HeatNet Control Firmware Version: 4.20+

This document lists and briefly describes the LonWorks variables available on KN Series Boilers with a HeatNet V3 control board.

Some variables reference a specific boiler. The following substitutions should be used:

Master or Stand Alone = 1 (the LonWorks connected boiler)
Member 2 = 2
Member 3 = 3
…
Member 16 = 16

Binding

The default binding modes are Explicitly Addressed Update Inputs and Explicitly Addressed Polled Outputs. To properly bind with Trane (Tracer SC), Tridium Niagara, and some other controls, it may be necessary to modify the configuration file to add support for Implicitly Addressed Update Outputs. There are instructions in the configuration file, but we recommend that you contact technical support for help.

If a device is configured with a hardcoded DSN in the configuration file, it will reload this DSN every time the device is power cycled which will cause bindings to be lost.

Input/Output Variables (Read/Write)

Name	SNVT Type/Index	Description	Valid Values/Range

<table>
<tr><th>Name</th><th>SNVT Type/Index</th><th>Description</th><th>Valid Values/Range</th></tr>
<tr><td>nviHeatDemand</td><td>SNVT_switch
100</td><td>Heat Demand/Request. Setting the state member of this variable will put the boiler in heating mode.</td><td><table><tr><th>state</th><th>value</th><th>Interpretation</th></tr><tr><td>0</td><td>0</td><td>no heat demand</td></tr><tr><td>0</td><td>>0</td><td>heat demand</td></tr><tr><td>1</td><td>any</td><td>heat demand</td></tr></table></td></tr>
<tr><td>nviSetpointTimer</td><td>SNVT_count
101</td><td>System Setpoint Timer

The system setpoint timer is a BMS failsafe feature. This countdown timer should be periodically reloaded with a timeout value (in seconds). If the timer reaches zero, the control assumes that the BMS is no longer operating and the local setpoint (saved on the control) is reloaded. This is a failsafe feature used to help safeguard the system in case of BMS failure.

When any (1) Read/Write variable is timer is written, if the SetpointTimer is less than 60, it is automatically reloaded with 60.

(1) In control firmware versions < 3.48, the BMS has to write the SystemSetpoint to automatically reload the SetpointTimer.</td><td>0 – 65535 seconds</td></tr>
<tr><td>nviSetpoint</td><td>SNVT_temp_p
102</td><td>System Setpoint (see nviSetpointTimer)</td><td>4.5 – 90.5 °C (40 - 195 °F) *

*Higher Temperatures allowed in some products</td></tr>
<tr><td>nviOAResetEnable</td><td>SNVT_switch
103</td><td>Enables/Disables outdoor air reset mode.</td><td><table><tr><th>state</th><th>value</th><th>interpretation</th></tr><tr><td>0</td><td>0</td><td>disabled</td></tr><tr><td>0</td><td>>0</td><td>enabled</td></tr><tr><td>1</td><td>any</td><td>enabled</td></tr></table></td></tr>
<tr><td>nviOARSetpoint</td><td>SNVT_temp_p
104</td><td>Outdoor air reset setpoint. Temperature at which boiler shuts down.</td><td>4.5 – 37.8 °C (40 – 100 °F)</td></tr>
<tr><td>nviOARHiWtrTemp</td><td>SNVT_temp_p
105</td><td>Boiler water temperature setpoint when outdoor air temperature is at the high outdoor air temperature setpoint (nviOARHiAirTemp).</td><td>15.6 – 87.8 °C (60 – 190 °F)</td></tr>
<tr><td>nviOARHiAirTemp</td><td>SNVT_temp_p
106</td><td>High outdoor air temperature setpoint.</td><td>10 – 32.2 °C (50 – 90 °F)</td></tr>
<tr><td>nviOARLoWtrTemp</td><td>SNVT_temp_p
107</td><td>Header/Supply temperature setpoint when outdoor air temperature is at the low outdoor air temperature setpoint (nviOARLoAirTemp).</td><td>21.1 – 90.5 °C (70 – 195 °F) *

