Republic of the Philippines
TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
ISO 9001: 2015 Certified

SUPPLEMENTAL/BID BULLETIN

BID BULLETIN NO. 2
26 April 2023

Name of Project: **Procurement of Learning Systems for TESDA Learning Center 4.0 Ready**

Pursuant to Section 22.5 of the 2016 Revised Implementing Rules and Regulations (RIRR) of Republic Act (RA) No. 9184, this Bid Bulletin No. 1 is being issued to further clarify the provisions in the Bidding Documents with reference to the queries/concerns raised by the bidders.

A. CLARIFICATION ON THE INVITATION TO BID

1. **On the Lot 12** (Paragraph 1)

ORIGINAL			AMENDED		
LOT NO.	TITLE	ABC	LOT NO.	TITLE	ABC
12	Robotics	₱22,534,339.08	12-A	Robotics PKG 1	₱9,003,415.08
			12-B	Robotics PKG 2	₱13,530,924.00

2. **On the applicable fees of the Bidding Documents** (Paragraph 5)

ORIGINAL			AMENDED		
LOT NO.	ABC (in Philippine Peso)	Cost of Bidding Documents (in Philippine Peso)	LOT NO.	ABC (in Philippine Peso)	Cost of Bidding Documents (in Philippine Peso)
12	22,534,339.08	25,000.00	12-A	9,003,415.08	10,000.00
			12-B	13,530,924.00	25,000.00

B. CLARIFICATION ON THE BIDDING DOCUMENTS

1. **On the number of lots** (Clause 1 of Section II Instructions to Bidders [ITB])

ORIGINAL

1. Scope of Bid

The Procuring Entity, **TESDA** wishes to receive Bids for the **Procurement of Learning Systems for TESDA Learning Center 4.0 Ready** with identification number **TESDA-CO-2023-02.**

The Procurement Project (referred to herein as "Project") is composed of **twenty-four (24) lots**, the details of which are described in Section VII (Technical Specifications).

AMENDED

1. Scope of Bid

The Procuring Entity, **TESDA** wishes to receive Bids for the **Procurement of Learning Systems for TESDA Learning Center 4.0 Ready** with identification number **TESDA-CO-2023-02.**

The Procurement Project (referred to herein as "Project") is composed of **twenty-five (25) lots**, the details of which are described in Section VII (Technical Specifications).

2. **<u>On the Requirement of Single Largest Completed Contract (SLCC)</u>** (ITB Clause 5.3 of Section III [Bid Data Sheet])

   - On the query for the submission of two (2) contracts

ORIGINAL	AMENDED
Pursuant to Section 23.4.1.3 of the 2016 revised IRR of RA No. 9184, the Bidder shall have an SLCC that is at least **one (1) contract** similar to the Project the value of which, adjusted to current prices using the PSA's CPI, must be at least equivalent to fifty percent (50%) of the ABC of each lot.	Pursuant to Section 23.4.1.3 of the 2016 revised IRR of RA No. 9184, the bidder must have completed, within the period specified in the Invitation to Bid, an SLCC that is similar to the contract to be bid, and whose value, adjusted to current prices using the Philippine Statistics Authority (PSA) consumer price indices, must be at least fifty percent (50%) of the ABC; OR The bidder should have completed at least two (2) similar contracts and the aggregate contract amounts should be equivalent to at least fifty percent (50%) of the ABC of each lot and the largest of these similar contracts must be equivalent to at least half of the percentage of the ABC as required above.

   - As for Lot 21 - Network System, the prospective bidder requested if the supply and set up of IT equipment be allowed, since network devices are also considered IT equipment

     The supply and set-up of IT equipment is of similar work. Thus, it is allowed to submit it as similar contract.

3. **<u>On the nature of SLCC</u>** (ITB Clause 5.3 of Section III [Bid Data Sheet])

ORIGINAL			AMENDED		
LOT NO.	**TITLE**	**NATURE OF SLCC**	**LOT NO.**	**TITLE**	**NATURE OF SLCC**
12	Robotics	Contract similar to supply and/or installation/integration of robotics, industrial automation and process controls, IT equipment and/or training equipment	12-A	Robotics PKG 1	Contract similar to supply and/or installation/integration of robotics, industrial automation and process controls, IT equipment and/or training equipment
			12-B	Robotics PKG 2	Contract similar to supply and/or installation/integration of robotics, industrial automation and process controls, IT equipment and/or training equipment

4. **On the amount of bid security** (ITB Clause 14.1 of Section III [Bid Data Sheet])

ORIGINAL				AMENDED			
Lot No.	Title	Cash, Cashier's/ Manager's Check, Bank Draft/ Guarantee or Irrevocable Letter of Credit (2% of ABC)	Surety Bond callable upon demand issued by a surety or insurance company duly certified by the Insurance Commission (5% of ABC)	Lot No.	Title	Cash, Cashier's/ Manager's Check, Bank Draft/ Guarantee or Irrevocable Letter of Credit (2% of ABC)	Surety Bond callable upon demand issued by a surety or insurance company duly certified by the Insurance Commission (5% of ABC)
12	Robotics	₱450,686.78	₱1,126,716.95	12-A	Robotics PKG 1	₱180,068.30	₱450,170.75
				12-B	Robotics PKG 2	₱270,618.48	₱676,546.20

5. **On the item(s) for each lot** (ITB Clause 19.3 of Section III [Bid Data Sheet])

ORIGINAL

Lot No.	Lot Name	No. of Items	ABC
12	Robotics	2	₱22,534,339.08

AMENDED

Lot No.	Lot Name	No. of Items	ABC
12-A	Robotics PKG 1	1	₱9,003,415.08
12-B	Robotics PKG 2	1	₱13,530,924.00

Kindly refer on the revised Section VI and Section VII of the Bidding Documents incorporating the amendments on Lot 12 - Robotics.

6. **On the query on the signing of bids**

- The bidder, or its authorized representative/s, shall affix their initials on each and every page of the bid in the technical and financial envelopes, including documents that require the bidder or its authorized representatives, signature. All forms that require signature/s on the space provided for shall be duly accomplished by the bidder or its authorized representative/s.

- The bid, except for unamended printed literature, shall be signed, and each and every page thereof shall be initialed, by the duly authorized representative/s of the Bidder.

7. **On the query on submission of requirements of joint venture**

- Pursuant to 23.1 of the 2016 RIRR of RA 9184, Each partner of the joint venture shall submit their respective PhilGEPS Certificates of Registration in accordance with Section 8.5.2 of said IRR. The submission of technical and financial eligibility documents by any of the joint venture partners constitutes compliance: Provided, That the partner responsible to submit the NFCC shall likewise submit the Statement of all of its ongoing contracts and Audited Financial Statements.

In this regard, each partner of the joint venture shall submit the legal eligibility documents. The submission of technical and financial eligibility documents by any of the joint venture partner constitutes compliance.

8. **<u>On the extension of delivery period from 180 calendar days to 240 calendar days</u>**

   - Pursuant to the Manual of Procedures for the Procurement of Goods issued by the Government Procurement Policy Board (GPPB), the winning supplier/manufacturer/distributor may submit a written request to the Project Management Office (PMO) or end-user unit or implementing unit for an extension of the delivery or performance period, citing the reason/s for such delay. The PMO or end-user unit or implementing unit may either approve or disapproves the request for extension.

9. **<u>On the query on the training requirements and arrangements</u>**

ORIGINAL	AMENDED
• Level 1: Utilization and maintenance (1~2 days) The winning bidder per lot will provide training on the familiarization, utilization, and maintenance of each equipment.	• Level 1: Utilization and maintenance (1~2 days) The winning bidder per lot will provide face-to-face training on the familiarization, utilization, and maintenance of each equipment.
• Level 2: Technology specific training (10 days per lot or 2 weeks) The winning bidder on the following lots will provide a comprehensive training, see details below:	• Level 2: Technology specific training (10 days per lot or 2 weeks) The winning bidder on the following lots will provide face-to-face or hybrid training, see details below: *Note: Hybrid training should have at least five days face-to-face session*
xxx	xxx

10. **<u>On the submission of the Omnibus Sworn Statement and Bid Security</u>**

    - The Bid Security and Omnibus Sworn Statement shall be submitted for each lot that the bidder participated in.

11. **<u>On the clarifications on the technical specifications of the items (Section VII of the Bidding Documents)</u>**

Lot 7 - Metal Fabrication Equipment

CODE	ITEM	CLARIFICATION	RESPONSE
07-001	Hydraulic Press Brake Machine	May we clarify if this item is CNC?	Item is Computer Numerically Controlled Hydraulic Press Brake Machine
07-002	Hydraulic Shearing Machine	May we clarify if this item is NC?	Item is Numerically Controlled Hydraulic Shearing Machine

Lot 8 - Industrial Automation – PKG 1

CODE	ITEM	CLARIFICATION	RESPONSE
08-001	Modular Production System	*Software Requirements* May we clarify if an educational license is allowed?	Educational license is allowed.
		Floating license supplied on USB stick May we clarify this requirement?	A floating license is a license management scheme that allows licenses to be transferred from one computer to another computer.
		Human Machine Interface May we clarify if the HMIs are needed for each module or just 1 for the whole system?	One (1) HMI per station

Lot 10 - Industrial Automation: PKG 3

CODE	ITEM	CLARIFICATION	RESPONSE
10-001	Smart Factory Enterprise	*CAD/CAM software for (2 users) perpetual license* May we clarify if an educational license is allowed?	Any type of license is allowed as long as the use of the software is perpetual

Lot 11 - Industrial Process Control

CODE	ITEM	CLARIFICATION	RESPONSE
11-001	Pressure, Flow, Level, and Temperature Process Learning Systems	*DCS Monitoring and supervision software* Please clarify type of software needed	These software **commonly comes** with the controllers or third party software which are used to control, monitor and collect data from the systems. Examples of these software are: • Honeywell • ABB Freelance DCS • PlantPAx

Lot 14 - 3D Printing Technology

CODE	ITEM	CLARIFICATION	RESPONSE
14-001	Metal 3D Printer Machine	Can we increase the temperature up to 1,500C? This will allow the end user to process a wider range of materials since other materials would require a higher temperature	Retain the specification for it already indicates "AT LEAST 1200°C"
		Will you accept a 3rd party Laboratory Furnace?	Third party laboratory furnace is acceptable as long as it will be compatible with the metal 3D printer and debinder
		Do you require a Slicing Software for this 3D Printer? Does it need to be Perpetual License?	Yes, 3D slicing software with perpetual license is required
14-001	Metal 3D Printer Machine	*Certificate of authority to sell from the manufacturer or local distributor/reseller* **Does the supplier need to have an experience or background in Metal 3D Printing?** **Suggestion: Winning bidder must have an expertise with Metal 3D Printing and have previous projects related**	Open competitive bidding should not be too restrictive, thus placing strict requirements. The suggestion of the potential bidder will limit the participation of other potential suppliers. Nonetheless, there are safeguards placed into system, such as:

		to Metal 3D Printing. This statement must be supported by a certificate. This will avoid future problems on installation and training since not all have a complete knowledge in Metal 3D Printing since this is a new technology. **Do you require Authorized Distributorship and not Only Exclusive Distributorship from the manufacturer?** These certifications will secure the end-user and can guarantee that the supplier is fully authorized by the manufacturer or its local reseller to sell and deliver the machines, fully knowledgeable and have the capability to conduct proper training by the manufacturer's certified and well trained Engineers.	• Certification from manufacturer to sell the product • Commissioning requirements prior acceptance, • Warranty coverage • Submission of training proposal • Training should be certified by the manufacturer
14-001	Metal 3D Printer Machine	*Training certificate provided by manufacturer to certified trainer (see section 6 of the bid document for details)* Do you need on-site training? May we suggest a - Letter for Onsite Training availability based on project location.	• Training is required for this lot. It can be done hybrid or full face-to-face on site. • A 10-day training period is required, with at least 5 days of face-to-face sessions on-site, after the equipment is installed. • Consumables and costs of learning materials and experts for the training should be covered by the supplier. • As per technical specification, it should • be a manufacturer's certification training.

14-001	Metal 3D Printer Machine	*Certificate of authority to sell from the manufacturer or local distributor/reseller* *Training certificate provided by manufacturer to certified trainer (see section 6 of the bid document for details)* May we suggest expanding the requirements of these certifications? Since this is a special machine that requires expertise and a proper background on additive manufacturing. **Recommendation**: -Certificate of Authority to Sell Issued by the manufacturer or its Philippine Distributor. -Letter of Expertise - to guarantee that the supplier has previously installed Metal 3D Printers in different entities in the Philippines. To ensure the reliability and capability of the supplier to conduct installation, training, maintenance and after sale service. State name of previous customer in the letter. -Training certificate provided by manufacturer to certified trainer (see section 6 of the bid document for details)	Request denied. Generic statements on the bid document will be retained since other information needed, as per suggestion, can be seen and verified from the submitted statement of Single Largest Contract Completed.

14-001	Metal 3D Printer Machine	This type of 3D Printer requires construction and installation of other related accessories/equipment to run and operate the machine therefore we suggest to add below parameters: **Recommendation** Acceptance: Test run onsite. The winning bidder shall provide all materials related to machine installation and all requirements related to the installation of equipment (Tooling, equipment handling to move and install the machine, construction of exhaust, cable ready for connection to electrical supply, connection to gas supply, etc. and labor needed in installation, commissioning and construction if necessary	The technical specifications indicate that the acceptance of the machine includes functionality testing.
14-002	Resin 3D Printer - LCD Type	*Light source: at least 9 inches with minimum 6k resolution* Can we offer 4k resolution? As this will not affect the output of the machine.	Request denied for this downgrading the agency specification
		Printer size: at least L11.0 x W9.0 X H17.0 in Can we add "Or equivalent"?	Request denied since the agency specification already indicates the minimum printer size: ***AT LEAST L11.0 x W9.0 X H17.0 in***
14-004	3D Scanner	Do you need a handheld 3D Scanner? Specify scanning capability.	The item is a Handheld 3D Scanner for Medium to Large Objects
		3D resolution up to 0.2 mm	Yes, higher resolution is better

		Can we go **higher**?	
		Working Distance: 0.4 - 1 meter Can we offer a **better** working distance?	Yes.
		Data acquisition speed (minimum): at least 18 mln point/s. Can we offer 3M point/s? Is it possible to make it range 3M to 18M point/s?	Denied.
		Do you require an on-board screen/touchscreen interface?	Yes, onboard screen touchscreen interface is required

Lot 19 - Teaching and Presentation Equipment

CODE	ITEM	CLARIFICATION	RESPONSE
19-004	Portable Whiteboard Solution	May we request this item to be removed due to manufacturer's parts issues or be replaced with an alternative product?	Retain the item, however it can be replaced with SMART projector • Interactive (uses stylus or finger/hand gestures) • short throw projector, • 3K lumens, • ethernet and WiFi • 220VAC • with carrying bag

12. **<u>On the revision of the technical specifications of the items (Section VII of the Bidding Documents)</u>**

<u>Kindly refer on the revised Section VII of the Bidding Documents incorporating the amendments on Lots 2, 3, 4, 5, 8, 9, 10, 11, 14, 16 and 17.</u>

Lot 2 - CNC Software and Simulation

CODE	ITEM	ORIGINAL	AMENDED
02-002	CNC Control Simulator (Full Function Control)	2 x 27" 2K/4K ultrawide curved monitor	2 x 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio.

Lot 3 - CNC Plasma Machine

CODE	ITEM	ORIGINAL	AMENDED
03-001	CNC Laser Cutting Machine	Controller: G-Code/Conversational type, support remote monitoring, Wired and WiFi connection, 15" touch control display	**Control:** G-Code/Conversational type, support remote monitoring, Wired **and/or** WiFi connection, 15" touch control display

Lot 4 - CNC Lathe Machine

CODE	ITEM	ORIGINAL	AMENDED
04-001	CNC Lathe Performance Training Center	Control: G-Code/Conversational type, support remote monitoring, Wired and WiFi connection, 15" touch control display	Control: G-Code/Conversational type, support remote monitoring, Wired **and/or** WiFi connection, 15" touch control display
		Other requirements: • Proof of extensive local service support (provide an organizational chart of the existing service staff, including certification from manufacturer) • Certificate of distributorship from the manufacturer • Certificate to conduct after-sales service and supply of spare	**Other requirements:** • **Compressor** • **Machine Tooling** • Proof of extensive local service support (provide an organizational chart of the existing service staff, including certification from manufacturer) • Certificate of distributorship from the manufacturer

CODE	ITEM	ORIGINAL	AMENDED
		parts from the manufacturer.	• Certificate to conduct after-sales service and supply of spare parts from the manufacturer.
04-002	CNC Lathe Machine	Control: G-Code/Conversational type, support remote monitoring, Wired and WiFi connection, 15" touch control display	Control: G-Code/Conversational type, support remote monitoring, Wired **and/or** WiFi connection, 15" touch control display

Lot 5 - CNC Milling Machine

CODE	ITEM	ORIGINAL	AMENDED
05-001	CNC Milling Machine	Control: G-Code/Conversational type, support remote monitoring, Wired and WiFi connection, 15" touch control display	Control: G-Code/Conversational type, support remote monitoring, Wired **and/or** WiFi connection, 15" touch control display

Lot 8 - Industrial Automation – PKG 1

CODE	ITEM	ORIGINAL	AMENDED
08-001	Modular Production System	Modular Production System (1 set, 6 modules)	Modular Production System (2 sets, 6 modules per set)
		Human Machine Interface (5 units)	Human Machine Interface (1 unit per station)

Lot 9 - Industrial Automation: PKG 2

CODE	ITEM	ORIGINAL	AMENDED
09-001	Automatic Production Line Trainer	○ Web server and networking: stations should be interconnected via ethernet protocol which allows remote data collection, monitoring and control and accessible via a web server.	○ Web server and networking: stations should be interconnected via ethernet protocol which allows remote data collection, monitoring and control and accessible via web **service.**

CODE	ITEM	ORIGINAL	AMENDED
		Dual 27" inch ultrawide 2K/4K curved monitor.	**Dual** 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio.

Lot 10 - Industrial Automation: PKG 3

CODE	ITEM	ORIGINAL	AMENDED
10-001	Smart Factory Enterprise	○ Web server and networking: stations should be interconnected via ethernet protocol which allows remote data collection, monitoring and control and accessible via a web server.	○ Web server and networking: stations should be interconnected via ethernet protocol which allows remote data collection, monitoring and control and accessible via web **service.**
		○ Laser marking This assembly simulates the robot laser welding/cutting process as applied into the workpiece.	○ Laser marking This assembly simulates the robot laser **to engrave/ mark via laser operation.**
		○ Two (2) computers for system programming and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port and **dual 27" inch 4K curved monitor.**	○ Two (2) computers for system programming and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port, **and dual 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio.**

CODE	ITEM	ORIGINAL	AMENDED
10-001	Smart Factory Enterprise	○ Two (2) computers for CNC Operations and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port and **dual 27" inch 4K curved monitor.**	○ Two (2) computers for CNC Operations and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port, **and dual 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio.**

Lot 11 - Industrial Process Control

CODE	ITEM	ORIGINAL	AMENDED
11-001	Pressure, Flow, Level, and Temperature Process Learning Systems	○ Two (2) computer/s for programming and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port and **dual 27" inch 4K curved monitor**	○ Two (2) computer/s for programming and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port, **and dual 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio**
		Training platform *This includes reference materials, exercises/activities (20+ activities) and the tools and consumables needed to run the exercises.*	Training platform *This includes reference materials, exercises/activities (20+ activities), 1 set of tools needed to service the equipment, 1 spool of electrical wires (per color used in the system)*
11-002	Bottle Filling Production Line Trainer	○ Web server and networking: stations should be interconnected via ethernet protocol which allows remote data collection, monitoring	○ Web server and networking: stations should be interconnected via ethernet protocol which allows remote data

CODE	ITEM	ORIGINAL	AMENDED
		and control and accessible via a web server.	collection, monitoring and control and accessible via web **service**.
		o Two (2) computer/s for programming and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port and **dual 27" inch 4K curved monitor**	o Two (2) computer/s for programming and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port, **and dual 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio**

Lot 14 - 3D Printing Technology

CODE	ITEM	ORIGINAL	AMENDED
14-001	Metal 3D Printer Machine	Material compatibility: Compatible with 316L, 17-4PH, FDM/FFF - PLA/ ABS/ HIPS/ PC/ TPU/ TPE/ PETG/ ASA/ PP/ PVA/ Nylon/ Glass Fiber Infused/ Carbon Fiber Infused and many different engineering materials	Material Compatibility: MFFF - Compatible with 316L, 17-4PH, High-End Metal Filament, Metal Support Material, etc.
		Filament diameters: 0.4mm up to 1.75 mm	Nozzle sizes: 1x 0.4mm and two (2) different sizes
		Includes Laboratory Furnace capable of reaching at least 1200C	TESDA retains the agency specifications for the laboratory furnace.
		Includes catalytic debinding Furnace using Oxalic Acid Fluid with work envelope of at least 200 x 200 x 200 mm	Includes catalytic debinding Furnace using Oxalic Acid Fluid **or equivalent** with work envelope of at least 200 x 200 x 200 mm

CODE	ITEM	ORIGINAL	AMENDED
14-001	Metal 3D Printer Machine	Size Capacity: At least 200 x 200 x 200 mm with Adjustable Multi-Level Tray for batch processing	○ Size Capacity: At least 200 x 200 x 200 mm with Adjustable Multi-Level Tray for batch processing ○ **Gas Type: Argon and Nitrogen** ○ **Fail safe features: Over-temperature protection and e-Stop feature** ***Note: Third party laboratory furnace is acceptable as long as it will be compatible with the metal 3D printer and debinder***
		Package inclusion: • 1 unit Debinder • 1 Unit vacuum furnace • 1 set of materials and consumables – metal filaments, gas and Fluid	**The package must be 2 sets of the following:** • 1 unit Debinder • 1 Unit vacuum furnace • 1 spool of metal filaments, 1.75mm and/or 3.0mm • 1 set of gas • 1 set of fluid ***(1 set per beneficiary institution)***
14-002	Resin 3D Printer - LCD Type	Maximum Printing Speed: up to 50mm/hr	**Minimum** Printing Speed: 50mm/hr
		Includes accessories for the complete operation of resin printer including 1 Wash and 1 Cure unit	Includes accessories for the complete operation of resin printer including **1 unit of Wash and 1 unit of Cure per resin printer** **25 sets of Wash and Cure for 25 Resin Printers**

CODE	ITEM	ORIGINAL	AMENDED
14-003	Fused Deposition Modelling 3D Printer	Extruder: Multiple (at least 2 extruders)	Extruder: Single; Nozzle size: 0.4mm
		Motherboard: 32 bit silent motherboard	Motherboard: 32 bit silent motherboard **or equivalent**
		Data transmission: SD card and Type C USB	Data transmission: SD card and **USB/**Type C USB
14-004	3D Scanner	3D resolution up to 0.2mm	3D resolution up to 0.2mm **or higher**
		Working Distance: 0.4 - 1 meter	Working Distance: 0.4 - 1 meter **or better**
		Linear field view, HxW at closest range: 214 x 148 mm	Linear field view, HxW at closest range: at least 100mm
		Linear field view, HxW at furthest range: 536 x 371 mm	Linear field view, HxW at furthest range: at least 300mm
		Ability to capture texture	Ability to capture texture, **light source: White LED**
		Texture resolution: 1.3 mp	Texture resolution: 1.3 mp **or better**
		3D reconstruction rate: 16 fps	3D reconstruction rate: 16 fps **or equivalent**
		Package inclusions: • 1 Unit Battery • 1 Unit Hard Case • 1 Set USB Kit • 1 Set Licensed 3D Scanning Software	**Package inclusion:** • 1 Unit Battery • 1 Unit Hard Case • 1 Set USB Kit • 1 Set Licensed 3D Scanning Software • **Class 1 Certificate on Eye Safety**

Lot 16 - Computers, Tablets and Handheld Devices

CODE	ITEM	ORIGINAL	AMENDED
16-006	Android Tablet	Operating System: Android 13 or newer	Android 12 or higher with the provision of OS upgrade

Lot 17 - Photography and Videography

CODE	ITEM	ORIGINAL	AMENDED
17-001	Mirrorless Digital Camera with Video	Standard zoom lens#2 • Focal length 28mm-300mm	• Standard zoom lens#2 o Focal length 28mm-300mm or equivalent, wherein the equivalence should be within the focal range indicated (example 35mm~100mm).
		Ultra-wide zoom • Focal length 11mm-24 mm	• Ultra-wide zoom o Focal length 11mm-24 mm or equivalent, wherein the equivalence should not be greater than 135 mm (example 50mm~135mm).
		Telephoto lens • Focal length 200mm-400mm	• Telephoto lens o Focal length 200mm-400mm or equivalent, wherein the equivalence should be within the focal range indicated (example 250mm~350mm).

Lot 19 – Teaching and presentation equipment

CODE	ITEM	ORIGINAL	AMENDED
19-004	Portable interactive whiteboard solution or SMART Projector	- Connectivity: Wireless connection via dongle, up to 9ft or farther - Capture area: 1.5 m x 2.4 m standard aspect ratio - Sensor power supply: 5V via USB Includes: - Stylus - Software	Portable Interactive Whiteboard Solution specification: • Connectivity: Wireless connection via dongle, up to 9ft or farther • Capture area: 1.5 m x 2.4 m standard aspect ratio • Sensor power supply: 5V via USB

CODE	ITEM	ORIGINAL	AMENDED

			• Includes:
			  ○ Stylus
			  ○ Software
			
			SMART Projector
			• Interactive (uses stylus or finger/hand gestures)
			• short throw projector,
			• 3K lumens,
			• ethernet and WiFi
			• 220VAC
			• with carrying bag

For the information and guidance of all concerned.

