



Ultra

Gas-fired water boilers

Ultra Series 1 and 2 U-Control Upgrade Instructions

Kit Part Number 383-500-665

Tools required:

- Phillips screwdriver #2
- Phillips screwdriver #2 Stubby
- Flat screwdriver 1/8"
- Nut driver 5/16"
- Wire Cutters
- Wire Strippers
- Drill
- Drill bit 1/8"
- Drill bit 1/4"
- Dremel with cutting wheel

Hazard definitions

The following defined terms are used throughout these Instructions to bring attention to the presence of hazards of various risk levels or to important information concerning the life of the product.

▲WARNING Indicates presence of hazards that can cause severe personal injury, death or substantial property damage.

▲CAUTION Indicates presence of hazards that will or can cause minor personal injury or property damage.

NOTICE Indicates special instructions on installation, operation or maintenance that are important but not related to personal injury or property damage.

To the installer:

These Instructions must only be used by a qualified installer/service technician. Read these Instructions completely before beginning the installation. Failure to follow all instructions can cause severe personal injury, death or substantial property damage.

NOTICE

Series identification:

Instructions in this instruction are based on factory default parameter settings.

NOTICE

Series identification:

Read the boiler rating plate to determine the series number. The rating plate is located inside the boiler jacket, on the right rear interior panel.

P/N 383-500-665 Kit Ultra Series 1 or 2 U-Control Upgrade

Contents:	Quantity
383-500-642 Kit-Service U-Control Terminal Blocks	1
511-330-267 Control Module with Circuit-Board UT 1176-100	1
511-330-455 Module Display Remote for Ultra Series 1 & 2	1
511-724-292 T-Sensor Flue NTC 5D x 60mm 2 x 12KOhm	1
511-724-293 T-Sensor Water NTC 12 KOhm	1
511-724-294 T-Sensor Heat Exchanger NTC Duplex 12 KOhm	2
550-100-046 Instructions U-Control Ultra Series 1 & 2	1
550-100-090 Manual-Boiler Ultra Series 3	1
562-135-777 Screw Type B Pan Head Phillips 6 x.88 Steel Zinc Plated	2
562-135-779 Screw Type B Pan Head Phillips 6 x.62 Steel Zinc Plated	1
590-318-011 Gasket Flue Temperature Sensor Black	1
591-392-013 Wire Harness Low Voltage	1
591-392-049 Wire Harness High Voltage	1
591-391-947 Wire Harness w/ Receptacle & Safety Cap	1
591-392-004 Wire Harness Control Module to Module-Display	1
591-638-851 Sealant Silicone RTV 700 3 Oz.	1

STOP! Read before proceeding

⚠ WARNING Shut off power to the boiler and close main gas valve. Failure to do so can result in severe personal injury, death or substantial property damage.

⚠ WARNING Removing and reinstalling components can change boiler behavior. After any maintenance procedure, you must prove the boiler is operating correctly. To do so, **follow the complete procedure for boiler and system start-up as instructed in the Boiler Manual.** Failure to comply could result in severe personal injury, death or substantial property damage.

U-Control Replacement Instructions:

Record boiler and system settings “U-Control Set-Up Data” using page 22 of this instruction.

1. Turn off boiler power switch, breaker and gas supply to boiler.
2. Remove Phillips head screw from electrical cover on top rear of boiler. Remove cover.
3. Remove two (2) knurled screws from bottom of front door. Remove front door.
4. Remove four (4) Phillips head screws from top front cover and lay top cover aside for re-use.

5. Remove pressure temperature gauge and lay aside for re-use.
6. Remove two (2) 5/16” hex head screws from display panel, disconnect cable and power switch connectors and remove display. Using 3/16” wrench or socket remove four screws from display module. Discard display module.
7. Remove all electrical connectors from Honeywell MCBA. Remove two (2) Phillips head screws from module and discard MCBA control module and screws.

NOTICE

If Ultra Series 1 or 2 has an AM-4 modulating control interface, carefully mark the two (2) input wires as to polarity for reuse and remove from AM-4. Then remove and discard AM-4 interface.

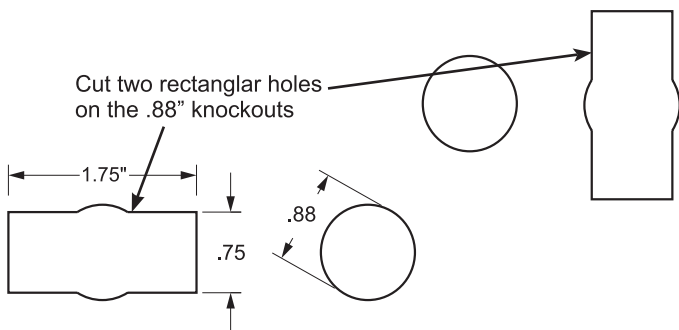
8. Remove all high and low voltage connectors from the inducer, gas valve, sensors, and 120 VAC outlet. Pull all wires and connectors up through boiler top metal panel and move to side for control access.

CAUTION Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

9. The transformer must be moved to the right to allow room for placement of the new U-Control. Remove the four (4) Phillips head screws from top rear plastic cover. Remove all four (4) screws from transformer and rear bracket with a #2 Phillips screwdriver. Lift the rear top plastic panel as far as possible to access the rear transformer screws and bracket. A stubby #2 Phillips screwdriver may be required for the rear screws.
10. Reposition transformer to the right 1 inch. Slide the transformer bracket to the right and position the transformer bracket so the left rear screw goes into the right rear original bracket screw hole. Ensure transformer is straight. Use the transformer and bracket holes to mark and drill 1/8" pilot holes for the front two (2) transformer mounting screws. Then insert the two (2) transformer mounting screws in the front. The right rear transformer bracket screw will not be installed.
11. Remove two (2) screws from each end of high voltage and low voltage terminal strips at top back of boiler. Lift terminal strips for access to wires beneath.
12. Install the new 7/8" black plastic plug in the right 7/8" open hole where the display sits.

14. Install the low voltage harness from the top to the bottom using the rectangular hole that is located toward the left side of where the display panel sits. Position the connectors so that they will go through the hole without damage.
15. Install the high voltage harness from the top to the bottom using the rectangular hole that is located to the right of where the pressure temperature gauge connectors go through the top panel. Position the connectors so that they will go through the hole without damage. Install the rectangular grommet into the hole.
16. Use a generous amount of the silicone provided in the kit to seal the grommets into the two (2) rectangular holes. These seals must be air tight for the sealed combustion burner.
17. Install high voltage Molex to inducer. Install new 120 VAC outlet into receptacle hole on right side of boiler jacket. Connect wire harness Molex connector to 120 VAC receptacle Molex.
18. Remove boiler supply and return sensors from heat exchanger and flue sensor from stainless flue adapter.
19. Install new boiler supply and return sensors in heat exchanger. Install new flue sensor (provided in kit) in stainless flue adapter.
20. Connect appropriate wire harness sensor connectors to heat exchanger and flue sensors. The heat exchanger sensor wires are yellow and the flue sensor wires are red. Connect the low voltage Molex connector to the inducer. Connect the gas valve Molex to the gas valve.
21. Position the U-Control behind the display so that electrical connections can be made. Mark and drill two (2) 1/8" pilot holes in the front two U-Control mounting holes. Then using the two (2) Phillips head screws provided in kit secure the U-Control module to the panel.
22. Install electrical connector plugs on new U-Control. Leave enough room to connect wires to the P2 circulator plug.
23. Lift top rear panel as high as possible. Cut all plastic cable ties on original high and low voltage wire harnesses under top rear panel.
24. Trim the display to fit around the low voltage grommet.
25. Reinstall original display bracket with two (2) 5/16" hex head screws.
26. Reinstall the pressure temperature gauge into the display bracket, through the top metal panel into the lower portion of the boiler. Insert the temperature sensor in the well and insert the pressure gauge fitting into the check valve.

Figure 1 Knockout hole modification for wire harnesses



13. To install the low voltage harness, new holes will need to be cut in the existing panel. The new grommets are rectangular and will require a hole cut into the area where the round grommet was installed. The rectangular hole will be 1.75" long and 0.75" wide. Refer to Figure 1 above for location and hole size.

27. Remove the left rear transformer #2 Phillips head screw and install the new Series 3 ground ring terminal under the screw and reinstall the screw into the transformer metal bracket.

