

Input/Output Variables (Read/Write)

Address	Name	Raw Data Type	Scale	Description	Valid Values/Range
40001	HeatDemand	1 bit unsigned	---	Heat Demand/Request. Setting the state member of this variable will put the boiler in heating mode.	0 = no heat demand 1 = heat demand
40002	SetpointTimer	16 bit unsigned	---	System Setpoint Timer The system setpoint timer and system setpoint work in tandem to externally control (i.e. a BMS - building management system) the operating setpoint. The setpoint (countdown) timer should be loaded with a timeout value (in seconds) prior to writing the system setpoint. When 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. If the setpoint timer is not written, a default timeout value of 60 seconds is assumed.	0 – 65535 seconds
40003	Setpoint	8 bit unsigned	1.0	System Setpoint (see <i>SetpointTimer</i>)	40 - 220 °F
40004	OARResetEnable	1 bit unsigned	---	Enables/Disables outdoor air reset mode.	0 = disabled 1 = enabled
40005	OARSetpoint	8 bit unsigned	1.0	Outdoor air reset setpoint. Temperature at which boiler shuts down.	40 – 100 °F
40006	OARHighWaterTemp	8 bit unsigned	1.0	Boiler water temperature setpoint when outdoor air temperature is at the high outdoor air temperature setpoint (OARHiAirTemp).	60 – 150 °F
40007	OARHighAirTemp	8 bit unsigned	1.0	High outdoor air temperature setpoint.	50 – 90 °F
40008	OARLowWaterTemp	8 bit unsigned	1.0	Header/Supply temperature setpoint when outdoor air temperature is at the low outdoor air temperature setpoint (OARLoAirTemp).	70 – 220 °F
40009	OARLowAirTemp	8 bit signed	1.0	Low outdoor air temperature setpoint.	-35 – 40 °F
40010	SetMonth	8 bit unsigned	---	Set real time clock – month (see <i>SetClock</i>)	0 (January) - 11 (December)
40011	SetDay	8 bit unsigned	---	Set real time clock – day (see <i>SetClock</i>)	1 – 31
40012	SetYear	8 bit unsigned	---	Set real time clock – year (see <i>SetClock</i>)	0 – 99
40013	SetHour	8 bit unsigned	---	Set real time clock – hour (see <i>SetClock</i>)	0 – 23
40014	SetMinute	8 bit unsigned	---	Set real time clock – minute (see <i>SetClock</i>)	0 – 59
40015	SetSecond	8 bit unsigned	---	Set real time clock – second (see <i>SetClock</i>)	0 – 59

Address	Name	Raw Data Type	Scale	Description	Valid Values/Range
40016	SetWeekday	8 bit unsigned	---	Set real time clock – weekday (<i>see SetClock</i>)	1 (Monday) - 7 (Sunday)
40017	SetClock	1 bit unsigned	---	<p>Set (write) the real time clock.</p> <p>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.</p>	<p>0 = no action 1 = set/write the clock</p>

Input Variables (Read Only)

Address	Name	Raw Data Type	Scale	Description	Valid Values/Range
30001	BoilersOn	8 bit unsigned	---	The number of boilers currently running.	0 – 16
30002	Modulation	8 bit unsigned	0.01	Current system modulation level.	0 – 100 %
30003	HeaderTemp	16 bit signed	0.01	Header / System temperature.	32 – 250 °F
30004	SupplyTemp	16 bit signed	0.01	Supply temperature.	32 – 250 °F
30005	ReturnTemp	16 bit signed	0.01	Return temperature.	32 – 250 °F
30006	OutsideTemp	16 bit signed	0.01	Outside air temperature.	-40 – 250 °F
30007	Spare1	16 bit signed	---	Raw A/D value from spare 1 input.	-32768 to 32767
30008	Spare2	16 bit signed	---	Raw A/D value from spare 2 input.	-32768 to 32767
30009	Month	8 bit unsigned	---	Real time clock month.	0 (January) - 11 (December)
30010	Day	8 bit unsigned	---	Real time clock day.	1 – 31
30011	Year	8 bit unsigned	---	Real time clock year.	0 – 99
30012	Hour	8 bit unsigned	---	Real time clock hour.	0 – 23
30013	Minute	8 bit unsigned	---	Real time clock minute.	0 – 59
30014	Second	8 bit unsigned	---	Real time clock second.	0 – 59
30015	Weekday	8 bit unsigned	---	Real time clock weekday.	1 (Monday) – 7 (Sunday)
30016	Boiler01Status1	16 bit unsigned	---	Boiler (1 – 16) status flags. These bits indicate the state of the 24VAC interlocks, ignition circuit, and various other conditions. See the values column for a list of conditions. Boiler01 = Master Boiler02 = Member01 ... Boiler16 = Member15	See the “BoilerStatus1” and “BoilerStatus2” Tables below.
30017	Boiler01Status2				
30018	Boiler02Status1				
30019	Boiler02Status2				
30020	Boiler03Status1				
30021	Boiler03Status2				
30022	Boiler04Status1				
30023	Boiler04Status2				
30024	Boiler05Status1				

