Multiple Boilers – Electro TS Series Application
EB-C-STG5

Drawings: **BC025**
BX404
BH504
XX017

Information

All Electro-Boilers, except Mini-Boiler, have the same control board (EB5623**). The plug-in control chip (software) determines how this control board is used or configured for each product model number. There are three basic types or programs:

- EB-S-**, EB-MS-**, EB-C+-** – control supply temperature is based upon a full stage (or element) switching on and off.
- EB-WA-**, EB-MA-** – control supply temperature is based upon modulation of electric element to more accurately maintain the dial set supply temperature.
- EB-WO-**, EB-MO-** – in addition to the above modulation control, the outdoor sensor provides for the WarmFlo concept which starts at a minimum or floor supply temperature and ramps up to a set point referencing 0° F.

Additional definition or mix – the commercial series (EB-C-**) uses staging and set-temperature concept. But with an option EB-CO-KIT it is also WarmFlo outdoor sensing (outdoor reset), see note below.

Configuration

1. Attached BC025 illustrates the concept for parallel boilers.
2. The first or **master** boiler must have WarmFlo temperature set, modulation, capability (WA, MA, or EBCA), etc.

   Note: The EB-C-**-** series has factory shipped or default chip code EBCA to comply with this recommendation. However, if it was determined that this master boiler is outdoor reset, separate line item EB-CO-KIT will apply.
3. Using the above recommended model for the master boiler also provides built-in standby boiler capability, if needed.
4. Consecutive (**slave**) boilers can be S, MS, or C. However, WA or MA will provide less stage "hunting" and smoother operation for these consecutive boilers.
5. Utility load control is connected to the **master boiler only**. The slave boilers (second and consecutive) do not need a load control connection because these units cannot turn on when the master is in standby (SB mode). **However**, the slave boilers will continue to show the EL MODE amber LED on. Perhaps this may be interpreted as a conflict, but in this arrangement it represents the best and simplest hardware condition and presumably is acceptable.
6. The roomstat or control device is connected to the **master boiler only**.
7. One EB-C-STG5 (this option item) is required to link the **master** boiler to the next consecutive. A second and so on is needed for consecutive boilers.
8. If the installation is a single large zone, all operation is through the **master** unit R and W.

Zone Configuration

1. A typical system arrangement is one or two large zones and the multiple boilers are typically sized to satisfy these large zones. However, there may also be several small zones (15,000, 30,000 Btu, etc.) which have individual room thermostats/pumps or zone valve and they do **not** require full boiler system capacity. In fact, they may not even require the full capacity of the master boiler. For this arrangement it is strongly recommended the Electro Industries zone controller be added to the system.
   a. EB-Z*A-* provides a configuration for zone pumps.

b. EB-Z*S-* provides arrangement for zone valves at each zone.

c. If there is more than one smaller zone, add-on EB-ZEA-2 or EB-ZES-2 will allow for additional small zones.

2. With this arrangement the large zone (main heating system) **must be** tied to zone input **2 or 3 or 4**.
3. The zone controller capacity size dial switch **must be set to F or G or H**. These setting tell the multiple boiler system that the dial switch associated with large zone arrangements have no meaning. But the dial switch setting for zone 1 and the second zone board unit (-2 zones 5 through 8) will control the **master** boiler at the capacity setting for each specific zone (1, 5, 6, 7, 8).

   a. **F** – zone 4 is large.

   b. **G** – zone 3 or 4 are large

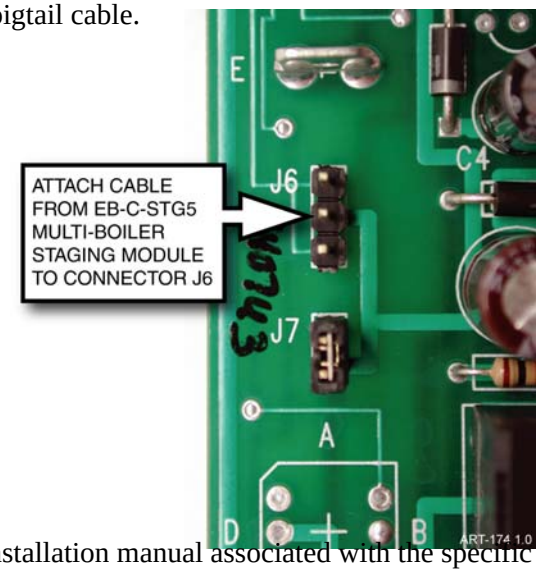
   c. **H** – zone 2 or 3 or 4 are large.

