INDUSTRIAL PLC TRAINER / SCADA /DCS TRAINER

(Model - I : TMS-PLC, Model - II : TMS-EduPLC-II) *(Family of training systems)*

SALIENT FEATURES

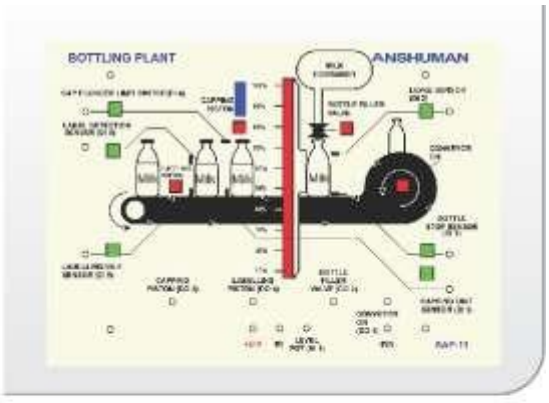
- **Two models :**
- Rack based table top model :Using Aluminum profile rack of 4 x 2 matrix.
- Table Top Model: Electronic desk with ergonically designed ABS Moulded enclosure with slick looking replaceable experiment panel in central slot.
- Can learn about different aspects of application trainers like Industrial PLC, SCADA, DCS etc. using simulated building blocks / replaceable static application panels (SAPs), Optionalal S/Ws.
- Analog I/O channel (Optional) with potentiometer for AI simulation
- Connection through sturdy 4mm Banana sockets & Patch cords
- Students workbook & Instructor's Guide provided with each unit
- Optional 4 mechanical setups like 4 floor Elevator, conveyor belt, Rotary transfer unit, water level control etc.

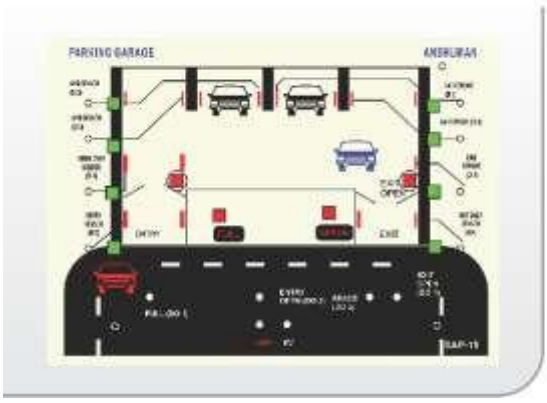
Technical Specifications

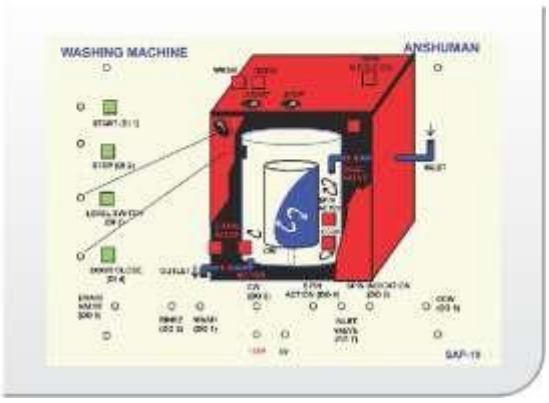
Model	TMS-PLC-II	TMS-EDU-PLC II
Make	Siemens	
CPU (DIO)	Model I :S7-1200- CPU1214C (Default) Model II :S7-300- CPU 313C	Model S7-200- CR40 (default), ST60 (Transistorized O/P) for Lift Elevator.
DIO	14 DI + 10 DO (8DI + 8DO or 16DI + 16DO Optional for lift)	24DI + 16DO
	Digital inputs 24 V DC (current sinking)	
	Digital outputs: either 24VDC transistorized or relay@ 0.1A.	Digital Output: Relay, dry contact Sourcing type (default)
AIO (optional)	2AI (built in) + 1AO (Optional)	4AI + 2AO
	Input range- 0 to +10V, Resolution- 10 bit	Input range- +10V, , Resolution- 10 bit
Software	Simatic - STEP 7 Basic programming package TIA-V15	STEP 7-MicroWIN SMART supports Ladder/Function Blocks Diagram Programming & monitoring troubleshooting & instruction set, Simulation Software.
Com Ports	Ethernet Port(RJ45) for Ladder Programing, Rs485 (Optional) for HMI if ordered	
Converter cum Distribution Panel/CDP	Converts screw driver terminal strip of PLC into 4mm sockets total 54 nos.	Converts screw driver terminal strip of PLC into 4mm sockets total 16 nos.
	Maximum 24 for Digital Inputs, 16 for Digital Outputs, 2 for Analog I/O & 16 for +24V Supply & GND. Facilitates easy replacement /maintenance / wiring.	Provided for Input on AIO panel located on top board *Note: CDP is not supplied for Model ST60 with 2 AIO modules.
Simulation cum Extension Panel (SEP/DI)	8 No. of Digital Input. (4 toggle switches + 4 push buttons) No. of 4mm banana sockets =20	Located on left side panel, Consisting of 16 Nos. of Digital Inputs. (8 Slider switches + 8 push to ON switches, No. of 4mm banana sockets =16
Simulation cum Extension Panel (SEP/DO)	Combined 8 Led indicator +Relay Panel / Relay 24V and contact rating of 230VAC / 1A (Resistive). No. of 4mm banana sockets =44.	Located on right side panel, 16 Nos. of Output LED Indicators, 4 Nos. of Relay Panel with coil rating 24V and contact rating of 230VAC / 5A, No. of 4mm banana sockets =20. Shrouded sockets for relay contact =4 Nos.

