

# Process Control Training Systems

By Ite Systems Ltd.



# Modern Process Control Systems - Highlights

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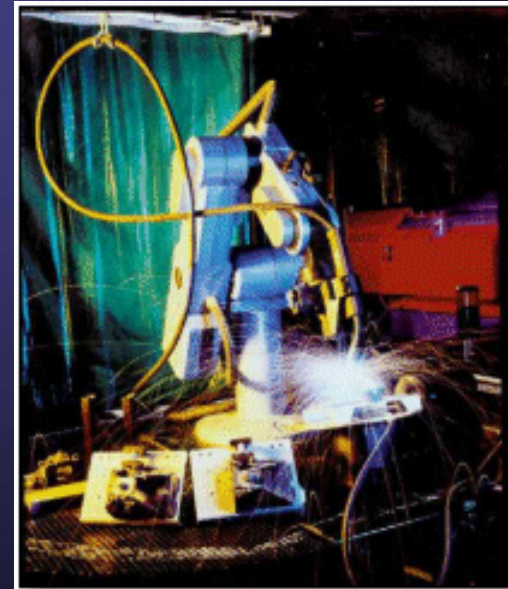
- Complex Control Systems– a lot of Controlled Parameters
- Better Products Manufacturing, lower Operating Cost
- Modernization of Processes due to:
  - Environmental Restrictions
  - Ecological Legislations
- Conversion of Open-Loop to Closed-Loop Systems
- Linear PID Controllers Replacing ON-OFF Controllers



# Transducers in the Industrial World

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- Used as a Link Between the Controlled Process and the Control Computer
- Sometimes used as the Limiting Factor in overall Process System Operation
- Measures of Controlled Parameters:
  - Temperature, Pressure, Flow, Weight  
In Various Processes, for Example:
    - Power Plants
    - Chemical
    - Metal
    - Plastics