Installation – Mechanical – BX404

1. Boilers are plumbed in parallel. The master boiler unit should be closest to manifolds and distribution point.
2. Each boiler **must have** its own pump in its own pipe leg, before the paralleling connection.
3. The sum of these pumps can be "viewed" as the "primary loop" main pump. However, if this multiple boiler arrangement is for one large single zone, installer must discern that these pumps or even the first pump from the master boiler has adequate capacity.
4. Single expansion tank is adequate, but must be rated for the total system capacity.
5. Reference previous page on zone controller configuration and add appropriate zone controller.

Installation – Electrical

1. Element power is wired as specified in each individual boiler installation manual and drawings.
2. Each pump is wired and operated from its appropriate boiler as described in each boilers' installation manual and drawing BH501, BH509, BH510, or BH502.
3. Mount each EB-C-STG5 special relay next to main control board, within the length of the provided 3-wire pigtail cable. Do not extend this interconnect pigtail cable.
4. On the boiler main control board (door opened), approximately center left, are three small pins (marked "J6"). The special relay pigtail cable plugs into these three pins. Polarity is not required; simply make sure the header covers all three pins.
5. Reference drawing BH504, connect an additional wire from master unit W to the special relay W-IN and a separate wire from W-OUT to the next consecutive boiler W.
6. Reference drawing BH504, all commons from all boilers must be tied together.
7. Room thermostat or controlling device and utility load management are connected to the master boiler only as described in its installation manual.



8. Reference page 1 zone controller paragraph, use the installation manual associated with the specific zone controller and wire in the individual thermostats, pump/zone valves, etc.

   Note: Size switch is set to H for zone 4 handling of the main or large zone.

Note: The 24-volt transformer within each boiler **must** have its primary wires connected to the control board with the same wire color or polarity for all units. This should be blue at the bottom or common and yellow at the 24VAC tab. It is important to recheck this factory assembly wiring or connection.

⚠ WARNING

DO NOT, UNDER ANY CIRCUMSTANCES, SIMPLY JUMPER ANY ONE OF THE BOILERS R TO W TO OPERATE AS A HOT BOILER SYSTEM.

⚠ WARNING

THE "E" TAB OR SENSOR BYPASS FUNCTION IS LIVE AND AVAILABLE ON EACH INDIVIDUAL BOILER. THIS IS INDEPENDENT AND HAS NOTHING TO DO WITH THIS STAGING ARRANGEMENT. THE TEST OR TROUBLESHOOTING "E" FUNCTION CAN BE USED ON ANY ONE OF THE BOILERS TO VERIFY ITS OPERATION, BUT **DO NOT** LEAVE A UNIT UNATTENDED WITH THE "E" TAB AT 24 VOLTS.

Setup

1. See operations manual for each individual boiler and its setup requirements.
2. The master boiler should set for the best operating temperature associated with the smaller zones or any office usage from this system.
3. The consecutive boilers should all be set at the same temperature and typically select the temperature which would be required for the large zone or large heating capacity.

Operating Sequence

1. The system is turned on with the thermostat or controlling device closing R to W on the master boiler only. If using EB-Z**-1 zone controller sending W-OUT to the master boiler, W will turn the system on.
2. The master stages up and controls its supply water temperature based upon its preset value.
3. If the master unit has all four stages on for 5 continuous minutes, it provides a W signal to the next consecutive boiler, via the EB-C-STG5 special relay.
4. The consecutive boiler stages up and controls its water supply temperature according to its program and its set value.
5. If the consecutive boiler has all four stages on for 5 minutes, it provides a W signal, via the second EB-C-STG5 special relay, to the next consecutive unit.
6. Steps 3, 4, and 5 repeat until the last boiler is on.
7. Utility load control performs its normal function (blue and blue/white wires) to the **master** unit only. With the load control in interrupt state, all consecutive boilers as well as the master boiler go into an interrupt mode.
8. Each boiler operates as described within its individual installation/operating manual.
9. If using EB-Z**-* zone controller, it operates as described in its appropriate installation/operating manual. See page 1, zone controller paragraph, in relation to large zone and setting the SIZE dial switch.

