

Technical Specifications

Lot 15

: Structured Cabling Equipment and Supplies

APPROVED BUDGET
FOR THE CONTRACT

: Six Million Six Hundred Thirty-Eight Thousand Six Hundred Eighty-
(P6,638,684.64)

Item Code	Item Name	Agency Specification	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
01-022	Fusion splicer	Kindly refer to the technical specifications attached as Annex B15.	10	units			
01-023	Optical Time-Domain Reflectometer		5	units			
01-024	LAN Cable Analyzer		30	units			
01-025	Optical Cable Stripper		20	pcs			
01-026	Fiber Loose Tube Cutter		20	pcs			
01-027	Fiber Kevlar shears		20	pcs			
01-028	Single Wire Punch Down Tool		20	pcs			
01-029	Curve-Wave Rack, 42U		10	pcs			
01-030	Curve-Wave Rack, 15U		10	pcs			
01-031	Curve-Wave Rack, 6U		5	pcs			
01-032	FO Splice and Patch Enclosure		10	pcs			
01-033	Inline type FO Splice Closure		10	pcs			
01-034	FO Rack Mount Slide 19"		10	pcs			
01-035	Category 6 Patch Panel		20	pcs			
01-036	Category 5E Patch Panel		20	pcs			
01-037	Cable Management Panel		20	pcs			
01-038	Spare Splice		10	pcs			
01-039	F.O Cable Distribution 48 Core, 4 Buffer Outdoor		1	set			

Item Code	Item Name	Agency Specification	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
01-040	F.O Cable Distribution 24 Core 2 Buffer Outdoor	Kindly refer to the technical specifications attached as Annex B15.	1	set			
01-041	F.O Cable Distribution 12 Core, Indoor		1	set			
01-042	CAT 6 UTP		15	boxes			
01-043	CAT 5E UTP Stranded		15	boxes			
01-044	CAT 5E UTP Solid		15	boxes			
01-045	CAT 5E UTP Cable, 25-Pair		1	set			
01-046	FTTH 2 Core Flat Cable (2000m)		1	set			
01-047	BNC Patch Panel		10	pcs			
01-048	RG-6 Cable		10	drum s			
01-049	Wire Mesh Cable Tray		20	pcs			

* 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.

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

Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date
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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
01-022	Fusion splicer	<ul style="list-style-type: none"> • Optical Fiber Fusion Splicer, Plug-in Battery Type <p>With Accessories</p> <ul style="list-style-type: none"> • Fiber Cleaver • Spare Electrode • Wire Stripping Pliers • Miler Stripper • Hex Key • Carrying Case • Fiber for ARC Calibration • Strap • Power Adapter • Alcohol Bottle • Brush • User's Manual Quality Certificate • Warranty Card 	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	10	units
01-023	Optical Time-Domain Reflectometer	1310/1550+OPM+OLS+OM+VFL+iOL M 35/33dB (Singlemode) OTDR	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	5	units

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
01-024	LAN Cable Analyzer	<ul style="list-style-type: none"> • 1 - #1-5 Coax ID and Test Remote Set • 1 - #1-5 Data ID-only Remote Set • 1 - F Female to F Female Adapter F81 • 1 - Network/Tel Test and ID Smart Remote #1 • 2 - No-Fault Cables • 1 - Micro USB Cable • 1 - Hanging Pouch • 1 - Quick Start Guide • 1 - User Manual (Online) 	Electronic Instruments	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	30	units
01-025	Optical Cable Stripper	<ul style="list-style-type: none"> • 9-40mm Round Cable Stripper • Fiber Optic Tool, Optical Fiber Cable Jacket Slitter, Longitudinal, and Window Stripping 	Tools and Measuring Instruments	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	20	pcs
01-026	Fiber Loose Tube Cutter	Fiber Optic Tool 45-163 Fiber Loose Tube Transverse Fiber Optic Buffer Tube Coaxial Cable Stripper Coax Stripping Pliers	Tools and Measuring Instruments	Brochure with picture and data sheet	<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 	1 Year	Yes	N/A	20	pcs

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
01-027	Fiber Kevlar shears	Kevlar Shear for fiber optics, size: 6-3/8-Inch, material: high carbon alloy and rubber/plastic for grip	Tools and Measuring Instruments	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	20	pcs
01-028	Single Wire Punch Down Tool	<ul style="list-style-type: none"> • PrecisionCore TFP Print Head • PrecisionCore Printhead • Maximum Printable Width: 36-inch • Maximum Resolution: 2880 x 1440 dpi • Ink cartridge (Cyan, Magenta, Yellow, Photo Black, Matte Black) • Ink refill volume: 110 ml, 350ml, or 700ml each 5 colors • USB and Ethernet • AC 100 - 240V, 50-60 Hz 	Tools and Measuring Instruments	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	20	pcs
01-029	Curve-Wave Rack, 42U	<ul style="list-style-type: none"> • VE Cabinet, W*D*H: 600*600*2000 mm, High density vented mesh front door, High density vented mesh split rear door, 42U, Flat Packed, vented top, black 9005 	Equipment	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Measurement of dimension - Checking of materials - Functionality testing 	1 Year	N/A	N/A	10	pcs

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
01-030	Curve-Wave Rack, 15U	<ul style="list-style-type: none"> • 19" Curve-Wave Rack 15U (60 x 60 x 88 cm.) Cabinet • VA Wall Cabinet, 540 x 600 x 726 mm, Tempered Glass, 15U 	Equipment	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Measurement of dimension - Checking of materials - Functionality testing 	1 Year	N/A	N/A	10	pcs
01-031	Curve-Wave Rack, 6U	<ul style="list-style-type: none"> • 19" Curve-Wave Rack 6U Cabinet • VA Wall Cabinet, 540*600*327mm, Tempered glass door, 6U 	Equipment	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Measurement of dimension - Checking of materials - Functionality testing 	1 Year	N/A	N/A	5	pcs
01-032	FO Splice and Patch Enclosure	<ul style="list-style-type: none"> • FO Wall Mount Splice and Patch Enclosure 01 Splice tray • FTTH Fiber Splicing and Termination Box, Unloaded 2 In 24 Out (for 24F SC, 48F LC Duplex) 	Gadgets and Devices	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	10	pcs
01-033	Inline type FO Splice Closure	<ul style="list-style-type: none"> • Inline type FO Splice Closure (FOSC) Dome Type, 24 cores 02 Splice tray • Dome Optic Fiber Splice Closure, Two-in and Two-out, Basket Type (1*24F, 24 Core) 	Gadgets and Devices	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	10	pcs

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
01-034	FO Rack Mount Slide 19"	<ul style="list-style-type: none"> • Splice and Patch Enclosure 24SC • FO 01 Splice tray • 24 Port Optical Fiber Patch Panel, Unloaded (For 24 Core Simplex SC, with Splice Tray, 1U) 	Gadgets and Devices	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	10	pcs
01-035	Category 6 Patch Panel	<ul style="list-style-type: none"> • UnShielded, 24- Port • CAT6 24 Port Unshielded Patch Panel (Loaded, 1U) 	Gadgets and Devices	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	20	pcs
01-036	Category 5E Patch Panel	<ul style="list-style-type: none"> • UnShielded, 24- Port • CAT 5e 24 Port Unshielded Patch Panel, Loaded, 1U 	Gadgets and Devices	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	20	pcs

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
01-037	Cable Management Panel	<ul style="list-style-type: none"> Cable Manager, 1U Cable Management, Steel, Management port:24 	Gadgets and Devices	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	20	pcs
01-038	Spare Splice	<ul style="list-style-type: none"> Metal Tray for 12 Fiber for FDU 24 Port Optical Fiber Patch Panel, Unloaded (For 24 Core Simplex SC, with Splice Tray,1U) 	Consumables	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	10	pcs
01-039	F.O Cable Distribution 48 Core, 4 Buffer Outdoor	<ul style="list-style-type: none"> Outdoor Stranded Loose Tube Optical Fiber Cable, Steel Tape Armor, Steel Center Strength Member, Jelly Filled, PE Sheath, G652D, 48 Core, total length of 2000 m 	Consumables	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	1	set

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
01-040	F.O Cable Distribution 24 Core 2 Buffer Outdoor	<ul style="list-style-type: none"> Outdoor Stranded Loose Tube Optical Fiber Cable, Steel Tape Armor, Steel Center Strength Member, Jelly Filled, PE Sheath, G652D, 24 Core, total length of 2000 m 	Consumables	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	1	set
01-041	F.O Cable Distribution 12 Core, Indoor	<ul style="list-style-type: none"> Indoor Bundle Tight-buffered Optical Fiber Cable, Aramid Yarn Strength Member, LSZH Sheath, G652D, 12 Core, total length of 2000 m 	Consumables	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	1	set
01-042	CAT 6 UTP	<ul style="list-style-type: none"> CAT 6 UTP w/Cross Filler, 23 AWG, CMR CAT6 U/UTP Unshielded Copper Cable, CM, total length of 305m 	Consumables	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	15	boxes

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
01-043	CAT 5E UTP Stranded	<ul style="list-style-type: none"> CAT 5E UTP Enhanced CABLE 350 MHz, CMR Stranded cable CAT5e U/UTP Unshielded Copper Cable, CM, total length of 305m 	Consumables	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	15	boxes
01-044	CAT 5E UTP Solid	<ul style="list-style-type: none"> CAT5E UTP Enhanced CABLE 350 MHz, CMR Solid CAT5E U/UTP Unshielded Copper Cable, CM, Blue, total length of 305m 	Consumables	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	15	boxes
01-045	CAT 5E UTP Cable, 25-Pair	<ul style="list-style-type: none"> Category 5E UTP Cable, 25-Pair, total length of 2000m CAT5 U/UTP 25 Pair Backbone Copper Cable, PVC 	Consumables	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	1	set

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
01-046	FTTH 2 Core Flat Cable (2000m)	<ul style="list-style-type: none"> • FTTH Flat Distribution Cable, total length of 2000m • Indoor Optical Fiber Drop Cable, FRP Strength Member, LSZH Sheath, G657A1, 2 Core 	Consumables	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	1	set
01-047	BNC Patch Panel	<ul style="list-style-type: none"> • 1U • 16 ports 	Consumables	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	10	pcs
01-048	RG-6 Cable	<ul style="list-style-type: none"> • 75 Ohms • VIVANCO RG6 Standard Shield Coaxial cable, total length of 305m, PVC 	Consumables	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	10	drums

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
01-049	Wire Mesh Cable Tray	<ul style="list-style-type: none"> • Wire Mesh Cable Tray, 12x2In, 10 Ft • Metal • Finish: Zinc Plated 	Tools and Measuring Instruments	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	20	pcs

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

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

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Technical Specifications

Lot 16

: Industrial Automation, Mechatronics and Robotics

**APPROVED BUDGET
FOR THE CONTRACT**

: **Seventy-Five Million Five Hundred Nine Thousand Fifty-Six Pesos
and 01/100 (P75,509,056.01)**

Item Code	Item Name	Agency Specification	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
18-001	Human Machine Interface	Kindly refer to the technical specifications attached as Annex B16.	5	units			
18-002	Variable Frequency Drive		10	units			
18-003	Additional Servo Drive System		10	units			
18-004	Additional Servo Motor		10	units			
19-001	Double Acting Cylinder		50	pcs			
19-002	Reed Switch		100	pcs			
19-003	5/2 Way Double Solenoid Valve		50	pcs			
19-004	5/2 Way Single Solenoid Valve		50	pcs			
19-005	Filter Regulator Lubricator		20	pcs			
13-001	Mobile Robots 4.0		2	units			
13-002	Robot Station		2	units			
14-001	Modular Production System		1	set			
15-001	Production Line Trainer		2	sets			

* 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.

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

Name of Company/Bidder	Signature over Printed Name of Authorized Representative	Date
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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
18-001	Human Machine Interface	<ul style="list-style-type: none"> • 7 inch display / TFT Display • 800X480 pixels resolution • Color display • 3 number of ports • Port Type: Ethernet, MPI, Profibus DP, USB • Processor Type: ARM • With backlight • Supply voltage: 24VDC • Dimension: 214x158x63mm • IP Rating: IP20, IP65 • Configurable from WINCC COMFORT V11 	Equipment	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Measurement of monitor - Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing 	1 Year	Yes	Yes	5	units
18-002	Variable Frequency Drive	<ul style="list-style-type: none"> • Power rating 2.2KW • Single phase • Current rating 11 AMP • Supply voltage 220-240 VAC • Output frequency 0-550HZ • fieldbus communication type : modbus • With control panel • Mounting type : wall mounting • With accessories : Smart access module 	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	10	units

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
18-003	Additional Servo Drive System	<p>Input</p> <ul style="list-style-type: none"> -Number of Phases : 1AC -Line voltage: 200-240VAC +- 10% -Line Frequency: 45 - 66Hz -Rated Current: 5.0 A -Inrush current: 8.0A <p>Output</p> <ul style="list-style-type: none"> -Number of phases: 3AC -Rated power: 0.40 kW (0.54 hp) -Rated current: 2.4 A -Max. Output current : 8.7 A -pulse frequency : 8 kHz -Output frequency for servo control: 0-550 hz <p>Control Methods : Servo Communication : PROFINET IRT, PROFISafe, PROFInergy Motor Connection : One cable connection (OCC) with SPEED-CONNECT quick-lock fastener and compact, rotatable plug; Allowed cable length: up to 165 ft. (50 m) Typical Controllers : Compatible with SIMOTION (motion control system)</p>	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	10	units

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
18-004	Additional Servo Motor	<p>Motor type : Permanent-magnet synchronous motor, Natural cooling, IP64 Motor type : High Dynamic Static torque : 0.32 Nm Static current : 0.8 A Power Rating: 100W Supply Voltage: 220-240V</p> <p>Maximum torque 1.11 Nm Maximum current 3.0 A Maximum speed : 8000 rpm</p> <p>Rotor moment of inertia 0.040 kgcm² Connection type : OCC for S210 Included: OCC (one cable connection) Connector size : M12 With holding brake</p> <p><i>Mechanical data</i> Shaft height : 20 Flange size (AB) : 40mm Centering ring (N) : 30 mm Hole circle (M) : 46mm Screw-on hole (S) : 4.5mm Overall length (LB) : 137mm Diameter of shaft (D) : 8mm Length of shaft (E) : 25mm Length of flange diagonal (P) : 54mm Compatible with additional servo drive system, item no. 18-003 with simotion controllers</p>	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	10	units

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
19-001	Double Acting Cylinder	Pneumatic double acting Piston Diameter : 20mm Stroke length: Maximum 100 mm Cushioning : P flexible cushioning ring/pads on both sides Position sensing : For proximity sensor ISO 6432	Gadgets and Devices	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	50	pcs
19-002	Reed Switch	Switching output : N/O contact (PNP / NPN) with switching status indication Operating voltage : 5 – 30 V DC Output current : max. 100 mA With mounting system for cylinder diameter : 20 mm Compatible with double acting cylinder, item no. 19-001	Gadgets and Devices	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	100	pcs
19-003	5/2 Way Double Solenoid Valve	Pneumatic double solenoid valve Operating pressure : 150 – 800 kPa (1.5 – 8 bar) Electrical connection : via integrated 4mm safety sockets Power supply : 24VDC with LED	Gadgets and Devices	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	50	pcs

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
19-004	5/2 Way Single Solenoid Valve	Pneumatic single solenoid valve Operating pressure : 250 – 800 kPa (2.5 – 8 bar) Electrical connection : via integrated 4mm safety sockets Power supply : 24VDC with LED	Gadgets and Devices	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	50	pcs
19-005	Filter Regulator Lubricator	Pneumatic Connection: G1/8, G1/4 Pressure: 0.5 - 7 bar Flow rate: 400 - 650 l/min with pressure gauge Grade of filtration: max 40 µm, min 5 µm Condensate drain : MANUAL / AUTOMATIC	Tools and Measuring Instruments	Brochure with picture and data sheet	<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 	1 Year	N/A	N/A	20	pcs
13-001	Mobile Robots 4.0	refer to Technical Specification of Item Code 13-001	Learning System	Brochure with picture and data sheet	<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 - Installation, Commissioning and Training 	1 Year	Yes	Yes	2	units

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
13-002	Robot Station	refer to Technical Specification of Item Code 13-002	Learning System	Brochure with picture and data sheet	<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 - Installation, Commissioning and Training 	1 Year	Yes	Yes	2	units
14-001	Modular Production System	refer to Technical Specification of Item Code 14-001	Learning System	Brochure with picture and data sheet	<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 - Installation, Commissioning and Training 	1 Year	Yes	Yes	1	set

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
15-001	Production Line Trainer	refer to Technical Specification of Item Code 15-001	Learning System	Brochure with picture and data sheet	<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 - Installation, Commissioning and Training 	1 Year	Yes	Yes	2	sets

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

Name of Company/Bidder

Signature over Printed Name of Authorized Representative

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TECHNICAL SPECIFICATION

Name of The Learning System	Mobile Robot 4.0
Item Code	13-001
Technology Area(s)	Industrial Automation, Mechatronics and Robotics

Required Topics/Lessons:

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

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

Courseware:

- Robotic SIM Professional
- CIROS Studio, single license

Hardware / Specification:

- **Parameters / Data**
 - Height: 325 mm
 - Diameter: 450 mm
 - Total weight (unladen weight): 20 kg
 - Total weight (including 4 rechargeable battery packs): 22.8 kg (approx. 700 g per rechargeable battery pack)
 - Degree of protection: IP 00
 - Battery voltage: 18 V
 - Housing material: Stainless steel, PA6
 - Degrees of freedom: 3 translational in x- and y-direction rotational about the z-axis
- **Control and Interface**
 - Controller: Embedded PC to COM Express specifications
Intel i5, 8th generation, 2.5 GHz frequency, up to 4.2 GHz in turbo mode, 4 physical cores with hyperthreading Integrated UHD Graphics 630
 - Main memory: 8 GB RAM
 - Hard disk: 64 GB SSD
 - Operating system: Linux Ubuntu 18.04 LTS (64 bit)
 - Motor control: microcontroller with 32-bit microprocessor and separate Ethernet interface
 - Drive wheels: 3 x omnidirectional wheels with 120 mm diameter
 - Drive wheels: 3 x DC motors, maximum 3,600 rpm, with encoders and gear unit, gear ratio: 32:1

- **Interface**

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

- **Digital inputs/outputs**

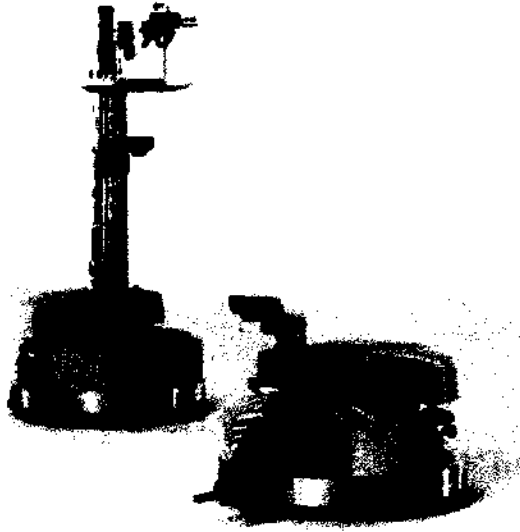
- Inputs: 8
- Outputs: 8
- Max. 24VDC
- Max. 2.A per output
- Max. 2 A total"
- Analog inputs: 8
- Analog output: 2"
- "WLAN standards: 5 GHz (IEEE802.11 ac/n/a)
- 2.4 GHz (IEEE802.11 b/g/n)
- Transmission power: CE: max. 23 dBm (5 GHz) max. 20 dBm (2.4 GHz)
- Power supply: 5 V max. 2 A

Other Equipment & Accessories:

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

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Sample Image:



Picture for reference only

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TECHNICAL SPECIFICATION

Name of The Learning System	Robot Station
Item Code	13-002
Technology Area(s)	Industrial Automation, Mechatronics and Robotics

Required Topics/Lessons:

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

- Handling assembly
- Integration of an industrial robot in an assembly process
- Teaching of robots in complex assembly environments
- Commissioning of complex systems
- Maintenance, servicing and troubleshooting of complex systems
- Programming of industrial robots combined with the integration of sensors and additional actuators
- Programming of multitasking applications

Courseware:

- CIROS Studio single license

Hardware:

- **Robot Handling Module**
 - Fiber-optic cable
 - Signal processing (measuring principle): red light
 - Switch triggering: Reflex
 - Function on actuation: Polymer fiber optic cable
 - Coverage range max.: 120 mm
 - Mounting thread: M 6
 - Material of housing: brass
 - 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
 - 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
- 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)
- **Robot Assembly Module**
 - Fiber-optic cable
 - Signal processing (measuring principle): red light
 - Switch triggering: Reflex
 - Function on actuation: Polymer fiber 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
- 5/2 Way Single Solenoid Valve
 - Design: for round slot
 - Conforms to standard: EN 60947-5-2
 - Ambient temperature: -20 ... 70 °C
 - Switch output: with contact, bipolar
 - Switching element function: Normally open contact
 - Reproducibility of switching value: +/- 0,1 mm
 - Switch-on time: <= 0.05 ms
 - Switch-off time: <= 0.05 ms
 - Max. switching frequency: 500 Hz
 - Operating voltage range AC/DC: 12 ... 27 V
 - Electrical connection: Cable, 3-core
 - Mounting type: Clamped in T-slot
Insertable into slot lengthwise
 - Materials information, cable sheaths: TPE-U(PUR)
- **Interface**
 - C 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)

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- Robot Interface Unit
 - Supply: 24 V \pm 20%
 - Number of outputs: 16 digitals
 - Output voltage: 24 V DC
 - Output current: 0.3 A/Output, overall max. 4.5 A
 - Short-circuit protection: Yes, display via LED
 - Thermal overload protection: Yes, display via LED
 - Number of inputs: 16 digitals
 - Trigger level ON: Vin $\square\square$ 8 V or lin $\square\square$ 2 mA
 - Trigger level OFF: Vin $\square\square$ 4 V or lin $\square\square$ 1 mA
 - Input voltage/Input current: 12 V/3 mA, 24 V/7 mA
 - Protection classification: IP20
 - Permissible ambient temperature: 0 – +55 °C
 - Dimensions: Length 215 mm Width 220 mm Height 55 mm

- **Communication Cable**
 - 15 PIN 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

- **MPS 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

- **Robot Controller**
 - Operating voltage: 230 V AC
 - Current rating: Approx. 10mA
 - Input resistance: Approx. 2.2k Ω
 - Response time (OFF->ON): Approx. 2.2k Ω
 - Common method: 1 point per common
 - Connection method: Connector
 - Conformity electric wire size: AWG#24 to #18
 - Dummy plug for T/B: 2D-DP1
 - Connector for EMG1: DFMC 1,5/12-ST-3,5-LR
 - Connector for EMG2: DFMC 1,5/12-ST-3,5-LR
 - Electrical connection: 3 x 24-pin IEEE-488 socket

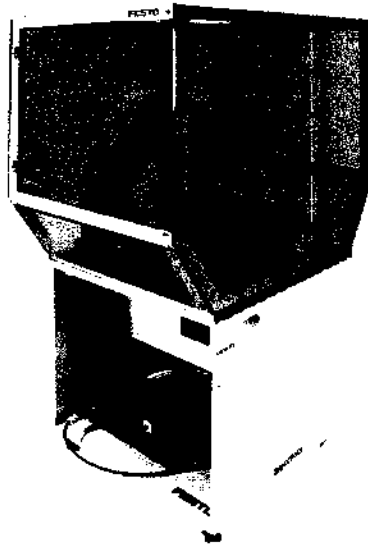
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- **Control Panel Console**

- 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.