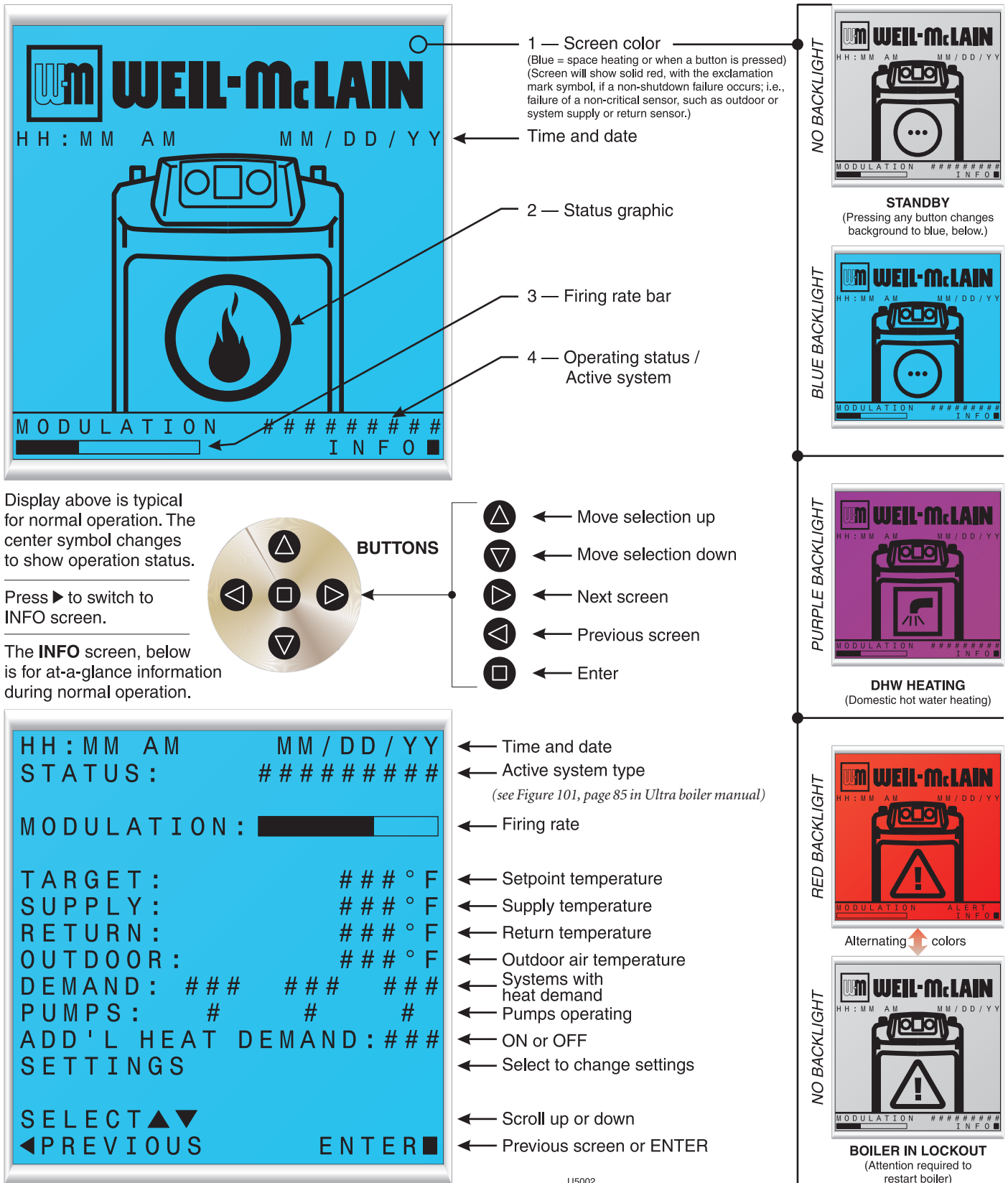
NOTICE

Make sure ground wiring is installed per wiring diagram. Good grounding is extremely important for proper operation.

28. Install the two (2) black power switch wires of the new harness to the power switch on the display panel.
29. **Connect high voltage wiring from the terminal strip to the new U-Control per the following steps.** Refer to Figure 9, page 12.
30. Cut and strip the end of the original harness green ground wire to 29-1/2" and install into the ground connector of the new 3 pin power connector on the new harness. If wires are too short add about six inches of 16 gage wire to lengthen the existing wire.
31. Trace the black H wire from terminal 1 of the high voltage terminal strip, cut and strip the end of the black wire to appropriate length the fit into the L1 connection of the power connector on the new high voltage harness.
32. Trace the white N wire from terminal 2 of the high voltage terminal strip, cut and strip the end of the white wire to appropriate length to fit into the L2 connection of the power connector on the new high voltage harness.
33. Trace the black wire that comes from terminal 3 (DHW H) of the high voltage terminal strip, cut and strip the end of this black wire to 33-1/2". If DHW and boiler circulator relays are present, disconnect the black wire from both relays.
34. Trace the black wire that comes from terminal 5 (Boiler H) of the high voltage terminal strip, cut and strip the end of this black wire to appropriate length to fit into the P2 plug, pin 2 of the new U-Control module.
35. Trace the white wire that comes from terminal 6 (Boiler N) of the high voltage terminal strip, cut and strip the end of this white wire to appropriate length to fit into the P2 plug, pin 5 of the new U-Control module.
36. Remove any extra high voltage wires from the terminal strip by cutting the extra wires close to the terminal strip so they cannot short to the cabinet.
37. **Connect low voltage wiring from the terminal strip to the new U-Control per the following steps.** Refer to Figure 10, page 13.
38. Trace the outdoor sensor wires from the low voltage terminal strip terminals 1 and 2, cut and strip to appropriate length and connect to the U-Control plug P10.
39. Trace the DHW aquastat wires from the low voltage terminal strip terminals 3 and 4, cut and strip to appropriate length and connect to U-Control plug P11, pins 4 and 5.
40. Trace the TSTAT and COM wires from the low voltage terminals 5 & 6, cut and strip to appropriate length and connect to the U-Control plug P15 pins 1 and 2.
41. Trace the soft limit wires from the low voltage terminals 6 and 7, cut and strip to appropriate length and connect to the U-Control plug P13, pins 3 and 4.
42. Trace the hard limit wires from the low voltage terminals 6 and 8, cut and strip to appropriate length and connect to the U-Control plug P13, pins 1 and 2.
43. Disregard the flame sense wire from the low voltage terminal 9. Flame sense is part of the U-Control wiring harness and read via the display screen.
44. Remove any extra low voltage wires from the terminal strip by cutting the extra wires close to the terminal strip so they cannot short to the cabinet.
45. Install U-Control display. This can be mounted on top of the front top plastic cover, or can be remotely mounted up to 48" from the boiler. Connect 48" cable to display and connect to U-Control display connector.
46. Restore electrical power to boiler, Turn on boiler power. Refer to Ultra Series 3 boiler manual for control set up and boiler start up instructions.