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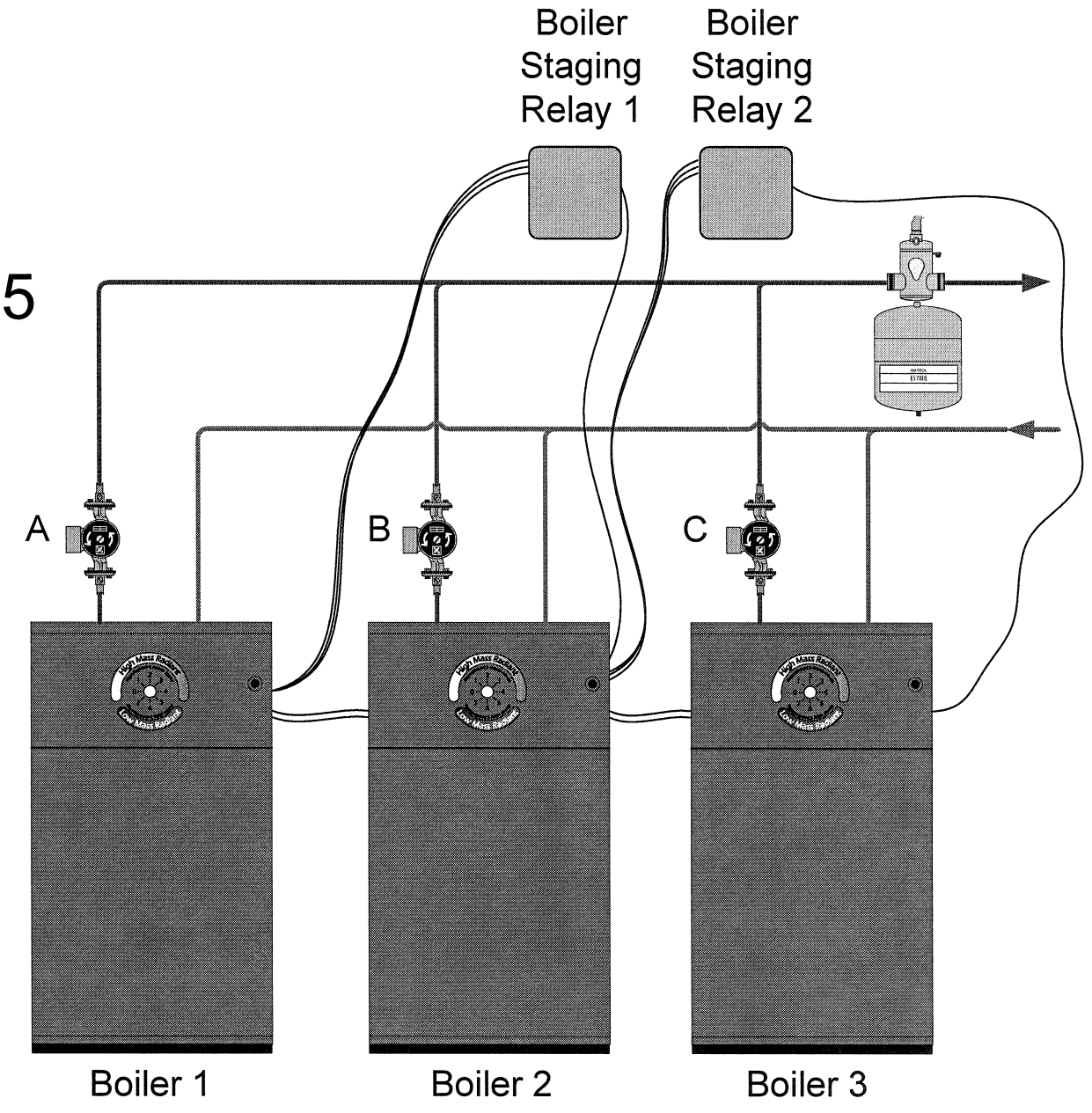
