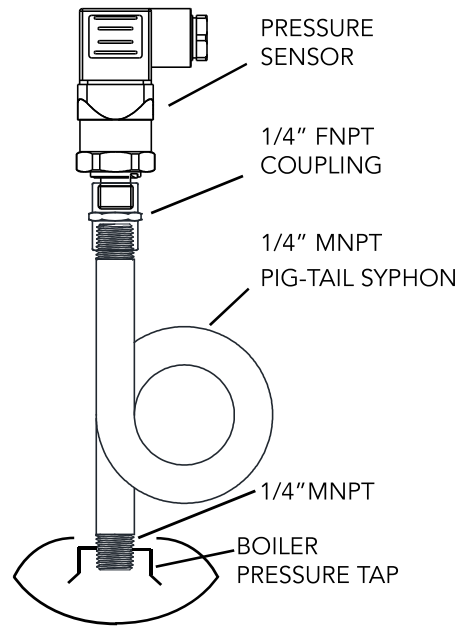
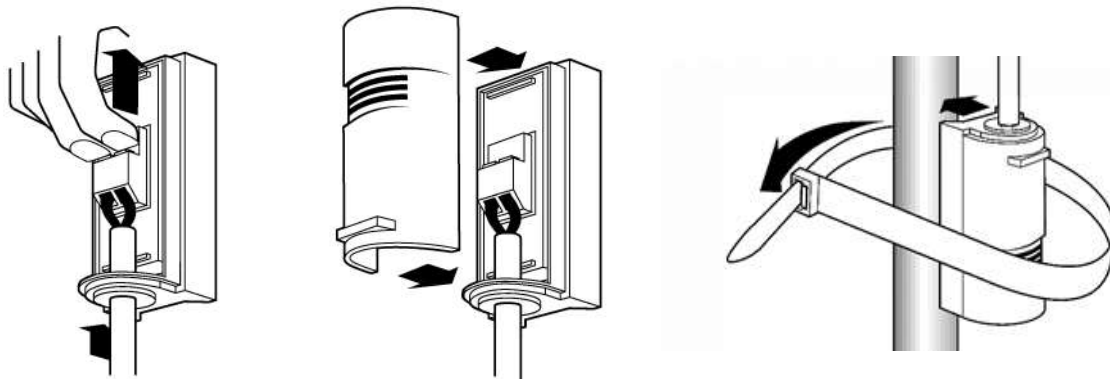


## TYPICAL PRESSURE SENSOR MOUNTING



## TYPICAL TEMPERATURE SENSOR CONNECTIONS AND MOUNTING



### Description

The UBE-1440 is a microprocessor-based fuel saving controller for Hydronic or Steam heating boilers. It reduces fuel consumption, wear on parts and emissions by actively managing the burner cycling in conjunction with the existing operating control. Efficiency gains and savings are achieved by matching the Boiler's output more closely to the required load. The controller is programmable. Settings and key data is stored in non-volatile memory. Access to all functions is via a touch-sensitive TFT color display.

### Electric Ratings

Power input: 115 or 208-230 VAC, 5 Watts max., 50/60Hz.  
 Control circuit input: 24,115/208-230 VAC  $\pm$  10%, 0.1A max. Burden  
 Relay Contact: Form B, 10A @ 220 VAC (General Purpose)

### Environmental Conditions

For Indoor Use. (Non-exposure to Outdoor conditions)  
 Maximum Altitude 6,600ft. (2000M).  
 Controller Operational Temperature Range: 0° - 140°F (-17° - 60°C)  
 Sensor Operational Temperature Range: -13° - 200°F (-25° - 182°C)  
 Controller Maximum Rh: 90% non-condensing  
 Mains Supply Voltage Fluctuations: +10%, -20%  
 Transient Over-Voltage Category (III)  
 Pollution Degree (2)

### Maintenance

Maintenance of the controller is NOT required. The Controller will provide many years of Energy Savings.

### Warranty

I-CON controls carry a limited manufacturer's warranty<sup>1</sup> against breakdowns or defects in materials and/or workmanship for 10 years<sup>2</sup>. If an I-CON control fails during normal operation, ICS™ will provide a replacement product at no charge.

