ASTi INDUSTRIAL AUTOMATION RESEARCH

SIEMENS partner

Worlddidac Association
Quality Resources for Education

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TECHNICAL TRAINING SYSTEMS

PRACTICAL ENGINEERING

STAY ON TOP OF THE LATEST TECHNOLOGY TRENDS

Technical skills in demand

Staying up to date with the latest technologies assumes to engage in an ongoing learning process. Having well trained and up to date employees is the only way a business can compete in a digitally complex world.

Technical skills are the capabilities that employees need to possess to fulfil their common tasks. Technical training may be required not only for new employees but for all the employees directly involved in technical jobs to keep up with the extensive development of technologies. Most of the time technical skills are job specific.

Develop personnel technical skills

Technical abilities need to be improved by everyone. To deliver the training, you might need to bring in third parties, which doesn't come inexpensive, but technical employment skills training has so many advantages that it should be seen as an investment in the company rather than a cost. Employees who find themselves under-trained are not satisfied. They are more likely to leave their current job and find an employer to invest in them. By comparison, studies confirm that trained employees are much more productive than their untrained counterparts. Promoting skills development builds not only a more productive but also more committed personnel.

Deliver in-house growth

Embed the skills of present and future technologies to get highly skilled personnel with knowledge for the requirements of the business.

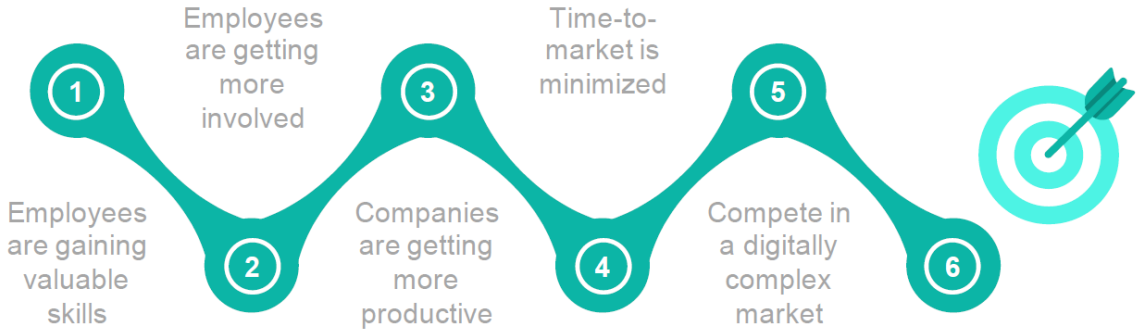
Reduce the business risks

Poorly qualified staff pose a risk to themselves and others when, for instance, they are not trained on the correct security practices to be followed when operating hazardous equipment or are under-qualified for their jobs. Thus, skilled personnel ensure a minimized time-to-market and reduce the business risks.

Deliver technical training the right way

Keep in mind that technical training is an ongoing learning process rather than a one-time effort for a company. There are fresh technologies in each industry and to guarantee their importance and significance, employees must remain on top of them.

EVERYONE ULTIMATELY BENEFITS FROM ENHANCED TECHNICAL ABILITIES



An investment for practical abilities
... An investment for the future!

Cooperates with Education
Automation
SIEMENS

ASTI Automation SRL, company founded in 2002, is one of the youngest members of the ASTI group. Since 1990, when the first ASTI company was established, ASTI has been a constant promoter of the most advanced automation systems in Romania.

Currently, the company is acting in the industrial automation field, participating in projects from sectors such as oil and gas, automotive, food industry, chemical industry, urban utilities, etc.

Since 2007, the business of the company has been extended through active involvement in increasing the quality of technical education in college and university. The company develops didactic equipment related to approved programs of study, taking into account the current technological level encountered in main industry sectors. The portfolio includes didactic equipment for specific technical fields integrated laboratories mainly for technical universities as well as for companies acting in the industry, training sessions for students or postgraduate courses for professionals in the industry.

Since 2011 ASTI Automation is Siemens SCE partner for training material and a full member of WORLDDIDAC, the global trade association for the education industry.

ASTI Automation complies with the rules of quality management and is certifie with ISO 9001: 2008.

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ASTI AUTOMATION RELIES ON STRONG PARTNERSHIPS WITH LEADING MANUFACTURERS OF AUTOMATION SOLUTIONS

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OUR VALUED CUSTOMERS

WE BRING INDUSTRY TO YOUR SCHOOL, MODERN TECHNOLOGY AT YOUR FINGERTIPS

CONCEPT

A quality educational process in the technical domain can be provided only by using modern didactic resources, combined into a single framework where the student learns practical skills with direct application in the industrial environment. For this purpose, a structure for workspace framing and equipment placement is suggested.

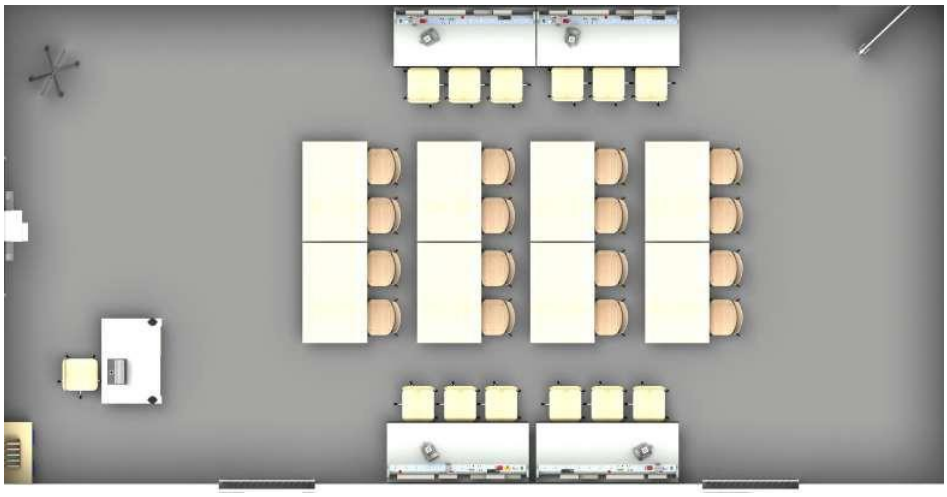
The laboratory is intended to allow carrying out practical experiments on different types of equipment similar to those used in industry, embedded in didactic structures whose size is suitable for laboratory study. The images show a suggested layout draft for the furniture and the laboratory equipment.

The didactic structures are accompanied by notebooks for experiments, practical results, and answers for solving the exercises.

The laboratory provides the support needed for theoretical presentations (basic principles of electronic and automation equipment).

Laboratory structure

- Workstations designed specifically for the activities performed in the laboratory
- Equipment for practical experiments
- Support for the equipment:
    - Theoretical support
    - Notebooks for experiments
    - Answers for solving
    - Dedicated software package accompanied by license



EQUIPMENT

AREA OF COMPETENCES

Sequential Control Systems (#10)

and Programmable Logic Controllers

Human Machine Interface (#16)

Industrial Network Communication (#18)

Safety (#20)

Energy Meter Equipment (#22)

Electrical Installations (#23)

Drives for electric motors (#24)

Advanced Motion Control (#26)

Pneumatics (#29)

Industrial Demo Cases (#29)

Data Acquisition, Processing and Monitoring (#30)

Process Control (#31)

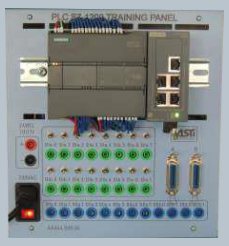
Industrial Process Simulation (#32)

Accessories (#33)

Technical Learning Configurations (#34)

Training Courses - Practical Engineering (#58)

SEQUENTIAL CONTROL SYSTEMS AND PROGRAMMABLE LOGIC CONTROLLERS

AA048.001.07 PLC S7-1513 TRAINING PANEL (CPU1513-1PN) SIEMENS		**AA048.010.07** PLC S7-1513 TRAINING PANEL (CPU1513-1PN) SIEMENS	
AA048.001.09 PLC S7-1511C TRAINING PANEL (CPU 1511C-1PN) SIEMENS		**AA048.010.06** PLC S7-1511 TRAINING PANEL (CPU1511-1PN) SIEMENS	
AA048.001.06 PLC S7-1511 TRAINING PANEL (CPU1511-1PN) SIEMENS		**AA048.001.08** PLC S7-1516 TRAINING PANEL (CPU1516-3PN/DP) SIEMENS	
AA503.001.03 PLC S7-1516 & HMI TRAINING CASE (CPU1516-3PN/DP & TP700) SIEMENS		**AA044.000.07** PLC S7-1215C TRAINING PANEL COMPACT (CPU1215C) SIEMENS	
AA044.000.03 PLC S7-1215C TRAINING PANEL COMPACT (CPU1215C) SIEMENS		**AA044.000.04** PLC S7-1215C TRAINING PANEL COMPACT (CPU1215C) SIEMENS	

AA044.001.01 PLC S7-1215C TRAINING PANEL (CPU1215C) SIEMENS		**AA044.001.02** PLC S7-1215C TRAINING PANEL (CPU1215C) SIEMENS	
AA044.001.03 PLC S7-1215C TRAINING PANEL (CPU1215C) SIEMENS		**AA044.001.04** PLC TRAINING PANEL & MOTOR CONTROL SIEMENS	
AA044.002.02 PLC S7-1212C TRAINING PANEL (CPU1212C) SIEMENS		**AA044.000.06** PLC S7-1214C TRAINING PANEL COMPACT (CPU 1214C) SIEMENS	
AA044.001.05 PLC S7-1214C TRAINING PANEL (CPU 1214C) SIEMENS		**AA044.002.03** PLC S7-1212C TRAINING PANEL COMPACT (CPU1212C) SIEMENS	
AA044.002.04 PLC S7-1212C TRAINING PANEL COMPACT (CPU1212C) SIEMENS		**AA066.002.02** PLC S7-1215C TRAINING PANEL (CPU1215C RLY & KTP700) SIEMENS	
AA066.001.01 PLC S7-1215C TRAINING PANEL (CPU1215C & KTP700) SIEMENS		**AA066.001.02** PLC S7-1215C & HMI TRAINING PANEL (CPU1215C & KTP700) SIEMENS	

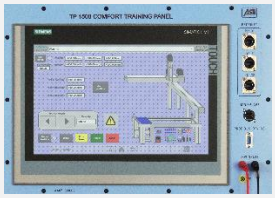
AA066.001.03 PLC S7-1215C & HMI TRAINING PANEL (CPU1215C & TP700) SIEMENS		**AA503.002.01** PLC S7-1215C & HMI TRAINING CASE (CPU1215C & KTP700) SIEMENS	
AA0503.000.06 PLC S7-1215C TRAINING CASE (CPU1215C) SIEMENS		**AA025.001.04** LOGO! 0BA8 TRAINING PANEL (DM8, AM2, AQ) SIEMENS	
AA025.000.03 LOGO! 0BA8 TRAINING PANEL COMPACT SIEMENS		**AA025.002.03** LOGO! 0BA8 DIDACTIC PANEL COMPACT SIEMENS	
AA503.001.07 PLC S7-1513 & HMI TRAINING CASE (CPU1513-1PN & TP700) SIEMENS		**AA503.001.08** PLC S7-1511 & HMI TRAINING CASE (CPU1511-1PN & TP700) SIEMENS	
AA062.001.01 ET200SP (CPU1512SP) DIGITAL TRAINING PANEL SIEMENS		**AA062.001.02** ET200SP (CPU1512SP) DISTRIBUTED TRAINING PANEL SIEMENS	
AA062.002.01 ET200SP (CPU1510SP) DIGITAL TRAINING PANEL SIEMENS		**AA062.002.02** ET200SP (CPU1510SP) DISTRIBUTED TRAINING PANEL SIEMENS	

AA503.001.01 ET200SP (IM155-6PN) TRAINING CASE SIEMENS		**AA063.000.02** ET200SP (IM155-6PN) DIGITAL TRAINING PANEL SIEMENS	
AA063.000.05 ET200SP (IM155-6PN) TRAINING PANEL SIEMENS		**AA074.000.02** PLC EXTENSION PANEL	
AA074.100.01 I/O TRAINING PANEL		**AA061.001.03** PLC S7-314C TRAINING PANEL (CPU314C-2PN/DP) SIEMENS	
AA070.000.02 ET200M TRAINING PANEL (IM153-2DP) SIEMENS		**AA022.101.01** BECKHOFF PLC CX TRAINING PANEL (CX9020) BECKHOFF	
AA022.101.02 BECKHOFF COUPLER TRAINING PANEL (EK1100) BECKHOFF		**AA022.101.03** BECKHOFF COUPLER TRAINING PANEL (EK9000) BECKHOFF	
AA022.100.03 BECKHOFF PLC & HMI TRAINING PANEL (CX9020 & CP6606) BECKHOFF		**AA504.001.01** BECKHOFF PLC & HMI TRAINING CASE (CX9020 & CP6606) BECKHOFF	

AA090.101.03 PLC WAGO TRAINING PANEL (CPU750-8101) WAGO		**AA090.101.04** PLC WAGO TRAINING PANEL (CPU750-890) WAGO	
AA023.001.01 ALLEN BRADLEY PLC TRAINING PANEL (COMPACT LOGIX) ALLEN BRADLEY		**AA023.002.01** ALLEN BRADLEY PLC TRAINING PANEL (COMPACT LOGIX 1769) ALLEN BRADLEY	
AA024.000.01 ALLEN BRADLEY PLC TRAINING PANEL (CONTROL LOGIX 1756-L71) ALLEN BRADLEY		**AA505.000.01** ALLEN BRADLEY TRAINING CASE (CLOGIX 5370 + PANELVIEW 800 GRAPHIC) ALLEN BRADLEY	
AA505.001.01 ALLEN BRADLEY TRAINING CASE (CLOGIX 1769 + PANELVIEW 800 GRAPHIC) ALLEN BRADLEY		**AA064.000.02** PLC NEXT TRAINING PANEL PHOENIX CONTACT	
AA065.001.01 PLC ILC 350 PN TRAINING PANEL PHOENIX CONTACT		**AA069.001.01** PLC ILC 191 ETH 2TX TRAINING PANEL PHOENIX CONTACT	
AA038.001.01 PLC ILC 130 ETH TRAINING PANEL PHOENIX CONTACT		**AA025.000.05** NANOLINE TRAINING PANEL COMPACT PHOENIX CONTACT	

AA025.001.07 NANOLINE TRAINING PANEL PHOENIX CONTACT		AA051.002.01 PLC M221 TRAINING PANEL (CPUTM221ME32TK) SCHNEIDER	
AA051.001.01 PLC M221 TRAINING PANEL (CPUTM221ME32TK) SCHNEIDER		**AA051.000.01** PLC M221 TRAINING PANEL (CPUTM221ME32TK) SCHNEIDER	
AA025.001.11 ZELIO TRAINING PANEL SCHNEIDER		**AA025.000.10** ZELIO TRAINING PANEL SCHNEIDER	
AA052.001.01 PLC X20 TRAINING PANEL (X20CP0482) B&R		**AA052.001.02** PLC X20 TRAINING PANEL (X20CP1586) B&R	
AA052.002.01 PLC X20 TRAINING PANEL (X20CP0482+T30) B&R		**AA052.002.02** PLC X20 TRAINING PANEL (X20CP1586+T30) B&R	
AA052.003.01 PLC X20 TRAINING PANEL (X20CP0482+T50) B&R		**AA052.003.02** PLC X20 TRAINING PANEL (X20CP1586+T50) B&R	

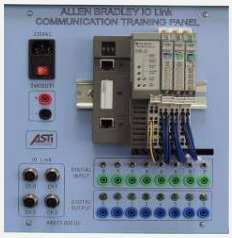
HUMAN MACHINE INTERFACE

AA071.000.04 HMI MTP1500 UNIFIED TRAINING CASE SIEMENS		**AA071.001.04** HMI MTP1500 UNIFIED TRAINING CASE WITH FLEXIBLE SUPPORT SIEMENS	
AA071.000.06 HMI TP1200 COMFORT TRAINING PANEL SIEMENS		**AA071.001.06** HMI TP1200 COMFORT TRAINING CASE WITH FLEXIBLE SUPPORT SIEMENS	
AA071.000.05 HMI MTP700 UNIFIED COMFORT TRAINING PANEL SIEMENS		**AA071.001.05** HMI MTP700 UNIFIED COMFORT CASE WITH FLEXIBLE SUPPORT SIEMENS	
AA071.000.03 HMI TP1500 COMFORT TRAINING PANEL SIEMENS		**AA071.001.03** HMI TP1500 COMFORT TRAINING CASE WITH FLEXIBLE SUPPORT SIEMENS	
AA071.000.02 HMI TP700 COMFORT TRAINING PANEL SIEMENS		**AA071.001.02** HMI TP700 COMFORT TRAINING CASE WITH FLEXIBLE SUPPORT SIEMENS	

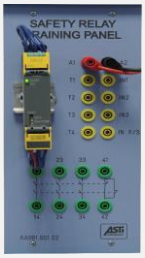
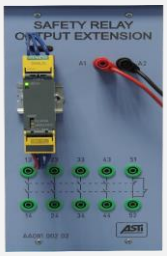
AA071.002.03 HMI TP700 TRAINING CASE WITH FLEXIBLE SUPPORT SIEMENS		**AA026.000.03** HMI KTP700 TRAINING PANEL SIEMENS	
AA026.001.03 HMI KTP700 TRAINING CASE WITH FLEXIBLE SUPPORT SIEMENS		**AA026.002.03** HMI KTP700 CASE PANEL SIEMENS	
AA067.000.02 HMI TP3105S TRAINING PANEL PHOENIX CONTACT		**AA027.000.01** HMI CP6606 TRAINING PANEL BECKHOFF	
AA072.000.01 HMI T30 TRAINING PANEL B&R		**AA072.000.02** HMI T50 TRAINING PANEL B&R	
AA030.000.01 HMI HMIST6400 TRAINING PANEL SCHNEIDER		**AA029.000.01** HMI PANELVIEW 800 TRAINING PANEL ALLEN BRADLEY	
AA029.000.02 HMI PANELVIEW PLUS 7 TRAINING PANELL ALLEN BRADLEY			