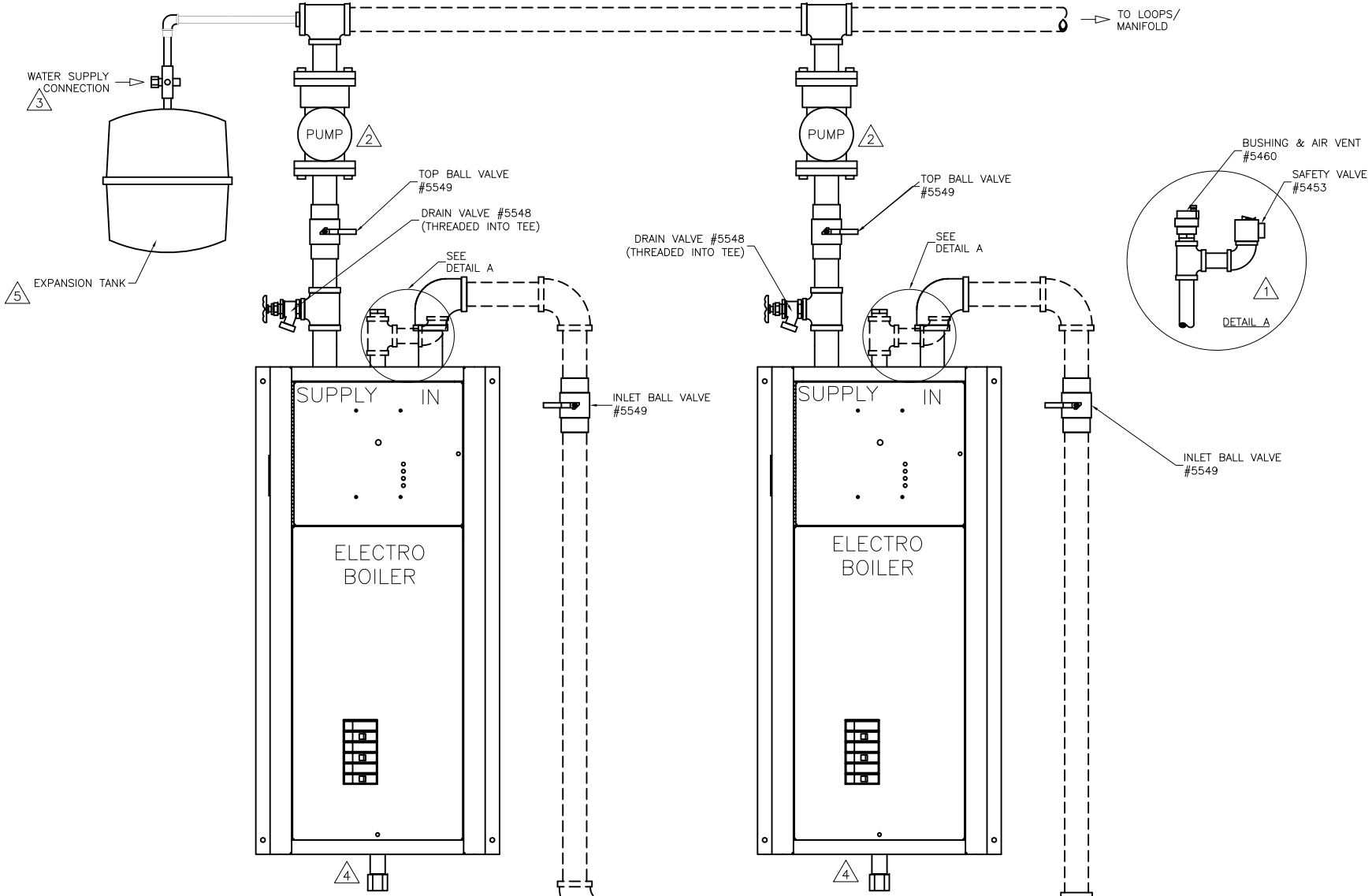
Multiple Boiler