U-Control operation and setup *(continued)*

Figure 2 U-Control display and navigation



U5002

Figure 3 Schematic wiring diagram — Ultra-80 through Ultra-230 Series 1 & 2

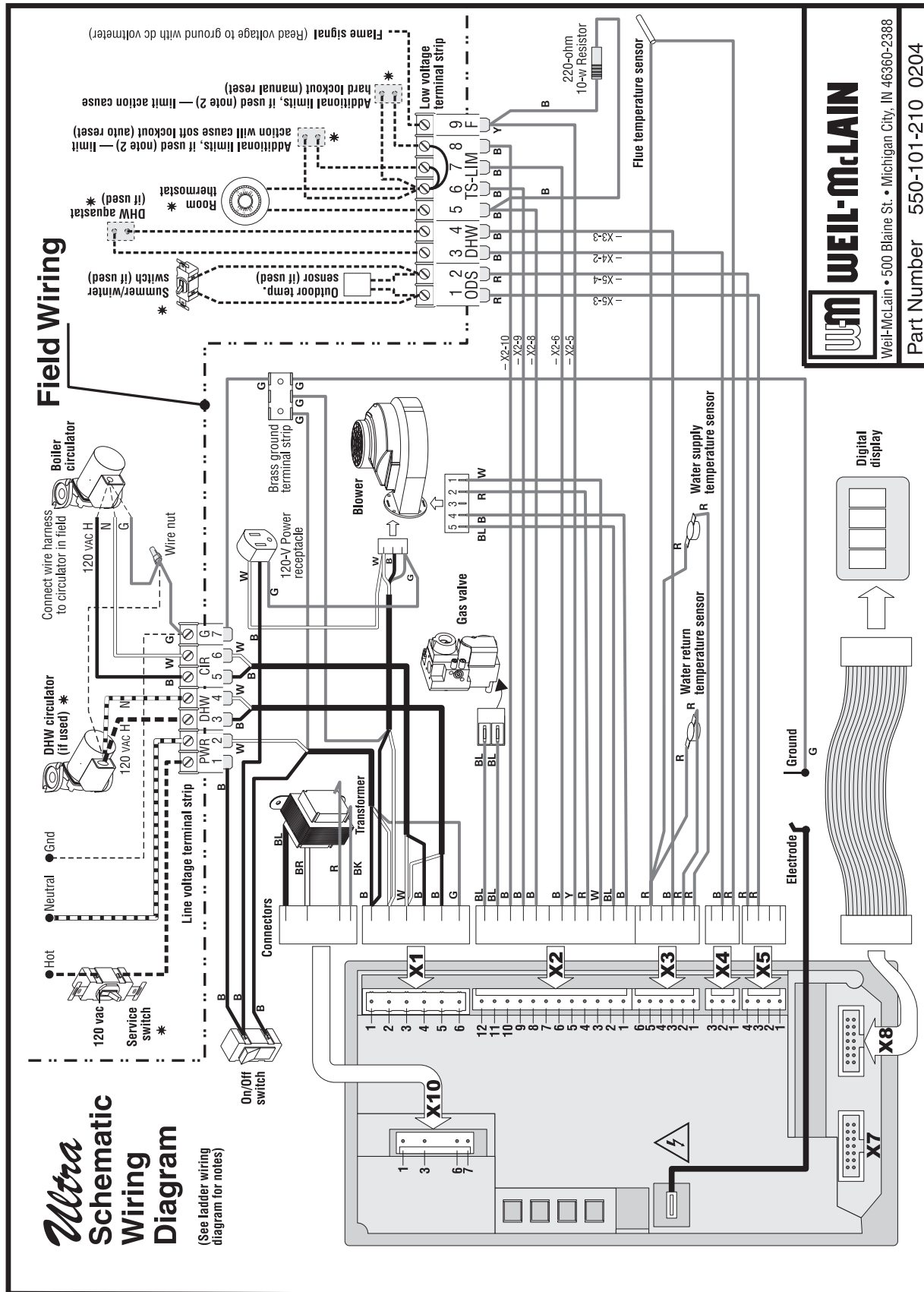


Figure 4 Ladder wiring diagram — Ultra-80 through Ultra-230 Series 1 & 2

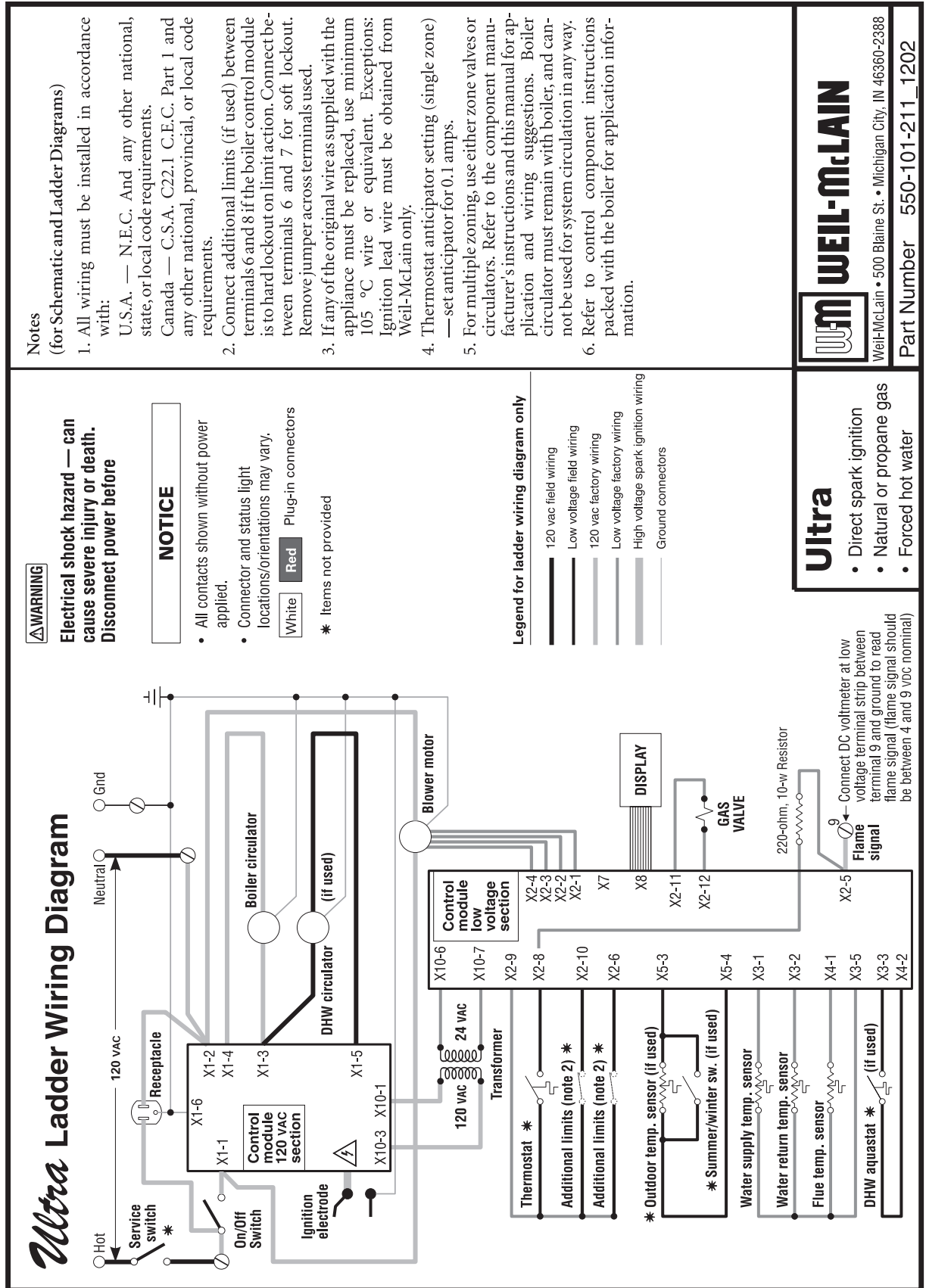


Figure 5 Schematic wiring diagram — Ultra-310 Series 1 & 2

The wire colors shown for the transformer in this wiring diagram supersede those shown on the boiler wiring label.