INDUSTRIAL NETWORK COMMUNICATION

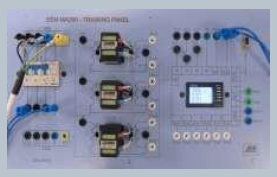
AA073.001.03 PLC S7-1215C COMMUNICATION TRAINING PANEL SIEMENS		**AA054.400.01** NETWORK SECURITY TRAINING PANEL SIEMENS	
AA503.002.02 PLC S7-1215C & HMI COMMUNICATION TRAINING CASE (KTP700) SIEMENS		**AA504.000.02** PLC & HMI COMMUNICATION TRAINING CASE (CX9020 & CP6606) BECKHOFF	
AA073.001.01 PLC S7-1215C CANOPEN TRAINING PANEL (CPU1215C) SIEMENS		**AA073.001.02** PLC S7-1215C IO-LINK TRAINING PANEL (CPU1215C) SIEMENS	
AA054.300.01 MINDCONNECT NANO PANEL SIEMENS		**AA054.300.02** SIMATIC INDUSTRIAL EDGE PANEL SIEMENS	
AA054.200.02 SIMATIC IOT2050 TRAINING PANEL SIEMENS		**AA070.000.01** SIMATIC ET200M HART COMM. TRAINING PANEL SIEMENS	

AA054.001.01 IE SCALANCE XC208 SWITCH PANEL SIEMENS		**AA054.000.01** IWLAN ACCESS POINT SIEMENS	
AA023.000.02 IO-LINK COMMUNICATION TRAINING PANEL ALLEN BRADLEY		**AA093.000.01** PLC CECC - LK COMM.TRAINING PANEL FESTO	
AA063.000.03 ET200SP (IM155-6PN) Digital IO-Link Training Panel SIEMENS		**AA073.100.01** IO-LINK MOTOR STARTER TRAINING PANEL SIEMENS	
AA063.100.01 ET200S PN MOTOR STARTER TRAINING PANEL (PN COUPLER) SIEMENS		**AA063.000.04** ET200SP (IM155-6PN) DIGITAL AS-I TRAINING PANEL SIEMENS	
AA060.000.03 IO-LINK MASTER (PN/ETHERCAT) TRAINING PANEL IFM		**AA060.000.05** IO-LINK MASTER (PROFINET) & DIGITAL I/O PANEL IFM	
AA050.000.01 REMOTE COMMUNICATION PANEL (SITE MANAGER) SECOMEA		**AA050.100.01** REMOTE COMMUNICATION LICENCE (LINK MANAGER) SECOMEA	

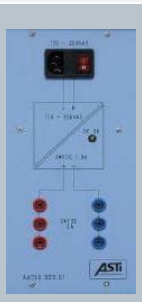
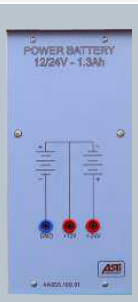
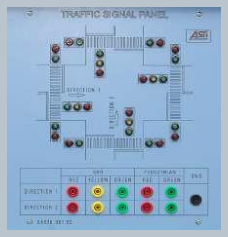
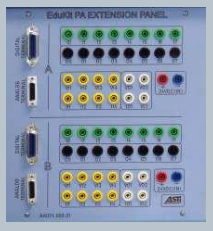
AA062.000.01 ET200SP (CPU 1512SP F) DIGITAL TRAINING PANEL SIEMENS		**AA062.000.02** ET200SP (CPU 1512SP F) DISTRIBUTED TRAINING PANEL SIEMENS	
AA062.000.03 ET200SP (CPU1512SP-F) SAFETY TRAINING PANEL SIEMENS		**AA062.000.04** F-PLC TRAINING PANEL AND MOTOR CONTROL (CPU 1512SP) SIEMENS	
AA062.003.01 ET200SP (CPU 1510SP F) DIGITAL TRAINING PANEL SIEMENS		**AA062.003.02** ET200SP (CPU 1510SP F) DISTRIBUTED TRAINING PANEL SIEMENS	
AA062.003.03 ET200SP (CPU 1510SP F) SAFETY TRAINING PANEL SIEMENS		**AA062.003.04** F-PLC TRAINING PANEL AND MOTOR CONTROL (CPU 1512SP) SIEMENS	
AA048.001.10 PLC S7-1516F TRAINING PANEL (CPU 1516F-3PN/DP) SIEMENS		**AA503.001.04** PLC S7-1516F & HMI TRAINING CASE (CPU-1516F-3PN/DP& TP700) SIEMENS	

AA061.001.04 PLC S7-317F SAFETY TRAINING PANEL (CPU317F-2PN/DP) SIEMENS		**AA076.000.01** PLC S7-315F SAFETY TRAINING PANEL (CPU315F-2PN/DP) SIEMENS	
AA080.000.01 I/O SAFETY TRAINING PANEL SIEMENS		**AA077.000.01** ET200SP (CPU1512SP-F) SAFETY TRAINING SYSTEM SIEMENS	
AA060.000.02 AS-I AC402S TRAINING PANEL IFM		**AA081.000.01** SAFETY TRAINING SYSTEM SIEMENS	
AA402.000.01 SAFETY CONNECTION CABLES 4MM 0.5M		**AA402.000.02** SAFETY CONNECTION CABLES 4MM 1M	
AA402.000.03 I/O DATA CABLE WITH SYSLINK CONNECTORS		**AA402.000.04** ANALOG CABLE PARALLEL	
AA081.001.02 SAFETY RELAY TRAINING PANEL		**AA081.002.02** SAFETY RELAY OUTPUT EXTENSION	

ENERGY METER EQUIPMENTS

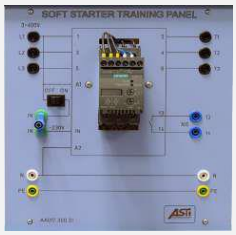
AA089.001.01 ENERGY METER TRAINING CASE (CPU 1215C) SIEMENS		**AA089.001.02** ENERGY METER TRAINING PANEL (CPU 1215C) SIEMENS	
AA089.001.03 ENERGY METER TRAINING PANEL (CPU 1212C) SIEMENS		**AA089.002.02** ENERGY METER TRAINING PANEL (CPU 1510SP) SIEMENS	
AA089.002.03 ENERGY METER TRAINING PANEL (CPU 1512SP) SIEMENS		**AA089.100.02** SOCKETS PANEL	
AA088.000.02 SENTRON PAC4200 ENERGY MEASUREMENT TRAINING PANEL SIEMENS		**AA088.000.03** SENTRON PAC5200 ENERGY MEASUREMENT TRAINING PANEL SIEMENS	
AA088.100.01 SENTRON PAC3220 ENERGY MEASUREMENT TRAINING PANEL SIEMENS		**AA041.001.01** ENERGY METER EEM MA250 TRAINING PANEL PHOENIX CONTACT	

ELECTRICAL INSTALLATIONS

AA500.001.02 TRAINING CONTROL CABINET (S7-1215C) SIEMENS		**AA500.000.01** TRAINING CONTROL CABINET (LOGO! 0BA8) SIEMENS	
AA204.000.01 TRAINING SYSTEM FOR ELECTRICAL INSTALATIONS		**AA203.000.01** TRAINING SYSTEM FOR RESIDENTIAL ELECTRICAL INSTALLATION	
AA055.000.01 POWER SUPPLY 24VDC, 3A		**AA055.100.01** POWER BATTERY 12/24V 1.3AH	
AA068.000.01 UPS PANEL PHOENIX CONTACT		**AA083.000.01** DRIVE POWER PANEL (DC VARIABLE VOLTAGE)	
AA028.001.02 TRAFFIC SIGNAL PANEL		**AA074.000.01** EDUKIT PA EXTENSION PANEL	

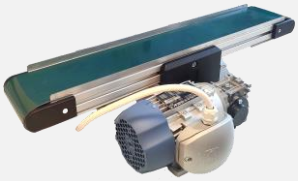
DRIVES FOR ELECTRIC MOTORS

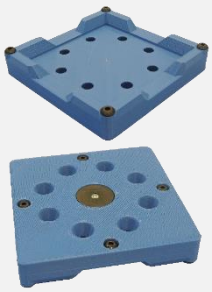
AA042.000.02 SINAMICS G120 PN TRAINING PANEL (1AC, 230V,0.37 kW) SIEMENS		**AA042.000.03** SINAMICS G120 PN TRAINING PANEL (1AC, 230V, 0.37 kW) SIEMENS	
AA042.000.04 SINAMICS G120 PN TRAINING PANEL (1AC, 230V, 1.5 kW) SIEMENS		**AA042.001.01** SINAMICS G120X TRAINING PANEL (3AC, 400V, 0.75 kW) SIEMENS	
AA042.001.02 SINAMICS G120PN TRAINING PANEL (3AC, 400V, 0.55 kW) SIEMENS		**AA042.001.03** SINAMICS G120 PN TRAINING PANEL (3xAC 400V,0.55kW) SIEMENS	
AA042.001.04 SINAMICS G120 PN TRAINING PANEL (3AC, 400V, 1.5 kW) SIEMENS		**AA042.001.05** SINAMICS G120C PN TRAINING PANEL (3xAC,400V, 0.75KW) SIEMENS	
AA010.000.02 MOTOR CONTROL TRAINING PANEL 3AC SUPPLY SIEMENS		**AA011.000.02** MOTOR CONTROL TRAINING PANEL CONTROL UNIT SIEMENS	

AA205.000.03 TRAINING SYSTEM FOR AC MOTOR & ENCODER (3AC MOTOR, 0.37kW, DRIVE 1AC G120PN) SIEMENS		**AA205.001.03** TRAINING SYSTEM FOR AC MOTOR & ENCODER (3AC MOTOR,0.37 kW, DRIVE 1AC G120PN) SIEMENS	
AA205.003.04 TRAINING SYSTEM FOR AC MOTOR (3AC MOTOR, 1.5 kW, DRIVE 1AC G120PN) SIEMENS		**AA042.002.02** SINAMICS V20 MODBUS TRAINING PANEL (3AC, 400 V, 0.55 kW) SIEMENS	
AA042.003.02 SINAMICS V20 MODBUS TRAINING PANEL (1AC, 230V, 0.37 kW) SIEMENS		**AA205.002.03** TRAINING SYSTEM FOR AC MOTOR (3AC MOTOR, 0.37 kW, DRIVE 1AC V20) SIEMENS	
AA205.000.03 TRAINING SYSTEM FOR AC MOTOR & ENCODER (3AC MOTOR, 0.37kW, DRIVE 1AC G120PN) SIEMENS		**AA086.000.01** SINAMICS DCM TRAINING SYSTEM DC MOTOR & TACHOMETER SIEMENS	
AA081.000.04 SINAMICS G120 TRAINING SYSTEM (3AC MOTOR, 0.37 kW & ENCODER) SIEMENS		**AA017.100.09** AC MOTOR & ENCODER (3AC MOTOR, 0.37 kW) SIEMENS	
AA017.300.01 SOFT STARTER TRAINING PANEL (1.5 kW, 400 V) SIEMENS		**AA017.400.01** SOFT STARTER TRAINING CASE SIEMENS	

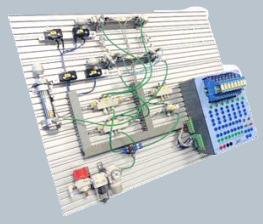
ADVANCED MOTION CONTROL

AA046.000.01 SINAMICS S210 TRAINING PANEL (1AC, 230V, 0.4 kW) SIEMENS		**AA046.001.01** TRAINING SYSTEM FOR SERVOMOTOR (1AC S210, SERVO 1FK2 0.4 kW) SIEMENS	
AA094.000.01 SINAMICS S120 TRAINING PANEL (1xAC, 230V, 0.4 kw) SIEMENS		**AA094.001.01** TRAINING SYSTEM FOR SERVOMOTOR (1 Ph S120, Servo 1FK7. 0.4 kw) SIEMENS	
AA045.000.01 SINAMICS V90 TRAINING PANEL (1AC, 230V, 0.4 kW) SIEMENS		**AA045.001.01** TRAINING SYSTEM FOR SERVOMOTOR (1AC V90, SERVO 1FL6 0.4kW) SIEMENS	
AA045.002.01 TRAINING SYSTEM FOR MOTION CONTROL (2x 1AC V90, 2x SERVO 1FL6 0.4 kW) SIEMENS		**AA046.002.01** TRAINING SYSTEM FOR MOTION CONTROL (2x 1AC S210, 2x SERVO 1FK2, 0.4kW) SIEMENS	
AA094.101.01 CONVEYOR TOOTHED BELT WITH SYNCHRONOUS SERVOMOTOR (S120/1FK7/0.4 kw) SIEMENS		**AA094.101.07** CONVEYOR TOOTHED BELT WITH SYNCHRONOUS SERVOMOTOR (S210/1FK2) SIEMENS	

AA049.001.01 PLC S7-1511T TRAINING PANEL (CPU1511T-1PN) SIEMENS		**AA045.002.02** SINAMICS V90 3x AXIS DRIVE PANEL (3x 1AC V90 0.4 kW) SIEMENS	
AA094.101.06 CONVEYOR TOOTHED BELT WITH SYNCHRONOUS SERVOMOTOR (V90/1FL6) SIEMENS		**AA094.101.08** CONVEYOR TOOTHED BELT WITH OTT BRUSH DC SERVO DRIVE CAN OTT	
AA094.101.05 CONVEYOR TOOTHED BELT WITH DUNKER BRUSH DC SERVO DRIVE CAN DUNKER		**AA094.102.04** CONVEYOR CHAIN WITH ASYNCHRONOUS 3AC MOTOR OTT	
AA094.101.04 CONVEYOR TOOTHED BELT WITH ASYNCHRONOUS 3AC MOTOR OTT		**AA097.003.01** CONVEYOR TECH FLAT BELT (120 mm) (CENTRAL DRIVE)	
AA097.003.02 CONVEYOR TECH FLAT BELT (120 mm) (DIRECT DRIVE)		**AA096.001.03** GRIPPER FOR TRAINING ROBOT SMC	
AA096.001.04 DOUBLE GRIPPER FOR TRAINING ROBOT SMC		**AA095.000.01** COMPACT PNEUMATIC PALLET STORAGE UNIT	

AA095.000.02 COMPACT PNEUMATIC BASE PIECE STORAGE UNIT		**AA095.000.03** COMPACT PNEUMATIC TOP PIECE STORAGE UNIT	
AA095.000.04 PRESS PIECES UNIT		**AA095.000.05** COMPACT PNEUMATIC INDEX UNIT	
AA095.000.06 COMPACT PNEUMATIC STORAGE UNIT		**AA096.001.05** CAGE FOR TRAINING ROBOT	
AA007.000.09 CMMP-AS MOTION CONTROL TRAINING PANEL (SERVO) FESTO		**AA007.000.10** CMMS-ST MOTION CONTROL TRAINING PANEL (STEPPER) FESTO	
AA059.000.09 AIR COMPRESSOR SUPERSILENT STAGER		**AA059.000.06** AIR SUPPLY FILTER REGULATOR CAMOZZI	
AA095.100.01 3D PRINTED PIECES (SET WITH TAG)		**AA095.101.01** 3D PRINTED PIECE (PALLET WITH TAG)	

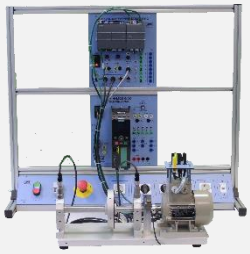
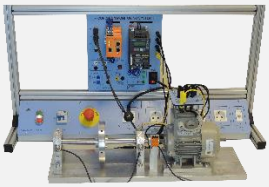
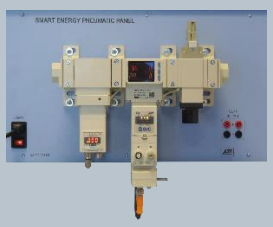
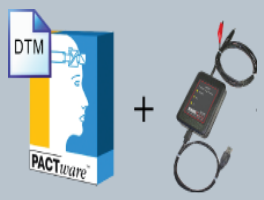
PNEUMATICS

AA059.000.08 E-PNEUMATIC SMC TRAINING SYSTEM SMC		**AA059.000.10** E-PNEUMATIC FESTO TRAINING SYSTEM FESTO	
AA059.000.05 SMART RELAY E-PNEUMATIC (LOGO! 0BA8) SIEMENS		**AA059.000.04** SMART RELAY E-PNEUMATIC (NANOLINE) PHOENIX CONTACT	

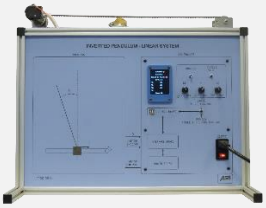
INDUSTRIAL DEMO CASES

AA008.000.01 SERVODRIVE FESTO TRAINING CASE (MINI-SLIDE ACTUATOR) FESTO		**AA008.000.02** SERVODRIVE FESTO TRAINING CASE (TOOTHED BELT AXIS) FESTO	
AA008.000.03 PLC FESTO & HMI TRAINING CASE FESTO		**AA008.000.04** 3x AXIS FESTO CARTESIAN ROBOT DEMO CASE FESTO	

DATA ACQUISITION PROCESSING AND MONITORING

AA001.001.01 DATA ACQUISITION TRAINING PANEL (NI USB 6001) NATIONAL INSTRUMENTS		**AA001.002.01** DATA ACQUISITION TRAINING PANEL (NI USB 6002) NATIONAL INSTRUMENTS	
AA031.010.04 VALS SIEMENS CONDITION MONITORING (S7-1281) SIEMENS		**AA031.010.05** VALS IFM CONDITION MONITORING (VSE 150) IFM	
AA506.000.01 MAGNETIC HYSTERESIS CYCLE MEAS.(B/H) EQUIPMENT		**AA059.001.08** SMART ENERGY E-PNEUMATIC PANEL SMC	
AA044.200.01 TIM 4R-IE TRAINING PANEL SIEMENS		**AA056.001.01** HART TEMPERATURE TRANSMITTER BOARD (SITRANS TH300) SIEMENS	
AA056.002.01 PROFIBUS PA TEMPERATURE TRANSMITTER BOARD (SITRANS TH400) SIEMENS		**AA056.100.01** HART USB CONFIGURATOR MULLER	