Model	TMS-PLC	TMS-EDU-PLC II
Simulation cum Extension Panel (SEP /AIO)	6 No. of Potentiometer to simulate inputs to AI. 2 No. of Analog outputs terminated on banana sockets. No. of 4mm banana sockets =16	Located on Top board, 4 nos. of simulation pots & 4 nos. of AI, 2 nos. of analog outputs, Led bar graph of 10 leds for AO simulation, settable range 5V/10V. No. of 4mm banana sockets =19
Operating voltage	A Separate SMPS power supply panel	SMPS Power Supply inside master unit with Power ON /OFF switch on hind panel
	SMPS I/P : 110/220/230Vac + 10% 50/60 Hz, O/P: 24V / 2 A	
	AC O/P: 2 x 3 pairs of shrouded banana sockets for 230V O/P with switch & fuse protection for other use.	6 Nos. of 4mm Banana Sockets(3nos. for +24V, 3nos. for common) for extension provided on AIO/SEP Panel
37 Pin D Connector (f)	Provided 37 pin D type connector for complex working models like lift elevator to save on wiring time. It supports DI= 21, DO=13 , +24V= 1 , GND=2	
Static Application Panel SAPs (Select 1 or more) (Note: * marked SAPS need AI channels of PLC)	Common Base Board consisting of 54 LEDs, with 10 LEDs for Bar Graph for AO. RTD signal conditioning circuit (optional) for temperature sensor. No. of 4mm banana sockets =32 Replaceable 19 Nos. of Static Application Panel which may be inserted onto common baseboard panel with selectively leds exposed :- 1) Door Bell Operation, 2) Switching of lights, 3) Silo Control, 4) Seven Segment Display, 5) Starter Control, 6) Sequential Control of Motors, 7) Star Delta Control, 8) Resistance Welding, 9) Tank Level Control*, 10) Traffic Light Control, 11) Bottling Plant*, 12) Drink Dispenses, 13) Reaction Vessel*, 14) Oven*, 15) Parking Garage, 16) Combination Lock, 17) Elevator Simulator, 18) Process Control Trainer *, 19) Washing Machine Stepper motor panel P25 (Optional): 12VDC, Step 7.50 stepper motor, Dir. & speed control.	
Mechanical	Dimensions: 960 (L) x 300 (W) x 545 (H) mm. Net Wt. 23 Kg, Gross Wt: 33Kg	Dimensions :460 (H) x 160 (L) x 350 (D) mm, Net Wt. : 5Kg, Gross Wt: 10Kg
Accessories	Mains cord, Ethernet cable1.5m, Patch cords red & black 600mm length 15nos. each	

Replaceable 19 Nos. of Static Application Panels which may be inserted into common base board panel :







Mechatronics Applications Working Models for Model-TMS-PLC

A] Rotary Transfer Unit:

[Applicable for Model TMS-PLC only] Table Top Unit of size (365 mm [L]x320mm [W] x 200mm [H]).

