Buderus

Applications Manual for

Buderus GB142 Wall Hung Heaters

BTC 435001101 A | 05.2009

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2 DESCRIPTION OF MAIN COMPONENTS

This GB142 Applications Manual is intended to present some of the most common applications of the wall-hung Buderus GB142 heater for use in hot water space heating applications. Applications are shown with both piping and corresponding electrical schematics. Auxiliary equipment depicted does not necessarily represent any one particular manufacturer or specific model number. There are a wide variety of techniques, practices and piping strategies possible with hydronic heating systems and it is the responsibility of the installing contractor to determine the most suitable arrangement for his application.

In an effort to simplify piping and electrical diagrams, only Diagrams 1P and 1E depict the complete details with respect to piping and wiring of an indirect hot water tank. This part is left off all subsequent drawings for clarity purposes.

Basic information regarding vent installation, clearances, condensate piping and termination locations are included as well.

Although this manual covers many common applications for our equipment, system possibilities are virtually endless. Should you encounter an application that is not covered in this manual or have any questions regarding any of its content, we encourage you to contact your local sales rep or us directly at Bosch Thermotechnology Corp.

PRE-PIPED MANIFOLD AND PUMP SETTINGS

All GB142 are standard supplied with a pre-piped and wired heater manifold with pump to easily facilitate required primary/secondary piping for the installing contractor. Shut-offs, relief valve, pressure and temperature gauge, purge station on the supply leg and built-in flow check and a Grundfos UPS15-58 3-speed heater pump are included on the return side of the manifold. (Refer to Diagram 1P).

Table 1 show ΔT values for different speed settings on the UPS15-58 pump for each GB142 model.

Table 1: Max Heater ΔT (ºF) Values for UPS 15-58 Manifold Pump

Heater Model	Speed 1	Speed 2	Speed 3
GB142/24	26	N/A	N/A
GB142/30	33	N/A	N/A
GB142/45	N/A	32	28
GB142/60	N/A	43	32

Integrated heater controls will automatically reduce the heater input once the heater ΔT exceeds 45 ºF regardless of feedback signal from the RC10 control. Complete burner shut-down will always take place before ΔT exceeds 99 ºF. The maximum flow rates are as follows: GB142/24 or /30: 11 GPM, model /45: 15 GPM, model /60: 20 GPM.

PUMP SIZING FOR BUDERUS INDIRECT TANKS

All heating zones are piped directly off the supply (left) side of the heater manifold; with heating returns combined on the return (right side). Piping connections for an indirect tank charging pump (PS) are included on the heater manifold. Refer to Tables 2 and 3 for tank pump recommendations for different Buderus indirect tanks. All piping to and from the indirect needs to be at least 1". Use a minimum number of elbows and keep piping lengths to a minimum.

Table 2: Indirect Pump Recommendations for GB142/24 and /30 models.

	GB142/24			GB142/30		
Tank Model	**Grundfos**	**Taco****	**B & G**	**Grundfos**	**Taco****	**B & G**
S120	UP14-42 3*	007	NRF22	UP26-64	0012	PL30
ST150	UP26-64	0011	PL30	UP26-64	0013	PL35
ST200	UP26-64	0014	PL30	UP26-64	0011	PL45
ST300	UP26-64	0014	PL30	UP26-64	0011	PL30
ST400	NR	0011	PL45	NR	NR	NR
SU500	UP26-64	0014	PL30	UP26-64	0011	PL45

* Refers to Grundfos UP15-42 w/ built-in flow check and speed setting

** Refers to Taco 007 without built-in flow check

NR – combination not recommended

Table 3: Indirect Pump Recommendations for GB142/45 and /60 models.

	GB142/45			GB142/60		
Tank Model	**Grundfos**	**Taco****	**B & G**	**Grundfos**	**Taco****	**B & G**
S120	UP26-64	0014	PL36	UP26-64	0011	PL30
ST150	UP26-99	NR	PL36	NR	0013	PL36
ST200	UP26-99	NR	PL36	NR	0013	PL36
ST300	UP26-99	0013	PL36	UP26-99	0013	PL36
ST400	UP26-99	NR	NR	UP26-99	NR	NR
SU500	NR	NR	PL36	NR	NR	NR
SU750 ***	UP26-64	0011	PL30	NR	0011	PL36
SU1000 ***	UP26-64	0012	PL30	UP26-64	0012	PL30

* Refers to Grundfos UP15-42 w/ built-in flow check and speed setting

** Refers to Taco 007 without built-in flow check

*** SU750 and SU1000 tanks are non stock. Allow 6 to 8 weeks for delivery.

NR – combination not recommended

Tables 4 and 5 show pump recommendations for 2 and 3 tank systems operating off a single GB142 heater. Tank pumps are placed in parallel with each tank having its own pump. The GB142 DHW sensor is placed in one tank; a high limit aquastat is to be installed in other tanks and wired in series with the pump power to prevent over heating. Domestic water must be drawn equally from the tanks.

Table 4: Two Tank Systems

	GB142/30			GB142/45			GB142/60		
Tank	**B & G**	**Grundfos**	**Taco**	**B & G**	**Grundfos**	**Taco**	**B & G**	**Grundfos**	**Taco**
ST150	PL50	15-42	009	PL30	26-64	0014	PL30	26-64	0011
ST200	PL50	15-42	009	PL30	26-64	0014	PL30	26-64	0011
ST300	PL50	15-42	009	PL30	26-64	0014	PL30	26-64	0011
ST400	PL50	15-42	009	PL30	26-64	0014	PL30	26-64	0011

Table 5: Three Tank Systems

	GB142/30			GB142/45			GB142/60		
Tank	**B & G**	**Grundfos**	**Taco**	**B & G**	**Grundfos**	**Taco**	**B & G**	**Grundfos**	**Taco**
ST150	NRF22	15-42	008	PL30	26-64	009	PL50	26-64	0014
ST200	NRF22	15-42	008	PL30	26-64	009	PL30	26-64	0014
ST300	NRF22	15-42	008	PL30	26-64	009	PL30	26-64	0014
ST400	NRF22	15-42	008	PL30	26-64	009	PL30	26-64	0014

Electrically the GB142 has 120 V connections for the heater manifold pump PK (4 Amp max), indirect tank charging pump PS and DHW recirculation pump PZ (Max Amp draw of 5 Amp for PS and PZ combined).

The low voltage side is equipped with the following terminals:

1) RC terminals (orange color) for an indoor room sensor for firing and modulating the burner. (RC10 control standard supplied with GB142).
2) FA optional outdoor sensor terminals (blue color) connections (requires RC34 controller; available Fall 2005).
3) WA T-T terminals (light green color) connections for optional conventional thermostat.
4) FW DHW tank sensor terminals (light gray color) for sensing tank water temperature. (Tank sensor standard supplied with GB142).
5) EV terminals (red color) for connecting of an optional safety such as LWCO, manual reset high limit or any other type of external limit circuit.

BC10 CONTROLLER

A BC10 control panel is installed in every GB142 which includes a diagnostic display, status indicator lights, dials for DHW and maximum heater temperature as well as programming and diagnostic access buttons. A detailed description of all diagnostic and status codes is provided with the GB142 Installation and Service Manual.

RC10 ROOM CONTROLLER

A RC10 room controller is provided with every GB142 to provide indoor reset and pin point precision control back to the BC10. The RC10 must be installed in a reference location for indoor feedback to the GB142. The RC10 will control the modulation and heater water temperature based on maintaining desired indoor comfort levels. The RC10 is typically placed in the main living area for optimum comfort and accurate temperature control. Give careful consideration to the placement of the RC10 sensor.

The use of the RC10 indoor room controller is shown in a number of diagrams to achieve maximum comfort and efficiency from the product. Suggested timings of the post purge for the boiler pump (PK) are shown on each wiring diagram.

Note: **Never** connect a RC10 control and a thermostat or end switch at the same time.

SPACE HEATING OPERATION:

The PK boiler pump operates and the burner fires on a call for heat from the T-T terminal or from the RC10 controller. Use only T-T connections or RC terminals, **but do NOT use both at the same installation**. Once the call for heat is satisfied, the PK pump continues to operate through an adjustable programmable post-purge cycle before shutting down. The PK pump can also set to operate continuously for up to 24 hours after the last call for heat.

DHW HEATING OPERATION:

A call for heat from the FW (DHW) sensor brings the control into DHW priority, shutting off the PK pump, firing the boiler to maximum temperature and operating the PS pump. Internal logic includes an anticipative DHW heating cycle with automatically adjusting post purge feature and reduces burner modulation rate.

3 DIMENSIONS, CONNECTIONS and CLEARANCES

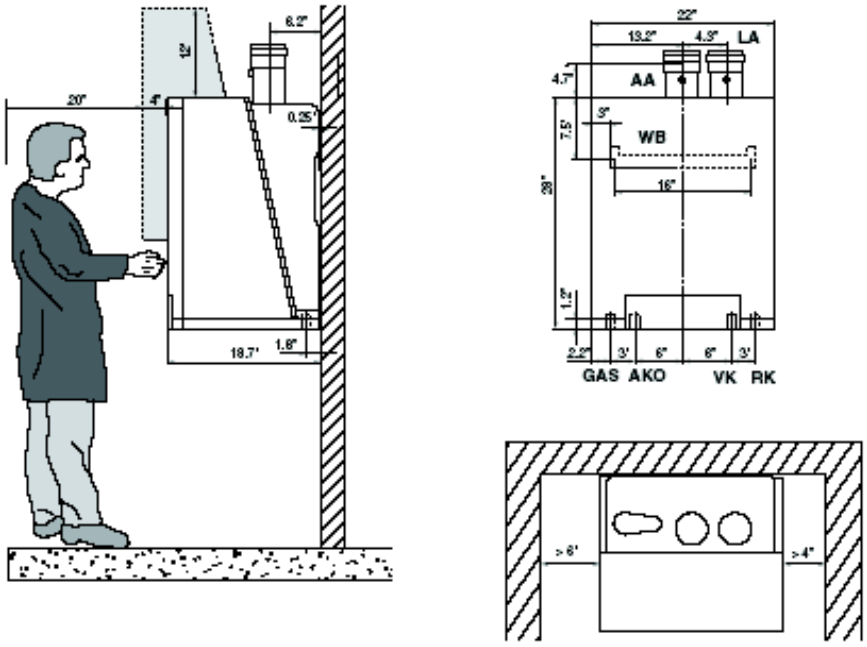


Fig. 1: Dimensions and Connections for GB142/24 and /30.

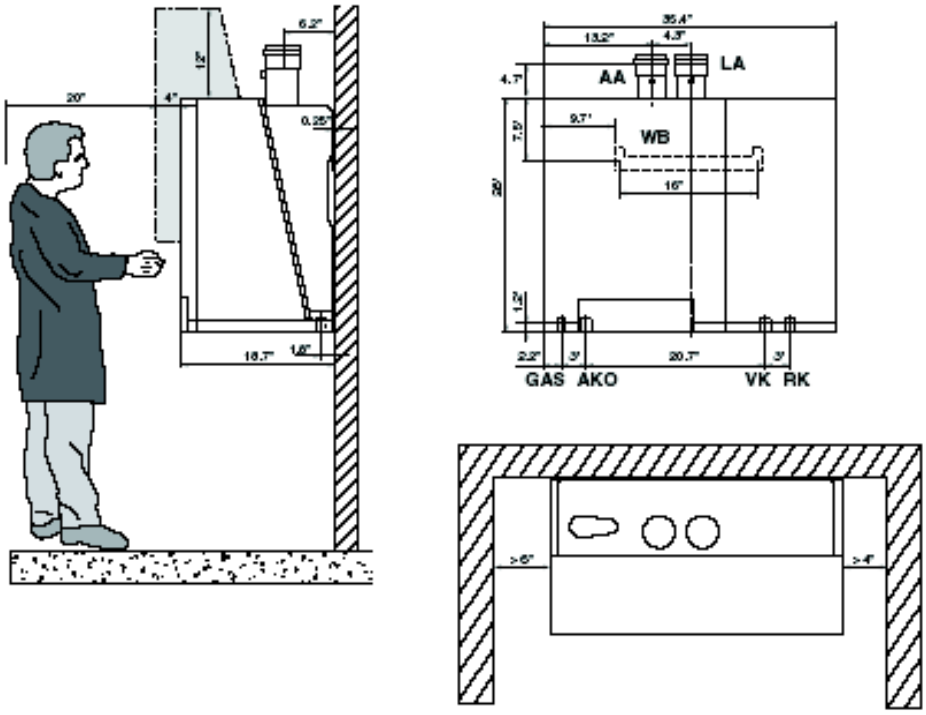


Fig. 2: Dimensions and Connections for GB142/45 and /60.

4 VENTING GUIDELINES

VENTING GUIDELINES

The GB142 is suitable for side-wall as well as vertical venting using field supplied 3" PVC or CPVC pipe in compliance with ANSI, ASTM D1785 (schedule 40 PVC), F441, D2665 (PVC-DWV), or ABS-DWV Schedule 40. Cement and primer must comply with ASTM D2564. For Canada, use CSA or ULC certified PVC or CPVC pipe, fittings and cement. **Foam core PVC pipe can not be used.**

Note: Installation must comply with local requirements/codes, National Fuel Gas Code, ANSI Z223.1 (USA installations) CSA B149.1 or B149.2 (Canadian installations). In Canada, venting must comply with ULC-S636.

Note: Installing contractor must install condensate tee (supplied by Buderus) immediately after the first 90 degree flue elbow. Condensate must be drained into a condensate pump or appropriate drain.

The GB142 is approved for both Direct Vent (sealed-combustion - see ***FIG. 3A*** for termination location) as well as Direct Exhaust (non sealed-combustion - see ***FIG. 3B*** for termination location) operation in both a horizontal and vertical vent arrangement. For room air applications, follow National Fuel Gas Code to ensure ample combustion air. All PVC venting material is approved for 0" clearance to combustibles for venting of the GB142 boiler.

Table 6: Maximum Equivalent Vent Lengths

Model	Max Eq. Intake Length (ft)	Max Eq. Exhaust Length (ft)
GB142/24, /30, /44	100	100
GB142/60	60	60

Table 7: Friction Loss Equivalent for Fittings

Fittings or Piping	Equivalent Length (ft)
45 ºElbow	3
90º Elbow	5
Optional Concentric Vent Kit	3

Fig. 3A

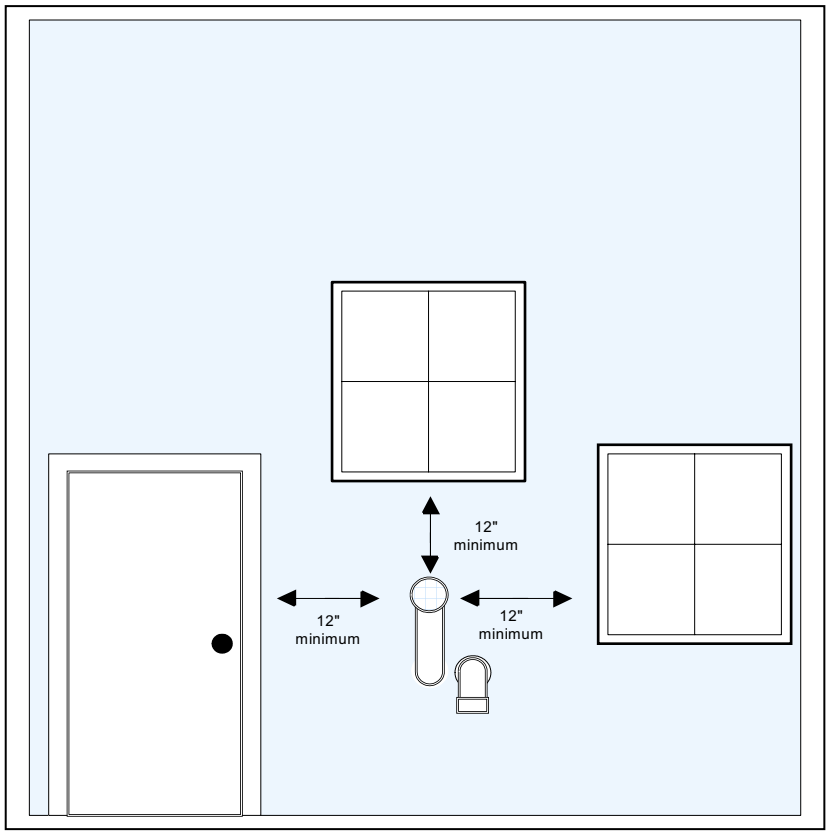
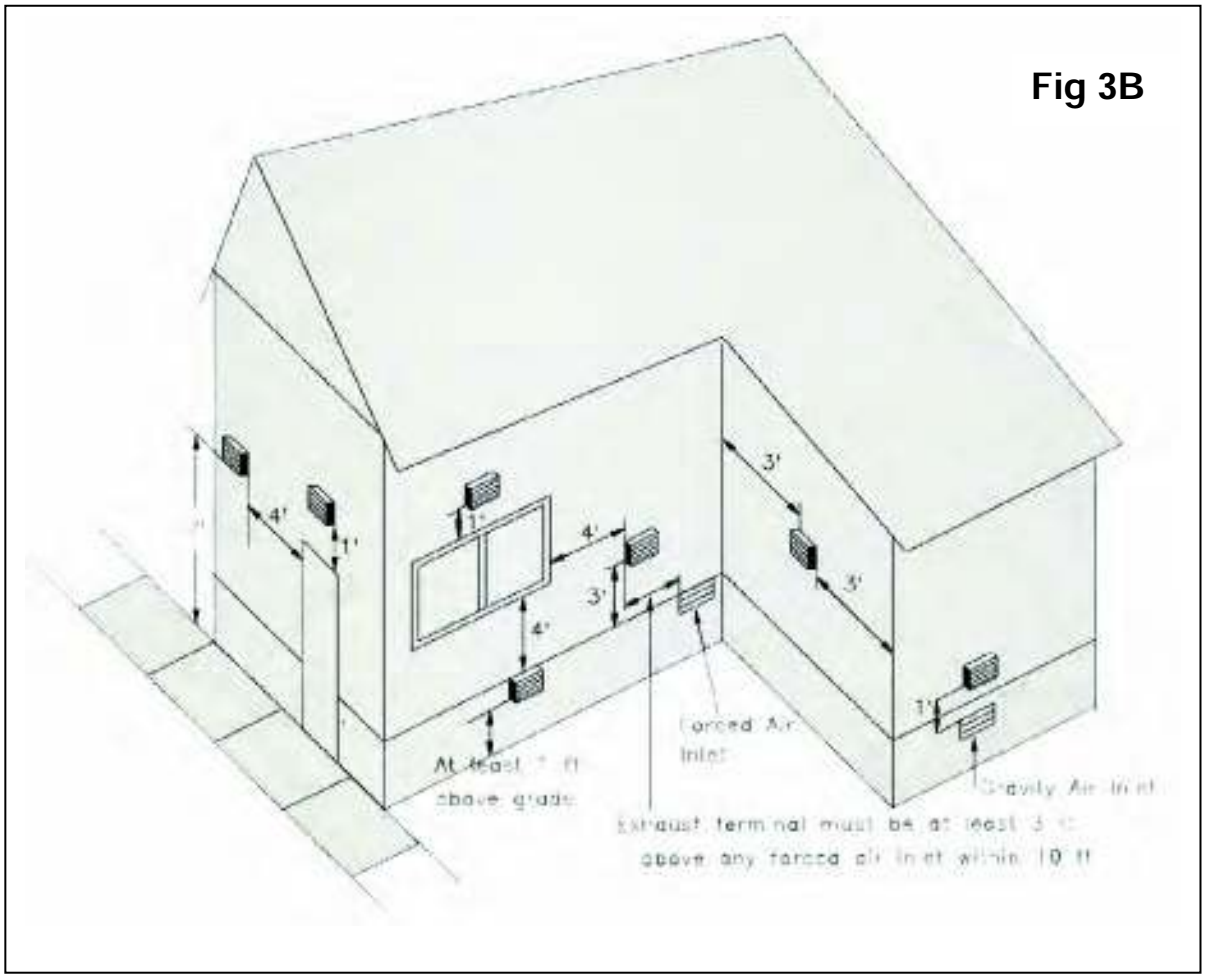

12"
minimum
12"
minimum
12"
minimum

Fig 3B


4'
1'
4'
3'
4'
3'
3'
1'
Forced Air
Inlet
above grade
above any forced air inlet within 10 ft

DIRECT VENT/SEALED COMBUSTION & DIRECT VENT/NON-SEALED COMBUSTION TERMINATION GUIDELINES

WARNING: Follow these instructions when determining vent termination location to avoid possibility of severe personal injury, death, substantial property damage or cross contamination of combustion air. Gas vent extending through an exterior wall shall not terminate adjacent to the wall or below building extensions such as eaves, parapets, balconies or decks. Failure to comply could result in severe personal injury, death or substantial property damage. Locate the concentric vent/air termination using the following guidelines.