Input supply voltage: 220-250VAC, 60Hz

Sample Image:



Picture for reference only

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TECHNICAL SPECIFICATION

Name of The Learning System	Modular Production System
Item Code	14-001
Technology Area(s)	Industrial Automation, Mechatronics and Robotics

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

MPS DISTRIBUTING/CONVEYOR STATION

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

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

Required Topics/Lessons:

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

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

Courseware:

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

Hardware:

• Conveyor Module

- Fiber-optic cable (diffuse sensor)
 - Signal processing (measuring principle): Red light
 - Coverage range max.: 120mm
 - Mounting thread: M6
 - Coating of housing: Nickel plated
 - Degree of protection: IP65
 - Switch triggering: Reflex
 - Function on actuation: Polymer fiber optic cable
- Fiber-optic device (diffuse sensor)
 - Signal processing (measuring principle): Red light
 - Switch triggering: Reflex / Interrupt
 - Function on actuation: Sender and receiver
 - Output potential: PNP
 - Coverage range max: 120mm
 - Thread for connector: M8x1
 - Number of pins, plug connection: 4
 - Operating status display: Yellow LED
 - Short-circuit strength: Pulse
 - Type of mounting: Hole
 - Material of housing: PBT - reinforced
 - Voltage type: DC
 - Nominal operating voltage (DC): 24V
 - Operating voltage min. (DC): 10V
 - Operating voltage max (DC): 30V
 - Idle current max.: 25mA
 - Maximum switching frequency: 1000 Hz
 - Degree of protection: IP65
- Fiber-optic cable (light barrier)
 - Signal processing (measuring principle): Red light
 - Switch triggering: interrupt
 - Function on actuation: Polymer fiber optic cable
 - Coverage range max.: 400mm
 - Mounting thread: M4
 - Degree of protection: IP65
- Fiber-optic device (light barrier)
 - Signal processing (measuring principle): Red light
 - Switch triggering: Reflex / triggering
 - Output potential: PNP
 - Coverage range max.: 120mm
 - Thread for connector: M8x1
 - Number of pins, plug connection: 4
 - Operating status display: Yellow LED
 - Voltage type: DC
 - Nominal operating voltage (DC): 24V

- Operating voltage min. (DC): 10V
 - Operating voltage max. (DC): 30V
 - Idle current max.: 25mA
 - Maximum switching frequency: 1000 Hz
 - Degree of protection: IP65
- DC Rotary Solenoid
 - Angle of rotation: 95°
 - Operating mode: S3 40%
 - Torque (NCM): 2.00
 - Rated power (W): 16.2
 - Mass inertia (kgm²) ft: 0.314x10⁻⁶
 - Time constant (ms): 6.5
- DC Gear Motor
 - Nominal voltage: 24V
 - Nominal current: 1.5A
 - Nominal speed of drive shaft: 65rpm
 - Reduction stages: 1
 - Nominal torque: 1 N-m
 - Reversible: yes
 - Starting torque: 7 N-m
- DC Motor Controller
 - Nominal voltage: 24 VDC ± 10%
 - Max. power consumption: 50 mA
 - Continuous motor current: 4 A DC
 - Control inputs, logic 1: 10 - 24V DC
 - Control inputs, logic 0: 0 - 4V DC
 - Analog input: 0...10V DC, 24V tolerant
 - Overvoltage protection: Yes
 - CE marking per: Class B interference emission
- Mini I/O terminal
 - Operating voltage: 24V DC
 - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
 - Analog I/O, 2AI, 1AO: 0...10V DC and ± 10V DC
 - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm²
 - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)
- **Stack Magazine Module**
 - Proximity Sensor
 - Design: For T-slot
 - Measuring principle: Reed magnetic
 - Switch output: with contact, bipolar
 - Max. switching frequency: 800hz
 - Max. output current: 500mA
 - Electrical connection: Cable 3-core

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- Connector exit direction: axial
- Cable length: 2.5m
- Mounting type: Clamped in T-slot, insertable into slot lengthwise
- Operating status display: Yellow LED
- Protection class: IP65, IP67
- Ambient temperature w/ flexible cable: -5 ... 60 °C
- Tightening torque: 0.2 N-m
- Fiber-optic cable (light barrier)
 - Signal processing (measuring principle): Red light
 - Switch triggering: interrupt
 - Function on actuation: Polymer fiber optic cable
 - Coverage range max.: 400mm
 - Mounting thread: M4
 - Degree of protection: IP65
- Fiber-optic device (light barrier)
 - Signal processing (measuring principle): Red light
 - Switch triggering: Reflex / triggering
 - Output potential: PNP
 - Coverage range max.: 120mm
 - Thread for connector: M8x1
 - Number of pins, plug connection: 4
 - Operating status display: Yellow LED
 - Voltage type: DC
 - Nominal operating voltage (DC): 24V
 - Operating voltage min. (DC): 10V
 - Operating voltage max. (DC): 30V
 - Idle current max.: 25mA
 - Maximum switching frequency: 1000 hz
 - Degree of protection: IP65
- Standard cylinder
 - Stroke: 100mm
 - Piston diameter: 8mm
 - Piston rod thread: M4
 - Cushioning: P: Flexible cushioning rings/plates at both ends
 - Assembly position: Any
 - Piston-rod end: male thread
 - Design structure: Piston, Piston rod, Cylinder barrel
 - Variants: Single-ended piston rod
 - Working pressure: 1.5 ... 10 bar
 - Mode of operation: Double acting
 - Corrosion resistance classification CRC: 2 - Moderate corrosion stress
 - Impact energy in end positions: 0.03 J
 - Theoretical force at 6 bars, return stroke: 22.6 N
 - Moving mass with 0 mm stroke: 30.2 N
 - Mounting type: with accessories

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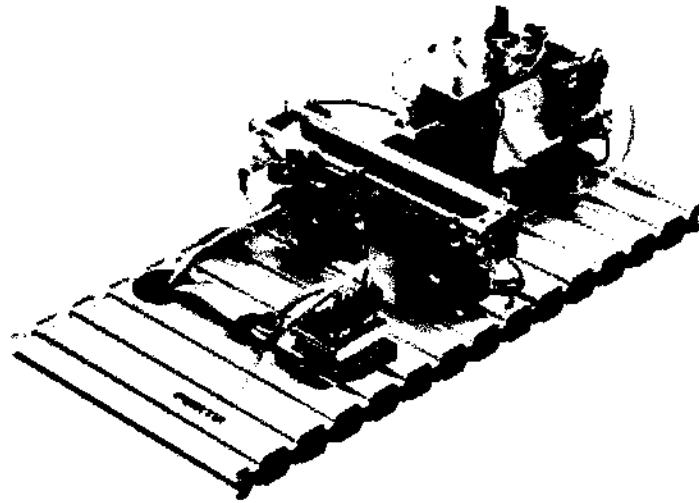
- Pneumatic connection: M5
- Materials information for seals: NBR, TPE-U(PU)
- Solenoid valve
 - Valve function: 2x3/2 closed, monostable 2x3/2 open, monostable
 - Type of actuation: Electrical
 - Valve size: 10 mm, 14 mm, 18 mm
 - Standard nominal flow rate: 90 ... 1,380 l/min
 - Working pressure: -0.9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

- **Sorting Gate/Separator Module**
 - DC Rotary Solenoid
 - Angle of rotation: 95°
 - Operating mode: S3 40%
 - Torque (NCM): 2.00
 - Rated power (W): 16.2
 - Mass inertia (kgm²) ft: 0.314x10⁻⁶
 - Time constant (ms): 6.5
- **Interface**
 - C Interface
 - Operating voltage: 24VDC
 - Digital inputs/outputs 8DI/8DO: Max. 24 V DC, Max. 2 A per output Max. 4 A total
 - Analogue inputs/outputs 4AI/2AO: 0 – 10 V DC or ± 10 V DC
 - Electrical connection: 2x 15-pin D-Sub HD (3 rows)
 - 1x 24 pin IEEE-488 socket (SysLink)
 - 1x 15-pin D-Sub (2 rows)
 - Indicators: Status LEDs: blue (power supply) green (input signals) orange (output signals)
- **Communication Cable**
 - D-Sub HD connecting cable crossed
 - Wires: 16
 - Cross section: 0.25 mm²
 - Plug type: D-Sub HD 15-pin (3 rows)
 - Socket type: D-Sub HD-15-pin (3 rows)
 - Power rating: Max. 2 A per wire
- **Supply Regulator Unit**
 - Start-up valve with filter control valve
 - Design: diaphragm control valve
 - Assembly position: Vertical ±5°
 - Standard nominal flow rate: 110 l/min
 - Upstream pressure: 100 to 1000 kPa (1 to 10 bar)
 - Operating pressure: 50 to 700 kPa (0.5 to 7 bar)
 - Connection: Coupling plug for coupling socket G1/8
- **MPS Trolley/accessories**
 - Trolley
 - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
 - Accessories
 - Profile plate and control console
 - Height adjustment
 - A4 mounting frame
 - A4 mounting profile
 - Assembly board

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

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

Sample Image:



Picture for reference only

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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 in on the conveyor.

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

The diffuse sensor supplies either an analog or a digital output signal, as required. The module can thus be used for various levels of training. The binary switching output can be adapted to the measurement requirement and the signal type by means of teach-in programming.

The rotary lifting module uses an electric quarter turn actuator and a pneumatic gripper to automate the measurement task and take random samples from the process.

Required Topics/Lessons:

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

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

Courseware:

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

Hardware:

• Conveyor Module

- Fiber-optic cable (diffuse sensor)
 - Signal processing (measuring principle): Red light
 - Coverage range max.: 120mm
 - Mounting thread: M6
 - Coating of housing: Nickel plated
 - Degree of protection: IP65
 - Switch triggering: Reflex
 - Function on actuation: Polymer fiber optic cable
- Fiber-optic device (diffuse sensor)
 - Signal processing (measuring principle): Red light
 - Switch triggering: Reflex / Interrupt
 - Function on actuation: Sender and receiver
 - Output potential: PNP
 - Coverage range max: 120mm
 - Thread for connector: M8x1
 - Number of pins, plug connection: 4
 - Operating status display: Yellow LED
 - Short-circuit strength: Pulse
 - Type of mounting: Hole
 - Material of housing: PBT - reinforced
 - Voltage type: DC
 - Nominal operating voltage (DC): 24V
 - Operating voltage min. (DC): 10V
 - Operating voltage max (DC): 30V
 - Idle current max.: 25mA
 - Maximum switching frequency: 1000 Hz
 - Degree of protection: IP65
- Fiber-optic cable (light barrier)
 - Signal processing (measuring principle): Red light
 - Switch triggering: interrupt
 - Function on actuation: Polymer fiber optic cable
 - Coverage range max.: 400mm
 - Mounting thread: M4
 - Degree of protection: IP65
- Fiber-optic device (light barrier)
 - Signal processing (measuring principle): Red light
 - Switch triggering: Reflex / triggering
 - Output potential: PNP
 - Coverage range max.: 120mm
 - Thread for connector: M8x1
 - Number of pins, plug connection: 4
 - Operating status display: Yellow LED
 - Voltage type: DC
 - Nominal operating voltage (DC): 24V

- Operating voltage min. (DC): 10V
 - Operating voltage max. (DC): 30V
 - Idle current max.: 25mA
 - Maximum switching frequency: 1000 Hz
 - Degree of protection: IP65
- DC Rotary Solenoid
 - Angle of rotation: 95°
 - Operating mode: S3 40%
 - Torque (NCM): 2.00
 - Rated power (W): 16.2
 - Mass inertia (kgm²) ft: 0.314x10⁻⁶
 - Time constant (ms): 6.5
- DC Gear Motor
 - Nominal voltage: 24V
 - Nominal current: 1.5A
 - Nominal speed of drive shaft: 65rpm
 - Reduction stages: 1
 - Nominal torque: 1 N-m
 - Reversible: yes
 - Starting torque: 7 N-m
- DC Motor Controller
 - Nominal voltage: 24 VDC ± 10%
 - Max. power consumption: 50 mA
 - Continuous motor current: 4 A DC
 - Control inputs, logic 1: 10 - 24V DC
 - Control inputs, logic 0: 0 - 4V DC
 - Analog input: 0... 10V DC, 24V tolerant
 - Overvoltage protection: Yes
 - CE marking per: Class B interference emission
- Mini I/O terminal
 - Operating voltage: 24V DC
 - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
 - Analog I/O, 2AI, 1AO: 0... 10V DC and ± 10V DC
 - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm²
 - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)
- **Rotary/lifting module**
 - Proximity Sensor
 - Measured variable: Position
 - Measuring principle: Magneto resistive
 - Design: For round slot
 - Conforms to standard: EN 60947-5-2
 - CE symbol: EU-EMV guideline
 - Ambient temperature: -40 ... 70 °C
 - Switch output: NPN, PNP, Non-contacting 2-wire

- Switching element function: Normally open contact
- Max. switching frequency: 150 Hz
- Max. output current: 100mA
- Nominal operating voltage DC: 24V
- Operating voltage range DC: 5 ... 30 V
- Protection class: IP65, IP68
- Proximity Sensor
 - Design: For T-slot
 - Conforms to standard: EN 60947-5-2
 - CE symbol: EU-EMV guideline
 - Measuring principle: Reed magnetic
 - Ambient temperature: 40 ... 60 °C
 - Switch output: with contact, bipolar
 - Switching element function: Normally open contact
 - Switch-on time: ≤ 0.5 ms
 - Electrical connection: Cable, 3-core
 - Connector exit direction: axial
- Parallel Gripper
 - Size: 10
 - Stroke per gripper jaw: 3mm
 - Max. angular gripper jaw backlash: < 0.5 deg
 - Rotationally symmetrical: ≤ 0.2 mm
 - Repetition accuracy, gripper: < 0.02 mm
 - Number of gripper fingers: 2
 - Mode of operation: double-acting
 - Gripper function: Parallel
 - Design structure: Lever, guided motion sequence
 - Guide: Plain-bearing guide
 - Position detection: For proximity sensor
 - Total force at 6 bars, opening: 80 N
 - Pneumatic connection: M3
 - Materials information for gripper jaws: High alloy steel, non-corrosive
 - Working pressure: 2 ... 8 bar
- Semi rotary actuator
 - Size: 10
 - Cushioning angle: 0.5 deg
 - Swivel angle: 0 ... 180 deg
 - Cushioning: Flexible cushioning rings/plates at both ends
 - Mode of operation: double-acting
 - Design structure: Rotary vane
 - Position detection: For proximity sensor
 - Working pressure: 2.5 ... 8 bar
 - Max. swivel frequency at 6 bars: 3 Hz
 - Operating medium: Accordance with ISO8573-1:2010
 - Theoretical torque at 6 bars: 0.85 N-m

- Mounting type: with internal (female) thread
- Pneumatic connection: M3
- Materials information for drive shaft: High alloy steel, non-corrosive
- Materials information for seals: TPE-U(PU)
- Materials information, housing: Aluminum, Anodized
- Compact cylinder
 - Stroke: 20 mm
 - Piston diameter: 12 mm
 - Based on the standard: ISO 21287
 - Cushioning: P: Flexible cushioning rings/plates at both ends
 - Design structure: Piston, Piston rod, Profile barrel
 - Position detection: For proximity sensor
 - Working pressure: 1.5 ... 10 bar
 - Mode of operation: double-acting
 - Pneumatic connection: M5
 - Moving mass with 0 mm stroke: 14 g
 - Materials information for cover: Aluminum, Anodized
- 5/2-way single solenoid valve
 - Valve function: 5/2 bistable, 5/2 monostable
 - Type of actuation: electrical
 - Valve size: 10 mm, 14 mm, 18 mm
 - Standard nominal flow rate: 90 ... 1,380 l/min
 - Working pressure: -0.9 ... 10 bar
 - Design structure: Piston slide
 - Type of reset: mechanical spring, Air spring
 - Protection class: IP40, IP65, with plug socket
 - Sealing principle: soft
 - Exhaust-air function: throttleable
 - Manual override: Detenting, Pushing, Covered
 - Type of piloting: Piloted
 - Pilot air supply: External, Internal
 - Duty cycle: 100%
 - Operating medium: Compressed air accordance with ISO8573-1:2010
 - CE symbol: according to EU-EMV guideline
 - Restriction ambient and medium temp.: -5 - 50 °C, without holding current reduction
 - Corrosion resistance classification CRC: 2 - Moderate corrosion stress
 - Medium temperature: -5 ... 60 °C
 - Ambient temperature: -5 ... 60 °C
- One way flow-control valve
 - Valve function: One-way flow control function for exhaust air
 - Pneumatic connection, port 1: QS-3
 - Pneumatic connection, port 2: M3

- Adjusting element: Slotted head screw
- Working pressure: 0.2 ... 10 bar
- Ambient temperature: -10 ... 60 °C
- Operating medium: Compressed air in accordance with ISO8573-1:2010
- Medium temperature: -10 ... 60 °C
- Max. tightening torque: 0.3 Nm
- Materials information for seals: NBR
- Regulating screw material data: Brass
- Multiple distributor
 - Size: Standard
 - Nominal size: 2.5mm
 - Design structure: Push/pull principle
 - Container size: 1
 - Operating pressure: -0.95 ... 6 bar
 - Corrosion resistance classification CRC: 1 - Low corrosion stress
 - Ambient temperature: -10 ... 80 °C
 - Number of outputs: 4
 - Number of supply lines: 1
 - Hose clamping segment material data: High alloy steel, non-corrosive
- **Measuring Table module**
 - Retro-reflective sensor
 - Design: Block design
 - Conforms to standard: EN 60947-5-2
 - CE symbol: according to EU-EMV guideline
 - Measured variable: Positioning
 - Measuring principle: Optoelectronic
 - Measurement method: Retro-reflective sensor For transparent objects
 - Type of light: Red, polarized
 - Working range: 5 ... 500 mm
 - Ambient temperature: -20 ... 60 °C
 - Reference material: Laser reflector, 51 x 51 mm
 - Switch output: PNP
 - Switching element function: Switchable
 - Max. switching frequency: 1,000 Hz
 - Max. output current: 100 mA
 - Voltage drops: <= 2.4 V
 - Operating voltage range DC: 10 ... 30 V
 - Idle current: 25 mA
 - Electrical connection: Plug, M8x1, 4-pin
 - Operating status display: Yellow LED
 - Protection class: IP67
 - Corrosion resistance classification CRC: 2 - Moderate corrosion stress

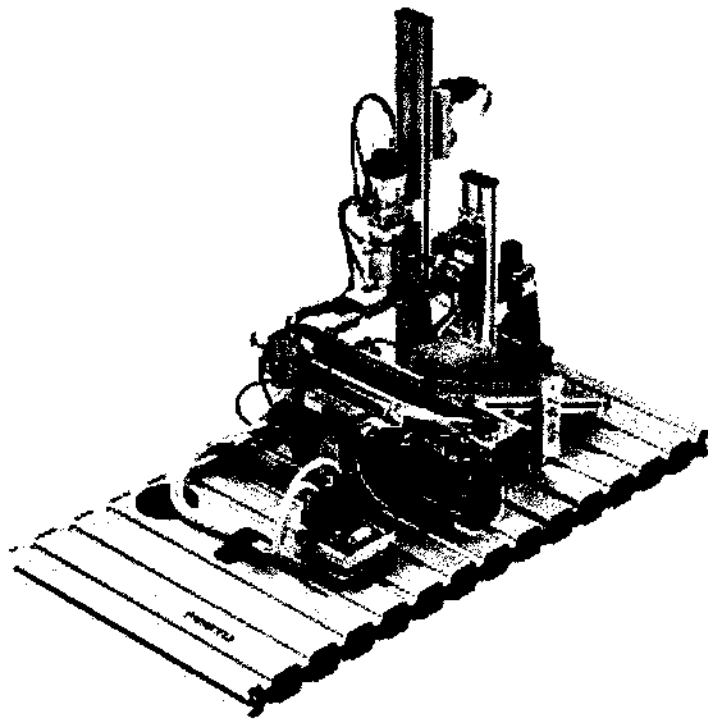
- Reflector
 - Measurement method: Reflector
 - Ambient temperature: -40 ... 70 °C
 - Mounting type: with through hole
 - Materials information, housing: ABS, PMMA
 - Corrosion resistance classification CRC: 4 - Very high corrosion stress
- **Stopper Module**
 - Short stroke cylinder
 - Stroke: 10mm
 - Piston diameter: 12mm
 - Spring return force, retracted: 4N
 - Cushioning: P: Flexible cushioning rings/plates at both ends
 - Mode of operation: single-acting, pushing action
- **Stopper with valve**
 - Short stroke cylinder
 - Design structure: Piston, Piston rod
 - Working pressure: 1.5 ... 10 bar
 - Ambient temperature: -20 ... 80 °C
 - Theoretical force at 6 bar, advance stroke: 59 N
 - Mounting type: Optional, with through hole, with accessories
 - Pneumatic connection: M5
 - Materials information for piston rod: High alloy steel
 - Solenoid Valve
 - Valve function: 3/2 open, monostable
 - Type of actuation: electrical
 - Width: 10 mm
 - Standard nominal flow rate: 10 l/min
 - Working pressure: 0 ... 6 bar
 - Design structure: Poppet valve with spring return
 - Type of reset: mechanical spring
 - Protection class: IP40
 - Nominal size: 0.7 mm
 - Grid dimension: 10 mm
 - Exhaust-air function: throttleable
 - Sealing principle: soft
 - Manual override: Pushing
 - Type of piloting: direct
 - Flow direction: non-reversible
 - Valve position identification: Label
 - Maximum switching frequency: 20 Hz
 - Duty cycle: 100%
 - Ambient temperature: -5 ... 40 °C
 - Mounting type: On subbase
 - Characteristic coil data: 24 V DC: 1 W
 -