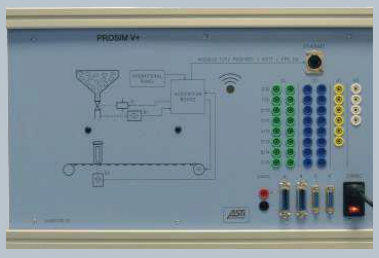
PROCESS CONTROL

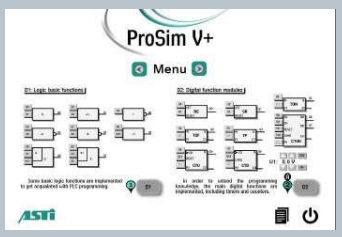
AA087.000.02 COUPLED TANK SYSTEM ASTANK-2+ (L, F, P, T)		**AA087.100.01** ASTANK-2+ SOFTWARE PACKAGE	
AA092.001.01 INVERTED PENDULUM LINEAR SYSTEM		**AA092.002.01** BALL AND BEAM SYSTEM	
AA078.000.01 PLC S7-412 TRAINING PANEL (CPU412-2PN) SIEMENS		**AA087.010.03** PLC S7-1516 TRAINING PANEL ASTANK-2+ SIEMENS	
AA087.011.02 PLC S7-1215C TRAINING PANEL ASTANK-2+ SIEMENS		**AA091.000.01** NI6001 - DAQ TRAINING PANEL ASTANK-2+ NATIONAL INSTRUMENTS	
AA090.001.01 WAGO 750-8101 DAQ TRAINING PANEL ASTANK-2+ BECKHOFF		**AA022.000.02** COUPLER TRAINING PANEL (EK9000 ASTANK-2+) BECKHOFF	

INDUSTRIAL PROCESS SIMULATION

AA600.101.04

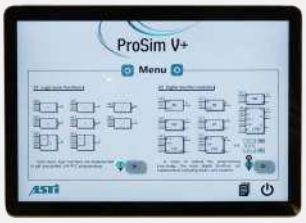
PROSIM V+ SMART DIGITAL PROCESSES





AA600.102.01

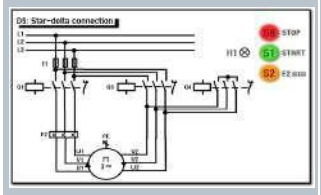
PROSIM V+ 10.5 INCH TABLET DISPLAY MICROSOFT



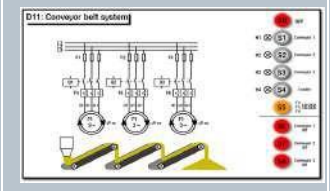
AA600.103.01

PROSIM V+ ALL IN ONE PC 23.8" I5 TOUCH LENOVO

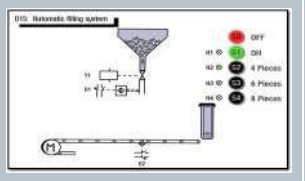
D5: STAR-DELTA CONNECTION



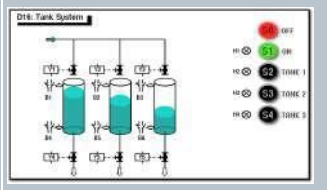
D11: CONVEYOR BELT SYSTEM



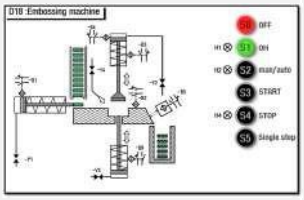
D15: AUTOMATIC FILLING SYSTEM



D16: TANK SYSTEM

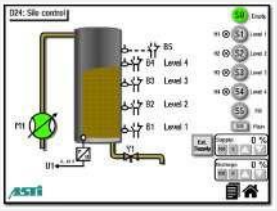


D18: EMBOSSING MACHINE

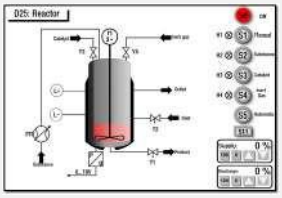


D21: TRAFFIC LIGHTS

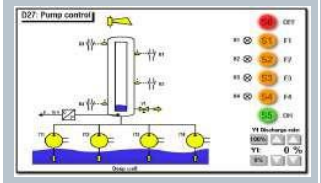
D23: SILO CONTROL



D25: REACTOR

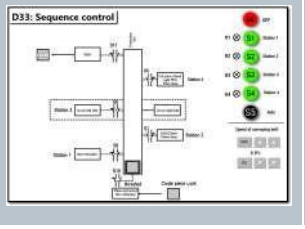


D27: PUMP CONTROL

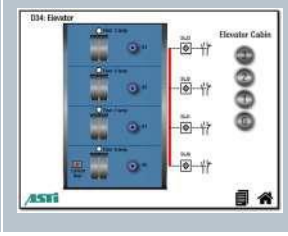


D30: DRINKS MACHINE

D33: SEQUENCE CONTROL



D34: ELEVATOR



ACCESSORIES

AA200.001.01 WORKSTATION (2000 x 800 x750) WITH 1AC MODULAR SUPPLY PANEL		**AA200.003.01** WORKSTATION (2000 x 800 x750) WITH 3AC MODULAR SUPPLY PANEL	
AA200.000.02 COMPACT WORKSTATION WITH WHEELS & MODULAR SUPPLY PANEL SIZE (WxH) 800 x 1000 mm		**AA200.000.04** TABLE-TOP STAND WITH MODULAR SUPPLY PANEL (3AC) SIZE (WxH) 910 x 790 mm	
AA200.000.05 TABLE-TOP STAND WITH MODULAR SUPPLY PANEL (1AC) SIZE (WxH) 910 x 790 mm		**AA200.000.06** TABLE-TOP STAND WITH MODULAR SUPPLY PANEL (1AC) SIZE (WxH) 910 x 1100 mm	
AA200.000.03 TABLE-TOP STAND SIZE (WxH) 910 x 800 mm		**Case Aluminium-1/2** CASE ALUMINIUM (INTERNAL SIZE (WxHxD): 530 x 400 x 175 / 500 x 400 x 200 mm	
Case HPRC-1 CASE HPRC-1 CUBED FOAM (INT. SIZE: 749 x 525 x 366)		**Case HPRC-1** CASE HPRC-2 CUBED FOAM (INT. SIZE: 509X460X316 mm)	

TECHNICAL LEARNING CONFIGURATIONS

AA096.001.01/AA096.002.01/AA096.003.01 /AA096.004.01
INTEGRATED 6 AXIS ROBOT TRAINING STATIONS

Description:

The Integrated 6 Axis Robot Training Stations is a didactic system which is built around a 6-axis industrial robot and an industrial small-scaled conveyor belt with 1FL6 servomotor. The Integrated 6 Axis Robot Training Station gives the opportunity to learn practical applications of closed loop speed and position control via the V90 driver. The pallets that are transported on the conveyor belt are fitted with an identification RFID Tag containing a unique identification code that can be both read and modified via the Siemens RF series RFID Readers. The process synchronization is assured by a SIEMENS S7-1200 PLC and the HMI KTP700. The station can assemble and disassemble the work piece thus being able to work for an indefinite time.

The structure includes (main pieces):

- 6 Axis Robot:
  - AA096.001.01 - ABB IRB-120C, IRC5 Compact controller, PN
  - AA096.002.01 - MITSUBISHI RV-2FR, CR800 controller, PN
  - AA096.003.01 –UNIVERSAL ROBOT UR3E controller PN
  - AA096.004.01 - ABB CRB 1100, Compact Controller, PN
- AA200.001.02 – Workstation MR (800 x 800 x 750) with Modular Supply Panel
- CPU1214C / SM12178 4xIO LINK/ Switch XB005 / PS 24V, 3A (connector: 8DI, 8DO)
- RFID System IO-LINK
- AA026.001.03 - HMI KTP700 TRAINING CASE with Flexible Support
- AA096.001.04 - Double Gripper E-PNEUM & VACUUM (SMC)
- AA094.101.06 – CONVEYOR TOOTHED BELT WITH SERVO (V90/1FL6)
- AA045.000.01 - SINAMICS V90 Panel (3xAC Servo 0.4kW)
- AA096.001.05 - CAGE (safety for ROBOT only ABB iRB120 & Mitsubishi)
- AA095.000.05 - Compact Pneumatic INDEX UNIT
- AA059.000.06 - Air Supply Filter Regulator with pressure switch
- AA059.000.09 - Air Compressor Super silent SAGER
- AA095.100.01 – 6 x 3D Printed Assembly Line Set

Practice:

- 3D product assembly with 6 axis industrial robot
- Controlling the process using SIMATIC S7-1200 & HMI KTP700
- Controlling the Servo motor of the conveyor belt using SINAMICS V90 Servo Drive

Optional equipment:

- AA054.200.02 - SIMATIC IOT2050 TRAINING PANEL SIEMENS
- AA054.001.01 - IE SCALANCE SWITCH SIEMENS

AA100.000.01/AA100.001.01/AA100.002.01/AA100.003.01
CYBER PHYSICAL SYSTEMS

Description:

The CYBER PHYSICAL SYSTEM is a state-of-the-art industrial automation system that combines cutting-edge technology with a durable and mobile design. The system includes a high-performance servomotor, powered by a SIEMENS SINAMICS driver for efficient movement. The system also includes a variety of advanced control and monitoring equipment such as a Siemens 7KT PAC1600, a SIEMENS SIMATIC S7-1200 PLC and RFID antenna from IFM. The system also includes a SIEMENS SIMATIC IoT2050 and an HMI KTP700 CASE PANEL (CPS) SIEMENS for easy monitoring and control.
The system also includes a conveyor belt, which is designed for heavy-duty use, as well as two IFM inductive sensors for precise positioning. All these components are housed in a durable ITEM aluminum structure with HPL panels and wheels, making it easy to move and set up in a variety of manufacturing and production environments. This system is ideal for those looking for a reliable, efficient, and high-performance automation solution for their production line.

The structure includes (main pieces):

- AA100.000.01 Cyber Physical System With:
- Conveyor Flat Belt (120mm Asynchronous Motor/Central Drive) / Sinamics V20 Inverter
- AA100.001.01 Cyber Physical System With:
- Conveyor 2xToothed Belt (120 mm Servomotor 1FL6) / Sinamics V90 Inverter
- AA100.002.01 Cyber Physical System With:
- Conveyor 2xToothed Belt (120 mm Asynchronous Motor) / Sinamics V20 Inverter
- AA100.003.01 Cyber Physical System With:
- Conveyor 2xToothed Belt (120 mm DC Servomotor)/ Drive/ CanOpen Communication
- ITEM Aluminum Structure with HPL Panels and Wheels
- SIEMENS SIMATIC PLC (CPU 1214C PN) / Power Supply 24V,2.5A
- SIEMENS SIMATIC Iolink Module / SIMATIC Iot2050 / SCALANCE XB005/ Communication board RS 485
- SIEMENS SENTRON Measuring Device, PAC1600, LCD, 1AC,230V, (Modbus RTU/ASCII, Apparent/ Active/Reactive Energy)
- IFM RFID System IO-LINK (Reader & Antenna)
- IFM Proximity Sensors

Practice:

- Programmable Logic Controllers (PLCs) such as the SIEMENS SIMATIC S7-1200, which are used to control and monitor industrial processes
- Industrial IoT such as IoT2050 which are used to create interfaces for monitoring and controlling the system
- IO-Link, a communication protocol for connecting sensors and actuators to PLCs and other automation equipment
- RFID technology, which is used to identify and track products and assets in industrial environments.

Recommended equipment:

- AA026.002.03 HMI KTP700 CASE PANEL (CPS) SIEMENS
- AA095.100.01 3D PRINTED PIECES (SET with IFM RFID tag ID-TAG)

AA700.001.01/AA700.002.01/AA700.003.01/AA700.004.01
SMART FLEXIBLE ASSEMBLY TRAINING SYSTEM

Description:

The Smart Flexible Assembly Training System comprises of five stations with five conveyor belts linked together precisely at the same height to ensure a smooth path for the pallets that will flow through. A fully automated pneumatic warehouse station with a 6-workpiece capacity provides rigorous PLC controlled horizontal linear positioning of the workpieces with feedback ensured by two sensors (capacitive and inductive). Each of the conveyors are powered by different types of electric motors: AC or DC motors, synchronous or asynchronous motors, brush motor. For rigorous positioning, encoder disks with counters monitor the direction and speed of each conveyor providing valuable feedback to the PLC controller unit.

The structure includes (main pieces):

- 6 Axis Robot:
    - AA700.001.01 - ABB IRB-120C, IRC5 Compact controller, PN
    - AA700.002.01 - MITSUBISHI RV-2FR, CR800 controller, PN
    - AA700.003.01 - Universal Robots UR3e controller PN
    - AA700.004.01 – ABB CRB 1100, Compact Controller, PN
- 5x AA200.000.02 Workstation MR (800 x 800 x750) with Modular Supply Panel
- 1x AA054.200.02 - SIMATIC IoT2050 Training Panel SIEMENS
- 1x AA048.010.06 PLC S7-1511 TRAINING PANEL (CPU1511-1PN)
- 4x AA044.000.07 PLC S7-1215C TRAINING PANEL (CPU1215C COMPACT)
- 1x AA071.001.02 HMI TP700 COMFORT TRAINING CASE with Flexible Support
- 4x AA094.101.06 CONVEYOR TOOTHED BELT WITH SERVOMOTOR (V90/1FL6)
- 1x AA094.101.04 CONVEYOR TOOTHED BELT with Asynchronous 3xAC Motor
- 4x AA045.000.01 SINAMICS V90 Training Panel
- 1x AA042.000.03 SINAMICS G120 PN TRAINING PANEL (1xAC,230V, 0.37kW)
- 1x AA026.001.03 HMI KTP700 TRAINING CASE with Flexible Support
- AA059.000.09 AIR Compressor SUPERSILENT & AA059.000.06 Regulator FILTER
- AA096.001.04 Double GRIPPER E-PNEUM VACUUM (SMC)
- AA096.001.05 CAGE FOR TRAINING ROBOT (safety for ROBOT- non for UR3E & ABB CRB 1100)
- AA095.000.01 Compact Pneumatic PALLET Storage Unit
- AA095.000.02 Compact Pneumatic BASE PIECE Storage
- AA095.000.05 Compact Pneumatic INDEX Unit
- AA095.000.03 Compact Pneumatic TOP PIECE
- AA095.000.04 Compact PRESS PIECES
- AA095.000.06 Compact Pneumatic Assembled Pieces Storage Unit

Practice:

- 3D product assembly with 6 axis industrial robot
- Controlling the process using S7-1200 & HMI TP700
- Familiarize with the operating different types of motors
- Familiarize with various industrial communication
- Familiarize with the common components and concepts of SCADA systems

AA700.001.02/AA700.002.02/AA700.003.02 /AA700.004.02
ADVANCED SMART FLEXIBLE ASSEMBLY TRAINING SYSTEM

Description:

The Advanced-Smart Flexible Assembly Training System (ASFATS) comprises of five stations with five conveyor belts linked together precisely at the same height to ensure a smooth path for the pallets that will flow through. The ASFATS can be configured in various setups designed for a wide variety of scenarios: linear assembly line, "U" shaped production facility. Timing is everything in the automation industry and the ASFATS is the perfect didactic tool for teaching and demonstrating the principles of manufacturing automation in future digitalized factories. A fully automated pneumatic warehouse station with a 6-workpiece capacity provides rigorous PLC controlled horizontal linear positioning of the workpieces with feedback ensured by two sensors (capacitive and inductive). Each of the conveyors are powered by different types of electric motors: AC or DC motors, synchronous or asynchronous motors, brush-less motor.

The structure includes (main pieces):

- 6 Axis Robot:
    - AA700.001.02 - ABB IRB-120C, IRC5 Compact controller, PN
    - AA700.002.02 - MITSUBISHI RV-2FR, CR800 controller, PN
    - AA700.003.02 - Universal Robots UR3 E controller PN
    - AA700.004.02- ABB CRB 1100, Controller, PN
- 5x AA200.000.02 Workstation MR (800 x 800 x750) with Modular Supply Panel
- 1x AA048.001.07 PLC S7-1513 TRAINING PANEL (CPU1513-1PN)
- 1x AA071.001.06 HMI TP1200 COMFORT TRAINING CASE with Flexible Support
- AA054.400.01 NETWORK SECURITY TRAINING PANEL
- AA054.300.02 SIMATIC INDUSTRIAL EDGE (IPC227E)
- 3x AA044.000.07 PLC S7-1215C TRAINING PANEL (CPU1215C COMPACT)
- 4x AA094.101.06 CONVEYOR TOOTHED BELT WITH SERVOMOTOR (V90/1FL6)
- 1x AA094.101.04 CONVEYOR TOOTHED BELT with Asynchronous 3xAC Motor
- AA088.100.01 SENTRON PAC3220 Energy Measurement Training Panel
- AA089.001.02 ENERGY METER Training Panel (CPU1215C& 2X SM 1238)
- 1x AA042.000.03 SINAMICS G120 PN TRAINING PANEL (1xAC,230V, 0.37kW)
- 1x AA026.001.03 HMI KTP700 TRAINING CASE with Flexible Support
- AA059.000.09 AIR Compressor SUPERSILENT & AA059.000.06 Regulator FILTER
- AA096.001.04 Double GRIPPER E-PNEUM VACUUM (SMC)
- AA096.001.05 CAGE FOR TRAINING ROBOT (safety for ROBOT- non for UR3E & ABB CRB1100)
- AA095.000.06 Compact Pneumatic Assembled Pieces Storage Unit
- AA095.000.01 Compact Pneumatic PALLET Storage Unit
- AA095.000.02 Compact Pneumatic BASE PIECE Storage
- AA095.000.05 Compact Pneumatic INDEX Unit
- AA095.000.03 Compact Pneumatic TOP PIECE Storage
- AA095.000.04 Compact PRESS PIECES
- 4x AA045.000.01 SINAMICS V90 Training Panel

Practice:

- 3D product assembly with 6 axis industrial robot
- Controlling the process using SIMATIC S7-1200 & SIMATIC S7-1500 & HMI TP700 & HMI TP1200
- Familiarize with the operating different types of motors and various industrial communication protocols

AA700.011.01/AA700.012.01/AA700.013.01 /AA700.014.01
SMART FLEXIBLE WITH CPS (CYBER PHYSICALSYSTEM) ASSEMBLY TRAINING LINE

Description:

The Smart Flexible WITH CPS (CYBER PHYSICALSYSTEM) ASSEMBLY TRAINING LINE comprises of three stations with three conveyor belts linked together precisely at the same height to ensure a smooth path for the pallets that will flow through. A fully automated pneumatic warehouse station with a 6-workpiece capacity provides rigorous PLC controlled horizontal linear positioning of the workpieces with feedback ensured by inductive sensors. Each of the conveyors is powered by different types of electric motors: AC or DC motors, synchronous or asynchronous motors, brush motor. For rigorous positioning, encoder disks with counters monitor the direction and speed of each conveyor providing valuable feedback to the PLC controller unit.