- The total length of piping for vent or combustion air should not exceed the limits in Table 6 for maximum output.
- One must consider the immediate environment when locating the vent/air termination. Gases will form a white plume in winter. Plume could obstruct window view. Prevailing winds could freeze condensate and cause water/ice buildup on building, plants or roof. Do not terminate vent in window well, stairwell, alcove, courtyard, or other recessed areas.
- Maintain Minimum Clearances below to prevent potential problems;
    1. Vent must terminate at least 12 inches above grade, anticipated snow line or roof surface (Canada 18" minimum).
    2. Vent termination must be at least 7 feet above a public walkway.
    3. Vent must be 3 feet above any forced air intake within 10 feet.
    4. Vent must terminate at least 3 feet horizontally, from electric meters, gas meters, regulators, relief valves, and other equipment, and in no case above or below, unless a 3 feet horizontal distance is maintained
    5. Do not extend exposed vent pipe outside the building beyond recommended distance. Condensate could freeze and block vent pipe.
    6. Vent should terminate at least 3 feet away from adjacent walls, inside corners and below roof overhang.
    7. It is not recommended to terminate vent above any door or window, condensate can freeze causing ice formations.
    8. Do not use chimney as a raceway if another appliance or fireplace is vented into or through chimney.
    9. The exhaust vent must be pitched up toward the termination a minimum of ¼" in. per foot. Condensate must flow back to the Boiler freely, without accumulating in the vent.
    10. Multiple boiler vent terminations; See Venting application.

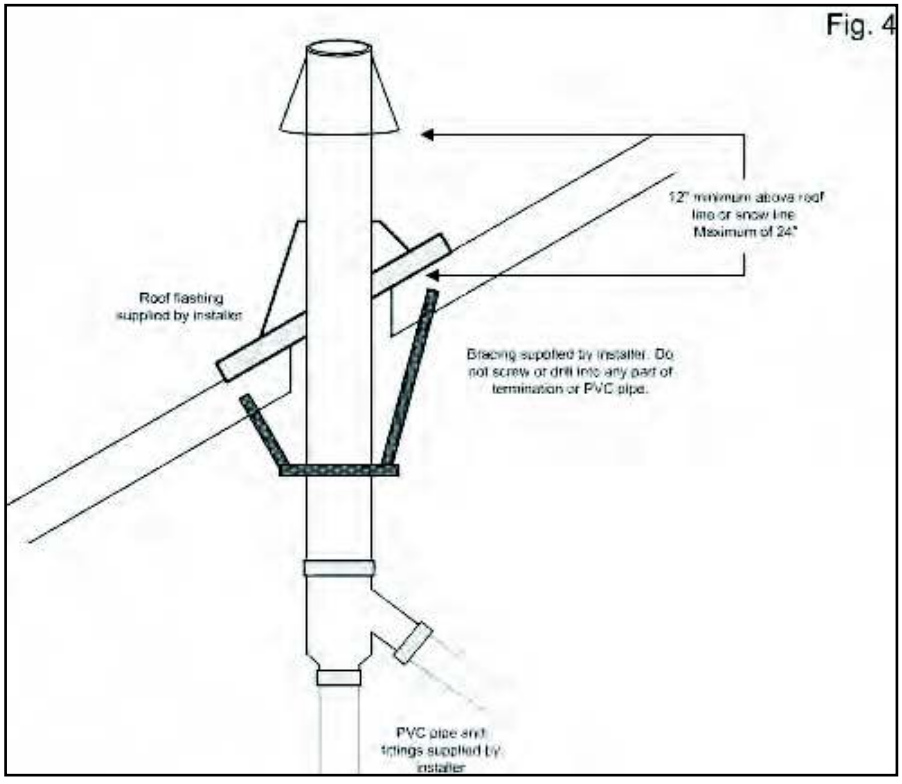
EXHAUST AND INTAKE AIR PLACEMENT

THROUGH THE ROOF PENETRATION — CONCENTRIC*:

1. Determine best location for vent/air termination using previous guidelines.
2. Cut a 5" hole to accommodate the 4½" diameter PVC pipe.
3. Cement termination concentric Y to 4½" diameter PVC pipe, then pass through roof penetration and field supplied roof boot/flashing.
4. Secure assembly to roof structure with field supplied metal strapping or equivalent support material.
5. Insert smaller 2½" PVC vent exhaust pipe into larger 4½" diameter combustion air pipe ensuring PVC exhaust vent pipe is properly cement into concentric Y.
6. Cement vent exhaust pipe and air inlet pipe onto concentric vent termination.
7. Concentric vent termination cannot be extended beyond manufactured length.
8. Concentric vent termination may be cut to desired length.
9. Concentric vent shall terminate at least 12 inches above snow line but not more 24 inches above roof surface. (see **FIG.4** and **FIG. 5** for details)
10. Operate heater through one complete cycle and check for flue gas leakage.
11. Refer to fig. 6 for multiple "Through the roof" installations and maintain a 12" center-to-center distance.

** Buderus Part Number: BRYKGAVT0602CVT*

Fig. 4



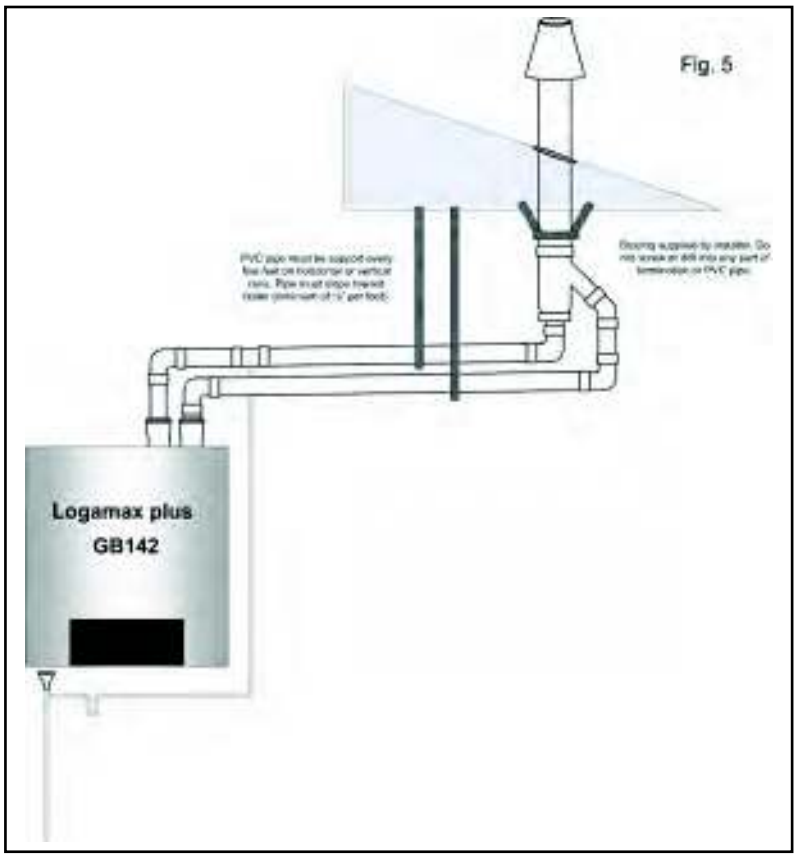
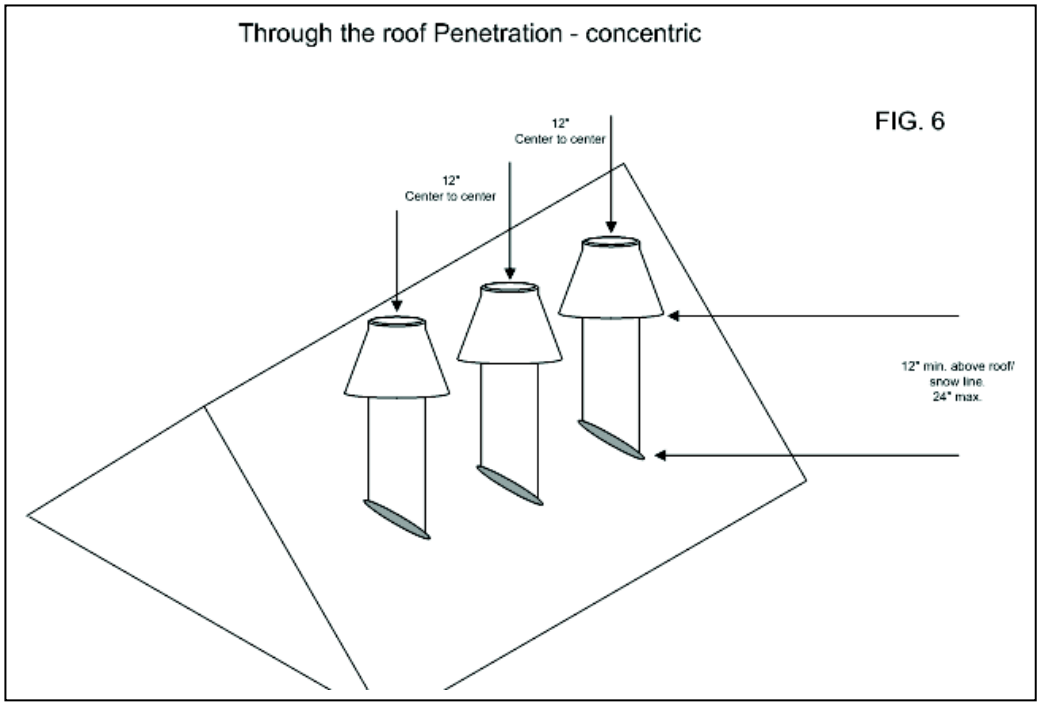
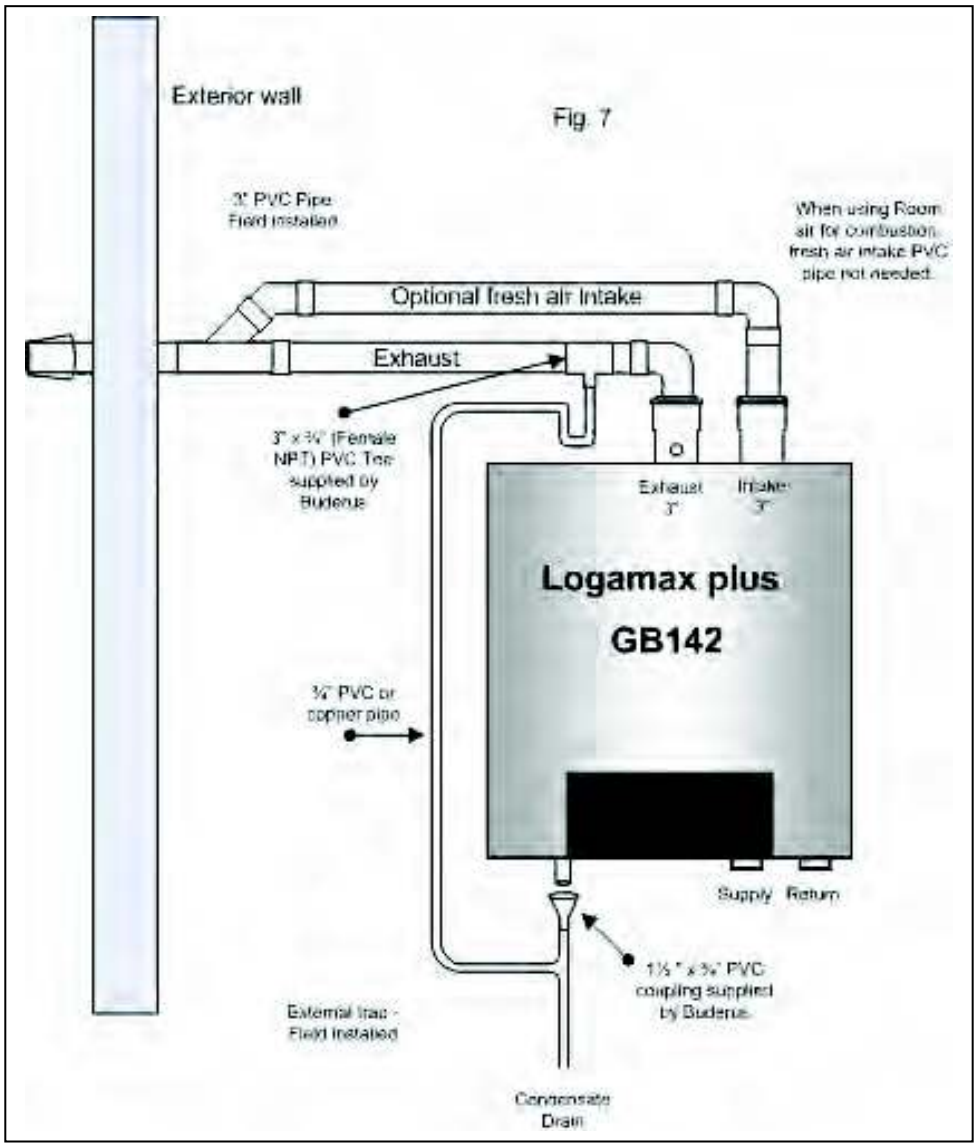


Fig. 5
Logamax plus
GB142


Through the roof Penetration - concentric
FIG. 6
12"
Center to center
12"
Center to center
12" min. above roof/
snow line.
24" max.

SIDE-WALL PENETRATION (CONCENTRIC)

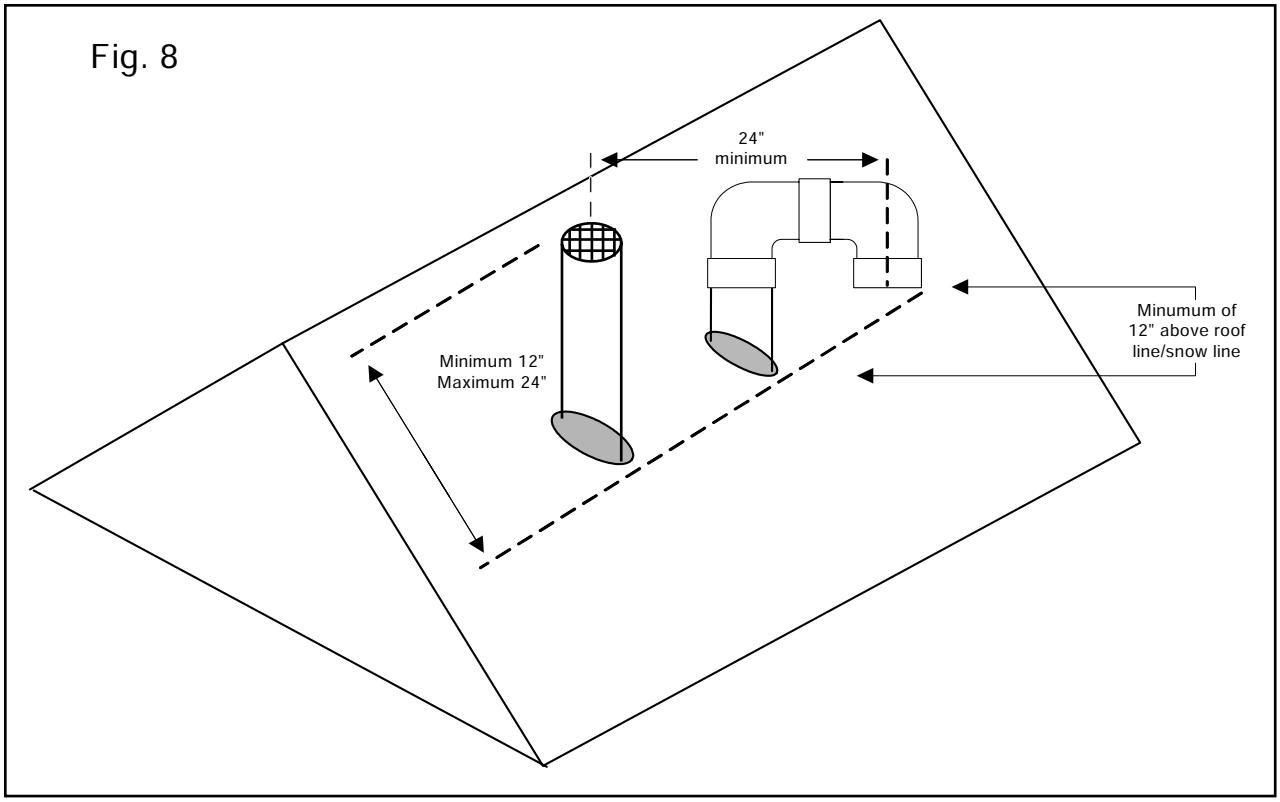
1. Determine best location for vent/air termination using previous guidelines (**FIG. 3A & 7**).
2. Cut a 5" hole to accommodate the 4½" diameter PVC pipe.
3. Cement termination concentric Y to 4½" diameter PVC pipe, then pass through wall penetration and field supplied flashing if required.
4. Insert smaller 2½" PVC vent exhaust pipe into larger 4½" diameter combustion air pipe ensuring PVC exhaust vent pipe is properly cement into concentric Y.
5. Cement vent exhaust pipe and air inlet pipe onto concentric vent termination.
6. Concentric vent termination cannot be extended beyond manufactured length.
7. Concentric vent termination may be cut to desired length.
8. Operate heater through one complete cycle and check for flue gas leakage.
9. Allow 8" center to center horizontal distance between concentric vent terminations with multiple heater installations.



THROUGH THE ROOF PENETRATION (NON-CONCENTRIC)

1. Determine best location for vent/air termination using previous guidelines.
2. Air pipe penetration – Cut a hole for the air pipe. Size the air pipe hole as close as desired to the air pipe outside diameter.
3. Vent pipe penetration – Cut a hole for the vent pipe. Size the vent pipe hole as close as desired to the vent pipe outside diameter.
4. Space the air and vent holes to provide the minimum spacing (see **FIG. 8**).
5. Follow all local codes for isolation of vent pipe when passing through floors, ceilings and roofs.
6. Install a field supplied roof penetration boot/flashing.