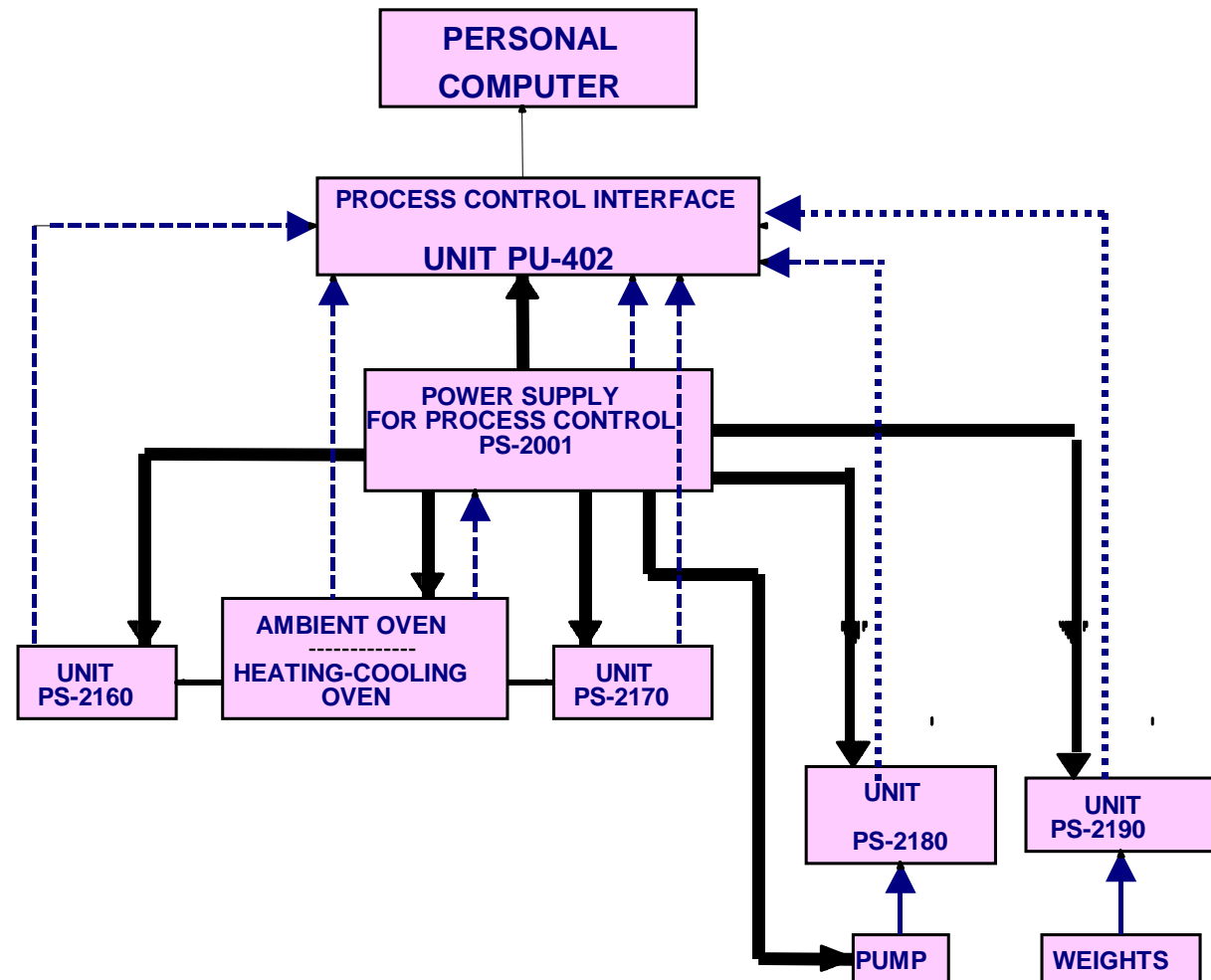


# PS-2000 Training Modules

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- ❑ PS-2160 Characteristics of type J and type K thermocouples temperature transducers.
- ❑ PS-2170 Characteristics of the PT-100, platinum temperature transducer.
- ❑ PS-2180 Characteristics of the pressure, flow and level transducers.
- ❑ PS-2190 Basic aspects of the load cell element.
- ❑ PU-402 Process control computer interface.
- ❑ PS-2001 Power supply for process control laboratory.
- ❑ PS-2002/1 Cooling and heating oven for measuring temperature transducer characteristics.
- ❑ PS-2002/2 Ambient temperature oven to show the effect of cold junction compensation of the thermocouples and the effect of the extending wire transducers.

# Interaction Between the PS-2000 Process Control Training Systems



## *PS-2160 - Thermocouples Temperature Transducers*

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- Introduction of Thermocouples.
- Thermocouples Characteristics.
- Temperature Display.
- Temperature Compensation.
- Thermocouple Transmitter.
- Thermocouple Extension Wires.
- Thermocouple Dynamic Response

## *PS-2170 - PT-100, Platinum Temperature Transducer*

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- PT-100 temperature sensor characteristics.
- Measuring resistance using a whetstone bridge.
- PT-100 temperature display.
- Effect of the ambient temperature on the Whetstone bridge.
- PT-100 temperature transmitter.
- PT-100 Dynamic response.



## *PS-2180 - Pressure, Flow & Level transmitters for Process Control*

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- Capacity Transducer
- Hydrostatic Transducer
- Measurements Transducer
- Pallet Transducer
- Orifice Transducer
- Pressure Transducer
- Current Transducer

