

SEQUENCE OF OPERATION

GENERAL: BAS shall fully control the hot water system and equipment and provide monitoring and diagnostic information for management purposes.

HEATING ENABLE: Heating shall be enabled by the operator at the operator interface via a graphic icon or when heating requests exceed 20% (adj., with a 50% cycle differential) of all available requests. Once enabled, heating shall remain enabled for at least one hour.

REHEAT HW PUMPS (P-1 & P-2): BAS shall control the pumps as follows:
 1. START/STOP: BAS shall command the operation of the lead pump and it shall run continuously whenever heating is enabled.
 2. PROOF: BAS shall prove pump operation and use the status indication to accumulate runtime. Upon failure of the lead pump, BAS shall energize the lag pump and enunciate a level 1 alarm.
 3. VFD CONTROL: Whenever heating is enabled, BAS shall control the output of the active pump VFDs to maintain the HW remote differential pressure (RDP) setpoint (determined by TAB; initially 10 PSID).

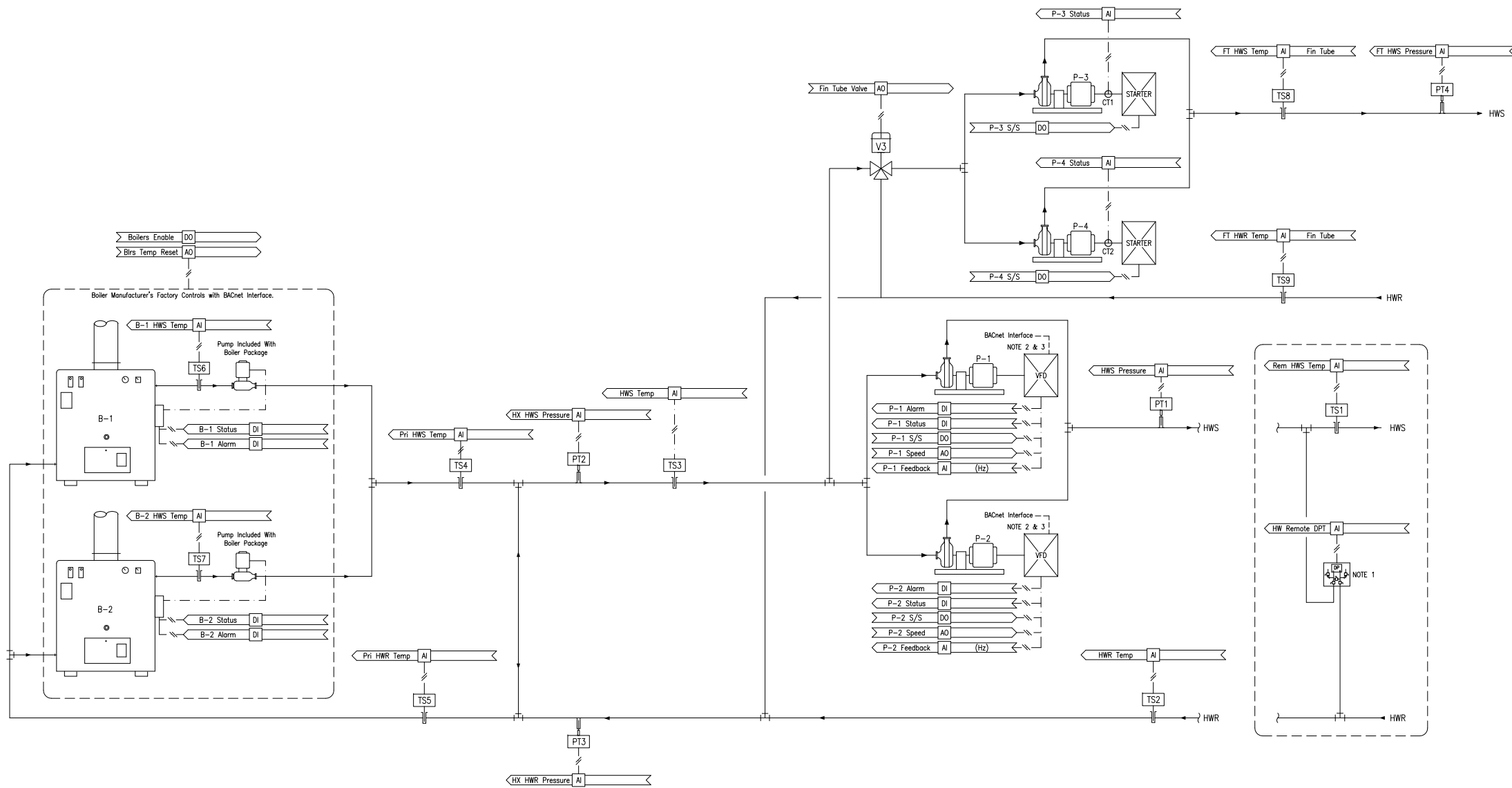
On start and stop, the VFD shall ramp to speed and slow down within adjustable acceleration and deceleration limits.
 FIN TUBE HW PUMPS (P-3 & P-4): BAS shall control the pumps as follows:
 1. START/STOP: BAS shall command the operation of the lead pump and it shall run continuously whenever heating is enabled.
 2. PROOF: BAS shall prove pump operation and use the status indication to accumulate runtime. Upon failure of the lead pump, BAS shall energize the lag pump and enunciate a level 1 alarm.

