Spindle speed: 100-24000rpml) Motor Type: X/Y/Z axis are AC Servom) Rapid movement in X /Y/Z Axis: 1-4000mm/minn) Feed rate in X/Y/Z Axis: 1-2000mm/mino) Power of X/Y/Z Axis: AC Servo 750Wp) Positioning accuracy: 0.03mmq) Repeatability accuracy: 0.02mmr) Transmission: ball screws) Table size: 450*160mmt) Number of T-slots: 3
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
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	<ul style="list-style-type: none"> u) Width of T-slot: 12mm v) Table structure: Full cast iron w) Power: Single phase 230VAC x) Weight(NW/GW): 500/550kg y) Electric Auto Door feeding speed:90mm/s
4	<p>Conveyors</p> <p>According to the material circulation in the production process of the actual factory, the circular produce line completes the whole circulation flow of the products in the whole production line.</p> <p>A conveying process with electro-pneumatic sorting of parts being conveyed.</p> <p>Each sorting station is programmed to discern specific part characteristics (Metallic or non-metallic or by colour). Based upon this determination, parts are pushed off of the conveyor into a storage tray.</p> <p>Conveyor speed and directional control is done via a Variable Frequency Drive control system. A PLC dedicated to the aforementioned activities is used to control the process and I/O communications at the sorting station. The proposed laboratory practical from this section is provided in Annexure A.</p> <p>The practical will be operated and controlled using Programmable logic controller (PLC) and Desktop computer.</p> <p>1. Structure :</p> <ul style="list-style-type: none"> a) The fixed frame is made of aluminium profiles b) Adopt adjustable lifting metal foot cup c) Chain plate connection d) Size: L*W 2*1.5M; Perimeter 7m


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
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	<p>e) Feeding and discharging blocking mechanism : air Cylinder</p> <p>2. Technical Parameter</p> <p>a) AC motor power $\geq 200W$</p> <p>b) Motor drive mode : PLC Control drive</p> <p>c) Feeding speed: 1-7M/min</p>
<p>5</p>	<p>RFID System</p> <p>The RFID system unit identifies the material by reading the electronic tag of the material on the Pallet, and submits the data to the upper computer, and the upper computer performs the corresponding action</p> <p>Technical parameter</p> <p>a) Working frequency : 13.56MHz</p> <p>b) Standard : SO/IEC 15693/ISO 18000-3M1</p> <p>c) 3.Voltage : +12V~+24V DC</p> <p>d) RF output power : 0.1W</p> <p>e) Maximum power consumption : 1W</p> <p>f) Card reading tips : Indicator light (indicator light flashes when reading card)</p> <p>g) Card reading distance : 1cm</p> <p>h) Communication interface : RS485</p> <p>i) communication protocol : Modbus</p> <p>j) Protection level : IP67</p> <p>k) Working temperature : $-10^{\circ}C \sim +65^{\circ}C$</p>

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
	<p>1) 12. Size(L×W×H) : Ø30×75mm</p>
<p>6</p> <p>Machine Vision System</p>	<p>General requirements of visual inspection unit:</p> <p>The visual inspection unit receives the signal from the upper computer, takes pictures, processes the results, and returns them to the upper computer to judge whether the workpiece is qualified.</p> <p>Technical parameters:</p> <ul style="list-style-type: none"> a) Memory: 4GB b) Number of cores: 4 cores c) UI operation: mouse d) Setting method: create the process e) Communication mode: RS232 / Ethernet / parallel / Io f) CAMERA CMOS g) Effective pixels: 720 * 540 h) Shutter function: within 100ms i) Frame rate: 40 j) 10 working temperature: 0-40 °C
<p>7</p> <p>Management Station</p>	<p>The PLC (Programmable Logic Controller) should control and monitor the flow of pallets on the conveyor with the help of sensors and actuators that are built into the stop stations. Various PLC types (Siemens, Omron, etc.,) and field bus systems (digital I/O, PROFIBUS, ASI bus) have to be supported.</p> <p>To achieve a proper pallet tracking function the following additional products are required</p> <ul style="list-style-type: none"> • Closed Loop Conveyor to mount the stop stations and carry the pallets.