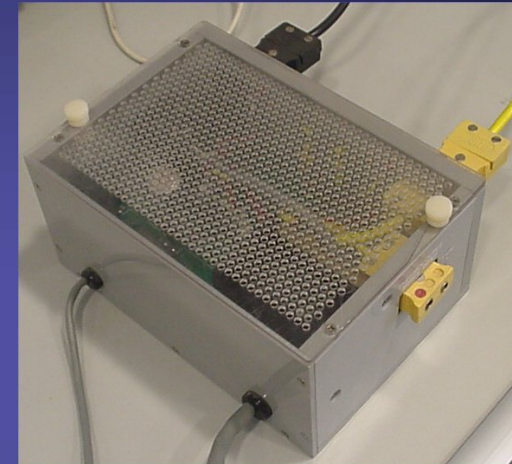
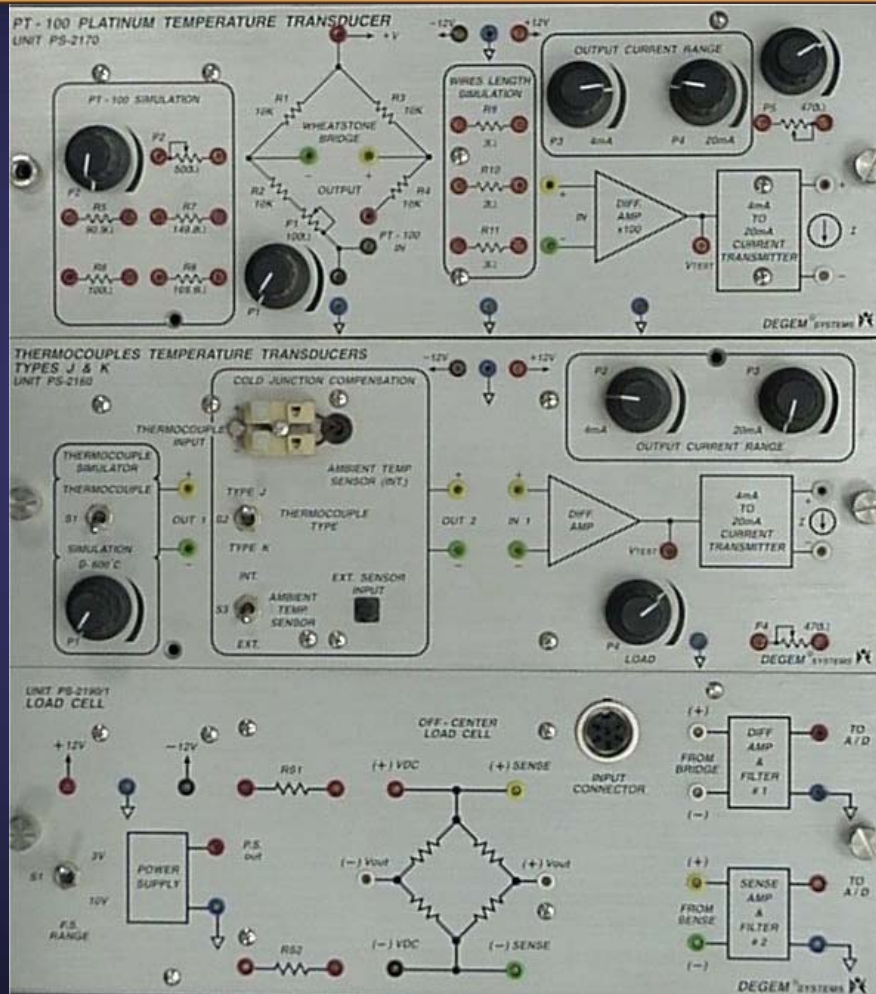