DDG ROSANNA A. URDANETA
Chairperson
Bids and Awards Committee

REVISED

Section VI. Schedule of Requirements

The delivery schedule expressed in calendar days stipulates hereafter a delivery date which is the date of delivery to the designated delivery address of the Regional TVET Innovation Centers (RTICs), as well as the distribution list attached as **Annex B and Annex C.**

Lot No.	Description	Delivered Weeks/Months
1	CNC Machining Equipment Upgrade	Within one hundred eighty (180) calendar days upon receipt of Notice to Proceed
2	CNC Software and Simulation	
3	CNC Plasma Machine	
4	CNC Lathe Machine	
5	CNC Milling Machine	
6	Machining Equipment	
7	Metal Fabrication Equipment	
8	Industrial Automation - PKG 1	
9	Industrial Automation - PKG 2	
10	Industrial Automation - PKG 3	
11	Industrial Process Control	
12-A	Robotics PKG 1	
12-B	Robotics PKG 2	
13	Food processing equipment	
14	3D Printing Technology	
15	Electronics Prototyping Set	
16	Computers, Tablets and Handheld Devices	
17	Photography and Videography	
18	Video Editing Equipment	
19	Teaching and presentation equipment	
20	Software: Productivity	
21	Network system	
22	Welding Equipment	
23	Sound System	
24	Refrigeration Equipment	

A. Scope of work

This project shall cover the following:

- delivery, installation, commissioning of goods; and
- training of trainers

B. Installation Requirements and Arrangements

- The end-user shall ensure that the installation site for the equipment is ready prior to the delivery of goods: This may include:
  - provision of equipment layout; and/or
  - access to source line (power and/or water). Tapping/connection point should not be more than 10 ft away from the location of the equipment to be installed.

- The supplier shall cover for the cost of the following:
  - Electrical system – which may include the following: enclosure/s, protective device(s), conduit and wires (10 ft)
  - Frame/Mounting platform/fixtures
  - Piping system (10 ft), as applicable
  - Provision of special/proprietary tools and/or instruments needed for the installation and/or configuration of the equipment. This tool/ instrument shall be turned over to the end user as part of the equipment package.

C. Training Requirements and Arrangements

The procurements of goods under this project includes two levels of training:

- Level 1: Utilization and maintenance (1~2 days)

  The winning bidder per lot will provide a face-to-face training on the familiarization, utilization, and maintenance of each equipment.

- Level 2: Technology specific training (10 days per lot or 2 weeks)

  The winning bidder on the following lots will provide a comprehensive face-to-face or hybrid training, see details below:

  - Lot 1: CNC Machining Equipment Upgrade
    The training should cover installation set-up, configuration and operation of CNC machining equipment upgrade. The training should include at least five machining exercises.

  - Lot 2: CNC Software and Simulation
    The training should cover design, installation set-up, configuration of the CNC simulator. The training should also cover a walk through on the course and learning materials that come with the package.

  - Lot 3: CNC Plasma Machine
    The training should cover installation set-up, configuration, operation and basic troubleshooting of CNC laser cutter. The training should include at least five cutting exercises.

  - Lot 4: CNC Lathe Machine
    The training should cover installation set-up, configuration, operation and basic troubleshooting of CNC lathe machine. The training should include at least five machining exercises.

  - Lot 5: CNC Milling Machine
    The training should cover installation set-up, configuration, operation and troubleshooting of CNC milling machine. The training should also cover a walk through on the course and learning materials that come with the package.

  - Lot 6: Machining Equipment
    The training should cover installation set-up, configuration, operation and basic troubleshooting. The training should include at least five exercises per machine.

- Lot 7: Metal Fabrication Equipment
  The training should cover the different metal fabrication processes. The training should include at least five exercises per machine.

- Lot 8: Industrial Automation: PKG 1
  The training should cover design, installation set-up, configuration, programming and operation. The training should also cover a walk through on the course and learning materials that come with the package. See technical specification of this lot for details.

- Lot 9: Industrial Automation: PKG 2
  The training should cover design, installation set-up, configuration, programming and operation. The training should also cover a walk through on the course and learning materials that come with the package. See technical specification of this lot for details.

- Lot 10: Industrial Automation: PKG 3
  The training should cover design, installation set-up, configuration, programming and operation. The training should also cover a walk through on the course and learning materials that come with the package. See technical specification of this lot for details.

- Lot 11: Industrial Process Control
  The training should cover design, installation set-up, configuration, programming and operation. The training should also cover a walk through on the course and learning materials that come with the package. See technical specification of this lot for details.

- Lot 12-A: Robotics PKG 1
  The training should cover design, installation set-up, configuration, programming and operation. The training should also cover a walk through on the course and learning materials that come with the package. See technical specification of this lot for details.

- Lot 12-B: Robotics PKG 2
  The training should cover design, installation set-up, configuration, programming and operation. The training should also cover a walk through on the course and learning materials that come with the package. See technical specification of this lot for details.

- Lot 13: Food processing equipment
  The training should cover the use of the equipment of at least three food processes per machine.

- Lot 14: 3D Printing Technology
  The training should cover basic, intermediate and advance designing and printing of 3D models using various types of filaments.

- Lot 17: Photography and Videography
  The training should cover indoor and outdoor photography and videography.

- Lot 18: Video Editing Equipment
  The training should cover familiarization with the features of each device/gadget, the OS environment and the use of the accompanying video editing software.

- Lot 20: Software: Productivity
  The training should cover familiarization with the features of the productivity office software and creative software bundle. Training should be in the context of data analytics, marketing and promotional materials development.

- Lot 24: Refrigeration Equipment
  The training should cover installation set-up, configuration and troubleshooting of reefer container/ transport refrigeration unit.

  The training will be held at the institution where the equipment will be delivered.

  The receiving institutions will cover the costs of the training venue, snacks and meals during training while the supplier will cover all other costs such as, but not limited to:
  - Honoraria of the trainer.
  - Accommodation of the trainer;
  - Supplies and materials required for the training;
  - Reproduction of the learning materials (maximum of 10 copies).

I hereby commit to comply and deliver all the above requirements in accordance with the above stated schedule.

Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED

Technical Specifications

Lot 2 : **CNC Software and Simulation**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance *	Make Brand / Model	Reference
1	CADCAM Software	Kindly refer to the technical specifications attached as **Revised Annex D2.**	18	set			
2	CNC Control Simulator (Full Function Control)		8	unit			

* Bidders must state here either "Comply" or "Not Comply" against each of the individual parameters of each Specification stating the corresponding performance parameter of the equipment offered. Statements of "Comply" or "Not Comply" must be supported by evidence in a Bidders Bid and cross-referenced to that evidence. Evidence shall be in the form of manufacturer's un-amended sales literature, unconditional statements of specification and compliance issued by the manufacturer, samples, independent test data etc., as appropriate. A statement that is not supported by evidence or is subsequently found to be contradicted by the evidence presented will render the Bid under evaluation liable for rejection. A statement either in the Bidder's statement of compliance or the supporting evidence that is found to be false either during Bid evaluation, post-qualification or the execution of the Contract may be regarded as fraudulent and render the Bidder or supplier liable for prosecution subject to the applicable laws and issuances.

All tools, equipment, gadgets and electrically operated instruments should have Standard Manufacturers Manual and/or Datasheet/Specification Sheet/Brochure as indicated in **Revised Annex D2.**

Instruction Manual is an instructional book or booklet that is supplied with almost all technologically advanced products such as electrical products.

Datasheet/Specification Sheet/Brochure is a document that summarizes the performance and other characteristics of a product, machine, component that comes along with the product from its release from the manufacturer.

I hereby certify that the statement of compliance to the foregoing technical specifications are true and correct, otherwise, if found to be false either during bid evaluation or post-qualification, the same shall give rise to automatic disqualification of our bid.

Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED ANNEX D2

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
2	CNC Software and Simulation	02-001	CADCAM Software	Computer Aided Design & Computer Aided Machining Software with Multiple Axis features (Turn, Mill, Mill-turn) Perpetual License, with yearly maintenance features (Software must be similar to the Worldskills Standards, CNC Milling/ Turning 2022) 1 year warranty with commissioning, testing and training Bookbinded modules in english language or video of instructional learning resources	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes
2	CNC Software and Simulation	02-002	CNC Control Simulator (Full Function Control)	refer to Technical Specification of Item Code 02-002	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of The Learning System	**CNC Control Simulator**
Item Code	02-002
Technology Area(s)	CNC Software and Simulation

Brief Description:

A computer-based CNC simulation software that allows configuration of different machining equipment using additive and deductive technologies.

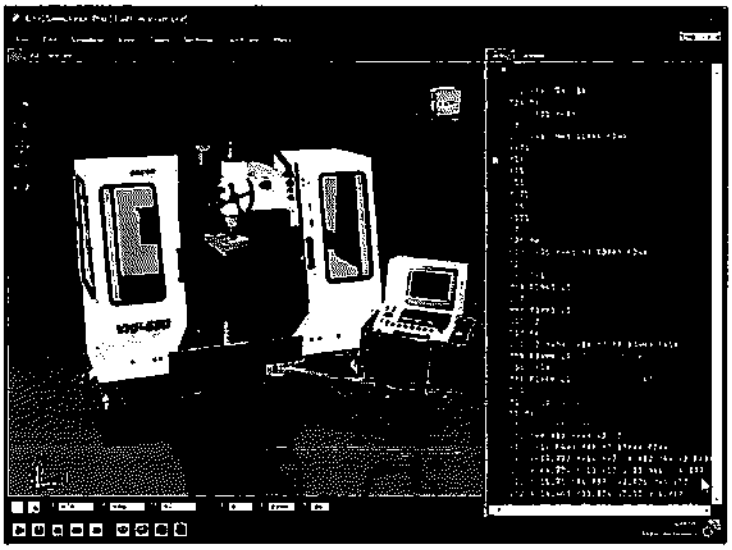
Features:

- At least 40 machine library
- Visualization of machine appearance in 3D
- Configurable machine settings and cutting tools
- CNC editor
- CNC code analysis
- Virtua controller
- CNC Simulator
- 3D CAM Tool
- Gear maker
- Cloud-based storage
- Allows transfer of workpiece from one machine to another

Package inclusion:

- 26 sets of desktop computers - latest Windows OS, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 1Gbit LAN, 8GB GPU GDDR5 with at least 4K video out, wireless and bluetooth, 2 x 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio. Includes mouse, keyboard, headset and computer table.
- Network system - wireless network with 4TB Network Attached Storage
- 30 seat educational license of CNC simulator with 5 year subscription
- 26 sets of measuring tools -1x digital vernier caliper (1-150mm) metric and english, 1 x digital micrometer caliper (0~25mm) metric and english, feeler gauge, 1x digital tread depth gauge (0~25.4mm), stainless steel rule 12", digital protractor, tool box (ABS)

Sample Image:



Picture for reference only

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED

Technical Specifications

Lot 3 : **CNC Plasma Machine**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	CNC Laser Cutting Machine	Kindly refer to the technical specifications attached as **Revised Annex D3.**	1	unit			

* Bidders must state here either "Comply" or "Not Comply" against each of the individual parameters of each Specification stating the corresponding performance parameter of the equipment offered. Statements of "Comply" or "Not Comply" must be supported by evidence in a Bidders Bid and cross-referenced to that evidence. Evidence shall be in the form of manufacturer's un-amended sales literature, unconditional statements of specification and compliance issued by the manufacturer, samples, independent test data etc., as appropriate. A statement that is not supported by evidence or is subsequently found to be contradicted by the evidence presented will render the Bid under evaluation liable for rejection. A statement either in the Bidder's statement of compliance or the supporting evidence that is found to be false either during Bid evaluation, post-qualification or the execution of the Contract may be regarded as fraudulent and render the Bidder or supplier liable for prosecution subject to the applicable laws and issuances.

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Instruction Manual is an instructional book or booklet that is supplied with almost all technologically advanced products such as electrical products.

Datasheet/Specification Sheet/Brochure is a document that summarizes the performance and other characteristics of a product, machine, component that comes along with the product from its release from the manufacturer.

I hereby certify that the statement of compliance to the foregoing technical specifications are true and correct, otherwise, if found to be false either during bid evaluation or post-qualification, the same shall give rise to automatic disqualification of our bid.

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REVISED ANNEX D3

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
3	CNC Plasma Machine	03-001	CNC Laser Cutting Machine	refer to Technical Specification of Item Code 03-001	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

I hereby certify that the statement of compliance to the foregoing technical specifications are true and correct, otherwise, if found to be false either during bid evaluation or post-qualification, the same shall give rise to automatic disqualification of our bid.

Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of The Learning System	**CNC Laser Cutting Machine**
Item Code	03-001
Technology Area(s)	CNC Plasma Machine

Specification

Control	G-Code/Conversational type, support remote monitoring, Wired and/or WiFi connection, 15" touch control display
*Cutting range:	3,000 x 1,500 mm
*X-axis stroke:	3,040 mm ±20%
*Y-axis stroke:	1,520 mm ±20%
*Z-axis stroke:	120 mm ±20%
*X/Y maximum trajectory speed	140m/min
*X/Y maximum acceleration	1.2 m/s^2
Positioning accuracy:	±0.03 mm
Repositioning accuracy	±0.02 mm
Maximum load of worktable	700 kg ±20%
Machine layout dimension	4,550 x 4,500 x 2,000 mm or smaller
Laser generator	2 kW
Air-compressor	30HP or greater
Power	220VAC 60Hz Single phase/3 phase

Other requirements:

- Proof of extensive local service support (provide an organizational chart of the existing service staff, including certification from manufacturer)
- Certificate of distributorship from the manufacturer
- Certificate to conduct after-sales service and supply of spare parts from the manufacturer

Sample Image:

Picture for reference only

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED

Technical Specifications

Lot 4 : **CNC Lathe Machine**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	CNC Lathe Performance Turning Center	Kindly refer to the technical specifications attached as **Revised Annex D4.**	1	unit			
2	CNC Lathe Machine		1	set			

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All tools, equipment, gadgets and electrically operated instruments should have Standard Manufacturers Manual and/or Datasheet/Specification Sheet/Brochure as indicated in **Revised Annex D4.**

Instruction Manual is an instructional book or booklet that is supplied with almost all technologically advanced products such as electrical products.

Datasheet/Specification Sheet/Brochure is a document that summarizes the performance and other characteristics of a product, machine, component that comes along with the product from its release from the manufacturer.

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED ANNEX D4

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
4	CNC Lathe Machine	04-001	CNC Lathe Performance Turning Center	refer to Technical Specification of Item Code 04-001	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes
4	CNC Lathe Machine	04-002	CNC Lathe Machine	refer to Technical Specification of Item Code 04-002	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of The Learning System	**CNC Lathe Performance Turning Center**
Item Code	04-001
Technology Area(s)	CNC Lathe Machine

Brief Description:

A CNC multi-axis machine equipment capable of high-performance multi-axis CNC Machining and Programming. Set-up for flexibility, extreme rigidity and high thermal stability.

Technical Specifications:

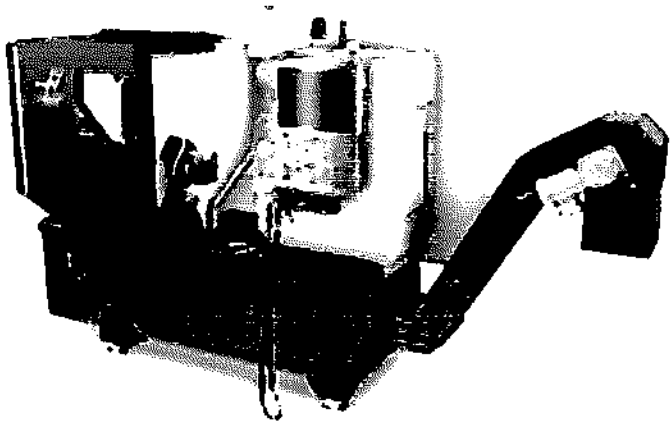
Control	G-Code/Conversational type, support remote monitoring, Wired and/or WiFi connection, 15" touch control display
Max swing	695 mm
Max machining diameter	340 mm
Max machining length	554 mm
Bar work capacity	Ø 52 mm
Travel X axis	215 mm
Travel Z axis	605 mm
C-axis indexing increment	0.0001 degree
Chuck size	6 inches
Spindle speed	6,000 rpm
Spindle bore	Ø 61 mm
Turret type	12 position drum turret (bolt-on)
Number of tools	12 tools
Tool shank height	25 mm
Boring bar shank diameter	Ø 40 mm
Rotary tool spindle speed	4,500 rpm

Milling Capacity: Drill	Ø 20 mm
Milling Capacity: Endmill	Ø 20 mm
Milling Capacity: Tap	M20 x 2.5
Rapid traverse rate: X-axis	30 m/min
Rapid traverse rate: Z-axis	30 m/min
Rapid traverse rate: C-axis	555 rpm
Tailstock stroke	565 mm
Tailstock center	MT No.5 dead center
Main spindle motor	11~15 kW
Rotary tool spindle motor	5.5 kW
Power Requirements:	Single/3 phase 220V 60Hz, with breaker and AVR system
Space requirement	Height should not be greater than 2.5m and width/length should not be greater than 4m (so that there will be no issue during ingress)
Others	Laptop with necessary application for design and control management
Consumable	2 Units Mild Steel 2 Units Stainless Steel

Other requirements:

- Compressor
- Machine Tooling
- Proof of extensive local service support (provide an organizational chart of the existing service staff, including certification from manufacturer)
- Certificate of distributorship from the manufacturer
- Certificate to conduct after-sales service and supply of spare parts from the manufacturer.

Sample Image:



Picture for reference only

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of The Learning System	**CNC Lathe Machine**
Item Code	04-002
Technology Area(s)	CNC Lathe Machine

SPECIFICATIONS:

Control	G-Code/Conversational type, support remote monitoring, Wired and/or WiFi connection, 15" touch control display
Max swing	580 mm
Max machining diameter	350 mm
Max machining length	299 mm
Bar work capacity	Ø 45 mm
Travel X axis	195 mm
Travel Z axis	325 mm
Chuck size	6 inches
Spindle speed	5,000 rpm
Spindle bore	Ø 53 mm
Turret type	8 position drum turret (bolt-on)
Number of tools	8 tools
Tool shank height	25 mm
Boring bar shank diameter	Ø 32 mm
Rapid traverse rate: X-axis	30 m/min
Rapid traverse rate: Z-axis	30 m/min
Tailstock stroke	325 mm
Tailstock center	MT No.4 dead center
Main spindle motor	11 kW

Main spindle motor type	Integral Spindle Motor
Required power capacity	14.5 kVA
Air supply	0.5 Mpa, 75L/min
Coolant tank capacity	160 L
Minimum Features included:	Tool Eye
	NC tailstock
	Tool life monitoring
	Backlash compensation
	Pitch error compensation
	Emergency stop
	Tailstock thrust automatic change
	Work light
	Manuals
	Set of adjusting tools
Power Requirements:	Single-phase/3 phase 220V, with breaker and AVR system
Space requirement	Height should not be greater than 2.5m and width/length should not be greater than 2m (so that there will be no issue during ingress)
Others	Laptop with necessary application for design and control management
Consumables	2 Units Mild Steel
	2 Units Stainless Steel
Tooling package and accessories	2 pcs Outside turning tool holder, right hand
	2 pcs Outside turning tool holder, left hand
	1 pc Facing tool holder
	4 pcs Boring bar holder
	Boring bar socket, 2 pcs each - 8, 10, 12, 16, 20, 25 mm
	1 pc MT drill socket

	1 pc U drill holder diameter
	1 pc U drill socket
	10 set soft jaws
	1 set hard jaw
	1 pc Hook Spanner
	Outside Turning Application - Roughing
	1pc each of Turning Holder Right Hand - WNMG and Turning holder Right hand- DNMG, 10 pcs each of WNMG insert and DNMG insert;
	Outside turning Application- Finishing
	2 pcs Turning holder Left hand- VNMG
	10pcs VNMG insert
	Boring bar- 2pcs each Holder and 10 pcs each insert
	Threading Tool- 1pc each Holder for external and internal
	Cut-off tool- 1pc Tool Block, 2 pcs Blade, 1pc Extractor 10pcs Insert
	Grooving-Turning Tool- 1 pc Holder, 10pcs Insert
	Drilling Application-1pc U Drill holder, 10pcs Insert
Measuring tools	CALIPER - DIGIMATIC W/O SPC 0-150 X 0.01 MM / 6" X .0005"
	CALIPER - DIGIMATIC W/O SPC 0-200 X 0.01 MM / 8" X .0005"
	CALIPER - DIGIMATIC W/SPC 0-300 X 0.01MM / 12"X .0005"
	MICROMETER - OUTSIDE WITH RATCHET STOP 0-25 X 0.01 MM
	MICROMETER - OUTSIDE WITH RATCHET STOP 25-50 X 0.01 MM
	CALIPER - VERNIER WITH METRIC/INCH DOUBLE SCALE 0-150 X 0.02 MM / 6" X 0.001"

	CALIPER - VERNIER WITH METRIC/INCH DOUBLE SCALE 0-200 X 0.02MM / 8" X .001"
	CALIPER - VERNIER WITH METRIC/INCH DOUBLE SCALE 0-300 X 0.02MM / 12" X .001"
	INDICATOR - DIAL TEST HORIZONTAL TYPE - BASIC UNIT 0.8 X .01 MM
	INDICATOR - DIAL TEST HORIZONTAL TYPE - BASIC UNIT 0.2 X .002 MM
	STAND - MAGNETIC W/ FINE ADJUSTMENT
	BEVEL PROTRACTOR UNIVERSAL - WHOLE SET 150 / 300 MM
	INDICATOR - DIGIMATIC IDC TYPE - FLAT BACK 0-25.4 X 0.001 MM / 1" X 0.000
	STAND - COMPARATOR GRANITE BASE 150 X 200 X 50 MM
	INDICATOR - DIAL BACK PLUNGER 1mm x 0.01mm
	HOLTEST 3 PT. INTERNAL MIKE (TITANIUM- 25-30 X 0.005 MM
	MICROMETER - CALIPER TYPE WITH RATCHET STOP 50-75 X 0.01 MM
	MICROMETER - INSIDE INTERCHANGEABLE ROD 50-63 X 0.01MM

Other requirements:

- Proof of extensive local service support (provide an organizational chart of the existing service staff, including certification from manufacturer)
- Certificate of distributorship from the manufacturer
- Certificate to conduct after-sales service and supply of spare parts from the manufacturer

Sample Image:

Picture for reference only

I hereby certify that the statement of compliance to the foregoing technical specifications are true and correct, otherwise, if found to be false either during bid evaluation or post-qualification, the same shall give rise to automatic disqualification of our bid.

Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED

Technical Specifications

Lot 5 : **CNC Milling Machine**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	CNC Milling Machine	Kindly refer to the technical specifications attached as **Revised Annex D5.**	1	set			

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED ANNEX D5

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
5	CNC Milling Machine	05-001	CNC Milling Machine	refer to Technical Specification of Item Code 05-001	Learning System	- Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of The Learning System	**CNC Milling Machine**
Item Code	05-001
Technology Area(s)	CNC Milling Machine

SPECIFICATIONS:

Control	G-Code/Conversational type, support remote monitoring, Wired and/or WiFi connection
Travel X axis	700 mm
Travel Y axis	450 mm
Travel Z axis	350 mm
Distance between spindle face and table face	150 - 500 mm
Table size	850 x 450 mm
Max load capacity	300 kg
Max spindle speed	20,000 rpm
Spindle taper	No. 30
Rapid traverse rate X	48,000 mm/min
Rapid traverse rate Y	48,000 mm/min
Rapid traverse rate Z	48,000 mm/min
Cutting feed rate	1 - 20,000 mm/min
Tool storage capacity	20 tools
Max tool diameter	60 mm
Max tool length	250 mm
Max tool weight	3 kg
Spindle motor	13 kW
Electrical power requirement	12.7 kVA
Coolant tank capacity	130 L
Power Requirements:	Single-phase/3 phase 220V, with breaker and AVR system

Space requirement	Height should not be greater than 2.5m and width/length should not be greater than 2m (so that there will be no issue during ingress)
Others	Laptop with necessary application for design and control management
Minimum Features included:	Tool length compensation
	Cutter and nose radius compensation
	Self-diagnosis function
	Alarm display
	Alarm history display
	8.4" color LCD display
	Air blower for tool cleaning
	Automatic lubrication unit
	Internal illumination light (LED)
	Tool length measurement
Tooling package necessary for training:	Facemill Holder
	Facemill Arbor
	Insert
	Drill Chuck Arbor
	Drill Bit Set (1-13mm, 26 pcs.)
	Collet Chuck Arbor ER40
	Collet Set ER40 (23 pcs.)
	Collet Chuck Arbor ER32
	Pull stud
	Flat end mill 12mm diameter
	Flat end mill 10mm diameter
	Flat end mill 8mm diameter
	Flat end mill 6mm diameter
	Ball end mill 12mm diameter
	Ball end mill 10mm diameter

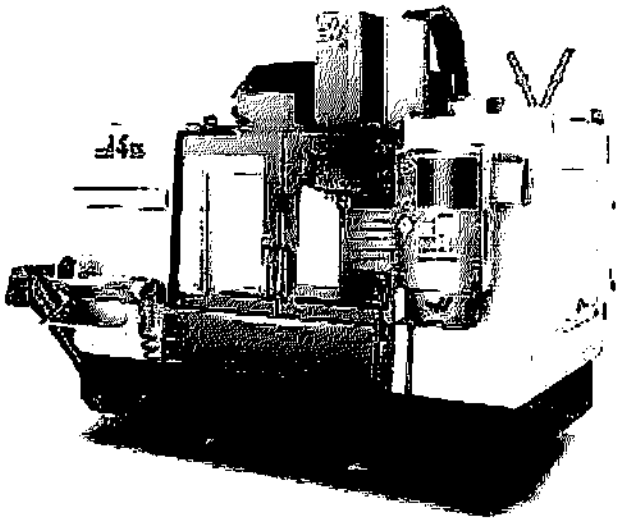
	Ball end mill 8mm diameter
	Taps M3x0.5mm (HSS)
	Taps M4x0.7mm (HSS)
	Taps M6x1mm (HSS)
	Taps M8x1.25mm (HSS)
	Taps M10x1.5mm (HSS)
	Taps M12x1.75mm (HSS)
	Rotary Tool Clamp
	Power Vise
	Coolant (pail)
Air compressor	Piston type Air compressor 10 HP
Measuring tools	CALIPER - DIGIMATIC W/O SPC 0-150 X 0.01 MM / 6" X .0005"
	CALIPER - DIGIMATIC W/O SPC 0-200 X 0.01 MM / 8" X .0005"
	CALIPER - DIGIMATIC W/SPC 0-300 X 0.01MM / 12"X .0005"
	MICROMETER - OUTSIDE WITH RATCHET STOP 0-25 X 0.01 MM
	MICROMETER - OUTSIDE WITH RATCHET STOP 25-50 X 0.01 MM
	CALIPER - VERNIER WITH METRIC/INCH DOUBLE SCALE 0-150 X 0.02 MM / 6" X 0.001"
	CALIPER - VERNIER WITH METRIC/INCH DOUBLE SCALE 0-200 X 0.02MM / 8" X .001"
	CALIPER - VERNIER WITH METRIC/INCH DOUBLE SCALE 0-300 X 0.02MM / 12" X .001"
	INDICATOR - DIAL TEST HORIZONTAL TYPE - BASIC UNIT 0.8 X .01 MM

	INDICATOR - DIAL TEST HORIZONTAL TYPE - BASIC UNIT 0.2 X .002 MM
	STAND - MAGNETIC W/ FINE ADJUSTMENT
	BEVEL PROTRACTOR UNIVERSAL - WHOLE SET 150 / 300 MM
	INDICATOR - DIGIMATIC IDC TYPE - FLAT BACK 0-25.4 X 0.001 MM / 1" X 0.000
	STAND - COMPARATOR GRANITE BASE 150 X 200 X 50 MM
	INDICATOR - DIAL BACK PLUNGER 1mm x 0.01mm
	HOLTEST 3 PT. INTERNAL MIKE (TITANIUM- 25-30 X 0.005 MM
	MICROMETER - CALIPER TYPE WITH RATCHET STOP 50-75 X 0.01 MM
	MICROMETER - INSIDE INTERCHANGEABLE ROD 50-63 X 0.01MM

Other requirements:

- Proof of extensive local service support (provide an organizational chart of the existing service staff, including certification from manufacturer)
- Certificate of distributorship from the manufacturer
- Certificate to conduct after-sales service and supply of spare parts from the manufacturer

Sample Image:



Picture for reference only

I hereby certify that the statement of compliance to the foregoing technical specifications are true and correct, otherwise, if found to be false either during bid evaluation or post-qualification, the same shall give rise to automatic disqualification of our bid.

Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED

Technical Specifications

Lot 8 : **Industrial Automation – PKG 1**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	Modular Production System	Kindly refer to the technical specifications attached as **Revised Annex D8.**	1	set			

* Bidders must state here either "Comply" or "Not Comply" against each of the individual parameters of each Specification stating the corresponding performance parameter of the equipment offered. Statements of "Comply" or "Not Comply" must be supported by evidence in a Bidders Bid and cross-referenced to that evidence. Evidence shall be in the form of manufacturer's un-amended sales literature, unconditional statements of specification and compliance issued by the manufacturer, samples, independent test data etc., as appropriate. A statement that is not supported by evidence or is subsequently found to be contradicted by the evidence presented will render the Bid under evaluation liable for rejection. A statement either in the Bidder's statement of compliance or the supporting evidence that is found to be false either during Bid evaluation, post-qualification or the execution of the Contract may be regarded as fraudulent and render the Bidder or supplier liable for prosecution subject to the applicable laws and issuances.

All tools, equipment, gadgets and electrically operated instruments should have Standard Manufacturers Manual and/or Datasheet/Specification Sheet/Brochure as indicated in **Revised Annex D8.**

Instruction Manual is an instructional book or booklet that is supplied with almost all technologically advanced products such as electrical products.

Datasheet/Specification Sheet/Brochure is a document that summarizes the performance and other characteristics of a product, machine, component that comes along with the product from its release from the manufacturer.

I hereby certify that the statement of compliance to the foregoing technical specifications are true and correct, otherwise, if found to be false either during bid evaluation or post-qualification, the same shall give rise to automatic disqualification of our bid.

Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED ANNEX D8

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
8	Industrial Automation - PKG 1	08-001	Modular Production System	refer to Technical Specification of Item Code 08-001	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

I hereby certify that the statement of compliance to the foregoing technical specifications are true and correct, otherwise, if found to be false either during bid evaluation or post-qualification, the same shall give rise to automatic disqualification of our bid.

Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of The Learning System	Modular Production System
Item Code	08-001
Technology Area(s)	Industrial Automation - PKG 1

MODULAR PRODUCTION SYSTEM ***(2 sets, 6 modules per set)***

MPS DISTRIBUTING/CONVEYOR STATION

Description: The MPS distributing station tackles a number of topics, including the basic principles of PLC programming and sensor technology. In addition to this, the station provides an introduction to conveyor control using micro controllers and the associated transport of materials.

The station separates individual workpieces in a stacking magazine. A double-acting cylinder pushes the workpieces out one at a time. The conveyor module transports the workpiece to the right or left. The conveyor can be stopped in order to separate the workpiece. The simple setup process for the MPS Station makes it easy to create a workflow program for the handling process. Different workpieces can be used in the stacking magazine module.

Required Topics/Lessons:
The training system shall include, but not limited to the following topics/lessons:

- Familiarization with the stacking magazine and conveyor modules
- Gaining insight into common separation and distribution processes
- Introduction to pneumatic control systems
- Acquisition of basic PLC programming skills
- Introduction to how sensors and actuators work and are used
- Controlling a DC motor using a microcontroller
- Preparation and commissioning of a mechatronic system

Courseware:

- PLC Simulation Software
- Programming software portal
- Realization of networked solutions
- Software and documentation supplied on DVD
- Floating license supplied on USB stick

Hardware:

- **Conveyor Module**
  - Fiber-optic cable (diffuse sensor)
    - Signal processing (measuring principle): Red light
    - Coverage range max.: 120mm
    - Mounting thread: M6
    - Coating of housing: Nickel plated
    - Degree of protection: IP65
    - Switch triggering: Reflex
    - Function on actuation: Polymer fiber optic cable

  - Fiber-optic device (diffuse sensor)
    - Signal processing (measuring principle): Red light
    - Switch triggering: Reflex / Interrupt
    - Function on actuation: Sender and receiver
    - Output potential: PNP
    - Coverage range max: 120mm
    - Thread for connector: M8x1
    - Number of pins, plug connection: 4
    - Operating status display: Yellow LED
    - Short-circuit strength: Pulse
    - Type of mounting: Hole
    - Material of housing: PBT - reinforced
    - Voltage type: DC
    - Nominal operating voltage (DC): 24V
    - Operating voltage min. (DC): 10V
    - Operating voltage max (DC): 30V
    - Idle current max.: 25mA
    - Maximum switching frequency: 1000 Hz
    - Degree of protection: IP65

  - Fiber-optic cable (light barrier)
    - Signal processing (measuring principle): Red light
    - Switch triggering: interrupt
    - Function on actuation: Polymer fiber optic cable
    - Coverage range max.: 400mm
    - Mounting thread: M4
    - Degree of protection: IP65

- Fiber-optic device (light barrier)
  - Signal processing (measuring principle): Red light
  - Switch triggering: Reflex / triggering
  - Output potential: PNP
  - Coverage range max.: 120mm
  - Thread for connector: M8x1
  - Number of pins, plug connection: 4
  - Operating status display: Yellow LED
  - Voltage type: DC
  - Nominal operating voltage (DC): 24V
  - Operating voltage min. (DC): 10V
  - Operating voltage max. (DC): 30V
  - Idle current max.: 25mA
  - Maximum switching frequency: 1000 Hz
  - Degree of protection: IP65

- DC Rotary Solenoid
  - Angle of rotation: 95°
  - Operating mode: S3 40%
  - Torque (NCM): 2.00
  - Rated power (W): 16.2
  - Mass inertia (kgm²) ft: 0.314x10^ (-6)
  - Time constant (ms): 6.5

- DC Gear Motor
  - Nominal voltage: 24V
  - Nominal current: 1.5A
  - Nominal speed of drive shaft: 65rpm
  - Reduction stages: 1
  - Nominal torque: 1 N-m
  - Reversible: yes
  - Starting torque: 7 N-m

- DC Motor Controller
    - Nominal voltage: 24 VDC ± 10%
    - Max. power consumption: 50 mA
    - Continuous motor current: 4 A DC
    - Control inputs, logic 1: 10 - 24V DC
    - Control inputs, logic 0: 0 - 4V DC
    - Analog input: 0...10V DC, 24V tolerant
    - Overvoltage protection: Yes
    - CE marking per: Class B interference emission

- Mini I/O terminal
    - Operating voltage: 24V DC
    - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
    - Analog I/O, 2AI, 1AO: 0....10V DC and ± 10V DC
    - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm2
    - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)

- **Stack Magazine Module**
    - Proximity Sensor
        - Design: For T-slot
        - Measuring principle: Reed magnetic
        - Switch output: with contact, bipolar
        - Max. switching frequency: 800hz
        - Max. output current: 500mA
        - Electrical connection: Cable 3-core
        - Connector exit direction: axial
        - Cable length: 2.5m
        - Mounting type: Clamped in T-slot, insertable into slot lengthwise
        - Operating status display: Yellow LED
        - Protection class: IP65, IP67
        - Ambient temperature w/ flexible cable: -5 ... 60 °C
        - Tightening torque: 0.2 N-m

- Fiber-optic cable (light barrier)
  - Signal processing (measuring principle): Red light
  - Switch triggering: interrupt
  - Function on actuation: Polymer fiber optic cable
  - Coverage range max.: 400mm
  - Mounting thread: M4
  - Degree of protection: IP65
- Fiber-optic device (light barrier)
  - Signal processing (measuring principle): Red light
  - Switch triggering: Reflex / triggering
  - Output potential: PNP
  - Coverage range max.: 120mm
  - Thread for connector: M8x1
  - Number of pins, plug connection: 4
  - Operating status display: Yellow LED
  - Voltage type: DC
  - Nominal operating voltage (DC): 24V
  - Operating voltage min. (DC): 10V
  - Operating voltage max. (DC): 30V
  - Idle current max.: 25mA
  - Maximum switching frequency: 1000 hz
  - Degree of protection: IP65
- Standard cylinder
  - Stroke: 100mm
  - Piston diameter: 8mm
  - Piston rod thread: M4
  - Cushioning: P: Flexible cushioning rings/plates at both ends
  - Assembly position: Any
  - Piston-rod end: male thread
  - Design structure: Piston, Piston rod, Cylinder barrel
  - Variants: Single-ended piston rod
  - Working pressure: 1.5 ... 10 bar
  - Mode of operation: Double acting
  - Corrosion resistance classification CRC: 2 - Moderate corrosion stress
  - Impact energy in end positions: 0.03 J
  - Theoretical force at 6 bars, return stroke: 22.6 N
  - Moving mass with 0 mm stroke: 30.2 N
  - Mounting type: with accessories
  - Pneumatic connection: M5
  - Materials information for seals: NBR, TPE-U(PU)

- Solenoid valve
  - Valve function: 2x3/2 closed, monostable 2x3/2 open, monostable
  - Type of actuation: Electrical
  - Valve size: 10 mm, 14 mm, 18 mm
  - Standard nominal flow rate: 90 ... 1,380 l/min
  - Working pressure: -0.9 ... 10 bar
  - Design structure: Piston slide
  - Type of reset: mechanical spring Air spring
  - Protection class: IP40, IP65 with plug socket
  - Exhaust-air function: throttleable
  - Sealing principle: soft
  - Type of piloting: Piloted
  - Pilot air supply: external internal
  - Operating medium: Compressed air in accordance with ISO8573-1:2010
  - Manual override: Detenting, Pushing, Covered
  - Medium temperature: -5 ... 60 °C
  - Ambient temperature: -5 ... 60 °C
  - Duty cycle: 100%
  - CE symbol: according to EU-EMV guideline
- Mini I/O terminal
  - Operating voltage: 24V DC
  - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
  - Analog I/O, 2AI, 1AO: 0....10V DC and ± 10V DC
  - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm2
  - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)
- One-way flow control valve
  - Valve function: One-way flow control function for exhaust air
  - Pneumatic connection, port 1: QS-4
  - Pneumatic connection, port 2: M5
  - Adjusting element: Slotted head screw
  - Mounting type: Threaded
  - Standard nominal flow rate in flow control direction: 40 l/min
  - Working pressure: 0.2 ... 10 bar
  - Ambient temperature: -10 ... 60 °C
  - Operating medium: Compressed air in accordance with ISO8573-1:2010
  - Materials information for seals: NBR
  - Release ring material data: POM

- **Sorting Gate/Separator Module**
  - DC Rotary Solenoid
    - Angle of rotation: 95°
    - Operating mode: S3 40%
    - Torque (NCM): 2.00
    - Rated power (W): 16.2
    - Mass inertia (kgm²) ft: 0.314x10^ (-6)
    - Time constant (ms): 6.5
- **Interface**
  - C Interface
    - Operating voltage: 24VDC
    - Digital inputs/outputs 8DI/8DO: Max. 24 V DC, Max. 2 A per output Max. 4 A total
    - Analogue inputs/outputs 4AI/2AO: 0 – 10 V DC or ± 10 V DC
    - Electrical connection: 2x 15-pin D-Sub HD (3 rows)
    - 1x 24 pin IEEE-488 socket (SysLink)
    - 1x 15-pin D-Sub (2 rows)
    - Indicators: Status LEDs: blue (power supply) green (input signals) orange (output signals)

- **Communication Cable**
  - D-Sub HD connecting cable crossed
    - Wires: 16
    - Cross section: 0.25 mm²
    - Plug type: D-Sub HD 15-pin (3 rows)
    - Socket type: D-Sub HD-15-pin (3 rows)
    - Power rating: Max. 2 A per wire

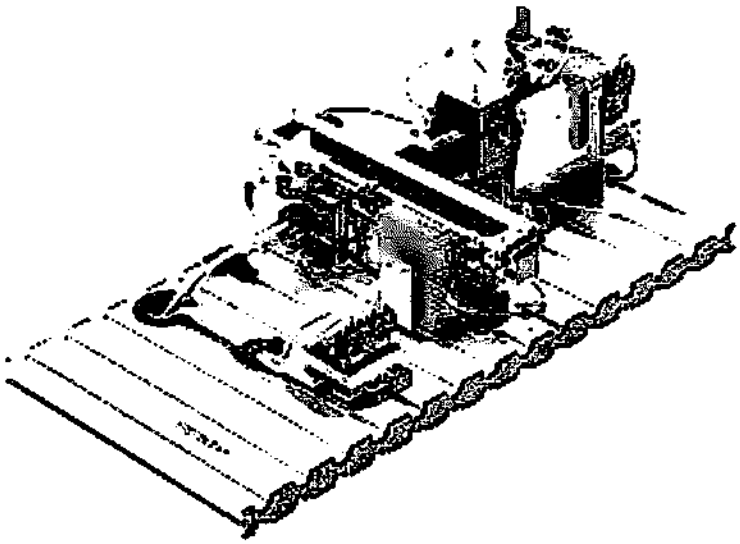
- **Supply Regulator Unit**
  - Start-up valve with filter control valve
    - Design: diaphragm control valve
    - Assembly position: Vertical ±5°
    - Standard nominal flow rate: 110 l/min
    - Upstream pressure: 100 to 1000 kPa (1 to 10 bar)
    - Operating pressure: 50 to 700 kPa (0.5 to 7 bar)
    - Connection: Coupling plug for coupling socket G1/8

- **MPS Trolley/accessories**
  - Trolley
    - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
  - Accessories
    - Profile plate and control console
    - Height adjustment
    - A4 mounting frame
    - A4 mounting profile
    - Assembly board

- **Control Panel/Console**
  - Control console for Syslink
    - Membrane keyboard: Start pushbutton with LED, stop pushbutton, Reset pushbutton with LED, 2 flexibly assignable control lamps, 4 mm safety sockets with LED status display for simple I/O connection. Syslink and Sub-D sockets for connection to PLC of choice are available on the rear panel.
- **Programmable Logic Controller with built-in power supply**
  - Programmable Logic Controller
    - Main memory: 250 KB for programs and 1 MB for data Memory card included
    - Inputs/outputs: 32 digital inputs (24 V DC) 32 digital outputs (24 V DC/0.5A) 5x analog inputs, 4x U/I, 1x R/RTD, 16-bit resolution, 2x analog outputs, 2x U/I, 16-bit resolution
    - The mounting system: (W x H) 305 mm x 300 mm Can be placed on a desk or in an MPS station Stable, powder-coated, sheet-steel mounting system
    - Integrated power supply unit: AC 110/230 V/DC 24 V, 4 A
    - 19" module simulation plate with 2x SysLink plug connector for MPS station and control panel, each with 8 digital inputs and 8 digital outputs and 1x Sub-D 15-pin plug connection with 4 analog inputs and 2 analog outputs; emergency stop jumper to connect a safety circuit for disconnecting 8 digital outputs.
    - Programming language
    - Statement list (STL)
    - Function diagram (FUN)
    - Ladder diagram (LDR)
    - Structured text
    - Function sequence diagram
    - Software compatible with:
      - Windows 10 (64-bit) Professional or later

    - Additional:
      - Programming cable (Ethernet cable)
      - Programming software portal
      - Realization of networked solutions
      - PLC simulation software
      - Software and documentation supplied on DVD
      - Floating license supplied on USB stick
      - Language: English

Sample Image:



Picture for reference only

MPS MEASURING STATION

Description: The MPS measuring station tackles a number of topics, including how to record and process analog and digital signals. The station also provides insight into how pneumatic actuators work and are used, and how actuators are calibrated.
The station takes workpieces out of the ongoing process in order to place them on a measuring table and measure their height. The conveyor module transports the workpieces to the measurement point. The rotary lifting module moves a workpiece into the measuring position. The diffuse sensor measures the height of the workpiece. Depending on the result of the measurement, an electric quarter-turn actuator either moves the workpiece onto a material slide or places it on the conveyor.

Fiber-optic through-beam sensors and opto sensors monitor the material flow on both conveyors. The conveyors can be used in both directions.

The diffuse sensor supplies either an analog or a digital output signal, as required. The module can thus be used for various levels of training. The binary switching output can be adapted to the measurement requirement and the signal type by means of teach-in programming.
The rotary lifting module uses an electric quarter turn actuator and a pneumatic gripper to automate the measurement task and take random samples from the process.

Required Topics/Lessons:

The training system shall include, but not limited to the following topics/lessons:

- Familiarization with the various functions of the MPS measuring station D
- Gaining insight into common measurement and sorting processes
- Acquisition of basic PLC programming skills
- Introduction to pneumatic control systems
- Introduction to how sensors and actuators work and are used
- Executing processes based on measurements recorded by sensors
- Controlling a DC motor using a microcontroller
- Controlling a conveyor; programming and processing standardizations
- Calibration of actuators
- Preparation and commissioning of a mechatronic system

Courseware:

- PLC Simulation Software
- Programming software portal
- Realization of networked solutions
- Software and documentation supplied on DVD
- Floating license supplied on USB stick

Hardware:

- **Conveyor Module**
    - Fiber-optic cable (diffuse sensor)
        - Signal processing (measuring principle): Red light
        - Coverage range max.: 120mm
        - Mounting thread: M6
        - Coating of housing: Nickel plated
        - Degree of protection: IP65
        - Switch triggering: Reflex
        - Function on actuation: Polymer fiber optic cable

- Fiber-optic device (diffuse sensor)
    - Signal processing (measuring principle): Red light
    - Switch triggering: Reflex / Interrupt
    - Function on actuation: Sender and receiver
    - Output potential: PNP
    - Coverage range max: 120mm
    - Thread for connector: M8x1
    - Number of pins, plug connection: 4
    - Operating status display: Yellow LED
    - Short-circuit strength: Pulse
    - Type of mounting: Hole
    - Material of housing: PBT - reinforced
    - Voltage type: DC
    - Nominal operating voltage (DC): 24V
    - Operating voltage min. (DC): 10V
    - Operating voltage max (DC): 30V
    - Idle current max.: 25mA
    - Maximum switching frequency: 1000 Hz
    - Degree of protection: IP65

- Fiber-optic cable (light barrier)
    - Signal processing (measuring principle): Red light
    - Switch triggering: interrupt
    - Function on actuation: Polymer fiber optic cable
    - Coverage range max.: 400mm
    - Mounting thread: M4
    - Degree of protection: IP65

- Fiber-optic device (light barrier)
    - Signal processing (measuring principle): Red light
    - Switch triggering: Reflex / triggering
    - Output potential: PNP
    - Coverage range max.: 120mm
    - Thread for connector: M8x1
    - Number of pins, plug connection: 4
    - Operating status display: Yellow LED
    - Voltage type: DC
    - Nominal operating voltage (DC): 24V
    - Operating voltage min. (DC): 10V
    - Operating voltage max. (DC): 30V
    - Idle current max.: 25mA
    - Maximum switching frequency: 1000 Hz
    - Degree of protection: IP65
- DC Rotary Solenoid
    - Angle of rotation: 95°
    - Operating mode: S3 40%
    - Torque (NCM): 2.00
    - Rated power (W): 16.2
    - Mass inertia (kgm^2) ft: 0.314x10^ (-6)
    - Time constant (ms): 6.5
- DC Gear Motor
    - Nominal voltage: 24V
    - Nominal current: 1.5A
    - Nominal speed of drive shaft: 65rpm
    - Reduction stages: 1
    - Nominal torque: 1 N-m
    - Reversible: yes
    - Starting torque: 7 N-m
- DC Motor Controller
    - Nominal voltage: 24 VDC ± 10%
    - Max. power consumption: 50 mA
    - Continuous motor current: 4 A DC
    - Control inputs, logic 1: 10 - 24V DC
    - Control inputs, logic 0: 0 - 4V DC
    - Analog input: 0...10V DC, 24V tolerant
    - Overvoltage protection: Yes
    - CE marking per: Class B interference emission

- Mini I/O terminal
  - Operating voltage: 24V DC
  - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
  - Analog I/O, 2AI, 1AO: 0....10V DC and ± 10V DC
  - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm2
  - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)

- **Rotary/lifting module**
  - Proximity Sensor
    - Measured variable: Position
    - Measuring principle: Magneto resistive
    - Design: For round slot
    - Conforms to standard: EN 60947-5-2
    - CE symbol: EU-EMV guideline
    - Ambient temperature: -40 ... 70 °C
    - Switch output: NPN, PNP, Non-contacting 2-wire
    - Switching element function: Normally open contact
    - Max. switching frequency: 150 Hz
    - Max. output current: 100mA
    - Nominal operating voltage DC: 24V
    - Operating voltage range DC: 5 ... 30 V
    - Protection class: IP65, IP68

  - Proximity Sensor
    - Design: For T-slot
    - Conforms to standard: EN 60947-5-2
    - CE symbol: EU-EMV guideline
    - Measuring principle: Reed magnetic
    - Ambient temperature: 40 ... 60 °C
    - Switch output: with contact, bipolar
    - Switching element function: Normally open contact
    - Switch-on time: <= 0.5 ms
    - Electrical connection: Cable, 3-core
    - Connector exit direction: axial

- Parallel Gripper
  - Size: 10
  - Stroke per gripper jaw: 3mm
  - Max. angular gripper jaw backlash: < 0.5 deg
  - Rotationally symmetrical: <= 0.2 mm
  - Repetition accuracy, gripper: < 0.02 mm
  - Number of gripper fingers: 2
  - Mode of operation: double-acting
  - Gripper function: Parallel
  - Design structure: Lever, guided motion sequence
  - Guide: Plain-bearing guide
  - Position detection: For proximity sensor
  - Total force at 6 bars, opening: 80 N
  - Pneumatic connection: M3
  - Materials information for gripper jaws: High alloy steel, non-corrosive
  - Working pressure: 2 ... 8 bar

- Semi rotary actuator
  - Size: 10
  - Cushioning angle: 0.5 deg
  - Swivel angle: 0 ... 180 deg
  - Cushioning: Flexible cushioning rings/plates at both ends
  - Mode of operation: double-acting
  - Design structure: Rotary vane
  - Position detection: For proximity sensor
  - Working pressure: 2.5 ... 8 bar
  - Max. swivel frequency at 6 bars: 3 Hz
  - Operating medium: Accordance with ISO8573-1:2010
  - Theoretical torque at 6 bars: 0.85 N-m
  - Mounting type: with internal (female) thread
  - Pneumatic connection: M3
  - Materials information for drive shaft: High alloy steel, non-corrosive
  - Materials information for seals: TPE-U(PU)
  - Materials information, housing: Aluminum, Anodized

- Compact cylinder
  - Stroke: 20 mm
  - Piston diameter: 12 mm
  - Based on the standard: ISO 21287
  - Cushioning: P: Flexible cushioning rings/plates at both ends
  - Design structure: Piston, Piston rod, Profile barrel
  - Position detection: For proximity sensor
  - Working pressure: 1.5 ... 10 bar
  - Mode of operation: double-acting
  - Pneumatic connection: M5
  - Moving mass with 0 mm stroke: 14 g
  - Materials information for cover: Aluminum, Anodized