*Higher Temperatures allowed in some products</td></tr>
</table>

Name	SNVT Type/Index	Description	Valid Values/Range
nviOARLoAirTemp	SNVT_temp_p 108	Low outdoor air temperature setpoint.	-37.2 – 4.4 °C (-35 – 40 °F)
nviSetMonth	SNVT_count 109	Set real time clock – month (*see nviSetClock*)	0 (January) – 11 (December)
nviSetDay	SNVT_count 110	Set real time clock – day (*see nviSetClock*)	1 – 31
nviSetYear	SNVT_count 111	Set real time clock – year (*see nviSetClock*)	0 – 99
nviSetHour	SNVT_count 112	Set real time clock – hour (*see nviSetClock*)	0 – 23
nviSetMinute	SNVT_count 113	Set real time clock – minute (*see nviSetClock*)	0 – 59
nviSetSecond	SNVT_count 114	Set real time clock – second (*see nviSetClock*)	0 – 59
nviSetWeekday	SNVT_count 115	Set real time clock – weekday (*see nviSetClock*)	1 (Monday) – 7 (Sunday)
nviSetClock	SNVT_switch 116	Set (write) the real time clock. To write the real time clock, the system variables (nviSetMonth, nviSetMonth, nviSetDay, nviSetYear, nviSetHour, nviSetMinute, nviSetSecond, nviSetWeekday) must first be loaded with the correct date and time. Then, a 1 must be written to the state portion of this system variable to write the new date and time to the system clock.	**state** / **value** / **interpretation** 0 / 0 / --- 0 / >0 / set the clock 1 / any / set the clock
nviDHWSetpoint	SNVT_temp_p 117	DHW Setpoint	4.4 – 93.3 °C (40 – 200 °F)
--- The following values are available on firmware versions 1.30+ ---			
nviBMSFlowRate	SNVT_flow_f 118	Sets the flow rate measured by the BMS system. Please see “Flow Limited Control” in the firmware revision sheet for a complete description.	0 – 94.6 L/s (0 – 1500 GPM)
nviLimitBoilers	SNVT_count 119	Sets the maximum number of boilers that HeatNet can control and fire. Please see “Boilers Limited Control” in the firmware revision sheet for a complete description.	0 – 16

Input Variables (Read Only)

Name	SNVT Type/Index	Description	Valid Values/Range
nvoBoilersOn	SNVT_count 200	The number of boilers currently running.	0 – 16
nvoModulation	SNVT_lev_cont_f 201	Current system (target) modulation level. This is the modulation level that the system is trying to run at to meet the heating demand.	0 – 100 %
nvoHeaderTemp	SNVT_temp_p 202	Header / System temperature.	0 – 121.1 °C (32 – 250 °F)
nvoSupplyTemp	SNVT_temp_p 203	Supply temperature.	0 – 121.1 °C (32 – 250 °F)
nvoReturnTemp	SNVT_temp_p 204	Return temperature.	0 – 121.1 °C (32 – 250 °F)
nvoOutsideTemp	SNVT_temp_p 205	Outside air temperature.	-40 – 121.1 °C (-40 – 250 °F)
nvoDHWTemp	SNVT_temp_p 206	DHW Temperature.	0 – 121.1 °C (32 – 250 °F)
nvoStackTemp	SNVT_temp_p 207	Stack Temperatuyre.	-45.6 – 537.2°C (-50 – 999 °F)
nvoMonth	SNVT_count 208	Real time clock month.	0 (January) – 11 (December)
nvoDay	SNVT_count 209	Real time clock day.	1 – 31
nvoYear	SNVT_count 210	Real time clock year.	0 – 99
nvoHour	SNVT_count 211	Real time clock hour.	0 – 23
nvoMinute	SNVT_count 212	Real time clock minute.	0 – 59
nvoSecond	SNVT_count 213	Real time clock second.	0 – 59
nvoWeekday	SNVT_count 214	Real time clock weekday.	1 (Monday) - 7 (Sunday)

