RBI, 2026
260 N. Elm St.
Westfield, MA 01085

RBI FIII, Fusion, Flexcore, Torus, and Encore HeatNet V3 Firmware Revision Sheet

23 – Oct – 2026 Release

Control Firmware Revision 4.38
Improved the calibration procedure on Torus and Encore boilers.

Display Firmware 1.6-R6
Added support for the improved calibration procedure on Torus and Encore boilers

31 – Mar – 2026 Release

Control Firmware Revision 4.37
1. Added new Torus Models WB/WW 1251 - WB/WW 3001.
2. Added Original/Cast flow headers on Torus Models WB/WW 0300 - WB/WW 1000

Display Firmware 1.6-R5
1. Added support for new Torus Models WB/WW 1251 - WB/WW 3001.
2. Added support for Original/Cast flow headers on Torus Models WB/WW 0300 - WB/WW 1000

4 – Feb – 2026 Release

Control Firmware Revision 4.36
Enhanced fault handling and annunciation when the control detects open or shorted supply or return temperature sensors.

Display Firmware 1.6-R4
No Changes

2 – May – 2025 Release

Control Firmware Revision 4.35
Improved fault handling during low fire shutdown.

Display Firmware 1.6-R4
No Changes

30 – Oct – 2024 Release

Control Firmware Revision 4.34
1. Increased VPS Prove Time on boilers with a Fenwal ignition control to support newer Dungs VPS units.
2. Fixed an issue with VFD Local Pump Constant Mode. When the Constant mode was selected, it reverted back to Linear after a power cycle.

Display Firmware 1.6-R4
No Changes

18 – Jun – 2024 Release

Control Firmware Revision 4.33
1. Changed Local Pump VFD output mapping ranges to 2-10V.
2. Fixed an issue that prevented the Local VFD Pump Constant output setting from permanently saving its value.

3. Improved portability of saved settings. Boiler specific settings (i.e. product/model, calibration, runtime/cycles, etc.) are no longer restored from settings that were saved to a USB flash or on-board memory. This allows the settings file to loaded on any boiler without changing boiler specific settings.
4. Fixed issue that could cause Air Prove faults to constantly send log entries to HeatNet Online.

Display Firmware 1.6-R4
Changed Local Pump VFD output mapping ranges to 2-10V.

04 – Mar – 2024 Release

Control Firmware Revision 4.32
1. Added Local VFD pump constant output mapping mode. There are now two output modes, linear and constant.
2. Added Local Pump retry to Failsafe modes.
3. Fixed an issue with select DHW modes when using a combustion air damper. When there was a DHW call the damper relay could continuously toggle and the boiler would never fire.
4. Fixed a minibus communications lockup that could occur on dual heat exchanger CK models when some settings (i.e. Firing Priority or Altitude) were changed.

Display Firmware 1.6-R3
1. Added support for local VFD pump constant output mapping mode.

08 – Dec – 2023 Release

Control Firmware Revision 4.31
1. Added the ability to only view Fault or Warning log entries. When using this feature, moving backwards/forwards in the Log will automatically search for the previous/next Fault or Warning.
2. Fixed an issue that could change the calibration minimum during a Factory Reset on RBI Torus and Encore Boilers.
3. The Boiler Fuel Type setting is no longer cleared during a Factory Reset.
4. Adjusted the USB drive timing when loading firmware on a 4-line display to support larger USB drives.
5. CK Subordinate Modbus alarm/failed bits are now included in the CK Manager Modbus alarm/failed bits to make it easier for a BMS to detect that the boiler is in an error condition.
6. Changed the default Delta T Limit setting on ALL Torus WBs to 40°F.
7. Increased the amount of time the blower is given to ramp down from pre-purge speed to ignition speed before the RPM check during the trial for ignition on boilers with a Fenwal ignition control.
8. HeatNet Expansion settings are no longer cleared during a Factory Reset.
9. Fixed an issue with the CK manager-subordinate firing synchronization when the manager has a long water flow prove time.

    - Firmware versions <= 4.20 resulted in frequent "Retry Start" log entries on the subordinate.
    - Firmware version 4.30 resulted in a "Call Service" lockout after 5 "Retry Start" log entries on the subordinate.

10. Added several new Log Entries

    Subordinate - Not Ready to Start
    This Log Entry is made when the CK subordinate(s) does not indicate that it is "ready to start" within 1 minute.

    Subordinate - No Main Valve Signal
    This Log Entry is made when the CK manager does not detect subordinates main valve signal (J5.9 Option) within 10 seconds after the CK manager's main valve signal is detected.

    Call Service

After 5 consecutive attempts to light that all failed with a "Blower Signal not Received" ("Retry Start" Log Entry), the boiler goes into a "Call Service" hard lockout which requires are power cycle to clear. It now also makes a "Call Service" log entry.

Display Firmware 1.6-R2

1. Added the ability to only view Fault/Warning log entries. See full description in Control Firmware Revision 4.31 revisions above.
2. Fixed inversion of Air Pressure Switch in downloaded Log File.
3. Added support for new "Subordinate – Not Ready to Start" (176–1), "Subordinate – No Main Valve Signal" (176-2) and "Call Service" (207) Log Entries.

8 – Sep – 2023 Release

Control Firmware Revision 4.30

1. Added VFD Local Pump Output mapping. This adds the ability to map the boiler modulation (turndown – 100%) to a 0-10V or 4-20mA signal on the VFD Local Pump Output.
2. Added Limit number of Firing Boilers Setting. This feature can be used to specify the maximum number of boilers (master + members) which can fire at any time.
3. Added support for new RBI Small Torus models (WB/WW 300-1000).
4. Added support for HeatNet Expansion Module.
5. Fixed an issue with Master Pump/Valve Remains On. Under some conditions, the master pump/valve wasn't turned on if the master and member fail on no/low flow.
6. The Blower Pre/Post Purge Acceleration rate is now a constant (non-adjustable) 3%.
7. Added 10s timers to qualify the max local flow exceeded warning/fault. The condition must now be present for at least 10s before it becomes a warning or fault. This should eliminate the nuisance warnings and faults.

Display Firmware 1.6-R1

1. Added support for the new VFD Local Pump Output Mapping feature (menu settings).
2. Added support for the new Limit Number of Firing Boilers feature (menu setting).
3. Added support for new RBI Small Torus Models.
4. Added support for RBI Torus/Encore optional Gas Valve Proving System (menu setting).

10 – Feb – 2023 Release

Control Firmware Revision 4.20

1. Added support for 10:1 High Turndown (with Virtuoso2 Control) on Flexcore Boilers
2. Added support for Encore Boilers
3. Allow Heating/DHW Modulation Maximum setting to be adjusted down to turndown
4. Allow modulation maximum to be adjusted down to turndown.
5. Fixed glycol derate on Flexcore subordinates.
6. Fixed duplicate No Local Flow (switch) log entries.
7. Fixed momentary VFD Pump signal drop to 0V after ignition.
8. Removed stack sensor auto-detection.
9. Log Fenwal blower prove failures due to no/low tach signal.
10. Changed Futera III, Futera Fusion and XLF maximum setpoint to 240°F.
11. Fixed Condensate Switch message on Futera III, Futera Fusion and XLF boilers. These boilers do not have a condensate switch, they should display a condensate warning message based on the return temperature over time.
12. Fixed issue with editing Heat Exchanger Delta on 4 line display.
13. Reset Interlock Configuration during factory reset.
14. Send pre-purge and post-purge flags to Virtuoso2 Control.
15. Fixed issue that could change the number of log entries during a Factory Reset or Firmware Update.
16. Fixed premature damper close during low fire shutdown on Torus and Encore Boilers

Display Firmware 1.5-R1

1. Added support for 10:1 High Turndown (with Virtuoso2 Control) on Flexcore Boilers
2. Added support for Encore Boilers
3. Allow Heating/DHW modulation maximum to be adjusted down to turndown.
4. Update Master/Boiler dialogs to display full HTD Control Version (major, minor, build, revision).

08 – Jun – 2022 Release

Control Firmware Revision 4.16

1. Added support for new Fenwal Ignition Control (35-705601-001) used on Torus boilers.

Display Firmware 1.4-R4

No Changes

18 – Apr – 2022 Release

Control Firmware Revision 4.15

1. VFD Local Pump runs at a higher speed during proof of flow until boiler is running.
2. Fixed brief Modbus fault/error (in Boiler Status 1 bits) that incorrectly occurred during UV and Max Runtime Shutdown.
3. Changed Flexcore pilot ignition default to 30% to support the new HE blowers.
4. Added code to reset the add boiler delay timer when a boiler fails to start or stops communicating. This allows the master to start firing another boiler immediately (if needed).
5. Fixed damper fault that occurred when a brief heat demand is removed before damper opens.
6. Fixed issue that kept independent dampers open longer than necessary.
7. Fixed "Blower Signal not received, retrying" status which would sometimes get latched on the display.

Display Firmware 1.4-R4

1. Added support for USB "partitionless" drives.
2. Fixed displayed subordinate water flow value in calibration.

09 – Nov – 2021 Release

Control Firmware Revision 4.13 - 4.14

1. Added support for High Turndown Torus Boilers. High Turndown Torus Boilers are manufactured with a chassis mount resistor (100Ω) which **MUST** be connected to J7 on the HeatNet V3 Control for proper operation.

Display Firmware 1.4-R3

1. Added support for High Turndown Torus Boilers.

04 –Aug – 2021 Release

Control Firmware Revision 4.12

Adjustable PID Feature Added

1. Added support for adjustable space heating and DHW PIDs. There is now a PID rate setting that can be used to speed up or slow down the PID response time. The rate is a selectable value from 2 – 10, CKs default to 2, Futeras default to 8.
2. Limit the rate that the 4-20ma direct modulation can change based on the new adjustable space heating PID rate setting.

General Futera Improvements

1. Updated Futera/Fusion Op Limit Setting Maximum to 10°F above the Maximum Water Setpoint.

General Flexcore Improvements

1. Fixed issue with Minimum Off Time on subordinate boilers. It is now automatically set to 0 on subordinates so that they can fire whenever the manager fires.
2. Disabled low return temperature faults/warnings on Flexcore Boilers
3. Changed the default Flexcore blower acceleration rate to 1.0%
4. Added Max Flow Exceeded Shutdown Feature on CK boilers
5. Added support for Low Fire Shutdown during a Max Flow Exceeded Shutdown on CK boilers.
6. The modulation on Flexcore boilers is now derated when the Glycol mix is above 20%. When a Flexcore boiler is first selected (in settings) the Glycol mix is set to 50% (it can be adjusted) and the user is notified of this change. A notification prompt will be displayed each time the boiler is power cycled.

General Torus Improvements

1. Disabled UV shutdown on Torus boilers. The Torus does not use UV flame verification.
2. Changed the maximum water setpoint to 195F and the maximum op limit to 200F on Torus boilers.
3. Eliminate interaction between a CSD1 ignition control fault and a blocked flue fault on Torus boilers.

Display Improvements

1. Fix incorrect 4-20ma display modulation during the modulation delay time.
2. Added support for relay status screens on the color display.
3. Added support for improved Space Heating/DHW Gauges on the color display.

Improved Master Valve Remains Open Feature

1. When the Master Pump/Valve Remains On feature is used, the Master will only keep its valve open for 30s instead of the full pump post purge time after enabling a member to fire.
2. Increased the local flow prove time to 600s (10 minutes)
3. When in local pump post purge, the required flow rate is decreased to the boiler minimum rating.

General Improvements

1. Disabled direct modulation on the master boiler which was never supported.
2. Fixed a system pump post purge issue when a new heat demand comes in before system pump post purge is finished. The boiler will shut down and restart and make "OP Limit Software" log entry.
3. Fixed a modulation issue when direct modulating (4-20ma/0-10V) which caused the boiler to run at the pilot modulation percent, instead of the boiler minimum, for the full modulation delay time.
4. Load Default Settings whenever the product is changed.
5. Abort/Cancel any calibration edits (Minimum, Ignition, or Maximum) in progress when calibrate switch is unexpectedly turned off.
6. Added Variable Start Boiler Delays Feature which allows up to 15 different Start Boiler Delays to be configured based on the number of boilers currently firing.
7. Fixed an issue when a Master is set to for Space Heating with DHW Override of Setpoint in DHW Methods 4a and 4b. A local fault on the Master could prevent the DHW pump from being enabled.
8. Fixed high fire display modulation during modulation delay time.

Improved Low Fire Shutdown Feature

1. Increased normal damper close timer to three minutes plus the extended post purge time to allow adequate time for a low fire shutdown and post purge of 30s.
2. Fixed timing condition that occasionally cause low fire shutdown to run twice on member boilers.
3. Fixed a Low Fire Shutdown issue which could occur when the Honeywell is set to retry as opposed to locking out. Low Fire Shutdown is now cancelled when the main valve is lost.
4. Allow low fire shutdown on ALL Futeras EXCEPT CAT1
5. Abort/Cancel Low Fire Shutdown when a Fault/Error Occurs.
6. Fixed flow meter prove issue during LFS and local pump post purge that allowed the flow to drop too low while the boiler was still running.

Display Firmware Revision 1.4-R2

1. Adjustable PID Support (menu).
2. Improved Space/DHW Gauge Display Logic.
3. Support Increased Local Flow Prove Time of 600s (10 minutes).
4. Added DHW Pump Icon to Main Screens.
5. Added Relay Status to Master/Member Main Screens and Dialogs.
6. Added support for Variable Start Boiler Delays feature.
7. Added support for Low Fire Shutdown during a Max Flow Exceeded Shutdown on CK boilers.
8. Added support for glycol setup confirmation on CK boilers.

1 – Jul – 2020 Release

Control Firmware Revision 4.11

1. Added support for RBI Torus Products.
2. Added support for sending Member Log Entries to HeatNet Online.
3. Added Subordinate Lost Status Code and Subordinate Found Log Entries.
4. Fixed an issue with the local flowprove switch showing as made when an Insufficient Local Flow (meter) log entries are made.
5. Fixed communication issue that could sometimes cause a watchdog reset to occur.
6. Major improvements to the performance of scheduler, log entries, and all communications.

Display Firmware Revision 1.4-R1

1. Added support for RBI Torus Products.
2. Added ability to send Member Log Entries to HeatNet Online.
3. Fixed display update issue after saving the time (Settings - System Clock).

30 –Mar – 2020 Release

Control Firmware Revision 3.24 - 3.25

1. Fixed issue with disengaging/shedding boilers in FOFO/LOFO firing modes (space heating only).
2. On Flexcore boilers, the software operator limit on subordinates is now set to 5°F above the manager's software operator limit to prevent subordinates from going off on software operator before the manager.
3. Fixed DHW issue that could prevent a loss of local flow from being detected.
4. Fixed issue in DHW Override when using a DHW sensor. This could cause NO FLOW faults to occur incorrectly when a Master turned off its local pump at the end of post purge if the DHW pump was still on.
5. Fixed several issues that occurred if a Low Fire Shutdown occurred during UV/Maximum Runtime shutdown. It is also now disabled during DHW heating and aborted if a fault occurs.
6. Updated defaults for all CK products. These are applied when the product is changed or during a factory reset.

   Modular Boiler Settings
   • Modulate Delay Time: 3 minutes

   Firing Mode Settings
   • Min Off Time: 2 min
   • Predictive Start: Off

   Blower Settings
   • Accelerate %: 0.5

   Setpoint Settings
   • Operate Limit: 180F
   • Operate Limit Band: 10F

7. Fixed issue that could prevent failsafe mode from exiting if it was entered during an OA reset.

LCD Touch Display Firmware Revision 1.3-R11
No Changes

15 – Jan – 2020

Control Firmware Revision 3.23
1. Reduced combustion air damper failure time once the boiler is running.