The structure includes (main pieces):

6 Axis Robot

- AA700.011.01 - ABB IRB-120C, IRC5 Compact controller, PN
- AA700.012.01 - MITSUBISHI RV-2FR, CR800 controller, PN
- AA700.013.01 - Universal Robots UR3e controller PN
- AA700.014.01 – ABB CRB 1100, Compact Controller, PN

STATION 1 CPS PRE-ASSEMBLY STATION)

- 1x AA100.003.01 CYBER PHYSICAL SYSTEM (OTT DC ServoMotor)
- 1x AA026.002.03 HMI KTP700 TRAINING CASE (CPS) with Flexible Support (cu AL)
- 1x AA095.000.01 COMPACT PNEUMATIC PALLET&BASE PIECES STORAGE UNIT

STATION 2 ROBOT ASSEMBLY STATION

- 1x AA200.001.02 WorkstationMR (800 x 800 x750) with Modular Supply Panel
- 1 x 6 AXIS ROBOT
- 1x CPU 1214C/ SM1278 4xIO-Link Master /Switch XB005//PS 24V/3A (connector: 8DI_8DO)
- 1x Communication Board CB 1241, RS485 / RFID read/write head HF
- 1x SENTRON, measuring device, 7KT PAC1600, LCD, L-N: 230 V, 63 A
- 1x A096.001.04 Double Gripper _E-PNEUM&Vacuum (SMC)
- 1x AA096.001.05 CAGE (safety for ROBOT- not for UR3E and ABB CRB 1100)
- 1x AA094.101.06 CONVEYOR TOOTHED BELT WITH SYNCHRONOUS SERVOMOTOR (V90/1FL6)
- 1x AA045.000.01 SINAMICS V90 TRAINING PANEL
- 1x AA095.000.05 Compact Pneumatic INDEX Unit

STATION 3 CPS STORAGE UNIT STATION

- 1x AA100.003.01 CYBER PHYSICAL SYSTEM (OTT DC ServoMotor)
- 1x SIMATIC IOT2050; 2x Gbit Ethernet RJ45; Display port; 2x USB2.0; 16 GB eMMC; SD card slot
- 1x AA095.000.06 Compact Pneumatic ASSEMBLED PIECES Storage Unit
- 1x AA059.000.09 AIR COMPRESSOR SUPERSILENT and 1x AA059.000.06 AIR SUPPLY FILTER REGULATOR
- 6x AA095.100.01 3D PRINTED PIECES (SET with IFM RFID tag)

Practice:

- 3D product assembly with 6 axis industrial robot
- Controlling the process using S7-1200 & HMI TP700
- Familiarize with the operating different types of motors
- Familiarize with various industrial communication protocols and common components and concepts of SCADA systems

AA700.011.02/AA700.012.02/AA700.013.02/AA700.014.02
ADVANCED SMART FLEXIBLE WITH CPS (CYBER PHYSICALSYSTEM) ASSEMBLY TRAINING LINE

Description:

The **Advanced Smart Flexible WITH CPS (CYBER PHYSICAL SYSTEM) ASSEMBLY TRAINING LINE** (ASFCPS) comprises of three stations with three conveyor belts linked together precisely at the same height to ensure a smooth path for the pallets that will flow through. The ASFCPS can be configured in various setups designed for a wide variety of scenarios: linear assembly line, "U" shaped production facility. Timing is everything in the automation industry and the ASFCPS is the perfect didactic tool for teaching and demonstrating the principles of manufacturing automation in future digitalized factories. A fully automated pneumatic warehouse station with a 6-workpiece capacity provides rigorous PLC controlled horizontal linear positioning of the workpieces with feedback ensured by two sensors (capacitive and inductive). Each of the conveyor is powered by an electric servomotor.

The structure includes (main pieces):

6 Axis Robot:

- AA700.011.02 - ABB IRB-120C, IRC5 Compact controller, PN
- AA700.012.02 - MITSUBISHI RV-2FR, CR800 controller, PN
- AA700.013.02 - Universal Robots UR3e controller PN
- AA700.014.02 – ABB CRB 1100, Compact Controller, PN

STATION 1 CPS PRE-ASSEMBLY STATION)

- 1x AA100.001.01 CYBER PHYSICAL SYSTEM (Siemens V90 ServoMotor)
- 1x AA071.002.03 HMI TP700 TRAINING CASE (CPS) with Flexible Support (cu AL)
- 1x AA095.000.01 COMPACT PNEUMATIC PALLET&BASE PIECES STORAGE UNIT

STATION 2 ROBOT ASSEMBLY STATION

- 1x AA200.001.02 WorkstationMR (800 x 800 x750) with Modular Supply Panel
- 1 x 6 AXIS ROBOT
- 1x CPU 1214C/ SM1278 4xIO-Link Master /Switch XB005//PS 24V/3A (connector: 8DI_8DO)
- 1x Communication Board CB 1241, RS485 / RFID read/write head HF
- 1x SENTRON, measuring device, 7KT PAC1600, LCD, L-N: 230 V, 63 A
- 1x A096.001.04 Double Gripper E-PNEUM & Vacuum (SMC)
- 1x AA096.001.05 CAGE (safety for ROBOT- not for UR3E and ABB CRB 1100;)
- 1x AA094.101.06 CONVEYOR TOOTHED BELT WITH SYNCHRONOUS SERVOMOTOR (V90/1FL6)
- 1x AA045.000.01 SINAMICS V90 TRAINING PANEL
- 1x AA095.000.05 Compact Pneumatic INDEX Unit

STATION 3 CPS STORAGE UNIT STATION

- 1x AA100.001.01 CYBER PHYSICAL SYSTEM (Siemens V90 ServoMotor)
- 1x SIMATIC IOT2050; 2x Gbit Ethernet RJ45; Display port; 2x USB2.0; 16 GB eMMC; SD card slot.
- 1x AA095.000.06 Compact Pneumatic ASSEMBLED PIECES Storage Unit
- 1x AA059.000.09 AIR COMPRESSOR SUPERSILENT and 1x AA059.000.06 AIR SUPPLY FILTER REGULATOR
- 6x AA095.100.01 3D PRINTED PIECES (SET with IFM RFID tag)

Practice:

- 3D product assembly with 6 axis industrial robot
- Controlling the process using S7-1200 & HMI TP700
- Familiarize with the operating different types of motors
- Familiarize with various industrial communication protocols and common components and concepts of SCADA systems

AA800.001.01 SMART SENSORS & COMMUNICATIONS TRAINING SYSTEM (IFM)

Description:

The IFM "SENSORS & COMMUNICATIONS" TRAINING SYSTEM is a comprehensive and versatile training solution for professionals in the industrial automation field. It includes a wide range of advanced equipment and components, such as a table-top stand with supply panel, PLC S7-1200 training panel, HMI training panel, Sinamics V90 training panel, IFM AS-i AC402S training panel, conveyor belt with servo drive, and a set of IFM sensors and communications equipment.

The system includes a wide range of sensor types, including sensors with IO-Link, RFID evaluation units, pressure sensors, temperature transmitters, photoelectric distance sensors, and more. Additionally, the system includes advanced communications equipment such as IO-Link master with PROFINET interface, AS-Interface ClassicLine Module and RFID read/write antenna. The system also includes 3D printed pieces and an illuminated E-STOP with integrated AS-I. All these components are designed to provide hands-on training for professionals in the field of industrial automation.

The structure includes (main pieces):

- AA200.000.05 TABLE_TOP STAND with Supply Panel (850 x 760) mm
- AA044.000.03 PLC S7-1215C Training Panel Compact (CPU1215C 8DI 8DO 2AI 2AO)
- SWITCH SCALANCE XB005
- AA026.000.03 KTP700 HMI TRAINING PANEL
- AA060.000.02 IFM AS-I AC402S TRAINING PANEL
- AA094.101.08 Conveyor Toothed Belt with DC MOTOR
- AA095.100.01 3D printed piece (1 set)
- A059.000.09 AIR Compressor SUPERSILENT
- Inductive sensor with IO-Link
- 5-segment light tower IO-Link programmable
- IO-Link memory plug
- Evaluation system and display for analogue signals 4-20 mA.
- RFID evaluation unit with IO-Link, M12 connectors
- RFID read/write antenna with AS-Interface and RFID tag
- AS-Interface flat cable connector M12
- Illuminated E-STOP with integrated AS-I
- AS-Interface illuminated pushbutton module with 2 buttons
- AS-Interface Airbox 4 Digital Inputs and 2 Pneumatic Outputs
- Pressure sensor with IO-Link communication
- Temperature transmitter with display IO-Link and RFID read/write antenna IO-Link
- IO-Link master with PROFINET interface and AS-Interface Classic Line Module with 2 IO-LINK PORTS
- Photoelectric distance sensor with AS-Interface and AS-Interface Classic Line Module

Practice:

- Programmable Logic Controllers (PLCs) such as the S7-1200 and the AC402S
- Human Machine Interface (HMI) panels, which are used to interface with PLCs and other automation equipment
- AS-Interface, a communication protocol for connecting sensors and actuators to PLCs and other automation equipment
- IO-Link, a communication protocol for connecting sensors and actuators to PLCs and other automation equipment
- RFID technology, which is used to identify and track products and assets in industrial environments

Optional equipment:

- AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)
- AA054.200.02 - SIMATIC IoT2050 Training Panel SIEMENS

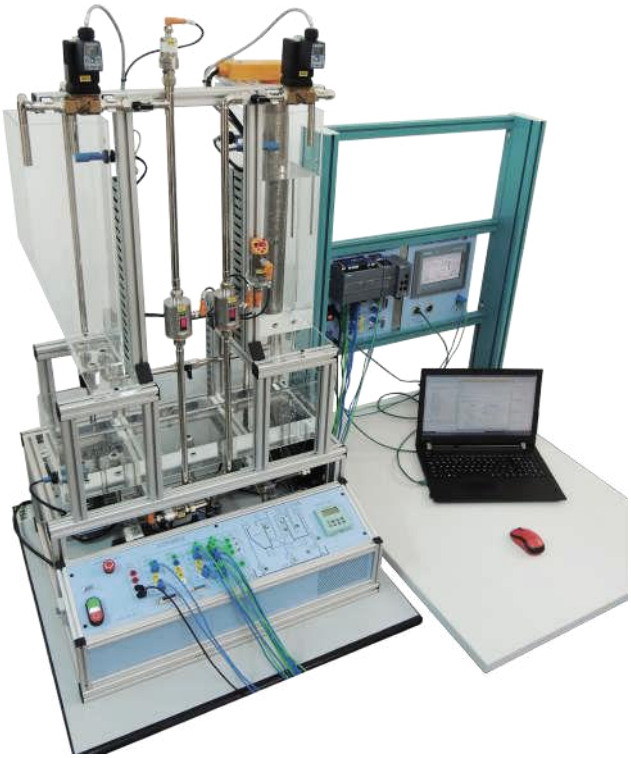
AA900.010.01 SMART PROCESS CONTROL LEARNING SYSTEM

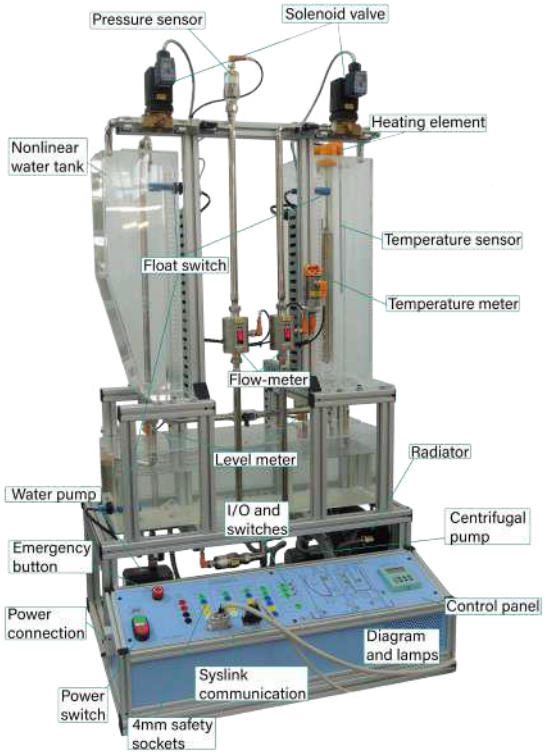
Description:

The Process Control Learning System (BPCLS) is a comprehensive training system that covers industrial-standard applications for open-loop and closed-loop control of level, flow, pressure, and temperature processes. It is designed to provide an enhanced learning experience for process control, and to speed up the training process in a safe, controlled environment with minimal risk. The BPCLS leverages the basic input/output (IO) and programming capabilities of a Programmable Logic Controller (PLC) with the Siemens S7-1200 automation configuration, as well as the basic graphic assets of the Siemens HMI KTP700. This allows users to acquire hands-on experience with the calibration, operation, and troubleshooting of industrial equipment such as pumps, flow-level-pressure-temperature transducers, and inverters.

The structure includes (main pieces):

- 1x AA087.000.02 - Coupled Tank System ASTANK-2+ (L, F, P, T)
- 1x AA087.011.02 - PLC S7-1215 (CPU1215C) Training Panel ASTANK-2+
- 1x AA026.000.03 – HMI KTP700 Training Panel
- 1x AA087.100.01 - ASTANK-2+ Software Package (SIEMENS PLC)
- 1x AA200.000.05 - Table-Top Stand for Training Panels with Modular Supply Panel





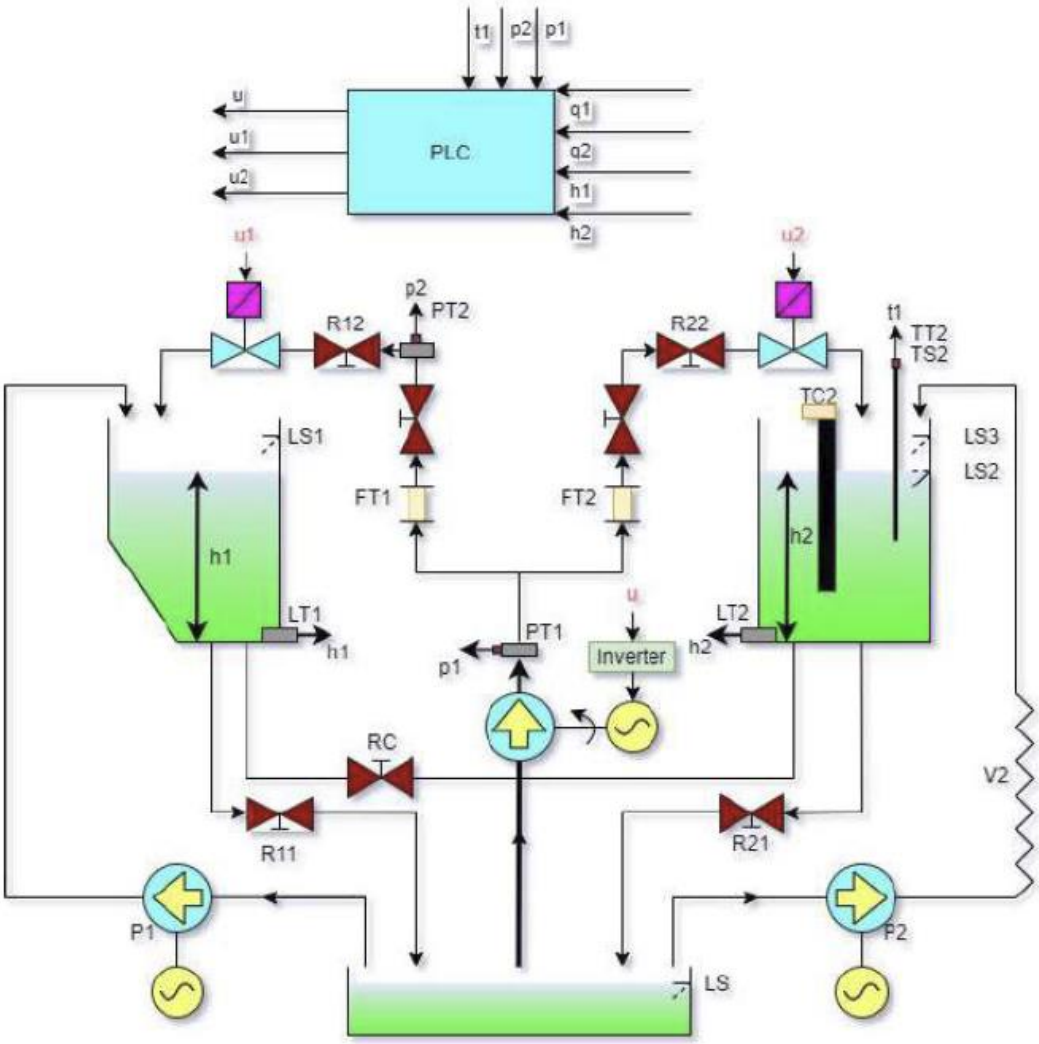
The system includes demo software for basic commissioning, PI level control, PID temperature control, and non-linear control. These features accelerate the learning curve for developing process control PLC programs in a realistic training environment. The BPCLS is an ideal solution for individuals and organizations that want to improve their process control skills and gain a deeper understanding of industrial equipment and processes.

Moreover, BPCLS is designed to mimic real-world scenarios as closely as possible, allowing users to gain hands-on experience in a safe and controlled environment. This reduces the risk of errors and accidents that may occur during training with real equipment. The BPCLS is a cost-effective and efficient way to improve process control skills, and it can be used in a variety of settings, including academic institutions, training centers, and industrial plants.

The BPCLS is also highly customizable, allowing users to adjust the system to suit their specific training needs. This includes the ability to set custom parameters and conditions, as well as the ability to create and edit custom control algorithms. This level of

customization allows users to tailor the training experience to their individual needs, and to focus on the areas where they need the most improvement.

Overall, the Process Control Learning System (BPCLS) is a powerful tool for improving process control skills and gaining a deeper understanding of industrial equipment and processes. It offers an enhanced learning experience through hands-on training, educational resources and materials, and a high degree of customizability. It is an ideal solution for individuals and organizations looking to improve their process control skills and increase their efficiency in the industrial setting.