- **Sorting Gate/Separator Module**
 - DC Rotary Solenoid
 - Angle of rotation: 95°
 - Operating mode: S3 40%
 - Torque (NCM): 2.00
 - Rated power (W): 16.2
 - Mass inertia (kgm²) ft: 0.314x10⁻⁶
 - Time constant (ms): 6.5
- **Interface**
 - C Interface
 - Operating voltage: 24VDC
 - Digital inputs/outputs 8DI/8DO: Max. 24 V DC, Max. 2 A per output Max. 4 A total
 - Analogue inputs/outputs 4AI/2AO: 0 – 10 V DC or ± 10 V DC
 - Electrical connection: 2x 15-pin D-Sub HD (3 rows)
 - 1x 24 pin IEEE-488 socket (SysLink)
 - 1x 15-pin D-Sub (2 rows)
 - Indicators: Status LEDs: blue (power supply) green (input signals) orange (output signals)
- **Communication Cable**
 - D-Sub HD connecting cable crossed
 - Wires: 16
 - Cross section: 0.25 mm²
 - Plug type: D-Sub HD 15-pin (3 rows)
 - Socket type: D-Sub HD-15-pin (3 rows)
 - Power rating: Max. 2 A per wire
- **Supply Regulator Unit**
 - Start-up valve with filter control valve
 - Design: diaphragm control valve
 - Assembly position: Vertical ±5°
 - Standard nominal flow rate: 110 l/min
 - Upstream pressure: 100 to 1000 kPa (1 to 10 bar)
 - Operating pressure: 50 to 700 kPa (0.5 to 7 bar)
 - Connection: Coupling plug for coupling socket G1/8
- **MPS Trolley/accessories**
 - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
 - Accessories
 - Profile plate and control console
 - Height adjustment
 - A4 mounting frame
 - A4 mounting profile
 - Assembly board

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

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

Sample Image:



Picture for reference only

MPS PICK AND PLACE STATION

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

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

Required Topics/Lessons:

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

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

Courseware:

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

Hardware:

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

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

- DC Rotary Solenoid
 - Angle of rotation: 95°
 - Operating mode: S3 40%
 - Torque (NCM): 2.00
 - Rated power (W): 16.2
 - Mass inertia (kgm²) ft: 0.314x10⁻⁶
 - Time constant (ms): 6.5
- DC Gear Motor
 - Nominal voltage: 24V
 - Nominal current: 1.5A
 - Nominal speed of drive shaft: 65rpm
 - Reduction stages: 1
 - Nominal torque: 1 N-m
 - Reversible: yes
 - Starting torque: 7 N-m
- DC Motor Controller
 - Nominal voltage: 24 VDC ± 10%
 - Max. power consumption: 50 mA
 - Continuous motor current: 4 A DC
 - Control inputs, logic 1: 10 - 24V DC
 - Control inputs, logic 0: 0 - 4V DC
 - Analog input: 0... 10V DC, 24V tolerant
 - Overvoltage protection: Yes
 - CE marking per: Class B interference emission
- Mini I/O terminal
 - Operating voltage: 24V DC
 - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
 - Analog I/O, 2AI, 1AO: 0... 10V DC and ± 10V DC
 - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm²
 - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)
- **Pick & Place Module**
 - Proximity sensor
 - Design: for round slot
 - Conforms to standard: EN 60947-5-2
 - Measuring principle: Reed magnetic
 - Ambient temperature: -20 ... 70 °C
 - Switch output: with contact, bipolar
 - Switching element function: Normally open contact
 - Reproducibility of switching value: +/- 0,1 mm
 - Switch-on time: <= 0.6 ms
 - Switch-off time: <= 0.05 ms
 - Max. switching frequency: 500 Hz
 - Operating voltage range AC/DC: 12 ... 27 V
 - Electrical connection: Cable, 3-core

- Mounting type: Clamped in T-slot Insertable into slot lengthwise
- Materials information, cable sheaths: TPE-U(PUR)
- Pressure Sensor
 - Switching element function: Normally open contact
 - Operating voltage range DC: 15 ... 30 V
 - Mounting type: with accessories
 - Pneumatic connection: QS-6
 - Protection class: IP40
 - Threshold value setting range 0-100 %: Threshold value setting range 0-100 %
- Mini slide
 - Stroke: 50 mm
 - Adjustable end position range/front length: 35.5 mm"
 - Adjustable end position range/rear length: 18.5 mm"
 - Piston diameter: 10 mm
 - Operating mode of drive unit: Yoke
 - Cushioning: P: Flexible cushioning rings/plates at both ends
 - Guide: Ball bearing cage guide
 - Design structure: Yoke kinematics
 - Position detection: For proximity sensor
 - Working pressure: 1.5 ... 8 bar
 - Max. speed: 0.8 m/s
 - Repetition accuracy: 0,3 mm
 - Mode of operation: double-acting
 - Operating medium: accordance with ISO8573-1:2010
 - Cushioning length: 1.5 mm
 - Mounting type: with through hole
 - Pneumatic connection: M3
 - Materials information for seals: HNBR
- One-way flow control valve
 - Regulating screw material data: Brass
 - Swivel joint material data: Zinc die-casting
 - Valve function: One-way flow control function for exhaust air
 - Pneumatic connection, port 1: QS-3
 - Pneumatic connection, port 2: M3
 - Adjusting element: Slotted head screw
 - Mounting type: Threaded
 - Working pressure: 0.2 ... 10 bar
 - Medium temperature: -10 ... 60 °C
- Vacuum Generator
 - Nominal size, Laval nozzle: 0.45 mm
 - Grid dimension: 13 mm
 - Ejector characteristic: High vacuum, Inline
 - Design structure: Straight design
 - Working pressure for max. suction rate: 6.3 bar
 - Working pressure: 1 ... 8 bar

- Working pressure for max. vacuum: 6 bar
- Max. vacuum: 86 %
- Nominal working pressure: 6 bar
- Air supply time at nominal working pressure: 4.7 s
- Medium temperature: accordance with ISO8573-1:2010
- Mounting type: Line installation
- Pneumatic connection, port 1: QS-6
- Pneumatic connection, port 3: non-ducted
- Vacuum connection: QS-6
- Material information, collector nozzle: POM
- Suction cup holder
 - Volume: 0.719 cm³
 - Assembly position: Vertical
 - Design structure: Vacuum connection at top
 - Correlation to suction-cup holder: Size 4
 - Operating medium: Atmospheric air based on ISO 8573-1:2010
 - Ambient temperature: 0 ... 60 °C
 - Mounting type: with lock nut
 - Suction cup mounting: M6
 - Vacuum connection: QS-6
 - Materials information for seals: NBR
- Vacuum filter
 - Grade of filtration: 10 µm
 - Working pressure: 0.95 ... 4 bar
 - Flow rate at vacuum pressure of -0.75 bar: 260 l/min
 - Operating medium: Atmospheric air based on ISO 8573-1:2010
 - Ambient temperature: 0 ... 60 °C
 - Mounting type: with external (male) thread, Via vacuum port
 - Pneumatic connection: M6
 - Vacuum connection: M6
 - Materials information for seals: NBR
 - Materials information for filter: PVF
 - Materials information, housing: Aluminum, Nickel-plated brass
 - Corrosion resistance classification CRC: 1 - Low corrosion stress
 - Materials note: Free of copper and PTFE, Conforms to RoHS
- Suction cup complete
 - Suction cup height compensator: 7 mm
 - Min. workpiece radius: 50 mm
 - Nominal size: 3 mm
 - suction cup diameter: 20 mm
 - suction cup volume: 2.75 cm³
 - Position of connection: on top
 - Correlation to suction-cup holder: Size 4
 - Suction cup shape: Round, bellows, 3.5 convolutions
 - Working pressure: 0 ... 0.95 bar
 - Nominal working pressure: -0.7 bar

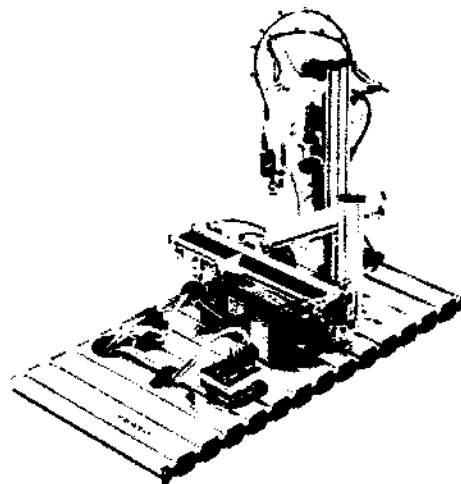
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- Operating medium: Atmospheric air based on ISO 8573-1:2010
- Corrosion resistance classification CRC: 1 - Low corrosion stress
- Ambient temperature: -30 ... 180 °C
- Mounting type: Via vacuum port
- Vacuum connection: M6
- Color: transparent
- Shore hardness: 50 +/- 5
- Push-in Connector
 - Size: Mini
 - Nominal size: 2.6 mm
 - Container size: 10
 - Design structure: Push/pull principle
 - Operating pressure complete temperature range: -0.95 ... 6 bar
 - Operating medium: accordance with ISO8573-1:2010
 - Pneumatic connection, port 1: Push-in sleeve QS-6
 - Pneumatic connection, port 2: For tubing outside diameter 4 mm
 - color of release ring: blue
 - Materials information, housing: PBT
 - Materials information for tubing seal: NBR
- Mini I/O terminal
 - Operating voltage: 24V DC
 - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
 - Analog I/O, 2AI, 1AO: 0...10V DC and ± 10V DC
 - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm²
 - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)
- **Sorting Gate/Separator Module**
 - DC Rotary Solenoid
 - Angle of rotation: 95°
 - Operating mode: S3 40%
 - Torque (NCM): 2.00
 - Rated power (W): 16.2
 - Mass inertia (kgm²) ft: 0.314x10⁻⁶
 - Time constant (ms): 6.5
- **Interface**
 - C Interface
 - Operating voltage: 24VDC
 - Digital inputs/outputs 8DI/8DO: Max. 24 V DC, Max. 2 A per output Max. 4 A total
 - Analogue inputs/outputs 4AI/2AO: 0 – 10 V DC or ± 10 V DC
 - Electrical connection: 2x 15-pin D-Sub HD (3 rows)
 - 1x 24 pin IEEE-488 socket (SysLink)
 - 1x 15-pin D-Sub (2 rows)
 - Indicators: Status LEDs: blue (power supply) green (input signals) orange (output signals)

- **Communication Cable**
 - D-Sub HD connecting cable crossed
 - Wires: 16
 - Cross section: 0.25 mm²
 - Plug type: D-Sub HD 15-pin (3 rows)
 - Socket type: D-Sub HD-15-pin (3 rows)
 - Power rating: Max. 2 A per wire
- **Supply Regulator Unit**
 - Start-up valve with filter control valve
 - Design: diaphragm control valve
 - Assembly position: Vertical ±5°
 - Standard nominal flow rate: 110 l/min
 - Upstream pressure: 100 to 1000 kPa (1 to 10 bar)
 - Operating pressure: 50 to 700 kPa (0.5 to 7 bar)
 - Connection: Coupling plug for coupling socket G1/8
- **MPS Trolley/accessories**
 - Trolley
 - Dimensions: H incl. Rolls unit top edge of Trolley x W x L 750 x 350 x 700 mm
 - Accessories
 - Profile plate and control console
 - Height adjustment
 - A4 mounting frame
 - A4 mounting profile
 - Assembly board
- **Control Panel/Console**
 - Control console for Syslink
 - Membrane keyboard: Start pushbutton with LED, stop pushbutton, Reset pushbutton with LED, 2 flexibly assignable control lamps, 4 mm safety sockets with LED status display for simple I/O connection. Syslink and Sub-D sockets for connection to the PLC of choice are available on the rear panel.
- **Programmable Logic Controller with built-in power supply**
 - Programmable Logic Controller
 - Main memory: 250 KB for programs and 1 MB for data Memory card included
 - Inputs/outputs: 32 digital inputs (24 V DC) 32 digital outputs (24 V DC/0.5A) 5x analog inputs, 4x U/I, 1x R/RTD, 16-bit resolution, 2x analog outputs, 2x U/I, 16-bit resolution
 - The mounting system: (W x H) 305 mm x 300 mm Can be placed on a desk or in an MPS station Stable, powder-coated, sheet-steel mounting system
 - Integrated power supply unit: AC 110/230 V/DC 24 V, 4 A

- 19" module simulation plate with 2x SysLink plug connector for MPS station and control panel, each with 8 digital inputs and 8 digital outputs and 1x Sub-D 15-pin plug connection with 4 analog inputs and 2 analog outputs; emergency stop jumper to connect a safety circuit for disconnecting 8 digital outputs.
- Programming language
- Statement list (STL)
- Function diagram (FUN)
- Ladder diagram (LDR)
- Structured text
- Function sequence diagram
- Software compatible with:
 - Windows 10 (64-bit) Professional or later
- Additional:
 - Programming cable (Ethernet cable)
 - Programming software portal
 - Realization of networked solutions
 - PLC simulation software
 - Software and documentation supplied on DVD
 - Floating license supplied on USB stick
 - Language: English

Sample Image:



Picture for reference only

MPS SEPARATING STATION

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

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

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

The diffuse sensor supplies either an analog or a digital output signal, as required. The module can thus be used for various levels of training. The binary switching output can be adapted to the measurement requirement and the signal type by means of teach-in programming.

The MPS separating station enables users to set up flexible assembly lines using a variety of stations. Downstream stations can be added to the station in two directions. Combined assembly processes such as cylinder assembly and installation of workpiece inserts in housings can be performed using the separating station.

Required Topics/Lessons:

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

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

Courseware:

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

Hardware:

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- **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

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- Operating voltage max. (DC): 30V
 - Idle current max.: 25mA
 - Maximum switching frequency: 1000 Hz
 - Degree of protection: IP65
- DC Rotary Solenoid
 - Angle of rotation: 95°
 - Operating mode: S3 40%
 - Torque (NCM): 2.00
 - Rated power (W): 16.2
 - Mass inertia (kgm²) ft: 0.314x10⁻⁶
 - Time constant (ms): 6.5
- DC Gear Motor
 - Nominal voltage: 24V
 - Nominal current: 1.5A
 - Nominal speed of drive shaft: 65rpm
 - Reduction stages: 1
 - Nominal torque: 1 N-m
 - Reversible: yes
 - Starting torque: 7 N-m
- DC Motor Controller
 - Nominal voltage: 24 VDC ± 10%
 - Max. power consumption: 50 mA
 - Continuous motor current: 4 A DC
 - Control inputs, logic 1: 10 - 24V DC
 - Control inputs, logic 0: 0 - 4V DC
 - Analog input: 0... 10V DC, 24V tolerant
 - Overvoltage protection: Yes
 - CE marking per: Class B interference emission
- Mini I/O terminal
 - Operating voltage: 24V DC
 - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
 - Analog I/O, 2AI, 1AO: 0... 10V DC and ± 10V DC
 - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm²
 - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)
- **Refexion-slichttaster 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)

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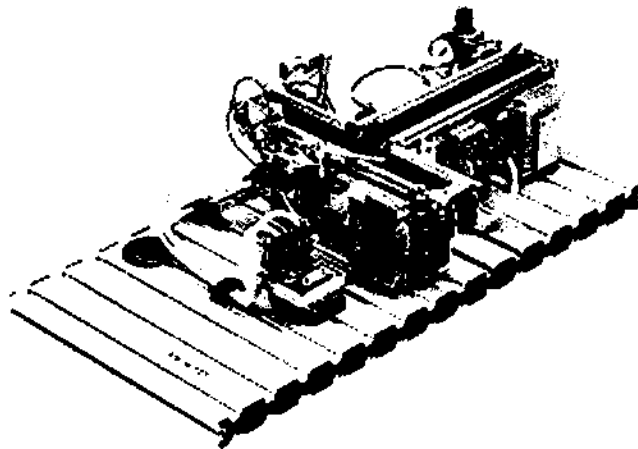
- **Communication Cable**
 - D-Sub HD connecting cable crossed
 - Wires: 16
 - Cross section: 0.25 mm²
 - Plug type: D-Sub HD 15-pin (3 rows)
 - Socket type: D-Sub HD-15-pin (3 rows)
 - Power rating: Max. 2 A per wire
- **Supply Regulator Unit**
 - Start-up valve with filter control valve
 - Design: 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

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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

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- Mass inertia (kgm²) ft: 0.314x10⁻⁶
 - Time constant (ms): 6.5
- DC Gear Motor
 - Nominal voltage: 24V
 - Nominal current: 1.5A
 - Nominal speed of drive shaft: 65rpm
 - Reduction stages: 1
 - Nominal torque: 1 N-m
 - Reversible: yes
 - Starting torque: 7 N-m
- DC Motor Controller
 - Nominal voltage: 24 VDC ± 10%
 - Max. power consumption: 50 mA
 - Continuous motor current: 4 A DC
 - Control inputs, logic 1: 10 - 24V DC
 - Control inputs, logic 0: 0 - 4V DC
 - Analog input: 0... 10V DC, 24V tolerant
 - Overvoltage protection: Yes
 - CE marking per: Class B interference emission
- Mini I/O terminal
 - Operating voltage: 24V DC
 - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
 - Analog I/O, 2AI, 1AO: 0... 10V DC and ± 10V DC
 - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm²
 - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)
- **Detection Module**
 - Fiber Optic cable
 - Signal processing (measuring principle): red light
 - Switch triggering: Reflex
 - Function on actuation: Polymer fibre optic cable
 - Coverage range max.: 120 mm
 - Minimum ambient temperature: -40 °C
 - Maximum ambient temperature: 70 °C
 - Mounting thread: M 6
 - Material of housing: brass
 - Product weight: 0,02 kg
 - Coating of housing: Nickel-plated
 - Degree of protection: IP65
 - Fiber-optic Device
 - Signal processing (measuring principle): red light
 - Switch triggering: Reflex/Interrupt
 - Function on actuation: sender and receiver
 - Coverage range max.: 120 mm
 - Output potential (el. output): PNP

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- Minimum ambient temperature: -5 °C
- Maximum ambient temperature: 55 °C
- Air connection type elec.: Plug
- Thread for connector: M 8x1
- Number of pins, plug connection: 4
- Operating status display: Yellow LED
- Type of mounting: Hole
- Voltage type: DC
- Nominal operating voltage [DC]: 24 V
- Operating voltage min. (DC): 10 V
- Operating voltage max. (DC): 30 V
- Degree of protection: IP65
- Proximity Sensor
 - Materials note: Free of copper and PTFE
 - Nominal switching distance: 2.5 mm
 - Guaranteed switching distance: 2.03 mm
 - Switch output: PNP
 - Switching element function: Normally open contact
 - Max. switching frequency: 3,000 Hz
 - Inductive protective circuit: Integrated
 - Operating voltage range DC: 10 ... 30 V
 - Electrical connection: Plug, M8x1, 3-pin
 - Size: M8x1
 - Mounting type: with lock nut
 - Operating status display: Yellow LED
 - Protection class: IP65 IP67
- Fork light barrier
 - Measured variable: Position
 - Measuring principle: Optoelectronic
 - Measurement method: Fork light barrier
 - Type of light: Red
 - Minimal object diameter: 0.3 mm
 - Ambient temperature: -10 ... 60 °C
 - Repetition accuracy: 0.03 mm
 - Switch output: PNP
 - Switching element function: Switchable
 - Operating voltage range DC: 10 ... 30 V
 - Polarity protected: For operating voltage connections
 - Operating status display: Yellow LED
 - Protection class: IP67
- Mini I/O terminal
 - Operating voltage: 24V DC
 - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
 - Analog I/O, 2AI, 1AO: 0...10V DC and ± 10V DC
 - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm²

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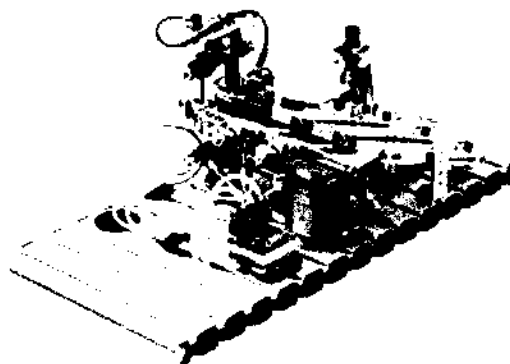
- Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)
- Retro-reflective sensor
 - Measured variable: Position
 - Measuring principle: Optoelectronic
 - Measurement method: Retro-reflective sensor for transparent objects
 - Type of light: Red, polarized
 - Polarity 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

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- 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

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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

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- 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%

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- Torque (NCM): 2.00
- Rated power (W): 16.2
- Mass inertia (kgm²) ft: 0.314x10⁻⁶
- Time constant (ms): 6.5
- DC Gear Motor
 - Nominal voltage: 24V
 - Nominal current: 1.5A
 - Nominal speed of drive shaft: 65rpm
 - Reduction stages: 1
 - Nominal torque: 1 N-m
 - Reversible: yes
 - Starting torque: 7 N-m
- DC Motor Controller
 - Nominal voltage: 24 VDC ± 10%
 - Max. power consumption: 50 mA
 - Continuous motor current: 4 A DC
 - Control inputs, logic 1: 10 - 24V DC
 - Control inputs, logic 0: 0 - 4V DC
 - Analog input: 0...10V DC, 24V tolerant
 - Overvoltage protection: Yes
 - CE marking per: Class B interference emission
- Mini I/O terminal
 - Operating voltage: 24V DC
 - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output
 - Analog I/O, 2AI, 1AO: 0...10V DC and ± 10V DC
 - Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm²
 - Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)
- **Detection Module**
 - Fiber Optic cable
 - Signal processing (measuring principle): red light
 - Switch triggering: Reflex
 - Function on actuation: Polymer fibre optic cable
 - Coverage range max.: 120 mm
 - Minimum ambient temperature: -40 °C
 - Maximum ambient temperature: 70 °C
 - Mounting thread: M 6
 - Material of housing: brass
 - Product weight: 0,02 kg
 - Coating of housing: Nickel-plated
 - Degree of protection: IP65
 - Fiber-optic Device
 - Signal processing (measuring principle): red light
 - Switch triggering: Reflex/Interrupt