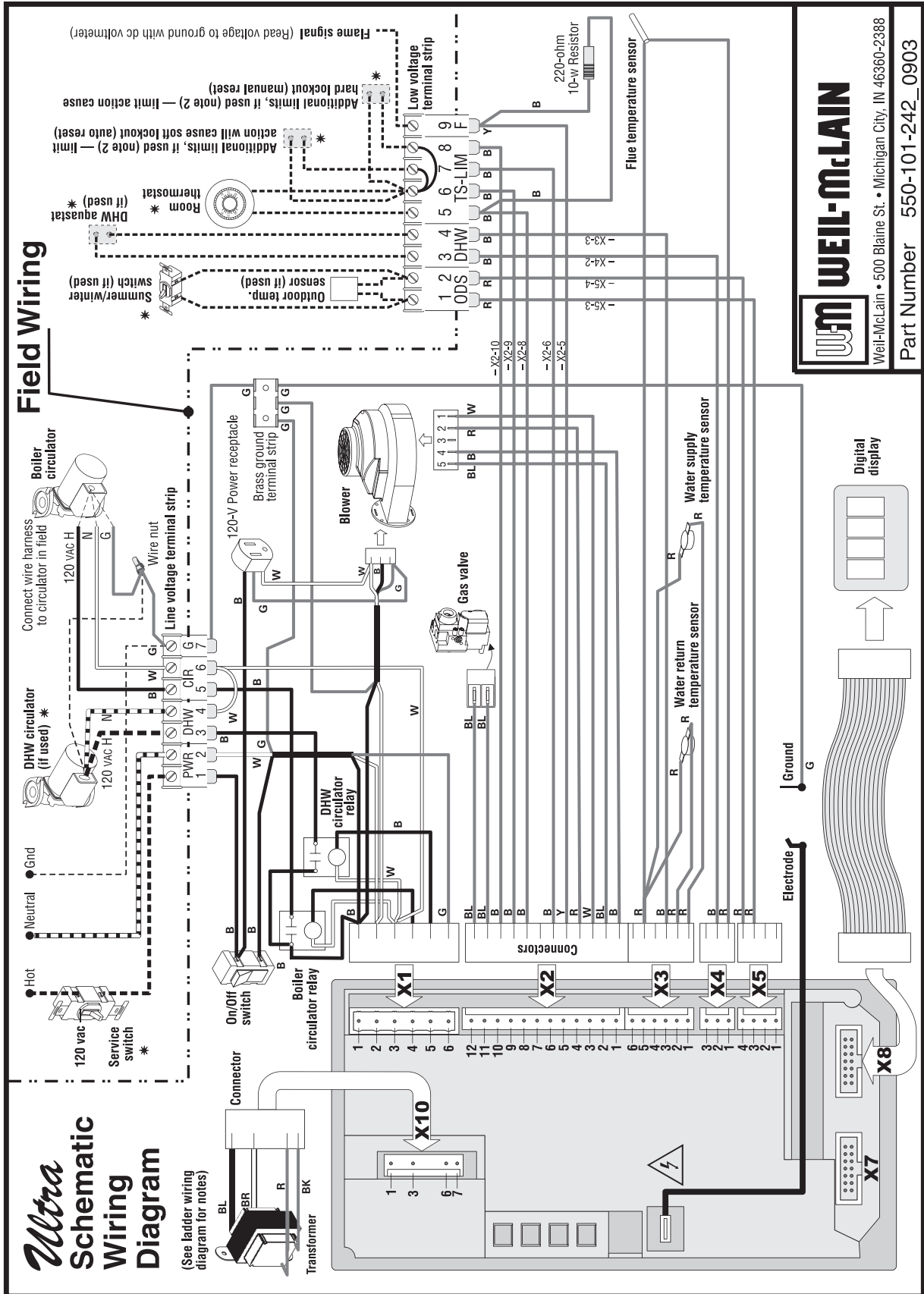


Figure 6 Ladder wiring diagram — Ultra-310 Series 1 & 2

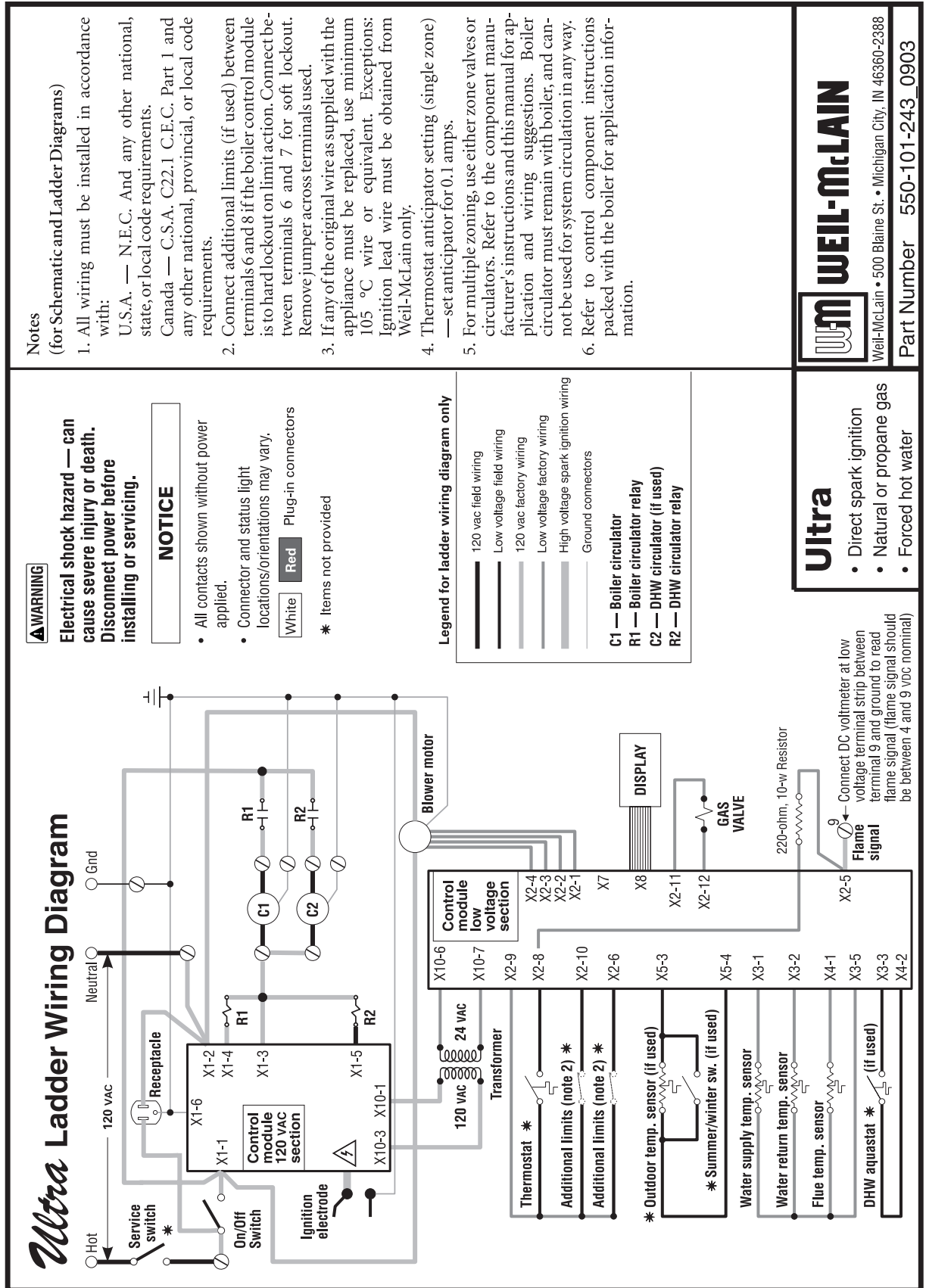


Figure 7 Schematic wiring diagram — Ultra-80 through Ultra-299 Series 3

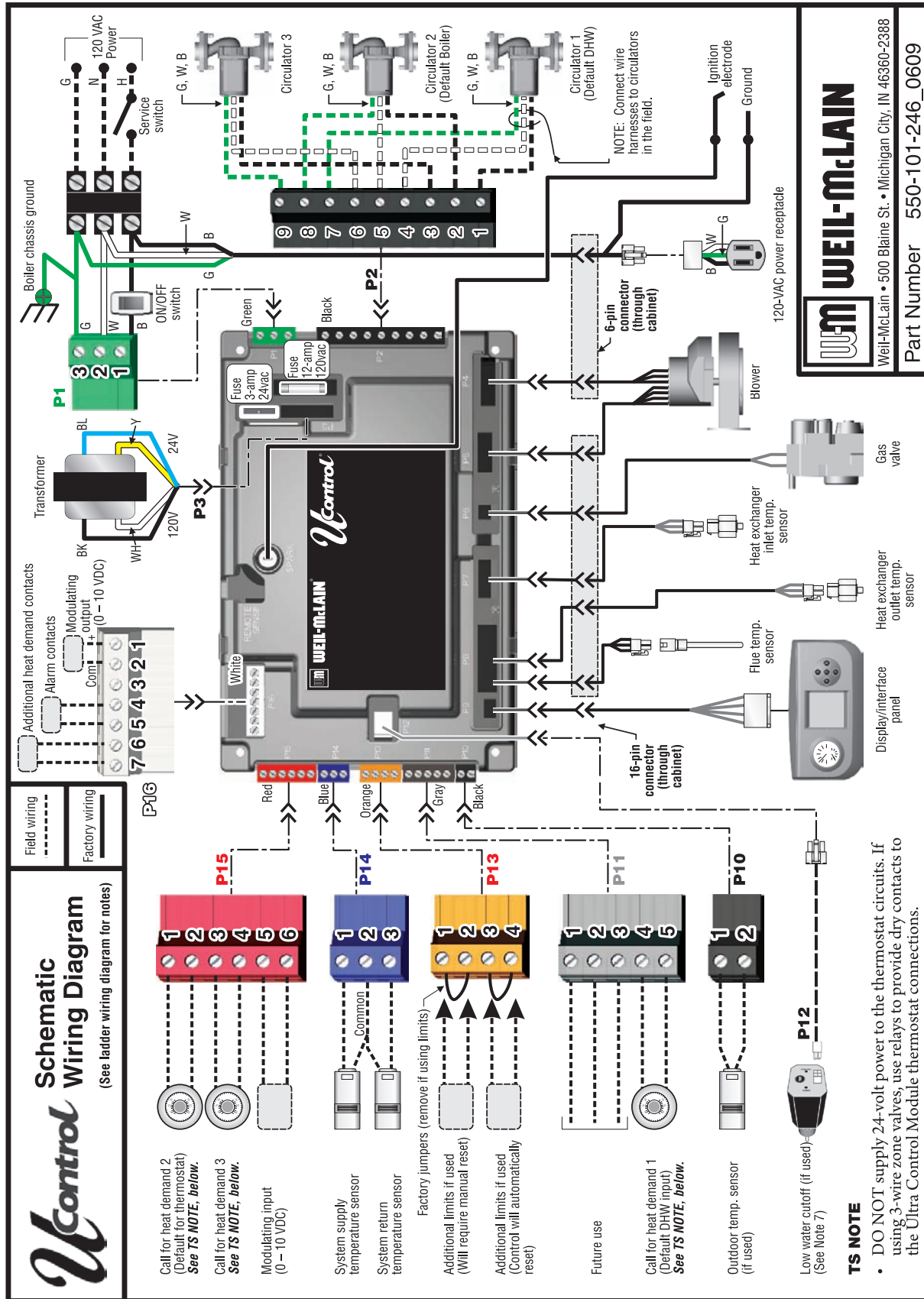


Figure 8 Ladder wiring diagram — Ultra-80 through Ultra-299 Series 3

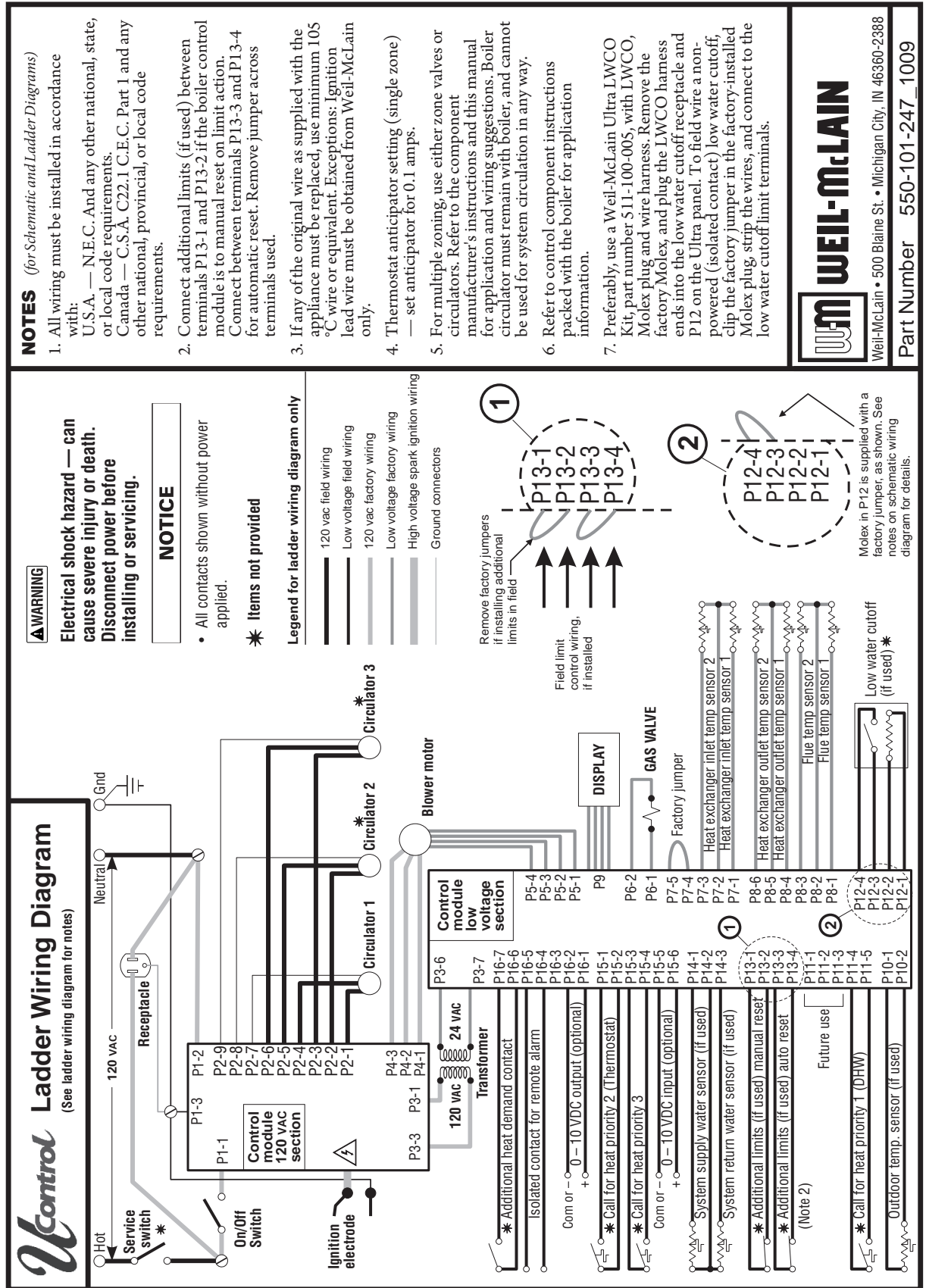


Figure 9 Ultra Series 1 or 2 to Series 3 upgrade - High Voltage

Ultra Series 1 or 2 to Series 3 Upgrade -
High Voltage wiring

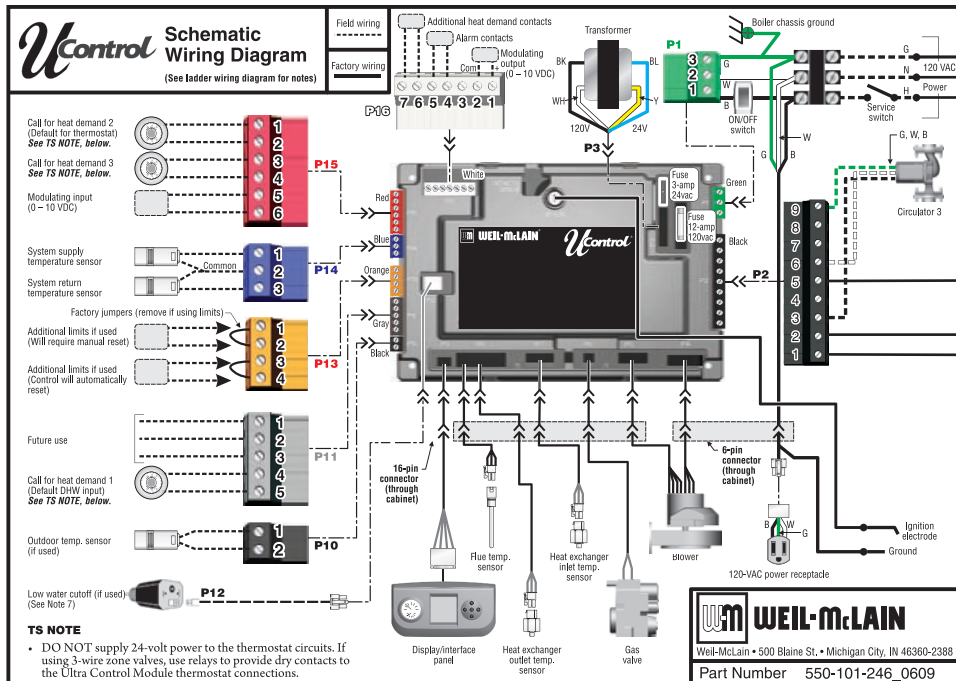
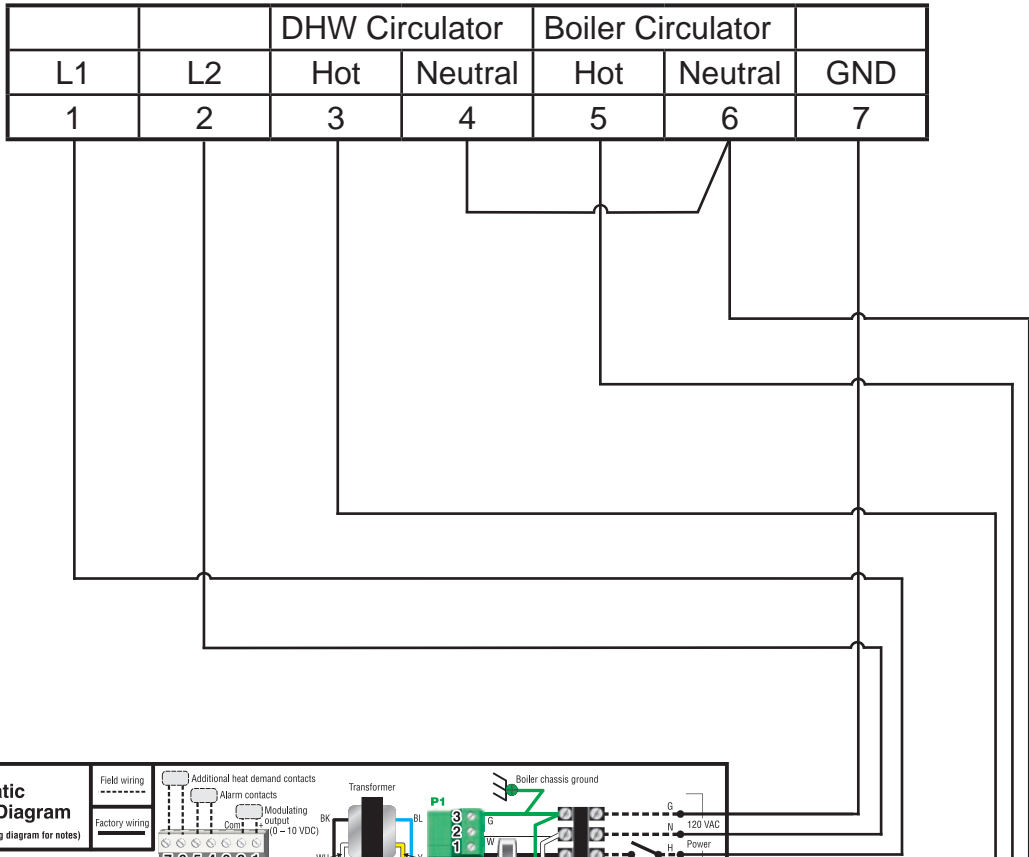