## *PS-2190 - Load Cell Transducer*

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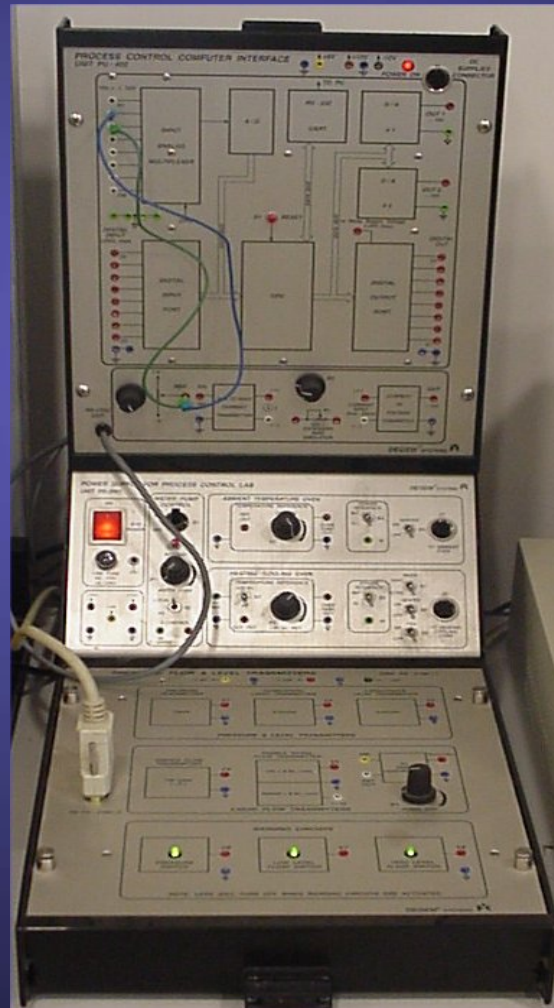
- The weight transducer.
- Use of the whetstone bridge for measuring weight
- Measuring weight - using the weight transducer.
- Weight transducer characteristics.
- Connecting the transducer to the weighing head calibration stages.
- Connecting the transducer to the weighing head.