- EB-C-STG5





NOTES:

1. LOOSE PARTS SHIPPED WITH BASIC BOILER MODEL.

2. EXCEPT FOR PUMP AND PARTS SHOWN IN DETAIL A, ALL PIPE FITTINGS AND EXTERNAL PARTS SHOWN ARE INCLUDED WITH INSTALL KIT EB-PK-TS.

3. THIS IS SHOWN AS A TEMPORARY WATER SUPPLY CONNECTION. IF A PERMANENT HOOK-UP OR CONTINUOUS WATER SOURCE, SOME LOCAL CODES MAY REQUIRE ANTI-SIPHON CHECK VALVE OR PRZ CHECK VALVE.

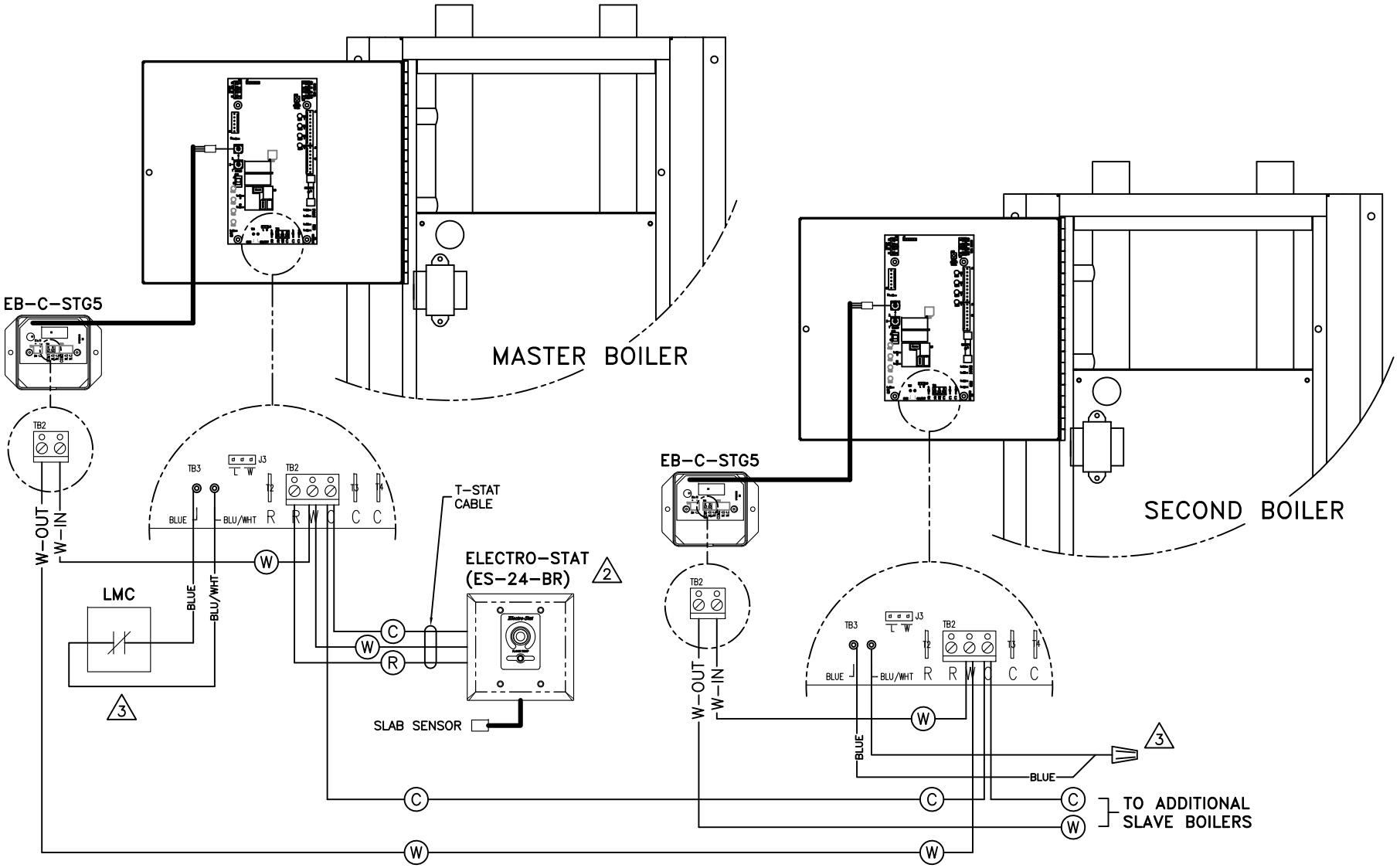
4. MINIMUM 20" SPACING BETWEEN FLOOR AND BOTTOM OF BOILER.