- Function on actuation: sender and receiver
- Coverage range max.: 120 mm
- Output potential (el. output): PNP
- Minimum ambient temperature: -5 °C
- Maximum ambient temperature: 55 °C
- Air connection type elec.: Plug
- Thread for connector: M 8x1
- Number of pins, plug connection: 4
- Operating status display: Yellow LED
- Type of mounting: Hole
- Voltage type: DC
- Nominal operating voltage [DC]: 24 V
- Operating voltage min. (DC): 10 V
- Operating voltage max. (DC): 30 V
- Degree of protection: IP65
- Proximity Sensor
 - Materials note: Free of copper and PTFE
 - Nominal switching distance: 2.5 mm
 - Guaranteed switching distance: 2.03 mm
 - Switch output: PNP
 - Switching element function: Normally open contact
 - Max. switching frequency: 3,000 Hz
 - Inductive protective circuit: Integrated
 - Operating voltage range DC: 10 ... 30 V
 - Electrical connection: Plug, M8x1, 3-pin
 - Size: M8x1
 - Mounting type: with lock nut
 - Operating status display: Yellow LED
 - Protection class: IP65 IP67
- Fork light barrier
 - Measured variable: Position
 - Measuring principle: Optoelectronic
 - Measurement method: Fork light barrier
 - Type of light: Red
 - Minimal object diameter: 0.3 mm
 - Ambient temperature: -10 ... 60 °C
 - Repetition accuracy: 0.03 mm
 - Switch output: PNP
 - Switching element function: Switchable
 - Operating voltage range DC: 10 ... 30 V
 - Polarity protected: For operating voltage connections
 - Operating status display: Yellow LED
 - Protection class: IP67
- Mini I/O terminal
 - Operating voltage: 24V DC
 - Digital I/O, 4DI, 4DO: Max. 24V DC, Max. 2A per output

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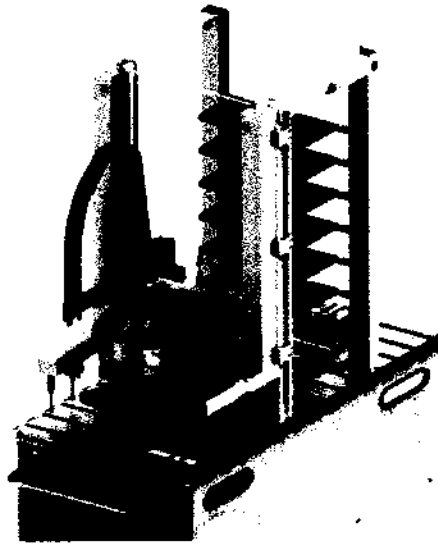
- Analog I/O, 2AI, 1AO: 0...10V DC and ± 10 V DC
- Electrical connection: D-Sub HD 15-pin (3-row) Spring clip: 0.14 ... 0.5 mm²
- Indicators: Status LEDs: Blue (power supply) Green (input signals) Orange (output signals)
- Retro-reflective sensor
 - Measured variable: Position
 - Measuring principle: Optoelectronic
 - Measurement method: Retro-reflective sensor for transparent objects
 - Type of light: Red, polarized
 - Polarity protected: for all electrical connections
 - Reference material: Laser reflector, 51 x 51 mm
 - Switch output: PNP
 - Switching element function: Switchable
 - Operating voltage range DC: 10 ... 30 V
 - Residual ripple: 10 %
 - Electrical connection: Plug, M8x1, 4-pin
- **Interface**
 - C Interface
 - Operating voltage: 24VDC
 - Digital inputs/outputs 8DI/8DO: Max. 24 V DC, Max. 2 A per output Max. 4 A total
 - Analogue inputs/outputs 4AI/2AO: 0 – 10 V DC or ± 10 V DC
 - Electrical connection: 2x 15-pin D-Sub HD (3 rows)
 - 1x 24 pin IEEE-488 socket (SysLink)
 - 1x 15-pin D-Sub (2 rows)
 - Indicators: Status LEDs: blue (power supply) green (input signals) orange (output signals)
- **Communication Cable**
 - D-Sub HD connecting cable crossed
 - Wires: 16
 - Cross section: 0.25 mm²
 - Plug type: D-Sub HD 15-pin (3 rows)
 - Socket type: D-Sub HD-15-pin (3 rows)
 - Power rating: Max. 2 A per wire
- **Supply Regulator Unit**
 - Start-up valve with filter control valve
 - Design: diaphragm control valve
 - Assembly position: Vertical $\pm 5^\circ$
 - 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

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- PLC simulation software
- Software and documentation supplied on DVD
- Floating license supplied on USB stick
- Language: English

Sample Image:



Picture for reference only

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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

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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

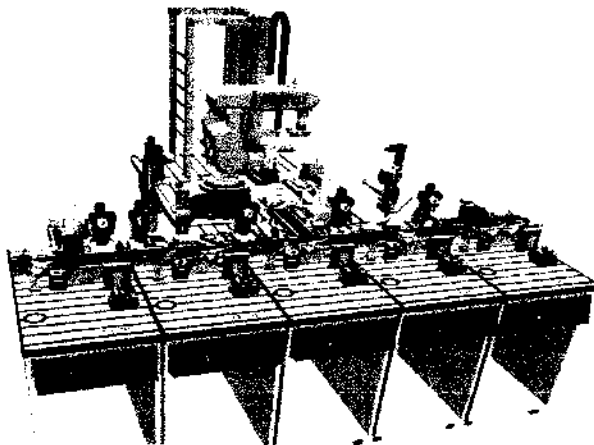
- 4 Units of Workpiece set "for cylinder assembly"
 - External diameter: 40mm
 - Height (black): 22.5mm
 - Height (red): 25mm

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

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

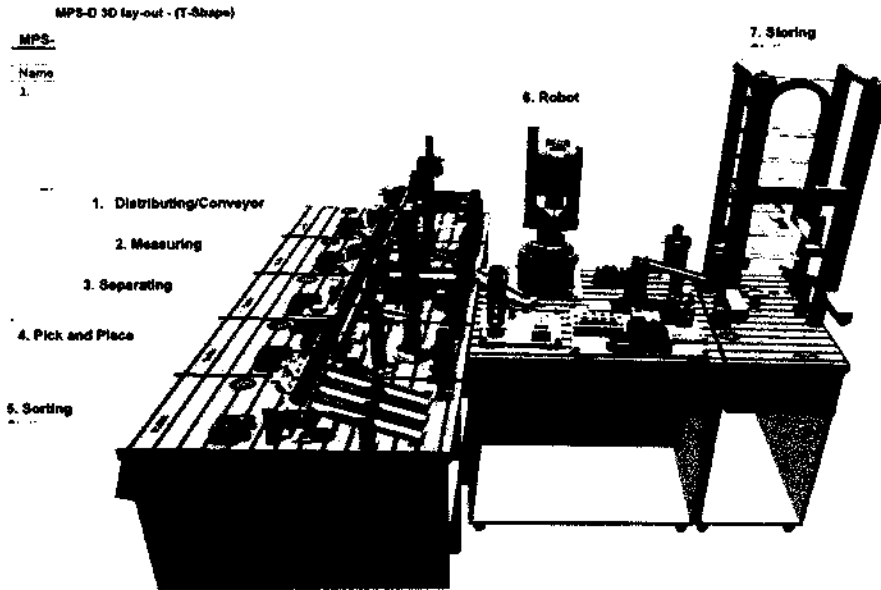
Sample Image:

MP8-D 3D key-out - (T-Stage)



Picture for reference only

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Picture for reference only

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

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TECHNICAL SPECIFICATION

Name of The Learning System	Production Line Trainer
Item Code	15-001
Technology Area(s)	Industrial Automation, Mechatronics and Robotics

Description: The equipment is composed of feeding unit, processing unit, assembly unit, transmission unit and sorting unit. The electrical layout is in double-drawer; all electrical controllers are installed on the drawers, in accordance with the real industrial patterns. Each unit is an independent system, as well as an electromechanical system. The executive mechanism of each unit is mainly based on pneumatic execution, but the mechanical arm movement of transmission unit adopts servo motor driving and precise position control, the drive system has the features of long travel and multi positioning points. The conveyor belt drive of sorting unit adopts general frequency converter drive 3-phase asynchronous motor. The position control and frequency converter technology are the most widely used electrical control technology in modern industry.

Required Topics/Lessons:

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

- Pneumatic system installation and debugging
- Electrical control circuit installation and PLC programming
- PLC communication network installation, programming and debugging
- Electromechanical equipment installation and debugging Transmission coaxality adjustment

Courseware:

- PLC Software
- HMI Software

Hardware:

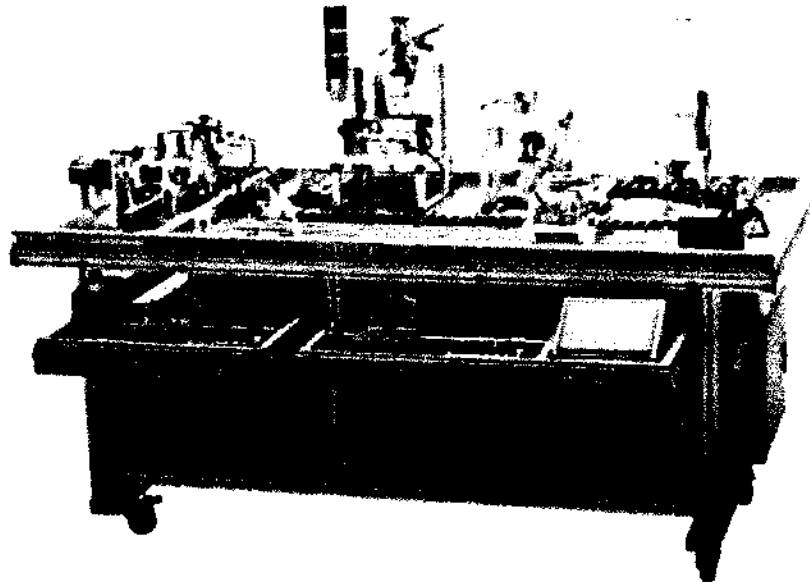
- Feeding Unit
- Processing Unit
- Transmission Unit
- Assembly Unit
- Sorting Unit
- Distribution box
- Servo motor and driver
- Three phase motors
- Photo-electric sensor
- Proximity sensor
- Metal sensor
- Fiber optic sensor
- Warning light
- Manifold board

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- Double way electronic controlled valve
- Cylinder
- Communication device
- Filter pressure relief valve
- Solenoid valve components
- Power distribution system
- Air pump
- Wiring terminal block
- Control unit
- PLC Controller (Mitsubishi)
- Workpiece
- Touch screen

Sample Image:

YL-335B Automatic production line training equipment



Picture for reference only

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Technical Specifications

Lot 17 : Machining Equipment

APPROVED BUDGET FOR THE CONTRACT : Forty Million Seven Hundred Ninety-Four Thousand Six Hundred Twelve Pesos and 60/100 (P40,794,612.60)

Item Code	Item Name	Agency Specification	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
17-001	CNC Vertical Milling Machine	Kindly refer to the technical specifications attached as Annex B17.	1	unit			
17-002	CNC Lathe Machine		1	unit			
17-003	Precision Lathe Machine		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.

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

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
17-001	CNC Vertical Milling Machine	refer to Technical Specification of Item Code 17-001	Equipment	Brochure with picture and data sheet	<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 - Installation, Commissioning and Training 	1 Year	Yes	Yes	1	unit
17-002	CNC Lathe Machine	refer to Technical Specification of Item Code 17-002	Equipment	Brochure with picture and data sheet	<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 - Installation, Commissioning and Training 	1 Year	Yes	Yes	1	unit
17-003	Precision Lathe Machine	refer to Technical Specification of Item Code 17-003	Equipment	Brochure with picture and data sheet	<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 - Installation, Commissioning and Training 	1 Year	Yes	Yes	1	unit

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

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

TECHNICAL SPECIFICATION

Name of The Learning System	CNC Vertical Milling Machine
Item Code	17-001
Technology Area(s)	Machining Equipment

Required Topics/Lessons:

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

- Interpret engineering drawings and follow the specification
- Process Planning
- CNC Programming
- Metrology
- CNC Operating
- CNC Machining

Hardware / Specification

- CNC Vertical Milling Machine
 - Table Size: Length 750 mm - 1000 mm; Width 350 - 550 mm,
 - Table Load Capacity: 500-1400 kg,
 - Travel X-axis: 500mm - 850 mm, Y - axis: 400 mm - 600 mm, Z - axis: 500 mm - 600 mm,
 - Maximum Spindle speed: 8,000 - 12,000 rpm; Direct Drive,
 - Spindle Taper: BT 40,
 - Tool Storage Capacity: 20 tools - 30 tools only,
 - Electricals: 220 volts / 3 phase / 60 Hz,
 - Spindle Motor Power: 20 hp - 30 hp, Max Rapids on (x, y, z): 25.4 m/ min - 42 m/ min;
 - Servomotors on all axes, 4th Axes Drive and wiring,
 - Coolant and Chip system, Max tool diameter: 80 -95 mm, bearing lubrication: air / oil/ grease injection
 - Industry 4.0 ready / Wi-Fi connectivity
- 2 Units External CNC CONTROLLER SIMULATOR (Stand-alone exact replica (duplicate) of the CNC Controller of the machine for off-machine training on CNC programming, operation and simulation), 3/4/5 Axes, Lathe and Mill Control Software, USB / Ethernet / Wi-Fi Connectivity (4th IR Ready)
 - 15" color LCD monitor
 - Dual Software – Selectable for Mill or Lathe
 - Visual Quick Code Programming
 - Full Machine Control
 - All Machine Functions Simulated
 - Full machine keypad
 - Simulated Graphic Dry run
 - Built-in Machining Calculators

- Fully Descriptive Alarms
- Built-in Help Menus
- Built-in USB port
- Upgradable to Future Software versions
 - 1 GB Memory
 - 4th Axis Rotary Table (Can be mounted horizontal / vertical, Worktable diameter: 160mm -350mm diameter, Accuracy: ± 15 sec, Servo Motor, complete with accessories)
- Machine Accuracy & Control Specifications
 - Control type - Dialog, Conversational/ Intuitive Programming Sys. /EIA/ ISO PROGRAMMING
 - Working Memory - 64gb
- Minimum features and accessories included:
 - Fully enclosed machining center
 - USB port
 - ethernet interface
 - Wireless Automatic tool length measuring device/ Touch probe
 - Spindle Orientation
 - User-definable macros, Coordinate Rotation and Scaling
 - Visual part programming
 - Chip Auger
 - Control touch screen
 - Early-power failure detection module
 - Ethernet Interface
 - Wi-Fi connection
 - Media Display M-code
 - Remote monitoring
 - Safe Run
 - Wireless file transfer, via android or iOS
 - Rigid Tapping
 - Automatic voltage regulator 30KVA, 3 Phase, 220V
 - Air Compressor 10 HP, 20 A, 220 volts, 3 phase

Other Equipment & Accessories:

- Milling vise
- Drill Chuck (3mm to 13 mm capacity)
- Drill Chuck arbor BT 40
- BT 40 Quick Change Milling (Collet) Chuck compatible for ER 40 Collets
- pull studs for BT 40 Quick Change Milling Chuck
- ER 40 Collets (3-25 mm diameter)
- Face mill arbor
- Carbide Inserts for face mill
- HSS-E Drill Bits (3mm- 13mm diameter)

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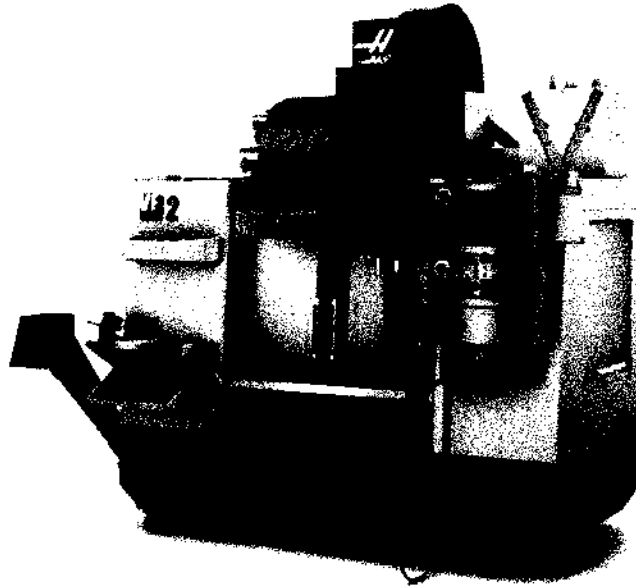
2

- BT 40 Spindle taper cleaner
- mill vise
- 18 mm diameter HSS-E End mills (roughing)
- 16 mm diameter HSS-E End mills (roughing)
- 14 mm diameter HSS-E End mills (roughing)
- 12 mm diameter HSS-E End mills (roughing)
- 10 mm diameter HSS-E End mills (roughing)
- 8 mm diameter HSS-E End mills (roughing)
- 16 mm diameter HSS-E End mills (roughing)
- 5 mm diameter HSS-E End mills (roughing)
- 4 mm diameter HSS-E End mills (roughing)
- 18 mm diameter HSS-E End mills (finishing)
- 16 mm diameter HSS-E End mills (finishing)
- 14 mm diameter HSS-E End mills (finishing)
- 12 mm diameter HSS-E End mills (finishing)
- 10 mm diameter HSS-E End mills (finishing)
- 8 mm diameter HSS-E End mills (finishing)
- 6 mm diameter HSS-E End mills (finishing)
- 5 mm diameter HSS-E End mills (finishing)
- 4 mm diameter HSS-E End mills (finishing)
- 2 mm diameter HSS-E BALL NOSE End mills
- 4 mm diameter HSS-E BALL NOSE End mills
- 5 mm diameter HSS-E BALL NOSE End mills
- 6 mm diameter HSS-E BALL NOSE End mills
- 8 mm diameter HSS-E BALL NOSE End mills
- 8 mm diameter HSS-E CHAMFER MILL 45 DEGREES ANGLE
- Coolant (pail) - 1 pc.

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Sample Image:



Picture for reference only

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

Name of The Learning System	CNC Lathe Machine
Item Code	17-002
Technology Area(s)	Machining Equipment

Required Topics/Lessons:

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

- Interpret engineering drawings and follow the specification
- Process Planning
- CNC Programming
- Metrology
- CNC Operating
- CNC Machining

Hardware / Specification

- CNC Lathe Machine
 - Spindle Power: 15 HP / 11.2kW
 - Spindle Speed: 6000RPM
 - Input AC Voltage: 220VAC/ 3 Phase / 60 hz
 - Full Load Amps: 40 A
 - X Axis Travel: 200 mm
 - Y Axis Travel: ± 51 mm
 - Z Axis Travel: 406 mm
 - Spindle Nose: A2-5
 - Spindle Bore Diameter: 58.7 mm
 - Chuck Size: 165 mm
 - Max Cutting Diameter: 356 mm
 - Max Cutting Length: 406 mm
 - Bar Capacity: 44 mm
 - Max Part Diameter: 419 mm
 - Over Wedge: 419
 - Turrets & Live tooling
 - Chip & Coolant Management: 30 Gallon Coolant Tank, variable flow
 - Drive System: Direct Speed, Belt Drive
 - Turret/ Tool Capacity: 12 Station Hybrid BOT/VDI Tool Turret
 - Live Tooling: 4000-RPM Live Tooling with C Axis
 - Probing System: Automatic Tool Presetter

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- CNC Control
 - Visual Part Programming System
 - Media Display M-Code:M130
 - Remote Monitoring
 - Rigid Tapping
 - Spindle Orientation to provide repeatable spindle positioning accurate to 0.5 degree
 - Safe Run Software feature
 - Wireless File Transfer. Via Android or iOS
 - Early Power Failure Detection Module
 - Ethernet Interface
 - Wi-Fi Connection for the CNC Control
 - Standard Program Memory, 64 GB
- Auto Door Option for Machine
- Air Requirements: 4scfm @ 100psi
- 6.5" Hydraulic Chuck, A2-5
- 3 Sets of Axial Driven Toolholder, ER-32
- 3 sets of Radial Driven Toolholder, ER-32
- Manual Tailstock with Hydraulic Quill
- Machine Size LxWxH: 2621x1827x1864mm
- Automatic Voltage Regulator 15 KVA 3 Phase, 220V input/220V output, ± 1% output regulation
- Compressor, 5HP, 200li
- Surge Suppressor

Other Equipment & Accessories:

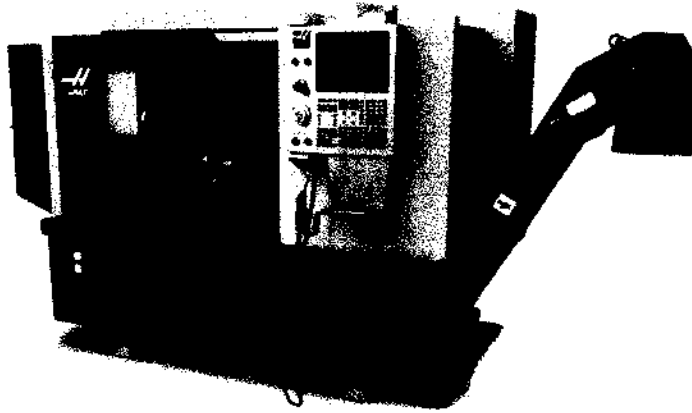
- Bolt-on Toolholders (Indexable Carbide inserts), 3/4" Right Hand Tool Roughing,
- Bolt-on Toolholders (Indexable Carbide inserts), 3/4" Right Hand Tool Finishing,
- Bolt-on Toolholders (Indexable Carbide inserts), 3/4" Left Hand Tool Roughing,
- Bolt-on Toolholders (Indexable Carbide inserts), 3/4" Left Hand Tool Finishing,
- Bolt-on Toolholders (Indexable Carbide inserts), 3/4" External Threading Tool
- Bolt-on Toolholders (Indexable Carbide inserts), 3/4" Cut-off Tool
- Bolt-on Toolholders (Indexable Carbide inserts), 3/4" Parting Tool
- Indexable Coated Carbide Inserts Right Hand Tool Roughing
- Indexable Coated Carbide Inserts Right Hand Tool Finishing
- Indexable Coated Carbide Inserts Left Hand Tool Roughing
- Indexable Coated Carbide Inserts Left Hand Tool Finishing
- Indexable Coated Carbide Inserts External Threading Tool
- Indexable Coated Carbide Inserts Parting Tool
- Indexable Coated Carbide Inserts Cut-Off Tool
- VDI Toolholder Kit
- Bolt-on 1" ID Boring Bar Holder
- Bolt-on 1.25" ID Boring Bar Holder
- ER-32 Collet

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- Live Center
- Dead Center
- Coolant (pail) - 1 pc.

