

Section VII. Technical Specifications

Technical Specifications

Lot 1 : CNC Machining Equipment Upgrade

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance *	Make Brand / Model	Reference
1	5-Axis Rotary Table Guide for Multi-Axes CNC Machine	Kindly refer to the technical specifications attached as Annex D1.	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.

All tools, equipment, gadgets and electrically operated instruments should have Standard Manufacturers Manual and/or Datasheet/Specification Sheet/Brochure as indicated in Annex D1.

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
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ANNEX D1

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
1	CNC Machining Equipment Upgrade	01-001	5-Axis Rotary Table Guide for Multi-Axes CNC Machine	refer to Technical Specification of Item Code 01-001	Learning System	Evaluation of Brochure with picture and/or data sheet and training proposal	<ul style="list-style-type: none"> - 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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Date

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TECHNICAL SPECIFICATION

Name of The Learning System	5-Axis Rotary Table Guide for Multi-Axes CNC Machine
Item Code	01-001
Technology Area(s)	CNC Machining Equipment Upgrade

Brief Description:

This CNC Rotary Table (trunnion) for 5 Axis CNC Milling Machine will upgrade the former 4 axis HAAS VF-2 CNC Milling Machines to become 5 Axis CNC Milling Machine.

Required Topics/Lessons:

Specifically, this equipment will engage the learner to perform the following:

- Perform 4 & 5 Axes CNC Milling Machine Operations
- Perform Actual Tool Length Compensation and Measurements (Advance)
- Perform Actual Set-up Work Offsets (Advance)
- Perform Actual CNC Milling Multi-Axis Machine Operations
- Perform Actual manual operations using Jog Mode on a Multi-Axes Environment
- Perform Actual Manual Data Input (MDI) on a Multi-Axes Environment
- Identify different machine alarms and how to troubleshoot it in a Multi-Axes Environment
- Perform routine maintenance checks on oil, coolant, air supply indicators.
- Perform transfer of CAD CAM Programs using USB, Ethernet and Wi-Fi Connectivity

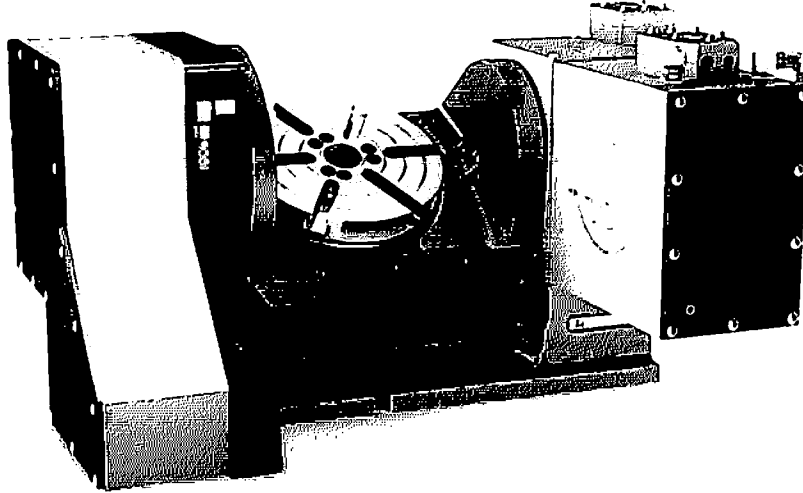
Hardware:

5 Axis Rotary Table (Trunnion) consists of the following specification and components:

- 4th and 5th Axis Drives and Software version M18.29B or later for true 4th and 5th Axis Operation.
- Platter Diameter: 100 mm
- Max Weight on Platter: 6.8kg
- Part Swing Max: 214 mm
- Spindle –A (Tilt)
 - - Max Speed: 1000° / Sec
 - - Max Torque: 48Nm
 - - Gear Ratio 8:1
 - - Brake Torque @ 100 psi/ 6.9 bar: 136 Nm
 - - Repeatability: 30 arc-sec
 - - Travel: 120 Degrees
 - - Indexing Resolution: 0.001 degrees
- Spindle – C (Rotary)
 - Max Speed: 1000° / Sec
 - Max Torque: 22Nm
 - Gear Ratio 7:1
 - Brake Torque @ 100 psi/6.9 bar: 68 Nm
 - Repeatability: 30 arc-sec
 - Travel: 360 Degrees
 - Indexing Resolution: 0.001 degrees

- Air Requirements: 150 PSI
- Rotary Table Weight: 77-80 kg

Sample Image:



Picture for reference only

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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 Annex D2.	18	set			
2	CNC Control Simulator (Full Function Control)		8	unit			

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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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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.