- 5/2-way single solenoid valve
  - Valve function: 5/2 bistable, 5/2 monostable
  - Type of actuation: electrical
  - Valve size: 10 mm, 14 mm, 18 mm
  - Standard nominal flow rate: 90 ... 1,380 l/min
  - Working pressure: -0.9 ... 10 bar
  - Design structure: Piston slide
  - Type of reset: mechanical spring, Air spring
  - Protection class: IP40, IP65, with plug socket
  - Sealing principle: soft
  - Exhaust-air function: throttleable
  - Manual override: Detenting, Pushing, Covered
  - Type of piloting: Piloted
  - Pilot air supply: External, Internal
  - Duty cycle: 100%
  - Operating medium: Compressed air accordance with ISO8573-1:2010
  - CE symbol: according to EU-EMV guideline
  - Restriction ambient and medium temp.: -5 - 50 °C, without holding current reduction
  - Corrosion resistance classification CRC: 2 - Moderate corrosion stress
  - Medium temperature: -5 ... 60 °C
  - Ambient temperature: -5 ... 60 °C

- One way flow-control valve
  - Valve function: One-way flow control function for exhaust air
  - Pneumatic connection, port 1: QS-3
  - Pneumatic connection, port 2: M3
  - Adjusting element: Slotted head screw
  - Working pressure: 0.2 ... 10 bar
  - Ambient temperature: -10 ... 60 °C
  - Operating medium: Compressed air in accordance with ISO8573-1:2010
  - Medium temperature: -10 ... 60 °C
  - Max. tightening torque: 0.3 Nm
  - Materials information for seals: NBR
  - Regulating screw material data: Brass

- Multiple distributor
  - Size: Standard
  - Nominal size: 2.5mm
  - Design structure: Push/pull principle
  - Container size: 1
  - Operating pressure: -0.95 ... 6 bar
  - Corrosion resistance classification CRC: 1 - Low corrosion stress
  - Ambient temperature: -10 ... 80 °C
  - Number of outputs: 4
  - Number of supply lines: 1
  - Hose clamping segment material data: High alloy steel, non-corrosive

- **Measuring Table module**
  - Retro-reflective sensor
    - Design: Block design
    - Conforms to standard: EN 60947-5-2
    - CE symbol: according to EU-EMV guideline
    - Measured variable: Positioning
    - Measuring principle: Optoelectronic
    - Measurement method: Retro-reflective sensor For transparent objects
    - Type of light: Red, polarized
    - Working range: 5 ... 500 mm
    - Ambient temperature: -20 ... 60 °C
    - Reference material: Laser reflector, 51 x 51 mm
    - Switch output: PNP
    - Switching element function: Switchable
    - Max. switching frequency: 1,000 Hz
    - Max. output current: 100 mA
    - Voltage drops: <= 2.4 V
    - Operating voltage range DC: 10 ... 30 V
    - Idle current: 25 mA
    - Electrical connection: Plug, M8x1, 4-pin
    - Operating status display: Yellow LED
    - Protection class: IP67
    - Corrosion resistance classification CRC: 2 - Moderate corrosion stress
  - Reflector
    - Measurement method: Reflector
    - Ambient temperature: -40 ... 70 °C
    - Mounting type: with through hole
    - Materials information, housing: ABS, PMMA
    - Corrosion resistance classification CRC: 4 - Very high corrosion stress
- **Stopper Module**
  - Short stroke cylinder
    - Stroke: 10mm
    - Piston diameter: 12mm
    - Spring return force, retracted: 4N
    - Cushioning: P: Flexible cushioning rings/plates at both ends
    - Mode of operation: single-acting, pushing action

- **Stopper with valve**
  - Short stroke cylinder
    - Design structure: Piston, Piston rod
    - Working pressure: 1.5 ... 10 bar
    - Ambient temperature: -20 ... 80 °C
    - Theoretical force at 6 bar, advance stroke: 59 N
    - Mounting type: Optional, with through hole, with accessories
    - Pneumatic connection: M5
    - Materials information for piston rod: High alloy steel

  - Solenoid Valve
    - Valve function: 3/2 open, monostable
    - Type of actuation: electrical
    - Width: 10 mm
    - Standard nominal flow rate: 10 l/min
    - Working pressure: 0 ... 6 bar
    - Design structure: Poppet valve with spring return
    - Type of reset: mechanical spring
    - Protection class: IP40
    - Nominal size: 0.7 mm
    - Grid dimension: 10 mm
    - Exhaust-air function: throttleable
    - Sealing principle: soft
    - Manual override: Pushing
    - Type of piloting: direct
    - Flow direction: non-reversible
    - Valve position identification: Label
    - Maximum switching frequency: 20 Hz
    - Duty cycle: 100%
    - Ambient temperature: -5 ... 40 °C
    - Mounting type: On subbase
    - Characteristic coil data: 24 V DC: 1 W

- **Sorting Gate/Separator Module**
  - DC Rotary Solenoid
    - Angle of rotation: 95°
    - Operating mode: S3 40%
    - Torque (NCM): 2.00
    - Rated power (W): 16.2
    - Mass inertia (kgm²) ft: 0.314x10^ (-6)
    - Time constant (ms): 6.5

- **Interface**
  - C Interface
    - Operating voltage: 24VDC
    - Digital inputs/outputs 8DI/8DO: Max. 24 V DC, Max. 2 A per output Max. 4 A total
    - Analogue inputs/outputs 4AI/2AO: 0 – 10 V DC or ± 10 V DC
    - Electrical connection: 2x 15-pin D-Sub HD (3 rows)
    - 1x 24 pin IEEE-488 socket (SysLink)
    - 1x 15-pin D-Sub (2 rows)
    - Indicators: Status LEDs: blue (power supply) green (input signals) orange (output signals)

- **Communication Cable**
  - D-Sub HD connecting cable crossed
    - Wires: 16
    - Cross section: 0.25 mm²
    - Plug type: D-Sub HD 15-pin (3 rows)
    - Socket type: D-Sub HD-15-pin (3 rows)
    - Power rating: Max. 2 A per wire

- **Supply Regulator Unit**
  - Start-up valve with filter control valve
    - Design: diaphragm control valve
    - Assembly position: Vertical ±5°
    - Standard nominal flow rate: 110 l/min
    - Upstream pressure: 100 to 1000 kPa (1 to 10 bar)
    - Operating pressure: 50 to 700 kPa (0.5 to 7 bar)
    - Connection: Coupling plug for coupling socket G1/8

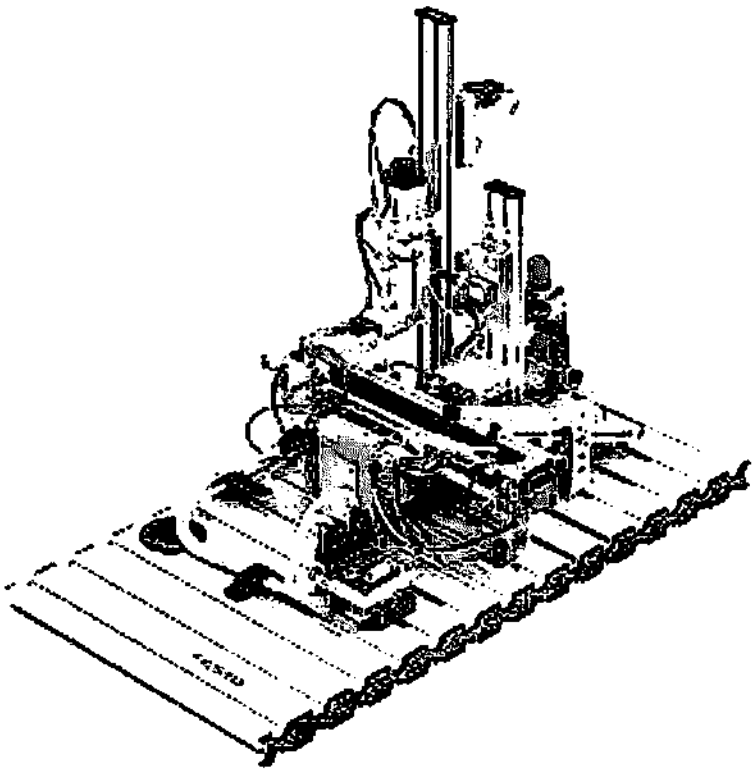
- **MPS Trolley/accessories**
    - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
  - Accessories
    - Profile plate and control console
    - Height adjustment
    - A4 mounting frame
    - A4 mounting profile
    - Assembly board

- **Control Panel/Console**
  - Control console for Syslink
    - Membrane keyboard: Start pushbutton with LED, stop pushbutton, Reset pushbutton with LED, 2 flexibly assignable control lamps, 4 mm safety sockets with LED status display for simple I/O connection. Syslink and Sub-D sockets for connection to PLC of choice are available on the rear panel.

- **Programmable Logic Controller with built-in power supply**
  - Programmable Logic Controller
    - Main memory: 250 KB for programs and 1 MB for data Memory card included
    - Inputs/outputs: 32 digital inputs (24 V DC) 32 digital outputs (24 V DC/0.5A) 5x analog inputs, 4x U/I, 1x R/RTD, 16-bit resolution, 2x analog outputs, 2x U/I, 16-bit resolution
    - The mounting system: (W x H) 305 mm x 300 mm Can be placed on a desk or in an MPS station Stable, powder-coated, sheet-steel mounting system
    - Integrated power supply unit: AC 110/230 V/DC 24 V, 4 A
    - 19" module simulation plate with 2x SysLink plug connector for MPS station and control panel, each with 8 digital inputs and 8 digital outputs and 1x Sub-D 15-pin plug connection with 4 analog inputs and 2 analog outputs; emergency stop jumper to connect a safety circuit for disconnecting 8 digital outputs.
    - Programming language
    - Statement list (STL)
    - Function diagram (FUN)
    - Ladder diagram (LDR)
    - Structured text
    - Function sequence diagram
    - Software compatible with:
      - Windows 10 (64-bit) Professional or later

- Additional:
  - Programming cable (Ethernet cable)
  - Programming software portal
  - Realization of networked solutions
  - PLC simulation software
  - Software and documentation supplied on DVD
  - Floating license supplied on USB stick
  - Language: English

Sample Image:



Picture for reference only

MPS PICK AND PLACE STATION

Description: The MPS Pick&Place station tackles a number of topics, including the basic principles of vacuum technology and how to use it in an automated process. A pneumatic gripper and the conveyor module are used to transport workpieces.

The station has a two-axis Pick&Place module and a conveyor module. Opto sensors, diffuse sensors or light barriers detect a workpiece housing when it is on the conveyor. The conveyor transports the workpiece to the electric feed separator. The Pick&Place module picks up a workpiece insert from the material supply slide and places it in the workpiece housing. The complete workpiece (housing and insert) is passed on by the feed separator. The conveyor module transports the workpiece to the end position.

Required Topics/Lessons:
The training system shall include, but not limited to the following topics/lessons:

- Familiarization with the various functions of the MPS Pick & Place station D
- Gaining insight into common handling processes
- Familiarization with the key components of a mechatronic system
- Acquisition of fundamental knowledge on vacuum technology and pneumatic grippers
- Acquisition of basic PLC programming skills
- Introduction to pneumatic control systems
- Introduction to how sensors and actuators work and are used
- Controlling a DC motor using a microcontroller
- Preparation and commissioning of a mechatronic system

Courseware:

- PLC Simulation Software
- Programming software portal
- Realization of networked solutions
- Software and documentation supplied on DVD
- Floating license supplied on USB stick

Hardware:

- **Conveyor Module**
    - Fiber-optic cable (diffuse sensor)
        - Signal processing (measuring principle): Red light
        - Coverage range max.: 120mm
        - Mounting thread: M6
        - Coating of housing: Nickel plated
        - Degree of protection: IP65
        - Switch triggering: Reflex
        - Function on actuation: Polymer fiber optic cable

- Fiber-optic device (diffuse sensor)
    - Signal processing (measuring principle): Red light
    - Switch triggering: Reflex / Interrupt
    - Function on actuation: Sender and receiver
    - Output potential: PNP
    - Coverage range max: 120mm
    - Thread for connector: M8x1
    - Number of pins, plug connection: 4
    - Operating status display: Yellow LED
    - Short-circuit strength: Pulse
    - Type of mounting: Hole
    - Material of housing: PBT - reinforced
    - Voltage type: DC
    - Nominal operating voltage (DC): 24V
    - Operating voltage min. (DC): 10V
    - Operating voltage max (DC): 30V
    - Idle current max.: 25mA
    - Maximum switching frequency: 1000 Hz
    - Degree of protection: IP65

- Fiber-optic cable (light barrier)
    - Signal processing (measuring principle): Red light
    - Switch triggering: interrupt
    - Function on actuation: Polymer fiber optic cable
    - Coverage range max.: 400mm
    - Mounting thread: M4
    - Degree of protection: IP65

- Fiber-optic device (light barrier)
    - Signal processing (measuring principle): Red light
    - Switch triggering: Reflex / triggering
    - Output potential: PNP
    - Coverage range max.: 120mm
    - Thread for connector: M8x1
    - Number of pins, plug connection: 4
    - Operating status display: Yellow LED
    - Voltage type: DC
    - Nominal operating voltage (DC): 24V
    - Operating voltage min. (DC): 10V
    - Operating voltage max. (DC): 30V
    - Idle current max.: 25mA
    - Maximum switching frequency: 1000 Hz
    - Degree of protection: IP65
- DC Rotary Solenoid
    - Angle of rotation: 95°
    - Operating mode: S3 40%
    - Torque (NCM): 2.00
    - Rated power (W): 16.2
    - Mass inertia (kgm²) ft: 0.314x10^ (-6)
    - Time constant (ms): 6.5
- DC Gear Motor
    - Nominal voltage: 24V
    - Nominal current: 1.5A
    - Nominal speed of drive shaft: 65rpm
    - Reduction stages: 1
    - Nominal torque: 1 N-m
    - Reversible: yes
    - Starting torque: 7 N-m
- DC Motor Controller
    - Nominal voltage: 24 VDC ± 10%
    - Max. power consumption: 50 mA
    - Continuous motor current: 4 A DC
    - Control inputs, logic 1: 10 - 24V DC
    - Control inputs, logic 0: 0 - 4V DC
    - Analog input: 0...10V DC, 24V tolerant
    - Overvoltage protection: Yes
    - CE marking per: Class B interference emission

- Mini I/O terminal
    - Operating voltage: 24V DC
    - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
    - Analog I/O, 2AI, 1AO: 0....10V DC and ± 10V DC
    - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm2
    - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)

- **Pick & Place Module**
    - Proximity sensor
        - Design: for round slot
        - Conforms to standard: EN 60947-5-2
        - Measuring principle: Reed magnetic
        - Ambient temperature: -20 ... 70 °C
        - Switch output: with contact, bipolar
        - Switching element function: Normally open contact
        - Reproducibility of switching value: +/- 0,1 mm
        - Switch-on time: <= 0.6 ms
        - Switch-off time: <= 0.05 ms
        - Max. switching frequency: 500 Hz
        - Operating voltage range AC/DC: 12 ... 27 V
        - Electrical connection: Cable, 3-core
        - Mounting type: Clamped in T-slot Insertable into slot lengthwise
        - Materials information, cable sheaths: TPE-U(PUR)

    - Pressure Sensor
        - Switching element function: Normally open contact
        - Operating voltage range DC: 15 ... 30 V
        - Mounting type: with accessories
        - Pneumatic connection: QS-6
        - Protection class: IP40
        - Threshold value setting range 0-100 %: Threshold value setting range 0-100 %

- Mini slide
  - Stroke: 50 mm
  - Adjustable end position range/front length: 35.5 mm"
  - Adjustable end position range/rear length: 18.5 mm"
  - Piston diameter: 10 mm
  - Operating mode of drive unit: Yoke
  - Cushioning: P: Flexible cushioning rings/plates at both ends
  - Guide: Ball bearing cage guide
  - Design structure: Yoke kinematics
  - Position detection: For proximity sensor
  - Working pressure: 1.5 ... 8 bar
  - Max. speed: 0.8 m/s
  - Repetition accuracy: 0,3 mm
  - Mode of operation: double-acting
  - Operating medium: accordance with ISO8573-1:2010
  - Cushioning length: 1.5 mm
  - Mounting type: with through hole
  - Pneumatic connection: M3
  - Materials information for seals: HNBR

- One-way flow control valve
  - Regulating screw material data: Brass
  - Swivel joint material data: Zinc die-casting
  - Valve function: One-way flow control function for exhaust air
  - Pneumatic connection, port 1: QS-3
  - Pneumatic connection, port 2: M3
  - Adjusting element: Slotted head screw
  - Mounting type: Threaded
  - Working pressure: 0.2 ... 10 bar
  - Medium temperature: -10 ... 60 °C

- Vacuum Generator
  - Nominal size, Laval nozzle: 0.45 mm
  - Grid dimension: 13 mm
  - Ejector characteristic: High vacuum, Inline
  - Design structure: Straight design
  - Working pressure for max. suction rate: 6.3 bar
  - Working pressure: 1 ... 8 bar
  - Working pressure for max. vacuum: 6 bar
  - Max. vacuum: 86 %
  - Nominal working pressure: 6 bar
  - Air supply time at nominal working pressure: 4.7 s
  - Medium temperature: accordance with ISO8573-1:2010
  - Mounting type: Line installation
  - Pneumatic connection, port 1: QS-6
  - Pneumatic connection, port 3: non-ducted
  - Vacuum connection: QS-6
  - Material information, collector nozzle: POM

- Suction cup holder
  - Volume: 0.719 cm3
  - Assembly position: Vertical
  - Design structure: Vacuum connection at top
  - Correlation to suction-cup holder: Size 4
  - Operating medium: Atmospheric air based on ISO 8573-1:2010
  - Ambient temperature: 0 ... 60 °C
  - Mounting type: with lock nut
  - Suction cup mounting: M6
  - Vacuum connection: QS-6
  - Materials information for seals: NBR

- Vacuum filter
  - Grade of filtration: 10 µm
  - Working pressure: 0.95 ... 4 bar
  - Flow rate at vacuum pressure of -0.75 bar: 260 l/min
  - Operating medium: Atmospheric air based on ISO 8573-1:2010
  - Ambient temperature: 0 ... 60 °C
  - Mounting type: with external (male) thread, Via vacuum port
  - Pneumatic connection: M6
  - Vacuum connection: M6
  - Materials information for seals: NBR
  - Materials information for filter: PVF
  - Materials information, housing: Aluminum, Nickel-plated brass
  - Corrosion resistance classification CRC: 1 - Low corrosion stress
  - Materials note: Free of copper and PTFE, Conforms to RoHS

- Suction cup complete
  - Suction cup height compensator: 7 mm
  - Min. workpiece radius: 50 mm
  - Nominal size: 3 mm
  - suction cup diameter: 20 mm
  - suction cup volume: 2.75 cm3
  - Position of connection: on top
  - Correlation to suction-cup holder: Size 4
  - Suction cup shape: Round, bellows, 3.5 convolutions
  - Working pressure: 0 ... 0.95 bar
  - Nominal working pressure: -0.7 bar
  - Operating medium: Atmospheric air based on ISO 8573-1:2010
  - Corrosion resistance classification CRC: 1 - Low corrosion stress
  - Ambient temperature: -30 ... 180 °C
  - Mounting type: Via vacuum port
  - Vacuum connection: M6
  - Color: transparent
  - Shore hardness: 50 +/- 5

- Push-in Connector
  - Size: Mini
  - Nominal size: 2.6 mm
  - Container size: 10
  - Design structure: Push/pull principle
  - Operating pressure complete temperature range: -0.95 ... 6 bar
  - Operating medium: accordance with ISO8573-1:2010
  - Pneumatic connection, port 1: Push-in sleeve QS-6
  - Pneumatic connection, port 2: For tubing outside diameter 4 mm
  - color of release ring: blue
  - Materials information, housing: PBT
  - Materials information for tubing seal: NBR
- Mini I/O terminal
  - Operating voltage: 24V DC
  - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
  - Analog I/O, 2AI, 1AO: 0....10V DC and ± 10V DC
  - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm2
  - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)

- **Sorting Gate/Separator Module**
  - DC Rotary Solenoid
    - Angle of rotation: 95°
    - Operating mode: S3 40%
    - Torque (NCM): 2.00
    - Rated power (W): 16.2
    - Mass inertia (kgm²) ft: 0.314x10^ (-6)
    - Time constant (ms): 6.5

- **Interface**
  - C Interface
    - Operating voltage: 24VDC
    - Digital inputs/outputs 8DI/8DO: Max. 24 V DC, Max. 2 A per output Max. 4 A total
    - Analogue inputs/outputs 4AI/2AO: 0 – 10 V DC or ± 10 V DC
    - Electrical connection: 2x 15-pin D-Sub HD (3 rows)
    - 1x 24 pin IEEE-488 socket (SysLink)
    - 1x 15-pin D-Sub (2 rows)
    - Indicators: Status LEDs: blue (power supply) green (input signals) orange (output signals)

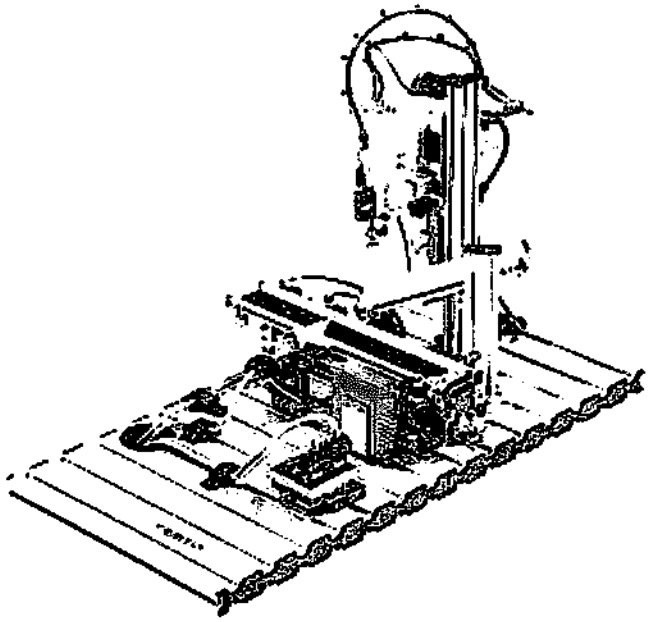
- **Communication Cable**
  - D-Sub HD connecting cable crossed
    - Wires: 16
    - Cross section: 0.25 mm²
    - Plug type: D-Sub HD 15-pin (3 rows)
    - Socket type: D-Sub HD-15-pin (3 rows)
    - Power rating: Max. 2 A per wire
- **Supply Regulator Unit**
  - Start-up valve with filter control valve
    - Design: diaphragm control valve
    - Assembly position: Vertical ±5°
    - Standard nominal flow rate: 110 l/min
    - Upstream pressure: 100 to 1000 kPa (1 to 10 bar)
    - Operating pressure: 50 to 700 kPa (0.5 to 7 bar)
    - Connection: Coupling plug for coupling socket G1/8

- **MPS Trolley/accessories**
  - Trolley
    - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
  - Accessories
    - Profile plate and control console
    - Height adjustment
    - A4 mounting frame
    - A4 mounting profile
    - Assembly board

- **Control Panel/Console**
  - Control console for Syslink
    - Membrane keyboard: Start pushbutton with LED, stop pushbutton, Reset pushbutton with LED, 2 flexibly assignable control lamps, 4 mm safety sockets with LED status display for simple I/O connection. Syslink and Sub-D sockets for connection to the PLC of choice are available on the rear panel.

- **Programmable Logic Controller with built-in power supply**
  - Programmable Logic Controller
    - Main memory: 250 KB for programs and 1 MB for data Memory card included
    - Inputs/outputs: 32 digital inputs (24 V DC) 32 digital outputs (24 V DC/0.5A) 5x analog inputs, 4x U/I, 1x R/RTD, 16-bit resolution, 2x analog outputs, 2x U/I, 16-bit resolution
    - The mounting system: (W x H) 305 mm x 300 mm Can be placed on a desk or in an MPS station Stable, powder-coated, sheet-steel mounting system
    - Integrated power supply unit: AC 110/230 V/DC 24 V, 4 A
    - 19" module simulation plate with 2x SysLink plug connector for MPS station and control panel, each with 8 digital inputs and 8 digital outputs and 1x Sub-D 15-pin plug connection with 4 analog inputs and 2 analog outputs; emergency stop jumper to connect a safety circuit for disconnecting 8 digital outputs.
    - Programming language
    - Statement list (STL)
    - Function diagram (FUN)
    - Ladder diagram (LDR)
    - Structured text
    - Function sequence diagram
    - Software compatible with:
      - Windows 10 (64-bit) Professional or later
    - Additional:
      - Programming cable (Ethernet cable)
      - Programming software portal
      - Realization of networked solutions
      - PLC simulation software
      - Software and documentation supplied on DVD
      - Floating license supplied on USB stick
      - Language: English

Sample Image:



Picture for reference only

MPS SEPARATING STATION

Description: The MPS separating station tackles a number of topics, including the use of digital sensors and actuators. The station controls a distribution process based on workpiece properties. The workpiece dimensions measured by the sensors are used to determine the subsequent process.

The workpieces on the conveyor are transported to the depth measurement point. An analog diffuse sensor checks the depth of a drilled hole. If the hole is deep enough, the conveyor carries the workpieces to the end position. An electric deflector with a quarter turn actuator guides workpieces that are skewed or do not have sufficient hole depth to a collection point via the second conveyor.

Fiber-optic through-beam sensors and opto sensors monitor the material flow on both conveyors. The workpieces on the conveyors can transport workpieces in both directions.
The diffuse sensor supplies either an analog or a digital output signal, as required. The module can thus be used for various levels of training. The binary switching output can be adapted to the measurement requirement and the signal type by means of teach-in programming.
The MPS separating station enables users to set up flexible assembly lines using a variety of stations. Downstream stations can be added to the station in two directions. Combined assembly processes such as cylinder assembly and installation of workpiece inserts in housings can be performed using the separating station.

