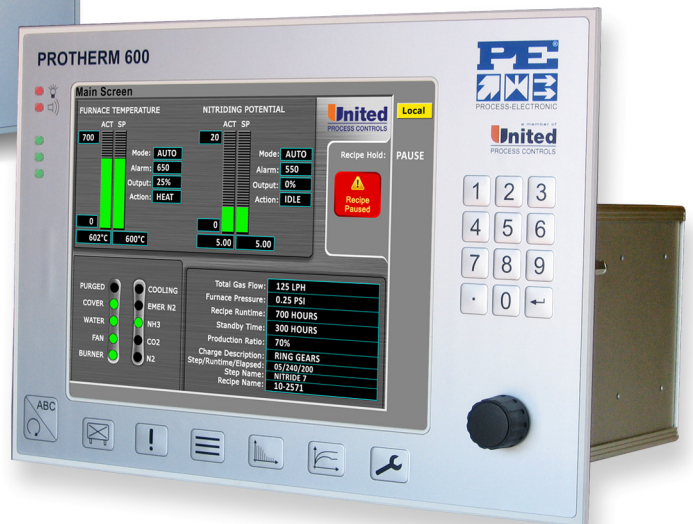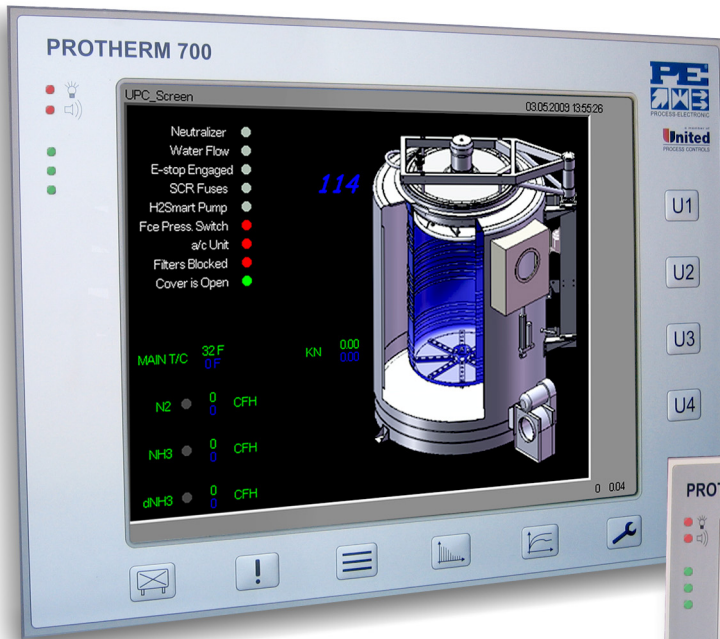# PROTHERM 500, 600 & 700

Universal Programmable Controllers
For Heat Treatment

FEATURES & CHARACTERISTICS

The **PROTHERM 500, 600 & 700** are designed to monitor, control, record and archive heat treatment processes running in a furnace or simultaneously in multiple chambers. They are configurable for various types of batch and continuous furnaces. Installations are done on new or refurbished furnaces and are used for updating existing systems.

MAIN FEATURES

- Visual display of the connected furnace, chambers, different configured components (e.g.: furnace door, recirculation turbines, etc.) and the loads

- Can hold up to 32 PID control-loops to regulate configured process parameters such as temperature, furnace pressure as well as atmosphere parameters (e.g.: carbon potential, nitriding potential and oxygen potential)

- Load oriented treatments: real-time monitoring of jobs at all stages of the process and all chambers of the furnace

- All process parameters can be configured with alarm limits

- Notification and processing of alarms

- An online diffusion calculation provides the capability to control the process using the required target values (e.g.: case depth, surface carbon content)

- Process variables can be viewed and recorded with chart recorders

- Log files in ASCII format can be downloaded to a remote computer for archiving

- Up to 99 treatments and templates can be created and modified

OPERATING CHARACTERITICS

- Control knob or Touch-enabled screen enables user to select input fields and enter data