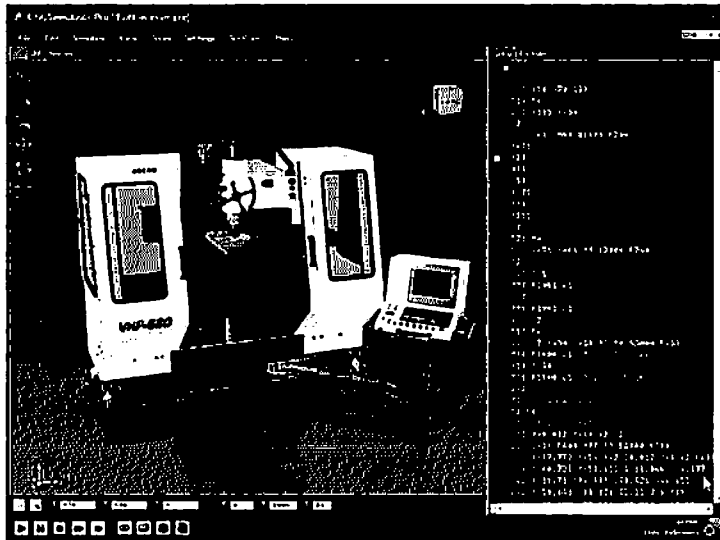
Features:

- 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" 2K/4K ultrawide curved monitor. Includes mouse, keyboard, headset and computer table.
- Network system - wireless network with 4TB Network Attached Storage
- 30 seat educational licence 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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Representative**

Date

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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 Annex D3.	1	unit			

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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	<ul style="list-style-type: none"> - 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	CNC Laser Cutting Machine
Item Code	03-001
Technology Area(s)	CNC Plasma Machine

Specification

Controller	G-Code/Conversational type, support remote monitoring, Wired and WiFi connection, 15" touch control display
*Cutting range:	3,000 x 1,500 mm
*X-axis stroke:	3,040 mm $\pm 20\%$
*Y-axis stroke:	1,520 mm $\pm 20\%$
*Z-axis stroke:	120 mm $\pm 20\%$
*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 $\pm 20\%$
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

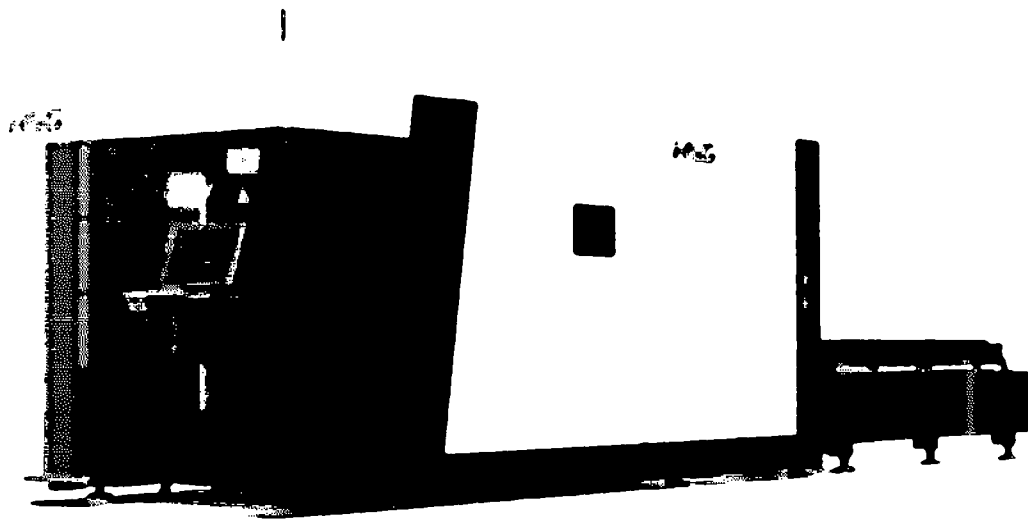
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Other requirements:

- 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.