Required Topics/Lessons:
The training system shall include, but not limited to the following topics/lessons:

- Familiarization with the various functions of the MPS separating station D
- Gaining insight into common distribution processes
- Familiarization with the key components of a mechatronic system
- Acquisition of basic PLC programming skills
- Introduction to pneumatic control systems
- Introduction to how sensors and actuators work and are used
- Controlling a DC motor using a micro controller
- Preparation and commissioning of a mechatronic system

Courseware:

- PLC Simulation Software
- Programming software portal
- Realization of networked solutions
- Software and documentation supplied on DVD
- Floating license supplied on USB stick

Hardware:

- **Conveyor Module**
    - Fiber-optic cable (diffuse sensor)
        - Signal processing (measuring principle): Red light
        - Coverage range max.: 120mm
        - Mounting thread: M6
        - Coating of housing: Nickel plated
        - Degree of protection: IP65
        - Switch triggering: Reflex
        - Function on actuation: Polymer fiber optic cable

- Fiber-optic device (diffuse sensor)
    - Signal processing (measuring principle): Red light
    - Switch triggering: Reflex / Interrupt
    - Function on actuation: Sender and receiver
    - Output potential: PNP
    - Coverage range max: 120mm
    - Thread for connector: M8x1
    - Number of pins, plug connection: 4
    - Operating status display: Yellow LED
    - Short-circuit strength: Pulse
    - Type of mounting: Hole
    - Material of housing: PBT - reinforced
    - Voltage type: DC
    - Nominal operating voltage (DC): 24V
    - Operating voltage min. (DC): 10V
    - Operating voltage max (DC): 30V
    - Idle current max.: 25mA
    - Maximum switching frequency: 1000 Hz
    - Degree of protection: IP65

- Fiber-optic cable (light barrier)
    - Signal processing (measuring principle): Red light
    - Switch triggering: interrupt
    - Function on actuation: Polymer fiber optic cable
    - Coverage range max.: 400mm
    - Mounting thread: M4
    - Degree of protection: IP65

- Fiber-optic device (light barrier)
    - Signal processing (measuring principle): Red light
    - Switch triggering: Reflex / triggering
    - Output potential: PNP
    - Coverage range max.: 120mm
    - Thread for connector: M8x1
    - Number of pins, plug connection: 4
    - Operating status display: Yellow LED
    - Voltage type: DC
    - Nominal operating voltage (DC): 24V
    - Operating voltage min. (DC): 10V
    - Operating voltage max. (DC): 30V
    - Idle current max.: 25mA
    - Maximum switching frequency: 1000 Hz
    - Degree of protection: IP65
- DC Rotary Solenoid
    - Angle of rotation: 95°
    - Operating mode: S3 40%
    - Torque (NCM): 2.00
    - Rated power (W): 16.2
    - Mass inertia (kgm²) ft: 0.314x10^ (-6)
    - Time constant (ms): 6.5
- DC Gear Motor
    - Nominal voltage: 24V
    - Nominal current: 1.5A
    - Nominal speed of drive shaft: 65rpm
    - Reduction stages: 1
    - Nominal torque: 1 N-m
    - Reversible: yes
    - Starting torque: 7 N-m
- DC Motor Controller
    - Nominal voltage: 24 VDC ± 10%
    - Max. power consumption: 50 mA
    - Continuous motor current: 4 A DC
    - Control inputs, logic 1: 10 - 24V DC
    - Control inputs, logic 0: 0 - 4V DC
    - Analog input: 0...10V DC, 24V tolerant
    - Overvoltage protection: Yes
    - CE marking per: Class B interference emission

- Mini I/O terminal
    - Operating voltage: 24V DC
    - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
    - Analog I/O, 2AI, 1AO: 0....10V DC and ± 10V DC
    - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm2
    - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)

- **Reflexions-lichttaster analog module / Diffuse sensor analog**
    - Distance Sensor
        - Measured variable: Travel
        - Measuring principle: Optoelectronic
        - Measurement method: Distance sensor
        - Type of light: Red
        - Working range: 20 ... 80 mm
        - Ambient temperature: 0 ... 60 °C
        - Travel resolution: 0.5 mm
        - Switch output: PNP
        - Analog output: 0 - 10 V
        - Operating voltage range DC: 15 ... 30 V
        - Electrical connection: Plug, M8x1, 4-pin
        - Size: 20x32x12 mm
        - Operating status display: Yellow LED
        - Operating reserve display: Green LED
        - Setting range lower limit: 20 mm
        - Upper limit of adjustment range: 80 mm

- **Stopper Module**
  - Short Stroke cylinder
    - Stroke: 10 mm
    - Piston diameter: 12 mm
    - Spring return force, retracted: 4 N
    - Cushioning: P: Flexible cushioning rings/plates at both ends
    - Mode of operation: single-acting, pushing action
    - Working pressure: 1.5 ... 10 bar
    - Operating medium: Compressed air with ISO8573-1:2010
    - Ambient temperature: -20 ... 80 °C
    - Moving mass: 6.9 g
    - Pneumatic connection: M5
    - Materials information for cover: Wrought Aluminum alloy, Anodized
    - Materials information for seals: NBR, TPE-U(PU)
    - Materials information, housing: Wrought Aluminum alloy, Anodized
    - Position detection: No

- **Sorting Gate/Separator Module**
  - DC Rotary Solenoid
    - Angle of rotation: 95°
    - Operating mode: S3 40%
    - Torque (NCM): 2.00
    - Rated power (W): 16.2
    - Mass inertia (kgm^2) ft: 0.314x10^ (-6)
    - Time constant (ms): 6.5

- **Interface**
  - C Interface
    - Operating voltage: 24VDC
    - Digital inputs/outputs 8DI/8DO: Max. 24 V DC, Max. 2 A per output Max. 4 A total
    - Analogue inputs/outputs 4AI/2AO: 0 – 10 V DC or ± 10 V DC
    - Electrical connection: 2x 15-pin D-Sub HD (3 rows)
    - 1x 24 pin IEEE-488 socket (SysLink)
    - 1x 15-pin D-Sub (2 rows)
    - Indicators: Status LEDs: blue (power supply) green (input signals) orange (output signals)

- **Communication Cable**
  - D-Sub HD connecting cable crossed
    - Wires: 16
    - Cross section: 0.25 mm²
    - Plug type: D-Sub HD 15-pin (3 rows)
    - Socket type: D-Sub HD-15-pin (3 rows)
    - Power rating: Max. 2 A per wire

- **Supply Regulator Unit**
  - Start-up valve with filter control valve
    - Design: diaphragm control valve
    - Assembly position: Vertical ±5°
    - Standard nominal flow rate: 110 l/min
    - Upstream pressure: 100 to 1000 kPa (1 to 10 bar)
    - Operating pressure: 50 to 700 kPa (0.5 to 7 bar)
    - Connection: Coupling plug for coupling socket G1/8

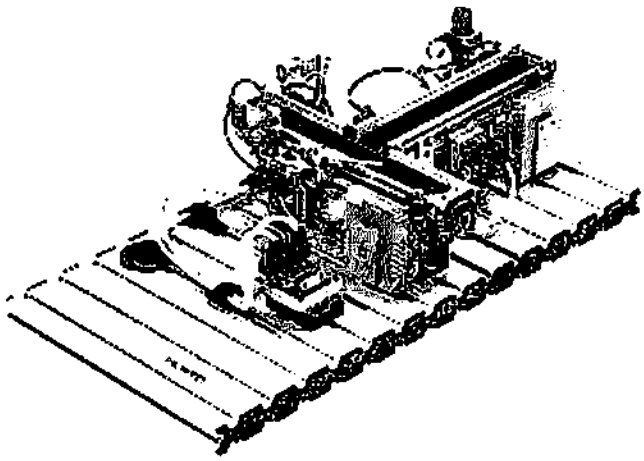
- **MPS Trolley/accessories**
  - Trolley
    - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
  - Accessories
    - Profile plate and control console
    - Height adjustment
    - A4 mounting frame
    - A4 mounting profile
    - Assembly board

- **Control Panel/Console**
  - Control console for Syslink
    - Membrane keyboard: Start pushbutton with LED, stop pushbutton, Reset pushbutton with LED, 2 flexibly assignable control lamps, 4 mm safety sockets with LED status display for simple I/O connection. Syslink and Sub-D sockets for connection to the PLC of choice are available on the rear panel.

- **Programmable Logic Controller with built-in power supply**
    - Programmable Logic Controller
        - Main memory: 250 KB for programs and 1 MB for data Memory card included
        - Inputs/outputs: 32 digital inputs (24 V DC) 32 digital outputs (24 V DC/0.5A) 5x analog inputs, 4x U/I, 1x R/RTD, 16-bit resolution, 2x analog outputs, 2x U/I, 16-bit resolution
        - The mounting system: (W x H) 305 mm x 300 mm Can be placed on a desk or in an MPS station Stable, powder-coated, sheet-steel mounting system
        - Integrated power supply unit: AC 110/230 V/DC 24 V, 4 A
        - 19" module simulation plate with 2x SysLink plug connector for MPS station and control panel, each with 8 digital inputs and 8 digital outputs and 1x Sub-D 15-pin plug connection with 4 analog inputs and 2 analog outputs; emergency stop jumper to connect a safety circuit for disconnecting 8 digital outputs.
        - Programming language
        - Statement list (STL)
        - Function diagram (FUN)
        - Ladder diagram (LDR)
        - Structured text
        - Function sequence diagram
        - Software compatible with:
            - Windows 10 (64-bit) Professional or later

        - Additional:
            - Programming cable (Ethernet cable)
            - Programming software portal
            - Realization of networked solutions
            - PLC simulation software
            - Software and documentation supplied on DVD
            - Floating license supplied on USB stick
            - Language: English

Sample Image:



Picture for reference only

MPS SORTING STATION

Description: The MPS sorting station tackles a number of topics, including combining different types of sensors to detect materials. The station controls a sorting process based on workpiece properties.

The station sorts workpieces onto three material slides. A diffuse sensor detects when a workpiece is placed in the station and triggers transportation of the workpiece to the sorting point: A pneumatic stopper (short-stroke cylinder) stops the workpiece while the conveyor keeps running, and passes it on for sorting onto one of three material slides. Opto and inductive sensors detect the workpiece properties and distinguish between workpieces based on their color and material. An electric deflector sorts the workpiece onto the correct material slide. A retro-reflective sensor monitors the fill levels of the material slides.

Required Topics/Lessons:
The training system shall include, but not limited to the following topics/lessons:

- Familiarization with the various functions of the MPS sorting station D
- Gaining insight into handling technology and common sorting processes
- Acquisition of basic PLC programming skills
- Introduction to pneumatic control systems
- Introduction to how sensors and actuators work and are used, in particular diffuse sensors, fiber-optic through-beam sensors, fork light barriers and inductive proximity sensors
- Executing processes based on measurements recorded by sensors
- Controlling a DC motor using a microcontroller
- Preparation and commissioning of a mechatronic system

Courseware:

- PLC Simulation Software
- Programming software portal
- Realization of networked solutions
- Software and documentation supplied on DVD
- Floating license supplied on USB stick

Hardware:

- **Conveyor Module**
  - Fiber-optic cable (diffuse sensor)
    - Signal processing (measuring principle): Red light
    - Coverage range max.: 120mm
    - Mounting thread: M6
    - Coating of housing: Nickel plated
    - Degree of protection: IP65
    - Switch triggering: Reflex
    - Function on actuation: Polymer fiber optic cable
  - Fiber-optic device (diffuse sensor)
    - Signal processing (measuring principle): Red light
    - Switch triggering: Reflex / Interrupt
    - Function on actuation: Sender and receiver
    - Output potential: PNP
    - Coverage range max: 120mm
    - Thread for connector: M8x1
    - Number of pins, plug connection: 4
    - Operating status display: Yellow LED
    - Short-circuit strength: Pulse
    - Type of mounting: Hole
    - Material of housing: PBT - reinforced
    - Voltage type: DC
    - Nominal operating voltage (DC): 24V
    - Operating voltage min. (DC): 10V
    - Operating voltage max (DC): 30V
    - Idle current max.: 25mA
    - Maximum switching frequency: 1000 Hz
    - Degree of protection: IP65

- Fiber-optic cable (light barrier)
    - Signal processing (measuring principle): Red light
    - Switch triggering: interrupt
    - Function on actuation: Polymer fiber optic cable
    - Coverage range max.: 400mm
    - Mounting thread: M4
    - Degree of protection: IP65
- Fiber-optic device (light barrier)
    - Signal processing (measuring principle): Red light
    - Switch triggering: Reflex / triggering
    - Output potential: PNP
    - Coverage range max.: 120mm
    - Thread for connector: M8x1
    - Number of pins, plug connection: 4
    - Operating status display: Yellow LED
    - Voltage type: DC
    - Nominal operating voltage (DC): 24V
    - Operating voltage min. (DC): 10V
    - Operating voltage max. (DC): 30V
    - Idle current max.: 25mA
    - Maximum switching frequency: 1000 Hz
    - Degree of protection: IP65

- DC Rotary Solenoid
    - Angle of rotation: 95°
    - Operating mode: S3 40%
    - Torque (NCM): 2.00
    - Rated power (W): 16.2
    - Mass inertia (kgm²) ft: 0.314x10^ (-6)
    - Time constant (ms): 6.5

- DC Gear Motor
    - Nominal voltage: 24V
    - Nominal current: 1.5A
    - Nominal speed of drive shaft: 65rpm
    - Reduction stages: 1
    - Nominal torque: 1 N-m
    - Reversible: yes
    - Starting torque: 7 N-m

- DC Motor Controller
  - Nominal voltage: 24 VDC ± 10%
  - Max. power consumption: 50 mA
  - Continuous motor current: 4 A DC
  - Control inputs, logic 1: 10 - 24V DC
  - Control inputs, logic 0: 0 - 4V DC
  - Analog input: 0...10V DC, 24V tolerant
  - Overvoltage protection: Yes
  - CE marking per: Class B interference emission

- Mini I/O terminal
  - Operating voltage: 24V DC
  - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
  - Analog I/O, 2AI, 1AO: 0....10V DC and ± 10V DC
  - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm2
  - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)

- **Detection Module**
  - Fiber Optic cable
    - Signal processing (measuring principle): red light
    - Switch triggering: Reflex
    - Function on actuation: Polymer fibre optic cable
    - Coverage range max.: 120 mm
    - Minimum ambient temperature: -40 °C
    - Maximum ambient temperature: 70 °C
    - Mounting thread: M 6
    - Material of housing: brass
    - Product weight: 0,02 kg
    - Coating of housing: Nickel-plated
    - Degree of protection: IP65

- Fiber-optic Device
  - Signal processing (measuring principle): red light
  - Switch triggering: Reflex/Interrupt
  - Function on actuation: sender and receiver
  - Coverage range max.: 120 mm
  - Output potential (el. output): PNP
  - Minimum ambient temperature: -5 °C
  - Maximum ambient temperature: 55 °C
  - Air connection type elec.: Plug
  - Thread for connector: M 8x1
  - Number of pins, plug connection: 4
  - Operating status display: Yellow LED
  - Type of mounting: Hole
  - Voltage type: DC
  - Nominal operating voltage [DC]: 24 V
  - Operating voltage min. (DC): 10 V
  - Operating voltage max. (DC): 30 V
  - Degree of protection: IP65
- Proximity Sensor
  - Materials note: Free of copper and PTFE
  - Nominal switching distance: 2.5 mm
  - Guaranteed switching distance: 2.03 mm
  - Switch output: PNP
  - Switching element function: Normally open contact
  - Max. switching frequency: 3,000 Hz
  - Inductive protective circuit: Integrated
  - Operating voltage range DC: 10 ... 30 V
  - Electrical connection: Plug, M8x1, 3-pin
  - Size: M8x1
  - Mounting type: with lock nut
  - Operating status display: Yellow LED
  - Protection class: IP65 IP67

- Fork light barrier
  - Measured variable: Position
  - Measuring principle: Optoelectronic
  - Measurement method: Fork light barrier
  - Type of light: Red
  - Minimal object diameter: 0.3 mm
  - Ambient temperature: -10 ... 60 °C
  - Repetition accuracy: 0.03 mm
  - Switch output: PNP
  - Switching element function: Switchable
  - Operating voltage range DC: 10 ... 30 V
  - Polarity protected: For operating voltage connections
  - Operating status display: Yellow LED
  - Protection class: IP67
- Mini I/O terminal
  - Operating voltage: 24V DC
  - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
  - Analog I/O, 2AI, 1AO: 0....10V DC and ± 10V DC
  - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm2
  - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)
- Retro-reflective sensor
  - Measured variable: Position
  - Measuring principle: Optoelectronic
  - Measurement method: Retro-reflective sensor for transparent objects
  - Type of light: Red, polarized
  - Polarity protected: for all electrical connections
  - Reference material: Laser reflector, 51 x 51 mm
  - Switch output: PNP
  - Switching element function: Switchable
  - Operating voltage range DC: 10 ... 30 V
  - Residual ripple: 10 %
  - Electrical connection: Plug, M8x1, 4-pin

- **Stopper Module**
  - Short Stroke cylinder
    - Stroke: 10 mm
    - Piston diameter: 12 mm
    - Spring return force, retracted: 4 N
    - Cushioning: P: Flexible cushioning rings/plates at both ends
    - Mode of operation: single-acting, pushing action
    - Working pressure: 1.5 ... 10 bar
    - Operating medium: Compressed air with ISO8573-1:2010
    - Ambient temperature: -20 ... 80 °C
    - Moving mass: 6.9 g
    - Pneumatic connection: M5
    - Materials information for cover: Wrought Aluminum alloy, Anodized
    - Materials information for seals: NBR, TPE-U(PU)
    - Materials information, housing: Wrought Aluminum alloy, Anodized
    - Position detection: No

- **Sorting Gate/Separator Module**
  - DC Rotary Solenoid
    - Angle of rotation: 95°
    - Operating mode: S3 40%
    - Torque (NCM): 2.00
    - Rated power (W): 16.2
    - Mass inertia (kgm²) ft: 0.314x10^ (-6)
    - Time constant (ms): 6.5

- **Interface**
  - C Interface
    - Operating voltage: 24VDC
    - Digital inputs/outputs 8DI/8DO: Max. 24 V DC, Max. 2 A per output Max. 4 A total
    - Analogue inputs/outputs 4AI/2AO: 0 – 10 V DC or ± 10 V DC
    - Electrical connection: 2x 15-pin D-Sub HD (3 rows)
    - 1x 24 pin IEEE-488 socket (SysLink)
    - 1x 15-pin D-Sub (2 rows)
    - Indicators: Status LEDs: blue (power supply) green (input signals) orange (output signals)

- **Communication Cable**
  - D-Sub HD connecting cable crossed
    - Wires: 16
    - Cross section: 0.25 mm²
    - Plug type: D-Sub HD 15-pin (3 rows)
    - Socket type: D-Sub HD-15-pin (3 rows)
    - Power rating: Max. 2 A per wire

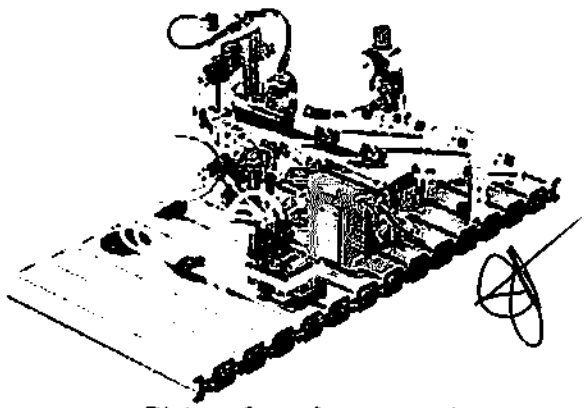
- **Supply Regulator Unit**
  - Start-up valve with filter control valve
    - Design: diaphragm control valve
    - Assembly position: Vertical ±5°
    - Standard nominal flow rate: 110 l/min
    - Upstream pressure: 100 to 1000 kPa (1 to 10 bar)
    - Operating pressure: 50 to 700 kPa (0.5 to 7 bar)
    - Connection: Coupling plug for coupling socket G1/8

- **MPS Trolley/accessories**
  - Trolley
    - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
  - Accessories
    - Profile plate and control console
    - Height adjustment
    - A4 mounting frame
    - A4 mounting profile
    - Assembly board

- **Control Panel/Console**
  - Control console for Syslink
    - Membrane keyboard: Start pushbutton with LED, stop pushbutton, Reset pushbutton with LED, 2 flexibly assignable control lamps, 4 mm safety sockets with LED status display for simple I/O connection. Syslink and Sub-D sockets for connection to PLC of choice are available on the rear panel.

- **Programmable Logic Controller with built-in power supply**
    - Programmable Logic Controller
        - Main memory: 250 KB for programs and 1 MB for data Memory card included
        - Inputs/outputs: 32 digital inputs (24 V DC) 32 digital outputs (24 V DC/0.5A) 5x analog inputs, 4x U/I, 1x R/RTD, 16-bit resolution, 2x analog outputs, 2x U/I, 16-bit resolution
        - The mounting system: (W x H) 305 mm x 300 mm Can be placed on a desk or in an MPS station Stable, powder-coated, sheet-steel mounting system
        - Integrated power supply unit: AC 110/230 V/DC 24 V, 4 A
        - 19" module simulation plate with 2x SysLink plug connector for MPS station and control panel, each with 8 digital inputs and 8 digital outputs and 1x Sub-D 15-pin plug connection with 4 analog inputs and 2 analog outputs; emergency stop jumper to connect a safety circuit for disconnecting 8 digital outputs.
        - Programming language
        - Statement list (STL)
        - Function diagram (FUN)
        - Ladder diagram (LDR)
        - Structured text
        - Function sequence diagram
        - Software compatible with:
            - Windows 10 (64-bit) Professional or later
        - Additional:
            - Programming cable (Ethernet cable)
            - Programming software portal
            - Realization of networked solutions
            - PLC simulation software
            - Software and documentation supplied on DVD
            - Floating license supplied on USB stick
            - Language: English

Sample Image:



Picture for reference only

MPS STORAGE STATION

Description: The MPS storing station addresses, among other things, the topics of parameterization and commissioning of multi-axis controllers and advanced PLC programming. Workpieces can be stored on several high rack storage levels using a combination of sensors and actuators during the process sequence. A modern web interface serves as a state-of-the-art HMI.

The storing station can differentiate workpieces based on their color and store up to 48 workpieces on six levels. It is also possible to additionally store cardboard boxes by adjusting the tray and the actuator. The workpiece or the cardboard box is identified on the conveyor module by a combination of sensors and the parameterization of the multi-axis controller. A pneumatic gripper fastened to a stepper motor with gear rack picks the workpiece or the cardboard box from the conveyor and places it in the storage area. The storage area can be located either at the beginning (removal from storage) or at the end (placement into storage) of a production line, or as a buffer station within a production line, by means of appropriate programming. The position of the gripper can be registered by means of the encoder on the motor. Position teaching is possible by means of password-protected user management. 3D simulation software with integrated simulated PLC and error simulation is available for the station. The control panel and a PLC turn the station into an automated system. The station can process different workpieces with a diameter/edge length of 40 mm.

