

PWC

Plant Wide Controller

Modulating Lead/Lag Control System
With Additional Monitoring And Control



- Efficient Boiler Plant Control
- Improved Steam or Hot Water System Availability
- Extends Equipment Life
- Single Point Boiler Plant Monitoring for Building Automation Systems
- Easy Setup And Operation

PREFERRED INSTRUMENTS



PWC

Plant Wide Controller

The Plant Wide Controller is a state-of-the-art boiler sequencing, control, and monitoring system.

The **Plant Wide Controller™ (PWC)** is a state-of-the-art boiler sequencing, control and monitoring system. The **PWC** combines innovative ease of operation, communication and expansion capabilities with boiler application expertise. Off-the-shelf, standard modulating Lead-Lag applications can be expanded to control circulating water variable

speed pumps and isolation valves while monitoring the flame safeguard and boiler control systems. Multiple communication protocols allow simultaneous communication to alphanumeric pagers and the **Building Automation System** or local devices. The **PWC** is a complete plant monitoring, control and communication interface.

Features

Saves Energy

- **Accurate PID Control** - Maintains hot water temperature or steam pressure supply at the desired value.
- **Outdoor Reset** - Heating plant firing rate setpoint is derived from outdoor temperature. Operating cost is reduced during warmer days.
- **Time Of Day / Week Setback** - Firing rate setpoint is adjusted based on the time of day, day of week and week of year. Operating cost is reduced during low demand periods.

Helps Extend Equipment Life

- **Assured Low Fire Shutdown** - Boiler thermal stress is decreased by reducing boiler load to minimum before removing the boiler from service.
- **Low Fire Hold And Boiler Warm-up Logic** - Boilers are held at low fire to ensure proper warm-up and a minimum run time. Optional temperature monitoring may be added to control warm up cycles.
- **Manual, Automatic Or Custom Boiler Sequence Modes** - One to seven day automatic lead boiler rotation evenly distributes runtime. Operator can set any custom sequence desired (i.e.: 3,1,2,4).

Easy Setup

- **Easy Installation** - The **PWC** integrates internal communications, relays, 24Vdc power supplies and outdoor reset functions into a single wall mountable controller. No external control devices are required.
- **Alarm / Event Summary And Historical Trends** - Easy to use displays allow quick steam or hot water system assessment and maintenance monitoring... such as hot water temperature and boiler operating hour trends and boiler gauge glass blow down event logs.

Applications

Firetube / Watertube Steam or HTHW Boilers

- **Full Boiler Modulation** - Multiple boiler firing rates are automatically adjusted to satisfy the overall plant hot water or steam demand. Either unison (parallel) or series modulation is used.
- **Improved Steam or Hot Water System Availability** - Automatic Sequencing ensures that the number of boilers in service meets hot water or steam demand. Tripped equipment is automatically replaced with a standby unit.
- **Boiler Monitoring** - Flue gas temperature, smoke opacity and boiler draft may be monitored and trended. Warning alarms and burner safety shutdown interlocks may be included.
- **Unmanned Boiler Plants** - Provides for off-site monitoring and control using internal modem or RS232/485 interface. Serves as a single plant monitoring point for Building Automation Systems and personal alphanumeric pagers.

Additional Monitoring And Control

- **Pumps (Hot Water Distribution, Feedwater, Oil, and Gas Booster)** - Sequencing, monitoring and variable speed control.
- **Valves (Hot Water Generator Isolation, Deaerator, Surge Tank, Air Handler Heating Coil)** - Sequencing, monitoring and control.
- **Fresh Air Dampers and Fans** - Sequence, monitor, and control are based on number of boilers online.
- **Generator Fuel Oil** - Level control, pump control, main tank selection and filtration.
- **Cooling Towers** - Sequencing and fan speed control with wet bulb optimization.
- **Chillers and Air Compressors** - Sequencing, monitoring and control.

PREFERRED

Rigged



Input/Output Specifications



PWC shown with both doors open, divider plate removed and three spare I/O slots. The wall-mounted enclosure provides field wiring conduit connection points and front door key lock security.

Expandable - Plug-in I/O expansion modules are easy to install. Blockware configuration language allows control strategies to be easily adapted to on-site conditions.