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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 Annex D4.	1	unit			
2	CNC Lathe Machine		1	set			

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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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	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 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

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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

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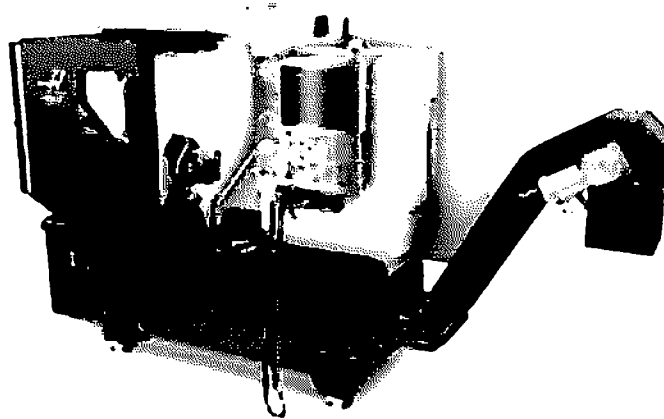
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Other requirements:

- Proof of extensive local service support (provide an organizational chart of the existing service staff, including certification from manufacturer)
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Sample Image:



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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 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

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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	

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	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"

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	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

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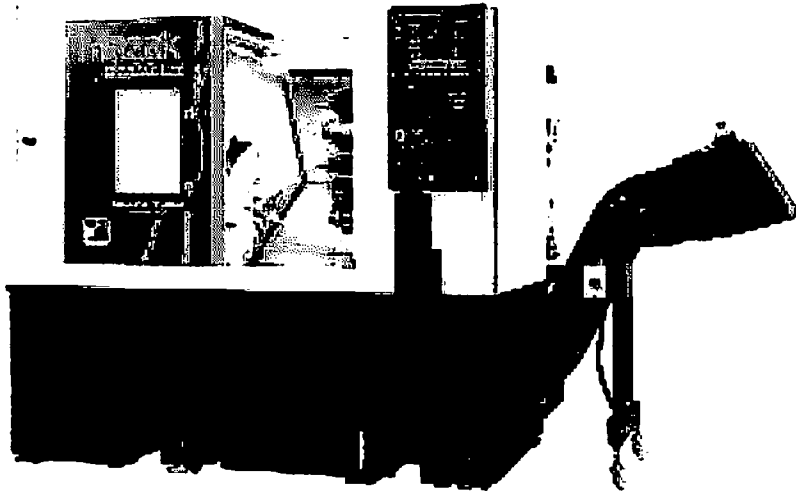
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Other requirements:

- 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
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Sample Image:



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Name of Company/Bidder

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Date

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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 Annex D5.	1	set			

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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	<ul style="list-style-type: none"> - 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

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76



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 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

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	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

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	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

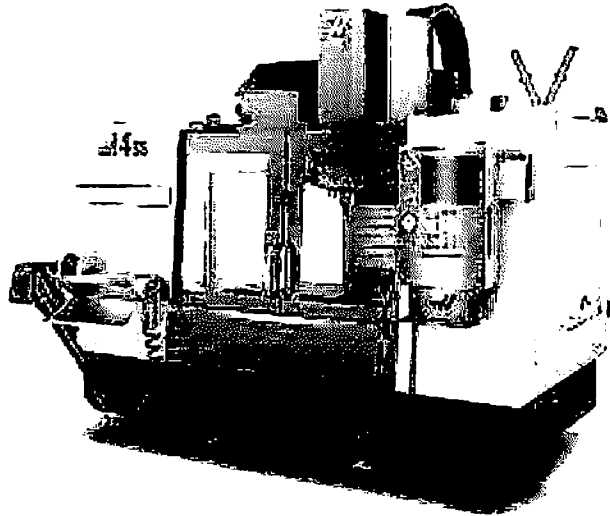
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Other requirements:

- 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.

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<hr/> Name of Company/Bidder	<hr/> Signature over Printed Name of Authorized Representative	<hr/> Date
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Technical Specifications

Lot 6 : Machining Equipment

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
1	Electric Box Furnace	Kindly refer to the technical specifications attached as Annex D6.	1	unit			
2	Hardness tester		1	unit			
3	Precision Centerless Grinding Machine		1	unit			
4	Pipe Beveling Machine		1	unit			
5	Plate Beveling Machine		1	unit			

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* 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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All tools, equipment, gadgets and electrically operated instruments should have Standard Manufacturers Manual and/or Datasheet/Specification Sheet/Brochure as indicated in Annex D6.