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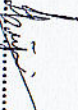
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
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		<ul style="list-style-type: none">• The conveyor has to stop alongside each CIM workstation. Include magnetic sensors for pallet detection and pneumatic pistons for halting and releasing the pallets. <p>CIM software should provide a comprehensive solution for the study and practice of CIM/FMS methods and operations.</p> <p>CIM software should implement manufacturing execution system (MES) technology. It should integrate real-time information with the system's PC-based database, and maintain online communication with all subsystems through a LAN, a lab network, or the Internet.</p> <p>The CIM software should allow users to monitor CIM/FMS cell operations in real-time from remote locations. , users should be able to view real-time reports generated by the CIM manager, remotely track live production cycles in and view details of current CIM/FMS cell status.</p> <p>The CIM software open architecture should enable the integration of various hardware and software components, making it easy to expand and customize the CIM/FMS system.</p> <p>The Management Station should include PLC electrical control and I / O communication system, which is mainly responsible for peripheral equipment and robot control to realize the process and logic general control of intelligent manufacturing unit; the touch screen is responsible for human-machine interface and setting operation data</p> <p>Technical Parameter</p> <ul style="list-style-type: none">a) Communication port: Ethernetb) 2.I/O : >=32c) Input Type : NPN/PNP
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
- d) Output Type : Transistor output
- e) Power Specifications : DC24V
- f) Program storage capacity : 100K
- g) CPU processing speed $\geq 0.26\mu s$
- h) PLC size : 100*180*75mm

Component specifications

- a) Controller – PLC:
- b) Work memory – 75 Kbyte or above
 - c) Interface: Ethernet with 2-port switch preferred
 - d) Load memory – 4 Mbyte or more
 - e) Ethernet cable included
 - f) Programming software included with the license
 - g) 14 digital inputs (24 V DC) with switches/pushbuttons for signal simulation
 - h) 10 digital outputs (24 V DC, 500 mA)
 - i) 2 analog inputs (0 – 10 V)
 - j) 1 analog output (± 10 V DC, 0 – 20 mA)
 - k) Modules with 4 mm safety plugs
 - l) Programming languages: FBD, LAD, SCL
 - m) Suitable for supplied mounting frame
 - n) Lightweight injection-molded housing

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		<p>o) The units are supplied fully assembled</p> <p>p) Preferred CPU processing times o for bit operations, typ. 0.07 -0.09 µs; / instruction o for word operations, typ. 1.6-1.7 µs; / instruction o for floating point arithmetic, typ. 2.2-2.3 µs; / instruction</p> <p>q) PLC approvals: CE mark, UL, cULus FM, RCM (formerly C-TICK), KC, Marine</p> <p>r) Compatible with other items in the trainer and furniture.</p>
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General Terms

1. Manufacturer authorization letter
2. Warranty – 1-year
3. Country of Origin – UK, EU, Japan, USA,
4. Only reputed brands are accepted
5. Product support – 10 years
6. Annual maintenance arrangement to be signed by successful bidder
7. Comprehensive training for 5 personal
8. All manuals should be in English (workshop manual, spare part catalogue, operations manual)
9. Standard set of operation tools, cutting tools and coolants

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Annexure A

Proposed practical for sorting Metal and Non-Metal items:

1. Objects are placed on a conveyor belt
2. A sensor identifies the object
3. When the object is present (identified) the conveyor starts to run.
4. There will be a light indicating that the conveyor is running.
5. The object is passing an inductive sensor.
6. If Inductive sensor detects the object (metals), a pneumatic actuator pushes the object into a basket in front of sensor (side of conveyor).
7. If not, the object will fall into the basket at the end of the conveyor.
8. After the operation is over, the conveyor will stop. (timed)
9. Light will also turn off.