Practice:

- Data acquisition for analytic modelling and/or experimental identification of the processes
- Design of simple control structures (single controller of type P, PI or PID), design of multi-model control algorithms or for multi-variable processes
- Implementation of adaptive structures for time-variant processes
- Implementation of control strategies based on evolutionary techniques (fuzzy controllers, genetic algorithms, neural networks)
- Basic PLC and HMI programming

Optional equipment:

- AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)
- AA600.102.01 - PROSIM V+ 10.5-inch Tablet Display (MICROSOFT)

AA900.010.03/AA900.010.04 SMART PROCESS CONTROL LEARNING SYSTEM

Description:

The SMART PROCESS CONTROL LEARNING SYSTEM is a state-of-the-art industrial control system designed for open / close loop control of an industrial fan. It utilizes cutting-edge technology such as a laser sensor for distance measurement and an advanced asynchronous motor for powerful airflow of 900 m3. The system is constructed with a durable aluminum frame and features advanced control and monitoring features like a SINAMICS V20, as well as various switches and potentiometers for local control. The system is easy to integrate with other equipment and can be controlled remotely, providing a smart and efficient way to manage the performance of an air fan, resulting in improved process control and energy savings.

Furthermore, the system is a highly customizable and flexible solution, allowing users to configure the system to their specific needs. The system can be programmed to operate within a specific set of parameters and can be fine-tuned to ensure optimal performance. This level of control and precision can lead to significant cost savings and improved production efficiency. Additionally, the system comes with a user-friendly interface that makes it easy to monitor and adjust settings, even for those with limited technical experience. Overall, the system is an innovative and reliable solution for managing the performance of an air fan, providing industrial facilities with improved process control, energy savings and increased production efficiency.

The structure includes (main pieces):

- 1x AA044.000.07 - PLC S7-1215C TRAINING PANEL (CPU1215C COMPACT)
- 1x Asynchronous motor, 0.37kW, 2800 rpm, 230 VAC
- 1x Fan /2x Fan, Maximum air flow: 900 m3/h, Maximum pressure: 420 Pa /
- 1x Laser sensor for measuring distance
- Aluminum Profile (30x30) Frame
- Electric box with:
  - 1x SINAMICS V20 200-240 V 1-phase-AC Rated power 0.37 kW I/O interface: 4 DI, 2 DQ, 2 AI, 1 AO
  - Fieldbus: USS/Modbus RTU with built-in BOP
  - 2x switches / 4x switches (retentive and pulse) for local control
  - 1x potentiometer / 2x potentiometer for local control
  - 1x SYSLINK digital connector for DI/DO (A)
  - 1x SYSLINK analog (DB15) connector for AI/AO (C)
  - 1x switch / 2x switch for control mode: local/remote

Practice:

- Data acquisition for experimental identification of the processes
- Design of simple control structures (single controller of type P, PI or PID), design of multi-model control algorithms
- Implementation of adaptive structures for time-variant processes
- Implementation of control strategies based on evolutionary techniques (fuzzy controllers, genetic algorithms, neural networks)
- Basic PLC and HMI programming

Optional equipment:

- AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)
- AA600.102.01 - PROSIM V+ 10.5-inch Tablet Display (MICROSOFT)

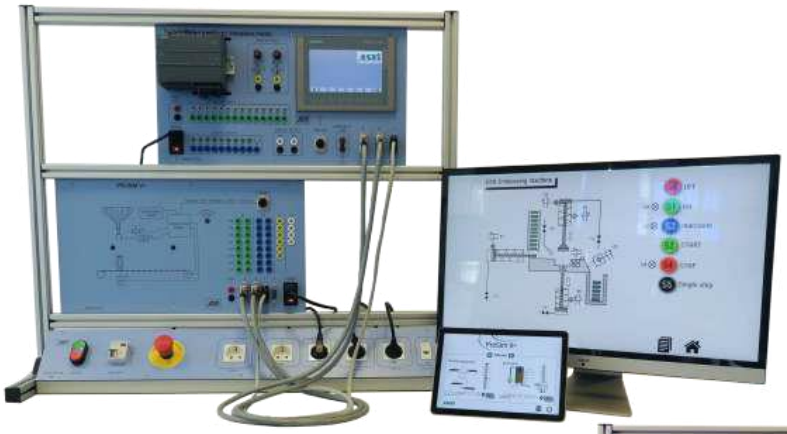
AA900.020.01/AA900.020.02/AA900.020.03 SMART PLC PROGRAMMING LEARNING SYSTEM

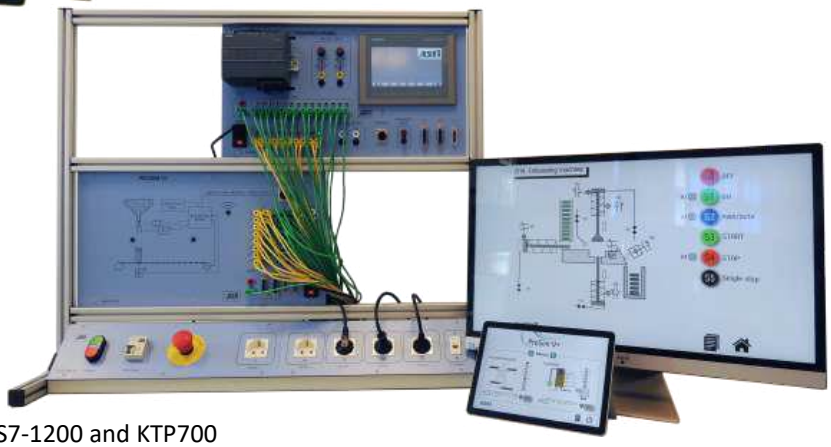
Description:

The Smart PLC programming system is built around an industrial process simulator (PROSIM V+) for immersive and engaging virtual learning experiences in industrial automation training, research, and development. It offers a complete software package (39 scenarios) for discrete and continuous automation processes in various fields of industry. The simulated process list, in increasing order of complexity, covers rich 2D/3D graphics and animations running on small or large capacitive displays. The Siemens S7-1200 PLC includes industrial standardized 14DI/10DO/2AI/2AO IO interface and PROFINET connection for programming and data linking. The solution includes 39 demo projects.

The structure includes (main pieces):

- AA900.020.01 includes: 1xAA044.002.02 - PLC S7-1212C Training Panel (CPU1212C) SIEMENS
- AA900.020.02 includes: 1xAA044.001.05 – PLC S7-1214C Training Panel (CPU1214C) SIEMENS
- AA900.020.03 includes: 1xAA044.001.02 - PLC S7-1215C Training Panel (CPU1215C) SIEMENS
- 1x AA600.101.04 - PROSIM V+ Smart Digital Coupler
- 1x AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)
- 1x AA200.000.05 - Table-Top Stand for Training Panels with Modular Supply Panel





Practice:

- Analysis of the basic structure of SIMATIC S7-1200 and KTP700
- Implementing programming languages in TIA Portal (LAD FBD, and SCL)
- Designing and implementing solutions for practical applications such as: motor controls, pumping systems, conveyor belts, lift control...etc.
- Study of the basic logic functions, numerical operations, and arithmetic instructions
- Integration of human machine interface in the automation process

Optional equipment:

- AA600.102.01 - PROSIM V+ 10.5-inch Tablet Display (MICROSOFT)

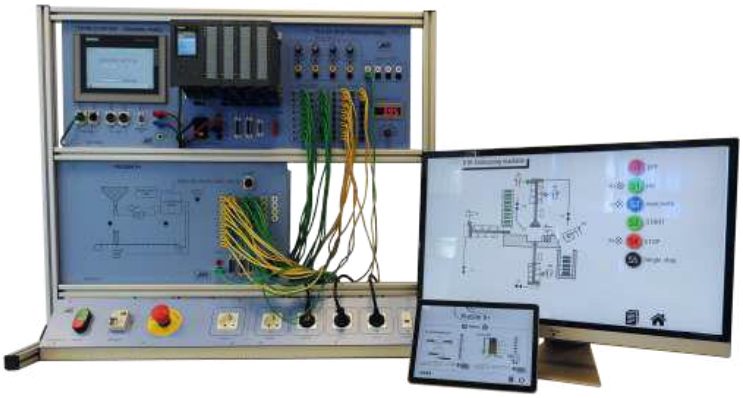
AA900.020.11/ AA900.020.13/AA900.020.16 SMART PLC PROGRAMMING LEARNING SYSTEM

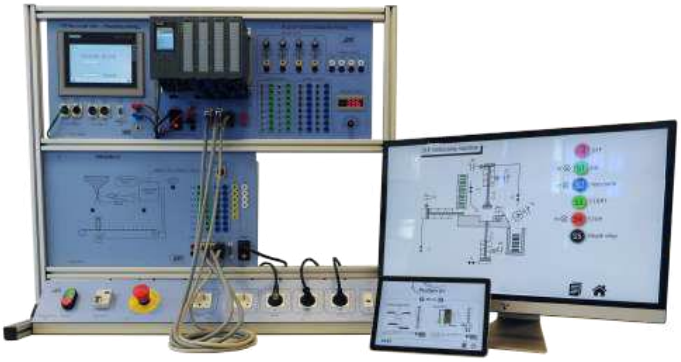
Description:

The Smart PLC Programming Learning System provides additional automation capabilities in comparison with the basic version by using the Siemens S7-1500 and optional TP700 as a base for the control infrastructure. The automation topology assures future scalability with an advanced and easy to use graphical interface that includes reports, recipes and user defined programs that manage the process. The Siemens S7-1500 PLC includes industrial standardized 16DI/16DO/4AI/4AO IO interface and PROFINET/PROFIBUS connection for programming and data linking. The Siemens TP700 provides advanced graphic capabilities. The solution includes one demo project for each simulation.

The structure includes (main pieces):

- AA900.020.11 includes: 1x AA048.001.06 - PLC S7-1511 Training Panel (CPU1511-1PN)
- AA900.020.13 includes: 1x AA048.001.07 - PLC S7-1513 Training Panel (CPU1513-1PN)
- AA900.020.16 includes: 1x AA048.001.03 - PLC S7-1500 Training Panel (CPU1516-3PN/DP)
- 1x AA600.101.03 - PROSIM V+ Smart Digital Coupler
- 1x AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)
- 1x AA200.000.05 - Table-Top Stand for Training Panels with Modular Supply Panel





Practice:

- Analysis of the basic structure of Simatic S7-1500 and TP700
- Implementing programming languages in TIA Portal (LAD, FBD, and SCL)
- Designing and implementing solutions for practical applications such as: motor controls, pumping systems, conveyor belts, lift control etc.
- Study of the basic logic functions, numerical operations, and arithmetic instructions
- Integration of human machine interface in the automation process

Optional equipment:

- AA071.000.02 - HMI TP700 COMFORT TRAINING PANEL
- AA600.102.01 - PROSIM V+ 10.5-inch Tablet Display (MICROSOFT)

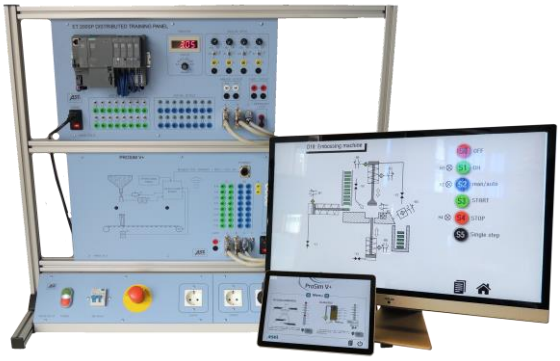
AA900.025.12/ AA900.025.10/AA900.023.14 SMART PLC PROGRAMMING LEARNING SYSTEM

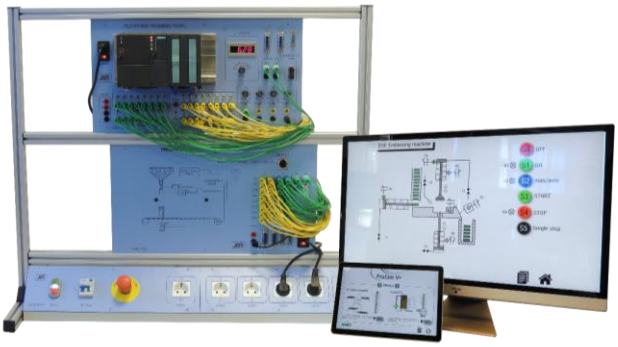
Description:

The Smart PLC Programming Learning System provides additional automation capabilities in comparison with the basic version by using the Siemens ET200SP and optional TP700 as a base for the control infrastructure. The automation topology assures future scalability with an advanced and easy to use graphical interface that includes reports, recipes and user defined programs that manage the process. The Siemens ET200SP (1512SP, 1510SP) PLC includes industrial standardized 16DI/16DO/4AI/4AO IO interface and PROFINET/PROFIBUS connection for programming and data linking. The Siemens TP700 provides advanced graphic capabilities. The solution includes one demo project for each simulation.

The structure includes (main pieces):

- AA900.025.12 includes: 1x AA062.001.02 – ET200SP (CPU 1512SP) Distributed Training Panel
- AA900.025.10 includes: 1x AA062.002.02 – ET200SP (CPU 1510SP) Distributed Training Panel
- AA900.023.14 includes: 1x AA061.001.03 – PLC S7-314C TRAINING PANEL (CPU 314C-2PN/DP)
- 1x AA600.101.03 - PROSIM V+ Smart Digital Coupler
- 1x AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)
- 1x AA200.000.05 - Table-Top Stand for Training Panels with Modular Supply Panel





Practice:

- Analysis of the basic structure of Simatic S7-1500 and TP700
- Implementing programming languages in TIA Portal (LAD, FBD, and SCL)
- Designing and implementing solutions for practical applications such as: motor controls, pumping systems, conveyor belts, lift control etc.
- Study of the basic logic functions, numerical operations, and arithmetic instructions
- Integration of human machine interface in the automation process

Optional equipment:

- AA071.000.02 - HMI TP700 COMFORT TRAINING PANEL
- AA600.102.01 - PROSIM V+ 10.5-inch Tablet Display (MICROSOFT)

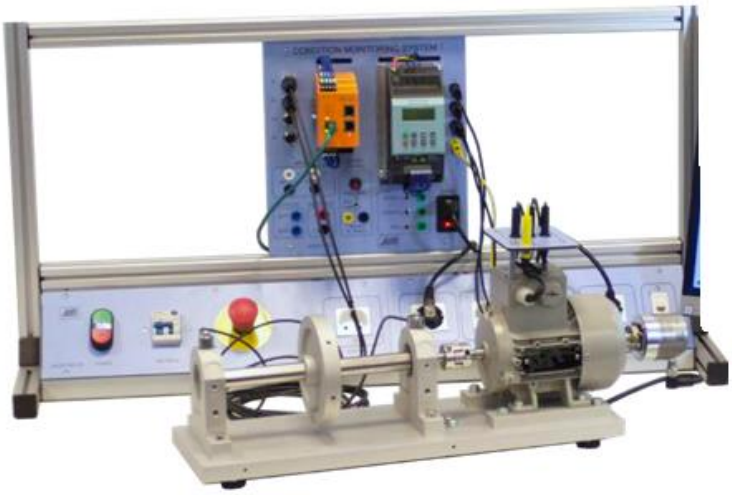
AA900.030.01/AA900.030.02 SMART VIBRATION ANALYSIS LEARNING SYSTEM

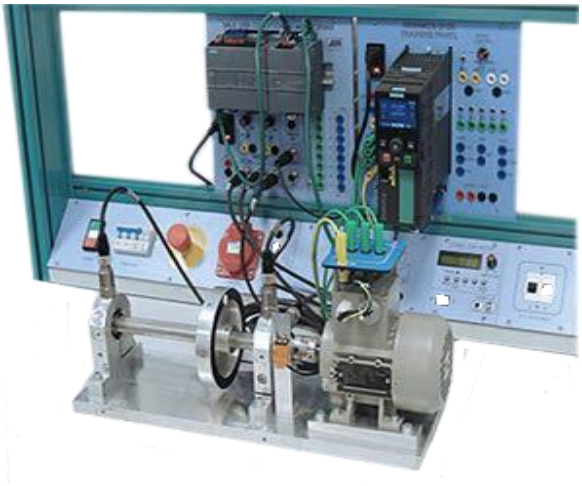
Description:

The Smart Vibration Analysis Learning System and the Advanced Smart Vibration Analysis Learning System are both powerful solutions for monitoring and protecting machines during operation. They both incorporate highly valuable didactic topics that enable the measurement of specific variables for effective monitoring and maintenance of various manufacturing processes. The Smart Vibration Analysis Learning System provides a complete solution for vibration monitoring, conditional monitoring, and machine protection/process monitoring. It includes a powerful monitoring tool that can observe up to 24 objects and share information via Profinet. Mechanical vibration is of special significance in both systems as it is one of the most important measured variables for effectively describing the state of the machine.