### Performance Guarantee

I-CON UBE-1440 controls carry a 10% energy reduction guarantee. If, after the first year of operation, the control does not reduce the fuel consumption of your heating system by the guaranteed amount<sup>3</sup>, ICS will refund the difference between your savings and our guarantee<sup>4</sup>.

<sup>1</sup> Only valid for the original installation.

<sup>2</sup> Signs of moisture and/or tampering will void the Warranty.

<sup>3</sup> Consumption data must be normalized for the periods of comparison.

<sup>4</sup> Refund amount will not exceed the manufacturing "List Price" of the control at the time of sale and the control must be returned to ICS.

## Installation

### The following instructions must be followed:

1. Prior to the actual installation, the following must be determined.
  - a) Identification and measurement of the power that will be applied to the controller.
  - b) Identification and measurement of the control circuit voltage that will be used to control the burner.
  - c) Determination of the Pre-Purge time.
  - d) Prior to the mounting of the controller the voltage input selection switch should be placed in the proper position. Note: The controller may be powered by either 115 VAC or 208-230 VAC. Based upon the input voltage, the switch should be in either the 115 or 230 position. Applying the wrong voltage and/or improper switch settings will void the Warranty.

### 2. Ensure ALL POWER TO THE CONTROL AND BOILER IS OFF!

*Do not apply power to the controller until directed to do so further in these Instructions.*

Determine a suitable mounting location for the controller and mount, using suitable hardware, within the Boiler's electric panel or on a suitable location that will provide sufficient visualization of the control and facilitate wiring. Again, consideration should be given to accessibility of the touch-screen, routing and connection of the various wiring, and serviceability. It may be necessary to relocate some items in the electric enclosure to obtain room for the controller. At no time should the controller be exposed to outdoor conditions.

### 3. Sensors: (See Page 12 for Mounting Instructions)

In the case of a Hydronic Boiler - Properly locate and mount the Supply, Domestic, and/or Return water temperature sensors. Note: All three (3) sensors are not required for operation. At a minimum either a Supply or Domestic temperature sensor MUST be used or an error message will be generated on the screen and the control will not operate. For example - for a HEATING only operation, only the Supply sensor is need. For a Domestic Hot Water only operation, only the Domestic water sensor is needed. If the boiler is used for both Heating and Domestic hot water, both sensors should be used to optimize the operation of the controller. The return water sensor is only used if Return water temperature indication is desired. Properly route and wire (See wiring diagram) the sensors to the appropriate terminals on the controller, using the supplied 20' wires. NOTE: The polarity of the sensor connections to the controller DOES NOT MATTER.

In the case of a Steam Boiler - Properly locate and mount the Pressure, Domestic, and/or Return water sensors. The Pressure sensor must be installed using a "Pig-Tail Siphon" (See Page 12). Note: All three (3) sensors are not required for operation. A Pressure sensor MUST be used or an error message will be generated on the screen and the control will not operate. For example - for a HEATING only operation, only the Pressure sensor is need. If the boiler also generates Domestic Hot Water the Domestic water sensor is needed especially if the boiler has summer/winter mode operation. The return water sensor should be used to enhance savings. Properly route and wire (See wiring diagram) the sensors to the appropriate terminals on the controller, using the supplied 20' wires. NOTE: The polarity of the water temperature sensor connections to the controller DOES NOT MATTER. **The connections from the pressure sensor to the controller are polarity sensitive and MUST BE FOLLOWED.**

**The Temperature / Pressure sensor wires may be extended using standard, 18 - 22 AWG 2-Conductor Jacketed Cable. Note: Pressure Sensor wiring is Polarity Sensitive.**

### 4. Power wiring to controller:

**All wiring must conform to the regulations and requirements in effect at the location of installation by properly trained and, if necessary, licensed installers.**

- a) Confirm that the voltage selection switch is positioned properly based upon the power input voltage value determined in Installation 1, above.
- b) Connect the power wiring to the controller (See wiring diagram). **DO NOT APPLY POWER TO THE CONTROLLER AT THIS TIME!**

### 5. Control wiring to controller:

The controller CONTROL CONNECTIONS are electrically installed in series (**NEVER IN PARALLEL**) with the operating-controls. It is very important that the control be installed, electrically, before any interlocks to ensure proper operation of the burner, and to eliminate any alarm or fault conditions that could arise because the controller is delaying the burner. **AT NO TIME SHOULD ANY SAFETY CONTROLS OR CIRCUITS BE CIRCUMVENTED.**

The control circuit may be energized by 24vac or 115/208-230vac. Because of this, it is MANDATORY that the proper common for the individual control circuits be identified and utilized. Follow the wiring diagram depending on the control type used.

