



**PHOTO : DISTRIBUTED CONTROL SYSTEM TRAINER**

This Distributed control System Trainer (Basic DCS Trainer-TDS-2001 / Hybrid DCS Trainer- TDS-2001 H / Advanced DCS- TDS 2001 A) outlines the principle of Distributed control System used in Industrial Environment. The SCADA software & an interfacing package, PLC /Hybrid Controller / Honeywell C 300 DCS Master Controller based data logging & Distributed Control facility gives the overall idea regarding its application. Master Controller acquires Data, Send/Receive commands to remotely placed Controllers over USB / RS 485/ Ethernet/ Modbus/ TCP-IP/HART Network. Thus Master Controller Controls Process Plants forming Distributed Control System.

**KEY WORDS:**

- ❖ Distributed Control System.
- ❖ PLC / Hybrid Controller/ DCS Controller (True DCS) Based Process Control Techniques.
- ❖ SCADA Based Process Control
- ❖ USB/RS 485/ Ethernet/ Modbus/ TCP-IP/HART Communication
- ❖ Process Plants such Flow-Level-Pressure-Temperature Control Trainer shall be hooked up with DCS (Distributed Control System Trainer)

**Technical Specification: -**

No.	Item Name	Technical Specifications
<b>OPTION - A] BASIC DCS -TDS 2001 (USING PLC)</b>		
1	SUPERVISORY STATION	<b>MASTER CONTROLLER (FOR TDS – 2001):</b> <b>PLC : (Allen Bradley Micrologix 1400/ Equivalent) with 20 DI, 12 DO &amp; 4AI, 2 AO (For Micrologix 1400).</b> Master Controller acquires Data, Send/Receive commands to remotely placed Controllers. <b>Communication: RS 232 / RS 485 / Ethernet/ TCP-IP</b>

		<b>Ladder diagram programming on PC. RS LOGIX 500 MICRO STARTER.</b> 24VDC, 3A Power source. 4" X 2" X 2". I/P- O/P LED indication on front panel. PC interface facility. PC-PLC interfacing
2	<b>SCADA Software:</b>	GE Proficy Ixix / Siemens WinCC Basic /Eqvt. SCADA Software , PID setting(P, PI And PID mode), Auto/Manual Tuning of PID, Software Data Storage, Off Line analysis, Online Data Acquisition, Simulation and Printing Of data in Graphical and tabular form. Interactive Graphical User Interface (GUI) includes.
3	<b>Necessary I/p-O/p simulating devices.</b>	<b>(Push Buttons, Indicating Lamps etc. fitted in front DOOR Panel of System Cabinet)</b> Front panel for display of digital input/output status:
4	<b>Computer</b>	PC with Latest Configuration color monitor: 15", PC Pentium Dual Core, with serial communication ports, 300/500 GB HDD, 2/4 GB RAM
<b><u>OPTION - B  HYBRID DCS – TDS-2001 H (USING HYBRID CONTROLLER)</u></b>		
1	<b>SUPERVISORY STATION :</b>	<b>MASTER CONTROLLER (FOR TDS – 2001 H):</b> <b>Hybrid controller, Make Honeywell, Model HC900 – C30, AI 8, AO4, DI 16, DO16, Control loops 8 with Hybrid Control Designer software</b> Master Controller acquires Data, Send/Receive commands to remotely placed Controllers. <b>Communication: RS 232 / RS 485 / Ethernet (TCP-IP)</b> <b>Ladder diagram programming on PC.</b> 24VDC, 3A Power source. 4" X 2" X 2". I/P- O/P LED indication on front panel. PC interface facility. PC-PLC interfacing
2	<b>SCADA Software:</b>	RS View 75 Tags/150Tags SCADA S/W, PID setting(P, PI And PID mode), Auto/Manual Tuning of PID, Software Data Storage, Off Line analysis, Online Data Acquisition, Simulation and Printing Of data in Graphical and tabular form. Interactive Graphical User Interface (GUI) includes.
3	<b>Necessary I/p-O/p simulating devices.</b>	<b>(Push Buttons, Indicating Lamps etc. fitted in front DOOR Panel of System Cabinet)</b> Front panel for display of digital input/output status:
4	<b>Computer</b>	PC with Latest Configuration color monitor: 15", PC Pentium Dual Core, with serial communication ports, 300/500 GB HDD, 2/4 GB RAM
<b><u>OPTION - C  ADVANCED DCS – TDS-2001 A (TRUE INDUSTRIAL DCS SYSTEM)</u></b>		
1	<b><u>SUPERVISORY STATION</u></b>	<b>CONTROLLER MAKE: Honeywell DCS C300 / Emerson Delta V / Yokogawa or equivalent. Master Controller acquires Data, Sends/Receives commands to remotely placed Controllers, Field Devices, Analog Input/ Output Display components over Field Bus network.</b> <b>Communication Protocol : HART / Field Bus/ Rs 485 Network</b> <b>System Power Supply – 1 No., Network Module – 1 No.</b> <b>Analog Input Module Cards: 16 Channels, Voltage / Current/HART Enable –1 No.</b> <b>Analog Output Module Cards: 16 Channels, Voltage / Current/HART Enable– 1 No.</b> <b>Digital Input Module: 32 Channels, 24 V DC– 1 No.</b> <b>Digital Output Module: 32 Channels, 24 V DC– 1 No.</b> <b>HART Transmitter – 1 No.</b> <b>Buzzer/ Alarm Annunciator fitted in System Cabinet</b>
2	<b>CONTROL PANEL</b>	MS Powder coated panel with switches, indicator, Test Points, controller on front facia, UK 2.5 Terminal Connectors mounted on DIN rail channel. Use of 1sq mm multistand wire with Proper insulated Lugs, Ferruling & neat wire Dressing