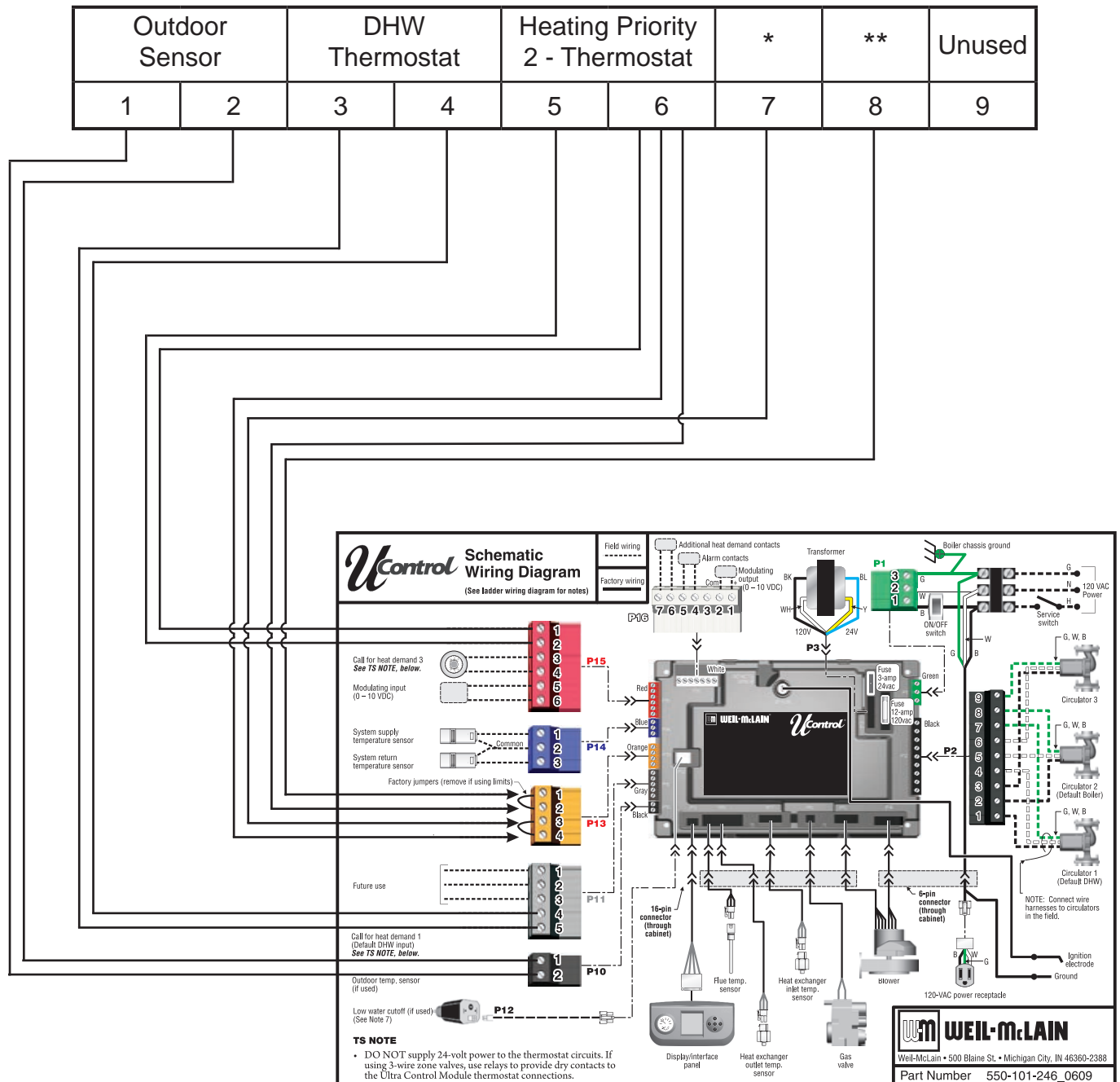


Figure 10 Ultra Series 1 or 2 to Series 3 upgrade - Low Voltage

Ultra Series 1 or 2 to Series 3 Upgrade -
Low Voltage wiring

* Terminals 6 & 7 – Additional Limit, Soft Lockout (auto reset). Jumper if not used.

** Terminals 6 & 8 – Additional Limit, Hard Lockout (manual reset). Jumper if not used.



U-Control operation and setup — advanced

⚠ WARNING **Low-temperature systems** (radiant slab, etc.) — **DO NOT** use the Ultra boiler control as the only means of water temperature regulation for low-temperature systems if higher-temperature systems are also supplied.

