This document lists and briefly describes the BACnet Objects available on FIII/Fusion/CK Series Boilers with a HeatNet V3 control board.

Some objects reference "boiler_number" when calculating the object id. The following substitutions should be used:

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

Input/Output Variables (Read/Write)

Name	Data Type/Units	Description	Valid Values/Range
HeatDemand	binary_variable 1 no-units	Heat Demand/Request. Setting the state member of this variable will put the boiler in heating mode.	<table><tr><td>value</td><td>state</td><td>Interpretation</td></tr><tr><td>any</td><td>0</td><td>no heat demand</td></tr><tr><td>any</td><td>1</td><td>heat demand</td></tr></table>
SetpointTimer	analog_variable 1 seconds	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.	0 – 65535 seconds
Setpoint	analog_variable 2 degrees-Fahrenheit	System Setpoint (see *SetpointTimer*)	40 - 220 °F (4.5 – 104.4 °C)

Name	Data Type/Units	Description	Valid Values/Range
OAResetEnable	binary_variable 2 no-units	Enables/Disables outdoor air reset mode.	<table><tr><th>value</th><th>state</th><th>interpretation</th></tr><tr><td>any</td><td>0</td><td>disabled</td></tr><tr><td>any</td><td>1</td><td>enabled</td></tr></table>
OARSetpoint	analog_variable 3 degrees-Fahrenheit	Outdoor air reset setpoint. Temperature at which boiler shuts down.	40 – 100 °F (4.5 – 37.8 °C)
OARHighWaterTemp	analog_variable 4 degrees-Fahrenheit	Boiler water temperature setpoint when outdoor air temperature is at the high outdoor air temperature setpoint (OARHiAirTemp).	60 – 190 °F (15.6 – 87.8 °C)
OARHighAirTemp	analog_variable 5 degrees-Fahrenheit	High outdoor air temperature setpoint.	50 – 90 °F (10 – 32.2 °C)
OARLowWaterTemp	analog_variable 6 degrees-Fahrenheit	Header/Supply temperature setpoint when outdoor air temperature is at the low outdoor air temperature setpoint (OARLoAirTemp).	70 – 220 °F (21.1 – 104.4 °C)
OARLowAirTemp	analog_variable 7 degrees-Fahrenheit	Low outdoor air temperature setpoint.	-35 – 40 °F (-37.2 – 4.4 °C)
SetMonth	analog_variable 8 months	Set real time clock – month (*see SetClock*)	0 (January) – 11 (December)
SetDay	analog_variable 9 days	Set real time clock – day (*see SetClock*)	1 – 31
SetYear	analog_variable 10 years	Set real time clock – year (*see SetClock*)	0 – 99
SetHour	analog_variable 11 hours	Set real time clock – hour (*see SetClock*)	0 – 23

Name	Data Type/Units	Description	Valid Values/Range
SetMinute	analog_variable 12 minutes	Set real time clock – minute (*see SetClock*)	0 – 59
SetSecond	analog_variable 13 seconds	Set real time clock – second (*see SetClock*)	0 – 59
SetWeekday	analog_variable 14 no-units	Set real time clock – weekday (*see SetClock*)	0 (Monday) – 6 (Sunday)
SetClock	binary_variable 3 no-units	Set (write) the real time clock. To write the real time clock, the system variables (SetMonth, SetMonth, SetDay, SetYear, SetHour, SetMinute, SetSecond, SetWeekday) 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.	<table><tr><th>value</th><th>state</th><th>interpretation</th></tr><tr><td>any</td><td>0</td><td>---</td></tr><tr><td>any</td><td>1</td><td>set the clock</td></tr></table>
DHWSetpoint	analog_variable 15 degrees-Fahrenheit	DHW Setpoint	40 – 200 °F (4.4 – 93.3 °C)
BMSFlowRateGPM	analog_variable 16 us-gallons-per-minute	Sets the flow rate (in GPM) that is measured by the BMS system. Please see "Flow Limited Control" in the firmware revision sheet for a complete description.	0 – 1500
BMSLimitBoilers	analog_variable 17 no-units	Sets that number of boilers that HeatNet can control. Please see "Boilers Limited Control" in the firmware revision sheet for a complete description.	0 – 16