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
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ANNEX D6

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
6	Machining Equipment	06-001	Electric Box Furnace	<p>*Technology Transfer/Training *English Manual *Oven for heat treatment *Volume (in liters): 15 *Inner dimension (w x d x h): 230 x 340 x 170 mm *Temp uniformity pf +/- 5K in the empty workspace (w x d x h): 180 x 270 x 120 mm *Max. Temperature: 1,300 °C *Heating time: 70 min *Connected load: 3,200 watts *Power source: Voltage 220V, 50-60Hz, single phase *Overall machine size: 2m (width) x 3m (height) to ensure that there will be no issue during ingress</p> <p>Minimum Features Required: *Heating from two sides *Heating elements on support tubes ensure free heat radiation and a long service life *Multi-layer insulation with robust lightweight refractory bricks in the furnace chamber *Optional flap door (L) which can be used as work platform or lift door (LT) with hot surface facing away from the operator *Adjustable air inlet in the furnace door *Exhaust air outlet in rear wall of furnace</p>	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	<ul style="list-style-type: none"> - 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
6	Machining Equipment	06-002	Hardness tester	<p>*Technology Transfer/Training</p> <p>*English Manual</p> <p>Testable Hardness: Rockwell</p> <p>*Hardness Display: Digital</p> <p>*Preliminary test force: 29.42 N, 98.07 N</p> <p>*Test force: Rockwell Superficial 147.1 N, 294.2 N, 441.3 N</p> <p>*Test force: Rockwell 588.4 N, 980.7 N, 1,471 N</p> <p>*Resolution: 0.1 HR indication</p> <p>*Preliminary test force switching: Dial switching</p> <p>*Total test force switching: Weight change</p> <p>*Total test force load operation: Motor drive, button start</p> <p>*Test force duration: Fixed 3-5.5 s or manual operation</p> <p>*Maximum specimen dimension: 180 mm (100mm if cover is attached), 165 mm (from indenter axis to frame)</p> <p>*Functions: OK/NG judgment function, Offset correction function, Hardness conversion function</p> <p>*Data output interface: Digimatic RS-232C</p> <p>*Power source: 220VAC, 60Hz Single phase/ 3 phase</p> <p>* Includes standard accessories:</p> <ul style="list-style-type: none"> - Flat anvil - V-anvil - AC Adapter - Vinyl cover - Accessory box - Level <p>*Overall machine size: 2m (width) x 3m (height) to ensure that there will be no issue during ingress</p>	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	<ul style="list-style-type: none"> - 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
6	Machining Equipment	06-003	Precision Centerless Grinding Machine	<p>Technology Transfer/Training</p> <p>*English Manual</p> <p>*Standard processing range: 1-80 diameter</p> <p>*Grinding wheel sizes: (ODxWxD): 400-455x200-205x200-250</p> <p>*Adjusting wheel sizes: (ODxWxD): 200-255x200-205x200-100-115</p> <p>*Regulating wheel speed: 13-308 rpm</p> <p>*Grinding wheel speed: 1000-1500rpm</p> <p>*Regulating wheel tilt range:-3 to +5 degrees</p> <p>*Regulating wheel swivel angle:±5 degrees</p> <p>*Coolant pump drive motor: 1/4 HP x 2P</p> <p>*Power source: 220VAC, 60Hz</p> <p>Includes standard accessories</p> <p>*Overall machine size: 2m (width) x 3m (height) to ensure that there will be no issue during ingress</p>	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	<ul style="list-style-type: none"> - Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing 	Yes
6	Machining Equipment	06-004	Pipe Beveling Machine	<p>*English Manual</p> <p>*Functions: External and Internal Beveling</p> <p>*Facing</p> <p>*Counter boring</p> <p>*Weld Removal</p> <p>*J-prepping and Compound bevels.</p> <p>*Materials: Any kind of steel & exotic alloy</p> <p>*Recommended working range: 3"-16" Diameter</p> <p>*Power: Pneumatic</p> <p>*Option of electric: 220VAC 50-60Hz</p> <p>*Overall machine size: 2m (width) x 3m (height) to ensure that there will be no issue during ingress</p>	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	<ul style="list-style-type: none"> - 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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Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
6	Machining Equipment	06-005	Plate Beveling Machine	*English Manual *Self-propelled *Max. bevel width: 40mm *Bevel angle: 15-60 degree *Plate thickness: 6-60mm *Beveling speed: 0-1.6 m/min. *Motor power: 3000 w *Motor idle speed: 800 rpm *Voltage: 220V/60 Hz, 3-phase *Tooling: 9 changeable inserts; 80 mm diameter *Overall machine size: 2m (width) x 3m (height) to ensure that there will be no issue during ingress	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

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

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Technical Specifications

Lot 7

: Metal Fabrication Equipment

No.	Item	Minimum Agency Specifications Unless Otherwise Specified	Qty	Unit	Statement of Compliance *	Make Brand / Model	Reference
1	Hydraulic Press Brake Machine	Kindly refer to the technical specifications attached as Annex D7.	1	unit			
2	Hydraulic Shearing Machine		1	unit			
3	Lock Forming Machine		1	unit			
4	Hydraulic Plate Bending Roller Machine		1	unit			
5	Automatic Sheet and Plate Rolling Machine		1	unit			
6	Bench Mini Drill Press		1	unit			
7	Cut Off Machine		1	unit			
8	Metal Sheet Bending Machine		1	unit			
9	Hydraulic Press		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.