### 6. Double-check all wiring and connections. Make sure there are no short-circuits between terminals.

### 7. When all of the above is confirmed, power may be re-applied to the Boiler and CONTROL.

### 8. After power-up, select the control application for the boiler type used.

## Configuration

The UBE-1440 controller has numerous configurable parameters to customize the control responses to achieve maximum savings. There are default values pre-configured into the various parameters that are proper for most applications. When first powered-up, the Installer will be prompted to select a control strategy for the controller. The selections are for use on a Hydronic or Steam Boiler application. If you determine that the control needs to be further customized, we suggest contacting our Technical support staff to discuss (1-516-340-1011 Ext. 404). The range and options of the adjustments for each parameter are shown on the configuration screens (See Screen flow diagrams on Page 8 & 9 for Steam, or 10 & 11 for Hydronic programmed controls).

When configuring, none of the changes go into effect until the Enter button is selected. Most of the programming is typical for both control schemes, however there are some different parameters depending upon whether or not you are configuring for a Hydronic or Steam boiler operation.

The screen Contrast may be set from the Configuration, Contrast screen.

In addition, the controller may be reset to factory defaults and/or the Timers/Counters Zeroed by selecting the appropriate touch-button for the required operation.

**The parameters are selected by touching the screen anywhere along the line of the parameter and will become highlighted in yellow.**

The following Items may be set in the various configuration menus:

### HYDRONIC PARAMETERS

1. RESET TO FACTORY DEFAULTS
2. RESET TIMERS/COUNTERS
3. TEMPERATURE INDICATION IN °F OR °C.
4. PREPURGE TIME – Time in seconds determined during 'Installation, Step 1,c'. This is extremely important for proper savings calculation and display.
5. SUPPLY TEMPERATURE Low-Limit Maximum Economizer Time Limit.
6. SUPPLY DYNAMIC LOW-LIMIT
7. DOMESTIC WATER TEMPERATURE LOW-LIMIT
8. DOMESTIC DYNAMIC TEMPERATURE LOW-LIMIT
9. MAXIMUM ECONOMIZER TIME
10. MAXIMUM STANDBY TIME

STEAM PARAMETERS ARE ON THE FOLLOWING PAGE.

## STEAM PARAMETERS

1. RESET TO FACTORY DEFAULTS
2. RESET TIMERS/COUNTERS
3. TEMPERATURE INDICATION IN °F OR °C.
4. PRESSURE INDICATION IN PSI OR W
5. PRE-PURGE TIME – Time in seconds determined during 'Installation, Step 1,c'. This is extremely important for proper savings calculation and display.
6. SUMMER-WINTER SWITCH ACTION
7. LOW PRESSURE SELECT
8. PRESSURE LOW LIMIT
9. DOMESTIC WATER TEMPERATURE LOW-LIMIT
10. DYNAMIC DOMESTIC LOW-LIMIT TEMPERATURE
11. RETURN WATER LOW-LIMIT TEMPERATURE
12. RETURN WATER DIFFERENTIAL TEMPERATURE
13. WINTER-MODE MAX ECONOMIZER TIME
14. SUMMER-MODE MAX ECONOMIZER TIME
15. MAXIMUM STANDBY TIME

## Operation:

All Functions, Screens and Unit Configuration is handled via the touch-sensitive TFT display.

After proper installation, including the proper setting of the control power input voltage selector switch, all sensors, control wiring, and the application of power, the control will activate. After a system check, the LED Activity indicator will blink on and off at a 1 second rate; indicating that the power is on and the program is running. In the event of a fault the touch-screen display will indicate the nature of the problem.

By default, after the Copyright notice, the control will start (Home Screen) with the selected Control status screen being displayed. The additional Control screens and functions may be accessed via the touch-screen. See the appropriate Screen Display pages for a view of the various Screens and their flow from one to the other.