# PS-2160 /2170/2190 and Ovens



# *Interface Modules of PS-2000 family of products*

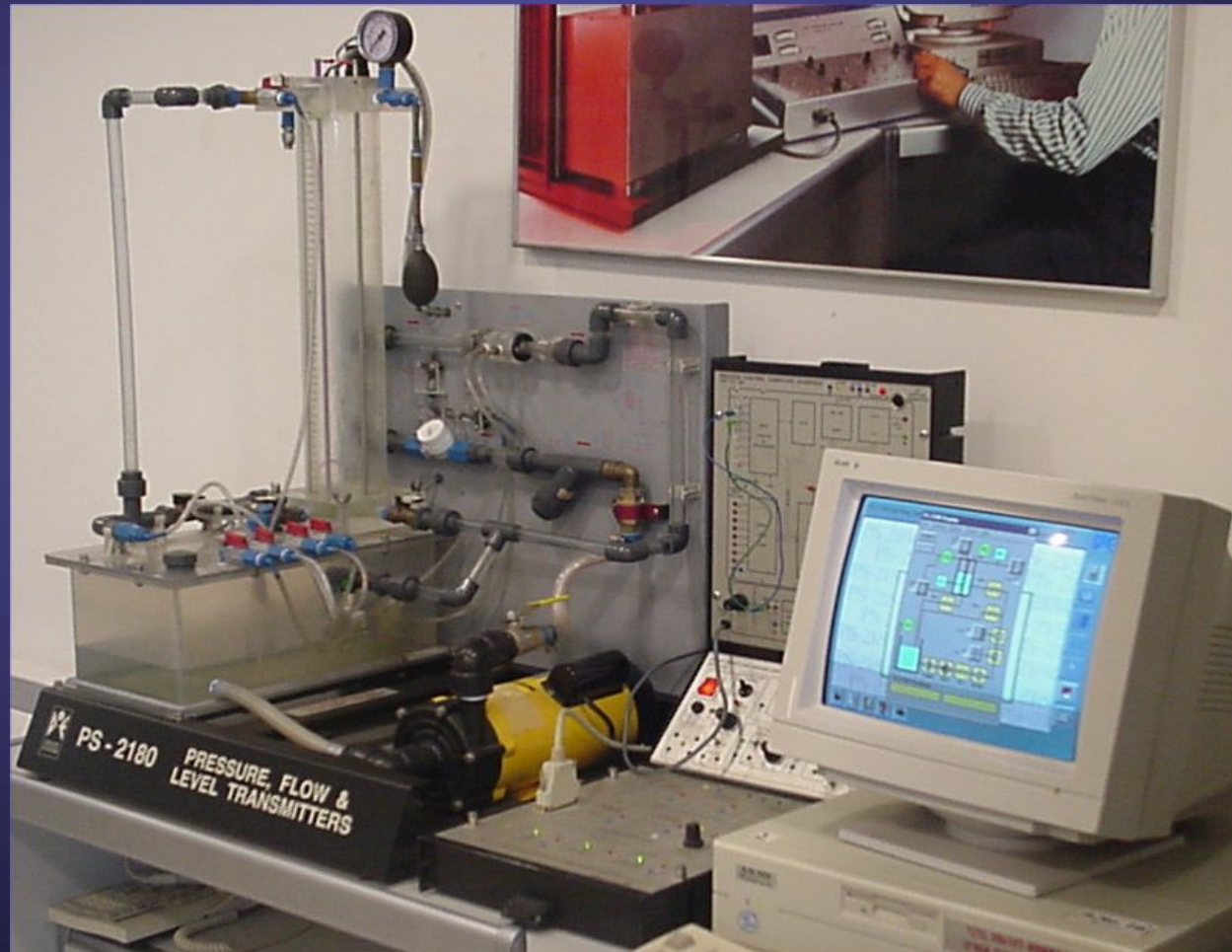
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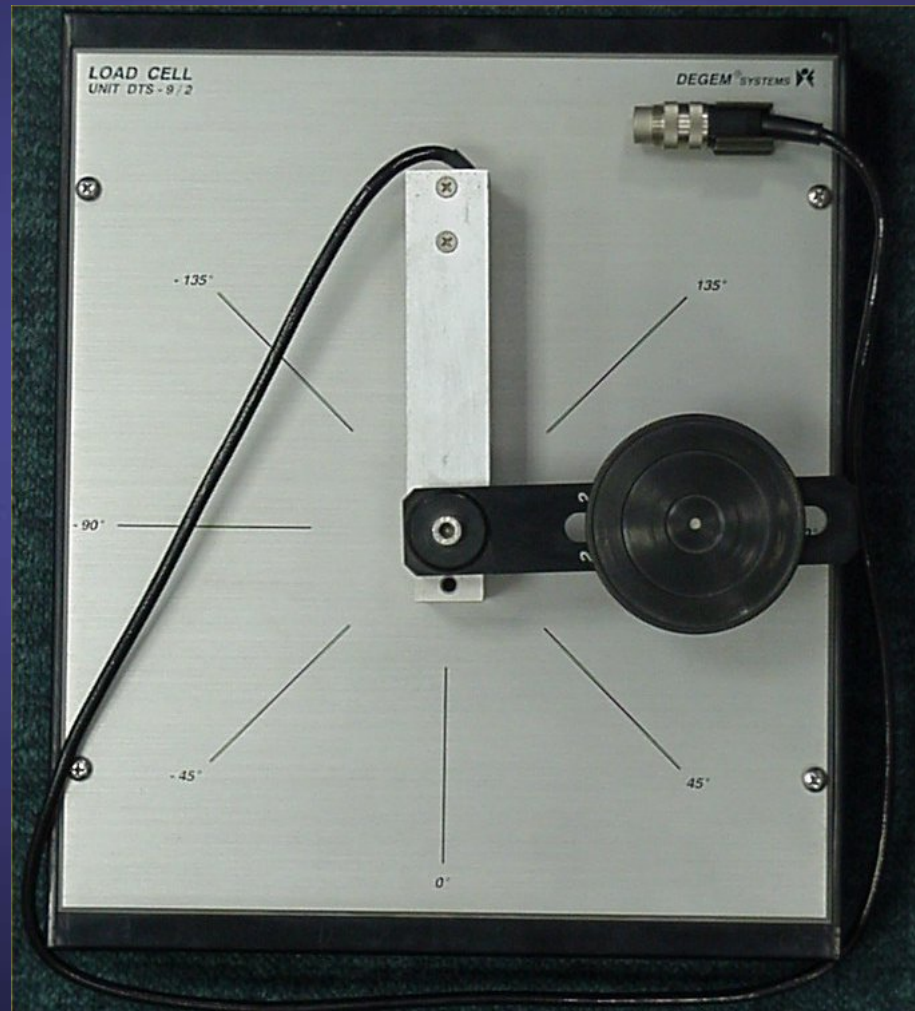