Required Topics/Lessons:
The training system shall include, but not limited to the following topics/lessons:

- Parameterization and commissioning of multi-axis controllers
- Acquisition of advanced PLC programming skills
- Learning about and configuring digital sensors and actuators
- Learning about and actuating stepper motors
- Using web interfaces to control and monitor the processes

Courseware:
- PLC Simulation Software
- Programming software portal
- Realization of networked solutions
- Software and documentation supplied on DVD
- Floating license supplied on USB stick

Hardware:
- **Conveyor Module**
    - Fiber-optic cable (diffuse sensor)
        - Signal processing (measuring principle): Red light
        - Coverage range max.: 120mm
        - Mounting thread: M6
        - Coating of housing: Nickel plated
        - Degree of protection: IP65
        - Switch triggering: Reflex
        - Function on actuation: Polymer fiber optic cable

- Fiber-optic device (diffuse sensor)
    - Signal processing (measuring principle): Red light
    - Switch triggering: Reflex / Interrupt
    - Function on actuation: Sender and receiver
    - Output potential: PNP
    - Coverage range max: 120mm
    - Thread for connector: M8x1
    - Number of pins, plug connection: 4
    - Operating status display: Yellow LED
    - Short-circuit strength: Pulse
    - Type of mounting: Hole
    - Material of housing: PBT - reinforced
    - Voltage type: DC
    - Nominal operating voltage (DC): 24V
    - Operating voltage min. (DC): 10V
    - Operating voltage max (DC): 30V
    - Idle current max.: 25mA
    - Maximum switching frequency: 1000 Hz
    - Degree of protection: IP65

- Fiber-optic cable (light barrier)
    - Signal processing (measuring principle): Red light
    - Switch triggering: interrupt
    - Function on actuation: Polymer fiber optic cable
    - Coverage range max.: 400mm
    - Mounting thread: M4
    - Degree of protection: IP65

- Fiber-optic device (light barrier)
    - Signal processing (measuring principle): Red light
    - Switch triggering: Reflex / triggering
    - Output potential: PNP
    - Coverage range max.: 120mm
    - Thread for connector: M8x1
    - Number of pins, plug connection: 4
    - Operating status display: Yellow LED
    - Voltage type: DC
    - Nominal operating voltage (DC): 24V
    - Operating voltage min. (DC): 10V
    - Operating voltage max. (DC): 30V
    - Idle current max.: 25mA
    - Maximum switching frequency: 1000 Hz
    - Degree of protection: IP65
- DC Rotary Solenoid
    - Angle of rotation: 95°
    - Operating mode: S3 40%
    - Torque (NCM): 2.00
    - Rated power (W): 16.2
    - Mass inertia (kgm^2) ft: 0.314x10^ (-6)
    - Time constant (ms): 6.5
- DC Gear Motor
    - Nominal voltage: 24V
    - Nominal current: 1.5A
    - Nominal speed of drive shaft: 65rpm
    - Reduction stages: 1
    - Nominal torque: 1 N-m
    - Reversible: yes
    - Starting torque: 7 N-m
- DC Motor Controller
    - Nominal voltage: 24 VDC ± 10%
    - Max. power consumption: 50 mA
    - Continuous motor current: 4 A DC
    - Control inputs, logic 1: 10 - 24V DC
    - Control inputs, logic 0: 0 - 4V DC
    - Analog input: 0...10V DC, 24V tolerant
    - Overvoltage protection: Yes
    - CE marking per: Class B interference emission

- Mini I/O terminal
    - Operating voltage: 24V DC
    - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
    - Analog I/O, 2AI, 1AO: 0....10V DC and ± 10V DC
    - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm2
    - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)

- **Detection Module**
    - Fiber Optic cable
        - Signal processing (measuring principle): red light
        - Switch triggering: Reflex
        - Function on actuation: Polymer fibre optic cable
        - Coverage range max.: 120 mm
        - Minimum ambient temperature: -40 °C
        - Maximum ambient temperature: 70 °C
        - Mounting thread: M 6
        - Material of housing: brass
        - Product weight: 0,02 kg
        - Coating of housing: Nickel-plated
        - Degree of protection: IP65
    - Fiber-optic Device
        - Signal processing (measuring principle): red light
        - Switch triggering: Reflex/Interrupt
        - Function on actuation: sender and receiver
        - Coverage range max.: 120 mm
        - Output potential (el. output): PNP
        - Minimum ambient temperature: -5 °C
        - Maximum ambient temperature: 55 °C
        - Air connection type elec.: Plug
        - Thread for connector: M 8x1
        - Number of pins, plug connection: 4
        - Operating status display: Yellow LED
        - Type of mounting: Hole
        - Voltage type: DC
        - Nominal operating voltage [DC]: 24 V
        - Operating voltage min. (DC): 10 V
        - Operating voltage max. (DC): 30 V
        - Degree of protection: IP65

- Proximity Sensor
  - Materials note: Free of copper and PTFE
  - Nominal switching distance: 2.5 mm
  - Guaranteed switching distance: 2.03 mm
  - Switch output: PNP
  - Switching element function: Normally open contact
  - Max. switching frequency: 3,000 Hz
  - Inductive protective circuit: Integrated
  - Operating voltage range DC: 10 ... 30 V
  - Electrical connection: Plug, M8x1, 3-pin
  - Size: M8x1
  - Mounting type: with lock nut
  - Operating status display: Yellow LED
  - Protection class: IP65 IP67
- Fork light barrier
  - Measured variable: Position
  - Measuring principle: Optoelectronic
  - Measurement method: Fork light barrier
  - Type of light: Red
  - Minimal object diameter: 0.3 mm
  - Ambient temperature: -10 ... 60 °C
  - Repetition accuracy: 0.03 mm
  - Switch output: PNP
  - Switching element function: Switchable
  - Operating voltage range DC: 10 ... 30 V
  - Polarity protected: For operating voltage connections
  - Operating status display: Yellow LED
  - Protection class: IP67
- Mini I/O terminal
  - Operating voltage: 24V DC
  - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
  - Analog I/O, 2AI, 1AO: 0....10V DC and ± 10V DC
  - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm2
  - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)

- Retro-reflective sensor
  - Measured variable: Position
  - Measuring principle: Optoelectronic
  - Measurement method: Retro-reflective sensor for transparent objects
  - Type of light: Red, polarized
  - Polarity protected: for all electrical connections
  - Reference material: Laser reflector, 51 x 51 mm
  - Switch output: PNP
  - Switching element function: Switchable
  - Operating voltage range DC: 10 ... 30 V
  - Residual ripple: 10 %
  - Electrical connection: Plug, M8x1, 4-pin
- **Interface**
  - C Interface
    - Operating voltage: 24VDC
    - Digital inputs/outputs 8DI/8DO: Max. 24 V DC, Max. 2 A per output Max. 4 A total
    - Analogue inputs/outputs 4AI/2AO: 0 – 10 V DC or ± 10 V DC
    - Electrical connection: 2x 15-pin D-Sub HD (3 rows)
    - 1x 24 pin IEEE-488 socket (SysLink)
    - 1x 15-pin D-Sub (2 rows)
    - Indicators: Status LEDs: blue (power supply) green (input signals) orange (output signals)
- **Communication Cable**
  - D-Sub HD connecting cable crossed
    - Wires: 16
    - Cross section: 0.25 mm²
    - Plug type: D-Sub HD 15-pin (3 rows)
    - Socket type: D-Sub HD-15-pin (3 rows)
    - Power rating: Max. 2 A per wire

- **Supply Regulator Unit**
  - Start-up valve with filter control valve
    - Design: diaphragm control valve
    - Assembly position: Vertical ±5°
    - Standard nominal flow rate: 110 l/min
    - Upstream pressure: 100 to 1000 kPa (1 to 10 bar)
    - Operating pressure: 50 to 700 kPa (0.5 to 7 bar)
    - Connection: Coupling plug for coupling socket G1/8

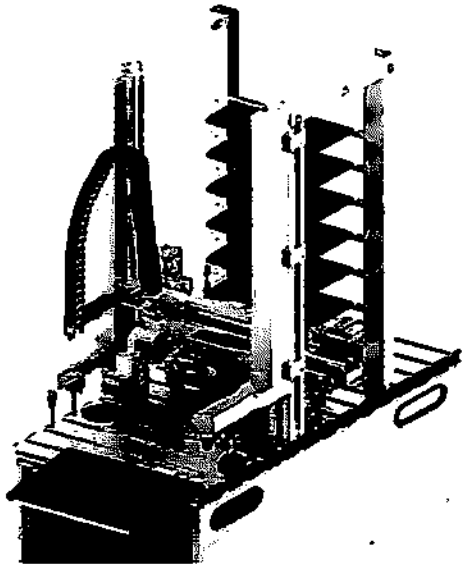
- **MPS Trolley/accessories**
  - Trolley
    - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
  - Accessories
    - Profile plate and control console
    - Height adjustment
    - A4 mounting frame
    - A4 mounting profile
    - Assembly board

- **Control Panel/Console**
  - Control console for Syslink
    - Membrane keyboard: Start pushbutton with LED, stop pushbutton, Reset pushbutton with LED, 2 flexibly assignable control lamps, 4 mm safety sockets with LED status display for simple I/O connection. Syslink and Sub-D sockets for connection to PLC of choice are available on the rear panel.

- **Programmable Logic Controller with built-in power supply**
  - Programmable Logic Controller
    - Main memory: 250 KB for programs and 1 MB for data Memory card included
    - Inputs/outputs: 32 digital inputs (24 V DC) 32 digital outputs (24 V DC/0.5A) 5x analog inputs, 4x U/I, 1x R/RTD, 16-bit resolution, 2x analog outputs, 2x U/I, 16-bit resolution
    - The mounting system: (W x H) 305 mm x 300 mm Can be placed on a desk or in an MPS station Stable, powder-coated, sheet-steel mounting system
    - Integrated power supply unit: AC 110/230 V/DC 24 V, 4 A
    - 19" module simulation plate with 2x SysLink plug connector for MPS station and control panel, each with 8 digital inputs and 8 digital outputs and 1x Sub-D 15-pin plug connection with 4 analog inputs and 2 analog outputs; emergency stop jumper to connect a safety circuit for disconnecting 8 digital outputs.
    - Programming language
    - Statement list (STL)
    - Function diagram (FUN)
    - Ladder diagram (LDR)
    - Structured text
    - Function sequence diagram
    - Software compatible with:
      - Windows 10 (64-bit) Professional or later

- Additional:
  - Programming cable (Ethernet cable)
  - Programming software portal
  - Realization of networked solutions
  - PLC simulation software
  - Software and documentation supplied on DVD
  - Floating license supplied on USB stick
  - Language: English

Sample Image:



Picture for reference only

Human Machine Interface ***(1 unit per station)***

System requirements: Windows XP/7/8/10 (32/64 bit)
Type code: CDPX
Real-time clock: Yes
Recipe memory: 32000 byte
Tags: 10000
Widgets: 2000
Simultaneous client access attempts: 4
Parameter sets per recipe: 32000
Event buffer: 4
Supported PLC protocols: CODESY 2.3 and 3.5, Modbus TCP client, TCP server, RTU client, RTU server
Alarms: 2000
Javascript file size per page: 8000 byte
Real-time clock deviation: 130 s/month
Display: Color TFT
Display properties: Touchscreen
Display size: 7"
Operating voltage: 18 - 30 V
Backup battery: Rechargeable lithium battery

Additional:
Open for web and multimedia applications
Incorporation of standard documents
Multiple interfaces for process communication
Integrated Ethernet switch
Programming with Designer Studio
HMI programming software downloadable

Additional Programmable Logic Controller *(5 units)*

CPU data: 400 MHz processor
Materials note: Conforms to RoHS
Safety class: III
Test for insensitivity to vibration: to EN61121-2
Test for insensitivity to shock: to EN61121-2
Protection class: IP20
Operating voltage: 19.2 - 30 VDC
Electrical connector technology I/O: Socket strip, grid 3.5 mm
Current consumption: 100 mA nominal at 24 VDC
Digital inputs, number: 12

Memory
Global memory and constraints (RAM): 16 MB
Available flash memory: 2 MB
Flag memory: 8,192 bytes
Input: 8,192 bytes
Output: 8,192 bytes
Protocol: CANopen
I-Port
IO-Link
Modbus TCP
IO-Link, protocol: Device V 1.0, Master V 1.1
IO-Link, protocol mode: Master SIO, COM1 (4.8 kBaud), COM2 (36.4 kBaud), COM3 (230.4 kBaud)

Other Equipment & Accessories:

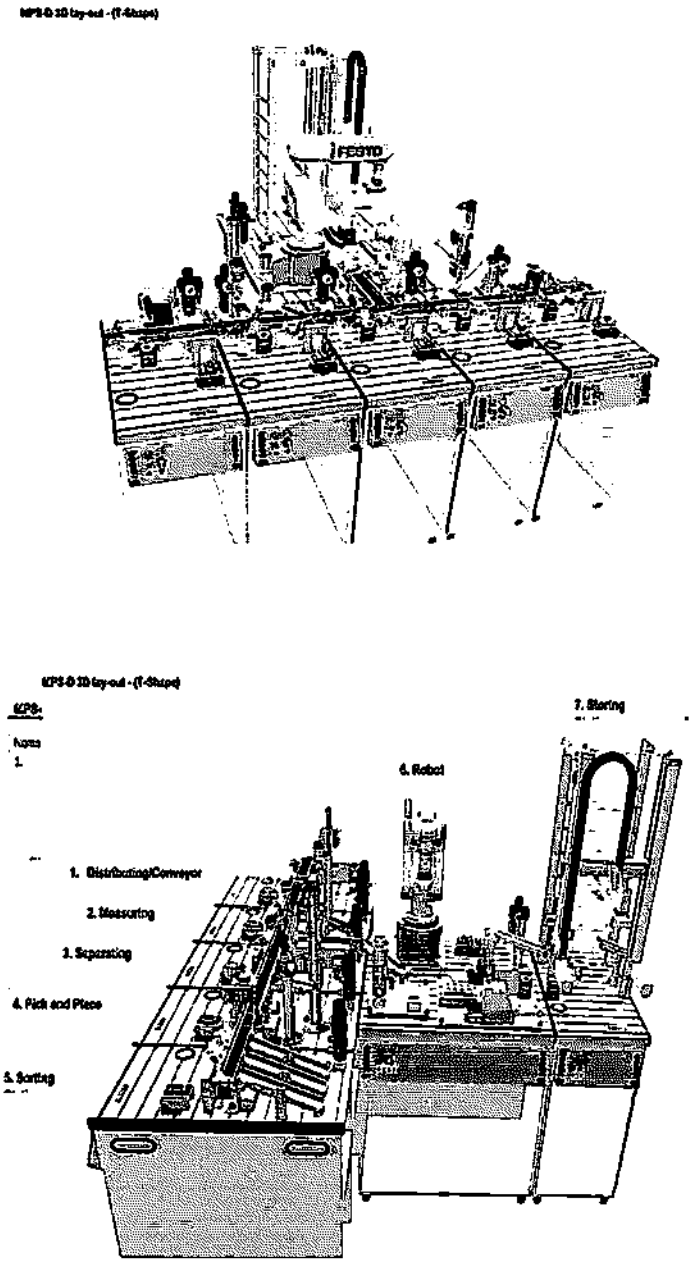
- 6 Units of Digital Simulation box
  - Technical Data
    Operating voltage 24VDC
    Signal Voltage 24VDC
    Syslink interface, IEEE448
    Switches: 9, non-detenting, detenting
    LED's: 9

- 4 Units of Workpiece set "for cylinder assembly"
  - External diameter: 40mm
  - Height (black): 22.5mm
  - Height (red): 25mm

- 2 Units of Silent type compressor 230V/60Hz with accessories

NOTE: Main voltage supply per station: 220-250VAC, 60hz

Sample Image:



Picture for reference only

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REVISED

Technical Specifications

Lot 9 : **Industrial Automation – PKG 2**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	Automatic Production Line Trainer	Kindly refer to the technical specifications attached as **Revised Annex D9.**	2	set			

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All tools, equipment, gadgets and electrically operated instruments should have Standard Manufacturers Manual and/or Datasheet/Specification Sheet/Brochure as indicated in Revised Annex D9.

Instruction Manual is an instructional book or booklet that is supplied with almost all technologically advanced products such as electrical products.

Datasheet/Specification Sheet/Brochure is a document that summarizes the performance and other characteristics of a product, machine, component that comes along with the product from its release from the manufacturer.

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REVISED ANNEX D9

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
9	Industrial Automation - PKG 2	09-001	Automatic Production Line Trainer	refer to Technical Specification of Item Code 09-001	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of The Learning System	**Automatic Production Line Trainer**
Item Code	09-001
Technology Area(s)	Industrial Automation - PKG 2

Description: The equipment simulates an automated production process that requires stamping/boring holes on a workpiece based on material composition and/or workpiece size/height. The system also includes automatic sorting of materials based on set parameters.

Required Topics/Lessons:
The training system shall include, but not limited to the following topics/lessons:

- Mechanical structure disassembly and adjustment
- Automatic detection technology application training
- Pneumatic technology application training
- Programmable controller programming training
- Touch screen technology application training
- Frequency converter technology application training
- Control drive technology application training
- Mechanical system installation and commissioning training
- System maintenance and fault detection training
- System communication technology application training
- Understanding of fingerprint recognition
- Application of Fingerprint Recognition

Technical Description

. **Description of system operation**

- Distribution station:
  This station holds the workpiece in que and releases it one-by-one into the system either manually or automatically.

- Handling station:
  This station is composed of a pick and place system and a guided rail synchronous belt transmission system which transfer the workpiece from distribution station to the succeeding stations. This system can be manual (push of a button) and automatic.

- Assembly station:
  This is a rotary table which assembles the workpiece based on set instruction. This system can be manual (push of a button) and automatic.

- Stamping station:
  This simulates a workpiece stamping process. There should be a clamping mechanism, and workpiece presence sensor for safety operation. This system can be manual (push of a button) and automatic (time-based setting).

- Sorting station:
  The sorting station will segregate the workpiece based on a given condition. A minimum of two kinds of workpiece can be sorted.

B. General parameters

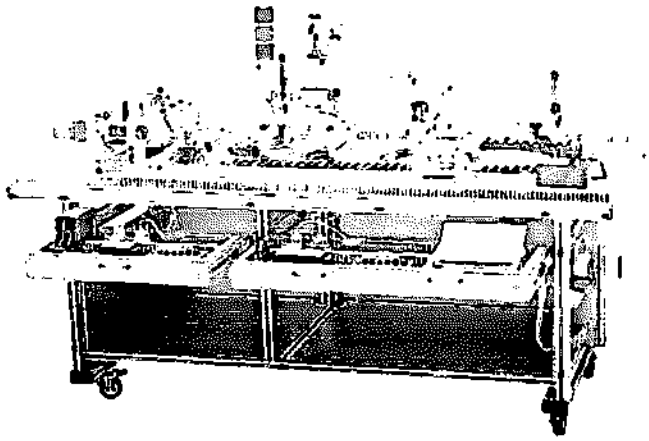
- Working power supply 220 ± 10% 60Hz single phase (a transformer should be provided if the system requires other power supply)
- Protection: short circuit, leakage, grounding, overcurrent, undervoltage, and emergency stop.
- Security: fingerprint for system power on.
- Web server and networking: stations should be interconnected via ethernet protocol which allows remote data collection, monitoring and control and accessible via a web service.
- Overall size should not be greater than 2m (width) x 3m (height) to ensure that ingress of the machine will not be an issue.
- One (1) computer station for programming and visualization. with the following specs:
  - OS: Windows 11 or higher,
  - No. of Cores: 20 cores,
  - RAM: 32 GB RAM,
  - Storage: 1TB SSD and 2TB HDD,
  - Network: 2x 1Gbit LAN, WiFi and Bluetooth port
  - Dual 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio.
  - Industry grade table and chair

- Programmable Logic Controller/s
  - Ethernet and other communication standards
  - Support cloud-based monitoring and control
  - With digital and analog I/Os
  - Expandable centrally and on distributed basis

- PLC Programming software (2 users), compatible to latest release of Windows
- Touch screen Human Machine Interface (HMI) 4~6 inches
- Silent type compressor

- Includes 3 sets of workpiece
- This includes curriculum and instruction to exercises in print and digital format

Sample Image:



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Technical Specifications

Lot 10 : **Industrial Automation – PKG 3**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	Smart Factory Enterprise	Kindly refer to the technical specifications attached as **Revised Annex D10.**	1	lot			

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REVISED ANNEX D10

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
10	Industrial Automation - PKG 3	10-001	Smart Factory Enterprise	refer to Technical Specification of Item Code 10-001	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

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TECHNICAL SPECIFICATION

Name of The Learning System	**Smart Factory Enterprise**
Item Code	10-001
Technology Area(s)	Industrial Automation - PKG 3

General Description

This training equipment simulates common manufacturing processes such as mechanical cutting, combined with CNC machine tools, industrial robots, laser equipment, intelligent sensing and control equipment, and intelligent testing.

Required Topics/Lesson

- Installation and application of PLC programming software
- HMI touch screen programming software button and application
- Robot installation, debugging, programming and application;
- Robot Fixture Installation, Debugging, Programming and Application
- Assembly, adjustment, maintenance and programming application of CNC lathe
- Application of Assembly, Maintenance and Programming of CNC Machining Center
- Application of Bus Communication Technology
- Application of industrial automation network;
- Application of PLC technology;
- Application of motor drive technology
- Application of motion control system;
- Instrumentation use;
- Safe and civilized production, etc
- Network monitoring, control and data collection

Technical Description

- **System Assembly**

  The minimum subsystem of the training equipment are the following:

  - Robot automatic pickup assembly
    This assembly pick-up the blank workpiece from the feeding module and positions it into the CNC machine. Either the same robot arm or another robot arm will pick-up the workpiece from the CNC, after the milling process has been completed and transfer it to the transport system.
  - CNC milling assembly
    The CNC machine will cut the blank workpiece based on the given design.
  - Transport assembly
    The transport assembly transfers the workpiece from one processing station to another.
  - Laser marking
    This assembly simulates the robot laser to engrave/ mark via laser operation.
  - Storage assembly
    This is mainly composed of storage shelves, stackers, connecting platforms, unit electric control and communication systems, etc. This uses an auto stacking system for easy storage and retrieval of workpieces.
  - Visual inspection

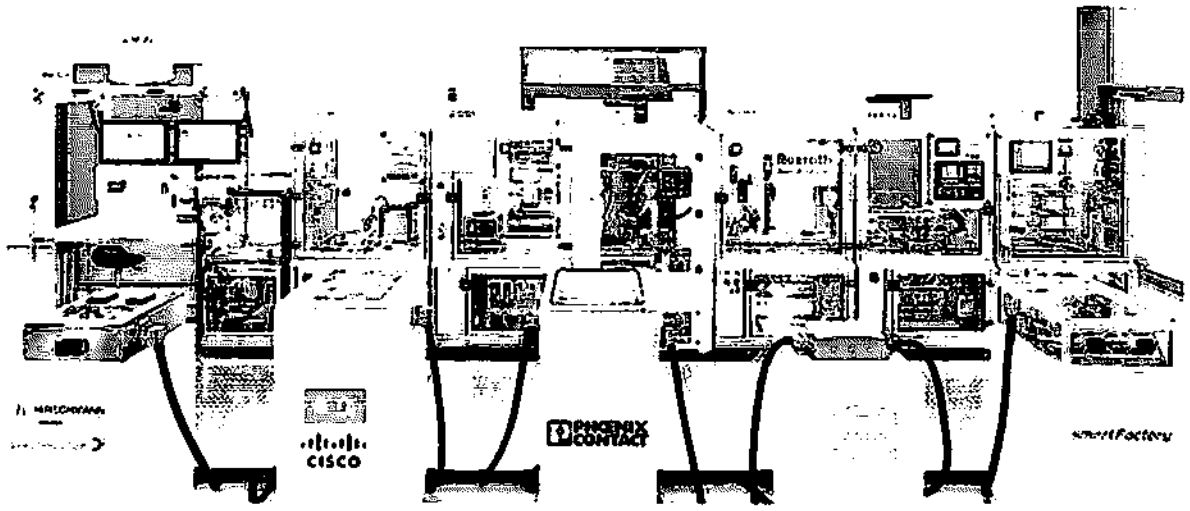
This uses an industrial grade color camera with at least 3.2MP and uses vision software which can assist in conducting visual inspection on the workpiece.

- Monitoring and Control System
  The system should use an RFID system, to monitor the location of the workpiece within the system. At least five (5) industry grade cameras should be installed in the system to monitor the system process in real time. It should have a touchscreen Human Machine Interface for visualization and control interface.

B. General parameters

- Working power supply 220 ± 10% 60Hz single phase (a transformer should be provided if the system requires other power supply)
- Protection: short circuit, leakage, grounding, overcurrent, undervoltage, and emergency stop.
- Security: fingerprint for system power on.
- Web server and networking: stations should be interconnected via ethernet protocol which allows remote data collection, monitoring and control and accessible via a web service.
- Overall size should not be greater than 2m (width) x 3m (height) to ensure that ingress of the machine will not be an issue.
- Two (2) computers for system programming and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port and dual 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio.
- Two (2) computers for CNC Operations and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port and dual 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio.
- Programmable Logic Controller/s
  - Ethernet and other communication standards
  - Support cloud-based monitoring and control
  - With digital and analog I/Os
  - Expandable centrally and on distributed basis
- PLC Programming software (2 users), compatible to latest release of Windows
- CAD/CAM software for (2 users) perpetual license
- Robot simulation software
  - Combination of 3D technology and interactive animation, which can simulate the mechanical structure of disassembling and assembling the robot arm in 3D
  - It should have an step-by-step assembly and disassembly guide
  - It support PC and Mobile Device platform
- Touch screen Human Machine Interface (HMI) 4~6 inches
- Silent type compressor
- Set of tools equipment servicing
- Includes 2 sets of bottles/workpiece
- This includes curriculum and instruction to exercises in print and digital format
- 2 sets connecting wires and two sets of hoses

Sample Image:



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Technical Specifications

Lot 11 : **Industrial Process Control**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	Pressure, Flow, Level, Temperature Process Learning Systems	Kindly refer to the technical specifications attached as **Revised Annex D11.**	1	set			
2	Bottle Filling Production Line Trainer		2	set			
3	Motor Control Trainer		2	set			

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REVISED ANNEX D11

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
11	Industrial Process Control	11-001	Pressure, Flow, Level, Temperature Process Learning Systems	refer to Technical Specification of Item Code 11-001	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes
11	Industrial Process Control	11-002	Bottle Filling Production Line Trainer	refer to Technical Specification of Item Code 11-002	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes
11	Industrial Process Control	11-003	Motor Control Trainer	refer to Technical Specification of Item Code 11-003	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of the Learning System	**Pressure, Flow, Level, and Temperature Process Learning Systems**
Item Code	11-001
Technology Area(s)	Industrial Process Control

General Description

This training equipment simulates an automated industrial process control using distributed control system and programmable control system PLC) technologies. With this equipment, one can learn to install sensors and monitoring devices, wiring of electrical circuits, configuration of instrumentation devices and controls, programming of PLC, debugging of programs and operation and monitoring of automated process control systems.