The Home Screen displays numerous information. Besides the system Pressure (Steam Boiler only) and Temperatures, Unit STATUS and secondary messages may be displayed depending upon the circumstance.

The possible messages and their explanations are as follows:

### Status Messages:

STANDBY - The Boiler is operating under its own internal operating-control, which has turned the burner off. This occurs until the load on the Boiler demands a heating response. This message may be accompanied with a secondary message.

ECONOMIZING - The existing Boiler control is responding to a heating demand, but the control is delaying the burner from firing until the control algorithm has been satisfied. This message may be accompanied with a secondary message.

HEATING - The controller has released the burner to fire.

SYSTEM BYPASSED – A condition has occurred that would inhibit the control from functioning properly. This message indicates that the control has taken itself out of the circuit (BYPASSED) and is no longer economizing. It will be accompanied with a secondary message that explains the cause.

*During normal operation, the first three messages will appear sequentially.*

### Secondary Messages:

STANDBY TIMER EXPIRED - as a fail-safe for the control, the internal electronics are monitored. By default, this is set to 90 minutes (adjustable between 5 – 90 minutes and Disabled). Disabling, is NOT recommended. This message may appear periodically, especially during seasonal changes depending upon the need for heating. This message should go away as soon as a call-signal is sensed. If not, or the burner is running and the control indicates a status of STANDBY, service should be contacted.

SUMMER ECON TIMER EXPIRED - THIS WILL ONLY BE DISPLAYED IF THE CONTROL IS SETUP FOR A STEAM BOILER. This message will be displayed if the burner has been released to run due to this timer expiring during Summer Mode of operation. This value is configurable. By default it is DISABLED.

WINTER ECON TIMER EXPIRED – will be displayed if the burner has been released to run due to this timer expiring. This value is configurable. By default it is set to 30 minutes.

LOW TEMPERATURE LIMIT - One of the controlling sensors has released the Burner to fire due to the sensed temperature being below the low-limit set-point value.

LOW PRESSURE LIMIT - Pressure sensor has released the Burner to fire due to the sensed pressure being below the low-limit set-point value.

SENSOR FAULT – this will be displayed whenever any of the sensors are in a fault condition that would cause a Bypass of that individual control function. The faulting sensor will be individually identified on all of the control Status screens. Sensors are only detected during a power-up or control reset. Replacement of a sensor must be accompanied by a reset of the control.

SET MANUALLY BY OPERATOR – this will be displayed whenever the control is manually bypassed through the 'RESET/BYPASS' screen.

INTERNAL FAULT – a condition has been sensed that would inhibit the control from functioning. The control has bypassed itself, to allow the Boiler's controls to function without the *UBE-1440* control intervening. SERVICE MUST BE CONTACTED.....

CRITICAL SENSOR NOT DETECTED - One of the mandatory sensors was not detected after a power-up or reset. The Control has bypassed itself and will require a power-off then -on or reset to detect the sensor.

## ----- **SPECIAL INSTRUCTIONS TO REPROGRAM THE CONTROL** -----

In the event that it is necessary to change the control type from Hydronic to Steam or visa-versa the following procedure must be followed. **NOTE: THE FOLLOWING PROCEDURE WILL CAUSE A LOSS OF ALL CONFIGURATION AND RUNTIME DATA. THIS LOSS IS IRREVERSIBLE!**

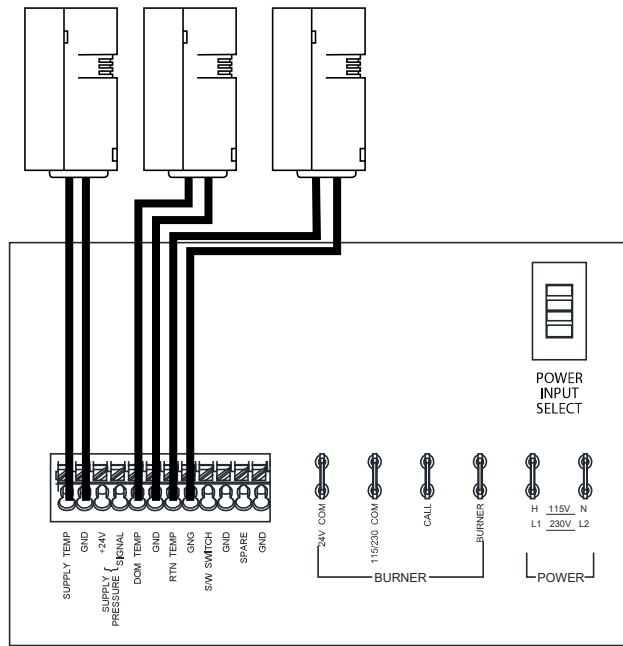
Follow the following procedure to the letter! Read through the procedure to become familiar with it.