The structure includes (main pieces)

- One of the following:
  - 1x AA031.010.05 - VALS IFM CONDITION MONITORING
  - 1x AA031.010.04 - VALS SIEMENS CONDITION MONITORING (S7-1281)
- 1x AA200.000.05 - Table-Top Stand for Training Panels with Modular Supply Panel
- 1x AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" I5 TOUCH LENOVO





Practice:

- Characteristic values (bearing, vibration monitoring)
- Frequency-selective analysis using FFT, H-FFT
- Vibration monitoring (total vibration to ISO)
- Condition monitoring (condition-based monitoring based on vibration characteristics)
- Recording with time stamp of trend values, raw data, frequency spectra, alarm log
- Machine protection/process monitoring (monitoring vibration characteristics in real time with a fast reaction time up to 1ms)
- Recording with time stamp of trend values, raw data, frequency spectra, alarm log
- Simple localization of damage using fingerprint comparison
- Extraction of raw data for further diagnoses
- Monitoring objects within the time range (v-RMS, a-RMS, and a-Peak)

Optional equipment:

- AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)

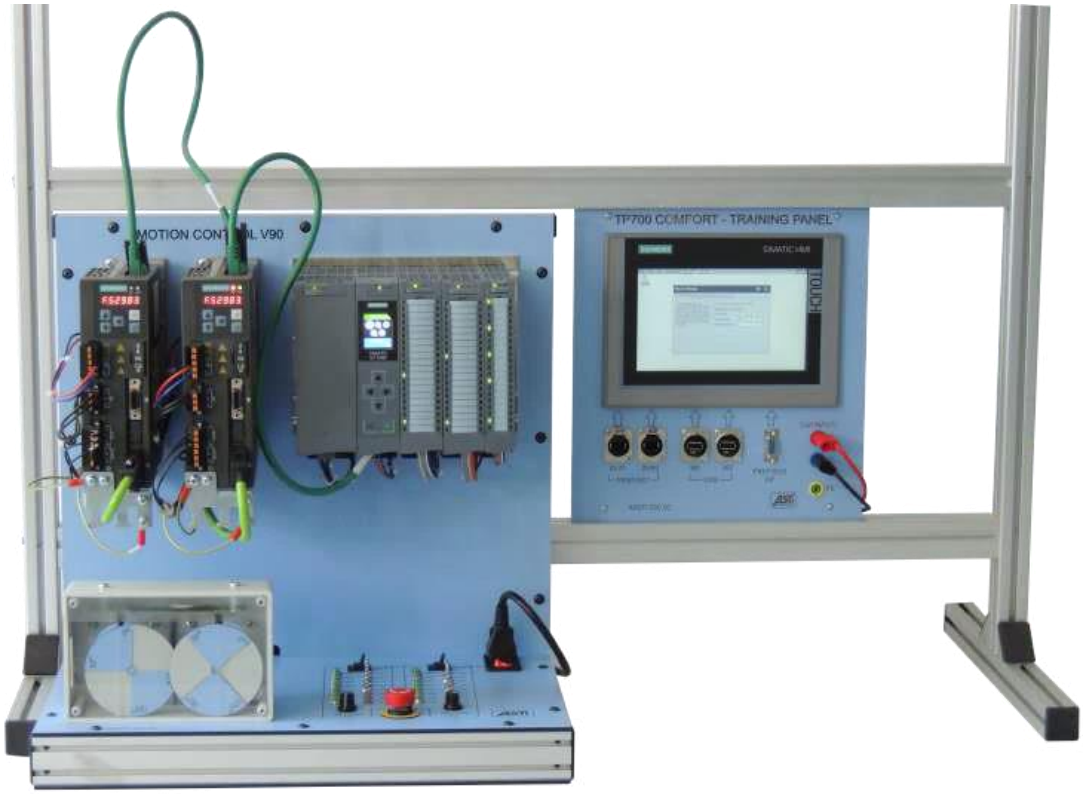
AA900.040.02 ADVANCED SMART MOTION CONTROL LEARNING SYSTEM

Description:

The Advanced Smart Motion Control Learning System (ASMCLS) covers more advanced applications such as gearing and camming. The main unit is Siemens 1500T which allows the use of specific multi-axes synchronization via Profinet network, it provides standardized motion control functions in accordance with PLCopen regarding CPU Drive data linking and configuration. Typical applications vary between simple speed control and positioning loops, to more complex such as cam tracking and gearing. The system includes two 1FL6 servomotors each linked with V90 driver. Moreover, the Demo project allows the user to make a first step in motion control.

The structure includes (main pieces):

- 1x AA045.002.01 - MOTION CONTROL SINAMICS V90 TRAINING SYSTEM
- 1x AA071.000.02 - HMI TP700 COMFORT TRAINING PANEL
- 1x AA200.000.05 - Table-Top Stand for Training Panels with Modular Supply Panel



Practice:

- Speed-controlled loops
- Rotary positioning control loops
- Synchronized axes
- Cams
- Cam tracking
- Cam disk and Gearing
- User defined kinematics

Optional equipment:

- AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)

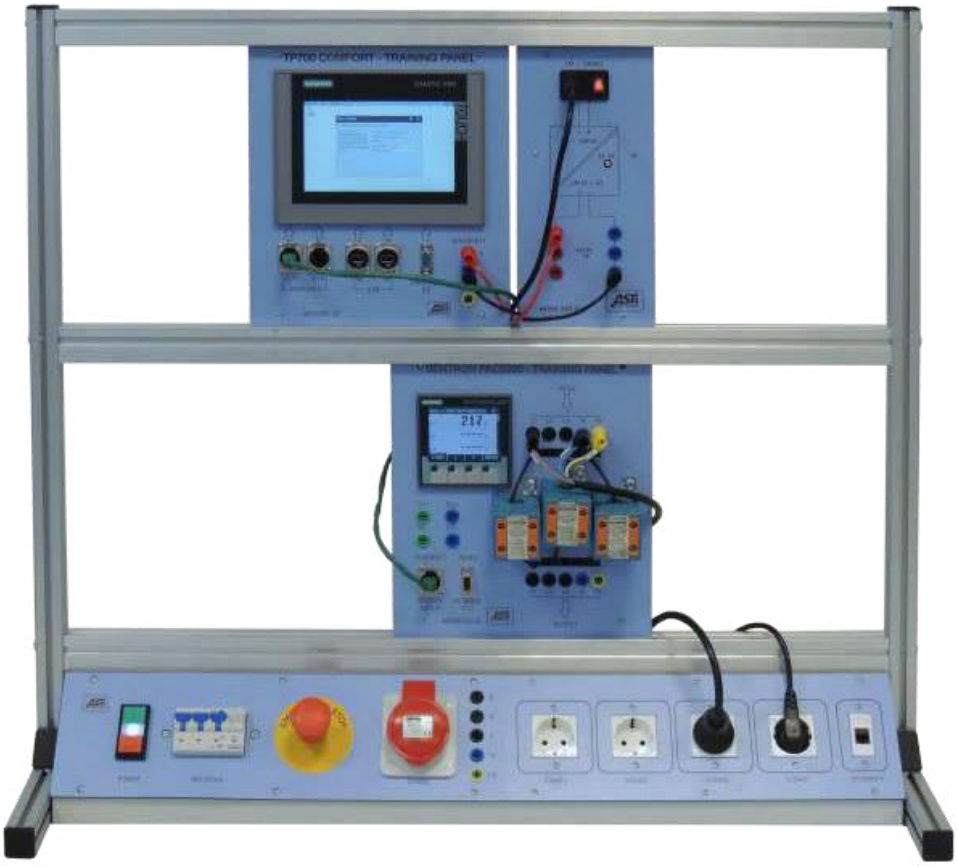
AA900.050.01 SMART ENERGY MANAGEMENT LEARNING SYSTEM

Description:

The Smart Energy Management Learning System (SEMLS) can display all the relevant system parameters in low-voltage power distribution. The main unit, Siemens Sentron PAC3220, is capable of single-phase, two-phase or three -phase measurement and can be used in two-wire, three-wire, four-wire, TN, TT and IT systems. It can be used for monitoring, diagnostics and service functions, a two-tariff active energy and reactive energy counter, a universal counter, and a working hours counter for monitoring the running time of connected loads. Relevant trends can be implemented on the TP700 graphic interface, moreover energy consumption reports can be generated for future analysis. The measured data can be shared via the Modbus TCP/IP communication protocol.

The structure includes (main pieces):

- 1x AA088.100.01 - SENTRON PAC3220 Energy Measurement Training Panel
- 1x AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)
- 1x AA055.000.01 - Power Supply
- 1x AA200.000.04 - TABLE-TOP STAND with MODULAR SUPPLY PANEL (3-PHASE) SIZE (WxH) 910x790 mm



Practice:

- Basic metering
- Electrical Parameters monitoring voltage, current, active power, reactive power, apparent power, active energy, reactive energy, apparent energy, power factor, frequency, and distortion factor
- Modbus TCP/IP Topology
- Energy reports

Optional equipment:

- AA071.000.02 - HMI TP700 COMFORT TRAINING PANEL

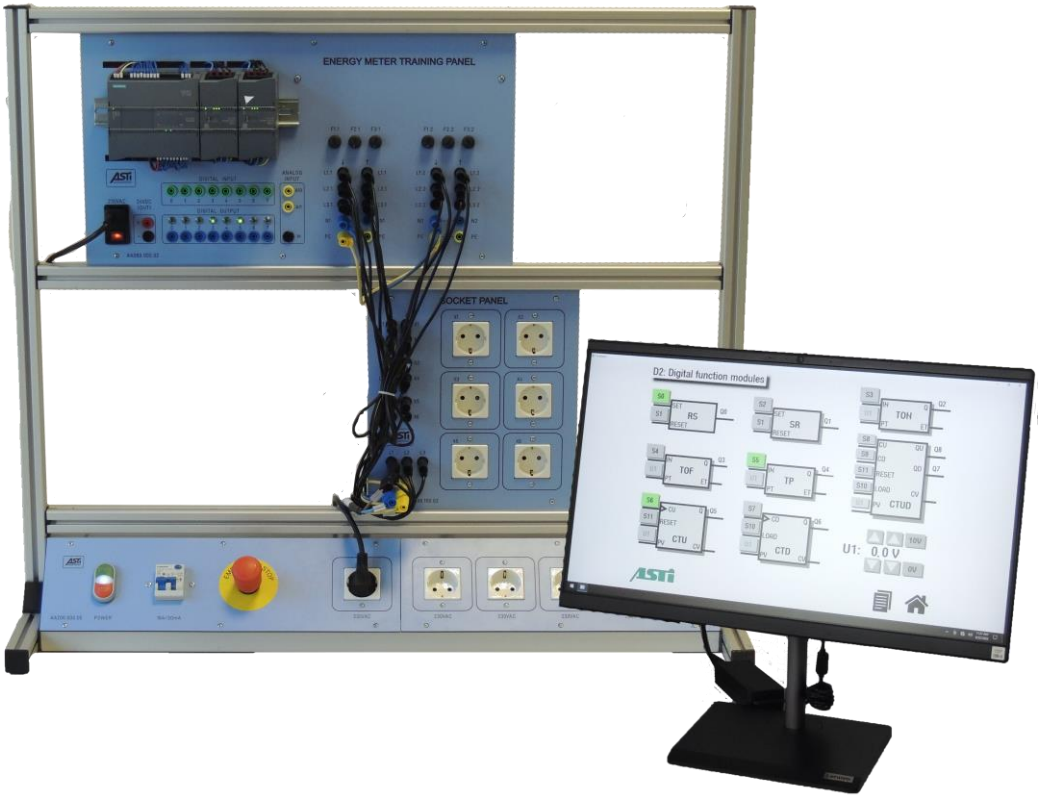
AA900.050.02 ADVANCED SMART ENERGY MANAGEMENT LEARNING SYSTEM

Description:

The Advanced Energy Management Learning System (AEMLS) is built around two modules of Siemens Simatic SM 1238 Energy Meter Module, each capable of measuring electrical variables from single-phase, two-phase, and three-phase power supply, maximum nominal voltage between two outer conductors 480 VAC (max. phase voltage 277 VAC). The system can determine energy consumption and power demand. Relevant trends can be implemented on the PC23 graphic interface, and energy consumption reports can be generated for future analysis.

The structure includes (main pieces):

- 1x AA089.001.02 - ENERGY METER Training Panel (CPU1215C, 6 channels)
- 1x AA089.100.02 - Sockets Panel
- 1x AA600.103.01 - PROSIM V+ALL IN ONE PC23.8" I5 TOUCH
- 1x AA200.000.04- Table Top Stand for training panels with Power Supply



Practice:

- Energy metering
- Energy reports
- Comparative analysis for multi-point energy metering
- Identification of power peaks
- Recording of voltages, currents, phase angles, power (electrical load-active (W), reactive (var), apparent (VA)), energy usage counter (electrical work), frequencies, minimum and maximum values, power factors, operating hours counters

Optional equipment:

- 1x AA071.001.06 - HMI TP1200 COMFORT TRAINING CASE with Flexible Support

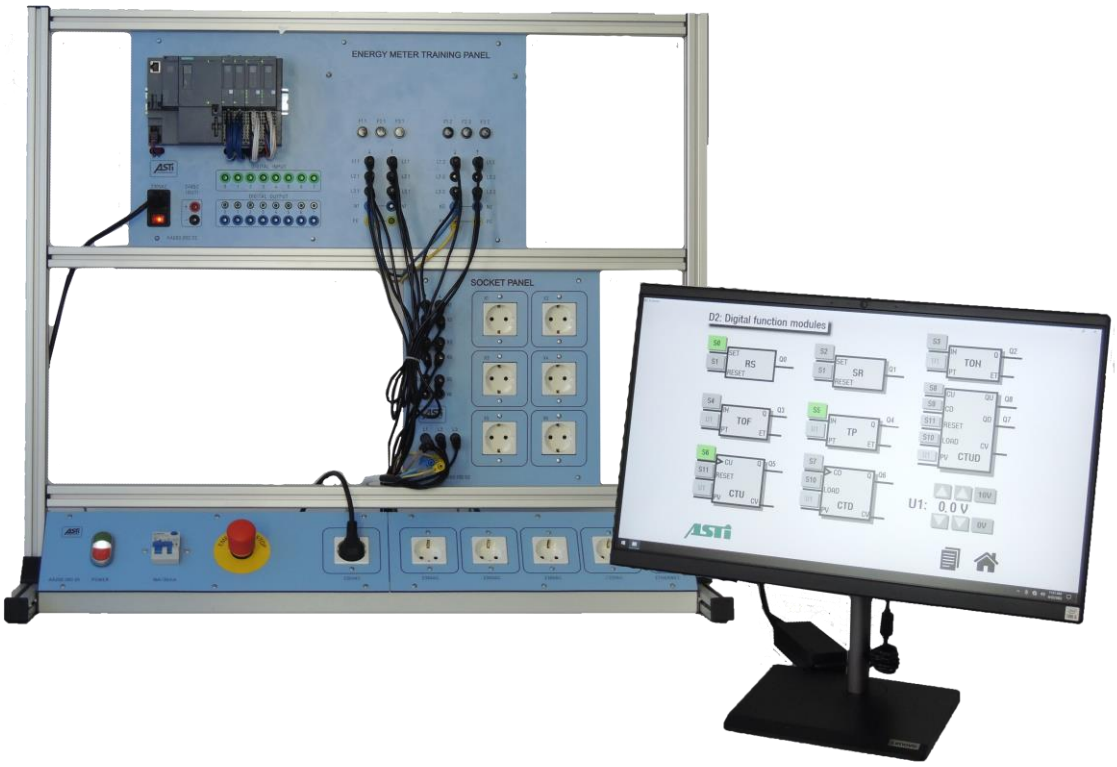
AA900.050.03 ADVANCED SMART ENERGY MANAGEMENT LEARNING SYSTEM

Description:

The Advanced Energy Management Learning System (AEMLS) is built around two modules of Siemens Simatic ET200SP (CPU 1510SP) AI ENERGY METER Module, each capable of measuring electrical variables from single-phase, two-phase, and three-phase power supply, maximum nominal voltage between two outer conductors 480 VAC (max. phase voltage 277 VAC). The system can determine energy consumption and power demand. Relevant trends can be implemented on the PC23 graphic interface, and energy consumption reports can be generated for future analysis.

The structure includes (main pieces):

- 1x AA089.002.02 - ENERGY METER PANEL (CPU 1510SP ,2x AI ENERGY METER)
- 1x AA089.100.02 - Sockets Panel
- 1x AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" I5 TOUCH
- 1x AA200.000.04- Table Top Stand for training panels with Power Supply



Practice:

- Energy metering
- Energy reports
- Comparative analysis for multi-point energy metering
- Identification of power peaks
- Recording of voltages, currents, phase angles, power (electrical load-active (W), reactive (var), apparent (VA)), energy usage counter (electrical work), frequencies, minimum and maximum values, power factors, operating hours counters

Optional equipment:

- AA071.001.06 - HMI TP1200 COMFORT TRAINING CASE with Flexible Support

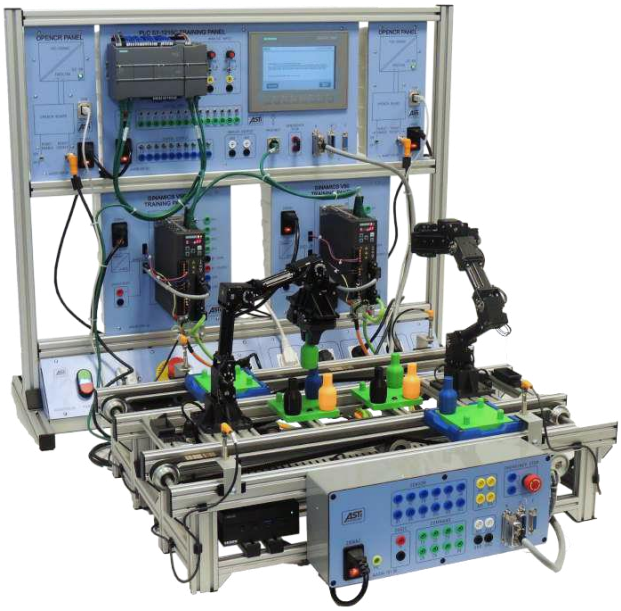
AA900.060.01 INTELLIGENT ROBOT AND MECHATRONICS RESEARCH LAB

Description:

The Intelligent Robot and Mechatronics Research Lab (IRMRL) is built around two industrial-standard conveyor units each powered by one 1FL6 servomotor. The closed-loop positioning control is assured by the new Siemens servo-drive V90. The motion synchronization is assured by the Siemens S7-1200 PLC via Profinet communication topology. Two robotic arms (with 4 DoF and electric gripper) are used to combine 3D printed sub-assemblies into one final product. Each robot is controlled by one OpenCR board, an open-source hardware/software platform, used for robot control.

The structure includes (main pieces):

- 2xAA094.101.06 - CONVEYOR TOOTHED BELT WITH SYNCHRONOUS SERVOMOTOR (V90/1FL6)
- 2xAA045.000.01 - SINAMICS V90 TRAINING PANEL (0.4 kW)
- 1xAA066.001.02 - PLC S7-1215C & HMI TRAINING PANEL (CPU 1215C, KTP700)
- 2xOpenManipulator with gripper and 4 DoF
- 2xROBOTIS OpenCR1.0 Dynamixel controller
- 1xAA200.000.05 - Table-Top Stand for Training Panels with Modular Supply Panel



Practice:

- Robot programming using an open hardware and software platform
- Compact open-source robot based on ROS
- OpenCR1.0 is developed for ROS embedded systems to provide completely open-source hardware and software.
- 3D product assembly with 2 robot arms
- Principle and function of various industrial sensors and actuators
- Making controlled movement on two conveyors and synchronization with two robot arms
- Controlling the systems using Siemens PLC-S7-1200 & KTP700 HMI
- Controlling the Servo motors of conveyors using SINAMICS V90 servo Drives
- Using 1FL6 servomotors work with conveyor belt for high precision positioning
- Positioning of a work piece carrier

Optional equipment:

- AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)

AA900.060.03 INTELLIGENT MOBILE ROBOT PLATFORM

Description:

The Intelligent Mobile Robot Platform (IMRP) is a didactic robotic system which consists of two teaching robots (Robotino 4®, Niryo Ned®) and sensors. The system can be used in current industry issues such as handling and moving objects.

The IMRP offers the possibility to create and implement different behaviors of a system which can be used in different assets. The possibility of programming in specially created software applications (Robotino View and Robotino Factory for Robotino 4® and Niryo Studio for Niryo Ned®) for the implementation of the most difficult requirements makes the IMRP a favorable environment for learning and simulation of industrial processes within the laboratory.