Fig. 8



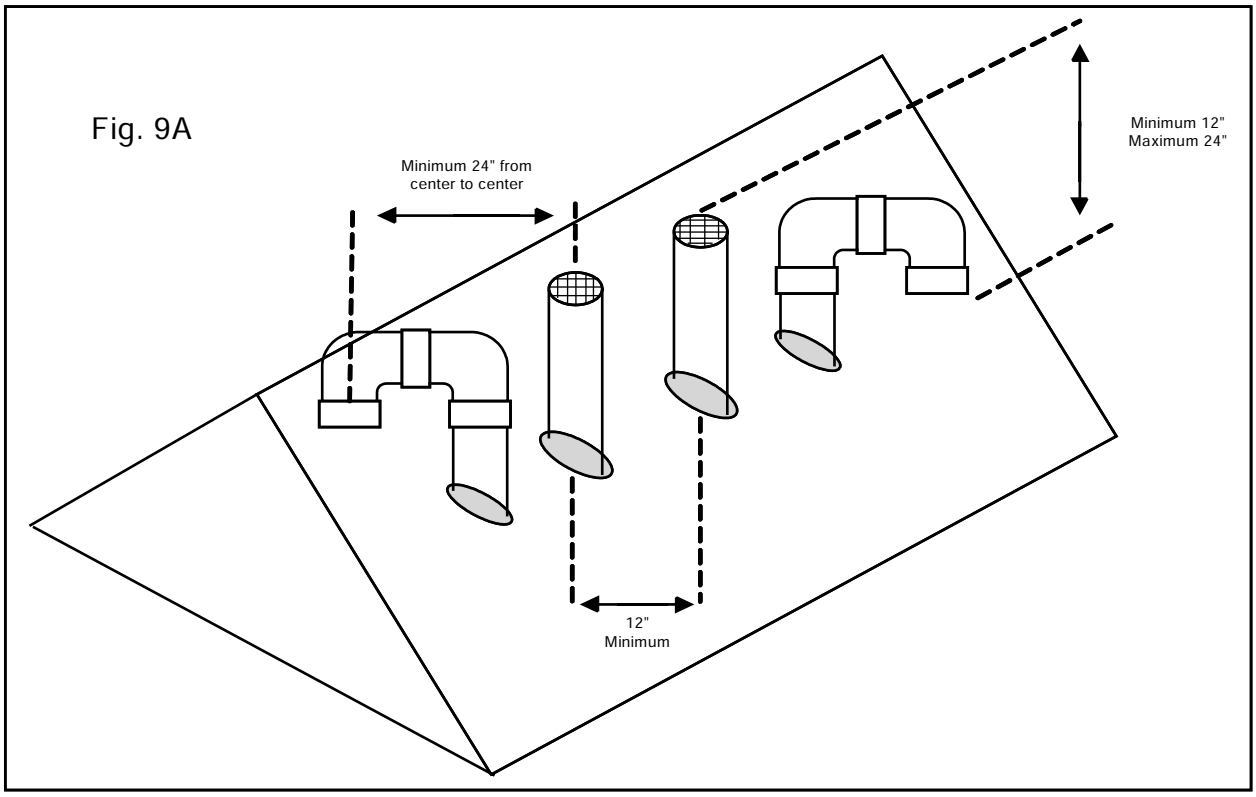
TERMINATION AND FITTING

1. Prepare the vent termination coupling and the air termination elbow by inserting the bird screens provided with boiler into the three inch fittings.
2. The combustion air inlet shall terminate at least 12 inches above maximum snow line or 24 inches above roof surface which ever is greater.
3. The combustion air inlet pipe must terminate in a downward position using two 90 degree elbows. The combustion air inlet pipe shall terminate at least two feet horizontally from the center line of the exhaust vent, this is to prevent cross contamination of flue gases into the combustion air stream.
4. The exhaust vent must terminate vertically upward with a coupling and bird screen. The top of the coupling shall termination at least 12 inches above the bottom of the down-turned 90° elbow, but no more than 24 inches.

MULTIPLE HEATER INSTALLATION

Terminate all exhaust vents at the same height and all combustion air inlets at the same height, while maintaining the minimum 12" to a maximum of 24" height clearance from the exhaust to the down turned 90 degree elbow and combustion air inlet. Exhaust vent termination edge shall be at least 12" from the edge of the air inlet pipe of an adjacent heater. Exhaust vent terminations may be place next to each other as practical, like wise air intake terminations may also be placed next to each other. The combustion air inlet is part of the direct vent system and not classified as a forced air inlet (see **FIG. 9A** and **9B**).

Fig. 9A



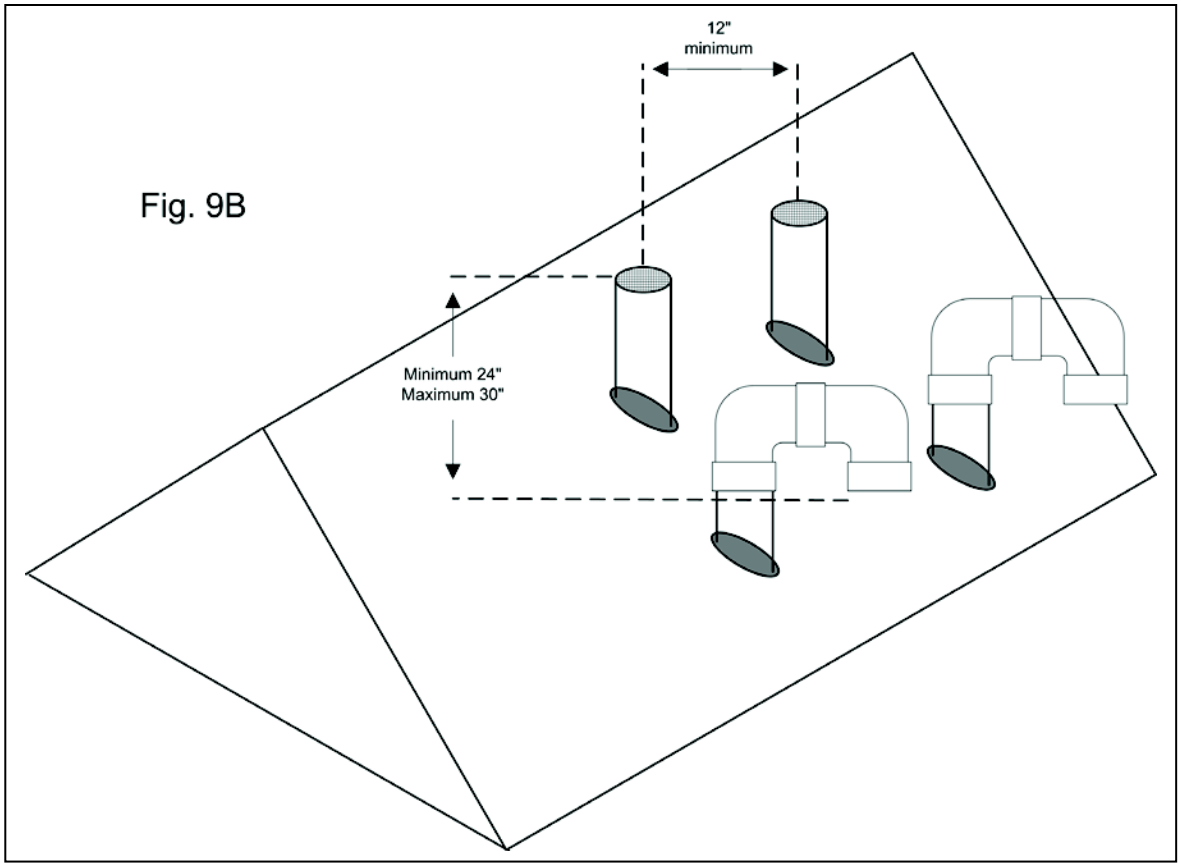
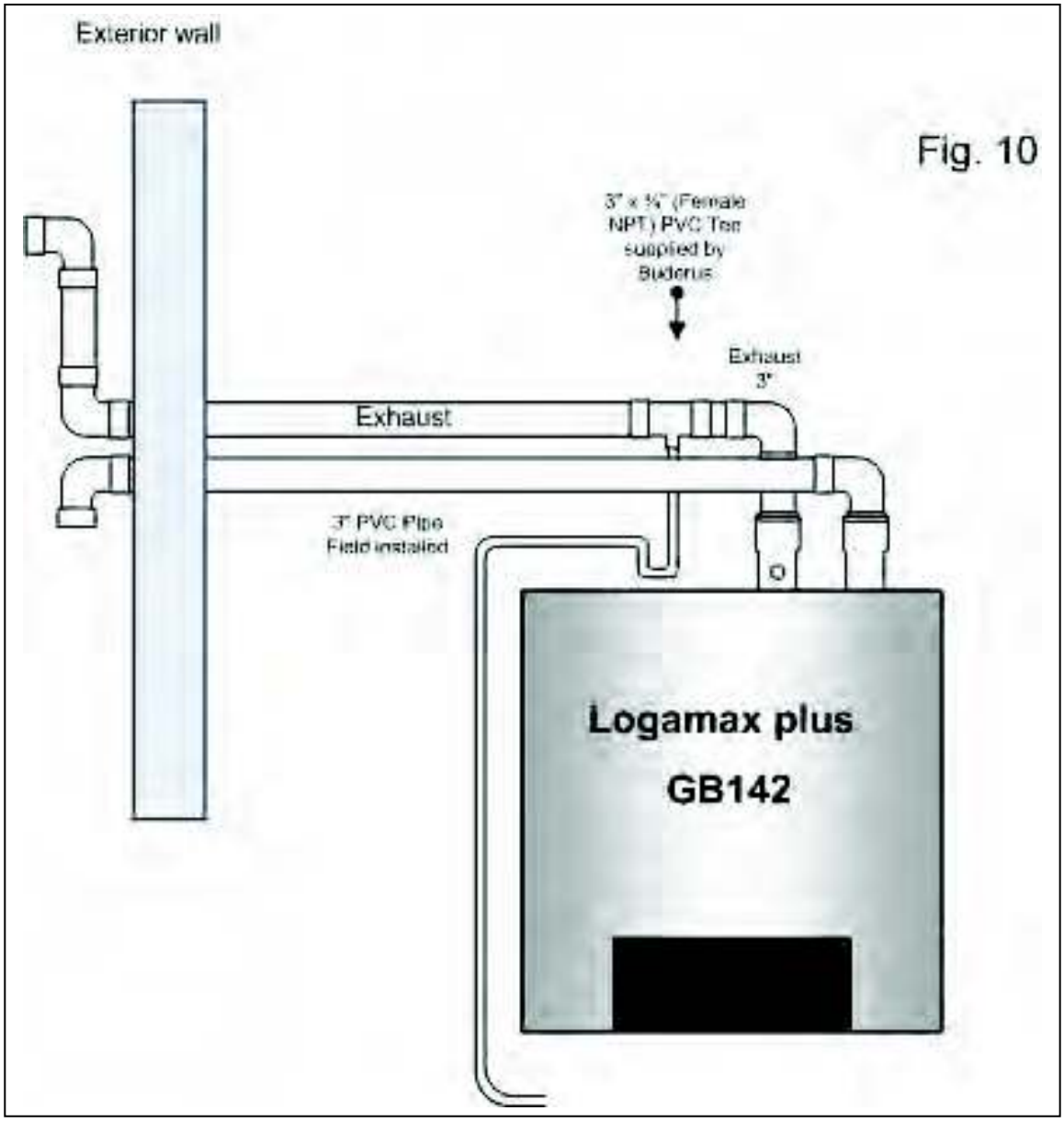


Fig. 9B

SIDE-WALL PENETRATION (NON-CONCENTRIC)

1. Determine best location for vent/air termination using previous guidelines.
2. Cut a 4" hole to accommodate the 3½" diameter PVC pipe. Through the wall penetration may be sealed with a field provided flashing if required.
3. Insert bird screens provided with heater into both exhaust and combustion air (field supplied) elbows.
4. Combustion air inlet elbow should always be positioned downward.
5. The exhaust outlet or elbow shall always be positioned pointing away from the building.
6. Combustion air inlet elbow must terminate at least 12" below exhaust elbow or outlet, but not exceed 15" maximum separation.
7. Combustion air inlet must maintain at least 12" above grade and/or snow line.
8. Combustion air inlet may be extended vertically upward a maximum of 24" from the building penetration (see **FIG. 10**).
9. Do not extend exposed exhaust vent pipe outside the building beyond recommendations.
10. Horizontal termination shall not extend beyond 18 inches from the building (based on minimum 12 inch required separation between intake and exhaust). Exhaust vent vertical rise shall not extend beyond 39" from building penetration to termination elbow. Condensate could freeze and block vent pipe.
11. Operate heater through one complete cycle and check for flue gas leakage.



Multiple Heater installation – Terminate all exhaust vents at the same height and all combustion air inlets at the same height, while maintaining the minimum 12 inches vertical height clearance from between exhaust and combustion air inlet. Exhaust vent termination edge shall be at least 12 inches laterally from the edge of the air inlet pipe of an adjacent heater. The combustion air inlet is part of the direct vent system and not classified as a forced air inlet.

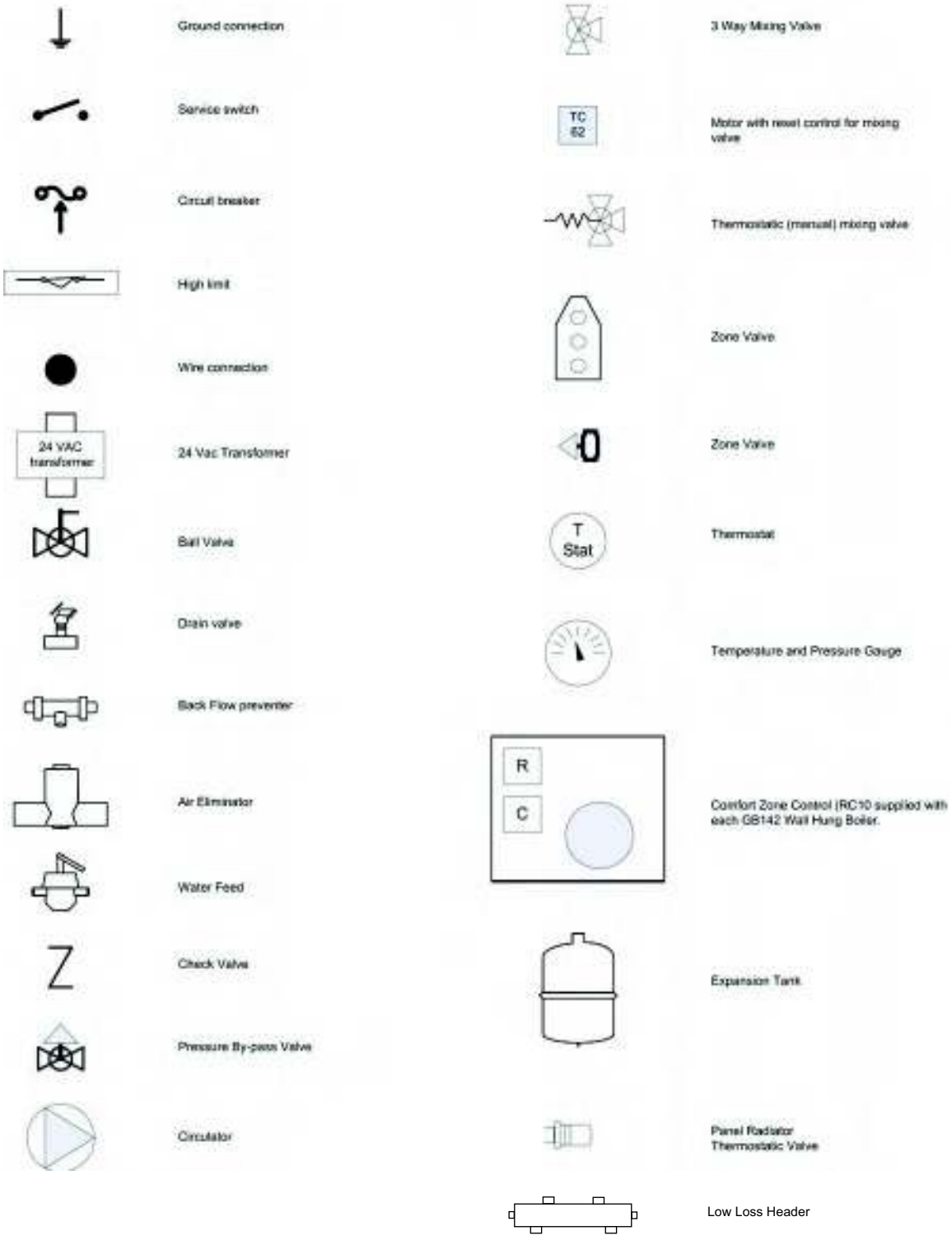
CONDENSATE PIPING

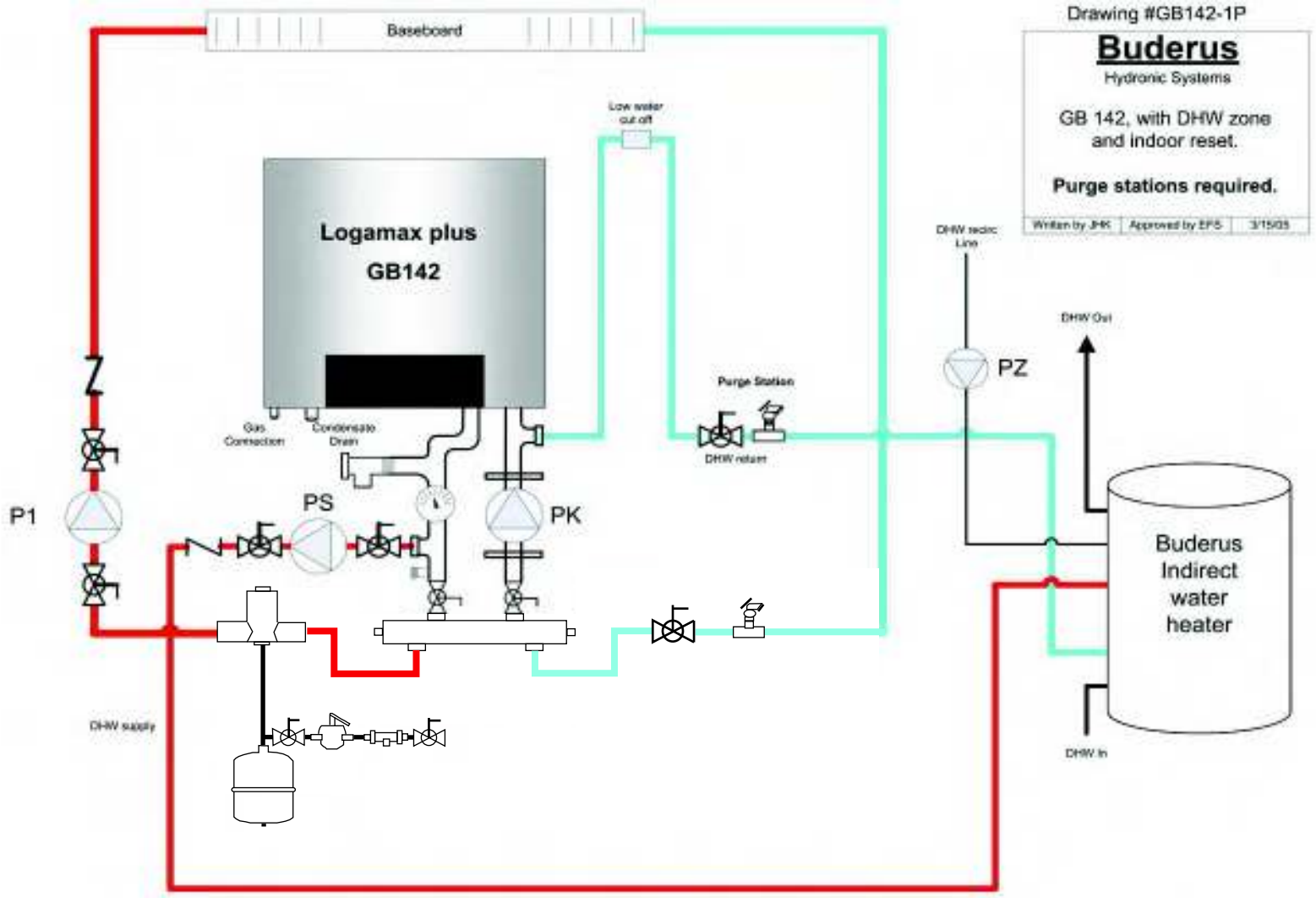
Figure 7 shows a typical sealed combustion installation.