- Function keys are used for accessing the most important functions

- Users access to different functions is password protected

- A PC keyboard can be connected through a PS/2 port
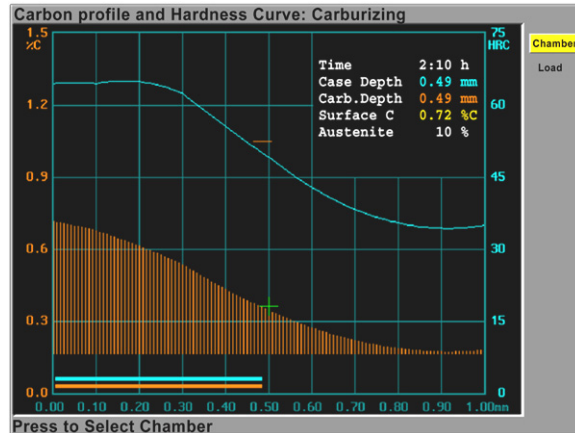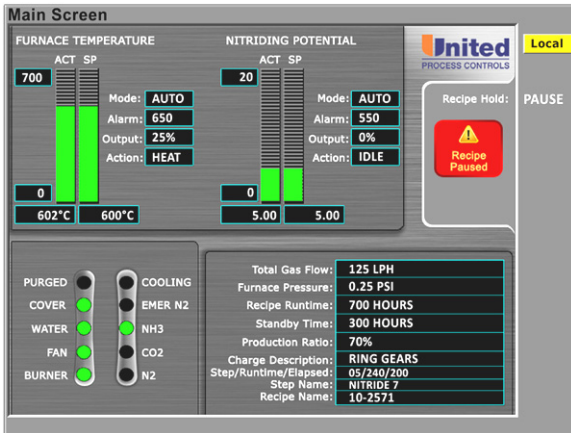
BUILT-IN FUNCTIONS

- Mathematical model for calculating atmospheric parameters from gas inputs and sensor values

- Real-time carbon and/or nitrogen diffusion calculation

- Hardness profile calculation based on chemical composition, carbon or nitrogen content in the material, and quenching parameters

CONFIGURATION

- The control loops, furnace graphics, process variables and more can be configured with a user-friendly proprietary configuration software

- The set-up of the PID parameters and other control functions are accessed via the configuration key
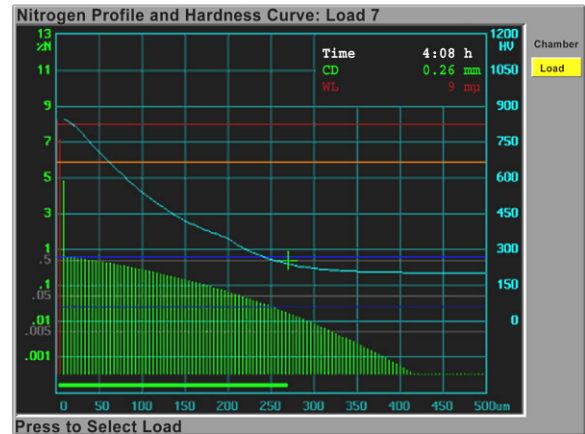
FUNCTIONS / SCREENS

Main Screen

Carbon profile and Hardness Curve: Carburizing

Current Alarms

Nitrogen Profile and Hardness Curve: Load 7

FURNACE AND SETTINGS SCREENS (configurable)

- Graphic display of the furnace chambers and loads
- Display of selected process variables
- Schematic view of the process gases system
- Input screen for process parameters

TREATMENT MANAGEMENT

- Treatments can be created and modified
- Jobs can be started and stopped
- Templates can be created and modified

HISTOGRAMS (configurable)

- Paperless Flexible Chart Recorder
- 8 chart recorders (screens) displaying up to 8 process variables (64 analogue values)
- Zoom functions
- Slide ruler displays individual settings and values

SPECIAL PROCESS DIAGRAMS

- Diagrams that display the actual state of a load during a process
- Carbon content and hardness profiles
- Nitrogen content and hardness profiles
- Fe-C state diagram
- Fe-N Lehrer diagram
- Fe-N-C NICARM diagram
- Fe-O state diagram

CONFIGURATION

Special menu for the configuration of the integrated controllers
- PID set-up
- Adjustment and setting of control parameters
- Real-time graph for displaying the control parameters and checking the settings