Need DI = 12, DO= 8. Consists of two geared bi-directional DC motor (3V) namely, a) Turn table with 8 pegs driven by seared motor with numbers (Optional) of IR emitter detector pairs to signal turn table position to controller & need 2 O/P from controller to select FWD/REV rotation. b) Dispensing motor to drop onto 8 pegs on turn table rings loaded in two holding tubes holders, needs 2 O/Ps @24VDC from controller to dispense ring from either of the holding tube. 8 fault switches, connects to controller using 4 mm sockets x 11 nos., Auto / Manual operation, Supply 220 /230VAC, 50Hz.

B] Conveyor Belt : Station2

Function : As the work pieces are moved on the conveyor, plastic, over height work pieces are separated from correct size metal pieces & rejected. **Sensors :** • PNP, 24vdc operated photo reflective Proximity 1No. For over height detection. • PNP, 24vdc operated Inductive proximity 1no. for metal detection. • PNP, 24vdc operated Capacitive proximity 1 No for plastic detection**. Control devices :** 5/2 way single Solenoid valve 24Vdc operated, 2 nos. **Actuators:** • 1 ph. AC Sync motor 60rpm, flange mounted • Double acting Cylinders- 2 nos, stroke length - 50mm, Dia- 12mm. **Material Handling system** :• Conveyor belt size 490x137x112mm, • slider plate (chute) to guide work piece from one station to another, • Reject part Storage bin 2nos. **Panels used :**• PLC IO distribution **Air distribution & manual control** : • 4 way manifold with self sealing QRC. Net / gross weight : Net wt = 13 kg • Gross wt = 14kg :

- **Air Compressor (Optional):** 0 to 10 bars, size 1/4", Oil catcher OR accessaries (1/4" size max. pressure= 10 bars) 1No.

Tank Capacity: 30 to 40 litres, Single Phase, 3 CFM with QRC Socket PU 6x4 Tube.

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C) Lift Elevator :