- The furnished 3" x ¾" socket female vent condensate drain must be installed as close as possible to the exhaust connection with the ¾" branch pointing down to drain condensate.
- Install furnished 1-1/2" x ¾" coupling under GB142 condensate drain, install a ¾" PVC tee and bring in upper vent drain with a trap into this tee.
- Pour 1 qt. of water in exhaust pipe and make sure to fill the external trap and internal trap of the GB142.
- In case of vertical venting, install a short horizontal run to install the vent condensate drain.

5 DRAWINGS

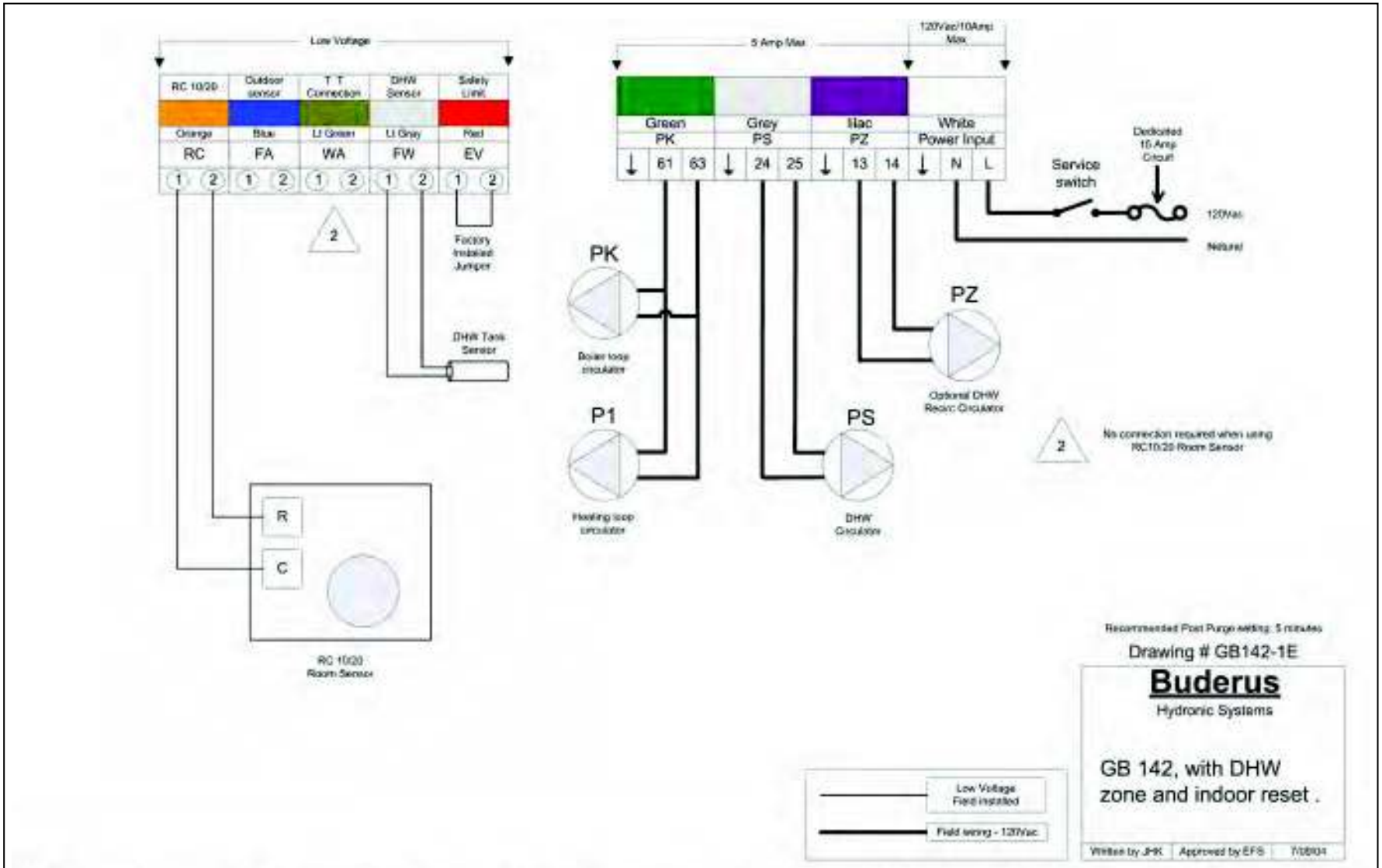
Mechanical/Electrical Symbols





Note: This drawing is conceptual in nature and does not purport to address all design, installation or safety considerations. Additional safety and/or auxiliary equipment may be needed. This diagram is for reference use by officials, designers and licensed installers. It is expected that installers have adequate knowledge of accepted industry practices for the equipment, procedures, and applications involved.

Drawing is not to scale.



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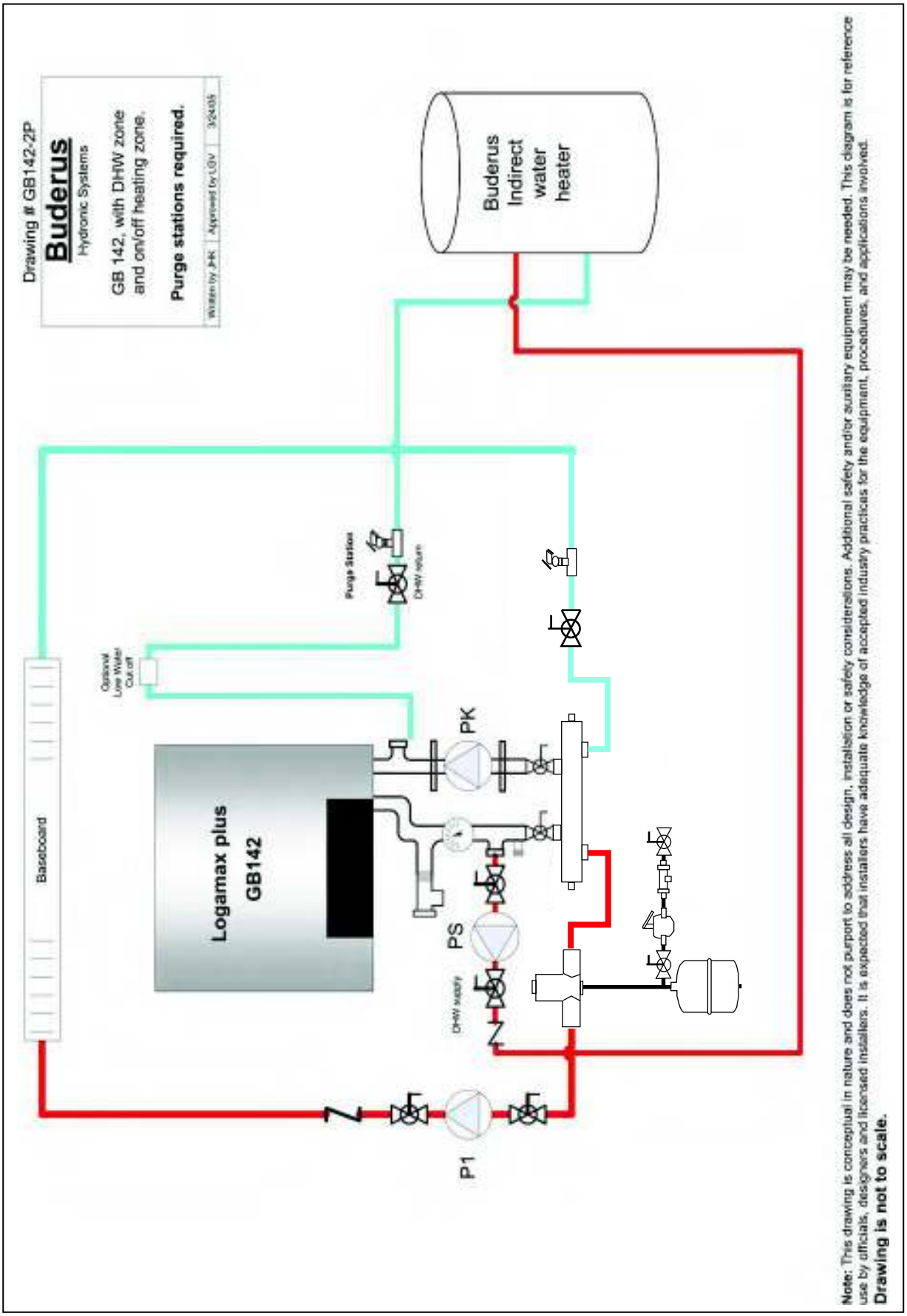
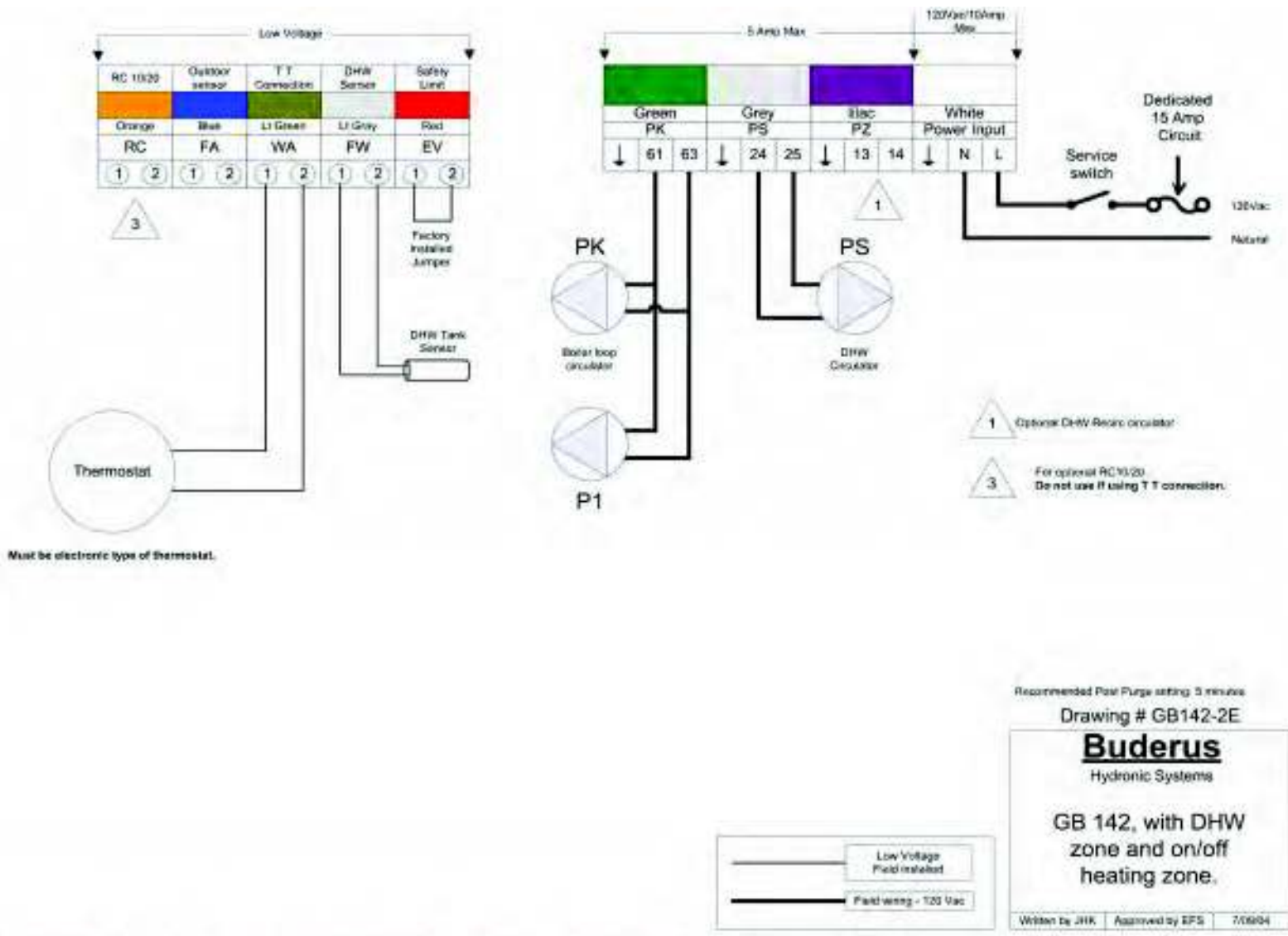

Drawing # GB142-2P
Buderus
Hydronic Systems
GB 142, with DHW zone and on/off heating zone.
Purge stations required.
Written by JHK
Approved by LGV
3/24/05
Buderus Indirect water heater
Baseboard
Logamax plus GB142
Optional Low Water Cut-off
Purge Station
DHW return
DHW supply
PK
PS
P1
Note: This drawing is conceptual in nature and does not purport to address all design, installation or safety considerations. Additional safety and/or auxiliary equipment may be needed. This diagram is for reference use by officials, designers and licensed installers. It is expected that installers have adequate knowledge of accepted industry practices for the equipment, procedures, and applications involved.
Drawing is not to scale.



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Drawing is not to scale.

Drawing #GB142-3P

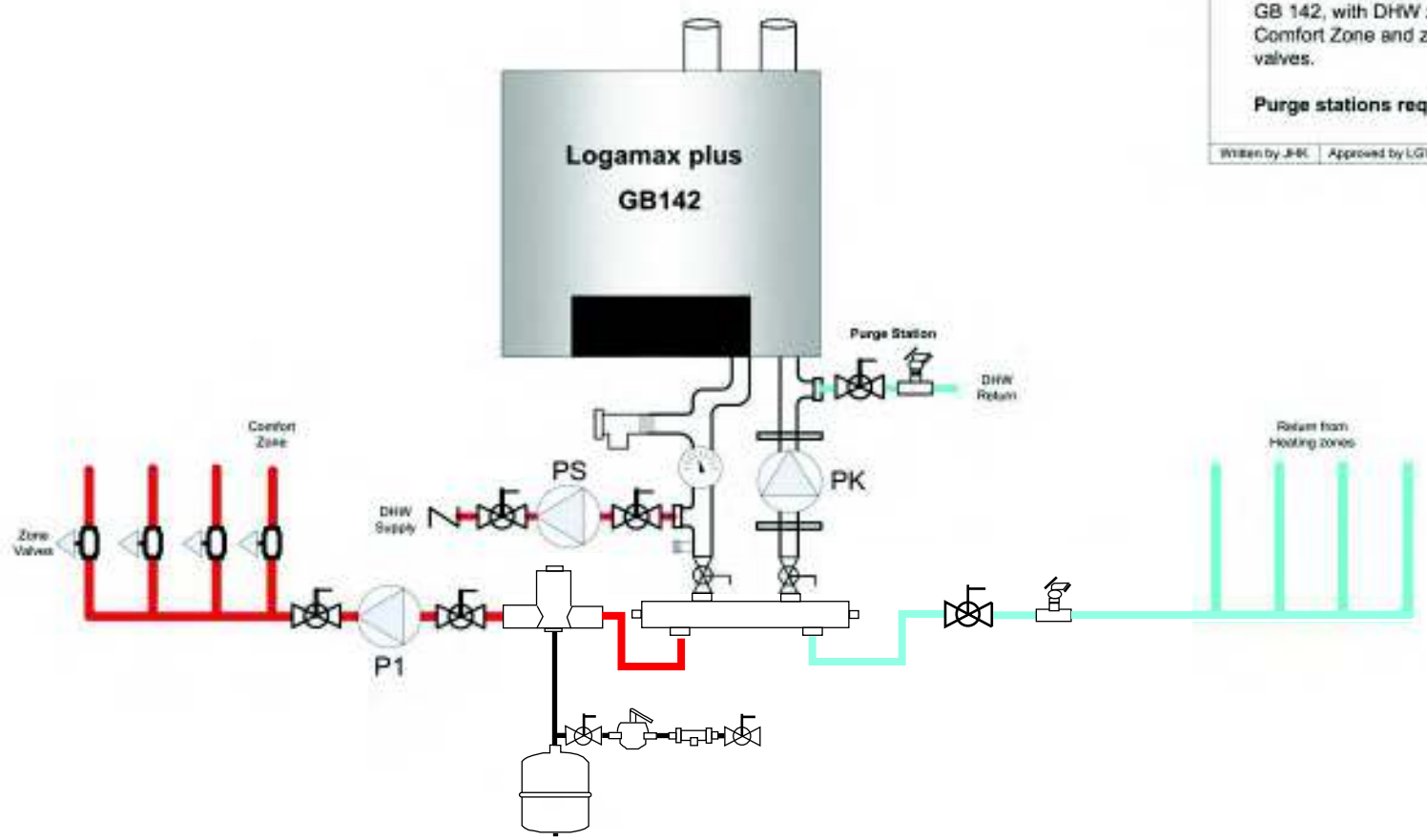
Buderus

Hydronic Systems

GB 142, with DHW zone, Comfort Zone and zone valves.