Input Variables (Read Only)

Name	Data Type/Units	Description	Valid Values/Range
BoilersOn	analog_input 1	The number of boilers currently running.	0 – 16
Modulation	analog_input 2	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 %
HeaderTemp	analog_input 3 degrees-Fahrenheit	Header / System temperature.	32 – 250 °F (0 – 121.1 °C)
SupplyTemp	analog_input 4 degrees-Fahrenheit	Supply temperature.	32 – 250 °F (0 – 121.1 °C)
ReturnTemp	analog_input 5 degrees-Fahrenheit	Return temperature.	32 – 250 °F (0 – 121.1 °C)
OutsideTemp	analog_input 6 degrees-Fahrenheit	Outside air temperature.	-40 – 250 °F (-40 – 121.1 °C)
Spare1	analog_input 7	Raw A/D value from spare 1 input.	-32768 to 32767
Spare2	analog_input 8	Raw A/D value from spare 2 input.	-32768 to 32767
Month	analog_input 9 months	Real time clock month.	0 – 11
Day	analog_input 10 days	Real time clock day.	1 – 31

Name	Data Type/Units	Description	Valid Values/Range
Year	analog_input 11 years	Real time clock year.	0 – 99
Hour	analog_input 12 hours	Real time clock hour.	0 – 23
Minute	analog_input 13 minutes	Real time clock minute.	0 – 59
Second	analog_input 14 seconds	Real time clock second.	0 – 59
Weekday	analog_input 15 no-units	Real time clock weekday.	0 – Monday 6 – Sunday
DHWTemp	analog_input 16 degrees-Fahrenheit	DHW Temperature.	32 – 250 °F (0 – 121.1 °C)
Boiler01_Runtime … Boiler16_Runtime	analog_input 48…63 minutes	The total number of minutes that the boiler has been running (with the current control board).	0 – 167772216 minutes
Boiler01_Cycles … Boiler16_Cycles	analog_input 64…79 no-units	The total number of boiler cycles (with the current control board).	0 – 167772216 cycles
Boiler01_SupplyTemp … Boiler16_SupplyTemp	analog_input 80…95 degrees-Fahrenheit	The boiler supply (outlet) temperature.	32 – 250 °F (0 – 121.1 °C)
Boiler01_ReturnTemp … Boiler16_ReturnTemp	analog_input 96…111 degrees-Fahrenheit	The boiler return (inlet) temperature.	32 – 250 °F (0 – 121.1 °C)

Name	Data Type/Units	Description	Valid Values/Range
Boiler##_Disabled	binary_variable 1000 + ((boiler_number - 1) * 32)	Boiler is disabled. For instance, when minimum off time has not been met.	0 = enabled, 1 = disabled
Boiler##_LocalOverride	binary_variable 1001 + ((boiler_number - 1) * 32)	Local Override (member boilers only)	0 = no override, 1 = override
Boiler##_Alarm	binary_variable 1002 + ((boiler_number - 1) * 32)	Boiler Alarm	0 = ok, 1 = alarm
Boiler##_Failed	binary_variable 1003 + ((boiler_number - 1) * 32)	Boiler Failed	0 =ok, 1 = failed
Boiler##_MemberError	binary_variable 1004 + ((boiler_number - 1) * 32)	Member Alarm or Failed	0 =ok, 1 = error
Boiler##_Running	binary_variable 1005 + ((boiler_number - 1) * 32)	Boiler is running/firing.	0 =off, 1 = running (firing)
Boiler##_LocalPumpOn	binary_variable 1006 + ((boiler_number - 1) * 32)	Local pump is on/running.	0 = off, 1 = on (running)
Boiler##_SystemFlowInterlock	binary_variable 1007 + ((boiler_number - 1) * 32)	System Flow Interlock. Previously called "Spare 3".	0 = open, 1 = closed
Boiler##_LwcoInterlock	binary_variable 1008 + ((boiler_number - 1) * 32)	Low Water Cutoff Interlock.	0 = open, 1 = closed
Boiler##_VfdInterlock	binary_variable 1009 + ((boiler_number - 1) * 32)	VFD Interlock.	0 = open, 1 = closed
Boiler##_GasProveInterlock	binary_variable 1010 + ((boiler_number - 1) * 32)	Gas Prove Interlock.	0 = open, 1 = closed
Boiler##_Spare4Interlock	binary_variable 1011 + ((boiler_number - 1) * 32)	Spare 4 (application defined) Interlock.	0 = open, 1 = closed
Boiler##_OperatorInterlock	binary_variable 1012 + ((boiler_number - 1) * 32)	Operator Interlock.	0 = open, 1 = closed
Boiler##_LocalFlowInterlock	binary_variable 1013 + ((boiler_number - 1) * 32)	Local Flow Interlock.	0 = open, 1 = closed
Boiler##_MainValve	binary_variable 1015 + ((boiler_number - 1) * 32)	Main Valve.	0 = closed, 1 = open
Boiler##_PilotValve	binary_variable 1016 + ((boiler_number - 1) * 32)	Pilot Valve.	0 = closed, 1 = open