All tools, equipment, gadgets and electrically operated instruments should have Standard Manufacturers Manual and/or Datasheet/Specification Sheet/Brochure as indicated in Annex D7.

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
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ANNEX D7

Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
7	Metal Fabrication Equipment	07-001	Hydraulic Press Brake Machine	<p>English Manual</p> <p>*Bending force: 1,100 kN</p> <p>*Bending length: 3000-3500mm</p> <p>*Throat depth: 300-450mm</p> <p>*Stroke adjustment range: 100-150mm/sec.</p> <p>*Ram Stroke:215 mm</p> <p>*Ram speed: 160, 10, 130 mm/s</p> <p>* Die setting height: 520 mm</p> <p>*Working Stroke Speed: 6-10mm/s</p> <p>*Return stroke speed: 40-50mm/s</p> <p>*Input power: 220VAC 60Hz</p> <p>*Main motor: 6-11Kw</p> <p>*Features and accessories: Mechanical Crowning, Fast clamp for upper tool, Finger stops along linear guide, Standard punch, Standard 2-V die, Hydraulic oil, Die holder, 4-Vee Die</p> <p>*Overall machine size : L=4m or less, W=2m or less, H=2.5m or less</p>	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	<ul style="list-style-type: none"> - 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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Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
7	Metal Fabrication Equipment	07-002	Hydraulic Shearing Machine	*Max. shearing Thickness: 6mm *Max. shearing length: 1000-2500mm *Cutting angle: 1.2 degrees * No. of Clamps: 11 *Power source: 220VAC, 60 Hz *with following accessories: Blade for stainless steel *Technology Transfer/Training *English Manual *Overall machine size: 2m (width) x 3m (height) to ensure that there will be no issue during ingress	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
7	Metal Fabrication Equipment	07-003	Lock Forming Machine	*Technology Transfer/Training *English Manual *Double seam rolls: capacity= 20 to 26 gauge, approx material used: 25 mm, size=9.5 mm seam *Drive cleat rolls: capacity= 20 to 26 gauge, approx material used: 54 mm, size=28 mm width *Right angle flange rolls: capacity= 26 to 25 gauge, approx material used: 9.5 mm, size=9.5 mm high *Motor: 1HP *Speed: 25 per minute *Drive: V-belt *Stand: Arc welded steel heavy top plate *All steel forming head, hardened ground shafts, case hardened steel forming rolls, machine cut gears and needle type roller bearing throughout *Power source: 220VAC, 60 Hz *Overall machine size: 1.5m or less x 1m or less x 1.5m or less	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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Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
7	Metal Fabrication Equipment	07-004	Hydraulic Plate Bending Roller Machine	*Technology Transfer/Training *English Manual *Capacity: 2.5 x 1550 * Roll diameter: 110mm * Min. Roll Diameter: 165mm * Motor capacity 3HP *Power source: 220VAC, 60 Hz *with following features: Welded steel frames, three rolls mounted independently, all rolls are driven by a gear system *Overall machine size: 3m or less x 1m or less x 1.5 m or less	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
7	Metal Fabrication Equipment	07-005	Automatic Sheet and Plate Rolling Machine	Technology Transfer/Training *English Manual *3 roller bending roll machine *Rolling services at up to 10mm thick x 2000mm width *Roll Diameter 200mm *Foot switch control *Power source: Voltage 220VAC, 60Hz *Overall machine size: 4.5m or less x 1.5m or less x 2m or less	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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Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
7	Metal Fabrication Equipment	07-006	Bench Mini Drill Press	Drilling cap: 25mm (1") Motor power: 3/4 - 1 1/4 hp Spindle travel: 75-100 mm Swing: 360 mm Table size: 290mmx290mm Base size: 460x272mm Column diameter: 70-80mm Height: 140-160mm	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
7	Metal Fabrication Equipment	07-007	Cut Off Machine	Disc Diameter: 14" No load Speed: 3,800 RPM Power: 2000W Voltage: 220-240V, 60Hz	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
7	Metal Fabrication Equipment	07-008	Metal Sheet Bending Machine	Box and pan brake Manual Bending angle: 0 - 135° Length: 48" Thickness: 16-20 gauge Beam lift max: 1.75" Box Depth: 4" With stand Includes 16 fingers with sizes 2" - 4" Power: 220V/60Hz/1Ph or 220V/60Hz/3Ph With English manual	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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Lot No.	Lot	Code	Item	Agency Specification	Classification	Test Procedure (Post Evaluation)	Test Procedure (Inspection and Acceptance)	English Manual
7	Metal Fabrication Equipment	07-009	Hydraulic Press	H-Frame 15 ton capacity Piston travel: 160mm Bend angle: 0-135 degree Maximum capacity: 16 gauge mild steel Dimension (from ground): 700 x 540 mm With Pressure Gauge	Equipment	Evaluation of Brochure with picture and/or data sheet and training proposal	<ul style="list-style-type: none"> - 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 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 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.