ADVANCED SETUP – OVERVIEW

1. Access contractor menus by pressing and holding the UP and DOWN arrow keys at the same time for 5 seconds.
2. The contractor screen will show:
 - a. BOILER SETTINGS
 - b. SYSTEM SETTINGS
 - c. DIAGNOSTICS
 - d. MAINTENANCE INFO
 - e. SET DATE AND TIME
3. Navigate through the menus as shown in Figure 13, page 17. For a description of each of the menu options, see Figure 14, page 19.
4. You will need to adjust settings as required for the systems supplied by the boiler and connect the wiring accordingly.

ADVANCED SETUP – BOILER SETTINGS

BOILER MODEL

⚠ WARNING Check the **boiler model** against the model listed on the boiler's rating plate. Change the selection to the correct model if not. Also verify the model number on the U-Control display at power-up. Failure to correct could result in severe personal injury, death or substantial property damage.

HIGH ALTITUDE

⚠ WARNING If the boiler is installed at an altitude above 5,500 feet, select YES for high altitude. The U-Control will automatically adjust firing rates (blower speeds) to compensate for altitude.

WWSD

1. WWSD stands for “warm weather shutdown.” It means the boiler will not be allowed to fire if the outside temperature is greater than the WWSD setting.
2. When the boiler is kept off because the outside temperature is above WWSD, the graphic display will show “WWSD,” and the boiler will remain in standby until the outside temperature drops below WWSD temperature.
3. WWSD does not apply to DHW systems.

4. The outdoor sensor must be installed to use this function.

ADJUST OUTDOOR

1. Use this setting to adjust the outdoor sensor temperature to account for solar or other effects that would cause the sensor to read incorrectly.

ADDITIONAL HEAT DEMAND

1. This setting is for multiple boilers or multiple heating sources (an Ultra boiler collaborating with a heat pump or a different boiler, for examples).
2. For Type 4 boilers, this function only applies to the Priority 1 system.
3. OFF — Function disabled.
4. Type 1 — This means the Ultra boiler is the primary heat source.
 - a. When the Ultra boiler receives a call for heat, it begins its startup sequence and also starts a delay timer (set as ADD'L HEAT DEMAND TIME).
 - b. When the delay timing is reached, the U-Control closes the “Additional heat demand contact,” terminals P16 #6 and #7. Use this contact to start the next heat source.
 - c. If the next heat source is an Ultra boiler, connect this contact to the boiler's “heat demand 1” terminals (P11 #4 and #5). Program the second boiler's delay timer to start a third boiler the same way, and so on to sequentially fire multiple boilers.
5. Type 2 — This means the boiler is the secondary heat source.
 - a. When the U-Control receives a call for heat, it immediately activates the “Additional heat demand contact,” terminals P16 #6 and #7. This contact is used to start the next heat source immediately.
 - b. When the delay timing is reached, the Ultra boiler begins its startup sequence and continues to heat until the demand is satisfied.
 - c. Type 2 assignment would generally only be used if the other heat source is a different boiler or a heat pump, for example.
6. Type 3 — This assigns the boiler as the LEAD boiler in a multiple boiler system.
 - a. This LEAD boiler must have system supply and return sensors mounted on the system supply and return pipes and wired to the boiler.
 - b. When the U-Control receives a call for heat, it begins its heating sequence and starts the additional heat demand delay timer.
 - c. When the delay timing is reached, the U-Control sends a 0–10 VDC proportional signal out its 0–10 VDC output terminals, P16 #1 and #2.
 - d. If the heat demand is satisfied before the timer runs out, the next boiler is not started.

U-Control operation and setup — advanced *(continued)*

- e. Connect these output terminals to the SHADOW boilers' 0–10 VDC input terminals, P15 #5 and #6. The SHADOW boilers will start and modulate based on the signal strength. The SHADOW boilers must be set up as Type 4 (see below). They do not need their additional heat timers to be setup.
 - f. An alternate method is to daisy chain the other boilers. That is, connect the output of each to the input of the next. Each of these boilers would be set up as a Type 4 (see below), and each needs its additional heat timer set for the desired delay between boilers.
7. Type 4 — This assigns the boiler as a SHADOW boiler in a multiple boiler system.
 - a. The boiler can be wired and setup to run in parallel with the other SHADOW boilers as in 6c, (previous page). Or they can be set up for sequential operation following 6d, (previous page).
 - b. When the boiler receives a 0–10 VDC input on terminals P15 #5 and #6, it starts up and modulates firing rate according to the signal.
 - c. If wired and setup per 6d (previous page), it also starts its additional heat delay timer immediately. When the delay timing is reached, the U-Control sends out a 0–10 VDC signal (on terminals P16 #1 and #2) for the next boiler.
 - d. The boiler uses the settings for Priority 1 while receiving the 0–10 VDC signal.

ADVANCED SETUP – PRIORITY 1, 2, 3

1. Priority 1, 2 and 3 refer to the three possible heating inputs that can be handled by the U-Control.
2. Select the priority level desired for the application. Priority 1 is usually assigned to domestic water heating, because of the need for quick response. Priority 2 and 3 usually used for space heating circuits.
3. Each of the three inputs has its own set of operating parameters, programmed using the menus shown in Figure 13, page 17.
4. The inputs to the U-Control are:
 - a. Priority 1 — P11 #4 and #5, “heat demand 1”
 - b. Priority 2 — P15 #1 and #2, “heat demand 2”
 - c. Priority 3 — P15 #3 and #4, “heat demand 3”

ADVANCED SETUP – SYSTEM TYPE

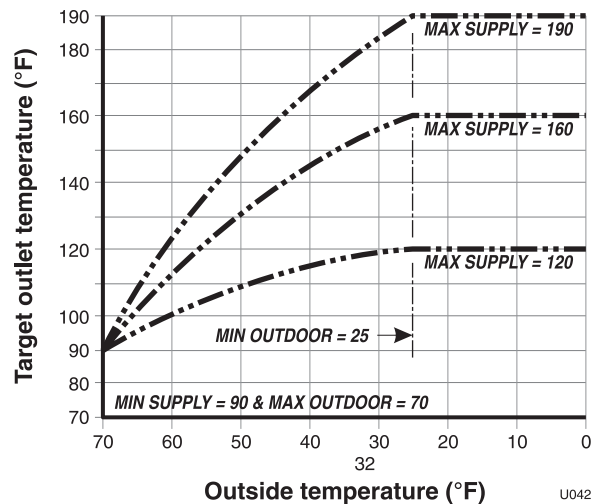
1. For each priority being used, select the appropriate system type. See Figure 12, page 16 for system options and preset temperatures.

2. The temperature presets are chosen based on normal best setting for these systems. The temperature values can be changed, if desired, under “TEMPERATURES.”

ADVANCED SETUP – TEMPERATURES

1. Setup desired temperatures for each of the priorities used.
2. For an explanation of the target temperatures and associated outdoor temperatures, see Figure 11.
 - a. Outdoor temp for max target means the outdoor temperature at which the target temperature reaches its maximum value. In the example of Figure 11, this occurs at 25 °F outside.
 - b. Outdoor temp for min target means the outdoor temperature at which the target temperature reaches its minimum. In the example of Figure 11, this occurs at 70 °F.
 - c. Note that the reset lines are curved. The shape of this curve is matched (or characterized) to the response of the system type chosen to ensure the most effective reset operation.

Figure 11 Typical outdoor reset curves



3. **Modulate on differential** — The temperature must drop this many degrees below target temperature for the boiler to come on.
4. **Modulate off differential** — While the boiler is firing, as the temperature increases above the target temperature, the boiler firing rate is reduced. At this many degrees above the target temperature, the boiler shuts down.

U-Control operation and setup — advanced *(continued)*

Figure 12 U-Control system types and preset parameters

System type	Display		Preset temperatures				Note
	8-character	3-char	Max Target Temp	Outdoor Temp for Max Target	Min Target Temp	Outdoor Temp for Min Target	
Fan-coil	FAN-COIL	FCL	190	0	140	70	
Finned tube baseboard	FIN BASE	FTB	180	0	130	70	
Cast iron baseboard	IRN BASE	CIB	180	0	120	70	
Cast iron radiators	RADIATOR	CIR	180	0	120	70	
Radiant – slab on grade	RAD SLAB	RSG	120	0	80	70	
Radiant – thin slab	RAD SLAB	RTS	140	0	80	70	
Radiant – below floor (staple up)	RADFLOOR	RSU	160	0	90	70	
Radiant – above floor (sleeper system)	RADFLOOR	RAF	140	0	90	70	
Custom	CUSTOM	CUS	190	0	70	70	<ul style="list-style-type: none"> • Does not pass along Add'l Heat Demand
DHW – system	DOMESTIC	DHW	190	DHW heating ignores outdoor reset and warm weather shutdown			<ul style="list-style-type: none"> • U-Control modulates to system temperature sensors.
DHW – direct	DOMESTIC	DHW	190				<ul style="list-style-type: none"> • U-Control modulates to boiler temperature sensors. • Does not pass along Add'l Heat Demand

ADVANCED SETUP – CIRCULATOR EXERCISING

1. For each circulator, select whether you want the U-Control to automatically start the circulator and run for 10 seconds for each 72-hour period of inactivity.

ADVANCED SETUP – FREEZE PROTECTION CIRCULATORS

1. This function automatically fires the boiler at low fire and starts the circulators chosen if the heat exchanger sensor detects a temperature less than 40 °F. The circulators turn off when the temperature rises above 45 °F.

ADVANCED SETUP – MAINTENANCE INFO

1. Use this section to enter contractor's information and to enter an automatic notice for maintenance (default is 12 months). Because this shows on the display, it is an automatic means of notifying the homeowner of need for scheduled maintenance by the technician. Update the screen reminder to reset for the next maintenance date.