LCD Touch Display Firmware Revision 1.3-R11
No Changes

12 – Dec – 2019

Control Firmware Revision 3.20 - 3.22
1. Shutdown members and stop HeatNet communication when Header or DHW sensor on master fails. This allows members to start running failsafe mode.
2. Fixed Distributed Control menu issue on VFD display. The up button navigation did not work.
3. Fixed flow meter glycol calculation issue.

LCD Touch Display Firmware Revision 1.3-R11
No Changes

05 – Aug – 2019

Control Firmware Revision 3.17 - 3.19
1. Fixed issue where the system pump could not turn off after servicing a DHW demand when in WWS.
2. Added the ability to use a DHW sensor with the OR/OVR input jumpered on a Master to trigger and service a DHW demand.
3. Fixed an issue where the DHW pump would not be enabled if the master boiler was faulted.
4. Fixed issue with stack sensor in PVC builds. The sensor was auto detected and enabled, but not used. On 4-line (VFD) displays, the temperature was also not displayed.

LCD Touch Display Firmware Revision 1.3-R9 - 1.3-R10
No Changes

8 – Apr - 2019 Release

Control Firmware Revision 3.16
1. Disabled local flow meter on subordinates.

LCD Touch Display Firmware Revision 1.3-R9 - 1.3-R10
1. Added subordinate blower tachometer values to the Analog I/O screens.
2. Fixed issue that prevented entering numbers on password dialogs.
3. Fixed issued that caused exchanger buttons on the calibration screen to be rendered with a black background.
4. Added improved data capture auto-resume functionality.
5. Added USB drive cleanup to fix an issue accessing USB drive(s) which can occur if the drive was removed during a data capture without properly stopping the capture first.

6 – Mar - 2019 Release

Control Firmware Revision 3.14 – 3.15
1. Improved local flow meter support. The local flow meter is automatically enabled when the product is changed to a Flexcore boiler. It can also be enabled/disabled in the flow meter menu. This is necessary to

help ensure local flow is proven correctly because some products are now shipping with a local flow meter installed.
2. Improved stack sensor type selection (limited by product).
3. Fixed min fire display modulation.
4. Fixed a DHW issue that could cause multiple (master/member) boilers to start immediately when DHW temperature "bounces" just above and just below the lower band. The DHW temperature now needs to go at least 2°F before the add boiler delay timer is cleared allowing another boiler to start immediately.
5. Fixed DHW "Pump Always On". NOTE: the "OR OVR" input MUST be present to activate this feature.
6. Improved HeatNet Online boiler status information.

LCD Touch Display Firmware Revision 1.3-R8

1. Fixed issue that prevented wiring diagrams from being shown in the documents list.
2. Improved stack sensor type selection (limited by product support).
3. Fixed "option" stage control input on status screens when available.
4. Added support for HeatNet Online boiler properties (product type, firmware versions, and network settings)
5. Added support for automatic local flow meter configuration. The local "flow meter enabled" setting is now available in the flow meter menu. The local flow meter menu is shown only for products that have a local flow meter option (Flexcore Series).
6. Removed documents from firmware update to decrease file size a greatly increase update speed.

9 – Nov - 2018 Release

Control Firmware Revision 3.13

1. Off Boiler Blower Running feature corrected for Ametek blowers
2. Added flow sensor temperature protection function.
    a. If the return water temperature rises above 190°F the boiler will be limited to half rate.
    b. If the return water temperature rises above 194°F, the boiler will shut down.
    c. "Local Flow Sensor Temperature Protection" is shown on the display, and a log entry is made when this condition is present.
    d. The boiler will be allowed to fire again once the return temperature drops below 190°F again.
3. Fixed issue with the displayed modulation on CAT1 boilers. The modulation is limited to 85%-100%, but the displayed value was sometimes dropping below 85%. This only affected the displayed value, the actual running modulation was correct.

LCD Touch Display Firmware Revision 1.3-R7

1. Fixed an issue with the local flow prove source and local flow prove GPM data that prevented those settings from working correctly.
2. Added support for local flow meter temperature protection status information and log entries.
3. Fixed repeated "Exchanger Count Changed" message that can occur when the control firmware version is less than v3.00.

19 - Oct - 2018 Release

LCD Touch Display Firmware Revision 1.3-R5 - 1.3-R6

1. Added local flow rate (GPM) data to HeatNet Online messages.
2. Added support for new "Insufficient Local Flow" (flow prove) log entry.
3. Modified Boiler Type settings so that the Back button is disabled until after the user has been prompted to load the default factory calibration.
4. Added local flow meter settings to Flow Meter Settings Dialog.
5. Added support for local flow prove source (switch or meter).
6. Added support for local flow prove rate (GPM) setting.

7. Fixed an issue that caused the HeatNet Online Manual to be displayed when the IOM button (on menu page 4) was pressed.
8. Added support for Heat Exchanger Protection status information and log entries.

Control Firmware Revision 3.11 - 3.12

1. Added support for new EE chips: Microchip SST26VF064B and Cypress S25FL064P.
2. Released support for local flow meter.
3. Added local flow rate (GPM) for master and members to Modbus.
4. Added local flow prove source (switch or meter).
5. Added local flow prove rate (GPM) setting. This setting is used to set the minimum flow rate (GPM) required to prove flow when a local flow meter is present.
6. Added insufficient local flow log entry and status message.
7. Modified glycol mix setting. It's range is now limited to 0-50% glycol.
8. Off Boiler Blower Running feature corrected for Ametek blowers.
9. Added support for Heat Exchanger Protection (on VFD interlock) status information and log entries.
10. Fixed an issue with initialization on Flexcore models CK850 and CK1000.

Jun-18- 2018 Release

Control Firmware Revision 3.10
No Changes.

LCD Touch Display Firmware Revision 1.3-R4

1. Added Chinese (Mandarin) translation support.
2. Added support for "Lost Subordinate" and "Low Fire Shutdown" log entries.
3. Fixed description of "Blower RPM too High during Pilot" log entry. It was "Pilot RPM too High".
4. Fixed description of " Blower RPM too High during Main Valve" log entry. It was "Main Valve RPM too High".
5. Changed Air Pressure Switch LED to display green (not yellow) when ON and fixed issue with Air Pressure Switch in log entries (inverted logic).

LCD Touch Display Firmware Revision 1.3-R3
No changes related to RBI products.

May -8- 2018 Release

Control Firmware Revision 3.08 - 3.10

1. Fixed an issue that was causing the master to shut down member boilers during UV or Max Runtime shutdown.
2. Fixed display modulation value during low fire shutdown.
3. Fixed an issue that caused ignition lockout on multi-exchanger Flexcore boilers if the manager is reset while running.
4. Fixed an issue that caused a low fire shutdown even when modulation was below 50%.
5. Fixed a synchronization issue that can sometimes cause ignition lockout during low fire shutdown.

LCD Touch Display Firmware Revision 1.3-R2
No Changes.

Mar -3- 2018 Release

Control Firmware Revision 3.07
Fixed an issue with the Heat Exchanger ΔT setting on Flexcore boilers. It did not work properly when changed from the default value.

LCD Touch Display Firmware Revision 1.3-R2
No Changes.

Feb -28- 2018 Release

Control Firmware Revision 3.01 to 3.06

1. Fixed an issue with Modbus Write Multiple (Holding) Registers that was causing write errors and writes to the wrong holding registers.
2. Fixed issues that were generating incorrect "Minibus Communications Lost" log entries on subordinates (a) immediately after a system reset and (b) when the call for heat was removed.
3. Fixed an issue that was causing an incorrect "LCD Power Reset" log entry on subordinates.
4. Enhanced ignition synchronization between the manager and subordinates.
5. Fixed an issue that could cause ignition lockout during UV and Max Runtime Shutdown when running above 50% modulation.
6. Added "Boiler Status Code" Modbus input registers for boilers 1 (master) to boiler 16 (member).

LCD Touch Display Firmware Revision 1.3-R1 to 1.3-R2

1. Added support for enhanced minibus functionality which allows the LCD display to communicate directly with the subordinate exchangers. This provides better integration, status, and error reporting on Flexcore boilers CK 3500 and above.
2. Added ability to save documents to a USB drive.
3. Added Local Flow rate (to Local Flow LED) on main screen.
4. Added HeatNet Online Manual to documents.
5. Modified HeatNet Online so that it sends the display firmware version.
6. Added support for Blower Speed log entry.
7. Fixed issue displaying stack temperature for type-z sensors on calibration screen.
8. Updated Interlocks to display:
    a. FIII Series: User and Scanner Air is hidden
    b. Flexcore: Condensate Switch and Subordinate Alarm (hidden on single exchanger units)
9. Added support for common supply sensor.
10. Updated Programming screen to display progress percent when supported by control firmware.
11. Fixed issue with DHW settings that incorrectly disabled "Pump Always On" setting in some cases.
12. Added support for the following products:
    a. MB/MW 6000
    b. MB/MW 10000
    c. CK 850
    d. CK 1000
    e. MB/MW 6000 CAT1
    f. MB/MW 8000 CAT1
    g. MB/MW 10000 CAT1
13. Updated Sensor Settings to make the J7 sensor type editable.
14. Fixed issue displaying turndown on Member Screen.
15. Fixed issue changing Modulate Maximum in Modular Boiler settings. Minimum Input was incorrectly used as a minimum instead of minpot.
16. Fixed issues displaying Local MBTUH on the Master and Boiler screens.
17. Added support for Condensate Warning and Condensate (presumed) status line messages.
18. Fixed issue loading control firmware from save file 1 (location 0).
19. Added support for Condensate Occurring log entry.

20. Fixed issue changing blower on Flexcore boilers, Ametek is now allowed.
21. Fixed issue saving HeatNet Online settings. If boiler was power cycled shortly after changing the settings, they did not get properly saved.
22. Improved support for multi-exchanger boilers eliminating the need to switch (multiplex) the display input to view the status of the subordinates. This feature requires control firmware that supports Minibus routing.
23. Added sensor calibration.
24. Added control Date and Time to the Main (Home) Screen.

Dec -11- 2017 Release

Control Firmware Revision 3.00

1. Added enhanced minibus functionality that allows the LCD display to communicate directly with the subordinate exchangers.
2. Added support for new boilers CK850, CK1000, MB6000, MB8000, and MB10000.
3. Added a Lockout and warning for condensate occurring in non-condensing FIII, Fusion, and XLF boilers.

   If the boiler is running for 30 minutes with the return temperature below 130F a warning: "CONDENSATE" will be displayed. If the SETUP: AUX FUNCTIONS: HEAT EXCHANGER: ALARM TYPE is set to FAULT, the boiler will lock out. If the temperature during the 30 minute time (waiting below 130F) goes above 130F, the boiler must remain above 130F for 30 minutes before the 30 minute (below 130F) timer resets. So, staying below 130F for 29 minutes, then going above 130F for 5 minutes, and then dropping below 130F for one minute will produce the WARNING or FAULT condition.

4. Fixed issue displaying Local/System BTUH on VFD display.
5. Fixed issue loading firmware from saved file 1.
6. Added Modbus support for common supply sensor on multi-exchanger Flexcore boilers.
7. Added LCD display sensor calibration support.
8. Restored System Pump VFD functionality which was removed in the original Flexcore release.

3 - May - 2017 Release

Control Firmware Revision 2.59

1. Added PVC support for Flexcore products:

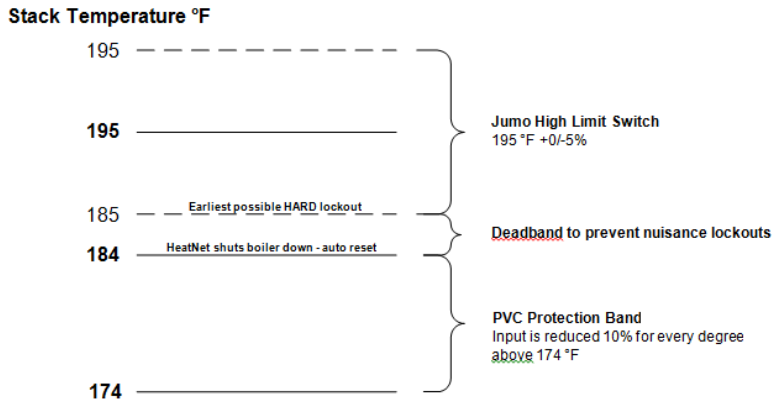
RBI Fusion/Flexcore PVC Operating parameters – Version 2.59P, Version 3 HeatNet

High Limit Switch – Jumo EM4 Manual Reset High Temperature Limit Switch, Trips at 195 °F +0/-5%, 6mm dia airstream mounted bulb using Fitting 606710-65-35-46-000-00.

Stack Temperature Sensor – Spectrum Controls (Advanced Thermal Products) 10K Type Z NTC Thermistor, 2" insertion depth Flange housing, insulated 3/16" quick connect terminated leads.

HeatNet PVC Modulation Limit Function – Starting at 174 °F through 184 °F The control will reduce the requested input by 10% for every degree above 174 °F until the Min Fire level is reached. The control will shut the boiler off if the stack temperature exceeds 184 °F.

RBI Fusion PVC Temperature Ranges



10 - April - 2017 Release

Control Firmware Revision 2.58

1. Added a Low Fire Shutdown on all Heat Demand inputs for better reliability on Flexcore series boilers. FIII, XLF and Fusion are not affected. When a Call for heat has ended, and if the firing rate was over 50%, the boiler will drop to low fire and run for one minute before shutting off.
2. Corrected an issue when direct modulating using the 4-20mA input. Display values did not accurately track the control signal.

LCD Touch Display Firmware Revision 1.2-R10

1. Made several data status and reliability improvements to HeatNet Online.
2. Enhanced the SNTP (Network Time) client to improve synchronization speed and provide additional status messages.
3. Fixed an issue that caused the SNTP client to continuously emit a "failed" message (shows up in the HeatNet Online Status Monitor), while waiting for a response when synchronization has already failed.
4. Fixed an issue that could sometimes cause HeatNet Online to stop transmitting data. This issue ONLY affected version 1.2-R9.
5. Added support for the new "Low Fire Shutdown" status code.

15 - March - 2017 Release

Control Firmware Revision 2.55 - 2.57

1. Added support for U25. The old component went "End Of Life" and new drivers written to allow operation of the new component. U25 is used as an intermediary storage location when updating firmware.
2. Enhanced the bootloader for loading firmware. The percentage loaded is now displayed when loading firmware. The bootloader can only be updated at the factory. All product shipped from this date will have it loaded
3. Due to the new flash chip (U25) on the HeatNet control, older versions of firmware cannot be loaded. Older versions of firmware cannot read or write the new flash chip.
4. Corrected a display issue while in calibrate. The Calibration Screen would show the Modulation at the Maximum % when the Minimum % or Ignition % was selected.

LCD Touch Display Firmware Revision 1.2-R9

6. Updated the HeatNet Online Status file format with *Windows* compatible line breaks so it is properly displayed in simple text editors like *Notepad*.
7. Improved the SNTP client by making it more resilient to network and time server issues.
8. Fixed a minor issue with restoring settings from USB on control firmware versions < 2.54. A file read error was sometimes displayed even when there were no errors.
9. Added enumerations for "Pump Change" and "Summer Pump Jog" log entries.
10. Added "PVC" notation to the version on the Splash Screen and the Master/Boiler dialogs when PVC firmware is detected on the HeatNet Control.
11. Fixed an issue with setting the *Lead Boiler*. The enumerated selections were incorrect:

Incorrect (old)	Correct (new)
Master (0)	Auto (0)
Member 2 (1)	Master (1)
…	…
Member 16 (15)	Member 16 (16)

12. Added support for the new flash chips being used on the HeatNet Control.
13. Added support for the enhanced bootloader added to the HeatNet Control. During the programming stage of a control firmware update, the actual progress percent is now displayed instead of an estimated time remaining.
14. Fixed an issue that would occasionally cause an "Out of Memory" message.