# *PS-2180 - Pressure, Flow & Level transmitters for Process Control*

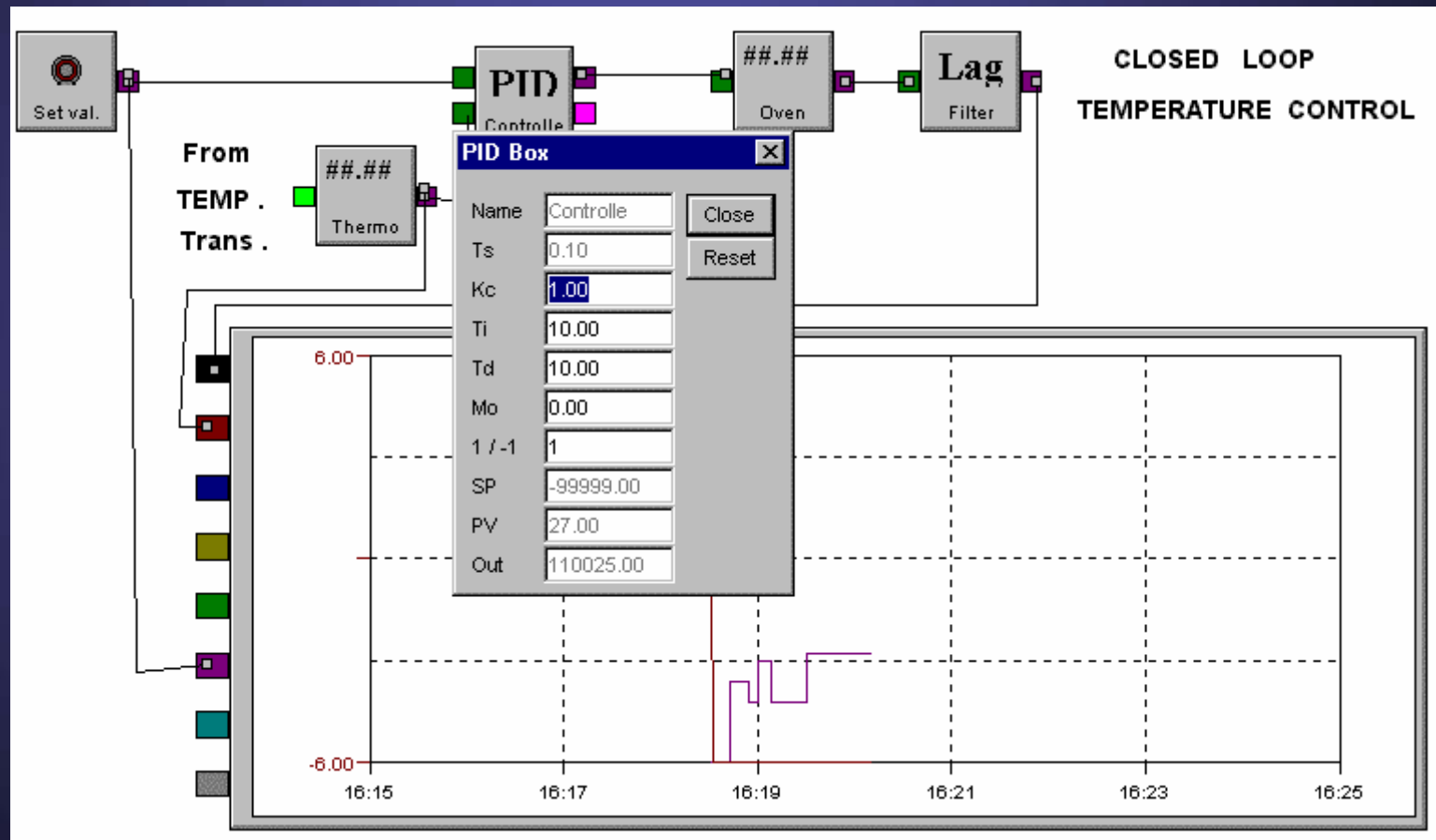
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# *PS-2190 - Load Cell Transducer Accessory*