Sample Image:



Picture for reference only

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TECHNICAL SPECIFICATION

Name of The Learning System	Precision Lathe Machine
Item Code	17-003
Technology Area(s)	Machining Equipment

Required Topics/Lessons:

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

- Interpret engineering drawings and follow the specification
- Process Planning
- Metrology
- Precision Lathe Machine operation

Hardware / Specification

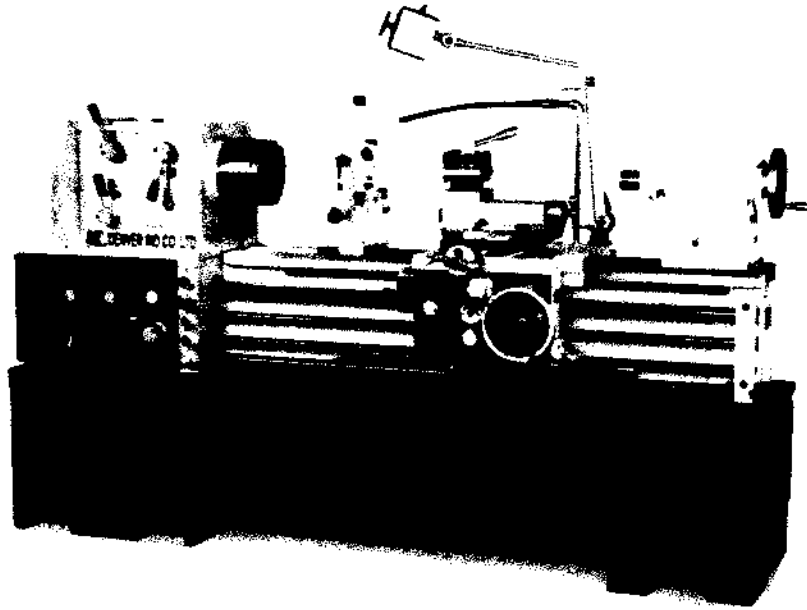
- Precision Lathe Machine
 - Swing over bed 460 mm
 - Distance between centers 1000 mm
 - Swing over cross slide 280 mm
 - Swing over gap 680 mm
 - Width of bed 317 mm
 - Spindle bore 52 mm
 - Spindle speed 80-1400 variable speed
 - Number of spindle speeds 8 steps
 - Spindle Nose A1-6
 - Length of bed 1990mm
 - Width of carriage 485 mm
 - Cross slide travel 250 mm
 - Top slide travel 125mm
 - Tool shank 20x20 mm
 - Tailstock 52 mm
 - Taper MT 4
 - Travel of barrel 140mm
 - Tool shank 20x20 mm
 - Tailstock 52 mm
 - Taper MT 4
 - Travel of barrel 140 mm
 - Lead screw dia & pitch dia 35mm, pitch 6mm
 - Range of metric pitches 0.2-14
 - Range of inch pitches 2-56 T.P.I.
 - Range of module pitches 0.3-3.5MP (18Nos)
 - Range of cross feeds 0.05-1.25mm/rev
 - Feed rod diameter 22 mm
 - Range of longitudinal feeds 0.04 – 1.0 mm/rev

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- Coolant pump motor 1/8 HP
- Motor 5HP
- Supply 220V/3P/60hz
- Supplied with
 - Main Drive Motor
 - Gap Bed Type
 - XZ-axes automatic lubrication system
 - Metric/Inch gear box
 - Coolant system
 - Longitudinal apron motion feed
 - Tailstock
 - 3-Jaw scroll chuck with backplate
 - Steady rest
 - Halogen lamp
 - Center sleeve
 - Dead center
 - Follow Rest
 - Tools in toolbox
 - Level pads
 - Operation manual
 - 4 jaw independent chuck
 - Face plate
 - Digital Read Out
- Features:
 - Gears in headstock and spindle are hardened & precision ground
 - Safety foot brake
 - Bed ways & surface of compound rest have been ultra-frequency heat treated & ground to provide longer life
 - One-piece Maghemite casting machine base
 - Apron enforced oil supply with safety device is used to avoid collision
 - Metric & inch gear box with full range of inch, DP, MP threading and multiple threads, all function is reached without change gear
 - Dynamically balanced alloy spindle is adopted 3 points of bearing support

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Sample Image:



Picture for reference only

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Technical Specifications

Lot 18 : Power Generation Equipment and Supplies

APPROVED BUDGET FOR THE CONTRACT : Eleven Million Nine Hundred Sixty-Four Thousand Three Hundred Nine Pesos and 94/100 (P11,964,309.94)

Item Code	Item Name	Agency Specification	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
07-001	Grid Connected Solar PV, 15kW	Kindly refer to the technical specifications attached as Annex B18.	5	unit			
07-002	Grid Connected Solar PV, 5kW		6	unit			
07-003	Grid Connect, 3.8kW		12	units			
07-004	Grid Connect, 5kW		12	units			
07-005	Grid Connect with power limiter, 5kW		14	units			
07-006	Solar Module, 300 to 350W		150	units			
07-007	Solar Module, 400 to 450W		150	units			
07-008	Solar Module, 200 to 250W		100	units			
07-009	Solar Site Analysis tool		5	sets			
07-010	Mounting rail		150	pcs			
07-011	Splice		50	pcs			
07-012	Mid Clamp		300	pcs			
07-013	End Clamp		300	pcs			
07-014	Grounding Lug		100	pcs			
07-015	Solar PV Complete Test Kit		2	set			
07-016	Computerized Battery Analyzer		10	units			

* 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.

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

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
07-001	Grid Connected Solar PV, 15kW	refer to Technical Specification of Item Code 07-001	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	5	unit
07-002	Grid Connected Solar PV, 5kW	refer to Technical Specification of Item Code 07-002	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	6	unit
07-003	Grid Connect, 3.8kW	refer to Technical Specification of Item Code 07-004	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	12	units
07-004	Grid Connect, 5kW	refer to Technical Specification of Item Code 07-005	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	12	units

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
07-005	Grid Connect with power limiter, 5kW	refer to Technical Specification of Item Code 07-006	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	14	units
07-006	Solar Module, 300 to 350W	Monocrystalline 300 - 350 W 60 - 72 cells System Voltage: at least 1000 Half Cell, MBB Aluminum Frame	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	150	units
07-007	Solar Module, 400 to 450W	Monocrystalline 400 - 450 W 140 - 152 cells System Voltage: at least 1000 Half Cell, MBB Aluminum Frame	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	150	units
07-008	Solar Module, 200 to 250W	Polycrystalline 200 - 250 W 60 - 72 cells System Voltage: at least 1000 Aluminum Frame	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	100	units

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
07-009	Solar Site Analysis tool	Non-electronic Composed of: - Dome Section - Base Section - Instrument Section With tripod and case	Equipment	Brochure with picture and data sheet	- Checking the conformity with the quantity including parts and accessories - Checking the conformity of hardware vis-a-vis offered specifications - Functionality testing	1 Year	Yes	Yes	5	sets
07-010	Mounting rail	Aluminum 4.2 meters	Tools and Measuring Instruments	Brochure with picture and data sheet	- Checking the conformity of quantity - Type and measurement of material used	1 Year	N/A	N/A	150	pcs
07-011	Splice	Aluminum Compatible with the mounting rail, item no. 07-010	Tools and Measuring Instruments	Brochure with picture and data sheet	- Checking the conformity of quantity - Type and measurement of material used	1 Year	N/A	N/A	50	pcs
07-012	Mid Clamp	Aluminum Nut must be compatible with the mounting rail, item no. 07-010	Tools and Measuring Instruments	Brochure with picture and data sheet	- Checking the conformity of quantity - Type and measurement of material used	1 Year	N/A	N/A	300	pcs
07-013	End Clamp	Aluminum Nut must be compatible with the mounting rail, item no. 07-010	Tools and Measuring Instruments	Brochure with picture and data sheet	- Checking the conformity of quantity - Type and measurement of material used	1 Year	N/A	N/A	300	pcs
07-014	Grounding Lug	Aluminum Nut must be compatible with the mounting rail, item no. 07-010	Tools and Measuring Instruments	Brochure with picture and data sheet	- Checking the conformity of quantity - Type and measurement of material used	1 Year	N/A	N/A	100	pcs

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
07-015	Solar PV Complete Test Kit	refer to Technical Specification of Item Code 07-015	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	2	set
07-016	Computerized Battery Analyzer	refer to Technical Specification of Item Code 07-016	Equipment	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	10	units

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

Name of Company/Bidder

Signature over Printed Name of Authorized Representative

Date

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TECHNICAL SPECIFICATION

Name of The Learning System	Grid Connect Solar PV
Item Code	07-001
Technology Area(s)	Power Generation Equipment and Supplies

Inverter

- Type: On-grid 3-phase
- Nominal Rating: 15 kW
- MPPT Tracker: 2
- Max DC Input Voltage: 1,000 V
- Rated AC Output Power: at least 15,000 Watts
- Rated Grid Voltage: 3/N/PE, 220/380Vac, 230/400Vac, 240/415VAC
- Nominal Grid Frequency: 60Hz
- Equipped with export control

All accessories shall be included

- Wifi Interface for power monitoring
- Power Limiter/export control if not integrated in the inverter

PV Array

- PV array shall be over sized from 17,000 to 20,000 Wp to increase production during times of low irradiation and losses compensation
- Must be equipped with rapid shutdown
- All accessories included: e.g. cable clips, end clamp, mid clamp, etc.

Solar Module

The solar module should have the following characteristics:

- Nominal power rating: 300 up to 550 kWp
- Technology: Half Cell MBB
- System Voltage: at least 1,000 volts

Mounting Structure

- Flat on tin roof
- Material: Aluminum
- Must be able to accommodate the PV array mentioned above
- Must include all attachments, fittings, and mounting accessories: e.g. mid and end clamp for selected solar modules, bolts and nuts, washers, etc.

Electrical accessories

The following electrical components, fittings and accessories shall be supplied together with the system:

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- **Conductors:**
 - String conductors shall be of approved type for photovoltaic application
 - Grounding conductor of approved type and of suitable size for the application
 - Other conductors required to make the system operational
 - Approximate distance:
 - ◆ PV Array to inverter: 100 meters
 - ◆ Inverter to AC common point of coupling: 50 meters

Distribution Panel

- Two distribution panels; one for DC and one for AC
- Size: good enough to accommodate the necessary protective devices
- At least IP 65

Grounding and Bonding

- WEEB to create bonding between solar modules and railings
- Grounding Lug to connect grounding conductor from railings to grounding electrode
- Grounding rod with clamps, at least 6 ft

Protective Devices and Disconnecting Means

- AC and DC surge protective Device, DIN mounted
- DC circuit breaker, DIN mounted for each string
- AC circuit breaker, DIN mounted
- AC Isolator: at least IP65, for outdoor application

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

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

Name of The Learning System	Grid Connected Solar PV
Item Code	07-002
Technology Area(s)	Power Generation Equipment and Supplies

Inverter

- Type: Hybrid
- Nominal Rating: 5 kW
- MPPT input: 2
- DC Input Power Per MPPT: at least 2,600 Watts
- DC input Current Per MPPT: at least 11A
- Rated AC Output Power: at least 3,500 Watts
- Rated Grid Voltage: 220V/230V/240V
- Nominal Grid Frequency: 60Hz
- Max. Charging Power: at least 2,500 Watts
- Must be able to handle 48V battery bank system
- EPS Rated Output Power: at least 3000VA
- Equipped with export control
- Equipped with automatic transfer to switch-on critical load from grid to back-up power

All accessories shall be included

- Wifi Interface for power monitoring
- Power Limiter/export control if not integrated in the inverter

Battery

- Lithium Iron Phosphate or Lithium Ion
- Must be compatible to the hybrid inverter mentioned above
- Rating: at least 3.0 kWh
- Equipped with BMS
- All accessories included: e.g mounting bracket, fastening devices, connecting cables and terminals, and battery storage

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

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

Name of The Learning System	Grid Connect, 3.8kW
Item Code	07-004
Technology Area(s)	Power Generation Equipment and Supplies

Grid Connect with export limiting smart meter and integrated data manager

GENERAL DATA

- Rated Power: 3.8 kW
- Protection Class: NEMA 4X
- Night time consumption: <1W
- Inverter topology: Transformerless
- Cooling: Variable speed fan
- Installation: Indoor and outdoor installation
- Ambient operating temperature range: -40 - 131°F (-40 - 55°C)
- Permitted humidity: 0 - 100 %
- Elevation: 4000m (13123 ft)
- DC connection terminals: 4x DC+ and 4x DC- screw terminals for copper (solid / stranded / fine stranded) or aluminum (solid/stranded)

PROTECTION DEVICES

- DC reverse polarity protection
- Anti islanding
- Over temperature protection
- AFCI
- Rapid shutdown compliant
- Ground fault protection with isolation monitor interrupter
- DC disconnect

INTERFACES

- Wi-Fi / Ethernet LAN
- USB (A socket)
- 2x RS422 (RJ45 socket)

INPUT DATA

- Recommended PV power (kWp): 3.0-6.0kW
- Max. usable input current (MPPT 1/MPPT 2): 18A / 18A
- Max. usable input current (MPPT 1+MPPT 2): 36A
- Max. array short circuit current (1.5* I_{max}) (MPPT1/MPPT2): 27A / 27A
- Nominal input voltage: 410V
- Operating voltage range: 80V-600V
- DC startup voltage: 80V
- MPP Voltage Range: 200-480V

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OUTPUT DATA

- Max. output power:c 3800VA / 3800 VA
- Frequency range (adjustable) : 45.0 - 55.0 Hz / 50 - 66 Hz
- Operating frequency range default for CAL setups: --/ 58.5 - 60.5 Hz
- Nominal operating frequency : 60Hz
- Admissible conductor size AC : AWG 14 - AWG 6
- Total harmonic distortion: < 5.0 %
- Power factor range: 0.85-1 ind./cap
- Max. continuous output current: 208V = 18.3A, 240V = 15.8A
- OCPD/AC breaker size : 208V=25A, 240V=20A
- Max. Efficiency: 96.7%
- CEC Efficiency: 95.0%

CERTIFICATES AND COMPLIANCE WITH STANDARDS

- UL 1741-2010 Second Edition (incl. UL1741 Supplement SA 2016-09 for California Rule 21 and Hawaiian Electric Code Rule14H), UL1998 (for functions: AFCI, RCMU and isolation monitoring), IEEE 1547-2003, IEEE 1547.1-2003, ANSI/IEEEC62.41, FCC Part 15 A & B, NEC 2017 Article 690, C22. 2 No.107.1-16, UL1699B Issue 2 -2013, CSA TIL M-07 Issue 1 – 2013

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

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

Name of The Learning System	Grid Connect, 5kW
Item Code	07-005
Technology Area(s)	Power Generation Equipment and Supplies

Input (DC)

- Max. PV power: 8000Wp
- Max. DC voltage: 600V
- Rated MPP voltage range: 220 – 480 V
- MPPT operating voltage range: 100 – 550 V
- Min. DC voltage / start voltage: 100 V / 125 V
- Max. operating input current per MPPT: 10A
- Max. short circuit current per MPPT: 18A
- Number of MPPT tracker / string per MPPT tracker: 3/1

Output (AC)

- AC nominal power: 5000W
- Max. AC apparent power: 5000VA
- Nominal voltage / adjustable: 240V
- AC voltage range: 211 – 264 V
- AC grid frequency: 60 Hz / 50 Hz
- Max. output current: 21.0 A
- Power factor ($\cos \phi$) / harmonics: 1 / < 4 %
- Output phases / line connections: 1 / 2
- Max. efficiency: 208V=97.3%, 240V=97.6%
- CEC efficiency: 208V=96.5%, 240V=97.0%

Protection devices

- DC disconnect device / DC reverse polarity protection
- Ground fault monitoring / Grid monitoring
- AC short circuit protection
- All-pole sensitive residual current monitoring unit (RCMU)
- Arc fault circuit interrupter (AFCI)
- Protection class / overvoltage category: I / IV

General data

- Rated Power: 5kW
- Environmental protection rating: NEMA 3R
- Noise emission (typical): 39 dB(A)
- Internal power consumption at night: < 5 W
- Topology / cooling concept: transformerless / convection

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Features

- Ethernet ports: 2
- Secure Power Supply
- Display (2 x 16 characters)
- 2.4 GHz WLAN / External WLAN antenna
- ShadeFix technology for string level optimization
- Warranty: 10 yrs

Certificates and approvals

- UL 1741, UL 1741 SA incl. CA Rule 21 RSD, UL 1998, UL 1699B Ed. 1, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA V22.2 107.1-1, HECO Rule 14H, PV Rapid Shutdown System Equipment

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

<hr/> Name of Company/Bidder	<hr/> Signature over Printed Name of Authorized Representative	<hr/> Date
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TECHNICAL SPECIFICATION

Name of The Learning System	Grid Connect with power limiter, 5kW
Item Code	07-006
Technology Area(s)	Power Generation Equipment and Supplies

General data

- Rated Power: 5kW
- Cooling concept: Natural
- Topology: Non-isolated
- Communication interfaces
 - Pocket WiFi(optional)/Pocket LAN(optional)/Pocket
 - GPRS(optional)/Meter(optional)/RS485/DRM/USB-Upgrade
- LCD display: Yes
- Standard warranty [years]: 5-10

Input Data

- Max. PV array power [Wp]: 5200
- Max. DC voltage [V]: 600
- Nominal DC operating voltage [V]: 600
- Max. input current [A]: 12/12
- Max. short circuit current [A]: 12.8/12.8
- MPPT voltage range[V]: 70-580
- Start operating voltage[V]: 100
- No. of MPP trackers: 2
- Strings per MPP tracker: 1

Output Data

- Nominal AC power [VA]: 5000
- Max. AC power [VA]: 5000
- Nominal grid voltage(AC voltage range) [V]: 200-250
- Nominal grid frequency/range [Hz]: 50-60
- Nominal AC current [A]: 21.7
- Max. AC current [A]: 22.7
- Displacement power factor: 0.8 leading ~ 0.8 lagging
- THDi, rated power [%]: <2

Device Protection

- Over voltage/ Under Voltage protection
- Overcurrent protection
- Overload Protection
- Overheat Protection
- Anti-Islanding Protection
- Backfeed Current Monitoring

- DC isolation impedance monitoring
- Ground fault current monitoring
- DC injection monitoring
- RCD protection

Certificates and Compliance with Standard

- Safety: IEC62109-1/-2
- EMC: EN 61000-6-1 / EN 61000-6-2 / EN 61000-6-3
- Certification: VDE4105 /G98 / G99/ AS4777 / EN50549 / CEI0-21

Environment Limit

- Degree of protection (according to IEC60529): IP65

Power Limiter: Compatible with the above inverter

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

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

Name of The Learning System	Solar PV Complete Test Kit
Item Code	07-015
Technology Area(s)	Power Generation Equipment and Supplies

The solar PV complete test kit shall include the following:

1. A compact solar PV tester with I-V curve tracing
2. Solar Irradiance Meter
3. Solar Irradiance meter mounting bracket
4. AC/DC Current Clamp Ammeter
5. SolarCert Solar PV Reporting Software
6. Complete testing and other accessories:
 - 2 x MC4 test lead adaptors
 - 2 x combiner box test probes and detachable alligator clips (MC4)
 - 2 x test leads with detachable alligator clips (4mm)
 - USB download cable
 - rugged carry bag
 - quick start guide
 - calibration certificates and a 2-year warranty

COMPACT SOLAR PV TESTER WITH I-V CURVE TRACING

Key Features:

- Instant NFC data transfer using the PVMobile app.
- All-in-one commissioning tests and I-V curve tracing.
- Automatic fill factor calculation.
- Ground continuity measurement with test lead null.
- PV string open circuit and maximum power point voltage measurements up to 1000V DC.
- PV string short current up to 15A DC.
- PV array insulation test at 250/500/1000V.
- Tests individual PV modules or strings.
- Memory for up to 999 records and USB download to PC.
- High contrast display, visible in bright light.