Hand-Off-Auto Relay Output Board. Toggle switch directly activates output in "Hand" and "Off."

CPU BOARD:

Analog Inputs: Quantity: 2
Type: 4-20 mA_{dc} or
-20°F to +300°F Thermistor

Relay Output: Quantity: 1
Type: SPDT, 8A, ½ Hp, 120Vac

HAND-OFF-AUTO RELAY OUTPUT (HOA-ROUT) BOARD:

Relay Output: Quantity: 5
Type: SPST, 8A, ½ Hp, 120Vac

Toggle Switches: Quantity: 5
Type: Hand-Off-Auto (hard wired)
SPDT, 8A, ½ Hp, 120Vac

LED Indicators: Quantity: 10
Type: "Call for Operation" and
"Output Status"

AUTO/MANUAL ANALOG OUTPUT (A/M-AOUT) BOARD:

Analog Output: Quantity: 5
Type: 4-20mA_{dc} or 135ohm
(any combination)

Toggle Switches: Quantity: 5
Type: Auto-Manual

Control Dial: Quantity: 5
Type: 0-100%
(Manual Potentiometer)

Bargraphs: Quantity: 5
Type: 0-100%, 10 segment

DISCRETE INPUT (DIN) BOARD:

Digital Inputs: Quantity: 15
Type: 120 Vac, optically isolated

LED Indicators: Quantity: 15
Type: Status Indication

ANALOG INPUT (AIN) BOARD:

Analog Input: Quantity: 8
Type: Universal, Switch Selectable as:
- 4-20 mA, 2 wire
- Thermistor, -20°F to +300°F,
Thermocouple Type J,
0-1200° F, 0-5 V_{dc}, or
Potentiometers
- Pulse, 0.01 – 4000 Hz,
0-15 V_{dc}

LED Indicators: Quantity: 8
Type: Status Indication

RELAY OUTPUT (ROUT) BOARD:

Relay Output: Quantity: 8
Type: (2) SPDT, (6) SPST-NO,
8A, ½ Hp, 120 Vac

LED Indicators: Quantity: 8
Type: Status Indication

PWC Specifications

APPLICATION

Boilers: Firetube / Watertube, Steam or High Temperature Hot Water (HTHW)

Facilities: Apartment and office buildings, industrial plants, schools, hotels, hospitals, and other institutions.

MECHANICAL

Case Size: 16.5" H x 14.5" W x 6.75" D

Enclosure Type: Wall mounted

Case: 7 Slot, (CPU + 6 I/O Slots)

Weight: 55 lbs.

ELECTRICAL

Input Power: 120 Vac (+/- 15%), 12A total, 0.7A internal
Built in surge suppressors

Internal Power Supplies:
24 Vdc @ 300 mA for external use

ENVIRONMENTAL

Operating Temp: 32° to 122° F (0° to 50° C)

Storage Temp: -20° to 150° F (-28° to 65° C)

Humidity Limits: 15 to 95% (non-condensing)

Enclosure: NEMA 1

PERFORMANCE

Accuracy: 0.025% Analog I/O

Resolution: 16 bit input/12 bit output

Microprocessor: 32 bit, 128k EEPROM

Execution Cycle: Five per second

Time/Date Clock: (battery backed)

OPERATOR CONTROL PANEL

LCD Graphic Display: 2.9" H x 5.1" W

Keyboard: Membrane, tactile feedback

HISTORICAL DATA (Optional)

Displays: 8 or 40 minute charts or 2, 8 or 24 hour charts

Memory: Non-Volatile, 32 Mb. 48 pts every 15 sec for 30 days, or greater with data compression

CONFIGURATION

Standard Lead / Lag: Menu style "Fill-In-The-Blanks" setup.