5. SIZE FOR TOTAL SYSTEM BTUH.

Rev.A 04-14-08: Updated Print To Show New Boiler Version (Removed External Gauges).

DESCRIPTION				SHEET	SCALE	PART/MODEL NUMBER
TWO BOILER, PARALLEL TWO ELECTRO-BOILER	ELECTRO INDUSTRIES, INC. MONTICELLO, MN 55362			1/1	NTS	-
	DRAWN	CHECKED	APPROVED	DATE	REV/STATUS	DOCUMENT NUMBER
	JAD	JAD		04-14-08	A	BX404

TS- SERIES, MULTI-BOILER INSTALLATION



1. SEE MANUAL AND DRAWING# BH502 FOR BASIC INSTALLATION INFORMATION. THIS DRAWING ONLY SHOWS THE UNIT-TO-UNIT INTERCONNECT.
2. CAN USE ZONE CONTROLLER, SEE MANUAL & P.2 FOR DETAILS.
3. LOAD CONTROL ONLY CONNECTS TO MASTER BOILER. NEXT BOILER(S) CAN NOT TURN-ON WITH MASTER IN STAND-BY (SB-MODE). SECOND AND FOLLOWING BOILER EL MODE LED WILL BE ON (COULD BE CONSIDERED INCORRECT).

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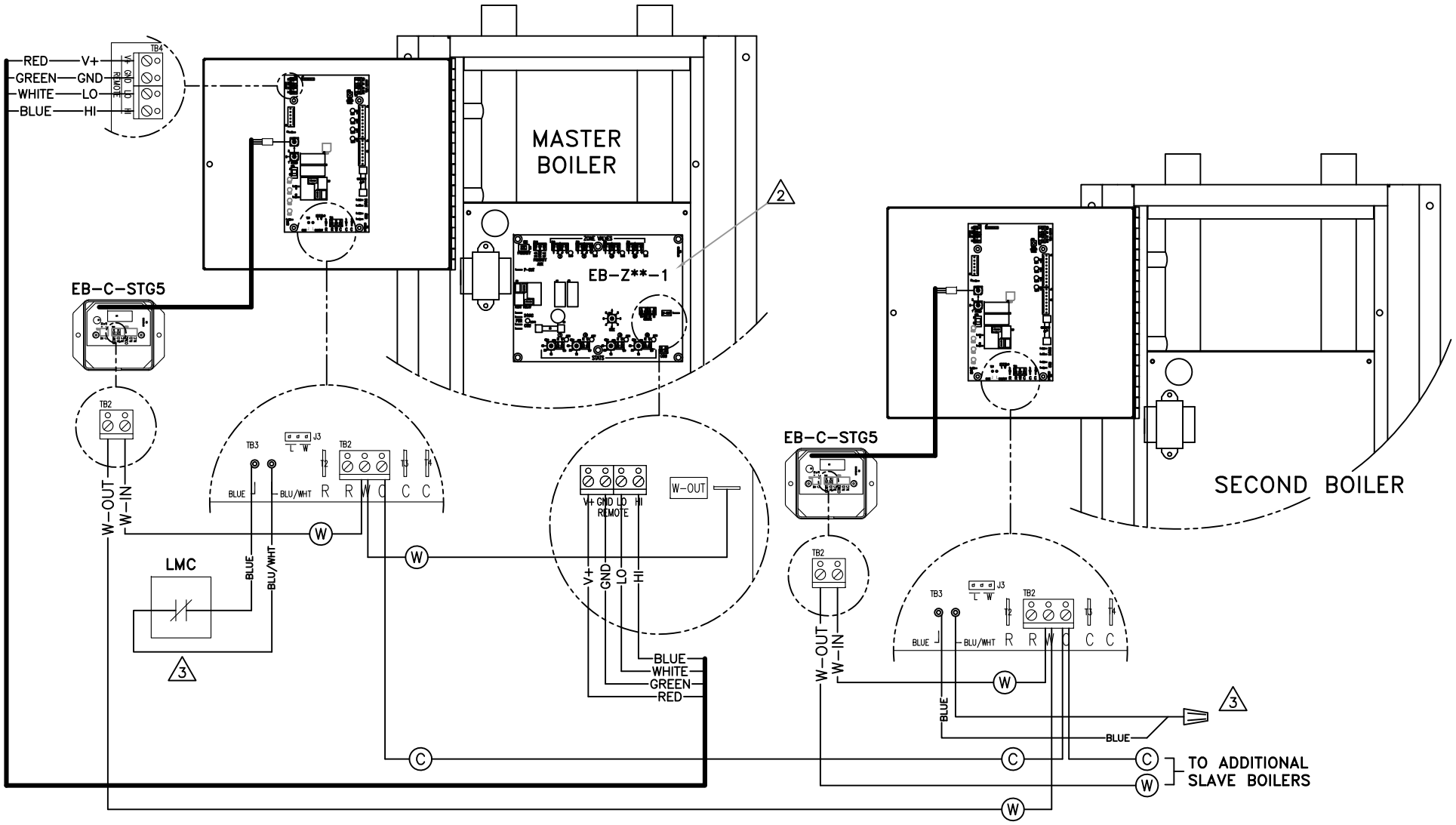
TS- SERIES, MULTI-BOILER INSTALLATION W/ ELECTRO ZONE CONTROLLER