The structure includes (main pieces):

- 1x ROBOTINO 4.0
- 1x LASER Range Finder Hokuyo
- 2x Accumulators 18V LI-ION IN PARALLEL
- 1x Inductive sensor SIEA-M12B-UI-S
- 1x Sensor NEBU-M12G5-K-2.5-LE4
- 1x Sensor SOOE-TB-R-PNLK-T
- 1x Sensor NEBU-M8G3-K-2.5-LE3
- 1x ROBOT 6 AXIS NIRYO COBOT
- 1x Power supply 24VDC/12VDC 6A

Practice:

- Object maneuvering
- Movement control
- Obstacle avoidance logic
- Environment mapping
- Principle and function of various industrial sensors
- Transporting objects from one workstation to another

Optional equipment:

- AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)

AA900.060.04 INTELLIGENT 4 WHEELS MOBILE PLATFORM

Description:

The Intelligent 4-Wheels Mobile Platform is a robotic structure which is construction consisting of one mobile robotic platform and a programmable conveyor. The mobile platform is produced by Wheeltec and it adopts mecanum wheels which are compact in structure and flexible in movement. The platform can move forward, backward, laterally and rotate in place.

The structure includes (main pieces):

- 1x Robotic Platform
- 1x M10 LsLiDAR
- 1x ASTRA Depth Camera
- 1x STM32F103RC core board
- 1x Jetson Nano NVIDIA
- 1x Arduino Mega2560 microcontroller
- 1x MD60 100W DC Motor
- 2x VRLA 12V Battery
- 1x CONVEYOR TOOTHED BELT WITH OTT BRUSH DC SERVO DRIVE CAN

Practice:

- Object maneuvering
- Movement control
- Obstacle avoidance logic
- Environment mapping
- Principle and function of various industrial sensors
- Transporting objects from one workstation to another

Optional equipment:

- AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)

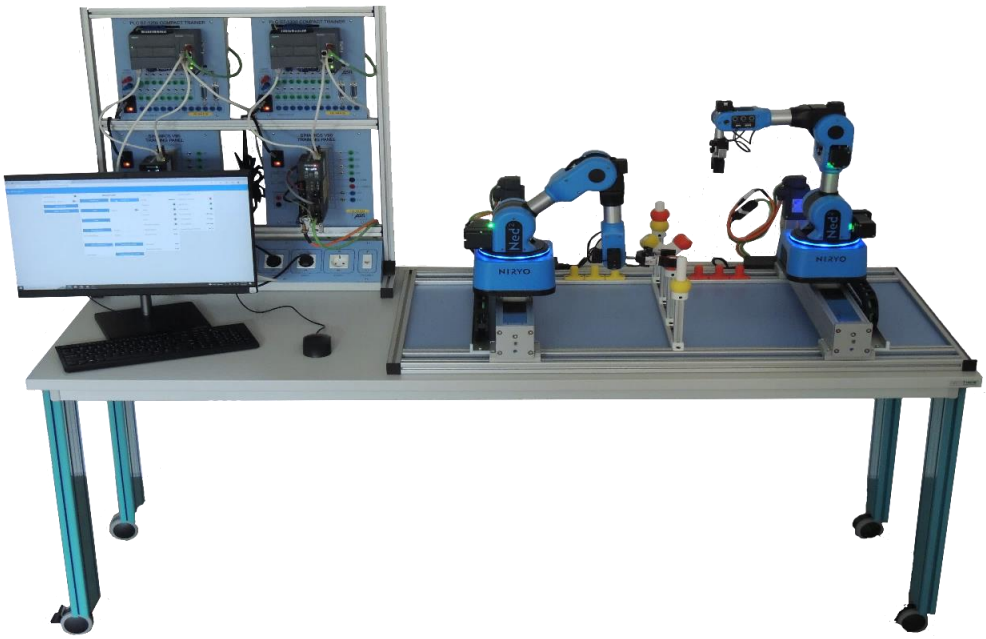
AA900.060.05 ADVANCED MECHATRONICS RESEARCH LAB

Description:

The Advanced Mechatronics Research Lab is a powerful didactic tool used both in academic and industrial courses. Through its enhanced performance and usability, the Advanced Mechatronics Research Lab is one of the best examples of productivity and innovation for device configuration and programming via the SIEMENS Totally Integrated Automation Portal (TIA Portal). The system is composed by two SIEMENS S7-1200 PLCs, two V90 drivers, two servomotors and two linear axes. The Advanced Mechatronics Research Lab is built around two industrial-standard conveyor units each powered by one 1FL6 servomotor. The closed-loop positioning control is assured by the new Siemens servo-drive V90. The motion synchronization is assured by the Siemens S7-1200 PLC via Profinet communication topology. Two robotic arms (Niryo Ned2) are used to move 3D printed objects between multiple local 3D printed storages. Each robot is controlled by one Raspberry PI 4 board used for robot control.

The structure includes (main pieces):

- 1x AA200.002.02 Workstation Mechatronics Research Lab (2000x1000x750)
- 2x AA044.000.04 - PLC S7-1215C TRAINING PANEL Compact (CPU1215C)
- 2x AA045.000.01 - SINAMICS V90 Training Panel (0.4 kW)
- 1x AA600.103.01 - PROSIM V+ALL IN ONE PC27"TOUCH (LENOVO)
- 2x Niryo NED2 6-axis Robot
- 2x SIEMENS Servomotor 1FL6034
- 2x FESTO Linear Axis ELGC-TB-KF-80-500



Practice:

- Object maneuvering
- Movement control
- Principle and function of industrial maneuvering robots
- Transporting objects from one storage to another

Optional equipment:

- AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)
- AA600.102.01 - PROSIM V+ 10.5-inch Tablet Display (MICROSOFT)

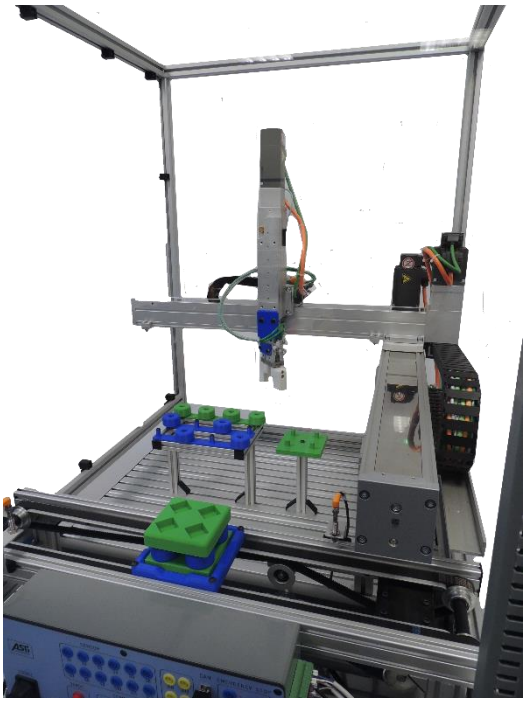
AA900.070.01 SMART 3 AXIS CARTESIAN ROBOT STATION

Description:

The SMART 3 Axis Cartesian Robot Station (SACRS) is a didactic system which consists of 3 axis system and an industrial-standard conveyor unit toothed belt controlled by a inverter Sinamics V90. The process synchronization is assured by a SIEMENS S7-1200 PLC and the HMI KTP700. The axis is fitted with a pneumatic gripper to perform a pick and place operation for assembling a final product.

The structure includes (main pieces):

- 1x Workstation MR (800 x 800 x 750) with Modular Supply Panel
- 3x AXIS FESTO (2xELGC, 1xEGSC)
- 3x Servomotors SIEMENS SIMOTICS
- 1x CAMERA IFM ELECTRONIC
- 1x AA045.002.02 SINAMICS V90 3x AXIS DRIVE PANEL (SIEMENS)
- 1x AA094.101.06 CONVEYOR TOOTHED BELT WITH SYNCHRONOUS SERVOMOTOR (V90/1FL6)
- 1x AA096.001.05 CAGE FOR TRAINING ROBOT (safety for CARTESIAN ROBOT)
- 1x AA026.001.03 HMI KTP700 TRAINING CASE with Flexible Support
- 1x AA059.000.09 AIR Compressor SUPERSILENT
- 1x AA059.000.06 Air Supply Filter Regulator



Practice:

- 3D product assembly with 3 axis cartesian system
- Controlling the Servo motors of axis system using SINAMICS V90 Servo Drive
- Controlling the process using SIMATIC S7-1200 & HMI KTP700
- Using 1FL6 servomotors with FESTO axis for high precision positioning

Optional equipment:

- AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)

AA900.070.02 ADVANCED SMART 3 AXIS CARTESIAN ROBOT STATION

Description:

The Advanced SMART 3 Axis Cartesian Robot Station (ASACRS) is a didactic system which consists of 3 axis system and an industrial small-scaled conveyor belt with 1FL6 servomotor. The ASACRS gives the opportunity to learn practical applications of closed loop speed and position control via the V90 driver. The process synchronization is assured by a SIEMENS S7-1500 PLC and the HMI KTP700. The axis is fitted with a pneumatic gripper to perform a pick and place operation for assembling a final product.

The structure includes (main pieces):

- 1x Workstation MR (800 x 800 x 750) with Modular Supply Panel
- 3x AXIS FESTO (2xELGC, 1xEGSC)
- 3x SERVOMOTORS SIEMENS SIMOTICS
- 1x CAMERA IFM ELECTRONIC
- 1x AA045.002.02 SINAMICS V90 3xAXIS DRIVE PANEL
- 1x AA049.002.01 PLC S7-1500T MOTION PANEL (CPU1511T-1 PN, 16DI, 16DO)
- 1x AA094.101.06 Conveyor Belt with SIMOTICS (1FL6 servo-V90)
- 1x AA045.000.01 SINAMICS V90 Training Panel (0.4 kW)
- 1x AA095.001.05 CAGE (safety for CARTESIAN ROBOT)
- 1x AA026.001.03 HMI KTP700 TRAINING CASE with Flexible Support
- 1x AA059.000.09 AIR Compressor SUPERSILENT
- 1x AA059.000.06 Air Supply Filter Regulator

Practice:

- 3D product assembly with 3 axis cartesian system
- Using the SIMATICS V90 Servo Drive for controlling the Servo motors of the conveyor
- Controlling the Servo motors of axis system using SINAMICS V90 Servo Drive
- Controlling the process using SIMATIC S7-1500T & HMI KTP700
- Using 1FL6 servomotors work FESTO axis for high precision positioning

Optional equipment:

- AA600.103.01 - PROSIM V+ ALL IN ONE PC 23.8" i7 (LENOVO)

TRAINING COURSES - SKILLS TRAINING FOR INDUSTRY

The courses are presented in a helpful and informative way, making frequent reference to typical electrical design problems, and offering practical solutions. The courses employ large numbers of practical activities where candidates are given the opportunity to 'learn by doing'. The use of real industrial components in practical exercises ensures that the experiences are realistic and relevant.

AA-STC100: SENSORS AND TRANSDUCERS IN CONTROL ENGINEERING
Identify and understand the purpose of typical sensors and transducer types: inductive, capacitive, optic. Sensor topology: IO-Link, AS-I, RFID and develop an automation solution.

AA-CLC200: CLOSED-LOOP CONTROL IN PROCESS ENGINEERING
Components of closed loop / open loop control system, cascade control loop functionality and cascade control advantages for a single element. Principles, characteristics of a P, PI, PD and PID control and control loop monitoring.

AA-SIM300: SIMATIC S7 PRACTICAL COURSE - BASIC LEVEL
Set up and commission a SIMATIC S7-300 / S7-1200 / S7-1500 PLC, create and change a hardware configuration. Know the basic instruction set. Create a program with different modules. Identify and eliminate errors using diagnostic tools.

AA-SIM310: SIMATIC S7 PRACTICAL COURSE - ADVANCED LEVEL
Implement applications with analog values, use analog output, connect analog input / output components correctly. Use algorithms (PID bidirectional) for control level, flow. Adjust the parameters of the PID algorithm. Test the control systems.

AA-TWI400: BECKHOFF TwinCat 2 PRACTICAL & PROGRAMMING COURSE
Structure and functions of BECKHOFF PLCs, automation structures buses (E-Bus, K-Bus), EtherCAT communication protocol, functions of TwinCAT 2 programming, faults simulations and maintenance work with Beckhoff equipment.

AA-TWI410: Beckhoff TwinCAT 3 PRACTICAL & PROGRAMMING COURSE
Structure and functions of BECKHOFF PLCs, automation structures and communication buses (E-Bus, K-Bus), EtherCAT communication protocol, functions of TwinCAT 3 programming environment, graphical interfaces, and faults simulations.

AA-INC500: INDUSTRIAL NETWORK COMMUNICATION COURSE
Communication architectures; practical applications for design, configuration, and use of systems with communication skills PROFINET, PROFIBUS, Modbus TCP/RTU, AS-Interface, IO-Link; commissioning, testing and error detection.

AA-SCA600: INDUSTRIAL PROCESS MONITORING - SCADA software
Implement applications for acquisition and conditioning of process variables, control loops for level, debit, and pressure; Implement screens with control elements, graphs, alerting and alarms, commissioning and testing of the SCADA system.

AA-IDC700: AC INVERTER DRIVEs COURSE - BASIC LEVEL
Design scheme for frequency converter installations; Understand the structure, principles of operation and installation of a frequency converter; Parameterize, program a frequency converter; Processes that require the use of frequency converters.

AA-LMC710: Linear Motion Control Course
Understand, describe, and analyze a closed loop control for motion control; Parametrize and configure a servo drive with FCT. Develop and commission a motion control application with PLC; Operate motion control driver (backup, restore, diagnostic).

AA-AMC720: ADVANCED MOTION CONTROL COURSE
Parametrize and configure a servo drive with TIA Portal; Implement a camming application; Implement a gearing application; Use TIA Portal as a maintenance tool for the camming/gearing applications.

AA-ROB800: MODULAR ROBOT CELL - PROGRAMMING & COMMISSIONING - basic level
Establish communication between the robot and its external controller; Communication between the robot controller and a SIEMENS PLC / Sinamics driver; Understanding pick and place applications using ABB robot and Siemens PLC.

AA-ROB810: MODULAR ROBOT CELL - programming & commissioning - advanced level
Implementing pick and place applications using ABB robot and Siemens PLC; Implementing assembly applications using ABB robot and Siemens PLC; Implementing transability applications using ABB robot, Siemens PLC, and RFID system.

AA-IDM900: INDUSTRIAL DATA MINING
Focus on a systematic approach and techniques for managing large data sets, building, and improving predictive models for solving practical issues. This leads to defining and answering key engineering and management questions by having control over the tuning aspects and design decisions behind high level machine learning tools and frameworks.

AA-STC100: SENSORS AND TRANSDUCERS IN CONTROL ENGINEERING

Description:

The quality of an automation solution is strongly influenced by the quality of the measurement of the process parameters. This course provides basic knowledge about structured and effective principles and notions regarding sensors and transducers as well as their use in industrial processes. Parametrization, measurement, and monitoring applications will be carried out through structures involving sensors and transducers. As a necessity in the current automation environment, the field communication layer will be included in relation to the industrial sensors. Protocols such as IOLink and AS-I and Profinet will be used in the practical exercises.

Content:

- Sensors and transducers – introduction
- Inductive sensors
- Capacitive sensors
- Optic sensors
- Data acquisition
- Communication protocols - introduction
- IO-Link – general characteristics and configuration
- AS-I – general characteristics and configuration
- Profinet – general characteristics and configuration
- RFID – general characteristics and configuration
- Practical exercises with conveyor system
- Operate and maintenance procedures

Objectives:

At the end of this seminar, the trainees will be able to:

- Identify and understand the purpose of typical sensors and transducer types: inductive, capacitive, optic
- Configure an IO-Link sensor topology
- Configure an AS-i sensor topology
- Operate systems with different types of sensors and communication topologies
- Develop an automation solution

Target group*: Electricians and engineers

Duration: 3 days

AA-CLC200: CLOSED-LOOP CONTROL IN PROCESS ENGINEERING

Description:

Controlling a process involves ensuring all the means and methods necessary for its evolution, closed loop, and open loop control being essential to provide the requirements of economic efficiency, quality, and safe operation. This course provides knowledge related to structured and efficient automation engineering concepts.

Content:

- Components of closed loop / open loop control system, including static and dynamic features
- Requirements for Open and Closed Loop Control, Stability, Adjustment and Control Methods
- Cascade control loop functionality and cascade control advantages for a single element
- Principles, characteristics of a P, PI, PD and PID control
- Control loop monitoring
- Security and operation of control loop systems

Objectives:

At the end of this seminar, the trainees will be able to:

- Command a closed loop / open loop control system
- Initiate and modify closed loop / open loop control systems
- Identify the components of a closed loop / open loop control
- Read a circuit diagram
- Connect components according to a circuit diagram
- Operate, describe, identify, and analyze a closed loop /open loop control system
- Know the basics of closed loop / open loop control

Target group*: Electricians and engineers

Duration: 3 days

(*): Enrollment and participation in this course require basic knowledge in the field

AA-SIM300: SIMATIC S7 PRACTICAL COURSE - BASIC LEVEL

Description:

In this course, you will learn the structure and operation of a SIMATIC S7 PLC. A key element of the course is the use of an industrial process simulator to exemplify and solve some exercises that highlight the main functions commonly used in PLC (logic functions, counters, timers, comparators, etc.). The proposed scenarios are based on applications such as electric motors control, pumping system, traffic lights and conveyor belts.

Content:

- The basic structure of a SIMATIC S7-300 / S7-1200
- Presentation of programming languages LAD, FBD and SCL in TIA Portal
- Global variable categories, data types and addressing modes
- Elementary logic instruction set
- Numerical instructions: timing, counting
- Arithmetic instructions
- Designing and implementing solutions to solve practical applications: electric motors control, pumping system, traffic lights and conveyor belts

Objectives:

At the end of this seminar, the trainees will be able to:

- Set up and commission a SIMATIC S7-300 / S7-1200 PLC
- Understand, create, and change a hardware configuration
- Know the basic instruction set
- Create and use a program for the SIMATIC S7-300 /S7-1200 PLC
- Combine different program modules
- Identify and eliminate errors using diagnostic tools

Target group*: Electricians and engineers

Duration: 4 days

AA-SIM310: SIMATIC S7 PRACTICAL COURSE - ADVANCED LEVEL

Description:

In this course, you will learn to use the Simatic S7 PLCs instruction set to process analog values and the PID control algorithm so you can achieve a closed-loop control system. A key element of the course is the use of equipment (ASTANK 2) introducing process engineering and closed-loop control. In this course, special attention is placed on the topics of complex hardware and software diagnostic functions, on the integrated PID controller technology functions and drive functions. There will be applications for measuring and controlling process parameters (flow, level, pressure) in open or closed loop, using classical control algorithms.