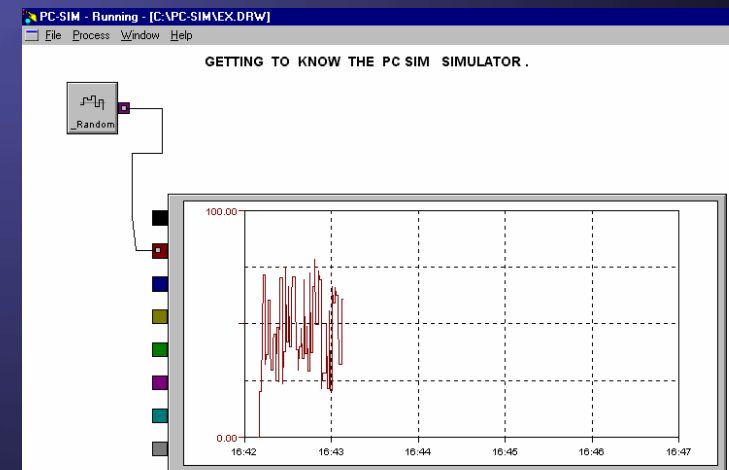
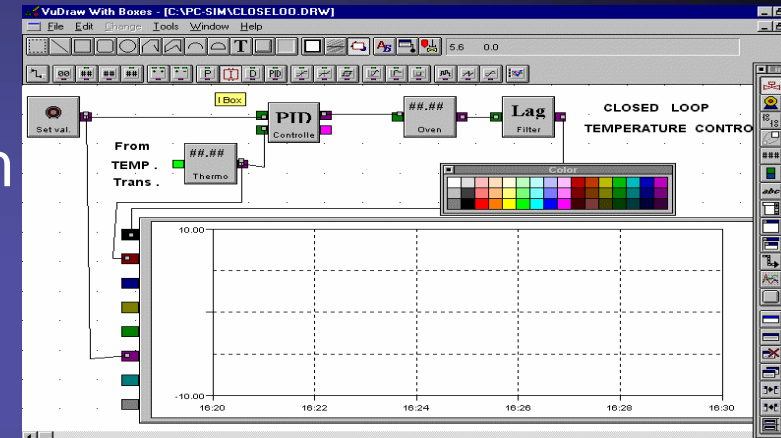