Purge stations required

Written by JHK	Approved by LGV	3/24/05



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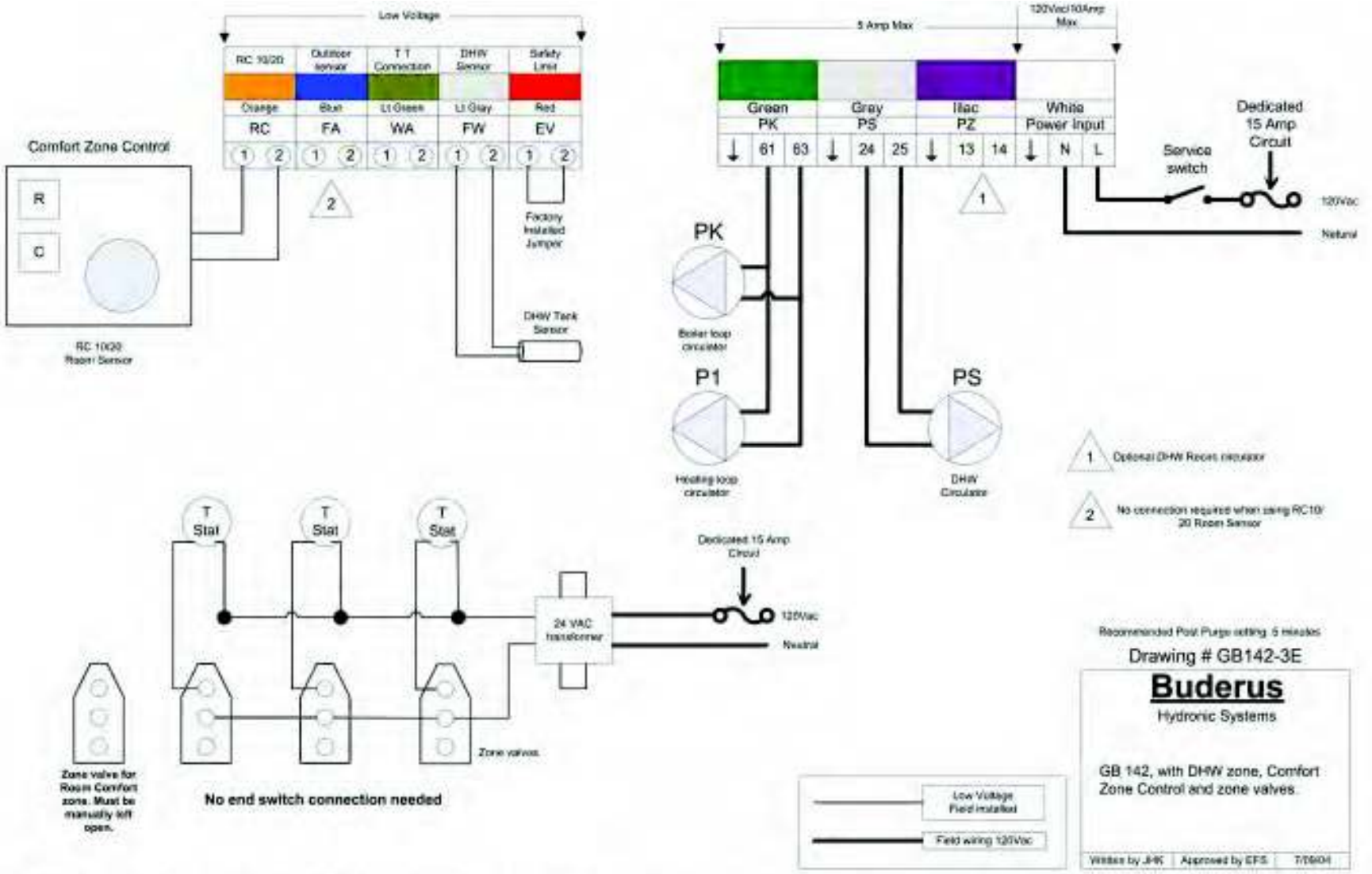
Drawing is not to scale.



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Drawing is not to scale.

Drawing #GB142-4P

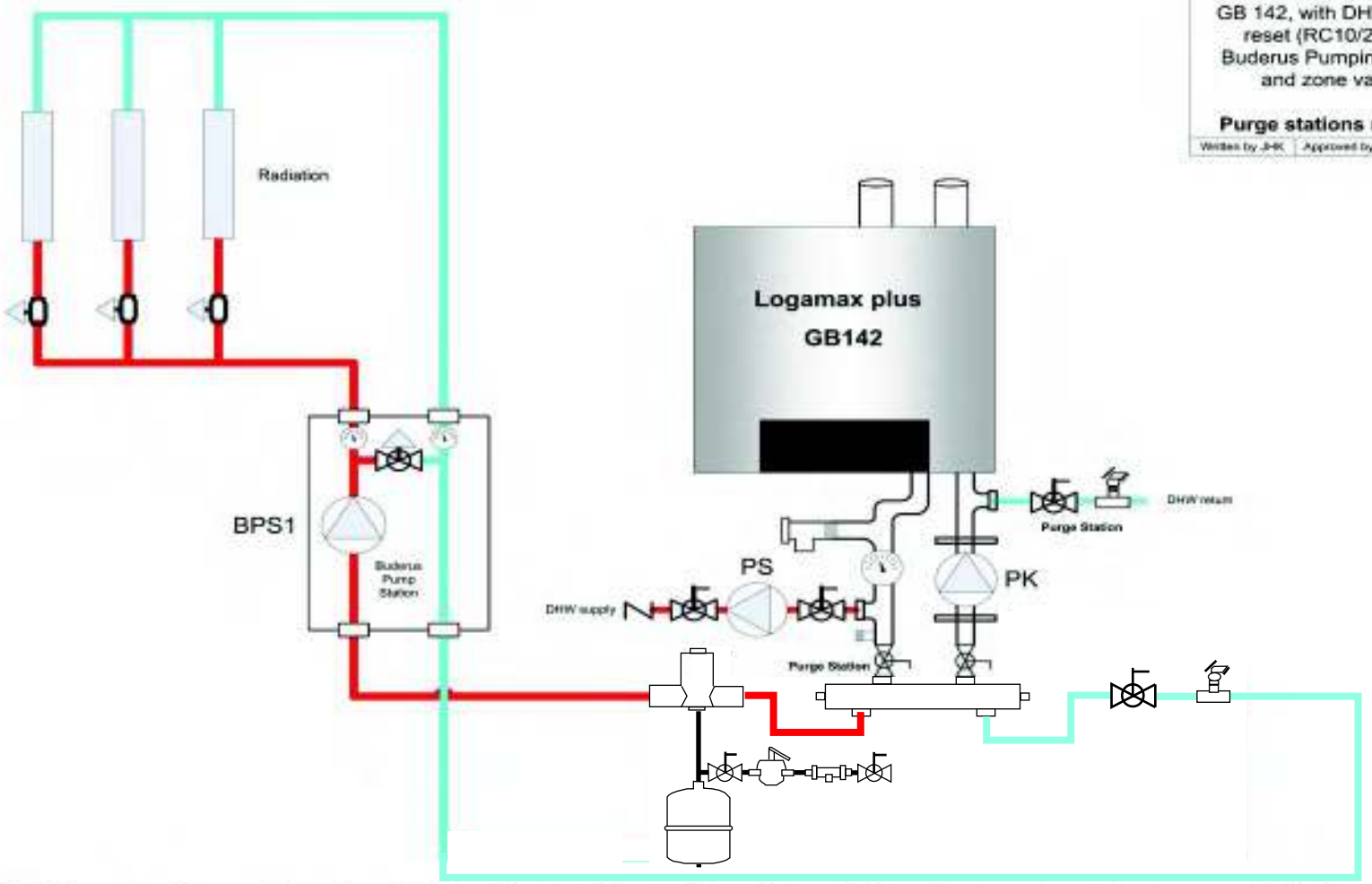
Buderus

Hydronic Systems

GB 142, with DHW, Indoor reset (RC10/20) with Buderus Pumping Station and zone valves.

Purge stations required.

Written by JHK | Approved by LGV | 3/28/06



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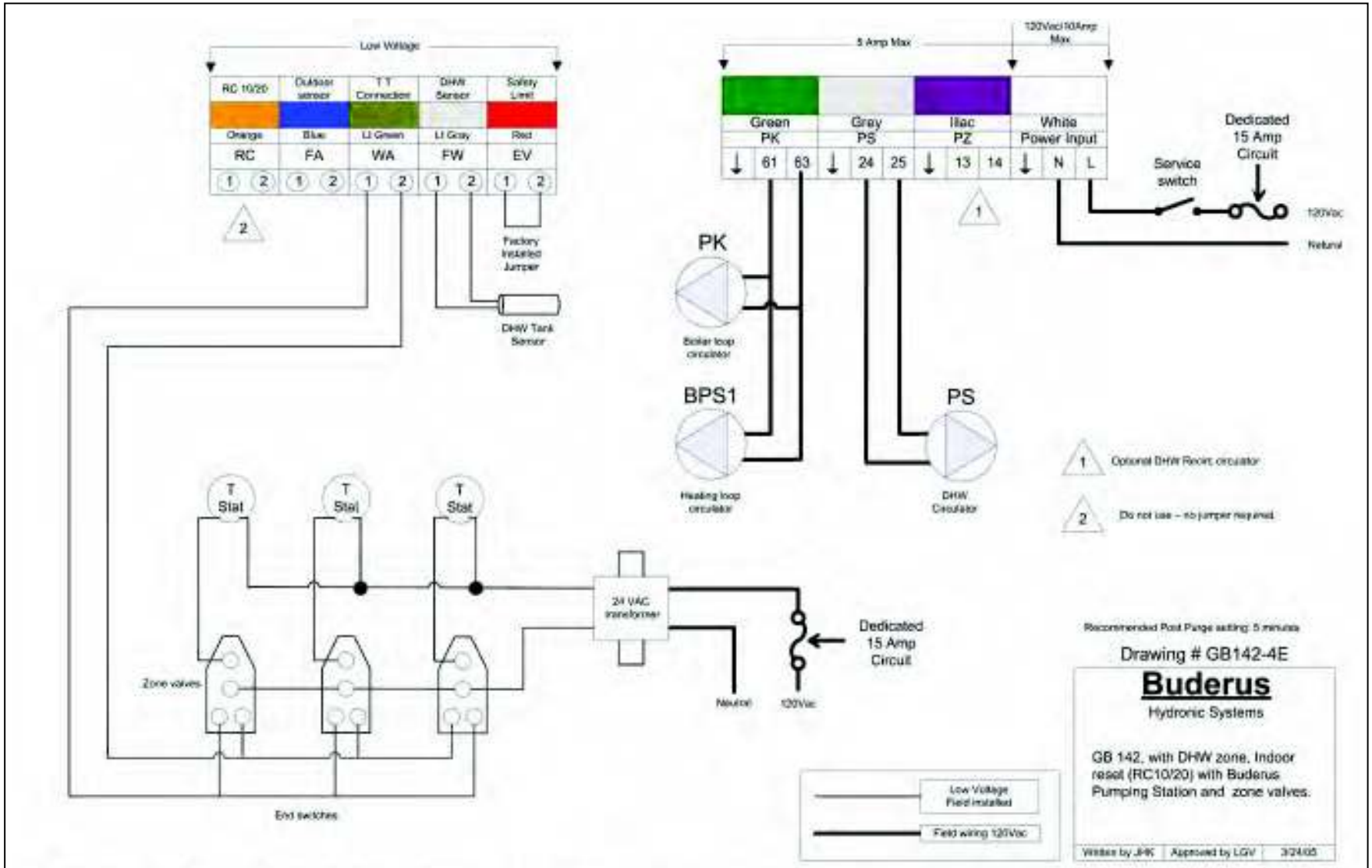
Drawing is not to scale.



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Drawing is not to scale.

Drawing # GB142-5P

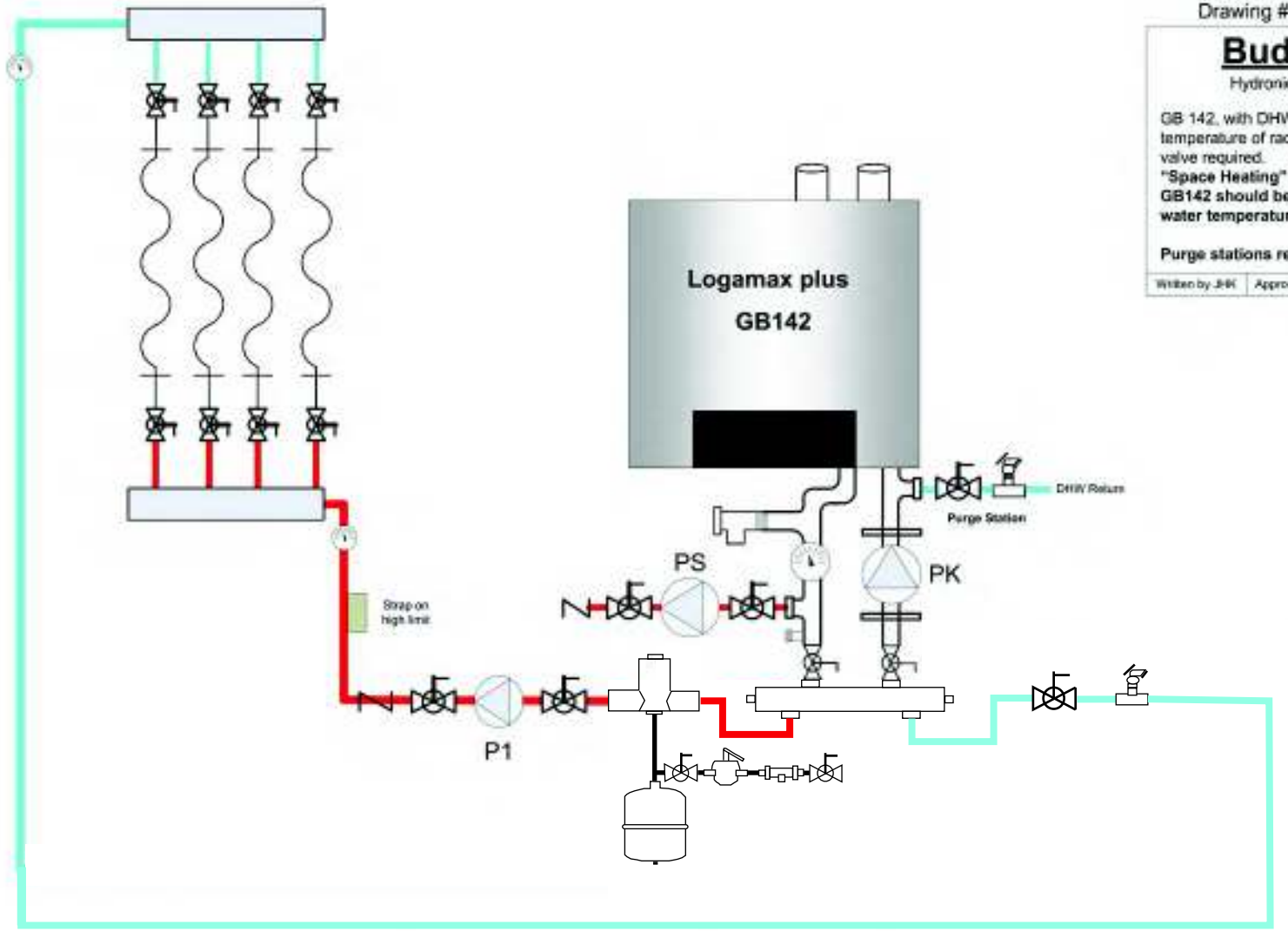
Buderus

Hydronic Systems

GB 142, with DHW zone single temperature of radiant. no mixing valve required.
"Space Heating" high limit on GB142 should be set to maximum water temperature.

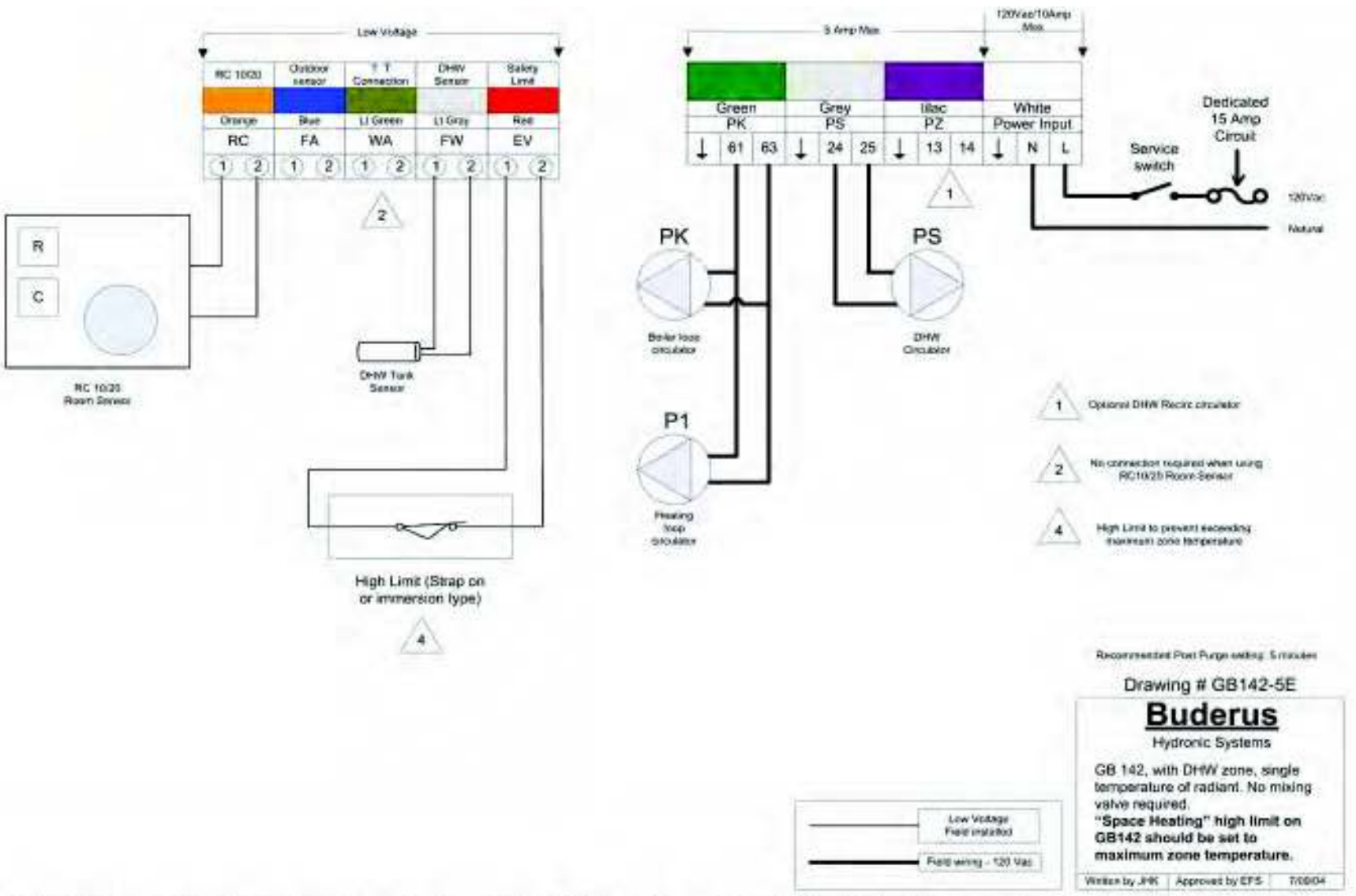
Purge stations required.

Written by JHK	Approved by LGV	3/24/05



Note: This drawing is conceptual in nature and does not purport to address all design, installation or safety considerations. Additional safety and/or auxiliary equipment may be needed. This diagram is for reference use by officials, designers and licensed installers. It is expected that installers have adequate knowledge of accepted industry practices for the equipment, procedures, and applications involved.

Drawing is not to scale.