U-Control operation and setup — advanced (continued)

Figure 13 U-Control menus (press and hold the UP and DOWN arrow keys for 5 seconds to enter contractor menus)

Menus	Next screen	Next screen	Next screen	Next screen	
<i>Follow information at the bottom of each screen to navigate to next/previous screen or enter/save data</i>					
BOILER SETTINGS	BOILER MODEL #####	80 105 155 230	299 310 399 550 (commercial model) 750 (commercial model)	⚠ WARNING Carefully verify that the boiler model number on the display now agrees with the boiler rating plate. Setting these incorrectly could result in severe personal injury, death or substantial property damage.	
	HIGH ALTITUDE ###	NO YES			
	HIGH TEMP LIMIT	###			
	WSD SETTING ### °F	###			
	ADJUST OUTDOOR ### °F	###			
	ADD'L HEAT DEMAND TYPE: #####	OFF TYPE 1 – ULTRA = PRIMARY HEAT SOURCE TYPE 2 – ULTRA = BACKUP HEAT SOURCE TYPE 3 – ULTRA = LEAD (0–10V OUTPUT) TYPE 4 – ULTRA = SHADOW (0–10V INPUT)			
ADD'L HEAT DEMAND TIME: ### MINUTES	## MINUTES				
SYSTEM SETTINGS	BOILER PRIORITY 1	SYSTEM TYPE: ###		OFF FAN COIL FINNED TUBE BASEBOARD CAST IRON BASEBOARD CAST IRON RADIATOR RADIANT – SLAB ON GRADE RADIANT – THIN SLAB RADIANT – ABOVE FLOOR CUSTOM DHW – DIRECT DHW – SYSTEM	
		TEMPERATURES	MAX SUPPLY: ### °F MIN SUPPLY: ### °F MAX OUTDOOR: ### °F MIN OUTDOOR: ### °F MODULATE ON DIFF: ### °F MODULATE OFF DIFF:### °F	MIN SUPPLY, MAX OUTDOOR AND MIN OUTDOOR are not shown for DHW types	
		TIMES	MAX ON TIME: ### MIN MIN ON TIME: ### MIN BOOST INTERVAL: ### MIN PRE PUMP TIME: ### SEC POST PUMP TIME: ### SEC	not on Priority 3 not on Priority 1	
		CIRCULATORS: # # #	CIRCULATOR 1: ### CIRCULATOR 2: ### CIRCULATOR 3: ###	ON/OFF ON/OFF ON/OFF	
		MAXIMUM RATE: ___% MINIMUM RATE: ___%	### % ### %		
	BOILER PRIORITY 2 BOILER PRIORITY 3	SAME MENU AS FOR PRIORITY 1 SAME MENU AS FOR PRIORITY 1			
	CIRCULATOR EXERCISING	CIRCULATOR 1: ### CIRCULATOR 2: ### CIRCULATOR 3: ###	ON/OFF ON/OFF ON/OFF		
	FREEZE PROTECT CIRCS	CIRCULATOR 1: ### CIRCULATOR 2: ### CIRCULATOR 3: ###	ON/OFF ON/OFF ON/OFF		
	MAINTENANCE INFO	NAME PHONE MODEL CP# INSTALLED LAST DATE NEXT DATE INTERVAL SETTINGS RESET REMINDER	##### ###-###-#### ULTRA ##### ##### MM/DD/YY MM/DD/YY DD/MM/YY ## MONTHS PRESS ENTER TO RESET		

U-Control operation and setup — advanced (continued)

Figure 13 U-Control menus, (press and hold the UP and DOWN arrow keys for 5 seconds to enter contractor menus)

Menus	Next screen	Next screen	Next screen	Next screen	
<i>Follow information at the bottom of each screen to navigate to next/previous screen or enter/save data</i>					
SET DATE AND TIME	SET YR/MN/DAY/HR/MIN				
DIAGNOSTICS	TEMPERATURES	STATUS: ##### SYSTEM SUPPLY: ###°F SYSTEM RETURN: ###°F BOILER OUT1: ###°F BOILER OUT2: ###°F BOILER IN1: ###°F FLUE 1: ###°F FLUE 2: ###°F OUTDOOR: ###°F			
	INPUTS	STATUS: ##### PRIORITY 1: ### PRIORITY 2: ### PRIORITY 3: ### ANALOG IN: #### MANUAL LIMIT: ##### AUTO LIMIT: ##### LOW WTR CUTOFF: ##### BLOWER TACH: ####RPM FLAME SIGNAL: ###			
	OUTPUTS	STATUS: ##### GAS VALVE: ### CIRCULATOR 1: ### CIRCULATOR 2: ### CIRCULATOR 3: ### BLOWER SIGNAL: ###% ADD'L HEAT DEMAND: ### ALARM: ### ANALOG OUT: ####			
	ERRORS	CONTROL FAULT ### IGNITION RETRIES ###			
		MANUAL RESET CNT ###			
		AUTO RESET CNT ###			
		LOCKOUT HISTORY 1	LOCKOUT HISTORY # HH:MM AM MM/DD/YY STATUS: ##### MANUAL RESET AUTO RESET INPUTS OUTPUTS TEMPERATURES	LIST OF LOCKOUTS LIST OF LOCKOUTS INPUT STATUS OUTPUT STATUS TEMPERATURES	
		LOCKOUT HISTORY 2 LOCKOUT HISTORY 3	. . . SAME AS HISTORY 1 . . . SAME AS HISTORY 1		
SOFTWARE VERSIONS	DISPLAY V### MAIN MICRO V### SECOND MICRO V###	NOTE: Display will show C#.# for CSD-1 control.			
MANUAL TEST MODE	STATUS: ##### TARGET: ###°F MODULATION: ###°F SYSTEM SUPPLY: ###°F SYSTEM RETURN: ###°F BOILER OUT: ###°F BOILER IN: ###°F FLAME SIGNAL: ### BLOWER SIGNAL: ###% BLOWER TACH: ####RPM FORCE RATE AUTO				
MANUAL RESET	PRESS ENTER TO RESET THE FOLLOWING ERROR (SCREEN SHOWS A LIST OF ERRORS)				

U-Control operation and setup — advanced *(continued)*

Figure 14 U-Control setup options (see Figure 13, page 17 for location in menu sequence)

Menu/Item	Units	Low Value	High Value	Default	Comment
Boiler Settings					
Boiler Model	80, 105, 155, 230, 299, 310, 399, 550, 750			factory	THIS MUST BE SET CORRECTLY FOR SAFE OPERATION. Adjusts blower speeds and flame sense (Display will show “HA” after the model number if high altitude has been selected, below.) NOTE: Ultra-550 and -750 are commercial models.
High Altitude	yes or no			no	Adjusts ignition and low fire fan speed (for altitudes above 5, 500 feet only)
High Limit	°F	50	200	200	If boiler out temperature reaches this temperature boiler will lockout which requires a manual reset
WWSD Temp	°F	Off, 50	100	70	Boiler will not respond to heating calls above this outdoor temp
Adjust Outdoor	°F (difference)	-10	+10	0	This value plus outdoor sensor reading equals outdoor temp (Use this setting to compensate for solar gain or other factors that cause a shift in sensor temperature.)
Add'l Heat Demand Type	Types	Off	Type 4	Off	Type 1 — Ultra is primary source, starts secondary after delay (requires system sensors) Type 2 — Ultra is secondary source, starts primary immediately Type 3 — Boilers operate in parallel, Ultra boiler is LEAD, outputs 0–10 VDC to others Type 4 — Boilers operate in parallel, Ultra boiler is SHADOW, receives 0–10 VDC input
Add'l Heat Demand Time	minutes	0	240	0	Delay before bringing on additional heating appliances
System Settings					
Boiler Priority 1					
System Type	Types	Off	Custom	DHW - direct	DHW-direct doesn't use ODR, boost, or Add'l heat demand output
Max Supply	°F	60	190	190	Boiler enters manual reset lockout at 200°F
Min Supply	°F	60	190	N/A	N/A - DHW does not use reset
Max OD Reset	°F	50	100	N/A	N/A - DHW does not use reset
Min OD Reset	°F	-20	50	N/A	N/A - DHW does not use reset
Modulate On Diff	°F	2	10	5	Boiler turns on if temperature drops below target minus differential on
Modulate Off Diff	°F	2	10	5	Boiler shuts down if modulates past target plus differential off
Max On Time	minutes	off	240	30	Longest time boiler will satisfy this system before switching to an active lower priority
Min On Time	—	—	—	—	Priority 1 does not have this setting
Boost Interval	minutes	off	240	N/A (not used)	When operating on ODR increases target 10F when this time expires until reaching MAX
Prepump Time: ### SEC	seconds	0	240	20	Additional time to run circulators longer than standard 10 second time
Postpump Time: ### SEC	seconds	off	240	30	Circulator run time after call for heat ends
Circulator 1	on-off	off	on	on	Circulator activates on this call for heat if on
Circulator 2	on-off	off	on	off	Circulator activates on this call for heat if on
Circulator 3	on-off	off	on	off	Circulator activates on this call for heat if on
Maximum Rate	%Rate	21%	100%	96%	Boiler Model and altitude specific (derated to 96% from factory) NOTE: Adjusting boiler firing rate will affect AFUE rating.
Minimum Rate	%Rate	20%	99%	33% (80-299) 20% (399)	Boiler Model and altitude specific
Boiler Priority 2					
System Type	Types			FTB	Finned-Tube Baseboard
Max Supply	°F	60	190	180	Highest target the control will calculate based on outdoor temperature Target temperature if outdoor sensor is not detected (manual reset lockout at 200°F)
Min Supply	°F	60	190	130	Lowest target the control will calculate based on outdoor air temperature
Max OD Reset	°F	50	100	70	Outdoor air temperature that forces the minimum supply water to be target temperature
Min OD Reset	°F	-20	50	0	Outdoor air temperature that forces the maximum supply water to be target temperature
Modulate On Diff	°F	2	10	5	Boiler turns on if temperature drops below target minus differential on
Modulate Off Diff	°F	2	10	5	Boiler shuts down if modulates past target plus differential off