1. FROM THE HOME SCREEN (ICON WITH A HOUSE) ENTER INTO THE CONFIGURATION SCREEN BY TAPPING ON THE TOOLS ICON (LOOKS LIKE GEARS).
2. WITHIN 6 SECONDS TAP ON THE SCREEN IN THE AREA WHERE IT SAYS "CONFIGURATION" RAPIDLY ABOUT 10 TO 15 TIMES.
3. IF THE SCREEN DOES NOT ENTER INTO THE RECONFIGURATION SCREEN, YOU WILL NEED TO GO BACK TO THE HOME SCREEN AND START AGAIN FROM NUMBER 1.
4. FROM THE RECONFIGURATION PAGE YOU MUST SELECT BY PRESSING "CONFIRM 1", THEN "CONFIRM 2", THEN "CONFIRM 3". IN THAT ORDER.
5. AFTER ALL 3 CONFIRMATION BUTTONS HAVE BEEN SELECTED THE UNIT WILL ENTER A 10 SECOND COUNT-DOWN. DURING THE COUNT-DOWN - TOUCHING THE SCREEN ANYWHERE WILL ABORT THE PROCEDURE.

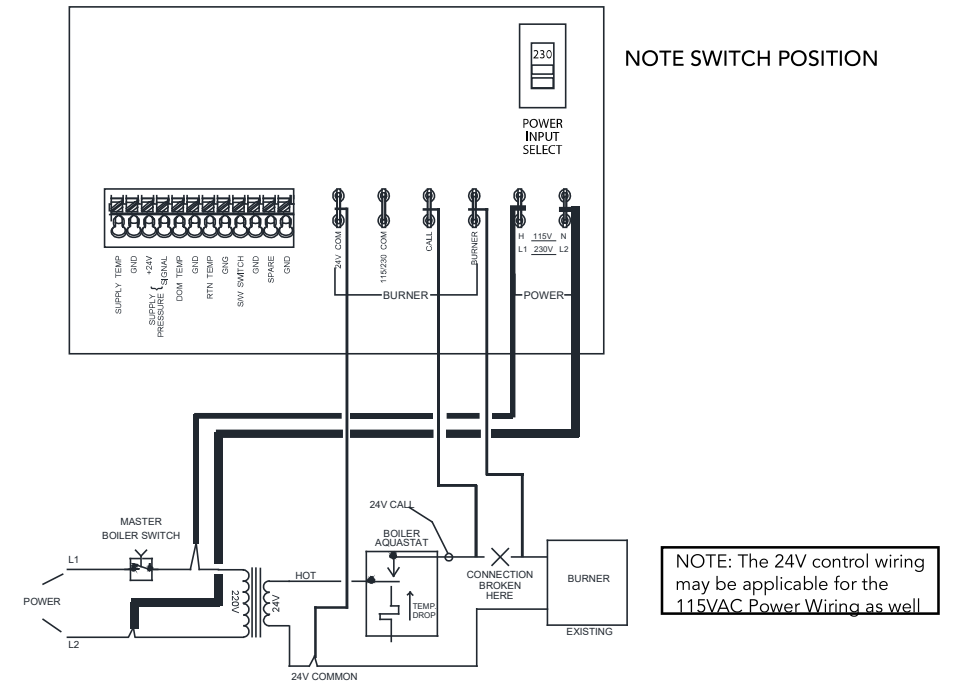
IF NOT ABORTED THE CONTROL WILL BE REPROGRAMMED.....