Name	Data Type/Units	Description	Valid Values/Range
Boiler##_BlowerOn	binary_variable 1017 + ((boiler_number - 1) * 32)	Blower is on/running.	0 = off, 1 = on (running)
Boiler##_IgnitionAlarm	binary_variable 1018 + ((boiler_number - 1) * 32)	Ignition Circuit Alarm.	0 = ok, 1 = alarm
Boiler##_IRIAlarm	binary_variable 1019 + ((boiler_number - 1) * 32)	IRI Alarm.	0 = ok, 1 = alarm
Boiler##_HighLimit	binary_variable 1020 + ((boiler_number - 1) * 32)	High Limit.	0 = ok, 1 = tripped
Boiler##_AirProveSwitch	binary_variable 1021 + ((boiler_number - 1) * 32)	Air Prove Switch.	0 = proven, 1 = not proven
Boiler##_SoftwareOperator	binary_variable 1023 + ((boiler_number - 1) * 32)	Software Operator Tripped.	0 = not tripped, 1 = tripped
Boiler##_HeaderSensorNA	binary_variable 1024 + ((boiler_number - 1) * 32)	Header Sensor not available (detected).	0 = detected, 1 = not available
Boiler##_SupplySensorNA	binary_variable 1025 + ((boiler_number - 1) * 32)	Supply/Outlet Sensor not available (detected).	0 = detected, 1 = not available
Boiler##_ReturnSensorNA	binary_variable 1026 + ((boiler_number - 1) * 32)	Return/Inlet Sensor not available (detected).	0 = detected, 1 = not available
Boiler##_OutsideSensorNA	binary_variable 1027 + ((boiler_number - 1) * 32)	Header Sensor not available (detected).	0 = detected, 1 = not available
Boiler##_SystemPumpOn	binary_variable 1028 + ((boiler_number - 1) * 32)	System Pump is on/running.	0 = off, 1 = on (running)
Boiler##_DamperProve1	binary_variable 1029 + ((boiler_number - 1) * 32)	Combustion Air Damper Prove (J10B). Obsolete – available only on revision 1.x controls.	0 = not proven, 1 = proven
Boiler##_Master	binary_variable 1030 + ((boiler_number - 1) * 32)	This is the Master Boiler.	0 = member, 1 = master
Boiler##_Detected	binary_variable 1031 + ((boiler_number - 1) * 32)	Boiler ## is detected (present).	0 = not detected, 1 = detected
Boiler##_AAHighFire	binary_variable 2000 + ((boiler_number - 1) * 16)	AA/High Fire Input.	0 = open, 1 = closed
Boiler##_HeatDemand	binary_variable 2001 + ((boiler_number - 1) * 16)	Heat Demand (Local Override) Input.	0 = open, 1 = closed
Boiler##_4to20Remote	binary_variable 2002 + ((boiler_number - 1) * 16)	4 to 20ma Remote Input.	0 = open, 1 = closed
Boiler##_OAROverride	binary_variable 2003 + ((boiler_number - 1) * 16)	Outside Air Reset Override Input.	0 = open, 1 = closed