# PC – SIM Process Control Simulator



# PC-SIM Process Control Simulator

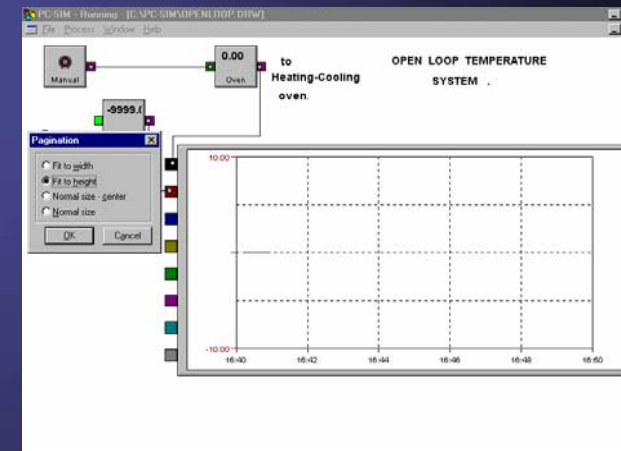
- ❑ **Operation Modes:**
  - Draw system block diagram
  - Set parameters
  - Run the simulation
  - Plot graphs
  - Frequency response
  - Determine root locus
  - Simulate applications



# PC-SIM Process Control Simulator

## □ Simulations:

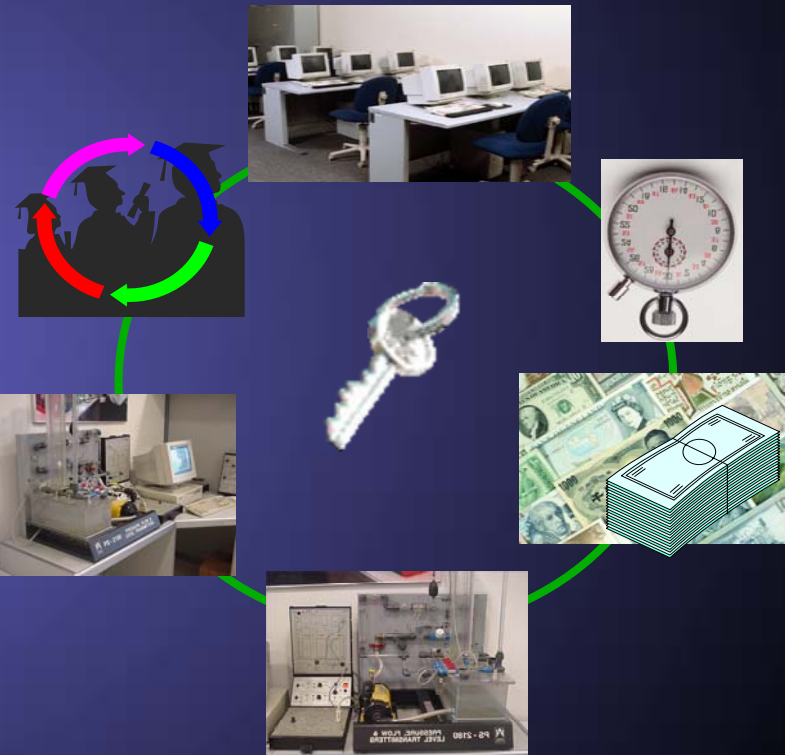
- First order lag processes
- Over damped second order lag
- Under damped second order lag
- Processes with an integrator
- Dead time processes
- First order lag with integrator
- First order lag with dead time
- Closed loop control system with proportion controller and first order lag





# Key issues for computerized training

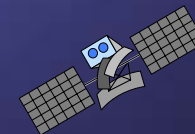
- Shorter learning time
- Smaller classroom spaces and reducing the teacher's load in class
- High amount of "trainee rotation" per Lab
- Training workstation with interchangeable modules
- Expandable and adaptable as the needs grow
- Rapid return of investment
- Lab mobility



# ADVANTAGES

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- Modular structure
- Flexible - easy to use
- Advanced technological design
- Advanced platform
- Suitable for variety of users
- Cost effective solution
- R&D



# SUMMARY

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The Process Control training program addressing educational needs of the students, schools and the industry



- Students develop broader and deeper understanding enabling migration across the industry
- Schools are able to attract more students because they are offering a broader scope to the student education, in addition to supporting specific skill sets
- The industry receives students with deeper knowledge base





# The End

Thank you for your attention

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