## HYDRONIC CONTROL SENSOR WIRING

(WIRING IS NON-POLARITY SENSITIVE)

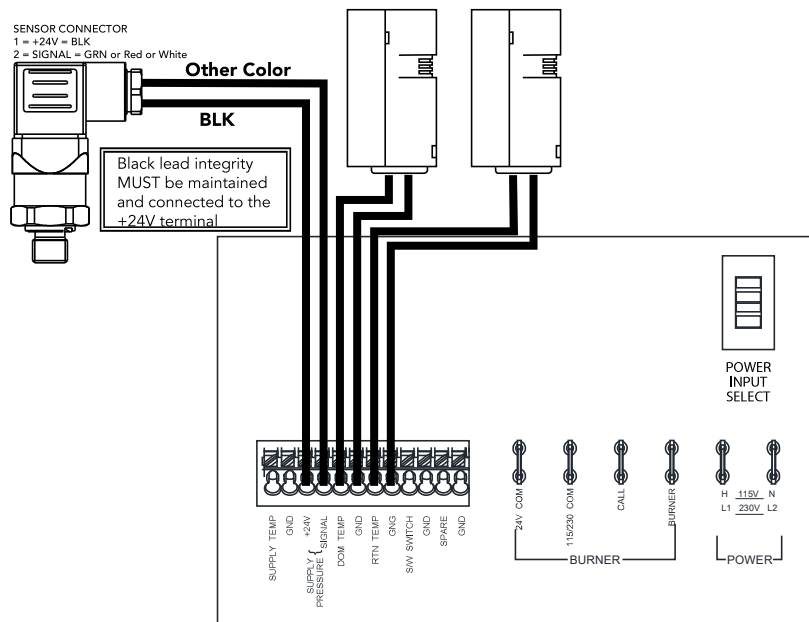


## TYPICAL 208-230VAC POWER / 24VAC CONTROL

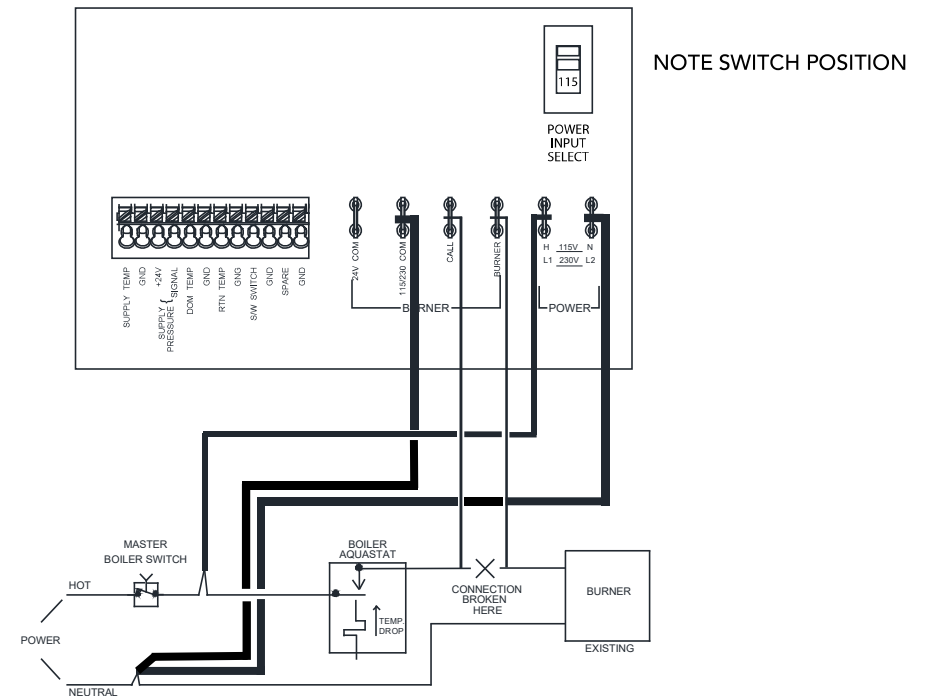


## STEAM CONTROL SENSOR WIRING

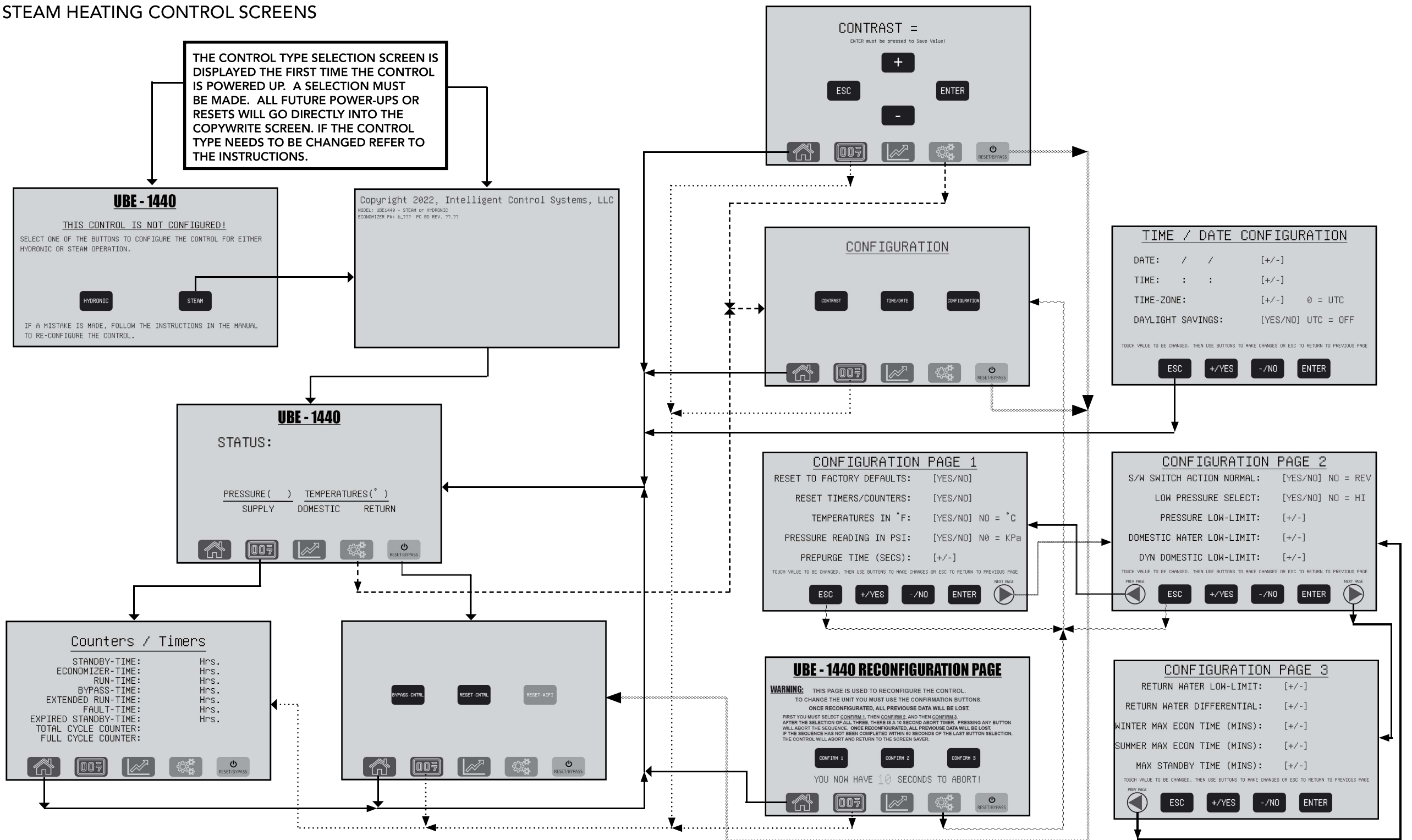
(PRESSURE SENSOR IS POLARITY SENSITIVE)



## TYPICAL 115VAC POWER / 115VAC CONTROL



# STEAM HEATING CONTROL SCREENS



# HYDRONIC HEATING CONTROL SCREENS

THE CONTROL TYPE SELECTION SCREEN IS DISPLAYED THE FIRST TIME THE CONTROL IS POWERED UP. A SELECTION MUST BE MADE. ALL FUTURE POWER-UPS OR RESETS WILL GO DIRECTLY INTO THE COPYWRITE SCREEN. IF THE CONTROL TYPE NEEDS TO BE CHANGED REFER TO THE INSTRUCTIONS.