ALARM MENU

- Comprehensive alarm processing
- Recording of all alarms
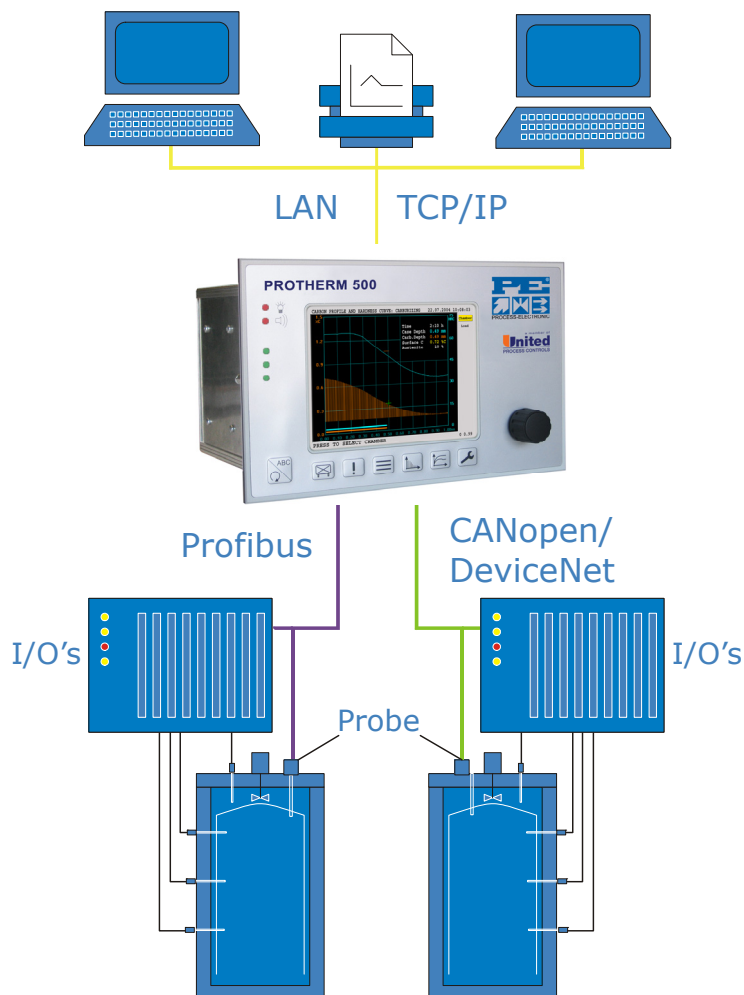
INTEGRATION & HARDWARE

INTEGRATED WEB SERVER

- A remote computer can be connected to the device through a standard web browser

- The treatment logs in ASCII format are kept for 30 days. They can be downloaded and then further processed with any appropriate PC software (e.g. Microsoft® Excel)

- A powerful Java based configuration tool can be downloaded and installed on a local PC for configuring all the device parameters

HARDWARE

- **Protherm 500**: Industrial PC with a 6" color TFT display, seven function keys, turn and press knob, serial port, keyboard port

- **Protherm 600**: Industrial PC with a 12" color TFT display, seven function keys, numerical keypad, turn and press knob, serial port, keyboard port

- **Protherm 700:** Industrial PC with a 15" color TFT display, touch-screen, seven function keys, serial port, keyboard port

- Integrated industrial Ethernet interface for connecting to a PC via TCP/IP with the configuration software, host system connection is optional

- Integrated CANopen/DeviceNet interface

- Profibus interface available as an option

INTEGRATION / CONNECTION

ALSO AVAILABLE

Analyzers	*Hydrogen, oxygen and ammonia analyzers available either as portable of fixed-mount*
Measuring Devices	*Carbo-Test (direct measuring of carbon in atmosphere)*
Atmosphere Sensors	*Oxygen, hydrogen and insitu carbon diffusion sensors used in various processes*
HT-Tools	*Carburizing process simulation software with diffusion and hardness profiles*
Protherm 455	*Multi-loop process controller. Direct drop-in replacement for Marathon's CarbPro, DualPro, MultiPro, and Carb PC*
Protherm 470	*Universal digital control system for regulating and controlling heat treatment processes*
Protherm 9800	*Integrated Production Management Software Package for optimizing the performance and efficiency of a heat treatment plant operating a variety of furnaces and for automatic handling of machinery*

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