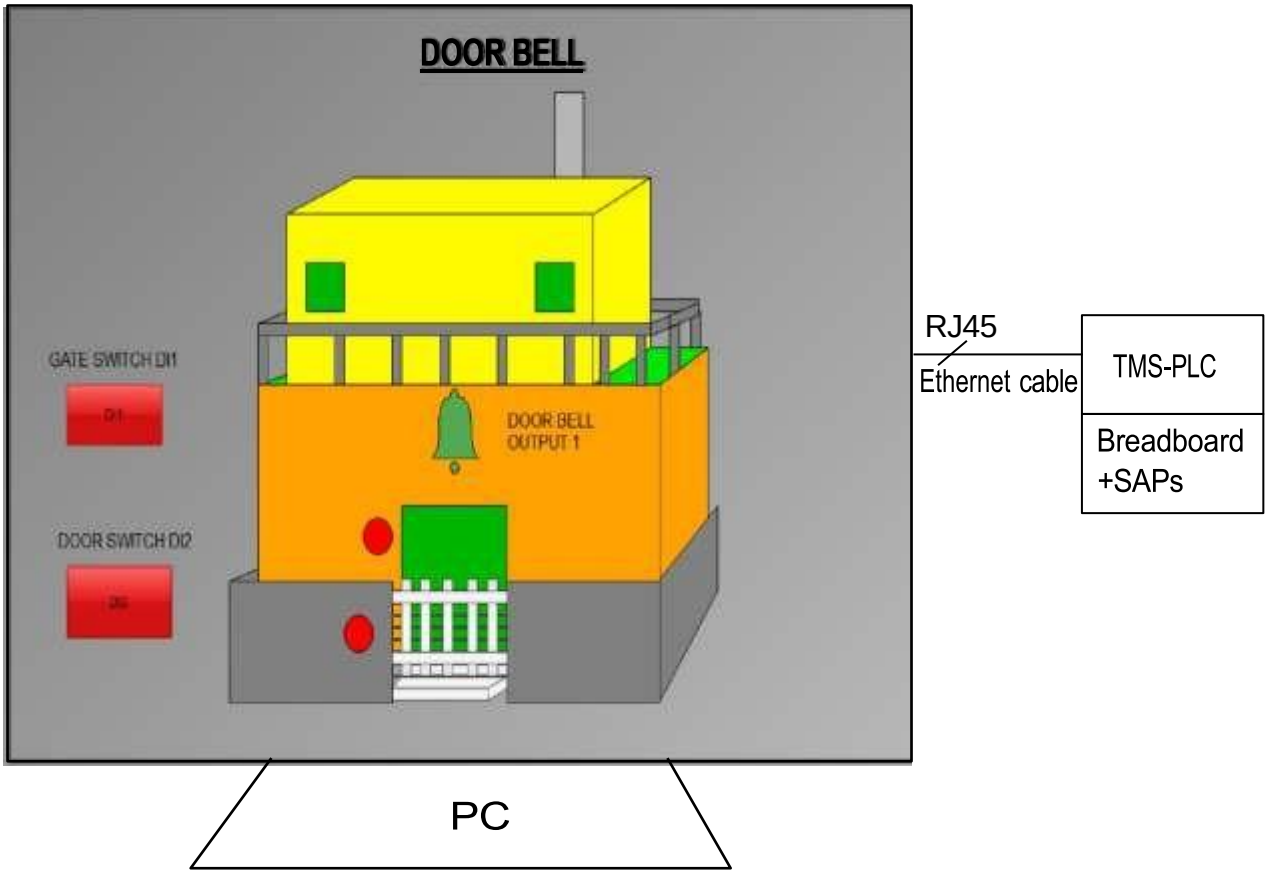
Needs DIs = 21 and DO's = 13 numbers, Table top model of 4 floor elevator with colourful floor overlay and 3 sides covered in transparent persplex sheets for easy viewing. Size: 1100(H) X 250(W) X 380(D) mm with motor 230VAC/100W with speed reduction gear box (30RPM), total 36 LED indications, 32 switches, 4 limit switches. Each floor has front panel consisting of motorized sliding door with limit switch to indicate door closed position, door open audio and LED indication/illumination, auto/manual door closing/opening with end limit switches, 2 numbers of door close/open push buttons for manual operation, 1 number of DPDT switch to select door opening from PLC or manual, "man in door" photo/IR sensor feedback to PLC for software interlock, four numbers of floor selection entry buttons inside the lift with key impulse indicators, two numbers of up/down call floor request button outside the lift & LEDs for up/down movement indication of lift, 1 floor sensing limit switch with floor indication/ illumination LED, 7-segment display to indicate floor position on each floor, 37-pin D connector cable [1.5m] to connect with PLC & top floor panel and 3 numbers 37-pin D patch cables for inter floor connections obviating any need for tedious wiring between PLC & elevator

D] Water Level Using Float Type Sensor (Optional)

Water Level Control using Float type sensor , 500 mm calibrated acrylic water tank, water pump, manual flow valve mounted on compact light weight (530 x 910 mm) table top panel.