Content:

- Processing of analog values
- Analog-numeric or numeric-analog conversion
- Standardization of analog input signals
- Upper and lower limits of analog values
- Differences between local variables and global variables
- 16/32-bit conversions
- Voltage/Current Input / Output Signals
- Analog sensors/analog actuators
- Open-loop control and closed-loop control, bi-positional control
- PID control algorithm with flow and level control applications

Objectives:

At the end of this seminar, the trainees will be able to:

- Implement applications that involve the processing of analog values
- Integrate analog elements into a PLC program
- Use analog output values, connect analog input / output components correctly
- Implement bidirectional or PID bidirectional (level, flow, flow) control structures
- Adjust the parameters of the PID algorithm
- Run and test the control systems

Target group*: Electricians and engineers

Duration: 4 days

(*): Enrollment and participation in this course require basic knowledge in the field

AA-TWI400: BECKHOFF TWINCAT 2 PRACTICAL & PROGRAMMING COURSE

Description:

In terms of professional training, both in the design of new automation solutions as well as in the process of maintenance and improvement, it is necessary to master certain notions about programmable logic controllers. In the case of Beckhoff, the automation elements present certain properties that once known, lead to efficient exploitation of the automation components. The trainee will be familiar with the programming languages specified in IEC61131-3 as well as the parameterization, monitoring and programming software.

Content:

- Structure and functions of a programmable logic controllers
- Overview of IEC 61131-3 standard and programming languages: IL, ST, LAD, FBD, SFC, CFC
- Automation structures and communication buses (E-Bus, K- Bus)
- EtherCAT communication protocol
- Functions of TwinCAT 2 programming environment
- Graphical interfaces
- Faults simulations and maintenance work with Beckhoff equipment
- The last day can be reserved for the presentation of the TwinCAT 3 programming environment

Objectives:

At the end of this seminar, the trainees will be able to:

- Identify Beckhoff equipment
- Use and combine different programming languages for automation solutions
- To program IEC 61131-3 compatible equipment
- Use different types of variables (local/global)
- Use simulation, test and troubleshooting tools
- Provide visualization interfaces for maintenance
- Identify and isolate communication problems
- Identify the operating state of coupled elements in an EtherCAT topology

Target group*: Electricians and engineers

Duration: 4 days

AA-TWI410: BECKHOFF TWINCAT 3 PRACTICAL & PROGRAMMING COURSE

Description:

Considering the current situation in industrial automation we can distinguish a tendency to improve the flexibility and adaptability of technological processes. In this context, TwinCAT 3 comes as a natural development of the real-time control software TwinCAT 2. The "only one software for programming and configuration" brings many advantages and new features to PC- based control technology. This course can be considered a starting point in career development in industrial automation.

Content:

- Structure and functions of PLCs
- Overview of IEC 61131-3 standard and programming languages: IL, ST, LAD, FBD, SFC, CFC
- Automation structures and communication buses (E-Bus, K-Bus)
- TwinCAT 2 – TwinCAT 3 comparison: advantages and new functionalities
- EtherCAT communication protocol
- Functions of TwinCAT 3 programming environment
- Faults simulations and maintenance work with Beckhoff equipment

Objectives:

At the end of this seminar, the trainees will be able to:

- Identify Beckhoff equipment
- Use and combine different programming languages for automation solutions
- To program IEC 61131-3 compatible equipment
- Use simulation, test and troubleshooting tools
- Provide visualization interfaces for maintenance
- Identify the operating state of coupled elements in an EtherCAT topology
- Use different types of variables (local/global)

Target group*: Electricians and engineers

Duration: 4 days

(*): Enrollment and participation in this course require basic knowledge in the field

AA-INC500: INDUSTRIAL NETWORK COMMUNICATION COURSE

Description:

Currently, industrial communication networks are an indispensable component of automation systems. This course aims at presenting the usual communication networks, both through the presentation of theoretical knowledge and especially through practical examples. There are various practical exercises that most often involve the interconnection of devices with multiple communication abilities so that the main features and particularities of the usual industrial communication networks are highlighted.

Content:

- Serial and parallel communications
- Network topologies
- Presentation of industrial communication networks
- Features of various industrial communications systems
- Differences between centralized and decentralized driving systems Communication architectures
- Practical applications for design, configuration, and
- implementation of systems with communication skills PROFINET, PROFIBUS, Modbus TCP/RTU, AS-Interface and IO-Link
- Commissioning, system testing and error detection

Objectives:

At the end of this seminar, the trainees will be able to:

- Design an industrial communication network
- Choose appropriate industrial communication network
- Make a distinction between common industrial communication systems
- Use different communication systems in practical applications

  Identify and eliminate errors using diagnostic tools

Target group*: Electricians and engineers

Duration: 4 days

AA-SCA600: INDUSTRIAL PROCESS MONITORING - SCADA SOFTWARE

Description:

In this course, you will learn to achieve a control system using SIMATIC S7 PLCs and visual interfaces to provide automatic control of process parameters and a detailed view of the plant. This course gives you the general basics of SCADA operating and monitoring based on Simatic WinCC. Also, the trainees will learn about creating projects, configuring display images, parameterizing messages, graphic alarm display and alarm logging, curve display, tag logging, all by doing practical exercises in hands-on modules.

Content:

- Acquisition and conditioning of process variables
- Implementing supervisory screens (TIA Portal WinCC)
- The set of available instruments for visualization and control
- Define alarms, usage of evolution graphs
- Study of static and dynamic characteristics of transducers and actuators
- Analytic modeling and experimental identification of industrial processes (level, flow)
- Open and closed loop control

  Classic PID control algorithms, cascade control loops

Objectives:

At the end of this seminar, the trainees will be able to:

- Implement applications for acquisition and conditioning of process variables
- Implement control loops for level, debit, and pressure
- Adjust the parameters of control algorithms through various methods
- Implement SCADA screens with control elements, graphs, alerting and alarms
- Commissioning and testing of the SCADA system

Target group*: Electricians and engineers

Duration: 4 days

(*): Enrollment and participation in this course require basic knowledge in the field

AA-IDC700: AC INVERTER DRIVE COURSE - BASIC LEVEL

Description:

The need for speed control according to various parameters in the industrial process via frequency converters is essential in modern automation applications. This course will provide the knowledge to learn structured and efficient principles and notions about the applicability, utility, choice, and configuration of frequency converters according to the technological process characteristics. Parametrization, measurement, and monitoring applications will be carried out through structures involving frequency converters.

Content:

- Symbols and electrical schemes for frequency inverter installations
- Basic structure of a frequency converter (power electronics, control electronics)
- The design, operation, and installation of a frequency converter
- User interface – parametrization and configuration
- Programming the hardware and software functions of the frequency converters
- Industrial communication protocols (PROFINET)
- Techniques for optimizing industrial processes by using frequency
- Design and implementation of practical applications: motor control, starting of star-delta, acceleration, and deceleration control

Objectives:

At the end of this seminar, the trainees will be able to:

- Design an electrical scheme for frequency converter installations
- Interpret the characteristics of a frequency converter in accordance with the requirements of an application
- Use the frequency converter interface
- Parameterize and program a frequency converter
- For an overview of the industrial processes that require the use of frequency converters
- Understand the structure, principles of operation and installation of a frequency converter

Target group*: Electricians, engineers, and system operators

Duration: 3 days

AA-LMC710: LINEAR MOTION CONTROL COURSE

Description:

This training course includes basic concepts and practical application for linear motion control. The trainee will learn about stepper and servo motors, encoders, linear actuators, drives and Profinet or Profibus communication. Moreover, the practical applications will include PLC programming in TIA Portal or Step7 for drive control. The theoretical Apart will include notions about close loop control for speed and position.

Content:

- Motion control elements – short theoretical presentation (servo,
- stepper, encoder, motion profile, drive)
- Drives configuration and parametrization considering different motor types and mechanical solutions in Festo Configuration Tool (FCT)
- Motion profiles
- Step7/TIA Portal programming
- Profinet/ Profibus for PLC – motion drive connection
- LD programming language
- Elementary logic instruction set; Operation and maintenance

Objectives:

At the end of this seminar, the trainees will be able to:

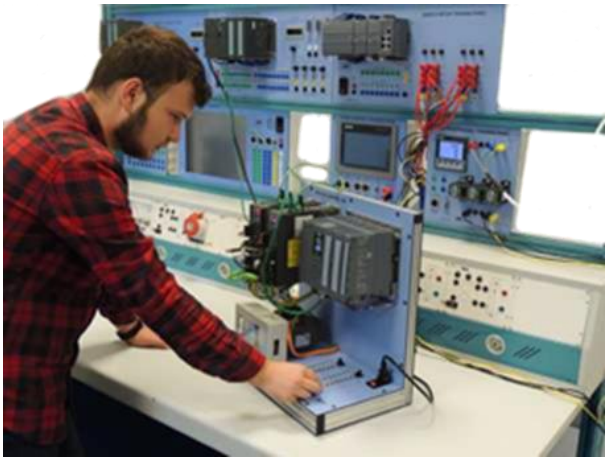
- Understand, describe, and analyze a closed loop control for motion control
- Parametrize and configure a servo drive with FCT
- Configure Profinet communication between a motion drive and a PLC
- Develop and commission a motion control application with PLC
- Operate and maintain a motion control driver (backup, restore, diagnostic)

Target group*: Electricians, mechanics, and engineers

Duration: 3 days

(*): Enrollment and participation in this course require basic knowledge in the field

AA-AMC720: ADVANCED MOTION CONTROL COURSE



Description:

To ensure the flexibility and versatility of the production lines, the motion control solutions present an increasing interest in the current industrial environment. Functionalities such as speed control, positioning, cam disc, cam/cam track, gearing can be easily integrated using servo drive such as V90 and technology control process unit. The course proposes multiple motion control scenarios using real industrial equipment. The trainee will focus on parametrization and programming to control 2 servomotors.

The exercises will provide the hardware background for operation and maintenance work.

Content:

- Identify the needed hardware for motion control solutions
- Overview of technology logic controller capabilities
- First steps in TIA Portal for parametrization and programming
- Overview of Profinet
- LD and SCL programming language
- Elementary logic instruction set
- Camming
- Gearing
- Operation and maintenance

Objectives:

At the end of this seminar, the trainees will be able to:

- Understand, describe, and analyze a closed loop control
- Parametrize and configure a servo drive with TIA Portal
- Configure Profinet communication between a servo-drive and a technology controller
- Implement a camming application
- Implement a gearing application
- Use TIA Portal as a maintenance tool for the camming/gearing applications

Target group*: Electricians, mechanics, and engineers

Duration: 3 days

(*): Enrollment and participation in this course require basic knowledge in the field

AA-ROB800: MODULAR ROBOT CELL – PROGRAMMING & COMMISSIONING - BASIC LEVEL

Description:

As a result of the exponential evolution of robotics over the last decade, this technology has become essential in modern manufacturing processes, offering added safety, repeatability, precision, and quality. This course provides an overview of robot-based technological processes through a systematic approach of the basic concepts of industrial robot programming within manufacturing structures. The current concepts related to robot programming will be outlined and exemplified with real industry applications. This theoretical introduction will be followed by practical applications for the configuration: ABB IRB 120 programming using the operator panel, Siemens Simatic S7 programming via TIA Portal framework, RFID configuration, Profinet communication, vision camera, Sinamics drive configuration and multiple industrial sensors and transducers.

Content:

- Introduction in integrated robot cells: automation structures, sensors, communication buses, drives and PLCs
- Overview of RAPID programming for ABB robots
- Overview of Siemens TIA Portal programming
- Elementary logic instruction set for robot programming
- Teaching, saving and adjusting robot targets
- Understand and modify robot movements between working positions
- Understanding the programming cycle with blocking and nonblocking instructions
- Presentation of programming languages LAD and SCL under TIA Portal
- Visualization with WinCC Basic
- Parametrization and commissioning for industrial conveyor with Sinamics drive
- Vision camera (3D sensors)
- Linking multiple industrial equipment via Profinet
- Pick and place applications with industrial robot

Objectives:

At the end of this seminar, the trainees will be able to:

- Use and combine different hardware and software applications to deliver professional and quick solutions
- Establish communication between the robot and its external controller
- Effectuate the communication between the robot controller and a SIEMENS PLC, respectively a SIEMENS Sinamics driver
- Understanding pick and place applications using ABB robot and Siemens PLC
- Gain some insight into industrial processes that use robots

Target group*: Electricians and engineers with some basic application knowledge

Duration: 4 days

(*): Enrollment and participation in this course require some basic knowledge in the field of industrial automation

AA-ROB810: MODULAR ROBOT CELL – PROGRAMMING & COMMISSIONING - ADVANCED LEVEL

Description:

As a result of the exponential evolution of robotics over the last decade, this technology has become essential in modern manufacturing processes, offering added safety, repeatability, precision, and quality. This course provides an overview of robot-based technological processes through a systematic approach of the basic concepts of industrial robot programming within manufacturing structures. The current concepts related to robot programming will be outlined and exemplified with real industry applications. This theoretical introduction will be followed by practical applications for the configuration: ABB IRB 120 programming using the operator panel, Siemens Simatic S7 programming via TIA Portal framework, RFID configuration, Profinet communication, vision camera, Sinamics drive configuration and multiple industrial sensors and transducers.

Content:

- Introduction in integrated robot cells: automation structures, sensors, communication buses, drives, PLCs, RFID and HMI
- Overview of RAPID programming for ABB robots, Siemens TIA Portal programming for PLCs and HMIs
- Teaching, saving, and adjusting robot targets
- Implement and modify robot movements between working positions
- Parametrization and commissioning for industrial conveyor with Sinamics drive
- Vision camera (3D sensors)
- Deployment of Profinet industrial network
- Pick and place exercises with industrial robots
- Product assembly exercises using industrial robots and multiple automation equipment
- RFID exercises for product traceability

Objectives:

At the end of this seminar, the trainees will be able to:

- Use and combine different hardware and software applications to deliver professional and quick solutions
- Establish communication between the robot and its external controller
- Effectuate the communication between the robot controller and a SIEMENS PLC, respectively a SIEMENS Sinamics driver
- Implementing pick and place applications using ABB robot and Siemens PLC
- Implementing assembly applications using ABB robot and Siemens PLC
- Implementing traceability applications using ABB robot, Siemens PLC and RFID system
- Gain some insight into industrial processes that use robots

Target group*: Electricians and engineers with application experience

Duration: 4 days

(*): Enrollment and participation in this course require some basic knowledge in the field of industrial automation

AA-IDM900: INDUSTRIAL DATA MINING

Description:

With the advent of the connected factory, in the Industry 4.0 paradigm, effective management and knowledge extraction from field-level data is becoming a critical challenge. The course focuses on a systematic approach and techniques for managing large data sets, building, and improving predictive models for solving practical issues. This leads to defining and answering key engineering and management questions by having control over the tuning aspects and design decisions behind high level machine learning tools and frameworks. Core topics include data mining methodology, data handling and structuring, modelling techniques for regression and classification, model selection, validation, and operationalization. Hands-on sessions and implementation of data mining pipelines, using specific tools e.g., RapidMiner, bring considerable productivity enhancements. These include relevant practical examples for predictive maintenance of equipment and enhancement of production line performance in industrial manufacturing environments.

Content:

- CRISP-DM data mining methodology
- Preparation of heterogenous data sets for data mining algorithms
- Classification of data mining tasks: supervised and unsupervised learning, regression and classification methods
- Evaluation of model accuracy, the bias-variance trade-off
- Hands-on sessions – Introduction to RapidMiner o Data ETL
- Linear regression techniques
- Classification by means of k-NN algorithm
- Decision trees
- Practical example: predictive maintenance based on equipment failure models
- Practical example: production line performance improvement

Objectives:

At the end of this seminar, the trainees will be able to:

- Structured approach to handling large data sets from various sources (raw data, machine logs, aggregated reports etc.)
- Solve specific maintenance and production problems and improve performance by applying data science processes
- Correctly select the appropriate modeling technique based on available data and domain knowledge
- Evaluation and implementation of the developed models in the daily workflow
- Essential visualization, reporting and presentation skills of the results of the data analysis
- Basic introduction to RapidMiner Studio for advanced analytics and data science workflows

Target group: Data scientists, Maintenance and Quality Engineers, IT Staff

Prerequisites: Technical or quantitative background, basic skills for handling structured data e.g., Excel

Duration: 3 days

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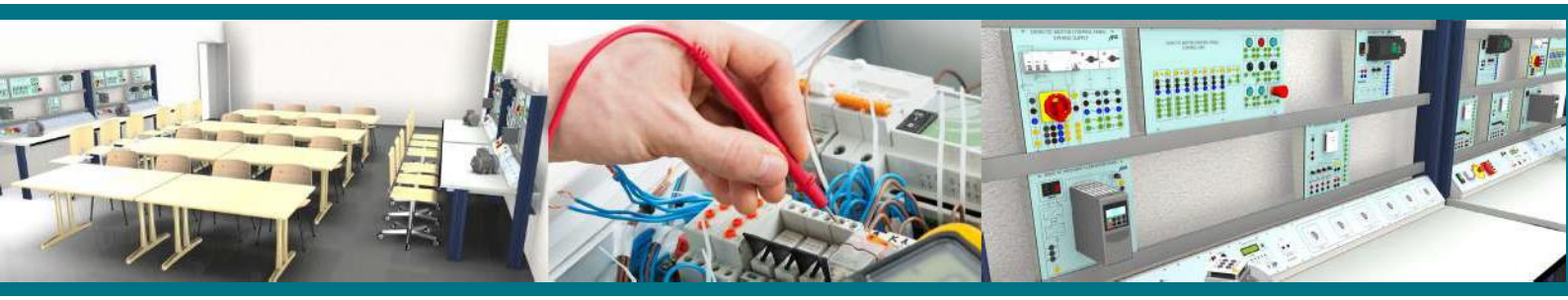

ASTI Automation S.R.L.
139 Calea Plevnei
060011 Bucharest
Romania
Tel: +40 722 291 815
Email:
office@astiautomation.com
www.astiautomation.com