General Specification:

- Instrument Dimensions and Weight Weight 1.04kg / 2.3lb
- Dimensions 26.4 x 10.7 x 5.8cm / 10.4 x 4.2 x 2.3"
- Display Custom LCD with backlight

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- Power Source 6 x 1.5V AA cells
- Battery life >1000 test sequences
- Auto power down User programmable
- Onboard memory Up to 999 complete test datasets
- Connectivity USB download to PC (CSV format)
- Wireless "Solarlink TM" to Survey 200R (range ~30m/100ft)
- NFC transfer of data to PVMobile Android App
- App compatibility: Compatible with Android version 4.2 Jelly Bean
- Software compatibility: Compatible with SolarCert software (English language only)
- Service 2 year warranty

Technical Specification:

Open Circuit Voltage Measurement (PV Terminals)

- Display Range: 0.0VDC - 1000VDC
- Measuring Range: 5.0VDC - 1000VDC
- Resolution: 0.1VDC maximum
- Accuracy: $\pm (0.5 \% + 2 \text{ digits})$
- Enunciators: DC voltage polarity correct or reversed

Short Circuit Current Measurement (PV Terminals)

- Display Range 0.00ADC - 15.00ADC
- Measuring Range 0.50ADC - 15.00ADC
- Maximum Power 10kW
- Resolution 0.01ADC maximum Accuracy $\pm (1\% + 2 \text{ digits})$

Earth Continuity Resistance Measurement (4mm Terminals)

- >Test Voltage Open Circuit >4VDC, nominal
- >Test Current into 2 Ω : >200mA
- >Display Range: 0.00 Ω - 199 Ω
- >Measuring Range (EN 61557-4): 0.05 Ω - 199 Ω
- >Resolution: 0.01 Ω maximum
- >Accuracy: $\pm (2\% + 5 \text{ digits})$
- >Test Leads Zero: Zero up to 10 Ω , by zero button
- >Visible Warning: $\geq 30\text{V}$ AC or DC at inputs
- >Circuitry Protection: Test inhibited if $\geq 30\text{V}$ AC or DC at inputs
- >Repeat tests as per IEC 61557-4: Approx 4000 1 second test

Insulation Resistance (Auto Test Sequence, PV Terminals and Red 4mm Terminal)

- Test Voltage Open Circuit 250V, 500V, 1000V (as per IEC61557-2)
- Test Voltage Specification -0% +20% (open circuit)
- Test Voltage @ 1mA >1mA into UN x (1000 Ω V)
- Test Current Short Circuit

- Measuring Range: (EN 61557-2) 0.05MΩ - 200MΩ
- Resolution: 0.01MΩ maximum
- Accuracy: 0.05MΩ - 100MΩ ±(5% + 5 digits), 101MΩ - 200MΩ ±(10% + 5 digits)
- Visible Warning: ≥ 30V AC or DC at inputs
- Circuitry Protection: Test inhibited if ≥ 30V AC or DC at inputs
- Repeat tests as per IEC61557-4: Approx 4000 1 second tests

SOLAR IRRADIANCE METER

General Specification:

- Display: Custom LCD
- Power Supply: 2AA Alkaline Batteries
- Battery Life: >20,000 Readings
- Auto power down After 2 minutes

IRRADIANCE

- Display Range: 100 – 1500 W/m-2 or 30 – 500 BTU/hr-ft 2
- Measurement Ranges -30°C to +125°C
- Resolution 1°

TEMPERATURE

- Display Range -30°C to +125°C
- Measurement Ranges -30°C to +125°C
- Resolution 1°

COMPASS BEARING

- Display Range: 0° to 360°
- Measurement Ranges: 0° to 360°
- Resolution 1°

INCLINOMETER

- Display Range: 0° to 90°
- Measurement Ranges: 0° to 90°
- Resolution 1°

DATALOGGING AND CONNECTIVITY

- Datasets: 5000 Sample
- Rate 1 to 60 minutes (user definable)
- Datalogging: Download utility software included
- Compatible with SolarCert Elements software (version 1.1)
- Connectivity: USB download to PC, Wireless 'Solarlink™' (range c. 100m / 330 ft)

SERVICEABILITY

- Warranty: 2 years

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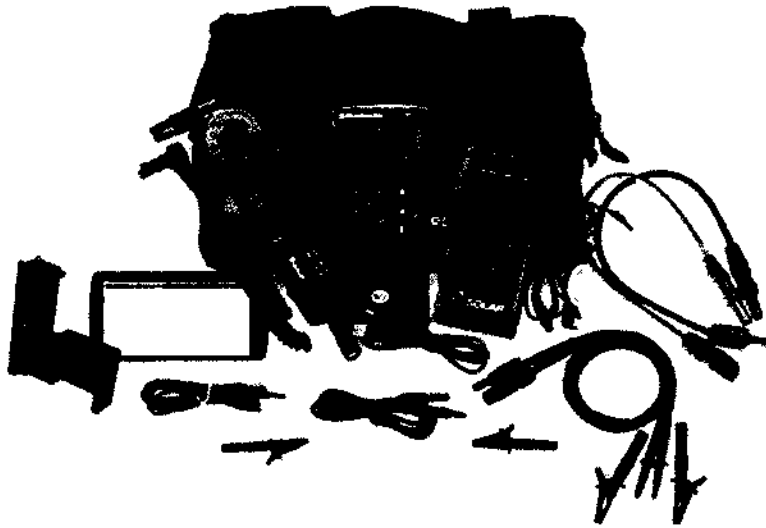
- Calibration: 1 year

SOLAR IRRADIANCE METER

General Specification:

The lightweight Solar AC/DC Current Clamp is a compact instrument capable of providing accurate measurements of AC or DC currents in conductors measuring up to 22mm in diameter. Used in conjunction with the compact PV tester mentioned above. AC and DC currents can be measured from 0.5A to 40.0A.

Sample Image:



Picture for reference only

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

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

Name of the Equipment	Computerized Battery Analyzer
Item Code	07-016
Technology Area(s)	Power Generation Equipment and Supplies

Capabilities

Scientifically Analyze Battery Performance

- True constant current battery capacity test with results graphically displayed constant power testing supported with Extended software upgrade
- Discharge current is software and electronically regulated using a solid-state switch and fan cooled electronic load
- Test any type of battery; coin cell to automotive or larger. Presets for NiCad, NiMH, Lead Acid, Li Ion, Li Poly, Alkaline, Carbon Zinc, Mercury etc.
- Solar cell profiling capability *
- Lower current testing capabilities - down to 10 mA
- Multiple discharge tests can use Watts as a parameter

Perform Fast, High Power Testing

- Tests quickly at real world load conditions, up to 150 watts or 40 amps maximum, whichever is higher
- High voltage testing at up to 55 volts (CBA II/CBA III is only 48V); the equivalent of 1 to 38 NiCad or NiMH cells *
- Perform power profile test (increase current at user's rate to see how voltage/power responds), useful for testing max power output of a power supply or solar cell *
- Optional 500 watt and 1000-watt amplifiers

Accuracy and Precision for Demanding Applications

- On-board computer performs accurate measurement with 12 bit effective resolution. Auto ranging for 2 current ranges and three voltages
- Each CBA is individually calibrated with a computerized calibration system.
- Calibration certification data provided with CBA IV Pro
- SDK for developing your own scripts or programming *
- TTL UART port that can be controlled by an Arduino, Raspberry PI, or other embedded system with a TTL serial port *

Built-in Safety Features Provide Superior Battery Protection

- Fail safe: automatic protection of temperature, current and power *
- Safety watchdog stops a discharge in the event of a computer crash *
- Discharge test current user selectable from 0 to 40 Amps
- Timed discharge test (stop discharge once certain Ah has been reached) *
- Dynamic test (alter test current using panel on the side of the software, without having to stop and start a new test) *
- Automatic voltage shut off at end of test using a software recommended or user selected safe discharge voltage

- Automatic over-temperature shut off at end of test at using a software recommended or user selected maximum temperature with optional external magnetic temperature sensor

Free Standard Software for Data Analysis

- User selected battery cell chemistry, number of cells and test current
- Software recommends safe tests based on user supplied battery information
- Automatic graph setup and scaling
- Measures and displays voltage, current, amp-hrs, and watts
- User can set the criteria for "Easy-Go/No-Go" testing
- Easy overlay comparisons of multiple graphs may be displayed saved and recalled
- Save, display and print battery test graphs and battery labels
- Plug and Play high speed USB interface, with easy to use and intuitive Windows® software supplied on CD ROM
- Manage individual tests on any number of CBA IV units connected to the same PC
- Software has no limit on number of CBA IVs that can be attached (CBA II/CBA III required multiple unit license) *

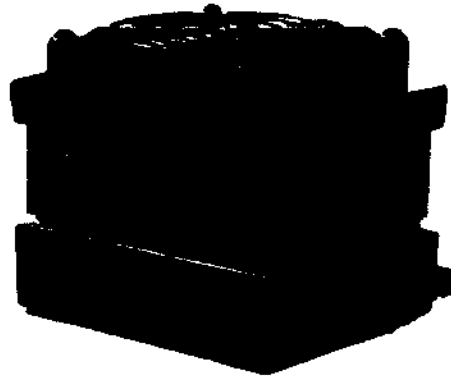
Specifications:

- Maximum continuous discharge rate: 100 watts
- Maximum limited term discharge rate with < 3500 ma-hour battery: 125 watts
- Maximum limited term discharge rate with < 1000 ma-hour battery: 150 watts
- 0-3 amp accuracy: typically better than + - 10 ma
- 3-40 amp accuracy: typically better than + - 45 ma
- 0-5 volt accuracy: typically better than + - .005 volts
- 5-15 volt accuracy: typically better than + - .01 volts
- 10-60 volt accuracy: typically better than + - .05 volts
- Maximum operating voltage: 55 Volts (48 Volt Lead Acid Telecom supported) *
- Maximum discharge rate: 40 amps (Battery dependent, 100 watt continuous)
- Minimum discharge voltage to maintain 30 amps .9Volts (Battery dependent)
- Minimum Voltage for a 40 amp discharge: 2 volts at completion of test (Battery dependant)
- Minimum discharge rate: 0.01 Amps *
- Residual current drain, battery connected while not in use: < .003 amps @ 12 volts
- High performance micro controller with built in USB interface and 12 bit A/D conversion.
- USB powered; the CBA does not use the battery being tested to run the CBA or the fan.
- System ready and Test in progress LED indicators, viewable from across a room.
- CBA internal over temperature sensing and protection.
- Graph printing on any standard color or B&W printer.
- Battery test label printing on standard 05160 stick-on labels.

The computerized battery analyzer shall include the following accessories/software:

- 6 inch pigtail adapter
- Standard version CBA software CD-ROM
- 6 ft USB Cable
- 40 amp fuse
- User Manual
- Calibration data

Sample Image:



Picture for reference only

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

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

Lot 19

: Solar and Wind Power Generation Trainer

**APPROVED BUDGET
FOR THE CONTRACT**

: **Eleven Million Eight Hundred Thirty-One Thousand Nine Hundred
Thirty Pesos and 88/100 (P11,831,930.88)**

Item Code	Item Name	Agency Specification	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
08-001	Solar and Wind Power Generation Training System	Kindly refer to the technical specifications attached as Annex B19.	2	sets			
08-002	Outdoor Wind Turbine Module		2	sets			

* 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.

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

Name of Company/Bidder

Signature over Printed Name of
Authorized Representative

Date

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
08-001	Solar and Wind Power Generation Training System	refer to Technical Specification of Item Code 08-001	Learning System	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	2	sets
08-002	Outdoor Wind Turbine Module	refer to Technical Specification of Item Code 08-002 Add-on to Solar and Wind Power Generation Training System, item 08-001	Learning System	Brochure with picture and data sheet	<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 	1 Year	Yes	Yes	2	sets

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

Name of Company/Bidder

Signature over Printed Name of
Authorized Representative

Date

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TECHNICAL SPECIFICATION

Name of The Learning System	Solar and Wind Power Generation Training System
Item Code	08-001
Technology Area(s)	Solar and Wind Power Generation Trainer

Description:

- The training system demonstrates how wind turbines and solar panels are used in the consumer and industrial markets to supplement the world's power needs.
- It includes everything required to function as a stand-alone, hands-on learning workstation: solar and wind energy power-generating equipment, training modules with fault-insertion capabilities, student manuals, and instructor guides.

Topic Coverage/Lesson:

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

- Energy Fundamentals
- Trainer Familiarization and Safety
- Solar Module
- Wind Turbine
- Solar/Wind Systems
- Going Green

Courseware:

- The courseware shall be stand alone, e-learning format on CD-ROM

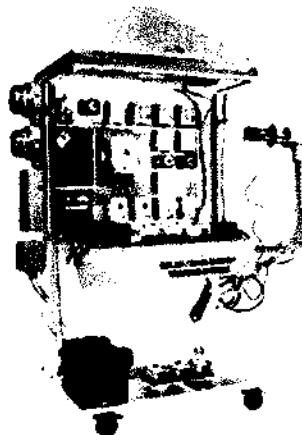
HARDWARE:

- 1 Solar/Wind Energy Mobile Workstation
- 1 Battery Bank
- 1 Battery Bank Junction Box
- 4 Electrical AC Outlet
- 3 Ammeter
- 1 DC Power Distribution Panel
- 2 Horizontal-Mount Disconnect Switch
- 2 Vertical-Mount Disconnect Switch
- 1 Diversion Load Controller
- 1 Dump Load
- 3 DC Circuit Breaker
- 1 kWh Meters with AC Circuit Breaker Box
- 4 AC/DC Wall Switch
- 1 Lockout/Tagout Module
- 1 Power Bus Bar
- 1 Power Inverter with Remote Control
- 1 Solar Charge Controller
- 1 Stop Switch

- 3 DC Lamp Socket
- 1 Photovoltaic (PV) Module Assembly
- 1 Wind Turbine Generator with DC Motor (for Wind Simulator)
- 1 Solar Array Junction Box
- 1 Sun Simulator Assembly
- 1 DC Motor Controller (for Wind Simulator)
- 1 Accessories Package
- 1 Connection Cables Kit
- 1 Power Usage Monitor
- 1 Multimeter
- 1 Photovoltaic Systems Textbook (Student Manual)
- 1 Energy Fundamentals (Job Sheets - Student)
- 1 Energy Fundamentals (Job Sheets - Instructor)
- 1 Solar Module (Job Sheets - Student)
- 1 Solar Module (Job Sheets - Instructor)
- 1 Wind Turbine (Job Sheets - Student)
- 1 Wind Turbine (Job Sheets - Instructor)
- 1 Solar/Wind Systems (Job Sheets - Student)
- 1 Solar/Wind Systems (Job Sheets - Instructor)
- 1 Going Green (Job Sheets - Student)
- 1 Going Green (Job Sheets - Instructor)
- 1 Solar/Wind Energy Training System (User Guide)

>Specification of all sub-components will depend on the engineering design of the training system.

Sample Image:



Picture for reference only

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

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

Name of The Learning System	Outdoor Wind Turbine Module
Item Code	08-002
Technology Area(s)	Solar and Wind Power Generation Trainer

> Add-on to Solar and Wind Power Generation Training System

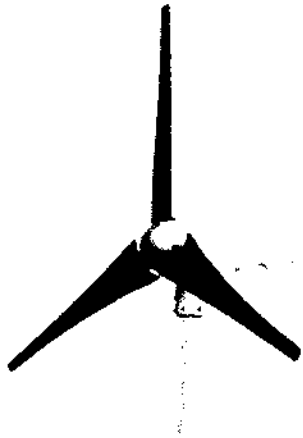
Description:

- The tower kit comprises all the hardware required to erect the tower, such as pipes, anchors, and cables.
- Must be compatible with Solar/Wind Training System

Hardware:

- 1 Wind Turbine Owner's Manual
- 1 Wind Turbine Generator
- 1 Tower Kit

Sample Image:



Picture for reference only

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

_____ Name of Company/Bidder	_____ Signature over Printed Name of Authorized Representative	_____ Date
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Technical Specifications

Lot 20

: Science Lab Equipment

APPROVED BUDGET
FOR THE CONTRACT

: One Million Three Hundred Sixty Thousand One Hundred Thirty-Nine
Pesos and 94/100 (P1,360,139.94)

Item Code	Item Name	Agency Specification	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
06-064	Eyewash with Shower Station	Kindly refer to the technical specifications attached as Annex B20.	1	set			
06-001	Compound Microscope, E-Function		1	unit			
06-002	Compound Microscope, Manual Operation		5	units			
06-003	Glass Slides		6	boxes			
06-004	Cover Slips/ Glass		6	boxes			
06-005	Set of Test Tubes		12	sets			
06-010	Test Tube Rack		12	pcs			
06-011	Test Tube Holder		30	pcs			
06-012	Set of Laboratory Funnel		6	sets			
06-014	Dissecting Set		6	sets			
06-015	Dissecting Pan		6	pcs			
06-016	Set of Beakers		12	sets			
06-021	Set of Graduated Cylinder		6	sets			
06-024	Set of Erlenmeyer Flask		6	sets			
06-028	Set of Petri Dish		6	sets			
06-030	Set of Stirring Rod		6	sets			
06-032	Set of Pipette/ Dropper		6	sets			
06-039	Wire Gauze		30	pcs			
06-040	Alcohol Lamp		12	pcs			
06-041	C-Clamp		6	pcs			
06-042	Tripod		12	pcs			
06-043	Bunsen Burner		6	pcs			
06-044	Magnet, u-shaped		6	pcs			
06-045	Magnet, bar type		6	pcs			
06-046	Set of Convex Lens		6	sets			
06-049	Set of Concave Lens		6	sets			
06-052	Crucible Tongs		6	pcs			
06-053	Double Beam Balance		6	pcs			
06-054	Spring Balance	6	pcs				
06-055	Triple Beam Balance	6	pcs				

Item Code	Item Name	Agency Specification	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
06-056	Thermometer	Kindly refer to the technical specifications attached as Annex B20.	6	pcs			
06-057	Ammeter		6	units			
06-058	Mortar and Pestle		6	pcs			
06-059	Spatula		6	pcs			
06-060	Compass		6	pcs			
06-061	PH Meter		6	units			
06-062	Salinometer/ Salinity Meter		6	units			
06-063	Flammable Chemicals Storage Cabinet		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.

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

Name of Company/Bidder

Signature over Printed Name of
Authorized Representative

Date

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
06-064	Eyewash with Shower Station	With Curtain, Floor Mounted Size : 310Mm X 350Mm X 660Mm Stainless Steel Pipe, Push Handle, Triangular Pull Handle	Apparatus	Brochure with picture and data sheet	Checking the conformity of hardware vis-a-vis offered specifications Measurement of dimension Functionality testing	1 Year	Yes	Yes	1	set
06-001	Compound Microscope, E-Function	Binocular, digital and optical Max. 1000X Magnification with 1.3 or + MP camera Illumination: LED light, transmitted, intensity adjustable Can be interfaced to computer for view sharing and image/video storage	Equipment	Brochure with picture and data sheet	Checking the conformity of hardware vis-a-vis offered specifications Functionality testing	1 Year	Yes	Yes	1	unit
06-002	Compound Microscope, Manual Operation	Monocular 3 objective lenses: 10x,40x,100x Magnification: 50-1250 eyepiece: 5x - 16 x with carrying case	Equipment	Brochure with picture and data sheet	Checking the conformity of hardware vis-a-vis offered specifications Functionality testing	1 Year	Yes	Yes	5	units
06-003	Glass Slides	Material: transparent glass Dimensions (L&W): 76x25mm 1.0 to 1.2mm thickness 100 pcs/box	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity Measurement of dimension Type of material used	1 Year	N/A	N/A	6	boxes
06-004	Cover Slips/ Glass	Material: Transparent glass Dimensions (L&W): 18x18mm 0.13 - 0.17 mm thickness 100 pcs/box	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity Measurement of dimension Type of material used	1 Year	N/A	N/A	6	boxes
06-005	Set of Test Tubes	Material: transparent glass Volume: 3mL, 5mL, 10mL, 15mL & 20mL	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity Type of material used	1 Year	N/A	N/A	12	sets
06-010	Test Tube Rack	Double row supports will hold up to 12 test tubes each Made of wood Should be able to support test tubes from item 06-005	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity Type of material used	1 Year	N/A	N/A	12	pcs
06-011	Test Tube Holder	Materials: Steel wire Capacity to grip size of test tubes is up to 40 mm diameter Should be able to support test tubes from item 06-005	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity Type of material used	1 Year	N/A	N/A	30	pcs
06-012	Set of Laboratory Funnel	Material: transparent glass Diameter: 75 mm & 100 mm	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity Type of material used	1 Year	N/A	N/A	6	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
06-014	Dissecting Set	Set of stainless steel materials composed of: scissors, 2 kinds of scalpel, niddle, knife, 2 kinds of forcep	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity Type of material used	1 Year	N/A	N/A	6	sets
06-015	Dissecting Pan	Dimensions: Atleast 7 in. x 11 in. Material : Aluminum Pan, Paraffin Wax	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity Measurement of dimension Type of material used	1 Year	N/A	N/A	6	pcs
06-016	Set of Beakers	Material: transparent glass Volume: 100mL, 250mL, 500mL and 1000mL	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and capacity Type of material used	1 Year	N/A	N/A	12	sets
06-021	Set of Graduated Cylinder	Material: transparent glass Volume: 10mL, 50mL, 100mL	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	sets
06-024	Set of Erlenmeyer Flask	Material: transparent glass Volume: 125mL, 250mL, 500mL, 1000 ml	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	sets
06-028	Set of Petri Dish	Material: transparent glass Size: 100mmx15mm & 60mmx15mm	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	sets
06-030	Set of Stirring Rod	Material: transparent glass Size: 5mmx150 mm & 6mmx200mm	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	sets
06-032	Set of Pipette/ Dropper	Material: glass Volume: 0.2 ml, 0.5 ml, 1 ml, 3 ml, 5 ml, 10 ml	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and capacity Type of material used	1 Year	N/A	N/A	6	sets
06-039	Wire Gauze	Width: 12mm; Length: 12mm; Ceramic diameter: 75mm	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	30	pcs
06-040	Alcohol Lamp	Capacity: 150 ml / 5.1 fl. oz. Materials: glass and cloth	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and capacity Type of material used	1 Year	N/A	N/A	12	pcs
06-041	C-Clamp	Material: Iron Size: 10 cm clamp	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	pcs
06-042	Tripod	Material: Iron ; height: 13 cm, diameter: 9 cm With rubber footing on its legs	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	12	pcs

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
06-043	Bunsen Burner	With metal tube on a base with a gas inlet at the lower end of the tube, which may have an adjusting valve; openings in the sides of the tube Gas inlet dimension: 10mm Outer diameter, 8mm Inner Diameter Minimum height: At least 16mm	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	pcs
06-044	Magnet, u-shaped	u-shaped metal Minimum dimensions: 8.5 cm x 6.5cm	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	pcs
06-045	Magnet, bar type	bar type metal Minimum dimensions: 7.5 cm x 1.5cm	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	pcs
06-046	Set of Convex Lens	Material: Transparent Glass Diameter: 30mm, 40mm, 50mm	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	sets
06-049	Set of Concave Lens	Material: Transparent Glass Diameter: 30mm, 40mm, 50mm	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	sets
06-052	Crucible Tongs	Stainless; 20 cm total length	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	pcs
06-053	Double Beam Balance	Materials: Sheet metal Dimension: 14"x7"x 10" Pan Diameter: 6" Minimum scale: 0.1 g Maximum weighing capacity: 2000 g	Measuring instruments	Brochure with picture and data sheet	Checking the conformity of quantity and capacity Type of material used	1 Year	N/A	N/A	6	pcs
06-054	Spring Balance	Size: Minimum 20cm Measuring range: Atleast 0-10N Material: Plastic, iron	Measuring instruments	Brochure with picture and data sheet	Checking the conformity of quantity and capacity Type of material used	1 Year	N/A	N/A	6	pcs
06-055	Triple Beam Balance	Capacity (without attachment weights): 610g x 0.1g Max Capacity (with attachment weights): 2610g x 0.1g Front Beam: 10g x 0.1g	Measuring instruments	Brochure with picture and data sheet	Checking the conformity of quantity and capacity Type of material used	1 Year	N/A	N/A	6	pcs

Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		Center Beam: 500g x 100g Rear Beam: 100g x 10g Platform Size: 6" diameter								
06-056	Thermometer	50-100 degree Celsius; L=200mm; glassware	Measuring instruments	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	pcs
06-057	Ammeter	AC 300/5A; SA-100T 4" x 4", analog	Measuring instruments	Brochure with picture and data sheet	Checking the conformity of quantity Measurement of dimension Type of material used	1 Year	N/A	N/A	6	units
06-058	Mortar and Pestle	Porcelain; Diameter: 10cm x Depth: 3cm	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity Measurement of dimension Type of material used	1 Year	N/A	N/A	6	pcs
06-059	Spatula	Stainless Steel; Length: 12 in; Flat spatula end and Spoon, connected by a bar	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	pcs
06-060	Compass	Weight: 100-150 g Material: Stainless Steel At least 5 cm diameter	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity and size Type of material used	1 Year	N/A	N/A	6	pcs
06-061	PH Meter	Portable Measurement: pH/mV/Temp Range: 0 to 14/-1999 to 1999 mV Operating Temp: 0 to 50°C (32 to 122°F) With digital display AA Battery operated With carrying case	Measuring instruments	Brochure with picture and data sheet	Checking the conformity of quantity Checking of specification (offered vs actual)	1 Year	N/A	N/A	6	units
06-062	Salinometer/ Salinity Meter	Pen type Digital display Salinity Range: 0.0 to 100.0 g/L (0.00 to 10.00 %) Resolution: 0.1 g/L (0.01%) Accuracy ±2% full scale (0.0 to	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity Checking of specification (offered vs actual)	1 Year	N/A	N/A	6	units

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		9.9 g/L/ ± 4% full scale (10.0 to 100.0 g/L) Temperature Display 0 to 50.0 °C Temperature Calibration 5 to 40.0 °C Battery operated With storage case Standard solution and Conditioning solution included								
06-063	Flammable Chemicals Storage Cabinet	Capacity : 45 gallon (170L) Material : Double-Layer anti-fire cold-rolled steel Adjustable Shelf : 2 Door: Double/Manual External Size (W*D*H) mm : 1090*460*1650	Apparatus	Brochure with picture and data sheet	Checking the conformity of quantity Type of material used Checking of specification (offered vs actual)	1 Year	N/A	N/A	1	unit

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

Name of Company/Bidder

Signature over Printed Name of Authorized Representative

Date

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Technical Specifications

Lot 21 : Science Learning Systems

APPROVED BUDGET FOR THE CONTRACT : Seventeen Million Ninety-Eight Thousand Two Hundred Thirty-Nine Pesos and 84/100 (P17,098,239.84)

Item Code	Item Name	Agency Specification	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
23-001	E-Learning for Chemistry and Physics	Kindly refer to the technical specifications attached as Annex B21 .	1	set			
23-002	Cloud Based Experiment Manual Content for Sciences		2	licenses			
23-003	Student Experiment Set for Mechanics		3	sets			
23-004	Student Experiment Set for Experiment Related to Application and Study of Water and Liquid		3	sets			
23-005	Smart Digital Cart Experiment Set for Kinematics and Energy		3	sets			
23-006	Student Experiment Set for Thermodynamics 1		3	sets			
23-007	Student Experiment Set for Introduction for Renewable Energy and Thermal Physics		3	sets			
23-008	Student Experiment Set for Electricity and Magnetism		3	sets			
23-009	Student Experiment Set for Optics		3	sets			
23-010	Student Experiment Set for Optics 2		3	sets			
23-011	Student Experiment Set for Optics 3 and introduction to Atomic Physics		3	sets			
23-012	Student Experiment Set for General Chemistry		3	sets			
23-013	Student Experiment Set for Inorganic Chemistry		3	sets			

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Item Code	Item Name	Agency Specification	Qty	Unit	Statement of Compliance*	Make Brand / Model	Reference
23-014	Student Experiment Set for Acids, Bases and Salt	Kindly refer to the technical specifications attached as Annex B21.	3	sets			
23-015	Student Experiment Set for Organic Chemistry		3	sets			
23-016	Student Experiment Set for Environmental Outdoor Activities		3	sets			
23-017	Student Experiment Set for Everyday Substance		3	sets			

* 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.

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

Name of Company/Bidder

Signature over Printed Name of Authorized Representative

Date

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
23-001	E-Learning for Chemistry and Physics	<p>Lifetime validity of license, at least 24 devices can access the content simultaneously Software compatible for Windows OS and Mac OS Can be used in any common browser</p> <p>Basic topic contents:</p> <ol style="list-style-type: none"> 1. Vectors 2. Uniform Linear Motion 3. Planar and Parabolic Motion Statics and Newton's Second Law 4. 4. Work, Energy, and Power (Rollercoaster) 5. Energy Sources and Transformation Hydraulic Press and 6. Pascal's Principle (3D) Thermodynamics 7. (Specific and Latent Heat) Accelerated Linear Motion and 8. Pendulum (3D) Motion Electromagnetic and Sound Waves 9. Light Synthesis and dispersion, Mirrors and Lens 10. Electrical Magnitudes, 11. Ohm's and Kirchhoff's Laws 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of software vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	N/A	Yes	Yes	1	set

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		Virtual Simulator included with the following topics; <ul style="list-style-type: none"> • Ecosystems • Origin and Classification of Living Beings • Matter • Planetary System • Earth • Movement and Reproduction in Living Beings • Atomic Models and the Periodic Table • Electricity and Magnetism • Sexuality and Reproduction • Taxonomy and Biological Functions • Fundamentals of Chemistry • Fluids and Gases • Genetics • Human Body Systems and Physiology Health services • Solutions and Fundamentals of Organic Chemistry • Work, heat and waves • Matter • Atoms, elements and compounds • Chemical reactions • Solutions • Gases • Carbon 								

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<ul style="list-style-type: none"> • Cycloalkanes, Alkanes and Alkynes • Alcohols, Aldehydes and Ketones • Carboxylic acids, Acyl halides, Anhydrides, Esters and Amides • Nitriles, ethers, benzene and amines. • Biological Compounds 								
23-002	Cloud Based Experiment Manual Content for Sciences	<p>The cloud based learning platform offers a quick and easy introduction to digital teaching. With its more than 1800 curriculum-compliant experiment descriptions for all subject areas (physics, chemistry, biology, and natural sciences) - more than 400 of them digital - and thousands of additional content. This is one of the largest experiment databases for digital science education.</p> <ul style="list-style-type: none"> - School license for up to 20 teachers - Unlimited student shares - Access to all content - with up to 150 interactive tasks - Unlimited storage space 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of software vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	2	licenses

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
23-003	Student Experiment Set for Mechanics	<p>Basic set allowing the performance of 32 experiments (with digital experiment content) about the following topics:</p> <ul style="list-style-type: none"> • Physical quantities and characteristics (5 exp) • Forces (10 experiments) • Elementary machines (9 experiments) • Liquids and gases (2 experiments) • Oscillations (6 experiments) <p>In 17 experiments, you can use the smart bluetooth force Sensor in combination with tablets (iOS and Android) and smartphones (Android) instead of the classic measuring device. In addition, the digital data acquisition provides additional didactic value in 2 experiments.</p> <p>Equipment and Technical Data</p> <ul style="list-style-type: none"> •The equipment set consists of all necessary components for the experiments •Robust, stackable storage box with a foam insert fitting to the contained equipment •Smart Bluetooth Force Sensor: Measuring range: +/- 50 N, resolution: 30 mN, sampling rate: 800 Hz 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
23-004	Student Experiment Set for Experiment Related to Application and Study of Water and Liquid	<p>Set for student experiments, especially suitable for teaching of natural sciences in Primary to technical School up to college level.</p> <p>14 experiments (with digital experiment content) are described such as;</p> <ul style="list-style-type: none"> • Water and ice • Sweet and salty solutions • The egg in water • The refrigerator in the beaker • Colder than ice • Soft and hard water • Soapsuds • Water and oil • The water mountain • The sinking paper clip • The soap vessels • The crack in the water surface • Water droplets • Cleaning water • 3 experiments also digitally measurable on smartphone or tablet • The ideal combination of classic experiments (action competence) and digital data acquisition. • Contains all necessary materials and description in a sturdy storage box with formed foam padding • Digital manual on CD (Languages: English) • Additional set for demonstration experiments and handbook with hints for teachers available. 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
23-005	Smart Digital Cart Experiment Set for Kinematics and Energy	<p>In addition to two carts with integrated sensors, this set contains the track and the full equipment to perform 12 experiments (with digital experiment content) with the cart. Data is transmitted wireless by Bluetooth 4. Usable with tablets in combination with the free digital app that can be download in apple apps store or Google Play Store.</p> <p>Benefits</p> <ul style="list-style-type: none"> • The Digital Smart Cart is a portable and easy to use physics LAB • Perform experiments to many topics in Dynamics: <ul style="list-style-type: none"> ▣ Theory of Movement ▣ Newtons Laws ▣ Movement on incline plane ▣ Momentum/Momentum Conservation ▣ Elastic/Inelastic Collisions ▣ Energy Conservation ▣ Electromagnetic Damping ▣ Oscillations and Resonance • Learn about the fundamental physical concepts of velocity, momentum, force, acceleration and energy • Integrated Sensors measure: <ul style="list-style-type: none"> ▣ Force ▣ Acceleration ▣ Velocity 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<ul style="list-style-type: none"> ▪ Position • Low Friction wheels for high quality measurements <p>Equipment and technical data</p> <ul style="list-style-type: none"> • Contains all necessary materials and description in a sturdy storage box with formed foam padding • Digital manual on CD (Languages: English) • Additional set for demonstration experiments and handbook with hints for teachers available 								
23-006	Student Experiment Set for Thermodynamics 1	<p>Basic set allowing the performance of 21 experiments (with digital experiment content) about the following topics:</p> <ul style="list-style-type: none"> • Thermal equilibrium and temperature measurement (3 experiments) • Thermal expansion (4 experiments) • Heat transfer (2 experiments) • Thermal energy (4 experiments) • Change of state (5 experiments) • Solutions (3 experiments) <p>In 18 experiments, you can use Bluetooth Temperature Sensor for Digital Measurement in combination with tablets (iOS and Android) and smartphones (Android) instead of the classic measuring device. In addition, the digital data acquisition provides further didactic added value in 6</p>	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<p>experiments.</p> <ul style="list-style-type: none"> • The equipment set consists of all necessary components for the experiments • Robust, stackable storage box with a foam insert fitting to the contained equipment • Bluetooth Smart Temperature Sensor: Measuring range: -40 - 120 ° C, resolution: 0.01 ° C, sampling rate: 10 Hz 								
23-007	Student Experiment Set for Introduction for Renewable Energy and Thermal Physics	<p>Basic set allowing the performance of 17 experiments (with digital experiment content) about the following topics:</p> <ul style="list-style-type: none"> • Energy conversion (5 Experiments) • Heat energy from solar energy (7 Experiments) • Ambient Heat (5 Experiments) <p>Benefits</p> <ul style="list-style-type: none"> • Covers energy conversion, heat energy from solar energy, ambient heat • The equipment is stored in a rugged, stackable and compact box, allowing quick control if set content is complete • Matched with international curriculum: all topics are covered • The equipment set consists of all necessary components for the experiments • Robust, stackable storage box 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		with a foam insert fitting to the contained equipment								
23-008	Student Experiment Set for Electricity and Magnetism	<p>Complete set for performing student experiments. This set allows to perform 15 experiments (with digital experiment content) about the following topics:</p> <ul style="list-style-type: none"> • Electrostatics (2 experiments) • The electric circuit (6 experiments) • Magnetism (7 experiments) <p>• Experiment guides are very easy to understand, especially for younger students</p> <p>• Associated competences are directly linked</p> <p>• The equipment set consists of all necessary components for the experiments</p> <p>• Robust, stackable storage box with a foam insert fitting to the contained equipment</p>	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets
23-009	Student Experiment Set for Optics	<p>Basic set allowing the performance of 34 experiments about the following topics:</p> <ul style="list-style-type: none"> • Propagation of light (5 Exp.) • Mirrors (7 Exp.) • Refraction (10 Exp.) • Lenses (8 Exp.) • The human eye (4 Exp.) <p>• Complete equipment set: simple execution of the experiments</p> <p>• the equipment is stored in a rugged, stackable and compact box, allowing quick control of completeness (foam insert)</p>	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<ul style="list-style-type: none"> • Experimenting literature for pupils and teachers available: minimal preparation time • Matched with international Curriculum: all topics are covered • The equipment set consists of all necessary components for the experiments (including light box) • Robust, stackable storage box with a foam insert fitting to the contained equipment 								
23-010	Student Experiment Set for Optics 2	<p>Equipment set allowing the performance of 17 experiments (with digital experiment content) about the following topics:</p> <ul style="list-style-type: none"> • Spectroscopic analysis (2 Experiments) • Diffraction on a grating (1 Experiment) • Diffraction on everyday life's objects (2 Experiments) • Absorption and fluorescence (3 Experiments) • Determination with light emitting diodes (1 Experiment) • Bandgap of semiconductors (1 Experiment) • Investigation of solar cells and photodiodes (2 Experiments) • Electric and optical properties of LED (2 Experiments) • Polarisation of light (3 Experiments) <p>In 10 experiments, you can use the Bluetooth SMART Current and Voltage sensors in</p>	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<p>combination with tablets (iOS and Android) and smartphones (Android) instead of the classic measuring device.</p> <ul style="list-style-type: none"> • The ideal combination of classic experiments (practical competence) and digital data acquisition (media competence) • Individual teaching structure possible: you can decide to choose the measuring instrument you want (classic or digital) • Future-proof: Prepare the transition to the digital school today • Perfectly matched to digital science lessons with tablets and smartphones • Faster and higher learning success: The use of digital devices increases the identification and thus increases the motivation of the students • Matched with international curriculum • Quantum and / or wave optics in student experiment • The equipment set consists of all necessary components for the experiments • Robust, stackable storage box with a foam insert fitting to the contained equipment • Bluetooth Voltage Sensor: Measuring range: +/- 30 V, resolution: 0.02 V, sampling rate: 800 Hz 								

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<ul style="list-style-type: none"> Bluetooth Current Sensor: Measuring range: +/- 1 A, resolution: 0.5 mA, sampling rate: 800 Hz 								
23-011	Student Experiment Set for Optics 3 and introduction to Atomic Physics	<p>Student experiment set allowing the performance of 17 experiments (with digital experiment content) about the following topics:</p> <ul style="list-style-type: none"> Spectroscopic analysis (2 Experiments) Diffraction on a grating (1 Experiment) Diffraction on everyday life's objects (2 Experiments) Absorption and fluorescence (3 Experiments) Determination with light emitting diodes (1 Experiment) Bandgap of semiconductors (1 Experiment) Investigation of solar cells and photodiodes (2 Experiments) Electric and optical properties of LED (2 Experiments) Polarisation of light (3 Experiments) <p>In 10 experiments, you can use the Bluetooth Smart Current and voltage sensors in combination with tablets (iOS and Android) and smartphones (Android) instead of the classic measuring device.</p> <ul style="list-style-type: none"> The ideal combination of classic experiments: 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<p>Specification(practical competence) and digital data acquisition (media competence)</p> <ul style="list-style-type: none"> • Individual teaching structure possible: you can decide to choose the measuring instrument you want (classic or digital) • Perfectly matched to digital science lessons with tablets and smartphones • Faster and higher learning success: The use of digital devices increases the identification and thus increases the motivation of the students • Matched with international curriculum • Quantum and / or wave optics in student experiment • The equipment set consists of all necessary components for the experiments • Robust, stackable storage box with a foam insert fitting to the contained equipment • Bluetooth smart Voltage sensor: Measuring range: +/- 30 V, resolution: 0.02 V, sampling rate: 800 Hz • Bluetooth smart Current sensor: Measuring range: +/- 1 A, resolution: 0.5 mA, sampling rate: 800 Hz 								

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
23-012	Student Experiment Set for General Chemistry	<p>Equipment set allowing the performance of 25 experiments (with digital experiment content) about the following topics:</p> <ul style="list-style-type: none"> • Properties of matter (5 Experiments) • Mixtures (2 Experiments) • Mixture separation (4 Experiments) • Chemical reactions (2 Experiments) • Test reactions (3 Experiments) • Particle model (4 Experiments) • Chemical Bonds (5 Experiments) <ul style="list-style-type: none"> • The equipment is stored in a rugged, stackable and compact box, allowing quick control of completeness (foam insert) • Experimenting literature for pupils and teachers available: min. preparation time • Matched with international curriculum: all topics are covered • Easy teaching and efficient learning by using the interactive experimentation software. • The equipment set consists of all necessary components for the experiments; • Robust, stackable storage box with a foam insert fitting to the contained equipment. 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
23-013	Student Experiment Set for Inorganic Chemistry	<p>Equipment set allowing the performance of 34 experiments (with digital experiment content) about the following topics:</p> <ul style="list-style-type: none"> • Metals (3 experiments) • Air and other gases (12 experiments) • Water - components of water and water purification (12 experiments) • Building material (3 experiments) • Fertilizer (4 experiments) • Glas manufacture (1 experiment) <p>In 3 experiments, you can use the Bluetooth smart temperature sensor instead of the classic measuring device in combination with tablets (iOS and Android) and smartphones (Android).</p> <ul style="list-style-type: none"> • The ideal combination of classic experiments (practical competence) and digital data acquisition (media competence) • Individual teaching structure possible: you can decide to choose the measuring instrument you want (classic or digital) • Future-proof: Prepare the transition to the digital school today • Perfectly matched to digital science lessons with tablets and smartphones • Faster and higher learning 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<p>success: The use of digital devices increases the identification and thus increases the motivation of the students</p> <p>Complete equipment set: simple execution of the experiments</p> <ul style="list-style-type: none"> • The equipment is stored in a rugged, stackable and compact box, allowing quickcontrol of completeness (foam insert) <p>Experimenting literature for students and teachers available: minimal preparation time</p> <p>Matched with international Curriculum: all topics are covered</p> <ul style="list-style-type: none"> • Set developed by pedagogues for introduction into inorganic chemistry • The equipment set consists of all necessary components for the experiments • Robust, stackable storage box with a foam insert fitting to the contained equipment • Bluetooth smart Temperature sensor: Measuring range: -40 ... 120 ° C, resolution: 0.01 ° C, sampling rate: 10 Hz 								

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
23-014	Student Experiment Set for Acids, Bases and Salt	<p>Equipment set allowing the performance of 31 experiments (with digital experiment content) about the following topics:</p> <ul style="list-style-type: none"> • Acids (16 experiments) • Alkalis (8 experiments) • Salts (7 experiments) <p>In 6 experiments you can use the bluetooth smart sensor for Temperature and pH instead of the classic measuring device in combination with tablets (iOS and Android) and smartphones (Android)</p> <ul style="list-style-type: none"> • The ideal combination of classic experiments (practical competence) and digital data acquisition (media competence) • Individual teaching structure possible: you can decide to choose the measuring instrument you want (classic or digital) • Future-proof: preparing today the transition to the digital school • Perfectly matched to digital science lessons with tablets and smartphones • Faster and higher learning success: The use of digital devices increases the identification and thus increases the motivation of the students. <p>Complete equipment set: simple execution of the experiments</p> <ul style="list-style-type: none"> • The equipment is stored in a rugged, stackable and compact 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<p>box, allowing quick control of completeness (foam insert)</p> <ul style="list-style-type: none"> • Experimenting literature for pupils and teachers available: minimal preparation time • Matched with international Curriculum: all topics are covered • Set developed by pedagogues for introduction into inorganic chemistry • The equipment set consists of all necessary components for the experiments; only one for the existing gas supply suitable burner must be purchased separately • Robust, stackable storage box with a foam insert fitting to the contained equipment • Smart Bluetooth Temperature sensor: Measuring range: -40 ... 120 ° C, resolution: 0.01 ° C, sampling rate: 10 Hz • Smart bluetooth pH sensor: Measuring range: 0 ... 14, resolution: 0.01, sampling rate: 10 Hz 								

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
23-015	Student Experiment Set for Organic Chemistry	<p>Equipment set allowing the performance of 36 experiments (with digital experiment content) about the following topics:</p> <ul style="list-style-type: none"> • Preliminary tests (7 experiments) • Hydrocarbons (5 experiments) • Petroleums (4 experiments) • Alcohols (7 experiments) • Carbonyl compounds (3 experiments) • Carboxylic (alkane) acids (4 experiments) • Esters (3 experiments) • Soaps (3 experiments) <p>In 2 experiments, you can use the Bluetooth Temperature sensor in combination with tablets (iOS and Android) and smartphones (Android) instead of the classic measuring device.</p> <ul style="list-style-type: none"> • The ideal combination of classic experiments (practical competence) and digital data acquisition (media competence) • Individual teaching structure possible: you can decide to choose the measuring instrument you want (classic or digital) • Future-proof: Prepare the transition to the digital school today • Perfectly matched to digital science lessons with tablets and smartphones • Faster and higher learning 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<p>success: The use of digital devices increases the identification and thus increases the motivation of the students</p> <ul style="list-style-type: none"> • Experimenting literature for pupils and teachers available: minimal preparation time • Matched with international Curriculum: all topics are covered • Set developed by pedagogues for introduction into organic chemistry • The equipment set consists of all necessary components for the experiments; only one for the existing gas supply suitable burner must be purchased separately • Robust, stackable storage box with a foam insert fitting to the contained equipment 								
23-016	Student Experiment Set for Environmental Outdoor Activities	<p>This set of data logging devices is ideally suited to shared-work experiments with school groups for outdoor measurements of ecological data and works with mobile devices (iOS and Android)</p> <ul style="list-style-type: none"> • Whether in the classroom, outdoors or on project days: in this robust aluminium case, you will always find the right device for carrying out fascinating experiments with school groups • Up to 4 groups can work on and investigate interesting topics in parallel • Works with all iOS and Android 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<p>devices</p> <ul style="list-style-type: none"> • Download free app from Apple App Store or Google Play Store • Students can evaluate the data at home, as a homework assignment • This device is also ideal for use e.g. in the context of a school hiking day: here, a topographic profile can easily be produced with the weather sensor. In geography lessons, the data can be evaluated and interpreted together. If the height is then set against the temperature, humidity relative to the path, or temperature relative to the time of day, great discoveries can be made, which are both practical and fun • With digital experiment content • Robust aluminum case • 1 x Bluetooth smart sensor - Relative Humidity, 0 ... 100 % • 1 x Bluetooth smart sensor - pH, 0 ... 14 • 1 x Bluetooth smart sensor - Conductivity, 0 ... 20000 µS/cm • 1 x Bluetooth smart sensor - Temperature, - 40 ... 120 °C • 1 x Bluetooth smart sensor - Absolute Pressure, 20...400 kPa • 1 x Bluetooth smart sensor - Light, 1 ... 128 kLX • 1 x Bluetooth smart sensor - Colorimeter for the measurement of turbidity, 0 ... 100 % 								

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Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		<p>Inclusion:</p> <ul style="list-style-type: none"> • 1 x pH electrode, plastic, gel-filled • 1 x 100 red pH 4 buffer tablets • 1 x 100 green pH 10 buffer tablets • 5 x 20 ml calibration solution for conductivity electrode • 2 x protective case for pH and conductivity electrodes • 1 x 120 labels • 4 x 100 ml square flange (HDPE) • 2 x 250 ml PP laboratory beaker 								
23-017	Student Experiment Set for Everyday Substance	<p>Function and Applications Complete set for performing student experiments. This set allows the performance of 15 experiments (with digital experiment content) about the following topics:</p> <ul style="list-style-type: none"> • Properties of substances and materials (10 experiments) • Separation process of substances (3 experiments) • Application of substance properties (2 experiments) • Experiment guides are very easy to understand, especially for younger students • Associated competences are directly linked to the experiments • Curriculum compatible • All components in one box: mobile teaching is possible • Fit for the future: implementation 	Learning System	Brochure with picture and data sheet	<ul style="list-style-type: none"> - Checking the conformity of hardware vis-a-vis offered specifications - Checking of teaching aids vis-a-vis listed course outline - Functionality testing - Training on specified lessons 	1 Year	Yes	Yes	3	sets

Item Code	Item Name	Agency Specification	Classification	Test Parameters (Post Evaluation)	Test Parameters (Inspection and Acceptance)	On-site Warranty	Training	English Manual	Qty	Unit
		of tablets possible • Robust, stackable storage box with a foam insert fitting to the contained equipment • The equipment set consists of all necessary components for the experiments • Robust, stackable storage box with a foam insert fitting to the contained equipment								

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

Name of Company/Bidder

Signature over Printed Name of Authorized Representative

Date

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Section VIII. Checklist of Technical and Financial Documents

Checklist of Technical and Financial Documents

I. TECHNICAL COMPONENT ENVELOPE

Class "A" Documents

Legal Documents

- (a) Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages);
or
- (b) Registration certificate from Securities and Exchange Commission (SEC), Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives or its equivalent document,
and
- (c) Mayor's or Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas;
and
- (d) Tax clearance per E.O. No. 398, s. 2005, as finally reviewed and approved by the Bureau of Internal Revenue (BIR).