19 - DEC - 2016 Release

Control Firmware Revision 2.51 - 2.54

1. Corrected an issue where a saved setting was updated too frequently when using an LCD color display. The result of this was a damaged storage block in the EEPROM saved settings memory. The EEPROM has a limited amount of times that it can be written to before being damaged. When the saved byte's cells were damaged, the result was that it took out the whole block of 256 bytes associated with it. This resulted in adjacent save locations being damaged.

   With this release, the 256 byte block that is affected is marked bad and the saved settings are moved to an adjacent free block.

   The damaged save locations could cause errant operation. These locations are not damaged when using the 4-line green Vacuum Florescent display and operation will be normal.

The affected saved settings were:

Heat Exchanger Return Water Temperature
Return Threshold Temp (takes a boiler offline if the Return temp is less than above temp)

DHW Max Runtime
DHW Holdoff Time (used to prevent the boiler from staying too long in DHW mode)

Force a Firmware file to be loaded (causes No Communications with the LCD)

2. Removed support for the KB Variable frequency drive at 110Hz.

LCD Touch Display Firmware Revision 1.2-R8
No Changes

30 - Nov - 2016 Release

Control Firmware Revision 2.50
No Changes

LCD Touch Display Firmware Revision 1.2-R8

1. Fixed issue with SNTP (Network Time) that caused incorrect time on the Display and HeatNet control when HeatNet Online was enabled.
2. Added improved DHW operation display.
3. Added Data Capture feature which can be used to periodically save a predefined set of temperatures and operational data to a USB drive. The data is saved as comma separated values (CSV) so it can be viewed and analyzed in any application that supports that format.

4 – Nov -2016 Release

Control Firmware Revision 2.50

1. Added a DHW Override Mode with Sensor as a supplement to DHW Mode 4, which will now be designated as Mode 4B. This mode was originally in the HeatNet Version 2 board firmware, but was not migrated over to Version 3.

   This mode is only available on the Master boiler since it's purpose is to override the system setpoint. In this mode the space heating setpoint (Header) is overridden with the DHW setpoint, and the DHW temperature is maintained at the DHW sensor using the DHW pump. The Master boiler will only control the DHW pump and allow all boilers to fire to maintain the DHW setpoint. The OA OVR input and the Heat Demand input must be closed to enable this mode. If either of these inputs are opened, the mode will be stopped.

   All boilers are started and stopped using the space heating Modular Boiler Settings. The Modular Boiler DHW tab is not available.

   In prior versions, Method 2 was only allowed in this application. This method required setting the Distributed Control: Master Type: to Combo along with the DHW (Boiler Mode): set to Combo on each boiler used for DHW heating. Using this mode allowed a DHW failsafe mode and pump redundancy. The limitation in this mode was that all DHW pumps needed to be wired in parallel. If the Master was the only boiler allowed to control the DHW pump, all other boilers needed to have their respective DHW (Boiler Mode): set to AUTO. This limited the system to only one boiler controlling the DHW heating load and no failsafe operation.

With this release and the LCD Touch panel firmware release, the Master will only show a showerhead indicating the system is running in DHW override. Member boilers will not show the showerhead since they are unaware of the task the Master is performing.

Settings: Distributed Control: Master Type: AUTO
DHW(Boiler Mode): AUTO
DHW: Use Sensor

2. Added a DHW pump stays on feature which can be used with the DHW Override Mode with sensor.
3. Disabled the Auto detection feature for the OA sensor due to false detections. The OA sensor will have to be manually enabled in the sensor menu.
4. Fixed issue with saving the Number of System Pumps and the System Pump Rotation on LCD Display. Previously it could take up to an hour before they were saved.
5. Added the ability to disable the DHW Max Runtime by setting it to 0.

LCD Touch Display Firmware Revision 1.2-R7

1. Added support for new DHW mode as outline above.

24 - August - 2016 Release

Control Firmware Revision 2.46-2.47

1. Fixed an issue that could cause control to reboot when a Modbus "Read Device Identification" request is sent by the BMS.
2. If the Master Pump/Valve Remains on is set to ON or Always Enabled is set to ON (in the local pump settings), the boiler will always look for flow. With this release and in this case, the flow is not monitored when there is no call for heat.

LCD Touch Display Firmware Revision 1.2-R6
No Changes

1 - August 2016 Pre-Release

Control Firmware Revision 2.45

1. Added the ability to auto detect the Manager in a multi heat exchanger boiler.
2. Allow the MBMW 500 to be selected. This was removed in prior releases due to Category 1 boiler changes.

LCD Touch Display Firmware Revision 1.2-R6
No Changes

20 – July - 2016 Release

Control Firmware Revision 2.45
No Changes

LCD Touch Display Firmware Revision 1.2-R6

1. Added support for CAT1 products (requires Control Firmware 2.42).

28 – June - 2016 Release

Control Firmware Revision 2.45

1. Added improved support for calibrating FlexCore boilers with multiple heat exchangers.

LCD Touch Display Firmware Revision 1.2-R5

1. Added improved support for calibrating FlexCore boilers with multiple heat exchangers.
2. Added HeatNet Online functionality.

22 – June - 2016 Release

Control Firmware Revision 2.44

1. Added Delta T protection while in Calibrate. All firing rates will drop to ½ the called for rate if the Delta T exceeds the Delta T setting while making calibration settings. If while performing the calibration procedure the boiler goes into a Delta T protection mode, the flow may need to be increased or the heating load adjusted to perform the calibration.

LCD Touch Display Firmware Revision 1.2-R4
No Changes.

15 – May - 2016 Release

Control Firmware Revision 2.43

1. Support for FlexCore multiple heat exchangers.

LCD Touch Display Firmware Revision 1.2-R4
No Changes.

5 – May - 2016 Release

Control Firmware Revision 2.42
No Changes.

LCD Touch Display Firmware Revision 1.2-R4

1. Added Maximum DHW Runtime Exceeded and LCD Power Reset log entries.
2. Added improved DHW operational status on master and member boilers.
3. Added a button to update the Display Firmware on the "No Communications Screen".
4. Added ability to detect if the display is booting from on board memory (EMMC) instead of the SD card. This is required to properly handle display switching on products with multiple heat exchangers.
5. Changed minimum DHW hold off time from 0 to 1 minute (60 seconds).
6. Fixed an issue with Open File Dialog which prevented valid matching files, but with different character casing from showing up in the file list. It is now case insensitive.
7. Fixed an issue with boiler buttons on the main screen. The “too hot” indicator was being displayed when the operator interlock was open.

3- May- 2016 Release

Control Firmware Revision 2.42

1. An issue occurs since the last release, where the Local Pump will remain on if the Main valve never opens and an extreme short cycle occurs. Once the boiler fires, the Local Pump resumes normal operation. This has been corrected to not allow the Local Pump to remain on.
2. If the HeatNet control has a previous companies/ product range firmware installed, it can cause the other companies product to display non-released products. This has been corrected.
3. Added the ability of a Member boiler to use the DHW MOD-MAX: RELEASE MOD MAX feature to limit the DHW modes firing rates to the MOD MAX value.
4. Flexcore default calibration values have changed and are now independent of each Flexcore model.
5. Enhance some minibus functions used by the LCD display on Flexcore.
6. Changed the Default DHW timeout to 2 hours from 1 hour, and the Holdoff (retry) to 30 minutes (was LOCKOUT). This allows the DHW call for heat to occur for a maximum time of 2 hours before shutting down and sets the wait time before firing in DHW again to 30 minutes.
7. Also, Limited the DHW Holdoff time to 1 minute minimum from 0 minutes due to possible race conditions.
8. Corrected an LCD Display issue when displaying DHW Modulation.
9. Limited the ADAPTIVE MOD: DELAY RELEASE: minimum and default time to 5 Seconds. The minimum was 0 seconds. If 0 seconds are needed, use the ORIG KN setting rather than ADAPTIVE under MOD MODE.
10. Version 2.32 through 2.42 has an issue when communications is lost from the Master. If a Member boiler is currently running when communications is lost, that Member boiler could remain running and act in Failsafe mode. That Member boiler will maintain the supply temperature using the operating limit.

LCD Touch Display Firmware Revision 1.2-R3
No Changes.

13– Apr - 2016 Pre-Release

Control Firmware Revision 2.39-2.41

1. An issue occurs after the last release where the DHW OR OVR input when toggled in DHW COMBO and Master Boiler in MASTER TYPE: COMBO, fails to start the next DHW cycle. The Hold-off timer for the Maximum Runtime of the DHW fails to reset when in LOCKOUT. This change ensures that the Lockout setting is cleared when the OR OVR is toggled.
2. Fixed an issue when using the VFD pump signal and the Local Pump Always Enabled feature. Prior to this release, the local pump's VFD modulation signal would hunt between a low speed and a high speed when post purging. This has been corrected to provide a stable high speed pump VFD signal at the Max VFD setting.
3. Issue with detecting a missing/open Stack sensor. If a Stack Sensor opens or is removed when it was installed, the open sensor warning may not occur due to threshold sensing. The threshold has been increased to allow greater detection.
4. Fixed issues with display modulation during modulation delay and in DHW operation.
5. Fixed issues with stack temperature when a TypeZ sensor is used. The temperature need to be divided by 100.
6. Fixed issues saving *Local Pump Always Enabled* and *Local Pump Delta Temp Enabled*.
7. Fixed issues saving *System Pump Always Enabled* and *Override Enabled in Warm Weather Shutdown*.
8. Added improved Minibus communications to support multi-heat exchanger units with the LCD boost.

LCD Touch Display Firmware Revision 1.2-R3
No Changes.

10 – FEB - 2016 Pre-Release

Control Firmware Revision 2.38

1. The password now dis-allows changing the setpoint in the main menu run screen (4-line display).
2. Add VFD pump output voltage change to post purge at 80% (8 VDC).

LCD Touch Display Firmware Revision 1.2-R3
No Changes.

19 – Jan - 2016 Release

Control Firmware Revision 2.35 - 2.36
No Changes.

LCD Touch Display Firmware Revision 1.2-R3

1. Added improved support for the LCD Boost interface card when loading control firmware to prevent unexpected resets.
2. Improved the method used for network restarts to help resolve issues when a network cable is not connected.
3. Fixed issues with editing temperature settings in Celsius.
4. Fixed an issue that occurred when the Display Units (English, Metric) was changed. The change inadvertently reset the following settings: Analog (4-20ma, 0-10V) Channel Priority, Firing Mode, Damper Type, Damper Enable, and Alarm Input/Silence.
5. Fixed an issue that occurred when setting the Heat Exchanger Delta Temperature. The upper limit was incorrectly calculated which limited the ability to increase the value to the correct maximum.
6. Modified boiler buttons so that the modulation percent is only displayed when it is non-zero.
7. Extended Post Purge and Maximum Runtime are now available in Heat Exchanger Settings on FIII firmware 2.37+.

8-Jan-2016 Release

Control Firmware Revision 2.35 - 2.36

1. Support for the LCD Boost interface card to allow automatic reset of the LCD after 1 minute if the LCD display has locked up or stopped transmitting data to the HeatNet control. V2.35
2. Increased the wait time for the LCD Boost Interface to 2 minutes (loss of communications) to ensure a reset does not occur when flashing updates. V2.36

18– Dec -2015 Release

LCD Touch Display Firmware Revision 1.2-R2

1. Added support for DHW Max Runtime and DHW Holdoff Time.

17– Dec -2015 Release

1. Added a timeout setting for the Domestic Hot Water modes. This timeout value can be set in SETUP: DOMESTIC HOT WATER: MAX RUNTIME: The DHW heating can be set to timeout up to (2) hours. The default time is (1) hour of continuous DHW heating. Once this time has been exceeded, a second timer is activated, called the HOLDOFF timer. It is located at SETUP: DOMESTIC HOT WATER: HOLDOFF. It can be used to hold off a call for the next DHW cycle, or Lockout after the Max Runtime has been exceeded. The HOLDOFF timer also has a maximum time of (2) hours and a default of LOCKOUT.
2. Added support for FlexCore Models.

LCD Touch Display Firmware Revision 1.2-R1

1. Added support for saving the log file to a comma separated values (CSV) file on a USB drive.
2. Added support for units with multiple Heat Exchangers. The display input can be switched (multiplexed) between each control.
3. Fixed several minor issues that sometimes occur when the control firmware has a product selected which the display firmware does not yet support.
4. Fixed an issue with the document viewer which caused the cursor to not be restored when a long operation was cancelled.
5. Added "Sync" mode to Baseload Start Mode and Baseload Stop Mode on firmware versions greater than 2.31.
6. Added support for dynamic Max Water Setpoint, Max DHW Setpoint, and Max. System Operating Limit.
7. Added support for changing Network Settings (IPv4 Address, Subnet Mask, etc.)
8. Added support for new products: RBI Flex Core 2000 - 9000, FIII MB/MW 8000.
9. Improved the modulation value displayed on the status line. If the boiler is "running", but the modulation is <= 1, "Running" is displayed instead of "Running 0%". This typically occurs during the boilers main valve proving time.

7 – Oct -2015 Release

Control Firmware Revision 2.22 - 2.32

1. Improved filtering of temperature sensors to stabilize jumping temperatures with long sensor wire runs.
2. Added the detection of the tach signal when using the Ametek blower or the VFD. If an incorrect setup is detected, as when a VFD is selected vs an Ametek blower or the other way around. "BLOWER, RPM FAULT" will now be displayed if a Tach signal is present or not, and is dependent on the configuration. The tach signal now has to be present for the boiler to fire when an Ametek drive is used, or not present when a VFD is used. This is a lockout condition.
3. Added new FlexCore product entries.

LCD Touch Display Firmware Revision 1.1-R5

1. Added display watchdog support for the newest and future OS releases.
2. Updated all logo and splash screen images to the new HeatNet logo.

LCD Touch Display Firmware Revision 1.1-R4

1. Added support for Heat Exchanger Max. Runtime setting, log entries, and status.
2. Enabled watchdog timer on the display.
3. Fixed an issue that prevented Load Factory Calibration from working properly.

3 – June -2015 Release

Control Firmware Revision 2.19 - 2.20
No Changes.

LCD Touch Display Firmware Revision 1.1-R4
1. Fixed a bug that prevented the "Load Factory Calibration" menu selection from working properly.
2. Fixed a bug that prevented the "Factory Reset" menu selection from working properly.
3. Enabled watchdog reset to help prevent rare system lockups on installations with severe electrical noise.
4. Removed the automatic detection of the stack sensor for non PVC models.

30-Mar-2015 Release

Control Firmware Revision 2.19 - 2.20
No Changes.

LCD Touch Display Firmware Revision 1.1-R3

1. Fixed an issue with changing DHW Master Type (Distributed Control) on DHW member boilers.
2. Added better descriptions (include input location i.e. J12B) for Interlock status line messages.

27-Mar-2015 Release

Control Firmware Revision 2.19 - 2.20

1. This revision supports the V1.6 HeatNet control. The Hardware revision 1.6 is different from prior versions in that it has greater protection from static and high voltage discharge. The G terminal is also protected from 24vac on the communication line. It can be identified by a green power LED near the 24VAC connector J14 and component VAR1.

2. Removed the running restriction when calling a Base Load boiler from a Member boiler. The Member boiler does not need to be firing in order to call a Base Load boiler. **Provisions on the Base Load boiler should be checked to allow a system pump to run and any dampers to open.**

   Failsafe using the Base Load boiler from the Member is automatic. Whenever the Member fails, the Base Load boiler will be enabled as long as the Member can do so.

   The Master boiler still requires a heat demand input in order to control a Base Load boiler connected to it. Though, the Master boiler does not need to be running. This is to ensure that the system pump and damper will be enabled for the system. The System pump and Damper control are the main reasons to connect the Base Load boiler to the Master.

   Failsafe on the Master boiler will occur if there is a Heat Demand input present, there are no available boilers to fire, and the Master has failed.

3. Added Float switch detection. The float switch input is located in the interlock string J11B connector marked USER.

LCD Touch Display Firmware Revision 1.1-R2

No Changes

24-Feb-2015 Release

Control Firmware Revision 2.18

No Changes.