U-Control operation and setup — advanced *(continued)*

Figure 14 U-Control setup options (see Figure 13, page 17 for location in menu sequence),

Menu/Item	Units	Low Value	High Value	Default	Comment
Max On Time	minutes	off	240	30	Longest time boiler will satisfy this system before switching to an active lower priority
Min On Time	minutes	off	240	15	Time boiler will satisfy this system before switching to the next active priority
Boost Interval	minutes	off	240	off	When operating on ODR increase target 10F when this time expires until reaching MAX
Prepump Time: ### SEC	seconds	0	240	20	Additional time to run circulators longer than standard 10 second time
Postpump Time: ### SEC	seconds	off	240	30	Circulator run time after call for heat ends
Circulator 1	on-off	off	on	off	Circulator activates on this call for heat if on
Circulator 2	on-off	off	on	on	Circulator activates on this call for heat if on
Circulator 3	on-off	off	on	on	Circulator activates on this call for heat if on
Maximum Rate	%Rate	21%	100%	96%	Boiler Model and altitude specific (derated to 96% from factory) NOTE: Adjusting boiler firing rate will affect AFUE rating.
Minimum Rate	%Rate	20%	99%	33% (80-299) 20% (399)	Boiler Model and altitude specific
Boiler Priority 3					
System Type	Types			Custom	
Max Supply	°F	60	190	190	Highest target the control will calculate based on outdoor temperature Target temperature if outdoor sensor is not detected (manual reset lockout at 200°F)
Min Supply	°F	60	190	70	Lowest target the control will calculate based on outdoor air temperature
Max OD Reset	°F	50	100	70	Outdoor air temperature that forces the minimum supply water to be target temperature
Min OD Reset	°F	-20	50	0	Outdoor air temperature that forces the maximum supply water to be target temperature
Modulate On Diff	°F	2	10	5	Boiler turns on if temperature drops below target minus differential on
Modulate Off Diff	°F	2	10	5	Boiler shuts down if modulates past target plus differential off
Max On Time	—	—	—	—	Priority 3 does not have this setting
Min On Time	minutes	off	240	15	Time boiler will satisfy this system before switching to the next active priority
Boost Interval	minutes	off	240	off	When operating on ODR increase target 10F when this time expires until reaching MAX
Prepump Time: ### SEC	seconds	0	240	20	Additional time to run circulators longer than standard 10 second time
Postpump Time: ### SEC	seconds	off	240	30	Circulator run time after call for heat ends
Circulator 1	on-off	off	on	on	Circulator activates on this call for heat if on
Circulator 2	on-off	off	on	on	Circulator activates on this call for heat if on
Circulator 3	on-off	off	on	on	Circulator activates on this call for heat if on
Maximum Rate	%Rate	21%	100%	96%	Boiler Model and altitude specific (derated to 96% from factory) NOTE: Adjusting boiler firing rate will affect AFUE rating.
Minimum Rate	%Rate	20%	99%	33% (80-299) 20% (399)	Boiler Model and altitude specific
Circulator Exercising					
Circulator 1	on-off	off	on	on	Circulators exercise 10 seconds every 72 hours of inactivity if on
Circulator 2	on-off	off	on	on	Circulators exercise 10 seconds every 72 hours of inactivity if on
Circulator 3	on-off	off	on	on	Circulators exercise 10 seconds every 72 hours of inactivity if on
Freeze Protect Circs					
Circulator 1	on-off	off	on	off	If HxOut sensor out falls below 40F boiler fires low and turns on this circ until 45F
Circulator 2	on-off	off	on	on	If HxOut sensor out falls below 40F boiler fires low and turns on this circ until 45F
Circulator 3	on-off	off	on	off	If HxOut sensor out falls below 40F boiler fires low and turns on this circ until 45F

U-Control operation and setup — advanced *(continued)*

Figure 15 U-Control diagnostic information (see Figure 13, page 17 for location in menu sequence),

Menu/Item	Units	Low Value	High Value	Default	Comment
Diagnostics					
Temperatures					
Status	Text			data	Current operating status of the boiler. Prepurge, Ignition, Name of the system Type being satisfied, post purge, Warm Weather Shutdown, Trouble
System Supply	°F			data	Temperature of the remote system supply sensor
System Return	°F			data	Temperature of the remote system return sensor
Boiler Out1	°F			data	Temperature of the first sensing element of the boiler's heat exchanger outlet sensor
Boiler Out2	°F			data	Temperature of the second sensing element of the boiler's heat exchanger outlet sensor
Boiler In1	°F			data	Temperature of the boiler's heat exchanger inlet sensor
Flue1	°F			data	Temperature of the first sensing element of the boiler's flue gas sensor
Flue2	°F			data	Temperature of the second sensing element of the boiler's flue gas sensor
Outdoor	°F			data	Temperature of the remote outdoor air temperature sensor
Inputs					
Status	Text			data	Current operating status of the boiler. Prepurge, Ignition, Name of the system Type being satisfied, post purge, Warm Weather Shutdown, Trouble
Priority 1	on-off			data	Call for heat status on Priority 1 Input
Priority 2	on-off			data	Call for heat status on Priority 2 Input
Priority 3	on-off			data	Call for heat status on Priority 3 Input
Analog Input	vdc			data	Value of 0–10 VDC input signal on P15 #5 and #6
Manual Limit	open-closed			data	External manual limit P13-1 & P13-2
Auto Limit	open-closed			data	External auto limit P13-3 & P13-4
Low Wtr Cutoff	open-closed			data	Low water cutoff device on P12-3 & P12-4
Blower Tach	rpm			data	Feedback from blower sensor
Flame Signal	no units			data	Number indicating the presence and quality of the flame used to shutdown boiler
Outputs					
Gas Valve	on-off			data	Control's gas valve circuit status
Circulator 1	on-off			data	Control's circulator 1 relay status
Circulator 2	on-off			data	Control's circulator 2 relay status
Circulator 3	on-off			data	Control's circulator 3 relay status
Blower Signal	% of rate			data	Control's signal controlling the blower speed
Add'l Heat Demand	on-off			data	Control's signal controlling the additional heat demand
Alarm	on-off			data	Control's alarm contact status
Analog Output	vdc			data	Value of 0–10 VDC output signal on P16 #1 and #2
Errors					
Control Fault	#			0	Displays number of control faults
Ignition Retries	#			0	Displays number of ignition attempts boiler is currently on
Manual Reset Cnt	#			0	Displays number of manual reset lockouts since last cleared
Auto Reset Cnt	#			0	Displays number of auto reset lockouts since last cleared
Lockout History 1					Choose this to view the most recent error recorded
Time & Date	text			data	Displays time and date that lockout occurred
Status	text			data	Displays what the status of the boiler at the time of the error
Manual Reset	yes or none			data	Choose this to view the details of manual reset lockouts
Auto Reset	yes or none			data	Choose this to view the details of auto reset lockouts
Inputs	menu			menu	Choose this to view the status of the Boiler Inputs at the time of the error
Outputs	menu			menu	Choose this to view the status of the Boiler Outputs at the time of the error
Temperatures	menu			menu	Choose this to view the Boiler Temperatures at the time of the error
Lockout History 2					Choose this to view the second most recent error recorded
Time & Date	text			data	Displays time and date that lockout occurred
Status	text			data	Displays what the status of the boiler at the time of the error

U-Control Set-Up Data

Installation information					
Boiler model					
Boiler CP number					
Boiler location					
U-CONTROL SET-UP DATA					
Boiler Model		WWSD Temp	°F	Add'l Heat Demand Type	1__ 2__ 3__ 4__
High Altitude	yes ____ no ____	Adjust Outdoor	°F	Add'l Heat Demand Time	minutes
Manual Reset Temp		°F			
PRIORITY 1 Settings		PRIORITY 2 Settings		PRIORITY 3 Settings	
System Type		System Type		System Type	
Max Supply	°F	Max Supply	°F	Max Supply	°F
Min Supply	°F	Min Supply	°F	Min Supply	°F
Max OD Reset	°F	Max OD Reset	°F	Max OD Reset	°F
Min OD Reset	°F	Min OD Reset	°F	Min OD Reset	°F
Modulate On Diff	°F	Modulate On Diff	°F	Modulate On Diff	°F
Modulate Off Diff	°F	Modulate Off Diff	°F	Modulate Off Diff	°F
Max On Time	minutes	Max On Time	minutes	Max On Time	—
Min On Time	—	Min On Time	minutes	Min On Time	minutes
Boost Interval	minutes	Boost Interval	minutes	Boost Interval	minutes
Pre-pump Time:	seconds	Pre-pump Time:	seconds	Pre-pump Time:	seconds
Post-pump Time:	seconds	Post-pump Time:	seconds	Post-pump Time:	seconds
Circulator 1	on-off	Circulator 1	on-off	Circulator 1	on-off
Circulator 2	on-off	Circulator 2	on-off	Circulator 2	on-off
Circulator 3	on-off	Circulator 3	on-off	Circulator 3	on-off
Maximum Rate	%Rate	Maximum Rate	%Rate	Maximum Rate	%Rate
Minimum Rate	%Rate	Minimum Rate	%Rate	Minimum Rate	%Rate
Circulator Exercising			Freeze Protection Circulators		
Circulator 1	on ____ off ____	Circulator 1	on ____ off ____	Circulator 2	on ____ off ____
Circulator 2	on ____ off ____	Circulator 2	on ____ off ____	Circulator 3	on ____ off ____
Circulator 3	on ____ off ____	Circulator 3	on ____ off ____		

Notes

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.

Ultra GAS-FIRED WATER BOILER SERIES 1 & 2 — **U-Control Upgrade Instructions**



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