Required Topics/Lessons:

- Installation and application of PLC programming software
- Programming and Application of DCS Control System
- Application of DCS Communication System
- Installation and Application of Process Control Equipment Piping
- Installation and application of pressure transmitter
- Installation and Application of Temperature Transmitter
- Installation and application of flow sensor
- Installation and application of liquid level transmitter
- Installation and Application of Weight Sensor
- Application of Industrial Automation Network
- Installation and wiring application of digital network intelligent measurement and control system
- Application of Instrument Communication System
- Cognition and application of production process technology
- Safe and civilized production

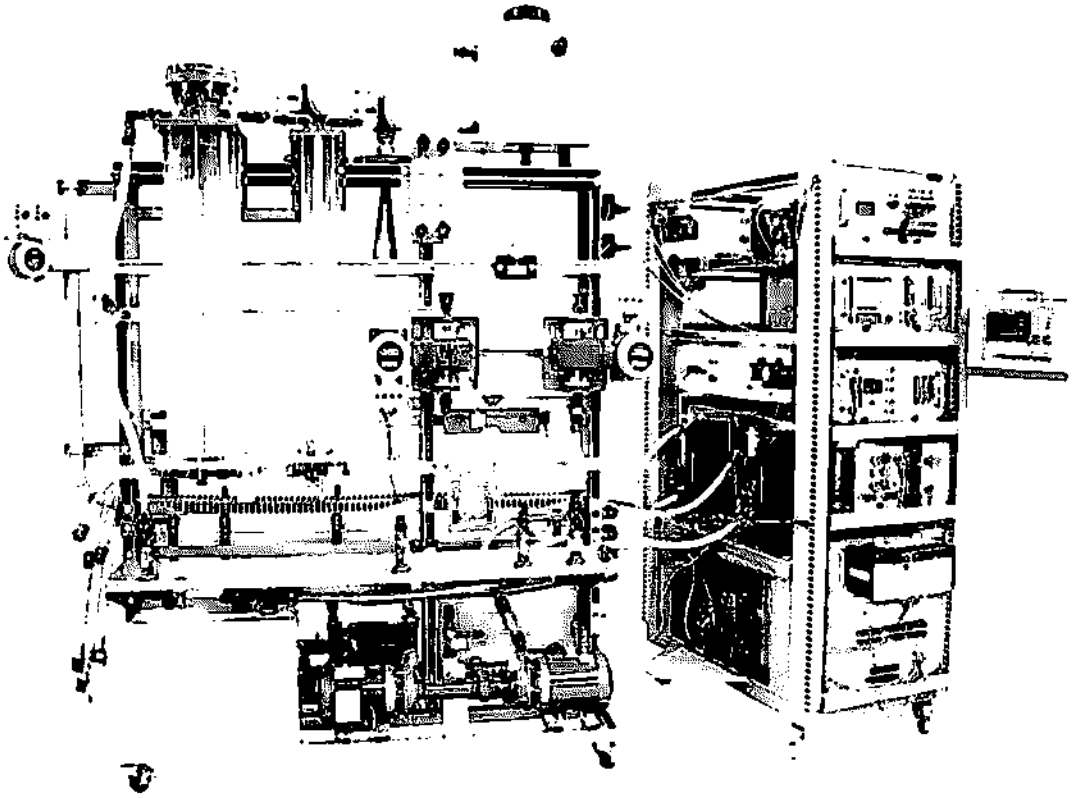
Technical Description

- **Description of system operation**
  This training simulator will consists of the following sub-systems:

No	Training Platforms	Qty	Unit Measure
1	Mini-industrial process/System process *This training equipment is a simulation of a chemical processing plant wherein it feeds material to a reactor through two feedlines for batching. The batching system is composed of two (2) raw material tanks and product mixing tanks. The system can perform functions such as precise proportioning of materials, timing control, and material mixing according to process requirements. The system allows monitoring and control of process variables such as pressure, level, flow and temperature, weight and others.*	1	set
2	Intelligent measurement and control system *DCS system can support multi-domain control and operation, and has multi-programming language support in compliance with IEC international standards; including SFC, CFC, ST, LD and other languages, the system has fail-safe functions and complete project management functions, including multi-engineer collaborative work, configuration integrity management, online single-point configuration download, configuration and operation authority management, etc., and provide historical traceability of relevant operation records. The system is compatible with MODBUS, HART and other international standard field buses and the comprehensive integration of various heterogeneous systems. The system should allow real-time monitoring of subsystems over LAN and cloud.*	1	set
3	Energy management platform *This platform allows monitoring and control of all electrical parameters in the system in local and remote computers/devices*	1	set
4	Visualization platforms *This is composed of computer/s where the dashboard on process variable status and process simulation are displayed accessible in local and remote computers/devices*	1	set
5	Training platform *This includes reference materials, exercises/activities (20+ activities),1 set of tools needed to service the equipment, 1 spool of electrical wires (per color used in the system)*	1	set

- **General parameters**
  - Working power supply 220 ± 10% 60Hz single phase (a transformer should be provided if the system requires other power supply)
  - Protection: Overpressure, over temperature, liquid level alarm and emergency stop.
  - Overall size should not be greater than 2m (width) x 3m (height) to ensure that ingress of the machine will not be an issue.
  - Two (2) computer/s for programming and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port and dual 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio
  - DCS controller:
    - Supports PROFIBUS/HART/MODBUS and other common international fieldbus. Third-party devices, such as intelligent instruments, PLCs, and inverters are easily added.
    - Centralized supervision in real time
    - Centralized/decentralized I/O modules,
    - Decentralized risks and control
    - Open system architecture supporting OPC industrial standards
  - Programmable Logic Controller/s
    - Ethernet and other communication standards
    - Support cloud-based monitoring and control
    - With digital and analog I/Os
    - Expandable centrally and on distributed basis
  - Field devices
    - Pressure Transmitter, 0-100 Kpa 4-20mA, HART protocol
    - Level Transmitter 0-5 Kpa 4-20mA, HART protocol
    - Temperature Transmitter 0-100°C 4-20mA, HART protocol
    - Flow Sensors-RS485 communication
    - Weight sensor 0-10 kg RS485
  - Software (2 users), compatible to latest release of Windows
    - PLC Programming software
    - Visualization design software
    - DCS Monitoring and supervision software
  - Set of tools for equipment servicing
  - This includes curriculum and instruction to exercises in print and digital format
  - Extra hoses and electrical wires

Sample Image:



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TECHNICAL SPECIFICATION

Name of the Learning System	**Bottle Filling Production Line Trainer**
Item Code	11-002
Technology Area(s)	Industrial Process Control

General Description

The learning system is a miniature bottle filling process simulation equipment which allows remote data collection, monitoring and control. In detail, the system should provide simulation of liquid mixing, bottle filling and labeling, handling and transferring, and sorting and storage.

Required Topics/Lessons:

1. Pneumatic technology
    - air pump
    - air source processor
    - vacuum generator
    - various cylinders
    - solenoid valve
    - Cognition and application of magnetic switch
    - Knowledge of tracheal intubation
    - Knowledge of speed joint
    - Solenoid valve installation and commissioning
    - Cylinder installation and debugging
    - Installation and commissioning of air source treatment
    - Maintenance and maintenance of various cylinders
    - Maintenance and maintenance of various solenoid valves

0. Sensor technology
    - Cognition and application of photoelectric sensor
    - Cognition and application of optical fiber sensor
    - Cognition and application of magnetic sensor
    - Cognition and application of inductive sensors
    - Wiring methods of various sensors
    - Fault judgment and maintenance of various sensors
    - Wide application of various sensors in industrial field

0. Mechanical transmission technology
    - belt transmission
    - cylinder transmission/actuation

0. Industrial automation technology
    - The principle and application of PLC
    - The method of programming the filling station program by PLC
    - The method of programming assembly station program by PLC
    - The method of programming the transfer station program by PLC

- The method of writing storage station program by PLC
- Ethernet communication
- Application of stepping motor and stepping driver
- PLC motion control programming method
- PID control programming method
- Configuration and application of touch screen
- Dynamic real-time monitoring
- Dynamic real-time monitoring
- Different programming language
    - LD(Ladder Diagram) (ladder diagram)
    - IL (Instruction List) (Instruction List)
    - SFC (Sequential Function Charts) (Sequential Function Chart)
    - FBD (Function Block Diagram) (Function Block Diagram)
    - ST (Structured Text) (Structured Text)
- Equipment calibration, fault diagnosis and maintenance

Technical Description

. **Description of system operation**

- Filling station
  The filling station will simulate how liquid from two tanks will be pumped-in a mixing container in which the ratio is based on a certain percentage/amount. This liquid mixture will then be transferred to the empty bottles in the assembly station.
- Assembly station
  The assembly station is the simulation of the process where the bottles will be filled with the liquid mixture, sealed with a cap and stamped with a label.
- Handling station
  The handling station is a pick and place system that simulates the transferring of filled bottles to the simulated warehousing station.
- Storage/Warehousing station.
  This station will simulate the sorting process of bottles that are to be transported into two different locations/ containers.

B. General parameters

- Working power supply 220 ± 10% 60Hz single phase (a transformer should be provided if the system requires other power supply)
- Protection: short circuit, leakage, grounding, overcurrent, undervoltage, and emergency stop.
- Security: fingerprint for system power on.
- Web server and networking: stations should be interconnected via ethernet protocol which allows remote data collection, monitoring and control and accessible via a web service.
- Overall size should not be greater than 2m (width) x 3m (height) to ensure that ingress of the machine will not be an issue.
- Two (2) computer/s for programming and visualization should be Windows 11 compatible, 20 cores, 32 GB RAM, 1TB SSD, 2TB HDD, 2x 1Gbit LAN port and dual 27~34 inches monitor with 2K resolution and 21:19 or 16:9 image aspect ratio
- Programmable Logic Controller/s
  - Ethernet and other communication standards
  - Support cloud-based monitoring and control
  - With digital and analog I/Os
  - Expandable centrally and on distributed basis
- PLC Programming software (2 users), compatible to latest release of Windows
- Touch screen Human Machine Interface (HMI) 4~6 inches
- Silent type compressor
- Set of tools equipment servicing
- Includes 2 sets of bottles/workpiece
- This includes curriculum and instruction to exercises in print and digital format
- 2 sets connecting wires and two sets of hoses

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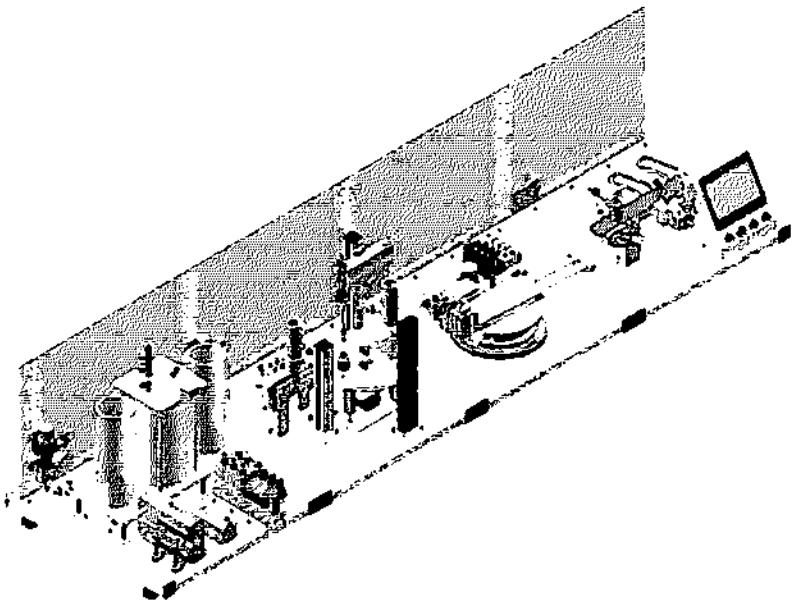

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TECHNICAL SPECIFICATION

Name of The Learning System	**Motor Control Trainer**
Item Code	11-003
Technology Area(s)	Industrial Process Control

Brief Description

This learning system will develop the learner's ability to apply control technology using various types of magnetic contactors, electromechanical and electronic switches both in AC and DC circuits.

Required Topics/Lessons

Specifically, this learning system will cover the following topics:

- Frequency Converter Panel Control Motor Start and Stop
- External Terminal Control Experiment Based on Frequency Converter
- Reverse Switch Control Motor Forward and Reverse Experiment
- Use Star - Delta starter to Star Motor
- Combination Switch Control Two-speed Motor Experiment
- Contactor Controlled Motor Self-locking Experiment
- Contactor Interlocking Motor Forward & Reversing Control Circuit
- Dual-interlock Three Phase Asynchronous Motor Forward/Reversing Control Circuit
- Y-Δ Start Experiment Controlled by Contactor
- Y-Δ Start Experiment Controlled by Time Relay
- Three-phase Asynchronous Motor Sequence Control
- Single-phase Capacitor Motor Start Experiment
- Single Phase Capacitor Motor Forward and Reverse Experiment
- Single-phase Resistance Motor Forward and Reverse Rotation Experiment
- Switched Reluctance Motor Speed Control Experiment
- How to Use Torque Sensor

Technical Description

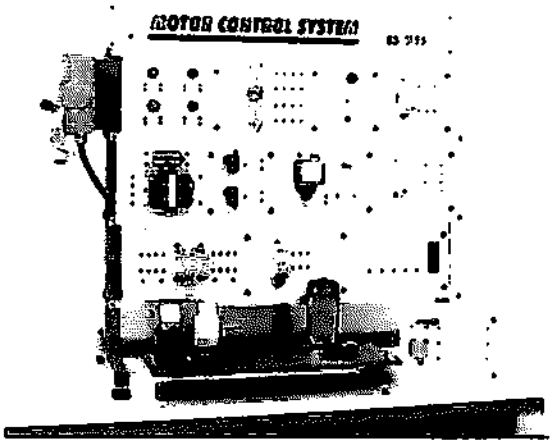
The requirements for this learning system are as follows:

- **Modules:**
  - Power supply
    - 3 phase 380V 60hz
    - 220 VDC 60Hz
    - Variable AC 0~220V 3 Phase
    - Variable DC 0~200V
    - Fixed 24 VDC

- Frequency converter
  - 3 phase
  - 0.55 kW
  - 1.7 A
  - 0~550Hz frequency out
  - Voltage depends on engineering design of the system
- Variable resistant module
  - 0-90Ω adjustable resistance
  - 150W
  - 4 groups
- Motor drag modules
  - Composed of circuit breaker, magnetic contactors, switches, relays, protection and other devices
  - Quantity and specification should be sufficient to run the exercises covered in each topics
- Motors
  - DC servo motor with controller
  - Shaded pole motor (motor + governor)
  - Repulsion motor with controller (single phase gear motor)
  - Single-phase capacitor motor 220VAC 60hz 120 watts, 1400 rpm
  - Two speed motor AC 380 VAC 60hz, 300/450 watts, 1400/2800 pm
  - Single-phase resistance motor, AC 220V 60Hz, 1400rpm
  - Three-phase induction motor AC380V, 60hz, 1 torque sensor, 1 magnetic powder brake and 3 sets of aviation plugs. (The motor can be replaced with any other motor)
  - Three-phase winding motor AC380V 60Hz 1400r/min
- Measuring instruments (panel type or hand held instruments/multimeters)
  - 3 AC digital voltmeter
  - 3 digital ammeter
  - 1 three phase digital power meter
  - 1 single-phase power meter
  - 1 digital power factor meter
  - 1 digital frequency meter
  - phase-sequence indicator
  - digital tachometer
- Other devices
  - torque sensor display meter,
  - tension controller

- Multi-level frame to hold the modules, table top to hold additional instruments and storage cabinet to hold modules not in use.
- Three Phase 220VAC, 60Hz
- 150 pieces per color of connecting wires
- Dimension: The equipment when installed should not consume more than 6 sqm space and not over 1.2.5m for the overall height.
- This includes curriculum and instruction to exercises in print and digital format

Sample Image:



Picture for reference only

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

Technical Specifications

Lot 12-A : **Robotics PKG 1**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	Mobile Robotics 4.0	Kindly refer to the technical specifications attached as **Annex D12-A.**	1	set			

* Bidders must state here either "Comply" or "Not Comply" against each of the individual parameters of each Specification stating the corresponding performance parameter of the equipment offered. Statements of "Comply" or "Not Comply" must be supported by evidence in a Bidders Bid and cross-referenced to that evidence. Evidence shall be in the form of manufacturer's un-amended sales literature, unconditional statements of specification and compliance issued by the manufacturer, samples, independent test data etc., as appropriate. A statement that is not supported by evidence or is subsequently found to be contradicted by the evidence presented will render the Bid under evaluation liable for rejection. A statement either in the Bidder's statement of compliance or the supporting evidence that is found to be false either during Bid evaluation, post-qualification or the execution of the Contract may be regarded as fraudulent and render the Bidder or supplier liable for prosecution subject to the applicable laws and issuances.

All tools, equipment, gadgets and electrically operated instruments should have Standard Manufacturers Manual and/or Datasheet/Specification Sheet/Brochure as indicated in Annex D12-A.

Instruction Manual is an instructional book or booklet that is supplied with almost all technologically advanced products such as electrical products.

Datasheet/Specification Sheet/Brochure is a document that summarizes the performance and other characteristics of a product, machine, component that comes along with the product from its release from the manufacturer.

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ANNEX D12-A

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
12-A	Robotics PKG 1	12-001	Mobile Robotics 4.0	refer to Technical Specification of Item Code 12-001	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of The Learning System	Mobile Robotics 4.0
Item Code	12-001
Technology Area(s)	Robotics: PKG 1

Required Topics/Lessons:
The training system shall include, but not limited to the following topics/lessons:

- Electrical and electronics circuit connection
- Mechanical assembly of robots
- Advance application in mobile robotics
- Familiarization and application of mechatronics and automation devices
- Application of the internet of things (IOT)
- Industry 4.0
- Programming

Courseware:
- Robotic SIM Professional
- CIROS Studio, single license

Hardware / Specification:

- **Parameters / Data**
  - Height: 325 mm
  - Diameter: 450 mm
  - Total weight (unladen weight): 20 kg
  - Total weight (including 4 rechargeable battery packs): 22.8 kg (approx. 700 g per rechargeable battery pack)
  - Degree of protection: IP 00
  - Battery voltage: 18 V
  - Housing material: Stainless steel, PA6
  - Degrees of freedom: 3 translational in x- and y-direction rotational about the z-axis

- **Control and Interface**
  - Controller: Embedded PC to COM Express specifications
  - Intel i5, 8th generation, 2.5 GHz frequency, up to 4.2 GHz in turbo mode, 4 physical cores with hyperthreading Integrated UHD Graphics 630
  - Main memory: 8 GB RAM
  - Hard disk: 64 GB SSD
  - Operating system: Linux Ubuntu 18.04 LTS (64 bit)

- Motor control: microcontroller with 32-bit microprocessor and separate Ethernet interface
- Drive wheels: 3 x omnidirectional wheels with 120 mm diameter
- Drive wheels: 3 x DC motors, maximum 3,600 rpm, with encoders and gear unit, gear ratio: 32:1

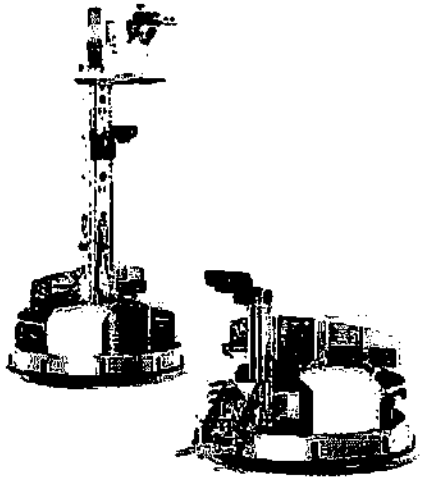
- **Interface**
  - 2 x USB 2.0 (1 x occupied by Access point)
  - 1 x RJ-45 (occupied by Access point)
  - 2 x 12 V WAGO-734-162 (max. 2 A total)
  - 4 x USB 3.0 (1 x occupied by camera)
  - 2 x PCI express slots (Gen3 4 x, extensions)
  - 1x HDMI 2 x Digital I/O connector 1 x analog input connector
  - 1 x relay connector
  - 1 x Wago 721-462 2-pole motor 4, power plug
  - 1 x MPE RM 2.54 2x3-pole motor 4, encoder
  - WLAN to specification, 5 GHz and 2.4 GHz as client or access point in bridge mode

- **Digital inputs/outputs**
  - Inputs: 8
  - Outputs: 8
  - Max. 24VDC
  - Max. 2.A per output
  - Max. 2 A total"
  - Analog inputs: 8
  - Analog output: 2"
  - "WLAN standards: 5 GHz (IEEE 802.11 ac/n/a)
  - 2.4 GHz (IEEE 802.11 b/g/n)
  - Transmission power: CE: max. 23 dBm (5 GHz) max. 20 dBm (2.4 GHz)
  - Power supply: 5 V max. 2 A

Other Equipment & Accessories:

- Tower
- Segment
- Laser range finder
- Legacy electric gripper
- Forklift
- Electric gripper
- Height adjustment
- Interface box
- Leg signal lamp
- Sensor package

Sample Image:



Picture for reference only

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

Technical Specifications

Lot 12-B : Robotics PKG 2

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	Robot Station	Kindly refer to the technical specifications attached as **Annex D12-B.**	1	set			

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ANNEX D12-B

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
12-B	Robotics	12-002	Robot Station	refer to Technical Specification of Item Code 12-002	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of The Learning System	Robot Station
Item Code	12-002
Technology Area(s)	Robotics: PKG 2

Required Topics/Lessons:
The training system shall include, but not limited to the following topics/lessons:

- Installation and wiring of industrial robot body and controller;
- Initialization and parameter recovery of industrial robots;
- Pneumatic technology application;
- Application of sensor detection technology;
- Industrial robot IO wiring;
- Track programming and debugging of industrial robots;
- Installation and wiring of industrial robot handling applications;
- Selection and design of fixtures for industrial robot handling applications;
- Programming and debugging of industrial robot handling applications;
- Industrial robot palletizing application installation and wiring;
- Selection and design of fixtures for industrial robot palletizing applications;
- Industrial robot palletizing application programming and debugging;
- Programming and debugging of industrial robot trajectory curve
- Industrial robot detection, arrangement, application, installation and wiring;
- Selection and design of fixtures for industrial robot inspection and arrangement applications;
- Application programming and debugging of industrial robot detection and arrangement;
- Installation and debugging of industrial robot workstation.

Technical Description

- **Robot Arm System**
  - Basic platform
    - Made of aluminum profile
    - Includes cable and house management
    - Push button switches and emergency stop switch for manual/automatic selection switch, start, stop, enable, reset, alarm light, and emergency stop

- Six-axis robot arm
  - Load capacity: 4kg
  - Working range: 600mm
  - Robot fixtures: claw fixture, calibration block, suction cup fixture and tracing fixture
  - Clamps: drawing pen clamp, gripper clamp

- Tracing module
- Parts palletizing module
- Detection arrangement module
- Plane raw material warehouse
- Drawing puzzle module
- Electric control system

- **General parameters**

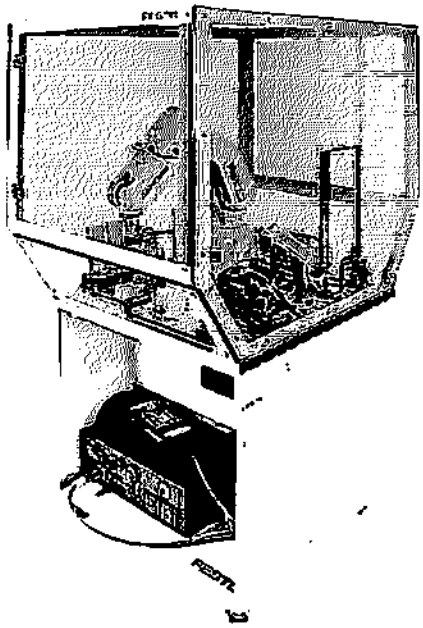
  - Working power supply 220 ± 10% 60Hz single phase (a transformer should be provided if the system requires other power supply)
  - Protection: short circuit, leakage, grounding, overcurrent, undervoltage, and emergency stop.
  - Security: fingerprint for system power on.
  - Web server and networking: stations should be interconnected via ethernet protocol which allows remote data collection, monitoring and control and accessible via a web server.