Technical Documents

- (e) Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; and
- (f) Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided for in Sections 23.4.1.3 and 23.4.2.4 of the 2016 revised IRR of RA No. 9184, within the relevant period as provided in the Bidding Documents
and
- (g) Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission;
or
Original copy of Notarized Bid Securing Declaration; and
- (h) Conformity with the Technical Specifications, which may include production/delivery schedule, manpower requirements, and/or after-sales/parts, if applicable; and
- (i) Original duly signed Omnibus Sworn Statement (OSS);
and if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

Financial Documents

- (j) The Supplier's audited financial statements, showing, among others, the Supplier's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission; **and**
- (k) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC);
or
A committed Line of Credit from a Universal or Commercial Bank in lieu of its NFCC computation.

Class "B" Documents

- (l) If applicable, a duly signed joint venture agreement (JVA) in case the joint venture is already in existence (Annex I);
or
duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

Other documentary requirements under RA No. 9184 (as applicable)

- (m) *[For foreign bidders claiming by reason of their country's extension of reciprocal rights to Filipinos]* Certification from the relevant government office of their country stating that Filipinos are allowed to participate in government procurement activities for the same item or product.
- (n) Certification from the DTI if the Bidder claims preference as a Domestic Bidder or Domestic Entity.

II. FINANCIAL COMPONENT ENVELOPE

- (a) Original of duly signed and accomplished Financial Bid Form; **and**
- (b) Original of duly signed and accomplished Price Schedule(s).

STATEMENT OF (i) ONGOING CONTRACTS (ii) AWARDED BUT NOT YET STARTED CONTRACTS

This is to certify that _____ (company) has the following ongoing and awarded but not yet started contracts:

Contracting Party	Name of Contract	Date and Status of the Contract	Kind of Goods	Amount of Contract	Value of Outstanding Contracts	Date of Delivery	Purchase Order Number/s or Date of Contract/s

Name and Signature of
Authorized Representative

Date

***Instructions:**

- a) State all ongoing contracts including those awarded but not yet started (government and private contracts which may be similar or not similar to the project called for bidding) as of:
 - i. The day before the deadline of submission of bids.
- b) If there is no ongoing contract including awarded but not yet started as of the aforementioned period, state none or equivalent term.
- c) The total amount of the ongoing and awarded but not yet started contracts should be consistent with those used in the Net Financial Contracting Capacity (NFCC) in case an NFCC is submitted as an eligibility document.
- d) "Name of Contract". Indicate here the Nature/ Scope of the Contract for easier tracking of the entries/ representations

STATEMENT OF SINGLE LARGEST COMPLETED CONTRACT SIMILAR TO THE CONTRACT TO BE BID

This is to certify that _____ (company) _____ has the following completed contracts within five (5) years prior to the date of submission and receipt of bids, a contract similar to the Project

Contracting Party	Name of Contract	Date of the Contract	Kind of Goods	Amount of Contract	Date of Delivery	Please submit any of the following attachment: a. Copy of End User's Acceptance; <u>OR</u> b. Copy of Official Receipt/s; <u>OR</u> c. Copy of Sales Invoice with Collection Receipt/s

Name and Signature of
Authorized Representative

Date

** Instructions:*

a) Cut-off date as of:

(i) Up to the day before the deadline of submission of bids.

b) In the column under "Dates" indicate the dates of Delivery/ End-user's Acceptance and Official Receipt.

c) "Name of Contract". Indicate here the Nature/ Scope of the Contract for the Procuring Entity to determine the relevance of the entry with the Procurement at hand.

Bid Securing Declaration Form

[shall be submitted with the Bid if bidder opts to provide this form of bid security]

REPUBLIC OF THE PHILIPPINES)
CITY OF _____) S.S.

BID SECURING DECLARATION **Invitation to Bid: *[Insert Reference number]***

To: *[Insert name and address of the Procuring Entity]*

I/We², the undersigned, declare that:

1. I/We understand that, according to your conditions, bids must be supported by a Bid Security, which may be in the form of a Bid Securing Declaration.
2. I/We accept that: (a) I/we will be automatically disqualified from bidding for any procurement contract with any procuring entity for a period of two (2) years upon receipt of your Blacklisting Order; and, (b) I/we will pay the applicable fine provided under Section 6 of the Guidelines on the Use of Bid Securing Declaration, within fifteen (15) days from receipt of the written demand by the procuring entity for the commission of acts resulting to the enforcement of the bid securing declaration under Sections 23.1(b), 34.2, 40.1 and 69.1, except 69.1(f), of the IRR of RA No. 9184; without prejudice to other legal action the government may undertake.
3. I/We understand that this Bid Securing Declaration shall cease to be valid on the following circumstances:
 - a. Upon expiration of the bid validity period, or any extension thereof pursuant to your request;
 - b. I am/we are declared ineligible or post-disqualified upon receipt of your notice to such effect, and (i) I/we failed to timely file a request for reconsideration or (ii) I/we filed a waiver to avail of said right; and
 - c. I am/we are declared the bidder with the Lowest Calculated Responsive Bid, and I/we have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this ____ day of *[month]* *[year]* at *[place of execution]*.

*[Insert NAME OF BIDDER OR ITS
AUTHORIZED REPRESENTATIVE]
[Insert signatory's legal capacity]
Affiant*

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

Pursuant to GPPB Resolution No. 16-2020 dated 16 September 2020

Omnibus Sworn Statement (Revised)

[shall be submitted with the Bid]

REPUBLIC OF THE PHILIPPINES)
CITY/MUNICIPALITY OF _____) S.S.

AFFIDAVIT

I, [Name of Affiant], of legal age, [Civil Status], [Nationality], and residing at [Address of Affiant], after having been duly sworn in accordance with law, do hereby depose and state that:

1. *[Select one, delete the other:]*

[If a sole proprietorship:] I am the sole proprietor or authorized representative of [Name of Bidder] with office address at [address of Bidder];

[If a partnership, corporation, cooperative, or joint venture:] I am the duly authorized and designated representative of [Name of Bidder] with office address at [address of Bidder];

2. *[Select one, delete the other:]*

[If a sole proprietorship:] As the owner and sole proprietor, or authorized representative of [Name of Bidder], I have full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached duly notarized Special Power of Attorney;

[If a partnership, corporation, cooperative, or joint venture:] I am granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached [state title of attached document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable)];

3. [Name of Bidder] is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government/foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board, **by itself or by relation, membership, association, affiliation, or controlling interest with another blacklisted person or entity as defined and provided for in the Uniform Guidelines on Blacklisting;**

4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;

5. [Name of Bidder] is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;

6. *[Select one, delete the rest:]*

[If a sole proprietorship:] The owner or sole proprietor is not related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

[If a partnership or cooperative:] None of the officers and members of *[Name of Bidder]* is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

[If a corporation or joint venture:] None of the officers, directors, and controlling stockholders of *[Name of Bidder]* is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

7. *[Name of Bidder]* complies with existing labor laws and standards; and

8. *[Name of Bidder]* is aware of and has undertaken the responsibilities as a Bidder in compliance with the Philippine Bidding Documents, which includes:

- a. Carefully examining all of the Bidding Documents;
- b. Acknowledging all conditions, local or otherwise, affecting the implementation of the Contract;
- c. Making an estimate of the facilities available and needed for the contract to be bid, if any; and
- d. Inquiring or securing Supplemental/Bid Bulletin(s) issued for the *[Name of the Project]*.

9. *[Name of Bidder]* did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

10. In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriating or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s. 1930, as amended, or the Revised Penal Code.

IN WITNESS WHEREOF, I have hereunto set my hand this ___ day of ___, 20__ at _____, Philippines.

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]

[Insert signatory's legal capacity]
Affiant

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

The identification card shall be at least one of the acceptable proofs of identity as identified under the provisions of the 2014 Rules on Notarial Practice

"Sec. 12. Competent Evidence of Identity — The phrase "competent evidence of identity" refers to the identification of an individual based on:

At least one current identification document issued by an official agency bearing the photograph and signature of the individual such as but not limited to, passport, driver's license, Professional Regulations Commission ID, National Bureau of Investigation clearance, police clearance, postal ID, voter's ID, Barangay certification, Government Service and Insurance System (GSIS) e-card, Social Security System (SSS) card, Philhealth card, senior citizen card, Overseas Workers Welfare Administration (OWWA) ID, OFW ID, seaman's book, alien certificate of registration/immigrant certificate of registration, government office ID, certification from the National Council for the Welfare of Disabled Persons (NCWDP), Department of Social Welfare and Development (DSWD) certification;

The Board Resolution or Secretary's Certificate referring to the said Board Resolution designating the bidder's authorized representative and signatory need not specifically indicate the particular project where such authority is given provided that the said authority covers activities by TESDA.

JOINT VENTURE AGREEMENT

KNOW ALL MEN BY THESE PRESENTS:

This JOINT VENTURE AGREEMENT (hereinafter referred to as the "Agreement"), entered into this _____ day _____ of 20__ at _____ City, Philippines by and among:

_____, a domestic corporation duly organized, registered and existing under and by virtue of the laws of the Republic of the Philippines, with office address at _____, represented by its _____, hereinafter referred to as "_____";

- and -

_____, a domestic corporation duly organized, registered and existing under and by virtue of the laws of the Republic of the Philippines, with office address at _____, represented by its _____, hereinafter referred to as "_____";

- and -

_____ a foreign corporation organized and existing under and by virtue of the laws of _____, represented by its _____, hereinafter referred to as "_____";

(Henceforth collectively referred to as the "**Parties**")

WITNESSETH: That

WHEREAS, the Technical Education and Skills Development Authority (TESDA) has recently published an Invitation to Apply for Eligibility and to Bid for the Supply and Delivery of _____ for the _____;

WHEREAS, the parties have agreed to pool their resources together to form the "_____ Joint Venture", hereinafter referred to as the Joint Venture, under the laws of the Philippines, for the purpose of participating in the abovementioned procurement of TESDA-CO;

NOW, THEREFORE, for and in consideration of the foregoing premises and the covenants hereto set forth, the Parties have agreed as follows:

**ARTICLE I
ORGANIZATION OF THE JOINT VENTURE**

SECTION 1. Formation — The Parties do hereby agree and bind themselves to establish, form and organize a Joint Venture pursuant to the laws of the Republic of the Philippines, in order for the JV to carry on the purposes and objectives for which it is created;

SECTION 2. Name — The name and style under which the JV shall be conducted is "_____";

SECTION 3. Principal Place of Business — The JV shall maintain its principal place of business at _____;

SECTION 4. Preparation and Documentation — The Parties shall secure and/or execute such certifications, documents, deeds and instruments as may be required by the laws of the Republic of the Philippines for the realization of the JV and in compliance with the Project. Further, they shall do all other acts and things requisite for the continuation of the JV pursuant to applicable laws;

SECTION 5. The Joint Venture shall be represented by the _____ in all biddings, related procurement transactions and other official dealings that it shall enter into with the TESDA-CO and third parties, such transactions to include, among others, the submission of eligibility documents, bids, registration documents obtaining bonds, performing the principal contract in the event that the contract is awarded in favor of the Joint Venture, receipt of payment for goods delivered, and similar and related activities.

SECTION 6. The period of the Joint Venture shall begin upon execution of this Agreement and shall continue until the complete performance of its contractual obligations to TESDA-CO, as described in Article II hereof, or upon its termination for material breach of any term or condition of this Agreement, by service of a written statement in English on the other Party, not less than 90 days prior to the intended date termination

**ARTICLE II
PURPOSE**

SECTION 1. The primary purpose of the Joint Venture is to participate in the public bidding to be conducted by the TESDA-CO Bids and Awards Committee for the supply and delivery of _____ for the _____.

SECTION 2. If the above-described contract/s is/are awarded to the Joint Venture, the Joint Venture shall undertake the performance thereof to TESDA-CO, and such other incidental activities necessary for the completion of its contractual obligations.

**ARTICLE III
SOLIDARY LIABILITY OF THE PARTIES**

SECTION 1. In the performance of the contract/s that may be awarded to the Joint Venture by the TESDA-CO, and all other related activities/obligations, as described in Article II hereof, - the Parties bind themselves jointly and solidarily, in the concept of solidarily debtors, subject to the right of reimbursement, as provided in the relevant provisions of the Civil Code of the Philippines.

**ARTICLE IV
CONTRIBUTION AND OTHER ARRANGEMENTS**

SECTION I. Contribution — The Parties shall contribute the amount of _____ (Php _____) to support the financial requirements of the Joint Venture, in the following proportion:

A.	-	P .00
B.	-	P .00
TOTAL		P .00

Additional contributions to the Joint Venture shall be made as may be required for contract implementation. In addition, shall contribute any labor and contract management requirements.

SECTION 2. Profit Sharing — The share of the Parties to the JV from any profit derived or obtained from the implementation and execution of the Project shall be distributed pro rata to each, in accordance with the contribution and resources each has provided to the JV;

SECTION 3. Liquidation and Distributions — Any sum remaining after deducting from the total of all moneys or benefits received for the performance of the contract, all costs incurred by the JV after award of the contract for the Project pursuant to the accounting practices established for the JV, shall be distributed in accordance with the relative balances in the accounts of each Party pursuant to Sec.1 of this Article upon completion, final accounting, termination and liquidation of the JV. In the event of liquidation and termination of JV, and after taking into account the shares of the Parties in all income, gain, deductions, expenses, and losses, should the account of a Party contain a negative balance, such Party shall contribute cash to the JV sufficient to restore the said balance to zero;

SECTION 4. Sharing of Burden of a Net Loss — In case a net loss is incurred, additional contributions shall be made by the Parties in accordance with their respective shares.

**ARTICLE V
MISCELLANEOUS PROVISIONS**

SECTION 1. The provisions of the Instructions to Bidders, Supplemental Bid Bulletin, and other bidding documents issued by the TESDA-CO in relation to the contract described in Article II hereof, shall be deemed incorporated in this Agreement and made an integral part thereof.

SECTION 2. This Agreement shall be binding upon and inure to the benefit of the Parties and their respective-successors and assigns.

SECTION 3. The Parties herein are duly represented by their authorized officers.

SECTION 4. Governing Law - This Agreement shall be governed by and construed according to the laws of the Republic of the Philippines. Venue of any court action arising from this Agreement shall be exclusively laid before the proper court of the Philippines.

IN WITNESS WHEREOF, the parties have set their hands and affixed their signatures on the date and place first above-stated.

Signed in the Presence of:

ACKNOWLEDGMENT

REPUBLIC OF THE PHILIPPINES)
CITY/MUNICIPALITY OF _____) S.S.
PROVINCE OF (in the case of Municipality)

BEFORE ME, a Notary Public for and in the City/Municipality of _____ (indicate also the Province in the case of Municipality), this _____ day of _____ month & year) personally appeared the following:

Name	ID Name, Number and Validity Date
------	-----------------------------------

Known to me and to me known to be the same persons who executed the foregoing instrument and they acknowledge to me that the same is their free and voluntary act and deed and that of the corporation(s) they represent.

This instrument refers to a Joint Venture Agreement consisting of _____ pages, including the page on which this Acknowledgement is written, and signed by the parties and their instrumental witnesses.

WITNESS MY HAND AND NOTARIAL SEAL on the place and on the date first above written.

NAME OF NOTARY PUBLIC
Serial No. of Commission _____
Notary Public for _____ until _____
Roll of Attorneys No. _____
PTR No. _____ [date issued], [place issued]
IBP No. _____, [date issued], [place issued]

Doc. No. _____
Page No. _____
Book No. _____
Series of _____

Note:

"Sec. 12. Competent Evidence of Identity — The phrase "competent evidence of identity" refers to the identification of an individual based on:

At least one current identification document issued by an official agency bearing the photograph and signature of the individual such as but not limited to, passport, driver's license, Professional Regulations Commission ID, National Bureau of Investigation clearance, police clearance, postal ID, voter's ID, Barangay certification, Government Service and Insurance System (GSIS) e-card, Social Security System (SSS) card, Philhealth card, senior citizen card, Overseas Workers Welfare Administration (OWWA) ID, OFW ID, seaman's book, alien certificate of registration/immigrant certificate of registration, government office ID, certification from the National Council for the Welfare of Disabled Persons (NCWDP), Department of Social Welfare and Development ID, OFW ID, seaman's book, alien certificate of registration/immigrant certificate of registration, government office ID, certification from the National Council for the Welfare of Disabled Persons (NCWDP), Department of Social Welfare and Development (DSWD) certification

Bid Form for the Procurement of Goods
[shall be submitted with the Bid]

BID FORM

Date : _____

Project Identification No. : _____

To: *[name and address of Procuring Entity]*

Having examined the Philippine Bidding Documents (PBDs) including the Supplemental or Bid Bulletin Numbers *[insert numbers]*, the receipt of which is hereby duly acknowledged, we, the undersigned, declare that:

- a. We have no reservation to the PBDs, including the Supplemental or Bid Bulletins, for the Procurement Project: *[insert name of contract]*;
- b. We offer to execute the Works for this Contract in accordance with the PBDs;
- c. The total price of our Bid in words and figures, excluding any discounts offered below is: *[insert information]*;
- d. The discounts offered and the methodology for their application are: *[insert information]*;
- e. The total bid price includes the cost of all taxes, such as, but not limited to: *[specify the applicable taxes, e.g. (i) value added tax (VAT), (ii) income tax, (iii) local taxes, and (iv) other fiscal levies and duties]*, which are itemized herein and reflected in the detailed estimates,
- f. Our Bid shall be valid within the a period stated in the PBDs, and it shall remain binding upon us at any time before the expiration of that period;
- g. If our Bid is accepted, we commit to obtain a Performance Security in the amount of *[insert percentage amount]* percent of the Contract Price for the due performance of the Contract, or a Performance Securing Declaration in lieu of the the allowable forms of Performance Security, subject to the terms and conditions of issued GPPB guidelines² for this purpose;
- h. We are not participating, as Bidders, in more than one Bid in this bidding process, other than alternative offers in accordance with the Bidding Documents;
- i. We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed; and

² currently based on GPPB Resolution No. 09-2020

- j. We understand that you are not bound to accept the Lowest Calculated Bid or any other Bid that you may receive.
- k. We likewise certify/confirm that the undersigned, is the duly authorized representative of the bidder, and granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for the [Name of Project] of the [Name of the Procuring Entity].
- l. We acknowledge that failure to sign each and every page of this Bid Form, including the Bill of Quantities, shall be a ground for the rejection of our bid.

Name: _____
Legal Capacity: _____
Signature: _____
Duly authorized to sign the Bid for and behalf of: _____
Date: _____

Price Schedule for Goods Offered from Within the Philippines
[shall be submitted with the Bid if bidder is offering goods from within the Philippines]

For Goods Offered from Within the Philippines

Name of Bidder _____ Project ID No. _____ Page
 ___ of ___

1	2	3	4	5	6	7	8	9	10
Item	Description	Country of origin	Quantity	Unit price EXW per item	Transportation and all other costs incidental to delivery, per item	Sales and other taxes payable if Contract is awarded, per item	Cost of Incidental Services, if applicable, per item	Total Price, per unit (col 5+6+7+8)	Total Price delivered Final Destination (col 9) x (col 4)

Name: _____

Legal Capacity: _____

Signature: _____

Duly authorized to sign the Bid for and behalf of: _____

Price Schedule for Goods Offered from Abroad
[shall be submitted with the Bid if bidder is offering goods from Abroad]

For Goods Offered from Abroad

Name of Bidder _____ Project ID No. _____ Page _____
of _____

1	2	3	4	5	6	7	8	9
Item	Description	Country of origin	Quantity	Unit price CIF port of entry (specify port) or CIP named place (specify border point or place of destination)	Total CIF or CIP price per item (col. 4 x 5)	Unit Price Delivered Duty Unpaid (DDU)	Unit price Delivered Duty Paid (DDP)	Total Price delivered DDP (col 4 x 8)

Name: _____

Legal Capacity: _____

Signature: _____

Duly authorized to sign the Bid for and behalf of: _____

Republic of the Philippines



Government Procurement Policy Board