Name	SNVT Type/Index	Description	Valid Values/Range
nvoClock	SNVT_time_stamp 215	Real time clock date and time.	0 – 11
nvoBlr01Status1 … nvoBlr16Status1	SNVT_state 300 302 304 … 328 330 (Even Indices)	Boiler status flags #1 (boilers 1 – 16). These bits indicate the state of the 24VAC interlocks, ignition circuit, and various other conditions.	See Appendix A BoilerStatus1 Flags.
nvoBlr01Status2 … nvoBlr16Status2	SNVT_state 301 303 305 … 329 331 (Odd Indices)	Boiler status flags #2 (boilers 1 – 16).). These bits indicate the state of the ignition circuit, sensors, and various other conditions.	See Appendix A BoilerStatus2 Flags.
nvoBlr01Status3 … nvoBlr16Status3	SNVT_state 400 … 415	Boiler stage control input flags. These bits indicate the state of the stage control inputs.	See Appendix A BoilerStatus3 Flags.
nvoBlr01Runtime … nvoBlr16Runtime	SNVT_reg_val 500 … 515	The total number of minutes that the boiler has been running (with the current control board).	0 – 35791394 minutes
nvoBlr01Cycles … nvoBlr16Cycles	SNVT_reg_val 600 … 615	The total number of boiler cycles (with the current control board).	0 – 2147483647 cycles
nvoBlr01Supply … nvoBlr16Supply	SNVT_temp_p 616 … 631	The boiler supply (outlet) temperature.	0 – 121.1 °C (32 – 250 °F)

Name	SNVT Type/Index	Description	Valid Values/Range
nvoBlr01Return … nvoBlr16Return	SNVT_temp_p 632 … 647	The boiler return (inlet) temperature.	0 – 121.1 °C (32 – 250 °F)
nvoBlr01Status4 … nvoBlr16Status4	SNVT_state 648 … 663	Boiler (1 – 16) status4 flags. These bits indicate the state of various boiler statuses.	See Appendix A BoilerStatus4 Flags.
nvoBlr01DHW … nvoBlr16DHW	SNVT_temp_p 664 … 679	Boiler (1 – 16) DHW temperature (if available). See Boiler Status4 to determine if the sensor is present.	0 – 121.1 °C (32 – 250 °F)
nvoBlr01Modulate … nvoBlr16Modulate	SNVT_lev_cont_f 680 … 695	The running (“display”) modulation. This is typically the actual running modulation except under special circumstances when the boiler is running in a self-protection mode (Op. Limit, ½ Fire Rate, etc.)	0 – 100 %
nvoOpSetpoint	SNVT_temp_p 696	This is the current operating or active setpoint. It may be: 1) The normal heating setpoint. 2) The DHW setpoint if running in DHW mode. 3) A calculated setpoint if running in Outdoor Air Reset Mode 4) The 4-20ma (0-10V) setpoint.	4.5 – 104.4 °C (40 - 220 °F)
--- The following values are available on firmware versions 1.30+ ---			
nvoAvailBoilers	SNVT_count 697	The maximum number of boilers that HeatNet can control and fire.	0 – 16
--- The following values are available on firmware versions 2.00+ ---			
nvoSystemBTUH	SNVT_btu_f 698	System BTUH. This is only an estimated value due to sensor tolerances (temperature, flow) and the actual BTU content in 1 cubic foot of gas.	0 – 100,000,000 BTU (per hour)
nvoSysReturnTemp	SNVT_temp_p 699	The system return temperature (if available). See Boiler Status 4 to determine if the sensor is present.	0 – 121.1 °C (32 – 250 °F)
nvoSystemFlow	SNVT_flow_f 700	Boiler System Flow. This value is either the system flow meter reading or the value written to nviBMSFlowRate by the BMS.	0 – 95 L/s 0-1500 GPM

Name	SNVT Type/Index	Description	Valid Values/Range
nvoHeatingBlrsOn	SNVT_count 701	The number of boilers currently running for heating.	0 – 16
nvoDHWBlrsOn	SNVT_count 702	The number of boilers currently running for DHW.	0 – 16
nvoManualBlrsOn	SNVT_count 703	The number of boilers currently running due to a local override, T1, T2, AA/High Fire, etc.	0 – 16
--- The following values are available on firmware versions 3.11+ ---			
nvoBoiler01Flow … nvoBoiler16Flow	SNVT_flow_f 704 … 719	The boiler local flow rate.	0 – 3,276 GPM
nvoAddBlrTimer	SNVT_count 720	The number of seconds remaining before another boiler (if available) will be started.	0 – 3600 seconds (60 minutes)
nvoShedBlrTimer	SNVT_count 721	The number of seconds remaining before another boiler (if available) will be stopped.	0 – 900 seconds (15 minutes)