LCD Touch Display Firmware Revision 1.1-R2

1. Fixed an issue with saving files to the USB Drive. If the drive was removed to quickly, the file would be lost.
2. Made communications between the Display and the HeatNet Control more robust.

19-Feb-2015 Release

Control Firmware Revision 2.18

1. Fixed an issue with the boiler modulation values available on a BMS (Modbus, BACnet, LonWorks). The modulation value was not returning to zero when the boiler stopped running.

LCD Touch Display Firmware Revision 1.1-R1

No Changes.

6-Feb-2015 Release

Control Firmware Revision 2.17

1. Fixed an issue with the operating setpoint displayed on the member boiler. The member was not correctly displaying the master (system) setpoint when being controlled by the master.

LCD Touch Display Firmware Revision 1.1-R1

No Changes.

9-Jan-2015 Release

Control Firmware Revision 2.15 - 2.16

1. A condition exists when controlling Variable Speed Local Pumps with the Delta T protection algorithm active. The output on J4.1 & .4 are mapped to the called for firing rate even though the real firing rate is less when the Delta T algorithm is active. This change maps the variable speed pump signal to the real firing rate.
2. Added the Russian build.
3. Fixed an issue with the "SETUP: PUMP OPTIONS: LOCAL PUMP: ALWAYS ENABLED" set to ON. When this feature is used on the Master boiler the boiler may not start after completing a cycle. This has been corrected with this release.

LCD Touch Display Firmware Revision 1.1-R1

No Changes.

16-Dec-2014 Release

Control Firmware Revision 2.13

1. The control no longer locks out when a DHW sensor fault occurs. If the DHW sensor temporarily faults the DHW Heating status is restored. Also, if the boiler is operating in Combo mode and the DHW sensor faults, space heating is still available.

2. Changed the default setting of the DHW SHARING option. Prior to this change, its default setting was set to OFF. The OFF setting would not allow DHW heating to occur as long as the boiler was running in space heating mode. Once it finished space heating, DHW heating would start. The default setting is now set to CYCLE which is a DHW priority mode. If the boiler is running in space heating a DHW call for heat will result in the boiler cycling off and then restarting in DHW heating mode.

LCD Touch Display Firmware Revision 1.1-R1

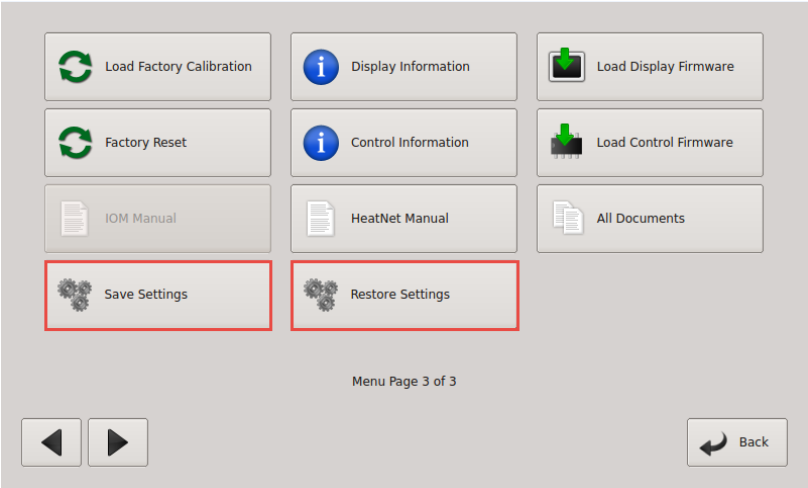
No Changes.

10-Dec-2014 Release

Control Firmware Revision 2.13

1. Firmware support for the Color LCD display to allow saving and restoring setup files to a flash drive. Setups can now be done remotely, placed on a flash drive, and then uploaded to the control. This also requires that LCD Touch Display Firmware Revision 1.1-R1 be installed.

   The Save/Restore menu buttons are located on menu page 3.



3-Dec-2014 Release

Control Firmware Revision 2.12

1. Fixed a display issue with the last firmware release. When in calibrate the MAX VFD value was not displayed.
2. Fixed a race condition on a Member when running in DHW LOCAL with a DHW sensor. The SHARNG option is also set to OFF or CYCLE. "NO CYCLE" does not cause this condition.
    1. The Master calls a Member boiler for space heating.
    2. That boiler begins its pre-purge to run in a space heating mode.
    3. **During this pre-purge**, the DHW temperature falls and initiates a DHW cycle and aborts the Master's call for space heating (the issue is with a small window during pre-purge).
    4. The Member finishes its DHW cycle and then **does not initiate the next DHW cycle**.

LCD Touch Display Firmware Revision 1.1-R1

1. Initial Release with RBI Fire Tube support.

Revision 2.11 14-Nov-2014 Release

1. Adjust CK 1500 default settings to match HeatNet IOM.

Revision 2.10 10-Nov-2014 Release

1. Fixed a flashing message in the STATUS * screen.

2. Fixed a display issue with the DHW modulation % in the DHW graph. The modulation used by the boiler was correct, but the display % added a scaling offset. This offset was removed. Also, on the DHW screen on the Master boiler, the % modulation always is for the system DHW Modulation. If the DHW modulation delay is in effect on the Master or Member, the called for Modulation is displayed.

3. Added the Adaptive Mode to the DHW. This mode was not available in the prior release. Now, the DHW will use the ADAPTIVE MOD space heating settings when firing DHW boilers.

4. Fixed the DHW Modulation delay to be 60 minutes rather than 4 minutes. This value needs to be set on each boiler. It is not a global value used by the Master.

5. Added the ability to use the Mod Max value as a limit clamp on DHW boilers. If the ADVANCED SETUP: MODULAR BOILER SET: DHW HEATING: MOD MAX _ LAST FIRE: RELEASE MOD MAX is set to YES, then when all boilers are firing, the clamp is released and all boilers are allowed to fire to 100%. If the RELEASE MOD MAX is set to NO, the clamp will remain in effect regardless if all boilers are firing.

6. Added support for the Firetube CK 1500 boiler.

Revision 2.02-2.04 14-Oct-2014 Release

1. There exists confusion with the DHW BOILER? MIXED setting and the DISTRIBUTED CTRL: MASTER TYPE: MIXED setting, with the FIRING MODE: MODE: MIXED setting. The setting for DHW and MASTER TYPE will now be named COMBO, for Combination DHW and Space heating. FIRING MODE: MODE:MIXED will remain the same.

2. Removed the repeated Fault during retries of the blower. Now, when the blower has failed and a retry is initiated, HEAT:WAIT is displayed. After 3 attempts the AIR SWITCH (BLOWER) will be displayed along with the Alarm relay and Fault condition.

3. While in Calibrate, an offset was being applied to the local pump VFD output signal. This offset has been removed to allow setting up the VFD local pump in calibrate.

Revision 2.01 1-Aug-2014 Release

1. Add support for a Local flow meter. The 2nd tachometer input on J1 is used to determine flow. Consult factory for this addition.

2. The Pilot Fan is turned on a few seconds before the Pilot is signaled on by the Honeywell. This is to clean up a lazy pilot that occurs for about 0.3 seconds.

3. Low OA Set at Modbus address 40009 fails to save properly when written from Modbus/BacNet/LonWorks. This version corrects this.

Revision 2.00 1-July-2014 Release

1. Full working release for the LCD touch panel display.

2. Added the ability to save and restore configuration settings. Access is available in the ADVANCED SETUP: LOAD DEFAULTS: CONFIG ?

3. Enabled 4-20ma/0-10VDC mode. Mode was not enabled in prior release.

4. When running in DHW Method Master TYPE = Mixed, the boilers firing menus now shows a ‘D’ where a Domestic Hot Water boiler is firing.

Revision 1.95 -1.99

1. Revise Modbus Address map Figure 40 to include flow registers.

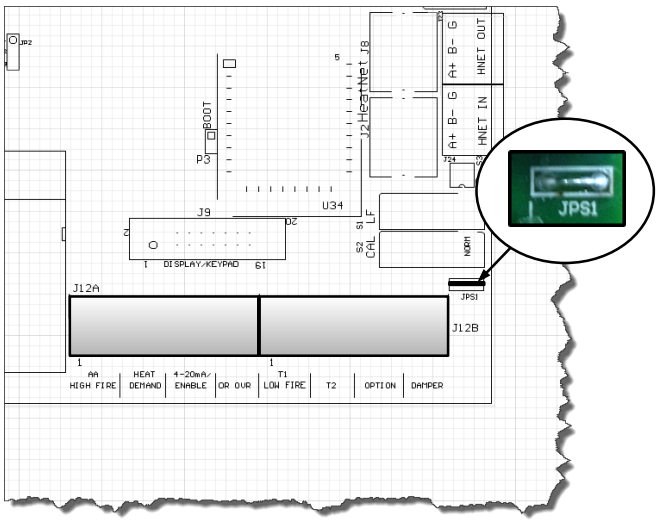
40019	BMSGPMRate	16 bit unsigned	1.0	**GPM rate to be loaded by BMS for calculating how many boilers can run based on flow.**	0-1500 GPM
40020	LimitBoilers	16 bit unsigned	1.0	Write the # of boilers that the BMS allows to fire. If x boilers are available, x becomes less than or equal to LimitBoilers.	0-16

2. Revised DHW manual to implement floating sensor on Method 5 and clarified other Methods.

Domestic Hot Water Methods

Domestic Hot Water control is supported using (6) methods. When using the Domestic Hot Water methods, the wire jumper, JPS1 on each control board providing Domestic Hot Water, must be cut to limit the boiler's maximum output temperature to 200F. Refer to Figure 42 for control input and output locations.

Figure 1 Jumper JPS1



Note: Most of these methods use a separate PID control for the DHW. This means that the Master boiler can be used to individually control its own DHW tank and provide space heating functionality at the same time.

A **MASTER TYPE** is required when using DHW. Its setting is located under the **DISTRIBUTED CTRL** menu. *Any time its setting is changed, a power cycle is required.* The menu choices are:

AUTO: will handle normal heating only applications. It may also be used when individual boilers have tanks connected and are controlled with the **DHW BOILER**? set to **LOCAL**.

DHW: is for **DHW** applications without space heating.

MIXED: Will allow mixed Space and DHW heating control of boilers by the Master.

MAX for the system. This allows the independent control of boilers by the Master for each of the (2) PIDs.

The OR OVR input now functions in many of the methods as a DHW Heat Demand input (except **DHW** Heating Only method), but still retains the original OR OVR functionality in **AUTO**, if the DHW menus are not used (**DHW BOILER**? **NO**). If the DISABLE TO CHANGE message appears, remember to remove the any call for heat including the OR OVR input.

When the MASTER TYPE is set to **MIXED** the MODULAR BOILER SET menu will contain (2) separate menus for controlling the ADD BOILER DELAY, SHED BOILER DELAY, MODULATE DELAY, and the MOD

DHW METHOD 1: DHW Heating ONLY using a DHW MASTER and Member boiler(s) employing H-Net.

This method requires a 10k thermistor connected to the DHW Sensor input of a DHW MASTER, or a stand-alone boiler, and a DHW tank. This method does not use a HEADER sensor. The DHW temperature is maintained by the space heating PID for backwards compatibility. With this method the OR OVR input does not function as a DHW enable and is not used. The Heat Demand input is used to enable/disable DHW heating operations.

The system pump is enabled on the Master as long as the Heat Demand input is closed. The Master's DHW pump is engaged only when there is a call for DHW heating by the system. This allows for a DHW loop/ buffer and A DHW tank that can be heated using the DHW pump/valve off of this loop/buffer.

Boilers are started as long as the tank's water temperature is below the (DHW SETPOINT – LOWER DHW DIFF). The first boiler is started immediately. The next boiler(s) is started after the ADD BOILER DELAY time expires. Boilers are not added when the temperature is above the (DHW SETPOINT – LOWER DHW DIFF) and below the UPPER DHW DIFF. Once the UPPER DHW DIFF is exceeded, boilers will shut off based on the SHED BOILER DELAY TIME.

Setting up this method is done via the menus in: **SETUP: DOMESTIC HOT WATER.**

1. Connect a 10k thermistor from the DHW tank's sensor well to J10B terminals on the DHW MASTER, or stand-alone boiler. Wire a pump or valve from the DHW pump or the System pump (normally open) relay contact to control flow of the heating water into the tank's coil or system loop.

   The System pump will always be enabled as long as the Heat Demand input is closed. The DHW pump will be enabled whenever there is a DHW call for heat.

   A DHW call for heat is when the DHW temperature is below the (DHW SETPOINT – LOWER DHW DIFF) or when the DHW temperature is below the (DHW SETPOINT + UPPER DHW DIFF) and boilers are firing. After a DHW call for heat ends:

   A. The pump will remain on during a post purge pump cycle until the post purge timer expires.

2. Next, enter the **DOMESTIC HOT WATER** menu on the Master boiler. When prompted for **DHW BOILER?**, enter **NO**. The Master treats this method as a DHW system much like a space heating system.

   Member boilers may set the DHW BOILER? to LOCAL and go offline to perform secondary DHW heating, but the Master setting must be set to NO.

   Setting the **DHW BOILER?**, to **MIXED** using this method will cause erratic operation and the DHW pump to not be enabled.

3. Change the **DHW SETPOINT** to the desired target temperature of the water in the tank. Once the control determines there is a call for DHW, the DHW SETPOINT is loaded and the Master boiler will target the setpoint.

4. Now, change the **DHW LOWER DIFF** to the desired temperature (DHW SETPOINT – LOWER DHW DIFF) below which boilers are to be added. This setting corresponds to the minimum water temperature required in the tank. DHW heating will be initiated when the DHW tank's water temperature is below the temperature (DHW SETPOINT – LOWER DHW DIFF).

   How long the temperature of the tank stays below the temperature (DHW SETPOINT – LOWER DHW DIFF)) is used to determine when boilers are started along with the ADD BOILER DELAY TIME.

5. Next, change the **DHW UPPER DIFF** to the desired temperature (DHW SETPOINT + UPPER DHW DIFF) above which boilers are to be shed. This setting is the maximum tank temperature. Setting the SHED BOILER DELAY TIME correctly will limit the maximum tank temperature to the (DHW SETPOINT + UPPER DHW DIFF). Setting the SHED BOILER DELAY TIME = 0 will shut off all boilers immediately once the (DHW SETPOINT + UPPER DHW DIFF) is exceeded.

6. Press the DOWN arrow key again to position the cursor beside the menu item **DHW PRIORITY?**. Setting this value to YES will turn OFF the system pump when the DHW mode is active. Setting this value to NO leaves the system pump on.

7. Press the DOWN arrow again and the menu item **POST PURGE** should appear. This is the

time that the DHW pump relay remains energized after the DHW SETPOINT has been satisfied.

A. The pump will remain on during a post purge pump cycle until the post purge timer expires.

B. Pump on the Master boiler functions as a global pump.

8. Scroll down to **USE SENSOR?** Press the **SELECT** key and select **YES,** then press the **SELECT** key again**.** This will allow the boiler to control the tank or DHW loop temperature using the DHW sensor. The upper and lower differential temperatures will also be loaded.

9. Press the DOWN arrow again and the menu item: **SHARING?,** will be displayed.

   If this item is set to **OFF,** only boilers that are not firing will be checked for runtimes and fired. Set the **SHARING?** to **OFF.**

10. Press the DOWN arrow again and the menu item **LOCAL PUMP OFF:** will be displayed.

    Set this value to **NO.** This will leave the local pump on during a DHW heating cycle (backwards compatibility). Setting this value to YES will always keep the local pump off.

    The Master's DHW relay will remain on as long as there are boiler's firing and the DHW temperature is below the (DHW SETPOINT + UPPER DHW DIFF). Once all boilers are off and the DHW temp is equal to or above the (DHW SETPOINT + UPPER DHW DIFF), the DHW pump will begin its post-purge time. If during this post-purge time the DHW temp falls below the (DHW SETPOINT + UPPER DHW DIFF), the DHW pump will remain on.