Proposed practical for Sorting objects based on color:

1. Objects are placed on a conveyor belt
2. A sensor identifies the object
3. When the object is present (identified) the conveyor starts to run.
4. There will be a light indicating that the conveyor is running.
5. The object is passing through red detecting and blue detecting sensors respectively.
6. If either one of the sensors detects the object (metals), a pneumatic actuator corresponding to that particular sensor pushes the objects into a basket in front.
7. If not (any other color) the object will fall into the basket at the end of the conveyor.
8. After the operation is over, the conveyor will stop. (timed)
9. Light will also turn off.

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Annexure B

Expected functions for the standalone operation

The robot assembly station can transport workpieces that are fed via a slide and place them in an assembly retainer. The sensor in the gripper enables the robot to differentiate workpieces by colour (black/non-black). The sensor in the assembly retainer monitors the orientation of the workpiece. From the assembly retainer the robot sorts the workpieces into various magazines or passes them on to the downstream station. Workpieces can be assembled in combination with the process module robot assembly. It supplies cylinder components for the assembly process. A double-acting cylinder pushes the cylinder caps out of the stacking magazine. The pistons are stored on a pallet. A double-acting cylinder pushes the springs out of a slim magazine. The assembled workpiece is placed on a slide.


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SPECIMEN FORM OF BID SECURITY

By this Bond we.....(hereinafter called "the Bidder") and We (name of bank or insurance company) whose registered office is at (hereinafter called "the Surety") are held and firmly bound onto (hereinafter called the Authority") in the sum of for the payment of which sum the Bidder and the Surety bind themselves their successors and assigns jointly and severally by those presents.

Whereas the authority has invited the Tender and other persons to compete tenders in similar terms for the supply of and to submit the same for the consideration of the Authority, and the Bidder proposes to submit to the Authority a Bid (hereafter called "the Bid") in accordance with such invitation, the Bond shall provide security to the Authority that the Bidder will honour certain obligations to be undertaken by him in the Tender in accordance with the following conditions.

Now the Conditions of this Bond are:

- (a) That it shall remain in full force and effect until the earliest of
 - (i) (Date), being () days from (submission date), the date stipulated by the Authority for the submission of tenders, or any prolongation of such date above notified to the Authority by the Bidder and the Surety in writing.
 - (ii) In the event of acceptance of the Tender by the Authority, the date upon which the Bidder provides a performance security to the Authority in accordance with the terms of the contract thereby made between them, or
- (b) Subject to this Bond being in full force and effect, the Surety shall pay the full amount specified in this Bond upon receipt of first written demand form the Authority stating that.
 - (i) The Bidder has withdrawn his Tender during the validity of this Bond, or
 - (ii) The Bidder has failed to provide a performance security to the Authority in accordance with the terms of the tender within 14 days from receipt of intimation of award of the Tender.

No alteration in the terms of the Tender, nor any forbearance of forgiveness in or in respect of neither any matter or thing concerning the Tender on the part of the Authority, nor any objection from the bidder shall in any way release the Surety from any liability under this Bond.

The benefit of this Bond shall not be assignable by the Authority and upon its ceasing to be in full force and effect the Authority shall return the same to the Bidder.

This Bond shall be governed by the laws of Sri Lanka

I executed as a deed on this () day of () 20 ()

For and on behalf of the Bidder

For and on behalf of the Surety

Signed by.....

Signed by.....

In the capacity of-----

In the capacity of-----

and by.....

and by.....

In the capacity of-----

In the capacity of-----

Seal (where applicable)

Seal (where applicable)

DELIVERY SCHEDULE

(IT IS MANDATORY TO FILL THE FOLLOWING SCHEDULE BY THE BIDDER)

TENDER NO :

ITEM :

QTY :

DURATION	QTY
EX STOCK QTY (WITHIN 01 WEEK)	
01MONTH	
02 MONTHS	
03 MONTHS	
04 MONTHS	
TOTAL	

NAME OF THE BIDDER :

SIGNATURE OF BIDDER :

DATE :

COMPANY SEAL :