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Address	Name	Raw Data Type	Scale	Description	Valid Values/Range
30025	Boiler05Status2				
30026	Boiler06Status1				
30027	Boiler06Status2				
30028	Boiler07Status1				
30029	Boiler07Status2				
30030	Boiler08Status1				
30031	Boiler08Status2				
30032	Boiler09Status1				
30033	Boiler09Status2				
30034	Boiler10Status1				
30035	Boiler10Status2				
30036	Boiler11Status1				
30037	Boiler11Status2				
30038	Boiler12Status1				
30039	Boiler12Status2				
30040	Boiler13Status1				
30041	Boiler13Status2				
30042	Boiler14Status1				
30043	Boiler14Status2				
30044	Boiler15Status1				
30045	Boiler15Status2				
30046	Boiler16Status1				
30047	Boiler16Status2				
30048	Boiler01RuntimeHigh16	16 bit unsigned	---	Boiler (1 – 16) Runtime seconds High (Upper) and Low (Lower) 16 bit counters. To get the actual runtime for any given boiler (##), the high and low 16 bit counters must be combined (concatenated) into a single 32 bit counter as:	0 – 4294967295 seconds
30049	Boiler01RuntimeLow16				
30050	Boiler02RuntimeHigh16				

Address	Name	Raw Data Type	Scale	Description	Valid Values/Range
30077	Boiler15RuntimeLow16				
30078	Boiler16RuntimeHigh16				
30079	Boiler16RuntimeLow16				
30080	Boiler01Status3	16 bit unsigned	---	Boiler (1 – 16) stage control input flags. These bits indicate the state of the stage control inputs. See the values column for a list of conditions.	See the "BoilerStatus3" Table below.
30081	Boiler02Status3				
30082	Boiler03Status3				
30083	Boiler04Status3				
30084	Boiler05Status3				
30085	Boiler06Status3				
30086	Boiler07Status3				
30087	Boiler08Status3				
30088	Boiler09Status3				
30089	Boiler10Status3				
30090	Boiler11Status3				
30091	Boiler12Status3				
30092	Boiler13Status3				
30093	Boiler14Status3				
30094	Boiler15Status3				
30095	Boiler16Status3				
----- The following registers are available starting in firmware version 2.0 -----					
30096	Boiler01SupplyTemp	16 bit signed	0.01	Boiler (1 – 16) supply temperature (if available). See BoilerStatus2 to determine if the sensor is present. Boiler01 = Master Boiler02 = Member01 ... Boiler16 = Member15	32 – 250 °F
30097	Boiler02SupplyTemp				
30098	Boiler03SupplyTemp				
30099	Boiler04SupplyTemp				
30100	Boiler05SupplyTemp				
30101	Boiler06SupplyTemp				

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Address	Name	Raw Data Type	Scale	Description	Valid Values/Range
30102	Boiler07SupplyTemp				
30103	Boiler08SupplyTemp				
30104	Boiler09SupplyTemp				
30105	Boiler10SupplyTemp				
30106	Boiler11SupplyTemp				
30107	Boiler12SupplyTemp				
30108	Boiler13SupplyTemp				
30109	Boiler14SupplyTemp				
30110	Boiler15SupplyTemp				
30111	Boiler16SupplyTemp				
30112	Boiler01ReturnTemp				
30113	Boiler02ReturnTemp				
30114	Boiler03ReturnTemp				
30115	Boiler04ReturnTemp				
30116	Boiler05ReturnTemp				
30117	Boiler06ReturnTemp				
30118	Boiler07ReturnTemp				
30119	Boiler08ReturnTemp				
30120	Boiler09ReturnTemp				
30121	Boiler10ReturnTemp				
30122	Boiler11ReturnTemp				
30123	Boiler12ReturnTemp				
30124	Boiler13ReturnTemp				
30125	Boiler14ReturnTemp				
30126	Boiler15ReturnTemp				
30127	Boiler16ReturnTemp				