    Setting this value to **YES,** will shut the local pump off during a DHW heating cycle, but will keep the local pump on for the LOCAL DELAY: 10s time before shutting off. This LOCAL DELAY: time can be adjusted in the next menu item by pressing the down arrow again.

11. Press the DOWN arrow again and the menu item **PURGE TO THE:** will be displayed.

    Set this value to **TANK.** This will purge the heat from the boiler into the tank or system loop. This will be done using the DHW pump after the DHW heating cycle is complete. Set **PURGE TO THE: TANK.**

    If the **PURGE TO THE**: is set to **SPACE**, once the DHW cycle has completed, the Master will shut the DHW pump off within a few seconds. The **SPACE** setting is to be used only for mixed space and DHW heating.

12. Set the **HYB SENSOR = OFF**. This sensor is selectable for Method 5A only.

    Now in the,

    ADVANCED SETUP:DISTRIBUTED CTRL: MASTER TYPE select **DHW**.

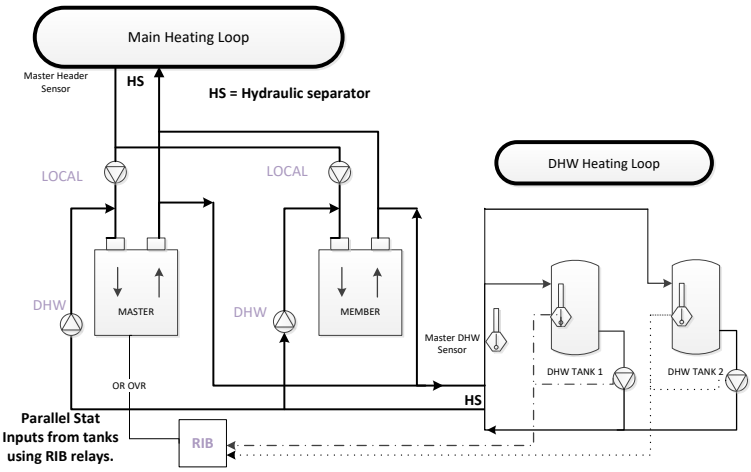
    NOTE: JPS1 MUST be cut on all boilers providing DHW.

DHW METHOD 2: Combination DHW and Space Heating using a MASTER Boiler and Member boiler(s)

(Master Type: MIXED)

This Method works much the same as DHW METHOD 1, but also has the ability to provide space heating. The Master boiler will use two PID controls to simultaneously maintain the DHW and space heating setpoints. This method is determined by **ADVANCED SETUP: DISTRIBUTED CTRL: MASTER TYPE: MIXED.**

This method utilizes a 10k thermistor connected to the DHW Sensor input and HEADER sensor input of a MASTER boiler. Setting up the DHW portion of this method is done via the menus in: **SETUP: DOMESTIC HOT WATER.** For information on setting up the space heating portion of this method, Refer to **Heat Demand Control Method 1** located in the CONTROL METHODS section.



Example: Mixed DHW/Space Heating Simplified Drawing

When this method is used, the OR OVR input functions as an enable/disable. This allows the DHW heating function to be enabled or disabled much in the same way as the Heat Demand input for space heating.

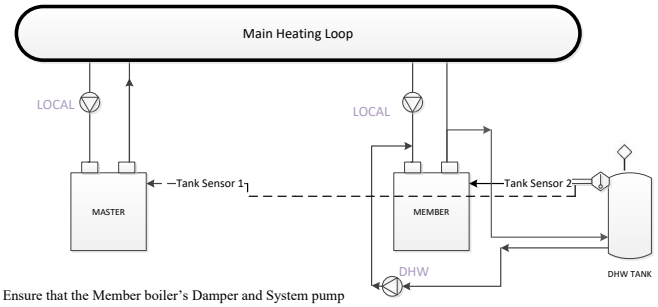
The DHW pump is individually controlled on each boiler that fires in DHW. The Master does not use its pump globally when any DHW boiler is called. The Master only engages its DHW pump if it was called to perform DHW heating.

When using this method, a DHW band is also available by scrolling through the status screens. Press the DOWN arrow key when SYSTEM SET is displayed. The space heating band will be displayed on the left and the DHW Heating band on the right. The bands will operate in a split screen view.

When using MASTER TYPE: **MIXED**, The Master may control DHW and Space Heating needs. If the Master goes down or loses communication with the Member, a Failsafe mode is available to provide temporary heat.

The DHW Failsafe mode is active when a Member boiler's SETUP:AUX FUNTIONS:FAILSAFE MODES:H-NET COMM LOST: is set to **ON**. When this is set to on, normal DHW heating using the OR OVR or DHW sensor is disabled, even though there may be a DHW call on one of these inputs.

When the Master Boiler's communication is lost, and after 10 minutes of not being restored, the DHW inputs become active. The boiler now enters a stand-alone mode. The Heat Demand on that boiler becomes active and not only runs to provide failsafe space heating, but DHW heat as well. The STATUS screen will display an '*' and H-NET LOST. If a thermostat is used, the boiler will run to Method 5A until the thermostat input removes the DHW call. If a DHW temperature sensor is used, the boiler will modulate to maintain tank temperature. The DHW Call always has priority over space heating. A dual 10k sensor is available that can be wired from one tank to two boilers.



Example: Failsafe Sensor Simplified Drawing

The above example uses (2) boilers. The Master controls the Space and Domestic needs. Failsafe control is provided by wiring the Member boiler to the tank sensor (dual sensor is optional) and any other system control needs the Member may require in its backup role. Then one of the local DHW control methods can be used to implement DHW heating.

One advantage to this configuration is that a BMS can control the system through the Master. It can also monitor system status through a central location (Master boiler) by a BMS, or HeatNet Online. This failsafe method can also be used in the **Mixed DHW/Space Heating Simplified Drawing.**

Set up the Master boiler first:

1. Connect a 10k thermistor from the DHW tank's sensor well to J10B terminals on the MASTER, and connect a Header Sensor to the SYSTEM HEADER input. Wire any pump or valve from the DHW Pump relay's (normally open) contact to control flow of the heating water into the tank's coil or DHW loop.
2. Now, set the **ADVANCED SETUP: DISTRIBUTED CTRL: MASTER TYPE:** to **MIXED**. This setting informs the HeatNet control that (2) PIDS are to be used to control DHW and space heating.

3. There are two **MODULAR BOILER SETTINGS**, one for space heating and one for DHW heating. These (2) menus appear when the **ADVANCED SETUP: DISTRIBUTED CTRL: MASTER TYPE** is set to **MIXED**. The (2) Modular boiler settings are located in the **ADVANCED SETUP: MODULAR BOILER SET:** menu. Normally, there is only one, but with (2) independent PIDs, the (2) heating setpoints may behave differently due to their loads or for other various reasons. These allow for separate **ADD, SHED, MODULATE DELAY TIME**, and **MOD MAX** settings for DHW and space heating.

4. Next, enter the **DOMESTIC HOT WATER** menu. When prompted for **DHW BOILER?**, enter **NO**. We will enter **YES** when we are finished entering all parameters

5. Change the **DHW SETPOINT** to the desired target temperature of the water in the tank/ or DHW loop. Once the control determines there is a call for DHW heat, the DHW PID will target this SETPOINT.

6. Now, change the **DHW LOWER DIFF** to the desired temperature (DHW SETPOINT – LOWER DHW DIFF) below which boilers are to be added. This setting corresponds to the minimum water temperature required in the tank. DHW heating will be initiated by starting boilers when the DHW tank's water temperature is below the temperature (DHW SETPOINT – LOWER DHW DIFF).

7. Next, change the **DHW UPPER DIFF** to the desired temperature (DHW SETPOINT + UPPER DHW DIFF) above which boilers are to be shed. This setting is the maximum tank temperature. Setting the SHED BOILER DELAY TIME correctly will limit the maximum tank temperature to the (DHW SETPOINT + UPPER DHW DIFF). Setting the SHED BOILER DELAY TIME = 0 will shut off all boilers immediately once the (DHW SETPOINT + UPPER DHW DIFF) is exceeded.

8. Press the DOWN arrow key again to position the cursor beside the menu item **DHW PRIORITY?**. Setting this value to **YES** will turn OFF the system pump when the DHW mode is active. Setting this value to **NO** leaves the system pump on. This time includes the DHW post purge of the DHW pump/valve.

9. Press the DOWN arrow again and the menu item **POST PURGE** should appear. This is the time that the DHW pump relay remains energized after the DHW SETPOINT has been satisfied. Once the tank has exceeded the DHW SETPOINT + UPPER DHW DIFF temperature and this DHW boiler has shut off (DHW SHED BOILER DELAY TIME), the post purge time will begin.

10. Scroll down to **USE SENSOR?** Press the **SELECT** key and select **YES,** then press the **SELECT** key again**.** This will allow the boiler to control the tank or DHW loop temperature using the DHW sensor. The upper and lower differential temperatures will also be loaded when set to YES.

11. Press the DOWN arrow, the menu item: **SHARING**: will be displayed. Sharing determines what happens when a DHW boiler is needed and none are available (all running is space heating and DHW heating). It needs to steal a space heating boiler that is running.

    OFF Is first come first serve. If a Boiler is not available because all boilers are firing, the DHW firing algorithm waits until one becomes available, even though at least one is running as a space heating boiler. If a space heating boiler is needed, a DHW running boiler cannot be stolen for space heating. **Space heating has priority when DHW is trying to steal**.

    CYCLE The DHW algorithm can steal a space heating boiler and fire it as a DHW boiler. The space heating boiler **stops** and then restarts as a DHW boiler. **DHW priority.**

    NO CYCLE The DHW algorithm can steal a boiler that is already running as a space heating boiler. Instead of shutting down the space heating boiler, it does a hot swap, engaging the DHW pump and leaving the local pump running or shutting it off. Use this in conjunction with the **LOCAL PUMP OFF:** and the **LOCAL DELAY**: settings. **DHW priority**.

12. Press the DOWN arrow, the menu item: **LOCAL PUMP OFF:** is displayed. When a DHW heating cycle begins, what to do with the local pump/valve is determined:

    NO The local pump/valve will remain running during DHW heating.

    YES The local pump will shut off with a delay determined by **LOCAL DELAY: seconds.** This allows the DHW pump/valve to prove before shutting off the local pump.

    Piping of the system will determine which setting to use.

13. Press the DOWN arrow, the menu item: **PURGE TO THE:** is displayed. After a DHW cycle completes, the pump/valve can be selected to either purge to the

TANK, or to the **SPACE** for the duration of the post purge time. This selection can use the space to dump the heat from the boiler and not overheat the DHW tank/load.

14. Set the **HYB SENSOR = OFF**. This sensor is selectable for Method 5A only.

15. Finally, Press the UP arrow until the menu: **DHW BOILER?** is displayed.. If JPS1 has not been cut, a message will appear instructing to do so. Once this is done, the MASTER boiler will control the temperature in the tank using as many boilers as it has available on H-Net along with the space heating needs. The boilers must be piped appropriately for this method to function correctly.

    Now set up the Member boiler(s).

    DHW BOILER? Set to **MIXED** on MEMBER boilers, only the MASTER boiler.

    DHW SETPOINT This does not need to be set on MEMBER boilers, only the MASTER boiler.

    LOWER DHW DIFF This does not need to be on MEMBER boilers, only the MASTER boiler.

    UPPER DHW DIFF This does not need to be set on MEMBER boilers, only the MASTER boiler.

    DHW PRIORITY This does not need to be set on MEMBER boilers, only the MASTER boiler.

    POST PURGE This needs to be set on all boilers. All boilers control their respective DHW pump/valve when they are called to perform DHW heating.

    SHARING This can be set on any boiler and will how boilers will cycle on/off when they are called to perform DHW Heating.

    LOCAL PUMP OFF This can be set on any boiler to determine how the local pump/valve behaves when called to perform DHW heating.

    PURGE TO THE: This does not need to be set on MEMBER boilers, only the MASTER boiler.

    HYB SENSOR: = OFF. This sensor is selectable for Method 5A only.

NOTE: JPS1 MUST be cut on all boilers providing DHW. Cutting JPS1 limits to maximum temperatures to 200F.

DHW METHOD 3: DHW Heating using a Header Sensor Input

This method will control a tank temperature when the tank temperature setpoint needs to be maintained for extended periods with minimal cycling. Multiple boilers can be used via the H-Net, as this method employs the same PID algorithm as for space heating. **ADVANCED SETUP: DISTRIBUTED CTRL: MASTER TYPE: AUTO.**

1. JPS1 must be cut on all boilers providing DHW to ensure the maximum output temperature of all boilers is limited to 200F for DHW operation.

   This Method is very similar to the DHW only method, but:

   A. The display will not indicate that it is a DHW heating boiler.

   B. The DHW Heating band will also not be displayed.

   C. The heating band will use the space heating band and not the UPPER and LOWER DHW heating band limits.

   D. DHW settings are not used.

   E. Set the **ADVANCED SETUP: DISTRIBUTED CTRL: MASTER TYPE:** to **AUTO**.

   F. This method is for backwards compatibility.

2. Use the **Heat Demand Control Method 1** located in the CONTROL METHODS section on page 22. Instead of placing the Header sensor in the Header pipe, place it in a well, in the tank, or a DHW loop.

   The temperature at which boilers are staged **ON,** and then **OFF** is controlled by the **SETUP:BOILERS:HEAT BAND** differential. This can be understood by referring to the INTRODUCTION section on the MASTER in the beginning of this manual.

   This differential has the added effect of heating the tank above the tank's setpoint temperature. If the tank setpoint is set to 140F and the heat band is set to 10F, then the tank temperature

will rise to 145F before the first boiler turns off (setpoint =140F +/- heat band/2). With (2) boilers running, the **SHED BOILER DELAY** time could add to the tank temperature. So, to ensure that all boilers are shut off at the upper point of the heat band, set the **SHED BOILER DELAY time to 0 or other small value**. This will effectively turn off all boilers at the upper heat band point of: (example) 145F.

Now, there is one more thing to consider, the pump's post purge time. Dumping the heat from all boilers (that were running) using a pump post purge cycle will have an effect on the tank's water temperature. Consider this when establishing the local pump's **POST PURGE TIME**.

3. Connect the Local Pump relay contact on J13 to enable the DHW pump. Set its post purge time to dump the boiler's heat into the tank when the boiler shuts off. **Be aware that this may heat the tank above the setpoint's upper heat band temperature.**
4. Enable the system by placing the LOCAL/REMOTE switch on the Master to the LOCAL position.

DHW METHOD 4: Space Heating with DHW Override of Setpoint on Master

This method is for controlling DHW utilizing a tank thermostat connected to a Master boiler. This method requires a thermostat input to the OR OVR. When the thermostat contact closes across the input **OR OVR (J12A .7 & .8),** the control will sense this closure and override the space heating setpoint with the DHW setpoint. **ADVANCED SETUP: DISTRIBUTED CTRL: MASTER TYPE: AUTO.**

This method is for backwards compatibility.

In this mode, the boiler will fire to the **DHW** setpoint. The settings for space heating will be used except for the addition of controlling the DHW pump/valve.