Control Language: Function block style, 60 functions, 600 Blocks

Security: 2 password levels

Custom Blockware Configuration Software: PWC-Edit™ spread sheet based or PWC-Draw™ graphical, editor. (Windows PC Required)

COMMUNICATION

Network:

Protocol: Modbus (ASCII or RTU mode) or Bacnet (optional)

Speed: 1200 to 38,400 baud

Type: RS-485, optically isolated

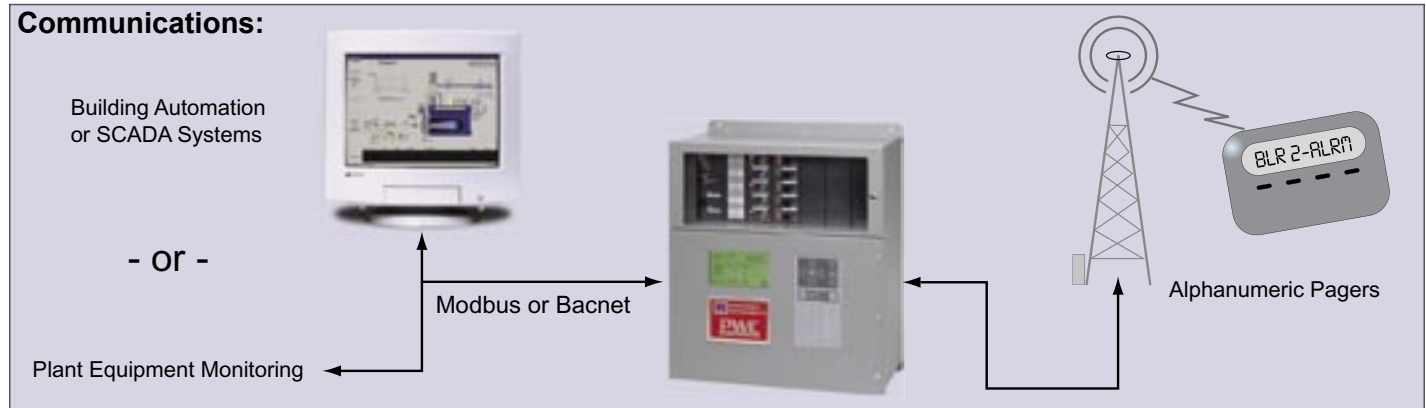
Telephone Modem (optional): Internal Card 33,600 baud, RJ-11 Jack, Data and Pagers Alarms / Logs, DB25F connector

Printer Port:

Configuration Port:

Speed: 9600 to 38,400 baud

Type: RS-232, DB9F connector



The **PWC** creates a single point of information gathering that can be communicated to the **Building Automation** or SCADA System. The **PWC** is the ideal choice for remote monitoring of unmanned plants.



Plant Wide Controller (PWC)
Shown with key lockable viewing window open.

As boilers or plant equipment quantities are increased, operator interface and I/O are conveniently added via plug-in modules.

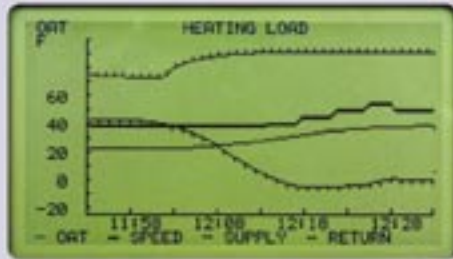
- **Discrete Input Boards** provide equipment status LED indicators.
- **Relay Output Boards** provide boiler control On-Off-Auto toggle switches and “Call For Operation” and “Output Status” LED indicators.
- **Analog Output Boards** provide Auto/Manual toggle switches and manual control dial with 10 segment bargraph output indication.

LCD Graphic Display brings plant overviews, **historical trending**, outdoor reset, alarm and event status and setup displays right to the plant floor.



Plant Overview Display(s)

At a glance control and monitoring of boiler status and lead/lag sequence.



Historical Trend Display(s)

An essential monitoring tool. Multiple (4) Pen “Charts” are included.



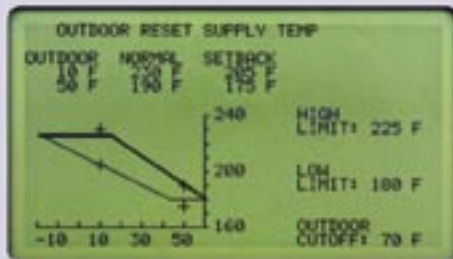
Alarm Display

Alarms, events and operator actions are logged with time, date stamp, and description.