HW TEMPERATURE CONTROL: BAS shall reset the leaving HW temperature supply setpoint based on outdoor air temperature and heating requests with all values being adjustable. The initial setpoint shall be reset from 140°F at or above 60°F to 180°F at or below 0°F. As the total percentage of heating requests rises from 0 to 100% the initial reset set point shall be increased by an additional 0 to 10°F with a maximum set point of 180°F (adj.). Once the hot water system has been enabled for at least 30 minutes (adj.) the BAS shall enunciate a level 3 alarm whenever the hot water supply temperature is more than 20°F (adj.) below setpoint for more than 10 minutes (adj.) continuously.

FIN TUBE TEMPERATURE CONTROL: BAS shall reset the fin tube HW temperature supply setpoint based on outdoor air temperature with all values being adjustable. The setpoint shall be reset from 100°F at or above 60°F to 180°F at or below 0°F. BAS shall modulate the 3-way mixing valve to maintain the fin tube hot water supply temperature setpoint.

BOILER STAGING:
 1. Staging of boilers shall be performed by factory provided controller to maintain primary hot water supply temperature setpoint as reset by BAS.

MAINTENANCE MODE: Operators shall be able to lock out boilers in maintenance mode. This means that the requests for this boiler and associated appurtenances shall be bypassed. This shall be done through a graphic icon associated with a virtual point indicating whether the maintenance mode is active or via a property associated with the boiler icon.



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 FACILITIES MANAGEMENT

Eng	HJN
Drawn	HJN
Chkd	---
Appd	---
Issued	8/4/11
Job No.	10080
Scale	N/A
Proj Code	

STANDARD

BOILER HOT WATER SYSTEM (SCHEMATIC)

20 OF 30 SHEET NUMBER

C-3.0a

DWG NUMBER

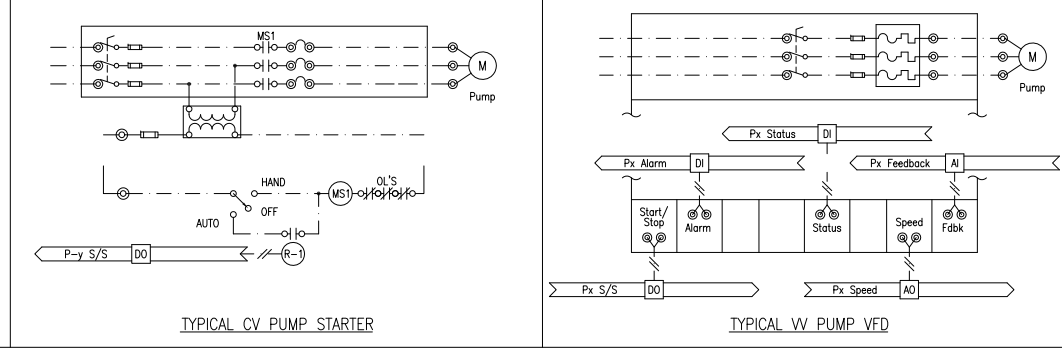
- NOTES
1. Locate remote differential pressure sensor at most remote HW coil, as directed. Install transmitter and bypass assembly no higher than 6 feet AFF.
 2. Provide communications interface to the control system for diagnostic point information.
 3. Provide BACnet interface to the control system for diagnostic point information. VSD rate of change (Acceleration/Deceleration) shall be programmed in to the VSD controller and not rely on BAS logic.

BILL OF MATERIAL

DESIG	QTY	MODEL NO.	DESCRIPTION
TS 1-9	9		Temp Sensor, Well
DP	1		Differential Pressure Transmitter
CT	2		Current Transformer

CONTROL SCHEMATIC

ELECTRIC LADDER DIAGRAMS



TYPICAL CV PUMP STARTER

TYPICAL W PUMP VFD