13. Wire the dry contact from the thermostat on the tank to the input on J12A terminal 7 & 8. Also, at this time wire any pump or valve from the DHW Pump relay (normally open) contact (J13 terminals 9, 10) to control flow of the heating water into the tank's coil.
14. Enter the **DOMESTIC HOT WATER MENU**. When prompted for **DHW BOILER?**, enter **NO**.
15. **DHW SETPOINT** The setpoint should reflect the temperature desired in the heating loop when a tank is calling for DHW heat.
16. **LOWER DHW DIFF** This is not used.
17. **UPPER DHW DIFF** This is not used.
18. **DHW PRIORITY** Setting this value to **YES** will turn OFF the system pump when the DHW setpoint override mode is active. Setting this value to **NO** leaves the system pump on. This active period includes the post purge of the DHW pump/valve.
19. Select the menu item **POST PURGE.** This is the time that the DHW pump relay remains energized after the DHW thermostat has been satisfied. Once the tank has opened it's thermostat, the system/local setpoint will be reloaded and the post purge time will begin.
20. Select the menu item: **LOCAL PUMP OFF:** When a DHW heating cycle begins, what to do with the local pump/valve is determined:

    NO The local pump/valve will remain running during DHW heating.

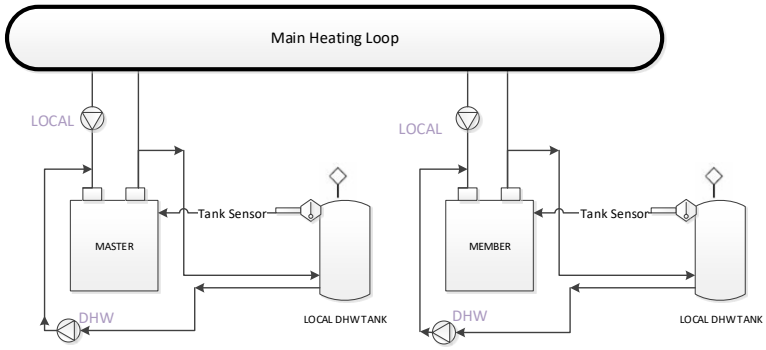
    YES The local pump will shut off with a delay determined by **LOCAL DELAY: seconds.** This allows the DHW pump/valve to prove before shutting off the local pump.

    Piping of the system will determine which setting to use.
21. Select the menu item: **PURGE TO THE.** After a DHW cycle completes, the pump/valve can be selected to either purge to the **TANK**, or to the **SPACE** for the duration of the post purge time. This selection can use the space to dump the heat from the boiler and not overheat the DHW tank/load.
22. Set the **HYB SENSOR = OFF**. This sensor is selectable for Method 5A only.

    Follow the same steps as used to program DHW Heating using a Header Sensor INPUT. **USE SENSOR?,** select **NO**.

DHW METHOD 5: DHW of a Local Boiler's Tank.

Method 5A using a 10k Type II tank sensor.
This method is used to provide combination space heating and DHW heating. The boiler may be stand alone or in a HeatNet configuration. It is meant to fire an individual boiler in a DHW heating priority mode when that boiler's local tank temperature has a call for DHW heat (tank sensor's temperature drops below the DHW Setpoint + Lower Diff). The boiler will stop space heating (if running) and switch to DHW heating. The DHW pump/valve will be engaged and the water temperature in the tank will be maintained by the boiler at the DHW setpoint. Once the tank temperature exceeds the Setpoint + Upper Diff temperature, DHW heating will stop and the pump/valve's post purge will start.



LOCAL DHW Simplified Drawing

When a tank's temperature sensor is connected directly to a boiler and the **DHW BOILER?** is set to **LOCAL.** The boiler will go offline from HeatNet and service the DHW needs of its local tank. If the boiler is running in space heating mode, then the "SHARING?" setting may be used to determine how, or if, to shut down before starting a DHW cycle. When the DHW cycle is complete (includes the post purge time of the DHW pump), the boiler will go back online with HeatNet and become available to fire.

During a DHW cycle the DHW setpoint will be loaded along with the UPPER and LOWER DHW DIFF. Also, the **ADVANCED SETUP: DISTRIBUTED CTRL: MASTER TYPE:** is set to **AUTO.**

When a 10k Type II sensor is used with this method, the OR OVR input functions as and enable/disable. This allows the DHW heating function to be enabled or disabled much in the same way as the Heat Demand input for space heating.

When using this method, a DHW band is also available by scrolling through the status screens. Press the DOWN arrow key when SYSTEM SET is displayed. The space heating band will be displayed on the left and the DHW Heating band on the right. The bands will operate in a split screen view.

23. Connect a 10k thermistor from the DHW tank's sensor well to J10B terminals on any boiler. Wire a pump or valve from the DHW pump or the System pump (normally open) relay contact to control flow of the heating water into the tank's coil or system loop.

    The System pump will always be enabled as long as the Heat Demand input is closed and the **SETUP: DOMESTIC HOT WATER:DHW PRIORITY** is set to **NO.** The DHW pump will be enabled whenever there is a DHW call for heat.

    A DHW call for heat is when the DHW temperature is below the (DHW SETPOINT – LOWER DHW DIFF) or when the DHW temperature is below the (DHW SETPOINT + UPPER DHW DIFF) and boilers are firing. After a DHW call for heat ends:

    A. The pump will remain on during a post purge pump cycle until the post purge timer expires.

24. Next, enter the **DOMESTIC HOT WATER** menu on the Master boiler. When prompted for **DHW BOILER?**, enter **LOCAL**.

25. Change the **DHW SETPOINT** to the desired target temperature of the water in the tank. Once the control determines there is a call for DHW, the DHW SETPOINT is loaded and the boiler will target the setpoint.

26. Now, change the **DHW LOWER DIFF** to the desired temperature (DHW SETPOINT – LOWER DHW DIFF) below which boilers are to be added. This setting corresponds to the minimum water temperature required in the tank. DHW heating will be initiated when the DHW tank's water temperature is below the temperature (DHW SETPOINT – LOWER DHW DIFF).

    How long the temperature of the tank stays below the temperature (DHW SETPOINT – LOWER DHW DIFF)) is used to determine when boilers are started along with the ADD BOILER DELAY TIME.

27. Next, change the **DHW UPPER DIFF** to the desired temperature (DHW SETPOINT + UPPER DHW DIFF) above which boilers are to be shed. This setting is the maximum tank temperature. Setting the SHED BOILER DELAY TIME correctly will limit the maximum tank temperature to the (DHW SETPOINT + UPPER DHW DIFF). Setting the SHED BOILER

DELAY TIME = 0 will shut off all boilers immediately once the (DHW SETPOINT + UPPER DHW DIFF) is exceeded.

28. Press the DOWN arrow key again to position the cursor beside the menu item **DHW PRIORITY?**. Setting this value to YES will turn OFF the system pump when the DHW mode is active (when the DHW pump is on). Setting this value to NO leaves the system pump on.

29. Press the DOWN arrow again and the menu item **POST PURGE** should appear. This is the time that the DHW pump relay remains energized after the DHW SETPOINT has been satisfied.

    A. The pump will remain on during a post purge pump cycle until the post purge timer expires.

30. Scroll down to **USE SENSOR?** Press the **SELECT** key and select **YES,** then press the **SELECT** key again**.** This will allow the boiler to control the local tank or DHW loop temperature using the DHW sensor. The upper and lower differential temperatures will also be loaded.

31. Press the DOWN arrow again and the menu item: **SHARING?,** will be displayed.

    Set this item is to **OFF or CYLE** if the boiler is currently running in space heating and needs to be shut down before starting up in DHW**.**

    If **SHARING?** is set to **NO CYCLE** a hot swap will occur. A hot swap is when the boiler is running in space heating mode and does not need to be shut down. The DHW pump will be energized without the boiler stopping. Once the DHW cycle has completed, the boiler will stop and wait to be called again for either space heating or DHW heating. A shutdown always occurs after a DHW cycle completes.

32. Press the DOWN arrow again and the menu item **LOCAL PUMP OFF:** will be displayed.

    Set this value to **NO.** This will leave the local pump on during a DHW heating cycle (backwards compatibility). Setting this value to YES will always keep the local pump off.

    Setting this value to **YES,** will shut the local pump off during a DHW heating cycle, but will keep the local pump on for the LOCAL DELAY: 10s time before shutting off. This LOCAL DELAY: time can be adjusted in the next menu item by pressing the down arrow again.

33. Press the DOWN arrow again and the menu item **PURGE TO THE:** will be displayed.

    Set this value to **TANK.** This will purge the heat from the boiler into the tank or system loop. This will be done using the DHW pump after the DHW heating cycle is complete. Set **PURGE TO THE: TANK.**

    If the **PURGE TO THE**: is set to **SPACE**, once the DHW cycle has completed, the Master will shut the DHW pump off within a few seconds. The **SPACE** setting is to be used only for mixed space and DHW heating.

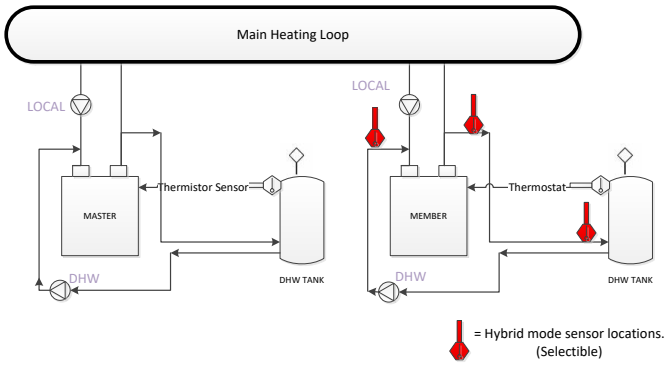
    HYB SENSOR = OFF

    ADVANCED SETUP:DISTRIBUTED CTRL: MASTER TYPE select **DHW**.

    NOTE: JPS1 MUST be cut on all boilers providing DHW.

Method 5B using a Thermostat & Sensor.

Method 5(B) can also be used in a hybrid mode on **Member** boilers with a thermostat connected to the OR OVR input. This will enable DHW heating, and be used instead of having the 10k sensor's temperature detect when DHW heating is needed, but will use a selectable sensor instead to maintain setpoint.



Simplified Drawing

When the OR OVR input sees the thermostat close, the DHW pump/valve will be engaged and remain energized as long as the OR OVR input sees that the thermostat is closed. The DHW setpoint along with the DHW heating band will then be loaded. A steady temperature will now be maintained using the **HYB SENSOR** setting in the DHW menu. This sensor will control the water temperature at the sensor's location,

enabling or disabling the boiler as needed until the OR OVR input sees the thermostat open. Once the thermostat opens, the DHW pump post purge will begin.

The difference between setting up the **5A** method vs **5B** method is the "**USE SENSOR?"** setting. **5A** requires that the "**USE SENSOR?"** setting be set to YES, and the **5B "USE SENSOR?"** setting be set to NO. The **HYB SENSOR** setting must also be set in the **5B** mode to the sensor where temperature needs to be maintained. It must be set to OFF in the 5A mode.

```
Method 5A
         USE SENSOR? = YES
         HYB SENSOR:    OFF

Method 5B
         USE SENSOR? = NO
         HYB SENSOR:    SUPPLY, DHW,
                       RETURN
```

Each sensor selection/location has its advantages. Selecting the:

Supply sensor will limit the temperature/firing rate of the boiler, but may not be sufficient for continuous demand or speed in heating the tank. It is already available, so no additional sensor is needed.

Return sensor will allow the boiler to run its supply temperature up quickly, but may bounce off of the operating limit band. This would heat the tank in the shortest time, but may overheat the tank. It is already available, so no additional sensor is needed.

DHW sensor will allow the placement anywhere needed to maintain that locations temperature. This is an additional sensor that needs to be acquired.

A thermostat can be placed in a tank and connected to the OR OVR input. (**On Member boilers only,** The Master uses OR OVR already with DHW METHOD 4), When the thermostat contact closes across the input **OR OVR (J12A .7 & .8)** on a Member boiler**,** the control will sense this closure and disconnect itself from HeatNet.

DHW METHOD 6: DHW using Direct Control

If the control's 4-20mA input is set to HIGH PRIORITY the 4-20mA signal, once brought above the 4-20mA starting current can be used to override any other Heat Demand and direct modulate the boiler.
This can be set in menu: **ADVANCED SETUP:4-20mA INPUT**. It allows a member boiler to be taken offline and directly modulated by an external control.
If the Master is using it for heating and the 4-20mA is set to HIGH PRIORITY, an external control can now output a 4-20mA signal which will take over the boiler's fire rate and override all other heating demand inputs. The external control would also need to open any valves/ or pumps This is typically used for DHW control.

Revision 1.92 8-APRIL-2014 Original Release

Revision 1.93-1.94 8-APRIL-2014 Original Release

1. The 4-20mA setpoint input not working properly. Input was disabled with the initial release. With this release it now functions properly.

2. The Flow proving timers were erratic when using DHW mode with a DHW pump and keeping the Local pump off. Retries also only allowed 10 seconds to prove rather than the local pump adjustable proving time.

Revision 1.11 5- OCT-2013 Pre-Release

1. Added additional time when waiting for a response from large flash drives. Some large flash drives tested (16 gigabyte and up), exceeded 5 seconds in response to a command sent requesting contents of the firmware directory. If this firmware release cannot be loaded using a large flash drive, a smaller/faster flash drive may be required.

Revision 1.10 2- OCT-2013 Pre-Release

1. Added some status checking to a running member boiler that will notify the Master of status. i.e. DHW sensor shorted and Calibration switch. This allows the boiler to be taken offline by the Master boiler when running in DHW modes.

2. Added the ability of the Master to work as a DHW MASTER only 'ADVANCED SETUP:DISTRIBUTED CTRL:MASTER TYPE: -> DHW' without the use of a header sensor. This change was for backwards compatibility.

3. When using a DHW sensor in DHW modes, the OR OVR input becomes the Enable/Disable for the DHW.

4. Added the ability to change the way that a DHW local call-for-heat overrides a running boiler. The "SETUP:DOMESTIC HOT WATER:MIXED DHW-SPACE:SHARING:" can now be set to CYCLE, NO_CYCLE and OFF for local control of DHW on a Member boiler.

Revision 1.09 23- SEPT-2013 Pre-Release

1. Fixed some display artifacts when using DHW modes.

2. Changed the ability to enable and disable DHW modes while the system is running. The HEAT DEMAND and the OR OVR inputs must be disabled prior to changing these menu settings. Prior to this release, indeterminate action would occur in DHW operation.

3. Added a note when using the Master boiler in DHW mode. If the Master boiler is set to ADVANCED SETUP:DISTRIBUTED CTRL:MASTER TYPE: ->**MIXED,** the setting SETUP:DOMESTIC HOT WATER:DHW BOILER?:->**LOCAL** is not valid. A message will be displayed in the SETUP:DOMESTIC HOT WATER: if it is changed.

Two ways to operate the Master as a DHW boiler:

When the Master is operated as a "ADVANCED SETUP:DISTRIBUTED CTRL:MASTER TYPE: -> **MIXED**" Master it uses the temperature sensor assigned to its DHW input. The DHW temperature sensor becomes common to all boilers operating as "SETUP:DOMESTIC HOT WATER:DHW BOILER?:->MIXED" In order to use the Master as a DHW boiler in the MIXED Master mode, the " SETUP:DOMESTIC HOT WATER:DHW BOILER?:-> " must be set to **MIXED** on the MASTER**.** The OA OVR input is then used to enable/disable DHW operation just as the HEAT DEMAND input.

If the ADVANCED SETUP:DISTRIBUTED CTRL:MASTER TYPE: -> is set to **AUTO**, the Master "SETUP:DOMESTIC HOT WATER:DHW BOILER?:->" can then be set to **LOCAL** and the Master can then be taken offline to perform DHW heating independently from space heating to control a local tank. The DHW sensor will only be used to monitor its local tank. The Master behaves like a Member boiler operating in DHW except that the Master will maintain and operate on (2) PID loops (space & DHW heating).

Revision 1.08 17- SEPT-2013 Release

1. Fixed a protection mode condition when the Local VFD 0-10v modulation signal used to modulate a pump (J4.1 & J4.5) equaled or exceeded 100%. When this condition occurred, the PWM modulation would drop to 0.