  - Overall size should not be greater than 2m (width) x 3m (height) to ensure that ingress of the machine will not be an issue.
  - One (1) computer station for programming and visualization. with the following specs:
    - OS: Windows 11 or higher,
    - No. of Cores: 20 cores,
    - RAM: 32 GB RAM,
    - Storage: 1TB SSD and 2TB HDD,
    - Network: 2x 1Gbit LAN, WiFi and Bluetooth port
    - Dual 27" inch ultrawide 2K/4K curved monitor.
    - Industry grade table and chair

  - Programmable Logic Controller/s
    - Ethernet and other communication standards
    - Support cloud-based monitoring and control
    - With digital and analog I/Os
    - Expandable centrally and on distributed basis
  - PLC Programming software (2 users), compatible to latest release of Windows
  - Touch screen Human Machine Interface (HMI) 4~6 inches
  - Silent type compressor

- Includes 3 set of workpiece
- This includes curriculum and instruction to exercises in print and digital format

Sample Image:



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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED

Technical Specifications

Lot 14 : **3D Printing Technology**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	Metal 3D Printer Machine	Kindly refer to the technical specifications attached as **Revised Annex D14.**	2	set			
2	Resin 3D Printer - LCD Type		25	set			
3	Fused Deposition Modeling 3D Printer		32	set			
4	3D Scanner		7	set			

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED ANNEX D14

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
14	3D Printing Technology	14-001	Metal 3D Printer Machine	refer to Technical Specification of Item Code 14-001	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes
14	3D Printing Technology	14-002	Resin 3D Printer - LCD Type	refer to Technical Specification of Item Code 14-002	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes
14	3D Printing Technology	14-003	Fused Deposition Modeling 3D Printer	refer to Technical Specification of Item Code 14-003	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
14	3D Printing Technology	14-004	3D Scanner	refer to Technical Specification of Item Code 14-004	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	Yes

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of The Learning System	Metal 3D Printer with Sintering Furnace
Item Code	14-001
Technology Area(s)	3D Printing Technology

Technical Specification

- Print technology: Fusion deposition modeling (FDM/FFF) / Metal Fused Filament Fabrication (MFFF) with Capability to print with composites such as advanced fiber and Metal filaments
- Build size: 300 x 200 x 200mm
- Material compatibility: MFFF - Compatible with 316L, 17-4PH, High-End Metal Filament, Metal Support Material, etc.
- Print Head: Dual Extrusion Print head with unique auto-nozzle lifting system
- Nozzle sizes: 1x 0.4mm and two (2) different sizes
- Print Head Technology: Dual extruder
- Layer resolution: Compatible with down to 20 micron layer resolution
- Certification: FCC, RoHS, CB, CE
- Enclosure: Fully enclosed system with air filter that filter out particles during printing.
- Materials Detection: Auto detection of materials
- Must be equipped with camera for live print viewing
- Heated bed: must be able to reach at least 100 degree celsius or higher
- Printer should be able to be connected to a printer management system that can track the users, print times, print consumption and other statistics
- Bed leveling should be an automatic leveling system using capacitive sensor technology and Pre Calibrated
- Connectivity: Wifi, Ethernet, LAN, USB Drive Connectivity
- Power Requirements: 200-240VAC, 60Hz, Single-phase
- File types: STL/OBJ/DAE/AMF
- Includes Laboratory Furnace capable of reaching at least 1200C
  - Size Capacity: At least 200 x 200 x 200 mm with Adjustable Multi-Level Tray for batch processing
  - Gas Type: Argon and Nitrogen
  - Fail safe features: Over-temperature protection and e-Stop feature

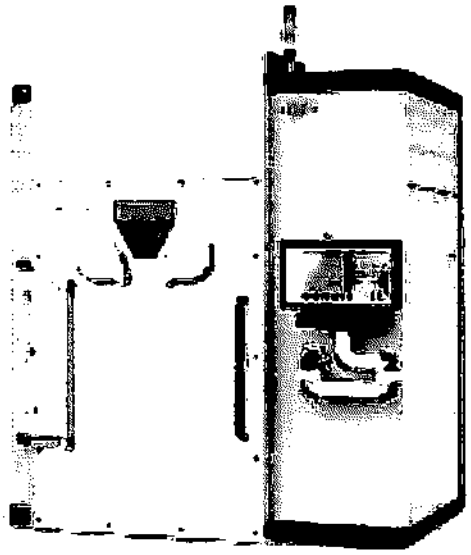
  Note: Third party laboratory furnace is acceptable as long as it will be compatible with the metal 3D printer and debinder
- Includes catalytic debinding Furnace using Oxalic Acid Fluid or equivalent with work envelope of At least 200 x 200 x 200 mm
- Includes slicing software (perpetual license) with templates and simpler splicing process
- Certificate of authority to sell from the manufacturer or local distributor/reseller.
- Certification of Safe Unattended Use
- Training certificate provided by manufacturer to certified trainer (see section 6 of the bid document for details)

Package inclusion:

- 1 unit Debinder

- 1 Unit vacuum furnace
- 1 spool of metal filaments, 1.75mm and/or 3.0mm
- 1 set of gas
- 1 set of fluid

Sample Image:



Picture for reference only

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

TECHNICAL SPECIFICATION

Name of The Learning System	**Resin 3D Printer - LCD Type**
Item Code	14-002
Technology Area(s)	3D Printing Technology

- Connectivity: USB / Ethernet
- Technology: Resin 3D Printer - LCD Type
- Operation: At least 3.0 inch touch screen
- Light source: at least 9 inches with minimum 6k resolution
- Monochrome screen
- XY Resolution: 35 um
- Layer Thickness: maximum range up to 0.2mm
- Minimum Printing Speed: 50mm/hr
- Power Requirement: AC100-240V-50/60Hz
- Printer size: at least L11.0 x W9.0 X H17.0 in
- Print Volume: at least L7.0 x 4.0 x 7.0 inch
- 1 year warranty with commissioning, testing and training
- Bookbinded modules in English language or video of instructional learning resources
- Must come with certificate of authorized distributorship issued by the manufacturer to ensure warranty
- Official warranty with certificate provided by the manufacturer to guarantee printer/parts availability
- Official brand training module covering topics on Hardware, Software usage & Technical deep dive published in English language.
- Training done by certified manufacturer's engineers with signed certificates
- Must include starter pack of resin materials of at least 1kg per machine
- Includes accessories for the complete operation of resin printer including 1 unit of Wash and 1 unit of Cure per resin printer

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Name of Company/Bidder	**Signature over Printed Name of Authorized Representative**	**Date**

TECHNICAL SPECIFICATION

Name of The Learning System	**Fused Deposition Modeling 3D Printer**
Item Code	14-003
Technology Area(s)	3D Printing Technology

Brief Description
3D printer that uses fused deposition modeling technology in printing models.

Technical Specification

Filament	PLA, ABS, PETG
Nozzle temperature	260~300 degree celcius
Printing size	235 x 235 x 270mm or larger
Maximum printing speed	150mm/s
Leveling	Auto-levelling
Extruder	Single; Nozzle size: 0.4mm
Motor accuracy	±0.1
Motherboard	32 bit silent motherboard or equivalent
Data transmission	SD card and USB/Type C USB
Language	English
Others	Touchscreen
Accessories	• Extruder cleaning kit • 4 spools PLA • 2 spools ABS • 2 spool PETG

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TECHNICAL SPECIFICATION

Name of The Learning System	**3D Scanner**
Item Code	14-004
Technology Area(s)	3D Printing Technology

Technical Specification

- Handheld 3D scanner for Medium to Large Objects
- 3D point accuracy up to 0.1mm
- 3D resolution up to 0.2mm or higher
- HD Mode
- Working Distance: 0.4 - 1 meter or better
- Volume capture zone: 61,000 cm3 or higher
- Linear field of view, HxW at closest range: at least 100mm
- Linear field of view, HxW at furthest range: at least 300mm
- Data processing algorithms: Geometry and texture based
- Ability to capture texture, light source: White LED
- Texture resolution: 1.3 mp or better
- 3D reconstruction rate: 16 fps or equivalent
- Data acquisition speed (minimum): at least 18 mln points/s
- Feature: Hybrid geometry and texture tracking, ability to capture texture
- Onboard screen, touchscreen interface
- System requirements: (Included and must be supplied)
- Intel Core i7 or i9, 64+GB RAM, NVIDIA GPU with 8+ GB VRAM, CUDA 6.0+ complete accessories
- 3D Formats: OBJ, PLY, STL, etc.
- Bookbinded modules in english language or video of instructional learning resources
- Certificate of authority to sell from the manufacturer or local distributor/reseller.
- Training certificate provided by manufacturer to certified trainer (see section 6 of the bidding document for details)

Package inclusions:

- 1 Unit Battery
- 1 Unit Hard Case
- 1 Set USB Kit
- 1 Set Licensed 3D Scanning Software
- Class 1 Certificate on Eye Safety

Sample Image:

Picture for reference only

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

Technical Specifications

Lot 16 : **Computers, Tablets and Handheld Devices**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance *	Make Brand / Model	Reference
1	Network Attached Storage	Kindly refer to the technical specifications attached as **Revised Annex D16.**	7	set			
2	Holographic Display		14	set			
3	Laptop, high-end		1	set			
4	Desktop Computer for 3D Design		59	set			
5	Desktop Computer for Productivity Application		100	set			
6	Android Tablet		100	set			
7	Laptop for productivity applications		25	set			
8	A3 Inkjet Printer		5	set			
9	A4 Inkjet Printer		10	set			
10	Wireless Router		43	set			

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED ANNEX D16

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
16	Computers, Tablets and Handheld Devices	16-001	Network Attached Storage	- Dual Core Processor or higher - 6GB RAM or higher - 4 Bays or more - Hot swappable HD - 2 built in M.2 SSD - 2x GbE LAN - 2 USB port - Windows and Mac Compatible Includes: - 4x8TB NAS HD - 220V 60Hz Power supply - Management Software/OS	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test - 24 hr burn-in test	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
16	Computers, Tablets and Handheld Devices	16-002	Holographic Display	1 unit Holographic Display, single display, 75cm/ 30" Key features - Fine pixel pitch (1.1mm) - 3000 Nits Brightness · Wide, accurate colour spectrum · Interactive capabilities · Larger display, perfect for viewing at a distance · Supports 3D and 2D content · HDMI input, LAN connectivity, Wi-Fi controllable, Stream enabled Specifications · Hardware: Holographic Display L module, Box 1 · Services: Display Software Service L · Applications: Web-based CMS and Holographic Display App · Accessories: Tripod, Dome L · Add-ons: Pro - Remote Access Capacity 3 years subscription · Content: 3D Studio, Use your own, Media Library 3D Hologram Accessories · Dome interface · Anti-Static Gloves	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
16	Computers, Tablets and Handheld Devices	16-003	Laptop, high-end	- Processor & Chipset 12th Generation Intel Core i9-12900H 2.5 GHz (24M Cache, up to 5.0 GHz, 6P+8E cores) RAM Memory 32 GB DDR5 4800 MHz Solid State Drive (SSD) 2TB + 2TB M.2 NVMe PCIe 4.0 Performance RAID0 SSD Screen Size 16.0 inch Type & Capacity 90WHrs, 4S1P, 4-cell Li-ion battery Battery Timing Up to 8 Hours Power Supply Wattage ø6.0, 240W AC Adapter Output: 20V DC, 12A, 240W Input: 100~240V AC 50/60Hz universal with licensed OS (Windows 11) with licensed Microsoft Office 2019 or higher	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test - 24 hr burn-in test	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
16	Computers, Tablets and Handheld Devices	16-004	Desktop Computer for 3D Design	- CPU - Processor: 12 Cores 24 threads 4.7GHz or higher overclockable - Motherboard: 4 memory slot, Built-in Audio port, Gigabit Lan Port, 2x 3.2 Gen USB port, Hardware monitoring, Multiple Temperature Feature, Q-Flash Update Bios - Memory: 64GB DDR4 (2 x 32GB) or higher - Video: 8GB GPU at least 200 GB/sec memory bandwidth, Direct X 11 Compliant, 3x video port output - Dual Drive: SSD NVME 500GB HD: 6TB 540 RPM or faster - 850 watts true rated power supply 220VAC 60Hz - ATX casing Mid/Full Tower Form Factor, 4 RGB Fans - Dual Monitor WQHD, 34" 21:9 screen ratio, 144Hz refresh rate, 220VAC 60Hz - Wired full sized mechanical keyboard - Mouse - Includes + Wifi Dongle/Card installed in CPU supports multiple band (i.e 5G, 2.4G) + Bluetooth 5.1 Dongle/Card installed in the CPU or higher + Windows 11 Professional with installation/recovery media + 1080P USB Webcam Bluetooth over the ear, Active Noise Cancellation Headset - With OS installation	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test - 24 hr burn-in test	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
16	Computers, Tablets and Handheld Devices	16-005	Desktop Computer for Productivity Application	- OS: Windows 10/ Windows 11 or higher - Core I5 (2.9GHZ) - 4GB DDR4 or faster - 1TB HDD, 2GB Graphics - DVD writer - 220VAC 60Hz compliant - 21.5 inch monitor FHD - With Mouse - With OS installed	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test - 24 hr burn-in test	Yes
16	Computers, Tablets and Handheld Devices	16-006	Android Tablet	- Operating System: Android 12 or higher with the provision of OS upgrade - Processor Snapdragon 8 Gen 1, Octa-core or higher - Display: 11-13 inches, up to 120Hz, at least 1600 x 2560 pixels, Corning Gorilla Glass 5, 500 nits min - Storage: 256GB or higher with external memory provision upto 1TB or higher - Main Camera (Back): Dual 13MP, f/2.4 (wide) and 6MP, f/2.2 (Ultrawide) or higher - Video recording: 4K video @30fps/60fps, 1080p @30fps or better - Speaker: 4 Speakers - Pen Support: Yes - Connectivity: USB-C, WiFi 6E, Bluetooth 5.2 or higher Features: - can be used as 2nd monitor for windows - available service center nationwide Includes: - Folio cover with keyboard (same brand as the tablet) - Rechargeable pen (same brand as the tablet) - Travel adapter 220VAC 60Hz with charging cable (same brand as the tablet)	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test - 24 hr burn-in test	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
16	Computers, Tablets and Handheld Devices	16-007	Laptop for productivity applications	- OS: Windows 10/ Windows 11 or higher - i5 11th Generation or higher - 8GB 2400MHz DDR4 or faster - Dual Storage: 256GB SSD + 1TB HDD - 14~16" IPS or better - Full HD or higher resolution - Connectivity: Gb Lan port, WiFi and Bluetooth - At least two (2) USB 3.0 Port Includes - Mouse - Licensed MS Office 2019 or higher - AC 220 - 240v 60Hz	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test - 24 hr burn-in test	Yes
16	Computers, Tablets and Handheld Devices	16-008	A3 Inkjet Printer	• print, scan, copy, fax • wide format inkjet printer • 1200 x 4800 dpi print resolution • print width 291mm, 297mm (borderless) • 250 sheets input tray • 100 sheets output tray • LAN and WiFi Connectivity • Supports mobile device direct print and full duplex printing	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes
16	Computers, Tablets and Handheld Devices	16-009	A4 Inkjet Printer	• With Print, Scan, Copy, Fax features • Tank type ink system • Supports A4 and Legal Paper sizes • Approximately 15 page per minute (Black) • Can scan documents over network environment • Photo Quality • WiFi Connectivity • Support full duplex printing	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
16	Computers, Tablets and Handheld Devices	16-010	Wireless Router	Dual band 2.4 and 5 GHz Networks Standard: 802.11b, 802.11a, 802.11n, 802.11ac, 802.11gi 3000-7200 Mbps 6 x Gigabit Ethernet LAN Ports 1 x Gigabit Ethernet WAN Port 2 x USB 3.0 Ports Google Assistant Integration Amazon Alexa Integration -AC 220 - 240v 60Hz	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test - 24 hr burn-in test	Yes

I hereby certify that the statement of compliance to the foregoing technical specifications are true and correct, otherwise, if found to be false either during bid evaluation or post-qualification, the same shall give rise to automatic disqualification of our bid.

Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

Technical Specifications

Lot 17 : **Photography and Videography**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	Digital Mirrorless Camera with Video	Kindly refer to the technical specifications attached as **Revised Annex D17.**	7	set			
2	Drone Camera		7	set			
3	Action Camera		10	set			
4	Video Switcher/Mixer		7	set			
5	4K Video Capture Device		7	unit			
6	Studio Lights		22	set			

* Bidders must state here either "Comply" or "Not Comply" against each of the individual parameters of each Specification stating the corresponding performance parameter of the equipment offered. Statements of "Comply" or "Not Comply" must be supported by evidence in a Bidders Bid and cross-referenced to that evidence. Evidence shall be in the form of manufacturer's un-amended sales literature, unconditional statements of specification and compliance issued by the manufacturer, samples, independent test data etc., as appropriate. A statement that is not supported by evidence or is subsequently found to be contradicted by the evidence presented will render the Bid under evaluation liable for rejection. A statement either in the Bidder's statement of compliance or the supporting evidence that is found to be false either during Bid evaluation, post-qualification or the execution of the Contract may be regarded as fraudulent and render the Bidder or supplier liable for prosecution subject to the applicable laws and issuances.

All tools, equipment, gadgets and electrically operated instruments should have Standard Manufacturers Manual and/or Datasheet/Specification Sheet/Brochure as indicated in Revised Annex D17.

Instruction Manual is an instructional book or booklet that is supplied with almost all technologically advanced products such as electrical products.

Datasheet/Specification Sheet/Brochure is a document that summarizes the performance and other characteristics of a product, machine, component that comes along with the product from its release from the manufacturer.

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REVISED ANNEX D17

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
17	Photography and Videography	17-001	Digital Mirrorless Camera with Video	refer to Technical Specification of Item Code 17-001	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes
17	Photography and Videography	17-002	Drone Camera	- Flight time: Approximately Max. 40 minutes or longer (no wind) - Foldable propellers - Flight distance: 30 KM or farther - Video resolution: 4K or higher - Camera sensor: 4/3 CMOS, Effective pixel 20MPs - 3 Axis Gimbal - ISO Range: 100-6400 for video and still - Internal storage: Approximately 8GB - Supported format: (video) MP4/MOV (photo) jPEG/DNG (raw) - Live view quality: 1080p @ 30fps and 60fps In the Box - x1 Aircraft Body - x1 Remote Controller with connector for android and iphone - x3 Intelligent Flight Battery - x1 Charger - x1 Battery Charging Hub - x6 Propellers (Pair) - x1 USB Cable - x1 Carrying Case Accessories - x2 Memory Card 128GB - x1 Wide angle lens 108° FOV	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
17	Photography and Videography	17-003	Action Camera	- CMOS Sensor, 27MP effective resolution or higher - 24.4 Focal length or higher - Single card slot mSD 256GB max V30 or faster - 5312 x 2988 at 60pfs video format or higher - with image digital stabilization - Supports photo and video - with built-in mic, speaker, flash and wifi - waterproof up to 10 meters - USB Type C input and headphone jack Includes - x1 set data cable(s) - x1 Hand grip - x1 Light mod - x1 Media mod - x1 battery Accessories: - x1 dual battery charger - 3 extra battery - Case	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes
17	Photography and Videography	17-004	Video Switcher/Mixer	- 4 HDMI and 2 microphone inputs or more - Support 4K and 6K or higher - Can be connected to computer for better control - With video effects and color balance feature - Records directly to USB devices Includes: - Software - Connecting Cables - Power supply	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
17	Photography and Videography	17-005	4K Video Capture Device	- 1x HDMI input - 1X HDMI Output for Monitor - 1x USB-C Output for digital recording - 2 Audio Inputs - Audio Output	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes
17	Photography and Videography	17-006	Studio Lights	-18 inches - 3200K-5500K Color temperature with adjustable (brightness 0~100%) - Multi-angle adjustment Includes: - Power Adaptor 220VAC 60Hz - Adjustable tripod: min. height 4 feet, max. height 7 ft - Remote control	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes

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Technical Specification

Name of The Learning System	**Mirrorless Digital Camera with Video**
Item Code	17-001
Technology Area(s)	Photography and Videography

Mirrorless Camera *(1 unit)*

Specification

- 45MP Full-Frame CMOS Sensor
- 8K - 8192 x 4320 video resolution
- Sensor-Shift 5-Axis Image Stabilization
- 12 fps Mech. Shutter, 20 fps E. Shutter
- Dual Pixel CMOS AF II with 1053 Points
- 3.2" Vari-Angle Touchscreen LCD
- 5760k dot Electronic viewfinder
- Weather Sealed Body
- Dual memory slot
- Movie format: MP4
- Image format: JPG, RAW
- Terminal: USB type C, Microphone, Headphone, Video terminal
- Image stabilizer: 5 axis in-body both for stills and video

Accessories (1 set per body)

- Battery (3 sets, 1 standard accessory plus 2 backup battery)
- Battery grip with wireless file transmitter
- High speed memory card with at least 128GB capacity (3pcs)
- AC power adapter/battery charger
- Cable to connect camera to computer
- Cable to connect camera to display device/monitor
- Hot-shoe mounted microphone with noise filter
- Headphone
- Wireless remote control
- Shoulder strap
- Hot shoe cover
- Utility software
- Owner's manual

Lenses *(1 set per lens)*

- Prime lens#1
  - 50mm, aperture f1.2~f1.8
    includes:
    - Lens hood
    - UV and skylight filter
    - Polarizing filter
    - Protective gear/bag

- Prime lens#2
  - 85mm, aperture f1.2~f1.8
    includes:
    - Lens hood
    - UV and skylight filter
    - Polarizing filter
    - Protective gear/bag

- Standard zoom lens#1
  - Focal length 24mm-70mm
  - aperture range of f2.8~f22
    includes:
    - Lens hood
    - UV and skylight filter
    - Polarizing filter
    - Neutral density filter
    - Protective gear/bag

- Standard zoom lens#2
  - Focal length 28mm-300mm or equivalent, wherein the equivalence should be within the focal range indicated (example 35mm~100mm).
  - aperture range of f3.5~f5.6
    includes:
    - Lens hood
    - UV and skylight filter
    - Polarizing filter
    - Neutral density filter
    - Protective gear/bag

- Ultra-wide zoom
    - Focal length 11mm-24 mm or equivalent, wherein the equivalence should not be greater than 135 mm (example 50mm~135mm).
    - aperture f4

      includes:

        - Lens hood
        - UV and skylight filter
        - Polarizing filter
        - Neutral density filter
        - Protective gear/bag

- Telephoto lens
    - Focal length 200mm-400mm or equivalent, wherein the equivalence should be within the focal range indicated (example 250mm~350mm).
    - aperture f4

      includes:

        - Lens hood
        - UV and skylight filter
        - Polarizing filter
        - Neutral density filter
        - Protective gear/bag

High-speed Flash *(1 set)*

- Hot-shoe mount
- TTL
- Can be tilted and can rotated
- Wireless Master/Slave TTL functionality
- Supports high-speed flash sync and multi-flash lighting
- Zoom range 24-105mm
- Weather resistant
- Runs on AA batteries

Flash accessories

- Rechargeable battery (2 sets per flash, total number of batteries depends on the number of batteries required by the flash)
- Smart battery charger at least 4 simultaneous charging (4pcs)
- Color filter with honeycomb and barndoor (1 set per flash)

Note:

- *Lenses compatible with the mirrorless camera*
- *Lenses with focal lengths 100mm and above requires image stabilization, unless camera body has a built-in image stabilization feature*
- *Lenses and flash should be of the same brand with the body*

Camera Tripod ***(1 pc)***

- Aluminum
- Height: 1.5-2 ft (folded), 4-6 ft (extended)
- Quick release flip-lock legs
- Ball head with easy locking mechanism
- Supports low angle photography (inverted camera set-up)
- Supports 22 kg load
- No load weight: 1~1.5kg
- Rubber/no-slip footing
- Includes tripod bag

Hardcase ***(1 pc)***

- ABS Plastic
- Waterproof
- Trolley type
- With foam divider
- With key lock/padlock
- Can contain 1 set of camera body, lenses and accessories

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

Technical Specifications

Lot 19 : **Teaching and Presentation Equipment**

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	AI Camera	Kindly refer to the technical specifications attached as **Revised Annex D19.**	11	set			
2	LED Wall		6	set			
3	Short throw Projector		4	set			
4	Portable Interactive Whiteboard Solution		4	set			
5	Interactive Smart TV		8	set			
6	Opaque Camera		7	set			
7	Smart TV, 55-inch		26	set			

* Bidders must state here either "Comply" or "Not Comply" against each of the individual parameters of each Specification stating the corresponding performance parameter of the equipment offered. Statements of "Comply" or "Not Comply" must be supported by evidence in a Bidders Bid and cross-referenced to that evidence. Evidence shall be in the form of manufacturer's un-amended sales literature, unconditional statements of specification and compliance issued by the manufacturer, samples, independent test data etc., as appropriate. A statement that is not supported by evidence or is subsequently found to be contradicted by the evidence presented will render the Bid under evaluation liable for rejection. A statement either in the Bidder's statement of compliance or the supporting evidence that is found to be false either during Bid evaluation, post-qualification or the execution of the Contract may be regarded as fraudulent and render the Bidder or supplier liable for prosecution subject to the applicable laws and issuances.

All tools, equipment, gadgets and electrically operated instruments should have Standard Manufacturers Manual and/or Datasheet/Specification Sheet/Brochure as indicated in Revised Annex D19.

Instruction Manual is an instructional book or booklet that is supplied with almost all technologically advanced products such as electrical products.

Datasheet/Specification Sheet/Brochure is a document that summarizes the performance and other characteristics of a product, machine, component that comes along with the product from its release from the manufacturer.

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Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date

REVISED ANNEX D19

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
19	Teaching and presentation equipment	19-001	AI Camera	- Video resolution: 1080p @60pfs and 4K@30pfs, or higher - Video Format: h.264, MjPEG - ISO: 100-300 - Aperture: 1.8 +/- 5% - HDR: Yes - AI Tracking: Yes - Autofocus: Yes - Audio: Dual noise cancelling microphones - Connectivity: USB C - Mounting: tripod and monitor - OS Compatibility: Windows and OS - Gesture control: Yes Accessories: - 1 set mounting adaptor/clip for tripod and computer monitor - Connecting cables	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes
19	Teaching and presentation equipment	19-002	LED Wall	- Indoor SMD LED Display P2.5 - Wall size: (2 (h) x 8 (w) meters) - Front Access Service/Maintenance - Built-in power supply - 2 years warranty Includes: - Laptop - Video processor - Frame, bracket and installation - Training	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test - 24 hr burn-in test	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
19	Teaching and presentation equipment	19-003	Short throw Projector	- 3500 lumens or higher - WXGA - Dual Screen interactivity - Support Wireless Mirroring - Input: RGB, HDMI, USB, LAN and HDMI - Video out - Power Supply: AC 100V-240V 60Hz	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes
19	Teaching and presentation equipment	19-004	Portable Interactive Whiteboard Solution or SMART Projector	Portable Interactive Whiteboard Solution specification: • Connectivity: Wireless connection via dongle, up to 9ft or farther • Capture area: 1.5 m x 2.4 m standard aspect ratio • Sensor power supply: 5V via USB • Includes: o Stylus o Software SMART Projector • Interactive (uses stylus or finger/hand gestures) • short throw projector, • 3K lumens, • ethernet and WiFi • 220VAC • with carrying bag	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
19	Teaching and presentation equipment	19-005	Interactive Smart TV	75" LED Touchscreen 4K Ultra HD Connectivity: Wi-Fi, LAN 3 HDMI Ports and USB HDMI, Audio, Headphone output 200 PQI (Picture Quality Index), 3200 HDR (High Dynamic Range) AC 110V-240V 50/60Hz Includes Operation Manual, Remote Control, Base Stand with HDMI cable, 5 meters	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test - 24 hr burn-in test	Yes
19	Teaching and presentation equipment	19-006	Opaque Camera	Pixels: 2MP (1920 x 1080 pixels) Camera Sensor: 1/2.7 inch CMOS Sensor Resolution: Up to Full HD (1080p) Frame rate: up to 30fps Zoom: 10x Digital Zoom, 12x Optical Zoom HDMI, USB, SD Card 100 - 240V AC (50/60 Hz) Features: - Split screen - Record audio and video - Built-in LED light - One-touch control Inclusion: - USB Cable - Computer Cable (VGA Cable) - External AC Power Adapter - Remote Control: Yes (with 2 AA Batteries) - Microscope Adapter - Software CD-ROM - User Manual CD-ROM	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual) - Check package completeness - Functionality test	Yes
19	Teaching and presentation equipment	19-007	Smart TV, 55-inch	55-inch QLED TV 4K Ultra HD Quantum 4 x HDMI 2.1 2 x USB ports	Equipment	Evaluation of Brochure with picture and/or data sheet	- Checking of specification and quantity (offered vs. actual)	Yes

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
				Wi-Fi & Bluetooth AC 100-240V, 50/60hz With base stand			- Check package completeness - Functionality test - 24 hr burn-in test	

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