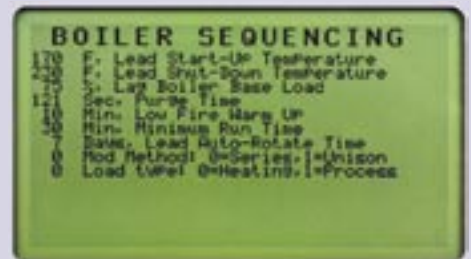
Setback Display(s)

Simple Day/Night/Week Setback setup.



Outdoor Reset Display

Easily configure normal and setback setpoints and limits. A graphical representation is automatically generated.



Boiler Setup Displays

Simple Menu style “Fill-In-The-Blanks” setup.

Ordering Information

Catalog Number: PWC - C a b c d e f - [#I]-[#P]-[M]-[T]-[B]

Optional Input/Output Boards (slots a - f):

x	none		
A	AIN	8 ch.	Universal, Switch Selectable
D	DIN	15 ch.	120 Vac, Optically Isolated
H	HOA-ROUT	5 ch.	Relay, 8A, 120Vac
R	ROUT	8 ch.	Relay, 8A, 120Vac
O	A/M-AOUT	5 ch.	4-20mAdc or 135ohm
	Specify A/M-AOUT output channel cards: (one required per active channel)		
	1 ch	4-20mAdc	(#I = quantity)
	1 ch	135ohm pot	(#P = quantity)
Optional Features:			
M	Internal Modem (CPU Daughter Board)		
T	Historical Memory (CPU Daughter Board), 32 Mb		
B	Bacnet RS232/485 Communication Protocol		

Catalog Number Example:

PWC-CDHODAR-3I-2P-M-T-B: PWC with CPU, DIN, HOA-ROUT, DIN, AIN, ROUT Boards,(3) 135ohm output cards and (2) 4-20mAdc output cards, Internal Modem, Historical Trending & Bacnet communication protocol.

PWC Model #	AIN	AOUT	DIN	ROUT	Total I/O	Example Applications
PWC-C <u>D</u> <u>H</u> <u>O</u> <u>x</u> <u>x</u> <u>x</u>	2	5	15	6	28	2-5 Boiler Modulating Lead / Lag
PWC-C <u>D</u> <u>H</u> <u>O</u> <u>D</u> <u>H</u> <u>O</u>	2	10	30	11	53	2-10 Boiler Modulating Lead / Lag
PWC-C <u>D</u> <u>H</u> <u>x</u> <u>x</u> <u>x</u> <u>x</u>	2	0	15	6	23	2-5 Boiler Lead / Lag
PWC-C <u>D</u> <u>H</u> <u>D</u> <u>H</u> <u>x</u> <u>x</u>	2	0	30	11	43	2-10 Boiler Lead / Lag
PWC-C <u>D</u> <u>H</u> <u>D</u> <u>H</u> <u>D</u> <u>H</u>	2	0	45	16	63	2-15 Boiler Lead / Lag
PWC-C <u>D</u> <u>H</u> <u>O</u> <u>A</u> <u>A</u> <u>A</u>	26	5	15	6	52	2-5 Blr. Mod. L / L With Monitoring
PWC-C <u>D</u> <u>H</u> <u>O</u> <u>A</u> <u>D</u> <u>R</u>	10	5	30	14	59	2-5 Blr. Mod. L / L With Monitoring
PWC-C <u>A</u> <u>A</u> <u>A</u> <u>A</u> <u>A</u> <u>A</u>	50	0	0	1	51	Plant Monitoring
PWC-C <u>D</u> <u>D</u> <u>D</u> <u>D</u> <u>D</u> <u>D</u>	2	0	90	1	93	Plant Monitoring

- Notes:
- 1) The examples given in no way reflect the number of possible option board combinations. The PWC has a total of six (6) option board slots, and any option board may be used in any slot.
 - 2) Consult factory for available pre-configured control strategies.
 - 3) Separately order PWC Edit™ or PWC Draw™ programming packages as required.

Specify Pressure Sensor as follows:

- P/N 90600 for 0-25 psi with syphon loop
- P/N 90601 for 0-200 psi with syphon loop
- P/N 90602 for 0-500 psi with syphon loop

Specify Thermistor Temperature Sensor as follows:

- P/N 70610 for 0-300° F hot water with 4" thermowell
- P/N 70611 for 0-300° F hot water with 8" thermowell
- P/N 70612 for Outside Air Temperature with weatherproof cover

Represented by:



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