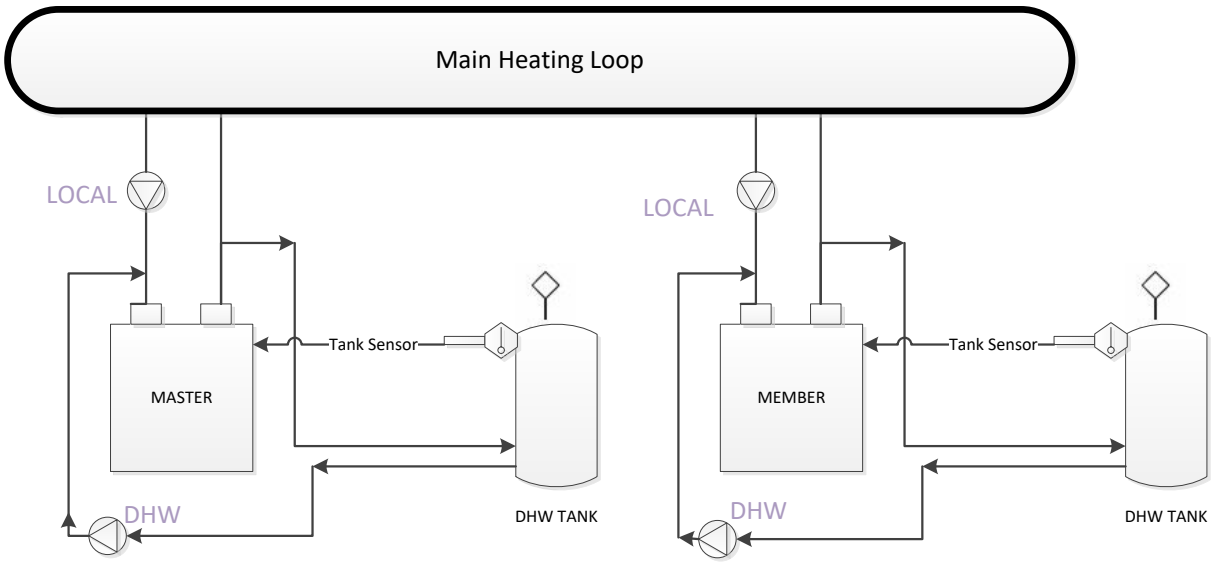
   During protection mode, and when the boiler is limiting the fire rate (input), the modulation control signal will remain at the called for rate and will not follow the limiting modulation's firing rate. The primary purpose for this is to maintain sufficient flow through the boiler when the boiler may be operating within the operating limit band.

2. Increased the efficiency of the (5) communications ports when all (5) ports are connected and being used at high transfer rates. The (5) ports include: HeatNet, Modbus, HeatNet Online (Ethernet), USB, and TBA intelligent display.

3. Fixed a condition when using the VFD local pump output signal on J4.1 and J4.5. The VFD pump control signal would only go as high as 8VDC when in Calibrate. This has been corrected to allow 0-10VDC output.

4. **Beta release candidate for Space Heating and DHW heating mixed mode still in effect**. Added the ability for the Master boiler to control itself and the system as a space heating boiler(s) and only itself in DHW mode with a local tank. In this mode, The Master does not control DHW Member boilers. It controls space heating only and let's each boiler control its own local tank.

SETTING UP AN ALTERNATIVE INDIVIDUAL DHW CONTROL:



Simplified Drawing

In the above example each DHW tank is controlled individually by a boiler and space heating is provided by both boilers. The Master boiler will be used to provide space heating to the system by using both boilers and DHW heat to its local tank. The Member boiler will provide space heating when called by the Master and DHW heat when requested by its local tank.

When a boiler is called by the tank, it will go off-line from the HeatNet Master and control its local DHW tank temperature. The OV OVR input or a DHW temperature sensor connected to the boiler is required to make the request.

To set this method up requires the **Master** boiler to have its own localized loop. So it would need to set the ADVANCED SETUP:DISTRIBUTED CTRL:MASTER TYPE: ->**AUTO** and the SETUP:DOMESTIC HOT WATER:DHW BOILER?:->**LOCAL**. This will allow it to control itself for Space heat and DHW heat. This configuration would require a Header sensor and a DHW tank sensor. *In this configuration, the Master's tank should not use a stat to control its call for heat.*

The **Member** boilers that are configured to locally control their own tanks would set their menu SETUP:DOMESTIC HOT WATER:DHW BOILER?:->**LOCAL**. This would allow the boiler to operate on the tank using a sensor or stat input. The Member would not send back DHW availability to the Master and therefore allow the Master to control the boiler for space heating **only**.

Revision 1.06 26- AUG-2013 Pre-Release

1. Beta release candidate for Space Heating and DHW heating mixed mode.

Mixed DHW Mode

This firmware release for HeatNet V3 platform introduces a mode which allows DHW boilers and Space heating boilers to be shared. In order to do this, (2) PID control loops are used

Prior releases of HeatNet allowed (3) DHW control methods: dedicating the system to DHW, allowing DHW and Space heating where only one could be used at a time, or taking a boiler off-line to perform DHW Heating while leaving the remaining boilers to heat the space.

One limitation of the prior releases was that the HeatNet Master could not perform concurrent DHW and space heating and the Master could not be taken off-line to perform DHW heating. This limitation in a (2) boiler system created a condition where the Member could be taken off-line to heat a tank, but the Master could not. This resulted in the Master remaining in standby.

Another limitation was that the local pump would always remain running when in DHW heating.

This additional method allows simultaneous control of two heating loops and overcomes the limitations. The intention is to provide for a Space heating system loop and a DHW heating loop. The prior method of taking a boiler off-line for DHW can also be employed with this method. This allows for more configurations and the ability to allow the Master boiler to heat a tank independently from the Member (When the Member has been pulled off-line for DHW heating using prior methods).

The second DHW heating loop can be as small as one boiler and one tank or many boilers with many tanks.

If DHW and Space heating boilers are to be mixed and controlled by the Master boiler, the menus need to be set up properly. Also, it is important to pipe the boilers appropriately. The pump/valve and changeover settings that have been provided are very flexible for ease in setting up system configurations.

Two new screens and several menu items have been added to allow flexibility of the system. Many of the menus are not visible until ADVANCED SETUP:DISTRIBUTED CTRL:MASTER TYPE->MIXED is set on the Master boiler.

The new menu items are:

ADVANCED SETUP:DISTRIBUTED CTRL:MASTER TYPE: -> AUTO, DHW, HEATING, MIXED.

AUTO is the normal method of operation as in prior releases.
DHW is for DHW heating only. A DHW sensor is required with no Header sensor
HEATING is for Space heating only, the **AUTO** setting performs the same. Requires Header sensor.
MIXED is for mixed DHW and Space heating where the Master controls both. Requires a Header and DHW sensor.

ADVANCED SETUP: MODULAR BOILER SET: -> SPACE HEATING, DHW HEATING

SPACE HEATING is the ADD BOILER, SHED BOILER, MODULATE DELAY TIME, MOD MAX menus
DHW HEATING is the same as SPACE HEATING, but specific when boilers are running as DHW

SETUP:DOMESTIC HOT WATER: DHW BOILER? NO, LOCAL, MIXED

NO is the setting when the boiler is not configured to perform DHW heating.
LOCAL is for local DHW heating without the Master being able to call it. It's own DHW sensor or OV OVR input can be used. Boiler will be taken off-line from HeatNet to perform DHW heating.
MIXED is used by the boiler to let the Master know it can perform DHW heating under control of the Master boiler. It may also be taken off-line to provide **LOCAL** heating.

SETUP:DOMESTIC HOT WATER:MIXED DHW-SPACE:DHW SHARING -> OFF, NO CYCLE, CYCLE

NO CYCLE allows the boiler to perform as a space or DHW heating boiler. DHW always has priority and will override (steal) a space heating boiler that is running when none are available to perform DHW heating. When this happens, the boiler will not shut down, but keep running during the change from space heating to DHW (Hot Swap). Once the DHW cycle completes, the boiler will shut down and wait to be called for space heating again.

CAUTION: If used in a low temperature heat pump system a forced shutdown may need to occur. TBD

Flow proving contacts and valve proving contacts need to be taken into account here. If the LOCAL PUMP OFF setting is set to YES, ensure enough time is given in LOCAL DELAY to re-establish flow in the path to the tank before shutting off the local pump/valve.

CYCLE allows the boiler to perform as a space or DHW heating boiler. DHW always has priority and will override (steal) a space heating boiler that is running when none are available to perform DHW heating. When this happens, the boiler will shut down and exit the space heating mode. The boiler will then re-start as a DHW heating boiler. Once the DHW cycle completes, the boiler will shut down and wait to be called for space heating again.

OFF allows the boiler to perform as a space or DHW heating boiler, but will not allow a space heating boiler that is running to be overridden if none are available. The system acts on a "First Come First Serve" basis. The heating system should be sized appropriately to minimize the chances of not providing sufficient DHW heat during cold weather.

SETUP:DOMESTIC HOT WATER:MIXED DHW-SPACE:LOCAL PUMP OFF -> YES, NO

YES will shut off the local pump/valve when DHW heating is in effect. If the boiler is running in space heating mode, the LOCAL DELAY will be in effect before the local pump/valve shuts off.
NO both the local and the DHW pump/valve will be enabled during DHW heating.

SETUP:DOMESTIC HOT WATER:MIXED DHW-SPACE:LOCAL DELAY: x seconds

X seconds is the time in seconds that the local pump/valve will remain on after the DHW pump/valve is enabled before shutting off. This is part of the changeover process when the boiler was running in space heating mode and now needs to provide DHW heating.

SETUP:DOMESTIC HOT WATER:MIXED DHW-SPACE:PURGE TO THE: TANK, SPACE

TANK will keep the DHW pump/valve enabled for the DHW POST PURGE time thus purging the boilers heat into the tank.
SPACE will turn off the DHW pump after 5 seconds and enable the local pump/valve when a DHW heating cycle completes. This allows dumping the remaining heat from the boiler into the heating space (dump zone).

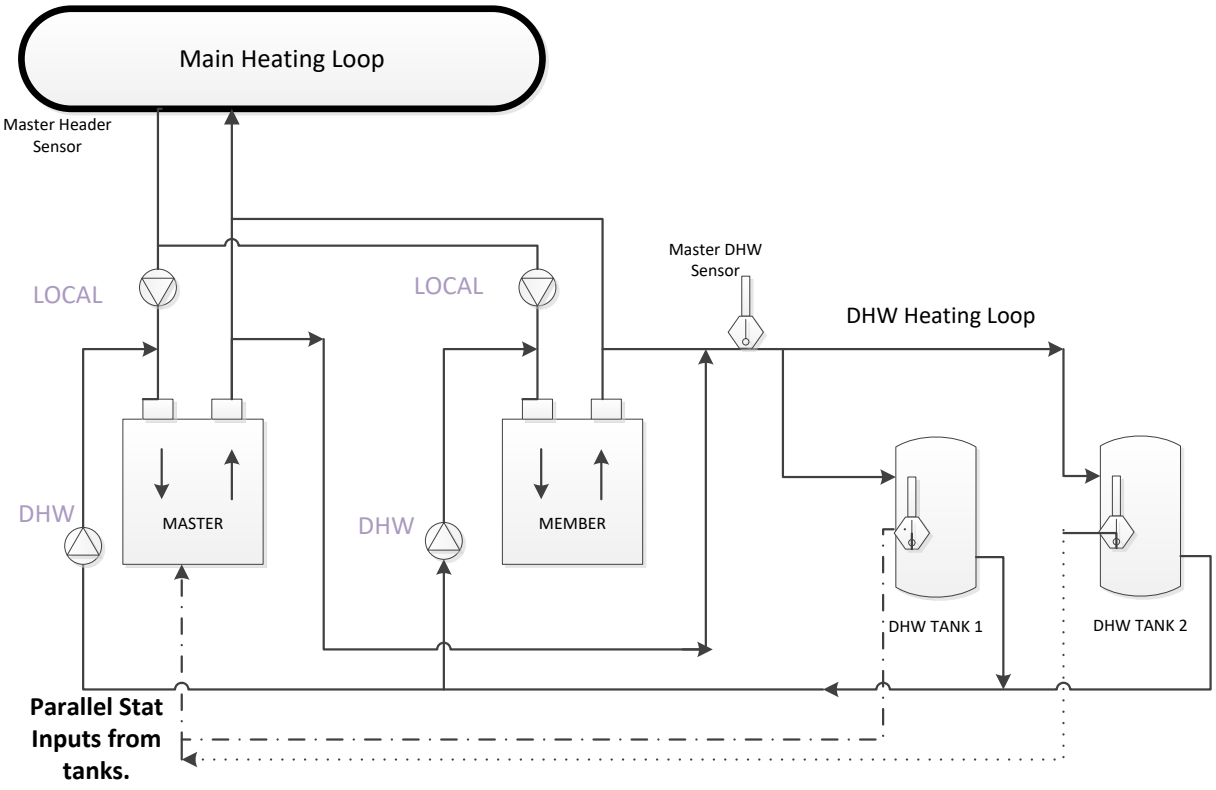
Status Screen:

In order to show the two simultaneous PIDs (Space Heating and DHW) a split screen has been added. It can be accessed from the main RUN screen by pressing the Down key. The Left side of the band will display the Space heating band. The right side will display the DHW heating band.

In the split screen with DHW and Space heating, the **DHW:** *run***%** will display **mDHW:** *run***%** when the Master boiler is running in mixed mode as a DHW boiler.

A second screen has been added primarily to display the START and STOP timers when the DHW heating has a call for heat. This screen can be accessed by pressing the Down key another time while in the split screen. The START and STOP timers here work the same as the heating START and STOP timers.

SETTING UP TWO LOOPS:



Simplified Drawing 1.

In a (2) loop system, the Master needs to have a Header sensor and a DHW loop sensor attached.

First, on the Master boiler change the ADVANCED SETUP:DISTRIBUTED CTRL:MASTER TYPE: ->MIXED. This will allow the modular boiler menu under ADVANCED SETUP:MODULAR BOILER SET: -> DHW HEATING. Select DHW HEATING and change the ADD BOILER DELAY, SHED BOILER DELAY, MODULATE DELAY TIME, and the MOD MAX- LAST FIRE values to what works best for the DHW system loop for the system.

The next thing to setup is the SETUP:DOMESTIC HOT WATER: menu. For the Master to see and control itself or Member Boiler(s) that are piped for DHW, the SETUP:DOMESTIC HOT WATER:DHW BOILER?:-> must be set to MIXED on each Member (This would include the Master boiler if it is piped and a part of the DHW loop). When any boiler's SETUP:DOMESTIC HOT WATER:DHW BOILER?**:**-> is set to MIXED, HeatNet will see that the boiler is available to be controlled by the Master, though the OR OVR input or the DHW temperature sensor connected to the Member will still take the boiler off-line for local DHW heating (an exception would be Fail Safe mode).

The Menu items DHW SETPOINT, LOWER DHW DIFF, UPPER DHW DIFF, DHW PRIORITY, POST PURGE, and USE SENSOR can be used as the Master's control or on an individual Member's control. This is to allow mixing the prior DHW methods with the new mixed DHW configurations. Backwards compatibility is also maintained.

The SETUP:DOMESTIC HOT WATER:MIXED DHW-SPACE: menu is used only when setting up the second DHW heating loop. The first menu SETUP:DOMESTIC HOT WATER:MIXED DHW-SPACE:DHW SHARING,

when set to NO CYCLE creates a priority mode for firing DHW boilers that are currently firing in a Space Heating mode. The Space heating boilers are overridden with the DHW modulation value and fired as DHW boilers immediately with no shutdown cycle. If a shutdown cycle is required set SHARING to CYCLE. You can also turn off the SHARING (priority mode) and just use DHW boilers that are available (boiler is OFF).