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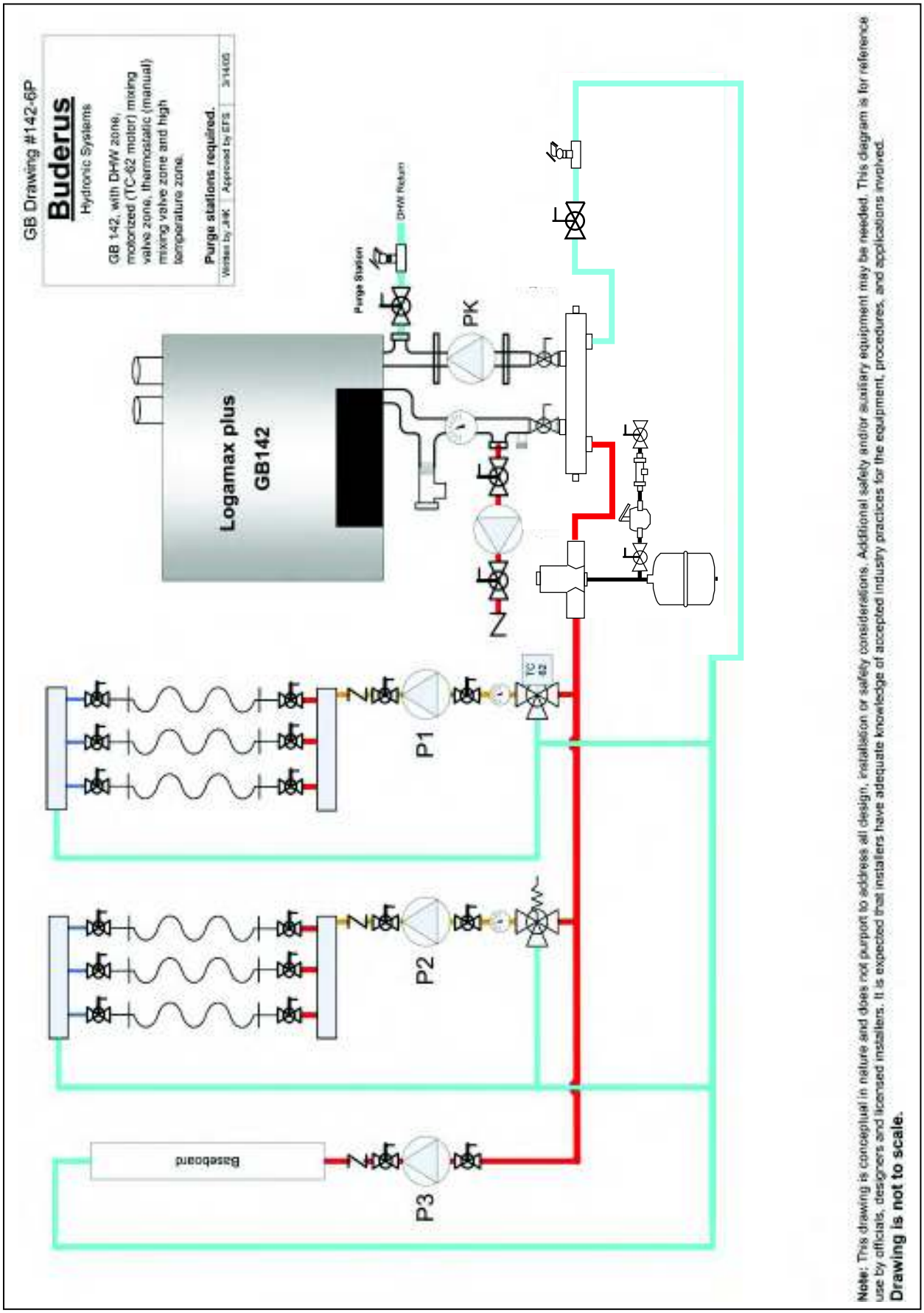
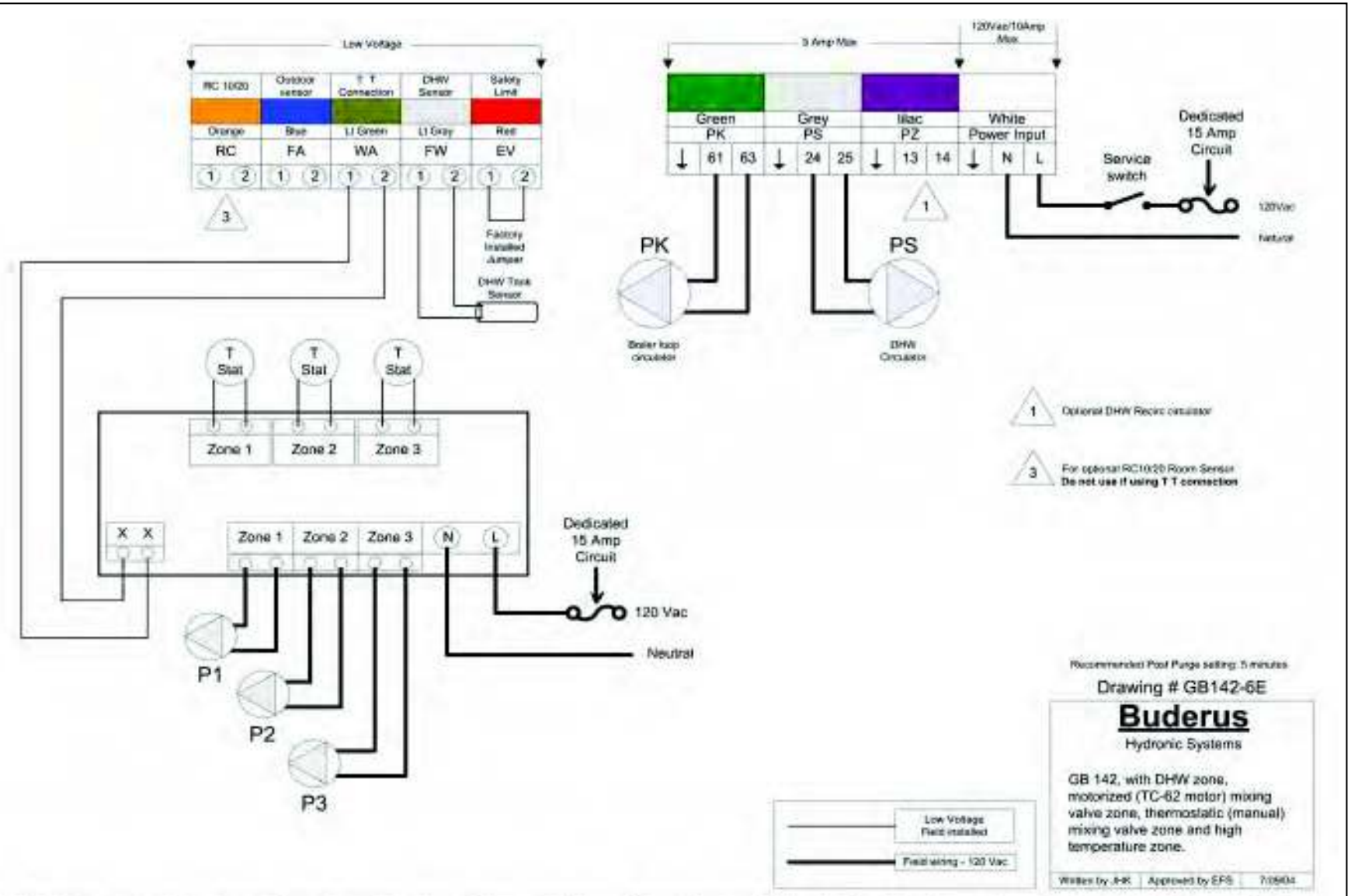
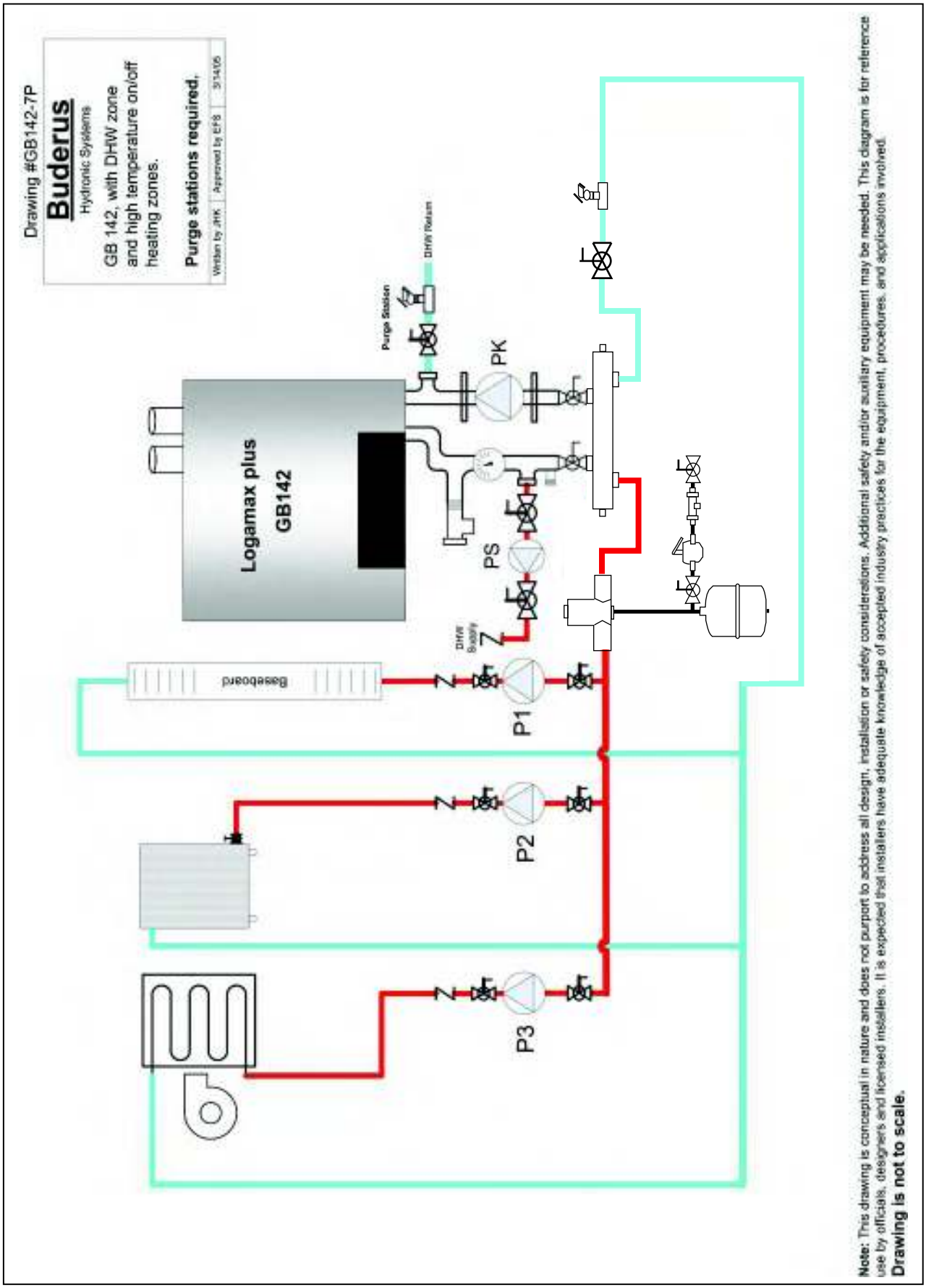
Drawing is not to scale.

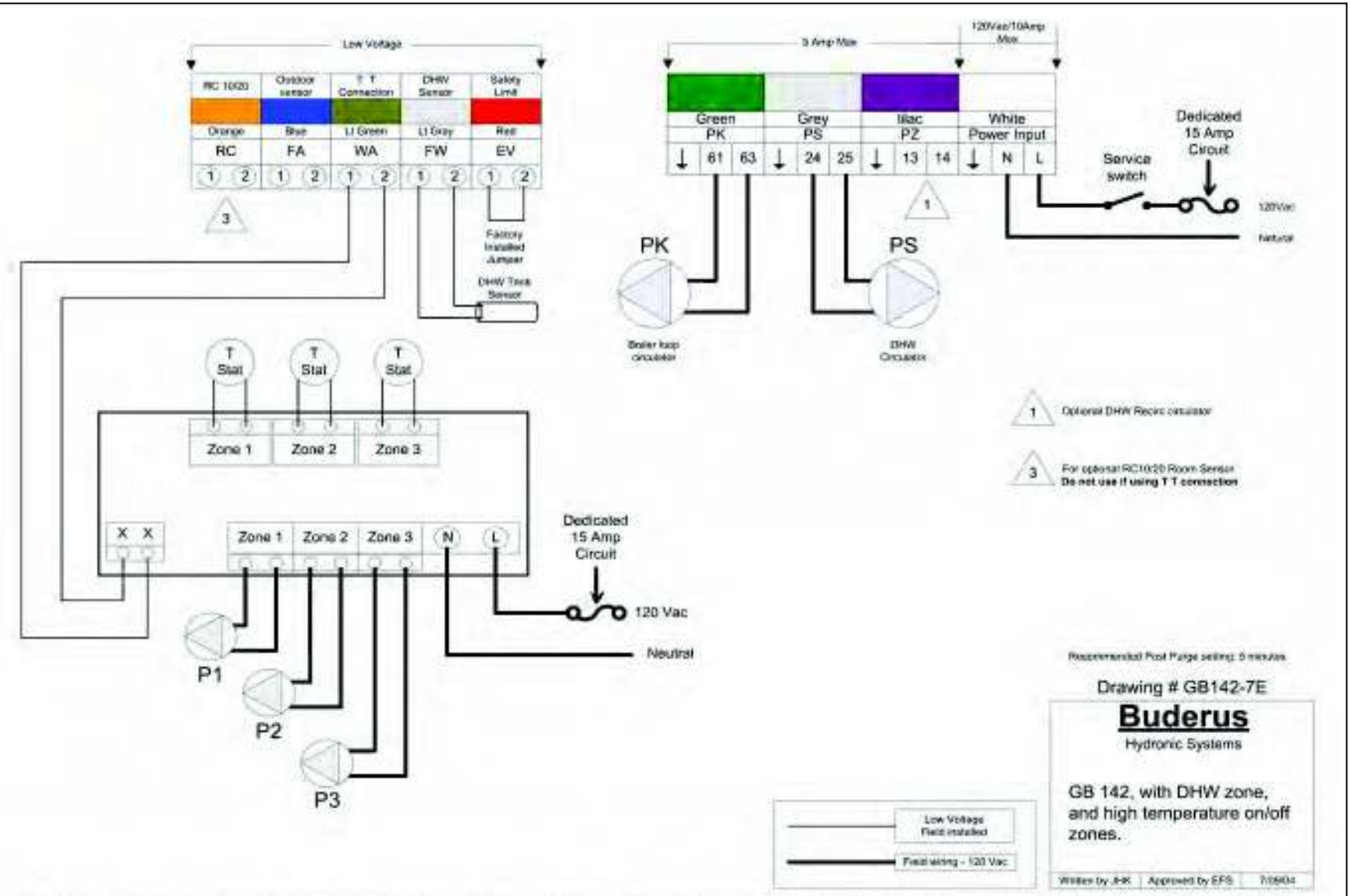

GB Drawing #142-6P
Buderus
Hydronic Systems
GB 142, with DHW zone, motorized (TC-62 motor) mixing valve zone, thermostatic (manual) mixing valve zone and high temperature zone.
Purge stations required.
Logamax plus
GB142
Purge Station
DHW Return
PK
P1
P2
P3
Baseboard
Note: This drawing is conceptual in nature and does not purport to address all design, installation or safety considerations. Additional safety and/or auxiliary equipment may be needed. This diagram is for reference use by officials, designers and licensed installers. It is expected that installers have adequate knowledge of accepted industry practices for the equipment, procedures, and applications involved.
Drawing is not to scale.



Note: This drawing is conceptual in nature and does not purport to address all design, installation or safety considerations. Additional safety and/or auxiliary equipment may be needed. This diagram is for reference use by officials, designers and licensed installers. It is expected that installers have adequate knowledge of accepted industry practices for the equipment, procedures, and applications involved.

Drawing is not to scale.


Drawing #GB142-7P
Buderus
Hydronic Systems
GB 142, with DHW zone
and high temperature on/off
heating zones.
Purge stations required.
Written by JHK
Approved by EFS
3/14/05
Purge Station
DHW Return
PK
Logamax plus
GB142
PS
DHW Supply
Baseboard
P1
P2
P3
Note: This drawing is conceptual in nature and does not purport to address all design, installation or safety considerations. Additional safety and/or auxiliary equipment may be needed. This diagram is for reference use by officials, designers and licensed installers. It is expected that installers have adequate knowledge of accepted industry practices for the equipment, procedures, and applications involved.
Drawing is not to scale.



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Drawing is not to scale.

Drawing #GB142-8P

Buderus

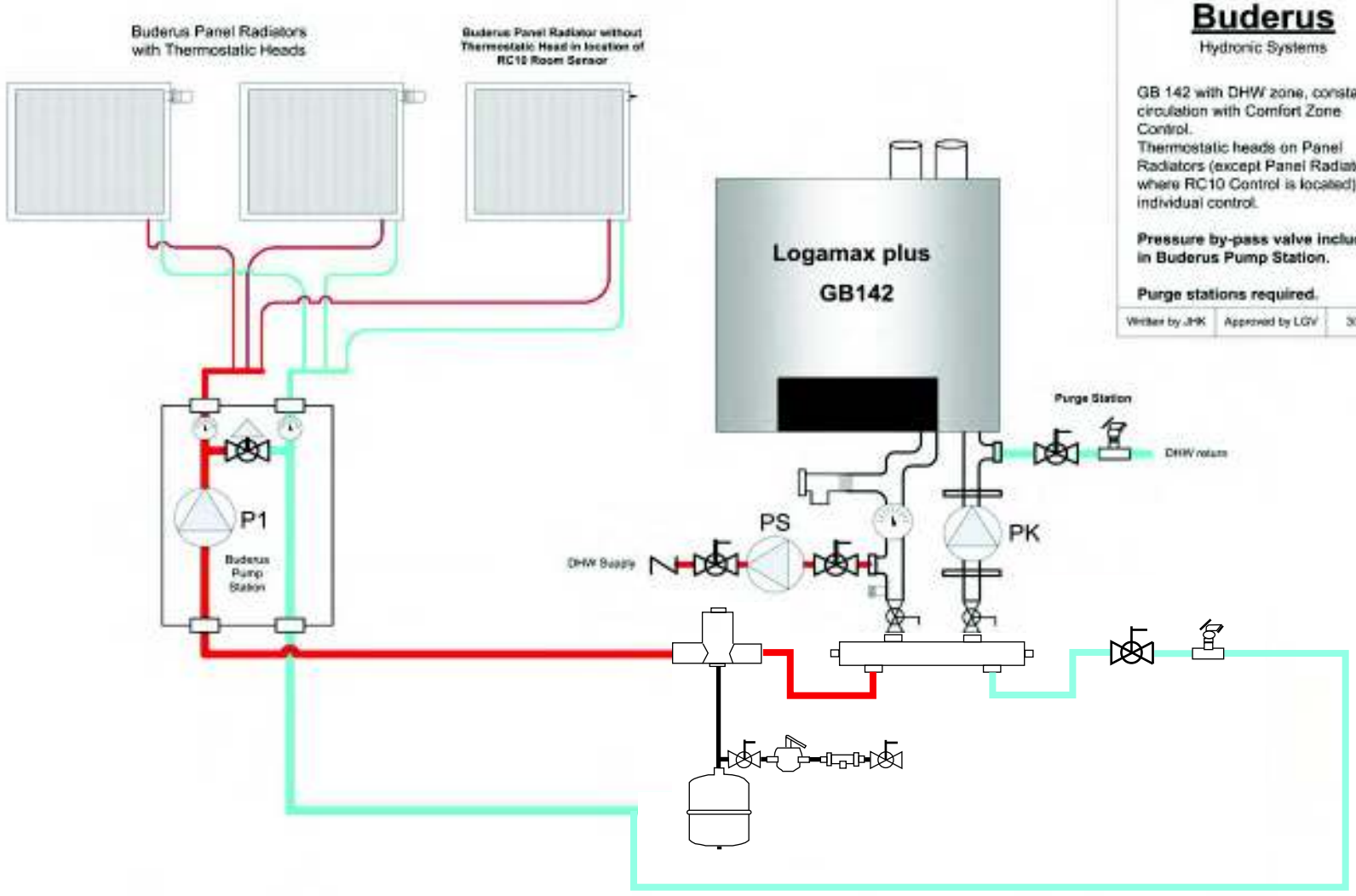
Hydronic Systems

GB 142 with DHW zone, constant circulation with Comfort Zone Control.
Thermostatic heads on Panel Radiators (except Panel Radiator where RC10 Control is located) for individual control.