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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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Date



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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	<ul style="list-style-type: none"> - 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 (1 set, 6 modules)

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 \pm 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 \pm 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

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- **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)

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- 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

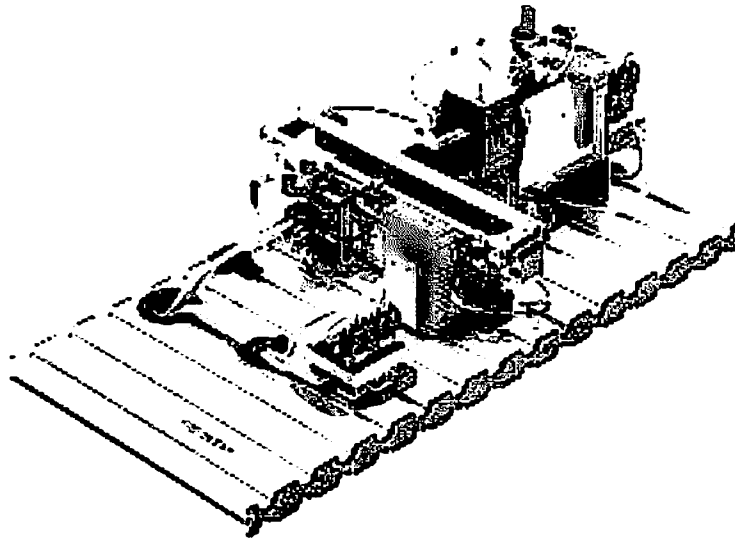
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- **MPS Trolley/accessories**
 - Trolley
 - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
 - Accessories
 - Profile plate and control console
 - Height adjustment
 - A4 mounting frame
 - A4 mounting profile
 - Assembly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

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- **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 $\pm 10V$ 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

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- **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**

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- **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

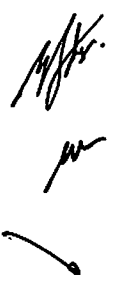
- **5/2-way single solenoid valve**
 - Valve function: 5/2 bistable, 5/2 monostable
 - Type of actuation: electrical
 - Valve size: 10 mm, 14 mm, 18 mm
 - Standard nominal flow rate: 90 ... 1,380 l/min
 - Working pressure: -0.9 ... 10 bar
 - Design structure: Piston slide
 - Type of reset: mechanical 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



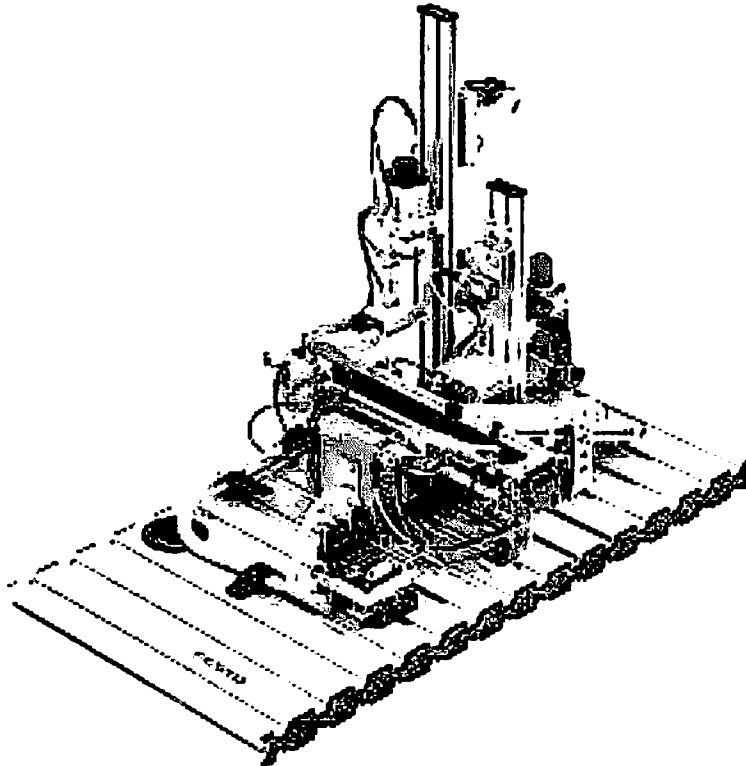
- **MPS Trolley/accessories**
 - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
 - Accessories
 - Profile plate and control console
 - Height adjustment
 - A4 mounting frame
 - A4 mounting profile
 - Assembly board