		& clamping Wires & power cables are Seated through 1"×1" PVC cable tray.
3	<b>Necessary I/p-O/p simulating devices.</b>	<b>(Push Buttons, Indicating Lamps etc. fitted in front DOOR Panel of System Cabinet)</b> Front panel for display of digital input/output status:
4	<b>Computer</b>	PC with Latest Configuration color monitor: 15", PC Pentium Dual Core, with serial communication ports, 300/500 GB HDD, 2/4 GB RAM
5	<b>Software</b>	<b>SCADA Software: License Software: DCS program development &amp; execution. Plant Cruise /CITECT/Equit SCADA Based Software for Run Time &amp; Development Mode (License Version) 1000 points / tags. Fully Configurable Graphics Configurations, Alarms, Trends, Reports &amp; History Generation Work Station: Server Grade PC with LCD Monitor (Dell / HP)</b>

\* To demonstrate proper Operation of the DCS, you will need to hook up the Supervisory Station to the below mentioned Process Control Loops

\*The DCS system is supplied complete with Software, Controller, network module & I/O modules that are needed to monitor & control the process plant.

#### ❖ **OPTIONAL LOOPS/ PROCESS PLANTS TO BE HOOKED UP WITH DISTRIBUTED CONTROL SYSTEM**

\*You can select any of the following Loops as per your requirement

**A] FLOW CONTROL SYSTEM TRAINER – PCST – 01**

(Please refer PCST-01 Leaflet)

**B] LEVEL CONTROL SYSTEM TRAINER – PCST – 02**

(Please refer PCST-02 Leaflet)

**C] WATER PRESSURE CONTROL SYSTEM TRAINER – PCST – 03 A**

(Please refer PCST-03A Leaflet)

**D] AIR PRESSURE CONTROL SYSTEM TRAINER – PCST – 03 B**

(Please refer PCST-03 B Leaflet)

**E] AIR TEMPERATURE CONTROL SYSTEM TRAINER – PCST – 04**

(Please refer PCST-04 Leaflet)

**F] WATER TEMPERATURE CONTROL SYSTEM TRAINER – PCST – 08**

(Please refer PCST-08 Leaflet)

**G] CASCADE CONTROL SYSTEM TRAINER – PCST – 05**

(Please refer PCST-05 Leaflet)

**H] RATIO CONTROL SYSTEM TRAINER – PCST – 06**

(Please refer PCST-06 Leaflet)

#### **RANGE OF EXPERIMENTS:**

- ❖ Study of Distributed Control Systems
- ❖ Study of Proportional (P), Integral (I) and Derivative control (D) Actions.
- ❖ Study of PLC Based (TDS-2001)/ Hybrid Controller Based (TDS-2001 - H )/ Advanced DCS Based (TDS-2001 A) Process Control.
- ❖ Study of operation and calibration of transmitters, I/P converter and Control Valve.
- ❖ Study of Communication Protocols such as - **USB/RS 485/ Ethernet/ Modbus/ TCP-IP/HART**
- ❖ Study of Individual Process Plants hooked up with the DCS.
- ❖ Study of SCADA Application Software/ Computerized Control of Process Plants.

#### **Features: -**

❖ **Three Different Options to make the meet the requirements of the User viz.:**

**A] BASIC DCS TRAINER -TDS-2001,**

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**B] HYBRID DCS TRAINER - TDS-2001 H**

**C] ADVANCED DCS TRAINER (TDS-2001 A - TRUE INDUSTRIAL DCS)**

- ❖ Understand the concept of Distributed Control System.
- ❖ User Friendly, Self Explanatory Systems.
- ❖ Explains the modern Process Control Techniques used in Industries
- ❖ Enhanced Electrical Safety Considerations.
- ❖ Training Manual & Mimic Charts for Operation Ease.
- ❖ System Frame with Caster Wheel Arrangement for ease in movement.
- ❖ M.S. powder coated cubical plant with standard Instrument Mountings.
- ❖ Inbuilt Safety Measures to avoid improper usage.
- ❖ Computer Interface, SCADA Application software connectivity for analysis of Process Plants.

**System Dimension:** 4.5 Ft. (L) X 1.5 Ft. (W) X 4.5 Ft. (H)

**Services Required:**

- ❖ Electric supply 230 V AC, 50 Hz.
- ❖ Clean, dry and dust free Compressed air supply 2.1 kg/cm<sup>2</sup>.

**Note:**

All descriptive matter and illustrations are intended to give only a general idea of the equipment. Detailed specifications may be altered at the company's discretion without any notice.