Pressure by-pass valve included in Buderus Pump Station.

Purge stations required.

Written by JHK	Approved by LGV	3/24/05



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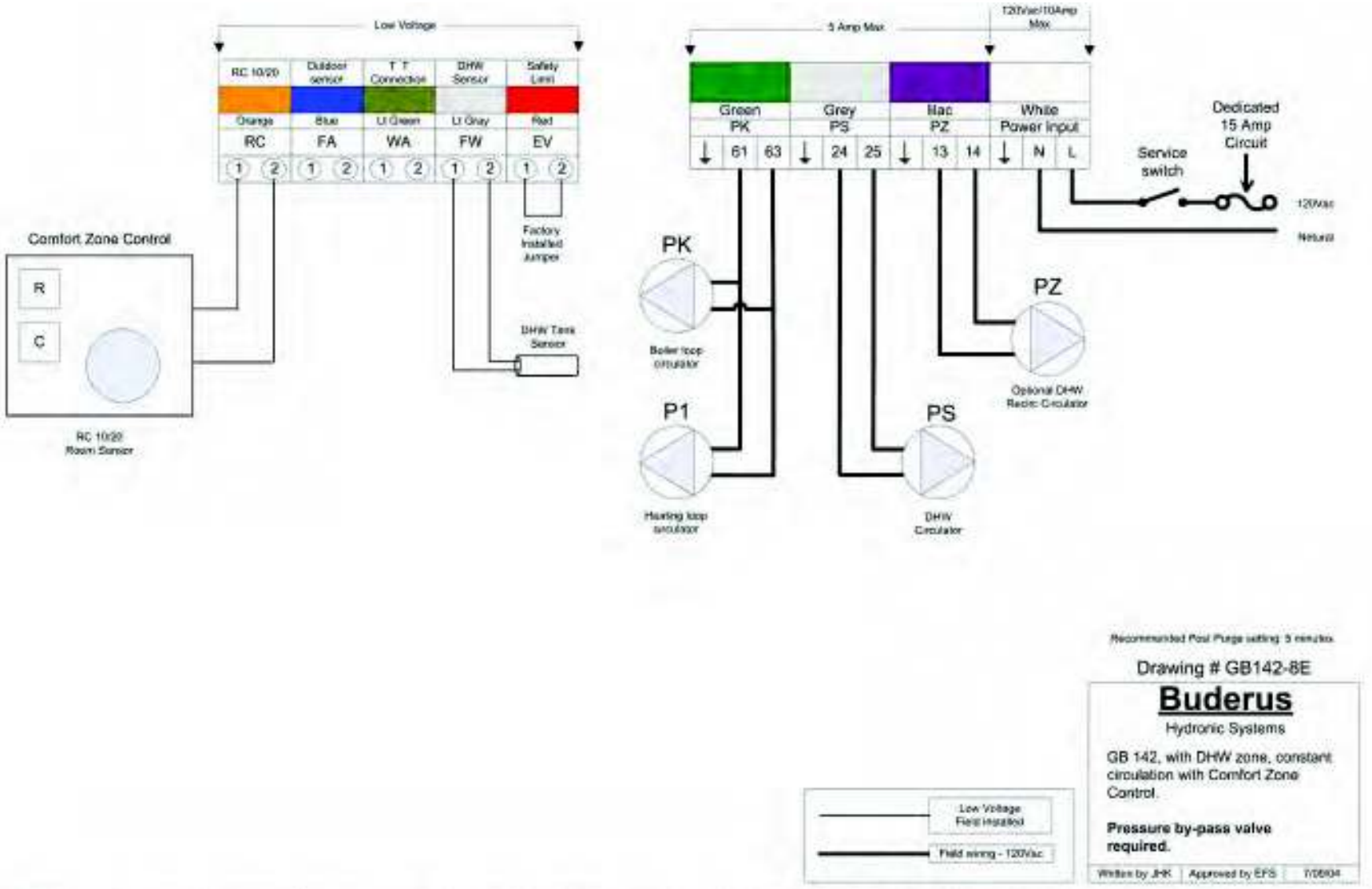

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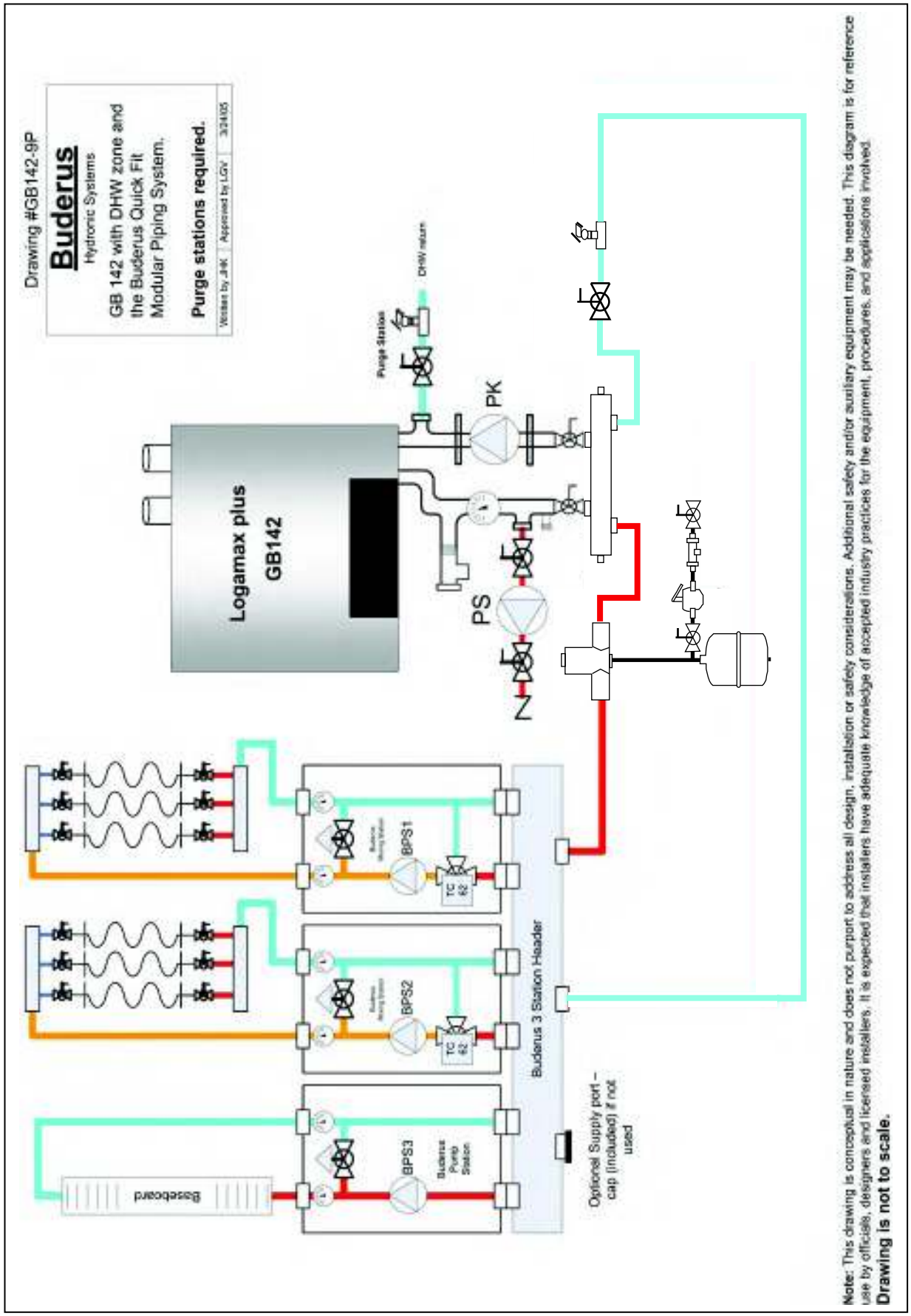
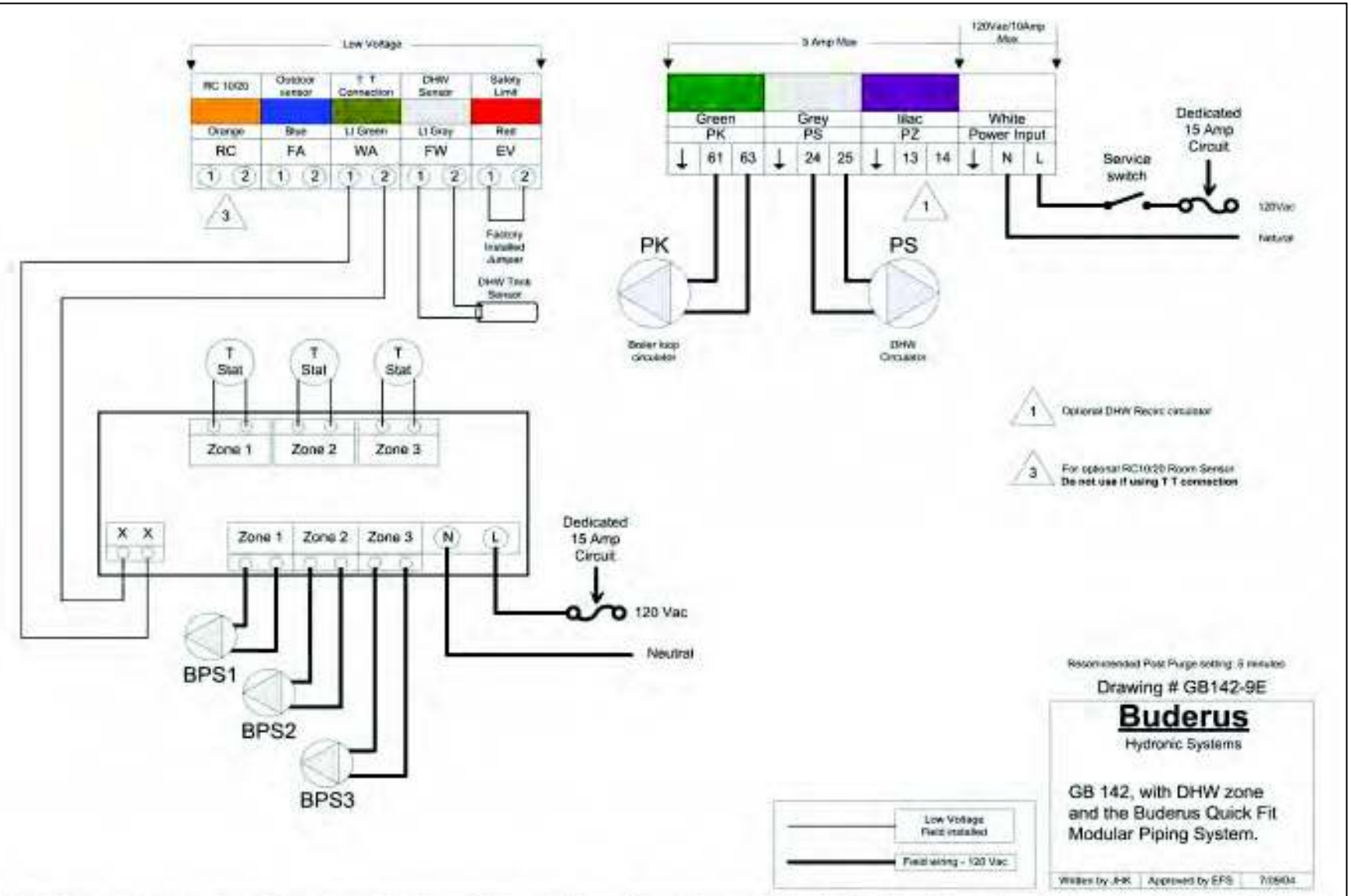
Drawing is not to scale.


Drawing #GB142-9P
Buderus
Hydronic Systems
GB 142 with DHW zone and the Buderus Quick Fit Modular Piping System.
Purge stations required.
Written by JHK | Approved by LGV | 3/24/05
Logamax plus GB142
Purge Station
DHW return
PK
PS
N
BPS1
BPS2
BPS3
Buderus Pump Station
TC 62
Buderus 3 Station Header
Optional Supply port – cap (included) if not used
Baseboard
Note: This drawing is conceptual in nature and does not purport to address all design, installation or safety considerations. Additional safety and/or auxiliary equipment may be needed. This diagram is for reference use by officials, designers and licensed installers. It is expected that installers have adequate knowledge of accepted industry practices for the equipment, procedures, and applications involved.
Drawing is not to scale.



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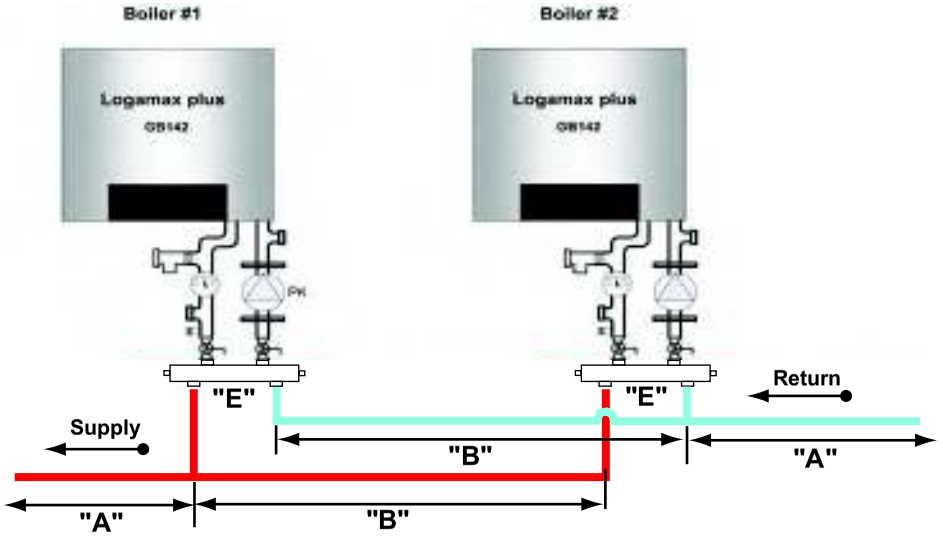
Drawing is not to scale.



Two GB System (20 F Delta T) Recommended Near Boiler Piping Size

Model	GB142/24	GB142/30	GB142/45	GB142/60
Pipe **A**	1½"	1½"	2"	2"
Pipe **B**	1"	1"	1½"	1½"
Header **E**	1"	1"	1½"	1½"

Two GB System (30 F Delta T) Recommended Near Boiler Piping Size

Model	GB142/24	GB142/30	GB142/45	GB142/60
Pipe **A**	1½"	1½"	2"	2"
Pipe **B**	1"	1"	1¼"	1¼"
Header **E**	1	1"	1½"	1½"

Note: Near GB piping can also be kept at "A" dimension instead of shown reductions.

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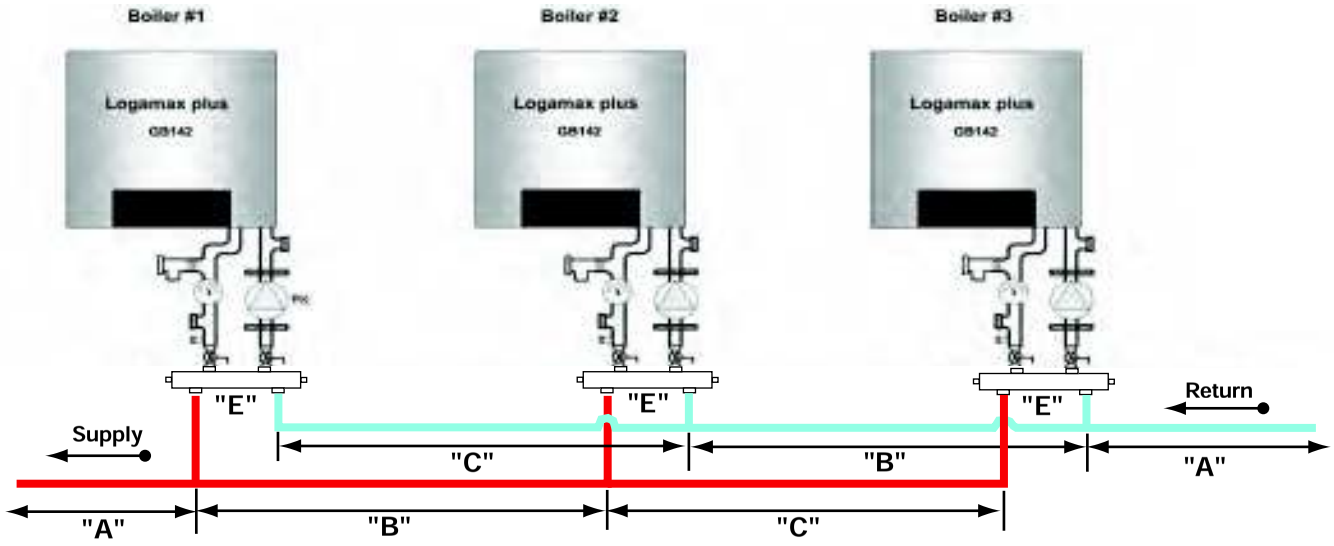
Drawing # GB142-10P

Buderus
Hydronic Systems

GB142 two unit recommend system piping.
Stage firing by other

Written by JHK	Approved by LGV	3/24/05



Three GB System (20 F Delta T) Recommended Near Boiler Piping Size

Model	GB142/24	GB142/30	GB142/45	GB142/60
Pipe **A**	2"	2"	2½"	2½"
Pipe **B**	1½"	1½"	2"	2"
Pipe **C**	1"	1"	1½"	1½"
Header **E**	1"	1"	1½"	1½"

Three GB System (30 F Delta T) Recommended Near Boiler Piping Size

Model	GB142/24	GB142/30	GB142/45	GB142/60
Pipe **A**	2"	2"	2"	2½"
Pipe **B**	1½"	1½"	2"	2"
Pipe **C**	1"	1"	1½"	1½"
Header **E**	1"	1"	1½"	1½"

Note: Near GB piping can also be kept at "A" dimension instead of shown reductions.

Drawing # GB142-11P

Buderus
Hydronic Systems

GB142 Three unit recommended system piping.

Stage firing by other.