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ELECTRO INDUSTRIES, INC.
MONTICELLO, MN 55362

Electro Industries, Inc.

Limited Product Warranty

Effective February 5, 2009

Electro Industries, Inc. warrants to the original owner, at the original installation site, for a period of two (2) years from date of installation, that the product and product parts manufactured by Electro Industries are free from manufacturing defects in materials and workmanship, when used under normal conditions and when such product has not been modified or changed in any manner after leaving the plant of Electro Industries. If any product or product parts manufactured by Electro Industries are found to have manufacturing defects in materials or workmanship, such will be repaired or replaced by Electro Industries. Electro Industries shall have the opportunity to directly, or through its authorized representative, examine and inspect the alleged defective product or product parts. Electro Industries may request that the materials be returned to Electro Industries at the owner's expense for factory inspection. The determination as to whether product or product parts shall be repaired, or in the alternative replaced, shall be made by Electro Industries or its authorized representative. Electro Industries will cover reasonable labor costs to repair defective product or product parts for ninety (90) days after installation.

TWENTY YEAR (20) LIMITED WARRANTY ON BOILER ELEMENTS AND VESSELS

Electro Industries, Inc. warrants that the boiler elements and vessels of its products are free from defects in materials and workmanship through the twentieth year following date of installation. If any boiler elements or vessels are found to have a manufacturing defect in materials or workmanship, Electro Industries will replace them.

TWENTY YEAR (20) LIMITED WARRANTY ON SPIN FIN ELEMENTS

Electro Industries, Inc. warrants that the spin fin elements of its products are free from defects in materials and workmanship through the twentieth year following date of installation. If any spin fin elements are found to have a manufacturing defect in materials or workmanship, Electro Industries will replace them.

FIVE YEAR (5) LIMITED WARRANTY ON OPEN WIRE ELEMENTS

Electro Industries, Inc. warrants that the open wire elements of its products are free from defects in materials and workmanship through the fifth year following date of installation. If any open wire elements are found to have a manufacturing defect in materials or workmanship, Electro Industries will replace them.

