

4TH GENERATION PROCESS CONTROLLER FOR HEAT TREATMENT

Drop-in Replacement for CarbPro, DualPro & MultiPro \*



\* Additional engineering may be required if DualPro or MultiPro use background logic programs.

# PROTHERM 455 PROCESS CONTROLLER

## FEATURES & CHARACTERISTICS

The **PROTHERM 455** is a ½ DIN powerful controller designed to monitor, control and record a variety of heat treat processes.

Used in new furnaces as well as for refurbishing or updating existing systems, it is ideal for nitriding, nitrocarburizing, carburizing, carbonitriding, hardening, tempering and vacuum furnaces.

## BENEFITS

- Direct drop-in replacement for Marathon's CarbPro, DualPro, MultiPro, and Carb PC \*
- Supports Marathon recipes
- Compatible with all legacy Marathon software
- Redundant probe feature is standard
- MMI TruCarb compatible

## MAIN FEATURES

- Full touch screen functionality makes intuitive menu-driven interface even simpler to use
- Configured for 3 Internal PID loops, expandable to 32 control loops, to regulate configured process parameters such as furnace temperature, quench oil temperature as well as atmosphere parameters (e.g., carbon flow, carbon potential, nitriding potential, oxygen potential and many others)
- Soft PID controllers within the device can be set-up in a cascade
- Advanced auto-tuning PID and Cascade capabilities
- Load-oriented treatments - real-time monitoring of jobs at all stages of the process
- All process parameters can be configured with alarm limits
- Built in trending capability
- Process variables are viewed and recorded by chart recorders
- Log files can be downloaded to a remote computer for archiving & viewing with UPC chart recorder
- Encrypted log files
- Security level password protection - user access to different functions is password protected
- Up to 200 treatments and templates can be created, modified and controlled
- 200 foreground programs in easy to use, industry standard opcode language
- Acts as a highway supervisor for up to 16 slave instruments. Communications compatibility with popular temperature controllers
- Supports legacy MMI and MODBUS protocols as well as Ethernet MODBUS over TCP
- Compatible with all popular data acquisition software application packages



## TECHNICAL DATA

### Programs

(200) 19-step foreground

### Control Outputs

(8) 120-220 VAC fused triacs rated at 1 Amp

### Alarm Outputs

(4) 120-220 VAC fused triacs rated at 1 Amp, assignable as process, deviation, deviation band, or program actuated

### Event Input/Output (VAC)

(4) 120-220 VAC fused triacs rated at 1 Amp, expandable to 68 events with external modules

### Event Input/Output (VDC)

(16) 24VDC isolated hi-side switching with external 24V supply connections. Events can be configured for either input or output

### Analog Outputs

(4) optically isolated 0-10 VDC, 0-20mA, 4-20 mA for process variable recording or programmable use

### Analog Inputs

(4) optically isolated; selectable: T/C, RTD, current, voltage or O2 probe

### Input Linearization

3 user definable curves

programmable offset and span

1 RTD, 100 ohm platinum, alpha = .00385 (DIN 43 760)

Thermocouples: B, C, E, J, K, N, NNM, R, S, T

Linear voltage

Linear current

### Serial Interface

(4) optically-isolated ports, rated to 19.2kb, full or half duplex

### Control Loops

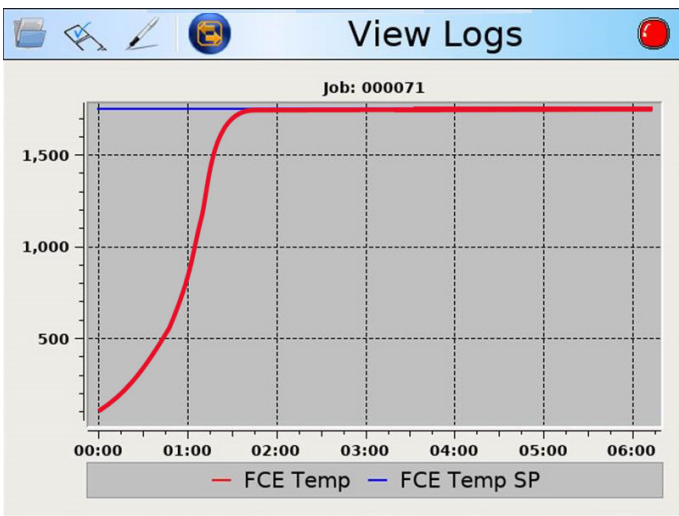
(4) based on any input or any calculated variables

## SCREENS

#	OP Code	Command	Description
1	(H) Set Temp	1750	Set temp to 1750
2	(h) Test Temp	1600	wait for 1600
3	(F) Flag	104.1	SEQ-Probe Verification
4	(C) C Setpoint	1.10	carbon setpoint
5	(L) Limit	00.20	if not at carbon in 20 minutes -
6	(S) Soak	04.00	soak 4 hours

### RECIPE MANAGEMENT

- Recipes can be created and modified
- Templates can be created and modified



### TRENDS

- Paperless flexible chart recorder
- Displays up to 10 process variables
- Zoom functions
- Print, view and export recorded data to PDF