The 2nd menu, SETUP:DOMESTIC HOT WATER:MIXED DHW-SPACE:LOCAL PUMP OFF:NO allows the local pump to remain on at the same time as the DHW pump. If set to YES, the local pump contact will open after the 3rd menu item, LOCAL DELAY: time has expired. The LOCAL PUMP OFF:YES sequence would be: Call for DHW heat -> if boiler is running, override space heating -> close DHW relay contacts -> keep local pump relay contacts closed until the LOCAL DELAY time has expired -> open local pump contacts.

The 4th menu allows a dump zone to aid the purging of boiler's heat energy into the Space or the tank. Purging into the tank may overheat the tank, so the application should be considered. There is a minimum DHW pump post purge of 5 seconds if the space heating dump zone is to be used or if the DHW PUMP POST PURGE TIME is less than 5 seconds. If valves are used, the DHW valve will begin closing after this time and the local valve will begin opening.

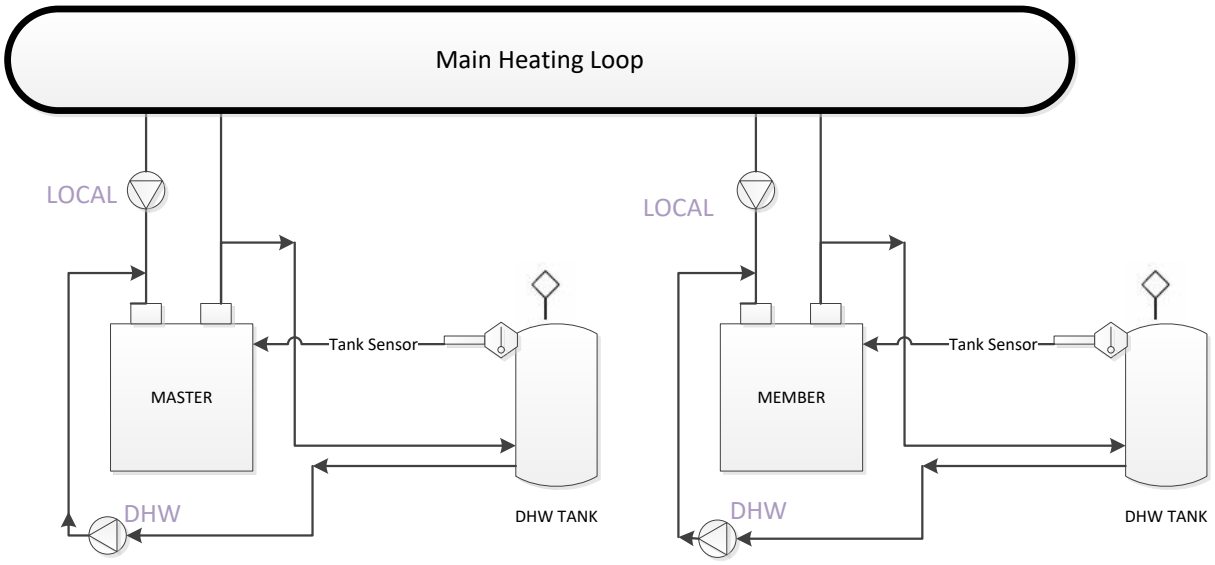
Since there are different delays when using local and DHW pumps versus local and DHW valves, the timers have been included.

In the example (Simplified Drawing 1.): A system has (2) boilers and both of them are configured as Space Heating and DHW Heating. Its cold out and all (2) boilers are providing Space heating to a building. The DHW temperature in one tank drops below the stat setting and needs to call a boiler to provide DHW heat. HeatNet evaluates the boilers that are running with the least runtime and steals the boiler with the least runtime immediately, and begins monitoring the DHW temperature supplied to both tanks with the flow established by the DHW pumps in the loop.

In this mode(SHARING=NO CYCLE), the boiler remains running, engages the DHW pump/valve relay, stops or leaves open the local pump relay (next menu item), and changes to the new DHW modulation rate. If the system had (1) boiler running in space heating out of the (2), it would have fired the available boiler first, and then begun stealing running space heating boilers to meet the DHW setpoint. Once the call-for-heat is satisfied, the stat on the tank opens and boilers are returned to Space Heating.

In the example, the OV OVR input is used to enable DHW heating and then establish flow by means of the boiler's DHW pumps. Another example would be to use a pump to establish flow in the DHW loop (example: secondary side of plate exchanger) and the OV OVR input can be used to enable/disable DHW heating. In this way the Boilers will maintain temperature in the secondary loop using the DHW sensor if there is enough thermal mass (such as in pool heating) otherwise short cycling will occur.

SETTING UP INDIVIDUAL DHW CONTROL:



Simplified Drawing 2.

In the above example each DHW tank is controlled individually by a boiler and space heating is provided by both boilers. The Master boiler will be used to provide space heating to the system by using both boilers and DHW heat to its local tank. The Member boiler will provide space heating when called by the Master and DHW heat when requested by its local tank.

When a boiler is called by the tank, it will go off-line from the HeatNet Master and control its local DHW tank temperature. The OV OVR input or a DHW temperature sensor connected to the boiler is required to make the request.

To set this method up requires the **Master** boiler to have its own localized loop. So it would need to set the ADVANCED SETUP:DISTRIBUTED CTRL:MASTER TYPE: ->**MIXED** and the SETUP:DOMESTIC HOT WATER:DHW BOILER?:->**MIXED**. This will allow it to control itself for Space heat and DHW heat. This configuration would require a Header sensor and a DHW tank sensor. *In this configuration, the Master's tank should not use a stat to control its call for heat.*

The Member boilers that are configured to locally control their own tanks would set their menu SETUP:DOMESTIC HOT WATER:DHW BOILER?:->**LOCAL**. This would allow the boiler to operate on the tank using a sensor or stat input. The Member would not send back DHW availability to the Master and therefore allow the Master to control the boiler for space heating **only**.

DHW in FAILSAFE:

The DHW Failsafe mode is active when the SETUP:AUX FUNTIONS:FAILSAFE MODES:H-NET COMM LOST:-> ON. If the Master Boiler's communication is lost, and after 10 minutes of not being restored, the boiler enters a stand-alone mode. The Heat Demand on that boiler becomes active and not only runs to provide failsafe

space heating, but DHW heat as well. The STATUS screen will display an '*' and H-NET LOST. If a stat is used, the boiler will run to 100% until the stat removes the DHW call. If a temperature sensor is used, the boiler will modulate to maintain tank temperature. The DHW Call always has priority over space heating.

The Failsafe boiler needs to either have a stat input from a DHW tank or a temperature sensor connected to a tank. When these sensors are connected normally, they would override any call to the boiler by the Master (when in SETUP:DOMESTIC HOT WATER:DHW BOILER?:-> **MIXED** mode) and enter DHW heating mode. With the Failsafe active, this function is inhibited and the Failsafe boiler only responds to these inputs with the loss of the Master's communication.

Revision 1.05 28-Feb-2013 Pre-Release

1. Added a BTU load measurement when using a flow meter with a System Return sensor. This value can be viewed under the FLOW window. The BTU value is relative to the accuracy of the sensors and is only available as an estimate of the BTU load.

   The BTU load value may also be accessed through Modbus read registers 30242 (upper 16 bit word) & 30243 (lower 16 bit word). These two words will need to be combined in order to get the BTU load value.

   When using the BMS GPM register the BTU values are only calculated to a whole GPM since the BMS GPM register currently does not support floating point numbers.

2. Replaced the 4-20 mA setpoint settings when using 0-10V input. The 0-10 V input may now be set using voltage settings rather than current.

3. Added (2) log entry types for debugging faults.

A. If the Main Valve signal is lost from the Ignition Control while the boiler is running a log entry, LOST MAIN VALVE with the modulation value being sent to the blower at the time of loss. Example: LOST MAIN VALVE 40
B. If the Blower signal is lost from the Ignition Control while the boiler is running a log entry, LOST BLOWER with the modulation value being sent to the blower at the time of loss. Example: LOST BLOWER 27

4. Normalized the 0-10 volt control signal for direct fire applications. Such that: 1 volt will track linearly by 10%. So, 1v=10%, 2v=20%, 3v=30%, 4v=40%... The control signal will still be limited by the turndown and the 4-20mA INPUT menu.

5. Removed the ability to silence the alarm with the push button. Alarm silencing is now done by pressing the BACK and ENTER keys at the same time. The input that was used for the ALARM SILENCE will now be dedicated to a stack sensor.

6. Added the auto detection of a Stack Sensor. If the Stack Sensor is present, a warning will occur at 325F and greater, and an Alarm will occur at 350F and greater. During the Warning and Alarm conditions the boiler will be limited to half the rate of fire requested. The only difference between the two is that the Alarm will close the Alarm relay.

   The Stack sensor should be a 1k ohm platinum type sensor. Part # 0040-1300. Currently, a 10k version is not supported due to the maximum temperature of the flue.

Revision 1.04 20-Feb-2013 Pre-Release

This revision addresses some bug fixes from the prior pre-release firmware and gives more control in overcoming issues with variable flow systems.

1. Fixed an issue that happens when a Modbus Setpoint is written and the outdoor reset is active. The (2) setpoints would override each other randomly.

   With this release, if a higher level setpoint control is lost, the next level setpoint control is used until the System Setpoint is loaded. The setpoints are prioritized in the following order:

   1. 0-10V, 4-20Ma setpoint Control
   2. BMS, Modbus Setpoint
   3. Outdoor Reset Setpoint
   4. System Setpoint

   Any Setbacks that are active are then applied.

2. Added the ability of a Building Management System (BMS) to limit the # of HeatNet boilers allowed to fire. With this addition; when a system has a fixed amount of boilers that HeatNet reports are available, the BMS can now limit the # of boilers that can fire. The BMS can write the GPM value it has for flow, or directly write a register with how many boilers HeatNet can control. If the BMS GPM flow feature is active, the direct control becomes inactive.

This change is in response to requests to limit HeatNet's control of adding boilers when the system flow changes. In variable flow systems, when the system flow is reduced, any boiler(s) that is/are running may go into a high delta temperature across the boiler. When this occurs, the boiler(s) will enter a high delta T protection mode and drop to half of the rate called for. At this time, the Master may not be able to achieve setpoint due to the reduced output with the running boiler(s). The Master will then call on more boilers to achieve setpoint, but at the same time splitting the already reduced flow through the boiler(s) it has running. The flow can now be so reduced that the boiler(s) trip their operating limits or even their high limits.

Note: using these features can limit HeatNet's ability to maintain setpoint.

1.) Flow Limited Control: This method helps HeatNet to limit the # of boilers firing based on the System Flow in GPM. In variable flow systems, this will limit HeatNet's ability to add new boilers when insufficient flow is available. The # of boilers allowed to fire is determined by:
# of HeatNet boilers that can fire = BMS GPM Set Rate/ LOWEST FLOW

To activate this flow limited feature for use with a BMS:

a. Set ADVANCED SETUP: FLOWMETER: FLOWMETER? YES
b. Set ADVANCED SETUP: FLOWMETER: GLYCOL MIX ? % , Currently, any mix over 10% de-rates the flow by 30% (rule of thumb method). Example: if the LOWEST FLOW = 50 GPM, HeatNet will calculate a New Lowest Flow required to be 65 GPM. The LOWEST FLOW does not need to be changed, but is calculated to 65 GPM and that value is used by HeatNet.
c. Set ADVANCED SETUP: FLOWMETER: INPUT TYPE to BMS.
d. Set ADVANCED SETUP: FLOWMETER: SET PARAMETERS?
Enter LOWEST FLOW: (The automatic value loaded will equal the lowest flow required for this boiler (it is adjustable). It should be = to the lowest flow of the largest boiler in the system).
e. The HIGHEST FLOW & FLOW FACTOR are currently not used with this release. Once flow meter manufacturers have been determined, new firmware will become available.
f. Write to address BMS GPM register 40019 with a valid flow (0 -1500 GPM).
g. **If a new GPM value is not written within 10 minutes, this feature will be deactivated until a new flow value is written. Ensure periodic updates of the flow register are done within 10 minute intervals.**

h. To check if HeatNet is in a flow limited state, read the boiler status 4 register starting at address 30160 for the Master Boiler; if Status 4 bit (12) is set, it indicates that the HeatNet control is running with limited boilers due to insufficient flow derived from the GPM value.

2.) Boilers Limited Control: This feature allows the BMS to directly change the amount of boilers that HeatNet can control.

To Activate the Boiler limited feature:

a. Read Modbus address 30241 to see how many boilers HeatNet has available to fire. MODBUS AVAILABLE BOILERS register.
b. Determine how many boilers the BMS system will require.
c. Write to address BMS LIMIT BOILERS register 40020 with the # of boilers HeatNet is allowed to control (0 - 16).
d. **If a new boiler # value is not written within 10 minutes, this feature will be deactivated until a new boiler # is written. Ensure periodic updates of the flow register are done within 10 minute intervals.**
e. To check if HeatNet is in a BMS limited state, read the boiler status 4 register starting at address 30160 for the Master Boiler; if Status 4 bit (13) is set, it indicates that the HeatNet control is running with limited boilers due to the BMS system specifying BMS LIMIT BOILERS being less than the available boilers.

4. Added the ability of a Flow Meter to control the # of HeatNet boilers allowed to fire. With this addition; HeatNet will look at the # of boilers it has available, and the amount of system flow to determine how many of boilers it can fire. As an Example: An Onicon F-1210 Flow Meter provides simultaneous 0-10V and 4-20mA outputs, so if the BMS system is using (1) output, the other may be used by HeatNet.

To activate this flow limited feature for use with an Onicon Flow Meter F-1210:

a. Set ADVANCED SETUP: FLOWMETER: FLOWMETER? YES
f. Set ADVANCED SETUP: FLOWMETER: GLYCOL MIX ? % , Currently, any mix over 10% de-rates the flow by 30% (rule of thumb method). Example: if the LOWEST FLOW = 50 GPM, HeatNet will calculate a New Lowest Flow required to be 65 GPM. The LOWEST FLOW does not need to be changed, but is calculated to 65 GPM and that value is used by HeatNet.
b. Set ADVANCED SETUP: FLOWMETER: INPUT TYPE to mA 2 or VOLTS 2 depending on whether a 4-20 milliamp or 0-10 volt signal is used. The connection should be made from the Flow Meter to analog input 4-20 mA (2).
c. Select ADVANCED SETUP: FLOWMETER: SET PARAMETERS?
Enter LOWEST FLOW: (The automatic value loaded will equal the lowest flow required for this boiler (it is adjustable). It should be equal to the lowest flow of the largest boiler in the system).
d. Set the ADVANCED SETUP: FLOWMETER: FULL SCALE value to the full scale reading on the calibration card that came with the flow meter.
e. The HIGHEST FLOW & FLOW FACTOR currently are not used with this release.
f. These settings will use the equations:

4-20 mA: Measured GPM = (signal/16) * FULL SCALE flow
0-10 Volt: Measured GPM = (signal/10) * FULL SCALE flow

These settings may work with other flow meters (consult their respective manuals).

Revision 1.03 18-Jan-2013 Pre-Release

1. Replaced the DHW differential temperature setting with an upper and lower control band limit (UPPER DHW DIFF & LOWER DHW DIFF). Instead of using just a differential temperature below the setpoint, the differential temperature now consists of a lower band limit and an upper band limit which can be set independently. This allows a DHW tank temperature to be maintained using a PID rather than the boiler shutting off at setpoint.

   The LOWER DHW DIFF brings on DHW heating when the DHW tank temperature falls below the (DHW SETPOINT - LOWER DHW DIFF). The boiler then maintains temperature until the (DHW SETPOINT + UPPER DHW DIFF) is exceeded. The UPPER DHW DIFF must be set properly to prevent overheating of the tank. The UPPER DHW DIFF + DHW SETPOINT should be set to the tank temperature required. In this way the tank temperature - UPPER DHW DIFF will be maintained while a continuous demand is present. When the continuous demand ends, the tank will be left at the (DHW SETPOINT + UPPER DHW DIFF) temperature.