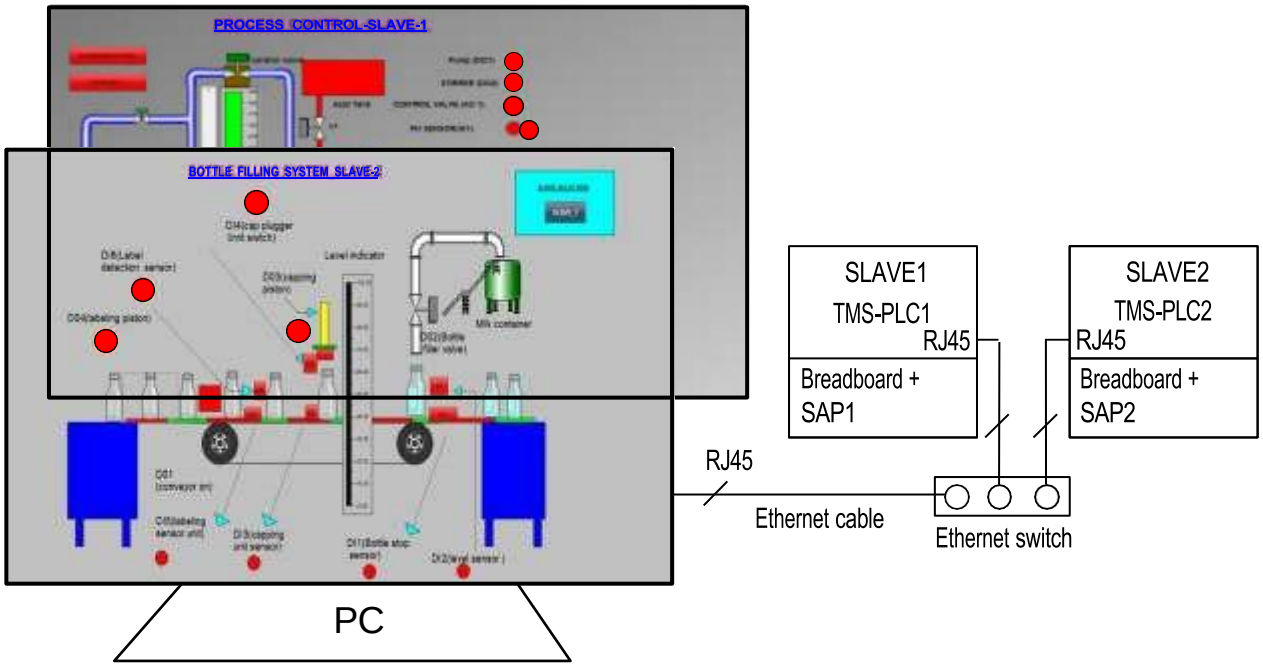
SCADA Trainer (Optional) (For TMS-PLC)

SCADA software development suite supplied on installable DVD. Supports 2048 tags, with license key to enable software suit on particular PC, predesigned 19 projects for 19 SAPs provided, PC with I3/Win7/8.1/10, RAM 4GB or higher version needed but **not in scope of supply**. Order separately one above PLC Trainer.

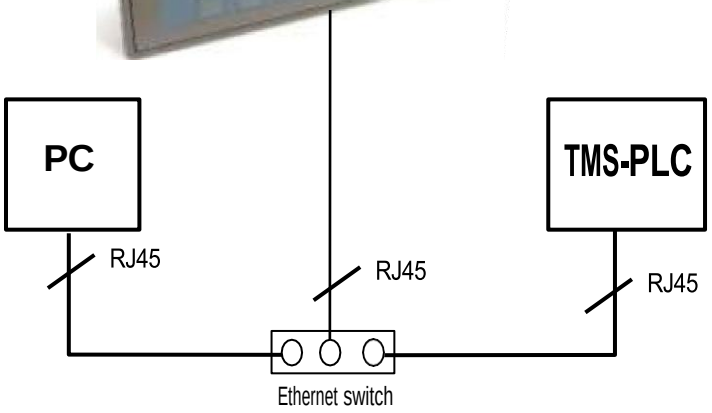


DCS Trainer

DCS Trainer needs 2 Nos. of TMS-PLC Trainer (order separately) . PLC1 controlling its own SAP acting as local controller, , PLC2 controlling its own SAP acting as second local controller, Both the PLCs networked over RJ45 Ethernet LAN cable between local slave controllers & PC based master supervisory software controller, SCADA Software Development suite supplied on installation DVD, supports 2048 tags with license key to enable software suit on particular PC. Predesigned 2 sets of 19 projects for 19 SAPs supplied for master & slaves and executed on each of controller concurrently.PC with I3/Win7/8.1/10, RAM 4GB or higher version needed but **not in scope of supply.**



HMI



Parameter	Specifications	
Display	Type	LCD mono FSTN
	Display area, active	76.79 mm x 57.59 mm (3.8")
	Resolution, pixels	320 x 240
Input device	Type	Touch screen, analog resistive
	Function keys	4
	Ethernet Rj45	1
Memory	Application memory	512 KB
Supply voltage	Rated voltage Range, permissible	+24 VDC 19.2 to 28.8 V (–20%, +20%)