Name	Data Type/Units	Description	Valid Values/Range
Boiler##_T1	binary_variable 2004 + ((boiler_number - 1) * 16)	T1 Input.	0 = open, 1 = closed
Boiler##_T2	binary_variable 2005 + ((boiler_number - 1) * 16)	T2 Input.	0 = open, 1 = closed
Boiler##_T3	binary_variable 2006 + ((boiler_number - 1) * 16)	T3 Input.	0 = open, 1 = closed
Boiler##_T4	binary_variable 2007 + ((boiler_number - 1) * 16)	T4 Input.	0 = open, 1 = closed
Boiler01_DHWTemp … Boiler16_DHWTemp	analog_input 112…127 degrees-Fahrenheit	The boiler DHW sensor temperature.	32 – 250 °F (0 – 121.1 °C)
Boiler01_Modulation … Boiler16_Modulation	analog_input 128…143 percent	The boiler modulation percent. Does not work in AA/High Fire, T1, or T2 modes.	0 – 100 %
OperatingSetpoint	analog_input 144 degrees-Fahrenheit	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.	40 - 220 °F (4.5 – 104.4 °C)
Boiler##_DHWEnabled	binary_variable 3000 + ((boiler_number - 1) * 16)	DHW enabled status (menus)	0 = disabled, 1=enabled
Boiler##_DamperProve2	binary_variable 3001 + ((boiler_number - 1) * 16)	Damper Prove (J12B)	0 = open, 1 = closed (proven)
Boiler##_ServiceFault	binary_variable 3002 + ((boiler_number - 1) * 16)	Call service fault.	0 = ok, 1 = fault
Boiler##_BlowerFault	binary_variable 3003 + ((boiler_number - 1) * 16)	Air Switch Blower fault.	0 = ok, 1 = fault
Boiler##_DHWSensorNA	binary_variable 3009 + ((boiler_number - 1) * 16)	DHW Sensor is not available (detected).	0 = detected, 1 = not available
Boiler##_DHWBoiler	binary_variable 3010 + ((boiler_number - 1) * 16)	DHW Boiler	0 = no, 1 = yes
Boiler##_OpLimitClamp	binary_variable 3011 + ((boiler_number - 1) * 16)	Boiler input is limited (clamped) due to high supply (outlet) temperature.	0 = not clamped, 1 = clamped

Name	Data Type/Units	Description	Valid Values/Range
AvailableBoilers	analog_input 145 no-units	Modbus Available Boilers	0 - 16
Boiler01_BoilersFlowLimited	binary_variable 3012	Boilers limited due to value in BMS Flow Rate.	0 = not limited, 1 = limited
Boiler01_BoilersBMSLimited	binary_variable 3013	Boilers limited due to value in BMS Limit Boilers.	0 = not limited, 1 = limited
--- The following values are available on firmware versions 2.00+ ---			
BTUH	analog_input 146 BTUs-per-hour	Boiler 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 BTUH 0 – 100 MBTUH
SystemReturnTemp	analog_input 147 degrees-fahrenheit	The system return temperature (if available). See Boiler##_SysReturnSensorNA to determine if the sensor is present.	32 – 250 °F (0 – 121.1 °C)
SystemFlow	analog_input 148 us-gallons-per-minute	Boiler System Flow. This value is either the system flow meter reading or the value written to BMSFlowRateGPM by the BMS.	0-1500 GPM
HeatingBoilersOn	analog_input 149 no-units	The number of boilers currently running for heating.	0 – 16
DHWBoilersOn	analog_input 150 no-units	The number of boilers currently running for DHW.	0 – 16
ManualBoilersOn	analog_input 151 no-units	The number of boilers currently running due to a local override, T1, T2, AA/High Fire, etc.	0 – 16
Boiler##_StackSensorNA	binary_variable 3014 + ((boiler_number - 1) * 16)	Stack Sensor is not available (detected).	0 = detected, 1 = not available
Boiler##_SysReturnSensorNA	binary_variable 3015 + ((boiler_number - 1) * 16)	System Return Sensor is not available (detected).	0 = detected, 1 = not available