Written by JHK	Approved by LGU	3/24/05

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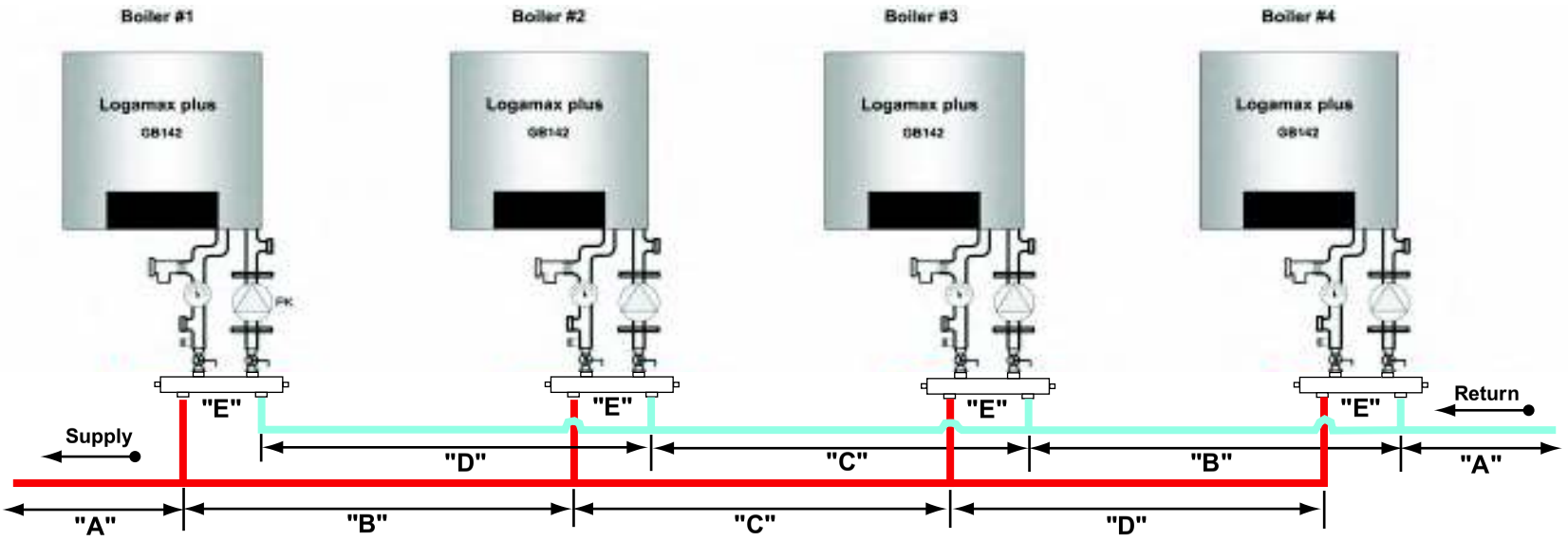

Four GB System (20 F Delta T) Recommended Near Boiler Piping Size

Model	GB142/24	GB142/30	GB142/45	GB142/60
Pipe **A**	2"	2"	2½"	3"
Pipe **B**	2"	2"	2½"	2½"
Pipe **C**	1½"	1½"	2"	2"
Pipe **D**	1"	1"	1½"	1½"
Header **E**	1"	1"	1½"	1½"

Four GB System (30 F Delta T) Recommended Near Boiler Piping Size

Model	GB142/24	GB142/30	GB142/45	GB142/60
Pipe **A**	2"	2"	2½"	2½"
Pipe **B**	1½"	2"	2"	2½"
Pipe **C**	1¼"	1½"	2"	2"
Pipe **D**	1"	1"	1½"	1½"
Header **E**	1	1"	1½"	1½"

Note: Near GB piping can also be kept at "A" dimension instead of shown reductions.

Drawing # GB142-12P

Buderus
Hydronic Systems

GB142 four unit recommended piping system.
Stage firing by others.

Written by JHK	Approved by LDV	3/24/05

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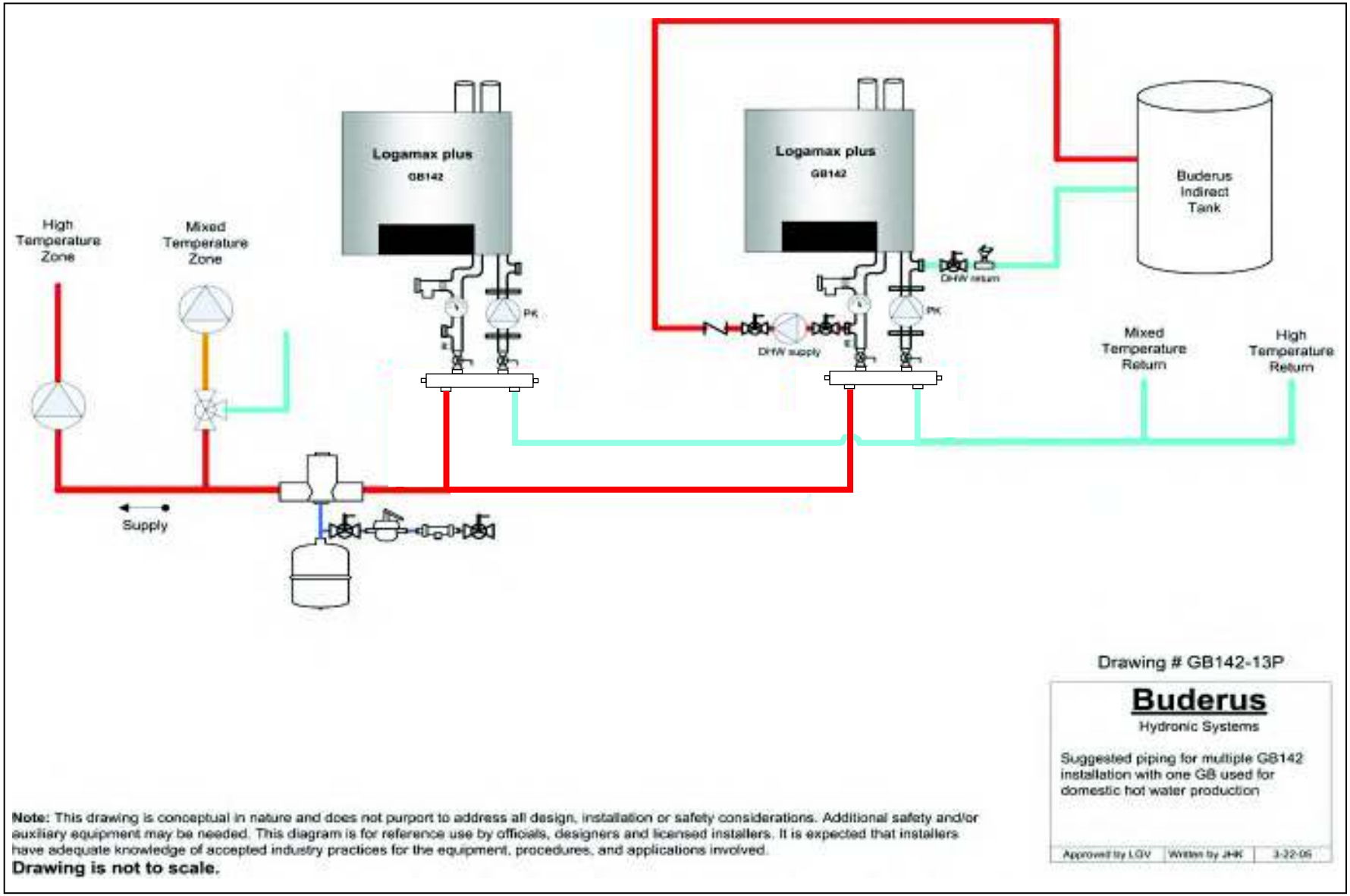

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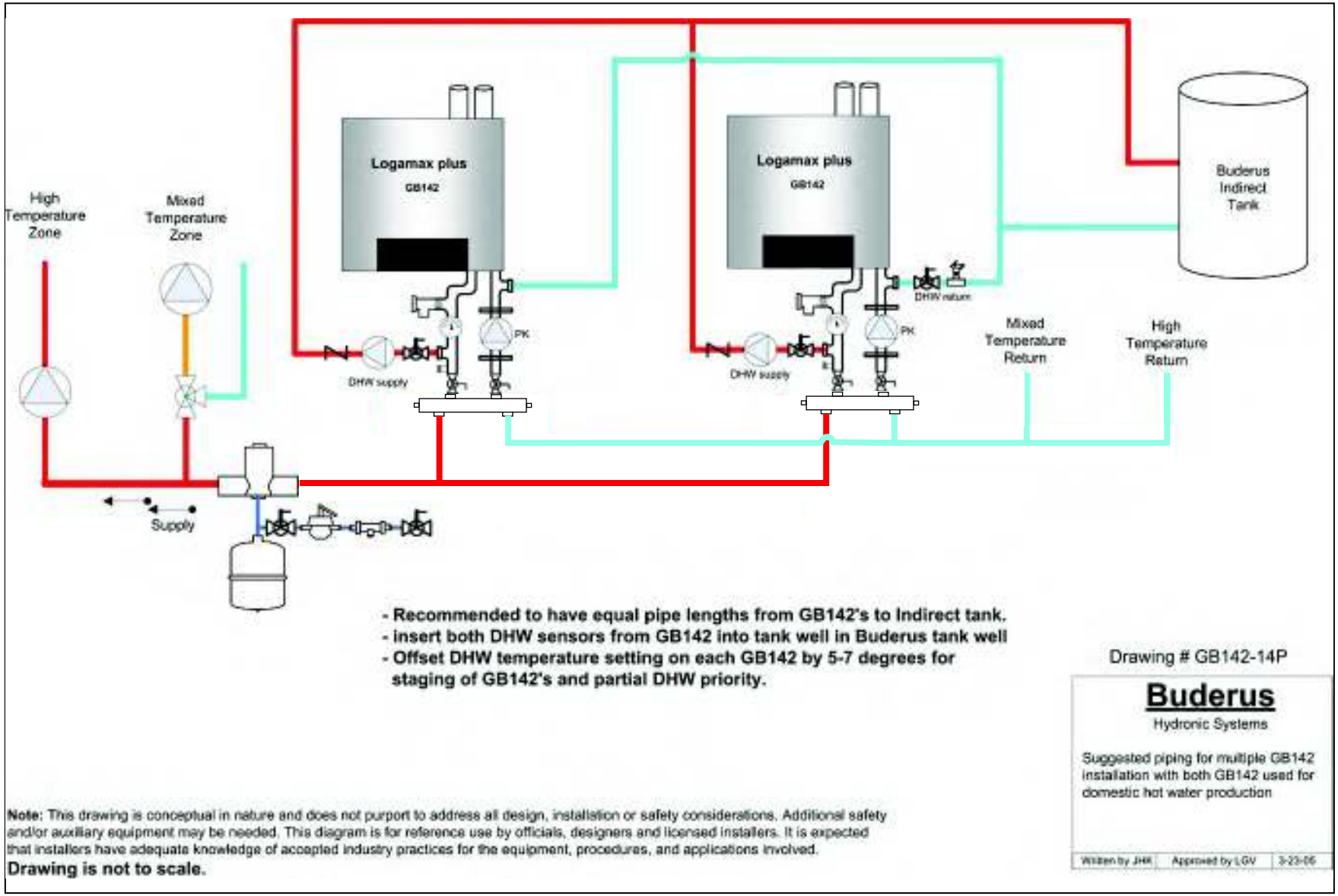
Drawing is not to scale.


High Temperature Zone
Mixed Temperature Zone
Logamax plus GB142
Logamax plus GB142
Buderus Indirect Tank
DHW supply
PK
DHW supply
PK
DHW return
Mixed Temperature Return
High Temperature Return
Supply
- Recommended to have equal pipe lengths from GB142's to Indirect tank.
- insert both DHW sensors from GB142 into tank well in Buderus tank well
- Offset DHW temperature setting on each GB142 by 5-7 degrees for staging of GB142's and partial DHW priority.
Drawing # GB142-14P
Buderus
Hydronic Systems
Suggested piping for multiple GB142 installation with both GB142 used for domestic hot water production
Written by JHK
Approved by LGV
3-23-06
Note: This drawing is conceptual in nature and does not purport to address all design, installation or safety considerations. Additional safety and/or auxiliary equipment may be needed. This diagram is for reference use by officials, designers and licensed installers. It is expected that installers have adequate knowledge of accepted industry practices for the equipment, procedures, and applications involved.
Drawing is not to scale.

display	effect	reset	meaning	possible problem / answer
no display	not working		it's turned off or elec supply prob. disconnected	check power cord, main switch , fuse in UBA
- (flashing)	status	startup	at power up UBA reads the KIM	Flashing continues/ check connection on BC10 to heater
0A	status	soft	10 min interval	2 many calls for heat in short time, burner will restart after 10min.
0C	status	startup	burner start	
0E	status	soft	more cap delivered then needed	interval , wait for restart
0L	status	startup	gas valve open	
0U	status	startup	Fan pre purge (10sec)	
0Y	status	soft	flow temp higher then set point.	heating knob on BC10 set to low / or boiler temp is higher then RC-10 calculated set point. Allow boiler to cool off then reset.
- H	status		the boiler is in heating mode	
-H . (dot flashing)	man override	status	chimney button is held for 10sec and the dot is flashing	boiler is now in manual override and will stay running up to max temp until the chimney button is pressed again to turn it off (no DHW during this setting)
"= H	status		the boiler is in hot water mode	no heat available (call for heat will show on the BC10)
OH	status		standby	no heat request
-A .	test mode	status	chimney button is held for 3sec and dot is in lower right corner of the display(max 30 min) no DHW during this period	
C0	flash	hard block	no pressure sensor value	check wires to pressure sensor, check pressure gauge or replace sensor
CY	flash	hard block	return sensor disconnected.	check wires or replace sensor
CU	flash	hard block	return sensor short circuit	check wires or replace sensor
CA	flash	hard block	return sensor sensed a temp > 220F	check sensor connections (connected in reverse order) and pump operation(fuse)
C9	status	hard lock	no reading from return sensor	check return sensor wires or replace return sensor
1C	flash	hard block	jumper in wire harness is disconnected	check jumper in wire harness (near condense trap)
1L	status	soft	no jumper between unused contacts 78/50	check 80 pin connector for a jumped loop between terminal 78 and 50
2E	status	soft	low water cut off (P<3Psi)	water level to low > fill the system
2F	status	soft	delta T between supply and safety to high	air in exchanger / dirt or defective pump in manifold, check fuse on ext board or sensors might give wrong value (possible sensor defect)
2P	status	soft	safety sensor or supply temp rises to quick	air in the heat exchanger (check if the auto air outlet is opened/working) also check pump operation
2U	status	soft	delta T between supply and return to high	not enough flow (air in exchanger / dirt of defective pomp in manifold) sensors might give wrong value (supply and return sensor can be cross wired (red sleeve is supply) or switch the sensors)
3A	status	soft	fan signal lost during operation(3x retry)	check wires and tightness of the UBA / possible fan defect
3F	flash	soft block	Boiler self check	After 24 hour continuous operation the heater will perform a self check then resume normal operations. Possible short on TT connection.
3L	flash	hard block	fan signal lost during startup	check wires and tightness of the UBA (wires not connected) / fan defective
3P	status	soft	fan runs to slow	fan defective or exhaust blocked
3Y	status	soft	fan runs to fast	fan or wires defective. Also check to make sure the UBA is secure and tight
4A	flash	hard block	supply sensor over 220F (105C)	Air in heat exchanger. Pump failed during operation? Check fuse on ext board.
4L	flash	hard block	short circ safety sensor or higher then 266F	check wire harness and/or replace safety sensor (check flow)
4P	flash	hard block	safety sensor disconnected	check wire harness and/or replace safety sensor
4U	flash	hard block	short circ supply sensor	check wire harness and/or replace supply sensor
4Y	flash	hard block	supply sensor disconnected	check wire harness and/or replace supply sensor
5C	flash	hard block	service key connected.	not used in USA
6A	status	soft	start up not completed	check gas supply and is gas valve opening (check power(24VAC)and Ohm coils)
				check hot surface ignitor for power (128V) if incorrect replace transformer
6A	flash	hard block	start up failed 3 times	check gas supply and is gas valve opening (check power(24VAC)and Ohm coils)
				hot surface ign. Broken ? or flame rectifying wire short/disconnected ?
6C	flash	hard block	flame signal before burner start	UBA defect > replace UBA
6L	status	soft	burner failure during operation	gas supply dropped during operation / gas/air ratio set to low/ short in rectifying wire or rod
6P	flash	hard block	hot surface ign on for to long	UBA defect > replace UBA

display	effect	reset	meaning	possible problem / answer
7C	flash	hard block	power failure	120V off and on within a short time. Just reset boiler.
7L	flash	hard block	UBA defect	replace UBA
8Y	status	soft	ext terminal 'open'	appliance connected to red terminal is 'open' or wires disconnected. Factory installed jumper missing
9A	flash	hard block	no communication between UBA and KIM	KIM missing , UBA defect
9H	flash	hard block	UBA error or short in wires to gas valve	check wires / replace UBA / replace gas valve
9P	flash	hard block	UBA error or short in wires to gas valve	check wires / replace UBA / replace gas valve
9L	flash	hard block	gas valve disconnected	check wires / replace UBA / replace gas valve
9U	flash	hard block	Kim defect	replace the KIM
E	status	hard block	UBA error	replace UBA
E1	flash	hard block	UBA error	replace UBA
EA	flash	hard block	UBA error	replace UBA
EC	flash	hard block	UBA error	replace UBA
EF	flash	hard block	UBA error	replace UBA
EH	flash	hard block	UBA error	replace UBA
EP	flash	hard block	UBA or Kim error	replace UBA or KIM
EL	flash	hard block	UBA error	replace UBA
EY	flash	hard block	UBA error	replace UBA
rE	status	soft	Reset indication	Reset button is pressed then boiler will restart
H 7	flash	soft block	system pressure < 12Psi (alternating pressure / H 7)	fill the system. Until pressure is > 12Psi the power output is adjusted accordingly
soft block : visible when wrench knob is pressed 2 times (default is temp, 1x press shows Pressure)				
hard block: display is blinking the code and RC10 also shows it				
2 level control BC 10				
2 or 3 digit reading	(not flashing)	read out	supply temp readout	press wrench for next step
"P" with 2 digit readout	(not flashing)	read out	system pressure reading in PSI	press wrench for next step
2 digit readout	(not flashing)	read out	service or soft error code display	press wrench for next step (this will put you in step 1(level1)
3 digit readout	(not flashing)	read out	extra specific error code (not used by Nefit field service)	
chimney + wrench 4sec for 2nd level				
L--	(not flashing)	setting	load setting 30-100%	press wrench for next step or use chimney for + and reset for -
F 5	(not flashing)	setting	pomp post purge 1-60min and 1day (FID)	press wrench for next step or use chimney for + and reset for -
C_1 (or C_0)	(not flashing)	setting	DHW, hot water software setting 1=on 0=off	press wrench for next step or use chimney for + and reset for - next step this will put you back in level 1 step 1
A01 (809)	(not flashing)	read out	setting C_1 without DHW sensor connected.	change setting C_1 to C_0
If you press the chimney button for 4sec (until dot shows in lower right corner of display) you'll be in manual override. **chimney + wrench 4sec**				
L--	(not flashing)	setting	manual burner setting 30-100%(30% for gas-air offset)	press wrench for next step or use chimney for + and reset for -
F 5	(not flashing)	setting	pomp post purge 1-60min and 1day (FID)	press wrench for next step or use chimney for + and reset for -
C_1 (or C_0)	(not flashing)	setting	DHW, hot water software setting 1=on 0=off	press wrench for next step or use chimney for + and reset for -
				Pressing the wrench again will bring you back to step 1 in level 1
				You're still in manual override for 30min or until manual override is turned off by pressing chimney for 4sec until dot in lower right corner disappears
				When manual override is off, the manual burner setting will be back at 100% (L--)

Buderus

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