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THESE WARRANTIES DO NOT COVER:

1. Costs for labor for removal and reinstallation of an alleged defective product or product parts, transportation to Electro Industries, and any other materials necessary to perform the exchange, except as stated in this warranty. Replacement material will be invoiced to the distributor in the usual manner and will be subject to adjustment upon verification of defect.
2. Any product that has been damaged as a result of being improperly serviced or operated, including, but not limited to, the following: operated with insufficient water or airflow, allowed to freeze, subjected to flood conditions, subjected to improper voltages or power supplies, operated with airflow or water conditions and/or fuels or additives which cause unusual deposits or corrosion in or on the product, chemical or galvanic erosion, improper maintenance or subject to any other abuse or negligence.
3. Any product that has been damaged as a result of natural disasters, including, but not limited to, the following: lightning, fire, earthquake, hurricanes, tornadoes or floods.
4. Any product that has been damaged as a result of shipment or handling by the freight carrier. It is the receiver's responsibility to claim and process freight damage with the carrier.
5. Any product that has been defaced, abused, or suffered unusual wear and tear as determined by Electro Industries or its authorized representative.
6. Workmanship of any installer of the product. This warranty does not assume any liability of any nature for unsatisfactory performance caused by improper installation.
7. Transportation charges for any replacement part or component, service calls, normal maintenance; replacement of fuses, filters, refrigerant, etc.

CONDITIONS AND LIMITATIONS:

1. If at the time of a request for service the original owner cannot provide an original sales receipt or a warranty card registration then the warranty period for the product will have deemed to begin thirty (30) days after the date of manufacture and **NOT** the date of installation.
2. The product must have been sold and installed by a licensed electrical contractor, a licensed plumbing contractor, or a licensed heating contractor.
3. The application and installation of the product must be in compliance with Electro Industries' specifications as stated in the installation and instruction manual, and all state and federal codes and statutes. If not, the warranty will be null and void.
4. The purchaser shall have maintained the product in accordance with the manual that accompanies the unit. Annually, a qualified and licensed contractor must inspect the product to assure it is in proper working condition.
5. All related heating components must be maintained in good operating condition.
6. All lines must be checked to confirm that all condensation drains properly from the unit.
7. Replacement of a product or product part under this limited warranty does not extend the warranty term or period.
8. Replacement product parts are warranted to be free from defects in material and workmanship for ninety (90) days from the date of installation. All exclusions, conditions, and limitations expressed in this warranty apply.
9. Before warranty claims will be honored, Electro Industries shall have the opportunity to directly, or through its authorized representative, examine and inspect the alleged defective product or product parts. Remedies under this warranty are limited to repairing or replacing alleged defective product or product parts. The decision whether to repair or, in the alternative replace, products or product parts shall be made by Electro Industries or its authorized representative.

THESE WARRANTIES DO NOT EXTEND TO ANYONE EXCEPT THE ORIGINAL PURCHASER AT RETAIL AND ONLY WHEN THE PRODUCT IS IN THE ORIGINAL INSTALLATION SITE. THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE.

ALL IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED WITH RESPECT TO ALL PURCHASERS OR OWNERS. ELECTRO INDUSTRIES, INC. IS NOT BOUND BY PROMISES MADE BY OTHERS BEYOND THE TERMS OF THESE WARRANTIES. FAILURE TO RETURN THE WARRANTY CARD SHALL HAVE NO EFFECT ON THE DISCLAIMER OF THESE IMPLIED WARRANTIES.

ALL EXPRESS WARRANTIES SHALL BE LIMITED TO THE DURATION OF THIS EXPRESS LIMITED WARRANTIES SET FORTH HEREIN AND EXCLUDE ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES RESULTING FROM THE BREACH THEREOF. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY. PRODUCTS OR PARTS OF OTHER MANUFACTURERS ATTACHED ARE SPECIFICALLY EXCLUDED FROM THE WARRANTY.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY HAVE OTHER RIGHTS WHICH VARY UNDER THE LAWS OF EACH STATE. IF ANY PROVISION OF THIS WARRANTY IS PROHIBITED OR INVALID UNDER APPLICABLE STATE LAW, THAT PROVISION SHALL BE INEFFECTIVE TO THE EXTENT OF THE PROHIBITION OR INVALIDITY WITHOUT INVALIDATING THE REMAINDER OF THE AFFECTED PROVISION OR THE OTHER PROVISIONS OF THIS WARRANTY.