LY	RY	Description
<input type="checkbox"/>	<input type="checkbox"/>	Probe T
<input checked="" type="checkbox"/>	<input type="checkbox"/>	FCE Temp
<input checked="" type="checkbox"/>	<input type="checkbox"/>	FCE Temp SP
<input type="checkbox"/>	<input type="checkbox"/>	O2 mV
<input type="checkbox"/>	<input type="checkbox"/>	Cold Junc.T
<input type="checkbox"/>	<input type="checkbox"/>	OIL TEMP

Vertical Markers  
 Use Elapsed Time  
 Interval (Seconds):   
 Save as default

Clear Points

✓ ✗

**CONFIGURATION MENU**

SYSTEM      COMMUNICATION

**CONTROLLERS**

INTERNAL LOOPS

SET CASCADE

EXTERNAL

ON/OFF

CALCULATIONS

**RECIPE**

ALARMS

FLAGS

EVENTS

PROBE TEST

### CONFIGURATION

Menu for configuration of integrated controllers and alarm limits of various process parameters

- PID set-up (self-tuning)
- I/O configuration
- Internal configuration I/O modules of various types

**MAINTENANCE MENU**

Manual Mode

Calibration

Offsets

Probe

Test Watchdog

Probe Test Menu

Impedance

Burn off

Both Tests

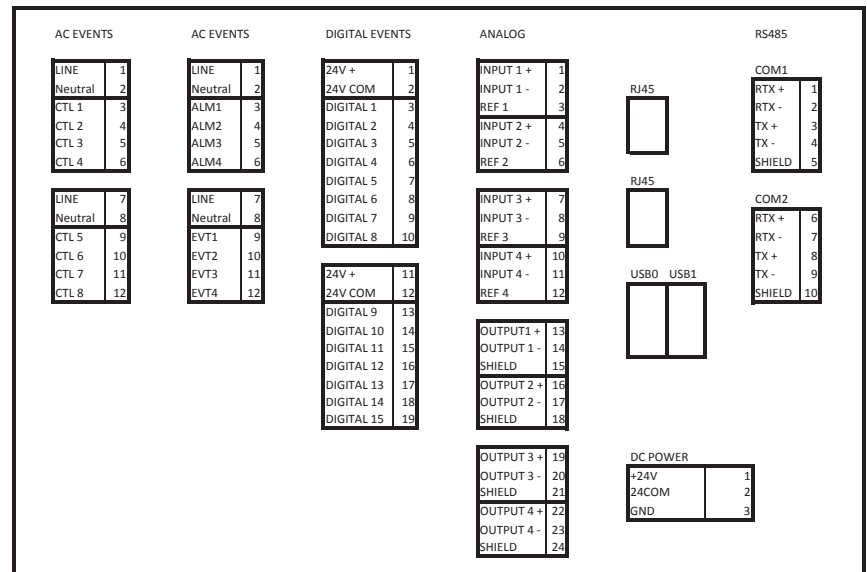
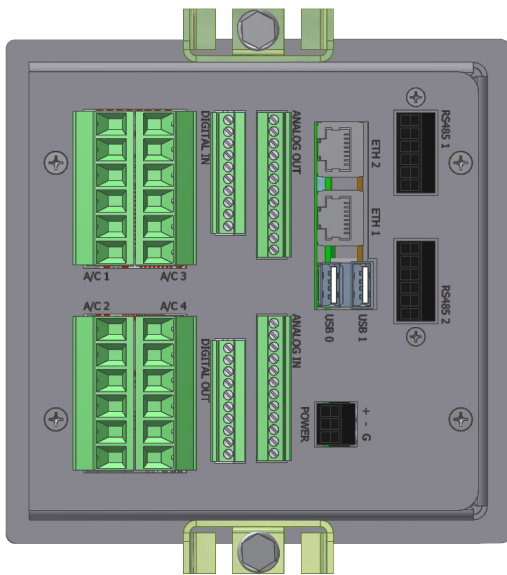
View Last Test Results

View Probe Alarms

### MAINTENANCE

- Easy access to maintenance tasks (e.g. on-site calibration, process offset, probe test, probe burn-off and much more)

## INTEGRATION & CONNECTION



Protherm 455 Backplate

## ALSO AVAILABLE

<b>Analyzers</b>	Hydrogen, oxygen and ammonia analyzers available either as portable or fixed-mount
<b>Atmosphere Sensors</b>	Oxygen, hydrogen and in situ carbon diffusion sensors used in various processes
<b>Measuring Devices</b>	Carbo-Test (direct measuring of carbon in atmosphere) & C-Detect (multi-parameter carbon analysis of shims)
<b>HT-Tools</b>	Carburizing process simulation software with diffusion and hardness profiles
<b>Protherm 10</b>	Cost-effective temperature and industrial controller with expanded functionality, including a programmer and a datalogger
<b>Protherm 455</b>	Multi-loop process controller. Direct drop-in replacement for Marathon's CarbPro, DualPro, MultiPro, and Carb PC
<b>Protherm 470</b>	Universal digital control system for regulating and controlling heat treatment processes
<b>Protherm 5/6/700</b>	Universal programmable controllers designed to monitor, control and record heat treatment processes running in various types of furnaces
<b>Protherm 9800</b>	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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