- **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 \pm 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: \leq 0.6 ms
 - Switch-off time: \leq 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**

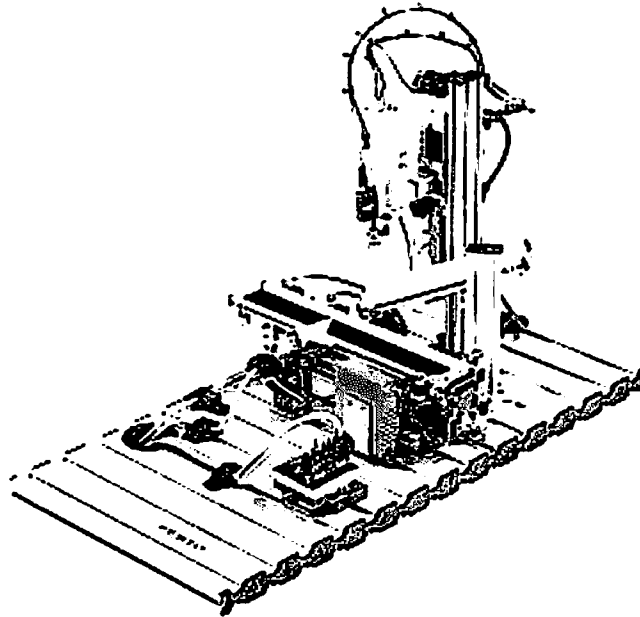
- **Push-in Connector**
 - Size: Mini
 - Nominal size: 2.6 mm
 - Container size: 10
 - Design structure: Push/pull principle
 - Operating pressure complete temperature range: -0.95 ... 6 bar
 - Operating medium: accordance with ISO8573-1:2010
 - Pneumatic connection, port 1: Push-in sleeve QS-6
 - Pneumatic 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 ± 10 V 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 $\pm 5^\circ$
 - 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 \pm 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 (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

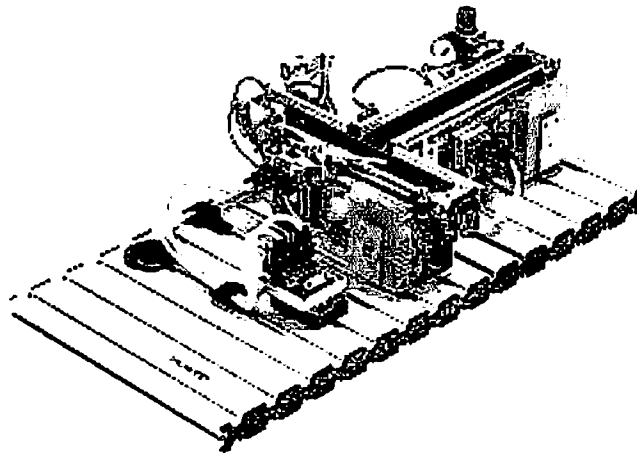
- **MPS Trolley/accessories**
 - Trolley
 - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
 - Accessories
 - Profile plate and control console
 - Height adjustment
 - A4 mounting frame
 - A4 mounting profile
 - Assembly board

- **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 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 \pm 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 \pm 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 \pm 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