**UBE - 1440**

THIS CONTROL IS NOT CONFIGURED!  
SELECT ONE OF THE BUTTONS TO CONFIGURE THE CONTROL FOR EITHER HYDRONIC OR STEAM OPERATION.

HYDRONIC      STEAM

IF A MISTAKE IS MADE, FOLLOW THE INSTRUCTIONS IN THE MANUAL TO RE-CONFIGURE THE CONTROL.

Copyright 2022, Intelligent Control Systems, LLC  
MODEL: UBE1440 - STEAM or HYDRONIC  
ECONOMIZER FH: 0.??? PC 00 REV. ????

**UBE - 1440**

STATUS:

TEMPERATURES (°)

SUPPLY	DOMESTIC	RETURN
--------	----------	--------

**Counters / Timers**

STANDBY-TIME:           Hrs.  
ECONOMIZER-TIME:       Hrs.  
RUN-TIME:                Hrs.  
BYPASS-TIME:            Hrs.  
EXTENDED RUN-TIME:     Hrs.  
FAULT-TIME:             Hrs.  
EXPIRED STANDBY-TIME:   Hrs.  
TOTAL CYCLE COUNTER:  
FULL CYCLE COUNTER:

BYPASS-CNTRL    RESET-CNTRL    RESET-HIPI

**CONTRAST =**

ENTER must be pressed to Save Value!

ESC      ENTER

+

-

**CONFIGURATION**

CONTRAST    TIME/DATE    CONFIGURATION

**TIME / DATE CONFIGURATION**

DATE:    /    /    [+/-]

TIME:    :    :    [+/-]

TIME-ZONE:            [+/-]    0 = UTC

DAYLIGHT SAVINGS:    [YES/NO]    UTC = OFF

TOUCH VALUE TO BE CHANGED, THEN USE BUTTONS TO MAKE CHANGES OR ESC TO RETURN TO PREVIOUS PAGE

ESC    +/-YES    -/NO    ENTER

**CONFIGURATION PAGE 1**

RESET TO FACTORY DEFAULTS:    [YES/NO]

RESET TIMERS/COUNTERS:        [YES/NO]

TEMPERATURES IN °F:            [YES/NO]    NO = °C

PREPURGE TIME (SECS):        [+/-]

SUPPLY TEMP LOW-LIMIT:        [+/-]

TOUCH VALUE TO BE CHANGED, THEN USE BUTTONS TO MAKE CHANGES OR ESC TO RETURN TO PREVIOUS PAGE

ESC    +/-YES    -/NO    ENTER    NEXT PAGE

**CONFIGURATION PAGE 2**

SUPPLY DYN LOW-LIMIT:        [+/-]

DOMESTIC WATER LOW-LIMIT:    [+/-]

DOMESTIC DYN LOW-LIMIT:      [+/-]

MAX ECON TIME:                [+/-]

MAX STANDBY TIME:             [+/-]

TOUCH VALUE TO BE CHANGED, THEN USE BUTTONS TO MAKE CHANGES OR ESC TO RETURN TO PREVIOUS PAGE

PREV PAGE    ESC    +/-YES    -/NO    ENTER

**UBE - 1440 RECONFIGURATION PAGE**

**WARNING:** THIS PAGE IS USED TO RECONFIGURE THE CONTROL. TO CHANGE THE UNIT YOU MUST USE THE CONFIRMATION BUTTONS. ONCE RECONFIGURED, ALL PREVIOUS DATA WILL BE LOST.

FIRST YOU MUST SELECT CONFIRM 1, THEN CONFIRM 2, AND THEN CONFIRM 3. AFTER THE SELECTION OF ALL THREE, THERE IS A 10 SECOND ABORT TIMER. PRESSING ANY BUTTON WILL ABORT THE SEQUENCE. ONCE RECONFIGURED, ALL PREVIOUS DATA WILL BE LOST. IF THE SEQUENCE HAS NOT BEEN COMPLETED WITHIN 60 SECONDS OF THE LAST BUTTON SELECTION, THE CONTROL WILL ABORT AND RETURN TO THE SCREEN SAVER.

CONFIRM 1    CONFIRM 2    CONFIRM 3

YOU NOW HAVE 10 SECONDS TO ABORT!