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Address	Name	Raw Data Type	Scale	Description	Valid Values/Range
30128	Boiler01CyclesHigh16	16 bit unsigned	---	Boiler (1 – 16) Cycles High (Upper) and Low (Lower) 16 bit counters. To get the actual cycle count for any given boiler (##), the high and low 16 bit counters must be combined (concatenated) into a single 32 bit counter as: Boiler##CyclesHigh16:Boiler##CyclesLow16 <u>Example</u> Boiler01Cycles = (Boiler01CyclesHigh16 * 65536) + Boiler01CyclesLow16 Boiler01 = Master Boiler02 = Member01 ... Boiler16 = Member15	0 – 4294967295
30129	Boiler01CyclesLow16				
30130	Boiler02CyclesHigh16				
30131	Boiler02CyclesLow16				
30132	Boiler03CyclesHigh16				
30133	Boiler03CyclesLow16				
30134	Boiler04CyclesHigh16				
30135	Boiler04CyclesLow16				
30136	Boiler05CyclesHigh16				
30137	Boiler05CyclesLow16				
30138	Boiler06CyclesHigh16				
30139	Boiler06CyclesLow16				
30140	Boiler07CyclesHigh16				
30141	Boiler07CyclesLow16				
30142	Boiler08CyclesHigh16				
30143	Boiler08CyclesLow16				
30144	Boiler09CyclesHigh16				
30145	Boiler09CyclesLow16				
30146	Boiler10CyclesHigh16				
30147	Boiler10CyclesLow16				
30148	Boiler11CyclesHigh16				
30149	Boiler11CyclesLow16				
30150	Boiler12CyclesHigh16				
30151	Boiler12CyclesLow16				
30152	Boiler13CyclesHigh16				
30153	Boiler13CyclesLow16				

Address	Name	Raw Data Type	Scale	Description	Valid Values/Range
30154	Boiler14CyclesHigh16				
30155	Boiler14CyclesLow16				
30156	Boiler15CyclesHigh16				
30157	Boiler15CyclesLow16				
30158	Boiler16CyclesHigh16				
30159	Boiler16CyclesLow16				

BoilerStatus1 Flags

Bit	Description	Valid Values/Range
0	Pilot Valve	0 = closed, 1 = open
1	Blower Running	0 = off, 1 = running
2	Ignition Alarm	0 = ok, 1 = alarm
3	Valve Alarm	0 = ok, 1 = alarm
4	High Limit	0 = ok, 1 = tripped
5	Air Prove Switch	0 = open, 1 = closed
6	RESERVED (FACTORY)	
7	Software Operator	0 = off, 1 = on
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	0 = off, 1 = on
13	Combustion Air Damper	0 = off, 1 = on
14	Master Boiler	0 = member, 1 = master
15	Boiler Detected (at this address)	0 = not detected, 1 = detected

BoilerStatus2 Flags

Bit	Description	Valid Values/Range
0	Disabled	0 = enabled, 1 = disabled
1	Heat Demand	0 = no demand, 1 = demand (1)
2	Alarm	0 = ok, 1 = alarm
3	Failed	0 = ok, 1 = failed
4	Member Error	0 = ok, 1 = error
5	Boiler Running	0 = off, 1 = running
6	Pump Running	0 = off, 1 = running
7	Spare 3 Interlock	0 = open, 1 = closed
8	LWCO Interlock	0 = open, 1 = closed
9	VFD Interlock	0 = open, 1 = closed
10	Gas Prove Interlock	0 = open, 1 = closed
11	Spare 4 Interlock	0 = open, 1 = closed
12	Operator Interlock	0 = open, 1 = closed
13	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

(1) This BoilerStatus2 Heat Demand Flag is a combination of the Heat Demand input and the Modbus Heat Demand (40001).

BoilerStatus3 Flags

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

(1) This BoilerStatus3 Heat Demand Flag is Heat Demand input. On member boilers, this indicates a "Local Override".