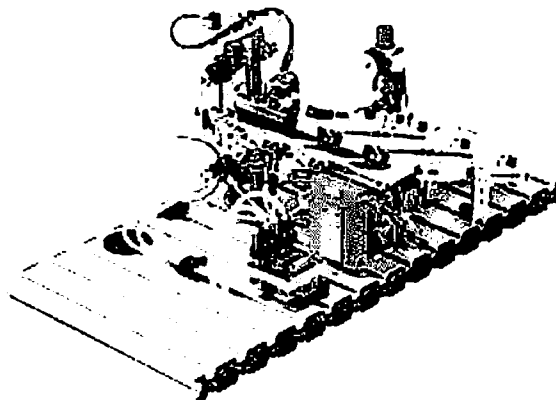
- **Supply Regulator Unit**
 - Start-up valve with filter control valve
 - Design: diaphragm control valve
 - Assembly position: Vertical $\pm 5^\circ$
 - Standard nominal flow rate: 110 l/min
 - Upstream pressure: 100 to 1000 kPa (1 to 10 bar)
 - Operating pressure: 50 to 700 kPa (0.5 to 7 bar)
 - Connection: 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 (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 $\pm 10V$ 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 \pm 10V DC
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 - Measuring principle: Optoelectronic
 - Measurement method: Retro-reflective sensor for transparent objects
 - Type of light: Red, polarized
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 - Reference material: Laser reflector, 51 x 51 mm
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 - Power rating: Max. 2 A per wire
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 - Start-up valve with filter control valve
 - Design: diaphragm control valve
 - Assembly position: Vertical $\pm 5^\circ$
 - Standard nominal flow rate: 110 l/min
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 - Operating pressure: 50 to 700 kPa (0.5 to 7 bar)
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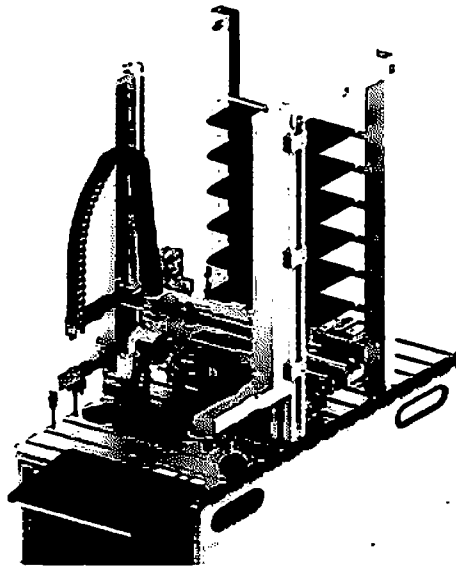
- **MPS Trolley/accessories**
 - Trolley
 - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
 - Accessories
 - Profile plate and control console
 - Height adjustment
 - A4 mounting frame
 - A4 mounting profile
 - Assembly board

- **Control Panel/Console**
 - Control console for Syslink
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 - Programming language
 - Statement list (STL)
 - Function diagram (FUN)
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 - 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 (5 units)

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: CODESYS 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

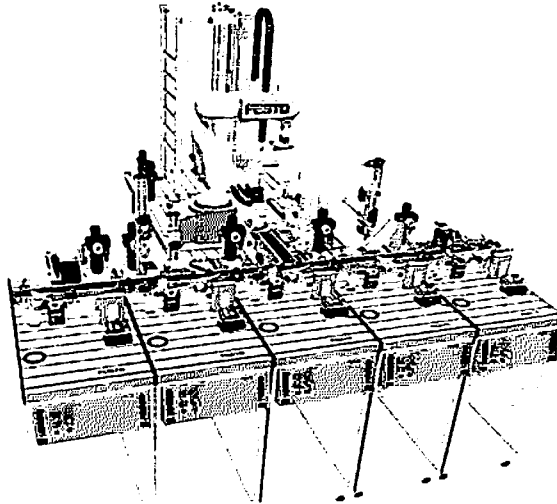
- 4 Units of Workpiece set "for cylinder assembly"
 - External diameter: 40mm
 - Height (black): 22.5mm
 - Height (red): 25mm

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

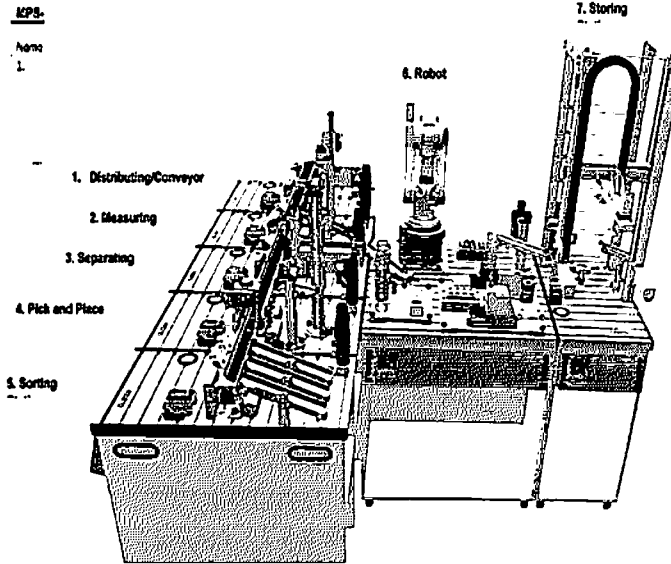
NOTE: Main voltage supply per station: 220-250VAC, 60hz

Sample Image:

MP8-D 3D lay-out - (T-Shape)



MP8-D 3D lay-out - (T-Shape)



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