APPENDIX A – Status Flags

BoilerStatus1 Flags

Bit	Description	Valid Values/Range
0	Pilot Valve	0 = closed, 1 = open
1	Blower Running	0 = off, 1 = on (running)
2	Ignition Alarm	0 = ok, 1 = alarm
3	IRI Alarm	0 = ok, 1 = alarm
4	High Limit	0 = ok, 1 = tripped
5	Air Prove Switch	0 = proven, 1 = not proven
6	---	---
7	Software Operator Tripped	0 = not tripped, 1 = tripped
8	Header Sensor not detected	0 = detected, 1 = not detected
9	Supply Sensor not detected	0 = detected, 1 = not detected
10	Return Sensor not detected	0 = detected, 1 = not detected
11	Outside Sensor not detected	0 = detected, 1 = not detected
12	System Pump Running	0 = off, 1 = on (running)
13	Combustion Air Damper Prove (J10B). Obsolete, available only on revision 1.x controls.	0 = not proven, 1 = proven
14	Master Boiler	0 = member, 1 = master
15	Boiler Detected A boiler was detected at this address.	0 = not detected, 1 = detected

BoilerStatus2 Flags

Bit	Description	Valid Values/Range
0	Disabled Boiler is disabled. For example when minimum off time has not been met.	0 = enabled, 1 = disabled
1	Local Override (member boilers only).	0 = no override, 1 = override
2	Alarm An alarm or warning condition has occurred. An attempt(s) will automatically be made to recover and resume normal operation.	0 = ok, 1 = alarm
3	Failed A condition has occurred under which the boiler can no longer run.	0 = ok, 1 = failed
4	Member Error An “Alarm” or “Failed” condition has occurred on one (or more) of the member boilers.	0 = ok, 1 = error
5	Boiler Running	0 = off, 1 = on (running)
6	Local Pump Running	0 = off, 1 = on (running)
7	System Water Prove (Flow) Interlock. This input was previously called “Spare 3”.	0 = open, 1 = closed
8	LWCO Interlock (Low Water Cut Off)	0 = open, 1 = closed
9	VFD Interlock (Variable Frequency Drive)	0 = open, 1 = closed
10	Gas Prove Interlock	0 = open, 1 = closed
11	Spare 4 (User) Interlock	0 = open, 1 = closed
12	Operator Interlock	0 = open, 1 = closed
13	Local Water Prove (Flow) Interlock	0 = open, 1 = closed
14	UV Sensor Air Prove Interlock	0 = open, 1 = closed
15	Main Valve	0 = closed, 1 = open

BoilerStatus3 Flags

Bit	Description	Valid Values/Range
0	AA High Fire Input	0 = off, 1 = on
1	Heat Demand Input (Local Override)	0 = off, 1 = on
2	4-20ma Remote Enable Input	0 = off, 1 = on
3	Outdoor Air Reset Override Input	0 = off, 1 = on
4	T1 Input	0 = off, 1 = on
5	T2 Input	0 = off, 1 = on
6	T3 Input	0 = off, 1 = on
7	T4 Input	0 = off, 1 = on
8	---	---
9	---	---
10	---	---
11	---	---
12	---	---
13	---	---
14	---	---
15	---	---

BoilerStatus4 Flags

Bit	Description	Valid Values/Range
0	DHW Enabled DHW Mode had been enabled in the menus.	0 = off, 1 = on (menu)
1	Combustion Air Damper Prove Status of Damper Prove Input J12B	0 = open, 1 = on
2	Call Service Fault	0 = ok, 1 = fault
3	Air Switch (Blower) Fault	0 = ok, 1 = fault
4	---	---
5	---	---
6	---	---
7	---	---
8	---	---
9	DHW Sensor not detected	0 = detected, 1 = not detected
10	DHW Boiler This control board has been designated a DHW boiler by cutting the DHW jumper (JPS1).	0 = no, 1 = yes (DHW jumper cut)
11	Operating Limit Clamp Boiler input is being limited (clamped) due to a high supply (outlet) temperature.	0 = off, 1 = clamped
12	Firing boilers limited by value in BMS Flow Rate Register (1)	0 = not limited, 1 = limited
13	Firing boilers limited by value in BMS Limit Boilers Register (1)	0 = not limited, 1 = limited
14	Stack Sensor not detected (2)	0 = detected, 1 = not detected
15	System Return Sensor not detected (2)	0 = detected, 1 = not detected

(1) Available on firmware versions 1.30+.
(2) Available in firmware version 2.00+.